Agilent Technologies 8960 Series 10 Wireless Communications Test Set
Agilent Technologies E1968A GSM/GPRS Mobile Test Application

Reference Guide

GSM/GPRS Mobile Test Application Revision A.01
E6701C GSM/GPRS Lab Application Revision C.01
E6704A EGPRS Lab Application Revision A.01
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www.agilent.com/find/8960/

Agilent Technologies

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Learning Products Department
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U.S.A.

Contents

Contents

Contents

Contents

Contents

Safety/Regulatory Information

Agilent Technologies

Notice

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Liberty Lake, WA 99019-9599
U.S.A.

Edition/Print Date

All Editions and Updates are listed below.

February 2003

Safety Summary

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies Inc. assumes no liability for the customer's failure to comply with these requirements.

GENERAL

This product is a Safety Class 1 instrument (provided with a protective earth terminal). The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

All Light Emitting Diodes (LEDs) used in this product are Class 1 LEDs as per IEC 60825-1.

This product has been designed and tested in accordance with *IEC Publication 1010*, "Safety Requirements for Electronic Measuring Apparatus," and has been supplied in a safe condition. This instruction documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

ENVIRONMENTAL CONDITIONS

This instrument is intended for indoor use in an installation category II, pollution degree 2 environment. It is designed to operate at a maximum relative humidity of 95% and at altitudes of up to 2000 meters. Refer to the specifications tables for the ac mains voltage requirements and ambient operating temperature range.

Ventilation Requirements: When installing the product in a cabinet, the convection into and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the product by 4° C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used.

BEFORE APPLYING POWER

Verify that the product is set to match the available line voltage, the correct fuse is installed, and all safety precautions are taken. Note the instrument's external markings described under Safety Symbols.

GROUND THE INSTRUMENT

To minimize shock hazard, the instrument chassis and cover must be connected to an electrical protective earth ground. The instrument must be connected to the ac power mains through a grounded power cable, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.

FUSES

Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuse holders. To do so could cause a shock or fire hazard.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the instrument in the presence of flammable gases or fumes.

DO NOT REMOVE THE INSTRUMENT COVER

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel.

Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

WARNING

The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

CAUTION

The CAUTION sign denotes a hazard. It calls attention to an operating procedure, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

Safety Symbols

Caution, refer to accompanying documents

Warning, risk of electric shock

Earth (ground) terminal

Alternating current

Frame or chassis terminal

Standby (supply). Units with this symbol are not completely disconnected from ac mains when this switch is off.

Product Markings

CE - the CE mark is a registered trademark of the European Community. A CE mark accompanied by a year indicated the year the design was proven.

CSA - the CSA mark is a registered trademark of the Canadian Standards Association.

CERTIFICATION

Agilent Technologies certifies that this product met its published specifications at the time of shipment from the factory. Agilent Technologies further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members

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Product maintenance agreements and other customer assistance agreements are available for Agilent Technologies products. For any assistance, contact your nearest Agilent Technologies Sales and Service Office.

Service and Support

Any adjustment, maintenance, or repair of this product must be performed by qualified personnel. Contact your customer engineer through your local Agilent Technologies Service Center. You can find a list of local service representatives on the Web at:

http://www.agilent-tech.com/services/English/index.html

If you do not have access to the Internet, one of these centers can direct you to your nearest representative:

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(Toll free in US)

(800) 452-4844

Europe

(31 20) 547 9900

Canada

(905) 206-4725

Japan Measurement Assistance Center

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DECLARATION OF CONFORMITY

According to ISO/IEC Guide 22 and CEN/CENELEC EN45014

Manufacturers Name:	**Agilent Technologies UK Ltd.**
Manufacturers Address:	**Electronic Products & Solutions** **Group - Queensferry** **South Queensferry** **West Lothian, EH30 9TG** **Scotland, United Kingdom**

Declares, that the product

Product Name:	8960 Series 10 Wireless Communications Test Set
Model Number:	E5515B
Product Options:	This declaration covers all options of the above product.

Conforms with the following European Directives:

The product herewith compiles with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EFC (including 93/68/EFC) and carries the CE Marking accordingly.

EMC	**Standard**	Limit
	IEC 61326-1:1997+A1:1998/EN 61326-1:1997+A1:1998	
	CISPR 11:1990 / EN 55011:1991	Group 1 Class A [1]
	IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995	4kV CD, 8kV AD
	IEC 61000-4-3:1995 / EN 61000-4-3:1995	3 V/m, 80-1000 MHz
	IEC 61000-4-4:1995 / EN 61000-4-4:1995	0.5V signal lines, 1kV power lines
	IEC 61000-4-5:1995 / EN 61000-4-5:1995	0.5 kV line-line, 1 kV line-ground
	IEC 61000-4-6:1996 / EN 61000-4-6:1996	3V, 0.15-80 MHz
	IEC 61000-4-11:1994 / EN 61000-4-11:1994	1 cycle, 100%

Safety: IEC 61010-1:1990+A1:1992+A2:1995 / EN 61010-1:1993+A2:1995
Canada CSA C22.2 No. 1010.1:1992

Supplemental Information:

[1] The product was tested in a typical configuration with Agilent Technologies test systems

14 December 2000

R.M. Evans / Quality Manager

14 December 2000

W.V.Roland / Reliability & Regulatory Engineering Manager

For further information, please contact your local Agilent Technologies sales office, agent, or distributor.
Authorized EU-representative: Agilent Technologies Deutschland GmbH, Herrenberger StraBe 130, D71034 Boblingen, Germany

DECLARATION OF CONFORMITY

According to ISO/IEC Guide 22 and CEN/CENELEC EN45014

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Manufacturers Address:	**Electronic Products & Solutions** **Group - Queensferry** **South Queensferry** **West Lothian, EH30 9TG** **Scotland, United Kingdom**

Declares, that the product

Product Name:	8960 Series 10 Wireless Communications Test Set
Model Number:	**E5515C**
Product Options:	This declaration covers all options of the above product.

Conforms with the following European Directives:

The product herewith compiles with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EFC (including 93/68/EFC) and carries the CE Marking accordingly.

EMC	**Standard**	Limit
	IEC 61326-1:1997+A1:1998/EN 61326:1997/A1:1998	
	CISPR 11:1990 / EN 55011:1991	Group 1 Class A [1]
	IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995	4kV CD, 8kV AD
	IEC 61000-4-3:1995 / EN 61000-4-3:1995	3 V/m, 80-1000 MHz
	IEC 61000-4-4:1995 / EN 61000-4-4:1995	0.5kV signal lines, 1kV power lines
	IEC 61000-4-5:1995 / EN 61000-4-5:1995	0.5 kV line-line, 1 kV line-ground
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Safety: IEC 61010-1:1990+A1:1992+A2:1995 / EN 61010-1:1993+A2:1995
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01 May 2001

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Authorized EU-representative: Agilent Technologies Deutschland GmbH, Herrenberger StraBe 130, D71034 Boblingen, Germany

Manufacturer’s Declaration

This statement is provided to comply with the requirements of the German Sound Emission Directive, from 18 January 1991.

This product has a sound pressure emission (at the operator position) < 70 dB(A).

- Sound Pressure Lp < 70 dB(A).
- At Operator Position.
- Normal Operation.
- According to ISO 7779:1988/EN 27779:1991 (Type Test).

Herstellerbescheinigung

Diese Information steht im Zusammenhang mit den Anforderungen der Maschinenlärminformationsverordnung vom 18 Januar 1991.

- Schalldruckpegel Lp < 70 dB(A).
- Am Arbeitsplatz.
- Normaler Betrieb.
- Nach ISO 7779:1988/EN 27779:1991 (Typprüfung).

Protocol Logging

Protocol Logging

This section is only applicable to the lab applications.

You can use the test set to capture the exchange of control and data information between the test set and a mobile station. Captured information is forwarded to a software application that runs on a personal computer (PC) under the Windows operating system.

The software application is referred to as the WPA, or "Wireless Protocol Advisor". It is tailored for the capture, display, and analysis of message exchange protocols between the test set, emulating a base station, and a mobile station.

IMPORTANT Most of the information necessary to establish a connection and to display, filter, store, print, and analyze the message exchange between the test set and a mobile station is accessible through the Help feature available on-line when the WPA application is running.

This on-line help is also available for download at: http://www.agilent.com/find/e6581a.

Additional information, including PC operating system requirements and additional protocol logging reference information is listed below.

PC Operating System Requirements

Logging protocol messages requires an external PC with the following system requirements:

- "Protocol Logging Requirements" on page 51

Starting and Stopping Protocol Logging

There are several ways to control the logging of signaling messages.

The primary method for starting and stopping is through features found in the WPA software.

The following information describes features available through the test set's remote and manual user interface for performing these functions:

- "Activating Protocol Logging From the Test Set" on page 52

Related Topics

"Protocol Logging and Data Channel Troubleshooting" on page 1471

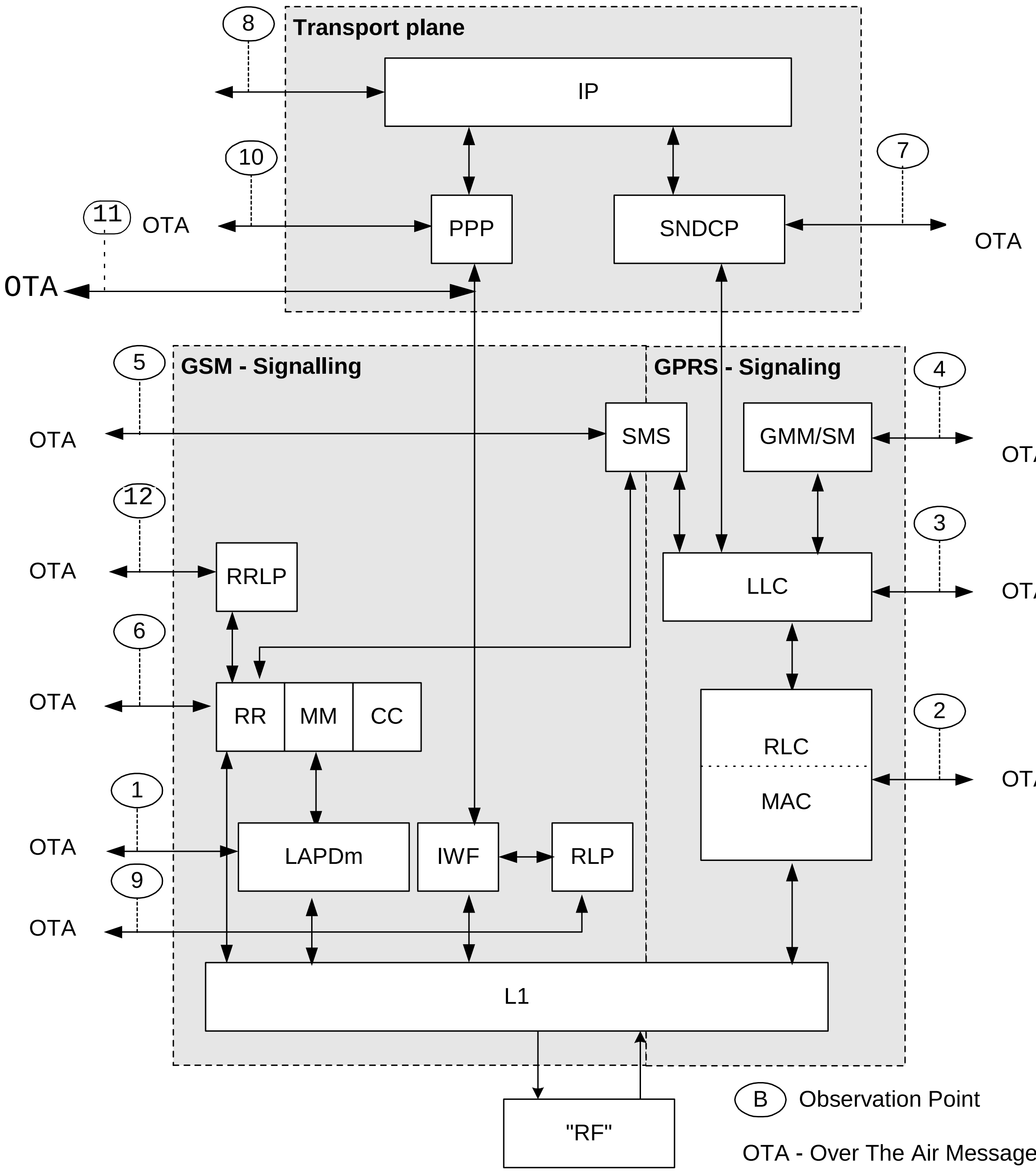
"Protocol Logging During Ping" on page 59

"Logging SMS Messages" on page 230

Protocol Layers and Messages

This section is only applicable to the lab applications.

This section outlines in a very general sense, the test set's support for individual protocol layers, the procedures associated with them, and their respective messages. Messages no included here may be supported. Certain parameters of messages included here may no be supported.



Observation Point 1 - LAPDm Over-the-Air Messages

The Link Access Procedure on the Dm channel (LAPDm) is the protocol for use by the data link layer on the radio interface. The frame structure and procedures for proper operation of the LAPDm are described in GSM 04.06.

Operating Considerations

This observation point is not enabled by default. If you want to capture LAPDm messages using the WPA, you should enable LAPDm in the Test Set Message Filter Settings.

Observation Point 2- RLC/MAC Over-the-Air Messages

This layer contains two functions: The Radio Link Control function provides a radio-solution-dependent reliable link. The Medium Access Control function controls the access signaling (request and grant) procedures for the radio channel, and the mapping of LLC frames onto the GSM physical channel. RLC/MAC is defined in GSM 04.60 for functions operating on the Packet Data Channel (PDCH), and in GSM 04.08 for functions operating on the CCCH (Common Control Channel).

Messages

Table 1. Uplink TBF establishment messages

Message	Reference	Supported
Packet Access Reject	04.60/11.2.1	Yes
Packet Channel Request	04.60/11.2.5	No
Packet Queuing Notification	04.60/11.2.15	No
Packet Resource Request	04.60/11.2.16	Yes
Packet Uplink Assignment	04.60/11.2.29	Yes

Table 2. Downlink TBF establishment messages

Message	Reference	Supported
Packet Downlink Assignment	04.60/11.2.7	Yes

Table 3. TBF release messages

Message	Reference	Supported
Packet TBF Release	04.60/11.2.26	Yes

Table 4. Packet Paging messages

Message	Reference	Supported
Packet Paging Request	04.60/11.2.10	Yes

Table 5. RLC messages

Message	Reference	Supported
Packet Downlink Ack/Nack	04.60/11.2.6	Yes
Packet Uplink Ack/Nack	04.60/11.2.28	Yes

Table 6. Miscellaneous messages

Message	Reference	Supported
Packet Control Ackno	04.60/11.2.2	Yes
Packet Cell Change Failure	04.60/11.2.3	No
Packet Cell Change Order	04.60/11.2.4	Yes
Packet Downlink Dummy Control Block	04.60/11.2.8	Yes
Packet Uplink Dummy Control Block	04.60/11.2.8b	Yes

Table 6. Miscellaneous messages

Message	Reference	Supported
Packet Measurement Report	04.60/11.2.9	Yes
Packet Measurement Order	04.60/11.2.9b	No
Packet Mobile TBF Status	04.60/11.2.9c	Yes
Packet PDCH Release	04.60/11.2.11	No
Packet Polling Request	04.60/11.2.12	Yes
Packet Power Control/Timing Advance	04.60/11.2.13	Yes
Packet PRACH Parameters	04.60/11.2.14	No
Packet PSI Status	04.60/11.2.17	Yes
Packet Timeslot Reconfigure	04.60/11.2.31	Yes

Procedures

Medium Access Control Procedures

- PBCCH
- “Medium Access Control Mode” on page 211
- Packet Paging

Observation Point 3 - LLC Over-the-Air Messages

Logical Link Control (LLC): LLC was designed to be independent of the underlying radio interface protocols in order to allow introduction of alternative GPRS radio solutions with minimum changes to the NSS (Network Subsystem). The procedures for the LLC layer are described in GSM 04.64.

Observation Point 4 -GMM/SM Over-the-Air Messages

GPRS Mobility Management and Session Management (GMM/SM): This protocol supports mobility management functionality such as GPRS attach, GPRS detach, security, routing area update, location update, PDP context activation, and PDP context deactivation. GMM/SM is defined in GSM 04.08

GMM Messages

Table 7.

Message	Reference	Supported
Attach Request	9.4.1	Yes
Attach Accept	9.4.2	Yes
Attach Complete	9.4.3	Yes
Attach Reject	9.4.4	Yes
Detach Request	9.4.5	Yes
Detach Accept	9.4.6	Yes
P-TMSI Reallocation Command	9.4.7	No
P-TMSI Reallocation Complete	9.4.8	No
Authentication and Ciphering Request	9.4.9	No
Authentication and Ciphering Response	9.4.10	No
Authentication and Ciphering Reject	9.4.11	No
Identity Request	9.4.12	Yes
Identity Response	9.4.13	Yes
Routing Area Update Request	9.4.14	Yes
Routing Area Update Accept	9.4.15	Yes
Routing Area Update Compete	9.4.16	No
Routing Area Update Reject	9.4.17	No
GMM Status	9.4.18	No
GMM Information	9.4.19	Yes

SM Messages

Table 8.

Messages	Reference	Supported
Activate PDP Context Request	9.5.1	Yes
Activate PDP Context Accept	9.5.2	Yes
Activate PDP Context Reject	9.5.3	Yes
Request PDP context Activation	9.5.4	Yes
Request PDP context Activation Reject	9.5.5	No
Modify PDP context Request	9.5.6	No

Table 8.

Messages	Reference	Supported
Modify PDP context Accept	9.5.7	No
Deactivate PDP context Request	9.5.8	Yes
Deactivate PDP context Accept	9.5.9	Yes
Activate AA PDP context Request	9.5.10	No
Activate AA PDP context Accept	9.5.11	No
Activate AA PDP context Reject	9.5.12	No
Deactivate AA PDP context Request	9.5.13	No
Deactivate AA PDP context Accept	9.5.14	No
SM Status	9.5.15	No

Observation Point 5- SMS Over-the-Air Messages

This observation point captures the messages exchanged between the LLC layer and the SMS sub-layers. See "SMS Logging Control" on page 230 for more information.

Observation Point 6- GSM L3 Over-the-Air Messages

GSM Layer 3 (GSM L3) is defined in GSM 04.08. GSM L3 includes messages that are transmitted over the Common Control Channels. These are:

- BCCH information (System information messages)
- PAGCH messages (Immediate assignments)
- RACH accesses

CCCH messages are useful mainly for the purpose of verifying correct channel allocation through the logging of RACH accesses and the related assignments. Note that the System Information Messages will only be visible whenever changes are made to the base station parameters. They are no continuously logged, although they are continuously broadcast on the BCCH.

All references in this section are relative to GSM 04.08 or GSM 04.60.

Table 9.

Message	Reference	Supported
Location Updating Request	04.08/9.2.15	Yes
Location Updating Accept	04.089.2.13	Yes
Channel Request	04.08/9.1.8	Yes
Immediate Assignment	04.08/9.1.18	Yes
Packet System information 1	04.60/11.2.18	Yes
Packet System information 13	04.60/11.2.25	Yes
Packet System information 2	04.60/11.2.19	Yes
Packet System information 3	04.60/11.2.20	Yes
Packet System information 3bis	04.60/11.2.21	Yes

Observation Point 7 - SNDCP Over-the-Air Messages

Subnetwork Dependent Convergence Protocol (SNDCP): This transmission functionality maps network-level characteristics onto the characteristics of the underlying network. SNDCP is specified in GSM 04.65.

Table 10.

Message	Reference	Supported
SN-DATA	7.2	Yes
SN-UNITDATA	7.2	Yes
SNDCP-XID	6.8	Yes

Observation Point 8 - IP Messages

Unlike most of the other protocols, IP only has a single type of message: the datagram. For each datagram, the IP header fields will be displayed by name and the user data will be displayed as a hex dump.

For each datagram, the following fields will be displayed:

- Version
- Internet Header Length
- Type of Service
- Total Length
- Identification
- Flags
- Fragment Offset
- Time to Live
- Protocol
- Header Checksum
- Source Address - Only the IP address is displayed. No attempt is made to look up the host name
- Destination Address - Only the IP address is displayed. No attempt is made to look up the host name
- Data - This contains the user data and any IP options displayed in hex.

For a more detailed explanation of these fields, refer to the Internet Engineering Task Force (IETF) document RFC 791.

Observation Point 9 - RLP Over-the-Air Messages

The Radio Link Protocol (RLP) stack layer provides reliable transportation of data between the mobile station and the PPP layer by using a Frame Check Sequence (FCS) for error detection and providing for retransmission of corrupted or missing data. RLP is specified in GSM 04.22.

Observing the messages set and received by this layer is only useful if you are using GSM data channels in non-transparent mode. See “GSM Circuit Switched Data (CSD)” on page 75 for more information.

Observation Point 10 - PPP Over-the-Air Messages

The Point-to-Point Protocol (PPP) is associated with data channels. It allows a mobile station to transfer IP packets to and from the IP layer. PPP is specified in the Internet Engineering Task Force (IETF) document RFC 1548.

For more information about data channel support in the test set, see “Data Channel” on page 55.

Observation Point 11 - PPP HDLC Over-the-Air Messages

The PPP High Level Data Link Control observation point provides access to the full PPP frame that is sent or received by the test set. Some header and footer octets are removed from the frame displayed in the PPP observation point. The additional octets viewable in the PPP HDLC layer are:

Front of the Frame

- Flag
- Address
- Control

Back of the Frame

- Frame Check Sequence (FCS)
- Closing Flag

PPP Observation Point and PPP HDLC Observation Point Comparison

```
+----------+----------+----------+
|   Flag   | Address  | Control  |             <--- HDLC frame only
| 01111110 | 11111111 | 00000011 |             <--- not PPP frame
+----------+----------+----------+
+----------+-------------+---------+
| Protocol | Information | Padding |           <--- viewable in both
| 8/16 bits|      *      |    *    |
+----------+-------------+---------+
+----------+----------+-----------------
|   FCS    |   Flag   | Inter-frame Fill       <--- HDLC frame only
|16/32 bits| 01111110 | or next Address        <--- not PPP frame
+----------+----------+-----------------
```

Operating Considerations

This observation point is not enabled by default. If you want to capture the PPP HDLC frames using the WPA, you should enable PPP_HDLC in the Test Set Message Filter Settings.

Observation Point 12 - RRLP Over-the-Air Messages

See "RRLP Configuration" on page 257 for more information about the RRLP layer support in the test set.

Related Topics

"Protocol Logging" on page 40

Protocol Logging Requirements

The Lab Application enables the test set to log protocol messages. Protocol messages are forwarded to the Wireless Protocol Advisor (WPA) software, which is required for message display and analysis. This software is included with the lab application and will run on PCs that meet the following system requirements:

Summary of Requirements for the Wireless Protocol Advisor

NOTE These requirements are subject to change or addition without notice. Always refer to the product web page for the latest information.

- PC Operating System:
  - Microsoft® Windows® 98
  - Microsoft® Windows® NT 4 SP3/4/5
  - Microsoft® Windows® 2000
- 300 MHz Pentium or equivalent recommended
- 128 MB RAM recommended
- 250 MB available disk space required for installation
- 100 MB available disk space recommended for storing logged information
- Video resolution minimum 800 by 600 pixels with at least 256 colors
- LAN or WAN connectivity required to connect to the test set

Activating Protocol Logging From the Test Set

This section is only applicable to the lab applications.

Logging can be started or stopped using the test set's front panel or GPIB commands. If the Wireless Protocol Advisor (WPA) software is not attached to the test set an error message is generated.

NOTE The WPA software performs the same start/stop functions when the REC (RECord) button is selected. Refer to the WPA on-line Help for details.

Related Topics

"How to use Protocol Logging" on page 1426

"CALL:PLOGging" on page 13

Data Channel

Data Channel

The Data Channel function allows you to use the test set as a router while you exchange IP datagrams between the MS and remote servers.

The test set supports "GSM Circuit Switched Data (CSD)" and both GPRS and EGPRS Packet Switched Data (PSD).

There are several applications of the Data Channel:

- "Ping" on page 57
- "WAP Test with the Data Channel" on page 61(link your WAP device to a wml server)
- "Modem Functional Test with the Data Channel" on page 64(e.g. to test a GPRS wireless modem, connect a PC with an html browser to the modem, and route the data through the test set to an html server)
- "FTP Throughput Test with the Data Channel" on page 67(use FTP to transfer data to and from an FTP source)
- "Base Station Emulation with the Data Channel" on page 71(use the test set as a router to transfer datagrams from your application to a wireless device)

Related Topics

"Protocol Logging and Data Channel Troubleshooting" on page 1471

"GSM Circuit Switched Data (CSD)" on page 75

Ping

This section is only applicable to the lab applications.

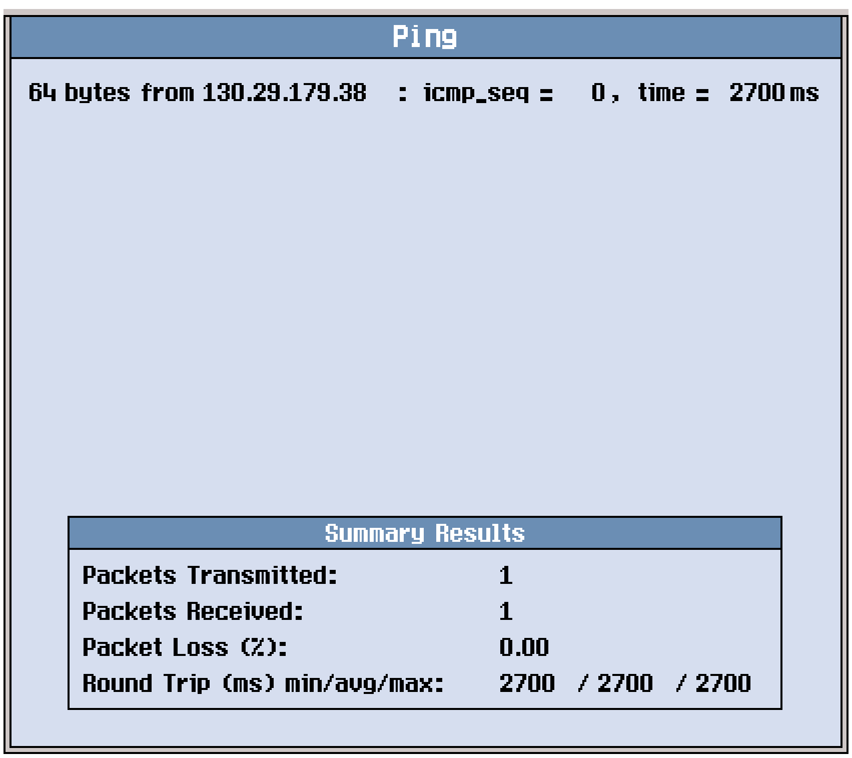
Ping is a tool to help check system interconnects. The test set has a Ping feature that allows you to ping either the DUT IP Address or an alternate address specified by you (see “How to “ping” an IP address from the test set” on page 1424). It sends an IP datagram (technically an Internet Control Message Protocol (ICMP) Echo Request message) from the test set to the ping target, and expects a response. You can define the size of the IP datagram. The default is 64 bytes. The response information is displayed on the test set’s front panel display. This feature is controlled through the front panel or through GPIB control.

Ping is the simplest implementation of the Data Channel feature. If you are trying to debug a system that is not responding to a full network setup (for example a WAP setup), try pinging the DUT from a computer attached to the network. Experiment with very large packets, very long timeouts and continuous pings.

How to Read the Ping Results

If the connection is good, then the device will return a packet to the test set and the packet transfer information is displayed on the test set’s screen (see “Ping Data Display” on page 57). In this example, the Ping has been set up to ping only once. Note that it took 2700 msec to complete the ping.

Figure 1. Ping Data Display



Operating Considerations

- When pinging the DUT, the DUT must either accept a network initiated PDP Context activation or have requested a PDP Context (for GPRS or EGPRS) or the instrument status should be `Connected + Data` (for GSM CSD).
- Ping is only available in Active Cell operating mode and when the connection type is set to Auto.
- When the Ping originates from the test set and the target is the DUT, the Downlink Source address is always 130.29.181.203, and Uplink Destination Address is the same value.
- Your mobile station must support ping for you to be able to successfully ping the DUT IP Address.

Protocol Logging During Ping

This section is only applicable to the lab applications.

Ping data passing between the test set and the mobile station can be logged using the Wireless Protocol Advisor (WPA) (see "Protocol Logging" on page 40). The log results during ping depend on the method used. Here are several methods and descriptions of the log results.

- "Method 1: Ping the Mobile Station from the Test Set" on page 59
- "Method 2: Ping an Alternate IP Address From the Test Set" on page 59
- "Method 3: Using Ping From Other Devices" on page 60
- "Ping Log" on page 60

Method 1: Ping the Mobile Station from the Test Set

To capture a protocol log while pinging the mobile station from the test set, start a capture in the WPA and then follow the steps in "Ping the DUT from the test set" on page 1424.

Looking at the Protocol Log

Note that the Source Address for the IP datagram in the Down direction is an unknown IP address. This is an internal address the test set uses to originate IP traffic from the test set to the mobile station.

See "Ping Log" on page 60 for more information about the log.

Method 2: Ping an Alternate IP Address From the Test Set

To capture a protocol log while pinging an alternate IP address from the test set, start a capture in the WPA and then follow the steps in "Ping an alternate address from the test set" on page 1425.

If your Alternate Ping Address is anything but the mobile station address, the test set's protocol logging does not log this ping. The test set's logging only captures messages exchanged between the test set and the mobile station. If you have a network logging device on your LAN, it will show that the source IP address is the test set's LAN IP address. If your Alternate Ping Address is the mobile station address, then the data is logged by the test set, and the Source Address for the datagram in the Down direction that contains the ping data is the same IP address as in Method 1.

Method 3: Using Ping From Other Devices

Any device on the network that has a ping feature can ping any other device, including the mobile station. For example, if you have a PC on the LAN that the test set is connected to, you can use ping from that PC to ping the mobile station.

Example procedure of pinging the mobile station from another device (e.g. a Windows PC):

1. Start protocol logging. See "Protocol Logging" on page 40.
2. Open a MS DOS command prompt on the PC.
3. Type the following command

   `ping xxx.xxx.xxx.xxx`

   where xxx.xxx.xxx.xxx is the IP address of the mobile station.
4. The ping should respond as normal.
5. Stop logging.

In this case, the Source_Address for the datagram in the Down direction that contains the ping data is the IP address of your PC.

Ping Log

The Ping can be logged using the Wireless Protocol Advisor (WPA) (see "Protocol Logging" on page 40), and certain information can be derived from the log of the Ping.

- "Down" in the "Direction" column of the WPA indicates that this is a downlink message and is therefore passing from the test set to the mobile station.
- Ping is an Internet Control Message Protocol message.
- Type is ECHO_MESSAGE, which is the instruction to the peer layer at the destination address to generate an ECHO_REPLY message.
- The IP address of the mobile station is the Destination Address on the downlink datagram and is the Source Address on the uplink datagram. The alternate address is an address within the test set that originated the Ping data packet.
- The Type, Code, Checksum, Identifier and Sequence Number are all listed.

Related Topics

"Ping" on page 57

"How to "ping" an IP address from the test set" on page 1424

"Data Channel" on page 55

"Protocol Logging and Data Channel Troubleshooting" on page 1471

WAP Test with the Data Channel

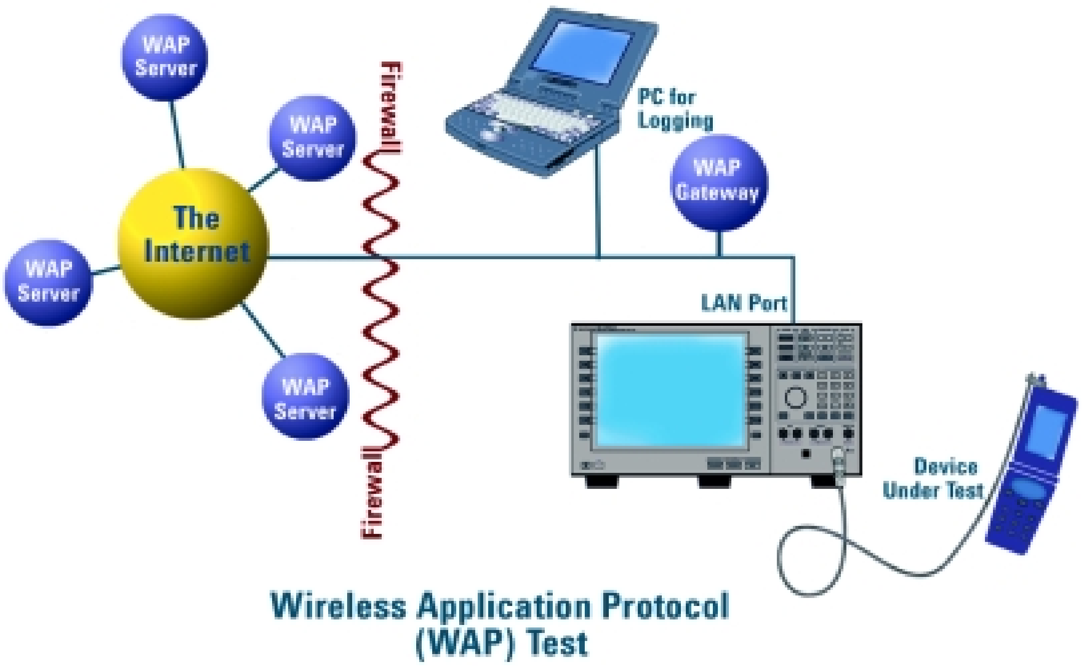
The Data Channel facilitates the functional test of a Wireless Application Protocol (WAP) device such as a WAP-enabled mobile station.

Logging data during this process provides protocol data at useful points in the stack, which may help in debugging the Device Under Test (DUT).

Before you use the Data channel for WAP, you must have the following information:

- an IP address valid for the subnet that you will connect the test set to
- the valid subnet mask for that subnet
- the default gateway for that network (not the same as the WAP gateway)
- a valid IP address for the DUT
- the default WAP gateway address (this may be required by the DUT)

A. Hardware Connections



Connect PC to LAN

Please consult with your IT department if you need assistance connecting your PC to the LAN. Refer to “Protocol Logging” on page 40 for more information about setting up protocol logging.

Connect Test Set to LAN

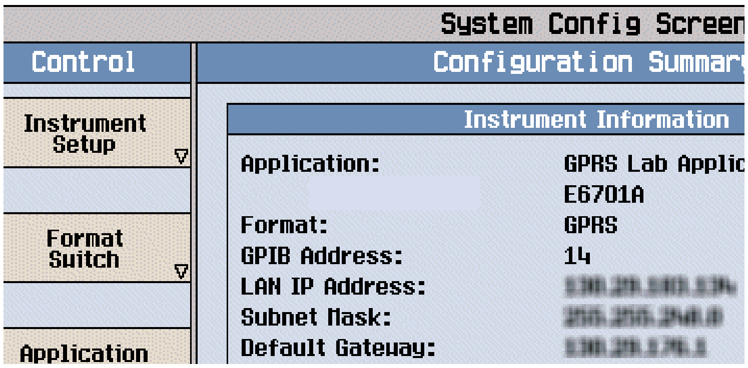
1. Connect the LAN port on the back of the test set to your LAN.

Connect DUT to the Test Set

1. Connect the DUT to the test set. There may be several ways to connect to the RF link of the DUT. The connection diagram shows a connection to the DUT's antenna.

B. Test Set and DUT Setup

Set Up Test Set



1. Press the **Sys Config** key to display the System Config screen.
2. Use the `Instrument Setup` softkey (**F1**) to display the Instrument Setup menu.
3. Enter the IP address for the test set.
4. Use the same menu to set the Subnet Mask.
5. Use the same menu to set the Default Gateway.
6. Press the **Call Setup** key to go to the Call Setup screen on the test set.
7. Verify that the `Operating Mode` (**F1**) is set to `Active Cell` and the `Connection Type` (**F2**) is set to `Auto`.
8. Press the left **More** key to go to the second screen of the Control menu.
9. Select `DUT PDP Setup` to open the DUT PDP Setup menu on the test set.
10. Set the DUT's IP address in the DUT PDP Setup menu on the test set.

NOTE The DUT IP address must be on the same subnet as the test set.

Set Up DUT

1. You may need to set some network parameters in the WAP device (the DUT). Some typical parameters include a home page, Primary Port, or Data Bearer. Set these as needed.
2. You may also need to set a default WAP gateway (may be called Primary IP Address). Do this if necessary. Some network setups may require that the WAP gateway be on the same side of the firewall as the DUT and test set.

C. Data Connection

The objective of the WAP evaluation is to successfully transfer WAP datagrams. The DUT must complete a successful PDP Context activation before datagrams can be transferred. With the test set this involves two steps:

First, the DUT must perform a GPRS attach.

1. Connect the DUT to the RF IN/OUT port of the test set.
2. Turn the DUT on and wait for Attached to appear in the Active Cell: field on the test set's front panel display.

NOTE For DUTs that don't perform a GPRS attach automatically, you may have to set the DUT to data mode.

Second, the DUT must request a PDP Context Activation.

1. Use the DUT to initiate data transfers. The DUT will request an activation, the DUT's IP address will be assigned by the test set, and the PDP Context will be active.

   Additional Information:

   If the Network initiates a data transfer before the DUT has requested a PDP context, the 8960 will send a Request_PDP_Context_Activation message. No data will be sent to the DUT until a PDP Context has been activated.
2. This can be observed by looking for "PDP Active" in the Active Cell Status: field.

NOTE You can also perform some measurements while using the Data Channel:

- BLER measurements are supported.
- TX measurements are supported.
- BER measurements are not supported.
- Logging is possible during Data Channel operation.

How do You Know When You Have Succeeded?

You have made a successful data connection if you can:

- Look at the WAP device and verify that the pages you were trying to transfer have actually transferred.
- See data transfer in both directions by observing the Counters field in the Call Setup screen.

Related Topics

"Protocol Logging and Data Channel Troubleshooting" on page 1471

"Data Channel" on page 55

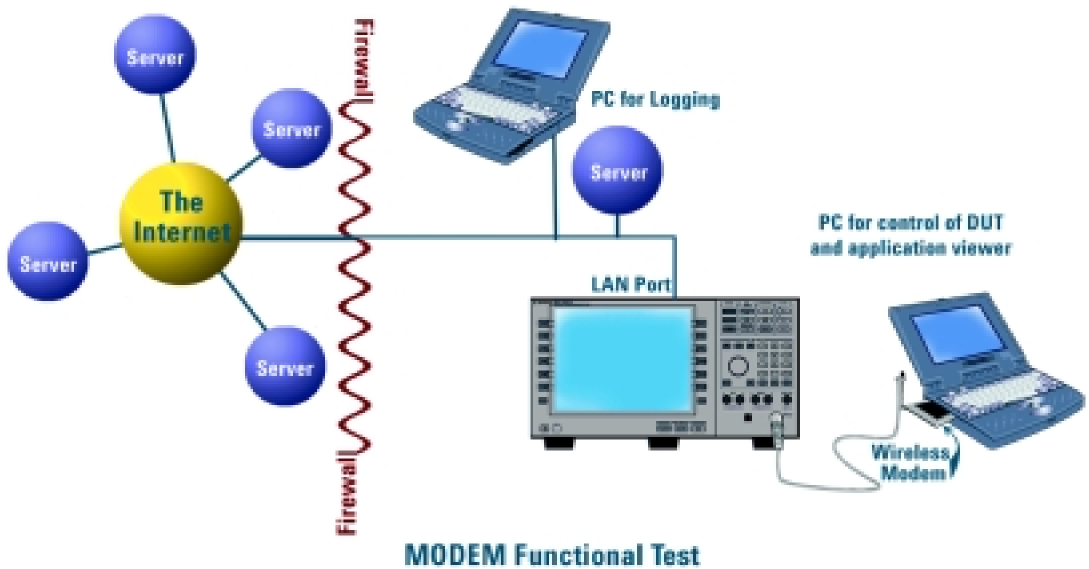
Modem Functional Test with the Data Channel

The Data Channel enables testing of wireless modems or GPRS devices with built-in modems, typically using dial-up connections. If the modem is not built-in, it is usually controlled from another device such as a PC.

Before you use the Data channel for modem testing, you must have the following information:

- an IP address valid for the subnet that you will connect the test set to
- the valid subnet mask for that subnet
- the default gateway for that network
- a valid IP address for the modem or its controlling PC (even though the modem is the Device Under Test (DUT), typically a PC will be assigned the IP address)

A. Hardware Connections



Connect Logging PC to LAN

Please consult with your IT department if you need assistance connecting your PC to the LAN. Refer to "Protocol Logging" on page 40 for more information about setting up protocol logging.

Connect Test Set to LAN

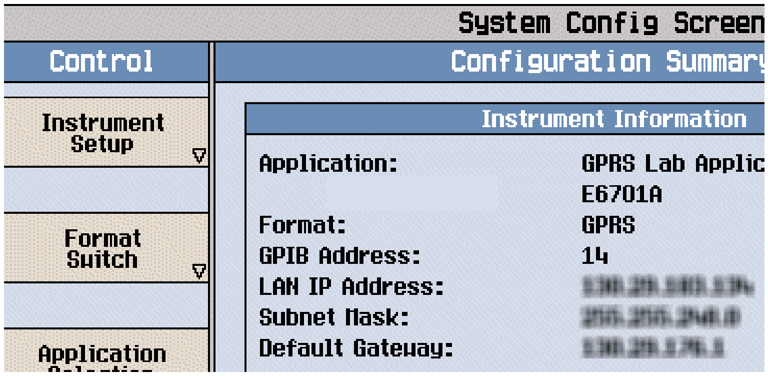
1. Connect the LAN port on the back of the test set to your LAN.

Connect DUT (Modem and Control PC) to the Test Set

1. Connect the modem to the PC as appropriate for your application.
2. Connect the DUT to the test set.

B. Test Set and DUT Setup

Set Up Test Set



1. Press the **Sys Config** key to display the System Config screen.
2. Use the `Instrument Setup` softkey (**F1**) to display the Instrument Setup menu.
3. Enter the IP address for the test set.
4. Use the same menu to set the Subnet Mask.
5. Use the same menu to set the Default Gateway.
6. Press the **Call Setup** key to go to the Call Setup screen on the test set.
7. Select `Data Conn Type` and set the field to `IP Data`.
8. Press the left **More** key to go to the second screen of the Control menu.
9. Select `DUT PDP Setup` to open the DUT PDP Setup menu on the test set.
10. Set the DUT's IP address (or the address of the controlling PC) in the DUT PDP Setup menu on the test set.

    Note: The entered IP address must be on the same subnet as the test set.

Set Up DUT

1. You may need to set the IP address or other network parameters in the controlling PC or the GPRS device. Set these as needed.
2. If using a dial-up connection, you may need to set up Dial-Up Networking in your PC. Do this as needed.

C. Modem Functional Test

In order to test the functioning of the DUT, it must first complete a successful PDP Context activation. With the test set this involves two steps:

First, the DUT must perform a GPRS attach.

1. Connect the DUT to the RF IN/OUT port of the test set.
2. Turn the DUT on and wait for Attached to appear in the Active Cell: field on the test set's front panel display. Some modems may need to attempt data transfer before it attaches to the test set. Sometimes the modem will attach if the number *99# is dialed.

NOTE For DUTs that don't perform a GPRS attach automatically, you may have to set the DUT to data mode.

Second, the DUT must request a PDP Context Activation.

1. Use the DUT to initiate data transfers. The DUT will request an activation, an IP address will be assigned by the test set, and the PDP Context will be active.
2. This can be observed by looking for "PDP Active" in the Active Cell Status: field.

NOTE You can also perform some measurements while using the Data Channel:

- BLER measurements are supported.
- TX measurements are supported.
- BER measurements are not supported.
- Logging is possible during Data Channel operation.

How do You Know When You Have Succeeded?

You have made a successful data connection if you can:

- Browse the Internet over the DUT.
- See data transfer in both directions by observing the Counters field in the Call Setup screen of the test set.
- Look at the DUT and its PC and verify that the data you were trying to transfer has actually transferred.

Related Topics

"Protocol Logging and Data Channel Troubleshooting" on page 1471

"Data Channel" on page 55

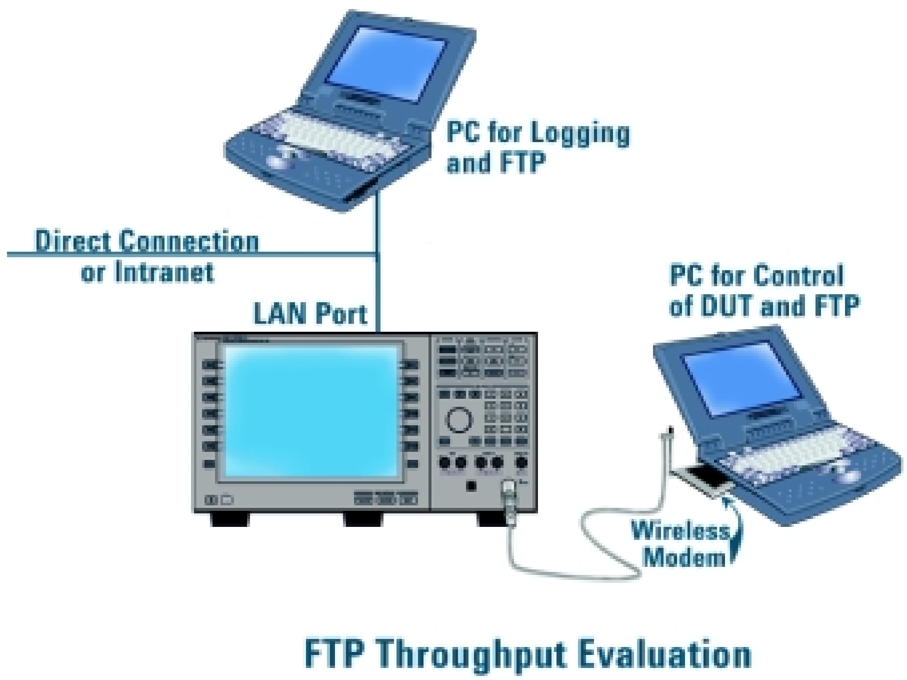
FTP Throughput Test with the Data Channel

The Data Channel facilitates File Transfer Protocol (FTP) via the device. Typically this is done with a dial-up connection to an external PC using a GPRS PCMCIA modem or an external GPRS modem.

With appropriate evaluation tools on the Control PC, you can measure the throughput of the modem. Many commercial FTP programs provide detailed information on transfer speed.

To empirically measure the throughput, the performance of the network must be known. For this reason, it is not recommended to perform this evaluation while connected to the Internet. A "Direct Connection" or Intranet connection should be used instead.

A. Hardware Connections



Connect PC to LAN

Please consult with your IT department if you need assistance connecting your PC to the LAN. Refer to "Protocol Logging" on page 40 for more information about setting up protocol logging.

Connect Test Set to LAN

1. Connect the LAN port on the back of the test set to your LAN.

Direct Connection An alternate connection may be made using the Direct Connection method of connecting to the test set. This may be preferred, since it won't be necessary to characterize the Intranet for the throughput evaluation.

Make the following connections:

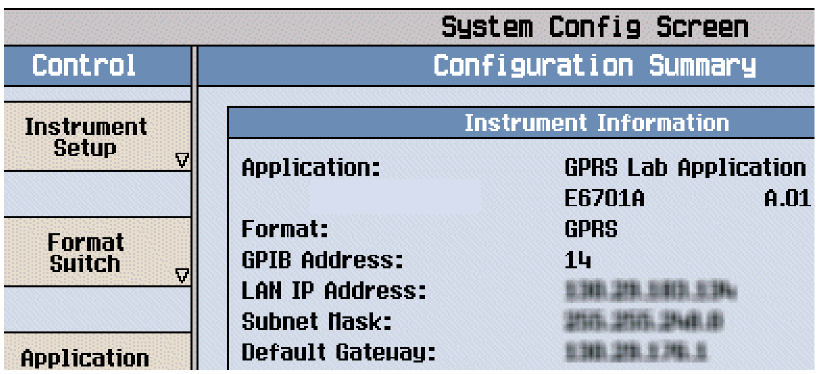
1. Connect the Logging PC directly to the LAN port of the test set using a crossover cable.
2. When setting up the test set and PCs (see "B. Test Set and DUT Setup" on page 68), set the IP addresses of the PCs and test set to any valid IP addresses, as long as they are on the appropriate subnets.

Connect DUT to the Test Set

1. Connect the modem to the PC as appropriate for your application.
2. Connect the DUT to the test set.

B. Test Set and DUT Setup

Set Up Test Set



1. Press the **Sys Config** key to display the System Config screen.
2. Use the `Instrument Setup` softkey (**F1**) to display the Instrument Setup menu.
3. Enter the IP address for the test set.
4. Use the same menu to set the Subnet Mask.
5. Use the same menu to set the Default Gateway.
6. Press the **Call Setup** key to go to the Call Setup screen on the test set.
7. Select `Data Conn Type` and set the field to `IP Data`.
8. Press the left **More** key to go to the second screen of the Control menu.
9. Select `DUT PDP Setup` to open the DUT PDP Setup menu on the test set.
10. Set the DUT's IP address (or the address of the controlling PC) in the DUT PDP Setup menu on the test set.

    Note: The entered IP address must be on the same subnet as the test set.

Set Up DUT

1. You may need to set the IP address or other network parameters in the controlling PC or the GPRS device. Set these as needed.
2. If using a dial-up connection, you may need to set up Dial-Up Networking in your PC. Do this as needed.

C. Data Connection

In order to test the throughput of the DUT during active data transfer, the DUT and test set must first complete a successful PDP Context activation. With the test set this involves two steps:

First, the DUT must perform a GPRS attach.

1. Connect the DUT to the RF IN/OUT port of the test set.
2. Turn the DUT on and wait for Attached to appear in the Active Cell: field on the test set’s front panel display. Some modems may need to attempt data transfer before it attaches to the test set. Sometimes the modem will attach if the number *99# is dialed.

NOTE For DUTs that don’t perform a GPRS attach automatically, you may have to set the DUT to data mode.

Second, the DUT must request a PDP Context Activation.

1. Use the DUT or the server to initiate transfers. The DUT will request an activation, an IP address will be assigned by the test set, and the PDP Context will be active.
2. This can be observed by looking for “PDP Active” in the Active Cell Status: field.

NOTE You can also perform some measurements while using the Data Channel:

- BLER measurements are supported.
- TX measurements are supported.
- BER measurements are not supported.
- Logging is possible during Data Channel operation, but it may affect throughput times.

How do You Know When You Have Succeeded?

You have made a successful data connection if you can:

- You see the data that was transferred on your DUT.
- Measure the throughput.
- See data transfer in both directions by observing the Counters field in the Call Setup screen of the test set.

Related Topics

“Protocol Logging and Data Channel Troubleshooting” on page 1471

“Data Channel” on page 55

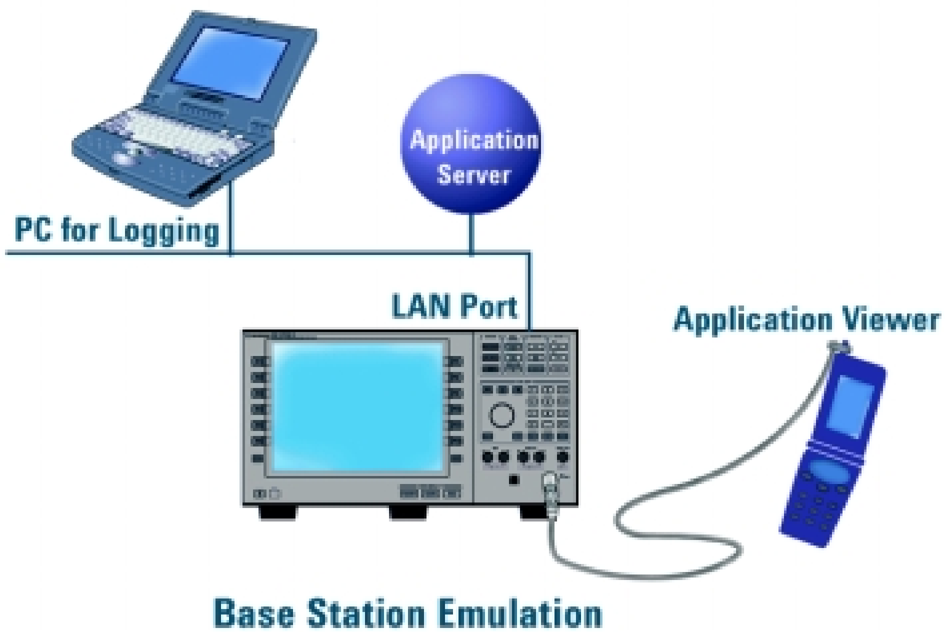
Base Station Emulation with the Data Channel

You can use the Data Channel and the test set to emulate a base station. This is particularly useful when you want to have a base station available, for example when demonstrating a wireless application, or when functionally testing wireless devices on a workbench. You may also want to vary key parameters of the cell, such as transmit power, and observe how the DUT performs.

Before you use the Data Channel for Base Station Emulation, you must have the following information:

- an IP address valid for the subnet that you will connect the test set to
- the valid subnet mask for that subnet
- the default gateway for that network
- a valid IP address for the DUT

A. Hardware Connections



Connect PC to LAN

Please consult with your IT department if you need assistance connecting your PC to the LAN. Refer to “Protocol Logging” on page 40 for more information about setting up protocol logging.

Connect Test Set to LAN

1. Connect the LAN port on the back of the test set to your LAN.

Direct Connection An alternate connection may be made using the Direct Connection method of connecting to the test set. This may be preferred, since it won't be necessary to characterize the Intranet for the throughput evaluation.

Make the following connections:

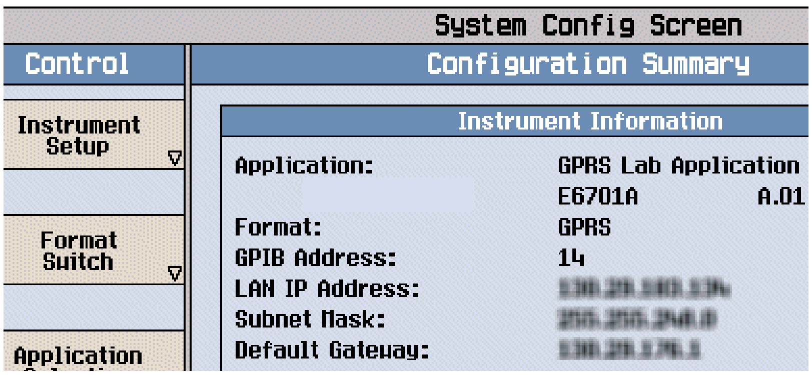
1. Connect the Logging PC directly to the LAN port of the test set using a crossover cable.
2. When setting up the test set and PCs (see "B. Test Set and DUT Setup" on page 72), set the IP addresses of the PCs and test set to any valid IP addresses, as long as they are on the appropriate subnets.

Connect DUT to the Test Set

1. Connect the DUT to the test set.

B. Test Set and DUT Setup

Set Up Test Set



1. Press the **Sys Config** key to display the System Config screen.
2. Use the `Instrument Setup` softkey (**F1**) to display the Instrument Setup menu.
3. Enter the IP address for the test set.
4. Use the same menu to set the Subnet Mask.
5. Use the same menu to set the Default Gateway.
6. Press the **Call Setup** key to go to the Call Setup screen on the test set.
7. Select `Data Conn Type` and set the field to `IP Data`.
8. Press the left **More** key to go to the second screen of the Control menu.
9. Select `DUT PDP Setup` to open the DUT PDP Setup menu on the test set.
10. Set the DUT's IP address (or the address of the controlling PC) in the DUT PDP Setup menu on the test set.

    Note: The entered IP address must be on the same subnet as the test set.

Set Up DUT

1. You may need to set the IP address or other network parameters in the DUT. Set these as needed.
2. If the device uses a dial-up connection, you may need to set up Dial-Up Networking in the device. Do this as needed.

Base station emulation is ready. You can adjust the cell settings on the test set as desired. Most Cell Parameters require the BCH to be OFF (i.e. Operating mode = Cell Off) before adjusting the settings. Cell Power is an example of a setting that does not require BCH to be OFF. Changing Cell Power, however, or making ARFCN changes would force the DUT to re-camp.

To use Base Station Emulation to transfer data, you must make a data connection with the DUT. See "C. Data Connection" on page 73.

C. Data Connection

The DUT must complete a successful PDP Context activation before datagrams can be transferred. With the test set this involves two steps:

First, the DUT must perform a GPRS attach.

1. Connect the DUT to the RF IN/OUT port of the test set.
2. Turn the DUT on and wait for Attached to appear in the Active Cell: field on the test set's front panel display.

NOTE For DUTs that don't perform a GPRS attach automatically, you may have to set the DUT to data mode.

Second, the DUT must request a PDP Context Activation.

1. Use the DUT or the server to initiate transfers. The DUT will request an activation, an IP address will be assigned by the test set, and the PDP Context will be active.
2. This can be observed by looking for "PDP Active" in the Active Cell Status: field.

NOTE You can also perform some measurements while using the Data Channel:

- BLER measurements are supported.
- TX measurements are supported.
- BER measurements are not supported.
- Logging is possible during Data Channel operation.

How do You Know When You Have Succeeded?

You have made a successful data connection if you can:

- Look at the DUT and verify that the data you were trying to transfer has actually transferred.
- See data transfer in both directions by viewing the number of packets transferred in the Counters window

of the Call Setup screen on the test set.

Related Topics

"Protocol Logging and Data Channel Troubleshooting" on page 1471

"Data Channel" on page 55

GSM Circuit Switched Data (CSD)

This section is only applicable to the lab applications.

This section discusses the GSM Circuit Switched (CSD) feature in the test set.

GSM CSD Capability in the Test Set

The circuit switched data (CSD) channel capability in the test set allows you to simulate a real-time GSM data transfer between your mobile station and a full network. The test set supports:

- establishing a mobile originated circuit switched data call,
- various bit rate, mode, and channel type combinations (See "CSD Configurations" on page 76.),
- IP datagrams routing to and from the mobile station through the test set's LAN interface,
- and terminating the PPP connection.

After establishing a CSD connection, the connection operates in full-duplex. IP datagrams originating from either the mobile station or the "network" may be transferred over this link.

The RF link is maintained even when there is no data being sent or received and is only terminated when you end the call from either the test set, mobile station, or from an attached PC. The only exception occurs if the test set determines that an error condition has been met. If this occurs, the test set drops the call.

For the duration of the CSD connection, the connection status displays "Connected + Data". For the location of the connection status on the front panel display, see "Instrument Status Area" on page 1447.

NOTE Only Mobile Originated CSD calls are currently supported.

Bit Rate and Mode Negotiation

Various modes and bit rates can be used in CSD connections. There are two possible modes:

- Transparent - The raw rate-adapted bits from the over-the-air (OTA) frame are passed to PPP directly. A connection using transparent mode does not provide for re-transmissions and has no error detection mechanism beyond the CRC at Layer 1.
- Non-Transparent - This mode uses the Radio Link Protocol (RLP) stack layer to provide a reliable transport mechanism. The RLP layer provides for the retransmission of corrupted data and uses a Frame Check Sequence (FCS) for error detection.

GSM Circuit Switched Data (CSD)

Bit rates can be 2400, 4800, or 9600 bps. The following table illustrates the possible configurations and the support provided by the test set.

Table 11. CSD Configurations

Speed (bps)	Mode	Channel Type	Test Set Support
14400	Transparent and Non-Transparent	Full Rate	No
9600	Transparent and Non-Transparent	Full Rate	Yes
4800	Transparent and Non-Transparent	Full Rate	Yes
4800	Transparent and Non-Transparent	Half Rate	No
2400	Transparent	Full Rate	Yes
2400	Transparent	Half Rate	No

The test set provides the mode and bit rate requested by the mobile station, if they are supported. When the mobile station's request is not supported, a warning is generated and the call is dropped.

NOTE The test set does not have any control over the mode or bit rate requested by the mobile station. Control for this in the mobile station differs between manufacturers. Possible control methods include configuration options available via the mobile station's user interface or by establishing a dial-up connection with the mobile station and using your PC to send it AT commands. Refer to GSM 7.01 for more information.

Operating Considerations

Operating Mode

The `Operating Mode` must be set to `Active Cell` to use the CSD capability in the test set.

Connection Type

The `Connection Type` must be set to `Auto` to use the CSD capability in the test set.

NOTE If the connection type is changed while a GSM CSD call is established, the call is dropped by the test set.

Measurements

Bit Error Rate(BER) or Fast Bit Error Rate (FBER) measurements are not supported during CSD connections.

It may be possible for you to make all the GSM transmitter measurements. If your phone goes into DTX mode and stops transmitting, it is not possible to make GSM transmitter measurements.

Related Topics

"Ping" on page 57

"WAP Test with the Data Channel" on page 61

Measurements

Analog Audio Measurement Description

This measurement is *not* applicable to GPRS.

How is an analog audio measurement made?

The analog audio measurement can measure Audio Level (V), SINAD (dB), Distortion (%), and Audio Frequency. Measurements are made through the test set's front panel AUDIO IN connectors. When measuring a mobile's audio output, the audio signal may come from either an acoustic coupler or from a test interface connection to the mobile's audio circuitry.

SINAD is one of four measurements available from the Analog Audio measurement. However, SINAD measurements are not typically made when testing GSM mobiles but are more common when testing AMPS or analog mobiles.

See "Analog Audio Measurement Block Diagram" on page 82.

The AUDIO IN connectors feed the inputs to a floating-input differential amplifier, with each input having an impedance of about 100,000 ohms to chassis ground. For best noise immunity, connect the audio signal and its ground reference to the two input ports through shielded coaxial cables, or input the signal to the AUDIO IN HI connector and ground the AUDIO IN LO connector's center contact.

SINAD/Distortion State

Select On or Off to enable or disable the SINAD and Distortion measurements. This can be done remotely using the "SETup:AAUDio:SDIStortion:STATe" on page 1045. When On, these measurement results are displayed on the screen below the Audio Level measurement. The SINAD/Distortion Fundamental Frequency must be entered to specify the audio frequency for the measurement (range: 100 Hz to 10 kHz).

Audio Frequency State

Select On or Off to enable or disable the analog audio frequency measurement.

Filter Type

- None - no filtering is provided (default).
- 100 Hz BW BPF - The 100 Hz BW Band Pass Filter (Tunable) setting is available when this filter is selected, and can be set in the range of 200 Hz to 20 kHz.
- C-Message - This type of filter is typically used when testing AMPS or other analog mobiles, and not GSM mobiles.
- 50 Hz to 15 kHz
- 300 Hz to 15 kHz

Detector Type

Select either Peak or RMS (default) for making and displaying an analog audio level measurement (does not affect other measurements). The type of detector selected is displayed next to the Audio Level measurement results. A 1-volt rms sinewave input signal would measure 1.414 V_{Peak} when the Peak detector is used. A 1-volt peak input signal would measure 0.707 V_{RMS} when the RMS detector is used.

Expected Peak Voltage

The Expected Peak Voltage sets the analog audio clipping level and must be set. This voltage is always the *absolute peak* audio input signal voltage expected at the AUDIO IN connectors, and must be in the range of 7.07 mV_{peak} (5 mV_{rms}) to 20 V_{peak}. Remember, measuring a 1-volt rms sinewave input signal would require a 1.414 V_{peak} expected voltage value to avoid clipping (over-driving) the input.

De-Emphasis State

Set to On or Off (default) to enable or disable 750 microsecond de-emphasis.

Expandor Reference Level

Set value from 10 mV/kHz to 10 V/kHz, or Off (default). Entering a numeric value automatically turns the state to On. Entering Off disables the expandor (state = Off).

Trigger Source

Analog audio measurements use immediate triggering and are continuously re-triggered each time the Trigger Arm parameter is set to Continuous. Trigger timing is independent of any mobile protocol signaling.

Related Topics

"Analog Audio Measurement Block Diagram" on page 82

"Analog Audio Troubleshooting" on page 1454

"Audio Level Measurement Description" on page 84

"Audio Frequency Measurement Description" on page 83

"SINAD Measurement Description" on page 141

"Distortion Measurement Description" on page 97

"Programming an Audio Frequency Measurement" on page 326

"Programming an Audio Level Measurement" on page 324

"Programming a SINAD Measurement" on page 360

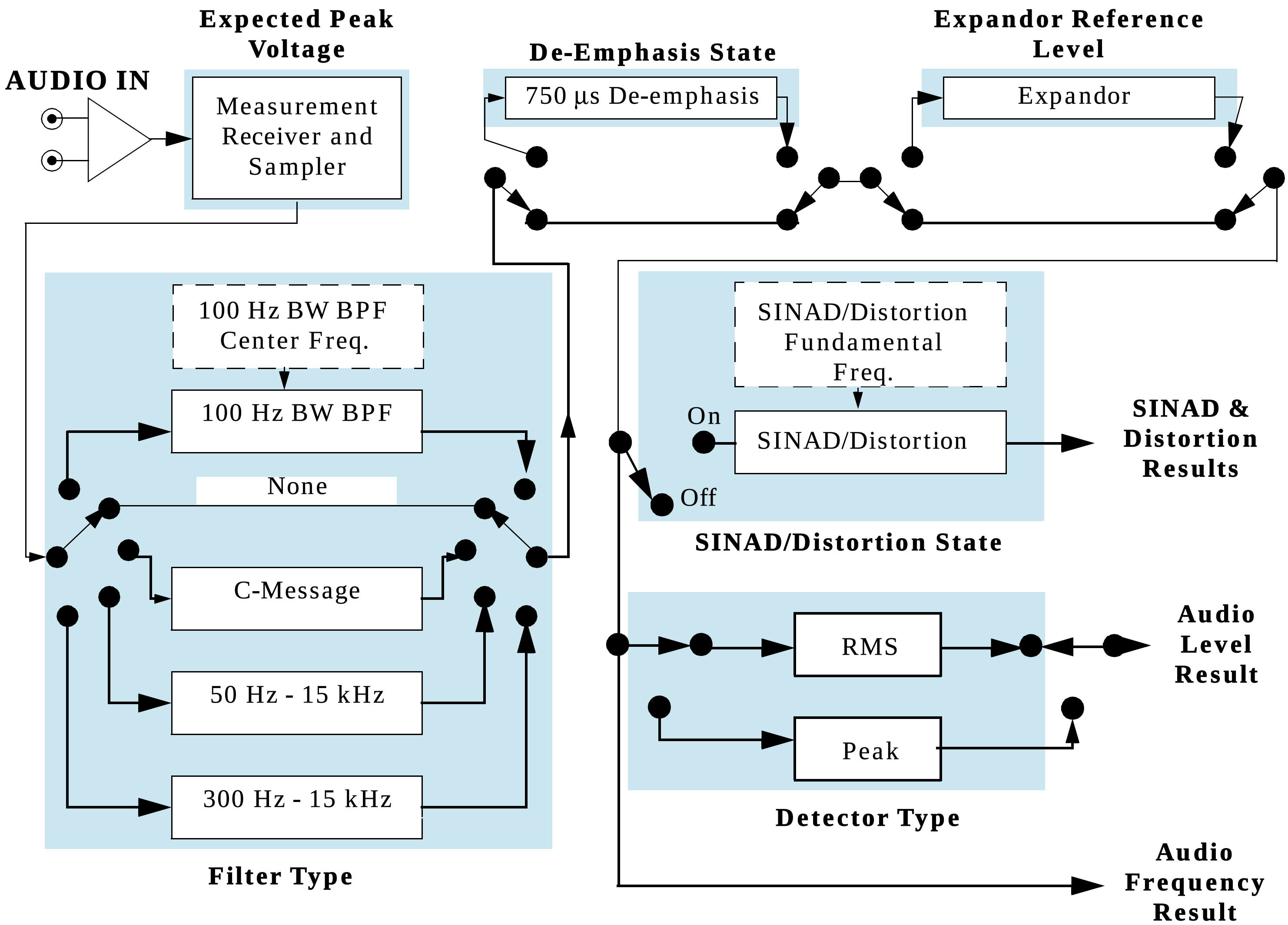
"Programming a Distortion Measurement" on page 338

"Statistical Measurement Results" on page 410 (Multi-measurements)

"Triggering of Measurements" on page 404

"Measurement Timeouts" on page 401

Analog Audio Measurement Block Diagram



Related Topics

"Analog Audio Measurement Description" on page 80

Audio Frequency Measurement Description

This measurement is *not* applicable to GPRS.

How is an Audio Frequency measurement made?

Audio Frequency measures the frequency of the signal applied to the front-panel AUDIO IN connectors, and is one of the Analog Audio measurements. Audio Frequency can be measured for signals in the frequency range of 100 Hz to 15 kHz, at levels from 7.1 mV peak to 20 V peak, and with a signal-to-noise ratio of 30 dB or greater.

The analog audio frequency measurement is made after any filtering and processing are applied for the audio measurements.

Related Topics

"Programming an Audio Frequency Measurement" on page 326

"Analog Audio Measurement Description" on page 80

"Analog Audio Measurement Block Diagram" on page 82

"Analog Audio Troubleshooting" on page 1454

Audio Level Measurement Description

This measurement is *not* applicable to GPRS.

How is an Audio Level measurement made?

Audio Level measures the AC voltage of the signal applied to the front-panel AUDIO IN connectors, and is one of the Analog Audio measurements. Audio Level can be measured for signals in the frequency range of 100 Hz to 20 kHz, at levels from 7.1 mV_{peak} to $20V_{peak}$. The measurement is made after any filtering is applied, and can be made using an RMS or Peak detector. The type of detector being used for the measurement is displayed next to the measurement value.

When measuring very low voltages, it may be helpful to use the adjustable bandpass filter and the rms detector to reduce noise components.

Related Topics

"Programming an Audio Level Measurement" on page 324

"Analog Audio Troubleshooting" on page 1454

"Analog Audio Measurement Description" on page 80

"Analog Audio Measurement Block Diagram" on page 82

Bit Error Measurement Description

The Bit Error Measurement is applicable to both GSM and GPRS. This measurement description contains two sections:

- "GSM Bit Error Measurement" on page 85
- "GPRS Bit Error Measurement" on page 88

GSM Bit Error Measurement

Bit Error Measurements versus Fast Bit Error Measurements

There are three commonly used types of bit error measurements in GSM:

- "BER with Frame Erasure" or "Residual BER" when the mobile station has been configured to loopback Type A.
- "BER without Frame Erasure" or "Non-residual BER" when the mobile station has been configured to loopback Type B.
- BER using burst-by-burst loopback when the mobile station has been configured to loopback Type C.

The test set allows you to select between Loopback Type A or B, and the fast bit error measurement, which uses Loopback Type C. Refer also to "Fast Bit Error Measurement Description" on page 100.

NOTE If the test set has codeware version A.02.00 or above, unnecessary loopback commands and delays can be eliminated by taking advantage of enhancements available.

Previous versions of the test set required you to set the loopback type, and did not have a feature that allowed time for the loop to close.

How is a Bit Error (BER) Measurement Made?

During BER measurements, the test set generates a downlink TCH with pseudo-random binary sequence, PRBS-15, data at a known level. The mobile station receives the data, loops it back to its transmitter, and returns the data to the test set. The test set compares data sent to data received, and BER is calculated.

SETup subsystem commands are sent to the test set to specify the time taken to close its loopback path, whether to open or close a loop during downlink signaling operations (for example, channel assignment), the number of bits to test, measurement type, speech frames delay, measurements units, trigger arm, and measurement timeout values.

When a call is established on the TCH, the loopback type corresponding to one of the BER measurement types must be sent to the mobile station. The test set closes the loopback automatically and re-opens it when the measurement is closed (that is, when INITiate:BERRor is OFF).

Bit Error Measurement Description

You must set the measurement type from one of the six measurement types available, (see "SETup:BERRor[:TYPE]" on page 1050). If you query a residual result when a non-residual measurement is initiated, the test set returns 9.91 E+37 (NAN). The Measurement type must be set before initiating a BER measurement. See "BER Measurement Types" on page 86

The loop must be closed before a BER test can start, using the close loop signalling delay time feature allows time for the loop to close. See "SETup:BERRor:CLSDelay[:STIMe]" on page 1048 for more details.

Each mobile station may have a different time delay between receiving a speech frame and re-sending it on the uplink. By default, the test set is configured to LDControl:AUTO:ON, and the amount of delay needed is determined automatically when the test set has, for two frames, correctly received 80% of the downlink bits back on the uplink. The test set can be queried for the speech frames delay value.

If necessary, you can manually set the delay (see "SETup:BERRor:LDControl:AUTO" on page 1052).

NOTE In case the test set is not able to correlate the data it transmits on the downlink with the data it receives on the uplink, a Measurement Timeout value should be set. If a timeout is not set and the test set is unable to correlate, the measurement will appear to "hang".

The BER measurement trigger source is always set to immediate. The BER measurement does not offer multi-measurement results. See "Statistical Measurement Results" on page 410

BER, FBER, and DAUDIO (uplink speech level) measurements are mutually exclusive measurements. Whichever of these measurements is activated last forces the others to stop.

BER Measurement Types

Residual:

- Residual Type IA (50 bits per speech frame)
- Residual Type IB (132 bits per speech frame)
- Residual Type II (78 bits per speech frame)

Loopback Type A is sent to the mobile station when one of these residual measurement types is selected. A BER measurement with FE will return the frame erasure count or ratio results. The mobile station will indicate in the speech frame, if the downlink frame was received with CRC (cyclic redundancy check) errors the speech frames are erased. The mobile station sets all bits in the uplink speech frame to 0, indicating speech frames were erased.

Non-residual:

- Type IA (50 bits per speech frame)
- Type IB (132 bits per speech frame)
- Type II (78 bits per speech frame)

Loopback Type B is sent to the mobile station when one of these non-residual measurement types is selected. A BER measurement with CRC's (cyclic redundancy check) will return the CRC count or ratio results. The mobile station will not indicate if any speech frames in the downlink were erased.

BER Measurement Results

The results of a BER measurement can be displayed in two ways, (number of errors counted) or (the ratio bad bits (errors) to total bits counted). If you are using the test set manually, select either Count or % from the Measurement Units field. If you are using the test set remotely, these results are available using the FETCh command, see "FETCh:BERRor:COUNt[:BITS]?" on page 880 or "FETCh:BERRor:RATio[:BITS]?" on page 885. Alternatively the "FETCh:BERRor[:ALL]?" on page 878 or "FETCh:BERRor:FULL?" on page 883 can also be used to return the results.

Type A Residual Measurement Results

- Integrity Indicator
- Bit Error Ratio
- Bits Tested
- Bit Error Count
- Frame Erasure Ratio
- Frame Erasure Count

Type B Non-Residual Measurement Results

- Integrity Indicator
- Bit Error Ratio
- Bits Tested
- Bit Error Count
- CRC Ratio
- CRC Count

Related Topics for GSM

"Programming a Bit Error Measurement" on page 329

"Test Adherence to Standards" on page 150

"Fast Bit Error Measurement Description" on page 100

"Programming a Fast Bit Error Measurement" on page 343

"CALL:TCHannel:LOOPback" on page 825

"Bit Error Troubleshooting" on page 1455

GPRS Bit Error Measurement

How is a Bit Error (BER) Measurement Made?

During BER measurements, the test set generates a downlink PDTCH with pseudo-random binary sequence, PRBS-15 data at a known level. The mobile station receives the data, loops it back to its transmitter, and returns the data to the test set. The test set compares data sent to data received, and BER is calculated.

If the test set's operating mode is set to Active Cell, the data connection type must be set to ETSI Type B (unacknowledged) or ETSI Type B Acknowledged in order to make BER measurements. This can be done using "CALL:FUNCtion:CONNection:TYPE" on page 538. Alternatively, you can make BER measurements when the test set's operating mode is set to GPRS BCH+PDTCH test mode (see "CALL:OPERating:MODE" on page 610).

The recommended channel coding scheme for GPRS BER measurements is CS-4. You use the command "CALL:PDTCH:CSCHeme" on page 627 to set the GPRS coding scheme.

SETup subsystem commands are sent to the test set to specify the loopback delay control mode, number of bits to test, block delay, measurements units, trigger arm, measurement timeout values, and zero bad block state.

The zero bad block state parameter determines how bad blocks are interpreted by the BER measurement. If you want more details on this parameter, see "SETup:GBERror:ZBBLocks" on page 1105.

Each mobile station may have a different time delay between receiving a block of data and re-sending it on the uplink. By default, the loopback delay control mode is set to automatic, and the amount of delay needed is determined when the test set has, for four consecutive blocks, correctly received 80% of the downlink bits back on the uplink. The test set can be queried for the block delay value using "FETCh:GBERror:DELay?" on page 913.

You can specify the first downlink burst to be looped back in the first uplink burst using the command "CALL:PDTCH:MSLot[:FIRSt]:DOWNlink:LOOPback[:BURSt]" on page 635.

If necessary, you can manually set the delay using "SETup:GBERror:LDControl:AUTO" on page 1102.

NOTE In case the test set is not able to correlate the data it transmits on the downlink with the data it receives on the uplink, a Measurement Timeout value should be set. If a timeout is not set and the test set is unable to correlate, the measurement will appear to "hang".

The BER measurement trigger source is always set to immediate. The BER measurement does not offer multi-measurement results. If you require more details on multi-measurement results, see "Statistical Measurement Results" on page 410.

Types of Signal BER can Measure

BER measurements can be made on these types of input signals:

- One or more uplink and downlink PDTCH pairs with the mobile station in active cell mode and the data connection type set to ETSI Type B or ETSI Type B Acknowledged. If you want to optimize measurement speed, it is important that the mobile station is set up for the same number of uplink and downlink PDTCHs.

- One or more uplink and downlink PDTCH pairs with the mobile station in GPRS BCH+PDTCH test mode (see “CALL:OPERating:MODE” on page 610 for details on setting the cell operating mode). Note that you have to manually set your mobile station to synchronize its internal frequency and timing reference with the test set. You also have to command the mobile station to loop back the PDTCH data.

BER Measurement Results

The results of a BER measurement can be displayed in two ways; the number of errors counted or the ratio of bad bits (errors) to total bits counted. If you are using the test set manually, both Count and Bit Error Ratio are displayed on the Bit Error measurement screen. If you are using the test set remotely, these results are available using the FETCh command, see “FETCh:GBERror:COUNt?” on page 913 or “FETCh:GBERror:RATio?” on page 914. Alternatively the command “FETCh:GBERror[:ALL]?” on page 912 can be used to return all of the following results:

- Integrity Indicator
- Bit Error Ratio
- Bits Tested
- Bit Error Count

In addition, the Intermediate Count of Bits Tested result can be queried using “FETCh:GBERror:ICOunt?” on page 914 and the Block Delay can be queried using “FETCh:GBERror:DELay?” on page 913.

Related Topics for GPRS

“Programming a Bit Error Measurement” on page 329

“Test Adherence to Standards” on page 150

“Bit Error Troubleshooting” on page 1455

“Receiver Sensitivity Testing in GPRS” on page 131

Block Error Measurement Description

This measurement is *not* applicable to GSM.

How is a Block Error (BLER) Measurement Made?

Block Error (BLER) measurements can be used in the production process to test the performance of a GPRS or EGPRS mobile station's receiver.

The BLER measurement which the test set provides is based on GPRS receiver tests defined in 3GPP 51.010 (formerly ETSI GSM 11.10), section 14.16 (GPRS) and section 14.18.1 (EGPRS).

The BLER measurement is made using one of the following two methods, depending on the test set's configuration:

- If the test set's data connection type is set to ETSI Type B or ETSI Type B Acknowledged, in Active Cell operating mode, *or* the operating mode is set to either GPRS BCH+PDTCH test mode or EGPRS BCH+PDTCH test mode:

  — The test set generates one or more downlink PDTCHs at a known level with data of the payload pattern that you specify. The mobile station receives the data, loops it back to its transmitter, and returns the data to the test set. The test set compares data sent to data received. A block that is received which has one or more bit errors within it is marked as having a block error.

  The BLER measurement result is calculated irrespective of the Layer 1 reported demodulation status. If a corrupted burst error or missing burst error is received, the burst is still included in the BLER measurement result and contributes to the Block Error count.

- If the test set's data connection type is set to BLER in Active Cell operating mode.

  — The test set periodically polls the mobile station, deriving the BLER measurement result from the Radio Link Control (RLC) layer's Packet ACK/NACK (Acknowledged/Not Acknowledged) message. Polling the mobile station for this message provides an indication of which blocks have been successfully received, and which blocks have been received with an error.

The number of blocks indicated to be in error and the total number of blocks received are counted. The polling interval can be set using "CALL:FUNCtion:DATA:BLER:POLLing:INTerval" on page 542.

BLER measurements cannot be made when the data connection type is set to ETSI Type A in Active Cell operating mode, *nor* in BCH test mode. The test set's operating mode can be set using "CALL:OPERating:MODE" on page 610. The data connection type can be set using "CALL:FUNCtion:CONNection:TYPE" on page 538.

The recommended channel coding scheme for GPRS BLER measurements is CS-4. You use the command "CALL:PDTCH:CSCHeme" on page 627 to set the GPRS coding scheme.

The recommended modulation coding scheme for EGPRS BLER measurements is MCS-9. You use the command "CALL:PDTCH:MCSCheme" on page 630 to set the EGPRS modulation coding scheme.

You can send SETup subsystem commands to the test set which specify the number of blocks to test, block delay, trigger arm, and measurement timeout values.

NOTE In case the test set is not able to correlate the data it transmits on the downlink with the data it receives on the uplink, a Measurement Timeout value should be set. If a timeout is not set and the test set is unable to correlate, the measurement will appear to “hang”.

Types of Signal BLER can Measure

BLER measurements can be made on these types of input signals:

- One or more uplink and downlink PDTCH pairs with the mobile station in active cell mode and the data connection type set to ETSI Type B, ETSI Type B Acknowledged, or BLER. If you want to optimize measurement speed, it is important that the mobile station is set up for the same number of uplink and downlink PDTCHs.
- One or more uplink and downlink PDTCH pairs with the mobile station in either GPRS BCH+PDTCH test mode or EGPRS BCH+PDTCH test mode (see “CALL:OPERating:MODE” on page 610 for details on setting the cell operating mode). Note that you have to manually set your mobile station to synchronize its internal frequency and timing reference with the test set. You also have to command the mobile station to loop back the PDTCH data.

BLER Measurement Results

The results of a BLER measurement can be displayed in two ways; the number of block errors counted or the ratio of bad blocks (errors) to total blocks counted. If you are using the test set manually, both Count and Block Error Ratio are displayed on the Block Error measurement screen. If you are using the test set remotely, these results are available using the FETCh command, see “FETCh:BLERror:COUNt?” on page 890 or “FETCh:BLERror:RATio?” on page 891. Alternatively the command “FETCh:BLERror[:ALL]?” on page 889 can be used to return all of the following results:

- Integrity Indicator
- Block Error Ratio
- Blocks Tested
- Block Error Count

In addition, the Intermediate Count of Blocks Tested result can be queried using “FETCh:BLERror:ICOunt?” on page 890 and the Block Delay can be queried using “FETCh:BLERror:DELay?” on page 890.

Related Topics

“Programming a Block Error Measurement” on page 334

“Test Adherence to Standards” on page 150

“Block Error Troubleshooting” on page 1456

“Receiver Sensitivity Testing in GPRS” on page 131

Block Error Rate (BLER) Reports Description

These reports are *not* applicable to GSM.

Block Error Rate (BLER) reports can be used in the production process to test the performance of a GPRS mobile station's receiver. The BLER result is derived from the Radio Link Control (RLC) layer's Packet ACK/NACK (Acknowledged/Not Acknowledged) message. BLER is simply the ratio of the number of negatively acknowledged blocks to the total number of blocks acknowledged by the mobile station.

The test set uses an Agilent proprietary data connection to enable BLER reports to be retrieved from the mobile station (For details on how to set the data connection type to BLER, see "CALL:FUNCtion:CONNection:TYPE" on page 538).

The BLER reports which the test set provides are based on GPRS receiver tests defined in 3GPP 51.010 (formerly ETSI GSM 11.10), section 14.16 (GPRS) and section 14.18.1 (EGPRS).

As well as BLER reports, the test set also provides a Block Error measurement (see "Block Error Measurement Description" on page 90). Starting or aborting a Block Error measurement does not affect the BLER reports. In addition, resetting the BLER reports does not affect the BLER measurement.

When are BLER Reports Made?

You obtain BLER results using the GPIB query "CALL:STATus:PDTCh | PDTChannel:BLERror?" on page 809. This query returns the percentage of blocks tested that were in error and the total number of blocks used to generate the BLER result. To reset the BLER result you must use "SYSTem:MEASurement:RESet" on page 1296. The BLER result does not reset automatically when you connect a different mobile station.

The BLER results are only available when the data connection status is transferring (TRAN). If you require details on data connection states, see "Data Connection Processing State Synchronization" on page 445.

Using Different Power Levels on Downlink Timeslots

The BLER results are calculated across all active downlink timeslots, not on any individual downlink timeslot.

NOTE When using the multislot configurations which provide two downlinks (D2U1 and D2U2), the test set requests Packet ACK/NACK (Acknowledged/Not Acknowledged) messages from the mobile station on timeslot 4. ETSI specifies that the mobile station must respond to these requests on the same timeslot. If the downlink on timeslot 4 degrades severely (and thus has a large number of block errors), the mobile station may be unaware of a request for Packet ACK/NACK messages. If this happens, the BLER reports may hang for long periods or stop completely. This may cause the data connection to stop after a few seconds.

Programming BLER Reports

This section provides an example of how to use BLER reports to test a GPRS mobile station's receiver via GPIB.

The following procedure assumes that a data connection has been established between the test set and the mobile station (connection status is Transferring). See "Step 4: Make a Connection" on page 276.

1. Configure the BCH and PDTCH parameters using the CALL subsystem.
2. Reset the BLER results using the SYSTem:MEASurement:RESet command.
3. Use the CALL:STATus:PDTCH:BLERror? query to obtain the first BLER results.
4. Re-configure the downlink PDTCH power level of one of the bursts using the CALL subsystem.
5. Reset the BLER results again using the SYSTem:MEASurement:RESet command.
6. Use the CALL:STATus:PDTCH:BLERror? query to obtain the second BLER results.

Programming Example

```
10    ! This code assumes that the current data connection state is Transferring.
20    !
30    ! Configure BCH and PDTCH parameters
40    OUTPUT 714;"CALL:PDTCH:BAND PGSM" ! Set the PDTCH band.
50    OUTPUT 714;"CALL:POW -60" ! Set the BCH level to -60 dBm
60    OUTPUT 714;"CALL:PDTCH:MSL:CONF D2U1" ! Set the multislot configuration to
70                                         ! two downlinks, one uplink.
80    OUTPUT 714;"CALL:PDTCH:PZER:LEV 30" ! Set the P0 reference level to 30 dB.
90    OUTPUT 714;"CALL:PDTCH:CSCH CS4" ! Set the channel coding scheme to CS4.
100   !
110   ! Perform a measurement reset to ensure a stable data connection.
120   OUTPUT 714;"SYST:MEAS:RES"
130   ! Read initial BLER ensuring that result is over 2000 blocks at least
140   REPEAT
150     OUTPUT 714;"CALL:STAT:PDTCH:BLER?"
160     ENTER 714;Bler_initial,Blocks_initial
170   UNTIL (Blocks_initial>=2000 AND Blocks_initial<=2300) ! <= required for
180                                                         ! NAN (9.91E+37) case.
190   !
200   ! Print results at initial downlink PDTCH power level
210   ! of -90 dBm(-60 dBm BCH level - 30 dB P0 level)
220   PRINT "Blocks tested at -90 dBm = ";Blocks_initial
230   PRINT "BLER Result at downlink PDTCH power of -90 dBm = ";Bler_initial
240   !
250   ! Set up and select the downlink PDTCH power reduction levels.
260   OUTPUT 714;"CALL:PDTCH:PRED:LEV1 11db"
270   OUTPUT 714;"CALL:PDTCH:PRED:LEV2 0dB"
280   OUTPUT 714;"CALL:PDTCH:PRED:BURS1 PRL1"
290   OUTPUT 714;"CALL:PDTCH:PRED:BURS2 PRL2"
300   OUTPUT 714;"SYST:MEAS:RES" ! Reset the BLER results
310   !
320   ! Now obtain the second set of BLER results when burst 1 has a lower
330   ! power level which introduces more block errors.
340   REPEAT
```

```
350     OUTPUT 714;"CALL:STAT:PDTCH:BLER?"
360     ENTER 714;Bler_second,Blocks_second
370   UNTIL (Blocks_second>=2000 AND Blocks_second<=2300)
380   !
390   ! Print results when downlink burst 1 is at lower downlink PDTCH
400   ! power level of -101 dBm(-60 dBm BCH level - 30 dB P0 level - 11 dB power
410   ! reduction level).
420   PRINT
430   PRINT "Blocks tested at -101 dBm = ";Blocks_second
440   PRINT "BLER Result at downlink PDTCH power of -101 dBm = ";Bler_second
450   END
```

Returned Values

The BLER reports returned by this program are:

- `Blocks_initial` returns the number of blocks tested to calculate the first BLER result.
- `Bler_initial` returns the BLER result, in percent (%) when the downlink PDTCH power levels of both bursts are at -90 dBm.
- `Blocks_second` returns the number of blocks tested to calculate the second BLER result.
- `Bler_second` returns the second BLER result, in percent (%). This result has been obtained when the downlink PDTCH power level of the first burst has been reduced by 11 dB to -101 dBm.

Related Topics

“Testing a GPRS Mobile Station” on page 316

“Receiver Sensitivity Testing in GPRS” on page 131

“CALL:STATus:PDTCh | PDTChannel:BLERror?” on page 809

“Programming: Getting Started Guide for E1968A GSM/GPRS Mobile Test Application Revision A.01 and E6701C GSM/GPRS Lab Application Revision C.01” on page 266

“GPRS Data Connection Troubleshooting” on page 1469

Decoded Audio Measurement Description

This measurement is *not* applicable to GPRS.

How is a decoded audio (DAUDIO) measurement made?

This measurement is also known as decoded audio or uplink speech level measurement. The DAUDIO measurement tests the ability of the mobile station to encode an audio signal onto the uplink traffic channel.

1. The audio signal originates from the test set's AUDIO OUT connector. The audio signal is connected to the mobile station by means of an audio frequency input connector, or acoustically through a speaker placed near the microphone of the mobile station. See "AFGenerator" on page 455 for set up commands for the test set's audio generator.
2. The mobile station digitizes and encodes the audio signal that is transmitted on the uplink TCH.
3. The uplink TCH is decoded with a bit accurate GSM RPE-LTP decoder to yield a block of 13-bit PCM samples within the DSP. As described in ETSI GSM 06.10.

NOTE The MS needs to be stimulated with a pulsed audio signal during a DAUDIO measurement. The audio signal must be pulsed at a 10 Hz rate with 50% duty cycle. See "AFGenerator:PULSe[:STATe]" on page 457.

The decoded audio measurement returns the rms value, in percent of full scale, of the speech signal present on the uplink (encoded) audio signal over a 100 ms (10 Hz) period of time.

The DAUDIO measurement performs an rms level measurement of a speech signal on the uplink TCH with optional bandpass filtering. Speech data can be filtered using a tunable 100 Hz bandpass filter prior to analysis. The center frequency of the 100 Hz bandpass filter may be tuned from 200 Hz to 3.6 kHz. Setting the frequency will activate the filter.

The trigger source for a DAUDIO measurement is always set to Immediate.

The DAUDIO measurement, BER and Fast BER measurements are mutually exclusive. Whichever of these measurements is activated last forces the other to become inactive.

Single or Multi-Measurements

The DAUDIO measurement can return single or averaged measurements defined by the multi-measurement count. A single measurement (multi-measurement count off) returns an estimate of the rms value of the decoded speech signal after removal of any dc component. The measurement units are in percent of full scale (%FS), ranging from 0 to 100%. Values greater than 70.70% may only result from non-sinusoidal signals. Multiple measurements (multi-measurement count >1) provide average, minimum, maximum, and standard deviation results. An integrity indicator is returned for both multi-measurement states. None of the results are affected by amplitude offset.

Trigger Source

DAUDIO measurement does not support any trigger source other than immediate.

Related Topics

"Programming a Decoded Audio Measurement" on page 337

"Test Adherence to Standards" on page 150

Distortion Measurement Description

This measurement is *not* applicable to GPRS.

How is a Distortion measurement made?

Distortion is an audio quality measurement that compares the audio signal level from the mobile at a specified (desired) frequency to the level of signals present at other frequencies. The audio signals from the mobile are typically measured after digital demodulation of the traffic channel.

The test set makes two measurements to determine distortion. First, the test set measures the total audio signal level. Next, a precise notch filter is then used to remove the signal at the specified frequency. The remaining signal level indicates the level of unwanted signals (distortion). Distortion is expressed as a percentage of the total audio signal.

Distortion can be measured in the range of 100 Hz to 10 kHz.

The distortion measurement can be used to perform the audio harmonic distortion test. For example in an analog system like AMPS, two audio signals are used: a 1004 Hz tone and the 6000 Hz Supervisory Audio Tone (SAT). The 1004 Hz tone is notched out to make the measurement.

Related Topics

"Analog Audio Measurement Description" on page 80

"Analog Audio Troubleshooting" on page 1454

"Programming a Distortion Measurement" on page 338

"Test Adherence to Standards" on page 150

Dynamic Power Measurement Description

How is a Dynamic Power Measurement Made?

The Dynamic Power measurement performs a series of consecutive power measurements on a mobile station returning a power measurement and an integrity value for each burst measured. Dynamic Power is only available via the test set's remote user interface.

NOTE When using the Dynamic Power measurement with an EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). The Dynamic Power measurement does *not* support 8PSK modulation coding schemes (MCS5 through MCS9).

Dynamic Power is not an ETSI specified measurement.

The signal is measured at the RF IN/OUT port.

Single or Multi-Measurements

The Dynamic Power measurement does not use the multi-measurement state parameter, and so does not return minimum, maximum, and standard deviation values. Instead, you specify the number of bursts that you want to measure using the Number of Bursts parameter (see "SETup:DPOWer:COUNt:NUMBer[:SELected]" on page 1073). A single measurement returns the integrity indicator and power level for every burst measured. For example, if you set the number of bursts to 15, the returned comma-separated list contains 15 integrity values followed by 15 corresponding measurement values.

Types of Signals Dynamic Power can Measure

Dynamic Power measurements can be made on these types of input signals:

- Normal TCH or PDTCH burst with mobile station in active cell mode.
- Normal TCH or PDTCH burst with mobile station in test mode (no protocol).

Input Signal Requirements

The Dynamic Power measurement will complete and meet its measurement accuracy specifications when the signal meets the following input signal conditions.

- Input signal level is between -20 dBm and +43 dBm.
- Input signal level is within +3 dB and -3 dB of the expected input level.
- Input signal is within 100 kHz of the measurement frequency.
- The measurement frequency is within the currently selected band.

Trigger Source

The only trigger source that the Dynamic Power measurement supports is RF Rise.

Related Topics

"Programming a Dynamic Power Measurement" on page 340

"SETup:DPOWer" on page 1070

"FETCh:DPOWer" on page 897

"Test Adherence to Standards" on page 150

Fast Bit Error Measurement Description

This measurement is *not* applicable to GPRS or EGPRS.

Bit Error Measurements vs. Fast Bit Error Measurements

There are three commonly used types of bit error measurements in GSM:

- "BER with Frame Erasure" or "Residual BER" when the mobile station has been configured to loopback Type A.
- "BER without Frame Erasure" or "Non-residual BER" when the mobile station has been configured to loopback Type B.
- BER using burst-by-burst loopback when the mobile station has been configured to loopback Type C.

The test set allows you to select between Loopback Type A or B, and the Fast Bit Error Measurement, which uses Loopback Type C. Refer also to "Bit Error Measurement Description" on page 85.

NOTE If the test set has codeware version A.02.00 or above, unnecessary loopback commands and delays can be eliminated by taking advantage of enhancements available.

Previous versions of the test set required you to set the loopback type, and did not have a feature that allowed time for the loop to close.

How is a fast bit error (FBER) measurement made?

During FBER measurements, the test set generates a downlink TCH with (Pseudo Random Binary Sequence) PRBS-15 data at a known low level. The mobile station receives the data, loops it back to its transmitter, and returns the data to the test set. The test set compares data sent to data received, and FBER is calculated. see "CALL:TCHannel" on page 813

SETup subsystem commands are sent to the test set to specify close loop delay, signal loopback control, the number of bits to test, TDMA frames delay, measurement unit, trigger arm, and measurement timeout values.

When a call is established on the TCH, the loopback type is sent to the mobile station if the signal loopback control is on, see "SETup:FBERror:SLControl[:STATe]" on page 1098. If you set signal loopback control to off, the loopback type is controlled using "CALL:TCHannel:LOOPback" on page 825. If you are using the test set manually, the loopback type is controlled using **Mobile Loopback** (**F12**) on **Call Parms** menu **1 of 4**.

FBER measurements use mobile station burst-by-burst loopback, referred to as loopback type C. In loopback type C the comparison is made between the 114 bits of data sent from the test set to the mobile station, then looped back and received by the test set.

The loop must be closed before a FBER test can start, using the close loop signalling delay time feature allows time for the loop to close. See "SETup:FBERror:CLSDelay[:STIMe]" on page 1091 for more details.

Each MS may have a different delay between receiving a TDMA frame and re-sending it on the uplink. By default, the test set is configured to LDControl:AUTO:ON, and the amount of delay needed is determined automatically when the test set has, for two frames, correctly received 80% of the downlink bits back on the uplink. The test set can be queried for the TDMA frames delay value.

If necessary, you can manually set the delay. See “SETup:FBERror:LDControl:AUTO” on page 1096 or “SETup:FBERror:MANual:DELay” on page 1097

NOTE In case the test set is not able to correlate the data it transmits on the downlink with the data it receives on the uplink, a Measurement Timeout value should be set. If a timeout is not set and the test set is unable to correlate, the measurement will appear to “hang”.

The FBER, BERR and the DAUDIO (uplink speech level) measurements are mutually exclusive, that is which ever of these measurements is activated last forces the other to become inactive. see “Decoded Audio Measurement Description” on page 95

FBER measurement trigger source is always set to immediate. The FBER measurement does not offer multi-measurement results. see “Statistical Measurement Results” on page 410

FBER measurement results

These the measurement results available from an FBER measurement.

The results of a FBER measurement can be displayed in two ways, (number of errors counted) or (the ratio bad bits (errors) to total bits counted). If you are using the test set remotely these results are available by using the FETCh command, see “FETCh:FBERror:COUNt?” on page 909 or “FETCh:FBERror:RATio?” on page 910. If you are using the test set manually select either Count or % from the Measurement Units field.

Manual user interface results:

- Fast BER Ratio (bad bits to total bits tested)
- Fast BER Count (bad bits found during a measurement)
- TDMA frame Delay (if TDMA Frame Loopback Delay Control = Manual)
- RX Level
- RX Quality

Remote user interface results:

- Fast BER Ratio (bad bits to total bits tested)
- Fast BER Count (bad bits found during a measurement)
- TDMA Frame Delay (if TDMA Frame Loopback Delay Control = Manual)
- Integrity Indicator
- Intermediate Count

Related Topics

"Programming a Fast Bit Error Measurement" on page 343
"Test Adherence to Standards" on page 150
"Bit Error Measurement Description" on page 85
"Programming a Bit Error Measurement" on page 329
"CALL:TCHannel:LOOPback" on page 825

I/Q Tuning Measurement Description

How is an I/Q Tuning Measurement Made?

The I/Q Tuning measurement is used in the production process (normally at mobile pre-test) where the I/Q modulator of the mobile is being calibrated. The measurement is normally performed with the mobile station in test mode and transmitting a GMSK modulated sequence of all 0s or all 1s. The mobile can be transmitting either a bursted signal or a continuous wave signal. I/Q Tuning is not an ETSI specified measurement.

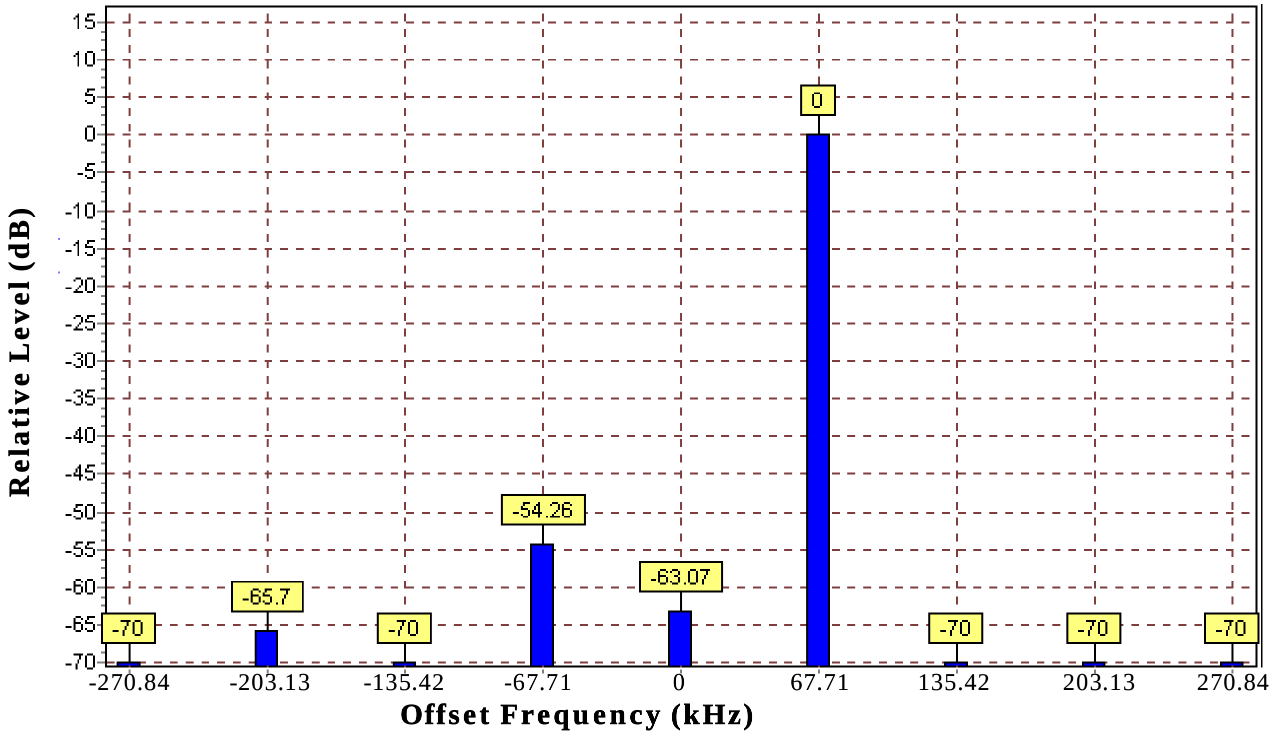
NOTE When using the I/Q Tuning measurement with an EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). The I/Q Tuning measurement does *not* support 8PSK modulation coding schemes (MCS5 through MCS9).

The carrier frequency is shifted up or down 67.7083 kHz by transmitting a sequence of all 0s (+67.7083 kHz) or all 1s (-67.7083 kHz). The accuracy of the mobile's I/Q modulator is determined by measuring the level of spurious signals relative to the desired signal (the desired signal being the carrier frequency +/-67.7083 kHz). The signals the test set measures are: the carrier frequency (Fc); Fc+/-67.7083 kHz; Fc+/-135.417 kHz; Fc+/-203.125 kHz and Fc+/-270.833 kHz. These signals are measured at the RF IN/OUT port.

The figure below shows a typical spectrum generated by a mobile transmitting a sequence of all 0s. The peak at the +67.7083 kHz offset is the one used as the reference.

The I/Q Tuning measurement also allows you to make an additional relative power measurement at any frequency you want between -13.0 MHz to -1.0 MHz and +1.0 MHz to +13.0 MHz relative to the carrier frequency.

Figure 2. Spectrum of a mobile transmitting a sequence of all 0s



Single or Multi-Measurements

The I/Q Tuning measurement can return either single or averaged measurement results.

- If you set the multi-measurement state OFF then only a single measurement is made at each offset.
- If you set the multi-measurement state ON, and the multi-measurement count number to a value greater than one, then multiple measurements are made at each offset. The returned results are an average of these measurements.

Types of Signals I/Q Tuning can Measure

I/Q Tuning measurements can be made on these types of input signals.

- Normal TCH or PDTCH burst without a midamble.
- CW signal.

I/Q Tuning Input Signal Requirements

The I/Q Tuning measurement will complete and meet its measurement accuracy specifications under the following input signal conditions.

- Input signal level is between -15 dBm and +43 dBm.
- Input signal level is within +3 dB and -10 dB of the expected input level.
- Signal must be within 500 kHz of expected frequency for RF Rise triggering to function.

Trigger Source

The trigger source depends on the type of input signal.

Recommended Trigger Source Settings

Input Signal Type	Recommended Trigger Source
Normal TCH or PDTCH burst without a midamble	RF Rise
CW signal	Immediate

Related Topics

"Programming an I/Q Tuning Measurement" on page 345

"Test Adherence to Standards" on page 150

Output RF Spectrum Measurement Description

The Output RF Spectrum Measurement is applicable to both GSM, GPRS, and EGPRS. This measurement description contains two sections:

- "GSM Output RF Spectrum Measurement" on page 106
- "GPRS and EGPRS Output RF Spectrum Measurement" on page 109

GSM Output RF Spectrum Measurement

How is an output RF spectrum (ORFS) measurement made?

ORFS is a narrow-band measurement that provides information about the distribution of the mobile station transmitter's out-of-channel spectral energy due to modulation and switching as defined in ETSI GSM 05.05, section 4.2, 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.4 at offsets < 1800 kHz.

The test set's measurements include both ORFS due to modulation and ORFS due to switching. Switching and modulation measurements may be performed from the same burst. If you request both modulation and switching results at the same frequency offsets, measurement throughput is improved. Measurements are made using a 30 kHz IF bandwidth, 5-pole synchronously tuned filter.

ORFS due to modulation measures out of channel interference during the useful part of the burst excluding the midamble. The measurement returns relative results in (dB) using the power in a 30 kHz bandwidth at zero offset as the reference. You can set 0 to 22 offsets.

ORFS due to switching measures out of channel interference over the entire burst, plus up to 10 additional bits on either side of the 147 bit wide normal burst. The measurement returns absolute power results (dBm) for each offset indicating the maximum value over the entire burst. You can set 0 to 8 ORFS due to switching offsets.

The number of measurements to be averaged for each offset may be different. The test set internally controls all other aspects of the measurement, including calibration.

TX power (average power), 30 kHz bandwidth power at zero offset, ORFS due to modulation average power, and ORFS due to switching maximum power are included in an ORFS measurement, when both modulation and switching measurements are made. (TX power is performed using the same method as described in the "Transmit Power Measurement Description" on page 144, which synchronizes the measurement with the burst amplitude).

ORFS due to modulation

When multiple offsets for the ORFS due to modulation measurement are set, the DSP averages the power across the appropriate time segments (40 bits) of the burst with a 30 kHz resolution bandwidth, 5-pole, synchronously tuned filter placed at the center frequency of the burst and compares it to a time segment of the response of the same filter placed at some frequency offset. The result is a relative power measurement using the 30 kHz bandwidth power at zero offset as a reference. For each offset you specify, the DSP retunes the filter and measures the 30 kHz bandwidth power and compares it to the reference, giving a relative power measurement of signal power over the entire burst. The DSP processes the data and makes the results available to you. The 30 kHz bandwidth power at zero offset is measured only if you request at least one ORFS due to modulation measurement.

For offsets up to 1.799999 MHz, an ORFS due to modulation measurement uses the 30 kHz resolution bandwidth filter required in GSM 05.05. At the 1800 kHz offset frequency the ORFS due to modulation measurement is made using the 30 kHz resolution bandwidth filter, not the 100 kHz resolution bandwidth filter required by ETSI.

The ORFS due to modulation measurement measures both the front and back data portions of the burst. Measurements occur from bit 15 to 60 and from bit 87 to 132. GSM 11.10 recommends that this measurement is performed on only the back section of the burst. Measuring both the front and back of the burst has the speed advantage of providing two modulation measurements per burst.

ORFS due to switching

When multiple offsets for the ORFS due to switching measurement are set, the DSP tunes the 30 kHz resolution bandwidth, 5-pole, synchronously tuned filter to the first requested offset and samples the power of the signal over the entire burst. The result for this measurement is the maximum of these sampled values and is reported as an absolute power measurement. The DSP then retunes the filter, samples the signal, processes the data for each requested offset, then provides the results.

The 30 kHz bandwidth power at zero offset measurement is not made during ORFS due to switching measurements. In order to make that measurement, you must request at least one ORFS due to *modulation* measurement.

Single or Multi-Measurements

To obtain statistical measurement results, the multi-measurement count must be set for both switching and modulation measurements. (See “Statistical Measurement Results” on page 410 for more information.)

Changing the multi-measurement modulation or switching count number or setting multi-measurement to ON allows the test set to make multiple measurements at each frequency offset. For modulation measurements the offset values returned are the average power at each offset. For switching measurements the offset values returned are the maximum power at each offset. If you set Multi-measurement count state to OFF only one ORFS measurement is completed at each offset (that is, one ORFS due to modulation, and one ORFS due to switching measurement).

- If you want to make multiple ORFS due to *modulation* measurements and no ORFS due to switching measurements, a number must be entered in the multi-measurement modulation count, and all the *switching* offset frequencies must be off.
- In order to make multiple ORFS due to *switching* measurements and no ORFS due to modulation measurements, a number must be entered in the multi-measurement switching count, and all *modulation* offset frequencies must be off.

Types of Signals ORFS can Measure

ORFS measurements can be made on these types of input signals:

- Normal GSM TCH burst with mobile station in active cell mode.
- Normal GSM TCH burst with mobile station in test mode.
- Non-bursted signal including GMSK modulation with mobile station in test mode.

  For a non-bursted signal, an ORFS due to switching measurement result is not useful.

Input Signal Requirements

The ORFS measurement will complete and meet its accuracy specification under the following conditions:

- Input signal level is between –10 dBm and +43 dBm.
- Input signal level within +/–3 dB of the expected input level.
- Frequency is within +/–200 Hz of expected input frequency.

Trigger Source

Auto triggering is the recommended trigger source for each measurement, allowing the test set to choose the preferred trigger source. However, you may want to select the trigger source.

Table 12. Recommended Trigger Source Settings

Input Signal Type	Recommended Trigger Source
Normal GSM TCH burst with mobile station in active cell mode	Protocol
Normal GSM TCH burst with mobile station in test mode	RF Rise
CW signal	Immediate

Related Topics

“Programming an Output RF Spectrum Measurement” on page 347

“Test Adherence to Standards” on page 150

“ORFS Troubleshooting” on page 1462

GPRS and EGPRS Output RF Spectrum Measurement

How is an output RF spectrum (ORFS) measurement made?

ORFS is a narrow-band measurement that provides information about the distribution of the mobile station transmitter's out-of-channel spectral energy due to modulation and switching as defined in ETSI GSM 05.05, section 4.2, 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.4.

For GPRS mobiles which support a single uplink timeslot or two adjacent uplink timeslots, the measurement conforms to 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.16.3 at offsets < 1800 kHz (when the Multi-Measurement Count - Modulation parameter is set to Off using "SETup:ORFSpectrum:COUNt:STATe" on page 1134).

For EGPRS mobiles which support a single uplink timeslot or two adjacent uplink timeslots, and while using one of the GMSK modulated coding schemes (MCS1, MCS2, MCS3, or MCS4) the measurement conforms to 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.16.3 at offsets < 1800 kHz (when the Multi-Measurement Count - Modulation parameter is set to Off using "SETup:ORFSpectrum:COUNt:STATe" on page 1134).

The test set's measurements include both ORFS due to modulation and ORFS due to switching.

ORFS due to modulation measures out of channel interference during the useful part of the burst excluding the midamble. The measurement returns relative results in (dB) using the power in a 30 kHz bandwidth at zero offset as the reference. You can set 0 to 22 offsets.

ORFS due to switching measures out of channel interference over the one, or two adjacent bursts in the multislot configuration, plus up to 10 additional bits on either side of the 147 bit wide normal burst. The measurement returns absolute power results (dBm) for each offset indicating the maximum value over the entire multislot configuration. You can set 0 to 8 ORFS due to switching offsets.

When measuring a single uplink timeslot, switching and modulation measurements can be performed from the same burst (provided that the overshoot in the burst is less than 1 dB). If you request both modulation and switching results at the same frequency offsets, measurement throughput is improved. Measurements are made using a 30 kHz IF bandwidth, 5-pole synchronously tuned filter.

When measuring two adjacent uplink timeslots, the modulation measurement is performed for only one burst at a time in the multislot configuration, which you specify using "RFANalyzer:MANual:MEASurement:BURSt" on page 1025. The switching measurement is performed over both adjacent bursts in the multislot configuration irrespective of which of the two bursts you have currently selected to measure.

NOTE In order for the test set to return a valid switching measurement result when measuring two adjacent uplink bursts, you should ensure that the burst you have selected to measure has a power level equal to or higher than the expected power level of the other uplink burst in the multislot configuration. If the selected burst has a lower expected power level, the same hardware range settings cannot be used for both the modulation and switching measurements and the test set returns NAN for the switching measurement. The expected power can be set manually using "RFANalyzer:MANual:POWer:GPRS[:SELected]:BURSt[1|2]" on page 1028.

The number of measurements to be averaged for each offset may be different. The test set internally controls all other aspects of the measurement, including calibration.

TX power (average power), 30 kHz bandwidth power at zero offset, ORFS due to modulation average power, and ORFS due to switching maximum power are included in an ORFS measurement, when both modulation and switching measurements are made. (TX power is performed using the same method as described in the “Transmit Power Measurement Description” on page 144, which synchronizes the measurement with the burst amplitude).

ORFS due to modulation

When multiple offsets for the ORFS due to modulation measurement are set, the DSP averages the power across the appropriate time segments (40 bits) of the burst with a 30 kHz resolution bandwidth, 5-pole, synchronously tuned filter placed at the center frequency of the burst and compares it to a time segment of the response of the same filter placed at some frequency offset. The result is a relative power measurement using the 30 kHz bandwidth power at zero offset as a reference. For each offset you specify, the DSP retunes the filter and measures the 30 kHz bandwidth power and compares it to the reference, giving a relative power measurement of signal power over the entire burst. The DSP processes the data and makes the results available to you. The 30 kHz bandwidth power at zero offset is measured only if you request at least one ORFS due to modulation measurement.

For offsets up to 1.799999 MHz, an ORFS due to modulation measurement uses the 30 kHz resolution bandwidth filter required in GSM 05.05. At the 1800 kHz offset frequency the ORFS due to modulation measurement is made using the 30 kHz resolution bandwidth filter, not the 100 kHz resolution bandwidth filter required by ETSI.

The ORFS due to modulation measurement measures both the front and back data portions of the burst. Measurements occur from bit 15 to 60 and from bit 87 to 132. GSM 11.10 recommends that this measurement is performed on only the back section of the burst. Measuring both the front and back of the burst has the speed advantage of providing two modulation measurements per burst.

ORFS due to switching

When multiple offsets for the ORFS due to switching measurement are set, the DSP tunes the 30 kHz resolution bandwidth, 5-pole, synchronously tuned filter to the first requested offset and samples the power of the signal over the entire burst. The result for this measurement is the maximum of these sampled values and is reported as an absolute power measurement. The DSP then retunes the filter, samples the signal, processes the data for each requested offset, then provides the results.

The 30 kHz bandwidth power at zero offset measurement is not made during ORFS due to switching measurements. In order to make that measurement, you must request at least one ORFS due to *modulation* measurement.

Single or Multi-Measurements

To obtain statistical measurement results, the multi-measurement count must be set for both switching and modulation measurements. (See “Statistical Measurement Results” on page 410 for more information.)

Changing the multi-measurement modulation or switching count number or setting multi-measurement to ON allows the test set to make multiple measurements at each frequency offset. For modulation measurements the offset values returned are the average power at each offset. For switching measurements the offset values returned are the maximum power at each offset. If you set Multi-measurement count state to OFF only one ORFS measurement is completed at each offset (that is, one ORFS due to modulation, and one ORFS due to switching measurement).

- If you want to make multiple ORFS due to *modulation* measurements and no ORFS due to switching measurements, a number must be entered in the multi-measurement modulation count, and all the *switching* offset frequencies must be off.
- In order to make multiple ORFS due to *switching* measurements and no ORFS due to modulation measurements, a number must be entered in the multi-measurement switching count, and all *modulation* offset frequencies must be off.

Measuring ORFS on GPRS and EGPRS mobiles using the BLER data connection type

The result of the Output RF Spectrum measurement relies on pseudo random data being present in the data field of the RF burst. When using the BLER data connection type, these data fields do not contain pseudo random data, therefore the results may not be representative.

Types of Signals ORFS can Measure

The following list summarizes the input signal attributes and mobile station operating modes for making PvT measurements.

- All supported GPRS PDTCH multislot configurations with the mobile station in active cell mode.
- All supported GPRS PDTCH multislot configurations with the mobile station in GPRS BCH or GPRS BCH+PDTCH test mode (no protocol).
- All supported EGPRS PDTCH multislot configurations with the mobile station in active cell mode and a modulation coding scheme that uses a GMSK modulation format (MCS1 through MCS4).
- All supported EGPRS PDTCH multislot configurations with the mobile station in EGPRS BCH or EGPRS BCH+PDTCH test mode (no protocol), and a modulation coding scheme that uses a GMSK modulation format (MCS1 through MCS4).
- Non-bursted signal including GMSK modulation with mobile station in test mode.

  For a non-bursted signal, an ORFS due to switching measurement result is not useful.

Input Signal Requirements

The ORFS measurement will complete and meet its accuracy specification under the following conditions:

- Input signal level is between –10 dBm and +37 dBm.
- Input signal level within +/–3 dB of the expected input level.
- Frequency is within +/–200 Hz of expected input frequency.

Trigger Source

Auto triggering is the recommended trigger source for each measurement, allowing the test set to choose the preferred trigger source. However, you may want to select the trigger source.

Table 13. Recommended Trigger Source Settings

Input Signal Type	Recommended Trigger Source
GPRS PDTCH multislot configuration with mobile station in active cell mode	Protocol
Normal GPRS PDTCH multislot configuration with mobile station in GPRS BCH or GPRS BCH+PDTCH test mode	RF Rise
EGPRS PDTCH multislot configuration with mobile station in active cell mode and modulation coding scheme set to MCS1, MCS2, MCS3, or MCS4	Protocol
EGPRS PDTCH multislot configuration with the test set in EGPRS BCH or EGPRS BCH+PDTCH test mode and modulation coding scheme set to MCS1, MCS2, MCS3, or MCS4	RF Rise
CW signal	Immediate

For more information on measurement triggering, refer to “Triggering of Measurements” on page 404.

Related Topics

“Programming an Output RF Spectrum Measurement” on page 347

“Test Adherence to Standards” on page 150

“ORFS Troubleshooting” on page 1462

Phase and Frequency Error Measurement Description

How is a phase and frequency error (PFER) measurement made?

The PFER measurement performs a narrow-band (<200 kHz) measurement of the modulation quality and frequency accuracy of the mobile station's transmitter. The test set measures frequency error, rms phase error and peak phase error over the useful part of the burst.

The PFER measurement demodulates the data and compares the measured wave form with the "ideal" waveform that was expected for the data received. The frequency error is the difference in frequency, after adjustment for the effect of the modulation and phase error, between the RF transmission from the mobile station and the test set. The phase error is the difference in phase, after adjustment for the effect of the frequency error, between the mobile station and the theoretical "ideal" transmission. This measurement conforms to ETSI GSM 05.05; and ETSI GSM 11.10, section 13.1.

For GPRS mobiles which support a single uplink timeslot or two adjacent uplink timeslots, this measurement conforms to ETSI GSM 05.05 (Ver 8.2.0, 7.2.0, 6.6.0), section 4.6.1. It also conforms with 3GPP 51.010 (formerly ETSI GSM 11.10) if used as part of a type approval system.

For EGPRS mobiles which support a single uplink timeslot or two adjacent uplink timeslots, and while using one of the GMSK modulated coding schemes (MCS1, MCS2, MCS3, or MCS4), the Phase and Frequency Error measurement conforms to 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.16.1.

You can measure one of the two adjacent uplink bursts of the multislot configuration at any one time. You specify the burst to measure using "RFANalyzer:MANual:MEASurement:BURSt" on page 1025. There are no limits on the relative powers of the two uplink bursts in the multislot configuration.

The PFER measurement is controlled by the DSP in the test set. No calibration is required by the user, the DSP gets calibration information during test set power up. PFER measurements can be initiated with any measurement made by the test set.

Single or Multi-Measurements

The DSP demodulates the data and compares the measured waveform with the "ideal" waveform created by the DSP.

A single burst for a PFER measurement calculates the following:

- peak phase error
- rms phase error
- frequency error

A multiple burst PFER measurement is made when the multi-measurement state is on and calculates the maximum, minimum and average values for the following:

- peak phase error
- rms phase error
- frequency error
- worst frequency error (worst frequency error is the frequency furthest from zero.)

All of these results are available using the FETCh command. If the most positive and the most negative frequency error are the same value, the most positive frequency will be returned. Worst frequency error is only accessible through GPIB. The test set always has an integrity indicator available regardless of whether it is a single or multiple burst measurement.

Types of Signals PFER can Measure

PFER measurements can be made on these types of input signals.

- Normal GSM TCH or GPRS PDTCH burst with mobile station in active cell mode.
- Normal EGPRS PDTCH burst with mobile station in active cell mode, and a modulation coding scheme that uses a GMSK modulation format (MCS1 through MCS4).
- Access (RACH) burst with mobile station in active cell mode.
- Normal GSM TCH or GPRS PDTCH burst with mobile station in test mode.
- Normal EGPRS PDTCH burst with mobile station in test mode, and a modulation coding scheme that uses a GMSK modulation format (MCS1 through MCS4).
- Access (RACH) burst with mobile station in test mode.
- Bursted signal with GMSK modulation without a valid midamble.

Input Signal Requirements

The PFER measurement will complete and meet its accuracy specification of:

- Frequency error measurement accuracy of +/–12 Hz + timebase reference (+/–18 Hz for RACH bursts).
- rms phase error measurement accuracy of less than +/–1 degree.
- Peak phase error measurement accuracy of less than +/–4 degrees.

under these conditions:

- Level is between –15 dBm and +43 dBm.
- Level within +/–3 dB of the expected input level.
- Frequency is within +/–100 kHz of expected input frequency.

Trigger Source

Auto triggering is the recommended trigger source for each measurement allowing the test set to choose the preferred trigger source. However, you may want to select the trigger source. Immediate trigger source is not recommended for PFER measurements.

Table 14. Recommended Trigger Source settings

Input Signal Type	Recommended Trigger Source
Normal GSM TCH or GPRS PDTCH burst with mobile station in active cell mode	Protocol or RF Rise
Normal EGPRS PDTCH burst with mobile station in active cell mode and modulation coding scheme set to MCS1, MCS2, MCS3, or MCS4	Protocol or RF Rise
RACH burst with mobile station in active cell mode (GSM only)	Protocol or RF Rise
Normal GSM TCH or GPRS PDTCH burst with mobile station in test mode	RF Rise
Normal EGPRS PDTCH burst with mobile station in test mode and modulation coding scheme set to MCS1, MCS2, MCS3, or MCS4	RF Rise
RACH burst with mobile station in test mode (GSM only)	RF Rise
Bursted signal with GMSK modulation but no valid midamble	RF Rise
Non-bursted (CW) signal with a manual frequency offset of +/- 67.7083 kHz	Immediate

Burst Synchronization

The PFER measurement provides you with a choice for the time reference (burst synchronization). (See “Burst Synchronization of Measurements” on page 408). For GPRS and EGPRS mobiles, you should note that only the Midamble synchronization method is available when you set the multislot configuration to D2U2 (2 downlink timeslots, 2 uplink timeslots). For more details on setting the multislot configuration, see “CALL:PDTCH:MSLot:CONFig” on page 634.

Table 15.

Burst Synchronization	Description
Midamble	References measurement timing to the midamble transmitted within a timeslot.
RF Amplitude	The amplitude rise and fall of a transmitted burst determines the measurement time reference.
None	No edge of the burst is detected, the measurement is made using the first 87 or 147 bits of data found centered around the middle of the expected burst position. Can be used when measuring non-bursted signals

Related Topics

“Programming a Phase and Frequency Error Measurement” on page 351

“Test Adherence to Standards” on page 150

“Phase and Frequency Error Troubleshooting” on page 1463

“Confidence Levels” on page 1524

Power versus Time Measurement Description

The Power versus Time Measurement is applicable to both GSM and GPRS. This measurement description contains two sections:

- "GSM Power versus Time Measurement" on page 117
- "GPRS and EGPRS Power versus Time Measurement" on page 123

GSM Power versus Time Measurement

How is a Power versus Time (PvT) measurement made?

PvT measurements determine if the mobile station's transmitter power falls within specified power and timing ranges. Refer to the "Typical GSM PvT Measurement" on page 121.

During a PvT measurement, the test set makes a narrowband point-by-point measurement of the instantaneous power received during the signal burst. The number of individual samples measured across the burst is 2220. A pass or fail result is returned based on a mask comparison (defined in "ETSI GSM 05.05 Ver 8.2.0, 7.2.0, 6.6.0 Annex B").

Included with the narrowband point-by-point measurement is a broad-band PvT carrier power measurement, labeled as Transmit Power on the Summary screen. The PvT Transmit Power measurement is synchronized to the burst midamble as recommended in 3GPP 51.010 (formerly ETSI GSM 11.10). (The test set also provides a faster transmit power measurement that is synchronized to the burst's amplitude. See "Transmit Power Measurement Description" on page 144).

The dynamic range of the PvT measurement is approximately 70 dB.

This measurement conforms to 3Gpp 51.010 (formerly ETSI GSM 11.10), section 13.3. This is based on ETSI GSM 05.05 Ver 8.2.0, 7.2.0, 6.6.0 Annex B.

Power versus Time Measurement Results

The primary result of a PvT measurement is the pass/fail result. The pass/fail result that the test set returns indicates whether the **entire** burst fell within power and timing ranges determined by a point-by-point comparison of the power versus time measurement mask.

The PvT measurement examines the burst to determine the points where the burst fails by the most or is closest to failing the upper and lower limits. These worst case points provide the upper and lower limit margin results. A negative value, along with the offset time, is returned for the result if the burst fails the mask. A positive value indicates the burst is within the mask. See "FETCh:PVTime:MASK:ALL?" on page 954.

For statistical analysis, the test set allows you to set up to 12 time markers. These markers do not define the mask, but are merely used to get results from specified points on the mask. See "SETup:PVTime:TIME[:OFFSet][:SELected]" on page 1183. Note that these points are not the same as those used in the point-by-point comparison which determines the pass/fail result.

The Power versus Time measurement allows you to use the ETSI mask specification or define up to two custom masks of your own. For more information refer to "SETup:PVTime" on page 1163.

The following lists show the results available for single measurements, multi-measurements and statistical measurements:

- Results for a *single* PvT measurement are listed below. Results one through four can be obtained using the query "FETCh:PVTime[:ALL]?" on page 950. Results 5 through 8 can be obtained using the query "FETCh:PVTime:MASK:ALL?" on page 954.

  1. PvT measurement integrity indicator
  2. PvT mask pass/fail result (0 = Pass, 1 & NaN = Fail)
  3. Transmit carrier power with midamble synchronization (average power during the burst)
  4. PvT maximum power at up to 12 time offsets
  5. Upper limit timing margin worst case (the time offset where the signal came close to or exceeded upper timing limit)
  6. Upper limit power margin worst case (how close to or where the signal exceeded upper power limit)
  7. Lower limit timing margin worst case (the time offset where the signal came close to or exceeded lower timing limit)
  8. Lower limit power margin worst case (how close or where the signal exceeded lower power limit)

- In addition to the results you can obtain for a single measurement the following results are also available for *multi-measurements*. These results can be obtained using the query "FETCh:PVTime:TXPower:ALL?" on page 952.

  1. Average of transmit carrier power measurements (average of averages)
  2. Minimum transmit carrier power measured across each burst
  3. Maximum transmit carrier power measured across each burst
  4. Standard deviation of transmit carrier power measured across each burst

- Statistical PvT measurement results, calculated from measurements taken at each of the active time offset markers or across a subset of the markers and available only through programming commands are listed below. These results can be obtained using the `FETCH:PVTime:POWer` queries.

  1. Average Power (in dBc) measured at the marker(s) relative to transmit power (carrier power)
  2. Maximum power (in dBc) measured at the marker(s) relative to transmit power (carrier power)
  3. Minimum power (in dBc) measured at the marker(s) relative to transmit power (carrier power)
  4. Standard deviation of power (in dBc) measured at the marker(s) relative to transmit power (carrier power)

- The measurement integrity indicator is another result available for any completed PvT measurement. This result provides information about error conditions which occurred and may have affected the accuracy of the most recently completed measurement. For more information about measurement integrity, refer to "Integrity Indicator" on page 411.

- Measurement progress report is a feature that allows you to periodically see how far multi-measurement cycle has progressed. When the multi-measurement count is greater than 1, the progress report will indicate the number of individual sub-measurements that have been completed, *n*, out of the total number to be completed, *m*. "n" is referred to as ICOunt remotely. "m," the total number of measurements to be made, is based on the PvT settings you make and the input signal attributes.

The progress report is displayed on the test set's screen in an "n of m" format. The number of measurements completed, *n*, increases from zero to the total number of measurements which need to be made, *m*.

Types of Signals Power vs. Time Can Measure

The following list summarizes the input signal attributes and mobile station operating modes for which PvT can be measured with the test set.

1. Normal GSM TCH burst with mobile station in active cell mode.
2. Normal GSM TCH burst with mobile station in test mode (no protocol).
3. GSM RACH burst with valid midamble with mobile station in active cell mode.

Power vs. Time Input Signal Requirements

The PvT measurement will complete and meet the PvT measurement accuracy specifications when the signal meets the following input signal conditions.

1. Input signal level is between –15 dBm and +43 dBm.
2. Transmit power is within +/-3 dB of expected input level.
3. Input signal frequency is within +/-10 kHz of expected input frequency.

Trigger Source

Triggering choices available for the PvT measurement are RF rise, protocol, immediate, and auto. In most cases, auto triggering provides the optimum measurement triggering condition for the PvT measurement.

When auto triggering is selected, the test set chooses a trigger source based on the optimum trigger source available. For example, PvT measurements will automatically be triggered by a protocol trigger if a call is connected or call processing events provide the protocol trigger source.

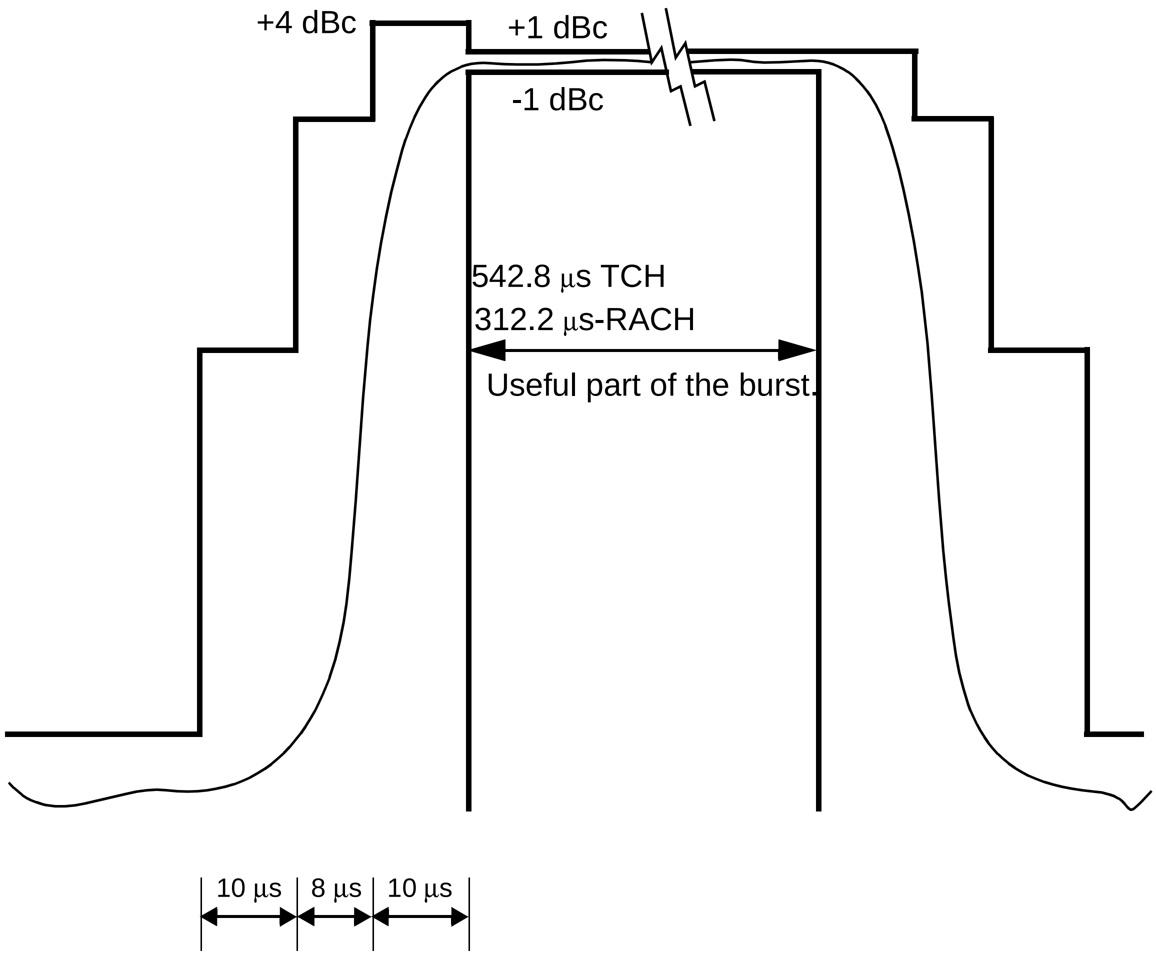
In situations where no protocol trigger is available, the test set will choose RF rise triggering for the PvT measurement. An example of this situation might be when the test set is in test mode operating mode.

Table 16. Recommended Trigger Source Settings

Input Signal Type	Recommended Trigger Source
Normal GSM TCH burst with mobile station in active cell mode	RF Rise or Protocol
RACH burst with mobile station in active cell mode	RF Rise or Protocol
Normal GSM TCH burst with mobile station in test mode	RF Rise
RACH burst with mobile station in test mode	RF Rise
Bursted signal with GMSK modulation but no valid midamble	RF Rise
CW signal	Immediate

For more information on measurement triggering, refer to “Triggering of Measurements” on page 404.

Figure 3. Typical GSM PvT Measurement



NOTE: dBc = dB relative to the power across the useful part of the burst

Burst Synchronization

The PvT measurement provides you with a choice for the time reference setting (burst synchronization). (See “Burst Synchronization of Measurements” on page 408).

Table 17.

Burst Synchronization	Description
Midamble	References measurement timing to the midamble transmitted within a timeslot.

Table 17.

Burst Synchronization	Description
RF Amplitude	The amplitude rise and fall of a transmitted burst determines the measurement time reference.
None	No edge of the burst will be detected, the measurement will be made using the first 87 or 147 bits of data found centered around the middle of the expected burst position. For may be used when measuring non-bursted signals

Related Topics

"Programming a Power versus Time Measurement" on page 354

"Test Adherence to Standards" on page 150

"Power versus Time Troubleshooting" on page 1464

GPRS and EGPRS Power versus Time Measurement

How is a Power versus Time (PvT) measurement made?

PvT measurements determine if the mobile station's transmitter power falls within specified power and timing ranges. Refer to the "Typical PvT Mask for a Two Burst Multislot Configuration" on page 127.

During a PvT measurement, the test set makes a narrowband point-by-point measurement of the transmitted carrier power of the GPRS or EGPRS mobile station as it varies across a single burst or two adjacent GMSK modulated TDMA bursts.

NOTE When using the Power versus Time measurement with an EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). The Power versus Time measurement does *not* support 8PSK modulation coding schemes at this time (MCS5 through MCS9). For more details on setting the modulation coding scheme, see "CALL:PDTCH:MCSCheme" on page 630.

The number of individual samples measured across a single burst is 2220. When measuring multiple bursts, 2220 samples are taken on each burst, however there is an overlap of approximately 10%. A single pass or fail result is returned for the entire multislot configuration. This means that if any part of the multislot configuration fails the multislot mask, the result is a Fail. Additional information is provided to indicate which segments of the multislot configuration have failed.

Included with the narrowband measurement are broad-band carrier power measurements of the average power for each of the individual bursts in the multislot configuration. The PvT Transmit Power measurement is synchronized to the burst midamble as recommended in 3GPP 51.010 (formerly ETSI GSM 11.10). (The test set also provides a faster transmit power measurement that is synchronized to the burst's amplitude. See "Transmit Power Measurement Description" on page 144).

The dynamic range of the PvT measurement is approximately 70 dB.

When using the PvT measurement to measure two adjacent bursts, the Guard Period Length parameter must be set correctly to ensure accurate pass/fail testing of the first guard period. For more details on setting this parameter see "CALL:MS:TX:BURSt:GPLength" on page 594.

This measurement conforms to ETSI GSM 05.05 (Ver 8.2.0, 7.2.0, 6.6.0), section 4.5 and Annex B. It will also conform with 3GPP 51.010 (formerly ETSI GSM 11.10) if used as part of a type approval system.

Power versus Time Measurement Results

The primary result of a PvT measurement is the pass/fail result. The pass/fail result that the test set returns indicates whether the entire multislot configuration fell within power and timing ranges determined by a point-by-point comparison of the power versus time measurement mask.

The PvT measurement examines the multislot configuration to determine the points which have failed the most, or the points which are closest to failing the upper and lower limits. These worst case points provide the upper and lower limit margin results. A negative value, along with the offset time, is returned for the result if the multislot configuration fails the mask. A positive value indicates the multislot configuration is within the mask. The command "FETCh:PVTime[:BURSt[1]]:MASK:ALL? FETCh:PVTime:BURSt2:MASK:ALL?" on page 970 is used to return these values for the burst you specify.

For statistical analysis, the test set allows you to set up to 12 time markers per burst. These markers do not define the mask, but are merely used to get results from specified points on the mask. To set these markers you use "SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]" on page 1186. Note that these points are a subset of those used in the point-by-point comparison which determines the pass/fail result.

The Power versus Time measurement allows you to use the ETSI mask specification or define up to two custom masks of your own. For more information refer to "SETup:PVTime" on page 1163.

The following lists show the results available for single measurements, multi-measurements and statistical measurements:

- Results for a *single* PvT measurement are listed below. Results one through four can be obtained using the query "FETCh:PVTime[:BURSt[1]][:ALL]? FETCh:PVTime:BURSt2[:ALL]?" on page 966. Results 5 through 8 can be obtained using the query "FETCh:PVTime[:BURSt[1]]:MASK:ALL? FETCh:PVTime:BURSt2:MASK:ALL?" on page 970.

  1. PvT measurement integrity indicator for each burst in the multislot configuration
  2. PvT multislot mask pass/fail result (0 = Pass, 1 & NaN = Fail)
  3. Transmit carrier power with midamble synchronization (average power during the burst) for each burst in the multislot configuration
  4. PvT maximum power at up to 12 time offsets
  5. PvT mask error code (this indicates which parts of the multislot configuration are causing failure). For more details on the mask error code result see "FETCh:PVTime:MASK[:FAIL]:SEGment?" on page 956.
  6. Upper limit timing margin worst case for each burst in the multislot configuration (the time offset where the signal came close to or exceeded upper timing limit)
  7. Upper limit power margin worst case for each burst in the multislot configuration (how close to or where the signal exceeded upper power limit)
  8. Lower limit timing margin worst case for each burst in the multislot configuration (the time offset where the signal came close to or exceeded lower timing limit)
  9. Lower limit power margin worst case for each burst in the multislot configuration (how close or where the signal exceeded lower power limit)

- In addition to the results you can obtain for a single measurement the following results are also available for *multi-measurements*. These results can be obtained using the query "FETCh:PVTime[:BURSt[1]]:TXPower:ALL? FETCh:PVTime:BURSt2:TXPower:ALL?" on page 967

  1. Average of transmit carrier power measurements (average of averages) for each burst in the multislot configuration
  2. Minimum transmit carrier power measured across each burst
  3. Maximum transmit carrier power measured across each burst
  4. Standard deviation of transmit carrier power measured across each burst

- Statistical PvT measurement results, calculated from measurements taken at each of the active time offset markers or across a subset of the markers and available only through programming commands are listed below. These results can be obtained using the `FETCH:PVTime[:BURSt[1]]:POWer` and `FETCH:PVTime[:BURSt[2]]:POWer` queries.

  1. Average Power (in dBc) measured at the marker(s) relative to transmit power (carrier power)
  2. Maximum power (in dBc) measured at the marker(s) relative to transmit power (carrier power)
  3. Minimum power (in dBc) measured at the marker(s) relative to transmit power (carrier power)
  4. Standard deviation of power (in dBc) measured at the marker(s) relative to transmit power (carrier power)

- The measurement integrity indicator is another result available for any completed PvT measurement. This result provides information about error conditions which occurred and may have affected the accuracy of the most recently completed measurement. For more information about measurement integrity, refer to "Integrity Indicator" on page 411.
- The measurement progress report is a feature that allows you to periodically see how far a multi-measurement cycle has progressed. When the multi-measurement count is greater than 1, the progress report indicates the number of individual sub-measurements that have been completed, *n*, out of the total number to be completed, *m*. "n" is referred to as ICOunt remotely. "m," the total number of measurements to be made, is based on the PvT settings you make and the input signal attributes.

  The progress report is displayed on the test set's screen in an "n of m" format. The number of measurements completed, *n*, increases from zero to the total number of measurements which need to be made, *m*.

Types of Signals Power vs. Time Can Measure

The following list summarizes the input signal attributes and mobile station operating modes for making PvT measurements.

1. All supported GPRS PDTCH multislot configurations with the mobile station in active cell mode.
2. All supported GPRS PDTCH multislot configurations with the mobile station in GPRS BCH or GPRS BCH+PDTCH test mode (no protocol).
3. All supported EGPRS PDTCH multislot configurations with the mobile station in active cell mode and a modulation coding scheme that uses a GMSK modulation format (MCS1 through MCS4).
4. All supported EGPRS PDTCH multislot configurations with the mobile station in EGPRS BCH or EGPRS BCH+PDTCH test mode (no protocol), and a modulation coding scheme that uses a GMSK modulation format (MCS1 through MCS4).

For details on the multislot configurations which the test set supports, see "CALL:PDTCH:MSLot:CONFig" on page 634.

Power vs. Time Input Signal Requirements

The PvT measurement will complete and meet the PvT measurement accuracy specifications when the signal meets the following input signal conditions.

1. Input signal level is between –15 dBm and +43 dBm.
2. Input signal level is within +/-3 dB of expected input level.
3. Input signal frequency is within 10 kHz of the measurement frequency.

Trigger Source

The triggering choices available for the PvT measurement are RF rise, protocol, immediate, and auto. In most cases, auto triggering provides the optimum measurement triggering condition for the PvT measurement.

When auto triggering is selected, the test set chooses a trigger source based on the optimum trigger source available. For example, PvT measurements are automatically triggered by a protocol trigger if a data connection is established or data connection processing events provide the protocol trigger source.

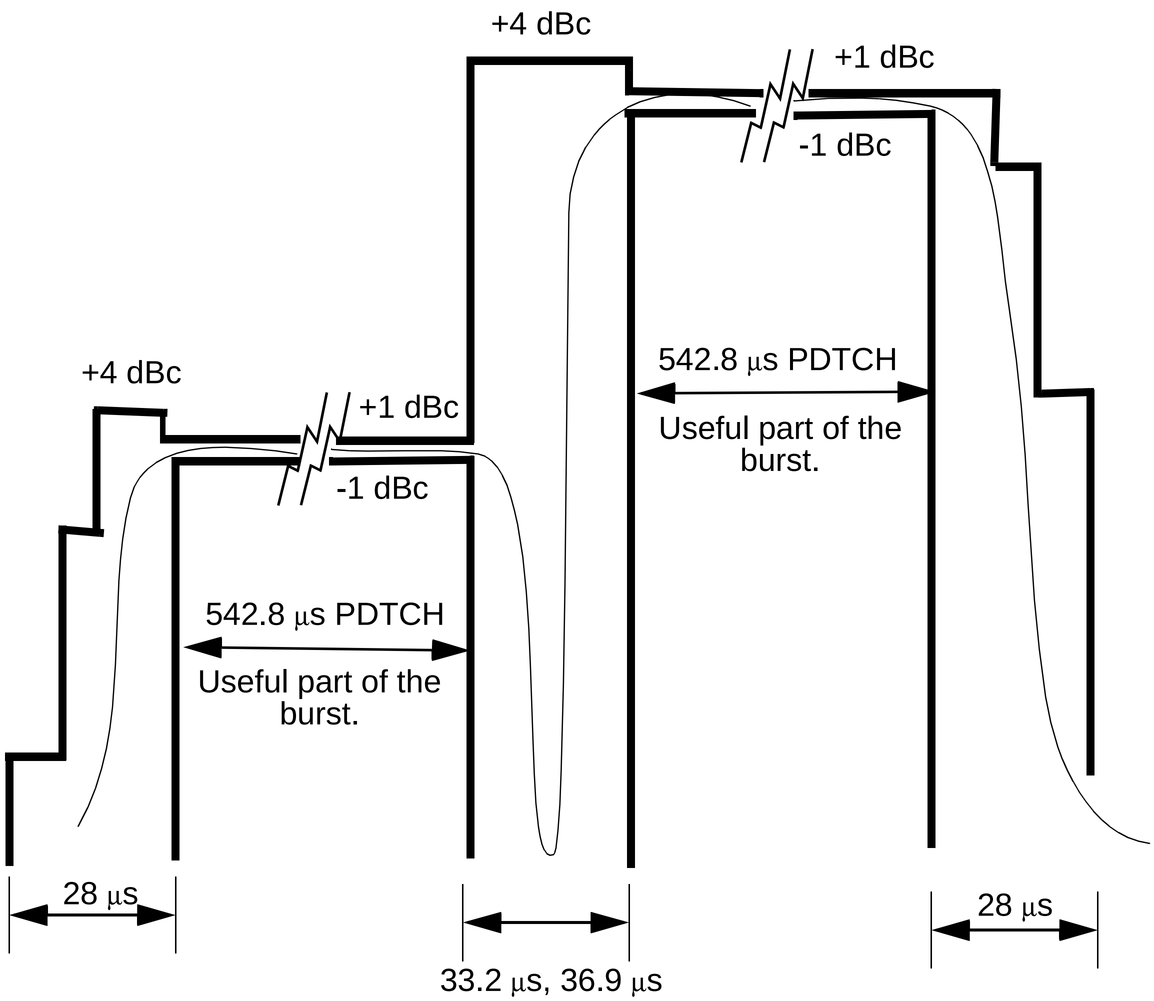
In situations where no protocol trigger is available, the test set chooses RF rise triggering for the PvT measurement. An example of this situation is when the test set is in one of the test mode operating modes.

Table 18. Recommended Trigger Source Settings

Input Signal Type	Recommended Trigger Source
GPRS PDTCH multislot configuration with mobile station in active cell mode	RF Rise or Protocol
GPRS PDTCH multislot configuration with the test set in GPRS BCH or GPRS BCH+PDTCH test mode	RF Rise
EGPRS PDTCH multislot configuration with mobile station in active cell mode and modulation coding scheme set to MCS1, MCS2, MCS3, or MCS4	RF Rise or Protocol
EGPRS PDTCH multislot configuration with the test set in EGPRS BCH or EGPRS BCH+PDTCH test mode and modulation coding scheme set to MCS1, MCS2, MCS3, or MCS4	RF Rise
Bursted signal with GMSK modulation but no valid midamble	RF Rise
CW signal	Immediate

For more information on measurement triggering, refer to “Triggering of Measurements” on page 404.

Figure 4. Typical PvT Mask for a Two Burst Multislot Configuration



NOTE: dBc = dB relative to the power across the useful part of the appropriate burst

Burst Synchronization

The PvT measurement provides you with a choice for the time reference setting (burst synchronization) for a single uplink burst. In the case of two adjacent uplink bursts the burst synchronization is fixed to Midamble. If a valid midamble cannot be found, the measurement will complete on a best effort basis using RF Amplitude synchronization. See "Burst Synchronization of Measurements" on page 408.

Table 19.

Burst Synchronization	Description
Midamble	References measurement timing to the midamble transmitted within a timeslot.
RF Amplitude	The amplitude rise and fall of a transmitted burst determines the measurement time reference.
None	No edge of the burst will be detected, the measurement will be made using the first 87 or 147 bits of data found centered around the middle of the expected burst position. None may be used when measuring non-bursted (CW) signals.

Related Topics

"Programming a Power versus Time Measurement" on page 354

"Test Adherence to Standards" on page 150

"Power versus Time Troubleshooting" on page 1464

RACH Measurement Description

What is a RACH?

A mobile sends a RACH (Random Access Channel) burst when it first attempts to originate a call or data connection. The RACH is transmitted on the uplink frequency of the channel number used by the Broadcast channel (BCH). The RACH is the first burst sent by the mobile. This burst is short, only 312.2 ms, as opposed to the normal GSM burst of 542.8 ms. The RACH is used by the base station to determine the timing advance which it then sends back to the mobile. The mobile starts to transmit normal bursts once the mobile receives timing advance information.

Measurements that can be performed on a RACH

The test set can perform the following three measurements on a RACH in Active Cell or a test mode:

- Power versus Time
- Transmit Power
- Phase and Frequency Error

NOTE Only one measurement at a time can be made on the RACH even if two measurements are initiated.

Triggering

The type of triggering used is dependent on whether you are in Active Cell or Test mode:

Active Cell mode:
The default triggering of Auto is acceptable for most signals. (In Active Cell mode Auto is equivalent to Protocol.) However, if the mobile's RACH timing is outside the specified limits you may need to use RF Rise triggering.

Test mode:
The default triggering of Auto should be used. (Trigger Auto is equivalent to RF Rise in a test mode.)

Overview of Measurement Procedure in Active Cell Mode

1. Set operating mode to Active Cell.
2. Set the receiver control to manual.
3. Set the test set's measurement receiver to the frequency the RACH will arrive on. The simplest way to do this is to set the manual channel (that is, the expected ARFCN) to the ARFCN of the BCH. Alternatively you could set the expected frequency to the uplink frequency of the BCH ARFCN.
4. Ensure trigger mode is set to Auto.

Once the RACH measurement is completed, in order to make further measurements on the TCH, ensure you reset the receiver control to Auto.

Overview of Measurement Procedure in Test Mode

1. Set operating mode to Test.
2. Set the test function to either BCH, BCH + TCH or BCH + PDTCH.
3. Set the Broadcast Channel to the channel you wish to use.
4. Using your proprietary commands, initiate the mobile to generate a sequence of RACH bursts on the BCH.
5. Start the appropriate measurement.

Example Procedure

The following procedure details how to make a GSM power versus time RACH measurement manually while in Active Cell mode.

1. Press the blue **SHIFT** key then the green **Preset** key. The “Call Setup Screen” is displayed.
2. Press the **More** key (which is positioned immediately below **F12**) two times. This displays screen **3 of 4**.
3. Press **Receiver Control** (**F7**) and set to **Manual**.
4. Press **Manual Channel** (**F9**) and change from 30 to 20. (This sets it to the same channel as the **Broadcast Chan** on screen **1 of 4**.)
5. Press **Measurement selection**. (This key is positioned below the display.)
6. Select **Power vs Time**.
7. Press **Power vs Time Setup** (**F1**).
8. Press **Measurement Setup** (**F1**).
9. Set **Trigger Arm** to **Single**, then select **Close Menu** (**F6**).
10. Press **START SINGLE** on the front panel of the test set. (Note, you are starting the measurement before originating a call. This is to ensure that it is the RACH burst that is measured.)
11. Connect the mobile, then originate a call from the mobile.
12. Immediately you press send on the mobile the power versus time measurement result is displayed. You can confirm that the measurement has occurred on the RACH by examining the measurement results. With a RACH measurement, since the burst is shorter than normal, the power drops off rapidly after 331 µs. To examine the results select **Return to PvT Control** (**F6**), **Change View** (**F2**), then select **Numeric 1 of 2** (**F2**), and **Numeric 2 of 2** (**F3**).
13. To do further measurements on the TCH ensure that the Receiver Control is returned to Auto.

Related Topics

“Programming a RACH Measurement” on page 358

“RACH Troubleshooting” on page 1466

Receiver Sensitivity Testing in GPRS

This section is *not* applicable to GSM and EGPRS.

The test set can be used to perform receiver sensitivity testing on GPRS mobiles in a number of ways. This section provides a comparison of the BER and BLER measurements, and looks at the different testing methods and configurations that can be used to verify the performance of a mobile’s receiver. The section contains:

- “BER and BLER Testing Overview” on page 131
- “Standards Definition for Reference Sensitivity” on page 132
- “Different Test Configurations” on page 133
- “Testing Multislot Configurations with Power in Adjacent Downlink Timeslots” on page 135

ETSI standards referred to in this section are the Release 99 versions of 4.14, 5.02, 5.03, 5.05 and 11.10. The ETSI GSM 11.10 standard has now been superseded by 3GPP 51.010.

BER and BLER Testing Overview

Traditionally, GSM mobile receiver sensitivity testing is done using bit error rate (BER) testing. In the case of GPRS, the standards refer to the use of Block Error Rate (BLER) rather than BER.

BLER is similar to BER, but the resolution is at a block, rather than a bit level. A block consists of four radio bursts. The number of data bits in a block depends on the channel-coding scheme that is in use. There are four different channel coding schemes (CS-1 through CS-4) with varying levels of error protection used within GPRS. The reference sensitivity for mobiles varies depending on the coding scheme that is in use and the power class of the mobile (that is, the maximum power that it transmits.)

In a BER measurement, the method typically involves transmitting a sequence of bits (usually a pseudo-random binary sequence (PRBS)) from the test set to the mobile. This data is transmitted at a low power level (usually somewhere close to the reference sensitivity level of the mobile's receiver.) The mobile receives and re-transmits (typically at a much high power level to avoid introducing further bit errors) all the received data back to the test set. The test set compares the received data with the transmitted data and calculates the bit error rate. There are different BER tests defined within the standards for GSM, depending on whether channel coding is considered or not.

For a BLER measurement, the data is transmitted in a similar way to the BER measurement, but the computation is based on the number of blocks received in error by the mobile compared to the number of blocks sent. A block consists of four bursts. Each block has a Block Check Sequence (BCS) associated with it. If the BCS is bad, the block is counted as being in error.

In normal operation, the mobile receives the blocks and, if the Medium Access Control (MAC) header polling bit is set, sends back an ACK (Acknowledged) or NACK (Not Acknowledged) response, depending on whether the block was properly received. The transmitting device (that is, the base station) can record the relative number of negatively acknowledged blocks to the total number of blocks acknowledged by the mobile. This data can be used to calculate the BLER as a ratio. The advantage of this method is that a network can monitor BLER performance in normal use.

It is also possible for a mobile to loop back all the data received to a test set and for the test set to do the BLER calculation in a similar way to a traditional BER test. The test set allows you to do this (see "Block Error Measurement Description" on page 90).

Standards Definition for Reference Sensitivity

The Release 99 GSM 5.05 standard defines the reference sensitivity of GPRS mobiles. The following table shows the reference sensitivity input levels for GPRS mobiles in the various bands under static conditions.

The BLER in each case must be less than or equal to 10%.

GSM450, GSM480, GSM750, GSM850, PGSM (GSM900), DCS1800, PCS1900, RGSM	Reference level under static conditions (dBm)
PDTCH/CS-1	-104
PDTCH/CS-2	-104
PDTCH/CS-3	-104
PDTCH/CS-4	-101

The input levels provided in the above table are referenced to a normal PGSM mobile (MS), and must be corrected by the following values for other MS:

- GSM 450, GSM480, GSM750, GSM850 and PGSM class 4 or 5 (small) MS: +2 dB
- DCS1800 class 1 or 2 MS: +4 dB
- DCS1800 class 3 and PCS1900 class 1 or 2 MS: +2 dB
- PCS1900 class 3 MS: 0 dB

The mobile is also required to receive data when there is power in adjacent timeslots with respect to the following two situations:

1. The mobile has to receive data in an adjacent timeslot intended for it as well as the timeslot in question. In this case, the standards specify that the mobile must be able to cope with a difference in power levels between the timeslots of up to 6 dB, without degradation of performance.
2. The mobile has to be able to receive data in the presence of power in an adjacent timeslot not intended for the mobile. In this case the difference in power levels can be up to 20 dB.

Different Test Configurations

There are four different configurations available in the test set for testing GPRS mobiles. Three of these are available in Active Cell operating mode and the fourth is in GPRS BCH+PDTCH Test Mode operating mode. All of these configurations allow transmitter tests to be performed. Only the following three allow receiver tests to be performed:

- Active Cell Operating Mode with the ETSI Type B Connection Type
- Active Cell Operating Mode with the BLER Connection Type
- GPRS BCH+PDTCH Test Operating Mode

Further details of each of these configurations are provided in the following sections.

Active Cell Operating Mode

Three of the connection types available in Active Cell operating mode are BLER, ETSI Type A and ETSI Type B. The ETSI test modes A and B are defined in GSM 04.14:

- **ETSI Test Mode Type A** forces the mobile into a transmit mode. Once in this mode the logical downlink is removed (although in the test set, the source remains active). This mode is *not* suitable for any type of receiver testing.
- **ETSI Test Mode Type B** places the mobile into a loop-back mode, where all the data transmitted on the downlink is sent back on the uplink. In an asymmetric configuration (for example, 2x1) it is possible to select which timeslot is looped back. Unfortunately, the downlink temporary block flow (TBF) is specified to operate in the unacknowledged Radio Link Control (RLC) mode. This simplifies BER measurements, but it makes it impossible to do a simple packet ACK/NACK based BLER measurement. It is however possible for the test set to compute BLER in a similar way to a BER measurement.

In Active Cell operating mode both a BER measurement (see “GPRS Bit Error Measurement” on page 88) and a test set calculated BLER measurement (see “Block Error Measurement Description” on page 90) are provided. However, it is not possible to run both of these measurements simultaneously.

In the case of a BER measurement, all of the GPRS coding schemes include a Frame Check Sequence (FCS). In normal operation, if a mobile (or the test set) receives a block for which any of the bursts fail this check, the entire block is discarded. The BER measurement allows you to specify how bad blocks are interpreted. Either of the following two settings can be used:

1. The test set assumes that all of the data bits in the block are zero for the purposes of BER calculation, resulting in an average BER for a block in error of 50% rather than a BLER of 100%. This is the default setting.
2. The test set takes into account all of the bits to be used for the BER calculation exactly as they are received from the mobile.

The **BLER connection type** is an Agilent proprietary method that makes use of standard signaling messages. This connection method sends GPRS Mobility Management (GMM) Information messages to the mobile with the polling bit set in the MAC header. This forces the mobile to respond with ACK/NACK messages, which allows the test set to calculate BLER (see “Block Error Measurement Description” on page 90). Note that the default BLER connection mode does *not* send a PRBS on the downlink, so results may be different from those when compared with an equivalent BER test or when the test set calculates the BLER (where a PRBS is used by default).

Test Mode

In GPRS Test Mode BCH+PDTCH, a BER measurement can be made in a similar way as the method used in ETSI test mode B. The primary difference is that the mobile must use some proprietary method for looping back the data from the downlink timeslot of interest. Only Layer 1 signaling is provided in this mode. For this reason it is not possible to make an ACK/NACK based BLER measurement in this test mode, although the test set calculated BLER measurement is still available.

Additional Features Related to Data Connection Reliability

There are some additional features that you can configure which improve the reliability of these connection methods with different manufacturers' mobiles.

For example, when using the BLER connection type, by default a message is sent to the mobile in every block. This can cause some mobiles to be overrun, so to counteract this the polling rate can be slowed down (see "CALL:FUNCtion:DATA:BLER:POLLing:INTerval" on page 542). Note that this additionally slows down the rate that the mobile transmits at, so if transmitter measurements are being made in parallel, these are also slowed down because there are fewer bursts available to make measurements on.

Another situation that can occur when using the BLER connection type is that mobiles can respond to the GMM information message in different ways. The GMM information elements are all optional. The test set transmits none of these elements, effectively sending a header with an empty message. In some cases this causes the mobile to respond differently from what could be expected. To overcome this problem, the Logical Link Control (LLC) Frame Check Sequence (FCS) can be deliberately corrupted (see "CALL:FUNCtion:DATA:BLER:LLC:FCSequence" on page 541). This causes the mobile to discard the LLC blocks, preventing the messages from reaching the GMM layer in the mobile. In the meantime, the RLC/MAC layer keeps responding to the polls and transmits ACK/NACK messages, allowing the test set to compute BLER (and make transmitter measurements).

When a TBF is established in all of the active cell data connection types, the test set uses a relative starting frame number by default. If you have not yet implemented this mandatory part of the standards, options have been added to use an absolute starting frame number or to start immediately (see "CALL:FUNCtion:DATA:FRAMe:STARt" on page 543).

The following additional features are also available:

- In the BLER mode data connection, it is possible to transmit a PRBS or other specific payload patterns. This is done by selecting the corrupt LLC FCS option (see "CALL:FUNCtion:DATA:BLER:LLC:FCSequence" on page 541) then selecting the payload pattern you want using "CALL:FUNCtion:DATA:PAYLoad:PATTern:BLER" on page 544. Note that if you want to switch between the corrupt and valid FCS messages, it is recommended that you should end the current data connection and then restart it.
- In GPRS BCH+PDTCH Test Operating Mode, and in Active Cell Mode with the Connection Type set to ETSI Type B, you can perform test set calculated BLER measurements (see "Block Error Measurement Description" on page 90), send a number of additional fixed patterns other than the default PRBS (see "CALL:FUNCtion:DATA:PAYLoad:PATTern:ETSIB" on page 545), and perform a true bit-wise BER measurement (see "GPRS Bit Error Measurement" on page 88).

In all test set operating modes, it is possible to switch on the power in unused timeslots using the "CALL:PDTCH:PREDuction:UBURst" on page 642. The power level for all the unused downlink timeslots can be set to either Power Reduction Level 1 (PRL1) or Power Reduction Level 2 (PRL2). This allows adjacent channel rejection tests to be done. Note that all unused timeslots are set to the same level; that is Off, PRL1 or PRL2.

Testing Multislot Configurations with Power in Adjacent Downlink Timeslots

As mentioned previously, there are two configurations that need to be tested. Using the test set, it is possible to set up power differences between adjacent active downlink timeslots.

The test set uses power control mode *A* for setting the downlink power. The standards specify a maximum difference of 10 dB between active timeslots. The test set provides even greater flexibility by allowing you to specify a maximum difference of up to 25 dB (although the source accuracy is currently only specified up to a difference of 20 dB). This allows greater dynamic range in GPRS testing. See "CALL:PDTCH:PREDuction:LEVel[1|2]" on page 641.

NOTE Because an indication of the power difference is included in the RLC/MAC header, there may be some cases where mobiles are confused by the use of differences greater than 10 dB.

The reason power control mode B has not been implemented in the test application (which allows a difference of up to 30 dB) is that this requires fixed allocation mode. Only dynamic allocation mode has been implemented in the test application. Fixed Allocation is available in the lab application.

The multislot configuration can be set up in any of the test set's operating modes/ data connection types (ETSI Type A, ETSI Type B, BLER and BCH+PDTCH test mode), to any one of the supported multislot configurations, that is 1x1, 2x1, 3x1, 4x1, 2x2 or 3x2.

In each case, there are two power levels (PRL1 and PRL2) that can be set on the downlink for the active timeslots (see "CALL:PDTCH:PREDuction:BURSt[1|2|3|4]" on page 640). PRL1 and PRL2 are the levels below the P0 level at which bursts can be transmitted. (The P0 level is the amount by which the PDTCHs are reduced below the BCH level when the PDTCHs and BCH are on different ARFCN (Absolute Radio Frequency Channel Numbers). The P0 level can differ from the BCH level by up to 30 dB. According to the standard, the P0 level must be set to an even number. Each used burst can be set to either PRL1 or PRL2.

The P0 level can be set independently (see "CALL:PDTCH:PZERo:LEVel" on page 643). PRL1 and PRL2 are both set relative to P0. To achieve the maximum level difference between active timeslots, set PRL1 to 0 dB and PRL2 to 25 dB, or set PRL1 to 25 dB and PRL2 to 0 dB. Assign PRL1 to the first burst and PRL2 to the second burst. If you want more details on power reduction levels, including a figure which illustrates GPRS power reduction levels, refer to "Downlink PDTCH Power Control" on page 320.

Example of Multislot Receiver BLER Testing

It is possible to perform multislot BLER testing on the test set with downlinks at different power levels. In BLER mode, the count of ACK/NACK messages is not currently associated to individual timeslots. For normal use this is acceptable, as the standards specify that BLER must be within limits for the multislot configuration as a whole.

If you want to attribute BLER to a single timeslot with other timeslots at higher levels in a multislot downlink, then the following type of procedure can be used. Note that this procedure assumes that your mobile's multislot performance is of an acceptable standard.

Receiver Sensitivity Testing in GPRS

The procedure is to first verify that the mobile has a BLER of zero when the downlink timeslots are at different powers, but all received timeslots are above the reference sensitivity level. The levels of all timeslots are then reduced, but the relative difference between them is maintained. When performing reference sensitivity level testing, only one of the timeslots should be close to or below the reference sensitivity level. In this case, any BLER is likely to be attributable to this lower power timeslot. To verify this, perform a BER measurement in either ETSI test mode B or in the GPRS Test Mode BCH+PDTCH (see "Example of Multi-slot Receiver BER Testing" on page 136). You should also ensure that the power is switched off in unused timeslots (see "CALL:PDTCH:PREDuction:UBURst" on page 642) to remove any possibility of power in unused bursts affecting the test results.

Step 1. Set the Connection Type to BLER.

Step 2. Set up the multislot configuration (for example, 2x1) in the required band.

Step 3. Make sure the BCH and the PDTCH's are on different ARFCN's. (If they are the same, then the standard requires *all* downlink timeslots to be transmitted at the same power level - namely that of the BCH.)

Step 4. Set the Cell Power to a suitably high level well above the reference sensitivity level of the mobile (for example, -80 dBm).

Step 5. Set P0 to a suitable level (for example, 0 dB).

Step 6. Set PRL1 and PRL2 to appropriate levels (for example, 0 and 6).

Step 7. Assign the first burst to PRL1 and the second to PRL2 (which means the first timeslot is transmitted at -80 dBm and the second at -86 dBm.)

Step 8. Set the BLER measurement to single trigger mode, and specify the number of blocks to measure, for example 100. See "SETup:BLERror" on page 1057.

Step 9. Start the BLER measurement.

Step 10. Check that the result is zero. If not, adjust the parameters in steps 4 through 6 above until the result is zero.

Step 11. Change the P0 level to reduce both the downlink levels (for example 14 dB, causing the first burst to now be transmitted at -94 dBm and the second at -100 dBm.)

Step 12. Start the BLER measurement again.

Step 13. Record the BLER results.

Example of Multi-slot Receiver BER Testing

In GPRS BCH+PDTCH Test Mode or ETSI Test Mode B, the first downlink burst to be looped back can be specified. By default this is the first active timeslot, but you can change this if required.

For example, to measure BER on a second received timeslot that is at a lower power level than the first, perform the following procedure:

Step 1. Set the operating mode to GPRS BCH+PDTCH Test Mode or set the operating mode to Active Cell and the connection type to ETSI Test Mode B. If you want to use GPRS BCH+PDTCH Test Mode, set the mobile into an appropriate loopback mode.

Step 2. Ensure that the BCH and PDTCH's are on different ARFCN's. (If they are the same, then the standard requires *all* downlink timeslots to be transmitted at the same power level - namely that of the BCH.)

Step 3. Set the cell power and P0 level to the values you want, for example -70 dBm and 14 dB.

Step 4. Set the multislot configuration to 2x1.

Step 5. Set the PRL1 level to the value you want, for example 0 dB. (The level transmitted is cell power - P0 - PRL1, in this example, -84 dBm).

Step 6. Set the PRL2 level to a higher value, for example 10 dB. (The level transmitted is cell power - P0 - PRL2, in this example, -94 dBm).

Step 7. Assign PRL1 to the first burst that you are interested in.

Step 8. Assign PRL2 to the second burst.

Step 9. Set the first burst to loop back to 2 (that is, the second received downlink.)

Step 10. Start the BER measurement.

Related Topics

"Testing a GPRS Mobile Station" on page 316

"Block Error Measurement Description" on page 90

"Bit Error Measurement Description" on page 85

"CALL:FUNCtion" on page 536

"CALL:PDTCH|PDTChannel" on page 621

"GPRS Data Connection Troubleshooting" on page 1469

SACCH Report Measurement Descriptions

This measurement is *not* applicable to GPRS or EGPRS.

When a call is established (the operating mode is active cell and the call status is not idle), the mobile station is required to report on the SACCH logical channel. The reported results available from the test set are shown here:

- MS TX Level Reported
- TCH Timing Advance Reported
- RX Level
- RX Qual
- Neighbour Channel
- Neighbour RX Level 1
- Neighbour NCC 1
- Neighbour BCC 1

When are SACCH Report Measurements Made?

When the test set receives SACCH data from the mobile station, results are reported to you in the SACCH Report window (Call Setup screen), and the Neighbour Cell Report window (Cell Info screen). The results are reported remotely with the CALL:MS:REPORTED commands. No mechanism is provided to turn off SACCH data reports.

The SACCH reports are delayed, they reflect what the mobile station is actually experiencing. It is possible for SACCH reported MS TX level results to be different than the cell power level due to limitations of the mobile station. The SACCH reported TCH timing advance should eventually match the value in the Timing Advance field once the mobile station has time to react.

SACCH data will report any time there is a downlink TCH and the mobile station is synchronized to the test set transmitting a valid SACCH on the uplink.

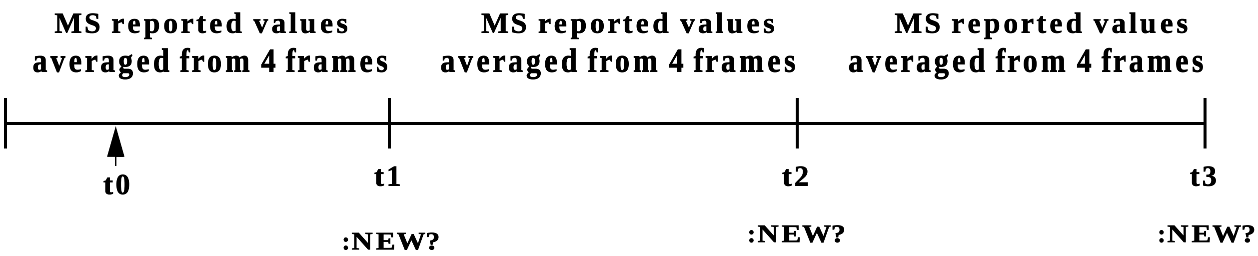
:NEW? and [:LAST?] Queries

:NEW? queries hang until a new SACCH message is received by the test set or until 10 seconds have elapsed at which point the test set times out. The mobile station issues data updates on the SACCH every 480 ms, (4 frames).

Measurements made during this four frame period are averaged and the result of these averaged measurements are reported by the mobile station during the next period. Measurements must be stable in order to give valid (stable) results for a :NEW? query. Therefore, it may take up to three SACCH reports before a reported value accurately reflects a change to any of its parameters. See Figure 1.

After changing measurement parameters, you must send three consecutive :NEW? queries to obtain stable, accurate results. By querying :NEW? three times the value becomes stable for the second query, and meaningful stable results are then reported for the third query. The results from the first two queries should not be used.

Figure 5. SACCH Report Measurement Cycle



t0: measurement parameter is changed to a new value.
t1-t2: MS measures the new value.
t3: the test set receives the first SACCH report that contains valid results reflecting the new parameter value.

If several SACCH reported values are needed from the same report, the first value needed should be queried three times (to receive a stable new report). Then the additional values should be immediately queried using the :LAST? query before the next report arrives or the measurement parameters are changed again.

The :LAST? query is not a hanging query; values are returned from the last SACCH report. As shown in the following program example (line 60), the :LAST? command is optional. If :NEW? is not used in the MS:REPORTED command, the :LAST value is automatically reported.

Programming Example

```
10    OUTPUT 714;”CALL:CELL:POW -83”
20    OUTPUT 714;”CALL:MS:TADV 11”
30    OUTPUT 714;”CALL:MS:TXL 11”
40    OUTPUT 714;”CALL:MS:REPORTED:TXL:NEW?;NEW?;NEW?”   ! Query 3 times
50    ENTER 714;Ignore_result,Ignore_result,Valid_result ! Only use Valid_result
60    OUTPUT 714;”CALL:MS:REPORTED:RXL?;TADV?”           ! Additional values
70    ENTER 714;Rceived_lvl,Timing_adv
80    END
```

SACCH Report Measurement Results

- MS TX level reported results reflect the value set in the Call Parms, MS TX Level field.
- TCH timing advance reported results reflect the value set in the Call Parms, Timing Advance field.
- RX Level reported reflects the received level of TCH in dB, from the Call Parms, Cell Power field that the MS measured during the preceding SACCH.
- RX Qual reported reflects the perceived quality of the signal used for the RX level SACCH report.

Neighbour Report Measurement Results

The mobile station determines what neighbour cells to measure from the BA tables transmitted on the BCH and the SACCH. The test set reports results from neighbour cell 1.

- Neighbour channel 1 results reflect the first ARFCN reported by the mobile station in the SACCH report.
- Neighbour NCC 1 results reflect the first network color code reported by the mobile station in the SACCH report.
- Neighbour BCC 1 results reflect the first base station color code reported by the mobile station in the SACCH report.
- Neighbour RX level 1 results reflect the first cell power level reported by the mobile station in the SACCH report.

Related Topics

"Configuring Mobile Station Operating Parameters" on page 202

"CALL:MS:REPorted:TXLevel[:LAST]?" on page 587

"CALL:MS:REPORTED:TXLEVEL:NEW?;NEW?;NEW?" on page 588

"CALL:MS:REPorted:TADVance[:LAST]?" on page 586

"CALL:MS:REPorted:TADVance:NEW?;NEW?;NEW?" on page 587

"CALL:MS:REPorted:RXLevel[:LAST]?" on page 582

"CALL:MS:REPorted:RXLevel:NEW?;NEW?;NEW?" on page 583

"CALL:MS:REPorted:RXQuality[:LAST]?" on page 584

"CALL:MS:REPorted:RXQuality:NEW?;NEW?;NEW?" on page 584

"CALL:MS:REPorted:NEIGhbour[1]?" on page 575

SINAD Measurement Description

This measurement is *not* applicable to GPRS.

How is a SINAD measurement made?

SINAD is one of four measurements available from the Analog Audio measurement. However, SINAD measurements are not typically made when testing GSM mobiles but are more common when testing AMPS or other analog mobiles.

SINAD is a receiver audio quality measurement for mobiles. It is the ratio of Signal+Noise+Distortion divided by Noise+Distortion, expressed in dB. SINAD can be measured in the range of 100 Hz to 10 kHz.

The SINAD measurement is used to determine receiver RF sensitivity. SINAD is usually measured in either of two ways:

- Reduce the Cell Power from the test set until 12 dB SINAD is displayed (re-triggering for each measurement), or
- Set the Cell Power from the test set to a specified low level and verify a >=12 dB SINAD reading.

Difference in Agilent 8960 Series 10 and 8920B Test Set SINAD Measurements

If you have previously used the Agilent 8920B RF Communications Test Set to measure SINAD, you may notice that the Agilent 8960 Series 10 test set's SINAD value may be higher by up to 0.8 dB when measuring 12 dB SINAD. This is due to the more precise digital notch filter used by the Agilent 8960, allowing a more accurate noise measurement to be made. The Agilent 8920B uses an analog filter that does not have as precise a filter notch as the Agilent 8960.

Related Topics

"Programming a SINAD Measurement" on page 360

"Analog Audio Troubleshooting" on page 1454

"Analog Audio Measurement Description" on page 80

"Test Adherence to Standards" on page 150

Spectrum Monitor Description

How is the spectrum monitor (SMON) used?

The Spectrum Monitor (SMON) can be used to locate, identify and measure transmitted signals from a device under test. The Spectrum Monitor can be used while a call is in progress.

The Spectrum Monitor is intended to be used for indication only. The Spectrum Monitor does not have the same level accuracy specifications as other measurements provided by the test set, and should therefore not be used when parametric accuracy is required (for example, calibration of a mobile). It is recommended that you use the other wireless format-specific measurements when you require accurate parametric measurements.

The Spectrum Monitor has the following two modes of operation:

- Swept mode, in which the X axis represents *frequency*, and the Y axis represents absolute amplitude.
- Zero span mode, in which the X axis represents *time* and the Y axis represents absolute amplitude.

You can use the markers on the Spectrum Monitor's graphical display to set the expected frequency and power levels that are used by the test or lab application for parametric measurements.

The center frequency used by the Spectrum Monitor is initially set at the expected frequency maintained by the test set's base station emulator. The expected frequency range is 292.5 MHz to 2700 MHz.

The range of frequencies which the spectrum monitor is calibrated to measure is determined by the range of traffic band frequencies supported by the specific test or lab application that is currently running. For example, if you are using the GSM Test Application, any of the frequencies used by the GSM traffic bands are available for you to monitor accurately. You can view signals which fall outside of any of the frequencies used by GSM, but the Spectrum Monitor will not be calibrated.

From the test set's front panel, the Spectrum Monitor can be accessed by pressing the **Instrument Selection** key, then selecting `Spectrum Monitor`. If you require more details on manual operation of the Spectrum Monitor, see "How Do I Use the Spectrum Monitor?" on page 1339.

Single or Multi-Measurements

The Spectrum Monitor can return either single or averaged results.

- If you set the averaging state OFF then the trace represents a single measurement sweep.
- If you set the averaging state ON, and the averaging count number to a value greater than one, then the trace represents the rolling average of the specified number of sweeps.

Input Signal Requirements

The Spectrum Monitor will complete and meet its accuracy specifications under the following input signal conditions.

- The signal is within 40 dB of the reference level.
- The measurement frequency is within the traffic band frequencies supported by the specific lab or test application that is currently running, and the expected frequency is tuned to the carrier.

Trigger Source

Triggering choices available for the Spectrum Monitor are Auto, Immediate, Protocol, RF Rise, and External.

When Auto triggering is selected, the test set chooses Protocol triggering if a protocol trigger is available. Otherwise, RF Rise triggering is selected.

For more information on measurement triggering, refer to “Triggering of Measurements” on page 404.

Related Topics

“Programming the Spectrum Monitor” on page 362

“Test Adherence to Standards” on page 150

“Spectrum Monitor Troubleshooting” on page 1467

Transmit Power Measurement Description

The Transmit Power Measurement is applicable to GSM, GPRS, and EGPRS. This measurement description contains two sections:

- "GSM and GPRS Transmit Power (TXP) Measurement"
- "EGPRS Transmit Power (ETXP) Measurement"

GSM and GPRS Transmit Power (TXP) Measurement

How is a transmit power (TXP) measurement made?

The TXP measurement performs a power measurement on a mobile station, averaged over the useful part of the burst. The signal is captured with a wide band 3 GHz fast RF power detector.

For GPRS mobiles, TXP provides a broadband measurement of the peak transmitted carrier power of a GMSK modulated signal for a specified burst in a multislot configuration which consists of adjacent timeslots. Only one burst which you specify using "RFANalyzer:MANual:MEASurement:BURSt" on page 1025 is measured at a time.

In order to provide you with a very fast TXP measurement the test set measures the power without synchronizing it to the midamble. The measurement is made with RF amplitude synchronization; therefore, the signal does not need to be demodulated to determine the midamble. This technique is different than the TXP measurement defined in 3GPP 51.010 (formerly ETSI GSM 11.10). (See "Burst Synchronization of Measurements" on page 408). The power versus time measurement provides a carrier power measurement that is synchronized to the burst's midamble, and conforms to 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.3 and 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.16.2. (See "Power versus Time Measurement Description" on page 117 for more details.)

The output RF spectrum measurement makes the TXP measurement as part of its measurement process, and makes this measurement result available along with output RF spectrum due to modulation and switching.

The TXP measurement is completely controlled by the digital signal processor (DSP) in the test set. Any power measurement requires calibration to ensure accuracy. The power meter used for this measurement is zeroed automatically by the DSP as needed, with no action required by you. No temperature dependent calibration is required because temperature compensation in the power detector circuits provide temperature stability.

Single or Multi-Measurements

The DSP analyzes the data and calculates the results. A single burst for a TXP measurement calculates the average power over the useful part of the burst. A multiple burst transmit power measurement is made when the multi-measurement state is on. This measurement calculates average, minimum, maximum, and standard deviation of the average power measured. All of these results are available with the FETCh command. The test set always has an integrity indicator available regardless of whether single or multiple burst measurements are selected.

Types of Signals TX Power can Measure

TXP measurements can be made on these types of input signals.

- Normal GSM TCH or GPRS PDTCH burst with mobile station in active cell mode.
- Access (RACH) burst with mobile station in active cell mode.
- Normal GSM TCH or GPRS PDTCH burst with mobile station in test mode.
- Access (RACH) burst with mobile station in test mode.
- Bursted signal with GMSK modulation without a valid midamble.
- CW signal.

Input Signal Requirements

The TX Power measurement will complete and meet its accuracy specification of less than +/-0.32 dB for 810 MHz to 960 MHz and +/-0.42 dB for 1.7 GHz to 1.99 GHz when.

- Level is between –30 dBm and +43 dBm.
- Level within +/–3 dB of the expected input level.
- Frequency is within +/–100 kHz of expected input frequency.

Trigger Source

Auto triggering is the recommended trigger source for each measurement. This allows the test set to choose the preferred trigger source. However you may want to select the trigger source. See Table 20. on page 145

Table 20. Recommended Trigger Source Settings

Input Signal Type	Recommended Trigger Source
Normal GSM TCH or GPRS PDTCH burst with mobile station in active cell mode	RF Rise or Protocol
RACH burst with mobile station in active cell mode	RF Rise or Protocol
Normal GSM TCH or GPRS PDTCH burst with mobile station in test mode	RF Rise
RACH burst with mobile station in test mode	RF Rise
Bursted signal with GMSK modulation but no valid midamble	RF Rise
CW signal	Immediate

Related Topics

"Programming a Transmit Power Measurement for GSM" on page 364

"Programming a Transmit Power Measurement for GPRS" on page 365

"Test Adherence to Standards" on page 150

"Transmit Power Troubleshooting" on page 1468

EGPRS Transmit Power (ETXP) Measurement

How is an EGPRS transmit power (ETXP) measurement made?

For EGPRS mobiles, ETXP provides a broadband measurement of the average transmitted burst and carrier power of an 8PSK or GMSK modulated signal for a specified burst in a multislot configuration. Multislot configurations with different power levels on each burst are supported. Only one burst which you specify using "RFANalyzer:MANual:MEASurement:BURSt" on page 1025 is measured at a time. Additionally, you can select the modulation format to be measured (either 8PSK or GMSK) using "SETup:ETXPower:MODulation" on page 1086.

The EGPRS radio format allows for all GMSK, all 8PSK or a mixture of GMSK and 8PSK bursts in a multislot configuration. Additionally, when a timeslot supports an 8PSK packet data traffic channel (PDTCH), GMSK modulated control blocks can be inserted. When you specify a burst to measure and a modulation format to expect, the measurement takes samples only from that burst in the multislot configuration and checks the modulation format. If the actual modulation format is the same as the format you have selected, the measurement proceeds normally. If the modulation format is not the same as the one you have selected, the samples are discarded and the measurement is re-armed. The measurement completes when a burst of the specified modulation format is detected.

The ETXP measurement returns two types of power results:

- Burst Power: This is the average power measured across a single timeslot. This value varies as a function of the modulating data.
- Estimated Carrier Power: This is an estimate of the power of the unmodulated carrier, calculated from a single burst. The Estimated Carrier Power is equivalent to the Long Term Average Power which is the primary definition of 8PSK power in the ETSI standards. Long Term Average Power is the average of many individual burst powers when the individual bursts are modulated with PRBS data. The Estimated Carrier Power measurement uses knowledge of the modulating data to determine the carrier power from the power measurement on a single burst.

When the selected modulation format is GMSK, Burst Power and Carrier Power measurements are equivalent so both results return the same value.

The ETXP 8PSK burst power measurement (with averaging turned on) conforms to ETSI GSM 05.05 (Ver 8), section 4. It also conforms with 3GPP 51.010 (formerly ETSI GSM 11.10) if used as part of a type approval system. The ETXP 8PSK Estimated Carrier Power measurement meets the accuracy requirements for an estimation technique of long term average power as defined in 3GPP 51.010, annex 5.

Single or Multi-Measurements

The 8PSK Transmit Power measurement supports single Burst Power and Estimated Carrier Power measurements. For multi-burst measurements, the average value of Burst Power is equivalent to the Long Term Average Power defined in the ETSI standards. You can choose either a more accurate but slower measurement with the multi-measurement Burst Power result, or a less accurate but faster measurement with the Estimated Carrier Power result.

This measurement calculates average, minimum, maximum, and standard deviation values for the burst power and estimated carrier power results. All of these results are available using the FETCh commands (see “FETCh:ETXPower” on page 901). The test set always has an integrity indicator available regardless of whether single or multiple burst measurements are selected.

Types of Signals TX Power can Measure

The following list summarizes the input signal attributes and mobile station operating modes for making ETXP measurements.

- Two burst multislot configuration comprising two normal PDTCH bursts with the mobile station in active cell mode.
- Single normal PDTCH burst with the mobile station in active cell mode.
- Access (RACH) burst with the mobile station in active cell mode, and the modulation format set to GMSK.
- Two burst multislot configuration comprising two normal PDTCH bursts with the mobile station in EGPRS BCH or EGPRS BCH+PDTCH test mode (no protocol).
- Single normal PDTCH burst with the mobile station in EGPRS BCH or EGPRS BCH+PDTCH test mode (no protocol).
- Access (RACH) burst with mobile station in EGPRS BCH or EGPRS BCH+PDTCH test mode (no protocol), and the modulation format set to GMSK.

Input Signal Requirements

The ETX Power measurement requires the following signal attributes:

- Level is between –30 dBm and +37 dBm (Peak).
- Level within +/–3 dB of the expected input level.
- Input signal is within 10 kHz of the measurement frequency.

Trigger Source

Auto triggering is the recommended trigger source for each measurement. This allows the test set to choose the preferred trigger source. However you may want to select the trigger source. See Table 21. on page 148

Table 21. Recommended Trigger Source Settings

Input Signal Type	Recommended Trigger Source
Two burst multislot configuration comprising two normal PDTCH bursts with the mobile station in active cell mode.	Protocol
Single normal PDTCH burst with the mobile station in active cell mode.	Protocol
Access (RACH) burst with the mobile station in active cell mode, and the modulation format set to GMSK.	Protocol
Two burst multislot configuration comprising two normal PDTCH bursts with the mobile station in EGPRS BCH or EGPRS BCH+PDTCH test mode (no protocol).	RF Rise
Single normal PDTCH burst with the mobile station in EGPRS BCH or EGPRS BCH+PDTCH test mode (no protocol).	RF Rise
Access (RACH) burst with mobile station in EGPRS BCH or EGPRS BCH+PDTCH test mode (no protocol), and the modulation format set to GMSK.	RF Rise

Related Topics

“Programming a Transmit Power Measurement for EGPRS” on page 366

“Test Adherence to Standards” on page 150

“Transmit Power Troubleshooting” on page 1468

Uplink State Flag (USF) BLER

Uplink State Flag (USF) BLER is a measurement report. It is viewed in the Call Setup screen.

The USF BLER report is an indication of the number of PDTCH blocks incorrectly decoded (USF bits only) by the MS. This report is calculated by counting the number of blocks that the MS fails to transmit as a consequence of incorrectly decoding the USF of the block preceding the expected transmission period. This serves as an indication of the MS's receiver performance.

RLC/MAC uplink allocation mode must be Dynamic. See “Dynamic Allocation” on page 212.

Test Adherence to Standards

The 8960 Series 10 is compliant with 3GPP 51.010 (formerly ETSI GSM 11.10).

Frequency Error and Phase Error

Standards Reference: 3GPP 51.010 (formerly ETSI GSM 11.10) sections 13.1 and 13.16.1

The method of test implemented by the test set's Phase and Frequency Error measurement conforms to the measurement method defined in 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.1. For GPRS mobiles which support a single uplink timeslot or two adjacent uplink timeslots, the Phase and Frequency Error measurement conforms to 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.16.1. For EGPRS mobiles which support a single uplink timeslot or two adjacent uplink timeslots, and while using one of the GMSK modulated coding schemes (MCS1, MCS2, MCS3, or MCS4), the Phase and Frequency Error measurement conforms to 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.16.1.

Related Topics

"Phase and Frequency Error Measurement Description" on page 113

"Programming a Phase and Frequency Error Measurement for GSM" on page 351

"Programming a Phase and Frequency Error Measurement for GPRS and EGPRS" on page 352

Transmitter Output Power and Burst Timing Error

Standards Reference: 3GPP 51.010 (formerly ETSI GSM 11.10) sections 13.3, 13.16.2, and 13.17.3

To make a transmitter output power measurement that conforms to 3GPP 51.010 (formerly ETSI GSM 11.10) standards, perform a Power versus Time measurement with the desired setup. An ETSI compliant, transmitter output power (TXPower) result is available as a result of this measurement. Pass/fail checking of the Power versus Time mask is also available by using the Power versus Time measurement. The Burst Timing Error result is available for GSM, GPRS and EGPRS on the Call Setup screen and by sending a query to the CALL subsystem ("CALL:STATus:TCHannel:TERRor?" on page 811 for GSM, "CALL:STATus:PDTCh | PDTChannel:TERRor?" on page 810 for GPRS and EGPRS).

For GPRS mobiles which support a single uplink timeslot or two adjacent uplink timeslots, the transmitter output power result conforms to 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.16.2. When measuring two adjacent uplinks, each of these can have different power levels.

For EGPRS mobiles which support a single uplink timeslot or two adjacent uplink timeslots, the 8PSK burst power measurement (with averaging turned on) conforms to 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.17.3. The 8PSK Estimated Carrier Power measurement meets the accuracy requirements for an estimation technique of long term average power as defined in 3GPP 51.010, annex 5.

Making a faster transmitter output power measurement

An alternative method for testing the transmitter output power is using the TX Power measurement in the test set. The TX Power measurement implemented in the test set varies from the ETSI recommended method for measuring carrier power in terms of synchronization. The TX Power measurement synchronizes using RF amplitude synchronization instead of midamble synchronization. This was intentionally done to speed up the measurement, as this is one of the most common measurements performed in manufacturing. This alternative measurement technique is approximately four times faster than the synchronized method with the same accuracy. If the input signal meets the GSM Power versus Time characteristics, the TX Power measurement provides the same results as the Power versus Time - TX Power result (which is midamble synchronized and ETSI compliant).

Note that the output RF spectrum measurement makes the TX Power measurement as part of its measurement process.

Related Topics

"Transmit Power Measurement Description" on page 144

"Programming a Transmit Power Measurement for GSM" on page 364

"Programming a Transmit Power Measurement for GPRS" on page 365

"GSM Power versus Time Measurement" on page 117

"GPRS and EGPRS Power versus Time Measurement" on page 123

"Programming a Power versus Time Measurement for GSM" on page 354

"Programming a Power versus Time Measurement for GPRS and EGPRS" on page 355

Output RF Spectrum

Standards Reference: 3GPP 51.010 (formerly ETSI GSM 11.10) sections 13.4 and 13.16.3

The Output RF Spectrum due to Switching method of test conforms to ETSI GSM 11.10, section 13.4 at offsets < 1800 kHz. For GPRS mobiles which support a single uplink timeslot or two adjacent uplink timeslots, the measurement conforms to ETSI GSM 11.10, section 13.16.3 at offsets < 1800 kHz.

The Output RF Spectrum due to Modulation method of test conforms to 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.4 at offsets < 1800 kHz.

For GPRS mobiles which support a single uplink timeslot or two adjacent uplink timeslots, the measurement conforms to 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.16.3 at offsets < 1800 kHz (when the Multi-Measurement Count - Modulation parameter is set to Off using "SETup:ORFSpectrum:COUNt:STATe" on page 1134).

For EGPRS mobiles which support a single uplink timeslot or two adjacent uplink timeslots, and while using one of the GMSK modulated coding schemes (MCS1, MCS2, MCS3, or MCS4) the measurement conforms to 3GPP 51.010 (formerly ETSI GSM 11.10), section 13.16.3 at offsets < 1800 kHz (when the Multi-Measurement Count - Modulation parameter is set to Off using "SETup:ORFSpectrum:COUNt:STATe" on page 1134).

Making a faster ORFS measurement

When Multi-Measurement Count (Modulation) is greater than 1, the measurement is performed over 40 or more bits in each of the regions from bit 15 to 60 and bit 87 to 132 of the burst. In 3GPP 51.010 (formerly ETSI GSM 11.10), the measurement is only specified on the latter section of the burst.

Measuring on both the front and back of the burst has two advantages. First, this method provides two modulation measurements per burst, effectively doubling measurement speed. Secondly, it provides additional information regarding the spurious performance of the mobile.

The method of test in 3GPP 51.010 (formerly ETSI GSM 11.10) is based upon time-gated spectrum analysis; this technique only allows one measurement per burst. Modern DSP techniques employed in the test set makes it possible to measure more of the burst while still excluding the unwanted effects of the midamble and switching transients generated by burst modulation.

Measuring ORFS on GPRS and EGPRS mobiles using the BLER data connection type

The result of the Output RF Spectrum measurement relies on pseudo random data being present in the data field of the RF burst. When using the BLER data connection type, these data fields do not contain pseudo random data, therefore the results may not be representative.

Related Topics

"GSM Output RF Spectrum Measurement" on page 106

"GPRS and EGPRS Output RF Spectrum Measurement" on page 109

"Programming an Output RF Spectrum Measurement for GSM" on page 347

"Programming an Output RF Spectrum Measurement for GPRS and EGPRS" on page 348

Reference Sensitivity

Standards Reference: 3GPP 51.010 (formerly ETSI GSM 11.10) section 14.2

The method of test implemented by the test set's Bit Error measurement conforms to the measurement method defined in 3GPP 51.010 (formerly ETSI GSM 11.10), section 14.2. The Bit Error measurement is available for GSM, GPRS, and EGPRS.

Making a faster reference sensitivity measurement

An alternative method of test for making a Reference Sensitivity measurement is to use the Fast Bit Error (FBER) measurement in the test set. The FBER measurement is five times faster than the normal BER measurement.

The Fast Bit Error measurement is *not* applicable to GPRS or EGPRS.

Block Error Measurement

The Block Error (BLER) measurement which the test set provides is based on GPRS receiver tests defined in 3GPP 51.010 (formerly ETSI GSM 11.10), section 14.16 (GPRS) and section 14.18.1 (EGPRS).

The Block Error measurement is *not* applicable to GSM.

Related Topics

"GSM Bit Error Measurement" on page 85
"GPRS Bit Error Measurement" on page 88
"Programming a Bit Error Measurement for GSM" on page 329
"Programming a Bit Error Measurement for GPRS" on page 331
"Fast Bit Error Measurement Description" on page 100
"Programming a Fast Bit Error Measurement" on page 343
"Block Error Measurement Description" on page 90
"Programming a Block Error Measurement" on page 334

I/Q Tuning Measurement

The I/Q Tuning measurement is not an ETSI specified measurement.

Related Topics

"I/Q Tuning Measurement Description" on page 103
"Programming an I/Q Tuning Measurement" on page 345

Dynamic Power Measurement

The Dynamic Power measurement is not an ETSI specified measurement.

Related Topics

"Dynamic Power Measurement Description" on page 98
"Programming a Dynamic Power Measurement" on page 340

Analog Audio Measurements

The Analog Audio measurements are not ETSI specified measurements.

The Analog Audio measurements are *not* applicable to GPRS.

Related Topics

"Analog Audio Measurement Description" on page 80

Spectrum Monitor Measurements

The Spectrum Monitor measurement is not an ETSI specified measurement.

Related Topics

"Spectrum Monitor Description" on page 142
"Programming the Spectrum Monitor" on page 362

What 3GPP TS 05.05 Requirements are supported?

This table shows the standard GSM and GPRS requirements as given in 3GPP TS 05.05 version 8. Shown are E1968A measurement capabilities.

Table 1. Transmitter Characteristics

3GPP TS 05.05	Test Description	As of January Ô03	E1968A Measurement
4.1.1	Output power: Mobile Station	Yes	Power versus Time
4.2.1	Output RF spectrum: Spectrum due to the modulation and wide band noise	Yes	Output RF Spectrum
4.2.2	Output RF spectrum: Spectrum due to switching Ttansients	Yes	Output RF Spectrum
4.3.3	Spurious emissions: Mobile Station	Yes**	Camp to E1968A. Use an external spectrum analyzer.
4.4	Radio frequency tolerance	Yes	Phase and Frequency Error
4.5.2	Output level dynamic operation: Mobile Station	Yes	Power versus Time
4.6.1	Modulation accuracy: GMSK modulation	Yes	Phase and Frequency Error

Table 2. Receiver Characteristics

3GPP TS 05.05	Test Description	As of January Ô03	E1968A Measurement
5.1	Blocking characteristics	Yes*	Bit Error (plus GSM signal from a signal generator)
5.2	AM suppression characteristics	Yes	Bit Error (plus GSM signal from a signal generator)
5.3	Intermodulation characteristics	Yes	Bit Error (plus 2 CW signals from signal generators)
5.4	Spurious emissions	Yes	Camp to E1968A. Use an external spectrum analyzer.

Table 3. Transmitter/Receiver Performance

3GPP TS 05.05	Test Description	As of January Ô03	E1968A Measurement
6.1	Nominal Error Rates (NER)	Yes	Bit Error
6.2	Reference sensitivity level	Yes	Bit Error (or Block Error)
6.3	Reference interference level	Yes	Bit Error (plus GSM signal from a signal generator)
6.4	Erroneous frame indication performance	Yes	Bit Error (FER)
6.5	Random access and paging performance at high input levels		
6.6	Frequency hopping performance under interference conditions		

X* - Also use an E4438C ESG Vector Signal Generator

X** - Also use an E4445A PSA Spectrum Analyzer

Related Topics

"Test Adherence to Standards" on page 150

"Power versus Time Measurement Description" on page 117

"Output RF Spectrum Measurement Description" on page 106

"Phase and Frequency Error Measurement Description" on page 113

"Bit Error Measurement Description" on page 85

"Block Error Measurement Description" on page 90

Amplitude Offset

Description

Amplitude offsets compensate for loss or gain between the test set's RF IN/OUT front panel connector and the mobile station's RF connector.

To access the amplitude offset feature, press the **SYSTEM CONFIG** key, followed by the `RF IN/OUT Amptd Offset` (**F5**) key.

Amplitude offset settings are preserved during power cycles or instrument preset.

Setting Up Amplitude Offsets and Frequency Points

Up to 20 frequency points can be assigned an amplitude offset. Negative amplitude offset values should be entered when there is a loss through the RF cabling and test fixtures and positive values should be entered when there is a gain.

The RF IN/OUT Amplitude Offset table displays the current (on/off) state of the amplitude offset feature. There are also 20 rows for entering frequencies and 20 rows for entering corresponding offset values. To enter values in the table use the RF IN/OUT Amplitude Offset Setup menu.

To set up amplitude offsets remotely, one comma-separated string is sent to set up frequency points and another comma-separated string assigns the corresponding amplitudes.

GPIB Commands

```
OUTPUT 714;"SYSTEM:CORRECTION:SFREQUENCY 1710.2 MHZ,1805.2 MHZ,1784.8 MHZ,1879.8 MHZ"
!sets the first 4 frequencies in the amplitude offset table.
```

```
OUTPUT 714;"SYSTEM:CORRECTION:SGAIN -2.55,-3.12,-3.68,-4.23"
!sets the first 4 amplitude offsets in the amplitude offset table.
```

Turning amplitude offsets on/off

When the RF IN/OUT Amplitude Offset State is on, all offsets that are not individually turned off are applied and the word "Offset" appears in the Instrument Status Area of the test set's display.

If the RF IN/OUT Amplitude Offset State is off, none of the amplitude offsets are applied.

GPIB Command

```
OUTPUT 714;"SYSTEM:CORRECTION:STATE ON"
!Sets the RF IN/OUT Amplitude Offset State to On
```

NOTE If the RF IN/OUT Amplitude Offset State is turned off , none of the amplitude offsets are on, even if values are entered for the individual offsets.

Examples of Amplitude Offset Behavior

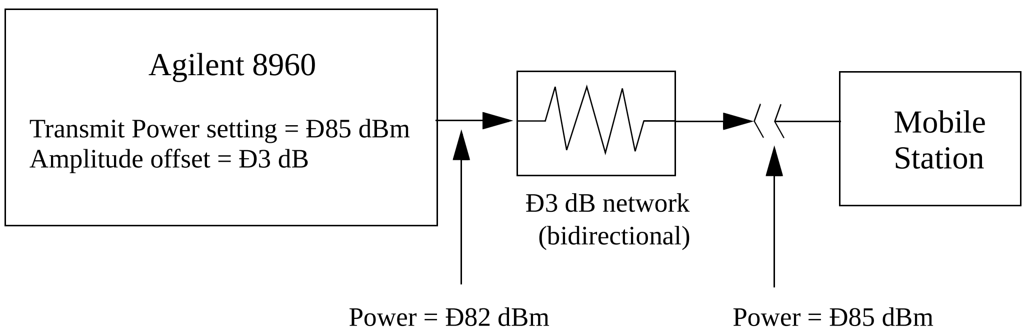
When the amplitude offset table entries accurately represent the loss in all components (cabling, connectors, and test fixturing) in the signal path between the test set and the mobile station, the test set will make the necessary adjustments in both receiver and transmitter measurements.

Mobile Station Receiver Example

When you set a transmit power level, the test set uses the amplitude offset value to adjust the power so that the test set's transmit power level refers to the power level received at the mobile station.

As shown in Figure 1. "Amplitude Offset Mobile Station Receiver Example", with the test set's transmit power set to -85 dBm and a -3 dB amplitude offset the actual power level transmitted from the test set will be automatically offset to -82 dBm. With a 3 dB loss in the signal path the mobile station will receive -85 dBm, the actual setting.

Figure 1. Amplitude Offset Mobile Station Receiver Example



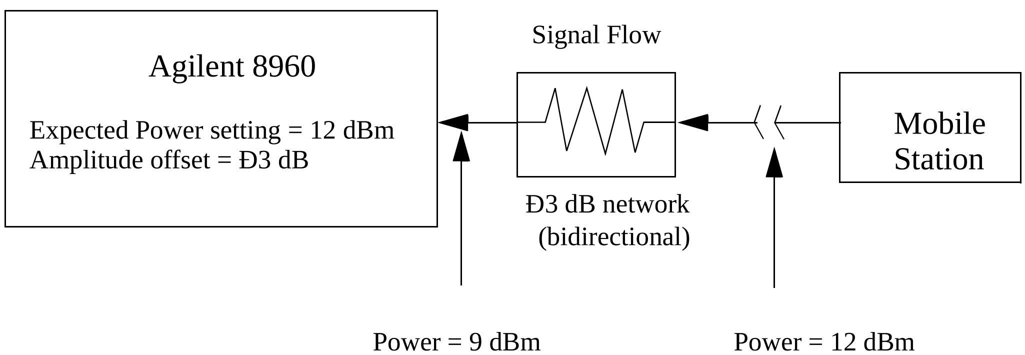
Mobile Station Transmitter Example

When you measure power from the mobile station, the displayed and queried values are offset to show the level at the mobile station.

As shown in Figure 2. "Amplitude Offset Mobile Station Transmitter Example", with the mobile station transmitting 12 dBm and a -3 dB amplitude offset is entered, the measured power at the test set would be 9 dBm. The displayed power level is automatically adjusted to 12 dBm to show the level at the mobile station.

If the expected power, which can be set manually or automatically is 12 dBm, the test set's internal hardware adjusts itself to receive 9 dBm which is the actual power from the mobile station after 3 dB loss in the network.

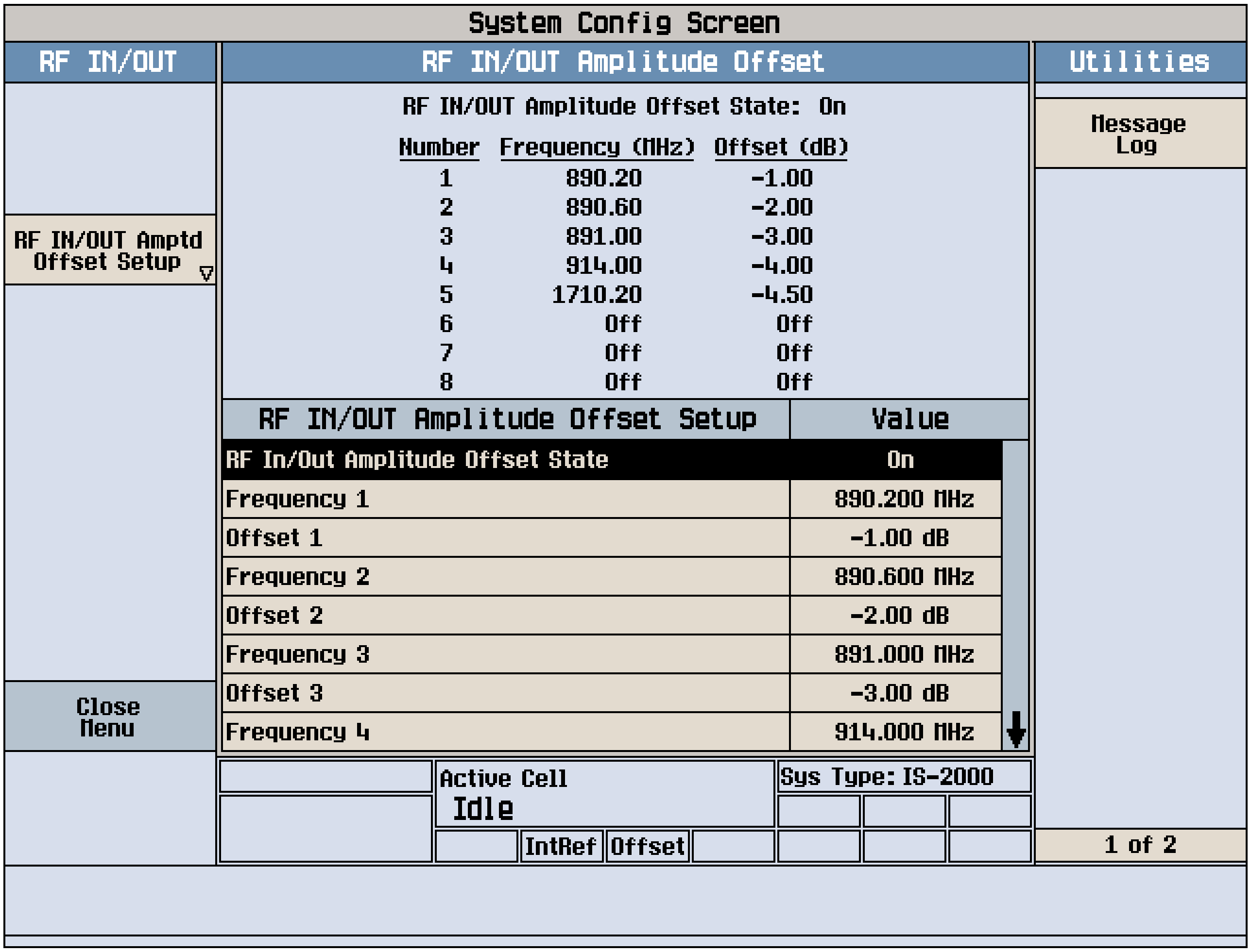
Figure 2. Amplitude Offset Mobile Station Transmitter Example



Amplitude Offsets Between Frequency Settings

If mobile station testing is performed at frequencies that do not have amplitude offsets assigned to them, the test set will estimate an amplitude offset based on the nearest settings. For example, the following screen shows five amplitude offsets for frequencies ranging from 890.2 MHz to 1710.2 MHz.

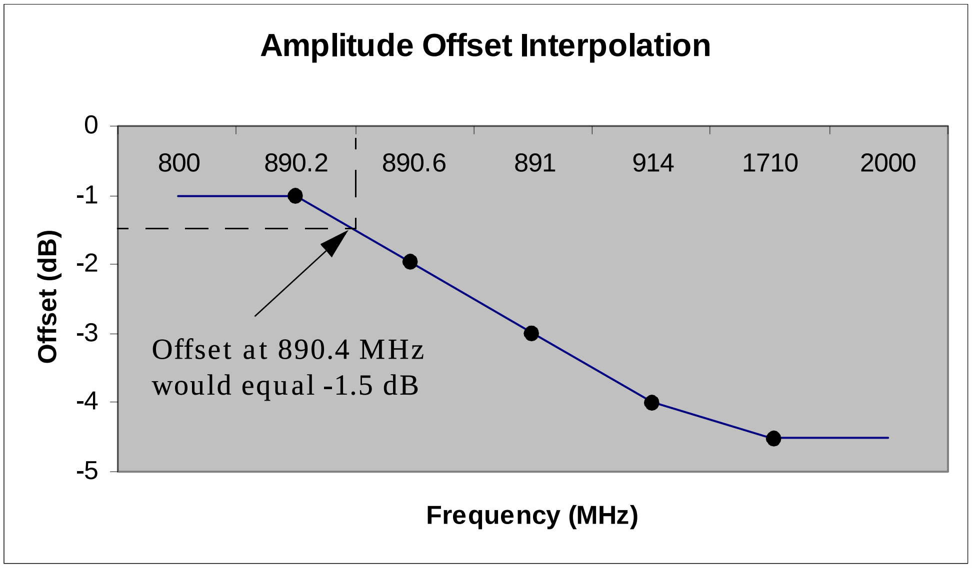
Figure 3. RF IN/OUT Amplitude Offset Setup



For test frequencies between the lowest (890.2 MHz) and highest (1710.2 MHz) frequency points that are not entered in the table, the test set will calculate offsets using piece-wise linear interpolation.

The graph shown in Figure 4. "Amplitude Offset Interpolation" is a conceptual representation of the test set's amplitude offset configuration using the settings from the RF IN/OUT Amplitude Offset table in Figure 3. "RF IN/OUT Amplitude Offset Setup". Each of the five points are shown on a non-scaled frequency versus amplitude offset graph. At a test frequency of 890.4 MHz, which is midway between point number one (-1 dB) and point number two (-2 dB) the test set applies an offset of -1.5 dB. Be aware that since amplitude offsets are in units of dB, this piece-wise linear interpolation does not produce a linear transition from point to point.

Figure 4. Amplitude Offset Interpolation



If testing is done outside the range of frequencies bounded by the lowest and highest frequency entries, the test set simply uses the amplitude offset that is paired with the nearest frequency point.

IMPORTANT It is highly recommended that amplitude offsets are set up for each test frequency. This eliminates inaccuracies due to the mismatch between the test set's linear interpolation and the actual frequency response of the RF path between the test set and mobile station.

Related Topics

"SYSTem:CORRection" on page 1279

Call Processing

E1968A GSM/GPRS GPIB COMMAND CHANGES

Operating Mode Commands

The operating mode was determined by three separate GPIB commands in the E1960A GSM Mobile Test Application (TA):

CALL[:CELL]:OPERating:MODE CALL | CELL | TEST

CALL[:CELL]:FUNCtion:DOWNlink CW | BCH | BCHTCH

CALL[:CELL]:ACTivated 1 | ON | 0 | OFF

The operating mode command selected between active cell mode and test mode. When in active cell mode, the cell activated command determined the cell state. When in test mode, the downlink function command determined which test mode was used.

The above three commands have been replaced with a single combined operating mode command in the E1968A GSM/GPRS Mobile Test Application:

CALL[:CELL]:OPERating:MODE

with the following parameters:

CALL* | CELL | GBTest | GBTTest | PBTest | PBPTest | OFF | CW

*CALL and CELL are equivalent, CALL is always returned by the query form of the command.

All existing E1960A test code should be checked wherever the above three commands occur. In most cases, the new form of the operating mode command will be required. See “CALL:OPERating:MODE” on page 610.

CALL[:CELL]:FUNCtion:DOWNlink has been deleted and should be replaced by CALL[:CELL]:OPERating:MODE

CALL[:CELL]:ACTivated has been retained as an alias of CALL[:CELL]:OPERating:MODE

CALL[:CELL]:ACTivated 1 | ON is replaced by CALL[:CELL]:OPERating:MODE CALL

CALL[:CELL]:ACTivated 0 | OFF is replaced by CALL[:CELL]:OPERating:MODE OFF

Connection Type Commands

A new E1968A GSM/GPRS command CALL:FUNCtion:CONNection:TYPE has been added to control what type of connection can be made. This command replaces the E1964A GPRS Mobile Test Application command CALL:FUNCtion:DATA:TYPE which is also retained for backwards compatibility with existing E1964A test code. The new command accepts the following parameters:

A | B | ACKB | BLER | AUTO

The A, B, ACKB, BLER parameters are only applicable when licensed for GPRS. The AUTO parameter is only applicable when licensed for either GSM TA or the E6701C GSM/GPRS Lab Application (LA). When set to AUTO, either mobile originated or mobile terminated GSM voice calls can be made, or alternatively IP Data data connections can be made. Effectively, AUTO is equivalent to the GPRS LA IPData connection type for GPRS data connections, but adds capability for GSM voice calls.

When licensed for GSM (E1960A or E6701C license present), the default setting for connection type is AUTO meaning that existing GSM code will not need to be modified to take account of this new setting. If the GPRS TA only is licensed, this setting defaults to BLER.

The old GPRS TA/LA command CALL:FUNCtion:DATA:TYPE is maintained for backwards compatibility and is identical to the newer CALL:FUNCtion:CONNection:TYPE command except that IPData is used instead of AUTO.

GSM RF Generator Commands

The E1960A GSM Mobile Test Application CW test mode was specific to the E1960A Mobile TA only, it was accessed by the following commands:

CALL:OPERating:MODE TEST

CALL:FUNCtion:DOWNlink CW

The E1964A GPRS Mobile Test Application and the E6701B GPRS Lab Application Rev B did not have any form of CW mode. E1968A GSM/GPRS based applications use a CW operating mode which is common to all other TAs e.g. IS136 and WCDMA. The new CW operating mode is accessed as follows:

CALL:OPERating:MODE CW

Since the common CW operating mode is used for all formats, it does not support setting the CW frequency by specifying GSM band and ARFCN as these have no meaning in formats such as IS136. To maintain backwards compatibility with the E1960A GSM Mobile Test Application, the old CALL:RFG commands are supported but with some differences, these are explained below.

E1968A GSM/GPRS GPIB COMMAND CHANGES

In the E1960A GSM Mobile Test Application there were no separate RFG settings, all RFG commands except frequency were actually aliases to other CELL commands, as shown below:

CALL[:CELL]:RFGenerator:BAND --> CALL[:CELL]:BAND

CALL[:CELL]:RFGenerator:CHANnel:[SELected] --> CALL[:CELL]:BCH:ARFCn:[SELected]

CALL[:CELL]:RFGenerator:CHANnel:EGSM --> CALL[:CELL]:BCH:ARFCn:EGSM

CALL[:CELL]:RFGenerator:CHANnel:RGSM --> CALL[:CELL]:BCH:ARFCn:RGSM

CALL[:CELL]:RFGenerator:CHANnel:DCS --> CALL[:CELL]:BCH:ARFCn:DCS

CALL[:CELL]:RFGenerator:CHANnel:PCS --> CALL[:CELL]:BCH:ARFCn:PCS

CALL[:CELL]:RFGenerator:CHANnel:GSM450 --> CALL[:CELL]:BCH:ARFCn:GSM450

CALL[:CELL]:RFGenerator:CHANnel:GSM480 --> CALL[:CELL]:BCH:ARFCn:GSM480

CALL[:CELL]:RFGenerator:CHANnel:GSM750 --> CALL[:CELL]:BCH:ARFCn:GSM750

CALL[:CELL]:RFGenerator:CHANnel:GSM850 --> CALL[:CELL]:BCH:ARFCn:GSM850

CALL[:CELL]:RFGenerator:POWer[:SAMPlitude] --> CALL[:CELL]:POWer:[SAMPlitude]

CALL[:CELL]:RFGenerator:POWer:AMPLitude --> CALL[:CELL]:POWer:AMPLitude

CALL[:CELL]:RFGenerator:POWer:STATe --> CALL[:CELL]:POWer:STATe

This meant that if you modified any RFG setting, it would reflect on its equivalant setting BCH setting. For example, if you modified CALL:RFG:BAND while in CW test mode, it would also change CALL:BAND, meaning that when you returned to Active Cell mode, the BCH BAND would have been changed.

In the E1968A GSM/GPRS Mobile Test Application there is no linkage between the CW mode parameters and BCH ARFCN, band and power parameters. CW mode maintains its own separate frequency, power and state parameters.

In the E1968A GSM/GPRS Mobile Test Application, the legacy GSM RFG commands are mapped onto common CW operating mode commands as shown below:

CALL[:CELL]:RFGenerator:POWer[:SAMPlitude] --> CALL[:CELL]:POWer:[SAMPlitude]:CW

CALL[:CELL]:RFGenerator:POWer:AMPLitude --> CALL[:CELL]:POWer:AMPLitude:CW

CALL[:CELL]:RFGenerator:POWer:STATe --> CALL[:CELL]:POWer:STATe:CW

The CALL[:CELL]:RFGenerator:FREQuency command exists unchanged from from the E1960A GSM Test Application.

The other GSM RFG band and channel commands do not have direct equivalent common CW operating mode commands. These commands have been implemented in the yuc code layer only, to provide a degree of backwards compatibility with E1960A code. This means that a *RST (or MUI full preset) will not reset these commands to their power on default values – their values do not change during a reset.

CALL[:CELL]:RFGenerator:BAND

CALL[:CELL]:RFGenerator:CHANnel:[SELected]

CALL[:CELL]:RFGenerator:CHANnel:PGSM

CALL[:CELL]:RFGenerator:CHANnel:EGSM

CALL[:CELL]:RFGenerator:CHANnel:RGSM

CALL[:CELL]:RFGenerator:CHANnel:DCS

CALL[:CELL]:RFGenerator:CHANnel:PCS

CALL[:CELL]:RFGenerator:CHANnel:GSM450

CALL[:CELL]:RFGenerator:CHANnel:GSM480

CALL[:CELL]:RFGenerator:CHANnel:GSM750

CALL[:CELL]:RFGenerator:CHANnel:GSM850

GSM RFAN Commands

The GSM RFAN commands are now obsolete and the GPRS RFAN commands should be used instead. To maintain backwards compatibility, the old GSM RFAN commands have been mapped onto the newer GPRS RFAN commands where possible. Where a direct mapping isn't possible, the setting has been created in the yuc code layer only to provide a degree of backwards compatibility. It is strongly recommended that previous code be changed over to the newer GPRS RFAN commands where ever possible.

One fundamental difference between GSM and GPRS RFAN commands is in GSM where there was only a single receiver expected power, therefore, when the receiver was under base station emulator control, changing MS TX Level would alter the single receiver expected power setting. This meant that if you switched from base station emulator (auto) control to RFAN (manual) control, the receiver expected power setting would remain the same as it was under base station emulator control until changed. There was a coupling between the base station emulator control MS TX Level and the manual expected power setting.

The E1968A GSM/GPRS Mobile Test Application does not retain this coupling between base station emulator (auto) and RFAN (manual) settings. The E1968A GSM/GPRS Mobile Test Application maintains separate settings for automatic and manual control, therefore, when you change to manual control in the E1968A, the receiver expected power and frequency settings will not necessarily remain the same, in fact it is likely that they will change. This means that receiver expected frequency and/or power must be explicitly set rather than assuming that it will be correct.

E1968A GSM/GPRS GPIB COMMAND CHANGES

Another difference between the E1960A GSM and E1968A GSM/GPRS Mobile Test Application is in the expected power control and measurement and uplink (demod) receivers. E1960A GSM Mobile Test Application used a single auto/manual control that governed the expected power control and measurement and uplink (demod) receivers. The E1968A GSM/GPRS Mobile Test Application individually sets these settings.

The following shows how the GSM RFAN commands map onto the newer GPRS RFAN commands.

RFANalyzer:CONTrol:AUTO **-->** RFANalyzer:CONTrol:POWer:AUTO

--> RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO

The single GSM auto/manual control command maps onto the GPRS expected power control and measurement control commands. Note however that the uplink (demod) frequency control is not altered.

RFANalyzer:EXPected:POWer[:SELected] **-->** RFANalyzer:MANual:POWer:BURS1

RFANalyzer:MANual:FREQuency **-->** RFANalyzer:MANual:MEASurement:FREQuency

The GPRS RFAN commands do not support banded settings for either power or frequency, and do not support setting frequency in terms of ARFCN, so the following GSM RFAN commands have had legacy settings added into the yuc code to ensure a degree of backwards compatibility:

RFANalyzer:MANual:BAND

RFANalyzer:EXPected:POWer:PGSM

RFANalyzer:EXPected:POWer:EGSM

RFANalyzer:EXPected:POWer:RGSM

RFANalyzer:EXPected:POWer:DCS

RFANalyzer:EXPected:POWer:PCS

RFANalyzer:EXPected:POWer:GSM450

RFANalyzer:EXPected:POWer:GSM480

RFANalyzer:EXPected:POWer:GSM750

RFANalyzer:EXPected:POWer:GSM850

RFANalyzer:MANual:CHANnel[:SELected]

RFANalyzer:MANual:CHANnel:PGSM

RFANalyzer:MANual:CHANnel:EGSM

RFANalyzer:MANual:CHANnel:RGSM

RFANalyzer:MANual:CHANnel:DCS

RFANalyzer:MANual:CHANnel:PCS

RFANalyzer:MANual:CHANnel:GSM450

RFANalyzer:MANual:CHANnel:GSM480

RFANalyzer:MANual:CHANnel:GSM750

RFANalyzer:MANual:CHANnel:GSM850

These legacy settings will retain their existing values through a *RST or full preset operation, they will not be reset to their power on default values.

RFANalyzer:MSLot:MEASurement:BURSt --> CALL:PDTCh:MSLot:MEASurement:BURSt

Note that none of the legacy GSM RFAN commands have any coupling to the new command CALL:PDTCh:MSLot:MEASurement:BURSt command which selects which burst is measured. This setting must be set to 1 for GSM TCH measurements. See “CALL:PDTChannel:MSLot:MEASurement:BURSt” on page 636. This command replaces RFAN:MSLot:MEASurement:BURSt.

Overlapped Commands

The E1960A GSM Mobile Test Application supported overlapped command functionality for the following commands:

CALL[:CELL]:BCHannel[:ARFCn][:SELected]

CALL[:CELL]:BCHannel[:ARFCn]:PGSM

CALL[:CELL]:BCHannel[:ARFCn]:EGSM

CALL[:CELL]:BCHannel[:ARFCn]:DCS

CALL[:CELL]:BCHannel[:ARFCn]:PCS

CALL[:CELL]:BCHannel[:ARFCn]:RGSM

CALL[:CELL]:BCHannel[:ARFCn]:GSM450

CALL[:CELL]:BCHannel[:ARFCn]:GSM480

CALL[:CELL]:BCHannel[:ARFCn]:GSM850

CALL[:CELL]:BCHannel[:ARFCn]:GSM750

CALL:END

CALL:MS:TADVance[:SELected]

CALL:MS:TADVance:PGSM

CALL:MS:TADVance:EGSM

CALL:MS:TADVance:DCS

CALL:MS:TADVance:PCS

CALL:MS:TADVance:RGSM

CALL:MS:TADVance:GSM450

CALL:MS:TADVance:GSM480

CALL:MS:TADVance:GSM850

CALL:MS:TADVance:GSM750

CALL:MS:TXLevel[:SELected]

CALL:MS:TXLevel:PGSM

CALL:MS:TXLevel:EGSM

CALL:MS:TXLevel:DCS

CALL:MS:TXLevel:PCS

CALL:MS:TXLevel:RGSM

CALL:MS:TXLevel:GSM450

CALL:MS:TXLevel:GSM480

CALL:MS:TXLevel:GSM850

CALL:MS:TXLevel:GSM750

CALL:TCHannel[:ARFCn][:SELected]

CALL:TCHannel[:ARFCn]:PGSM

CALL:TCHannel[:ARFCn]:EGSM

CALL:TCHannel[:ARFCn]:DCS

CALL:TCHannel[:ARFCn]:PCS

CALL:TCHannel[:ARFCn]:RGSM

CALL:TCHannel[:ARFCn]:GSM450

CALL:TCHannel[:ARFCn]:GSM480

CALL:TCHannel[:ARFCn]:GSM850

CALL:TCHannel[:ARFCn]:GSM750

CALL:TCHannel:CMODe[:VALue]

CALL:TCHannel:CMODe:HRSPeech:SCHannel

CALL:TCHannel:TSLot

In the E1968A GSM/GPRS Mobile Test Application, this functionality has been removed. All other commands with overlapped functionality, such as CALL:ORIGinate, still have overlapped functionality as before. This means that sending one of the above commands in the E1968A Mobile TA is equivalent to appending :SEQ in the E1960A Mobile TA. All of the above commands execute sequentially in the E1968A GSM/GPRS Mobile Test Application.

:SEQ

All of the above commands operate sequentially by default, therefore appending :SEQ is uneccessary, but is still supported.

:WAIT

In the E1960A GSM Mobile Test Application, the :WAIT GPIB extension could be used to convert a previously issued overlapped command into a sequential command. In the E1968A GSM/GPRS Mobile Test Application, overlapped functionality is not available for the above commands, therefore, this GPIB extension has no purpose. To maximise backwards compatibility, the :WAIT GPIB extension will be accepted without error for the above commands, but will be ignored. Ideally, :WAIT GPIB extensions should be removed from test code.

:DONE? And OPC?

These GPIB extensions no longer have any meaning for the above commands and will always return 1. It is recommended the above commands with :OPC? or :DONE? extensions be removed from test code.

Deferred Commands

To compensate for the loss of overlapped functionality in the above E1960A GSM commands, deferred commands have been added for the following settings:

CALL:SETup:TCHannel:MS:TXLevel[:SELected]

CALL:SETup:TCHannel:MS:TXLevel:PGSM

CALL:SETup:TCHannel:MS:TXLevel:EGSM

CALL:SETup:TCHannel:MS:TXLevel:DCS

CALL:SETup:TCHannel:MS:TXLevel:PCS

CALL:SETup:TCHannel:MS:TXLevel:RGSM

CALL:SETup:TCHannel:MS:TXLevel:GSM450

CALL:SETup:TCHannel:MS:TXLevel:GSM480

CALL:SETup:TCHannel:MS:TXLevel:GSM850

CALL:SETup:TCHannel:MS:TXLevel:GSM750

CALL:SETup:TCHannel[:ARFCn][:SELected]

CALL:SETup:TCHannel[:ARFCn]:PGSM

CALL:SETup:TCHannel[:ARFCn]:EGSM

CALL:SETup:TCHannel[:ARFCn]:DCS

CALL:SETup:TCHannel[:ARFCn]:PCS

CALL:SETup:TCHannel[:ARFCn]:RGSM

CALL:SETup:TCHannel[:ARFCn]:GSM450

CALL:SETup:TCHannel[:ARFCn]:GSM480

CALL:SETup:TCHannel[:ARFCn]:GSM850

CALL:SETup:TCHannel[:ARFCn]:GSM750

CALL:SETup:TCHannel:BAND

CALL:SETup:TCHannel:CMODe[:VALue]

CALL:SETup:TCHannel:CMODe:HRSPeech:SCHannel

CALL:SETup:TCHannel:TSLot

As with the E1964A GPRS TA, a handover is initiated with the CALL:HAND GPIB command.

Since the above deferred commands are new commands, there is no direct impact on previous test code. However, it is recommended previous test code be optimised to take advantage of the faster handovers possible using the new deferred commands.

Other Commands and Changes

CALL:COUNt:TDMA:FRAMes

In the E1960A GSM Mobile Test Application, this command specified the timeout period (in frames) within which a mobile must respond to a TCH assignment command such as a TCH ARFCN change. If this time was exceeded, an error was logged.

In the E1968A GSM/GPRS Mobile Test Application architecture, this command is redundant. It is supported for backwards compatibility reasons, but the setting doesn’t do anything. It is recommended that this command be removed from previously written test code.

CALL:TCHannel:TSLot

This command now accepts values in the range 1 to 7 whereas previously, it was limited to 3 to 5. There is no impact on previously written test code.

CALL:BURSt:TYPE

This command now accepts the parameter RACH for GPRS as well as GSM. No impact on previously written test code.

CALL:STATus:TCHannel[:ARFCn]?

This command is now redundant, it is now an alias for CALL:TCHannel:ARFCn? which should be used instead.

CALL:STATus:TCHannel:BAND?

This command is now redundant, it is now an alias for CALL:TCHannel:BAND? which should be used instead.

CALL:STATus:TCHannel:TSLot?

This command is now redundant, it is now an alias for CALL:TCHannel:TSLot? which should be used instead.

SYSTem:APPLication:FORMat[:NAME]

In the E1985A Fast Switching Test Application, this command would fast switch between formats. In the E1968A GSM/GPRS Mobile Test Application, there is no fast switch between GSM and GPRS because the GSM and GPRS formats are integrated. To switch from another format e.g. WCDMA to GSM/GPRS, you can use any of the following parameters:

“GSM/GPRS” (preferred) or “GSM” or “GPRS”

The query will always return “GSM/GPRS”.

It is strongly recommended that all instances of the SYS:APPL:FORM:NAMe command be removed where there is a fast switch between GSM and GPRS or vice-versa to optimise test plan execution. In the E1968A.GSM/GPRS Mobile Test Application this command does not perform any function and will waste time because the E1968A now integrates these two technologies. It is also recommended, though not essential, that the new format name “GSM/GPRS” be used when switching from other formats to the E1968A. Any code using the query form of this command must be modified to expect “GSM/GPRS” as the response.

SYSTem:APPLication:SELect[:NAME]

The name used for the E1968A is “GSM/GPRS Mobile Test Application”.

New Commands

The following commands are new to the E1968A GSM/GPRS Mobile Test Application, consequently there will be no impact on existing test code.

CALL:TCHannel:PREDuction:LEVel[1|2]

Assigns a value in dB to power reduction level 1 or 2 - accepts values in the range 0 to 25 dB. This command works in the same manner as the existing E1964A GPRS command CALL:PDTChannel:PREDuction:LEVel[1|2].

CALL:TCHannel:PREDuction:BURSt

Specifies a power reduction level to use for the downlink TCH burst power – accepts either PRL1 or PRL2 as a parameter. This command works in the same manner as the existing E1964A GPRS command CALL:PDTChannel:PREDuction:BURSt[1|2|3|4].

CALL:TCHannel:PREDuction:UBURst

Specifies a power reduction level to use for the downlink TCH unused burst power – accepts either PRL1 or PRL2 as a parameter. This command works in the same manner as the existing E1964A GPRS command CALL:PDTChannel:PREDuction:UBURst.

CALL:TCHannel:POWer[:AMPLitude]?

Query only. Returns the downlink TCH used burst power in dB.

CALL:TCHannel:POWer[:AMPLitude]:UBURst?

Query only. Returns the downlink TCH unused burst power in dB.

CALL:MS:TXLevel:CCHannel[:SELected]

CALL:MS:TXLevel:CCHannel:PGSM

CALL:MS:TXLevel:CCHannel:EGSM

CALL:MS:TXLevel:CCHannel:RGSM

CALL:MS:TXLevel:CCHannel:DCS

CALL:MS:TXLevel:CCHannel:PCS

CALL:MS:TXLevel:CCHannel:GSM450

CALL:MS:TXLevel:CCHannel:GSM480

CALL:MS:TXLevel:CCHannel:GSM750

CALL:MS:TXLevel:CCHannel:GSM850

These commands specify the maximum burst power a mobile may uses for access bursts. At present this is an LA only feature. The range of values accepted is dependant on the band.

DCS band 0 to 28

PCS band 0 to 15 and 30 to 31

Other bands 0 to 31

These settings can only be changed when the operating mode is OFF.

CALL[:CELL]:MS:CCHannel:POWer:OFFSet:DCS

This command specifies an additional offset for use with the Max CCH value in the DCS band only. It accepts values in the range 0 to 3. This command is an LA only command, and can only be changed when the operating mode is OFF.

CALL:TRIGger[:OUTPut]:FRAMe:NIDLe:STATe

This command which was previously only available in the LA, is now available in the GSM and GPRS TAs.

CALL[:CELL]:BCHannel:SCELl

This command sets the serving cell, that is it determines the capabilities of the cell BCH generated by the base station emulator.

Parameters are license dependent and can include GSM | GPRS | EGPRS.

The EGPRS parameter is only applicable when licensed for EDGE. The GPRS parameter is only applicable when licensed for GPRS. If the only application licensed is GSM, you will be unable to change this setting. If you are licensed for GPRS, setting this parameter to GSM will mean that GPRS BCH information (sysinfo 13 etc) is not broadcast, therefore GPRS mobiles won't attempt to attach.

CALL:MS:REPorted:PCLass:EPSK:DCS

CALL:MS:REPorted:PCLass:EPSK:EGSM

CALL:MS:REPorted:PCLass:EPSK:GSM450

CALL:MS:REPorted:PCLass:EPSK:GSM480

CALL:MS:REPorted:PCLass:EPSK:GSM750

CALL:MS:REPorted:PCLass:EPSK:GSM850

CALL:MS:REPorted:PCLass:EPSK:PCS

CALL:MS:REPorted:PCLass:EPSK:PGSM

CALL:MS:REPorted:PCLass:EPSK:RGSM

CALL:MS:REPorted:PCLass:EPSK[:SELected]

CALL:MS:REPorted:PCLass:GMSK:DCS

CALL:MS:REPorted:PCLass:GMSK:EGSM

CALL:MS:REPorted:PCLass:GMSK:GSM450

CALL:MS:REPorted:PCLass:GMSK:GSM480

CALL:MS:REPorted:PCLass:GMSK:GSM750

CALL:MS:REPorted:PCLass:GMSK:GSM850

CALL:MS:REPorted:PCLass:GMSK:PCS

CALL:MS:REPorted:PCLass:GMSK:PGSM

CALL:MS:REPorted:PCLass:GMSK:RGSM

CALL:MS:REPorted:PCLass:GMSK[:SELected]

The above commands return the power class for each band in either the GSMK or EPSK (8PSK - EDGE) modulation scheme. This information is only made available during the attach procedure and therefore, is not available to the GSM TA.

CALL:MS:REPorted:MCLass:EGPRS:DCS

CALL:MS:REPorted:MCLass:EGPRS:EGSM

CALL:MS:REPorted:MCLass:EGPRS:GSM450

CALL:MS:REPorted:MCLass:EGPRS:GSM480

CALL:MS:REPorted:MCLass:EGPRS:GSM750

CALL:MS:REPorted:MCLass:EGPRS:GSM850

CALL:MS:REPorted:MCLass:EGPRS:PCS

CALL:MS:REPorted:MCLass:EGPRS:PGSM

CALL:MS:REPorted:MCLass:EGPRS:RGSM

CALL:MS:REPorted:MCLass:EGPRS[:SELected]

CALL:MS:REPorted:MCLass:GPRS:DCS

CALL:MS:REPorted:MCLass:GPRS:EGSM

CALL:MS:REPorted:MCLass:GPRS:GSM450

CALL:MS:REPorted:MCLass:GPRS:GSM480

CALL:MS:REPorted:MCLass:GPRS:GSM750

CALL:MS:REPorted:MCLass:GPRS:GSM850

CALL:MS:REPorted:MCLass:GPRS:PCS

CALL:MS:REPorted:MCLass:GPRS:PGSM

CALL:MS:REPorted:MCLass:GPRS:RGSM

CALL:MS:REPorted:MCLass:GPRS[:SELected]

The above commands return the power class for each band in either the GSMK or EPSK (8PSK - EDGE) modulation scheme as reported by the mobile during its attach procedure. This information is only made available during the attach procedure and therefore, is not available to the GSM TA.

CALL:MS:REPorted:SBANd[:GMSK]?

Returns a comma-separated list of all supported bands.

RFANalyzer:CONTrol:MEASurement:BURSt:AUTO <0 | 1 | OFF | ON>

This command determines how the receiver decides which uplink burst to measure. If set to the default “ON” state, the measurement burst will be determined automatically. When set to the “OFF” or manual state, the measurement is made on either burst 1 or 2 set by the following new command

RFANalyzer:MANual:MEASurement:BURSt <1 | 2>

This manual measurement burst command is active only when the control measurement burst auto is off. In the manual mode, if you attempt to measure burst 2 while on a GSM call, the TXP measurement will report an integrity error of ‘Parameter Error’.

CALL:PCTCh:MSLot:MEASurement:BURSt <1 | 2>

This new command sets which uplink burst will be measured for single slot measurements on dual uplink PDTCH’s when the receiver measurement burst control is AUTO. This command setting has no effect on GSM calls where the measurement burst will always be 1.

Active Cell Operating Mode

The operating mode changes the way in which the test set interacts with the mobile station.

For GSM, the test set can operate in active cell mode, test mode GSM BCH, test mode GSM BCH+TCH, CW mode or cell off (see “GSM Test Mode Operation” on page 179).

For GPRS and EGPRS, the test set can operate in active cell mode, test mode GPRS BCH, test mode GPRS BCH+PDTCH, EGPRS BCH, EGPRS BCH+PDTCH or cell off (see “GPRS Test Mode Operation” on page 185 or “EGPRS Test Mode Operation” on page 186).

Active cell operating mode provides active signaling between the mobile station and the test set’s base station emulator:

Active Cell For GSM

Active cell mode is the default operating mode for GSM and is used with connection type `Auto` (see “Connection Types” on page 189) when emulating a normal GSM cell. One of the GSM test modes, either GBTest (BCH test) or GBTTest (BCH + TCH test), is used when it is not possible, or not desired, to communicate via over-the-air signaling with the mobile station, but downlink stimulus and uplink measurements are still needed. For more details on GSM test modes, see “Test Mode Operating Modes” on page 179.

The OPERating:MODE CALL and OPERating:MODE OFF parameters turn on and off respectively, the test set’s control of the uplink and downlink (including all signalling operations, uplink demodulation and downlink (broadcast channel, BCH, and traffic channel, TCH) generation).

Trying to set any of the network configuration parameters while the cell is in the active state will generate the following error:

```
GSM/GPRS operation rejected; Attempting to set <MCC|MNC|LAC|NCC|BCC|RAC> while generating a BCH
```

Setting the Test Set’s Operating Mode to Active Cell Mode

The test set’s operating mode is set using the command, “CALL:OPERating:MODE” on page 610. Specifying the ‘CALL’ parameter selects Active Cell Mode.

Active Cell For GPRS

Active cell mode is used when emulating a normal GSM/GPRS cell.

The Serving Cell parameter is used to set the type of cell; either GSM or GPRS. To set the Serving Cell remotely, use the GPIB command “CALL[:CELL]:BCHannel:SCELl” on page 509. To set the Serving Cell manually, press the **CALL SETUP** key, `Cell Info` (**F6**), `BCH Setup` (**F1**), then select the type of `Serving Cell` you want. For more information about the Serving Cell parameter, refer to “Serving Cell” on page 197.

The Connection Type parameter is used to set the type of data connection. See “Connection Types” on page 189 for details about the different connection types and when it is appropriate to use each.

In active cell operating mode the base station emulator, using the test set’s GMSK modulated source, generates a downlink (base station to mobile station direction) broadcast channel (BCH) which represents a cell. The GPRS mobile station can “camp” to this signal, just as it would camp to a cell on a real network, and perform an attach procedure to register the mobile station with the network. A Packet Data Traffic Channel (PDTCH) can then be established and data can be transferred in both the downlink and uplink directions.

For GPRS mobile stations which support a single uplink timeslot or two adjacent uplink timeslots, the following measurements can be made under essentially identical conditions to that which the mobile station would experience on a real network:

- Output RF Spectrum (ORFS) - see “Output RF Spectrum Measurement Description” on page 106.
- Transmit Power (TXP) - see “Transmit Power Measurement Description” on page 144
- Phase and Frequency (PFER) - see “Phase and Frequency Error Measurement Description” on page 113
- Power versus Time (PVT) - see “GPRS and EGPRS Power versus Time Measurement” on page 123
- Dynamic Power (DPOW) - see “Dynamic Power Measurement Description” on page 98
- Bit Error Rate - see “GPRS Bit Error Measurement” on page 88
- Block Error Rate - see “Block Error Measurement Description” on page 90
- I/Q Tuning - see “I/Q Tuning Measurement Description” on page 103

For a typical scenario detailing the steps you might take to test a GPRS mobile station, see “Testing a GPRS Mobile Station” on page 316.

Active Cell For EGPRS

Active cell mode is used when emulating a normal GSM/GPRS/EGPRS cell.

The Serving Cell parameter is used to set the type of cell; either GSM, GPRS, or EGPRS. To set the Serving Cell remotely, use the GPIB command “CALL[:CELL]:BCHannel:SCELl” on page 509. To set the Serving Cell manually, press the **CALL SETUP** key, `Cell Info` (**F6**), `BCH Setup` (**F1**), then select the type of `Serving Cell` you want. For more information about the Serving Cell parameter, refer to “Serving Cell” on page 197.

The Connection Type parameter is used to set the type of data connection. See “Connection Types” on page 189for details about the different connection types and when it is appropriate to use each.

In active cell operating mode the base station emulator, using the test set’s GMSK/8PSK modulated source, generates a downlink (base station to mobile station direction) broadcast channel (BCH) which represents a cell. The EGPRS mobile station can “camp” to this signal, just as it would camp to a cell on a real network, and perform an attach procedure to register the mobile station with the network. A Packet Data Traffic Channel

(PDTCH) can then be established using an ETSI defined EGPRS Test Mode or IP Data mode, and data can be transferred in both the downlink and uplink directions.

For EGPRS mobile stations which support a single uplink timeslot or two adjacent uplink timeslots, the following measurements can be made under essentially identical conditions to that which the mobile station would experience on a real network:

- EGPRS Transmit Power (ETXP) - see "EGPRS Transmit Power (ETXP) Measurement" on page 146
- Power versus Time (PVT)* - see "GPRS and EGPRS Power versus Time Measurement" on page 123
- Phase and Frequency (PFER)* - see "Phase and Frequency Error Measurement Description" on page 113
- Output RF Spectrum (ORFS)* - see "Output RF Spectrum Measurement Description" on page 106
- Dynamic Power (DPOW)* - see "Dynamic Power Measurement Description" on page 98
- Block Error (BLER) - see "Block Error Measurement Description" on page 90
- I/Q Tuning - see "I/Q Tuning Measurement Description" on page 103

NOTE When using the these measurements with your EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). These measurements do *not* support 8PSK modulation coding schemes at this time (MCS5 through MCS9). Note that the EGPRS Transmit Power measurement supports both 8PSK and GMSK (MCS1 through MCS9).

Related Topics

"Configuring the Broadcast Channel (BCH)" on page 196

"CALL:OPERating" on page 609

"Configuring the Traffic Channel (TCH)" on page 198

"Configuring the Packet Data Traffic Channel (PDTCH)" on page 205

"Testing a GPRS Mobile Station" on page 316

"Programming: Getting Started Guide for E1968A GSM/GPRS Mobile Test Application Revision A.01 and E6701C GSM/GPRS Lab Application Revision C.01" on page 266

"GPRS Data Connection Troubleshooting" on page 1469

"Connection Types" on page 189

Test Mode Operating Modes

The operating mode changes the way in which the test set interacts with the mobile station. Active cell operating mode is the default setting and is used when emulating a normal GSM, GPRS, or EGPRS cell. You use one of the test set's test mode operating mode when it is not possible, or not desired, to communicate using over-the-air signalling with the mobile station, but downlink stimulus and uplink measurements are still needed:

The following test modes are available for each format:

- GSM:
  - GSM BCH and GSM BCH+TCH
- GPRS:
  - GPRS BCH and GPRS BCH+TCH
- EGPRS:
  - GPRS BCH and GPRS BCH+TCH

Refer to the following sections for more details on eash test mode operating mode:

- "GSM Test Mode Operation" on page 179
- "GPRS Test Mode Operation" on page 185
- "EGPRS Test Mode Operation" on page 186

If you require details on active cell operating mode for GSM or GPRS, see "Active Cell Operating Mode" on page 176.

GSM Test Mode Operation

Active cell mode is the default operating mode and is used when emulating a normal GSM cell. When a GSM test mode is selected (GBTest or GBTTest), the choices of downlink stimulus, selected by Operating Mode, are:

- GSM BCH (broadcast channel) (see "BCH Operating Mode Behavior" on page 181)
- GSM BCH+TCH (broadcast channel + traffic channel) (see "BCH+TCH Operating Mode Behavior" on page 182)

See "CALL:FUNCtion" on page 536 for test function GPIB syntax.

When the test set's operating mode is a GSM test mode:

- No over-the-air signaling is available.
- No capability to demodulate and decode uplink RACH bursts is available.
- When the operating mode is set to one of the test modes, auto triggering sets the trigger source to RF Rise. See "RF Rise Trigger Source:" on page 404.

Receiver Control - Auto

If the receiver control field is set to auto (see “RFANalyzer:CONTrol:MEASurement:BURSt:AUTO” on page 1022), the test set’s receiver frequency is set according to the fields or GPIB commands in the following table.

Table 1. Test Set Receiver Frequencies (Receiver Control = Auto)

Test Function	Receiver Frequency Fields	GPIB Command
BCH	Broadcast Chan (1)	“CALL[:CELL]:BCHannel[:ARFCn][:SELected]” on page 498
BCH + TCH	Traffic Channel (2)	“CALL:TCHannel[:ARFCn][:SELected]” on page 815
CW	RF Gen Channel	“CALL[:CELL]:RFGenerator:FREQuency[:SELected]” on page 741

Table Footnotes

1 Actual frequency depends on current broadcast band (PGSM, EGSM, GSM450, GSM480, GSM750, GSM850, PCS, DCS or RGSM), and is defined in GSM as the uplink frequency.

2 Actual frequency depends on current traffic channel band (PGSM, EGSM, GSM450, GSM480, GSM750, GSM850, PCS, DCS or RGSM), and is defined in GSM as the uplink frequency.

Receiver Control - Manual

If the Receiver Control field is set to Manual (see “RFANalyzer:CONTrol:MEASurement:BURSt:AUTO” on page 1022), the test set’s receiver frequency is set according to the fields or GPIB commands in the following table.

Expected Burst

This parameter is only used when the test set’s operating mode is set to a test mode. The expected burst type should be set when in one of the test modes with the CALL:BURSt:TYPE command. If it is not set, the test set may not synchronize to the input signal’s midamble.

A TCH can have one of eight midamble patterns. These patterns are called Training Sequence Codes (TSC). The Expected Burst parameter allows you to set the test set to expect a certain midamble pattern (TSC0 through TSC7) from the mobile. Alternatively, selecting RACH for this parameter allows you to set the test set to expect the special midamble pattern used by a RACH burst.

For details on the GPIB command, see “CALL:BURSt” on page 510. (If you are using the test set manually, you can set the Expected Burst by pressing `Receiver Control` (**F12**) on the Call Setup screen.)

```
OUTPUT 714;”CALL:BURST:TYPE TSC5” !Sets the test set to expect a TCH with midamble
                                  !pattern TSC5.
```

BCH Operating Mode Behavior

- The test set generates a BCH without a TCH. BCH configuration and timeslot configuration are the same as when the operating mode is set to active cell.
- Cell power is set using the “CALL:POWer” on page 647 command.
- By default, the test set expects the mobile station to transmit on the uplink BCH. The test set’s receiver frequency can be set manually, which de-couples the automatic setting.
- Changes to the mobile station TX level will couple to the expected power, and the mobile station TX Level parameter will be transmitted on the downlink BCCH.
- All measurements are available to you as if the operating mode was set to active mode.

Example 1. BCH Operating Mode Using Auto Receiver Control

The following example shows how to set up a test mode measurement using the GSM BCH test operating mode. In this example the test set is configured to transmit a BCH on PGSM channel 21, and receive the mobile station on PGSM channel 21 at a power level of 12.

1. Select GSM BCH test mode (GBTest).

   ```
   OUTPUT 714;”CALL:OPERATING:MODE GBTest”
   ```
2. Select PGSM as the broadcast band.

   ```
   OUTPUT 714;”CALL:CELL:BAND PGSM”
   ```
3. Configure the receiver control to auto.

   ```
   OUTPUT 714;”RFANALYZER:CONTROL:AUTO ON”
   ```
4. Set the BCH to channel 21.

   ```
   OUTPUT 714;”CALL:BCH:PGSM 21”
   ```
5. Set the mobile station TX level to 12.

   ```
   OUTPUT 714;”CALL:MS:TXLEVEL 12”
   ```
6. To make the measurement, set up the mobile station to transmit on PGSM channel 21 at a power level of 12.

Example 2. BCH Operating Mode Using Manual Receiver Control

The following example shows how to set up a GSM test mode measurement using the GSM BCH operating mode. In this example the test set is configured to transmit a BCH on PGSM channel 21. Manual receiver control is used to configure the test set to measure a signal from the mobile station at 895 MHz and 14 dBm.

1. Select GSM BCH test mode.

   ```
   OUTPUT 714;”CALL:OPERATING:MODE GBTest”
   ```
2. Select PGSM as the broadcast band.

   ```
   OUTPUT 714;”CALL:CELL:BAND PGSM”
   ```
3. Set the BCH to channel 21.

   ```
   OUTPUT 714;”CALL:BCH:PGSM 21”
   ```

4. Configure the receiver control to manual.

   ```
   OUTPUT 714;"RFANALYZER:CONTROL:AUTO OFF"
   ```

5. Configure the test set's receiver frequency to 895 MHz.

   ```
   OUTPUT 714;"RFANALYZER:MANUAL:MEASUREMENT:FREQUENCY 895 MHZ"
   ```

6. Set the receiver's power level to 14 dBm.

   ```
   OUTPUT 714;"RFANALYZER:MANUAL:POWER:BURST1 14 DBM"
   ```

7. To make the measurement, set up the mobile station to transmit at 895 MHz and at a power level of 14 dBm.

BCH+TCH Operating Mode Behavior

- The test set generates BCH+TCH on the downlink path. The BCH+TCH burst modulation is the same as when the operating mode is set to active cell.
- Cell power is set using the "CALL:POWer" on page 647 command.
- Manually synchronizing the mobile station to the BCCH is not under direct control of the test set. You are responsible for this synchronization.
- Changes to the TCH timeslot and TCH ARFCN will reconfigure the downlink (although no channel assignment signaling will take place).
- By default, the test set's receiver is configured to receive the mobile station's signal at the TCH uplink frequency. The test set's receiver frequency can be set manually, which decouples the automatic setting.
- Changes to the mobile station TX level will couple to the expected power, and the mobile station TX Level parameter will be transmitted on the downlink BCCH and SACCH.
- Changes to TCH timing advance will also appear on the downlink SACCH. Whether the mobile station makes use of these parameters is a function of the mobile station.
- All measurements are available to you, the same as if the operating mode was active mode.

Example 3. BCH+TCH Operating Mode Using Auto Receiver Control

The following example shows how to set up a GSM test mode measurement using the "GSM BCH + TCH" (GBTTest) test mode operating mode. In this example the test set is configured to transmit a BCH on PGSM channel 21, a TCH on PGSM channel 31, and receive the mobile station on PGSM channel 31 at power level 12.

1. Select GSM BCH+TCH test mode.

   ```
   OUTPUT 714;"CALL:OPERATING:MODE GBTTest"
   ```

2. Configure the receiver control to auto.

   ```
   OUTPUT 714;"RFANALYZER:CONTROL:AUTO ON"
   ```

3. Set the BCH to channel 21.

   ```
   OUTPUT 714;"CALL:BCH:PGSM 21"
   ```

4. Set the TCH to channel 31.

   ```
   OUTPUT 714;"CALL:TCH:PGSM 31"
   ```

5. Set the mobile station TX Level to 12.

   ```
   OUTPUT 714;"CALL:MS:TXLEVEL 12"
   ```

6. To make the measurement, set the mobile station to transmit on PGSM channel 31 at a power level of 12.

Example 4. BCH+TCH Operating Mode Using Manual Receiver Control

The following example shows how to set up a GSM test mode measurement using the "GSM BCH+ TCH" (GBTTest) test mode operating mode. In this example the test set transmits a BCH on PGSM channel 21 and a TCH on PGSM channel 31. Manual receiver control is used to configure the test set to measure a signal from the mobile station at 895 MHz. Expected power is set at +14 dBm.

1. Select GSM BCH+TCH test mode.

   ```
   OUTPUT 714;"CALL:OPERATING:MODE GBTTest"
   ```

2. Select PGSM as the broadcast band (the TCH will automatically be set to this band).

   ```
   OUTPUT 714;"CALL:CELL:BAND PGSM"
   ```

3. Set the BCH to channel 21.

   ```
   OUTPUT 714;"CALL:BCH:PGSM 21"
   ```

4. Set the TCH to channel 31.

   ```
   OUTPUT 714;"CALL:TCH:PGSM 31"
   ```

5. Configure the receiver control to manual.

   ```
   OUTPUT 714;"RFANALYZER:CONTROL:MEASUREMENT:FREQUENCY:AUTO OFF"
   OUTPUT 714;"RFANALYZER:CONTROL:POWER:AUTO OFF"
   ```

6. Configure the test set's receiver frequency to 895 MHz.

   ```
   OUTPUT 714;"RFANALYZER:MANUAL:MEASUREMENT:FREQUENCY 895 MHZ"
   ```

7. Set the receivers power level to 14 dBm.

   ```
   OUTPUT 714;"RFANALYZER:MANUAL:POWER:BURST1 14 DBM"
   ```

8. To make the measurement, set up the mobile station to transmit at 895 MHz and at a power level of 14 dBm.

CW Operating Mode Behavior

When the test set's downlink function is set to CW, the test set operates like a signal generator with level and frequency controls. The Call Parms selections change from Cell Power to RF Gen Power, from Cell Band to RF Gen Band, from Broadcast Chan to RF Gen Channel. The CW setting also gives you the opportunity to set output frequency using the RF Gen Freq parameter.

- The test set generates an unmodulated CW downlink signal.
- The RF generator's power is set using the "CALL[:CELL]:POWer[:SAMPlitude]:CW" on page 649 command.
- The downlink frequency is controlled by the RF Gen Freq field. The RF generator's frequency is set using the "CALL[:CELL]:RFGenerator:FREQuency[:SELected]" on page 741 command, in this mode the user has direct control of the output frequency without making a channel selection.

- By default, the test set's receiver is configured to receive the mobile station's signal at the current RF generator channel setting. The test set's receiver frequency can be set manually, which decouples the automatic setting.
- No uplink demodulation or channel decoding is available. BER and uplink audio measurements will not return any results.

Example 5. CW Operating Mode Using RF Generator Frequency

The following example shows how to set up an operating mode using the CW mode. In this example the test set transmits a CW signal on DCS frequency 1805.4 mHz at an output power level of -80 dBm.

1. Set the RF generator output power to -80 dBm.

   ```
   OUTPUT 714;"CALL:CELL:POWER:SAMPLITUDE:CW -80"
   ```

2. Select the CW mode.

   ```
   OUTPUT 714;"CALL:OPERATING:MODE CW"
   ```

3. Configure the test set's output frequency to 1805.4 MHz.

   ```
   OUTPUT 714;"CALL:CELL:RFGENERATOR:FREQUENCY 1805.4MHZ"
   ```

GPRS Test Mode Operation

GPRS BCH Test Mode Behavior

When Cell Operating Mode is set to “GPRS BCH” (PBTest) test mode operating mode, the base station emulator produces the BCH but does not attempt to demodulate the uplink. Non-functional features (for example, “Start Data Connection”) of the BS Emulator do not result in an execution error.

GPRS BCH+PDTCH Test Mode Behavior

When Cell Operating Mode is set to “GPRS BCH + PDTCH” (PBPTest) test mode operating mode, the base station emulator produces the BCH and PDTCH. To specify the positions of the PDTCH use “CALL:PDTCH[:ARFCn][:SELected]” on page 625 and “CALL:PDTCH:MSLot:CONFig” on page 634. The locations of the specified uplink are demodulated but no signaling for control of a data connection is performed and PRACH bursts are not demodulated.

In this mode the following features are available:

- Generation of BCH + PDTCH on the downlink.
- If you manually synchronize the mobile station with the BCH, and then turn on the mobile station’s own PDTCH, and both uplink and downlink use the same ARFCN and timeslot(s), what is sometimes known as a “forced” call is in progress. Demodulation and channel decoding of the uplink are available, although no messages are decoded.

  Manually synchronizing the mobile station to the BCH is usually initiated from the mobile station keypad, or over a special mobile station test bus. This is not under the direct control of the base station emulator and is your responsibility.
- When a “forced” call is in progress (as defined above), BER measurements can be made.
- Changes to the Multislot Configuration or PDTCH ARFCN [PDTCH Band] reconfigure the downlink (although no channel assignment signalling takes place). The BS Emulator’s receiver is configured to receive at the modified frequency, timeslot and timing advance in the same way as when Cell Operating Mode is set to “Active Cell” (CELL).

OFF Behavior

If you set Cell Operating Mode “OFF” it causes the following actions:

- If Cell Operating Mode was currently using CALL:OPERating OFF, the setting is ignored and the operation is assumed to have successfully completed immediately.
- If a mobile station is attached or a data connection is in progress, no attempt is made to use over-the-air signaling to disconnect or detach.
- All signaling operations, uplink demodulation and downlink (BCH, and PDTCH) generation are stopped.
- There is no RF power output.

Expected Burst

This parameter is only used when the test set’s operating mode is set to “GPRS BCH” (PBTest) or “GPRS BCH + PDTCH” (PBPTest). When operating mode is set to Active Cell, the test set automatically selects the correct burst type.

A PDTCH can have one of eight midamble patterns. These patterns are called Training Sequence Codes (TSC). The Expected Burst parameter allows you to set the test set to expect a certain midamble pattern (TSC0 through TSC7) from the mobile. Alternatively, selecting RACH for this parameter allows you to set the test set to expect the special midamble pattern used by a RACH burst.

For details on the GPIB command, see "CALL:BURSt" on page 510. (If you are using the test set manually, you can set the Expected Burst by pressing `Receiver Control` (**F12**) on the Call Setup screen.)

```
OUTPUT 714;"CALL:BURST:TYPE TSC5" !Sets the test set to expect a TCH with midamble
    !pattern TSC5.
```

RLC/MAC Header State

This parameter is only used when the test set's operating mode is set to "GPRS BCH + PDTCH" (PBPTest).

The RLC/MAC header state parameter allows you to select whether or not a valid Radio Link Control (RLC)/Medium Access Control (MAC) header is present on the downlink PDTCH burst(s):

- If the RLC/MAC header state is set to OFF, all 53 octets (for CS4 encoding, for other coding schemes the number of octets will be less) in the burst are filled with PRBS data.
- If the RLC/MAC header state is set to ON, the first 3 octets in the burst contain a valid RLC/MAC header indicating the burst sequence number and the power reduction value. The remaining 50 octets (for CS4 encoding, for other coding schemes the number of octets will be less) in the burst are filled with PRBS data.

If the RLC/MAC header state is changed when the operating mode is any mode other than GPRS BCH+PDTCH, the setting is remembered until GPRS BCH+PDTCH is next used.

For details on the GPIB command, see "CALL:PBPTest:RLCMac[:HEADer]:STATe" on page 620. (If you are using the test set manually, the RLC/MAC Header field is in the Call Parms window, screen 2 of 3, F10).

```
OUTPUT 714;"CALL:PBPTest:RLCMac:HEADer:STATe ON" !Enables the RLC/MAC header.
```

EGPRS Test Mode Operation

EGPRS BCH Test Mode Behavior

When Cell Operating Mode is set to "EGPRS BCH" (EBTest) test mode operating mode, the base station emulator produces the BCH but does not attempt to demodulate the uplink. Non-functional features (for example, "Start Data Connection") of the BS Emulator do not result in an execution error.

EGPRS BCH + PDTCH Test Mode Behavior

When Cell Operating Mode is set to "EGPRS BCH + PDTCH" (EBPTest) test mode operating mode, the base station emulator produces the BCH and PDTCH. To specify the positions of the PDTCH use "CALL:PDTCH[:ARFCn][:SELected]" on page 625 and "CALL:PDTCH:MSLot:CONFig" on page 634. The locations of the specified uplink are demodulated but no signaling for control of a data connection is performed and PRACH bursts are not demodulated.

In this mode the following features are available:

- Generation of BCH + PDTCH on the downlink.
- If you manually synchronize the mobile station with the BCH, and then turn on the mobile station's own PDTCH, and both uplink and downlink use the same ARFCN and timeslot(s), what is sometimes known as

a “forced” call is in progress. Demodulation and channel decoding of the uplink are available, although no messages are decoded.

Manually synchronizing the mobile station to the BCH is usually initiated from the mobile station keypad, or over a special mobile station test bus. This is not under the direct control of the base station emulator and is your responsibility.

- When a “forced” call is in progress (as defined above), BER measurements can be made.
- Changes to the Multislot Configuration or PDTCH ARFCN [PDTCH Band] reconfigure the downlink (although no channel assignment signalling takes place). The BS Emulator’s receiver is configured to receive at the modified frequency, timeslot and timing advance in the same way as when Cell Operating Mode is set to “Active Cell” (CELL).

OFF Behavior

If you set Cell Operating Mode “OFF” it causes the following actions:

- If Cell Operating Mode was currently using CALL:OPERating OFF, the setting is ignored and the operation is assumed to have successfully completed immediately.
- If a mobile station is attached or a data connection is in progress, no attempt is made to use over-the-air signaling to disconnect or detach.
- All signaling operations, uplink demodulation and downlink (BCH, and PDTCH) generation are stopped.
- There is no RF power output.

Expected Burst

This parameter is only used when the test set’s operating mode is set to “EGPRS BCH” (EBTest) or “EGPRS BCH + PDTCH” (EBPTest). When operating mode is set to Active Cell, the test set automatically selects the correct burst type.

A PDTCH can have one of eight midamble patterns. These patterns are called Training Sequence Codes (TSC). The Expected Burst parameter allows you to set the test set to expect a certain midamble pattern (TSC0 through TSC7) from the mobile. Alternatively, selecting RACH for this parameter allows you to set the test set to expect the special midamble pattern used by a RACH burst.

For details on the GPIB command, see “CALL:BURSt” on page 510. (If you are using the test set manually, you can set the Expected Burst by pressing `Receiver Control` (**F12**) on the Call Setup screen.)

```
OUTPUT 714;”CALL:BURST:TYPE TSC5” !Sets the test set to expect a TCH with midamble
    !pattern TSC5.
```

Related Topics

"Active Cell Operating Mode" on page 176

"Configuring the Broadcast Channel (BCH)" on page 196

"Configuring the Traffic Channel (TCH)" on page 198

"CALL:OPERating" on page 609

"Receiver Control" on page 370

"Configuring the Packet Data Traffic Channel (PDTCH)" on page 205

Connection Types

AUTO

The AUTO connection type emulates a typical real world scenario where a GPRS or EGPRS capable mobile can initiate either a voice call or a data connection (not simultaneously). Alternatively the test set can initiate a voice call to simulate the mobile being called. Voice calls have priority over data connections. If a voice call is in progress, data transfer requests will be ignored. Originating a mobile terminated voice call while a data transfer is in progress will cause the data connection to be terminated.

Also see "Operating Considerations" on page 190.

BLER

This connection type is not applicable to GSM.

The BLER connection type ensures that an Agilent proprietary data connection type is used which allows the test set to obtain BLock Error Rate (BLER) measurement reports from the mobile station (see "Block Error Rate (BLER) Reports Description" on page 92). In addition, the BLER connection type allows you to perform other GPRS measurements at the same time (except BER and ORFS due to Modulation).

Also see "Operating Considerations" on page 190.

ETSI Type A

This connection type is not applicable to GSM.

The ETSI Type A connection type ensures that packet data traffic channel (PDTCH) bursts are only transmitted on the uplink, not on the downlink. The number of downlink bursts is determined by the setting of the command "CALL:PDTChannel:MSLot:CONFig" on page 634.

Also see "Operating Considerations" on page 190.

ETSI Type B (Unacknowledged)

This connection type is not applicable to GSM.

The ETSI Type B connection type ensures that one or more downlink (PDTCH) bursts are present, which can be used to loopback data through the uplink. ETSI Type B is required if you want to perform BER measurements in active cell mode.

Also see "Operating Considerations" on page 190.

ETSI Type B Acknowledged

This connection type is not applicable to GSM.

The ETSI Type B Acknowledged connection type is almost identical to the ETSI Type B (Unacknowledged) connection type, except that it features an acknowledged downlink. The acknowledged downlink ensures maximum compatibility with different mobile station types.

Also see "Operating Considerations" on page 190.

Switched Radio Block Loopback

This connection type is only applicable to EGPRS.

The Switched Radio Block (SRB) Loopback connection type allows an EGPRS mobile to perform a layer one loopback while in a signaling mode. This ETSI defined standard test mode within the mobile is sometimes known as ETSI test mode C.

Also see "Operating Considerations" on page 190.

Operating Considerations

The operating mode must be Active Cell for any connection types to be used. For more information about Active Cell operatin mode, see "Active Cell Operating Mode" on page 176.

These settings are not coupled to the serving cell which must be set to GPRS or EGPRS to allow the GPRS or EGPRS mobile to accept or originate data connections. See "Serving Cell" on page 197 for more information.

Related Topics

"CALL:FUNCtion:CONNection:TYPE" on page 538

"Active Cell Operating Mode" on page 176

"Serving Cell" on page 197

Packet Broadcast Control Channel (PBCCH)

This section is only applicable to the lab applications.

Packet Broadcast Control Channel (PBCCH) is transmitted in Active Cell operating mode. When available, the PBCCH is the channel that is used by the mobile station, in place of the BCCH, for control information and signaling related to packet services.

PBCCH can only be enabled/disabled when operating mode is Cell Off.

When the PBCCH is activated, PSI1, PSI2 & PSI3bis are transmitted on the new channel. When the PBCCH is on, it is generated in Timeslot 1 on the same ARFCN as the BCCH.

Once activated, the PBCCH may be used by the mobile station, in place of the BCCH, to Attach to the test set. You can see requests by the mobile station to Attach by observing the PRACH count indicator.

PRACH length (8 or 11 bit) can also be configured using the PBCCH Setup softkey.

PBCCH Control

1. Press the **Call Setup** key to go to the `Call Setup` screen.
2. Press the `Operating Mode` softkey (**F1**) and select `Cell Off`.
3. Press the `Cell Info` softkey (**F6**).
4. Press the `BCH Setup` softkey (**F1**) to open the BCH Setup menu.
5. Set `PBCCH` to `On`.
6. Set `PRACH` to `8` or `11` bits as desired.
7. Press the `Return` softkey (**F6**) to go back to the Call Setup screen.
8. Press the `Operating Mode` softkey (**F1**) and select `Active Cell`.

To verify that the PBCCH is on, switch on the mobile station and verify that a PRACH is received during the attach procedure. The PRACH counter is on the Call Setup screen.

Related Topics

"CALL:PBCChannel" on page 618

"CALL:COUNt:PRACh?" on page 520

Access Burst Power Control

The test set allows you to control two parameters broadcast on the BCCH which are associated with the power of mobile station access bursts:

- "MS TX Power Max CCH"
- "DCS1800 Max CCH Power Offset"

MS TX Power Max CCH

The value of this parameter is the maximum transmit power level that may be used by the mobile station for its next access burst. See "CALL:MS:TXLevel:CCHannel[:SELected]" on page 600 for more information about possible parameter settings.

DCS1800 Max CCH Power Offset

The value of this parameter corresponds to a power offset used by class 3 DCS1800 mobile stations. Mobile stations prior to class 3 do not support power levels 29-31. Therefore, for DCS 1800, the power control levels 29, 30, and 31 are not valid values for the MS TX Power Max CCH parameter to ensure backwards compatitibility. However, class 3 mobile stations do support the extended power range. The DCS1800 Max CCH Power Offset is provided for procedures where a class 3 DCS 1800 mobile stations should use its extended power range.

A class 3 DCS 1800 mobile station shall use the power level defined in the MS TX Power Max CCH parameter plus the value of the power offset. As illustrated in the following table, when the MS TX Power Max CCH's value is 0, setting the Power Offset value to 1,2, or 3 can be used to achieve output power corresponding to power levels 31, 30, and 29 respectively.

Table 4. Power Offset Parameter Values

Value	Offset	Power Control Level	Maximum Output Power
0	0 dB	0	30 dBm
1	2 dB	31	32 dBm
2	4 dB	30	34 dBm
3	6 dB	29	36 dBm

Related Topics

"How to Configure Access Burst Power Control" on page 1415

"How to Configure Access Burst Power Control for DCS" on page 1418

"CALL:MS:TXLevel:CCHannel[:SELected]" on page 600

"CALL:MS:CCHannel:POWer:OFFSet:DCS" on page 567

Broadcast Allocation (BA) Table

The broadcast allocation (BA) table in the test set provides a list of BCH ARFCNs for each band that the mobile station must measure. This provides a means for you to stress the mobile station's receiver, especially when the traffic channel and the BCH are in different bands.

NOTE The test set does not actually generate a signal for each BCH in the BA table, but it instructs the mobile station to make measurements and report signal level.

Related Topics

"CALL:BA" on page 477

"Configuring the Broadcast Channel (BCH)" on page 196

Cell Parameters

User Configurable Cell Parameters

Parameter	GPIB Command
3 Digit MNC for PCS	"CALL:PMNCode" on page 644
Mobile Network Code	"CALL:MNCode" on page 557
Mobile Country Code	"CALL:MCCode" on page 555
Location Area Code	"CALL:LACode" on page 551
Routing Area Code	"CALL:RACode" on page 740
Network Color Code	"CALL:NCCode" on page 606
Base Station Color Code	"CALL:BCCode" on page 496
Mobile DTX State	"CALL:MS:DTX[:STATe]" on page 568
Paging Mode	"CALL:PAGing:MODE" on page 615
Paging Multiframes	"CALL:PAGing:MFRames" on page 616
Repeat Paging	"CALL:PAGing:REPeat[:STATe][:SELected]" on page 616
TX Level FACCH Signaling	"CALL:SIGNaling" on page 793
Guard Period Length	"CALL:MS:TX:BURSt:GPLength" on page 594

Operating Considerations

There are a number of cell parameters and traffic channel (see "Configuring the Traffic Channel (TCH)" on page 198) parameters that can be configured. However, the test set's default parameters should allow a properly functioning mobile station to successfully camp on the cell and make a connection under most circumstances.

Parameters can be queried from the test set regardless of the state of the test set.

If the test set is in active cell operating mode, parameters 3 Digit MNC for PCS1900, MNC, MCC, LAC, RAC, NCC, and BCC can not be set unless the Operating Mode is Cell Off. See "CALL:OPERating:MODE" on page 610.

If the test set is in a test mode (see "Test Mode Operating Modes" on page 179) operating mode, any BCH parameter can be set at any time.

The 3 Digit MNC for PCS1900 parameter defines if the PCS BCCH should be configured using the standard 2-digit MNC (J-STD-007 coding), or the PCS 3-digit MNC (J-STD-007A coding, section 2.10.5.1.3). The PCS 3-digit MNC is used on the PCS BCCH instead of the 2-digit MNC only when the current cell band is PCS and the 3 Digit MNC for PCS parameter is set to on.

For more information about the Mobile DTX State, Paging Mode, Paging Multiframes, Repeat Paging, and Guard Period Length parameters, see "Configuring Mobile Station Operating Parameters" on page 202.

When TX Level FACCH Signaling is set to on, measurements are aborted and restarted as a result of mobile TX power level changes. However, when TX Level FACCH Signaling is set to off, measurements are not aborted and restarted. This may cause the integrity result for some measurements to indicate an under range or over range condition until the mobile's TX power level is within the specified measurement range. For more information about measurement integrity, see "Integrity Indicator" on page 411.

Related Topics

"Configuring the Broadcast Channel (BCH)" on page 196

"Serving Cell" on page 197

"How Do I Change Cell Parameters?" on page 1315

Configuring the Broadcast Channel (BCH)

The broadcast channel parameters are configured using the following call processing subsystem commands.

For a complete list of GPIB commands in the call processing subsystem, refer to "CALL Subsystem" on page 474.

Broadcast Channel Parameters

Parameter	GPIB Command
Cell Band	"CALL[:CELL]:BAND" on page 495
Cell Power	"CALL[:CELL]:POWer[:SAMPlitude][:SELected]" on page 648
Cell Power State	"CALL[:CELL]:POWer:STATe[:SELected]" on page 654
Broadcast Channel (ARFCN) - Selected band	"CALL[:CELL]:BCHannel[:ARFCn][:SELected]" on page 498
Broadcast Channel (ARFCN) - DCS band	"CALL[:CELL]:BCHannel[:ARFCn]:DCS" on page 500
Broadcast Channel (ARFCN) - EGSM band	"CALL[:CELL]:BCHannel[:ARFCn]:EGSM" on page 501
Broadcast Channel (ARFCN) - PCS band	"CALL[:CELL]:BCHannel[:ARFCn]:PCS" on page 506
Broadcast Channel (ARFCN) - GSM450 band	"CALL[:CELL]:BCHannel[:ARFCn]:GSM450" on page 502
Broadcast Channel (ARFCN) - GSM480 band	"CALL[:CELL]:BCHannel[:ARFCn]:GSM480" on page 503
Broadcast Channel (ARFCN) - GSM750 band	"CALL[:CELL]:BCHannel[:ARFCn]:GSM750" on page 504
Broadcast Channel (ARFCN) - GSM850 band	"CALL[:CELL]:BCHannel[:ARFCn]:GSM850" on page 505
Broadcast Channel (ARFCN) - PGSM band	"CALL[:CELL]:BCHannel[:ARFCn]:PGSM" on page 507
Broadcast Channel (ARFCN) - RGSM band	"CALL[:CELL]:BCHannel[:ARFCn]:RGSM" on page 508
Paging IMSI	"CALL:PAGing:IMSI" on page 614
Auto IMEI Request	"CALL:IMEI" on page 550

Operating Considerations

There are a number of parameters for the broadcast channel and the traffic channel (see "Configuring the Traffic Channel (TCH)" on page 198) that can be configured, however the test set's default parameters should allow a properly functioning mobile station to successfully camp on the cell and make a call under most circumstances.

Parameters can be queried from the test set regardless of the state of the test set.

The 3 Digit MNC for PCS parameter defines if the PCS BCCH should be configured using the standard 2-digit MNC (J-STD-007 coding), or the PCS 3-digit MNC (J-STD-007A coding, section 2.10.5.1.3). The PCS 3-digit MNC is used on the PCS BCCH instead of the 2-digit MNC only when the current cell band is PCS and the 3 Digit MNC for PCS parameter is set to on.

Serving Cell

You can set the serving cell to either GSM, GPRS, or EGPRS. The choice of serving cells available to you depends on the test or lab application you are currently using. When the serving cell is GPRS or EGPRS, the test set provides GPRS or EGPRS specific information on the BCH, such as System Information 13 data. This setting is independent of the Connection Type setting, which determines the type of call or data connection permitted.

To set the Serving Cell remotely, use the command "CALL[:CELL]:BCHannel:SCELl" on page 509. To set the Serving Cell manually, press the **CALL SETUP** key, `Cell Info` (**F6**), `BCH Setup` (**F1**), then select the type of `Serving Cell` you want.

NOTE When this setting is GPRS or EGPRS, it is still possible to make GSM voice calls. If the mobile station is GPRS or EGPRS capable it still sees the cell as being GPRS/EGPRS enabled and may attempt an attach procedure. It is still possible to initiate and accept GSM voice calls when the mobile station is GPRS attached.

When this setting is GSM, a GPRS or EGPRS capable mobile should not attempt to attach or be capable of accepting a data connection.

Related Topics

"Cell Parameters" on page 194

"Connection Types" on page 189

"Access Burst Power Control" on page 192

"Frequency Banded Parameters" on page 250

"Band Selection Parameters" on page 254

Configuring the Traffic Channel (TCH)

This section is *not* applicable to GPRS and EGPRS.

The traffic channel parameters are configured using the following call processing subsystem commands.

For complete GPIB command syntax, see “CALL:TCHannel” on page 813.

TCH Parameters

Parameter	GPIB Command
Traffic Channel Band	“CALL:TCHannel:BAND” on page 821
Traffic Channel (ARFCN) - Selected band	“CALL:TCHannel[:ARFCn][:SELected]” on page 815
Traffic Channel (ARFCN) - DCS band	“CALL:TCHannel[:ARFCn]:DCS” on page 817
Traffic Channel (ARFCN) - EGSM band	“CALL:TCHannel[:ARFCn]:EGSM” on page 817
Traffic Channel (ARFCN) - GSM450 band	“CALL:TCHannel[:ARFCn]:GSM450” on page 818
Traffic Channel (ARFCN) - GSM480 band	“CALL:TCHannel[:ARFCn]:GSM480” on page 818
Traffic Channel (ARFCN) - GSM750 band	“CALL:TCHannel[:ARFCn]:GSM750” on page 819
Traffic Channel (ARFCN) - GSM850 band	“CALL:TCHannel[:ARFCn]:GSM850” on page 819
Traffic Channel (ARFCN) - PCS band	“CALL:TCHannel[ARFCN]:PCS” on page 820
Traffic Channel (ARFCN) - PGSM band	“CALL:TCHannel[:ARFCn]:PGSM” on page 820
Traffic Channel (ARFCN) - RGSM band	“CALL:TCHannel[:ARFCn]:RGSM” on page 821
Timeslot	“CALL:TCHannel:TSLot” on page 828
Mobile Loopback	“CALL:TCHannel:LOOPback” on page 825
Speech	“CALL:TCHannel:DOWNlink:SPEech” on page 824
Channel Mode	“CALL:TCHannel:CMODe[:VALue]” on page 823
Speech Channel	“CALL:TCHannel:CMODe[:VALue]” on page 823

Operating Considerations

When configuring the base station emulator you must configure the broadcast channel (see "CALL:BCHannel" on page 497) and the traffic channel (TCH). There are a number of parameters for the BCH and the TCH that can be configured; however, the test set's default parameters should allow a properly functioning mobile station to successfully camp on the cell and make a call under most circumstances.

When the Operating Mode is Active Cell and a call is connected, changes to the traffic channel number (ARFCN) or traffic channel timeslot, **including a change to the value of the parameter's current setting**, causes signaling on the downlink FACCH to initiate a channel reassignment, see "How the Test Set Performs a Dualband Handover" on page 249. This configures the TCH to use the new parameter. If a call is not connected, changes to the parameter are stored for when the next call **is** established

When the operating mode is GSM BCH+TCH (see "CALL:OPERating:MODE" on page 610), changes to the traffic channel number (ARFCN) or traffic channel timeslot will reconfigure the downlink TCH accordingly, but there will be no signaling initiated. The change will be immediate. If a TCH is not being generated, changes to the parameter are stored for when the next call is established

Downlink speech controls what kind of speech data is transmitted on the downlink TCH. A TCH with speech data is generated when call control status is connected (see "Call Processing State Synchronization" on page 433), or when in GSM BCH+TCH operating mode.

When an FBER measurement is activated, PRBS15 data is transmitted on the downlink TCH, overriding the user setting of downlink speech source. Any changes to downlink speech source will be accepted and saved but not applied until FBER become inactive.

There are 6 different settings for the downlink speech source. See "CALL:TCHannel:DOWNlink:SPEech" on page 824.

- None
- Echo retransmits the uplink speech frames back to the downlink with a non-selectable delay of about 1 second.
- PRBS15 the 260 speech frame bits (prior to channel coding) are generated using a pseudo random bit sequence.
- SIN300 the sequence of 260 speech bit frames represent a sine wave at 300 Hz.
- SIN1000 the sequence of 260 speech bit frames represent a sine wave at 1000 Hz.
- SIN3000 the sequence of 260 speech bit frames represent a sine wave at 3000 Hz.

Traffic channel loopback type cannot be set to type C if the traffic channel band is PGSM.

The Max Frames Allowed for Assignment parameter, is used to specify the maximum number of TDMA frames the mobile station is allowed to take for a channel assignment. This is only applicable to changes in TCH band, traffic channel, or TCH timeslot. Changes to any other TCH parameter will not cause an error to be generated if, the number of frames taken to perform the change exceeds the setting of the maximum frames allowed for assignment. If the mobile station does not complete the channel assignment within the specified number of frames, the test set will generate an error message, but this will not cause a call to drop. If the mobile DTX state (discontinuous transmission) parameter is on (see "CALL:MS:DTX[:STATe]" on page 568), the error is not generated, because when a mobile station is in discontinuous transmission mode, it is not required to transmit on the new channel, at least not until a SACCH, FACCH, or SID frame is ready. In this case, the mobile station may actually have changed channels in the correct time, but had nothing to transmit.

Related Topics

"Configuring the Broadcast Channel (BCH)" on page 196

"Configuring Mobile Station Operating Parameters" on page 202

"Receiver Control" on page 370

"Traffic Band Parameter" on page 254

"CALL:TCHannel" on page 813

"Fast Bit Error Measurement Description" on page 100

Testing a Mobile for Enhanced Full Rate Speech and Half Rate Speech Channel Modes

This test is *not* applicable to GPRS and EGPRS.

The channel mode function allows you to command a mobile to switch between full rate speech, enhanced full rate speech and half rate speech either before a call is originated, or during a call connected state with any or all of the supported measurements running. In half rate speech mode you can also set the half rate sub channel.

The following measurements are supported in enhanced full rate and half rate speech modes:

- Analog Audio (AAUDio)
- Bit Error Rate (BERRor)
- Fast Bit Error Rate (FBERror) (only supported in enhanced full rate)
- Dynamic Power (DPOWer)
- I/Q Tuning (IQTuning)
- Output RF Spectrum (ORFSpectrum)
- Phase and Frequency Error (PFERror)
- Power versus Time (PVTime)
- Transmitter Power (TXPower)

You can initiate a Decoded Audio (DAUDio) measurement in enhanced full rate and half rate speech modes. However, this measurement is not supported in this channel mode and the integrity indicator will report that the results are questionable (see “Decoded Audio Troubleshooting” on page 1458).

If you change the channel mode when no call is connected, the mobile is requested to go into the selected channel mode the next time a mobile originated or mobile terminated call is initiated.

If you change the channel mode when a call is connected, the mobile is requested to go into the selected channel mode immediately.

The channel mode should only be changed when the test set is in active cell operating mode, not test operating mode.

NOTE GSM Phase 1 mobiles are not required to support enhanced full rate or half rate speech vocoders. Therefore, the behavior of a GSM Phase 1 mobile which does support this may be manufacturer dependent when used with the channel mode function.

If you switch the channel mode between the differerent speech modes when the downlink speech source is set to Echo (see “CALL:TCHannel:DOWNlink:SPEech” on page 824), you may hear momentary unpleasant audio bursts from the mobile.

Related Topics

“Programming a Channel Mode Change” on page 322

Configuring Mobile Station Operating Parameters

The mobile station operating parameters are configured using the following call processing subsystem commands.

For a complete list of GPIB commands in the call processing subsystem, refer to "CALL Subsystem" on page 474.

GSM Mobile Station Operating Parameters

Parameter	GPIB Command
Mobile station TX Level	"CALL:MS:TXLevel[:SELected]" on page 595
Timing Advance	"CALL:MS:TADVance[:SELected]" on page 588
Mobile DTX State	"CALL:MS:DTX[:STATe]" on page 568
Maximum Control Channel Power	"CALL:MS:TXLevel:CCHannel[:SELected]" on page 600
Defines an additional offset value used to increase the Max CCHannel value for DCS band only	"CALL:MS:CCHannel:POWer:OFFSet:DCS" on page 567

GPRS and EGPRS Mobile Station Operating Parameters

Parameter	GPIB Command
Uplink Burst TX Level for selected PDTCH band	"CALL:PDTCH:MS:TXLevel[:SELected]:BURSt[1|2]" on page 632
Uplink Burst TX Level for DCS band	"CALL:PDTCH:MS:TXLevel[:SELected]:BURSt[1|2]" on page 632
Uplink Burst TX Level for EGSM band	"CALL:PDTCH:MS:TXLevel[:SELected]:BURSt[1|2]" on page 632
Uplink Burst TX Level for PCS band	"CALL:PDTCH:MS:TXLevel[:SELected]:BURSt[1|2]" on page 632
Uplink Burst TX Level for selected PGSM band	"CALL:PDTCH:MS:TXLevel[:SELected]:BURSt[1|2]" on page 632
Deferred Uplink Burst TX Level for selected band	"CALL:SETup:PDTCh:MS:TXLevel[:SELected]:BURSt[1|2]" on page 761
Guard Band Period Length	"CALL:MS:TX:BURSt:GPLength" on page 594
Maximum Control Channel Power	"CALL:MS:TXLevel:CCHannel[:SELected]" on page 600
Defines an additional offset value used to increase the Max CCHannel value for DCS band only	"CALL:MS:CCHannel:POWer:OFFSet:DCS" on page 567

Operating Considerations

GSM

There are a number of parameters for the broadcast channel (see "Configuring the Broadcast Channel (BCH)" on page 196) and the traffic channel (see "Configuring the Traffic Channel (TCH)" on page 198) that can be configured, however the test set's default parameters should allow a properly functioning mobile station to successfully camp on the cell and make a call under most circumstances.

When Operating Mode = Active Cell, if a call is connected, changes to these parameters, including a change to the value of the parameter's current setting, causes signaling on the downlink to automatically initiate the change. No separate command is necessary to initiate the change. If a call is not connected, changes to the parameter are stored for when the next call is established

GPRS and EGPRS

For details on the parameters you can use to configure the PDTCH, see "Configuring the Packet Data Traffic Channel (PDTCH)" on page 205.

Configuring the Packet Data Traffic Channel (PDTCH)

This section is *not* applicable to GSM.

The GPRS and EGPRS packet data traffic channel parameters are configured using the following call processing subsystem commands.

For a complete list of GPIB commands in the call processing subsystem, refer to "CALL Subsystem" on page 474.

GPRS and EGPRS Packet Data Traffic Channel Parameters

Parameter	GPIB Command
Packet Data Traffic Channel Band	"CALL:PDTCH:BAND" on page 627
Packet Data Traffic Channel (ARFCN)	"CALL:PDTCH[:ARFCn][:SELected]" on page 625
Downlink Burst Power Reduction Selection	"CALL:PDTCH:PREDuction:BURSt[1|2|3|4]" on page 640
Unused Downlink Burst Power Reduction Selection	"CALL:PDTCH:PREDuction:UBURst" on page 642
Downlink Power Reduction Level (dB)	"CALL:PDTCH:PREDuction:LEVel[1|2]" on page 641
Data Connection Type	"CALL:FUNCtion:CONNection:TYPE" on page 538
Data Connection Frame Number Type	"CALL:FUNCtion:DATA:FRAMe:STARt" on page 543
Data Connection LLC Frame Check Sequence	"CALL:FUNCtion:DATA:BLER:LLC:FCSequence" on page 541
BLER Block Polling Interval	"CALL:FUNCtion:DATA:BLER:POLLing:INTerval" on page 542
Payload Pattern (BLER)	"CALL:FUNCtion:DATA:PAYLoad:PATTern:BLER" on page 544
Payload Pattern (ETSI B)	"CALL:FUNCtion:DATA:PAYLoad:PATTern:ETSIB" on page 545
Downlink Burst Current Absolute Power Level	"CALL:PDTCH:POWer[:AMPLitude]:BURSt[1|2|3|4]?" on page 639
Unused Downlink Burst Current Absolute Power Level	"CALL:PDTCH:POWer[:AMPLitude]:UBURst?" on page 639
GPRS PDTCH Coding Scheme	"CALL:PDTCH:CSCHeme" on page 627 (*GPRS Only*)
EGPRS Modulation Coding Scheme for Active Cell Operating Mode	"CALL:PDTChannel:MCSCheme" on page 630 (*EGPRS Only*)
EGPRS Modulation Coding Scheme for BCH+PDTCH Test Mode Operating Mode	"CALL:PDTCH:MCSCheme:EBPTest" on page 631 (*EGPRS Only*)
Multislot Configuration	"CALL:PDTCH:MSLot:CONFig" on page 634
P0 for Downlink PDTCH	"CALL:PDTCH:PZERo:LEVel" on page 643
First Downlink Burst to Loop	"CALL:PDTCH:MSLot[:FIRSt]:DOWNlink:LOOPback[:BURSt]" on page 635
Packet Power Timing Advance State	"CALL:PDTCH:PMESsage:PPTadvance" on page 637
Packet Timeslot Reconfigure State	"CALL:PDTCH:PMESsage:PTReconfig" on page 638
Deferred Parameters	
Deferred Packet Data Traffic Channel Band	"CALL:SETup:PDTCh:BAND" on page 758

Parameter	GPIB Command
Deferred Packet Data Traffic Channel (ARFCN)	“CALL:SETup:PDTCh[:ARFCn][:SELected]” on page 747
Deferred GPRS PDTCH Coding Scheme	“CALL:SETup:PDTCh:CSCHeme” on page 759
Deferred EGPRS Modulation Coding Scheme for Active Cell Operating Mode	“CALL:PDTChannel:MCSCheme” on page 630 (*EGPRS Only*)
Deferred Multislot Configuration	“CALL:SETup:PDTCh:MSLot:CONFiguration” on page 770
Deferred P0 for Downlink PDTCH	“CALL:SETup:PDTCh:PZERo:LEVel” on page 771

Using Deferred Parameters

Deferred parameters allow you to set up multiple parameters without implicit over-the-air signalling taking place. Using deferred parameters offers the following benefits:

- Code construction is more succinct.
- Only one signaling exchange between the test set and the mobile station sets up multiple parameters rather than a separate exchange for each parameter.
- Once the current data connection has been established, you can set up the next set of deferred parameters.

Operating Considerations

When configuring the base station emulator you must configure the broadcast channel (see “CALL:BCHannel” on page 497) and the packet data traffic channel (PDTCH). There are a number of parameters for the BCH and the PDTCH that can be configured; however, the test set’s default parameters should allow a properly functioning GPRS or EGPRS mobile station to successfully establish a data connection under most circumstances.

PDTCH (ARFCN) is a frequency banded parameter (see “Frequency Banded Parameters” on page 250).

Related Topics

“Configuring the Broadcast Channel (BCH)” on page 196

“Configuring Mobile Station Operating Parameters” on page 202

“Packet Data Traffic Channel Band Parameter” on page 255

“CALL:PDTCH|PDTChannel” on page 621

“Testing a GPRS Mobile Station” on page 316

“GPRS Data Connection Troubleshooting” on page 1469

Bursted Parameters

This section is *not* applicable to GSM.

The majority of the test set's base station emulator parameters allow you to set or query a single value which is applied to all allowed burst (or timeslot) locations. However, there are a number of parameters for GPRS and EGPRS that have a :BURSt suffix. The :BURSt suffix indicates that the parameter name refers to a set of parameters, one for each of the possible bursts. These are called bursted parameters.

Bursted parameters use the concept of an active burst. An active burst is a timeslot that is expected to contain RF power relating to a traffic channel based on the multislot configuration. Bursted parameters are activated when the burst you have set a value for becomes active.

Bursted parameters are useful when changing the multislot configuration. For example, they allow you to specify the uplink burst TX level for a burst that is not currently active.

The GPIB command for each bursted parameter lets you specify one of the allowable bursts. If you do not specify a burst number, then burst one is assumed. The burst numbers you specify are relative from the first active uplink or downlink burst.

GPRS and EGPRS Bursted Parameters

Parameter	GPIB Command
Downlink Burst Absolute Power Level	"CALL:PDTCH:POWer[:AMPLitude]:BURSt[1|2|3|4]?" on page 639
Downlink Burst Power Reduction Selection	"CALL:PDTCH:PREDuction:BURSt[1|2|3|4]" on page 640
Manual Receiver Power Level	"RFANalyzer:MANual:POWer[:SELected][:SELected]:BURSt[1|2]" on page 1027
Uplink Burst TX Level	"CALL:PDTCH:MS:TXLevel[:SELected]:BURSt[1|2]" on page 632

Operating Considerations

The following bursted parameters are also frequency banded parameters (see "Frequency Banded Parameters" on page 250):

- Uplink Burst TX Level
- Manual Receiver Power Level

Related Topics

"Configuring the Packet Data Traffic Channel (PDTCH)" on page 205

"CALL:PDTCH|PDTChannel" on page 621

Timing Advance

There are two methods in which the test set may inform the MS of the Timing Advance value, an assignment method or the "Continuous Timing Advance Procedure" .

Background

The test set allows you to assign the MS a timing advance value to test whether it alters its transmission accordingly. The timing advance value is initially specified in the Packet Uplink or Packet Downlink Assignment messages. If the timing advance value is altered during a data connection, the new value is sent to the MS in a Packet Power Control/ Timing Advance (PPTA) message.

Continuous Timing Advance Procedure

Continuous Timing Advance is an alternative method for assigning timing advance values. In the assignment/reassignment messages, in place of a timing advance value, the MS is given a timeslot number, and an index value. With these two parameters, the MS is able look at the correct position in the Packet Timing-Advance Control Channel/Downlink (PTCCH/D) for its timing advance value. In addition, as part of this procedure, the MS periodically sends an access burst on the Packet Timing-Advance Control Channel / Uplink (PTCCH/U) on the given timeslot. Using the Continuous Timing Advance procedure, Packet Timeslot Reconfigure (PTR) or Packet Power Control / Timing Advance (PPTA) messages are no longer sent when the timing advance value is altered during a data connection.

If the Continuous Timing Advance procedure is enabled, the MS has to delay transmission of the uplink TBF until it has received its timing advance value.

Timing Advance Parameters

- Continuous Timing Advance
  - allows you to turn on and off the Continuous Timing Advance functionality.
  - cannot be changed in the middle of a TBF. Any change takes effect when the next TBF is established.

NOTE If Continuous Timing Advance is "on", the timing advance value shall not be given in Packet Timeslot Reconfigure (PTR) or Packet Power Control / Timing Advance (PPTA) messages.

- Timing Advance
  - allows you to select the Timing Advance value that the MS should use, regardless of the method used to communicate the actual value to the MS.
  - can be changed in the middle of a TBF.

NOTE If the Continuous Timing Advance procedure is on, the Timing Advance value should not be changed more often than once every two multiframes (approximately 0.5 seconds). This restriction arises due to the physical mapping of the PTCCH/D onto the GSM/GPRS multiframe structure.

You may specify both the state of Continuous Timing Advance and timing advance values when using Active Cell operating mode and all available Connection Types: Auto, ETSI A, ETSI B, and BLER.

Timing Advance and Measurements

The test set is able to adjust for up to four symbols of offset in the MS transmission. If the MS does not react to changes in timing advance, the amount of Burst Timing Error reported will change.

TX measurements should be disregarded when the Continuous Timing Advance control method is used. They may be made invalid by the access burst.

Medium Access Control Mode

This section applies only to the lab applications.

The test set provides you with control over resource allocation. This allows you to define difficult scenarios for the MS and more comprehensively exercise its protocol. Two modes for uplink resource allocation are provided:

- “Fixed Allocation”
- “Dynamic Allocation”

Fixed Allocation

In the fixed allocation mode, the MS is allocated uplink blocks based on the number of octets the MS needs to transfer all its data. The MS requests these octets in the RLC octet count parameter in either the Packet Resource Request message or the Packet Downlink Ack/Nack message. There are two types of TBFs that might be requested by the MS:

- An open-ended TBF - The MS sets the RLC octet count to 0 (zero). The test set then provides an arbitrary number of octets and the MS continues to make resource requests until it has been able to transfer all its data.
- A close-ended TBF - The MS sets the RLC octet count to a value greater than 0, requesting a specific number of octets. The test set provides resources for this request.

Maximum Octet Allocation

You can use the Maximum Octet Allocation parameter to limit the number of octets that the test set provides in any single allocation to an MS requesting a close-ended TBF. When this parameter is turned off, the MS is provided with exactly what it requests. When the Maximum Octet Allocation value is set to a value greater than zero, this is the maximum amount of octets that the MS may transfer on the uplink. If this allocation does not satisfy the MS’s requirement for a data transfer then it must request further fixed allocations until its needs are met. Therefore, you can control the number of reallocations by limiting the maximum number of octets per allocation. Forcing requests for more allocations utilizes the MS’s protocol more extensively.

Why can fixed allocation only be used when the connection type is set to Auto?

Fixed allocation is valid only while using the Auto Connection Type. It cannot be used in the ETSI test modes connection types because the test specification mandates that Dynamic Allocation must be used. In BLER mode there is no uplink TBF, so the allocation type is unused. Connections established while the connection type is set to Auto do use uplink TBFs and have no restrictions on the choice of allocation type.

As Fixed Allocation is only valid when using the Auto Connection Type, when an invalid connection type is selected, the current TBFs end and the test set changes the allocation mode setting to a valid selection (e.g. dynamic mode).

Dynamic Allocation

When dynamic allocation is used, the MS monitors the downlink for a USF value that matches its assigned USF. When it finds a match, the MS can then transfer the data blocks on the allocated uplink block.

Dynamic allocation is valid while using the following Connection Types: Auto, ETSI Type A, ETSI Type B, and BLER.

Allocation Mode and USF BLER

USF BLER results are displayed only when the allocation mode is dynamic. In Fixed mode, the MS is not sending data blocks dependent upon the USF value. Instead, the MS ignores the USF flag on the downlink because it is given a block allocation by the network or, in this case, the test set.

Related Topics

"How to use Allocation Control" on page 1421

"Uplink State Flag (USF)" on page 213

"Uplink State Flag (USF) BLER" on page 149

"CALL:PDTCH:MACCess" on page 628

Uplink State Flag (USF)

The USF, or Uplink State Flag, allows the multiplexing of several MS onto a single uplink PDTCH. The USF value is sent to the MS in a Packet Immediate Assignment message. The USF is also sent in Packet Uplink Assignment and Packet Timeslot Reconfigure messages.

You can determine how well the MS reallocates its transmission to the appropriate uplink block by changing the USF value during a data transmission.

1. Establish a GPRS data link and start transferring data.
2. On the `Control` menu (`1 of 1`), press `Handover Setup` (**F5**).
3. Scroll to Uplink State Flag and enter a new value.
4. Press `Handover Execute` (**F5**).
5. Verify that the MS transmits on the block corresponding to the new USF. Incorrect transmissions show up as USF BLER.

Protocol Control

This section is only applicable to the lab applications.

The protocol stack configuration options provide you with control over the content and execution of events in the protocol stack. These are organized by protocol layer.

RLC/MAC

- "Timing Advance" on page 209
- "Medium Access Control Mode" on page 211
- Handover Control
  — "Packet Timeslot Reconfigure" on page 219
  — "Packet Power Timing Advance" on page 219
- Block Poll Rate
- Frame Start Position

LLC

- BLER Frame Check Sequence
- Payload Pattern

GMM

- "Attach Accept" on page 215
- "Attach Reject" on page 215
- "Detach Request" on page 215
- "Identity Request" on page 215

SM

- "Activate PDP Context Accept" on page 216
- "Activate PDP Context Reject" on page 216

Attach Accept

The parameters associated with the Attach Accept event allow you to configure the test set to simulate a network allowing only GPRS services. This means you can expect an IMSI attach for both GPRS and non-GPRS services to be rejected. You may also choose which cause value is sent to the MS in the GMM cause information element (See “GMM Cause Information Element” on page 217.) with the Attach Reject message. Use this function in parallel with protocol logging (See “Protocol Logging” on page 40.) to verify that the MS behaves in a manner conforming to the standards for this situation and for each associated GMM cause value.

The MS only sends an Attach Request in the “Idle” state. Therefore, the connection status must be “Idle” before the Attach Accept event can be used.

Attach Reject

You may configure the test set to simulate a network rejection of any Attach Attempt. You may choose from a variety of cause values to be sent in the GMM cause information element (See “GMM Cause Information Element” on page 217.) with the attach reject message. Use this function in parallel with protocol logging (See “Protocol Logging” on page 40.) to verify that the MS behaves in a manner conforming to the standards for this situation and for each associated GMM cause value.

The MS only sends an Attach Request in the “Idle” state. Therefore, the connection status must be “Idle” before the Attach Accept event can be used.

Detach Request

You can initiate a detach from the test set. This allows you to observe how the MS responds to a detach request from a network and determine if it complies with mobile performance specifications. You may also choose which cause value is sent to the MS in the GMM cause information element (See “GMM Cause Information Element” on page 217.) with the Detach Request. Use this function in parallel with protocol logging (See “Protocol Logging” on page 40.) to verify that the MS behaves in a manner conforming to the standards for this situation and for each associated GMM cause value.

You can initiate the Detach Request event anytime the data connection state is “Attached”. In addition, a Detach Request can also occur when the data connection state is either “Transferring” or “PDP Active”.

Identity Request

A GPRS MS has four identity values:

- IMSI - International Mobile Subscriber Identity
- IMEI- International Mobile Station Equipment
- IMEISV - IMEI and the Software Version number
- TMSI - Temporary Mobile Subscriber Identity

You can send a request for any one of these four identities from the test set to verify that the MS supplies the appropriate value for the identity requested. Use this function in parallel with protocol logging (See “Protocol Logging” on page 40.) to verify that the MS behaves in a manner conforming to the standards for this situation.

The data connection state can be either “Attached” or “PDP Active” when an Identity Request message is sent to the MS.

Activate PDP Context Accept

Using the Activate PDP Context Accept event, you can control the Quality of Service Reliability Class that the MS is assigned.

The data connection state must be “Attached” to use the Activate PDP Context Accept event.

Override Requested Reliability Class

If the MS requests a particular reliability class in its Activate PDP Context Request message, you can configure the test set to override this request and instead, assign the reliability class you have chosen.

Subscribed Reliability Class

Instead of requesting a specific reliability class, the MS can also request its subscribed class within the request message. You can specify the subscribed class to be sent to the MS. This value is sent only if the state of the Override Requested Reliability Class parameter is turned off.

Activate PDP Context Reject

You may configure the test set to simulate a network rejection of an Activate PDP Context Request from an MS. You can select from a variety of SM cause values to be sent in the SM cause information element (See “SM Cause Information Element” on page 218.) with the Activate PDP Context Reject message. Use this function in parallel with protocol logging (See “Protocol Logging” on page 40.) to verify that the MS behaves in a manner conforming to the standards for this situation and for each associated SM cause value.

The data connection state must be “Attached” to use the Activate PDP Context Reject event.

GMM Cause Information Element

Table 5. GMM Cause Information Element

Cause Value (decimal)	Cause Value (bits)	Cause
2	00000010	IMSI Unknown
3	00000011	Illegal MS
6	00000110	Illegal ME
7	00000111	GPRS Services Not Allowed
8	00001000	GPRS/Non-GPRS Services Not Allowed
9	00001001	MS Identity Cannot Be Derived
10	00001010	Implicitly Detached
11	00001011	PLMN Not Allowed
12	00001100	Location Area Not Allowed
13	00001101	Roaming Not Allowed In This LA
16	00010000	MSC Temporarily Not Reachable
17	00010001	Network Failure
22	00010110	Congestion
48	00110000	Retry Upon Entry Into A New Cell
95	01011111	Semantically Incorrect Message
96	01100000	Invalid Mandatory Information
97	01100001	Message Type Nonexistent
98	01100010	Msg Type Incompatible With Prot State
99	01100011	Information Element Nonexistent
100	01100100	Conditional IE Error
101	01100101	Msg Incompatible With Protocol State
111	01101111	Protocol Error, Unspecified

SM Cause Information Element

Table 6. SM Cause Information Element

Cause Value (decimal)	Cause Value (bits)	Cause
25	00011001	LLC or SNDCP Failure
26	00011010	Insufficient Resources
27	00011011	Missing or Unknown APN
28	00011100	Unknown PDP Address or PDP Type
29	00011101	User Authentication Failed
30	00011110	Activation Rejected By GGSN
31	00011111	Activation Rejected, Unspecified
32	00100000	Service Option Not Supported
33	00100001	Requested Service Opt Not Subscribed
34	00100010	Service Opt Temporarily Out of Order
35	00100011	NSAPI Already Used
36	00100100	Regular Deactivation
37	00100101	QoS Not Accepted
38	00100110	Network Failure
39	00100111	Reactivation Required
81	01010001	Invalid Transaction Identifier Value
95	01011111	Semantically Incorrect Message
96	01100000	Invalid Mandatory Information
97	01100001	Msg Type Nonexistent/Not Implemented
98	01100010	Msg Type Incompatible With Protocol State
99	01100011	IE Non-existent or Not Implemented
100	01100100	Conditional IE Error
101	01100101	Msg Not Compatible With Protocol State
111	01101111	Protocol Error, Unspecified

Related Topics

“How to access Protocol Control” on page 1432

“CALL:PPRocedure” on page 656

Handover Control

Control over the Packet Timeslot Reconfigure message and the Packet Power Timing Advance message provides you with power control settings for mobiles that do not fully support the Packet Timeslot Reconfigure (PTR) message.

Packet Timeslot Reconfigure

You can configure the test set to send a Packet Timeslot Reconfigure (PTR) message to the mobile for reconfiguring PDTCH parameters.

When you configure the PTR message to be used, the test set sends a PTR message to the mobile when applying deferred or immediate PDTCH parameters to an active data connection (that is, data connection status is Transferring).

When you configure the test set to not use the PTR message, the test set sends an alternative message to the mobile instead of a PTR message. The alternative message that is sent to the mobile depends on the type of data connection (set using "CALL:FUNCtion:CONNection:TYPE" on page 538):

- If the data connection type is BLER a Packet Downlink Assignment (PDA) message is sent.
- If the data connection type is ETSI Type A a Packet Uplink Assignment (PUA) message is sent.
- If the data connection type is ETSI Type B, both PDA and PUA messages are sent.

If you change the PTR state while the data connection status is Transferring, any changes you make will take effect immediately during the current data connection.

Packet Power Timing Advance

You can configure whether or not the test set sends a Packet Power Timing Advance (PPTA) message to the mobile when applying deferred or immediate PDTCH parameters to an active data connection (that is, data connection status is Transferring).

Related Topics

"CALL:PDTCH:PMESsage:PTReconfig" on page 638

"CALL:PDTCH:PMESsage:PPTadvance" on page 637

Measurement Reports

The following channel parameters are available:

- C Value
- RX Quality
- Signal Variance
- Interference Levels

These values represent reports from the MS about channel quality. These reports are updated on the test set approximately every 0.5 seconds when there is an active TBF. Therefore, the results provided by the test set are an average of the reports received over this update time.

Measurement Reports are available for all data connection types. However, when using the ETSI Test Mode A data connection, results are available for the initial establishment of the connection only. The downlink TBF is released in ETSI Test Mode A. Therefore, there is no signal for the MS to measure and no updates to the report during the connection.

Related Topics

"How to view Measurement Reports" on page 1423

"CALL:MS:REPorted:CVALue:AVERage?" on page 569

"CALL:MS:REPorted:RXQuality:AVERage?" on page 583

"CALL:MS:REPorted:SVARiance:AVERage?" on page 586

"CALL:MS:REPorted:ILEVel:TSLot<n>:AVERage?" on page 570

Protocol Event Trigger Output (PETO)

This feature provides a hardware trigger output from the rear panel of the test set to control external instruments and devices. It is an extension of the trigger provided in earlier applications. Frame triggers and protocol message-based triggers are available, based on various layers of the protocol stack.

The original trigger could be set to trigger on every TDMA frame with user-settable timeslot and symbol positions. PETO offers additionally:

- Several more frame based triggers with varying degrees of frequency
- Protocol message based triggers output when specific DL messages are sent by the test set
- Triggers generated when the MS is expected to Transmit or Receive

Multiple Triggers

Any combination of frame and protocol triggers can be enabled at the same time. Triggers fire in the order in which they occur, but all triggers are output on the same Trig Out port. It is not possible to discern which trigger has fired based only on the output signal.

If triggers occur at the same time, only one signal will appear on the port. Choose triggers carefully to provide the most meaningful results.

Related Topics

"Protocol Message Based Triggers" on page 224

"Frame Triggers" on page 223

"Protocol Trigger Timing" on page 222

"CALL:TRIGger" on page 830

Protocol Trigger Timing

Frame Trigger Timing

For any frame trigger that is enabled, a signal will be generated on the test set’s trigger output on the first symbol period of the frame or frames on which the trigger is fired.

If a frame offset is set for any of the frame triggers, a signal will be generated that number of frames after the frame in which the trigger is fired.

Message Based Trigger Timing

All triggers associated with the sending of a message from the test set will generate a signal on the first symbol of the timeslot on which the first burst of the related message is sent.

All triggers associated with the MS starting to receive data will generate a signal on the first symbol of the timeslot on which the test set begins transmission of the data.

All triggers associated with the MS starting to transmit data will generate a signal on the first symbol of the timeslot on which the MS should start to transmit.

If a frame offset is set for any of the message based triggers, a signal will instead be generated that number of frames after the frame in which the event occurs.

Related Topics

“Protocol Event Trigger Output (PETO)” on page 221

“Protocol Message Based Triggers” on page 224

“Frame Triggers” on page 223

“CALL:TRIGger” on page 830

Frame Triggers

All of the frame based triggers can be enabled and will fire in all operating modes except Cell Off. In Cell Off mode, triggers can be enabled, but will not fire.

Frame Triggers Unique to the Lab Applications

The following frame triggers are available:

- Every frame except the idle frame
- Every GPRS radio block
- Every 51 Frame BCH multiframe
- Every 52 Frame PDTCH multiframe
- Every hyperframe (designated by frame number)

All frame triggers (except "every frame except idle") allows for a frame offset within the hyperframe/multiframe/radio block, on which the trigger should fire. Timeslot or symbol position cannot be set.

Frame Trigger Common Between the Lab and Test Applications

There is an "every frame" trigger which can be configured for both timeslot and symbol position that is available. See "Frame Trigger Parameters" on page 416 for details.

Related Topics

"Protocol Event Trigger Output (PETO)" on page 221

"Protocol Message Based Triggers" on page 224

"Protocol Trigger Timing" on page 222

"CALL:TRIGger" on page 830

Protocol Message Based Triggers

Messages that assign downlink resources have a trigger associated with them that can fire on the first frame the MS is expected to start receiving data as a result of the downlink resource assignment. The Expected MS RX Trigger could be used to analyze data sent to a MS by connecting the MS to a logic analyzer. This could be useful to track MS software defects or wireless application communication issues. This trigger indicates when the test set expects the MS to start receiving data.

Messages that assign uplink resources also have an associated trigger that can fire on the first frame the MS is expected to start transmitting as a result of the uplink assignment. The Expected MS Tx Trigger could be used to ensure that a MS responds correctly to resource assignments and starts its transmission period in the correct place. The trigger output could be connected to a spectrum analyzer to initiate measurements on the frame in which the MS starts to transmit.

Each protocol message to which triggers are related may have more than one trigger associated with it. At the very least each message has an associated trigger that can fire on the frame used to transmit the message from the test set to the MS (downlink).

The protocol messages handled and the triggers associated with them are shown in the following table.

Table 7. Protocol Messages and their Associated Triggers

Protocol Message	Protocol Stack Layer	Test Set Tx Trigger	Expected MS Tx Trigger	Expected MS Rx Trigger
Packet Uplink Assignment	RLC/MAC	Yes	Yes	
Packet Downlink Assignment	RLC/MAC	Yes		Yes
Packet Timeslot Reconfigure	RLC/MAC	Yes	Yes	
Packet Power Control/Timing Advance	RLC/MAC	Yes		
Packet Immediate Assignment	RR	Yes	Yes	Yes
Identity Request	GMM	Yes		
Attach Accept	GMM	Yes		
Detach Request	GMM	Yes		
Request PDP Context Activation	SM	Yes		

Table 7. Protocol Messages and their Associated Triggers

Protocol Message	Protocol Stack Layer	Test Set Tx Trigger	Expected MS Tx Trigger	Expected MS Rx Trigger
PDP Context Activation Accept	SM	Yes		

NOTE The Packet Timeslot Reconfigure and the Packet Immediate Assignment do not always assign uplink resources. The Expected MS TX Trigger will not be fired for occurrences where no uplink resource assignment is made.

All protocol message based triggers can only be used in the Active Cell operating mode. Any message based trigger will not fire in any other mode other than active cell.

Related Topics

"Protocol Event Trigger Output (PETO)" on page 221

"Frame Triggers" on page 223

"Protocol Trigger Timing" on page 222

"CALL:TRIGger" on page 830

Demodulation Trigger Delay

You can specify a delay of up to 200 symbols for uplink channel demodulation to compensate for any delay introduced on the test set’s downlink channel by an external source. A time delay might be introduced to simulate a physical distance between the MS and the test set while performing E-OTD tests (see “E-OTD (Enhanced Observed Time Difference)” on page 256 for more information). If the downlink delay were too great, the connection between the MS and the test set might be lost.

Operating Considerations

Configuring the Demodulation Trigger Delay

The demodulation trigger delay is configured via GPIB only. See “CALL:DEModulation” on page 534 for more information.

Operating Mode

You can set the value of the trigger delay in any operating mode.

The demodulation trigger delay is only usable in the following operating modes:

- Active Cell
- GSM BCH
- GPRS BCH
- GSM BCH + TCH
- GPRS BCH + PDTCH

Related Topics

“CALL:DEModulation” on page 534

“E-OTD (Enhanced Observed Time Difference)” on page 256

“RRLP Configuration” on page 257

“Neighbor Cell Synchronization Trigger” on page 3

Short Message Service (SMS)

This section is only applicable to the lab applications.

Several Short Message Service (SMS) options are available. These allow you to test both point-to-point and cell broadcast SMS functionality by sending and receiving short messages to and from the MS. In addition, you may be interested in capturing a log of the protocol messages exchanged between the Test Set and the MS.

- "Point-to-Point SMS" on page 242 - Includes information on how to send and receive point-to-point SMS messages using either GSM or GPRS protocol layers.
- "Cell Broadcast Service (CBS)" on page 228
- "Logging SMS Messages" on page 230

Related Topics

"How to use the Short Message Service Features" on page 1428

"Short Message Service (SMS) Messages" on page 236

"CALL:SMService" on page 794

Cell Broadcast Service (CBS)

This section is only applicable to the lab applications.

You can test a mobile station's ability to receive Cell Broadcast messages using the Cell Broadcast Service capability in the test set.

Starting the Cell Broadcast Service (CBS)

The Cell Broadcast Service in the test set allows you to send short messages to the mobile station that are repeated at intervals over a period of time, which allows the mobile station to receive the message even if entering the cell after the first transmission. These messages are not acknowledged by the mobile station.

The test set can transmit up to three different messages at a time using the Cell Broadcast Service. If you configure the Cell Broadcast Service to transmit multiple messages, the messages are sent serially in numerical order at a rate of one page every multiframe. The messages are retransmitted every 30 seconds. This allows time to react to an incoming message.

Message Setup

All three of the messages available for use in the test set's Cell Broadcast Service can be configured independently. Each message can include either one of two predefined text messages or one you define yourself. In addition, each message is classified by topic and allocated a channel number, message code, update number, and language. You can configure the following parameters for each of the three possible Cell Broadcast messages:

- `Message State` allows you to configure the number of messages sent using CBS. The message state should be `ON` for each message you want to send. Message 1 is on by default.
- `Message Text` associates the message with the actual SMS data to be sent by the test set. The test set only provides support for ASCII messages. See "Short Message Service (SMS) Messages" on page 236 for more specific information.
- `Message Code` identifies a particular message, so that a mobile station receiving a message with the same code as a previously received message will recognize that it is a repeat, and may not display it to the user.
- `Channel Number` is a header number identifying the message topic (such as 'Weather Report' or 'Traffic Information'). It is not in any way related to logical channels.
- `Update Number` is used to identify a particular version of a message. This is useful for reporting a dynamic situation, where a message may be reporting one event (such as road works or road construction ahead), but the details change periodically (the length of the tail-back or traffic jam caused, for example). A mobile station which remains in one cell for a length of time receives messages with the same message code but increments the update numbers as updated versions of the same message are received. A mobile station that has just entered a cell receives only the most recent version of the message, followed by any subsequent versions.
- `Language` indicates in what language the message is. Changing this parameter does not translate the text of a message.

Related Topics

“Short Message Service (SMS)” on page 227

“Short Message Service (SMS) Messages” on page 236

“Point-to-Point SMS” on page 242

“How to use the Short Message Service Features” on page 1428

“CALL:SMService” on page 794

Logging SMS Messages

This section is only applicable to the lab applications.

You can use the Wireless Protocol Advisor (WPA) to log SMS messages.

- "SMS Logging Control" on page 230
- "Setting Up the Wireless Protocol Advisor (WPA)" on page 231

SMS Logging Control

The test set gives you access to the protocol layers necessary to allow you to observe the SMS cell broadcast and point-to-point messages. You can capture all the messages exchanged between either the LLC or the RR and these protocol layers:

- CM - Connection Management
- SMRL - Short Message Relay Layer
- SMTL - Short Message Transport Layer

SMS Message Support

The messages in the following tables are examples of messages related to SMS. The table indicates whether each is supported in the test set. There may be more messages supported by the test set or by the Wireless Protocol Advisor. In addition, certain parameters in these messages may not be supported.

Table 8. SMS Point-to-Point Messages

Messages	Supported
SMS_CP_DATA	Yes
SMS_CP_ERROR	Yes
SMS_CP_ACK	Yes
SMS_RL_MS2N_DATA	Yes
SMS_RL_N2MS_DATA	Yes
SMS_RL_MS2N_ERROR	Yes
SMS_RL_N2MS_ERROR	Yes
SMS_RL_MS2N_ACK	Yes
SMS_RL_N2MS_ACK	Yes
SMS_RL_MS2N_SMMA	Yes
SMS_TP_DELIVER	Yes
SMS_TP_SUBMIT_RPT	Yes
SMS_TP_STATUS_RPT	Yes
SMS_TP_DELIVER_RPT	Yes
SMS_TP_SUBMIT	Yes

Table 8. SMS Point-to-Point Messages

Messages	Supported
SMS_TP_COMMAND	No

Table 9. SMS GSM Layer 3 Cell Broadcast Messages

Messages	Supported
CB_BlockTypeFrame	Yes

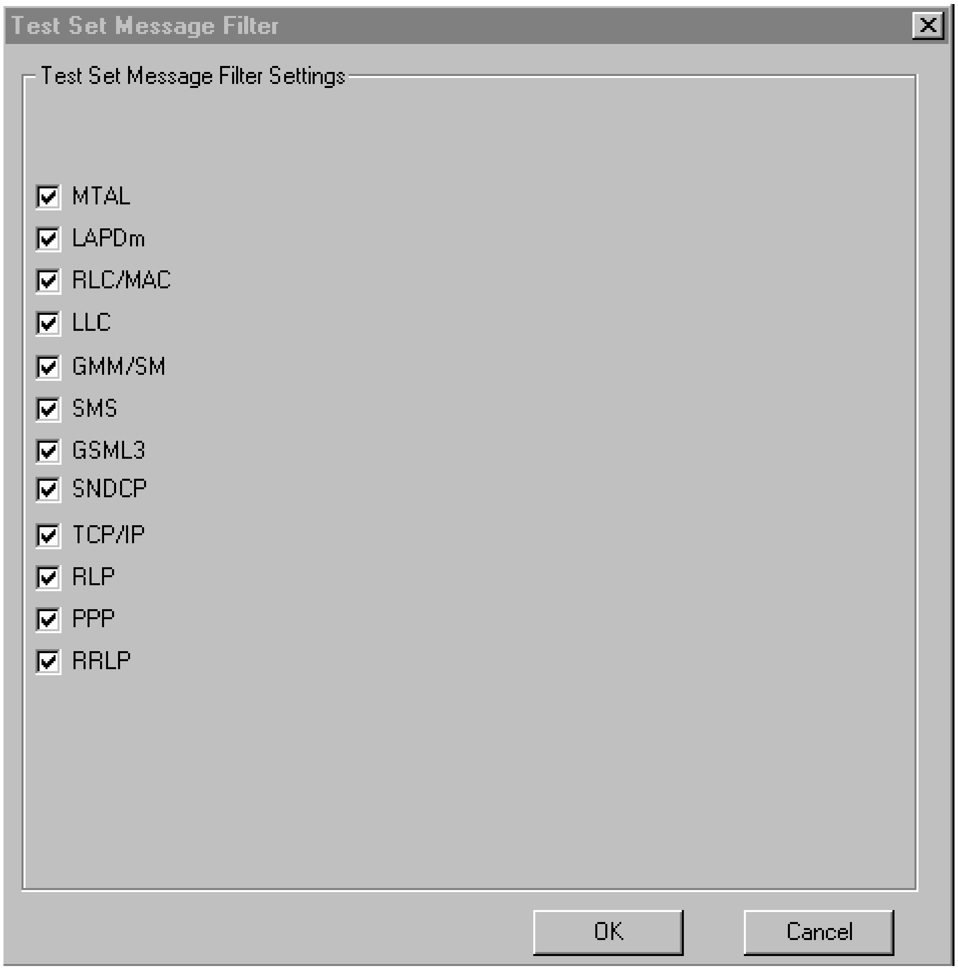
Setting Up the Wireless Protocol Advisor (WPA)

You can use the Wireless Protocol Advisor (WPA) to log the messages exchanged between the test set and the mobile station during SMS procedures. This tool provides a means to evaluate the mobile station's performance and to troubleshoot problems.

You can set up the WPA to capture and display as much or little information as you want. For this example, the logging filter is defined to capture only SMS protocol messages. The view filter is configured to only display the CP-Data messages. This allows you to view only the messages that contain the SMS message contents being exchanged between the mobile station and the test set.

Test Set Message Filter Setup

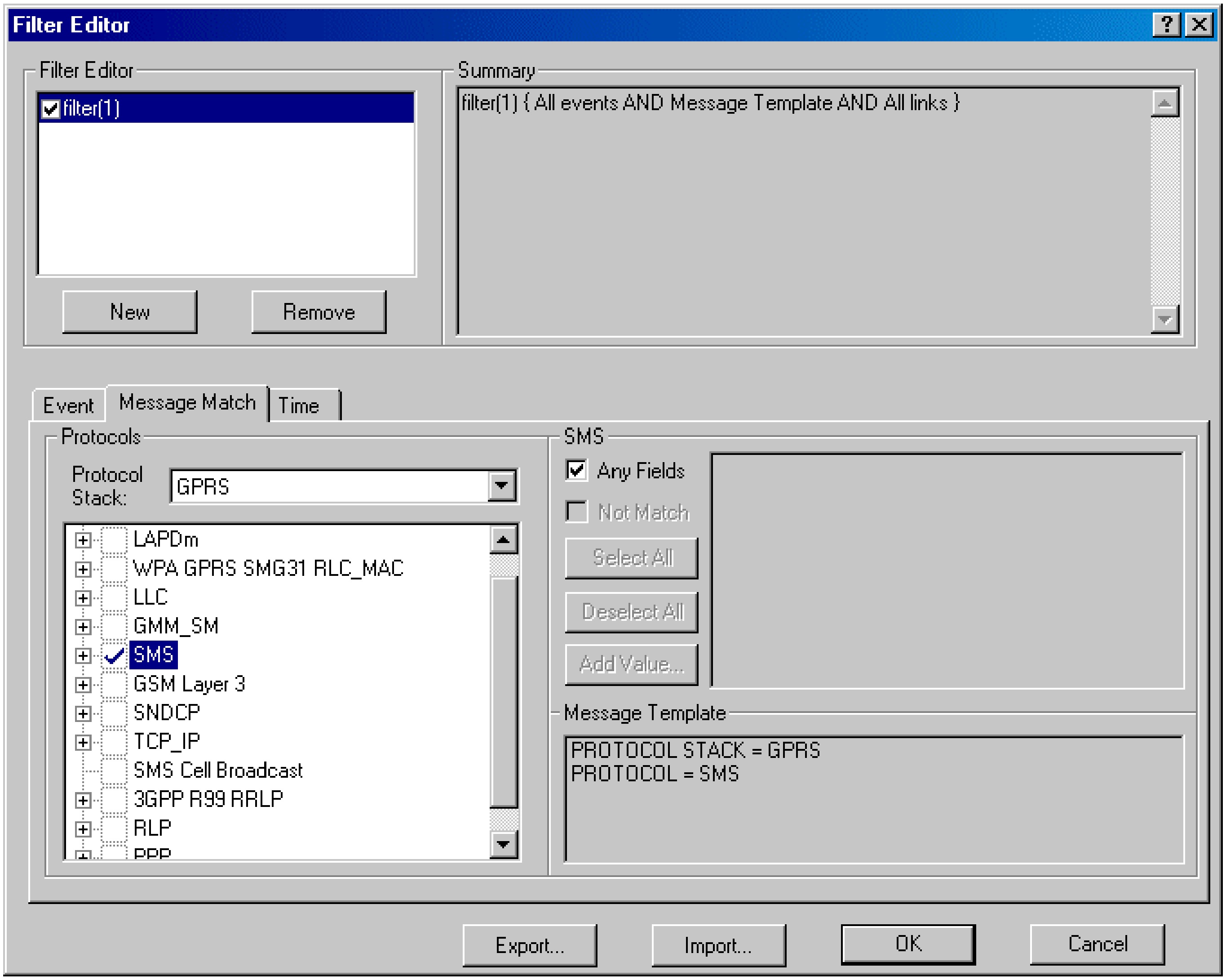
The test set filter is useful for limiting the amount of data sent over the LAN connecting the test set and the WPA. In the example below, all messages are sent from the test set to the WPA.



All filters are accessed from the Measurement Setup view. This can be accessed from the menu bar by clicking:

WPA Logging Filter Setup

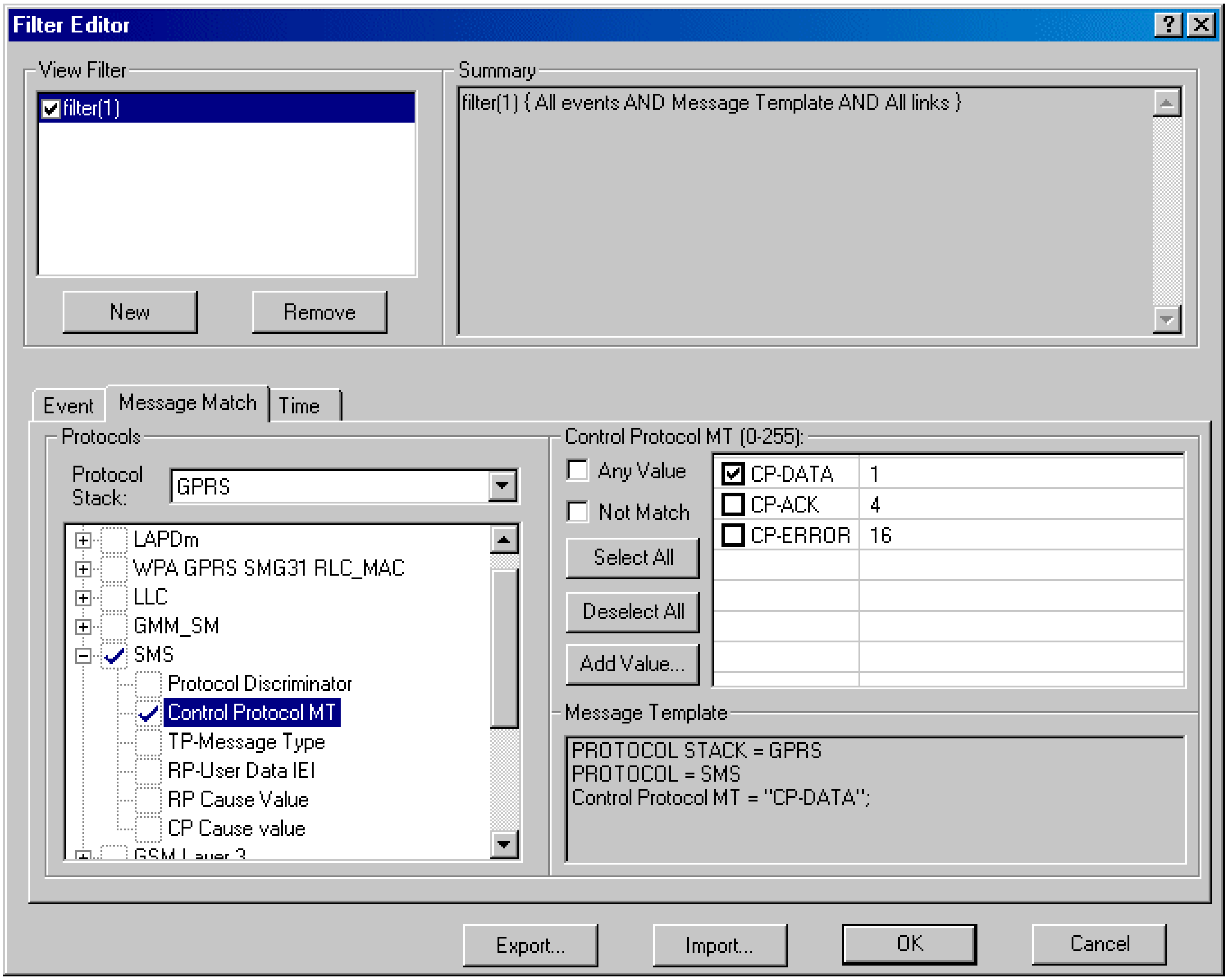
The logging filter is useful for limiting what messages get captured in your log. Using this filter, you can choose to only log certain types of messages from certain protocol layers. In this example, we are using the logging filter to limit the captured log to SMS protocol messages.



WPA View Filter Setup

The view filter has no effect on what messages are captured. It simply limits the messages that are visible on the WPA's traffic overview. The view filter can easily be enabled and disabled by right clicking your mouse in the traffic overview and selecting `View Filter Enabled` from the menu that appears.

In the following view filter example, the messages in the traffic overview are limited to the CP-Data messages.


Filter Editor
View Filter
filter(1)
New
Remove
Summary
filter(1) { All events AND Message Template AND All links }
Event
Message Match
Time
Protocols
Protocol Stack:
GPRS
LAPDm
WPA GPRS SMG31 RLC_MAC
LLC
GMM_SM
SMS
Protocol Discriminator
Control Protocol MT
TP-Message Type
RP-User Data IEI
RP Cause Value
CP Cause value
Control Protocol MT (0-255):
Any Value
Not Match
Select All
Deselect All
Add Value...
CP-DATA 1
CP-ACK 4
CP-ERROR 16
Message Template
PROTOCOL STACK = GPRS
PROTOCOL = SMS
Control Protocol MT = "CP-DATA";
Export...
Import...
OK
Cancel

SMS Message Log

For the step-by-step procedure for setting up the test set to capture this log, refer to “Mobile Terminated Point-to-Point Message Transfer” on page 1428.

The captured log allows you to determine exactly what is being exchanged between the test set and the mobile station. In this example, an SMS message was sent from the test set to the mobile station. You can look in the decode of the captured message to verify all the parameters associated with that message. The following data is only a portion of the decode belonging to the captured message. In this data, you can see the text message that was sent to the mobile station. Look at the letters in `Octet 28` after `SM Value =` in the `Description` column.

Octet	Binary	Hex	Description
27	10100111	a7	User Data Length=7
28	00100000	20	SM Value = HELLO!
29	01100100	64	
30	10010001	91	
31	11001001	c9	
32	01111100	7c	
33	10000110	86	
34	00000000	00	

Related Topics

“Protocol Logging” on page 40

“Protocol Layers and Messages” on page 41

“Short Message Service (SMS)” on page 227

“How to use the Short Message Service Features” on page 1428

Short Message Service (SMS) Messages

This section is only applicable to the lab applications.

Several Short Message Service (SMS) message options are available which allow you to choose or create messages to be sent.

Predefined Point-to-Point Text Messages

There are two predefined point-to-point text messages. The ASCII text strings of these messages are as follows:

- Predefined text message 1 -

  `01234567890ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz`

- Predefined text message 2 -

  `Agilent Technologies, your partner in wireless solutions.`

Predefined Cell Broadcast Text Messages

There are two predefined cell broadcast text messages. The ASCII text strings of these messages are as follows:

- Predefined text message 1 -

  `The quick brown fox jumps over the lazy dog`

- Predefined text message 2 -

  ```
  This instrument provides functional testing of broadcast SMS by sending up to three
  broadcast messages to the device under test. Two fixed messages and a user defined
  message are available for selection. The second fixed message spans multiple pages.
  ```

User Defined Text Message (Custom Text Message)

Point-to-point and cell broadcast messages each have their own custom message available. You can define the text for these customer messages using the following GPIB commands:

"CALL:SMService:PTPoint[:MTERminated]:TEXT:CUSTom" on page 802 for point-to-point messages, and

"CALL:SMService:CBRoadcast:TEXT:CUSTom" on page 800 for cell broadcast messages.

A custom text message can be defined only via the remote user interface. The maximum length for user defined messages is:

- Point-to-point: 160 characters
- Cell Broadcast: 93 characters

The default custom text message is:

`Enter your text here`

NOTE SMS text messages exchanged between the test set and the mobile station are encoded using the ETSI Default Alphabet character set. The ETSI Default Alphabet encoding shares the majority of its character codes with those used by the ASCII character set. Between the two character sets, all alphanumeric characters and most punctuation characters have identical codes.

For user defined text messages, the test set accepts a 7-bit ASCII string. This string is then encoded using the ETSI Default Alphabet before it is transmitted. The ASCII code for each character in this string is mapped to the ETSI Default Alphabet character with the same code. Characters present in the user defined text message whose ASCII and ETSI Default Alphabet codes are not identical will be received and displayed by the mobile station as the ETSI Default Alphabet character with the original ASCII character’s code. This behaviour is only noticeable with certain user defined text messages as all of the predefined text messages use only alphanumeric and basic punctuation characters.

Related Topics

“Short Message Service (SMS)” on page 227

“Point-to-Point SMS” on page 242

“Cell Broadcast Service (CBS)” on page 228

“How to use the Short Message Service Features” on page 1428

“CALL:SMService” on page 794

How to use the Short Message Service Features

This section describes general procedures for using SMS features.

- "Mobile Terminated Point-to-Point Message Transfer" on page 238
- "Mobile Originated Point-to-Point Message Transfer" on page 238
- "Cell Broadcast Message Transfer" on page 239
- "Cell Broadcast Updated Message Transfer" on page 240

Mobile Terminated Point-to-Point Message Transfer

1. If you would like a log of the protocol messages exchanged between the test set and the mobile station, set up the Wireless Protocol Advisor (WPA) and start logging. See "Logging SMS Messages" on page 230.
2. Connect the mobile station to the test set and power it on.
3. If mobile station does not attach automatically, perform a manual attach using the mobile station.
4. After the mobile station has attached, go to the `Call Setup` screen by pressing the **Call Setup** key.
5. Go to menu (`2 of 2`) of the `Call Control` menu by pressing the **More** key on the lower left corner of the test set.
6. Select `Short Message Service` by pressing the softkey **F5**.
7. Select the `Point to Point SMS` messaging by pressing the softkey **F1**.
8. Choose the message to send using the `Message Text` softkey (**F2**).
9. Choose to use either GSM or GPRS transportation layers to be used for sending the SMS message using the `Transportation` softkey (**F3**).
10. Press the `Send Message` softkey (**F1**) to send the message. Observe the mobile station for indications that the message has been received. The test set display also gives an indication.
11. If you are capturing a log, stop logging.

Mobile Originated Point-to-Point Message Transfer

1. If you would like a log of the protocol messages exchanged between the test set and the mobile station, set up the Wireless Protocol Advisor (WPA) and start logging. See "Logging SMS Messages" on page 230.
2. Connect the mobile station to the test set and power it on.
3. If the mobile station does not attach automatically, perform a manual attach using the mobile station.
4. After the mobile station has attached, go to the `Call Setup` screen by pressing the **Call Setup** key.
5. Go to the second page of the `Call Control` menu by pressing the **More** key on the lower left corner of the test set.
6. Select `Short Message Service` by pressing the softkey **F5**.
7. Select the `Point to Point SMS` messaging by pressing the softkey **F1**.

8. If you want the message received by the test set to be resent to the mobile station, change the Loopback option to On using the Loopback softkey (**F4**).

9. Using the mobile station's interface, set the mobile station to send either GPRS SMS or GSM SMS).

10. Use the mobile station to send a point-to-point message to any address.

11. Observe the test set for indications that the message has been received. If the loopback option is enabled, observe the mobile station for indications that the message has been received.

12. If you are capturing a log, stop logging.

Cell Broadcast Message Transfer

1. If you would like a log of the protocol messages exchanged between the test set and the mobile station, set up the Wireless Protocol Advisor (WPA) and start logging. See "Logging SMS Messages" on page 230.

2. Connect the mobile station to the test set and power it on.

NOTE The mobile station does not have to attach.

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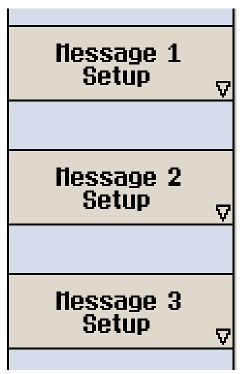
3. Go to the Call Setup screen by pressing the **Call Setup** key.

4. Go to the second page of the Call Control menu by pressing the **More** key on the lower left corner of the test set.

5. Select Short Message Service by pressing the softkey **F5**.

6. Select Cell Broadcast by pressing the softkey **F2**. The Broadcast SMS menu appears. You can select setup menus for three different messages.



7. To select the setup menu, press the softkey next to the menu item labeled Message X Setup where X can be 1, 2, or 3. The following menu appears:

Message 1 Setup	Value
Message State	On
Message Text	Text1
Message Code	0
Message Channel Number	0
Message Update Number	0
Message Language	English

8. See “Message Setup” on page 228 for more information about each parameter in the message setup.
9. Set the parameters as desired for each message.
10. Start the broadcast message using the Start Cell Broadcast softkey (**F1**).
11. Observe the display on the mobile station to confirm that the message(s) were received.

NOTE This could take up to 30 seconds.

12. If required, stop the broadcast by pressing the Stop Cell Broadcast softkey (**F1**).
13. If you are capturing a log, stop logging.

Cell Broadcast Updated Message Transfer

1. If you would like a log of the protocol messages exchanged between the test set and the mobile station, set up the Wireless Protocol Advisor (WPA) and start logging. See “Logging SMS Messages” on page 230.
2. Connect the mobile station to the test set and power it on.

NOTE The mobile station does not have to attach.

3. Go to the Call Setup screen by pressing the **Call Setup** key.
4. Go to the second page of the Call Control menu by pressing the **More** key on the lower left corner of the test set.
5. Select Short Message Service by pressing the softkey **F5**.
6. Select Cell Broadcast by pressing the softkey **F2**.
7. Set parameters as desired. To choose the messages to be sent, select Message Setup for that message and set Message State to On.
8. Select the message to be sent using the Message Text menu for each message.
9. Start the broadcast message using the Start Cell Broadcast softkey (**F1**).
10. Observe the display on the mobile station to confirm that the message(s) were received.

11. Select Message Setup for each message to be sent as an update.
12. Set the Update Number for these messages higher than their previous value. The update number wraps from 15 to 0.
13. Observe the display on the mobile station to confirm that the updated message(s) have replaced the first versions.
14. If required, stop the broadcast by pressing the Stop Cell Broadcast softkey (**F1**).
15. If you are capturing a log, stop logging.

Related Topics

"Short Message Service (SMS)" on page 227

"Point-to-Point SMS" on page 242

"Cell Broadcast Service (CBS)" on page 228

"Short Message Service (SMS) Messages" on page 236

"Logging SMS Messages" on page 230

Point-to-Point SMS

This section is only applicable to the lab applications.

- "Transportation"
- "Sending a Message to the Mobile Station"
- "Receiving a Message Transmitted by the Mobile Station"
- "Message Loopback"

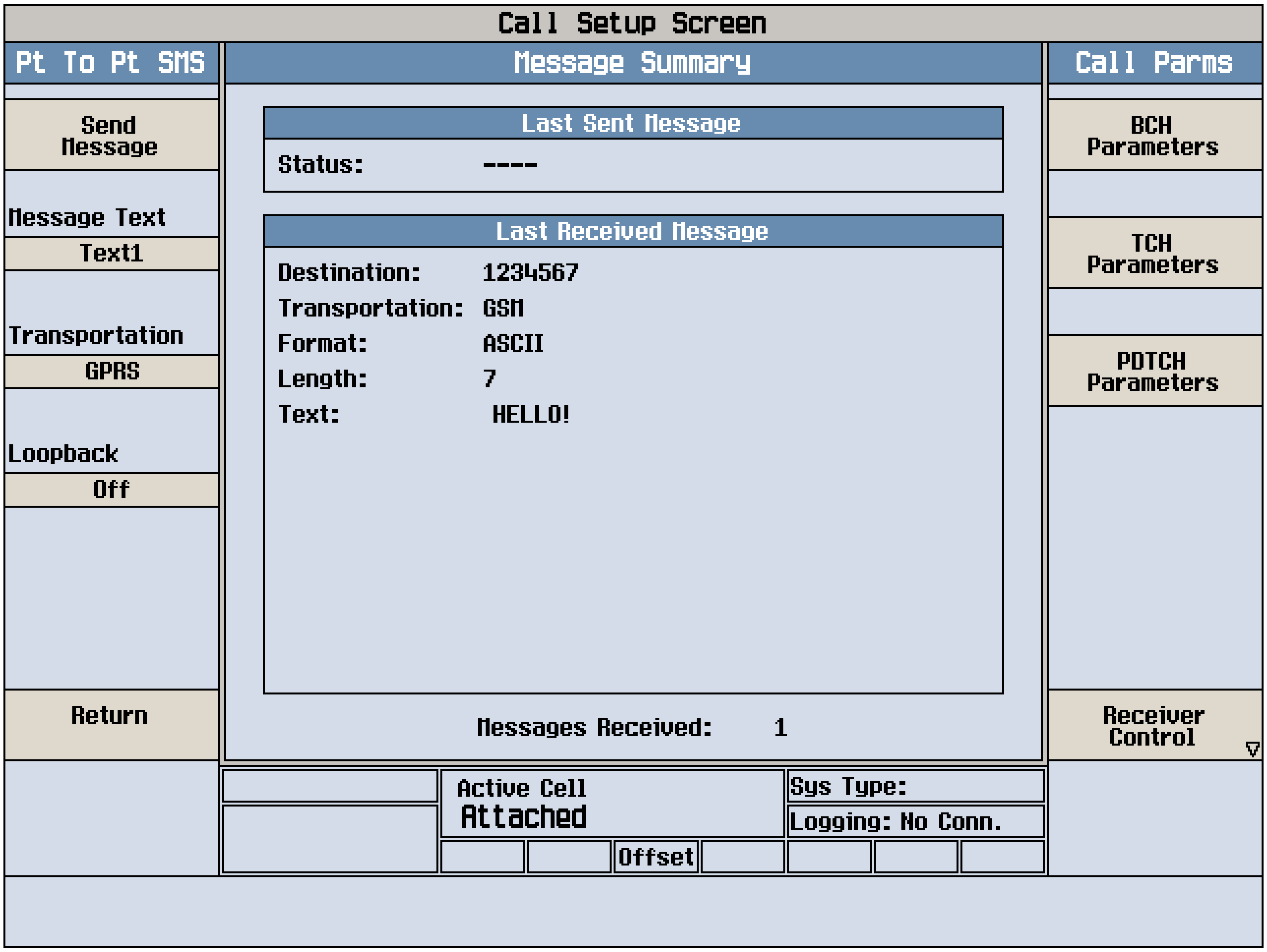
Transportation

You can choose to send Point-to-Point SMS messages via either the GSM or GPRS protocol layers. The protocol layers to be used are configurable by specifying the transportation mechanism (See "CALL:SMService:PTPoint[:MTERminated]:TRANsport" on page 803).

If the SMS message is originated by the mobile station, the transportation mechanism that was used by the mobile station is displayed on the front panel display and can also be queried (See "CALL:SMService:PTPoint:MORiginated:TRANsport?" on page 806).

As an example, in the following graphic you can see the details for the `Last Received Message`. Notice that the `Transportation` field contains the value `GSM`. This indicates that GSM protocol layers were used to deliver this message from the mobile station.

Also notice that the `Transportation` field in the `Pt to Pt SMS` menu on the left is set to `GPRS`. This setting configures the test set to use GPRS protocol layers for delivering SMS messages to the mobile station.



Sending a Message to the Mobile Station

You can simulate sending a message from a network to a mobile station using the test set's SMS capability. One of two predefined messages can be sent or you can define a text message yourself. See "Short Message Service (SMS) Messages" on page 236 for more information.

A message sent from the network to a mobile station is a mobile terminated message. When sending mobile terminated point-to-point messages from the test set, you can choose the message delivery to be through either GSM or GPRS protocol layers. See "Transportation" on page 242.

Operating Mode and Connection Type

The operating mode must be Active Cell to send a mobile terminated SMS message.

The connection type must be Auto to send an SMS message to the mobile station.

Other Considerations

GPRS If you initiate a GPRS Point-to-Point mobile terminated SMS message while the mobile station is on a voice call, the request is rejected by the test set and the following message appears on the test set's front panel.

`Call operation rejected; Protocol request ignored.`

If the mobile station is not on a voice call, a new Packet Data Channel (PDCH) is created or an existing one is used to send the SMS message.

GSM If you initiate a GSM Point-to-Point mobile terminated SMS message while the mobile station is on a voice call or if a data connection is established, the message is sent on the Slow Associated Control Channel (SACCH). Otherwise, if the mobile station is not on a voice call, GSM Point-to-Point SMS messages are sent on the Stand-alone Dedicated Control Channel (SDCCH).

Receiving a Message Transmitted by the Mobile Station

You can also send an SMS message from a mobile station to the test set. This is a mobile originated message.

The protocol layers used for mobile originated messages can not be directly specified by the test set. This depends on the mobile station's support for SMS. If the mobile station supports both GSM and GPRS SMS, it may be possible to select which one the mobile station uses from its menu.

If the mobile station does not allow you to select between GSM and GPRS, it is still possible to test both. When the mobile station has performed a GPRS attach, it may use GPRS protocol layers for mobile originated SMS. You can determine whether GSM or GPRS was used by observing the `Transportation` field displayed on the front panel. If you want to test the mobile station's GSM SMS support, it is possible to force the use of GSM protocol layers by setting the test set's serving cell to GSM. See "Serving Cell" on page 197 for more information.

Mobile Originated SMS Parameters

All of the following parameters are displayed on the test set's front panel display and can be queried via GPIB after the test set receives a mobile originated SMS message.

- Destination - The phone number to receive the SMS message. For interactions with the test set, any phone number can be specified.
- Transportation - The protocol layers used to deliver the SMS message to the test set.
- Format - The format of the message delivered to the test set. The test set recognizes ASCII, binary data, or the Unicode Character Set 2 (UCS2). If other formats are delivered to the test set, `Unknown` is displayed fro this parameter. All other parameters except `Text` are still displayed.
- Length - The number of characters in an ASCII text message, or the number of octets of data if the message is either binary data or unicode (UCS2) text.
- Text - The test set only displays the content of received messages when they are ASCII text. Only 160 characters of ASCII text can be displayed. Other information about the message is still displayed regardless of the format.

NOTE SMS text messages exchanged between the test set and the mobile station are encoded using the ETSI Default Alphabet character set. The ETSI Default Alphabet encoding shares the majority of its character codes with those used by the ASCII character set, notably, all alphanumeric characters and most punctuation characters have identical codes.

Any ETSI Default Alphabet specific characters received will be replaced by their ASCII equivalents on the front panel display. In the cases where the ETSI characters map to control characters in the ASCII character set, a received character will be displayed as a blank space. The message text can be retrieved over the RUI in its original format without the conversion process detailed for the front panel.

Operating Mode and Connection Type

The operating mode must be Active Cell to receive an SMS message from a mobile station.

The connection type must be Auto when receiving a GSM SMS message from the mobile station.

Any connection type can be used when receiving a GPRS SMS message from the mobile station.

Message Loopback

This feature gives you the ability to simulate the complete transfer of an SMS message from an originating mobile station to a destination mobile station through the network. The test set takes the message it receives from the mobile station and sends it back to the mobile station.

This feature also allows you to perform basic tests on data formats such as binary or UCS2 as the data type received from the mobile station is returned to it using the loopback feature.

Related Topics

"Short Message Service (SMS)" on page 227

"Cell Broadcast Service (CBS)" on page 228

"Short Message Service (SMS) Messages" on page 236

"How to use the Short Message Service Features" on page 1428

"CALL:SMService" on page 794

Establishing an Active GSM Link with the Mobile Station

Making a Base Station Originated Call

The process for making a base station originated call is to:

1. If necessary, configure the traffic channel parameters for the call assignment. See “CALL:TCHannel” on page 813.
2. If necessary, set the IMSI state. See “CALL:PAGing:IMSI” on page 614.

   Example 6.

   ```
   OUTPUT 714;"CALL:PAGING:IMSI ““01012345678901”””
   ```

   would set the paging IMSI to 01012345678901.

3. If necessary, set the repeat paging state. See “CALL:PAGing:REPeat[:STATe][:SELected]” on page 616.

   Example 7.

   ```
   OUTPUT 714;"CALL:PAGING:REPEAT ON"
   ```

   would turn on repeat paging.

4. Configure the necessary call processing connect/disconnect synchronization conditions. See “Call Processing State Synchronization” on page 433.
5. Page the mobile station by sending the call originate command to the test set.

   Example 8.

   ```
   OUTPUT 714;"CALL:ORIGINATE"
   ```

   would start the process of making a base station originated call.

IMPORTANT To verify that the origination is successfully completed, see “Call Processing State Synchronization” on page 433.

Making a Mobile Station Originated Call

The process for making a mobile station originated call is to:

1. If necessary, configure the traffic channel parameters for the call assignment. See “CALL:TCHannel” on page 813 for more information about the traffic channel parameters.
2. Configure the necessary call processing connect/disconnect synchronization conditions. See “Call Processing State Synchronization” on page 433.
3. Initiate a call from the mobile station.

NOTE There is no facility in the test set to initiate a call from the mobile station. This must be accomplished manually or through a test bus built-in to the mobile station.

IMPORTANT To verify that the origination is successfully completed, see “Call Processing State Synchronization” on page 433.

Operating Considerations

The test set must be in active cell operating mode and the connection type must be Auto. The correct frequency band must be selected.

Related Links

“Active Cell Operating Mode” on page 176

“Connection Types” on page 189

Establishing a Data Connection with the Mobile Station

This section is *not* applicable to GSM.

For instructions and a programming example on how to make a GPRS or EGPRS data connection, see "Step 4: Make a Connection" on page 276.

Related Topics

"CALL:PDTCH|PDTChannel" on page 621

"CALL:FUNCtion:DATA:START" on page 546

"Data Connection Processing State Synchronization" on page 445

How the Test Set Performs a Dualband Handover

The dualband handover function has been implemented as an interband channel assignment for GSM and a packet timeslot reconfigure for GPRS and EGPRS, rather than an interband handover, since the test set currently has one BCH (cell).

The test set has the ability to switch traffic channels from:

- EGSM/PGSM/RGSM to DCS/PCS/GSM450/GSM480/GSM750/GSM850
- GSM450 to EGSM/PGSM/RGSM/DCS/PCS/GSM480/GSM750/GSM850
- GSM480 to EGSM/PGSM/RGSM/DCS/PCS/GSM450/GSM750/GSM850
- GSM750 to EGSM/PGSM/RGSM/DCS/PCS/GSM450/GSM480/GSM850
- GSM850 to EGSM/PGSM/RGSM/DCS/PCS/GSM450/GSM480/GSM750
- DCS/PCS to EGSM/PGSM/RGSM/GSM450/GSM480/GSM750/GSM850

No other combinations of traffic channel band handovers are supported. Also, the traffic channel band can only be changed when an active link exists between the test set and a mobile station. See "Establishing an Active GSM Link with the Mobile Station" on page 246 or for GPRS and EGPRS see, "Step 4: Make a Connection" on page 276.

There are parameters that can be set up to take on different values depending on the broadcast band currently selected. These are called "Frequency Banded Parameters" on page 250. After a handover, the frequency banded parameters for the new band are active. Only one set of frequency banded parameters is active at any one time. However, you can set up any of the traffic channel parameters for bands involved in the handover because the test set remembers the settings and switches to them when the handover occurs.

Related Topics

- "Step 6: Reconfigure Test Set and Mobile Station Connection Parameters" on page 282

Frequency Banded Parameters

The majority of the test set's parameters are active regardless of the frequency band selected. There are a number of parameters that allow you to specify a band; PGSM, EGSM, GSM450, GSM480, GSM750, GSM850, DCS, PCS or RGSM. These exceptions are called frequency banded parameters.

Frequency banded parameters are activated upon selection of a band. Parameters that select frequency bands include cell band and traffic band (see "Band Selection Parameters" on page 254).

You can set parameter values for a band that is not currently selected, and the test set stores the settings for future use. For example, during a call on the PGSM band, the MS TX level can be set to 10 for the DCS frequency band. When a handover (see "How the Test Set Performs a Dualband Handover" on page 249) to the DCS band is made, the MS TX level of 10 for DCS will already be set.

If you do not specify a frequency band when setting frequency banded parameters, settings to the parameter are made in the currently selected band.

- "GSM Frequency Banded Parameters" on page 250
- "GPRS and EGPRS Frequency Banded Parameters" on page 252

GSM Frequency Banded Parameters

Parameter	**GPIB Command**
Broadcast Channel (ARFCN)	"CALL[:CELL]:BCHannel[:ARFCn][:SELected]" on page 498
BA Table	"CALL[:CELL]:BA:TABLe[:SELected]" on page 479
BA Table Points	"CALL[:CELL]:BA:TABLe:POINts[:SELected]?" on page 490
Traffic Channel (ARFCN)	"CALL:TCHannel[:ARFCn][:SELected]" on page 815
MS TX Level	"CALL:MS:TXLevel[:SELected]" on page 595
TCH Timing Advance	"CALL:MS:TADVance[:SELected]" on page 588
Control Channel Power	"CALL:MS:TXLevel:CCHannel[:SELected]" on page 600

GSM Programming Example

This section provides an example of how to use frequency banded parameters.

The following procedure assumes that an active link is established between the test set and the mobile station. See “Establishing an Active GSM Link with the Mobile Station” on page 246.

```
10  OUTPUT 714;"CALL:TCH:PGSM 124" !Sets traffic channel to 124 for PGSM band.
20  OUTPUT 714;"CALL:MS:TXL:PGSM 7" !Sets the mobile station uplink power control
30                                   !level to 7 for PGSM band.
40  ! Now set up frequency banded parameters for DCS band.
50  OUTPUT 714;"CALL:TCH:DCS 850" !Sets traffic channel to 850 for DCS band.
60                                 !The default traffic channel for the DCS
70                                 !band is 30.
80  OUTPUT 714;"CALL:MS:TXL:DCS 5" !Sets the mobile station uplink power control
90                                  !level to 5 for the EGSM band. The default level is
100                                 !15.
110 ! Now change the traffic channel band to DCS. The TCH and uplink power control level
120 ! parameters are set to the values you specified above, not the default values.
130 OUTPUT 714;"CALL:TCH:BAND DCS"
140 ! Now query the traffic channel and uplink power control level.
150 OUTPUT 714;"CALL:TCH?"
160 ENTER 714;Channel
170 OUTPUT 714;"CALL:MS:TXL?"
180 ENTER 714;Tx_lev
190 ! Print the current values.
200 PRINT "The default TCH for the DCS band is 698. The current TCH is: ";Channel
210 PRINT "The default Tx Level is 10. The current Tx Level is: ";Tx_lev
220 END
```

GPRS and EGPRS Frequency Banded Parameters

Parameter	GPIB Command
Broadcast Channel (ARFCN)	"CALL[:CELL]:BCHannel[:ARFCn][:SELected]" on page 498
BA Table	"CALL[:CELL]:BA:TABLe[:SELected]" on page 479
BA Table Points	"CALL[:CELL]:BA:TABLe:POINts[:SELected]?" on page 490
EGPRS Multislot Class	"CALL:MS:REPorted:MCLass:EGPRS[:SELected]?" on page 573
EPSK Power Class	"CALL:MS:REPorted:PCLass:EPSK[:SELected]?" on page 577
GMSK Power Class	"CALL:MS:REPorted:PCLass:GMSK[:SELected]?" on page 578
GPRS Multislot Class	"CALL:MS:REPorted:MCLass:GPRS[:SELected]?" on page 574
Packet Data Traffic Channel (ARFCN)	"CALL:PDTCH[:ARFCn][:SELected]" on page 625
Timing Advance	"CALL:PDTCH:MS:TADVance[:SELected]" on page 633
Uplink Burst TX Level	"CALL:PDTCH:MS:TXLevel[:SELected]:BURSt[1|2]" on page 632

Programming Example

The following procedure assumes that a data connection has been established between the test set and the mobile station (connection status is Transferring). See "Step 4: Make a Connection" on page 276.

```
10  OUTPUT 714;"CALL:PDTCH:PGSM 124" !Sets packet data traffic channel to 124 for PGSM
20                                   !band.
30  OUTPUT 714;"CALL:PDTCH:MS:TXL:PGSM:BURS 7;BURS2 10" !Sets the mobile station uplink
40                                  !power control level for burst 1 to 7 and burst 2
50                                  !to 10 for the PGSM band.
60  ! Now set up frequency banded parameters for DCS band.
70  OUTPUT 714;"CALL:PDTCH:DCS 850" !Sets packet data traffic channel to 850 for DCS band.
80                                  !The default packet data traffic channel for the DCS
90                                  !band is 30.
100 OUTPUT 714;"CALL:PDTCH:MS:TXL:DCS:BURS 5;BURS2 7" !Sets the mobile station uplink
110                                !power control level for burst 1 to 5 and burst 2 for
120                                !for the EGSM band.  The default levels are 10.
130 ! Now change the packet data traffic channel band to DCS. The PDTCH and uplink power
140 ! control level parameters are set to the values you specified above, not the
150 ! default values.
160 OUTPUT 714;"CALL:PDTCH:BAND DCS"
170 ! Now query the packet data traffic channel and uplink power control levels.
180 OUTPUT 714;"CALL:PDTCH?"
190 ENTER 714;Channel
200 OUTPUT 714;"CALL:PDTCH:MS:TXL:BURS?"
210 ENTER 714;Tx_lev_burs1
220 OUTPUT 714;"CALL:PDTCH:MS:TXL:BURS2?"
230 ENTER 714;Tx_lev_burs2
240 ! Print the current values.
250 PRINT "The default PDTCH for the DCS band is 698. The current PDTCH is: ";Channel
260 PRINT "The default Tx Levels are 10. The current Tx Level for Burst 1 is: ";Tx_lev_burs1
```

```
270 PRINT “The default Tx Levels are 10. The current Tx Level for Burst 2 is: “;Tx_lev_burs2
280 END
```

Related Topics

“Band Selection Parameters” on page 254

“How the Test Set Performs a Dualband Handover” on page 249

“Configuring the Broadcast Channel (BCH)” on page 196

“Configuring the Traffic Channel (TCH)” on page 198

“Configuring the Packet Data Traffic Channel (PDTCH)” on page 205

“Receiver Control” on page 370

Band Selection Parameters

Band selection parameters allow you to choose the frequency band for different channel types in GSM, GPRS or EGPRS:

- "GSM Band Selection Parameters" on page 254
- "GPRS and EGPRS Band Selection Parameters" on page 255

GSM Band Selection Parameters

Parameter	GPIB Command
Cell Band	"CALL[:CELL]:BAND" on page 495
Traffic Band	"CALL:TCHannel:BAND" on page 821
RF Generator Band	"CALL[:CELL]:RFGenerator:FREQuency[:SELected]" on page 741

Operating Considerations for GSM

Cell Band Parameter

- When the operating mode is active cell and the call connected state is idle, changes to the cell band parameter will be reflected in the traffic band parameter as well.
- When the operating mode is active cell and the call connected state is connected, changes to the cell band parameter will disconnect any call in progress.
- When the operating mode is GSM BCH test mode (GBTest) or GSM BCH+TCH test mode (GBTTest), the cell band parameter should be used. See "CALL:OPERating" on page 609.
- When the operating mode is set to CW, the cell band parameter should be used.

Traffic Band Parameter

- When the operating mode is active cell and the call connected state is connected, changes to the traffic band parameter cause an inter-band channel assignment. See "How the Test Set Performs a Dualband Handover" on page 249.
- When the operating mode is active cell and the call connected state is connected, changes to the traffic band parameter are not reflected in the cell band parameter.
- When the operating mode is set to GSM BCH+TCH (GBTTest), the traffic band parameter should be used. See "CALL:OPERating" on page 609.

RF Generator Band Parameter

- When the operating mode is set to CW, the test set operates like a signal generator with level and frequency controls. See "CW Operating Mode Behavior" on page 183.

GPRS and EGPRS Band Selection Parameters

Parameter	GPIB Command
Cell Band	"CALL[:CELL]:BAND" on page 495
Packet Data Traffic Channel Band	"CALL:PDTCH:BAND" on page 627
RF Generator Band	"CALL[:CELL]:RFGenerator:FREQuency[:SELected]" on page 741

Operating Considerations for GPRS and EGPRS

Cell Band Parameter

- When the data connection status is *not* transferring (see "Data Connection Processing State Synchronization" on page 445), changing the cell band parameter to a new band changes the packet data traffic channel band to the new band as well.
- When the data connection status is transferring (see "Data Connection Processing State Synchronization" on page 445), changing the cell band parameter will disconnect any data connection in progress.

Packet Data Traffic Channel Band Parameter

- When the data connection status is transferring (see "Data Connection Processing State Synchronization" on page 445), changing the packet data traffic band parameter selects the PDTCH ARFCN and uplink burst TX level parameters.

RF Generator Band Parameter

- When the operating mode is set to CW, the test set operates like a signal generator with level and frequency controls. See "CW Operating Mode Behavior" on page 183.

Related Topics

"Configuring the Broadcast Channel (BCH)" on page 196

"Configuring the Traffic Channel (TCH)" on page 198

"Configuring the Packet Data Traffic Channel (PDTCH)" on page 205

"Receiver Control" on page 370

"CALL:OPERating" on page 609

"CALL:CONNected[:STATe]?" on page 511

"CALL:STATus[:STATe]:DATA?" on page 808

"Programming: Getting Started Guide for E1968A GSM/GPRS Mobile Test Application Revision A.01 and E6701C GSM/GPRS Lab Application Revision C.01" on page 266

E-OTD (Enhanced Observed Time Difference)

Description

The test set provides testing for the E-OTD (Enhanced Observed Time Difference) provision of the location services (LCS) capability described in *3GPP TS 03.71*. The test set can be used as the serving cell in an E-OTD test system. It can perform the main location services interactions such as issuing location requests to the MS and receiving location estimates or measurement results in response. The E-OTD solution in the test set allows you to test both MS-based or MS-assisted E-OTD.

E-OTD Solution Features

The E-OTD solution in the test set includes:

- "Neighbor Cell Synchronization Trigger" on page 3
- "Demodulation Trigger Delay" on page 226
- "RRLP Configuration" on page 257

RRLP Configuration

The test set supports the configuration, sending, and retrieving of the components of a generic RRLP message used to transport location services information between the MS and the Serving Mobile Location Centre (SMLC). The possible components of the message are:

- "Measure Position Request" on page 258
- "Measure Position Response" on page 259
- "Assistance Data" on page 262
- "Assistance Data Acknowledgment" on page 263
- "Protocol Error" on page 263

Introduction

The information that follows provides the user configurations allowed by the test set for of each of these components. For more information about each of the parameters and the meanings of their respective values refer to *3GPP TS 04.31, Location Services (LCS);Radio Resource LCS Protocol (RRLP).*

Operating Considerations

RRLP Control

The configuration, sending, and retrieval of results for RRLP messages are all performed using GPIB commands only.

Test Set Requirements

You can configure the RRLP message in any operating mode.

RRLP messages can only be sent while the test set is in Active Cell operating mode.

Mobile Station Requirements

For your mobile station to receive and respond to RRLP messages, it must be in one of the following states:

- idle mode and able to monitor the CCCH,
- in a speech call,
- or transferring circuit switched data (CSD).

The mobile station can NOT be monitoring a PBCCH or transferring packet data. Verify that your mobile station is in one of the valid states before attempting to send it RRLP messages.

Measure Position Request

This component of the RRLP message is used to request location measurements or a location estimate from the MS. It includes instructions and can also include assistance data for the MS. The Measure Position Request component can contain several elements. Only the Positioning Instructions Element is required. The following table contains the elements and the fields and values that you can configure. You can configure the fields that have an “X” in the “User Configurable” column of the table. If there is no “X” designation, the value that is supplied by the test set for that parameter is shown in the table. The “Optional” column is used to indicate optional components and elements. You can include or exclude these components and elements using GPIB commands.

Table 10. Measure Position Request Variable Parameters

Positioning Instructions		
Field	User Configurable	Optional
Method Type	X	
Positioning Methods	0 = EOTD	
Response Time	X	
Accuracy	X	X
Multiple Sets	X	
Environment Characterization	X	X
|		
E-OTD Reference BTS for Assistance Data		
Field	User Configurable	Optional
BCCH Carrier	Same as the serving cell	
BSIC	Same as the serving cell	
Timeslot Scheme	157, 156, 156, 156...	
BTS Position - Type of Description	X	X
BTS Position - Sign of Latitude	X	X
BTS Position - Degrees Latitude	X	X
BTS Position - Degrees Longitude	X	X
BTS Position - Direction Altitude	X	X
BTS Position - Altitude	X	X
|		
E-OTD Measurement Assistance Data		
Field	User Configurable	Optional
Number of BTSs (n<= 8)	X	

Table 10. Measure Position Request Variable Parameters

BTS[n] BCCH Carrier (n<= 8)	X	
BTS[n] BSIC (n<= 8)	X	
BTS[n] Multiframe Offset (n<= 8)	X	
BTS[n] Timeslot Scheme (n<= 8)	X	
BTS[n] Rough RTD (n<= 8)	X	
BTS[n] Fine RTD (n<= 8)	X	
BTS[n] Relative North (n<= 8)	X	
BTS[n] Relative East (n<= 8)	X	
BTS[n] Relative Altitude (n<= 8)	X	
Release 98 Extension		
Field	User Configurable	Optional
BTS[n] Expected OTD (n<= 8)	X	
BTS[n] Expected OTD Uncertainty (n<= 8)	X	

Associated GPIB commands

See "CALL:PPRocedure:PMEasurement:MPRequest" on page 674 for the GPIB commands necessary to configure the Measure Position Request parameters.

Measure Position Response

The following table contains the elements and the fields and values of the Measure Position Response component of the RRLP message that you can retrieve using GPIB commands. The test set gives you access to the fields that have a "Yes" in the "Available" column of the table. A "No" indicates the information is not available.

Table 11. Measure Position Response Message Contents

Multiple Sets Element	
Parameter	Available?
Number of Measurement Information Sets	YES
Number of Reference BTS' (= x, where 1 <= x <= 3)	YES
Reference BTS Relation to Measurement Elements	YES
Reference BTS Identity Element (Optional)	
Parameter	Available?
Cell ID Type (for each BTS 'x' where 1 <= x <= 3)	YES

Table 11. Measure Position Response Message Contents

Reference LAC (for each BTS ‘x’ where 1 <= x <= 3)	YES
Reference CI (for each BTS ‘x’ where 1 <= x <= 3)	YES
Reference BCCH Carrier (for each BTS ‘x’ where 1 <= x <= 3)	YES
Reference BSIC (for each BTS ‘x’ where 1 <= x <= 3)	YES
Request Index (for each BTS ‘x’ where 1 <= x <= 3)	YES
System Info Index (for each BTS ‘x’ where 1 <= x <= 3)	YES
E-OTD Measurement Information Element (Optional)	
Parameter	Available?
Reference Frame Number (for each set ‘x’ where 1 <= x <= 3)	YES
Reference Time Slot (for each set ‘x’ where 1 <= x <= 3)	YES
Reference Quality (for each set ‘x’ where 1 <= x <= 3)	YES
Number of Measurements (for each set ‘x’ where 1 <= x <= 3)	YES
Std Resolution (for each set ‘x’ where 1 <= x <= 3)	YES
TA Correction (for each set ‘x’ where 1 <= x <= 3)	YES
Number of Measured Neighbours (n) (for each set ‘x’ where 1 <= x <= 3)	YES
BTS ‘n’ Identity Present (n <= 10) (for each set ‘x’ where 2 <= x <= 3 – this field is not included in the first measurement set)	YES
BTS ‘n’ Cell ID Type (n <= 10) (for each set ‘x’ where 1 <= x <= 3)	YES
BTS ‘n’ LAC (n <= 10) (for each set ‘x’ where 1 <= x <= 3)	YES
BTS ‘n’ CI (n <= 10) (for each set ‘x’ where 1 <= x <= 3)	YES
BTS ‘n’ BCCH Carrier (n <= 10) (for each set ‘x’ where 1 <= x <= 3)	YES
BTS ‘n’ BSIC (n <= 10) (for each set ‘x’ where 1 <= x <= 3)	YES
BTS ‘n’ Multiframe Offset (n <= 10) (for each set ‘x’ where 1 <= x <= 3)	YES
BTS ‘n’ Request Index (n <= 10) (for each set ‘x’ where 1 <= x <= 3)	YES
BTS ‘n’ System Info Index (n <= 10) (for each set ‘x’ where 1 <= x <= 3)	YES
BTS ‘n’ Neighbour Time Slot (n <= 10) (for each set ‘x’ where 1 <= x <= 3)	YES
BTS ‘n’ Number of EOTD Measurements (for each set ‘x’ where 1 <= x <= 3)	YES
BTS ‘n’ Std of EOTD (n <= 10) (for each set ‘x’ where 1 <= x <= 3)	YES
BTS ‘n’ OTD (n <= 10) (for each set ‘x’ where 1 <= x <= 3)	YES
Location Information Element (Optional)	
Parameter	Available?

Table 11. Measure Position Response Message Contents

Reference Frame	YES
Fix Type	YES
GPS TOW	NO
Position Estimate – Type of Description	YES
Position Estimate – Sign of Latitude	YES
Position Estimate – Degrees Latitude	YES
Position Estimate – Degrees Longitude	YES
Position Estimate – Uncertainty Code	YES
Position Estimate – Uncertainty Semi Major	YES
Position Estimate – Uncertainty Semi Minor	YES
Position Estimate – Orientation Major Axis	YES
Position Estimate – Confidence	YES
Position Estimate – Direction of Altitude	YES
Position Estimate – Altitude	YES
Position Estimate – Altitude Uncertainty	YES
GPS Measurement Information Element (Optional)	
If GPS measurement information is provided, the message will still be decoded but no information will be available on this element via GPIB.	
Location Information Error Element (Optional)	
Parameter	Available?
Error Reason	YES
Extension Container Element	
If the Extension Container element is included, the message will still be decoded but no information will be available on this element via GPIB.	
Release 98 Extension Element (Optional)	
If the Release’98 Extension element is included, the message will still be decoded but no information will be available on this element via GPIB.	

Associated GPIB commands

See the following for the GPIB commands necessary to query the Measurement Position Response message contents.

- "CALL:PPRocedure:PMEasurement:PRESponse:AVAilable?" on page 701
- "CALL:PPRocedure:PMEasurement:PRESponse:MSETs" on page 732
- "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity" on page 735
- "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation" on page 713
- "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation" on page 704
- "CALL:PPRocedure:PMEasurement:PRESponse:LIERror" on page 702

Assistance Data

Most configurable elements of the Assistance Data component of the RRLP message are identical to related elements in the Measure Position Request message detailed in "Measure Position Request Variable Parameters" on page 258. Therefore, the values currently set for these common elements in the Measure Position Request message are used for constructing the Assistance Data message.

The following table contains the elements and the fields and values unique to the Assistance Data component of the RRLP message that you can configure. You can configure the fields that have an "X" in the "User Configurable" column of the table. If there is no "X" designation, the value that is supplied by the test set for that parameter is shown in the table. The "Optional" column is used to indicate optional components and elements. You can include or exclude these components and elements using GPIB commands.

Table 12. Assistance Data Variable Parameters

E-OTD Reference BTS for Assistance Data (Optional)		
Field	User Configurable	Optional
BCCH Carrier	Same as the serving cell	
BSIC	Same as the serving cell	
Timeslot Scheme	157, 156, 156, 156...	
BTS Position - Type of Description	X	X
BTS Position - Sign of Latitude	X	X
BTS Position - Degrees Latitude	X	X
BTS Position - Degrees Longitude	X	X
BTS Position - Direction Altitude	X	X
BTS Position - Altitude	X	X
|		
E-OTD Measurement Assistance Data (Optional)		
Field	User Configurable	Optional

Table 12. Assistance Data Variable Parameters

Number of BTSs (n<= 8)	X	
BTS[n] BCCH Carrier (n<= 8)	X	
BTS[n] BSIC (n<= 8)	X	
BTS[n] Multiframe Offset (n<= 8)	X	
BTS[n] Timeslot Scheme (n<= 8)	X	
BTS[n] Rough RTD (n<= 8)	X	
BTS[n] Fine RTD (n<= 8)	X	
BTS[n] Relative North (n<= 8)	X	
BTS[n] Relative East (n<= 8)	X	
BTS[n] Relative Altitude (n<= 8)	X	
|		
More Assistance Data to be Sent(Optional)		
Field	User Configurable	Optional
More Assistance Data	X	
|		
Release 98 Extension (Optional)		
Field	User Configurable	Optional
BTS[n] Expected OTD (n<= 8)	X	
BTS[n] Expected OTD Uncertainty (n<= 8)	X	

Associated GPIB commands

See “CALL:PPRocedure:PMEasurement:ADATa” on page 670 for the GPIB commands necessary to configure the Measure Position Request parameters.

Assistance Data Acknowledgment

Use the “CALL:PPRocedure:PMEasurement:ADATa:ACKNowledged?” on page 671 to query the status of the last Assistance Data message sent to the mobile station.

Protocol Error

The RRLP Protocol Error message can be sent in two directions:

- “Network to Mobile Station” and
- “Mobile Station to Network” .

The test set can both send and receive protocol error messages.

Network to Mobile Station

In a network, protocol error messages are only sent in response to a Measure Position Response from the mobile station. However, with the test set, you can send a protocol error message to the mobile station at any time. You can configure the error cause value to be sent and send the protocol error message using GPIB commands. See "CALL:PPRocedure:PMEasurement:PERRor" on page 699.

Mobile Station to Network

The mobile station can generate a protocol error message in response to either the Measure Position Request or Assistance Data messages. When this occurs, the following error message appears on the front panel display: "Protocol Error; RRLP Protocol Error Received from MS. Error Code <n>". <n> is a number between 0 and 5 and represents the value of the Protocol Error component of the RRLP message received from the MS. These values and their meanings are listed as settings for the command "CALL:PPRocedure:PMEasurement:PERRor:CODE" on page 700.

This error message can also be retrieved using the GPIB command "SYSTem:ERRor?" on page 1289.

Related Topics

"E-OTD (Enhanced Observed Time Difference)" on page 256

"Neighbor Cell Synchronization Trigger" on page 3

"Demodulation Trigger Delay" on page 226

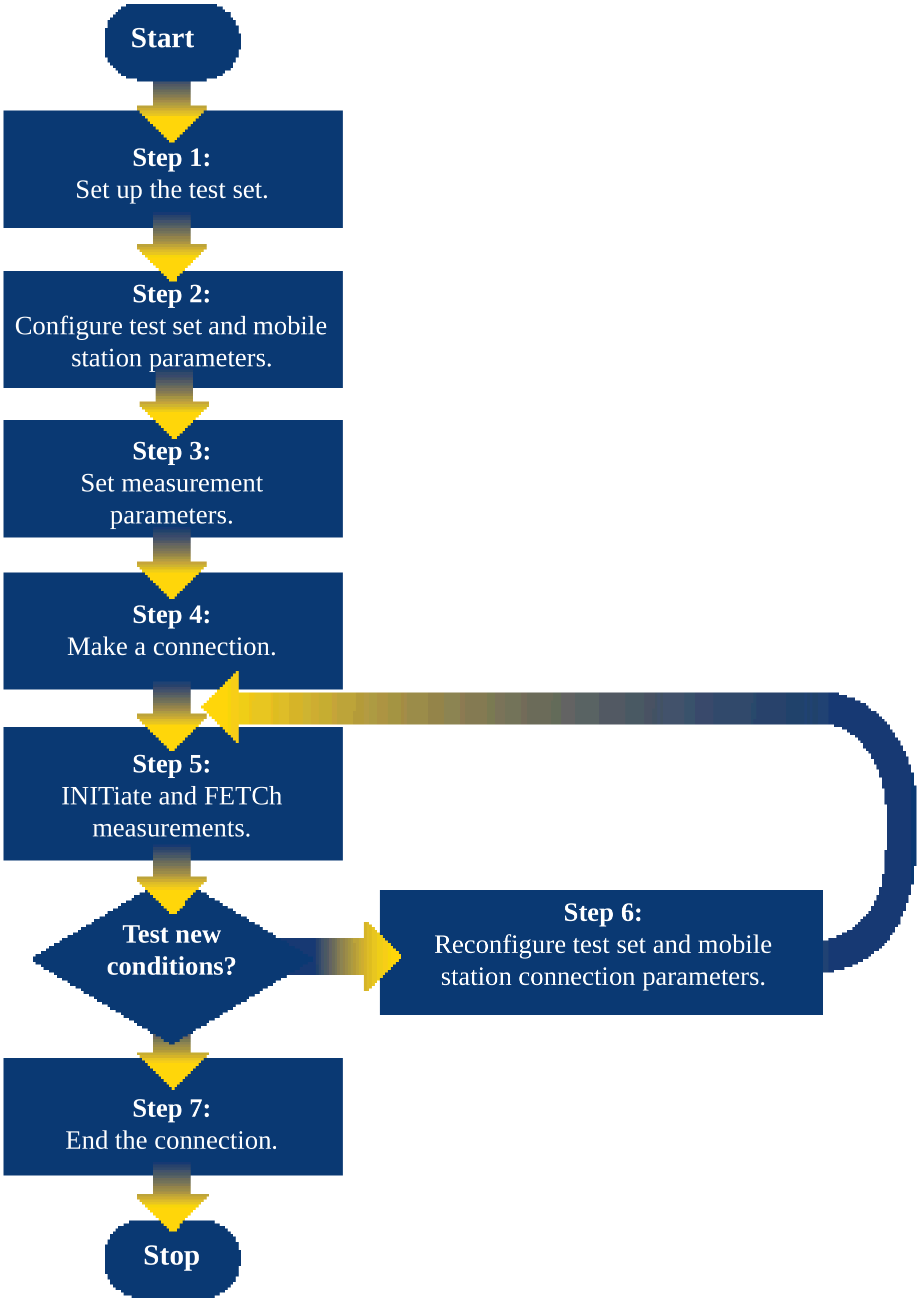
Programming

Programming: Getting Started Guide for E1968A GSM/GPRS Mobile Test Application Revision A.01 and E6701C GSM/GPRS Lab Application Revision C.01

Introduction

The Getting Started Guide is organized around the basic set of tasks a control program normally performs when testing a mobile station in a manufacturing environment.

Programming Flowchart



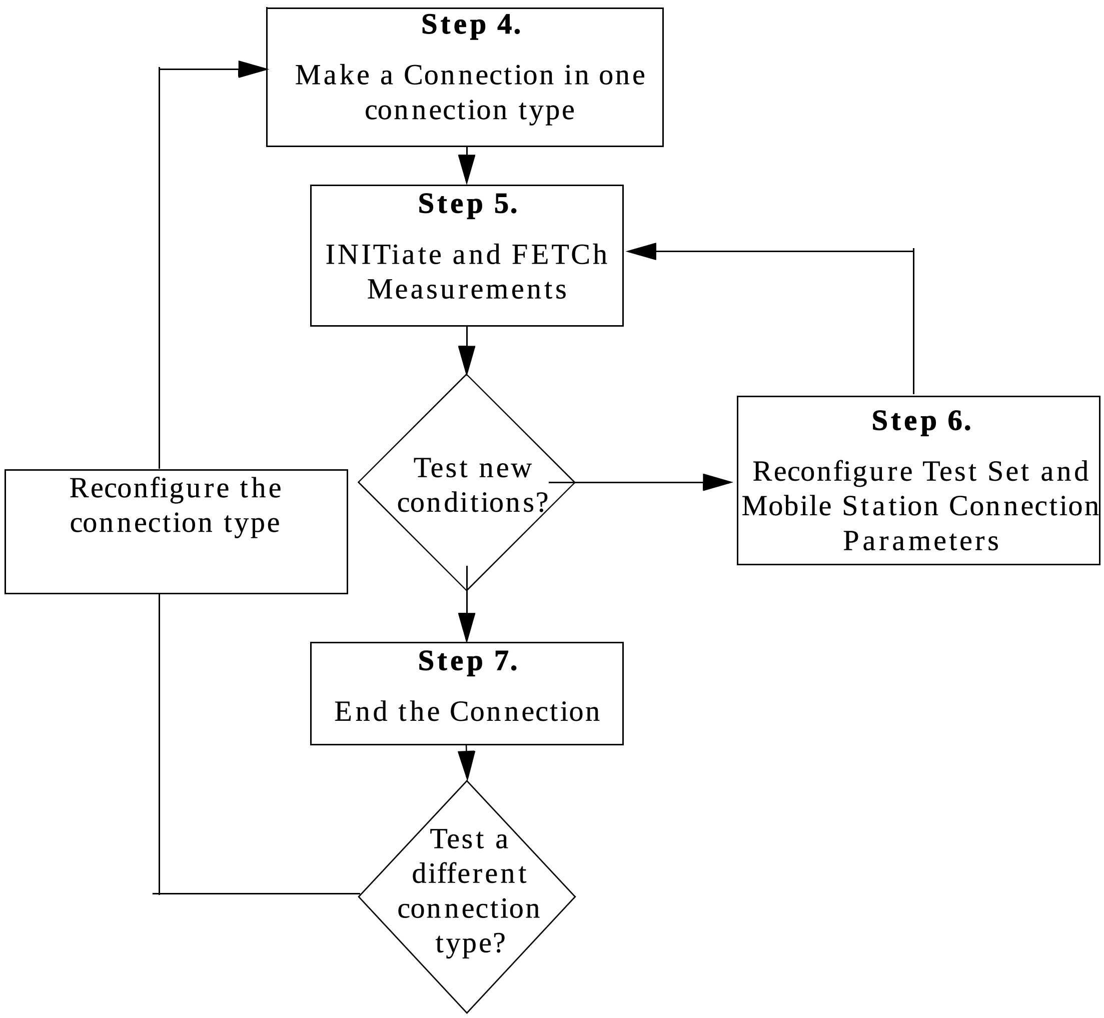
- “Step 1: Set up the Test Set” on page 272
- “Step 2: Configure Test Set and Mobile Station Parameters” on page 273

- "Step 3: Set the Measurement Parameters" on page 275
- "Step 4: Make a Connection" on page 276
- "Step 5: INITiate and FETCh Measurements" on page 279
- "Step 6: Reconfigure Test Set and Mobile Station Connection Parameters" on page 282
- "Step 7: End the Connection" on page 285

How to use the programming flowchart for testing GSM and GPRS

It is important for you to understand how to utilize the programming flowchart when designing a control program that tests both GSM and GPRS mobile station capability. In steps 1,2, and 3 of the programming flowchart, you set up the test set and configure parameters for GSM and GPRS all at once. In contrast, you implement steps 4-7 for only one connection type at a time. Figure 1. on page 269 illustrates in greater detail how to perform these steps for each format. Example code for both GSM and GPRS is contained in steps 4-7 of this guide.

Figure 1. Flowchart for performing GSM and GPRS testing



Conventions used in this Getting Started Guide

Throughout this Getting Started Guide the term “test set” refers to an Agilent Technologies 8960 Series 10 wireless communications test set with either the E1968A GSM/GPRS mobile test application or the E6701C GSM/GPRS Lab Application installed.

The variable `Test_set` used in the steps of the Getting Started Guide refers to the test set’s GPIB address.

How to use this Getting Started Guide

The most effective way to use this Getting Started Guide is with the “Programming Flowchart” on page 268 and the 8960 User Documentation. This documentation is found in two locations:

- the 8960 Family Support Site (updated frequently) on the Internet, or
- the User Documentation CD-ROM shipped with your test application.

Each step on the Programming Flowchart is illustrated with example program code in this guide. Using this Getting Started Guide, the Programming Flowchart, and the on-line information about 8960 programming, you will be able to generate a control program to perform fundamental mobile station manufacturing tests.

Useful on-line links

Go to the E1968A Product Site on either the CD-ROM or the Internet. The CD-ROM should self-launch to its home page. The URL for the website is:

www.agilent.com/find/e1968a/

Click on “Programming” to navigate to the programming information for this test application.

The following links are under the heading Getting Started on the Programming page:

- Programming: Getting Started Guide
  — This online version of this guide contains links to more detailed information about each step which may be useful as you develop your control program.
- Control Program Examples
  — These examples are for you to download. You may want to use these as templates for your own control program or to execute.
  — The control program explained in the Getting Started Guide is also available here for you to download. It is a fully functional control program.

About the Programming Examples Presented in this Guide

Programming Language:

Programming examples presented in this guide are written in the HP BASIC programming language, also known as RMB or Rocky Mountain BASIC. The use of HP BASIC is not an endorsement of the HP BASIC product.

Line Numbers

All of the programming examples in the guide with line numbers are sections from a control program example available on-line for you to download.

Code that is not part of the download control program example does not have line numbers. This code may represent an alternate method of performing the task or may illustrate a feature not used by the control program example.

Syntax used in Programming Examples:

- The programming examples use the shortened form of the command syntax to minimize GPIB bus transactions. The shortened form of a command is defined by use of capital letters in the command syntax. For the command syntax:

  ```
  RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO?
  ```

  the shortened form would be:

  ```
  RFAN:CONT:MEAS:FREQ:AUTO?
  ```

- The programming examples do not include optional nodes. Optional nodes in the command syntax are defined by enclosing the node inside the [ ] brackets. For example, the command syntax:

  ```
  CALL[:CELL]:POWer[:SAMPlitude] -80dBm
  ```

  appears in the programming examples as:

  ```
  CALL:POW -80dBm
  ```

- Programming examples make extensive use of compound commands using the ; and the ;: separators. Refer to the on-line information for the definition and use of these command separators.

Complex Commands

Complex commands are used to configure the state and assign values to parameters simultaneously. Complex commands can be used to save programming steps and minimize GPIB bus transactions.

- The syntax below turns the state of the parameter on.

  ```
  OUTPUT Test_set;"SET:DTXP:TIM:STAT ON"
  ```

- The syntax below is used to assign a value to the parameter.

  ```
  OUTPUT Test_set;"SET:DTXP:TIM:TIME 10 S"
  ```

- Both of the above actions can be accomplished with one syntax command:

  ```
  OUTPUT Test_set;"SET:DTXP:TIM:STIM 10 S"
  ```

  The command above sets the parameter state to ON and the value of the parameter to 10 seconds. Note that in this example the optional command mnemonic :STIMe has been included to clarify that this complex command was used to set both the state and the value.

- This command can be shortened further by removing the optional command mnemonic :STIMe, as shown below.

  ```
  OUTPUT Test_set;"SET:DTXP:TIM 10 S"
  ```

  This is the format that will be used throughout this guide.

Step 1: Set up the Test Set

This step explains how to:

- "Fully Preset the Test Set"
- "Turn on the GPIB Debugger"
- "Set the Amplitude Offsets"

Fully Preset the Test Set

```
290   OUTPUT Test_set;"*RST"
300   !
350   OUTPUT Test_set;"SYST:COMM:GPIB:DEB:STAT ON"
360   !
420   OUTPUT Test_set;"SYST:CORR -7,-7,-7"
430   OUTPUT Test_set;"SYST:CORR:FREQ 914 MHZ,959 MHZ,1.8 GHZ"
```

Turn on the GPIB Debugger

Set the Amplitude Offsets

Fully Preset the Test Set

To set up the test set, you begin by sending the *RST command. The *RST is used to perform a full preset of the test set, returning it to a known state. *RST also sets all measurements to single trigger.

Turn on the GPIB Debugger

Another useful tool that you may want to turn on at this time is the GPIB command debugger. While turned on, error messages appear on the test set's screen when the test set receives an unknown GPIB command. The message contains information about what type of error was caused and indicates where in the syntax the error occurred. Troubleshooting, like locating and fixing typing errors for example, becomes easier using the GPIB command debugger.

NOTE The `SYST:COMM:GPIB:DEB:STAT ON` command assists you when debugging code. This command should be taken out of your code once development is completed.

Set the Amplitude Offsets

The `SYST:CORR` and `SYST:CORR:FREQ` commands in the diagram are used to set amplitude offsets to account for loss in your fixture and cabling.

Step 2: Configure Test Set and Mobile Station Parameters

This step explains how to:

- "Configure the Broadcast Channel Parameters"
- "Configure GSM Parameters"
- "Configure GPRS Parameters"

NOTE Many of the parameters configured below are being configured to their default values. In a manufacturing environment it may be desirable to explicitly configure these parameters to ensure that the required settings have not been changed by someone setting a parameter's value through the test set's front panel. However, greater code efficiency can be achieved by not configuring them.

Configure the Broadcast Channel Parameters

The example below illustrates how to set up the broadcast channel parameters.

You must deactivate the cell, as shown in line 520 below, before setting the network parameters in line 540. If you do not deactivate the cell, the test set generates the following error:

```
GSM/GPRS operation rejected; Attempting to set <MCC|MNC|LAC|NCC|BCC|RAC> while generating a BCH.
```

```
480   ! Configure BCH parameters
490   OUTPUT Test_set;"CALL:BAND PGSM"! Set active broadcast band.
500   ! Deactivate cell to set network parameters by setting the
510   ! operating mode to Cell Off.
520   OUTPUT Test_set;"CALL:OPER:MODE OFF"!
530   ! Set BCH parameters
540   OUTPUT Test_set;"CALL:MCC 1;LAC 1;MNC 1;NCC 1;BCC 5"
550   !
560   OUTPUT Test_set;"CALL:OPER:MODE CELL"! Reactivate the cell.
570   OUTPUT Test_set;"CALL:FUNC:CONN:TYPE AUTO"! Set connection type
580   OUTPUT Test_set;"CALL:BCH 32"
590   OUTPUT Test_set;"CALL:POW -70"! Set cell power to -70 dBm and
600                                  ! cell power state to ON with
610                                  ! a complex command.
```

Configure GSM Parameters

The following example illustrates setting GSM traffic channel parameters. Refer to "Configuring the Traffic Channel (TCH)" on page 198 and "Configuring Mobile Station Operating Parameters" on page 202 for other traffic channel and mobile station operating parameters you can configure.

```
630   ! Configure GSM parameters
640   OUTPUT Test_set;"CALL:TCH 5;:CALL:MS:TXL 0;TADV 0"
```

Configure GPRS Parameters

In the next example, several packet data traffic channel parameters are specified. Note that the PDTCH ARFCN is set to 45. This is on a different ARFCN than the broadcast channel (20 is the default broadcast channel ARFCN for PGSM), allowing the use of the power reduction levels specified and assigned to the downlink bursts.

```
670   OUTPUT Test_set;”CALL:PDTCH:BAND PGSM”! Set broadcast band
680   OUTPUT Test_set;”CALL:PDTCH 45”! Set packet data traffic channel
690   !
700   !  The following commands are helpful in enabling the test set to
710   !  establish a data connection with mobiles which cannot establish
720   !  a BLER data connection under default conditions.
730   !
740   !  Set the test set to send an invalid FCS to the mobile
750   OUTPUT Test_set;”CALL:FUNC:DATA:BLER:LLC:FCS CORR”!
760   !  Set the block polling interval used during BLER connection
770   OUTPUT Test_set;”CALL:FUNC:DATA:BLER:POLL:INT 4”
780!  Set the type of frame numbering scheme used during attach.
790   OUTPUT Test_set;”CALL:FUNC:DATA:FRAM:STAR ABS”
800   !
810   ! Set Multi-slot Configuration to two downlinks and one uplink.
820   OUTPUT Test_set;”CALL:PDTCH:MSL:CONF D2U1”
830   OUTPUT Test_set;”CALL:PDTCH:CSCH CS4”! Set Coding Scheme to CS4
840   !
850   ! Assign values to the power reduction levels
860   OUTPUT Test_set;”CALL:PDTCH:PZER:LEV 25” ! Assign a value to P0
870   OUTPUT Test_set;”CALL:PDTCH:PRED:LEV1 5”! Set PRL1 to 5 dB
880   OUTPUT Test_set;”CALL:PDTCH:PRED:LEV2 11” ! Set PRL2 to 11 dB
890   !
900   ! Assign power levels to the downlink bursts
910   ! Assign Burst 1 a PRL of 5 dB
920   OUTPUT Test_set;”CALL:PDTCH:PRED:BURS1 PRL1”
930   ! Assign Burst 2 a PRL of 11 dB
940   OUTPUT Test_set;”CALL:PDTCH:PRED:BURS2 PRL2”
950   !
960   ! Assign a power level to the uplink burst
970   OUTPUT Test_set;”CALL:PDTCH:MS:TXL:BURS 5”

990   ! Configure the test set to use the Packet Timeslot Reconfigure
1000  !  message for GPRS handovers instead of the Packet Power Timing
1010  !  Advance message.
1020  OUTPUT Test_set;”CALL:PDTCH:PMES:PPT OFF”
1030  OUTPUT Test_set;”CALL:PDTCH:PMES:PTR ON”
```

Step 3: Set the Measurement Parameters

This step gives an example of how you can configure measurement parameters. For more information about measurement parameters, refer to "Step 3: Set Measurement Parameters" on page 294.

```
1080  ! Configure ORFS Measurement for both GSM and GPRS:
1090  !
1100  OUTPUT Test_set;"SET:ORFS:TIM 20"! Set timeout time.
1110  ! Put switching and modulation offsets to be tested into string
1120  ! variables.  Swit$ contains switching offsets.  Mod$ contains
1130  ! modulation offsets.
1140  Swit$=".4MHZ,-.4MHZ,.6MHZ,-.6MHZ,1.2MHZ,-1.2MHZ,1.8MHZ,-1.8MHZ"
1150  Mod$=".4MHZ,-.4MHZ,.6MHZ,-.6MHZ,1.2MHZ,-1.2MHZ,1.8MHZ,-1.8MHZ"
1160  OUTPUT Test_set;"SET:ORFS:SWIT:COUN 20"
1170  OUTPUT Test_set;"SET:ORFS:SWIT:FREQ "&Swit$
1180  OUTPUT Test_set;"SET:ORFS:MOD:COUN 10;FREQ "&Mod$
1190  OUTPUT Test_set;"SET:ORFS:MOD:FREQ "&Mod$
1200  !
1210  ! Configure Power vs. Time Measurement for GSM and GPRS:
1220  !
1230  OUTPUT Test_set;"SET:PVT:TIM 10;COUN 5"
1240  Pvt$="-28us,-10us,321.2us,552.8us,570.8us"
1250  OUTPUT Test_set;"SET:PVT:TIME "&Pvt$
1260  !
1270  ! Configure Phase & Frequency Error Measurement for GSM and GPRS:
1280  !
1290  OUTPUT Test_set;"SET:PFER:COUN 10;TIM 5"
1300  OUTPUT Test_set;"SET:PFER:SYNC MID"
1310  !
1320  ! Configure Block Error Rate Measurement for GPRS
1330  OUTPUT Test_set;"SET:BLER:TIM 200;COUN 2000"
```

Step 4: Make a Connection

This control program example is written to test a mobile station with both GSM and GPRS capability. The GSM capability of the mobile station is tested first, then the voice call is ended in "Step 7: End the Connection" on page 285. The test set is then reconfigured and a GPRS data connection is established. See the following for code examples:

- "GSM Call Connection" on page 276
- "GPRS Data Connection" on page 277

GSM Call Connection

There are two possible ways to make a GSM call connection with the mobile station.

- "Originating a Call from the Test Set"
- "Originating a Call from the Mobile Station"

Originating a Call from the Test Set

The code below illustrates how to make a connection by originating a call from the test set.

Synchronization for a test set origination is very similar to that for a mobile station originated call. However, as a programming convenience the test set automatically arms the state change detector with a fixed timeout value of 60 seconds for test set initiated events. Therefore, there is no need for you to specify a timeout value or arm the change detector when originating a call from the test set.

```
1430  OUTPUT Test_set;"CALL:PAG:IMSI '001012345678901'"
1440  OUTPUT Test_set;"CALL:PAG:REP OFF"! Set the paging repeat state.
1570  !
1580  Tries=1
1590  LOOP
1600    OUTPUT Test_set;"CALL:ORIG"   ! Originate a call.
1610    OUTPUT Test_set;"CALL:CONN:STAT?"! CALL:CONN hanging query.
1620    ENTER Test_set;Call_connected
1630  ! Program will hang here until origination process completes.  If
1640  ! successful and the call is connected the query will return a 1.
1650  ! If unsuccessful and the call is not connected, the query
1660  ! returns 0.
1670  !
1680  EXIT IF Call_connected
1690    OUTPUT Test_set;"CALL:END"
1700    IF Tries=50 THEN
1710      BEEP
1720      DISP ""
1730      PRINT "Call did not connect after";Tries;"."
1740      PRINT "Program terminated."
1750      STOP
1760    END IF
1770    DISP "Call has not connected after";Tries;"attempts."
1780    Tries=Tries+1
1790  END LOOP
```

Originating a Call from the Mobile Station

The code below illustrates how to make a connection by originating a call with the mobile station. This code is not included in the control program available on-line for you to download. That example originates the connection from the test set.

Synchronization between the control program and the test set is maintained by querying the test set for the state of the connection between it and the mobile station. When a Mobile Station origination occurs, the CALL:CONN? hanging query is used. It will return a “1” when the call is connected and a “0” otherwise. A state change detector is also armed to ensure the query does not stop hanging before the state transition from “IDLE” to “CONNected” is able to begin. Finally, to prevent the query from hanging indefinitely, which could occur if the mobile station is not turned on, badly broken, or no one pushes the “send” button on the mobile, a timeout is set for this query. In this example, 15 seconds is the value assigned to the timeout. After 15 seconds, the change detector is disarmed and the query returns either a “1” or “0”. For more information about call synchronization, refer to the Internet.

```
OUTPUT Test_set;”CALL:CONN:TIM 15”   ! Set timeout time to 15 seconds
OUTPUT Test_set;”CALL:CONN:ARM”      ! Arm the change detector
OUTPUT Test_set;”CALL:CONN:STAT?”    ! Initiate call connect state query
DISP “Originate call from mobile station.”
ENTER Test_set;Call_connected        ! Program will hang here until
                                     ! origination passes or fails
IF NOT Call_connected THEN           ! Check if connection successful
  OUTPUT Test_set;”CALL:END”
  PRINT “Origination failed.  Program terminated.”
  STOP
END IF
```

GPRS Data Connection

The code example below illustrates the steps necessary to establish a GPRS data connection. In this example, the test set is configured to use the BLER connection type for testing. Refer to “Connection Types” on page 189 for information about the different connection types that can be used.

Before establishing the data connection, it is necessary to confirm that the mobile station is GPRS attached. A GPRS attache must be initiated by the mobile station. In this control program, the mobile station should return to the attached state after the GSM voice call ends. In this example, the CALL:STAT:DATA? query is used to confirm the state. This query returns the current connection state. If the state is “ATT” the mobile station is attached to the test set and a data connection can be started.

The CALL:FUNC:DATA:STAR command on line 2590 is used to start the data connection. The CALL:FUNC:DATA:STAR command is a overlapped command, meaning the test set accepts other commands before completely processing this command. Because this is an overlapped command, synchronization is maintained by using the CALL:TRAN? hanging query. It allows the test set to initiate the data connection and then returns a “1” if the data connection starts successfully and a “0” if the state of the connection returns to either “IDLE” or “ATTached”. Because the test set originated the data connection, it is not necessary to assign a timeout value or arm the change detector for this query. Instead, there is a default timer associated with this query and the change detector is armed automatically

```
2430  ! The BLER connection type will be used for GPRS testing.
2440  !
2450  OUTPUT Test_set;”CALL:FUNC:CONN:TYPE BLER”
2460  !
```

```
2470  ! The MS should still be GPRS attached.
2480  ! The following code will query the test set for the connection
2490  ! status and then stop the program if the MS is not attached
2500  !
2510  OUTPUT Test_set;”CALL:STAT:DATA?”
2520  ENTER Test_set;Data_state$
2530  IF Data_state$<>”ATT” THEN
2540    PRINT “NO LONGER GPRS ATTACHED.  PROGRAM TERINATED.”
2550    STOP
2560  END IF
2570  PRINT “ATTACHED SUCCESSFULLY”
2580  !  Start the data connection
2590  OUTPUT Test_set;”CALL:FUNC:DATA:STAR”
2600  !  Verify that the data connection started.  If not, end the
2610  !   program.
2620  OUTPUT Test_set;”CALL:TRAN?”
2630  ENTER Test_set;Tran_state
2640  IF NOT Tran_state THEN
2650    BEEP
2660    DISP ““
2670    PRINT “Data connection failed.  Program terminated.”
2680    STOP
2690  END IF
```

Step 5: INITiate and FETCh Measurements

This step explains how to:

- “INITiate a set of measurements”
- “FETCh measurement results using a subroutine”

INITiate a set of measurements

The example below illustrates how to start three measurements running concurrently.

```
1860  ! Start a set of concurrent measurements:
1870  !
1880  OUTPUT Test_set;”INIT:PVT;PFER;ORFS”
```

FETCh measurement results using a subroutine

In a typical control program, measurements are repeated on various frequencies and power levels. Therefore, it is desirable to have a subroutine capable of fetching multiple measurement results. The example code below demonstrates how you might create a subroutine for fetching the measurement results. Refer to “Step 5: INITiate and FETCh Measurements” on page 305 for more information about the different measurement results that are available and how to fetch them.

```
3630  SUB Global_fetch
3640    OPTION BASE 1
3650    COM /Address/Test_set
3660    REAL Pvt(5)
3670  !
3680  !  Determine if a measurement is done:
3690  !
3700      LOOP
3710        OUTPUT Test_set;”INIT:DONE?”
3720        ENTER Test_set;Meas_done$
3730  !
3740  ! Obtain measurement results: Each measurement illustrates a
3750  ! different way of reading in results. There is no one right way.
3760  ! The method used is application dependent. Note that the examples
3770  ! do not show all possible ways.
3780  !
3790        SELECT Meas_done$
3800  !
3810        CASE “PVT”
3820          OUTPUT Test_set;”FETC:PVT?”
3830          ENTER Test_set;Integrity,Mask,Txp,Pvt1,Pvt2,Pvt3,Pvt4,Pvt5
3840          IF (Integrity=0) THEN
3850              Print_pvt(Mask,Txp,Pvt1,Pvt2,Pvt3,Pvt4,Pvt5)
3860          ELSE
3870            GOSUB Bad_measurement
3880          END IF
3890  !
3900        CASE “PFER”! Phase & Frequency Error measurement done.
```

```
3910          OUTPUT Test_set;”FETC:PFER?”
3920          ENTER Test_set;Integrity,Rms_ph_er,Peak_ph_er,Worst_frq_er
3930          IF (Integrity=0) THEN
3940            PRINT “RMS Phase Error: “;Rms_ph_er;” deg”
3950            PRINT “Peak Phase Error: “;Peak_ph_er;” deg”
3960            PRINT “Worst Freq Error: “;Worst_frq_er;” Hz”
3970          ELSE
3980            GOSUB Bad_measurement
3990          END IF
4000  !
4010        CASE “ORFS”! ORFS measurement done.
4020  !
4030  ! This code illustrates a more ‘generic’ approach to reading
4040  ! measurement results. By using the capabilities designed into
4050  ! high-level measurements, routines that access measurement
4060  ! results do not have to explicitly know what the measurement
4070  ! execution conditions were.  That information can be determined
4080  ! at the time the measurement results are queried.
4090  !
4100          OUTPUT Test_set;”FETC:ORFS:INT?”! Check integrity.
4110          ENTER Test_set;Integrity
4120          IF (Integrity=0) THEN
4130  ! Get the number of offsets tested.
4140            OUTPUT Test_set;”SET:ORFS:SWIT:FREQ:POIN?”
4150            ENTER Test_set;Points
4160            IF Points THEN ! Only query if one or more offsets tested.
4170              ALLOCATE Swit_res(Points),Swit_offs(Points)
4180  ! Get measurement offsets.
4190              OUTPUT Test_set;”SET:ORFS:SWIT:FREQ?”
4200              ENTER Test_set;Swit_offs(*)
4210  ! Get results
4220              OUTPUT Test_set;”FETC:ORFS:POW?”
4230              ENTER Test_set;Tx_power
4240              OUTPUT Test_set;”FETC:ORFS:SWIT:MAX?”
4250              ENTER Test_set;Swit_res(*)
4260              PRINT USING “19X,””TX Power =””,M2D.2D,”” dBm”””;Tx_power
4270              PRINT “     Offset(kHz)          Level(dBm)”
4280              PRINT “     -----------          ----------”
4290 Orfs_image:  IMAGE 6X,M4D.2D,12X,M4D.2D
4300              FOR J=1 TO Points
4310                PRINT USING Orfs_image;(Swit_offs(J)/1.E+3),Swit_res(J)
4320              NEXT J
4330              DEALLOCATE Swit_res(*),Swit_offs(*)
4340            END IF
4350  ! Get the number of offsets tested.
4360              OUTPUT Test_set;”SET:ORFS:MOD:FREQ:POIN?”
4370              ENTER Test_set;Points
4380              IF Points THEN ! Only query if one or more offsets tested.
4390                ALLOCATE Mod_res(Points),Mod_offs(Points)
4400  ! Get measurement offsets
4410                OUTPUT Test_set;”SET:ORFS:MOD:FREQ?”
4420                ENTER Test_set;Mod_offs(*)
4430  ! Get results
```

```
4440              OUTPUT Test_set;”FETC:ORFS:POW?;MOD?”
4450              ENTER Test_set;Tx_power,Pwr_30khz,Mod_res(*)
4460              PRINT “ORFS Mod Results: TCH=”;Tch;”and TXL=”;Ms_pwr_lvl
4470              PRINT “30 KHz BW Power =”;Pwr_30khz;” dBm”
4480              PRINT “    Offset(kHz)          Level(dB)”
4490              PRINT “    -----------          ---------”
4500              FOR J=1 TO Points
4510                PRINT USING Orfs_image;(Mod_offs(J)/1.E+3),Mod_res(J)
4520              NEXT J
4530              DEALLOCATE Mod_res(*),Mod_offs(*)
4540            END IF
4550        ELSE
4560          GOSUB Bad_measurement
4570        END IF
4580      END SELECT
4590    EXIT IF Meas_done$=”NONE”
4600    END LOOP ! If ‘WAIT’ is returned from ‘INIT:DONE?’ query, it
4610             ! just falls through the loop.
4620    SUBEXIT
```

Step 6: Reconfigure Test Set and Mobile Station Connection Parameters

You can reconfigure both GSM voice connections and GPRS data connections.

- "Reconfiguring the GSM Voice Connection" on page 282
- "Reconfiguring the GPRS Data Connection" on page 283

Reconfiguring the GSM Voice Connection

There are several ways you may want to reconfigure the connection parameters. Some examples are:

- "Reconfigure the Mobile Station Parameters" on page 282
- "Reconfigure the GSM Connection to a New ARFCN in a Different Band" on page 282

Reconfigure the Mobile Station Parameters

The example below illustrates how to change the mobile station's transmit level. The test set does not accept any other commands until this command has completed. This is important because the mobile station must have received the command to go to a new power level before transmitter measurements can be made accurately.

```
OUTPUT 714;"CALL:MS:TXL 12"
```

Reconfigure the GSM Connection to a New ARFCN in a Different Band

When reconfiguring the connection to a new ARFCN, you may also want to change other parameters at the same time. In this case, using deferred parameter commands would create the most efficient code. The code below shows how to set a new mobile station TX level, ARFCN, and band with deferred parameter commands, and then use the `CALL:HAND` command to apply the new parameters. The order in which these are set is not important. The code also shows you how to use the `CALL:STAT:STAT?` synchronization command to make sure the connection was maintained. The `CALL:STAT:STAT?` query returns the current state of the connection. In this case, "CONN" should be returned, indicating the connection is still in the transferring state and the handover was successful.

```
2010  OUTPUT Test_set;"CALL:SET:TCH:BAND DCS"
2020  OUTPUT Test_set;"CALL:SET:TCH 600"
2030  OUTPUT Test_set;"CALL:SET:TCH:MS:TXL 5"
2040  OUTPUT Test_set;"CALL:HAND"
2050  !
2060  OUTPUT Test_set;"CALL:STAT:STAT?"! Verify that the call is still
2070  ENTER Test_set;Call_status$      ! in the connected state after
2080                                   ! the handover.
2090  IF Call_status$<>"CONN" THEN
2100    PRINT "Call handover failed."
2110    PRINT "Program terminated."
2120    STOP
2130  END IF
```

Reconfiguring the GPRS Data Connection

There are several ways you may want to reconfigure the connection parameters. Some examples are:

- "Reconfigure GPRS Uplink Burst Parameters" on page 283
- "Reconfigure the connection to a new PDTCH ARFCN" on page 283
- "Reconfigure the connection to a new PDTCH ARFCN in a different band" on page 284

Reconfigure GPRS Uplink Burst Parameters

The example below illustrates how to change the transmit levels of the uplink bursts. The test set does not accept any other commands until these commands have completed. This is important because the mobile station must have received the command to go to new power levels before transmitter measurements can be made accurately.

```
OUTPUT 714;"CALL:PDTCH:MS:TXL:BURS 12"
OUTPUT 714;"CALL:PDTCH:MS:TXL:BURS2 10"
```

Reconfigure the connection to a new PDTCH ARFCN

When reconfiguring the connection to a new packet data traffic channel ARFCN, you may also want to change other parameters at the same time. In this case, using deferred parameter commands would create the most efficient code. The code below shows how to set a new mobile station TX level, PDTCH ARFCN, and coding scheme with deferred parameter commands, and then use the `CALL:HAND` command to apply the new parameters. The code also shows you how to use the `CALL:STAT:DATA?` synchronization command to make sure the connection was maintained. The `CALL:STAT:DATA?` query returns the current state of the connection. In this case, "TRAN" should be returned, indicating the connection is still in the transferring state and the handover was successful. This query can be used because the `CALL:HAND` command is sequential, meaning its operation completes before the test set accepts a new command.

```
OUTPUT Test_set;"CALL:SET:PDTCH:MS:TXL:BURS 5"
OUTPUT Test_set;"CALL:SET:PDTCH 120"
OUTPUT Test_set;"CALL:SET:PDTCH:CSCH CS2"
OUTPUT Test_set;"CALL:HAND"
! Use a call synchronization command to ensure the
! reconfiguration succeeded.
OUTPUT Test_set;"CALL:STAT:DATA?"
ENTER Test_set;Conn_status$
IF Conn_status$<>"TRAN" THEN
   PRINT "Data connection failed to reconfigure properly."
   PRINT "Program terminated."
   STOP
END IF
```

Reconfigure the connection to a new PDTCH ARFCN in a different band

Configuring the connection to a new band is exactly the same as configuing the connection to a new PDTCH. In the following example, we use deferred commands to reconfigure the mobile station transmit levels for both bursts and specify a new band and channel number. Again, the `CALL:HAND` command is used to indicate these new parameters should be sent to the mobile station.

```
2870  OUTPUT Test_set;”CALL:SET:PDTCH:MS:TXL:DCS:BURS 15”
2880  OUTPUT Test_set;”CALL:SET:PDTCH:MS:TXL:DCS:BURS2 15”
2890  OUTPUT Test_set;”CALL:SET:PDTCH:BAND DCS”
2900  OUTPUT Test_set;”CALL:SET:PDTCH 665”
2910  OUTPUT Test_set;”CALL:HAND”
2920  ! Use a call syncrhonization command to ensure the
2930  ! reconfiguration succeeded.
2940  OUTPUT Test_set;”CALL:STAT:DATA?”
2950  ENTER Test_set;Conn_status$
2960  IF Conn_status$<>”TRAN” THEN
2970    PRINT “Data connection failed to reconfigure properly.”
2980    PRINT “Program terminated.”
2990    STOP
3000  END IF
```

Step 7: End the Connection

This control program example is written to test a mobile station with both GSM and GPRS capability. The GSM capability of the mobile station is tested first, then the voice call is ended before a data connection is established. After GPRS testing, the GPRS data connection must be stopped. See the following for code examples:

- "Ending a GSM Call Connection" on page 285
- "Ending a GPRS Data Connection" on page 286

Ending a GSM Call Connection

You can end the connection in one of two ways:

- "Ending the Connection from the Test Set"
- "Ending the Connection from the Mobile Station"

Ending the Connection from the Test Set

When you are ending the connection from the test set use the CALL:END command. The example below illustrates how you use the CALL:CONN:STAT? query for call synchronization. This query returns a "0" if the call ended successfully and a "1" if the call is not ended. It is not necessary for you to arm the change detector or set a change detector timeout when using the test set to terminate a call. The test set automatically arms the change detector and uses a default timeout in this situation.

```
2280  !  End the GSM call so a GPRS connection can be established.
2290  !
2300  OUTPUT Test_set;"CALL:END"
2310  OUTPUT Test_set;"CALL:CONN:STAT?"
2320  ENTER Test_set;Call_connected
2330  IF Call_connected THEN
2340    BEEP
2350    PRINT "Unable to complete BS termination. Program terminated."
2360    STOP
2370  END IF
```

Ending the Connection from the Mobile Station

When the connection is being ended from the mobile station, it is important to set a timeout value and arm the change detector. More information about using these commands to achieve call synchronization is available in "Step 7: End Connection" on page 312.

This code is not included in the control program available on-line for you to download. In that example, the connection is ended from the test set.

```
OUTPUT Test_set;"CALL:CONN:TIM 5" !Set timeout time to 5 seconds.
OUTPUT Test_set;"CALL:CONN:ARM"   !Arm the change detector.
OUTPUT Test_set;"CALL:CONN:STAT?" !Initiate call connect state query.
DISP "Terminate the call from the mobile station."
ENTER Test_set;Call_connected     !Program will hang here until state
                                  !change or timer expires.
IF Call_connected THEN            !Check if disconnect successful.
  OUTPUT Test_set;"CALL:END"
  PRINT "Call failed to end correctly.  Program terminated."
  STOP
END IF
```

Ending a GPRS Data Connection

Stopping the data connection

The CALL:FUNC:DATA:STOP command ends the data connection. Use the CALL:STAT:DATA? query to ensure the data connection has ended and the connection is in the "ATTached" state.

```
3160  OUTPUT Test_set;"CALL:FUNC:DATA:STOP"
3170  OUTPUT Test_set;"CALL:STAT:DATA?"
3180  ENTER Test_set;Conn_status$
3190  IF Conn_status$<>"ATT" THEN
3200    PRINT "Unable to terminate data connection correctly."
3210    PRINT "PROGRAM TERMINATED."
3220    STOP
3230  END IF
```

Initiating a GPRS Detach

The test set does not require you to perform a GPRS detach. No errors are generated if a GPRS detach is not performed. Therefore, you may choose to remove the tested phone after the data connection has ended.

There are two ways to initiate a GPRS Detach.

- "Initiating the GPRS Detach from the Test Set"
- "Mobile Station initiated GPRS Detach"

Initiating the GPRS Detach from the Test Set The example below illustrates initiating a GPRS Detach from the Test Set.

```
3280  ! Initiate a GPRS detach from the test set.
3290  OUTPUT Test_set;”CALL:FUNC:DATA:DET”
3300  !
3310  Start_time=TIMEDATE
3320  LOOP
3330    OUTPUT Test_set;”CALL:DCON:ARM”
3340    OUTPUT Test_set;”CALL:ATT?”
3350    ENTER Test_set;Att_state
3360  EXIT IF NOT Att_state
3370    Current_time=TIMEDATE-Start_time
3380    IF Current_time>=Timer THEN
3390      DISP ““
3400      PRINT “GPRS detach did not occur.  Program terminated”
3410      STOP
3420    END IF
3430    IF Conn_state$=”DET” THEN
3440      DISP “GPRS detach is in process.”
3450    END IF
3460  END LOOP
```

Mobile Station initiated GPRS Detach The example below illustrates initiating a GPRS Detach from the mobile station.

```
DISP “Initiate a GPRS Detach”
Start_time=TIMEDATE
LOOP
  OUTPUT Test_set;”CALL:STAT:DATA?”
  ENTER Test_set;Conn_state$
 EXIT IF Conn_state$=”IDLE”
  Current_time=TIMEDATE-Start_time
  IF Current_time>=Timer THEN
    DISP ““
    PRINT “GPRS detach did not occur.  Program terminated”
    STOP
  END IF
  IF Conn_state$=”DET” THEN
    DISP “GPRS detach is in process.”
  END IF
END LOOP
```

Step 1: Set Up the Test Set

The following information provides additional details on Step 1 of the Programming Flowchart. This information is applicable to all test applications.

Description

In this step you initialize the test set and set up the general operating conditions.

Contents

Initialize the Test Set

- Fully Preset the Test Set

  It is important to get the test set to a known state before each production session.

  Sending the *RST command fully presets the test set, which ends all call processing and measurement processes and restores all values to defaults.

- Clear the Error Queue

  Before each production session, it is useful to clear the error queue of any old messages. That way, you know that any messages logged are relevant to the current production session.

  Sending the *CLS command clears the error queue.

Set Up General Operating Conditions

- Turn Debugger On

  While developing your code, it is very useful to enable the GPIB debugger using the SYST:COMM:GPIB:DEB ON command. When the debugger is on, the test set alerts you when you send an incorrect command, and it also tells you which symbol or letter in the command is incorrect.

NOTE You should turn the debugger off once you have finished development and your code is stable.

- Set Operating Mode

  The test set contains a base station emulator (BSE), whose primary purpose is to provide enough call processing to allow parametric measurements of a mobile station's RF signal.

  An important characteristic of the test set's base station emulator is its operating mode. The operating mode sets the way in which the base station emulator interacts with the mobile station.

  Active cell mode is used when emulating a normal cell. Active cell mode allows active signaling between the mobile station and BSE. The mobile station camps to the BSE signal, and an actual call is established.

  In test mode, the mobile station synchronizes to the BSE signal and transmits an appropriate signal which the test set analyzes.

The test set's operating mode is set using the following command:

Command to Set the Test Set's Operating Mode

Command	Example
CALL:OPER:MODE <operating mode>	CALL:OPER:MODE CALL

- Set Amplitude Offsets

  To achieve accurate measurement results, it is important to account for losses in the cabling and fixturing between the mobile station and test set. You must determine what the losses are for your test setup and then specify the appropriate frequency-dependent amplitude offset values.

  You can specify amplitude offsets for up to 20 frequencies using the following commands:

Commands to Set Amplitude Offsets

Command	Example
SYST:CORR:FREQ <freq1>, <freq2>, <freq3>	SYST:CORR:FREQ 800MHz, 1800MHz, 1900MHz
SYST:CORR[:SGAin] <offset1>, <offset2>, <offset3>	SYST:CORR -0.7, -1.0, -1.2

- Set Display Mode

  To achieve a slightly faster test execution speed, you can disable the front panel display on the test set using the DISP:MODE FAST command.

Step 2: Configure Test Set and Mobile Station Parameters

The following information provides additional details on Step 2 of the Programming Flowchart. This information is applicable to all test applications.

Description

In this step you configure the parameters that allow a connection to be made between the test set and mobile station. This mainly involves setting up channels and power levels.

Contents

Set Up Channels

Setting up channels involves specifying the channel associated with every band and channel type (for example, analog or digital), and then setting the active band and channel type.

- Specify Channel Numbers

  All of the test set's test applications can test in more than one frequency band (for example, US Cellular, US PCS, or Korean PCS). To produce the most efficient code, you should configure the channel information for each band in advance. Then, to move to a new band during testing, you only need to send the command to change bands. You do not need to also specify the channel of the new band. This reduces test time.

  To set up the channel number for the various bands, use one of the following commands (depending upon which test application you are using):

Commands to Set the Channel for a Band

Command	Example
CALL:<channel mnemonic>:<band mnemonic> <num value>	CALL:TCH:EGSM 124
CALL:SET:<channel type mnemonic>:<band mnemonic> <num value>	CALL:SET:DTC:PCS 777
CALL:CHAN:<channel type mnemonic>:<band mnemonic> <num value>	CALL:CHAN:DIG2000:KPCS 384

This practice also applies to test applications which test both analog and digital channel types. In this case you should specify the channel for the analog and digital channel types in advance. Then, switching between them requires only one command to initiate the change, and not an additional change to specify the channel of the new channel type.

If you specify channels in advance as described, the only time you need to specify a channel during testing is if you move to a new channel within the same band and channel type.

- Set Active Band and Mode

  Once you have specified the channel information for each band and channel type, you must set the active band using one of the following commands (depending upon which test application you are using):

Commands to Set the Active Band

Command	Example
CALL:<channel mnemonic>:BAND <band mnemonic>	CALL:TCH:BAND EGSM
CALL:SET:<channel type mnemonic>:BAND <band mnemonic>	CALL:SET:DTC:BAND PCS
CALL:BAND:<channel mnemonic> <band mnemonic>	CALL:BAND:DIG2000 KPCS

If the test application you are using supports testing of both analog and digital channel types, then you must also set the channel type using the following command:

Command to Set the Active Channel Type

Command	Example
CALL:<channel mnemonic>:TYPE <channel type mnemonic>	CALL:TCH:TYPE DTC

- Active Cell and Test Mode Considerations

  The function of the CALL commands differ depending upon whether you are in active cell or test mode.

  In active cell mode, when you use the CALL commands to set the channel numbers, the test set’s output frequency and receiver frequency are set. A message is also sent to the mobile station to set its frequency.

  However, in test mode, since the BSE does not send call processing information to the mobile station, the CALL commands only configure the test set’s output frequency and receiver frequency. You need to also send the appropriate test mode commands to the mobile station to set it to the correct frequency.

  In test mode, instead of using the CALL commands to configure the test set’s frequencies, you may prefer to manually control the RF generator and RF analyzer using the CALL:RFG and RFAN commands, respectively. In either case, you must still send the appropriate test mode commands to the mobile station to move it to the proper frequency.

Step 2: Configure Test Set and Mobile Station Parameters

Set Cell Power

To set the output power of the test set, use the following command:

Command to Set Cell Power

Command	Example
CALL:POW <num value>	CALL:POW -75

- Active Cell and Test Mode Considerations

  You can use the CALL:POW command to set the cell power in both active cell and test mode. However, in test mode you may prefer to manually control the output power of the test set using the CALL:RFG commands.

Set Mobile Station Transmit Power

In active cell mode, use one of the following commands to set the mobile station transmit power level (depending upon which test application you are using):

Commands to Set Mobile Station Transmit Power

Command	Example
CALL:MS:TXL:<band mnemonic> <num value>	CALL:MS:TXL:DCS <num value>
CALL:SET:MS:<channel type mnemonic>:TXL:<band mnemonic> <num value>	CALL:SET:MS:DIG:TXL:PCS <num value>
CALL:<channel mnemonic>:MS:TXL:<band mnemonic>:BURS <num value>	CALL:PDTCH:MS:TXL:DCS:BURS <num value>

In addition to setting the mobile station transmit level, these commands also automatically configure the test set's receiver at the expected input level, whether in active cell or test mode. However, in test mode, you must also send the appropriate test mode commands to the mobile station to command it to output at the correct level. This is due to the fact that the BSE is not transmitting call processing commands to the mobile station.

- Manually Setting Expected Power

  Sending the CALL commands in Table , "Commands to Set Mobile Station Transmit Power," automatically sets the expected input level of the test set's receiver. However, there is another option for setting the receiver's input level in both active cell and test mode. It is often beneficial to manually set the expected input power level using the RFAN commands, rather than using the CALL commands.

  When you set the expected power manually, you tell the test set exactly what power level to expect. Whereas the CALL commands simply tell the test set the range of input level to expect, based on the definition of the mobile station power level (for example, an AMPS/136 mobile station transmitting at power level 3 has an output level in the range of +20 dBm to +26 dBm).

Set Up Additional Connection Parameters

Depending upon the test application you are using, there may be other connection parameters to specify, such as timeslot, timing advance, vocoder, or data rates and types.

In active cell mode, you may also choose to set up network parameters, such as base station identifier numbers (for example, SID) and color codes.

All of these parameters are configured using the CALL subsystem.

Step 3: Set Measurement Parameters

The following information provides additional details on Step 3 of the Programming Flowchart. This information is applicable to all test applications.

Description

In this step you set up the conditions under which the measurements operate. You do this by configuring measurement parameters.

Contents

Measurement Parameters Overview

There are two different types of measurement parameters:

- Generic Measurement Parameters
- Measurement-Specific Measurement Parameters

The SETup subsystem is used to configure measurement parameters. Each individual measurement parameter can be set and queried using the associated SETup subsystem command. The general hierarchy of the SETup subsystem command structure is as follows:

```
SETup:<measurement mnemonic>:<measurement parameter> <parameter setting/value>
```

NOTE Not all measurements use all measurement parameters. Refer to the GPIB syntax listing for the detailed list of measurement parameters for individual measurements.

Generic Measurement Parameters

There are three types of generic measurement parameters:

- Measurement Count (used by most measurements)
  Measurement Count State
  Measurement Count Number
- Measurement Timeout (used by all measurements)
  Measurement Timeout State
  Measurement Timeout Time

- Measurement Trigger (used by most measurements)
  Trigger Arm (used by all measurements)
  Trigger Source (not applicable to analog measurements)
  Trigger Delay (not applicable to analog measurements)

Measurement Count Parameters

The measurement count parameters control measurement averaging. The STATe command turns averaging on or off, and the NUMBer command determines the number of averages. The SNUMber command is a complex command which allows you to turn averaging on and set the number of averages in one command.

Statistical Measurement Results Parameters

Parameter	Command Syntax
Measurement Count State	`SETup:<meas-mnemonic>:COUNt:STATe <ON|1|OFF|0>`
Measurement Count Number	`SETup:<meas-mnemonic>:COUNt:NUMBer <numeric value>`
Measurement Count Number and State	`SETup:<meas-mnemonic>:COUNt[:SNUMber] <numeric value>`

Example 9. Programming Example:

```
OUTPUT Test_set;”SET:DTXP:COUN 10”
```

sets the multi-measurement count state to ON and set the number of averages to 10 for the digital transmit power measurement.

Measurement Timeout Parameters Measurement timeout parameters control the maximum time that a measurement executes. TIMe sets the amount of time and STATe determines if the timeout is in use. The STIMe command is a complex command which enables you to set both parameters in one command.

Measurement Timeout Parameters

Parameters	Command Syntax
Measurement Timeout Time and State	`SETup:<meas-mnemonic>:TIMeout[:STIMe] <numeric value>[<suffix>]`
Measurement Timeout State	`SETup:<meas-mnemonic>:TIMeout:STATe <ON|1|OFF|0>`
Measurement Timeout Time	`SETup:<meas-mnemonic>:TIMeout:TIME <numeric value>[<suffix>]`

Example 10. Programming Example:

```
OUTPUT Test_set;"SET:DTXP:TIM 10"
```

sets the measurement timeout state to ON and set the measurement timeout time to 10 seconds for the digital transmit power measurement.

Step 3: Set Measurement Parameters

Measurement Trigger Parameters There are three measurement trigger parameters. They control the arming of a measurement, the source of the trigger, and the trigger's delay.

- The trigger arm parameter determines whether the test set makes one measurement and then stops (single), or automatically re-arms upon completion of one measurement and repeats the process (continuous). The recommended setting when writing a control program is single (CONTinuous OFF).
- The trigger source parameter selects the source of the measurement trigger signal. The recommended Trigger Source setting when writing a control program is AUTO.

NOTE Trigger source is always IMMediate for analog measurements and cannot be changed by the user.

- The trigger delay parameter controls the delay between the trigger event (the point in time at which the trigger signal is received) and the start of sampling. Negative values indicate that the sampling should occur prior to the trigger event.

NOTE Trigger delay is not applicable to analog measurements.

Measurement Trigger Parameters

Parameter	Command Syntax
Trigger Arm	`SETup:<meas-mnemonic>:CONTinuous <ON|1|OFF|0>`
Trigger Source	`SETup:<meas-mnemonic>:TRIGger:SOURce <AUTO|IMMediate|PROTocol|RISE>`
Trigger Delay	`SETup:<meas-mnemonic>:TRIGger:DELay <numeric value>[<suffix>]`

NOTE You can set the Trigger Arm for all measurements to single (CONTinuous OFF) using the following command syntax:

```
SETup[:ALL]:CONTinuous:OFF
```

Example 11. Programming Example:

```
OUTPUT Test_set;"SET:CONT:OFF"
```

sets the trigger arm to single for all measurements.

Example 12. Programming Example:

```
OUTPUT Test_set;"SET:DTXP:TRIG:SOUR AUTO"
```

sets the trigger source to AUTO for the digital transmit power measurement.

Example 13. Programming Example:

```
OUTPUT Test_set;"SET:DTXP:TRIG:DEL 10 US"
```

sets the trigger delay to 10 microseconds for the digital transmit power measurement.

Measurement-Specific Measurement Parameters

Measurement-specific measurement parameters set up operating conditions for a specific measurement. For example:

- Setting the channel power measurement speed in IS-2000
- Setting ORFS frequency offsets in GPRS
- Setting number of bits for the FBER measurement in GSM

Refer to the GPIB syntax listing for the detailed list of measurement parameters for individual measurements.

Example 14. Programming Example:

```
OUTPUT Test_set;"SET:CPOW:MSP FAST"
```

sets the IS-2000 channel power measurement speed to fast.

Example 15. Programming Example:

```
OUTPUT Test_set;"SET:ORFS:SWIT:FREQ 400 KHZ"
```

sets the first ORFS offset to 400 kHz.

Example 16. Programming Example:

```
OUTPUT Test_set;"SET:FBER:COUN 10000"
```

sets the number of fast BER bits to test to 10,000 bits.

Example 17. Program Example Setting Both Generic and Measurement-Specific Measurement Parameters

```
! Set trigger arm to single for all measurements:
!
OUTPUT Test_set;”SET:CONT:OFF”
!
! *****************************************************
! Configure Modulation Accuracy Measurement:
!
OUTPUT Test_set;”SET:MACC:COUN 5”
! Example of using a complex command to set both the
! measurement count state and number at the same time.
!
OUTPUT Test_set;”SET:MACC:TRIG:SOUR AUTO”
! Sets trigger source to auto.
!
OUTPUT Test_set;”SET:MACC:TIM 15”
! Sets timeout state to ON and time to 15 sec.
!
OUTPUT Test_set;”SET:MACC:EVM10:STAT ON”
! Turns the EVM10 State ON
!
! ******************************************************
! Configure Digital TX Power Measurement:
```

Step 3: Set Measurement Parameters

```
!
OUTPUT Test_set;”SET:DTXP:COUN 5”
OUTPUT Test_set;”SET:DTXP:TRIG:SOUR AUTO”
OUTPUT Test_set;”SET:DTXP:TIM 5”
!
! ******************************************************
! Configure Frequency Stability Measurement:
!
OUTPUT Test_set;”SET:FST:COUN 3”
OUTPUT Test_set;”SET:FST:TIM 10”
!
! ******************************************************
! Configure Analog TX Power Measurement:
!
OUTPUT Test_set;”SET:ATXP:COUN 5”
OUTPUT Test_set;”SET:ATXP:TRIG:SOUR AUTO”
OUTPUT Test_set;”SET:ATXP:TIM 15”
```

Step 4: Make Connection

The following information provides additional details on Step 4 of the Programming Flowchart. This information is applicable to all test applications.

Description

In this step you make a connection between the mobile station and test set. How you do this depends upon whether you are in active cell or test mode. In active cell mode you establish a phone call between the test set and mobile station. In test mode, you command the mobile station to synchronize to the test set's signal and begin transmitting back an appropriate signal.

Contents

Establish a Call in Active Cell Mode

To test a mobile station in active cell mode, you must first establish a call between the test set and mobile station. Your control program must issue the commands necessary to initiate the call connection process, either to the test set (for a base station originated call) or to the mobile station (for a mobile station originated call). Your control program must then determine when the call has successfully connected so that it can proceed to testing. The control program must also determine if the call has not been successfully connected so that it can take appropriate action.

Call States At any instant in time a call can be in a stable state such as the idle or the connected state, or in one of many transitory states such as alerting, handoff, registering, releasing or paging. These are referred to as transitory states because the amount of time which the call can spend in any of these states is limited by the mobile station's protocol. The call is not allowed to stay in a transitory state indefinitely.

NOTE If repeat paging or repeat registration are on, it is possible for the call process to stay in one of the transitory states beyond the time specified by the mobile station's protocol timers.

Call Connection Synchronization Commands The test set has a set of commands designed specifically for call connection and release synchronization.

Call Connection Synchronization Commands

Synchronization Command	Command Syntax
Call-Connected-State Query	CALL:CONNected[:STATe]?
Call-State-Change Detector Arm	CALL:CONNected:ARM[:IMMediate]
Call-State-Change Detector Timeout	CALL:CONNected:TIMeout

- Call-Connected-State Query

  The CALL:CONN? query allows the control program to determine if a call is in the connected state or in the idle state.

  Responses Returned by the CALL:CONN? Query

Response	Meaning
1	The call is in the connected state.
0	The call is in the idle state.

  If the call is in one of the transitory states, the query waits until the call reaches the idle state or connected state before returning a value.

- Call-State-Change Detector Arm Command

  The test set has a call-state-change detector which can be used to temporarily hold the response to a CALL:CONN? query until the call state has moved from idle to connected or vice versa.

  Without the call-state-change detector, the CALL:CONN? query only hangs if the call is in a transitory state. Otherwise, it immediately returns a 1 or 0. Therefore, if a call connection process is started and the CALL:CONN? query is sent before the call state has transitioned from idle to one of the transitory states, the query immediately returns a 0. This indicates that the call is in the idle state (and therefore that the connection attempt failed). In reality, the call likely connected, but not until after the CALL:CONN? query immediately returned a 0.

  When the call-state-change detector is armed during a connection attempt, if the CALL:CONN? query is sent while the call state is still idle, the query waits until the state changes to connected, and then returns a 1.

  The CALL:CONNected:ARM[:IMMediate] command is used to arm this call-state-change detector.

- Call-State-Change Detector Timeout Command

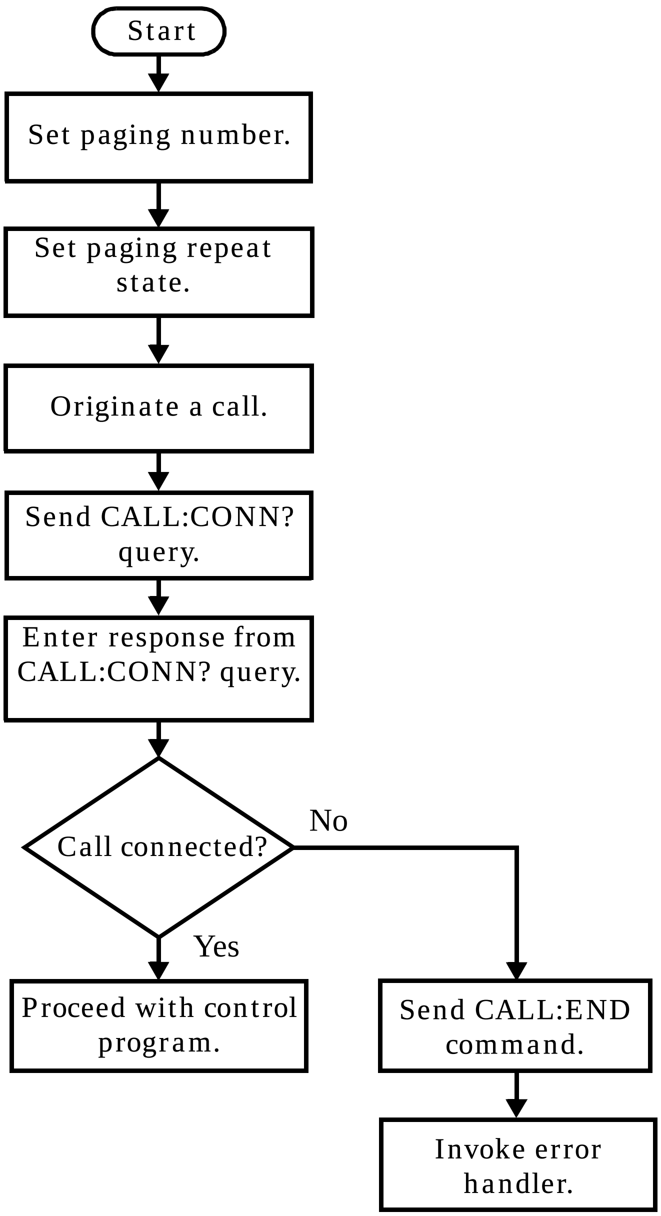
  If the call-state-change detector is armed and a call connection is attempted but the call state never changes from the idle state, the CALL:CONN? query hangs the bus. This easily happens if the mobile is badly broken, the mobile is not connected to the test set, or no one pushes the send button on the mobile.

  The CALL:CONNected:TIMeout command is used to set the timeout value for the call-state-change detector.

  The timeout timer is started whenever the call-state-change detector is armed, and should be set to the maximum amount of time the control program should wait between arming the detector and the beginning of the connection process (when the call state moves from the idle state). If the timer expires before the call state has moved from the idle or connected state, the call-state-change detector is disarmed, which releases the CALL:CONN? query if it is currently hanging.

Process for Making a Base Station Originated Call

Figure 5. Process for Making a Base Station Originated Call



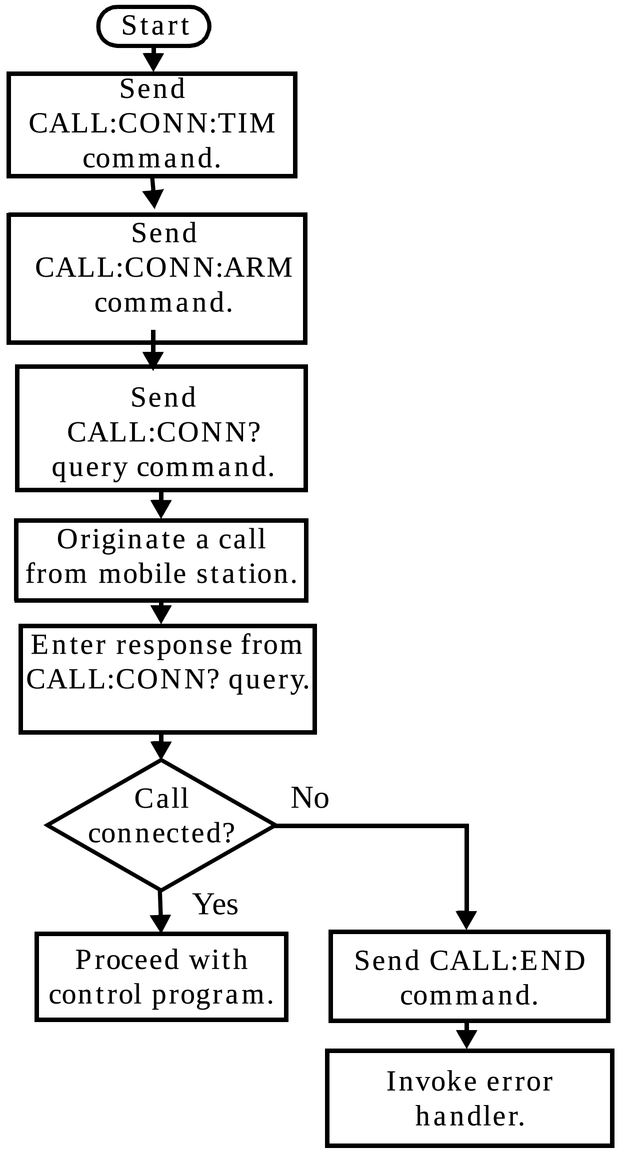
NOTE It is not necessary for you to send the CALL:CONN:TIM and CALL:CONN:ARM commands as they are automatically sent by the test set during a base station originated call or base station release.

Step 4: Make Connection

Example 18. Programming Example

```
OUTPUT Test_set;"CALL:PAG:PNUM '0000574016'"! Set paging number
OUTPUT Test_set;"CALL:PAG:REP ON" ! Set paging repeat state
OUTPUT Test_set;"CALL:ORIG" ! Start a base station originated call
OUTPUT Test_set;"CALL:CONN?"  ! Hanging GPIB query
ENTER Test_set;Call_connected      ! Program hangs here until
                                   ! origination passes or fails
IF NOT Call_connected THEN
   OUTPUT Test_set;"CALL:END"
! <put error handler here>
END IF
! Call is connected so proceed with control program
```

Process for Making a Mobile Station Originated Call **Figure 6. Process for Making a Mobile Station Originated Call**



NOTE The test set cannot originate a call from the mobile station. You must physically dial a number on the mobile station and press send, or send commands to a test bus built into the mobile station. For mobile station originated calls where the call is originated by physically dialing a number (as opposed to using a test bus) ensure that the call-state-change detector timeout time is long enough to allow the number to be dialed.

Example 19. Programming Example

```
OUTPUT Test_set;"CALL:CONN:TIM 10"         ! Set timeout time to 10 seconds
OUTPUT Test_set;"CALL:CONN:ARM"            ! Arm the change detector
DISP "Initiate a call from the mobile"
OUTPUT Test_set;"CALL:CONN?"          ! Initiate a call connected state query
ENTER Test_set;Call_connected              ! Program hangs here until
                                           ! origination passes or fails
IF NOT Call_connected THEN
   OUTPUT Test_set;"CALL:END"
! <put error handler here>
END IF
! Call is connected.  Proceed with the control program.
```

Make a Test Mode Connection

To make a connection between the test set and mobile station in test mode, you must send the appropriate test mode commands to the mobile station to command it to synchronize to the test set's signal and begin transmitting.

You may also want to make a quick power measurement to ensure that the connection has been made.

Step 5: INITiate and FETCh Measurements

The following information provides additional details on Step 5 of the Programming Flowchart. This information is applicable to all test applications.

Description

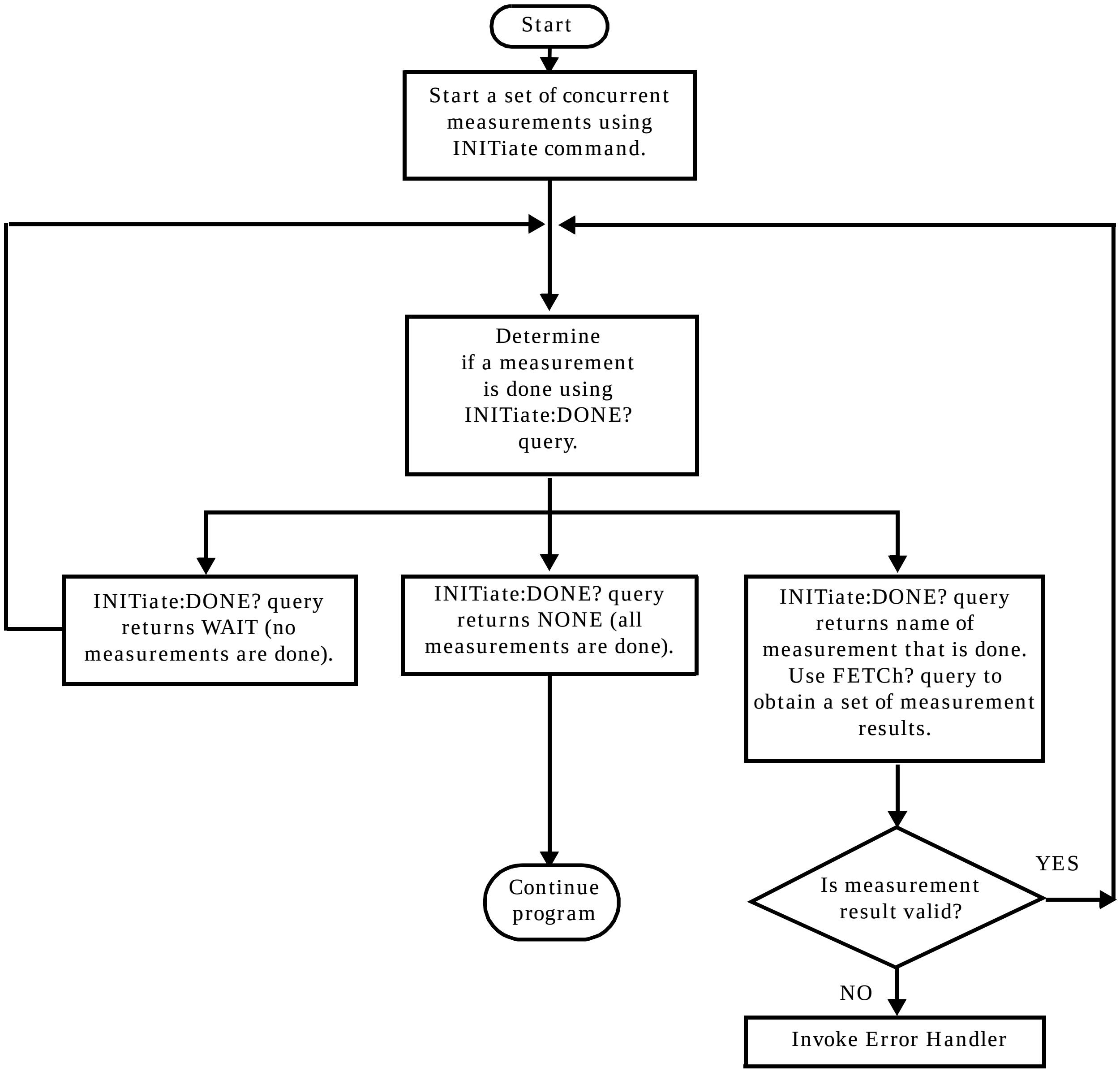
This step involves making measurements on the mobile station.

The test set has multiple signal paths and processors, which means you can make measurements concurrently and reduce test time. Making concurrent measurements involves starting a group of measurements, fetching the results of the measurements as they complete, and then verifying that the results are valid.

Contents

Concurrent Measurement Process

Figure 7. Process for Making Concurrent Measurements



Start a Set of Concurrent Measurements The INITiate command is used to start measurements. Each individual measurement can be started using the INITiate command. For starting measurements, the syntax of the INITiate command is as follows:

```
INITiate:<measurement mnemonic>[:ON]
```

More than one measurement can be started using a single INITiate command. For example:

```
OUTPUT Test_set;"INIT:TXP;PFER"
```

starts the transmit power measurement and the phase and frequency error measurement. These measurements then run concurrently.

Determine if a Measurement Is Done Use the INITiate:DONE? query command to determine which measurement has completed.

This command is a query only and returns only one response per query. The responses returned and their meanings are shown in the following table:

Table 13. Responses Returned from INITiate:DONE? Query

Response String	Meaning
<MEASUREMENT1 mnemonic>	MEASUREMENT1 is done.
<MEASUREMENT2 mnemonic>	MEASUREMENT2 is done.
WAIT	There are one or more measurements that are in progress, but none of those measurements are done yet.
NONE	No measurements are in progress.

Once a measurement is reported as being complete via the INITiate:DONE? query it is removed from the done list (it is not reported again). To use the INITiate:DONE? query properly, your control program should immediately fetch a measurement's results once it is reported as being complete.

Obtain a Set of Measurement Results In order to minimize bus traffic and reduce test time, the test set's measurements are designed to return multiple measured values in response to a single measurement request.

For example, if a transmit power measurement with averaging is initiated there are five measurement results available. These are:

1. Measurement integrity value
2. Average value
3. Minimum value
4. Maximum value
5. Standard deviation value

The test set can return the measurement results in a variety of formats to suit your needs using the FETCh? subsystem. The general structure of the FETCh? command is as follows:

```
FETCh:<measurement mnemonic>:<result format>?
```

Step 5: INITiate and FETCh Measurements

For example, the transmitter power measurement results can be returned as:

Example FETCh? Result Formats

Command	Results Returned
FETC:TXP?	Measurement integrity and average value
FETC:TXP:POW:ALL?	Minimum, maximum, average and standard deviation values
FETC:TXP:POW:AVER?	Average value only
FETC:TXP:POW:MIN?	Minimum value only
FETC:TXP:POW:MAX?	Maximum value only
FETC:TXP:POW:SDEV?	Standard deviation value only
FETC:TXP:INT?	Measurement integrity value only

Example 20. Concurrent Measurement Process Programming Example

```
! Start a Set of Concurrent Measurements:
!
OUTPUT Test_set;"INIT:TXP;PFER"
!
! Determine if a Measurement Is Done:
!
LOOP
  OUTPUT Test_set;"INIT:DONE?"
  ENTER Test_set;Meas_done$
!
! Obtain a Set of Measurement Results:
!
  SELECT Meas_done$
    CASE "TXP"
      OUTPUT Test_set;"FETC:TXP:POW?"
      ENTER Test_set;Avg_tx_power
    CASE "PFER"
      OUTPUT Test_set;"FETC:PFER:RMS?"
      ENTER Test_set;Max_rms_phas_er
  END SELECT
EXIT IF Meas_done$="NONE"
END LOOP
```

Validate Measurement Results Validating measurement results is extremely important. The test set returns a result if it is capable of making a measurement, even if this result is obtained under adverse conditions.

The measurement integrity indicator is a measurement result and therefore is queried using the FETCh subsystem. A value of 0 indicates that the measurement is valid. A value other than 0 indicates that an error occurred during the measurement process.

Example Integrity Indicators

Value Returned	Description (message also appears on test set)
0	Normal
1	No Result Available
2	Measurement Timeout
5	Over Range
6	Under Range

Example 21. Programming Example

```
OUTPUT Test_set;”FETC:DTXP?”
ENTER Test_set;Integrity,Avg_dig_pow
IF Integrity=0 THEN
   PRINT “AVG DIG POW= “;Avg_dig_pow
ELSE
   PRINT “DTXP Measurement Error”
   PRINT “DTXP Measurement Integrity is “;Integrity
END IF
```

Alternative Measurement Process

You may choose to test in a sequential way rather than use the concurrent measurement process.

For instance, instead of using the INIT:DONE? query to determine when a measurement is complete, you may choose to initiate a set of measurements and then simply fetch them sequentially.

Example 22. Programming Example

```
OUTPUT Test_set; “INIT:DTXP;MACC”
OUTPUT Test_set; “FETC:DTXP:POW?”
ENTER Test_set;Avg_dig_pow
OUTPUT Test_set; “FETC:MACC:EVM[1]?”
ENTER Test_set;Max_EVM1
```

In this example, the test set starts both measurements at the same time. However, if the MACC measurement finishes first, the results are not fetched until the DTXP measurement finishes. Therefore, this process requires that you understand the order in which measurements will complete in order to optimize your testing speed.

Step 6: Reconfigure Test Set and Mobile Station Connection Parameters

The following information provides additional details on Step 6 of the Programming Flowchart. This information is applicable to all test applications.

Description

After performing a set of measurements on the mobile station using the configuration established in step 2, you may want to change this configuration and test the mobile station again. This step involves changing testing conditions such as channel, mobile station transmit power level, or cell power.

Contents

Change Channels

In a manufacturing environment it is common to test a mobile station on more than one channel. Some or all of the tests may be performed on multiple channels, to verify the mobile station's performance in a range of operating frequencies.

Perform a Handoff (Handover) in Active Cell Mode

If you are operating in active cell mode, to change channels you perform a handoff (handover) to the new channel. The control program sends the commands to initiate the handoff (handover), and then determines whether the transition was successfully completed. This is accomplished using the CALL:STATus? query.

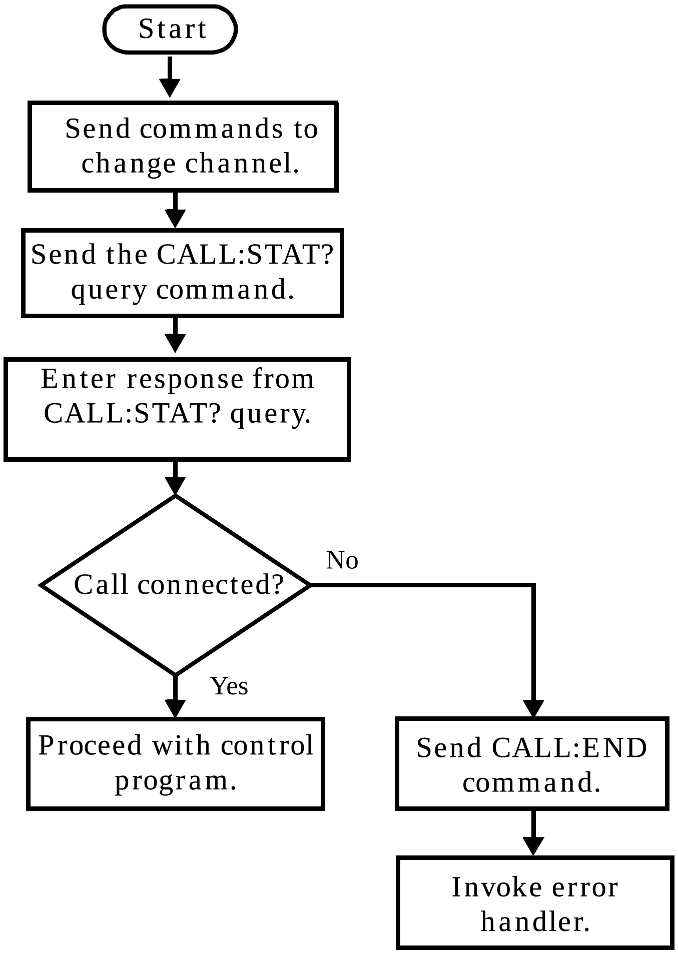
The CALL:STATus? query immediately returns the state of the call at the time the query is received.

Example Responses Returned from the CALL:STAT? Query

Response	Meaning
IDLE	The call is in the Idle state
ALER	The call is in the Alerting transitory state.
HAND	The call is in the Handoff transitory state.
PAG	The call is in the Paging transitory state.
CONN	The call is in the Connected state.

After issuing the commands to perform a handoff (handover), you should send the CALL:STAT? query to verify that the call is still connected before resuming testing.

Figure 8. Process for Performing a Handoff (Handover)



Test Mode Considerations In test mode, you can either change the test set's frequencies by using the handoff (handover) commands, or directly control the RF generator and RF analyzer.

In either case, you must also send the appropriate test mode commands to the mobile station to move it to the new channel.

Change Other Connection Parameters

You may also choose to change the mobile station transmit power level or cell power, or other connection parameters such as timeslot or timing advance.

Step 7: End Connection

The following information provides additional details on Step 7 of the Programming Flowchart. This information is applicable to all test applications.

Description

In this step you release the call (in active cell mode) or end the mobile station transmission (in test mode).

Contents

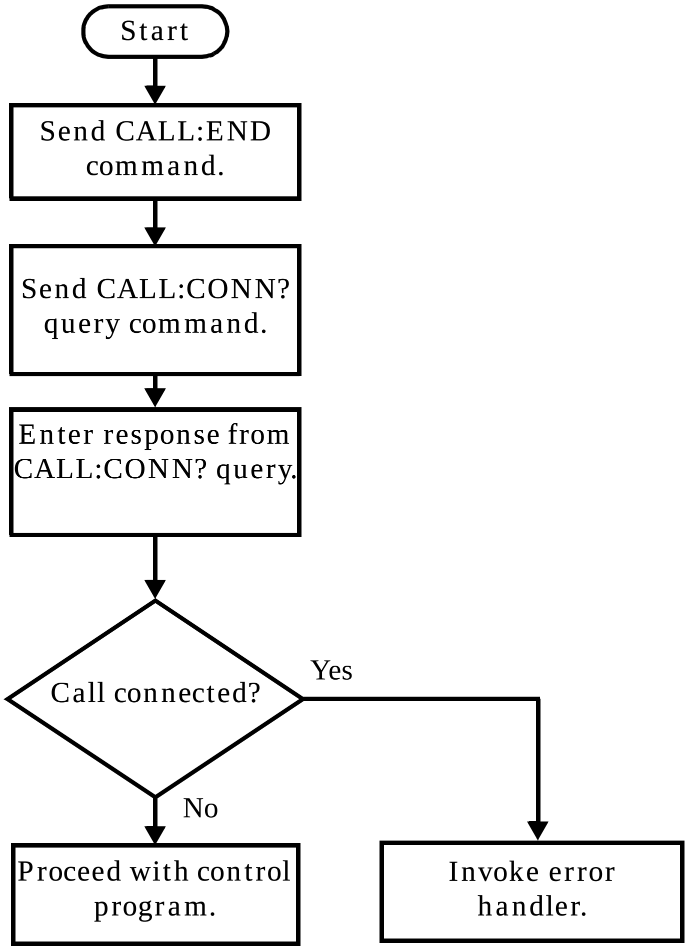
Release the Call in Active Cell Mode

In active cell mode, you can release the call with the mobile station in one of two ways:

- Release from the Base Station
- Release from the Mobile Station

Releasing an Active Call from the Base Station

Figure 9. Process for Releasing an Active Call from the Base Station



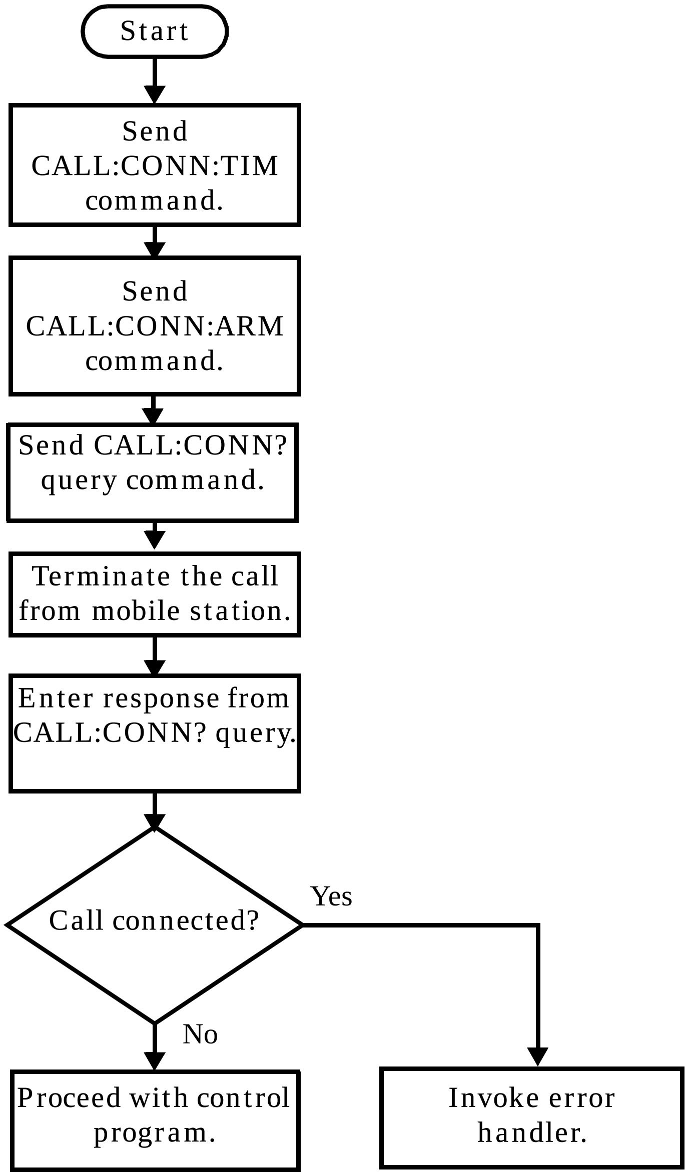
Example 23. Programming Example

```
OUTPUT Test_set;"CALL:END"        ! Initiate a base station release.
OUTPUT Test_set;"CALL:CONN?"  ! Send call connected state query.
ENTER Test_set;Call_connected     ! Program hangs here until state
                                  ! change or timer expires.
IF Call_connected THEN            ! Check if disconnection successful
! <put error handler here>
END IF
! Call is disconnected so proceed with control program
```

Step 7: End Connection

Releasing an Active Call from the Mobile Station

Figure 10. Process for Terminating an Active Call from the Mobile Station



NOTE The test set cannot initiate a call disconnection from the mobile station. You must manually push the end button on the mobile station or send commands to a test bus built into the mobile station. For a mobile station release where the call is terminated by physically pushing a button on the phone (as opposed to using a test bus) ensure that the call-state-change-detector timeout time is long enough to allow the end button to be pushed.

Example 24. Programming Example

```
OUTPUT Test_set;"CALL:CONN:TIM 5" !Set timeout time to 5 seconds.
OUTPUT Test_set;"CALL:CONN:ARM"   !Arm the change detector.
DISP "Terminate the call from the mobile station."
OUTPUT Test_set;"CALL:CONN?" !Initiate call connected state query.
ENTER Test_set;Call_connected     !Program hangs here until state
                                  !change or timer expires.
IF Call_connected THEN            !Check if disconnection successful.
! <put error handler here>
END IF
! Call is disconnected so proceed with control program
```

End the Mobile Station Test Mode Transmission

In test mode, you must send the necessary test mode commands to end the mobile station transmission.

Partially Preset the Test Set

At this point, it is good practice to partially preset the test set by sending the SYST:PRES3 command. This command stops all measurement and call processing processes, but does not reset all values to default.

Testing a GPRS Mobile Station

This section is *not* applicable to GSM or EGPRS.

This section provides a description of how you may want to use the test set to test a GPRS mobile station which supports a single uplink timeslot or two adjacent uplink timeslots. The section contains:

- "Test Overview" on page 316
- "Procedure" on page 317
- "Operating Considerations" on page 320

If you want a detailed description of how to write a basic control program that performs fundamental manufacturing tests on a GPRS mobile station, see "Programming: Getting Started Guide for E1968A GSM/GPRS Mobile Test Application Revision A.01 and E6701C GSM/GPRS Lab Application Revision C.01" on page 266.

Test Overview

To test a GPRS mobile station, you need to perform the following steps:

"1. Configure the base station emulator, mobile station, and measurement execution parameters" on page 317

"2. Switch on the GPRS mobile station, perform an attach and establish a data connection" on page 318

"3. Make measurements and obtain results" on page 319

"4. Reconfigure the data connection and make more measurements (if required)" on page 319

"5. Disconnect the Mobile Station from the base station emulator" on page 319

These steps are described in more detail in the next section.

Procedure

1. Configure the base station emulator, mobile station, and measurement execution parameters

Before starting to transfer data and make measurements on a GPRS mobile station, you may need to configure some, or all of the following parameters:

- Broadcast channel (BCH) parameters:
  - — Cell Band (see "CALL[:CELL]:BAND" on page 495)
  - — Broadcast Channel (ARFCN) (see "CALL[:CELL]:BCHannel[:ARFCn][:SELected]" on page 498)
  - — Cell Power (see "CALL[:CELL]:POWer:AMPLitude[:SELected]" on page 651)
  - — Serving Cell (see "CALL[:CELL]:BCHannel:SCELl" on page 509)
- Packet data traffic channel (PDTCH) parameters:
  - — Packet Data Traffic Channel Band (see "CALL:PDTCH:BAND" on page 627)
  - — Packet Data Traffic Channel (ARFCN) (see "CALL:PDTCH[:ARFCn][:SELected]" on page 625)
  - — Packet Data Traffic Channel Coding Scheme (see "CALL:PDTCH:CSCHeme" on page 627)
  - — Downlink Packet Data Traffic Channel Power Control:
    - — Downlink Power Reference Level (dB) (see "CALL:PDTCH:PZERo:LEVel" on page 643)
    - — Downlink Power Reduction Level (dB) (see "CALL:PDTCH:PREDuction:LEVel[1|2]" on page 641)
    - — Downlink Burst Power Reduction Selection (see "CALL:PDTCH:PREDuction:BURSt[1|2|3|4]" on page 640)

      Note: In order to make use of power reduction levels, you must set the downlink PDTCHs to be on a different ARFCN from the broadcast channel. This is because the power level across all timeslots on the BCH must remain constant. Therefore, power reduction levels are ignored if the BCH and PDTCH are on the same ARFCN.
    - — Unused Downlink Burst Power Reduction Selection (see "CALL:PDTCH:PREDuction:UBURst" on page 642)

      Note: In order to make use of power reduction levels, you must set the downlink PDTCHs to be on a different ARFCN from the broadcast channel. This is because the power level across all timeslots on the BCH must remain constant. Therefore, power reduction levels are ignored if the BCH and PDTCH are on the same ARFCN.
  - — Packet Data Traffic Channel Protocol Control:
    - — Packet Timeslot Reconfigure (see "CALL:PDTCH:PMESsage:PTReconfig" on page 638)
    - — Packet Power Timing Advance (see "CALL:PDTCH:PMESsage:PPTadvance" on page 637)
    - — Data Connection Frame Number Type (see "CALL:FUNCtion:DATA:FRAMe:STARt" on page 543)
    - — Data Connection LLC Frame Check Sequence (see "CALL:FUNCtion:DATA:BLER:LLC:FCSequence" on page 541)
    - — BLER Block Polling Interval (see "CALL:FUNCtion:DATA:BLER:POLLing:INTerval" on page 542)
    - — Payload Pattern (BLER) (see "CALL:FUNCtion:DATA:PAYLoad:PATTern:BLER" on page 544)

— Payload Pattern (ETSI B) (see “CALL:FUNCtion:DATA:PAYLoad:PATTern:ETSIB” on page 545)

— Connection Type (see “CALL:FUNCtion:CONNection:TYPE” on page 538)

Note: The BLER, ETSI Type A, and ETSI Type B Connection Types allow you to establish the continuous data connection with the test set required for testing in a manufacturing environment. Please see “Connection Types” on page 189 for descriptions of the different connection types and they’re uses.

— Multislot Configuration (see “CALL:PDTCH:MSLot:CONFig” on page 634)

— First Downlink Burst to Loop (see “CALL:PDTCH:MSLot[:FIRSt]:DOWNlink:LOOPback[:BURSt]” on page 635)

- Mobile station operating parameters:

— PDTCH MS TX Level (see “CALL:PDTCH:MS:TXLevel[:SELected]:BURSt[1|2]” on page 632)

— Guard Period Length (see “CALL:MS:TX:BURSt:GPLength” on page 594)

- Measurement execution parameters:

— The SETup subsystem is used to configure measurement parameters. For a brief description of this subsystem and links to the GPIB commands, see “SETup Subsystem” on page 1032. For a more detailed description of measurement execution parameters along with programming examples, see “Step 3: Set the Measurement Parameters” on page 275.

- Deferred parameters (if required):

— Deferred parameters allow you to set up a new data connection ahead of time.This is useful if you plan to reconfigure the data connection after your first set of measurements to make more measurements on the new channel. The settings you make are only applied when a channel change is executed using the “CALL:HANDover | HANDoff[:IMMediate]” on page 548. For a list of the deferred parameters see “Configuring the Packet Data Traffic Channel (PDTCH)” on page 205. For more details on using deferred parameters see “Using Deferred Parameters” on page 207.

2. Switch on the GPRS mobile station, perform an attach and establish a data connection

Ensure the GPRS mobile station you want to test has either a GSM Test SIM card, or a standard SIM card installed. When you connect your mobile station to the test set and switch the mobile station on, it should automatically perform a GPRS attach. (For those mobile stations which do not automatically perform a GPRS attach, you may have to instruct the mobile station to go into a data mode. The method for doing this will vary from one mobile station to another. For example, you may have to press a key on the mobile station’s keypad, or make a selection from the mobile station’s on-screen menu system.)

The mobile station must be GPRS attached before you can use the command “CALL:FUNCtion:DATA:START” on page 546 to start the data connection. You can verify that a data connection has been successfully established, by checking that the connection status is “transferring”. (If you require more details on connection states see “Data Connection Processing State Synchronization” on page 445).

If you have problems starting the data connection with your mobile station under normal conditions, you may want to try changing the frame numbering scheme using the command “CALL:FUNCtion:DATA:FRAMe:STARt” on page 543.

If you have problems establishing a data connection using the BLER Connection Type specifically, you may want to change the setting of the Data Connection LLC Frame Check Sequence (see “CALL:FUNCtion:DATA:BLER:LLC:FCSequence” on page 541) or the BLER Block Polling Interval (see

"CALL:FUNCtion:DATA:BLER:POLLing:INTerval" on page 542).

If you require more troubleshooting information related to getting the mobile to perform a GPRS attach, or start a data connection, see "GPRS Data Connection Troubleshooting" on page 1469.

3. Make measurements and obtain results

Now that the data connection is successfully established, you can start making concurrent transmitter measurements and gathering results. Output RF Spectrum, Transmit Power, Phase and Frequency Error, and Power versus Time are all available for GPRS. In addition, you can make Receiver Bit Error, or Block Error measurements in parallel with your transmitter measurements depending on the connection type you want to use.

The FETch subsystem is used to obtain transmitter and receiver measurement results. For a description of this subsystem along with links to the GPIB commands, see "FETCh? Subsystem" on page 863.

You may want to vary the downlink power to stress the mobile's receiver during your testing (see "Downlink PDTCH Power Control" on page 320).

If you want the test set to perform Transmit Power, and Phase and Frequency Error measurements on both bursts of a multislot configuration which features two adjacent uplink timeslots, you can select only one burst at a time to measure (using the command "RFANalyzer:MANual:MEASurement:BURSt" on page 1025). In order to optimize your test code, the recommended method is to select the first burst you want to measure, perform the first set of Transmit Power, and Phase and Frequency Error measurements and then repeat these measurements after you have selected the second burst. To select a multislot configuration with two adjacent uplink timeslots (that is, D2U2 or D3U2) use "CALL:PDTCH:MSLot:CONFig" on page 634. Note that the Power versus Time measurement can measure over both bursts in a multislot configuration with two adjacent uplink timeslots. If you require more details on the Power versus Time measurement, see "GPRS and EGPRS Power versus Time Measurement" on page 123.

For more details on the process of making measurements and gathering results, see "Step 5: INITiate and FETCh Measurements" on page 279.

4. Reconfigure the data connection and make more measurements (if required)

In order to test the mobile station using different parameters, such as channel number, channel band, or mobile station transmit level, you have to reconfigure the data connection. To do this, you can execute a channel change using the "CALL:HANDover | HANDoff[:IMMediate]" on page 548. This applies the deferred parameters that you set earlier (see Deferred Parameters above). If you require more details on the process of reconfiguring the data connection, see "Step 6: Reconfigure Test Set and Mobile Station Connection Parameters" on page 282.

Note that additional PDTCH protocol control parameters are available in case your mobile station does not support the Packet Timeslot Reconfigure (PTR) message. (If you require details on these parameters, see "CALL:PDTCH:PMESsage:PPTadvance" on page 637 and "CALL:PDTCH:PMESsage:PTReconfig" on page 638).

5. Disconnect the Mobile Station from the base station emulator

When your testing is complete, you need to end the data connection (using "CALL:FUNCtion:DATA:STOP" on page 546) and then initiate the GPRS detach procedure from the mobile station. If you require more details, see "Step 7: End the Connection" on page 285. You should note that the GPRS detach procedure is optional in a testing environment. The test set can be left in the Attached data connection state and will recognize if a different mobile station performs a GPRS attach.

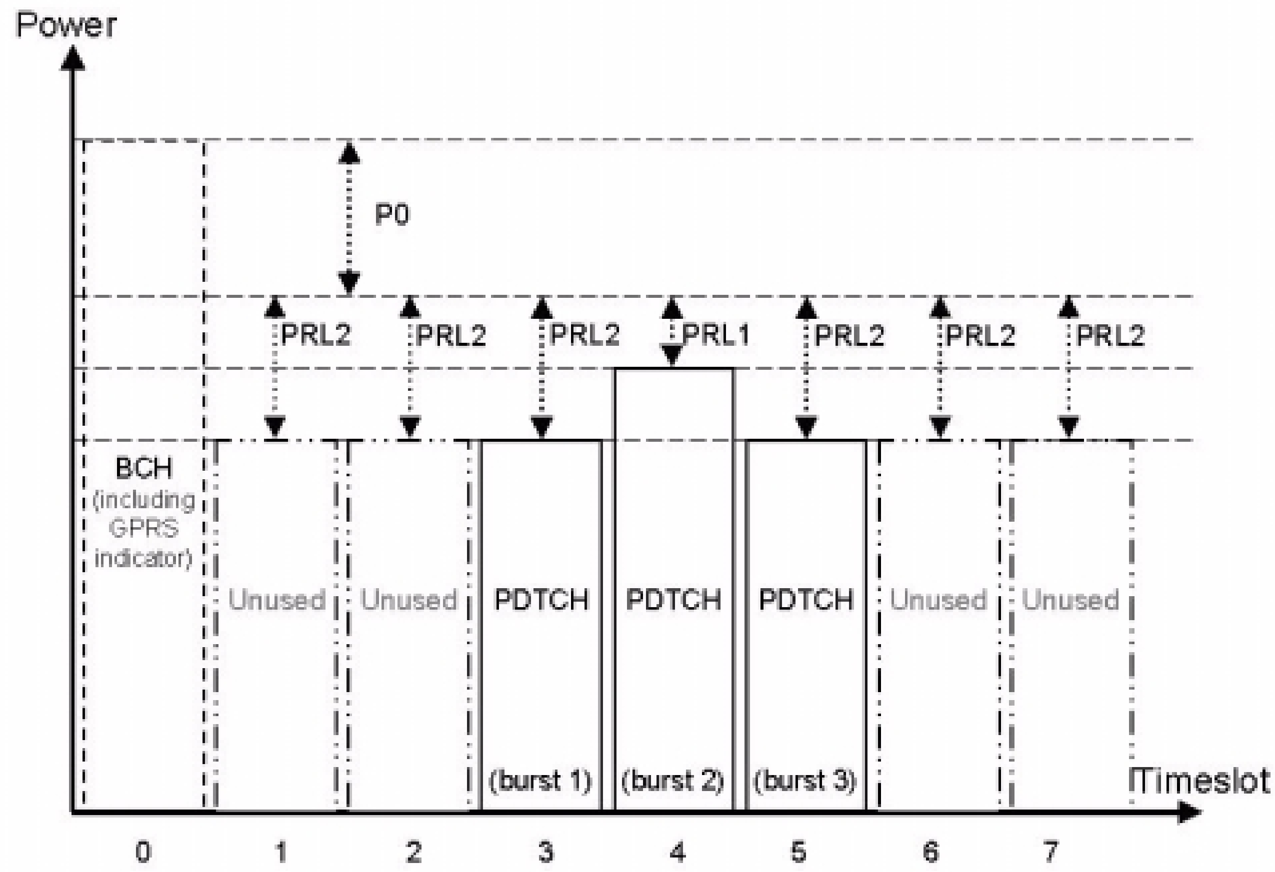
Operating Considerations

Downlink PDTCH Power Control

For GPRS-specific testing of mobile stations, you must take into consideration the multislot mode of operation (where a single packet data connection uses multiple timeslots on the same ARFCN possibly at different power levels). In GPRS, downlink power levels are referenced to the power reduction reference level (which in turn is referenced to the BCCH). ETSI refers to these power reduction levels as PR values, and the reference level is known as P0. In the test set, the power reduction levels are implemented as two values (PRL1 and PRL2) which can be mapped to any downlink burst.

P0, PRL1, and PRL2 are shown in the figure below. Note that the BCH (including GPRS indicator) is shown on the same ARFCN in the figure only to illustrate the BCH level. To make use of power reduction levels, you must set the downlink PDTCHs to be on a different ARFCN from the BCH.

Figure 11. GPRS Power Reduction Levels



Use the following commands to set the BCH power, P0 reference level, and PDTCH power reduction levels:

- To set the Cell Power (BCH power level), use “CALL[:CELL]:POWer:AMPLitude[:SELected]” on page 651.
- To set the P0 Reference Level, use “CALL:PDTCH:PZERo:LEVel” on page 643.
- To set the Downlink Power Reduction Level (dB) for PRL1 and PRL2, use “CALL:PDTCH:PREDuction:LEVel[1|2]” on page 641.
- To make the Downlink Burst Power Reduction Selection (either PRL1 or PRL2) for each PDTCH burst, use “CALL:PDTCH:PREDuction:BURSt[1|2|3|4]” on page 640.
- To make the Unused Downlink Burst Power Reduction Selection (either PRL1 or PRL2) for all PDTCH bursts that are *not* being used for transmitting downlink PDTCH(s), use “CALL:PDTCH:PREDuction:UBURst” on page 642.

Related Topics

“Programming: Getting Started Guide for E1968A GSM/GPRS Mobile Test Application Revision A.01 and E6701C GSM/GPRS Lab Application Revision C.01” on page 266

“Active Cell For GPRS” on page 177

“Broadcast Channel Parameters” on page 196

“Configuring the Packet Data Traffic Channel (PDTCH)” on page 205

“Receiver Sensitivity Testing in GPRS” on page 131

“GPRS Data Connection Troubleshooting” on page 1469

Programming a Channel Mode Change

Channel Mode Change is *not* applicable to GPRS or EGPRS.

This section provides an example of how to change a mobile station's channel mode to enhanced full rate speech via GPIB while a call is connected and a measurement is running.

The following procedure assumes that an active link is established between the test set and the mobile station. See "Establishing an Active GSM Link with the Mobile Station" on page 246.

1. Ensure the mobile is initially in full rate speech channel mode.
2. Configure the parameters for the measurement(s) you want to run using the SETup subsystem.
3. Start the measurement(s) using the INITiate subsystem.
4. Change the mobile's channel mode to enhanced full rate speech.
5. Use the INITiate:DONE? command to find out if the measurement results are available.
6. Use the FETCh? command to obtain the measurement results.

Programming Example

The following program uses the TX Power measurement to show how to change the channel mode to enhanced full rate speech while a measurement is running. The TX Power measurement is chosen because it is one of the measurements that is supported in enhanced full rate speech mode.

```
10    OUTPUT 714;"CALL:TCHANNEL:CMODE FRSPEECH" !Ensure mobile is in
20                        !full rate speech channel mode initially.
30    OUTPUT 714;"SETUP:TXPOWER:CONTINUOUS OFF" !Configures trigger
40                        !mode to single for a TX Power measurement.
50    OUTPUT 714;"SETUP:TXPOWER:COUNT:NUMBER 100" !Configures a
60                        !multi measurement of 100.
70    OUTPUT 714;"SETUP:TXPOWER:TRIGGER:SOURCE AUTO" !Configures the
80                        !trigger source to auto.
90    OUTPUT 714;"INITIATE:TXPOWER" !Start TX Power measurement.
100   OUTPUT 714;"CALL:TCHANNEL:CMODE EFRSPEECH" !Sets the channel
110                       !mode to enhanced full rate speech while
120                       !the TX Power measurement is running.
130   REPEAT
140   OUTPUT 714;"INITIATE:DONE?" !Check to see if TX Power
150                       !measurement is complete.
160   ENTER 714;Meas_complete$
170   UNTIL Meas_complete$="TXP"
180   OUTPUT 714;"FETCH:TXPOWER:ALL?" !Fetch TX Power results.
190   ENTER 714;Integrity,Avg_tx_pwr
200   PRINT "TX Power Measurement Results"
210   PRINT "Integrity=";Integrity
220   PRINT "TX Power=";Avg_tx_pwr
230   END
```

Returned Values

The measurements returned by this program are:

- Integrity returns the measurement “Integrity Indicator” on page 411 (0 means a successful measurement with no errors).
- Avg_tx_pwr returns the average transmit power in dBm.

Related Topics

“Testing a Mobile for Enhanced Full Rate Speech and Half Rate Speech Channel Modes” on page 201

“CALL:TCHannel:CMODe[:VALue]” on page 823

Programming an Audio Level Measurement

This measurement is *not* applicable to GPRS.

This section provides an example of how to make an audio level measurement via the GPIB.

The following procedure assumes that an audio source is connected to the AUDIO IN connectors. See "Analog Audio Measurement Description" on page 80.

1. Configure analog audio measurement parameters using the SETup subsystem. Even though default settings exist for each parameter, it is preferable to deliberately set each parameter to make sure the setting is correct for the specific audio analyzer measurement you are making.
2. Start the analog audio measurement using the INITiate subsystem.
3. Use the FETCh? subsystem to obtain analog audio measurement results.

Programming Example

```
10  OUTPUT 714;"SETup:AAUDio:CONTinuous OFF" !Set the analog audio
20                                            !measurements to single trigger mode.
30  OUTPUT 714;"SETup:AAUDio:EXPECTED:VOLTage 3V" !Set the Expected Amplitude level for
40                                                 !audio input voltage in Vpeak.
50  OUTPUT 714;"SETup:AAUDio:SDIStortion:STATe OFF" !Turn off the SINAD and
60                                                   !distortion measurements since
70                                                   !they are not being used.
80  OUTPUT 714;"SETup:AAUDio:FILTer:TYPE NONE" !Bypass all audio filters.
90  OUTPUT 714;"SETup:AAUDio:DEMPhasis:STATe OFF" !Turn off de-emphasis.
100 OUTPUT 714;"SETup:AAUDio:EXPANDOR:STATe OFF" !Turn off the expandor.
110 OUTPUT 714;"SETup:AAUDio:DETector RMS" !Specify the RMS detector for the
120                                             !audio measurement.
130 OUTPUT 714;"SETup:AAUDio:TIMeout 3S" !Set a timeout value of 3 seconds
140                                       !in case the measurement cannot be made.
150 OUTPUT 714;"INITiate:AAUDio" !Start the Analog Audio measurement.
120 OUTPUT 714;"FETCh:AAUDio:INTegrity?" !Query the integrity indicator to
130                            !verify that a reliable measurement was made.
140 ENTER 714;Integrity  !Enter the returned value into a variable for comparison
150                      !with possible integrity indicator values (not shown here).
160 IF Integrity=0 THEN  !Only fetch measurement result if integrity indicator is 0.
170  OUTPUT 714;"FETCh:AAUDio:VOLTage?" !Fetch the Audio Level result.
180  ENTER 714;Audio_level  !Enter the result into a variable.
190 END IF
200 END
```

Returned Values

The results returned by this program are:

- `Integrity` returns the measurement integrity indicator (0 means a successful measurement with no errors). See "Integrity Indicator" on page 411.
- `Audio_level` returns the audio level in volts rms.

Related Topics

"Analog Audio Measurement Description" on page 80

"Analog Audio Troubleshooting" on page 1454

"INITiate" on page 990

"SETup:AAUDio" on page 1035

"FETCh:AAUDio" on page 865

Programming an Audio Frequency Measurement

This measurement is *not* applicable to GPRS.

This section provides an example of how to make an Audio Frequency measurement via the GPIB.

The following procedure assumes that an audio source is connected to the AUDIO IN connectors. See "Analog Audio Measurement Description" on page 80.

1. Configure the analog audio measurement parameters using the SETup subsystem. When more than one audio frequency signal may be present, use the 100 Hz bandpass filter to isolate the desired signal to measure (see the Programming Example below).
2. Start the audio frequency measurement using the INITiate subsystem.
3. Use the FETCh? subsystem to obtain analog audio measurement results.

Programming Example

```
10  OUTPUT 714;"SETup:AAUDio:CONTinuous OFF" !Set the audio
20                                           !measurements to single trigger mode.
30 OUTPUT 714;"SETup:AAUDio:EXPected:VOLTage 3V" !Set the Expected peak voltage
40                                                !for the audio input level in Vpeak.
50  OUTPUT 714;"SETup:AAUDio:FREQuency:STATe ON" !Enable audio frequency measurement.
60  OUTPUT 714;"SETup:AAUDio:FILTer:STATe ON" !Enable the bandpass filter.
70  OUTPUT 714;"SETup:AAUDio:FILTer:FREQuency 8000 Hz" !Set the filter's center
80     !frequency to 8 kHz.
90  OUTPUT 714;"SETup:AAUDio:TIMeout 3S" !Set a timeout value of 3 seconds
100                                      !in case the measurement cannot be made.
110 OUTPUT 714;"INITiate:AAUDio" !Start the Analog Audio measurement.
120 OUTPUT 714;"FETCh:AAUDio:INTegrity?" !Query the integrity indicator to
130                            !verify that a reliable measurement was made.
140 ENTER 714;Integrity  !Enter the returned value into a variable for comparison
150                      !with possible integrity indicator values (not shown here).
160 IF Integrity=0 THEN  !Only fetch measurement result if integrity indicator is 0.
170  OUTPUT 714;"FETCh:AAUDio:FREQuency?" !Fetch the analog audio frequency result.
180  ENTER 714;Audio_frequency !Enter the result into a variable.
190 END IF
200 END
```

Returned Values

The results returned by this program are:

- `Integrity` returns the measurement integrity indicator (0 means a successful measurement with no errors). See "Integrity Indicator" on page 411.
- `Audio_frequency` returns the average audio frequency in hertz.

Related Topics

"Audio Frequency Measurement Description" on page 83

"Analog Audio Troubleshooting" on page 1454

"Analog Audio Measurement Description" on page 80

"INITiate" on page 990

"SETup:AAUDio" on page 1035

"FETCh:AAUDio" on page 865

Programming a Bit Error Measurement

This section contains three programming examples:

- "Programming a Bit Error Measurement for GSM" on page 329
- "Programming a Bit Error Measurement for GPRS" on page 331
- "Programming a Bit Error Measurement for EGPRS" on page 332

Programming a Bit Error Measurement for GSM

This section provides an example of how to make the bit error (BER) measurement via GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See "Establishing an Active GSM Link with the Mobile Station" on page 246.

1. Set the cell power to a good level.
2. Configure BER measurement parameters using the SETup subsystem.
3. Set the measurement type (either residual Type IA, Type IB, Type II, or non-residual Type IA, Type IB, Type II).
4. Set the cell power to a low level for BER measurement.
5. Use the INITiate command to begin a BER measurement.
6. Use the FETCh? command to obtain BER measurement results.
7. Set the cell power to a good level.

Programming Example

```
10     OUTPUT 714;"SETUP:BERROR:TIMEOUT:TIME 5" ! BER measurement times out after
20                                             ! 5 seconds.
30    OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -102 DBM" ! Sets the cell power level
40                                                     ! to a "low" level for the
50                                                     ! BER measurement.
60     OUTPUT 714;"SETUP:BERROR:CONTINUOUS OFF" ! Configures a BER measurement to
70                                               ! Single Trigger.
80     OUTPUT 714;"SETUP:BERROR:COUNT 10000" ! Sets the number of bits to measure
90                                            ! at 10,000.
100     OUTPUT 714;"SETUP:BERROR:CLSDELAY:STIME 500 MS" ! Sets the Close Loop Delay
110                                                      ! to 500 ms.
120    OUTPUT 714;"SETUP:BERROR:SLCONTROL ON" ! Sets the Signal Loop Control state to on.
130    OUTPUT 714;"SETUP:BERROR:TYPE TYPEIA" ! Sets the Measurement Type to IA.
140    OUTPUT 714;"SETUP:BERROR:LDCONTROL:AUTO OFF" ! Configure loopback delay
150                                                  ! control to manual.
160    OUTPUT 714;"SETUP:BERROR:MANUAL:DELAY 6" ! Set frame delay to 6 frames in order
170                                             ! to correlate uplink and downlink bits.
180    OUTPUT 714;"INITIATE:BERROR"  ! Start a BER measurement.
190    OUTPUT 714;"FETCH:BERROR?" ! BERR results.
```

```
200   ENTER 714;Integrity,Bits_tested,Bit_err_ratio,Bit_err_count
210   OUTPUT 714;"FETCH:BERROR:COUNT:CRC?" ! Query CRC Count results.
220   ENTER 714;Crc_count
230   OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -85 DBM" ! Sets the cell power level
240                                                  ! to a good level.
250   END
```

Alternatively, you could use the "FETCh:BERRor:FULL?" query to return the same results but for all bit types simultaneously.

Returned values

The measurements returned by this program are:

- `Integrity` returns the "Integrity Indicator" on page 411 (0 means a successful measurement with no errors).
- `Bits_tested` returns the number of bits tested.
- `Bit_err_ratio` returns the ratio of bit errors to total bits tested.
- `Bit_err_count` returns the number of bit errors.
- `Crc_count` returns the CRC count (cyclic redundancy check).

Related Topics

"Bit Error Measurement Description" on page 85

"SETup:BERRor" on page 1047

"INITiate" on page 990

"FETCh:BERRor" on page 877

"Programming: Getting Started Guide for E1968A GSM/GPRS Mobile Test Application Revision A.01 and E6701C GSM/GPRS Lab Application Revision C.01" on page 266

"Bit Error Troubleshooting" on page 1455

Programming a Bit Error Measurement for GPRS

This section provides an example of how to make the GPRS bit error (BER) measurement via GPIB.

The following procedure assumes that the Operating Mode has been set to Active Cell (using “CALL:OPERating:MODE” on page 610) and the data connection type has been set to ETSI Type B (using “CALL:FUNCtion:CONNection:TYPE” on page 538). In addition, it is assumed that a data connection has been established between the test set and the mobile station (that is, the connection status is Transferring). See “Step 4: Make a Connection” on page 276. Note that you can also make BER measurements when the test set’s operating mode is set to GPRS BCH+PDTCH test mode (see “CALL:OPERating:MODE” on page 610).

1. Configure the BCH and PDTCH parameters using the CALL subsystem.
2. Configure the Bit Error measurement parameters using the SETup subsystem.
3. Configure the downlink PDTCH parameters using the CALL subsystem.
4. Start the Bit Error measurement using the INITiate subsystem.
5. Use the FETCh? command to obtain Bit Error measurement results.

Programming Example

```
10   ! This code assumes that the current data connection state is Transferring.
20   !
30   ! Configure BCH and PDTCH parameters.
40   OUTPUT 714;"CALL:POW -60 DBM" ! Set the BCH power.
50   OUTPUT 714;"CALL:PDTCH:PZER:LEV 30" ! Set the P0 reference level to 30 dB.
60   OUTPUT 714;"CALL:PDTCH:CSCH CS4" ! Set the channel coding scheme to CS4.
70   ! Configure the measurement parameters
80   OUTPUT 714;"SET:GBER:TIM:TIME 5" ! BER measurement times out after
90                                    ! 5 seconds.
100  OUTPUT 714;"SET:GBER:CONT OFF" ! Configures a BER measurement to
110                                 ! Single Trigger.
120  OUTPUT 714;"SET:GBER:COUN 10000" ! Sets the number of bits to measure
130                                   ! at 10,000.
140  OUTPUT 714;"SET:GBER:LDC:AUTO ON" ! Sets the Loopback Delay
150                                    ! Control mode to ON. This
160                                    ! commands the test set to
170                                    ! determine the Block Delay.
180  ! Set up and select the downlink PDTCH power reduction levels.
190  OUTPUT 714;"CALL:PDTCH:PRED:LEV1 12db"
200  OUTPUT 714;"CALL:PDTCH:PRED:LEV2 0dB"
210  OUTPUT 714;"CALL:PDTCH:PRED:BURS1 PRL1"
220  OUTPUT 714;"CALL:PDTCH:PRED:BURS2 PRL1"
230  OUTPUT 714;"INIT:GBER"  ! Start a BER measurement.
240  OUTPUT 714;"FETC:GBER?"
250  ENTER 714;Integrity,Bits_tested,Bit_ratio,Bit_err_cnt
260  END
```

Returned values

The measurements returned by this program are:

- `Integrity` returns the “Integrity Indicator” on page 411 (0 means a successful measurement with no errors).
- `Bits_tested` returns the number of bits tested.
- `Bit_ratio` returns the ratio of bit errors to total bits tested.
- `Bit_err_cnt` returns the number of bit errors.

Related Topics

“Bit Error Measurement Description” on page 85

“SETup:GBERror” on page 1100

“INITiate” on page 990

“FETCh:GBERror” on page 911

“Bit Error Troubleshooting” on page 1455

Programming a Bit Error Measurement for EGPRS

This section provides an example of how to make the EGPRS bit error (BER) measurement via GPIB.

The following procedure assumes that the Operating Mode has been set to Active Cell (using “CALL:OPERating:MODE” on page 610) and the data connection type has been set to ETSI Type B (using “CALL:FUNCtion:CONNection:TYPE” on page 538). In addition, it is assumed that a data connection has been established between the test set and the mobile station (that is, the connection status is Transferring). See “Step 4: Make a Connection” on page 276. Note that you can also make BER measurements when the test set’s operating mode is set to EGPRS BCH+PDTCH test mode (see “CALL:OPERating:MODE” on page 610).

1. Configure the BCH and PDTCH parameters using the CALL subsystem.
2. Configure the Bit Error measurement parameters using the SETup subsystem.
3. Configure the downlink PDTCH parameters using the CALL subsystem.
4. Start the Bit Error measurement using the INITiate subsystem.
5. Use the FETCh? command to obtain Bit Error measurement results.

Programming Example

```
10   ! This code assumes that the current data connection state is Transferring.
20   !
30   ! Configure BCH and PDTCH parameters.
40   OUTPUT 714;"CALL:POW -60 DBM" ! Set the BCH power.
50   OUTPUT 714;"CALL:PDTCH:PZER:LEV 30" ! Set the P0 reference level to 30 dB.
60   OUTPUT 714;"CALL:PDTCH:MCSC MCS3" ! Set the modulation coding scheme to MCS3.
70   ! Configure the measurement parameters
80   OUTPUT 714;"SET:GBER:TIM:TIME 5" ! BER measurement times out after
90                                    ! 5 seconds.
100  OUTPUT 714;"SET:GBER:CONT OFF" ! Configures a BER measurement to
110                                 ! Single Trigger.
120  OUTPUT 714;"SET:GBER:COUN 10000" ! Sets the number of bits to measure
```

```
130                                   ! at 10,000.
140  OUTPUT 714;"SET:GBER:LDC:AUTO ON" ! Sets the Loopback Delay
150                                    ! Control mode to ON. This
160                                    ! commands the test set to
170                                    ! determine the Block Delay.
180  ! Set up and select the downlink PDTCH power reduction levels.
190  OUTPUT 714;"CALL:PDTCH:PRED:LEV1 12db"
200  OUTPUT 714;"CALL:PDTCH:PRED:LEV2 0dB"
210  OUTPUT 714;"CALL:PDTCH:PRED:BURS1 PRL1"
220  OUTPUT 714;"CALL:PDTCH:PRED:BURS2 PRL1"
230  OUTPUT 714;"INIT:GBER"  ! Start a BER measurement.
240  OUTPUT 714;"FETC:GBER?"
250  ENTER 714;Integrity,Bits_tested,Bit_ratio,Bit_err_cnt
260  END
```

Returned values

The measurements returned by this program are:

- `Integrity` returns the “Integrity Indicator” on page 411 (0 means a successful measurement with no errors).
- `Bits_tested` returns the number of bits tested.
- `Bit_ratio` returns the ratio of bit errors to total bits tested.
- `Bit_err_cnt` returns the number of bit errors.

Related Topics

“Bit Error Measurement Description” on page 85

“SETup:GBERror” on page 1100

“INITiate” on page 990

“FETCh:GBERror” on page 911

“Bit Error Troubleshooting” on page 1455

Programming a Block Error Measurement

This measurement is *not* applicable to GSM.

This section provides an example of how to make the block error (BLER) measurement via GPIB.

The following procedure assumes that the Operating Mode has been set to Active Cell (using "CALL:OPERating:MODE" on page 610) and the data connection type has been set to ETSI Type B or BLER (using "CALL:FUNCtion:CONNection:TYPE" on page 538). In addition, it is assumed that a data connection has been established between the test set and the mobile station (that is, the connection status is Transferring). See "Step 4: Make a Connection" on page 276. Note that you can also make BLER measurements when the test set's operating mode is set to GPRS BCH+PDTCH test mode (see "CALL:OPERating:MODE" on page 610).

1. Configure the BCH and PDTCH parameters using the CALL subsystem.
2. Configure the Block Error measurement parameters using the SETup subsystem.
3. Configure the downlink PDTCH parameters using the CALL subsystem.
4. Start the Block Error measurement using the INITiate subsystem.
5. Use the FETCh? command to obtain Block Error measurement results.

Programming Example

```
10   ! This code assumes that the current data connection state is Transferring.
20   !
30   ! Configure BCH and PDTCH parameters.
40   OUTPUT 714;"CALL:POW -50 DBM" ! Set the BCH power.
50   OUTPUT 714;"CALL:PDTCH:PZER:LEV 30" ! Set the P0 reference level to 30 dB.
60   OUTPUT 714;"CALL:PDTCH:MCSC MCS3" ! Set the modulation coding scheme to MCS3.
70   ! Configure the measurement parameters
80   OUTPUT 714;"SET:BLER:TIM:TIME 5" ! BLER measurement times out after
90                                    ! 5 seconds.
100  OUTPUT 714;"SET:BLER:CONT OFF" ! Configures a BLER measurement to
110                                 ! Single Trigger.
120  OUTPUT 714;"SET:BLER:COUN 2000"  ! Sets the number of blocks to measure
130                                   ! at 2,000.
140  OUTPUT 714;"SET:BLER:LDC:AUTO ON" ! Sets the Loopback Delay
150                                    ! Control mode to ON. This
160                                    ! commands the test set to
170                                    ! determine the Block Delay.
180  ! Set up and select the downlink PDTCH power reduction levels.
190  OUTPUT 714;"CALL:PDTCH:PRED:LEV1 12db"
200  OUTPUT 714;"CALL:PDTCH:PRED:LEV2 0dB"
210  OUTPUT 714;"CALL:PDTCH:PRED:BURS1 PRL1"
220  OUTPUT 714;"CALL:PDTCH:PRED:BURS2 PRL1"
230  OUTPUT 714;"INIT:BLER"  ! Start a BLER measurement.
240  REPEAT
```

```
250     OUTPUT 714;"INIT:DONE?"
260     ENTER 714;Meas_complete$
270   UNTIL Meas_complete$="BLER"
280   ! Fetch results.
290   OUTPUT 714;"FETC:BLER?"
300   ENTER 714;Integrity,Blocks_tested,Block_ratio,Block_err_cnt
310   END
```

Returned values

The measurements returned by this program are:

- `Integrity` returns the “Integrity Indicator” on page 411 (0 means a successful measurement with no errors).
- `Blocks_tested` returns the number of blocks tested.
- `Block_ratio` returns the ratio of block errors to total blocks tested.
- `Block_err_cnt` returns the number of block errors.

Related Topics

“Block Error Measurement Description” on page 90

“SETup:BLERror” on page 1057

“INITiate” on page 990

“FETCh:BLERror” on page 888

“Block Error Troubleshooting” on page 1456

Programming a Decoded Audio Measurement

This measurement is *not* applicable to GPRS.

This section provides an example of how to make a Decoded Audio (DAUDio) measurement. The following procedure assumes that an active link is established between the test set and the mobile station. See "Establishing an Active GSM Link with the Mobile Station" on page 246.

1. Configure decoded audio measurement parameters using the SETup subsystem.
2. Setup the audio source to stimulate the mobile station with a pulsed audio signal.
3. Start the decoded audio measurement using the INITiate subsystem.
4. Use the FETCh? command to obtain decoded audio measurement results.

Programming Example

```
10     OUTPUT 714;"SETUP:DAUDIO:CONTINUOUS OFF"         ! Configures the decoded audio
20                                                      ! measurement to single trigger mode.
30     OUTPUT 714;"AFGENERATOR:PULSE:STATE ON"          ! Audio signal must be pulsed.
40     OUTPUT 714;"AFGENERATOR:VOLTAGE:SAMPLITUDE 100MV"
50     OUTPUT 714;"AFGENERATOR:FREQUENCY 2.1KHZ"
60     OUTPUT 714;"SETUP:DAUDIO:FILTER:SFREQUENCY 2.1KHZ"! Specifies the tunable
70                                                       ! bandpass filter frequency
80                                                       ! and set the filter state to on.
90     OUTPUT 714;"INITIATE:DAUDIO"
100    OUTPUT 714;"FETCH:DAUDIO?"                        ! Fetch the decoded audio results.
110    ENTER 714;Ingerity,Decoded_audio
120    END
```

Returned Values

The measurements returned by this program are:

- `Integrity` returns the measurement "Integrity Indicator" on page 411 (0 means a successful measurement with no errors).
- `Decoded_audio` returns the decoded audio measurement results in percent (%).

Related Topics

"Decoded Audio Measurement Description" on page 95

"SETup:DAUDio" on page 1063

"INITiate" on page 990

"FETCh:DAUDio" on page 892

Programming a Distortion Measurement

Last updated: March 25, 2003

This measurement is *not* applicable to GPRS.

This section provides an example of how to make a distortion measurement via the GPIB. Distortion measurements are not typically made when testing GSM mobiles but are more common when testing AMPS or other analog mobiles. The programming example below is typical for a 136 mobile.

SINAD and Distortion measurements are affected by the same STATe and INITiate commands, so both measurements are enabled and triggered at the same time. However, measurement results are queried separately. See “Analog Audio Measurement Description” on page 80.

The following procedure assumes that the mobile’s audio output is connected to the AUDIO IN connectors and the mobile is on an analog voice channel (AVC). The AVC is being modulated with a 1004 Hz tone at +/–8 kHz peak deviation, and a 6000 Hz supervisory audio tone (SAT) at +/–2 kHz peak deviation. It is also assumed that the Cell Power from the test set is set to -50 dBm.

1. Configure analog audio measurement parameters using the SETup subsystem.
2. Start the analog audio measurement using the INITiate subsystem.
3. Use the FETCh? subsystem to obtain analog audio measurement results.

Programming Example

```
10  OUTPUT 714;”SETup:AAUDio:CONTinuous OFF” !Set the analog audio
20                                           !measurements to single trigger mode.
30  OUTPUT 714;”SETup:AAUDio:EXPected:VOLTage 3V” !Set the Expected Amplitude level for
40                                                !audio input voltage in Vpeak.
50  OUTPUT 714;”SETup:AAUDio:SDIStortion:STATe ON” !Turn on the SINAD and
60                                                  !distortion measurements.
70  OUTPUT 714;”SETup:AAUDio:SDIStortion:FREQuency 1004 HZ” !Specify the audio
80                                       !frequency to use for the measurements.
90  OUTPUT 714;”SETup:AAUDio:FILTer:TYPE CMESsage” !Select the c-message filter.
100 OUTPUT 714;”SETup:AAUDio:DEMPhasis:STATe OFF” !Turn off de-emphasis.
110 OUTPUT 714;”SETup:AAUDio:EXPANDOR:STATe OFF” !Turn off the expandor.
120 OUTPUT 714;”SETup:AAUDio:TIMeout 3S” !Set a timeout value of 3 seconds
130                                       !in case the measurement cannot be made.
140 OUTPUT 714;”INITiate:AAUDio” !Start the Analog Audio measurement.
150 OUTPUT 714;”FETCh:AAUDio:INTegrity?” !Query the integrity indicator to
160                            !verify that a reliable measurement was made.
170 ENTER 714;Integrity  !Enter the returned value into a variable for comparison
180                      !with possible integrity indicator values (not shown here).
190 IF Integrity=0 THEN  !Only fetch measurement result if integrity indicator is 0.
200  OUTPUT 714;”FETCh:AAUDio:DISTortion?” ! Fetch the Distortion result.
210  ENTER 714;Distortion !Enter the returned value into a variable.
220 END IF
230 END
```

Returned Values

The results returned by this program are:

- `Integrity` returns the measurement integrity indicator; 0 means a successful measurement with no errors. See “Integrity Indicator” on page 411.
- `Distortion` returns the Distortion measurement value in percent (%).

Related Topics

“Analog Audio Measurement Description” on page 80

“Analog Audio Troubleshooting” on page 1454

“Distortion Measurement Description” on page 97

“INITiate” on page 990

“SETup:AAUDio” on page 1035

“FETCh:AAUDio” on page 865

Programming a Dynamic Power Measurement

This section provides an example of how to make a Dynamic Power measurement via the GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See "Establishing an Active GSM Link with the Mobile Station" on page 246.

1. Configure the Dynamic Power measurement parameters using the SETup subsystem.
2. Start the Dynamic Power measurement using the INITiate subsystem.
3. Use the INITiate:DONE? command to determine if Dynamic Power measurement results are available.
4. Use the FETCh? commands to obtain Dynamic Power measurement results.

Programming Example

The following program shows how to use the Dynamic Power measurement to measure a GSM mobile station's power control level capability when using SACCH (Slow Associated Control Channel) TX Level Signaling. This technique is based upon the RF power control characteristics specified in GSM 05.08 section 6.3.0 Release 1997.

```
10    ! INITIALIZE VARIABLES IN THE TEST
20    !
30    Sacch_time=TIMEDATE  ! Set up a variable to capture test time
40    OPTION BASE 1  ! Set default lower bound of array subscripts to 1
50    REAL Integ1(100),Txp1(100),Power(300)
60    REAL Integ2(100),Txp2(100),Integ3(100),Txp3(100)
70    REAL Start_power,Stop_power
80    INTEGER Test_set,I,Start_level,Stop_level
90    Test_set=714
100   Start_level=5
110   Start_power=33.0
120   Stop_level=15
130   Stop_power=13.0
140   !
150   OUTPUT Test_set;"RFAN:MAN:POW:BURS1 33"  ! Set expected power
160   OUTPUT Test_set;"SYST:CORR -1.2"   ! Set value to compensate for cable loss
170   !
180   ! SETUP DPOW PARAMETERS
190   OUTPUT Test_set;"SET:DPOW:CONT OFF;EMD 2"
200   OUTPUT Test_set;"SET:DPOW:COUN:NUMBER 300"  ! Set the number of bursts high enough
210                                              ! to capture all 10 power level changes
220   OUTPUT Test_set;"CALL:SIGN:MS:TXL:FACCH 1" ! Switch on FACCH mode
230   !
240   ! CHANGE POWER LEVEL FROM 5 TO 15
250   OUTPUT Test_set;"CALL:MS:TXL:SEQ ";Start_level
260   OUTPUT Test_set;"CALL:SIGN:MS:TXL:FACCH 0"  ! Switch off FACCH signaling - only
270                                              ! SACCH header is used
280   OUTPUT Test_set;"CALL:MS:TXL:SEQ ";Stop_level
290   !
```

```
300 ! A SHORT WAIT MIGHT BE NEEDED HERE TO ENSURE 100 PERCENT RELIABILITY OF MEASUREMENT
310 ! THIS MAY BE DEPENDENT ON THE PHONE AND IS TO ENSURE THAT VERY LAST POWER STEP IS
320 ! ALWAYS CAPTURED
330 ! WAIT .1
340   !
350   ! INITIATE DPOW MEASUREMENT AND FETCH RESULTS
360   OUTPUT Test_set;"INIT:DPOW"
370   REPEAT
380     OUTPUT 714;"INIT:DONE?"
390     ENTER 714;Meas_complete$
400   UNTIL Meas_complete$="DPOW"
410   OUTPUT Test_set;"FETC:DPOW?"
420   ENTER Test_set;Integ1(*),Txp1(*)
430   OUTPUT Test_set;"FETC:DPOW:RANG2?"
440   ENTER Test_set;Integ2(*),Txp2(*)
450   OUTPUT Test_set;"FETC:DPOW:RANG3?"
460   ENTER Test_set;Integ3(*),Txp3(*)
470   !
480   ! LOAD TXP RESULTS WHICH HAVE VALID INTEGRITY INTO ARRAY
490   !
500   ! PROCESS BURSTS 1 TO 100
510   K=1
520     FOR J=1 TO 100
530       IF Integ1(J)=0 THEN
540         Power(K)=Txp1(J)
550         K=K+1
560       END IF
570     NEXT J
580   ! PROCESS BURSTS 101 TO 200
590     FOR J=1 TO 100
600       IF Integ2(J)=0 THEN
610         Power(K)=Txp2(J)
620         K=K+1
630       END IF
640     NEXT J
650   ! PROCESS BURSTS 201 TO 300
660     FOR J=1 TO 100
670       IF Integ3(J)=0 THEN
680         Power(K)=Txp3(J)
690         K=K+1
700       END IF
710     NEXT J
720   !
730   PRINT
740   !
750   ! PRINT MEASUREMENT RESULTS
760   PRINT "Measured TX Levels from 5 to 15 using SACCH Method"
770   PRINT
780   I=1
790   FOR J=Start_level TO Stop_level
800     LOOP
810       IF I=(K-1) THEN
820         PRINT "MS TX LEVEL=";J,"MEASURED POWER=";PROUND(Power(I),-2)
```

```
830         GOTO 920
840       END IF
850     EXIT IF (PROUND(Power(I),-2)-PROUND(Power(I+1),-2))>=.8
860       I=I+1
870     END LOOP
880     PRINT "MS TX LEVEL=";J,"MEASURED POWER=";Power(I)
890     I=I+1
900   NEXT J
910   !
920   ! PRINT TOTAL TIME FOR PROGRAM TO COMPLETE
930   PRINT "Total Test Time=";PROUND(TIMEDATE-Sacch_time,-2);"Seconds"
940   END
```

Returned Values

The measurements returned by this program are:

- `Integ1`, `Integ2`, and `Integ3` return the measurement integrity indicators for each of the ranges used when the Dynamic Power measurement is made over 300 bursts (0 means a successful measurement with no errors). If you require more details, see "Integrity Indicator" on page 411.
- `Txp1()`, `Txp2()`, and `Txp3()` return the average TX power results for each of the ranges used over 300 bursts. For example, `Txp1()` returns average TX power results for bursts 1 to 100.
- `Power()` returns average TX power results for all bursts which have been successfully measured with no errors. That is, only results with an integrity indicator of 0 are contained in `Power()`. This program does not display the entire contents of the `Power()` array. It only displays the results which correlate with power level changes 5 to 15.
- `Sacch_time` returns the total test time.

Related Topics

"Dynamic Power Measurement Description" on page 98

"SETup:DPOWer" on page 1070

"INITiate" on page 990

"FETCh:DPOWer" on page 897

Programming a Fast Bit Error Measurement

This measurement is *not* applicable to GPRS or EGPRS.

This section provides an example of how to make the fast bit error (FBER) measurement via GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See "Establishing an Active GSM Link with the Mobile Station" on page 246.

1. Set the cell power to a good level.
2. Configure FBER measurement parameters using the SETup subsystem.
3. Set the cell power to a low level for a FBER measurement.
4. Start the FBER measurement using the INITiate subsystem.
5. Use the FETCh? command to obtain FBER measurement results.
6. Set the cell power to a good level.

Programming Example

```
10     OUTPUT 714;"SETUP:FBERROR:TIMEOUT:TIME 5" ! BER measurement times out after
20                                               ! 5 seconds.
30     OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -85 DBM" ! Sets the cell power level to
40                                                    ! a good level.
50     OUTPUT 714;"SETUP:FBERROR:CONTINUOUS OFF" ! Configures a BER measurement to
60                                               ! Single Trigger.
70     OUTPUT 714;"SETUP:FBERROR:COUNT 10000" ! Sets the number of bits to measure
80                                            ! at 10,000.
90     OUTPUT 714;"SETUP:FBERROR:CLSDELAY:STIME 500 MS" ! Sets the Close Loop Delay
100                                                     ! to 500 ms.
110    OUTPUT 714;"SETUP:FBERROR:SLCONTROL ON" ! Sets the Signal Loop Control state to on.
120    OUTPUT 714;"SETUP:FBERROR:LDCONTROL:AUTO OFF" ! Configure loopback delay
130                                                  ! control to manual.
140    OUTPUT 714;"SETUP:FBERROR:MANUAL:DELAY 6" ! Set frame delay to 6 frames in order
150                                              ! to correlate uplink and downlink bits.
160    OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -102 DBM" ! Sets the cell power level
170                                                    ! to a "low" level for the
180                                                    ! BER measurement.
190    OUTPUT 714;"INITIATE:FBERROR"  ! Start a FBER measurement.
200    OUTPUT 714;"FETCH:FBERROR?"
210    ENTER 714;Integrity,Bits_tested,Fas_bit_ratio,Fas_bit_err_cnt
220    OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -85 DBM" ! Sets the cell power level
230                                                   ! to a good level.
240    END
```

Returned values

The measurements returned by this program are:

- `Integrity` returns the measurement “Integrity Indicator” on page 411 (0 means a successful measurement with no errors).
- `Bits_tested` returns the number of bits tested.
- `Bit_error_ratio` retuns the ratio of bit errors to total bits tested, in percent (%).
- `Bit_error_count` returns the number of bit errors.

Related Topics

“Fast Bit Error Measurement Description” on page 100

“SETup:FBERror” on page 1090

“INITiate” on page 990

“FETCh:FBERror” on page 907

“GSM/GPRS Control Program Example” on page 1

Programming an I/Q Tuning Measurement

This section provides an example of how to make an I/Q Tuning measurement via the GPIB.

1. Ensure that the mobile is in test mode and is transmitting all 1s or all 0s.
2. Ensure that the expected frequency, expected power level and trigger are appropriately set.
3. Configure the I/Q Tuning measurement parameters using the SETup subsystem.
4. Start the I/Q Tuning measurement using the INITiate subsystem.
5. Use the FETCh? command to obtain I/Q Tuning measurement results.

Programming Example

The following program shows how to make an I/Q Tuning measurement on a normal GSM TCH burst. If you want to test a CW signal all you need to change in this program is the trigger type, which should be set to Immediate, rather than RF Rise.

```
10    PRINT “Ensure your mobile is transmitting:” !On-screen prompts.
20    PRINT “-all 1s or all 0s.”
30    PRINT “-on ARFCN 30.”
40    PRINT “-a power level of 10 dBm.”
50    PRINT “                         “
60    PRINT “Press any key to continue.”
70    LOOP
80      ON KBD GOTO Key_exit
90    END LOOP
100 Key_exit: !
110   OUTPUT 714;”RFANALYZER:MANUAL:CHANNEL:SELECTED 30” !Configures the
120                         !test set to expect a transmission on ARFCN 30.
130   OUTPUT 714;”RFANALYZER:EXPECTED:POWER:SELECTED 10 DBM” !Configures
140                        !the test set to expect a power level of 10 dBm.
150   OUTPUT 714;”SETUP:IQTUNING:CONTINUOUS OFF”  !Configures trigger
160                          !mode to single for an I/Q Tuning measurement.
170   OUTPUT 714;”SETUP:IQTUNING:COUNT:SNUMBER 50”  !Configures the
180   OUTPUT 714;”SETUP:IQTUNING:SPUR:STATE ON”  !Configures spur on.
190   OUTPUT 714;”SETUP:IQTUNING:SPUR:FREQUENCY 10MHZ” !Configures a
200   !power measurement at 10MHz from the carrier.
210   !multi_measurement state to ON with a measurement count value
220   !of 50.
230   OUTPUT 714;”SETUP:IQTUNING:TRIGGER:SOURCE RISE” !Configures the
240                                          !trigger source to RF RISE.
250   OUTPUT 714;”SETUP:IQTUNING:REFERENCE:FREQUENCY AUTO” !Sets the
260   !set to choose which offset frequency is to be used as the ref.
270   OUTPUT 714;”INITIATE:IQTUNING” !Start I/Q Tuning measurement.
280   OUTPUT 714;”FETCH:IQTUNING:ALL?”!Fetches the measurement integrity
290   !value and the relative power levels at the offset frequencies.
300   ENTER 714;Integrity,N270,N203,N135,N67,Carrier,P67,P135,P203,P270,Sr
310   PRINT “I/Q Tuning Measurement Results”
```

```
320   PRINT “Integrity = “;Integrity
330   PRINT “Spur Power = “;Sr
340   PRINT “Offset (kHz)       Level (dB)”
350   PRINT “------------       ----------”
360   PRINT “-270.334          “;N270
370   PRINT “-203.125          “;N203
380   PRINT “-135.417          “;N135
390   PRINT “-67.708           “;N67
400   PRINT “0.000             “;Carrier
410   PRINT “+67.708           “;P67
420   PRINT “+135.417          “;P135
430   PRINT “+203.125          “;P203
440   PRINT “+270.334          “;P270
450   END
```

Returned Values

The measurements returned by this program are:

- Integrity returns the measurement “Integrity Indicator” on page 411 (0 means a successful measurement with no errors).
- The signal level of the following offsets are measured relative to the signal level at the reference offset (either Fc + 67.7083 kHz for all 0s or Fc -67.7083 kHz for all 1s). Note, if the TX I/Q Tuning measurement multi-measurement command is set to ON the average of all the individual results at each offset are returned.

  — -270.833 kHz

  — -203.125 kHz

  — -135.417 kHz

  — -67.7083 kHz

  — Carrier Frequency

  — +67.7083 kHz

  — +135.417 kHz

  — +203.125 kHz

  — +270.833 kHz

Related Topics

“I/Q Tuning Measurement Description” on page 103

“SETup:IQTuning” on page 1106

“INITiate” on page 990

“FETCh:IQTuning” on page 915

Programming an Output RF Spectrum Measurement

This section contains two programming examples:

- "Programming an Output RF Spectrum Measurement for GSM" on page 347
- "Programming an Output RF Spectrum Measurement for GPRS and EGPRS" on page 348

Programming an Output RF Spectrum Measurement for GSM

This section provides an example of how to make the output RF spectrum (ORFS) measurement via GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See "Establishing an Active GSM Link with the Mobile Station" on page 246.

1. Configure the ORFS measurement parameters using the SETup subsystem.
2. Start the ORFS measurement using the INITiate subsystem.
3. Use the FETCh? command to obtain ORFS Power measurement results.

Programming Example

```
10  OUTPUT 714;"SETUP:ORFSPECTRUM:CONTINUOUS OFF" !Configures a ORFS measurement
20                                                !to single trigger mode.
30  OUTPUT 714;"SETUP:ORFSPECTRUM:COUNT:STATE ON" !Configures a multi-measurement
40                                                !state to on.
50  OUTPUT 714;"SETUP:ORFSPECTRUM:TRIGGER:SOURCE AUTO" !Configure trigger source
60                                                     !to auto.
70  OUTPUT 714;"SETUP:ORFSPECTRUM:SWITCHING:COUNT:NUMBER 50" !Configures ORFS due
80                                                           !to switching
90                                                           !multi-measurement
100                                                          !count.
110 OUTPUT 714;"SETUP:ORFSPECTRUM:SWITCHING:FREQUENCY 200KHZ,400KHZ" !Configure
120                                                                  !switching
130                                                                  !offsets.
140 OUTPUT 714;"SETUP:ORFSPECTRUM:MODULATION:COUNT:NUMBER 100" !Configure ORFS
150                                                            !due to modulation
160                                                            !multi-measurement
170                                                            !count.
180 OUTPUT 714;"SETUP:ORFSPECTRUM:MODULATION:FREQUENCY 200KHZ" !Configure
190                                                            !modulation offset.
200 OUTPUT 714;"INITIATE:ORFSPECTRUM" !Start ORFS measurement.
210 OUTPUT 714;"FETCH:ORFSPECTRUM:ALL?" !Fetch ORFS results.
220 ENTER 714;Integrity,Tx_pwr,Max_swit_200,Max_swit_400,Bw_pwr,Avg_mod_200
230 END
```

Returned values

The measurements returned by this program are:

- `Integrity` returns the measurement “Integrity Indicator” on page 411 (0 means a successful measurement with no errors).
- `Tx_pwr` returns the transmit power in dBm.
- `Max_swit_200,Max_swit_400` returns maximum ORFS power due to switching in dBm (one maximum power level at a 200 kHz offset and one maximum power level at a 400 kHz offset).
- `Bw_pwr` returns the power level in a 30 kHz bandwidth at zero offset in dBm (this is the reference level for ORFS power due to switching and ORFS power due to modulation).
- `Avg_mod_200` returns the average ORFS power due to modulation in dBm (one average power level at a 200 kHz offset).

Related Topics

“Output RF Spectrum Measurement Description” on page 106

“SETup:ORFSpectrum” on page 1130

“INITiate” on page 990

“FETCh:ORFSpectrum” on page 920

“GSM/GPRS Control Program Example” on page 1

Programming an Output RF Spectrum Measurement for GPRS and EGPRS

This section provides an example of how to make the output RF spectrum (ORFS) measurement via GPIB.

When using the ORFS measurement with an EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). The ORFS measurement does *not* support 8PSK modulation coding schemes at this time (MCS5 through MCS9). For more details on setting the modulation coding scheme, see “CALL:PDTCH:MCSCheme” on page 630.

The following procedure assumes that a data connection has been established between the test set and the mobile station (connection status is Transferring). See “Step 4: Make a Connection” on page 276.

1. Set the multislot configuration to two downlinks, two uplinks (D2U2) and set the uplink power control level for each of the two bursts using the CALL subsystem.
2. Configure the ORFS measurement parameters using the SETup subsystem.
3. Start the ORFS measurement using the INITiate subsystem.
4. Use the FETCh? command to obtain ORFS Power measurement results.

Programming Example

```
10  OUTPUT 714;"CALL:POWER:AMPLITUDE -60"
20  OUTPUT 714;"CALL:PDTCH:MSLOT:CONFIG D2U2" ! Configures the multislot
30                                            ! configuration to be
40                                            ! 2 downlink, 2 uplink.
50  OUTPUT 714;"CALL:PDTCH:MS:TXLEVEL:BURST1 5" ! Sets the uplink power for
60                                              ! the first burst.
```

```
70  OUTPUT 714;"CALL:PDTCH:MS:TXLEVEL:BURST2 5" ! Sets the uplink power for
80                                              ! the second burst.
90  OUTPUT 714;"RFANALYZER:MSLOT:MEASUREMENT:BURST 2" ! Select to measure the
100                                                   ! second uplink burst in the
110                                                   ! multislot configuration.

120 OUTPUT 714;"SETUP:ORFSPECTRUM:CONTINUOUS OFF" !Configures a ORFS measurement
130                                                !to single trigger mode.
140 OUTPUT 714;"SETUP:ORFSPECTRUM:COUNT:STATE ON" !Configures a multi-measurement
150                                               !state to on.
160 OUTPUT 714;"SETUP:ORFSPECTRUM:TRIGGER:SOURCE AUTO" !Configure trigger source
170                                                    !to auto.
180 OUTPUT 714;"SETUP:ORFSPECTRUM:SWITCHING:COUNT:NUMBER 50" !Configures ORFS due
190                                                          !to switching
200                                                          !multi-measurement
210                                                          !count.
220 OUTPUT 714;"SETUP:ORFSPECTRUM:SWITCHING:FREQUENCY 200KHZ,400KHZ" !Configure
230                                                                  !switching
240                                                                  !offsets.
250 OUTPUT 714;"SETUP:ORFSPECTRUM:MODULATION:COUNT:NUMBER 100" !Configure ORFS
260                                                            !due to modulation
270                                                            !multi-measurement
280                                                            !count.
290 OUTPUT 714;"SETUP:ORFSPECTRUM:MODULATION:FREQUENCY 200KHZ" !Configure
300                                                            !modulation offset.
310 OUTPUT 714;"INITIATE:ORFSPECTRUM" !Start ORFS measurement.
320 REPEAT
330   OUTPUT 714;"INITIATE:DONE?" !Check to see if ORFS measurement is done.
340   ENTER 714;Meas_complete$
350 UNTIL Meas_complete$="ORFS" !"ORFS" must be all upper case.
360 OUTPUT 714;"FETCH:ORFSPECTRUM:ALL?" !Fetch ORFS results.
370 ENTER 714;Integrity,Tx_pwr,Max_swit_200,Max_swit_400,Bw_pwr,Avg_mod_200
380 END
```

Returned values

The measurements returned by this program are:

- `Integrity` returns the measurement “Integrity Indicator” on page 411 (0 means a successful measurement with no errors).
- `Tx_pwr` returns the transmit power in dBm.
- `Max_swit_200,Max_swit_400` returns maximum ORFS power due to switching in dBm (one maximum power level at a 200 kHz offset and one maximum power level at a 400 kHz offset). This result relates to the whole multislot configuration.
- `Bw_pwr` returns the power level in a 30 kHz bandwidth at zero offset in dBm (this is the reference level for ORFS power due to switching and ORFS power due to modulation).
- `Avg_mod_200` returns the average ORFS power due to modulation for the specified burst of the multislot configuration in dBm (one average power level at a 200 kHz offset).

Related Topics

"Output RF Spectrum Measurement Description" on page 106

"SETup:ORFSpectrum" on page 1130

"INITiate" on page 990

"FETCh:ORFSpectrum" on page 920

"GSM/GPRS Control Program Example" on page 1

Programming a Phase and Frequency Error Measurement

This section contains two programming examples:

- "Programming a Phase and Frequency Error Measurement for GSM" on page 351
- "Programming a Phase and Frequency Error Measurement for GPRS and EGPRS" on page 352

Programming a Phase and Frequency Error Measurement for GSM

This section provides an example of how to make the phase and frequency error (PFER) measurement via GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See "Establishing an Active GSM Link with the Mobile Station" on page 246.

1. Configure PFER measurement parameters using the SETup subsystem.
2. Start the PFER measurement using the INITiate subsystem.
3. Use the FETCh? command to obtain PFER measurement results.

Programming Example

```
10  OUTPUT 714;"SETUP:PFERROR:CONTINUOUS OFF" !Configures a PFER measurement to
20                                             !single trigger mode.
30  OUTPUT 714;"SETUP:PFERROR:COUNT:NUMBER 100" !Configures a multi-measurement
40                                              !of 100.
50  OUTPUT 714;"SETUP:PFERROR:TRIGGER:SOURCE AUTO"!Configure trigger source
60                                                 !to auto.
70  OUTPUT 714;"SETUP:PFERROR:SYNC MIDAMBLE" !Configures a PFER measurement so
80                                            !that burst synchronization, which
90                                            !will synchronize the timing of the
100                                           !measurement algorithm relative to
110                                           !the data sample, will be set
120                                           !to midamble.
130 OUTPUT 714;"INITIATE:PFERROR" !Starts the PFER measurement.
140 OUTPUT 714;"FETCH:PFERROR:ALL?"
150 ENTER 714;Integrity, Max_phase_err, Max_peak_error, Worst_freq_err
160 END
```

Returned values

The measurements returned by this program are:

- `Integrity` returns the measurement "Integrity Indicator" on page 411 (0 means a successful measurement with no errors).
- `Max_phase_err` returns the maximum rms phase error in degrees
- `Max_peak_phase_error` returns the maximum peak phase error in degrees
- `Worst_freq_err` returns the frequency, in Hz, that is the furthest from zero, if the most positive and the most negative frequency error are the same value, the most positive will be returned.

Related Topics

"Phase and Frequency Error Measurement Description" on page 113

"SETup:PFERror" on page 1147

"INITiate" on page 990

"FETCh:PFERror" on page 934

"GSM/GPRS Control Program Example" on page 1

Programming a Phase and Frequency Error Measurement for GPRS and EGPRS

This section provides an example of how to make the phase and frequency error (PFER) measurement via GPIB.

When using the PFER measurement with an EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). The PFER measurement does *not* support 8PSK modulation coding schemes (MCS5 through MCS9). For more details on setting the modulation coding scheme, see "CALL:PDTCH:MCSCheme" on page 630.

The following procedure assumes that a data connection has been established between the test set and the mobile station (connection status is Transferring). See "Step 4: Make a Connection" on page 276.

1. Set the multislot configuration to two downlinks, two uplinks (D2U2) and set the uplink power control level for each of the two bursts using the CALL subsystem.
2. Configure PFER measurement parameters using the SETup subsystem.
3. Use the RFANalyzer:MSLot:MEASurement:BURSt command to select burst 1 for the first PFER measurement.
4. Start the PFER measurement using the INITiate subsystem.
5. Use the FETCh? command to obtain PFER measurement results.
6. Use the RFANalyzer:MSLot:MEASurement:BURSt command to select burst 2 for the second PFER measurement.
7. Repeat steps 4 to 6 above to perform a PFER measurement on burst 2 of the multislot configuration.

Programming Example

```
10  OUTPUT 714;"CALL:PDTCH:MSLOT:CONFIG D2U2" ! Configures the multi-
20                                             ! slot configuration to be
30                                             ! 2 downlink, 2 uplink.
40  OUTPUT 714;"CALL:PDTCH:MS:TXLEVEL:BURST 9" ! Sets the uplink power for
50                                              ! burst 1 to 25 dBm.
60  OUTPUT 714;"CALL:PDTCH:MS:TXLEVEL:BURST2 6" ! Sets the uplink power for
70                                               ! burst 2 to 31 dBm.
80  OUTPUT 714;"SETUP:PFERROR:CONTINUOUS OFF" !Configures a PFER measurement to
90                                            !single trigger mode.
100 OUTPUT 714;"SETUP:PFERROR:COUNT:NUMBER 100" !Configures a multi-measurement
110                                             !of 100.
120 OUTPUT 714;"SETUP:PFERROR:TRIGGER:SOURCE AUTO" !Configure trigger source
130                                                !to auto.
140 OUTPUT 714;"SETUP:PFERROR:SYNC MIDAMBLE" !Configures a PFER measurement so
```

```
150                                          !that burst synchronization, which
160                                          !will synchronize the timing of the
170                                          !measurement algorithm relative to
180                                          !the data sample, will be set
190                                          !to midamble.
200 OUTPUT 714;"RFANALYZER:MSLOT:MEASUREMENT:BURST 1" ! Perform first PFER
210                                                   ! measurement on burst 1.
220 OUTPUT 714;"INITIATE:PFERROR" !Starts the first PFER measurement.
230 OUTPUT 714;"FETCH:PFERROR:ALL?"
240 ENTER 714;Integrity1,Max_phase_err1,Max_peak_err1,Worst_freq_err1
250 OUTPUT 714;"RFANALYZER:MSLOT:MEASUREMENT:BURST 2" ! Perform next PFER
260                                                   ! measurement on burst 2.
270 OUTPUT 714;"INITIATE:PFERROR" !Starts the next PFER measurement.
280 REPEAT
290    OUTPUT 714;"INITIATE:DONE?"
300    ENTER 714;Meas_complete$
310 UNTIL Meas_complete$="PFER"
320 OUTPUT 714;"FETCH:PFERROR:ALL?"
330 ENTER 714;Integrity2,Max_phase_err2,Max_peak_err2,Worst_freq_err2
340 END
```

Returned values

This program instructs the test set to make two sets of PFER measurements, the first on burst 1 in the multislot configuration and the second on burst 2. The results returned by this program are:

- `Integrity1` returns the measurement "Integrity Indicator" on page 411 (0 means a successful measurement with no errors) for burst 1.
- `Max_phase_err1` returns the maximum rms phase error in degrees for burst 1.
- `Max_peak_err1` returns the maximum peak phase error in degrees for burst 1.
- `Worst_freq_err1` returns the frequency, in Hz, that is the furthest from zero for burst 1. If the most positive and the most negative frequency error are the same value, the most positive is returned.
- A similar set of results are returned for burst 2 (`Integrity2`, `Max_phase_err2`, `Max_peak_err2` and `Worst_freq_err2`).

Related Topics

"Phase and Frequency Error Measurement Description" on page 113

"SETup:PFERror" on page 1147

"INITiate" on page 990

"FETCh:PFERror" on page 934

"GSM/GPRS Control Program Example" on page 1

"Confidence Levels" on page 1524

Programming a Power versus Time Measurement

This section contains two programming examples:

- “Programming a Power versus Time Measurement for GSM” on page 354
- “Programming a Power versus Time Measurement for GPRS and EGPRS” on page 355

Programming a Power versus Time Measurement for GSM

This section provides an example of how to make the power versus time (PvT) measurement via GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See “Establishing an Active GSM Link with the Mobile Station” on page 246.

1. Configure PvT measurement parameters using the SETup subsystem.
2. Start the PvT measurement using the INITiate subsystem.
3. Use the FETCh? command to obtain PvT measurement results.

Programming Example

```
10  OUTPUT 714;”SETUP:PVTIME:CONTINUOUS OFF” !Configures a PvT measurement to
20                                           !single trigger mode.
30  OUTPUT 714;”SETUP:PVTIME:COUNT:NUMBER 100 !Configures a multi-measurment
40                                            !of 100.
50  OUTPUT 714;”SETUP:PVTIME:TRIGGER:SOURCE AUTO” !Configure trigger source
60                                                !to auto.
70  OUTPUT 714;”SETUP:PVTIME:SYNC MIDAMBLE” !Configures a PvT measurement so
80                                           !that burst synchronization, which
90                                           !will synchronize the time of the
100                                          !measurement algorithm relative to
110                                          !the data sample, will be set
120                                          !to midamble.
130 OUTPUT 714;”SETUP:PVTIME:TIME:OFFSET -28US,-18US” !Turns on time markers
140                                                  !-28 and -18 microseconds.
150 OUTPUT 714;”INITIATE:PVTIME” !Start PvT measurement.
160 OUTPUT 714;”FETCH:PVTIME:ALL?” !PvT results for time measurements.
170 ENTER 714;Integrity,Pvt_mask, Pvt_power, Max_offset1, Max_offset2
180 END
```

Returned values

The measurements returned by this program are:

- `Integrity` returns the measurement "Integrity Indicator" on page 411 (0 means a successful measurement with no errors).
- `Pvt_mask` returns the mask pass/fail indicator. When the multi-measurement count is greater than 1, the PvT mask pass/fail result will return Fail (1) if any single measurement fails.
- `Pvt_power` returns the PvT carrier power in dBm.
- `Max_offset1` and `Max_offset2` return the maximum offset levels in dB, relative to the PvT carrier power at the two offsets.

Related Topics for GSM

"GSM Power versus Time Measurement" on page 117

"SETup:PVTime" on page 1163

"INITiate" on page 990

"FETCh:PVTime" on page 947

"GSM/GPRS Control Program Example" on page 1

Programming a Power versus Time Measurement for GPRS and EGPRS

This section provides an example of how to make the power versus time (PvT) measurement via GPIB.

When using the Power versus Time measurement with an EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). The Power versus Time measurement does *not* support 8PSK modulation coding schemes at this time (MCS5 through MCS9). For more details on setting the modulation coding scheme, see "CALL:PDTCH:MCSCheme" on page 630.

The following procedure assumes that the Operating Mode has been set to Active Cell (using "CALL:OPERating:MODE" on page 610) and the data connection type has been set to ETSI Type B (using "CALL:FUNCtion:CONNection:TYPE" on page 538). In addition, it is assumed that a data connection has been established between the test set and the mobile station (connection status is Transferring). See "Step 4: Make a Connection" on page 276.

Note that you can also make power versus time measurements in active cell mode using the BLER and ETSI Type B data connection types (see "CALL:FUNCtion:CONNection:TYPE" on page 538). Power versus time measurements can also be made when the test set's operating mode is set to GPRS BCH+PDTCH, or EGPRS BCH+PDTCH test mode (see "CALL:OPERating:MODE" on page 610).

1. Set the multislot configuration to two downlinks, two uplinks (D2U2) and set the uplink power control level for each of the two bursts using the CALL subsystem.
2. Configure PvT measurement parameters using the SETup subsystem.
3. Set the trigger type to single using the SETup subsystem.
4. Start the PvT measurement using the INITiate subsystem.
5. Use the FETCh? commands to obtain PvT measurement results.

Programming Example

```
10  OUTPUT 714;"CALL:PDTCH:MSLOT:CONFIG D2U2" ! Configures the multislot
20                                            ! configuration to be
30                                            ! 2 downlink, 2 uplink.
40  OUTPUT 714;"CALL:PDTCH:MS:TXLEVEL:BURST1 10" ! Sets the uplink power for
50                                               ! the first burst to 23 dBm.
60  OUTPUT 714;"CALL:PDTCH:MS:TXLEVEL:BURST2 5" ! Sets the uplink power for
70                                              ! the second burst to 33 dBm.
80  OUTPUT 714;"SETUP:PVTIME:CONTINUOUS OFF" !Configures a PvT measurement to
90                                           !single trigger mode.
100 OUTPUT 714;"SETUP:PVTIME:COUNT:NUMBER 100" !Configures a multi-measurement
110                                            !of 100.
120 OUTPUT 714;"SETUP:PVTIME:TRIGGER:SOURCE AUTO" !Configure trigger source
130                                               !to auto.
140 OUTPUT 714;"SETUP:PVTIME:SYNC MIDAMBLE" !Configures a PvT measurement so
150                                         !that burst synchronization, which
160                                         !will synchronize the time of the
170                                         !measurement algorithm relative to
180                                         !the data sample, will be set
190                                         !to midamble.
200 OUTPUT 714;"INITIATE:PVTIME" !Start PvT measurement.
210 ! Fetch all the required PvT results.
220 OUTPUT 714;"FETCH:PVTIME:BURST1:INTEGRITY?" ! Always check integrity values.
230 ENTER 714;Integ_burst1
240 OUTPUT 714;"FETCH:PVTIME:BURST2:INTEGRITY?"
250 ENTER 714;Integ_burst2
260 IF (Integ_burst1=0) AND (Integ_burst2=0) THEN
270    OUTPUT 714;"FETCH:PVTIME:MASK?" !PvT pass/fail result for entire mask
280    ENTER 714;Mask_result
290    OUTPUT 714;"FETCH:PVTIME:MASK:SEGMENT?" ! PvT mask error code. This will
300                                            ! tell us which parts of the
310                                            ! uplink has failed the mask.
320    ENTER 714;Mask_error_code
330    OUTPUT 714;"FETCH:PVTIME:BURST1:POWER:AVERAGE?" ! PvT Carrier Power result
340                                                    ! for the first burst.
350    ENTER 714;Pvt_pwr_burst1
360    OUTPUT 714;"FETCH:PVTIME:BURST2:POWER:AVERAGE?" ! PvT Carrier Power result
370                                                    ! for the second burst.
380    ENTER 714;Pvt_pwr_burst2
390  ELSE
400    PRINT "Measurement error: "&Meas_complete$
410    PRINT "Measurement Integrity value for burst 1 = ";Integ_burst1
420    PRINT "Measurement Integrity value for burst 2 = ";Integ_burst2
430  END IF
440 END
```

Returned values

The measurements returned by this program are:

- `Integ_burst1` and `Integ_burst2` return the measurement integrity values for each of the two adjacent uplink bursts in the multislot configuration (0 means a successful measurement with no errors). See "Integrity Indicator" on page 411.
- `Mask_result` returns the mask pass/fail indicator for the entire mask, not an individual burst. When the multi-measurement count is greater than 1, the PvT mask pass/fail result will return Fail (1) if any single measurement fails.
- `Mask_error_code` returns the mask error code for the entire multislot configuration. For more details on how to interpret the value returned by this result, see "FETCh:PVTime:MASK[:FAIL]:SEGment?" on page 956.
- `Pvt_pwr_burst1` and `Pvt_pwr_burst2` return the PvT carrier power results in dBm for each of the bursts in the multislot configuration.

Related Topics for GPRS and EGPRS

"GPRS and EGPRS Power versus Time Measurement" on page 123

"SETup:PVTime" on page 1163

"INITiate" on page 990

"FETCh:PVTime" on page 947

"GSM/GPRS Control Program Example" on page 1

Programming a RACH Measurement

This section provides an example of how to make a power versus time measurement on a RACH. The same principles as used in this example can also be used for transmit power and phase and frequency error measurements.

Overview of Measurement Procedure

1. Ensure that the mobile is switched off.
2. Set the test set's measurement receiver to the frequency the RACH will arrive on. The simplest way to do this is to set the manual channel (that is, the expected ARFCN) to the ARFCN of the BCH. Alternatively you could set the expected frequency to the uplink frequency of the BCH ARFCN.
3. Set triggering to single.
4. Set trigger mode to Auto.

Once the RACH measurement is completed, in order to make further measurements on the TCH, ensure you reset the receiver control to Auto.

NOTE Only one measurement at a time can be made on the RACH even if two measurements are initiated.

Programming Example

The following example details how to make a power versus time RACH measurement on a mobile originated call in Active Cell mode.

Alternatively, the same measurement could be made on a base station originated call by replacing lines 160 and 170 with the CALL:ORIGinate command.

```
10    INTEGER Int
20    DIM Results(11)
30    REAL Mask,Power
40    OUTPUT 714;"*RST"
50    OUTPUT 714;"RFANALYZER:MANUAL:CHANNEL:SELECTED 20" !Configures the
60                         !test set to expect a transmission on ARFCN 20.
70    OUTPUT 714;"RFANALYZER:EXPECTED:POWER:SELECTED 10 DBM" !Configures
80                        !the test set to expect a power level of 10 dBm.
90    OUTPUT 714;"SETUP:PVTIME:CONTINUOUS OFF"  !Configures trigger
100                         !mode to single for a pvt measurement.
110   OUTPUT 714;"SETUP:PVTIME:COUNT:STATE OFF"  !Configures the
120   !multi_measurement state to OFF.
130   OUTPUT 714;"SETUP:PVTIME:TRIGGER:SOURCE AUTO" !Configures the
140                                              !trigger source to AUTO.
150   OUTPUT 714;"INITIATE:PVTIME" !Start a pvt measurement.
160   PRINT "Connect your mobile to the Test Set and initiate a call"
170   PRINT "from the mobile."
180   OUTPUT 714;"FETCH:PVTIME:ALL?"!Fetches the measurement integrity
190   !value, mask indicator, tx power, and pvt offsets.
```

```
200   ENTER 714;Int,Mask,Power,Results(*)
210   PRINT "****************************************"
220   PRINT "*Power vs Time RACH Measurement Results*"
230   PRINT "****************************************"
240   PRINT "Integrity = ";Integrity
250   PRINT "Mask = ";Mask
260   PRINT "Carrier Power =";Power
270   PRINT "Offset        Level (dB)"
280   PRINT "(micro sec)   (dB)"
290   PRINT "-------       ----------"
300   PRINT "-28            ";Results(0)
310   PRINT "-18            ";Results(1)
320   PRINT "-10            ";Results(2)
330   PRINT "0              ";Results(3)
340   PRINT "321.2          ";Results(4)
350   PRINT "331.2          ";Results(5)
360   PRINT "339.2          ";Results(6)
370   PRINT "349.2          ";Results(7)
380   PRINT "542.8          ";Results(8)
390   PRINT "552.8          ";Results(9)
400   PRINT "560.8          ";Results(10)
410   PRINT "570.8          ";Results(11)
420   EN
```

Related Topics

"RACH Measurement Description" on page 129

"RACH Troubleshooting" on page 1466

Programming a SINAD Measurement

This measurement is *not* applicable to GPRS.

This section provides an example of how to make a SINAD measurement via the GPIB. SINAD measurements are not typically made when testing GSM mobiles but are more common when testing AMPS or other analog mobiles. The programming example below is typical for a 136 mobile.

SINAD and Distortion measurements are affected by the same STATe and INITiate commands, so both measurements are enabled and triggered at the same time. However, measurement results are queried separately. See “Analog Audio Measurement Description” on page 80.

The following procedure assumes that the mobile’s audio output is connected to the AUDIO IN connectors and the mobile is on an analog voice channel (AVC) that is being modulated with a 1004 Hz tone at +/–8 kHz peak deviation. It is also assumed that the Cell Power from the test set is set to a minimum usable level (typically about -116 dBm).

1. Configure analog audio measurement parameters using the SETup subsystem.
2. Start the analog audio measurement using the INITiate subsystem.
3. Use the FETCh? subsystem to obtain analog audio measurement results.

Programming Example

```
10  OUTPUT 714;"SETup:AAUDio:CONTinuous OFF" !Set the analog audio
20                                            !measurements to single trigger mode.
30  OUTPUT 714;"SETup:AAUDio:EXPected:VOLTage 3V" !Set the Expected Amplitude level for
40                                                 !audio input voltage in Vpeak.
50  OUTPUT 714;"SETup:AAUDio:SDIStortion:STATe ON" !Turn on the SINAD and
60                                                   !distortion measurements.
70  OUTPUT 714;"SETup:AAUDio:SDIStortion:FREQuency 1004 HZ" !Specify the audio
80                                       !frequency to use for the measurements.
90  OUTPUT 714;"SETup:AAUDio:FILTer:TYPE CMESsage" !Select the c-message filter.
100 OUTPUT 714;"SETup:AAUDio:DEMPhasis:STATe OFF" !Turn off de-emphasis.
110 OUTPUT 714;"SETup:AAUDio:EXPANDOR:STATe OFF" !Turn off the expandor.
120 OUTPUT 714;"SETup:AAUDio:TIMeout 3S" !Set a timeout value of 3 seconds
130                                       !in case the measurement cannot be made.
140 OUTPUT 714;"INITiate:AAUDio" !Start the Analog Audio measurement.
150 OUTPUT 714;"FETCh:AAUDio:INTegrity?" !Query the integrity indicator to
160                             !verify that a reliable measurement was made.
170 ENTER 714;Integrity  !Enter the returned value into a variable for comparison
180                      !with possible integrity indicator values (not shown here).
190 IF Integrity=0 THEN !Only fetch measurement result if integrity indicator is 0.
200  OUTPUT 714;"FETCh:AAUDio:SINad?" !Fetch the SINAD result.
210  ENTER 714;Sinad  !Enter the returned value into a variable.
220 END IF
230 END
```

Returned Values

The results returned by this program are:

- `Integrity` returns the integrity indicator (0 means a successful measurement with no errors). See "Integrity Indicator" on page 411.
- `SINAD` returns the SINAD value in dB.

Related Topics

"Analog Audio Measurement Description" on page 80

"Analog Audio Troubleshooting" on page 1454

"INITiate" on page 990

"SETup:AAUDio" on page 1035

"FETCh:AAUDio" on page 865

Programming the Spectrum Monitor

This section provides an example of how to use the Spectrum Monitor via the GPIB.

The following procedure assumes that the mobile station’s antenna output is connected to the RF IN/OUT connector, and that the mobile station is transmitting an uplink signal.

1. Configure the Spectrum Monitor parameters using the SETup subsystem.
2. Start the Spectrum Monitor using the INITiate subsystem.
3. Use the INITiate:DONE? command to determine if Spectrum Monitor results are available.
4. Use the FETCh? commands to obtain Spectrum Monitor results.
5. Use the CALCulate commands to set and query the Spectrum Monitor markers.

Programming Example

```
10  REAL Amplitudes(400) ! Set up array to hold amplitude results (trace data)
20  OUTPUT 714;"SETUP:SMONITOR:CONTINUOUS OFF" !Configures the Spectrum Monitor to
30                                            !single trigger mode.
40  OUTPUT 714;"SETUP:SMONITOR:COUNT:NUMBER 20" !Configures a multi-measurement
50                                              !of 20.
60  OUTPUT 714;"SETUP:SMONITOR:TRIGGER:SOURCE AUTO" !Configure trigger source
70                                                  !to auto.
80  OUTPUT 714;"SETUP:SMONITOR:FREQUENCY:SPAN 20 MHz" !Set frequency span
90  OUTPUT 714;"INITIATE:SMONITOR"  !Start the Spectrum Monitor
100   REPEAT
110     OUTPUT 714;"INIT:DONE?"
120     ENTER 714;Meas_complete$
130   UNTIL Meas_complete$="SMON"
140 OUTPUT 714;"FETCH:SMONITOR:INTEGRITY?" !Fetch SMON Integrity
150 ENTER 714;Integrity
160 PRINT "Spectrum Monitor Integrity: ";Integrity
170 IF Integrity=0 THEN                     !Fetch results if SMON
180   OUTPUT 714;"FETCH:SMONITOR:TRACE?"   !has valid integrity.
190   ENTER 714;Amplitudes(*)  !Load valid results into array
200   PRINT "Trace Data Amplitude Results (dB):"
210   PRINT "--------------------------------------------------"
220   PRINT Amplitudes(*)
230   PRINT "--------------------------------------------------"
240 ELSE
250   PRINT "Bad Integrity value =";Integrity
260   STOP
270 END IF
280 ! Move the marker to the signal peak and query the frequency and level
290 OUTPUT 714;"CALCULATE:SMONITOR:MARKER1:PEAK:MAXIMUM"
300 OUTPUT 714;"CALCULATE:SMONITOR:MARKER1:FREQUENCY?"
310 ENTER 714;Peak_frequency
320 PRINT "Maximum Peak Frequency (MHz): ";Peak_frequency
330 OUTPUT 714;"CALCULATE:SMONITOR:MARKER1:AMPLITUDE?"
340 ENTER 714;Peak_amplitude
```

```
350 PRINT "Maximum Peak Amplitude (dBm): ";Peak_amplitude
360 END
```

Returned Values

The results returned by this program are:

- `Integrity` returns the Spectrum Monitor "Integrity Indicator" on page 411 (0 means that the Spectrum Monitor completed with no errors).
- `Amplitudes()` returns 401 points representing the amplitude results (in dBm) of the trace data.
- `Peak_frequency` returns the frequency in MHz at marker 1. In this case, marker 1 is positioned at the highest peak value.
- `Peak_amplitude` returns the amplitude in dBm at marker 1. In this case, marker 1 is positioned at the highest peak value.

Related Topics

"Spectrum Monitor Description" on page 142

"SETup:SMONitor" on page 1195

"INITiate" on page 990

"FETCh:SMONitor" on page 981

"CALCulate:SMONitor" on page 467

Programming a Transmit Power Measurement

This section contains two programming examples:

- “Programming a Transmit Power Measurement for GSM” on page 364
- “Programming a Transmit Power Measurement for GPRS” on page 365
- “Programming a Transmit Power Measurement for EGPRS” on page 366

Programming a Transmit Power Measurement for GSM

This section provides an example of how to make the transmit power (TXP) measurement via GPIB.

The following procedure assumes that an active link is established between the test set and the mobile station. See “Establishing an Active GSM Link with the Mobile Station” on page 246.

1. Configure the TXP measurement parameters using the SETup subsystem.
2. Start the TXP measurement using the INITiate subsystem.
3. Use the FETCh? command to obtain TXP measurement results.

Programming Example

```
10  OUTPUT 714;”SETUP:TXPOWER:CONTINUOUS OFF” !Configures a TXP measurement to
20                                             !single trigger mode.
30  OUTPUT 714;”SETUP:TXPOWER:COUNT:NUMBER 100” !Configures a multi-measurement
40                                              !of 100.
50  OUTPUT 714;”SETUP:TXPOWER:TRIGGER:SOURCE AUTO” !Configure trigger source
60                                                 !to auto.
70  OUTPUT 714;”INITIATE:TXPOWER” !Start TXP measurement.
80  OUTPUT 714;”FETCH:TXPOWER:ALL?” !Fetch TXP results.
90  ENTER 714;Integrity, Avg_tx_power
100 END
```

Returned Values

The measurements returned by this program are:

- `Integrity` returns the measurement “Integrity Indicator” on page 411 (0 means a successful measurement with no errors).
- `Avg_tx_power` returns the average transmit power in dBm.

Related Topics

“Transmit Power Measurement Description” on page 144

“SETup:TXPower” on page 1207

“INITiate” on page 990

“FETCh:TXPower” on page 983

“GSM/GPRS Control Program Example” on page 1

Programming a Transmit Power Measurement for GPRS

This section provides an example of how to make the transmit power (TXP) measurement via GPIB.

The following procedure assumes that a data connection has been established between the test set and the mobile station (connection status is Transferring). See "Step 4: Make a Connection" on page 276.

1. Set the multislot configuration to two downlinks, two uplinks (D2U2) using the CALL subsystem.
2. Configure the TXP measurement parameters using the SETup subsystem.
3. Use the RFANalyzer:MSLot:MEASurement:BURSt command to select burst 2 of the multislot configuration for the TXP measurement.
4. Start the TXP measurement using the INITiate subsystem.
5. Use the FETCh? command to obtain TXP measurement results.

Programming Example

```
10  OUTPUT 714;"CALL:PDTCH:MSLOT:CONFIG D2U2" ! Configures the multi-
20                                            ! slot configuration to be
30                                            ! 2 downlink, 2 uplink.
40  OUTPUT 714;"SETUP:TXPOWER:CONTINUOUS OFF" !Configures a TXP measurement to
50                                            !single trigger mode.
60  OUTPUT 714;"SETUP:TXPOWER:COUNT:NUMBER 100" !Configures a multi-measurement
70                                             !of 100.
80  OUTPUT 714;"SETUP:TXPOWER:TRIGGER:SOURCE AUTO" !Configure trigger source
90                                                 !to auto.
100 OUTPUT 714;"RFANALYZER:MSLOT:MEASUREMENT:BURST 2" ! Perform the TXP
110                                                   ! measurement on burst 2.
120 OUTPUT 714;"INITIATE:TXPOWER" !Start TXP measurement.
130 OUTPUT 714;"FETCH:TXPOWER:ALL?" !Fetch TXP results.
140 ENTER 714;Integrity, Avg_tx_power
150 END
```

Returned Values

The measurements returned by this program are:

- `Integrity` returns the measurement "Integrity Indicator" on page 411 (0 means a successful measurement with no errors).
- `Avg_tx_power` returns the average transmit power in dBm for burst 2 of the multislot configuration.

Related Topics

"Transmit Power Measurement Description" on page 144

"SETup:TXPower" on page 1207

"INITiate" on page 990

"FETCh:TXPower" on page 983

"GSM/GPRS Control Program Example" on page 1

Programming a Transmit Power Measurement for EGPRS

This section provides an example of how to make the transmit power (ETXP) measurement via GPIB.

The following procedure assumes that a data connection has been established between the test set and the mobile station (connection status is Transferring). See "Step 4: Make a Connection" on page 276.

1. Set the multislot configuration to two downlinks, two uplinks (D2U2) using the CALL subsystem.
2. Configure the ETXP measurement parameters using the SETup subsystem.
3. Use the RFANalyzer:MSLot:MEASurement:BURSt command to select burst 1 of the multislot configuration for the ETXP measurement.
4. Start the ETXP measurement using the INITiate subsystem.
5. Use the FETCh? command to obtain ETXP measurement results.

Programming Example

```
10  OUTPUT 714;"CALL:PDTCH:MSLOT:CONFIG D2U2" ! Configures the multi-
20                                            ! slot configuration to be
30                                            ! 2 downlink, 2 uplink.
40  OUTPUT 714;"SETUP:ETXPOWER:CONTINUOUS OFF" !Configures an ETXP measurement to
50                                            !single trigger mode.
60  OUTPUT 714;"SETUP:ETXPOWER:COUNT:NUMBER 100" !Configures a multi-measurement
70                                             !of 100.
80  OUTPUT 714;"SETUP:ETXPOWER:TRIGGER:SOURCE AUTO" !Configure trigger source
90                                                 !to auto.
100 OUTPUT 714;"RFANALYZER:MSLOT:MEASUREMENT:BURST 1" ! Perform the ETXP
110                                                   ! measurement on burst 2.
120 OUTPUT 714;"INITIATE:ETXPOWER" !Start ETXP measurement.
130 OUTPUT 714;"FETCH:ETXPOWER:ALL?" !Fetch ETXP results.
140 ENTER 714;Integrity, Avg_burst_power, Avg_carrier_power
150 END
```

Returned Values

The measurements returned by this program are:

- `Integrity` returns the measurement "Integrity Indicator" on page 411 (0 means a successful measurement with no errors).
- `Avg_burst_power` returns the average burst power in dBm for burst 1 of the multislot configuration.
- `Avg_carrier_power` returns the average estimated carrier power in dBm for burst 1 of the multislot configuration.

Related Topics

"Transmit Power Measurement Description" on page 144

"SETup:ETXPower" on page 1081

"INITiate" on page 990

"FETCh:ETXPower" on page 901

Preset Descriptions

Description

The test set is capable of accepting several different preset commands.

At no time during a preset operation, does transmit power exceed the last user setting of the transmit power. The input power is not set to any value lower than the last user setting of the input power. This is to avoid power spikes on the output and possible receiver damage on the input during transitions associated with preset operations.

Partial Preset

Partial preset saves setup time because measurement setup parameters remain unchanged. This is the recommended way to place the test set in a known condition.

When you fast switch between formats in a fast switching test application the test set behaves as if a partial preset has occurred. The table below lists some key partial preset results.

Example

```
OUTPUT 714;"SYSTEM:PRESET3"  !Command for a partial preset when user in
                             !remote operation.
```

SYSTEM:PRESET3 is the recommended command for a partial preset operation. The SYSTEM:PRESET[1] command is not recommended for use at this time.

Press the green Preset key on the front panel to perform a partial preset.

Table 14. Partial Preset Behavior

Function	Partial Preset Result
Trigger Arm	no change
Measurement parameters	no change
Calibration data	no change
Enable registers	no change
Positive Transition Filter registers	no change
Negative Transition Filter registers	no change
Contents of RAM	no change
Contents of output queue	no change
Contents of error queue	no change
Maskable Message Display State	no change

Table 14. Partial Preset Behavior

Function	Partial Preset Result
Operating Mode	Active Cell
Measurements	aborted and inactivated
Measurement results	NAN
Measurement integrity indicator	1 = no result available
Transmit Power State	ON
Cell Activated State	ON
Call in progress	aborted
Call Control Status	Idle
Call Counters	cleared
Call Error Counters	cleared
SACCH	cleared
Pending Service request	not cleared

Full Preset

A full preset requires you to select new measurements and configure their parameters. If measurement parameters do not need to be changed, use a partial preset to save time.

Example

```
OUTPUT 714;”*RST” !Recommended command for a full preset, sets trigger arm to single.

OUTPUT 714;”SYSTEM:PRESET2” !Command for a full preset, sets trigger arm to continuous.
```

The *RST common command is the recommended command for a full preset operation.

NOTE Transmit power is not set to OFF during a full preset, transmit power is set to the default value.

Table 15. Full Preset Behavior

Function	Full Preset Result
Trigger Arm	Continuous (manual operation full preset or SYSTEM:PRESET2 command)
Trigger Arm	Single (remote operation full preset, *RST command)

Table 15. Full Preset Behavior

Function	Full Preset Result
Measurement Parameters	all set to defaults
Maskable Message Display State	On (manual operation full preset)
Maskable Message Display State	Off (remote operation full preset)

Status Preset

The STATUS:PRESET command sets the status system as defined in “SCPI 1995 Volume 2: Command Reference” section 20.7. All of the enable registers are set to 0, all PTR registers are set to 1, and all NTR registers are set to 0.

Example

```
OUTPUT 714;”STATUS:PRESET” !Presets the STATus subsystem.
```

Related Topics

“SYSTem:PRESet” on page 1297

“*RST” on page 1306

Receiver Control

Receiver Control is applicable to GSM, GPRS, and EGPRS. This topic contains the following sections:

- "GSM Receiver Control" on page 370
- "GPRS and EGPRS Receiver Control" on page 372

GSM Receiver Control

You may want to control the internal receiver parameters rather than allow the test set to control them. You can do this by using the receiver control parameters.

Selecting Manual or Automatic Receiver Control

Receiver control defines whether the test set (auto) or you (manual) are in control of the receiver's band, channel, frequency and power.

- Setting a manual band, manual frequency, or manual channel causes receiver control to be set to manual control mode.
- Setting the broadcast band, or any reset operation causes the receiver control to be set to auto control mode.
- Setting the RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO to ON or OFF.
- Setting the RFANalyzer:CONTrol:POWer:AUTO to ON or OFF.

Example

```
OUTPUT 714;"RFANALYZER:CONTROL:MEASUREMENT:FREQUENCY:AUTO OFF" !Allows manual
                                  !control of receiver frequency parameters.

OUTPUT 714;"RFANALYZER:CONTROL:POWER:AUTO OFF" !Allows manual
                                  !control of receiver power parameters.
```

Operating Mode and Receiver Control

The test set's receiver control parameter is set using, "RFANalyzer:CONTrol:POWer:AUTO" on page 1023and "RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO" on page 1022.

Manual Receiver Control Parameters When receiver control is set to auto, the test set's protocol controls the parameters. When receiver control is set to manual, the following two parameters (power and frequency) are under user control.

- Manual Power
- Manual Freq

Manual Burst Power Manual expected burst power defines the expected input power at the RF IN /OUT connector on the front panel of the test set. The manual burst power is set by the RFANalyzer:MANual:POWer[:SELected][:SELected]:BURSt[1 | 2] command (see "Expected Power" on page 372).

```
OUTPUT 714;"RFANALYZER:MANUAL:POWER:BURST1 -15 dB"!Sets the expected power level to -15 dB.
```

Manual Measurement Frequency Manual frequency is used to tune the test set's measuring receiver. None of the "Manual Receiver Control Parameters" on page 373 are affected by changes to manual frequency.

```
OUTPUT 714;"RFANALYZER:MANUAL:MEASUREMENT:FREQUENCY 942.6MHZ" !Sets the input frequency to 942.6 MHz.
```

Manual Measurement Burst Manual burst is used to select the uplink burst that will be measured when the burst control AUTO setting is set to OFF (Manual). This must be set to 1 for a TXP measurement in a GSM call. See "RFANalyzer:MANual:MEASurement:BURSt" on page 1025.

```
OUTPUT 714;"RFANALYZER:MANUAL:MEASUREMENT:BURST 2" !Sets the receiver to measure uplink burst 2.
```

Manual Receiver Control If the receiver control parameter is set to manual, the test set's receiver frequency is set using the parameters in the following table.

Table 2. Test Set Receiver Frequencies (Manual)

Operating Mode	Cell Activated State	Measurement Band	Measurement Frequency	Measurement Channel
Active Cell	ON or OFF	Manual Band	Manual Frequency	Manual Channel
Test Mode	ON or OFF	Manual Band	Manual Frequency	Manual Channel

Auto Receiver Control If the receiver control parameter is set to auto, the test set's receiver frequency is set using the parameters in the following table. See "CALL:TCHannel[:ARFCn][:SELected]" on page 815 traffic channel details and "CALL:TCHannel:BAND" on page 821 for traffic band details. See "CALL[:CELL]:BAND" on page 495 for cell band details. See "CALL:BCHannel" on page 497 for broadcast channel details.

Table 3. Test Set Receiver Frequencies (Auto)

Operating Mode	Cell Activated State	Measurement Band	Measurement Frequency
Active Cell	ON	Traffic Band	Traffic Channel
Active Cell	OFF	Cell Band	Broadcast Channel

Table 4. Test Set Receiver Frequencies (Auto)

Operating Mode	Test Function	Measurement Band	Measurement Frequency
Test Mode GBTest	BCH (1)	Cell Band	Broadcast Channel
Test Mode GBTTest	BCH +TCH (2)	Traffic Band	Traffic Channel
Test Mode CW	CW	Cell Band	Broadcast Channel

Table Footnotes

1 Actual frequency depends on current broadcast band (PGSM, EGSM, GSM450, GSM480, GSM750, GSM850, PCS, DCS or RGSM) and is defined in GSM as the uplink frequency.

Table Footnotes

2 Actual frequency depends on current traffic channel band (PGSM, EGSM, GSM450, GSM480, GSM750, GSM850, PCS, DCS or RGSM) and is defined in GSM as the uplink frequency.

Expected Power

You can use the manual expected burst power parameter regardless of the receiver control setting. The MS TX level parameter sets the mobile station uplink power control level ranges while manual power burst sets the mobile station uplink power in dBm.

Manual expected burst power defines the expected input power at the RF IN /OUT connector on the front panel of the test set. The expected burst power range is beyond the capability of the test set's hardware. This is because manual expected burst power is intended to reflect the potential range of RF power at the DUT. This range of RF power is meant to accommodate the use of a gain or loss network between the DUT and the test set. See "Amplitude Offset" on page 156 for details about amplitude offset.

The upper and lower limits of manual expected burst power provide boundaries for the combination of amplitude offset and power. If the user sets power to +52 dBm and the amplitude offset to −3 dB, the calculated receiver power will be 49 dBm, but the test set shall be set to +43 dBm, the upper limit of the hardware. If the calculated value of receiver power goes below −25 dB, the lower limit of the hardware, the test set shall be set to −25 dB.

Manual expected bust power is always overwritten by settings made to the MS TX Level parameter.

Setting the manual expected burst power will not set receiver control to manual.

```
OUTPUT 714;"RFANALYZER:MANUAL:POWER:BURST1 -15DBM" !Set input burst power to −15 dbm.
```

See "RFANalyzer:MANual:POWer[:SELected][:SELected]:BURSt[1|2]" on page 1027 or "CALL:MS:TXLevel[:SELected]" on page 595.

Related Topics

"Active Cell Operating Mode" on page 176

"Test Mode Operating Modes" on page 179

"Frequency Banded Parameters" on page 250

GPRS and EGPRS Receiver Control

The test set normally sets all receiver parameters automatically using data connection control settings. You may want to control the test set's receiver parameters manually rather than allowing the test set to control them. This ability is referred to as manual receiver control.

Selecting Manual or Automatic Receiver Control

- Auto mode is the default for all operating modes. The receiver's expected power and measurement frequency settings are set automatically according to the data connection control settings you specify (Packet Data Traffic Channel, Packet Data Traffic Band, and MS TX Level).
- Manual mode allows you to override some or all of the automatic settings by first selecting the manual mode for the setting and then specifying the desired value. You can view the affected settings by selecting F12 (Receiver Control) from the Call Setup screen. A full or partial preset of the test set, including cycling power, returns the test set back to auto mode.

GPIB Examples The following program examples use simple commands to perform a single function. Complex commands that enable manual receiver control and set a specified parameter at the same time are also available. See "RFANalyzer" on page 1020 for a listing of all receiver control syntax. (Note that some of the commands described in "RFANalyzer" on page 1020 are GSM only.)

```
OUTPUT 714;"RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO OFF" !Enables manual control of the
measurement receiver's frequency.
```

```
OUTPUT 714;"RFANalyzer:MANual:MEASurement:FREQuency 825.030 MHZ" !Tunes the measurement
receiver to 825.030 MHz through manual receiver control.
```

```
OUTPUT 714;"RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO ON" !Returns measurement receiver
frequency tuning control to auto.
```

Manual control parameter values are stored internally (as long as the test set is powered on). Enabling manual control of a parameter without providing a new value causes a previously stored value to immediately take effect. This allows you to pre-define manual control parameter values in your program before enabling manual control.

Operating Mode and Receiver Control

Manual Receiver Control Parameters The following parameters can be used to control the receiver manually:

- Manual Burst Power Control
- Measurement Frequency
- Uplink Frequency
- Measurement Burst

Expected Power Control The expected power from the mobile is set manually using the following settings (see "Expected Power" on page 372):

- To set the test set receiver's expected power setting to manual use "RFANalyzer:CONTrol:POWer:AUTO" on page 1023.

  ```
  OUTPUT 714;"RFANalyzer:CONTrol:POWer:AUTO OFF"
  ```

- To set the power level that the test set's receiver is expecting the mobile station uplink burst to transmit at for the GPRS system type, use "RFANalyzer:MANual:POWer:GPRS[:SELected]:BURSt[1|2]" on page 1028. Each burst is set individually.

  ```
  OUTPUT 714;"RFANalyzer:MANual:POWer:GPRS:BURSt1 15 DBM"
  ```

  ```
  OUTPUT 714;"RFANalyzer:MANual:POWer:GPRS:BURSt2 19 DBM"
  ```

NOTE During manual receiver control, make sure you are using the correct operating mode for the type of measurement you are making. Trying to measure a CW signal while in active cell mode will likely result in an error. This error occurs because the test set uses the expected power setting for the operating mode you are using, and uses different methods to measure analog and digital signals.

It is recommended that you specify the expected power each time you perform a handoff to a new band or traffic channel type during manual receiver control. This ensures that the correct expected power is set for the new channel settings.

Measurement Frequency Measurement frequency is used to tune the test set's measuring receiver for all bands:

- To set the receiver to manual mode and change the measurement frequency use "RFANalyzer:MANual:MEASurement[:MFRequency]" on page 1025.

```
OUTPUT 714;"RFANalyzer:MANual:MEASurement 942.6 MHZ" !Enables manual measurement
!receiver control and sets the test set's measurement receiver frequency to 942.6 MHz.
```

Uplink Frequency Uplink Frequency sets the test set's demodulation receiver frequency, used to demodulate information from the mobile's uplink transmission:

- To set the receiver to manual mode and set the demodulation receiver frequency use "RFANalyzer:MANual:UPLink[:MFRequency]" on page 1029.

```
OUTPUT 714;"RFANalyzer:MANual:UPLink 942.6 MHZ" !Enables manual demodulation
!receiver control and sets the test set's demodulation receiver frequency to 942.6 MHz.
```

NOTE Manual control of the demodulation receiver frequency is rarely needed. Use the measurement receiver when manual receiver frequency control is required. Automatic control is always used when the cell operating mode is active cell.

Measurement Burst Measurement Burst sets the mobile uplink burst number on which the measurement is performed (not the absolute timeslot number, but the burst number relative to the first uplink burst in the TDMA frame):

- To set the measurement burst use "RFANalyzer:MANual:MEASurement:BURSt" on page 1025.

```
OUTPUT 714;"RFANalyzer:MSLot:MEASurement:BURSt 2" !Sets the receiver to measure the second uplink
!burst.
```

The Measurement Burst parameter is always controlled manually. The choice of bursts available is based on the selection table shown under the multislot selection command, "CALL:PDTCH:MSLot:CONFig" on page 634.

Auto Receiver Control

The receiver settings are derived from the following parameters when using automated control:

- Expected Power - derived from the MS TX Level setting for the specified system type, queried/set using the following command:
  — "CALL:PDTCH:MS:TXLevel[:SELected]:BURSt[1|2]" on page 632
- Measurement Frequency and Link Frequency - derived from the PDTCH Band and PDTCH (ARFCN) settings, queried/set using the following command:
  — "CALL:PDTCH[:ARFCn][:SELected]" on page 625

Expected Power

To make accurate measurements, the test set needs to know how much power to expect at the test set's RF IN/OUT port; referred to as the Expected Power. It gets this value from the call control MS TX Level setting during automatic receiver control, or by the user specifying the expected power with the receiver power control set to manual. See "Expected Power Control" on page 373 for more information.

You can set the expected power level beyond the capability of the test set's hardware because expected power is intended to reflect the potential range of RF power at the DUT. This range of RF power is meant to accommodate the use of a gain or loss network between the DUT and the test set. See "Amplitude Offset" on page 156 for details about amplitude offset.

The upper and lower limits of expected power provide boundaries for the combination of amplitude offset and expected power. If you set expected power to +52 dBm and the amplitude offset to –3 dB, the calculated receiver power will be 49 dBm, but the test set shall be set to +43 dBm, the upper limit of the hardware. If the calculated value of receiver power goes below –25 dB, the lower limit of the hardware, the test set shall be set to –25 dB.

Effects on Receiver Control When Changing Operating Mode

After selecting the operating mode to use and setting one or more receiver controls to manual, the receiver control settings remain as you set them until you change operating mode. Changing operating mode causes all receiver parameters to return to automatic control.

Related Topics

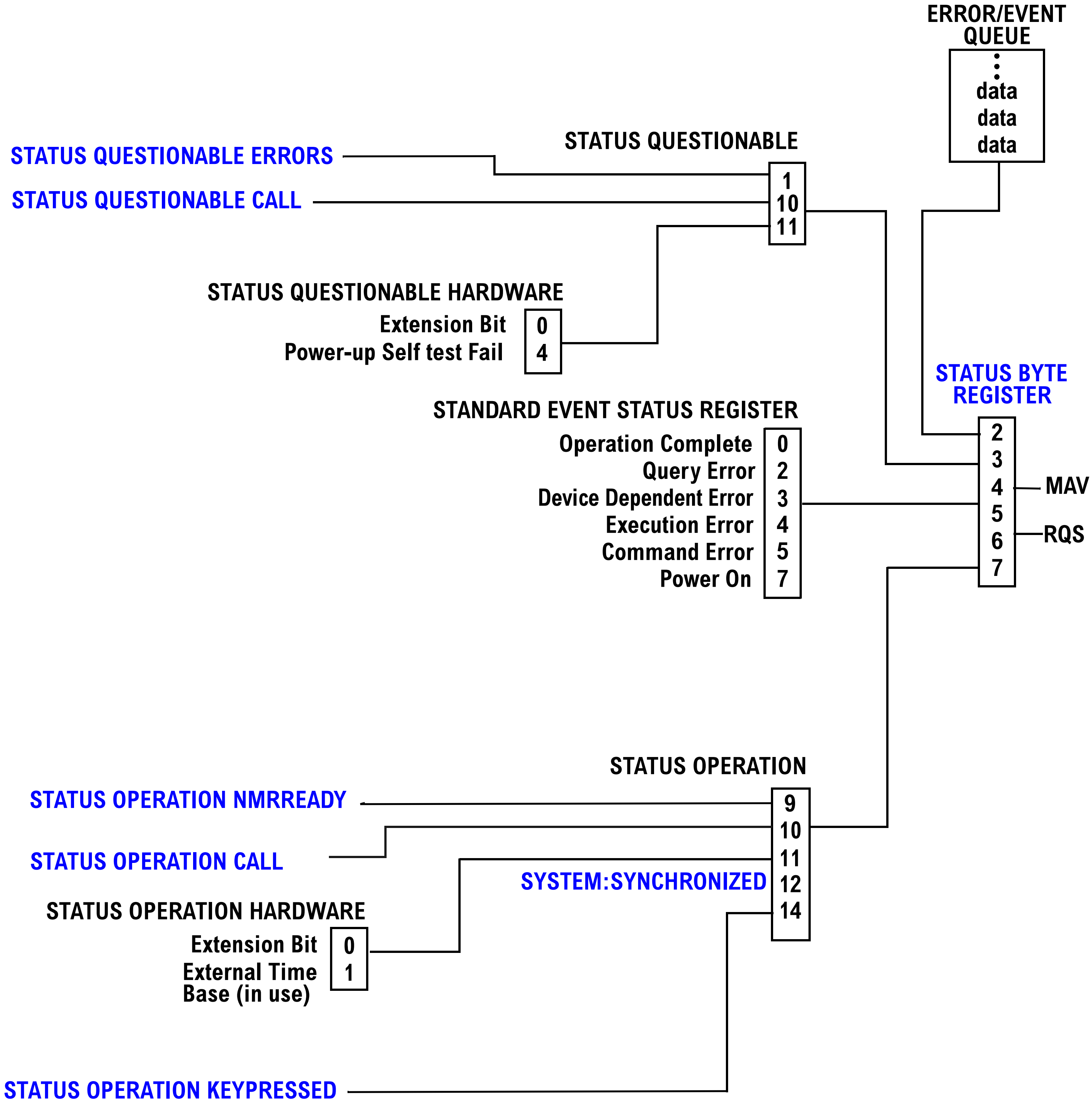
"Test Mode Operating Modes" on page 179

"Active Cell Operating Mode" on page 176

"RFANalyzer" on page 1020

Status Subsystem Overview

Overview of STATus Reporting Structure



Status Reporting Structure For STATus QUEStionable and STATus OPERation

STATUS QUESTIONABLE CALL → Bit 10 STATUS QUESTIONABLE

Extension Bit	0
COMMon Summary	1
GSM Summary	2
AMPS Summary	3
DIGital 136 Summary	4
TA136 Summary	5
DIGital 95 Summary	6
DIGital 2000 Summary	7
CDMA Summary	8
TA 2000 Summary	9
GPRS Summary	12

STATUS QUESTIONABLE ERRORS → Bit 1 STATUS QUESTIONABLE

Extension Bit	0
COMMon Summary	1
GSM Summary	2
AMPS Summary	3
DIGital 136 Summary	4
TA136 Summary	5
DIGital 95 Summary	6
DIGital 2000 Summary	7
CDMA Summary	8
TA 2000 Summary	9
FDD Summary	10
WCDMA Summary	11
GPRS Summary	12

Some status registers are not functional at this time.

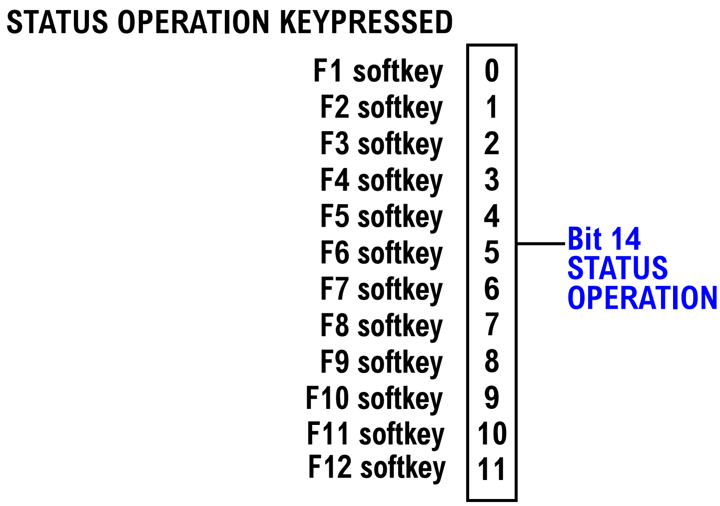
STATUS OPERATION CALL → Bit 10 STATUS OPERATION

Extension Bit	0
COMMon Summary	1
GSM Summary	2
AMPS Summary	3
DIGital 136 Summary	4
TA136 Summary	5
DIGital 95 Summary	6
DIGital 2000 Summary	7
CDMA Summary	8
TA 2000 Summary	9

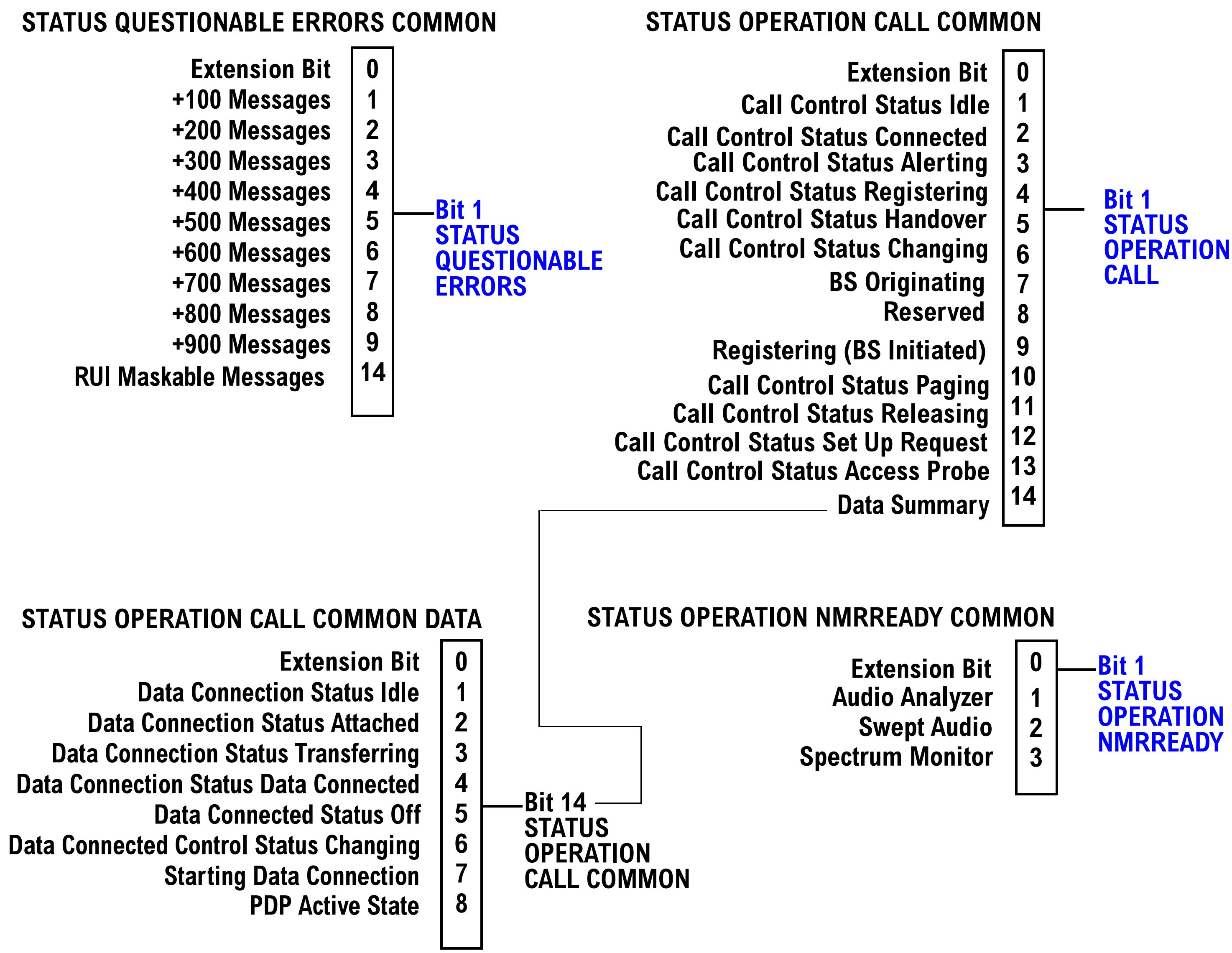
STATUS OPERATION NMRREADY → Bit 9 STATUS OPERATION

Extension Bit	0
COMMon Summary	1
GSM Summary	2
AMPS Summary	3
DIGital 136 Summary	4
TA136 Summary	5
DIGital 95 Summary	6
DIGital 2000 Summary	7
CDMA Summary	8
TA 2000 Summary	9
FDD Summary	10
WCDMA Summary	11
GPRS Summary	12

Status Reporting Structure For STATus OPERation KEYPressed Register



Status Reporting Structures for the COMMon Registers



Status Reporting Structure for the GSM Registers

STATUS QUESTIONABLE CALL GSM

Extension Bit	0
Date Link Failure	1
Radio Link Failure	2
Immediate Assignment Failure	3
Channel Assignment Failure	4
Handover Failure	5
No Response to Page	6
Channel Assignment > Frames	7
Identification Failure	8
Channel Mode Not Supported	9

Bit 2 STATUS QUESTIONABLE

STATUS QUESTIONABLE ERRORS GSM

Extension Bit	0
+100 Messages	1
+200 Messages	2
+300 Messages	3
+400 Messages	4
+500 Messages	5
+600 Messages	6
+700 Messages	7
+800 Messages	8
+900 Messages	9

Bit 2 STATUS QUESTIONABLE ERRORS

STATUS OPERATION NMRREADY GSM

Extension Bit	0
Tx Power	1
Power vs. Time	2
Phase/Freq Error	3
Output RF Spectrum	4
Analog Audio	5
Decoded Audio	6
Fast Bit Error Rate	7
Bit Error	8
I/Q Tuning	9
Dynamic Power	10

Bit 2 STATUS OPERATION NMRREADY

STATUS OPERATION CALL GSM

Extension Bit	0
Idle	1
Connected	2
Alerting	3
BCH Changing	4
TCH Changing	5
Control Status Changing	6
BS Originating	7
BS Disconnecting	8

Bit 2 STATUS OPERATION CALL

Status Reporting Structure For the GPRS Registers

STATUS QUESTIONABLE CALL GPRS

Extension Bit	0
Attach Failure	1
Detach Failure	2
Routing Area Update Failure	3
Start Data Connection Failure	4
No Data Received Recently	5
Downlink Timed Out	6
Uplink Immediate Assignment Failure	7
Downlink Immediate Assignment Failure	8
MS Unexpectedly Ended TBF	9
End Data Connection Failure	10

Bit 12
STATUS
QUESTIONABLE
CALL

STATUS QUESTIONABLE ERRORS GPRS

Extension Bit	0
+100 Messages	1
+200 Messages	2
+300 Messages	3
+400 Messages	4
+500 Messages	5
+600 Messages	6
+700 Messages	7
+800 Messages	8
+900 Messages	9

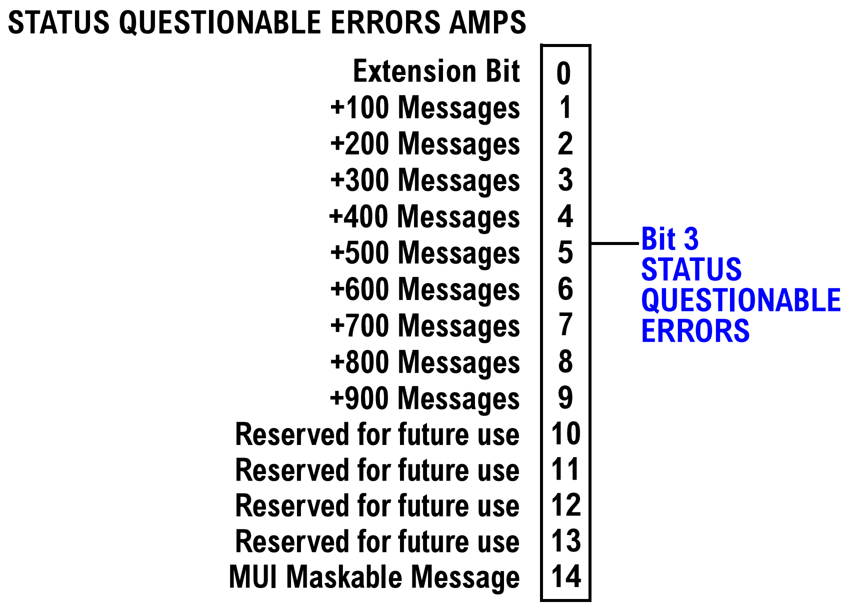
Bit 12
STATUS
QUESTIONABLE
ERRORS

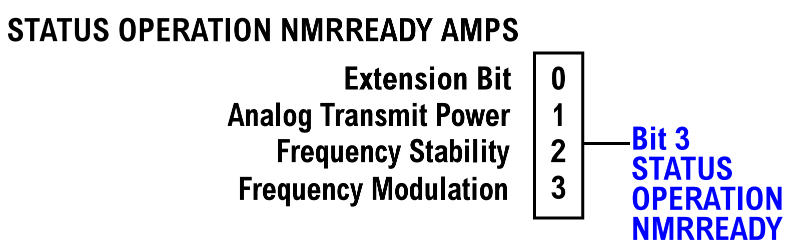
STATUS OPERATION NMRREADY GPRS

Extension Bit	0
Transmit Power	1
Power versus Time	2
Phase and Frequency Error	3
Output RF Spectrum	4
Reserved for future use	5
Reserved for future use	6
Reserved for future use	7
Reserved for future use	8
Reserved for future use	9
Reserved for future use	10
Bit Error Rate	11
Block Error Rate	12
EGPRS Transmit Power	13

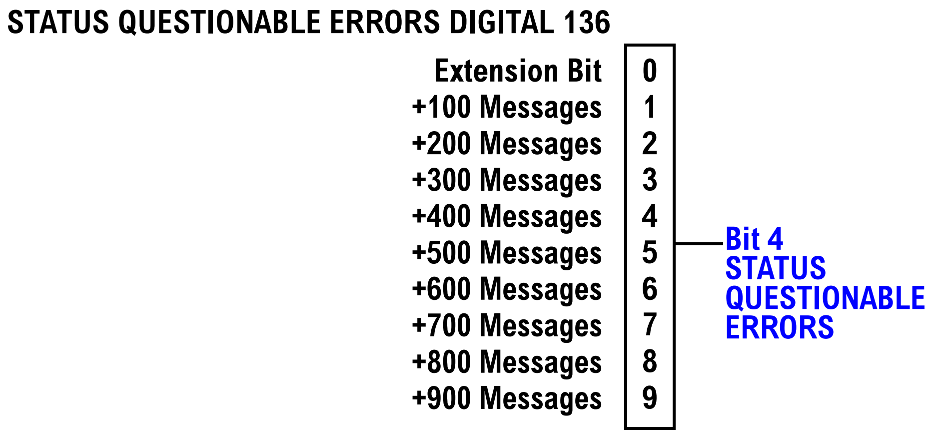
Bit 12
STATUS
OPERATION
NMRREADY

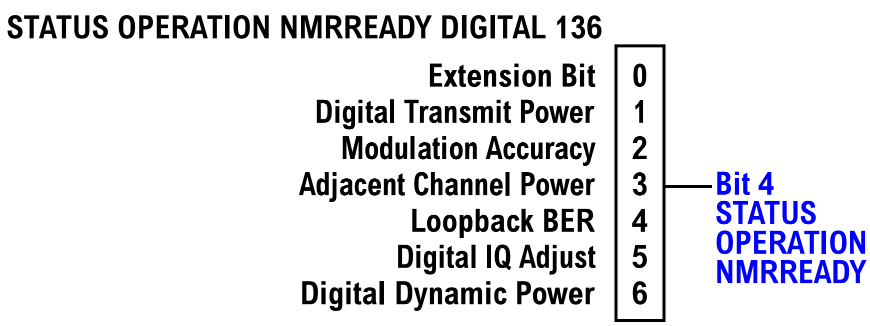
Status Reporting Structure for the AMPS Registers



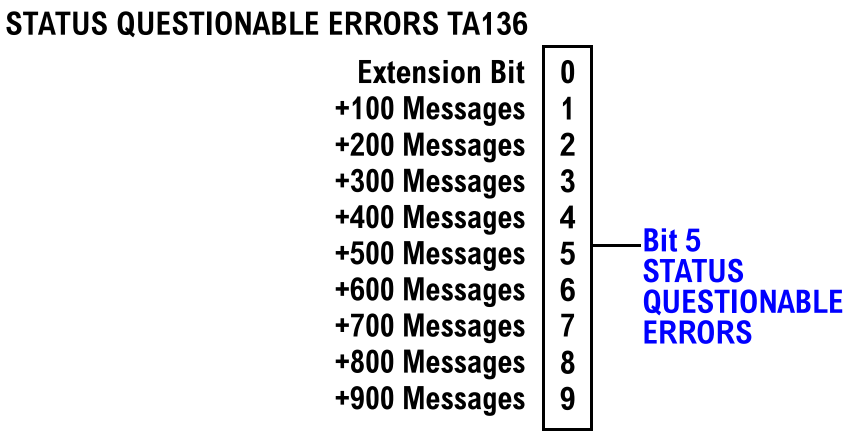


Status Reporting Structure for the DIGital136 Registers

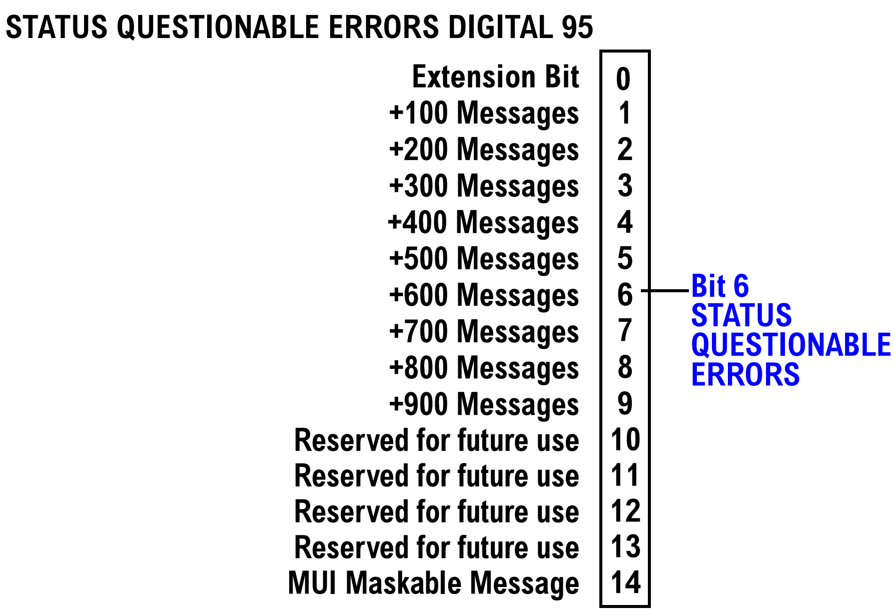




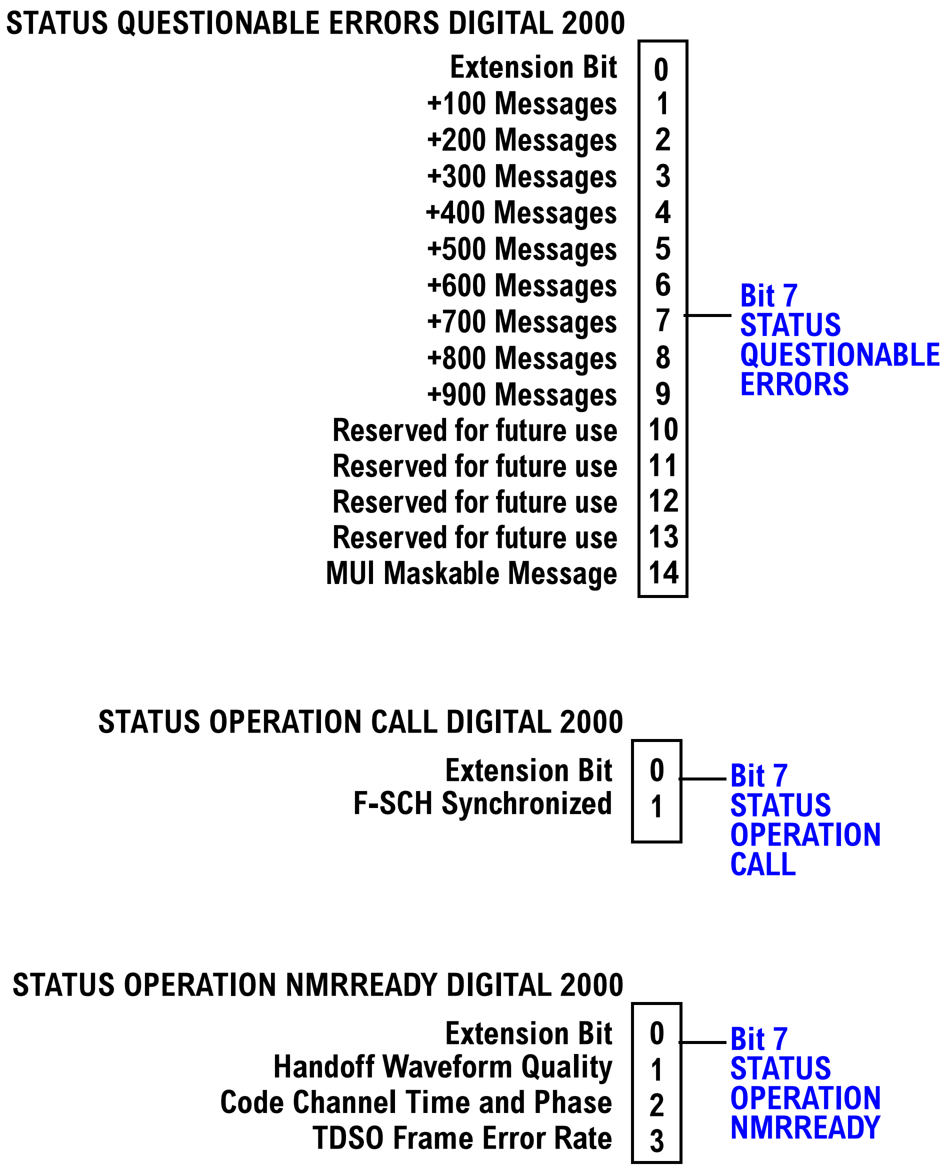
Status Reporting Structures for the TA136 Registers



Status Reporting Structure for the DIGital95 Registers



Status Reporting Structure for the DIGital 2000 Registers



Status Reporting Structure for the CDMA Registers

STATUS QUESTIONABLE ERRORS CDMA

Extension Bit	0
+100 Messages	1
+200 Messages	2
+300 Messages	3
+400 Messages	4
+500 Messages	5
+600 Messages	6
+700 Messages	7
+800 Messages	8
+900 Messages	9
Reserved for future use	10
Reserved for future use	11
Reserved for future use	12
Reserved for future use	13
MUI Maskable Message	14

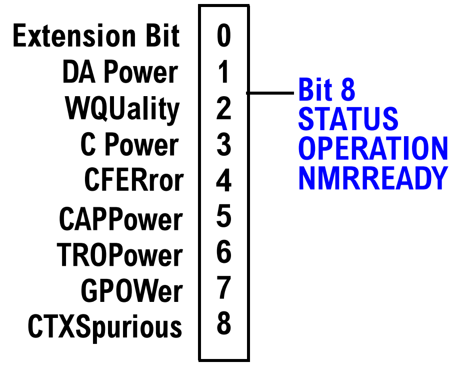
Bit 8
STATUS
QUESTIONABLE
ERRORS

STATUS QUESTIONABLE CALL CDMA

Extension Bit	0
Traffic channel preamble not received	1
Service Option or Radio Configuration rejected by MS	2
Service connect completion not received	3
Call drop timer timed out	4
Reserved for future use	5
Reserved for future use	6
Reserved for future use	7
Reserved for future use	8
Reserved for future use	9
Reserved for future use	10
Reserved for future use	11
Reserved for future use	12
Reserved for future use	13
MUI Maskable Message	14

Bit 8
STATUS
QUESTIONABLE
CALL

STATUS OPERATION NMRREADY CDMA



Status Reporting Structure for the TA 2000 Registers

STATUS QUESTIONABLE ERRORS TA 2000

Extension Bit	0
+100 Messages	1
+200 Messages	2
+300 Messages	3
+400 Messages	4
+500 Messages	5
+600 Messages	6
+700 Messages	7
+800 Messages	8
+900 Messages	9
Reserved for future use	10
Reserved for future use	11
Reserved for future use	12
Reserved for future use	13
MUI Maskable Message	14

Bit 9 STATUS QUESTIONABLE ERRORS

STATUS QUESTIONABLE CALL TA 2000

Extension Bit	0
Release order not received	1
Handoff completion not received	2
Carrier not detected on new channel	3
MS reject order received	4
Reserved for future use	5
Reserved for future use	6
Reserved for future use	7
Reserved for future use	8
Reserved for future use	9
Reserved for future use	10
Reserved for future use	11
Reserved for future use	12
Reserved for future use	13
MUI Maskable Message	14

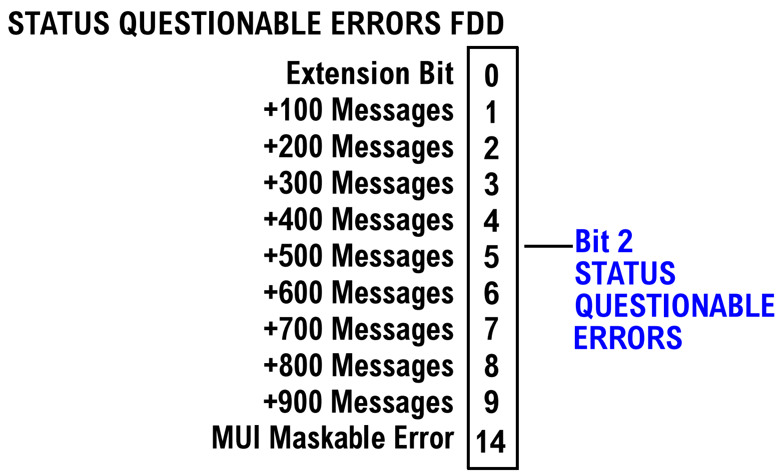
Bit 9 STATUS QUESTIONABLE CALL

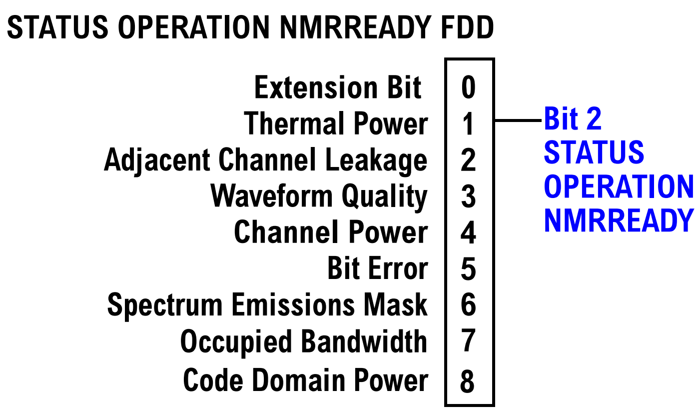
STATUS OPERATION NMRREADY TA 2000

Reserved for future use	0
Reserved for future use	1
Reserved for future use	2
Reserved for future use	3

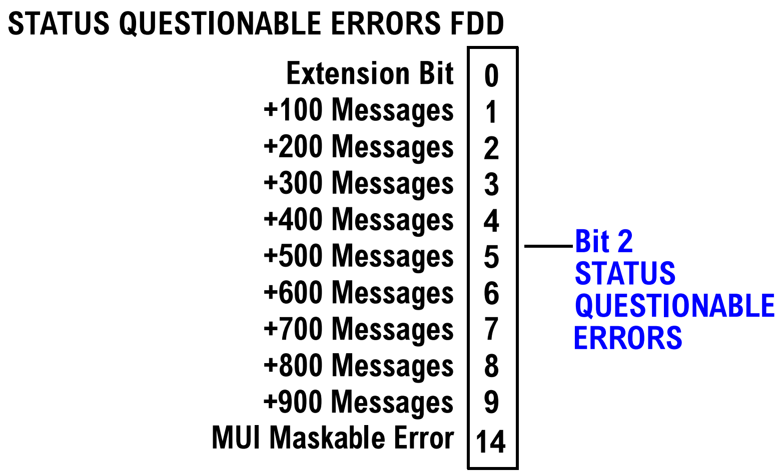
Bit 9
STATUS
OPERATION
NMRREADY

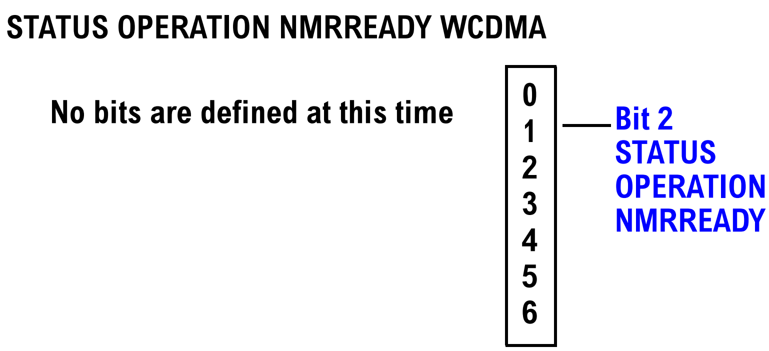
Status Reporting Structure for the FDD Registers





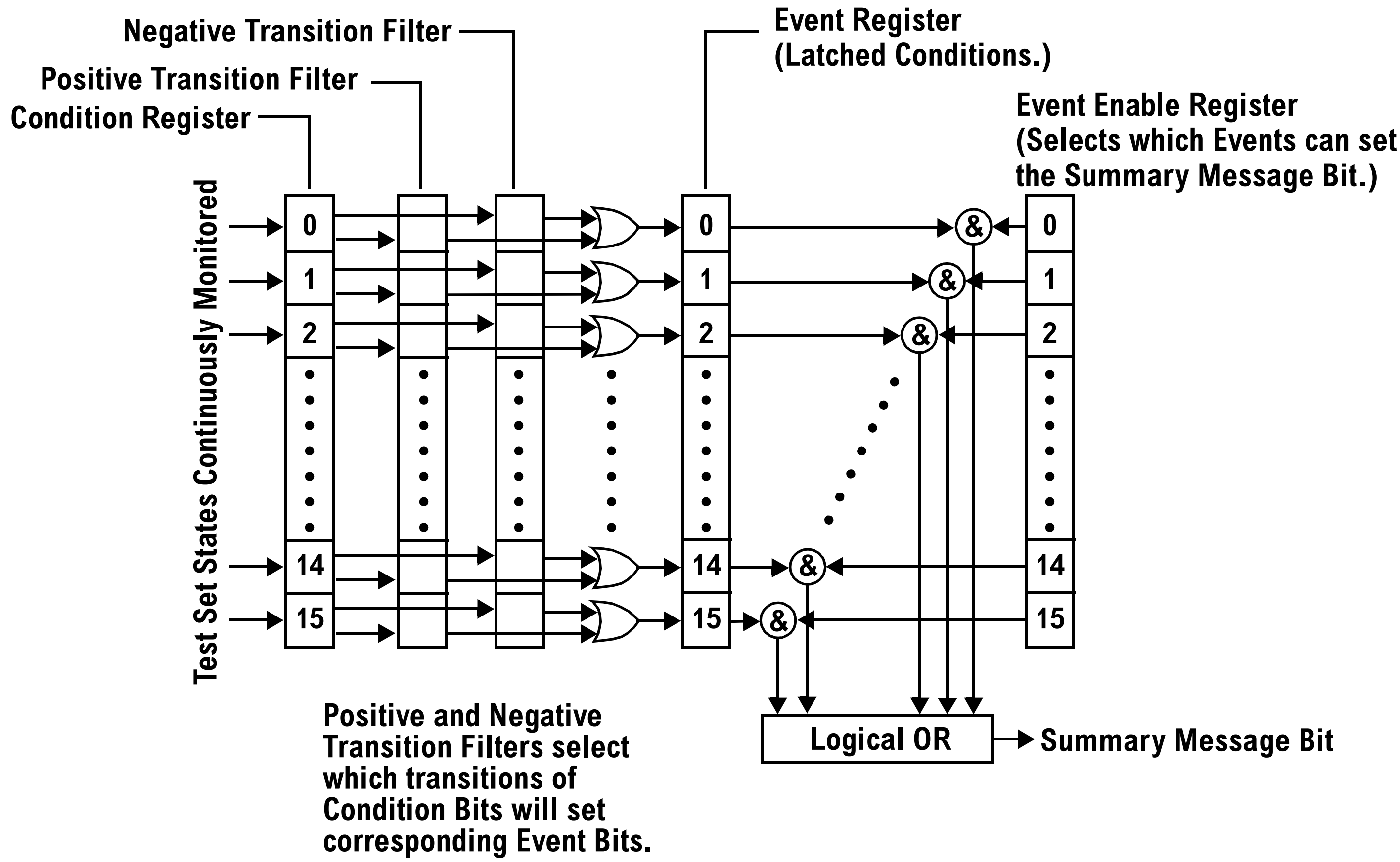
Status Reporting Structure for the WCDMA Registers





Status Data Structure - Register Model

The generalized status register model consists of a Condition Register, Transition Filters, an Event Register, an Enable Register, and a Summary Message Bit.



Condition Register

A condition is a test set state that is either TRUE or FALSE (a GPIB command error has occurred or a GPIB command error has not occurred). Each bit in a Condition Register is assigned to a particular test set state. A Condition Register continuously monitors the hardware and firmware states assigned to it. There is no latching or buffering of any bits in a Condition Register; it is updated in real time. Condition Registers are read-only. Condition Registers in the test set are 16 bits long and may contain unused bits. All unused bits return a zero value when read.

Transition Filters In the test set, the Transition Filters are implemented as two registers: a 16-bit positive transition (PTR) register and a 16-bit negative transition (NTR) register.

For each bit in the Condition Register, a Transition Filter bit determines the state transitions which will set a corresponding bit in the Event Register. Transition Filters may be set to pass positive transitions (PTR), negative transitions (NTR) or either (PTR or NTR). A positive transition refers to a condition bit which has changed from 0 to 1. A negative transition refers to a condition bit which has changed from 1 to 0.

A positive transition of a bit in the Condition register will be latched in the Event Register if the corresponding bit in the positive transition filter is set to 1. A positive transition of a bit in the Condition register will not be latched in the Event Register if the corresponding bit in the positive transition filter is set to 0.

A negative transition of a bit in the Condition register will be latched in the Event Register if the corresponding bit in the negative transition filter is set to 1. A negative transition of a bit in the Condition register will not be latched in the Event Register if the corresponding bit in the negative transition filter is set to 0. Either transition (PTR or NTR) of a bit in the Condition Register will be latched in the Event Register if the corresponding bit in both transition filters is set to 1. No transitions (PTR or NTR) of a bit in the Condition Register will be latched in the Event Register if the corresponding bit in both transition filters is set to 0.

Transition Filters are read-write.

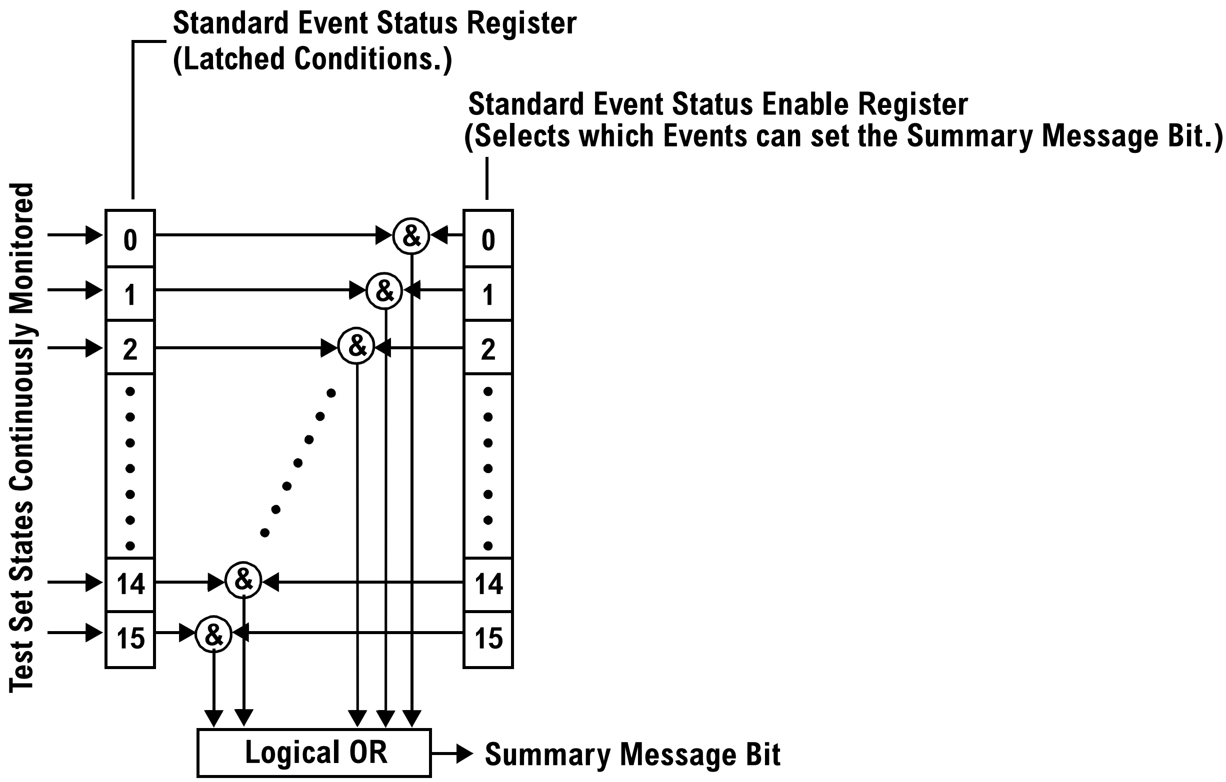
Transition Filters are unaffected by a *CLS (clear status) command.

Transitions Filters are set to pass positive transitions (all 16 bits of the PTR register are set to 1 and all 16 bits of the NTR register are set to 0) at power on or after receiving the *RST (reset) command.

Event Register The Event Register captures bit-state transitions in the Condition Register as defined by the Transition Filters. Each bit in the Event Register corresponds to a bit in the Condition Register. Bits in the Event Register are latched, and, once set, they remain set until cleared by a query of the Event Register or a *CLS (clear status) command. This guarantees that the application can't miss a bit-state transition in the Condition Register. There is no buffering; so while an event bit is set, subsequent transitions in the Condition Register corresponding to that bit are ignored. Event Registers are read-only. Event Registers in the test set are 16 bits long and may contain unused bits. All unused bits return a zero value when read.

Event Enable Register The Event Enable Register defines which bits in the Event Register will be used to generate the Summary Message. Each bit in the Enable Register has a corresponding bit in the Event Register. The test set logically ANDs corresponding bits in the Event and Enable registers and then performs an inclusive OR on all the resulting bits to generate the Summary Message. By using the enable bits the application program can direct the test set to set the Summary Message to the 1 or TRUE state for a single event or an inclusive OR of any group of events. Enable Registers are read-write. Enable Registers in the test set are 16 bits long and may contain unused bits which correspond to unused bits in the associated Event Register. All unused bits return a zero value when read and are ignored when written to. Enable Registers are unaffected by a *CLS (clear status) command or queries.

Standard Event Status Register Model

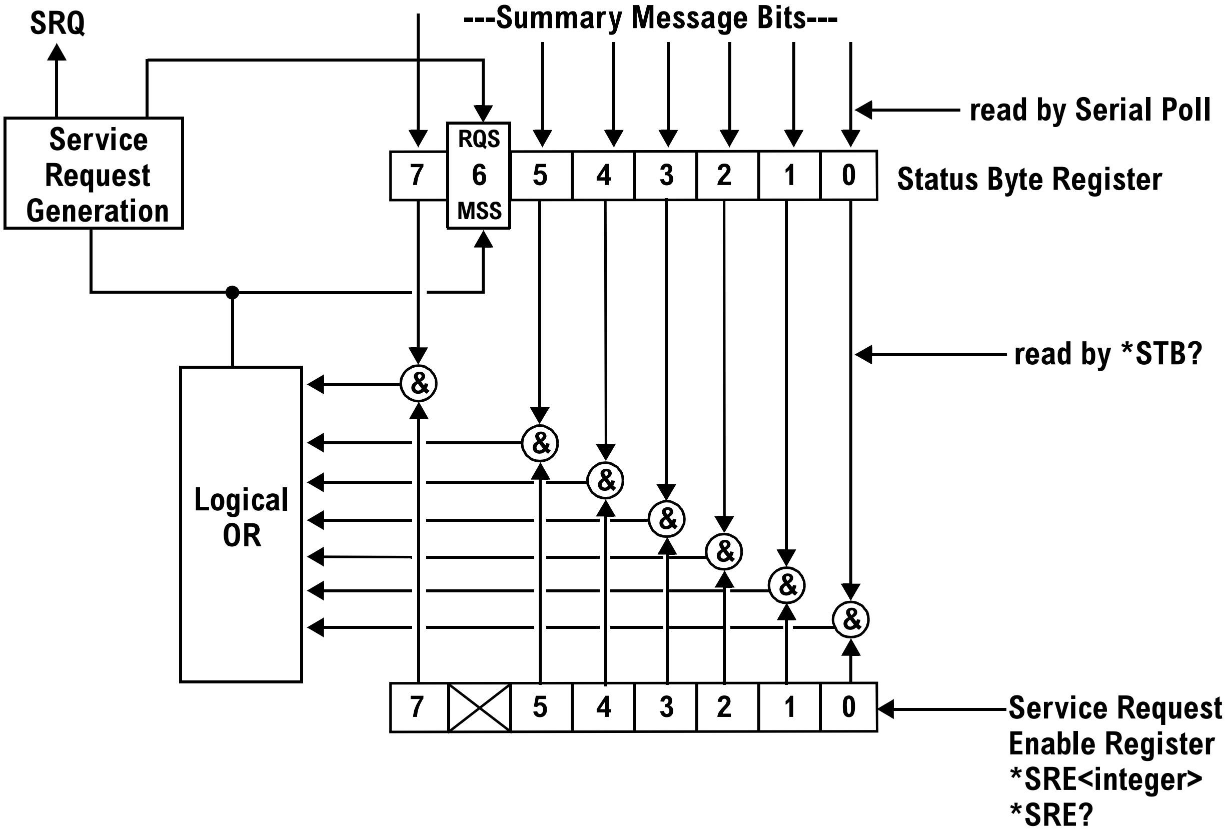


Summary Message Bit The Summary Message is a single-bit message which indicates whether or not one or more of the enabled events have occurred since the last reading or clearing of the Event Register. The test set logically ANDs corresponding bits in the Event and Enable registers and then performs an inclusive OR on all the resulting bits to generate the Summary Message. By use of the enable bits, the application program can direct the test set to set the Summary Message to the 1, or TRUE, state for a single event or an inclusive OR of any group of events.

The Summary Message is TRUE, logic 1, if the register contains some information and an enabled event in the Event Register is set TRUE.

The Summary Message is FALSE, logic 0, if the queue is empty and no enabled events are TRUE. Registers can be cleared by reading all the information from the queue. Registers can also be cleared using the *CLS (clear status) command.

Service Request Enabling Register Model



Status Byte Register The Status Byte Register is an 8 bit register that provides single bit summary messages, each summary message summarizes and overlaying status data structure. Summary messages always track the current status of the associated status data structure. Service request enabling determines if one or more of the summary messages will generate a message. Device status reporting is defined in IEEE 488.2-1992, 11.1.

The Status Byte Register contains the STB and RQS (or MSS) messages from the test set. The Status Byte Register can be read with either a serial poll or the *STB? common query. The value for bit 6 is dependent on which method used.

When reading with a serial poll the status byte and the RQS message are returned as a single data byte. The RQS message indicates if the SRQ is TRUE. The Status Byte Register is not affected by a serial poll, the RQS is set to FALSE when polled.

The *STB? query allows you to read the status byte and the MSS. The response represents the sum of the binary weighted values of the Status Byte Register from bit 0-5 and 7.

The Master Summary Status (MSS) message from bit 6 indicates when there is at least one reason for requesting service.

The Message Available (MAV) summary message from bit 4 is TRUE when there is a message is in the output queue.

The Status Byte Register is cleared with the *CLS common command. The output queue and the MAV are not affected by the *CLS command.

Service Request Enable Register The Service Request Enable Register is an 8 bit register that enables corresponding summary messages in the Status Byte Register. Enabling the service request with the *SRE command allows you to choose which bits in the Status Byte Register will trigger a service request.

The Service Request Enable Register is read with the *SRE? query. The returned value is the sum of the binary weighted values of the Service Request Enable Register, with a range of 0 through 63 or 128 through 191.

The value of the unused bit 6 will always be zero.

System Synchronization Bit Bit 12 of the status operation condition register is “pulsed” when the SYSTem:SYNChronized command is sent. This allows the status system to indicate that:

- the input buffer is synchronized to the point where this command is parsed
- all prior sequential commands are completed
- all prior overlapped commands have started

Related Topics

“STATus Subsystem Description” on page 1214

“Standard Event Status Register” on page 1260

Concurrent Measurements

Description

A number of measurements can be initiated (with the INITiate command) while other measurements are being made, and the test set will perform as many operations simultaneously as its architecture allows. This technique is referred to as concurrency. Performing measurements concurrently can greatly improve test throughput.

Operating Considerations

The test set has three parallel signal paths to improve measurement throughput.

- Demodulation downconverter path.
- Measurement downconverter path.
- Power detector path.

Since measurements are DSP (digital signal processor) based, and there are four A/D converters available to digitize or “sample” the input signal for analysis by the DSP, the test set will always have the capability to perform one transmitter measurement, one receiver measurement, and maintain the radio link concurrently. The test set’s ability to perform multiple transmitter, or multiple receiver tests concurrently will depend on the availability of resources within the test set and availability of the signal to be tested.

Concurrent Measurements for the GSM and GPRS Test Applications

This table shows the concurrency considerations for the GSM Mobile Test Application. Refer to the “Table Key” on page 399 if you require an explanation of the codes used in the table.

Table 1. GSM Concurrency Considerations

	Bite Error Rate	Dynamic Power	TCH assignment/handover	Transmit Power Level change	Mobile SACCH info	Audio Level Meas	Audio Source	Downlink Speech Source	Decoded Audio	Fast Bit Error Rate	I/Q Tuning	Output RF Spectrum	Phase & Frequency Error	Power vs. Time	Transmit Power
Uplink Path Demodulation															
Transmit Power		D	C	C								B		B	
Power vs. Time		D	C			B					B	B	B		
Phase & Frequency Error		D	C			B					B	B			
Output RF Spectrum		D	C			B					B				
I/Q Tuning		D	C			B									
Fast Bit Error Rate	A	D	C	C				A	A						
Decoded Audio	A	D	C												
Downlink Speech Source	A	D													
Audio Source		D													
Analog Audio Meas		D													
Mobile SACCH info		D													
Transmit Power Level change	C	C													
TCH assignment/handover	C	C													
Dynamic Power	D														

Table 2. GPRS/EGPRS Concurrency Considerations

	PDTCH Reconfigure	Dynamic Power	Transmit Power Level Change	Block Error Rate	Bit Error Rate	IQ Tuning	Output RF Spectrum	Phase & Frequency Error	Power vs. Time	Transmit Power
Uplink Path Demodulation										
Transmit Power	C	D					B		B	
Power vs. Time	C	D				B	B	B		
Phase & Frequency Error	C	D				B	B			
Output RF Spectrum	C	D				B				
IQ Tuning	C	D								
Bit Error Rate	C	D		E						
Transmit Power Level Change	C	D								
Block Error Rate	C	D								
Dynamic Power										

Table Key

Empty cell: These measurements can operate concurrently with no conflicts.

A: Cannot operate concurrently. The measurement which is initiated most recently will cause all other conflicting measurements to be closed.

B: These measurements share a sampler path. If multiple measurements are initiated at the same time, they will execute sequentially. However, if multiple measurements are configured to operate off the same trigger event and only a single occurrence of that event happens, only the first initiated measurement will complete.

C: The traffic channel ARFCN or transmit power level can be changed while the measurement is in progress. However, this causes the measurement to re-start, obviously increasing test time.

D: When this measurement is initiated, all other measurements are closed.

E: The Block Error Rate (BLER) measurement cannot operate concurrently with the Bit Error Rate (GBER) measurement.

NOTE This note is applicable to GSM only.

The downlink speech source cannot be used when the FBER or BER measurements are running. These measurements take absolute control of the downlink speech source and use it to generate the pseudo-random data.

Related Topics

"Measurement Event Synchronization" on page 424

"Block Diagram" on page 1507

Measurement Timeouts

Description

The primary use of measurement timeouts is to regain control of the test set's GPIB in cases where the bus could potentially "hang."

The time normally required for a measurement to complete may vary greatly depending on the individual measurement, its settings, it's multiple measurement count value, and so forth. Because of this, you may need to set the timeout longer than the default for measurements where a large number of multiple measurements are requested or where measurement triggers may be infrequent.

Be careful when setting a timeout that is shorter than the default. It is possible to specify a timeout that is so short the measurement does not even have a chance to begin. Measurement timeouts should always be at least several seconds long.

Timeout units default to S (seconds). The seconds suffix is an optional part of the command. If you want MS (milliseconds), US (microseconds) or NS (nanoseconds), you must specify these units in the suffix.

Timeout Default Values

Table 3. List of Timeouts and Default Values

Measurement Function	Default Timeout Time	Default Timeout State	Integrity Indicator Value
Analog Audio Measurements*	10 seconds	OFF	2
Bit Error Rate	10 seconds	OFF	2
Block Error Rate	10 seconds	OFF	2
Decoded Audio * also know as Uplink Speech Level	10 seconds	OFF	2
Dynamic Power	10 seconds	OFF	2
Fast Bit Error Rate *	10 seconds	OFF	2
I/Q Tuning	10 seconds	OFF	2
Output RF Spectrum	10 seconds	OFF	2
Phase and Frequency Error	10 seconds	OFF	2
Power versus Time	10 seconds	OFF	2
Transmit Power	10 seconds	OFF	2

NOTE The measurements in the table marked with an * apply to GSM only.

Programming Example

The following program causes a timeout to occur on an attempted transmit power measurement. The integrity indicator should return a 2 (the measurement timeout indicator).

```
10  !Existing conditions: A call is not connected.
20  OUTPUT 714;"SETUP:TXPOWER:TIMEOUT:TIME 5;STATE ON" !Sets a timeout value
30                                                     !of 5 seconds
40  OUTPUT 714;"INITIATE:TXPOWER" !Initiates a single TX power measurement.
50  OUTPUT 714;"FETCH:TXPOWER?" !Queries the TX Power measurement result.
60  ENTER 714;Integrity,Tx_pwr_result
70  PRINT "Integrity indicator was ";Integrity
80  IF Integrity=2 THEN   !Integrity Indicator 2 indicates TX power timed-out.
90  PRINT "Measurement timed out"
100 ELSE
110 PRINT "Measurement did not time out, TX power measurement result was ";Tx_pwr_result
120 END IF
130 END
```

In this example, if the transmit power measurement takes longer than 5 seconds to complete, the FETCh command retrieves an integrity value of 2. The test set's GPIB is then available to accept more commands.

Related Topics

"Integrity Indicator" on page 411

"SETup Subsystem" on page 1032

Measurement Progress Report

Description

The measurement progress report is a query of how far along a multi-measurement cycle has progressed. When the multi-measurement count is greater than one, the measurement progress report will indicate the number of measurements that have completed. The returned value will be the last update and not the actual number, because the value is updated periodically and not for each multi-measurement cycle. Every measurement has the measurement progress report available.

Programming Example

```
OUTPUT 714;"FETCH:PVTIME:ICOUNT?" !Returns the approximate number of
                                  !multi-measurement cycles completed during a
                                  !multi-measurement count cycle
```

Related Topics

"Statistical Measurement Results" on page 410

Triggering of Measurements

Operating Considerations

When the operating mode is active cell mode, Auto triggering sets the trigger source to Protocol. In any other operating mode, auto triggering sets the trigger source to RF Rise.

Description

- "Trigger Source Description"
- "Triggering Process Description"
- "Trigger Arm (Single or Continuous) Description"
- "Trigger Delay Description"
- "Trigger Qualifier Description"

Trigger Source Description

A measurement trigger causes hardware (for example, a sampler) to capture data which is used by a measurement algorithm to produce a measurement result. Not all of the trigger source choices are available in every measurement, or every test application.

RF Rise Trigger Source: When RF rise triggering is selected, a measurement dependent threshold is used to define the trigger point on the envelope of the signal being measured. The envelope amplitude must fall below this threshold and remain there for a measurement-dependent period of time before the trigger is armed. After the trigger is armed, a trigger will occur as the envelope amplitude increases and passes through the threshold.

Protocol Trigger Source: When protocol triggering is selected, a data capture is triggered by a protocol generated signal. The test set's protocol engine knows when the DUT's signal should be present and generates a trigger signal for use by the measurement to trigger the data capture.

External Trigger Source: When external triggering is selected, the user supplies an external trigger signal via the rear panel TRIG IN connector in order to trigger data capture. The trigger will occur on the rising edge of this signal.

Immediate Trigger Source: When immediate triggering selected, the trigger occurs as soon as any pre-trigger samples required by the measurement algorithm are taken. Data capture is triggered when the measurement is initiated.

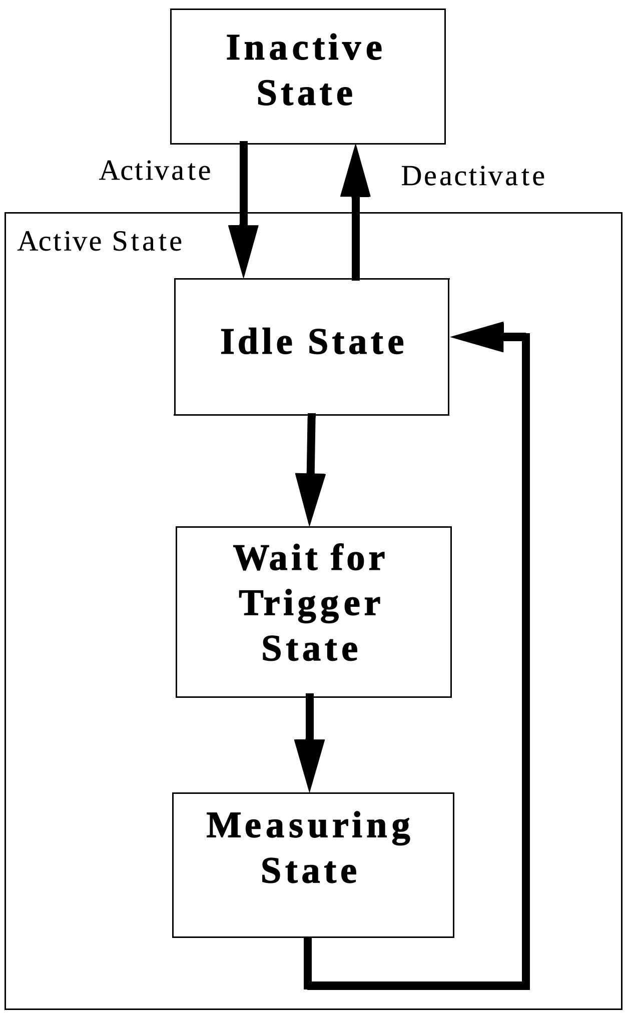
Auto Trigger Source: When auto triggering is selected, the test set automatically chooses the best trigger source for that measurement. This trigger source setting is convenient because the measurement trigger doesn't need to be changed when switching parameters. Auto trigger source is the best choice for most users.

Triggering Process Description

The triggering process controls the present and future states of the test set during the measurement cycle. Triggers are set up using the SETup commands and can be set up when a measurement is in the inactive state. A measurement is activated (selected) with an INITiate command. If a measurement is initiated while in its measurement cycle, it will terminate that measurement and restart it. The active state is not a single state but a collection of any state other than the inactive state. Deactivating (de-selecting) the measurement is accomplished through an INITiate:<MEAS>:OFF command.

Manually, a measurement is activated by selecting it from the `Measurement Selection` menu. A measurement is deactivated by pressing the `Measurement Selection` key, scrolling to measurement in the `Measurement Selection` menu, and then pressing `F4 (Close Measurement)`.

Figure 1. The Test Set's Measurement States



Measurement States

The following examples describe states of the test set under various conditions. Refer to Figure 1. on page 405.

Example 1. Inactive State

If the test set has just been powered on, or any form of preset has been performed, then the measurement state is inactive.

Example 2. Wait for Trigger State

If a measurement has been initiated with the INITiate command but has not been triggered, or a measurement has been selected from the Measurement Selection menu but has not been triggered, then the measurement state is wait for trigger.

Example 3. Measuring and Idle States (Trigger Arm Single)

If the trigger arm is set to single, the trigger source is available, and the trigger qualifier (optional) is satisfied, the measurement state transitions to measuring and measurement results are now available to the user. The state then transitions to idle (awaiting another INITiate).

Example 4. Measuring State (Trigger Arm Continuous)

If the trigger arm is set to continuous, the trigger source is available, and the trigger qualifier (optional) is satisfied, the measurement state transitions to measuring and measurement results are now available to the user. The measurement is continually triggered until the measurement is deactivated. Measurement results are only available after the measurement completes and before it rearms. The measurement is deactivated using the INITiate:<MEAS>:OFF. or `Close Measurement`.

Trigger Arm (Single or Continuous) Description

Trigger arm determines if a measurement will make one measurement then return to idle (single), or automatically rearm on completion of a measurement and repeat the process (continuous).

NOTE When operating the test set remotely, the recommended setting for the trigger arm parameter is single. This ensures proper operation of the INIT:DONE? query which is used to control the retrieval of measurement results when measurements are initiated concurrently.

When a continuously armed measurement gets a result, it is available to any currently pending (waiting, hanging) FETCh? query. Then another measurement cycle is started immediately. At this point the results are no longer valid. The INIT:DONE? query is used to determine when there is a completed measurement with valid results that can be fetched. If you look for a continuously armed measurement with valid results that can be fetched using INIT:DONE? then you are unlikely to get anything but WAIT. Each time the Test Set is queried, it is 99% likely to be making another measurement. Even if it did return a measurement name, by the time the control program determines which FETCh? query to send, it is too late to fetch the results and the FETCh? query just hangs until the next measurement cycle is done, nullifying the efficiency provided by the INIT:DONE? query.

Pressing the `Start Single` key on the front panel will cause all currently active measurements with trigger arm set to single to arm and make the measurement.

Pressing Shift, Start Single (Stop) causes all measurements with trigger arm set to single to abort the measurement.

It is unnecessary for you to arm a measurement if the trigger arm is set to continuous. When in continuous mode, the measurement is automatically rearmed after completing a measurement.

Table 4. Trigger Arm Default Settings

Action	Trigger Arm Default Setting
Power up of test set	Continuous
Manual Full Preset	Continuous
*RST (Remote) Full Preset	Single
Partial Preset	No change

Trigger Delay Description

Trigger delay controls the delay time between the trigger and the start of sampling. Resolution is 1 nanosecond per measurement and the units are in seconds. A negative value indicates the sampling should occur prior to the trigger. The default is zero seconds which is preferred for most measurements.

Trigger Qualifier Description

When the trigger qualifier is on, the test set samples the input signal when a trigger is received. It then determines if the input signal was valid by looking at its power level. If the power level during sampling did not meet the requirements of a valid signal, the state returns to wait for trigger without processing the samples. Trigger qualifier is available for GSM/GPRS TX Power and Phase Frequency Error measurements only.

If a valid signal is present, then it is qualified, and the samples are processed.

Related Topics

"Integrity Indicator" on page 411

"SETup:ORFSpectrum:TRIGger:SOURce" on page 1146

"SETup:PFERror:TRIGer:SOURce" on page 1161

"SETup:PVTime:TRIGger:SOURce" on page 1194

"SETup:IQTuning:TRIGger:SOURce[:SELected]" on page 1128

"SETup:TXPower:TRIGger:SOURce" on page 1213

Burst Synchronization of Measurements

Measurement Synchronization

Measurement Synchronization Description

Measurement synchronization determines how a measurement's time reference is determined from the measurement data (a sampled time record). Measurement synchronization occurs after the measurement data is captured.

For the transmit power and ORFS (switching and modulation) measurements, the RF amplitude of the input signal is used for measurement synchronization. For Phase and Frequency Error Measurement and the Power versus Time Measurement (see "Phase and Frequency Error Measurement Description" on page 113 and "Power versus Time Measurement Description" on page 117.) there are three possible settings for measurement synchronization:

- Midamble
- RF Amplitude
- None

Selecting midamble causes the test set to use the input signal's midamble data to determine the measurement's time reference. A measurement is capable of midamble synchronization if the test set is able to determine transmitted data from measurement samples (i.e. perform demodulation). Midamble synchronization is not available for Transmit Power measurements. However, the Power vs. Time measurement can perform an average power measurement using midamble synchronization.

NOTE When the test set's operating mode is "test mode" or when the cell activated state is "off", the burst type may need to be specified before the test set can synchronize to the input signal's midamble. See "Expected Burst" on page 180.

Selecting RF amplitude causes the test set to use the input signal's rising and falling edges (if edges are detected within the sampled time record) to determine the measurement's time reference. If a non-bursted signal was sampled, the measurement's time reference will be developed using the beginning and end of the sampled time record, and the samples used for making the measurement will be taken from the middle of the time record.

Selecting None causes the test set to perform measurements exactly as if RF amplitude was chosen.

An integrity indicator is returned for each completed measurement. Integrity errors are prioritized so that when multiple errors occur, the highest priority error is returned first, as the root error. The integrity indicator returns a number from 0 to 16, where 0 indicates normal. The following integrity indicators reveal problems with measurement synchronization:

- (7) Burst Short
- (8) Trigger Early
- (8) Fall Early
- (9) Trigger Late

- (9) Rise Late
- (11) Sync Not Found

Refer to “Integrity Indicator” on page 411 for descriptions of integrity indicators.

Programming Example:

```
OUTPUT 714;”SETUP:PVTIME:SYNC MIDAMBLE”!selects midamble synchronization for PVT measurements
```

Related Topics

“Integrity Indicator” on page 411

“INITiate” on page 990

“SETup Subsystem” on page 1032

Statistical Measurement Results

Description

Most measurements have a setup window that provides for the entry of a multi-measurement count value. This specifies how many measurements the test set will perform to obtain a set of values from which to calculate the following statistical measurement results:

- Average (arithmetic mean) of measurement set
- Minimum value from measurement set
- Maximum value from measurement set
- Standard Deviation of measurement set

Operating Considerations

The advantages of using the multi-measurement feature to obtain statistical measurement data include: reduced time associated with GPIB bus traffic, and reduced time configuring hardware. This is because the number of measurements specified in the multi-measurement count value are performed during one measurement cycle.

Programming Example

```
OUTPUT 714;”SETup:TXPower:COUNt:SNUMber 10” !Enters a TX Power multi-measurement count
                                      !value of 10, and turns the TX Power
                                      !multi-measurement state on.
```

Related Topics

“Measurement Progress Report” on page 403

Integrity Indicator

Description

The test set can evaluate its own performance and make a determination as to the validity of a measurement result. The test set evaluates the conditions surrounding a measurement and reports to the user its evaluation of these conditions in a parameter called the measurement integrity indicator. A measurement integrity indicator value is returned for every completed measurement. It is recommended that the user take advantage of this feature in every measurement.

The returned value defines whether or not a problem was encountered by the measurement process. It is not, however, guaranteed to be the only or root cause of the measurement problem. This is because some of the conditions surrounding a measurement may interact, and the test set may have insufficient information to determine the root cause of the measurement problem. However, in most cases, the value returned is the most likely cause of the problem.

Not all of the integrity indicator values are available for each measurement or test application, if a value doesn't apply it will not be available.

Example: Questionable Result for PGSM (15) and Questionable Result Due To Channel Mode (16) are GSM only integrity indicator values.

NOTE GSM, GPRS and EGPRS measurements return integrity indicators (8, 9, 11) when the measurement synchronization is set to midamble.

Table 5.

Integrity Indicator Number	Integrity Indicator Message
0	Normal: Indicates the measurement completed successfully without error and the result is accurate.
1	No Result Available: Indicates that there is no measurement result and returns NAN (not a number).
2	Measurement Timeout: Indicates that a measurement has timed out. The measurement timeout state must be set to ON.
3	Hardware Not Installed: Indicates that a piece of hardware is not installed in the test set, or the hardware has failed in a way which leads the instrument controller to believe it isn't installed.
4	Hardware Error: Indicates that a hardware failure has occurred. These include failures such as a phase lock loop out-of-lock, defective DSP samplers, or power detectors that can not be calibrated.
5	Over Range: Indicates that the input signal is over range. The amplitude of the device-under test's (DUT's) signal is causing the voltage at a DSP sampler to be above its maximum input level or the frequency is too high or the voltage measured is beyond the maximum voltmeter range, either positive or negative.

Table 5.

Integrity Indicator Number	Integrity Indicator Message
6	Under Range: Indicates that the input signal is under range. The amplitude of the DUT’s signal is not high enough for the DSP sampler to produce accurate results with the measurement algorithm.
7	Burst Short: Indicates that the burst duration is too short, or part of the burst was not sampled due to improper triggering.
8	Trigger Early or Fall Early: Indicates that the DUT’s burst amplitude fell prematurely or, due to an early trigger (early relative to a transmitted burst) the measurement sampling operation terminated before the falling edge of the burst.
9	Trigger Late or Rise Late: Indicates that either the rising edge of the DUT’s burst was late or, due to a late trigger (late relative to a transmitted burst) the measurement sampling operation didn’t start until after the rising edge of the transmitted burst.
10	Signal Too Noisy: Indicates that the measurement algorithm has found the signal measured to be too noisy to provide accurate results.
11	Sync Not Found: Indicates that the midamble was not found therefore the measurement was not synchronized.
12	Oven Out of Range: Indicates that a temperature controlled oven (other than the internal timebase oven) is outside of its operating range. The power meter’s oven is checked and its condition reported with this value. (The internal timebase generates a temporary error message (out of lock) that is sent to the system error queue and the display. This is not an integrity indicator value, it is an error message.)
13	Unidentified Error: Indicates errors which are not covered by the other integrity values. Examples include: parameter errors, algorithm memory errors (too many measurements), measurements unavailable (unable to control), autorange unable to converge, default calibration data used.
14	PCM Full Scale Warning: Indicates that the PCM signal has reached plus or minus full scale. The measurement made will be accurate on the PCM signal but would typically indicate an overdriven or oscillating element in the DUT.
15	Questionable Result for PGSM: Indicates that the user attempted to make an FBER measurement in a phase 1 system. FBER is only possible in a phase 2 GSM system. This indicator is available only when the selected broadcast band is PGSM.
16	Questionable Result Due To Channel Mode: Indicates that the channel mode was set to Enhanced Full Rate Speech while a Decoded Audio measurement was active. Decoded Audio is not supported for EFR Speech.

Table 5.

Integrity Indicator Number	Integrity Indicator Message
17	Can not Correlate: Indicates that the test sets internally generated reference signal does not correlate with the received signal. Some conditions that could cause this integrity indicator result include the following: • an input signal that is corrupted • the input signal is extremely distorted • the input signal is off by more than 10 ms. • the frequency of the input signal deviates more than allowed • something is wrong with the long-code mask coming from the mobile ID
18	Frequency Out Of Range: Indicates that a Channel Power Measurement was attempted at a frequency for which there is no calibration data. The test set display will indicate 4 dashes.
19	Uncalibrated Due To Temperature: Indicates that the current temperature of the test set is different than the calibration data temperature by more than ±10 degrees C, when attempting a Channel Power Measurement.
20	Potential Receiver Saturation: Indicates that an input signal immediately prior to the measured input was high enough to potentially saturate the receiver hardware.
21	Parameter Error: Indicates that a measurement setup parameter has been set in a way that gives invalid measurement results.
22	Unsupported Configuration: Indicates that some parameter, other than a measurement setup parameter has been set so that it causes an invalid measurement result. Typically this would be a base station emulator parameter.
23	Call Processing Operation Failed: Indicates that a call processing operation, (base station emulator) needed in the course of making the measurement could not complete.
24	Calibration Error
25	Burst Not Found
26	Missing Loopback Packets or AT Buffer Overflow: Indicates that Loopback Packets are missing, or the Access Terminal had an overflow. This integrity indicator was added for the 1xEV-DO Packet Error Rate measurement.
27	No AT Loopback Packets: Indicates that no Loopback Packets from the Access Terminal were detected for a period of several seconds. This integrity indicator was added to provide an early termination criteria for the 1xEV-DO Packet Error Rate measurement.
28	Questionable MS-to-Cell Data: Indicates that a condition exists on the uplink or reverse channel that has caused the measurement results to be in question. In the case of the WCDMA Loopback BER measurement, an example condition that could cause this integrity indicator would be detection of a CRC error in an uplink transport block.

Programming Example

```
10  OUTPUT 714;"INITIATE:TXPOWER" !Start TXP measurement
20  OUTPUT 714;"FETCH:TXPOWER?" !Request measurement results.
30  ENTER 714;Integrity,Tx_power !Read measurement results.
40  IF Integrity = 0 THEN !Permits measurement to be printed if integrity
50                        !indicator indicates a successful measurement
60  PRINT "TX Power =";Tx_power!if 0 then measurement was successful
70  ELSE
80  PRINT "Measurement integrity questionable, integrity value = ";Integrity
90                                        !If integrity not zero then print
100                                       !integrity value.
110 END IF
120 END
```

Related Topics

"Classes of Errors" on page 1473

Invalid Measurement Results

Description

Invalid measurement results are returned by the test set when conditions such as signal level are not within the present measurement range. Three different invalid measurement results are provided in order to help you understand the condition that caused the invalid result.

- 9.9E+37 = INFinity (Infinity)
- -9.9E+37 = NINF (Negative Infinity)
- 9.91E+37 = NAN (Not A Number)

9.9E+37 (INFinity)

9.9E+37 is returned by the test set when the measurement is out of range and results are far above the present measurement range.

-9.9E+37 (NINFinity)

-9.91E+37 is returned by the test set when the measurement is out of range and results are far below the present measurement range.

9.91E+37 (NAN)

9.91E+37 is returned by the test set when the measurement is out of range but it can not be determined if measurement results are far above, or far below the measurement range.

If a measurement exceeds its measurement timeout value before a valid result is determined, 9.91E+37 is returned.

FETCH? and READ? Invalid Results

When a FETCH? or READ? query is performed on a measurement with invalid results, the integrity indicator returns a value of 1, indicating No Result Available.

Manual Users Invalid Results

Manual users will generally see four dashes , “----” on the test set display. When the measurement timeout value has been exceeded, “Measurement Timeout” is displayed as well as the four dashes.

Frame Trigger Parameters

Frame Trigger Parameters

The frame trigger is a positive-going TTL compatible pulse that is one GSM bit wide, it is aligned to the downlink TDMA frame timing. The test set provides a frame trigger for synchronizing other test equipment to a measurement it is available at the rear-panel TRIG OUT connector.

The frame trigger has 3 parameters that the user must set. See "CALL:TRIGger" on page 830.

- "External Trigger State (on or off)" on page 416
- "External Trigger Timeslot (0 to 7)" on page 416
- "External Trigger Symbol (0 to 1250)" on page 416

External Trigger State (on or off)

The External Trigger State parameter turns the external frame trigger on and off. See "CALL:TRIGger[:OUTPut]:FRAMe:STATe" on page 837 for command information.

External Trigger Timeslot (0 to 7)

The External Trigger Timeslot parameter causes the external frame trigger pulses to align with the timeslot you specify. See "CALL:TRIGger[:OUTPut]:FRAMe:TSLot" on page 839 for command information.

External Trigger Symbol (0 to 1250)

The External Trigger Symbol parameter causes the external frame trigger pulses to occur a user specified number of bits after bit 0 of the selected timeslot. See "CALL:TRIGger[:OUTPut]:FRAMe:SYMBol" on page 837 for command information.

Operating Considerations

Each frame is made up of 8 time slots. Time slots are defined in "ETSI GSM 05.10 Ver. 4.9.0 Section 5. Time slots 0 and 4 are 157 bit periods long, time slots 1, 2, 3, 5, 6, 7 are 156 bit periods long, the average time slot is 156.25 bits in duration. The external trigger timeslot can be set to any time slot 0 through 7, the external trigger bit position can be set from 0 through 1250. If the trigger bit position is set to 1250, that is one full frame beyond the setting of the external trigger timeslot, (156.25 * 8 = 1250).

When the cell activated state is OFF, the frame trigger output is disabled (set to 0 volts) since there is no reference downlink TDMA frame structure available. However, the frame trigger state command ("CALL:TRIGger[:OUTPut]:FRAMe:STATe" on page 837) is not affected when there are changes to cell activated state.

The frame trigger can be set manually from the system configuration screen by pressing the External Trigger Setup soft key.

Related Topics

"CALL:TRIGger" on page 830

Dealing With Semicolon Separated Response Data Lists

Description

In accordance with IEEE 488.2-1992 Section 8.4.1 the test set uses the semicolon (;) as the response message unit separator (RMUS). The RMUS separates sequential response message unit elements from one another when multiple response message unit elements are sent in a response message. This condition would occur when combining multiple queries into a single GPIB transaction.

Query Response Data Types Used By Test Set

The test set can return the following data types in response to queries:

- character data (char): ASCII characters A-Z (65-90 decimal), underscore (95 decimal), digits (48-57 decimal).
- string data: ASCII characters enclosed in quotes (for example, “5551212” or “PGSM”)
- numeric response data (nr1): numeric data in the form +/- dddddddd
- numeric response data (nr3): numeric data in the form +/- ddd.ddd E +/- dddd

Semicolon Separated Response Data Lists Containing Mixed Data Types

Problems can occur when trying to enter semicolon separated response data lists containing mixed data types.

For example: If the following command string is sent to the test set, the test set will respond by constructing a response message which contains multiple response message unit elements (that is, one response message unit element for each query item contained in the command string). Some response message unit elements are string data type, some are character data type and some are nr3 data type.

```
OUTPUT 714;"CALL:MS:REP:IMSI?;PCL?;REV?;SBAN?;ONUM?;MCC?;MNC?;LAC?"
```

An example response message generated by the test set in response to the above OUTPUT statement would be:

“001012345678901”;+4.00000000E+000;PHAS1;”PGSM”;”5551212”;9.91E37;9.91E37;9.91E37

Constructing the following data entry statement will account for multiple responses from the query:

```
ENTER 714;Imsi$,Pcl,Rev$,Sban$,Onum$,Mcc,Mnc,Lac
```

In the Basic programming environment the above ENTER statement will fail with an ‘Insufficient data for ENTER’ error. Some programming languages, Basic for example, cannot use the semicolon character as a data item terminator for string variables. In this example Basic will attempt to enter data into Imsi$ until it sees a LF (line feed) data item terminator. The test set does not send the LF until all the data has been sent. Consequently when Basic sees the LF it terminates entry of data into Imsi$ and starts to look for data to enter into Pcl. Since the test set is no longer sending any data the error message ‘Insufficient data for ENTER’ is generated.

One possible workaround is to enter all the data into a single string variable, replace all semicolons with line feeds and then enter the data from the string into the individual data items. For example:

```
DIM Response$[500]
!
```

```
!
OUTPUT 714;”CALL:MS:REP:IMSI?;PCL?;REV?;SBAN?;ONUM?;MCC?;MNC?;LAC?”
ENTER 714;Response$
Semicolon=POS(Response$,”;”)
WHILE Semicolon
Response$[Semicolon,Semicolon]=CHR$(10)
Semicolon=POS(Response$,”;”)
END WHILE
ENTER Response$;Imsi$,Pcl,Rev$,Sban$,Onum$,Mcc,Mnc,La
```

Semicolon Separated Response Data Lists Containing Only Numeric Data Types

Semicolon separated response data lists containing only numeric data types do not present the types of problem associated with semicolon separated response data lists containing mixed data types. The number building routines in most languages will use any non-numeric character (that is, anything other than +/- 0123456789 E .) as the data item terminator. Consequently when the number building routines encounter the semicolon the data item is terminated. The following example illustrates this:

```
OUTPUT 714;”FETCH:TXP:INT?;POW:MIN?;MAX?”
ENTER 714;Integrity,Min_power,Max_power
```

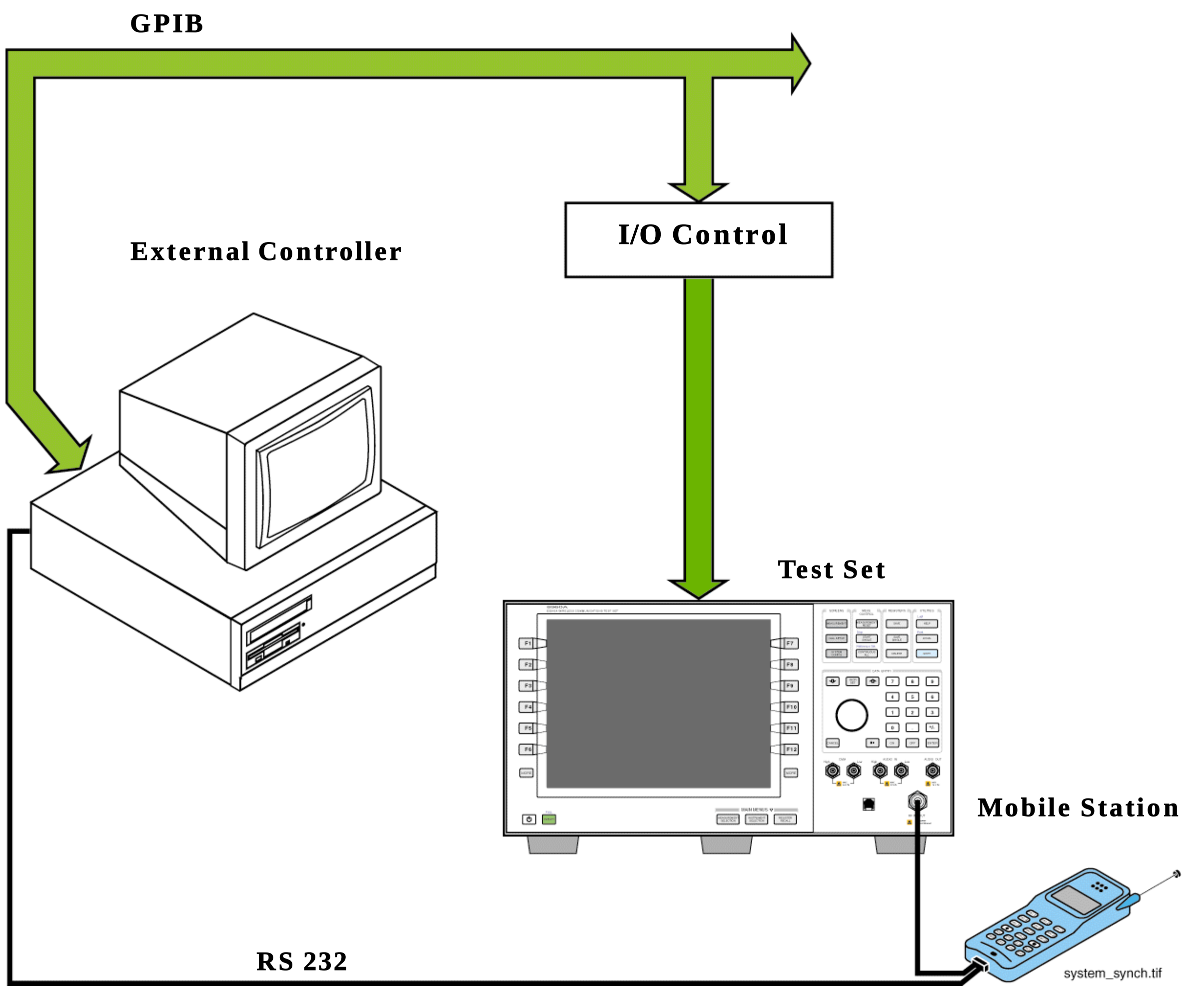
Test System Synchronization Overview

Description

Typical test systems include an external controller with a GPIB connection to the test set, an RF (and possible AF) connection between the test set and a mobile station under test, and a serial connection between the mobile station and the external controller.

Synchronizing an external controller with the test set and a mobile station under test ensures that no device does something before it is supposed to, which can cause errors, or does something well after it could have, which wastes time.

Figure 2. Test System



Sequential versus overlapped commands

The test set uses both sequential and overlapped commands:

- Sequential commands must finish executing before the next command starts to execute.
- Overlapped commands do not finish executing before the next command starts to execute.

Overlapped commands are more difficult to synchronize because an overlapped operation that started several commands earlier may still be executing as subsequent commands are being parsed out from the input buffer and executed. This can present a problem unless the external controller is properly synchronized to the test set's execution of commands. Overlapped commands allow the test set to use its internal resources as efficiently as possible.

Methods for synchronization

The test set’s GPIB command set supports the following methods to achieve synchronization for overlapped commands. In some cases, combinations of these methods will provide the best results:

Methods one and two do not require the external controller to query the test set, nor to perform any branching or decision-making associated with information acquired from the test set.

Methods three through six rely on responses from the test set to an external controller, indicating that some event has occurred. The external controller can then make decisions based on these responses to control the flow of commands to the test set and other devices in the test system.

1. Force the test set to execute overlapped commands sequentially.
2. Force the test set to wait until an overlapped command is done executing before executing any more commands.
3. Query the test set to determine when a command has finished executing.
4. Query the test set to determine when all commands sent to it have at least begun executing.
5. Query the test set to determine the current call or data connection processing state.
6. Program the test set to generate a service request when an operation has completed or the test set is in a certain state.

Commands used for synchronization:

- “CALL:STATus[:STATe][:VOICe]?” on page 808

  This command queries the test set’s current call processing state. This command supports synchronization method five. (See “Call Processing State Query” on page 433).

- “CALL:CONNected[:STATe]?” on page 511

  This command determines the connected/idle state of a call. A feature called the change detector provides the user with a way to hold off the response to this query until a call processing state transition has taken place. (See “Connected/Idle Query” on page 434). This command supports synchronization method five.

- :DONE? and :OPC?
  These specialized commands can be appended to call processing overlapped commands to support synchronization method three. (See “Call Processing Subsystem Overlapped Command Synchronization Commands” on page 429.)

- :WAIT
  This specialized command can be appended to call processing overlapped commands to support synchronization method two.
  (See “Call Processing Subsystem Overlapped Command Synchronization Commands” on page 429.)

- :SEQ
  This specialized command can be appended to call processing overlapped commands to support synchronization method one.
  (See “Call Processing Subsystem Overlapped Command Synchronization Commands” on page 429.)

- “INITiate:DONE?” on page 993

This specialized command causes the test set to return a mnemonic indicating if a measurement is done. If not, the returned mnemonic will indicate if the measurement is still executing. This command supports synchronization method three.
(See “INITiate:DONE?” on page 424.)

- STATUS:<register>
  Status bits in the “STATus:OPERation:CALL:GSM Condition Register Bit Assignment” on page 1226 register are provided to indicate the test set’s call processing state. These bits support synchronization methods five and six.

  Status bits in the “STATus:OPERation:NMRReady:GSM Condition Register Bit Assignment” on page 1233 register are provided to indicate when a measurement is ready to be fetched. These bits support synchronization method three and six.
  Many other status bits are provided in the GPIB status subsystem that are useful for synchronization. See“STATus Subsystem Description” on page 1214.
- “SYSTem:SYNChronized” on page 1300
  This specialized command causes a condition bit to be set then cleared when all prior sequential commands have completed and all prior overlapped commands have started indicating that the input buffer is synchronized. (See “STATus:OPERation Condition Register Bit Assignment” on page 1221). This command supports synchronization method four and six.
- “*OPC” on page 1305, “*OPC?” on page 1305, and “*WAI” on page 1306 (not recommended)

  Note: These commands look at all of the test set’s operations collectively. Because multiple processes are likely to be executing at the same time, it is recommended that the other commands above be used instead.

Related Topics

“Call Processing State Synchronization” on page 433

“Measurement Event Synchronization” on page 424

“Call Processing Event Synchronization” on page 428

“SYSTem:SYNChronized” on page 1300

Measurement Event Synchronization

Description

Measurement event synchronization saves time by controlling the communication between the controller, the test set, and the mobile station, so that no device does something before it is supposed to (which can cause errors or do something well after it could have). Because some measurements can run concurrently, it is necessary that the control program know when individual measurement results are available.

Measurement event synchronization is accomplished using the INITiate subsystem's command INITiate:DONE? or the STATus:OPERation:NMRReady status registers.

INITiate:DONE?

The INITiate:DONE? query returns a string that indicates what, if any, measurements are ready to be fetched. This query should be used inside a loop, checking each measurement that was initiated. See "INITiate:DONE?" on page 993 for more details about this query.

The INITiate:DONE? query returns at least one of the following indicators for each pass through the loop:

- "AAUD*" - The analog audio measurement results are available.*
- "BERR" - The GSM bit error measurement results are available.*
- "BLER[o]" - The block error measurement results are available.[o]
- "DAUD" - The decoded audio measurement results are available.*
- "DPOW" - The dynamic power measurement results are available.
- "ETXP[o]*" - The EGPRS transmit power measurement results are available.*[o]
- "FBER*" - The fast bit error measurement results are available.
- "GBER[o]" - The GPRS/EGPRS bit error measurement results are available.[o]
- "IQT" - The I/Q Tuning measurement results are available.
- "ORFS" - The output RF spectrum measurement results are available.
- "PFER" - The phase and frequency error measurement results are available.
- "PVT" - The power versus time measurement results are available.
- "SMON" - The spectrum monitor measurement results are available.
- "TXP" - The GSM/GPRS transmit power measurement results are available.
- "WAIT" - There are one or more measurements which are in the measuring state which are not excluded from the query. See "INITiate:DONE:FLAG:<measurement mnemonic>" on page 995. When WAIT is returned at least one measurement is not ready to be fetched yet.
- "NONE" - There are no measurements currently in the measuring state. This assumes no measurements have been excluded. See "INITiate:DONE:FLAG:<measurement mnemonic>" on page 995. This indicates that all measurements results are available or none have been initiated.

NOTE The indicators marked with a ^{o} are not returned for GSM as those measurements are not available in that test application.

The indicators marked with a * are not returned for GPRS as those measurements are not available in that test application.

Programming Example

The following example assumes that a call is currently connected and that no measurements other than TX power (TXP) and phase and frequency error (PFER) are currently being triggered. See “Establishing an Active GSM Link with the Mobile Station” on page 246 and “Triggering Process Description” on page 405.

```
10  OUTPUT 714;”SETUP:TXPOWER:CONTINUOUS OFF” !Sets TX power trigger mode
20                                            !to single.
30  OUTPUT 714;”SETUP:PFERROR:CONTINUOUS OFF” !Sets PFER trigger mode
40                                            !to single.
50  OUTPUT 714;”INITiate:TXPower;PFERror” !Begins a TX power and
60                                        !PFER measurement.
70  REPEAT
80  OUTPUT 714;”INITIATE:DONE?” !Queries the test set for measurements
90                              !that are done
100 ENTER 714;Meas_done$ !String value representing DONE measurements,
110                      ! NONE if no measurements are done.
120 SELECT Meas_done$ !This variable will be set to WAIT until measurements
130                   !are DONE.
140 CASE “TXP” !Characters must be upper case.
150 OUTPUT 714;”FETCH:TXPOWER:POWER?” !If this case is selected, Tx power
160                                   !(no integrity indicator) is FETCHed.
170 ENTER 714;Tx_power
180 PRINT “TX_Power is “;Tx_power
190 CASE “PFER” !Characters must be uppercase.
200 OUTPUT 714;”FETCH:PFERROR:RMS?” !If this case is selected, rms phase error
210                                 !measurement is FETCHed.
220 ENTER 714;Phs_error
230 PRINT “Max RMS Phase Error is “;Phs_error
240 END SELECT
250 UNTIL Meas_done$ = “NONE” !When all triggered measurements have completed,
260                           !the INITiate:DONE? query returns NONE.
270 END
```

STATUS:OPERATION:NMRREADY:GSM

The STATus:OPERation:NMRReady:GSM command allows the program to immediately branch to the next operation or command without continuing through a loop as in INITiate:DONE? See “STATus:OPERation:NMRReady:GSM Condition Register Bit Assignment” on page 1233 for more details about this command.

You must enable the following so that as soon as the enabled NMRReady bit is true the program moves on.

- Positive or negative transition filter. See“Transition Filters” on page 392.
- STATus:OPERation:NMRReady:GSM bit for the measurement desired.
- STATus:OPERation:NMRReady bit (4 for GSM) for the required system. See “STATus Subsystem Description” on page 1214 or “Status Subsystem Overview” on page 376.
- STATus:OPERation bit (512 for NMRReady).
- Service Request Enabling (*SRE 128 for NMRReady).

The “STATus:OPERation:NMRReady:GSM Condition Register Bit Assignment” on page 1233 status register provides status reporting on the following measurement completions:

- TX Power
- Power vs. Time
- Phase/Frequency Error
- Output RF Spectrum
- Analog Audio
- Decoded Audio
- Fast Bit Error Rate
- Bit Error Rate
- I/Q Tuning
- Dynamic Power

Example 5. Generating a Service Request (SRQ) Interrupt - Bit Error Rate NMRR

The following example illustrates the use of the STATus subsystem to generate a service request when a BERR measurement completes. This example assumes a call is already connected and the BERR measurement is setup (mobile station must be in loopback type A or B).

```
10  OUTPUT 714;”STATUS:OPERATION:NMRREADY:GSM:PTR 256” !Enable positive transition
20                                                   !filter on fast BER bit.
30  OUTPUT 714;”STATUS:OPERATION:NMRREADY:GSM:ENABLE 256” !Enable the fast BER Bit to
40                                                      !generate a summary message.
45  OUTPUT 714;”STATUS:OPERATION:NMRREADY:ENABLE 4” !Enable the GSM summary bit.
50  OUTPUT 714;”STATUS:OPERATION:ENABLE 512” !Enable the Operation summary bit to
60                                           !generate a summary message.
70  OUTPUT 714;”*SRE 128” !Enable the service request enable register to generate SRQ.
80  OUTPUT 714;”*CLS” !Clear all status data structures.
90  ON INTR 7,15 CALL Meas_complete !Define interrupt-initiated branch with a priority
100                                !of 15 (highest)
```

```
110 ENABLE INTR 7;2 !Enable interrupt on interface card 7 with a bit mask
120                 !(for interface’s interrupt-enable register) of 2.
130 OUTPUT 714;”SETUP:FBER:CONTINUOUS OFF;:INITIATE:FBERROR” !Initiate a single
140                                                           !fast BER test.
150 LOOP
160 DISP “Waiting for BERR test to complete”
170 WAIT .1 !”Dummy” loop
180 END LOOP
190 !Instead of a “dummy” loop, controlling application could be performing setups,
200 !making measurements, etc.
210 END
220 SUB Meas_complete
230 DISP “BER test complete, OK to FETCh results now”
240 Clear_interrupt=SPOLL(714) !Clear the RQS message in the status byte register.
250 STOP
260 SUBEND
```

Operating Considerations

Only one indicator is returned per query.

All active measurements must be set to single trigger mode. This ensures that when a measurement completes it remains in the “DONE” state rather than restarting. Sending the “*RST” command at the beginning of the test code or using the “SETup:CONTinous:OFF” command during measurement setups are ways to set the trigger to single for all measurements.

Related Topics

“INITiate Subsystem” on page 988

“What Happens When a Measurement is INITiated?” on page 988

“Concurrent Measurements” on page 397

“STATus:OPERation:NMRReady:GSM Condition Register Bit Assignment” on page 1233

“STATus:OPERation:NMRReady:GPRS Condition Register Bit Assignment” on page 1232

Call Processing Event Synchronization

Description

Using the call processing subsystem overlapped command synchronization commands, you can query the test set to find out when an overlapped command operation is done (:DONE?, :OPC?), force the test set to not execute any more commands until an overlapped command operation has completed (:WAIT), or simply force an overlapped command to behave as a sequential command (:SEQ).

Pending Operation Flags

Associated with each overlapped command, the test set maintains a binary indicator known as a pending operation flag. A pending operation flag is set true when the operation started by the overlapped command is executing, and is set false when the operation is no longer executing.

NOTE In addition to the call processing subsystem overlapped commands, the test set also provides the measurement-related INITiate <measurement> overlapped commands.

Call Processing Subsystem Overlapped Command Synchronization Commands

Table 6. Overlapped Commands

Command	Purpose Of Command	Example
:DONE?	Returns a 0 if the associated command's pending operation flag is true, or a 1 if it is false.	10 OUTPUT 714;"CALL:TCH 65" 20 OUTPUT 714;"SETUP:TXP:CONT OFF" 30 OUTPUT 714;"SETUP:PFER:CONT OFF" 40 REPEAT 50 OUTPUT 714;"CALL:TCH:DONE?" 60 ENTER 714;Process_done 70 UNTIL Process_done 80 OUTPUT 714;INIT:TXP;PFER" 90 END The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and execute two setup commands. After the two setup commands have finished, the :DONE? command is used to find out if the handover is finished
:SEQuential	Forces an overlapped command to execute in a sequential manner. No subsequent commands will be executed until the pending operation flag for this operation is false.	OUTPUT 714;"CALL:TCH:SEQ 65" The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and to not execute any more commands until the pending operation flag associated with the CALL:TCH command is false.
:WAIT	Forces the test set to wait until the associated command's pending operation flag is false before executing any more commands.	10 OUTPUT 714;"CALL:TCH 65" 20 OUTPUT 714;"SETUP:TXP:CONT OFF" 30 OUTPUT 714;"SETUP:PFER:CONT OFF" 40 OUTPUT 714;"CALL:TCH:WAIT" 50 OUTPUT 714;"INIT:TXP;PFER" 60 END The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and execute two setup commands. After the two setup commands have finished, the :WAIT command is sent to prevent the test set from executing the INITiate command until the handover is finished.

Table 6. Overlapped Commands

Command	Purpose Of Command	Example
:OPComplete?	Places a 1 in the test set's output queue when the associated command's pending operation flag goes false. Controlling program hangs on this query until the 1 is retrieved.	`10 OUTPUT 714;"CALL:TCH 65"` `20 OUTPUT 714;"SETUP:TXP:CONT OFF"` `30 OUTPUT 714;"SETUP:PFER:CONT OFF"` `40 OUTPUT 714;"CALL:TCH:OPC?"` `50 ENTER 714;Op_complete` `60 OUTPUT 714;"INIT:TXP;PFER"` `70 END` The example shown is from the E1960A GSM test application. Commands the test set to perform a traffic channel handover and execute two setup commands. After the two setup commands have finished, the :OPC? command is sent to hang program execution until a 1 is put in the test set's output queue, satisfying the ENTER statement and allowing program execution to continue with the INITiate command.

Operating Considerations

When using the call processing subsystem overlapped command synchronization commands, check the conditions that set the operation's pending operation flag (POF) false to avoid unexpected results.

Call Processing Subsystem Overlapped Commands

Call Processing Command	Purpose Of Command	Pending Operation Flag (POF) is false when
CALL:ORIGinate See “CALL:ORIGinate” on page 612.	Performs a base station call origination.	The call processing state leaves the Idle state (when the operating mode is active cell), or The test set has noted this parameter change (when the operating mode is test mode).
CALL:END See “CALL:END” on page 535.	Performs a base station call termination.	The call processing state reaches the Idle state (when the operating mode is active cell), or The test set has noted this parameter change (when the operating mode is test mode).
CALL[:CELL[1]]:BCHannel[:ARFCn][:SELected] See “CALL[:CELL]:BCHannel[:ARFCn][:SELected]” on page 498.	Sets the BCH ARFCN for currently selected broadcast band.	The downlink signal is transmitting on the new broadcast channel.
CALL[:CELL[1]]:BCHannel[:ARFCn]:<broadcast band> See “CALL:BCHannel” on page 497.	Sets the BCH ARFCN for a broadcast band not currently selected.	The test set has noted this parameter change.

<table>
<tr><th>Call Processing Command</th><th>Purpose Of Command</th><th>Pending Operation Flag (POF) is false when</th></tr>
<tr><td>CALL:TCHannel[:ARFCn][:SELected]

See “CALL:TCHannel[:ARFCn][:SELected]” on page 815.</td><td>Sets the TCH ARFCN for currently selected traffic band.</td><td rowspan="6">At least one of the following conditions has been met for all occurrences of these call processing commands that have begun execution:

The channel assignment has been successfully completed (when a call is established), or

The test set has noted this parameter change (no call established), or

The test set has noted this parameter change (not currently selected band), or

An error message was generated.</td></tr>
<tr><td>CALL:TCHannel[:ARFCn]:<traffic band>

See “CALL:TCHannel” on page 813.</td><td>Sets the TCH ARFCN for a traffic band not currently selected.</td></tr>
<tr><td>CALL:TCHannel:TSLot

See “CALL:TCHannel:TSLot” on page 828.</td><td>Sets the TCH timeslot.</td></tr>
<tr><td>CALL:MS:TADVance

See “CALL:MS:TADVance[:SELected]” on page 588.</td><td>Sets the mobile station timing advance.</td></tr>
<tr><td>CALL:MS:TXLevel[:SELected]

See “CALL:MS:TXLevel[:SELected]” on page 595.</td><td>Sets the mobile station transmit level for currently selected band.</td></tr>
<tr><td>CALL:MS:TXLevel:<traffic band>.</td><td>Sets the mobile station transmit level for a traffic band not currently selected.</td></tr>
<tr><td>CALL:CONNected:ARM[:IMMediate]

See “CALL:CONNected:ARM[:IMMediate]” on page 512.</td><td>Arms the call control status change detector.</td><td>The call control status change detector has been disarmed.

See “Connected/Idle Query” on page 434.</td></tr>
</table>

Related Topics

“Call Processing State Synchronization” on page 433

“Measurement Event Synchronization” on page 424

“Test System Synchronization Overview” on page 420

Call Processing State Synchronization

Call Processing State Query

The CALL:STATus[:STATe]? query returns a string indicating the current call processing state.

There are five possible call processing states for GSM.

The query returns one of the following strings:

- "IDLE"

  Idle is returned when the test set is not on a call, involved with any termination, page, origination, or registration call processing procedures with the mobile station.

- "SREQ"

  Set Up Request is returned when the test set is in the process of assigning a channel to a mobile station as part of a Page or a mobile station originated call setup.

- "ALER"

  Alerting is returned when the mobile station is about to receive an Alert message as part of a call setup due to a page.

- "CONN"

  Connected is returned when the test set and the mobile station are connected on a call.

- "DISC"

  Disconnected is returned when the test set is in the process of ending a call.

The following command returns the current state of a data connection:

```
OUTPUT 714;"CALL:STATus:STATe:DATA?"
```

Description

Connected/Idle Query

This query will determine if a call is connected or disconnected by returning an integer value. The value indicates if the call state is idle or connected, not if any call state change has occurred.

Query returns one of the following:

- 0 = idle
- 1 = connected

If the call is in the setup request, proceeding, alerting, or disconnecting state, this command will not return a value until the call status proceeds to either connected or idle.

```
OUTPUT 714;”CALL:CONNECTED:STATE?”
```

Example 6. Base Station Originated Call - Using the Connected/Idle Query

The following example illustrates the use of the connected/idle query for a base station originated call. This code originates a call, then waits for the connected/idle query to return a result.

Note that this code does not include the CALL:CONNECTED:TIME (timeout timer) or the CALL:CONNECTED:ARM (change detector arm) commands. These commands are unnecessary since the change detector is armed automatically by the CALL:ORIGINATE command, and the timeout timer value is never applicable since a base station originated call guarantees a state change.

```
10    OUTPUT 714;”CALL:ORIGINATE” ! Begin the BS originated call.
20    OUTPUT 714;”CALL:CONNECTED:STATE?” ! The connect/idle query.
30    ENTER 714;Call_connected ! Program will hang here until state
40                             ! change or protocol timer expires.
50    !************************************************************
60    ! If mobile is not set to auto-answer, answer the call.
70    !************************************************************
80    IF NOT Call_connected THEN
90      DISP “CALL NOT CONNECTED.”
100   ELSE
110     DISP “CALL IS CONNECTED.”
120   END IF
130   END
```

Call State Change Detector

This feature provides a method for holding off the “Connected/Idle Query” results until a change in call processing states is detected. Arming the call state change detector is useful only for mobile station originated calls or disconnects only. It is armed automatically when call processing functions originating from the test set are requested.

The call state change detector becomes *disarmed* when any of the following conditions have been met:

- the call processing state has changed to either connected or idle

  or...

- the attempt to connect or disconnect a call has failed, and one of the test set’s Fixed Timers has timed out

  or...

- no call processing state changes occurred within the time period specified by the “Call State Change Detector Timeout” .

The following command arms the call state change detector:

```
OUTPUT 714;”CALL:CONNECTED:ARM[:IMMEDIATE]”
```

Example 7. Mobile Station Originated Call - Arming the Change Detector

The following example illustrates the use of the call state change detector along with the connected/idle query to synchronize a controlling application with a call processing state change during a mobile station originated call.

When the CALL:CONNECTED:ARM command is received by the test set, the detector becomes armed and configures the test set to hold off on returning a result for the CALL:CONNECTED:STATE? query until the detector is disarmed by one of the three events described above.

```
10    OUTPUT 714;”CALL:CONNECTED:TIMEOUT 10S” ! Sets the time out
20                                            ! time to 10 seconds.
30    OUTPUT 714;”CALL:CONNECTED:ARM” ! Arm the change detector.
40    DISP “Make a mobile station orginated call. Continue when done.”
50    PAUSE
60    OUTPUT 714;”CALL:CONNECTED:STATE?” ! The connected/idle query.
70    ENTER 714;Call_connected
80    IF Call_connected=1 THEN
90      DISP “Call is connected.”
100     WAIT 2
110   ELSE
120     DISP “Call is not connected.”
130     WAIT 2
140   END IF
150   END
```

Call State Change Detector Timeout If a state change does not occur, the user needs a way to control how long to wait for the change detector. The change detector is disarmed by the timeout timer. After a timeout, the connected/idle query will return a 1 for connected or a 0 for idle. The timeout timer is user settable, but the user setting is only applied during mobile station originated call processing operations. For base station originated call processing operations, the timeout timer is automatically set to 60 seconds by the test set.

STATus:OPERation:CALL:GSM Status Register

The STATus subsystem provides a status register group that allows the user to query call processing states. Call processing state synchronization can be performed using the bit transitions of STATUS:OPERATION:CALL:GSM to generate interrupts to the external controller. Refer to “STATus:OPERation:CALL:GSM Condition Register Bit Assignment” on page 1226 for status bit definitions and GPIB command syntax. See “Call State STATus:OPERation:CALL:GSM Program Example” on page 436.

Call State STATus:OPERation:CALL:GSM Program Example

Example 8. Generating a Service Request (SRQ) Interrupt - Dropped Call

The following example illustrates the use of the status subsystem to generate a service request when a call has been dropped.

```
10    OUTPUT 714;"*CLS"
20    OUTPUT 714;"STATUS:OPERATION:CALL:ENABLE 4" !Enable the
30                                            !connected bit
40                                            ! to generate a
50                                            !summary message.
60    OUTPUT 714;"STATUS:OPERATION:CALL:PTR 0;NTR 4" !Enable the
70                                              !negative
80                                              !transition
90                                              !filter for the
100                                             !GSM Summary bit.
110   OUTPUT 714;"STATUS:OPERATION:CALL:GSM:PTR 0;NTR 4" !Enable the
120                                                  !negative
130                                                  !transition
140                                                  !filter for the
150                                                  !GSM connected bit.
160   OUTPUT 714;"STATUS:OPERATION:CALL:GSM:ENABLE 4" !Enable the
170                                               !connected bit for
180                                               !GSM to generate a
190                                               !summary message.
200   OUTPUT 714;"STATUS:OPERATION:ENABLE 1024" !Enable the call sumary
210                                           !bit to generate a summary
220                                           !message.
230   OUTPUT 714;"*SRE 128" !Enable the service request enable register to
240                         !generate an SRQ.
250   ON INTR 7,15 CALL Err !Define the interrupt-initiated branch wiht a
260                         !priority of 15, the highest.
270   ENABLE INTR 7;2 !Enable interrupt on interface card 7 with a bit mask
280                   !(for the interface's interrupt-enable register) of 2.
290   PRINT "Make a call, type CONT when connected." !Make a Mobile Station
300                                                  !originated call.
310   PAUSE
320   PRINT "End the call from the mobile station and then type CONT."
330   PAUSE
340   LOOP
350     OUTPUT 714;"STATUS:OPERATION:CALL:GSM:EVENT?" !Query the event register.
360     ENTER 714;Eve
370     IF Eve=0 THEN
380       PRINT "The call is still connected, press the end key."
390     END IF
400   END LOOP
410   END
420   SUB Err
430     DISP "The call has ended."
440     Clear_interrupt=SPOLL(714)
450     OUTPUT 714;"*CLS"
460     STOP
470   SUBEND
```

Related Topics

“Call Processing Event Synchronization” on page 428

“CALL:STATus[:STATe][:VOICe]?” on page 808

“CALL:CONNected:ARM[:IMMediate]” on page 512

“CALL:CONNected:TIMeout” on page 513

“Instrument Status Area” on page 1447

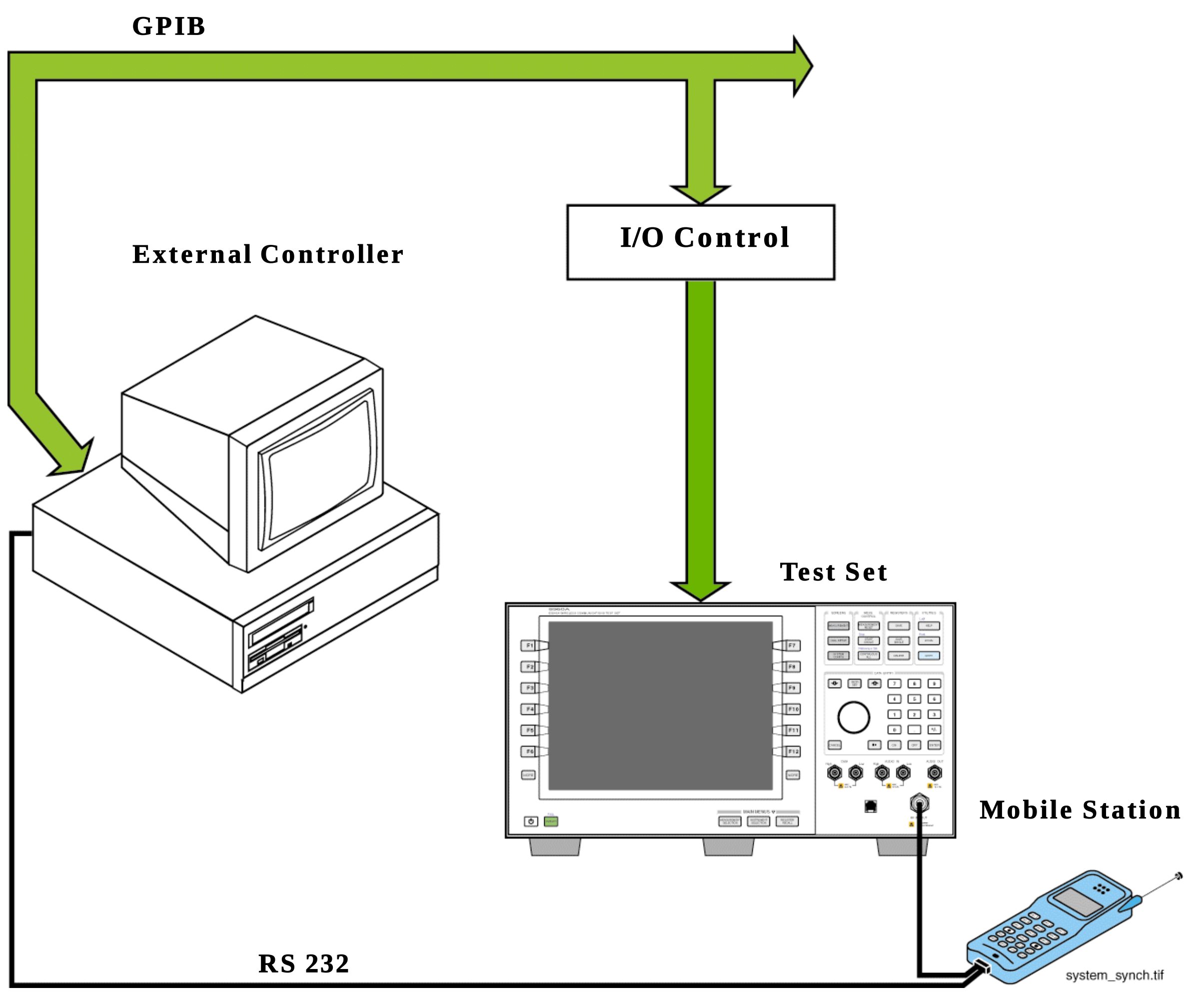
Test System Synchronization Overview

Description

Typical test systems include an external controller with a GPIB connection to the test set, an RF (and possible AF) connection between the test set and a mobile station under test, and a serial connection between the mobile station and the external controller.

Synchronizing an external controller with the test set and a mobile station under test ensures that no device does something before it is supposed to, which can cause errors, or does something well after it could have, which wastes time.

Figure 3. Test System



Sequential versus overlapped commands

The test set uses both sequential and overlapped commands:

- Sequential commands must finish executing before the next command starts to execute.
- Overlapped commands do not finish executing before the next command starts to execute.

Overlapped commands are more difficult to synchronize because an overlapped operation that started several commands earlier may still be executing as subsequent commands are being parsed out from the input buffer and executed. This can present a problem unless the external controller is properly synchronized to the test set's execution of commands. Overlapped commands allow the test set to use its internal resources as efficiently as possible.

Methods for synchronization

The test set's GPIB command set supports the following methods to achieve synchronization for overlapped commands. In some cases, combinations of these methods will provide the best results:

Methods one and two do not require the external controller to query the test set, nor to perform any branching or decision-making associated with information acquired from the test set.

Methods three through six rely on responses from the test set to an external controller, indicating that some event has occurred. The external controller can then make decisions based on these responses to control the flow of commands to the test set and other devices in the test system.

1. Force the test set to execute overlapped commands sequentially.
2. Force the test set to wait until an overlapped command is done executing before executing any more commands.
3. Query the test set to determine when a command has finished executing.
4. Query the test set to determine when all commands sent to it have at least begun executing.
5. Query the test set to determine the current call or data connection processing state.
6. Program the test set to generate a service request when an operation has completed or the test set is in a certain state.

Commands used for synchronization:

- "CALL:STATus[:STATe]:DATA?" on page 808
  This command queries the test set's current data connection processing state. This command supports synchronization method five. See "Data Connection Processing State Query" on page 445.
- "CALL:ATTached[:STATe]?" on page 476
  This command determines if the current data connection is in the attached state. This command supports synchronization method 5.
- "CALL:TRANsferring[:STATe]?" on page 829
  This command determines if the current data connection is in the transferring state. This command supports synchronization method 5.
- :DONE? and :OPC?
  These specialized commands can be appended to data connection processing overlapped commands to support synchronization method three. See "Call Processing Subsystem Overlapped Command Synchronization Commands" on page 442.

- :WAIT
  This specialized command can be appended to data connection processing overlapped commands to support synchronization method two.
  See "Call Processing Subsystem Overlapped Command Synchronization Commands" on page 442.
- :SEQ
  This specialized command can be appended to data connection processing overlapped commands to support synchronization method one.
  See "Call Processing Subsystem Overlapped Command Synchronization Commands" on page 442.
- "INITiate:DONE?" on page 993
  This specialized command causes the test set to return a mnemonic indicating if a measurement is done. If not, the returned mnemonic will indicate if the measurement is still executing. This command supports synchronization method three.
  See "INITiate:DONE?" on page 424.
- "SYSTem:SYNChronized" on page 1300
  This specialized command causes a condition bit to be set then cleared when all prior sequential commands have completed and all prior overlapped commands have started indicating that the input buffer is synchronized. (See "STATus:OPERation Condition Register Bit Assignment" on page 1221). This command supports synchronization method four and six.
- "*OPC" on page 1305, "*OPC?" on page 1305, and "*WAI" on page 1306 (not recommended)

  Note: These commands look at all of the test set's operations collectively. Because multiple processes are likely to be executing at the same time, it is recommended that you use the other commands above instead.

Related Topics

"Data Connection Processing State Synchronization" on page 445

"Measurement Event Synchronization" on page 424

"Data Connection Processing Event Synchronization" on page 441

"SYSTem:SYNChronized" on page 1300

Data Connection Processing Event Synchronization

Description

Using the call processing subsystem overlapped command synchronization commands, you can query the test set to find out when an overlapped command operation is done (:DONE?, :OPC?), force the test set to not execute any more commands until an overlapped command operation has completed (:WAIT), or simply force an overlapped command to behave as a sequential command (:SEQ).

Pending Operation Flags

Associated with each overlapped command, the test set maintains a binary indicator known as a pending operation flag. A pending operation flag is set true when the operation started by the overlapped command is executing, and is set false when the operation is no longer executing.

NOTE In addition to the call processing subsystem overlapped commands, the test set also provides the measurement-related INITiate overlapped commands. For more details on these commands see "INITiate" on page 990.

Call Processing Subsystem Overlapped Command Synchronization Commands

Table 7. Overlapped Commands

Command	Purpose Of Command	Example
:DONE?	Returns a 0 if the associated command's pending operation flag is true, or a 1 if it is false.	`OUTPUT 714;"CALL:DCON:ARM:DONE?"` This example queries whether the data connection state change detector has been successfully armed.
:SEQuential	Forces an overlapped command to execute in a sequential manner. No subsequent commands are executed until the pending operation flag for this operation is false.	`OUTPUT 714;"CALL:FUNC:DATA:STAR:SEQ"` This example commands the test set to start a data connection. A data connection must be established before any GPRS or EGPRS measurements can be made. :SEQ ensures that no other commands are executed until the pending operation flag associated with the CALL:FUNCtion:DATA:STARt command is false.
:WAIT	Forces the test set to wait until the associated command's pending operation flag is false before executing any more commands.	`OUTPUT 714;"CALL:DCON:ARM:WAIT?"` This example prevents the test set from executing the next command until the data connection state change detector has been armed.
:OPComplete?	Places a 1 in the test set's output queue when the associated command's pending operation flag goes false. Controlling program hangs on this query until the 1 is retrieved.	`OUTPUT 714;"CALL:FUNC:DATA:STAR:OPC?"` This example hangs program execution until the :OPC query's until a 1 is placed in the test set's output queue.

Data Connection Processing Subsystem Overlapped Commands

Data Connection Processing Command	Purpose Of Command	Pending Operation Flag (POF) is false when
CALL:FUNCtion:DATA:STARt See “CALL:FUNCtion:DATA:START” on page 546.	Attempts to start the data connection.	The connection status is any non-transitory state (that is Idle, Attached or Transferring).
CALL:DCONnected:ARM[:IMMediate] See “CALL:DCONnected:ARM[:IMMediate]” on page 531.	Arms the data connection state change detector.	The data connection state change detector has been disarmed.

Related Topics

"Data Connection Processing State Synchronization" on page 445

"Measurement Event Synchronization" on page 424

"Test System Synchronization Overview" on page 438

Data Connection Processing State Synchronization

Description

Data Connection Processing State Query

The CALL:STATus[:STATe]:DATA? query returns a string indicating the current data connection processing state.

There are seven possible data connection processing states.

The query returns one of the following strings:

- "IDLE"

  Idle is returned when the mobile station is not GPRS attached or EGPRS attached.

- "ATTG"

  Attaching is returned when the mobile station has sent an attach request. This is a transitory state (which means that the mobile station can only remain in this state until the protocol timer expires). At the end of the signalling exchange, the new state will either be Attached or Idle, depending on whether or not the attach procedure completes without error.

- "DET"

  Detaching is returned when the attached mobile station has sent a detach request. This is a transitory state (which means that the mobile station can only remain in this state until it successfully moves to another state, or the protocol timer expires). At the end of the signalling exchange, the new state will be Idle, even if the procedure encounters an error.

- "ATT"

  Attached is returned when the mobile station has performed a successful GPRS attach or EGPRS attach.

- "STAR"

  Starting is returned when you have performed the "Start Data Connection" action (using "CALL:FUNCtion:DATA:START" on page 546). This is a transitory state (which means that the mobile station can only remain in this state until it successfully moves to another state, or the protocol timer expires). At the end of the signalling exchange, the new state will be either Transferring, Attached or Idle, depending on whether or not the data connection is successfully established.

- "END"

  Ending is returned when you have performed the "End Data Connection" action (using "CALL:FUNCtion:DATA:STOP" on page 546). This is a transitory state (which means that the mobile station can only remain in this state until it successfully moves to another state, or the protocol timer expires). At the end of the signalling exchange, the new state will be Attached, even if the procedure encounters an error.

- “TRAN”

  Transferring is returned when a data connection has been established.

The following command returns the current state of a data connection:

```
OUTPUT 714;"CALL:STATus:STATe:DATA?"
ENTER 714;Inst_state$
```

Attached State Query This query determines if a data connection is in the Attached state by returning an integer value. The value indicates if the data connection state is Attached or any other non-transitory state, not if any data connection state change has occurred.

The query returns one of the following:

- 0 = Any non-transitory state other than Attached (that is, Idle or Transferring)
- 1 = Attached

If the data connection is in the Attaching, Detaching, Starting, or Ending state, this command does not return a value until the data connection state proceeds to Idle, Attached, or Transferring.

```
OUTPUT 714;"CALL:ATTached:STATe?"
```

Transferring State Query This query determines if a data connection is in the Transferring state by returning an integer value. The value indicates if the data connection state is Transferring or any other non-transitory state, not if any data connection state change has occurred.

The query returns one of the following:

- 0 = Any non-transitory state other than Transferring (that is, Idle or Attached)
- 1 = Transferring

If the data connection is in the Attaching, Detaching, Starting, or Ending state, this command will not return a value until the data connection state proceeds to Idle, Attached, or Transferring.

```
OUTPUT 714;"CALL:TRANsferring:STATe?"
```

Data Connection State Change Detector This method provides the advantage of indicating that a data connection state change has occurred. The change detector works in conjunction with the Attached State and Transferring State queries. Arming the CALL:DCONnected? query provides a way for the external controller to know when the data connection state change process is done.

The data connection state change detector becomes *disarmed* when any of the following conditions have been met:

- the data connection processing state has changed to either Idle, Attached or Transferring from one of the transitory states

  or,

- the attempt to establish a data connection failed and one of the test set’s Fixed Timers has timed out

  or,

- no data connection processing state changes occurred within the time period specified by the timeout timer.

The following command arms the data connection state change detector, but does not cause any data connection processing function to start:

```
OUTPUT 714;"CALL:DCONnected:ARM[:IMMEDIATE]"
```

Data Connection State Change Detector Timeout

If a state change does not occur, you need a way to control how long to wait for the change detector. The change detector is disarmed by the timeout timer. After a timeout, the state query that you have initiated (Attached state query or Transferring state query will return a 1 for connected or a 0 for idle. You can set the timeout value using "CALL:DCONnected:TIMeout" on page 533.

Related Topics

"Test System Synchronization Overview" on page 438

"Data Connection Processing Event Synchronization" on page 441

"CALL:STATus[:STATe]:DATA?" on page 808

GPIB Command Syntax

ABORt Subsystem

Description

The ABORt command causes a measurement cycle in progress to stop. If the measurement is not being continuously armed (trigger arm set to single) , the measurement will remain in the idle state after this event. If the measurement is being continuously armed (trigger arm set to continuous), a new measurement cycle will begin after ABORt. If an ABORt command is issued from any measurement state other than measuring, the command is ignored.

Other Commands that Execute an ABORt Action

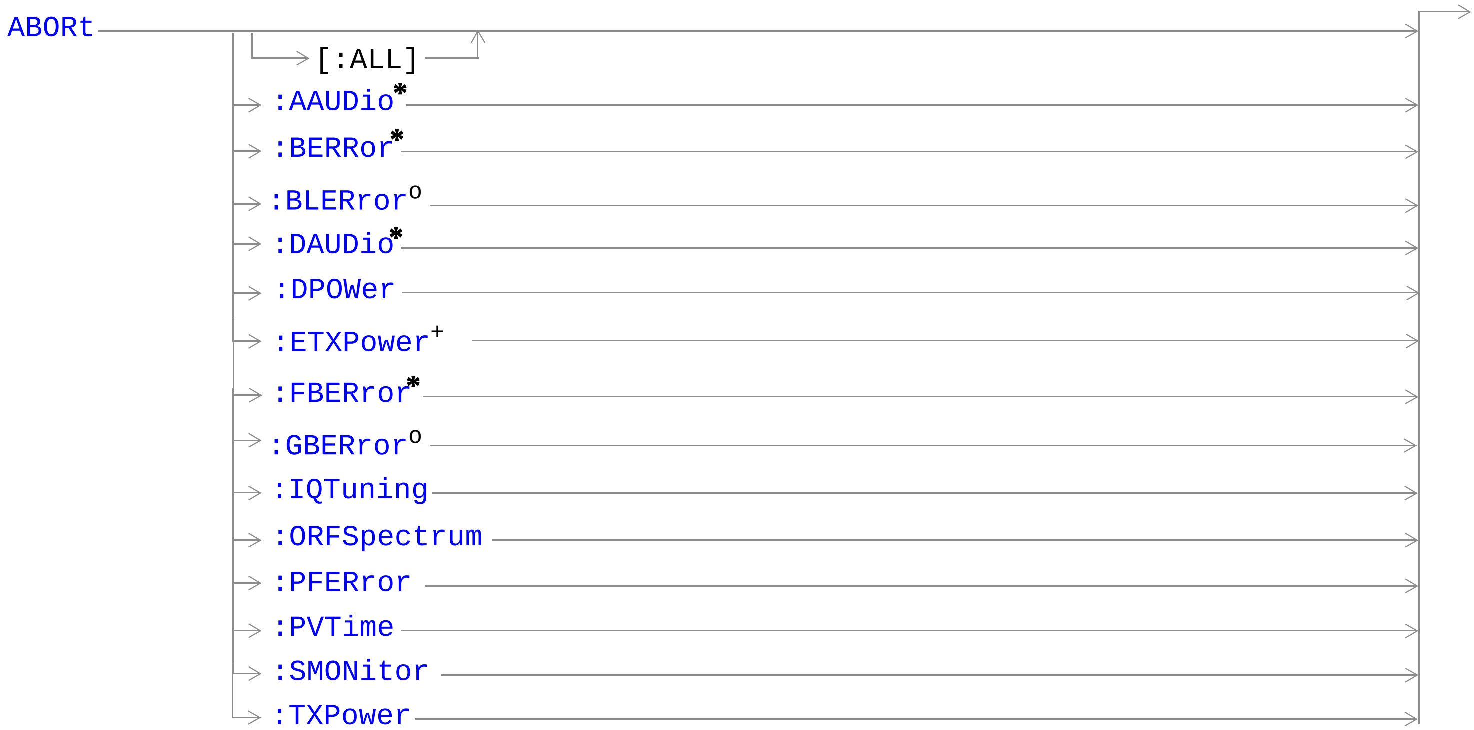
INITiate:<meas> will execute an ABORt:<meas> as part of the INITiate:<meas> command.

READ:<meas>? will execute an ABORt:<meas> action that aborts just one trigger sequence and then combines the INITiate and FETCh? commands.

Syntax Diagram and Command Descriptions

"ABORt"

ABORt



* Not applicable to GPRS.
° Not applicable to GSM.
\+ Only applicable to EGPRS.

"Diagram Conventions" on page 1

ABORt[:ALL]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Stops any and all measurements that are active. See "Measurement States" on page 406 If the trigger arm is set to single, see "Trigger Arm (Single or Continuous) Description" on page 406 the measurements will go to the idle state. If the trigger arm is set to continuous the measurements will re-arm and initiate again.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"ABORT:ALL" !Aborts all active measurements in progress.
```

ABORt:<meas-mnemonic>

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Stops the selected measurement if it is active. See “Measurement States” on page 406

If the trigger arm is set to single, see “Trigger Arm (Single or Continuous) Description” on page 406 the measurements will go to the idle state.

If the trigger arm is set to continuous the measurements will re-arm and initiate again.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td rowspan="4">meas-mnemonic</td><td>GSM TA</td><td>Range:

AAUDio | BERRor | DAUDio | DPOWer | FBERror | IQTuning | ORFSpectrum | PFERror | PVTime | SMONitor | TXPower</td></tr>
<tr><td>GPRS TA</td><td>Range:

BLERror | DPOWer | GBERror | IQTuning | ORFSpectrum | PFERror | PVTime | SMONitor | TXPower</td></tr>
<tr><td>GSM/GPRS LA</td><td>Range:

AAUDio | BERRor | BLERror | DAUDio | DPOWer | FBERror | GBERror | IQTuning | ORFSpectrum | PFERror | PVTime | SMONitor | TXPower</td></tr>
<tr><td>EGPRS LA</td><td>Range:

AAUDio | BERRor | BLERror | DAUDio | DPOWer | ETXPower | FBERror | GBERror | IQTuning | ORFSpectrum | PFERror | PVTime | SMONitor | TXPower</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

<code>OUTPUT 714;"ABORT:PVTIME" !Aborts a PvT measurement.</code></td></tr>
</table>

AFGenerator Subsystem

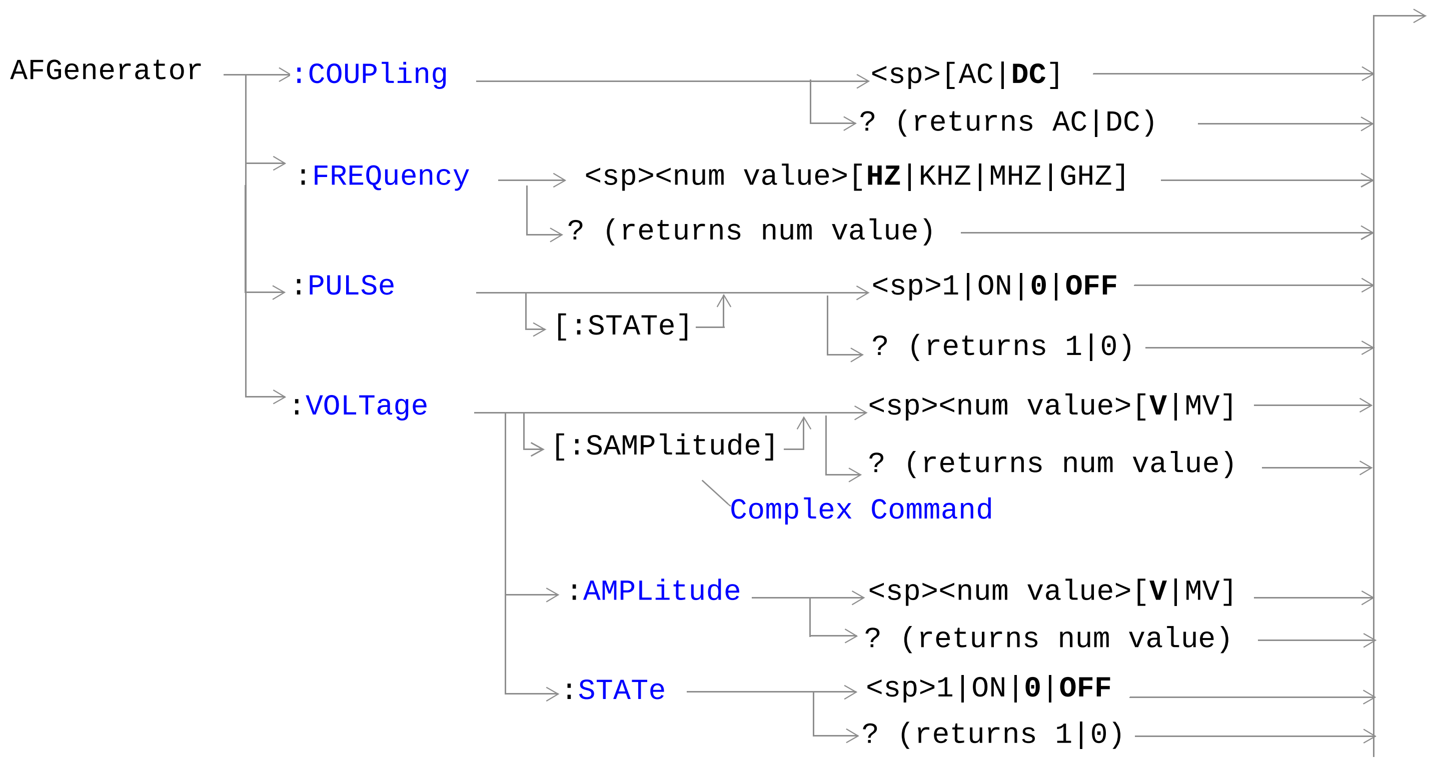
Description

The AFGenerator subsystem is used to control the audio source that is available at the Audio Output connector.

Syntax Diagram and Command Descriptions

"AFGenerator"

AFGenerator



“Diagram Conventions” on page 1

AFGenerator:COUPling

Function	GSM TA	Sets the output of the audio generator to be ac or dc coupled to the front-panel AUDIO OUT port.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: AC or DC
Query		Range: AC or DC
*RST setting		DC
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"AFGENERATOR:COUPling AC" !Sets the audio generator coupling to AC.`		

AFGenerator:FREQuency

Function	GSM TA	Sets/queries the frequency of the audio generator. Optional units (HZ|KHZ|MHZ|GHZ) can be specified when setting frequency but will default to Hz if units are not specified.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 Hz to 20 kHz Resolution: .1 Hz
Query		Range: 1 Hz to 20 kHz Resolution: .1 Hz
*RST setting		1 kHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"AFGENERATOR:FREQUENCY 1000" !Sets the audio generator frequency to 1000 Hz.`		

AFGenerator:PULSe[:STATe]

Function	GSM TA	Sets/queries the audio generator pulse state. The pulse state must be on when the test set's audio generator is used for audio stimulation during a decoded audio measurement. When the state is on, the audio signal from the test set is pulsed at a 10 Hz rate with a 50% duty cycle. The amplitude and frequency of the pulse is set with afgenerator commands. See “AFGenerator” on page 455.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"AFGENERATOR:PULSE ON" !Sets the audio generator pulse to ON.
```

AFGenerator:VOLTage[:SAMPlitude]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets /queries the amplitude of the audio generator in volts and turns the state to on. Optional units (V|MV) can be specified when setting the amplitude but units will default to V if units are not specified.
Setting		Range: 0 - 9 V pk. Resolution: • .5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
Query		Range: 0 - 9 V peak Resolution: • .5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
*RST setting		zero volts
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"AFGENERATOR:VOLTAGE 2.1" !Sets the state to on and the output
                                     !voltage to 2.1 volts.
```

AFGenerator:VOLTage:AMPlitude

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the amplitude for the audio generator when the audio generator state is on. Optional units (V|MV) can be specified when setting amplitude but units will default to V if units are not specified.
Setting		Range: 0 - 9 V pk. Resolution: • .5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
Query		Range: 0 - 9 V pk. Resolution: • .5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
*RST setting		zero volts
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”AFGENERATOR:VOLTAGE:AMPLITUDE 1.414” !Sets the audio generator output
                                                !voltage to 1.414 volts peak.
```

AFGenerator:VOLTage:STATe

Function	GSM TA	Sets/queries the audio generator state
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"AFGENERATOR:VOLTAGE:STATE ON" !Set the audio generator state to ON.`		

CALibration Subsystem

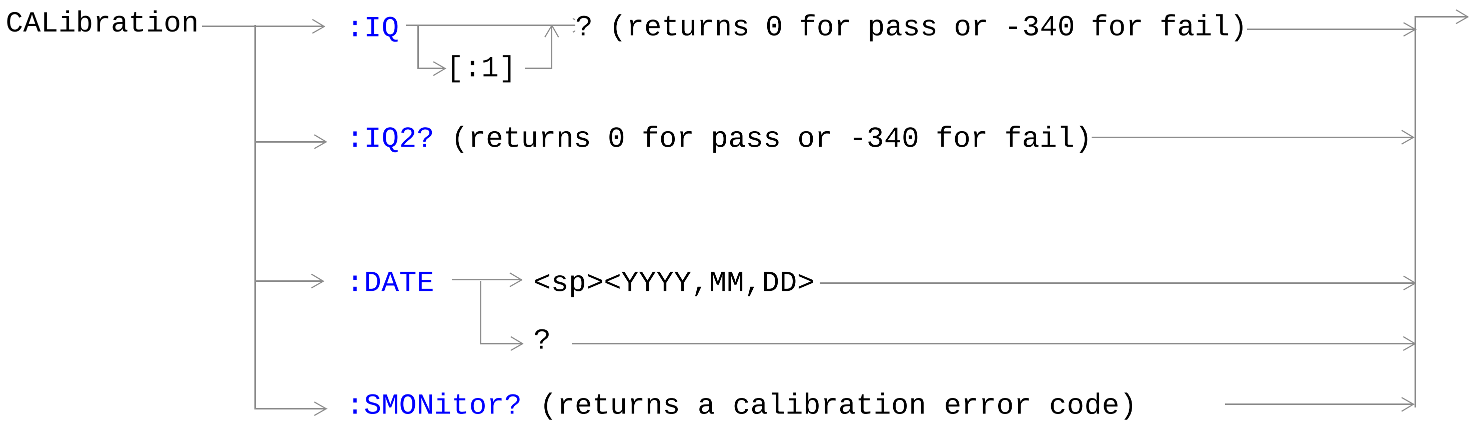
Description

The only user calibration that can be performed is for the IQ modulator. This calibration is required if the Baseband Generator or the Vector Output modules are serviced or swapped. The CALibration:IQ subsystem should not be used as part of frequent (i.e. daily, weekly or monthly) test set calibration.

Syntax Diagram and Command Descriptions

"CALibration"

CALibration



"Diagram Conventions" on page 1

CALibration:IQ[:1]?

Function	GSM TA	Sets/queries the calibration of the IQ modulator for RF generator 1. It takes some time to complete calibration and can't be aborted except by cycling the power switch. • Calibrates the IQ modulator for RF generator 1. • Returns a value indicating success or failure of calibration.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range • 0 = Pass • –340 = Fail
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALIBRATION:IQ1?"  !Performs a calibration of the IQ modulator
                               !for RF generator 1 and returns 0 or -340
```

NOTE When the calibration is done the test set display will display:

IQ Calibration completed successfully for modulator 1.

CALibration:IQ2?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the calibration of the IQ modulator for RF generator 2. It takes some time to complete calibration and can't be aborted except by cycling the power switch. • Calibrates the IQ modulator for RF generator 2. • Returns a value indicating success or failure of calibration.
Query		Range • 0 = Pass • –340 = Fail
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALIBRATION:IQ2?"  !Performs a calibration of the IQ modulator
                               !for RF generator 2 and returns 0 or -340
```

NOTE When the calibration is done the test set display will display:

IQ Calibration completed successfully for modulator 2.

CALibration:DATE

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the date of the last system calibration done to the test set, not the IQ calibration date. Returns a comma separated list YYYY,MM,DD in that order.
Setting		Sets the system calibration date. Range • Year = 0000 to 9999 • Month = 01 to 12 • Day = 01 to 31
Query		Returns the date when system calibration was performed. Range • Year = 0000 to 9999 • Month = 1 to 12 • Day = 1 to 31
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALIBRATION:DATE 1999,01,04" !Sets the date of the last system
                                         !calibration year, month and day.
```

CALibration:SMONitor

Function	GSM TA	Starts the spectrum monitor calibration routine. It is important that no power is applied to the RF IN/OUT connector during calibration.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 through 10, and -340 • 0 (Spectrum Monitor calibration completed successfully) • 1 (Spectrum Monitor calibration failed due to temperature drift. Wait for temperature to stabilize) • 2 (Spectrum Monitor calibration failed due to oven out of range) • 3 (Spectrum Monitor calibration failed due to loopback switch problem) • 4 (Spectrum Monitor calibration failed due to under range condition) • 5 (Spectrum Monitor calibration failed due to over range condition) • 6 (Spectrum Monitor calibration failed due to correlation problem) • 7 (Spectrum Monitor calibration failed due to source level problem) • 8 (Spectrum Monitor calibration failed due to IF filter coefficient problem) • 9 (Spectrum Monitor calibration failed due to IF frequency response problem) • 10 (Spectrum Monitor calibration failed due to waveform quality problem) • -340 (Spectrum Monitor calibration failed)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALIBRATION:SMONitor?" !Queries the spectrum monitor calibration.
```

CALCulate Subsystem

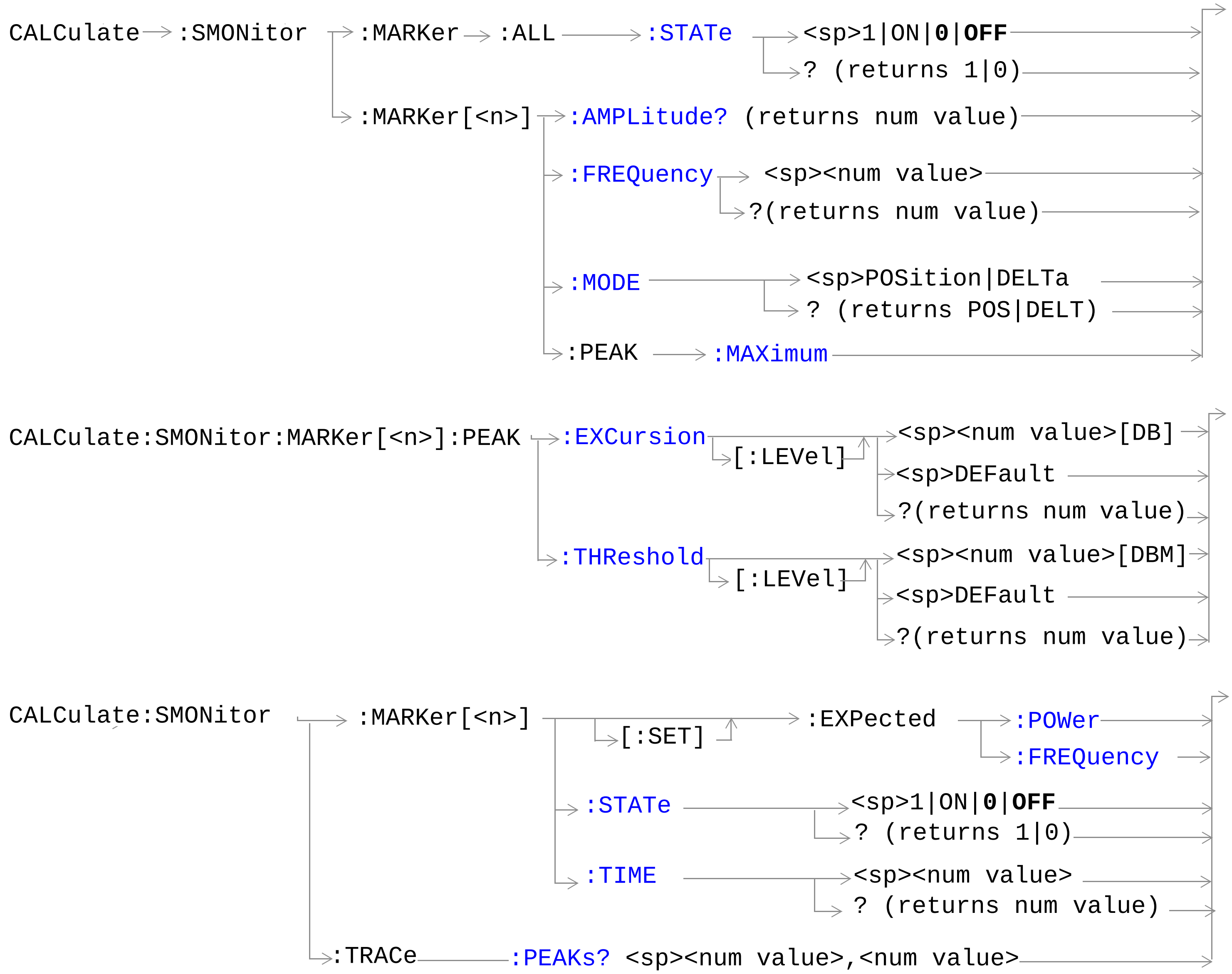
Description

The CALCulate subsystem is used to perform data processing on the measurement results. For example, the CALCulate subsystem uses the markers to find the peaks and to read back their values in the Spectrum Monitor.

Syntax Diagram and Command Descriptions

"CALCulate:SMONitor"

CALCulate:SMONitor



“Diagram Conventions” on page 1

CALCulate:SMONitor:MARKer:ALL:STATe

Function	This command determines whether all markers are turned on or turned off.	
Setting	Range: 1 | ON | 0 | OFF	
Query	Range: 1 | ON | 0 | OFF	
*RST Setting	0 | OFF	
Requirements	GSM/GPRS TA Revision A.01.00	
	GSM/GPRS LA Revision C.01.00	
	EGPRS LA Revision A.01.00	

Programming Example

```
OUTPUT 714;"CALCulate:SMONitor:MARKer:ALL:STATe 1"
!Turns on all markers.
```

CALCulate:SMONitor:MARKer[<n>] :AMPLitude?

Function	This query returns the amplitude for marker <n>, where <n> is a number 1 through 3. When no marker number is specified, marker 1 is used. If you are using delta marker mode, the result is the delta marker amplitude result. (See “CALCulate:SMONitor:MARKer[<n>] :MODE” .)
Query	Range • Position Mode: -180 dBm to +37 dBm • Delta Mode: -200 dB to +200 dB Resolution: 0.01 dB
Requirements	GSM/GPRS TA Revision A.01.00
	GSM/GPRS LA Revision C.01.00
	EGPRS LA Revision A.01.00

Programming Example

```
OUTPUT 714;"CALCulate:SMONitor:MARKer2:AMPLitude?" !Returns the amplitude of marker 2.
```

CALCulate:SMONitor:MARKer[<n>]:FREQuency

Function	This command sets/queries the frequency of marker <n>. where <n> is a number 1 through 3. When no marker number is specified, marker 1 is used. If you are using delta marker mode, this command sets/queries the offset frequency of the delta marker. (See “CALCulate:SMONitor:MARKer[<n>] :MODE” .)
Query	Range: • **Position Mode** Range: This is dependent on the settings of the center frequency and the frequency span. The markers frequency range is therefore equal to the center frequency +/- half the frequency span. Resolution: 0.001 MHz • **Delta Mode**: Range: The range is dependent on the center frequency, the frequency span and the position of the reference marker. Resolution: 0.001 MHz
Requirements	GSM/GPRS TA Revision A.01.00
	GSM/GPRS LA Revision C.01.00
	EGPRS LA Revision A.01.00

Programming Example

```
OUTPUT 714;"CALCulate:SMONitor:MARKer:FREQuency?"
!Queries the frequency of marker 1.
```

CALCulate:SMONitor:MARKer[<n>] :MODE

Function	This command sets the mode of the marker. Position mode activates a single frequency marker at the center frequency. Delta mode freezes the marker at its current location and uses it as a reference marker. A second marker is created at the position of the reference marker and is used a delta marker.
Setting	Range: POSition | DELTa | OFF
Query	Range: POS | DELT | OFF
*RST Setting	OFF
Requirements	GSM/GPRS TA Revision A.01.00
	GSM/GPRS LA Revision C.01.00
	EGPRS LA Revision A.01.00

Programming Example

```
OUTPUT 714;"CALCulate:SMONitor:MARKer:MODE DELT"
!Sets a reference marker and creates a delta marker.
```

CALCulate:SMONitor:MARKer:PEAK:EXCursion[:LEVel]

Function	This command sets the peak excursion level. A peak is identified by using the peak threshold and peak excursion value. A point is only marked as a peak if it rises and falls more than the peak excursion value from the peak threshold value. Setting this command to DEFault sets it to 6 dB.
Setting	Range: 1 to 100 dB | DEFault Resolution: 0.1 dB
Query	Range: 1 to 100 dB Resolution: 0.1 dB
*RST Setting	6 dB
Requirements	GSM/GPRS TA Revision A.01.00
	GSM/GPRS LA Revision C.01.00
	EGPRS LA Revision A.01.00
Programming Example	

```
OUTPUT 714;"CALCulate:SMONitor:MARKer:PEAK:EXCursion 20DB"
!Sets the peak excursion level to 20 dB.
```

CALCulate:SMONitor:MARKer[<n>] :PEAK:MAXimum

Function	This command moves the specified marker <n> (1 to 3) to the highest peak value. If no marker <n> is specified, then marker 1 is moved. An error message is returned if no peaks were found in the trace.
Requirements	GSM/GPRS TA Revision A.01.00
	GSM/GPRS LA Revision C.01.00
	EGPRS LA Revision A.01.00
Programming Example	

```
OUTPUT 714;"CALCulate:SMONitor:MARKer2:PEAK:MAXimum"
!Moves marker 2 to the highest peak value on the selected trace.
```

CALCulate:SMONitor:MARKer:PEAK:THReshold[:LEVel]

Function	This command sets peak threshold level. A peak is identified by using the peak threshold and peak excursion value. A point is only marked as a peak if it rises and falls more than the peak excursion value from the peak threshold value. Setting this command to DEFault sets it to -90 dBm.
Setting	Range: -120 to +37 dBm | DEFault Resolution: 0.1
Query	Range: -120 to +37 dBm Resolution: 0.1
*RST Setting	-90 dBm
Requirements	GSM/GPRS TA Revision A.01.00
	GSM/GPRS LA Revision C.01.00
	EGPRS LA Revision A.01.00
Programming Example	
`OUTPUT 714;"CALCulate:SMONitor:MARKer:PEAK:THReshold:LEVel 10DBM"`	

CALCulate:SMONitor:MARKer[<n>] [:SET]:EXPected:POWer

Function	This command sets the base station emulator’s expected power to the amplitude of the specified marker. There are three markers <n> (1 to 3) that can be set. If no <n> is specified, marker 1 is used.
Requirements	GSM/GPRS TA Revision A.01.00
	GSM/GPRS LA Revision C.01.00
	EGPRS LA Revision A.01.00
Programming Example	
`OUTPUT 714;"CALCulate:SMONitor:MARKer2:EXPected:POWer"`	

CALCulate:SMONitor:MARKer[<n>] [:SET]:EXPected:FREQuency

Function	This command sets the base station emulator’s expected frequency to the frequency of the specified marker. There are three markers <n> (1 to 3) that can be set. If no <n> is specified, marker 1 is used.
Requirements	GSM/GPRS TA Revision A.01.00
	GSM/GPRS LA Revision C.01.00
	EGPRS LA Revision A.01.00
Programming Example	
`OUTPUT 714;"CALCulate:SMONitor:MARKer3:EXPected:FREQuency"`	

CALCulate:SMONitor:MARKer[<n>]:STATe

Function	This command sets which markers are turned on. There are three markers <n> (1 to 3) that can be set. If no <n> is specified, marker 1 is used.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | ON | 0 | OFF
*RST Setting	0 | OFF
Requirements	GSM/GPRS TA Revision A.01.00
	GSM/GPRS LA Revision C.01.00
	EGPRS LA Revision A.01.00

Programming Example

```
OUTPUT 714;"CALCulate:SMONitor:MARKer2:STATE 1" !Turns on marker 2.
```

CALCulate:SMONitor:MARKer[<n>]:TIME

Function	This command sets/queries the time at marker <n>. where <n> is a number 1 through 3. When no marker number is specified, marker 1 is used. If you are using delta marker mode, this command sets/queries the delta offset time. (See “CALCulate:SMONitor:MARKer[<n>] :MODE” .)
Setting	Range: -50 ms to 10070 ms Resolution: 0.25 us
Query	Range: -50 ms to 10070 ms Resolution: 0.25 us
*RST Setting	5 ms
Requirements	GSM/GPRS TA Revision A.01.00
	GSM/GPRS LA Revision C.01.00
	EGPRS LA Revision A.01.00

Programming Example

```
OUTPUT 714;"CALCulate:SMONitor:MARKer2:TIME 30" !Places marker 2 at 30 ms.
```

CALCulate:SMONitor:TRACe:PEAKs?

Function	This query expects two input parameters, excursion and threshold. This query returns an integer value followed by list of floating point numbers. The integer value represents the number of peaks that are reported in the list. The list of peaks consists of two values for each peak: the peak frequency in Hz and the peak amplitude in dBm.	
Setting	• Excursion: Range: 1 dB to 100 dB Resolution: 0.1 dB • Threshold: Range: -120 dBm to +37 dBm Resolution: 0.1 dBm	
Query	• Number of peaks Range: 0 to 200 Resolution: 1 • Peak Frequency Range: This is dependent on the settings of the center frequency and the frequency span. The peak frequency range is therefore equal to the center frequency +/- half the frequency span. Resolution: 0.001 MHz • Peak Amplitude Range: -180 dBm to +37 dBm Resolution: 0.01 dBm	
Requirements	GSM/GPRS TA Revision A.01.00	
	GSM/GPRS LA Revision C.01.00	
	EGPRS LA Revision A.01.00	
Programming Example OUTPUT 714;"CALCulate:SMONitor:TRACe:PEAKs?"		

CALL Subsystem

Description

The CALL subsystem handles all setup, control, and query functions for call processing. This includes mobile station (MS) and Base Station (cell) functions.

Syntax Diagrams and Command Descriptions

	Applicable to:			
	GSM TA	GPRS TA	GSM/GPRS LA	EGPRS LA
"CALL:ATTached" on page 476	No	Yes	Yes	Yes
"CALL:BA" on page 477	Yes	Yes	Yes	Yes
"CALL:BAND" on page 495	Yes	Yes	Yes	Yes
"CALL:BCCode" on page 496	Yes	Yes	Yes	Yes
"CALL:BCHannel" on page 497	Yes	Yes	Yes	Yes
"CALL:BURSt" on page 510	Yes	Yes	Yes	Yes
"CALL:CONNected" on page 511	Yes	No	Yes	Yes
"CALL:COUNt" on page 514	Yes	Yes	Yes	Yes
"CALL:DCONnected" on page 530	No	Yes	Yes	Yes
"CALL:END" on page 535	Yes	No	Yes	Yes
"CALL:FUNCtion" on page 536	Yes	Yes	Yes	Yes
"CALL:HANDover | HANDoff" on page 547	Yes	Yes	Yes	Yes
"CALL:IMEI" on page 550	Yes	Yes	Yes	Yes
"CALL:LACode" on page 551	Yes	Yes	Yes	Yes
"CALL:MCCode" on page 555	Yes	Yes	Yes	Yes

	Applicable to:			
	GSM TA	GPRS TA	GSM/GPRS LA	EGPRS LA
"CALL:MS" on page 560	Yes	Yes	Yes	Yes
"CALL:NCCode" on page 606	Yes	Yes	Yes	Yes
"CALL:OPERating" on page 609	Yes	Yes	Yes	Yes
"CALL:ORIGinate" on page 612	Yes	No	Yes	Yes
"CALL:PAGing" on page 613	Yes	No	Yes	Yes
"CALL:PBCChannel" on page 618	No	No	Yes	Yes
"CALL:PBPTest" on page 620	No	Yes	Yes	Yes
"CALL:PDTCH | PDTChannel" on page 621	No	Yes	Yes	Yes
"CALL:PLOGging" on page 13	No	No	Yes	Yes
"CALL:PMNCode" on page 644	Yes	Yes	Yes	Yes
"CALL:POWer" on page 647	Yes	Yes	Yes	Yes
"CALL:PPRocedure" on page 656	No	No	Yes	Yes
"CALL:RACode" on page 740	Yes	Yes	Yes	Yes
"CALL:RFGenerator" on page 741	Yes	Yes	Yes	Yes
"CALL:SETup" on page 743	Yes	Yes	Yes	Yes
"CALL:SIGNaling" on page 793	Yes	No	Yes	Yes
"CALL:SMService" on page 794	No	No	Yes	Yes
"CALL:STATus" on page 807	Yes	Yes	Yes	Yes
"CALL:TCHannel" on page 813	Yes	No	Yes	Yes
"CALL:TRANsferring" on page 829	No	Yes	Yes	Yes
"CALL:TRIGger" on page 830	Yes	Yes	Yes	Yes

CALL:ATTached

```
CALL ——> :ATTached ——————————————> ? (returns 1|0) ——————————>
                   └> [:STATe] ┘
```

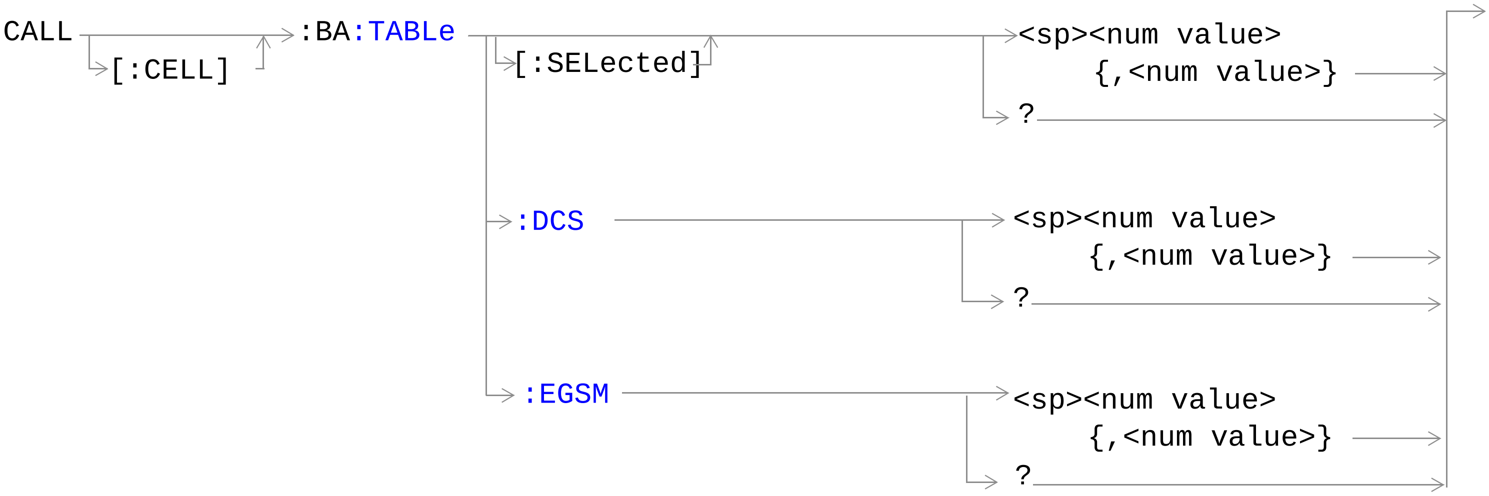
This diagram is not applicable to GSM.

“Diagram Conventions” on page 1

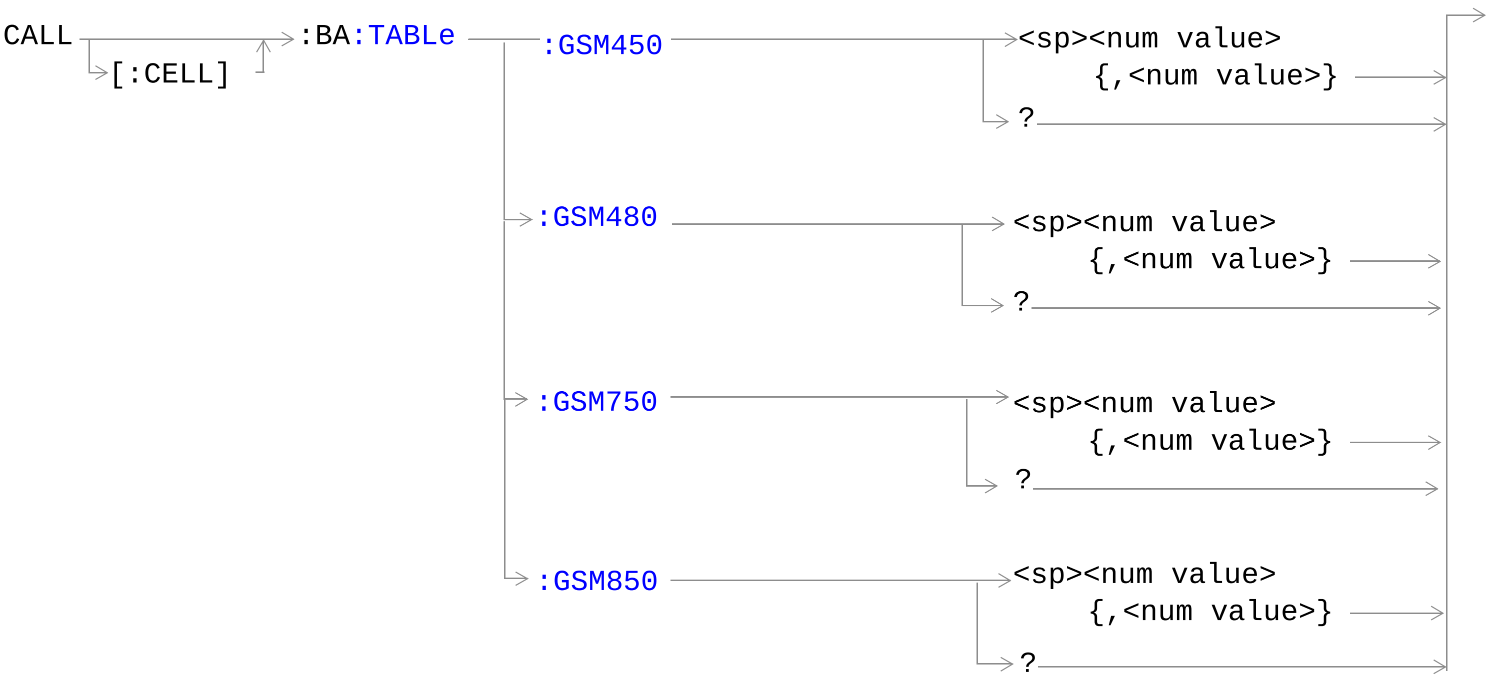
CALL:ATTached[:STATe]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the data connection and determines if it is in the attached state. 1 is returned if the data connection is in the attached state. 0 is returned if the data connection is in any other non-transitory state. For more details on the Attached State query or the data connection states, see “Data Connection Processing State Synchronization” on page 445.
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00
Programming Example `OUTPUT 714;"CALL:ATTached:STATe?"`		

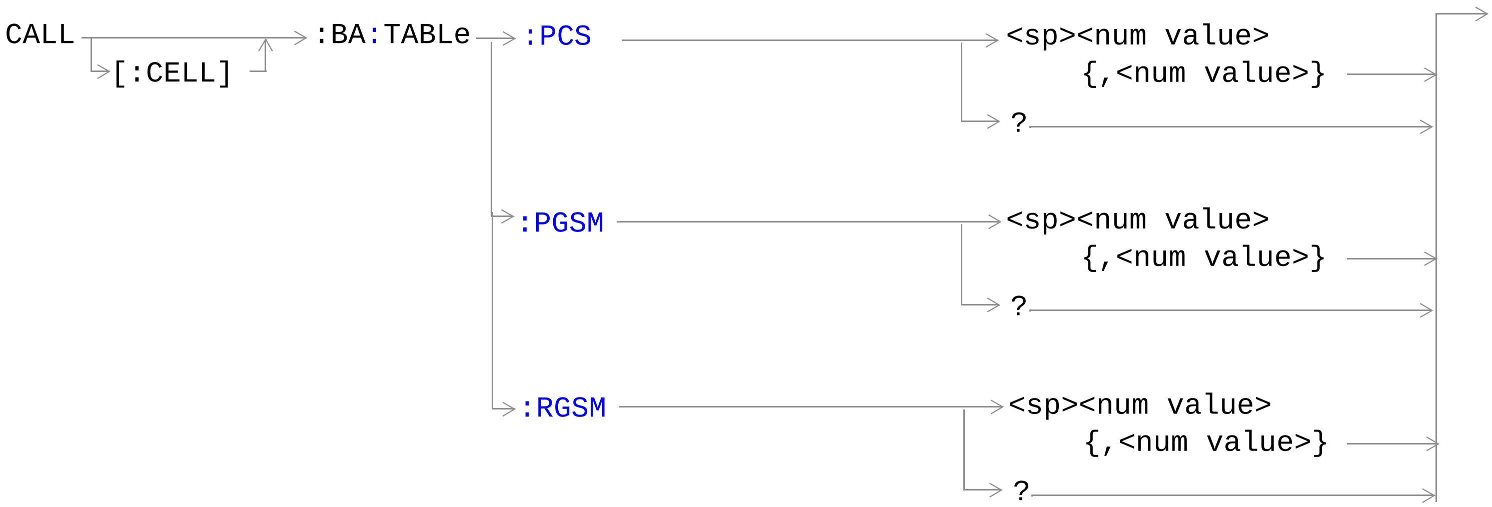
CALL:BA

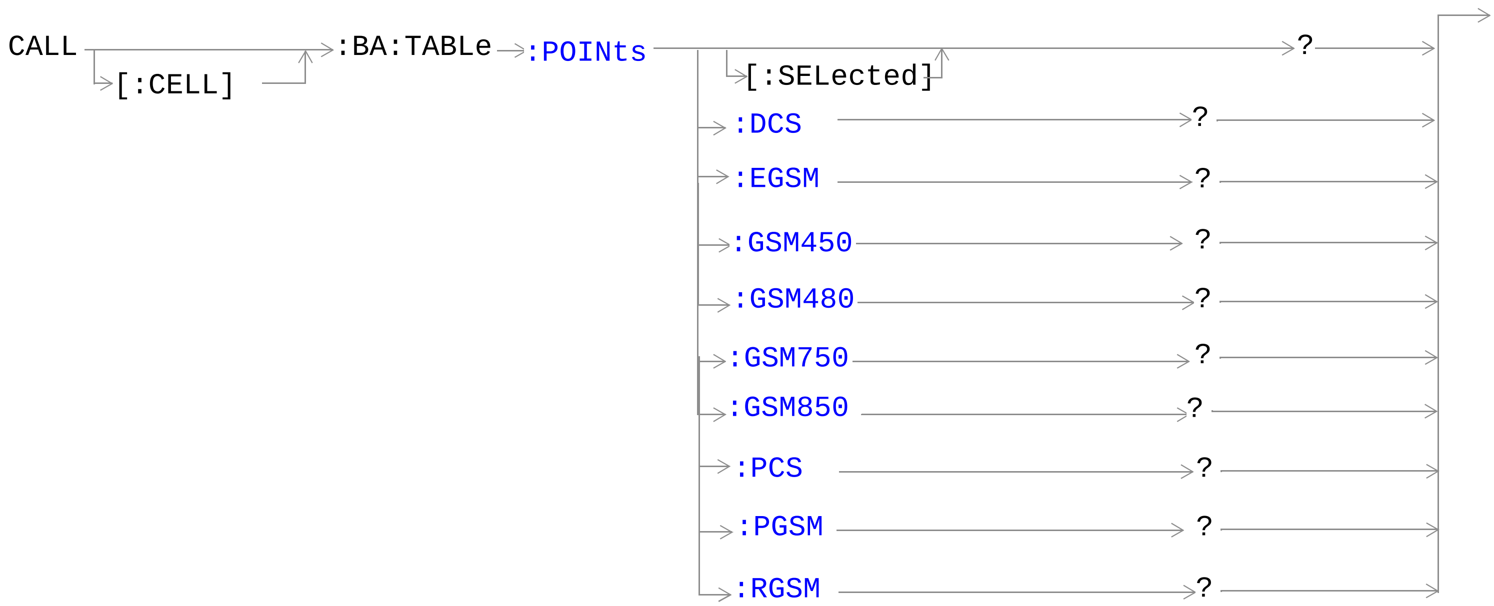


CALL
[:CELL]
:BA:TABLe
[:SELected]
<sp><num value>
{,<num value>}
?
:DCS
<sp><num value>
{,<num value>}
?
:EGSM
<sp><num value>
{,<num value>}
?



CALL
[:CELL]
:BA:TABLe
:GSM450
<sp><num value>
{,<num value>}
?
:GSM480
<sp><num value>
{,<num value>}
?
:GSM750
<sp><num value>
{,<num value>}
?
:GSM850
<sp><num value>
{,<num value>}
?





“Diagram Conventions” on page 1

CALL[:CELL]:BA:TABLe[:SELected]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the BA Table entries for the selected broadcast band in the active (that is the selected) format. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in the setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns 9.91E+37 (NAN).
Setting		Depends upon the selected broadcast band: Range: • DCS, EGSM, GSM450, GSM480, GSM750, GSM850, PGSM and RGSM broadcast band range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 • PCS broadcast band range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 810 | 955 to 1023 Resolution: 1 default setting: • DCS BA Table: 512, 698, 885, 537, 562, 587, 612, 637, 662, 712, 737, 762, 787, 812, 837, 862 • EGSM BA Table: 20, 975, 37, 124, 986, 1008, 1019, 7, 18, 30, 53, 64, 76, 87, 99, 110 • GSM450 BA Table: 270, 259, 276, 293, 262, 264, 267, 269, 272, 275, 277, 280, 282, 285, 287, 290 • GSM480 BA Table: 310, 306, 323, 340, 309, 311, 314, 316, 319, 321, 324, 327, 329, 332, 334, 337 • GSM750 BA Table: 450, 438, 474, 511, 444, 449, 454, 459, 465, 470, 476, 481, 487, 493, 499, 505 • GSM850 BA Table: 150, 128, 190, 251, 138, 148, 158, 168, 178, 188, 198, 208, 218, 228,238, 248 • PCS BA Table: 512, 660, 810, 530, 550, 570, 590, 610, 630, 650, 690, 710, 730, 750, 770, 790 • PGSM BA Table: 20, 1, 62, 124, 9, 18, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117 • RGSM BA Table: 20, 955, 28, 124, 969, 984, 999, 1014, 5, 21, 35, 50, 65, 80, 95, 110 states: first entry = ON, all others = OFF

Query		Range: • DCS, EGSM, GSM450, GSM480, GSM750, GSM850, PGSM and RGSM broadcast band range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 • PCS broadcast band range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 810 | 955 to 1023 • 9.91E+37 (NAN)
*RST Setting		PGSM BA Table: 20, 1, 62, 124, 9, 18, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117 states: First entry = ON, all others = OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:SELECTED 512,689,885" !Sets 3 table entries for the
                                                     !selected broadcast band.
                                                     !States of the remaining 13
                                                     !entries are set to OFF.
OUTPUT 714;"CALL:CELL:BA:TABLE:SELECTED" !Sets states of all table entries to OFF.
```

CALL[:CELL]:BA:TABLe:DCS

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the BA Table entries for the DCS broadcast band in the active (that is the selected) format. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37).
Setting		Range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 Resolution: 1
Query		Range: • 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 • 9.91E+37 (NAN)
*RST Setting		entries: 512, 698, 885, 537, 562, 587, 612, 637, 662, 712, 737, 762, 787, 812, 837, 862 states: 512 = ON, all others = OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:CELL:BA:TABLE:DCS 512,612,787” !Sets three BA table entries for
                                                !the DCS broadcast band. States
                                                !of the remaining 13 entries are
                                                !set to OFF.
OUTPUT 714;”CALL:CELL:BA:TABLE:DCS” !Sets states of all table entries to OFF.
```

CALL[:CELL]:BA:TABLe:EGSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the BA Table entries for the EGSM broadcast band in the active (that is the selected) format. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37).
Setting		Range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 Resolution: 1
Query		Range: • 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 • 9.91E+37 (NAN)
*RST Setting		entries: 20, 975, 37, 124, 986, 1008, 1019, 7, 18, 30, 53, 64, 76, 87, 99, 110 states: 20 = ON, all others = OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:EGSM 120,975,1012" !Sets three BA table entries for
                                                  !the EGSM broadcast band. States
                                                  !of the remaining 13 entries are
                                                  !set to OFF.
OUTPUT 714;"CALL:CELL:BA:TABLE:EGSM" !Sets states of all table entries to OFF.
```

CALL[:CELL]:BA:TABLe:GSM450

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the BA Table entries for the GSM450 broadcast band in the active (that is the selected) format. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37).
Setting		Range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 Resolution: 1
Query		Range: • 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 • 9.91E+37 (NAN)
*RST Setting		entries: 270, 259, 276, 293, 262, 264, 267, 269, 272, 275, 277, 280, 282, 285, 287, 290 states: 270 = ON, all others = OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:GSM450 120,975,1012" !Sets three BA table entries for
                                                    !the GSM450 broadcast band. States
                                                    !of the remaining 13 entries are
                                                    !set to OFF.
OUTPUT 714;"CALL:CELL:BA:TABLE:GSM450" !Sets states of all table entries to OFF.
```

CALL[:CELL]:BA:TABLe:GSM480

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the BA Table entries for the GSM480 broadcast band in the active (that is the selected) format. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37).
Setting		Range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 Resolution: 1
Query		Range: • 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 • 9.91E+37 (NAN)
*RST Setting		entries: 310, 306, 323, 340, 309, 311, 314, 316, 319, 321, 324, 327, 329, 332, 334, 337 states: 310 = ON, all others = OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:CELL:BA:TABLE:GSM480 120,975,1012” !Sets three BA table entries for
                                                    !the GSM480 broadcast band. States
                                                    !of the remaining 13 entries are
                                                    !set to OFF.
OUTPUT 714;”CALL:CELL:BA:TABLE:GSM480” !Sets states of all table entries to OFF.
```

CALL[:CELL]:BA:TABLe:GSM750

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the BA Table entries for the GSM750 broadcast band in the active (that is the selected) format. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37).
Setting		Range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 Resolution: 1
Query		Range: • 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 • 9.91E+37 (NAN)
*RST Setting		entries: 450, 438, 474, 511, 444, 449, 454, 459, 465, 470, 476, 481, 487, 493, 499, 505 states: 450 = ON, all others = OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:GSM750 120,975,1012" !Sets three BA table entries for
                                                    !the GSM750 broadcast band. States
                                                    !of the remaining 13 entries are
                                                    !set to OFF.
OUTPUT 714;"CALL:CELL:BA:TABLE:GSM750" !Sets states of all table entries to OFF.
```

CALL[:CELL]:BA:TABLe:GSM850

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the BA Table entries for the GSM850 broadcast band in the active (that is the selected) format. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37).
Setting		Range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 Resolution: 1
Query		Range: • 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 • 9.91E+37 (NAN)
*RST Setting		entries: 150, 128, 190, 251, 138, 148, 158, 168, 178, 188, 198, 208, 218, 228, 238, 248 states: 150 = ON, all others = OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:CELL:BA:TABLE:GSM850 130,190,249” !Sets three BA table entries for
                                                   !the GSM850 broadcast band. States
                                                   !of the remaining 13 entries are
                                                   !set to OFF.
OUTPUT 714;”CALL:CELL:BA:TABLE:GSM850” !Sets states of all table entries to OFF.
```

CALL[:CELL]:BA:TABLe:PCS

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the BA Table entries for the PCS broadcast band in the active (that is the selected) format. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37).
Setting		Range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 810 | 955 to 1023 Resolution: 1
Query		Range: • 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 810 | 955 to 1023 • 9.91E+37 (NAN)
*RST Setting		entries: 512, 660, 810, 530, 550, 570, 590, 610, 630, 650, 690, 710, 730, 750, 770, 790 states: 512 = ON, all others = OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:PCS 660,710,790" !Sets three BA table entries for
                                                !the PCS broadcast band. States
                                                !of the remaining 13 entries are
                                                !set to OFF.
OUTPUT 714;"CALL:CELL:BA:TABLE:PCS" !Sets states of all table entries to OFF.
```

CALL[:CELL]:BA:TABLe:PGSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the BA Table entries for the PGSM broadcast band in the active (that is the selected) format. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37).
Setting		Range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 Resolution: 1
Query		Range: • 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 511 | 512 to 885 | 955 to 1023 • 9.91E+37 (NAN)
*RST Setting		entries: 20, 1, 62, 124, 9, 18, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117 states: 20 = ON, all others = OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:PGSM 20,36,120" !Sets three BA Table entries for
                                               !the PGSM broadcast band. States
                                               !of the remaining 13 entries are
                                               !set to OFF.
OUTPUT 714;"CALL:CELL:BA:TABLE:PGSM" !Sets states of all BA Table entries to OFF.
```

CALL[:CELL]:BA:TABLe:RGSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the BA Table entries for the RGSM broadcast band in the active (that is the selected) format. Entries are set (value entered into table and state set to ON) using a comma separated list of 1 to 16 values. States of table entries not included in setting list are set to OFF. Sending a null list (no values) sets states of all table entries to OFF. Query returns a comma separated list of the table entries that are in the ON state. If states of all table entries are set to OFF, query returns NAN (9.91E+37).
Setting		Range: 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 885 | 955 to 1023 Resolution: 1
Query		Range: • 0 to 124 | 128 to 251 | 259 to 293 | 306 to 340 | 438 to 885 | 955 to 1023 • 9.91E+37 (NAN)
*RST Setting		entries: 20, 955, 28, 124, 969, 984, 999, 1014, 5, 21, 35, 50, 65, 80, 95, 110 states: 20 = ON, all others = OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:RGSM 120,975,1012" !Sets three BA table entries for
                                                 !the RGSM broadcast band. States
                                                 !of the remaining 13 entries are
                                                 !set to OFF.
OUTPUT 714;"CALL:CELL:BA:TABLE:RGSM" !Sets states of all table entries to OFF.
```

CALL[:CELL]:BA:TABLe:POINts[:SELected]?

Function	GSM TA	Queries the number of entries that are in the ON state in the selected broadcast band's BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLe[:SELected]? query. A return value of zero indicates that there are no table entries in the ON state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 16 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:POINTS:SELECTED?" !Queries the number of entries
                                                 !that are in the ON state in the
                                                 !selected broadcast band's BA Table.
```

CALL[:CELL]:BA:TABLe:POINts:DCS?

Function	GSM TA	Queries the number of entries that are in the ON state in the DCS broadcast band BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLe:DCS? query. A return value of zero indicates that there are no table entries in the ON state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 16 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:POINTS:DCS?" !Queries the number of entries that are
                                            !in the ON state in the DCS broadcast
                                            !band BA Table.
```

CALL[:CELL]:BA:TABLe:POINts:EGSM?

Function	GSM TA	Queries the number of entries that are in the ON state in the EGSM broadcast band BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLe:EGSM? query. A return value of zero indicates that there are no table entries in the ON state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 16 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:POINTS:EGSM?" !Queries the number of entries that
                                             !are in the ON state in the EGSM
                                             !broadcast band BA Table.
```

CALL[:CELL]:BA:TABLe:POINts:GSM450?

Function	GSM TA	Queries the number of entries that are in the ON state in the GSM450 broadcast band BA Table in the active (that is the selected) format. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLe:GSM450? query. A return value of zero indicates that there are no table entries in the ON state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 16 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:POINTS:GSM450?" !Queries the number of entries that
                                               !are in the ON state in the GSM450
                                               !broadcast band BA Table.
```

CALL[:CELL]:BA:TABLe:POINts:GSM480?

Function	GSM TA	Queries the number of entries that are in the ON state in the GSM480 broadcast band BA Table in the active (that is the selected) format. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLe:GSM480? query. A return value of zero indicates that there are no table entries in the ON state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 16 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:POINTS:GSM480?" !Queries the number of entries that
                                                !are in the ON state in the GSM480
                                                !broadcast band BA Table.
```

CALL[:CELL]:BA:TABLe:POINts:GSM750?

Function	GSM TA	Queries the number of entries that are in the ON state in the GSM750 broadcast band BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLe:GSM750? query. A return value of zero indicates that there are no table entries in the ON state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 16 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:POINTS:GSM750?" !Queries the number of entries that
                                                !are in the ON state in the GSM750
                                                !broadcast band BA Table.
```

CALL[:CELL]:BA:TABLe:POINts:GSM850?

Function	GSM TA	Queries the number of entries that are in the ON state in the GSM850 broadcast band BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLe:GSM850? query. A return value of zero indicates that there are no table entries in the ON state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 16 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:CELL:BA:TABLE:POINTS:GSM850?” !Queries the number of entries that
                                               !are in the ON state in the GSM850
                                               !broadcast band BA Table.
```

CALL[:CELL]:BA:TABLe:POINts:PCS?

Function	GSM TA	Queries the number of entries that are in the ON state in the PCS cellband BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLe:PCS? query. A return value of zero indicates that there are no table entries in the ON state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 16 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:CELL:BA:TABLE:POINTS:PCS?” !Queries the number of entries that
                                            !are in the ON state in the PCS
                                            !broadcast band BA Table.
```

CALL[:CELL]:BA:TABLe:POINts:PGSM?

Function	GSM TA	Queries the number of entries that are in the ON state in the PGSM broadcast band BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLe:PGSM? query. A return value of zero indicates that there are no table entries in the ON state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 16 Resolution: 1
*RST Setting		1
Related Topics		See “Configuring the Broadcast Channel (BCH)” on page 196
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:POINTS:PGSM?"  !Queries the number of entries that
                                              !are in the ON state in the PGSM
                                              !broadcast band BA Table.
```

CALL[:CELL]:BA:TABLe:POINts:RGSM?

Function	GSM TA	Queries the number of entries that are in the ON state in the RGSM broadcast band BA Table. This is the number of values that will be returned from the CALL[:CELL]:BA:TABLe:RGSM? query. A return value of zero indicates that there are no table entries in the ON state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 16 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BA:TABLE:POINTS:RGSM?"  !Queries the number of entries that
                                              !are in the ON state in the RGSM
                                              !broadcast band BA Table.
```

CALL:BAND

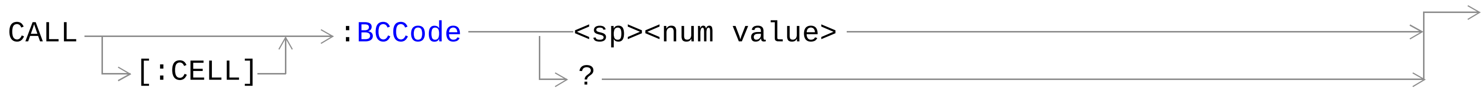
```
CALL ──────────────> :BAND ──────────────┬─> <sp>DCS|EGSM|GSM450|GSM480|GSM750|  ──>┐──>
     └─>[:CELL] ─┘                       │       GSM850|PCS|PGSM|RGSM                │
                                         └─> ? (returns DCS|EGSM|GSM450|GSM480|  ──>┘
                                                 GSM750|GSM850|PCS|PGSM|RGSM)
```

“Diagram Conventions” on page 1

CALL[:CELL]:BAND

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the band in which the broadcast channel (BCH) is transmitted.
Setting		Range: PGSM | DCS | EGSM | GSM450 | GSM480 | GSM750 | GSM850 | PCS | RGSM
Query		Range: PGSM | DCS | EGSM | GSM450 | GSM480 | GSM750 | GSM850 | PCS | RGSM
*RST Setting		The *RST value of this command depends on the format currently active. For example, if the GSM format is currently active, the *RST value for this command is the value equivalent to that generated by the command containing the :GSM format identifier.
Related Topics	GSM	See “Cell Band Parameter” on page 254.
	GPRS	See “Cell Band Parameter” on page 254
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;”CALL:CELL:BAND PGSM” !Sets the band for the BCH to PGSM.`		

CALL:BCCode

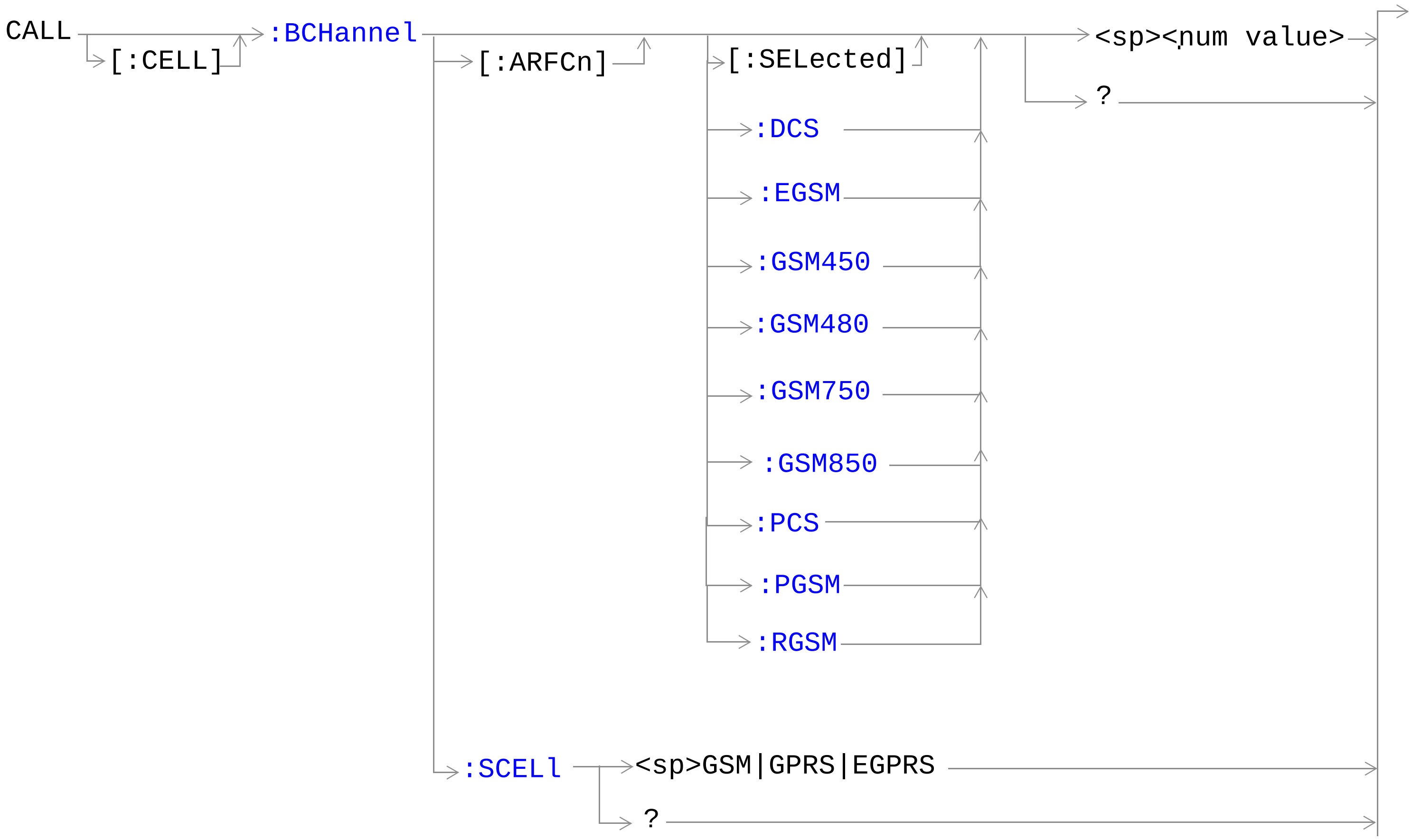


“Diagram Conventions” on page 1

CALL[:CELL]:BCCode

Function	GSM TA	Sets/queries the value of the Base Station Colour Code (BCC) for the active format which is the selected format. This can only be set when the Cell Activated State parameter is set to Off (see “CALL:OPERating:MODE” on page 610).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 7 Resolution: 1
Query		Range: 0 to 7 Resolution: 1
*RST Setting		5
Related Topics		See “Configuring the Broadcast Channel (BCH)” on page 196.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:CELL:BCCODE 4” !Sets the cell’s base station color code to 4.`		

CALL:BCHannel



"Diagram Conventions" on page 1

CALL[:CELL]:BCHannel[:ARFCn][:SELected]

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">This command sets/queries the broadcast channel ARFCN for the currently selected broadcast band in the active (that is the selected) format.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Depends upon the selected broadcast band.
Range:
• PGSM broadcast band range: 1 to 124
• EGSM broadcast band range: 0 to 124 | 975 to 1023
• GSM450 broadcast band range: 259 to 293
• GSM480 broadcast band range: 306 to 340
• GSM750 broadcast band range: 438 to 511
• GSM850 broadcast band range: 128 to 251
• DCS broadcast band range: 512 to 885
• PCS broadcast band range: 512 to 810
• RGSM broadcast band range: 0 to 124 | 955 to 1023
Resolution: 1</td></tr>
<tr><td colspan="2">Query</td><td>Depends upon the selected broadcast band.
Range:
• PGSM broadcast band range: 1 to 124
• EGSM broadcast band range: 0 to 124 | 975 to 1023
• GSM450 broadcast band range: 259 to 293
• GSM480 broadcast band range: 306 to 340
• GSM750 broadcast band range: 438 to 511
• GSM850 broadcast band range: 128 to 251
• DCS broadcast band range: 512 to 885
• PCS broadcast band range: 512 to 810
• RGSM broadcast band range: 0 to 124 | 955 to 1023
Resolution: 1</td></tr>
<tr><td colspan="2">*RST Setting</td><td>20</td></tr>
<tr><td colspan="2">Related Topics</td><td>“Configuring the Broadcast Channel (BCH)” on page 196.</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
</table>

Programming Example

```
OUTPUT 714;”CALL:CELL:BCHANNEL:ARFCN:SELECTED 512” !Sets BCH ARFCN for the selected
                                                  !broadcast band to channel 512.
```

CALL[:CELL]:BCHannel[:ARFCn]:DCS

Function	GSM TA	This command sets/queries the broadcast channel ARFCN for the DCS broadcast band in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 512 to 885 Resolution: 1
Query		Range: 512 to 885 Resolution: 1
*RST Setting		512
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BCHANNEL:ARFCN:DCS 810" !Sets BCH ARFCN for DCS broadcast
                                              !band to 810.
```

CALL[:CELL]:BCHannel[:ARFCn]:EGSM

Function	GSM TA	This command sets/queries the broadcast channel ARFCN for the EGSM broadcast band in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 124 | 975 to 1023 Resolution: 1
Query		Range: 0 to 124 | 975 to 1023 Resolution: 1
*RST Setting		20
Related Topics		“Configuring the Broadcast Channel (BCH)” on page 196.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:CELL:BCHANNEL:ARFCN:EGSM 120” !Sets BCH ARFCN for EGSM broadcast
                                               !band to 120.
```

CALL[:CELL]:BCHannel[:ARFCn]:GSM450

Function	GSM TA	This command sets/queries the broadcast channel ARFCN for the GSM450 broadcast band in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 259 to 293 Resolution: 1
Query		Range: 259 to 293 Resolution: 1
*RST Setting		270
Related Topics		“Configuring the Broadcast Channel (BCH)” on page 196.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:CELL:BCHANNEL:ARFCN:GSM450 263” !Sets BCH ARFCN for GSM450 broadcast
                                               !band to 263.
```

CALL[:CELL]:BCHannel[:ARFCn]:GSM480

Function	GSM TA	This command sets/queries the broadcast channel ARFCN for the GSM480 broadcast band in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 306 to 340 Resolution: 1
Query		Range: 306 to 340 Resolution: 1
*RST Setting		310
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BCHANNEL:ARFCN:GSM480 320" !Sets BCH ARFCN for GSM480 broadcast
                                               !band to 320.
```

CALL[:CELL]:BCHannel[:ARFCn]:GSM750

Function	GSM TA	This command sets/queries the broadcast channel ARFCN for the GSM750 broadcast band in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 438 to 511 Resolution: 1
Query		Range: 438 to 511 Resolution: 1
*RST Setting		450
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BCHANNEL:ARFCN:GSM750 460" !Sets BCH ARFCN for GSM750 broadcast
                                               !band to 460.
```

CALL[:CELL]:BCHannel[:ARFCn]:GSM850

Function	GSM TA	This command sets/queries the broadcast channel ARFCN for the GSM850 broadcast band in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 128 to 251 Resolution: 1
Query		Range: 128 to 251 Resolution: 1
*RST Setting		150
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BCHANNEL:ARFCN:GSM850 230" !Sets BCH ARFCN for GSM850 broadcast
                                               !band to 230.
```

CALL[:CELL]:BCHannel[:ARFCn]:PCS

Function	GSM TA	This command sets/queries the broadcast channel ARFCN for the PCS broadcast band in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 512 to 810 Resolution: 1
Query		Range: 512 to 810 Resolution: 1
*RST Setting		512
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BCHANNEL:ARFCN:PCS 800" !Sets BCH ARFCN for PCS broadcast
                                              !band to 800.
```

CALL[:CELL]:BCHannel[:ARFCn]:PGSM

Function	GSM TA	This command sets/queries the broadcast channel ARFCN for the PGSM broadcast band in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 124 Resolution: 1
Query		Range: 1 to 124 Resolution: 1
*RST Setting		20
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BCHANNEL:ARFCN:PGSM 113" !Sets BCH ARFCN for PGSM broadcast
                                              !band to 113.
```

CALL[:CELL]:BCHannel[:ARFCn]:RGSM

Function	GSM TA	This command sets/queries the broadcast channel ARFCN for the RGSM broadcast band in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 124 | 955 to 1023 Resolution: 1
Query		Range: 0 to 124 | 955 to 1023 Resolution: 1
*RST Setting		20
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:BCHANNEL:ARFCN:RGSM 960" !Sets BCH ARFCN for RGSM broadcast
                                               !band to 960.
```

CALL[:CELL]:BCHannel:SCELl

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="3">The serving cell command sets what information is broadcast on the broadcast channel. It can be set to either GSM or to GPRS to provide GPRS capabilities.

NOTE: The serving cell will be fixed at GSM if only the GSM TA is licensed.

Setting GSM will hide GPRS features and a GPRS mobile will not see the serving cell as GPRS capable and therefore, will not attempt to attach.

The :SCELl query command returns the current serving cell setting.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td><td>This command sets or returns the serving cell. The serving cell defines the type of information that is broadcast on the broadcast channel. It can be set to either GSM, GPRS or EGPRS. If you set this command to GPRS, EGPRS features are hidden and an EGPRS mobile does not see the serving cell as being EGPRS capable. However, an EGPRS mobile should still be able to attach using GMSK modulation coding schemes (MCS1 through MCS4).

If you set this command to a value other than EGPRS, you can still send GPIB commands to the test set which control EGPRS functions. However, these settings are not applied until the serving cell is set to EGPRS.</td></tr>
<tr><td rowspan="3">Setting</td><td>GSM/GPRS TA</td><td rowspan="2">Range: GSM | GPRS</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td><td>Range: GSM | GPRS | EGPRS</td></tr>
<tr><td rowspan="3">Query</td><td>GSM/GPRS TA</td><td rowspan="2">Range: GSM | GPRS</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td><td>Range: GSM | GPRS | EGPRS</td></tr>
<tr><td colspan="2">*RST Setting</td><td>GPRS if a GPRS TA or GSM/GPRS LA license is present, otherwise GSM if only the GSM TA license is present.</td></tr>
<tr><td colspan="2">Related Topics</td><td>“Configuring the Broadcast Channel (BCH)” on page 196.</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
<code>OUTPUT 714;”CALL:CELL:BCHANNEL:SCELI GPRS” !Sets broadcast channel SCELl to GPRS</code>
<code>!(requires the E1968A GPRS TA license or E6701C license).</code></td></tr>
</table>

CALL:BURSt

```
CALL →:BURSt:TYPE ──┬──────────────┬──┬→<sp>RACH|TSC0|TSC1|TSC2|TSC3|TSC4|  ──→┐
                    └→[:SELected] ─┘  │         TSC5|TSC6|TSC7                  │
                                      └→?  ─────────────────────────────────────→┘
```

"Diagram Conventions" on page 1

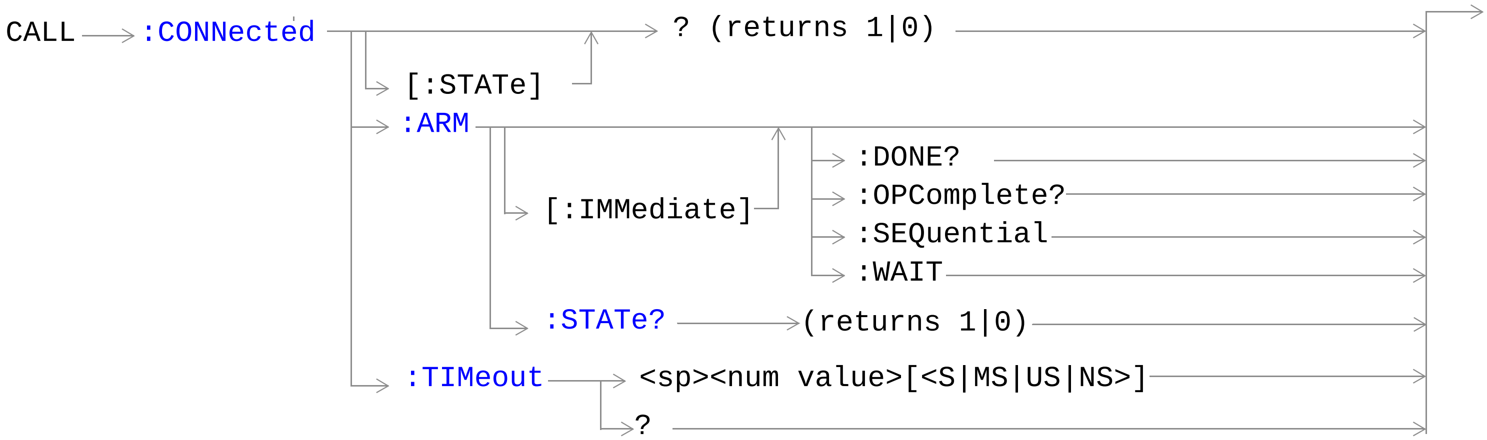
CALL:BURSt:TYPE[:SELected]

Function	GSM TA	Sets/queries the Expected Burst parameter in the active (that is the selected) format. This parameter is used for measurement synchronization when the test set's operating mode is set to one of the test modes, see "CALL:OPERating:MODE" on page 610 (If it is not set, the test set may not synchronize to the input signal's midamble). For more details on this parameter, see "Expected Burst" on page 185.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting	GSM	Range: RACH | TSC0 | TSC1 | TSC2 | TSC3 | TSC4 | TSC5 | TSC6 | TSC7
	GPRS	Range: RACH | TSC0 | TSC1 | TSC2 | TSC3 | TSC4 | TSC5 | TSC6 | TSC7
Query	GSM	Range: RACH | TSC0 | TSC1 | TSC2 | TSC3 | TSC4 | TSC5 | TSC6 | TSC7
	GPRS	Range:RACH | TSC0 | TSC1 | TSC2 | TSC3 | TSC4 | TSC5 | TSC6 | TSC7
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Related Topics		"Test Mode Operating Modes" on page 179.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:BURSt:TYPE TSC2" ! Sets the test set to expect Training Sequence Code 2 in
                                   !the midamble burst.
```

CALL:CONNected



These commands are not applicable to GPRS.

"Diagram Conventions" on page 1

CALL:CONNected[:STATe]?

Function	GSM TA GSM/GPRS LA EGPRS LA	Queries the connected/disconnected state of the call. 1 is returned if the call is in the connected state. 0 is returned if the call is in the idle (that is, disconnected) state. If the call is in any state other than connected or idle, the query will hang until the call state transitions to the connected or idle state. When used in conjunction with the CALL:CONNected:ARM and CALL:CONNected:TIMeout commands, the CALL:CONNected:STATe? command allows the control program to synchronize to call connection/disconnection. See "Call Processing State Synchronization" on page 433.
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 | 1
*RST Setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:STATE?" !Returns 1 if call connected,
                                   !0 if call disconnected.
```

CALL:CONNected:ARM[:IMMediate]

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets (arms) the call-state-change detector. Arming the call-state-change detector allows the control program to tell the test set that it is expecting a change to the state of a call prior to initiating the state change. Once armed, the detector remains armed until there is a call state change to Idle or Connected from one of the transitory states. The call-state-change-detector is not disarmed by a call state change to one of the transitory states, nor is it disarmed by any transitions from Idle to Idle, or Connected to Connected. When used in conjunction with the CALL:CONNected:STATe? and the CALL:CONNected:TIMeout commands, the CALL:CONNected:ARM command allows the control program to synchronize to call connection/disconnection. See “Call Processing State Synchronization” on page 433.
	GPRS TA	This command is not applicable to GPRS.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:ARM:IMMEDIATE" !Arms the call-state-change detector.
```

CALL:CONNected:ARM:STATe?

Function	GSM TA GSM/GPRS LA EGPRS LA	Queries the arm state of the call-state-change detector. This command never hangs and immediately returns a 1 if the call-state-change detector is armed and a 0 if it is not armed. See “Call Processing State Synchronization” on page 433.
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 | 1
*RST Setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:ARM:STATE?" !Returns arm state of
                                       !call-state-change detector.
```

CALL:CONNected:TIMeout

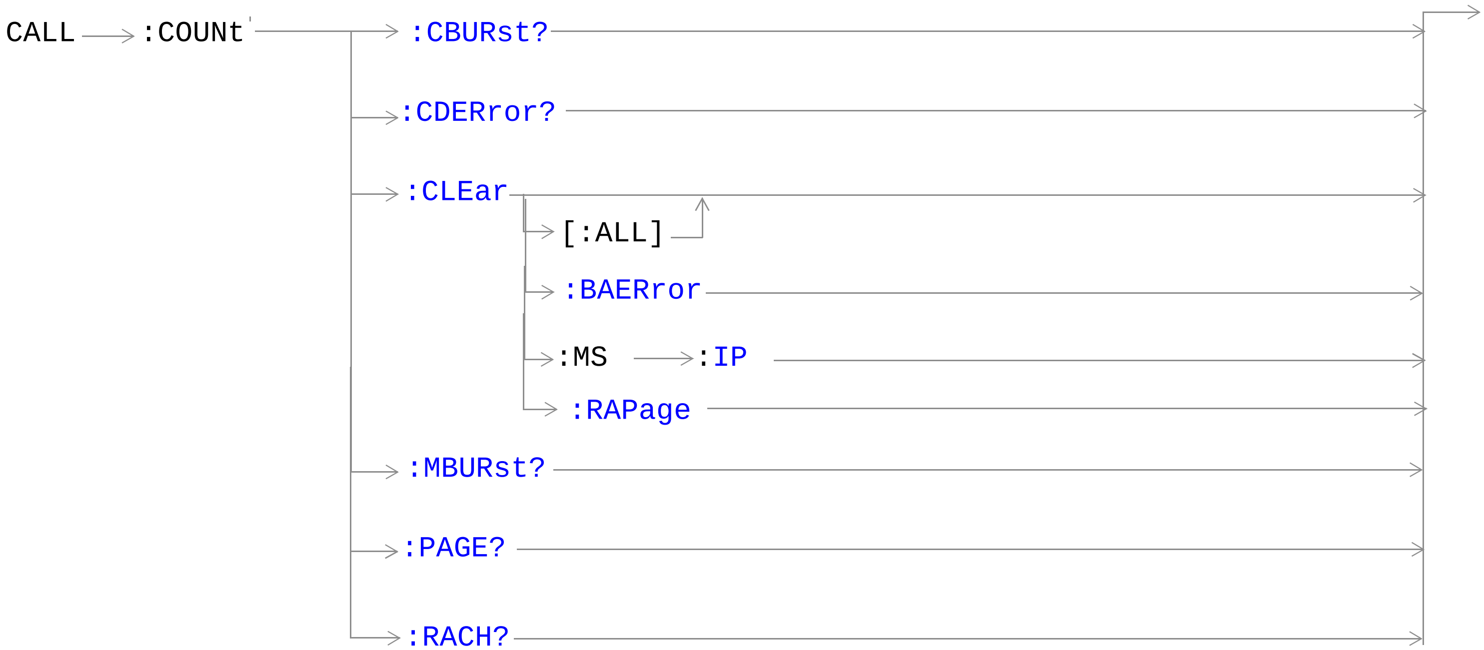
Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the maximum time the test set will wait for a hanging CALL:CONNected:STATe? query to complete. Default setting units are seconds. To set timeout time in units other than seconds include optional unit specifier in command string. A timeout timer is started whenever the call-state-change-detector becomes armed or gets rearmed when already armed. The duration of this timeout is a set using the CALL:CONNected:TIMeout command and should be greater than the maximum amount of time the control program needs/wants to wait between arming the call-state-change detector and the connect/disconnect operation starting. Once the process starts and the call state has moved into one of the transitory states the GSM defined protocol timers take over and prevent the call state from staying in a transitory state forever. See “Call Processing State Synchronization” on page 433.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 100 seconds Resolution: 0.1 seconds
Query		Range: 0 to 100 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Related Topics		“Call Processing State Synchronization” on page 433
		“Call Processing State Synchronization” on page 433
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

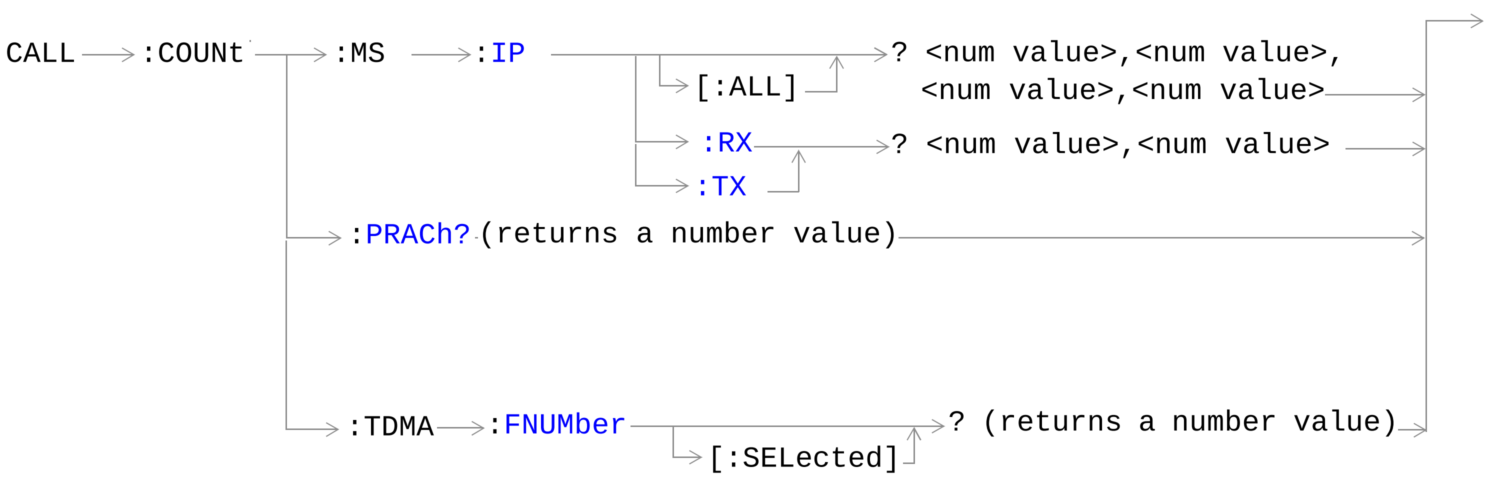
Programming Example

```
OUTPUT 714;"CALL:CONNECTED:TIMEOUT 3" !Sets the CALL:CONNected:STATe? query
                                      !timeout time to 3 seconds.

OUTPUT 714;"CALL:CONNECTED:TIMEOUT 500 MS" !Sets the CALL:CONNected:STATe? query
                                           !timeout time to 500 ms.
```

CALL:COUNt





These commands are only applicable to the GPRS lab application.

“Diagram Conventions” on page 1

CALL:COUNt:CBURst?

Function	GSM TA	Queries the corrupt burst counter. The corrupt burst counter keeps track of the number of uplink bursts where power was detected but the expected midamble could not be found.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 99999 Resolution: 1
*RST Setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:COUNT:CBURST?" !Queries the corrupt burst counter.`		

CALL:COUNt:CDERror?

Function	GSM TA	Queries the channel decode error counter. The channel decode error counter keeps track of how many channel decoder errors have occurred. Channel decode errors include convolutional, FIRE, and block errors, but not CRC errors.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 99999 Resolution: 1
*RST Setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:COUNT:CDERROR?" !Queries the channel decode error counter.`		

CALL:COUNt:CLEar[:ALL]

Function	GSM TA GPRS TA	This command resets the corrupt burst, channel decode error, missing burst, RACH, and page counters to zero.
	GSM/GPRS LA EGPRS LA	This command resets the corrupt burst, channel decode error, missing burst, RACH, and page counters to zero. It also clears the PRACH counter and the reported results for the transmitted and received IP packets and bytes.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:COUNt:CLEar" !Clears all counters.
```

CALL:COUNt:CLEar:BAERror

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets the corrupt burst, missing burst, and decode error counters' count to zero.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:COUNt:CLEar:BAERror" !Clears the corrupt burst, missing burst, and
                                       !decode error counters
```

CALL:COUNt:CLEar:MS:IP

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA EGPRS LA	This command clears the reported results for the transmitted and received IP packets and bytes.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:COUNt:CLEar:MS:IP" !Clears the TX and RX IP packet and byte counters.
```

CALL:COUNt:CLEar:RAPage

Function	GSM TA	This command sets the RACH and page counters' count to zero.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:COUNt:CLEar:RAPage" !Clears the RACH and page counters.`		

CALL:COUNt:MBURst?

Function	GSM TA	This command queries the missing burst counter. The missing burst counter keeps track of how many uplink bursts, that should have been there, were missing. The missing burst counter does not count idle frames as missing.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 99999 Resolution: 1
*RST Setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:COUNt:MBURst?" !Returns the number of missing uplink bursts.`		

CALL:COUNt:MS:IP[:ALL]?

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA EGPRS LA	Queries the data transmitted from and received by the device being tested. Data is returned in the following order: packets transmitted, bytes transmitted, packets received, bytes received. The function connection type must be set to AUTO by "CALL:FUNCtion:CONNection:TYPE" . If the data type is not AUTO, this query will return 9.91 E+37.
Query		Range: 0 to 9999999999, 9.91 E+37 Resolution: 1
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:COUNt:MS:IP:ALL?"`		

CALL:COUNt:MS:IP:RX?

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA EGPRS LA	Queries the data received by the device being tested. Data is returned in the following order: packets received, bytes received. The fuction connection type must be set to AUTO. See "CALL:FUNCtion:CONNection:TYPE" . If the data type is not AUTO, this query will return 9.91 E+37.
Query		Range: 0 to 9999999999, 9.91 E+37 Resolution: 1
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:COUNt:MS:IP:RX?"`		

CALL:COUNt:MS:IP:TX?

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA EGPRS LA	Queries the data transmitted by the device being tested. Data is returned in the following order: packets transmitted, bytes transmitted. The data connection type must be set to AUTO. See "CALL:FUNCtion:CONNection:TYPE" . If the data type is not AUTO, this query will return 9.91 E+37.
Query		Range: 0 to 9999999999, 9.91 E+37 Resolution: 1
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:COUNt:MS:IP:TX?"
```

CALL:COUNt:PAGE?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command queries the page counter. The page counter keeps track of the number of pages sent by the base station (BS) emulator during a BS originated call setup.
Query		Range: 0 to 9999 Resolution: 1
*RST Setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:COUNt:PAGE?" !Returns the number of pages sent by the base station
                              !emulator.
```

CALL:COUNt:PRACh?

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Queries the number of PRACHs received. Used in conjunction with the PBCCH. Valid in all data connection types.
	EGPRS LA	
Query		Range: 0 to 9999, 9.91 E+37 Resolution: 1
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:COUNt:PRACh?"
```

CALL:COUNt:RACH?

Function	GSM TA	This command queries the RACH counter in the active (that is the selected) format. The RACH counter keeps track of the number of RACH bursts received by the base station emulator during call setup attempts.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 9999 Resolution: 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

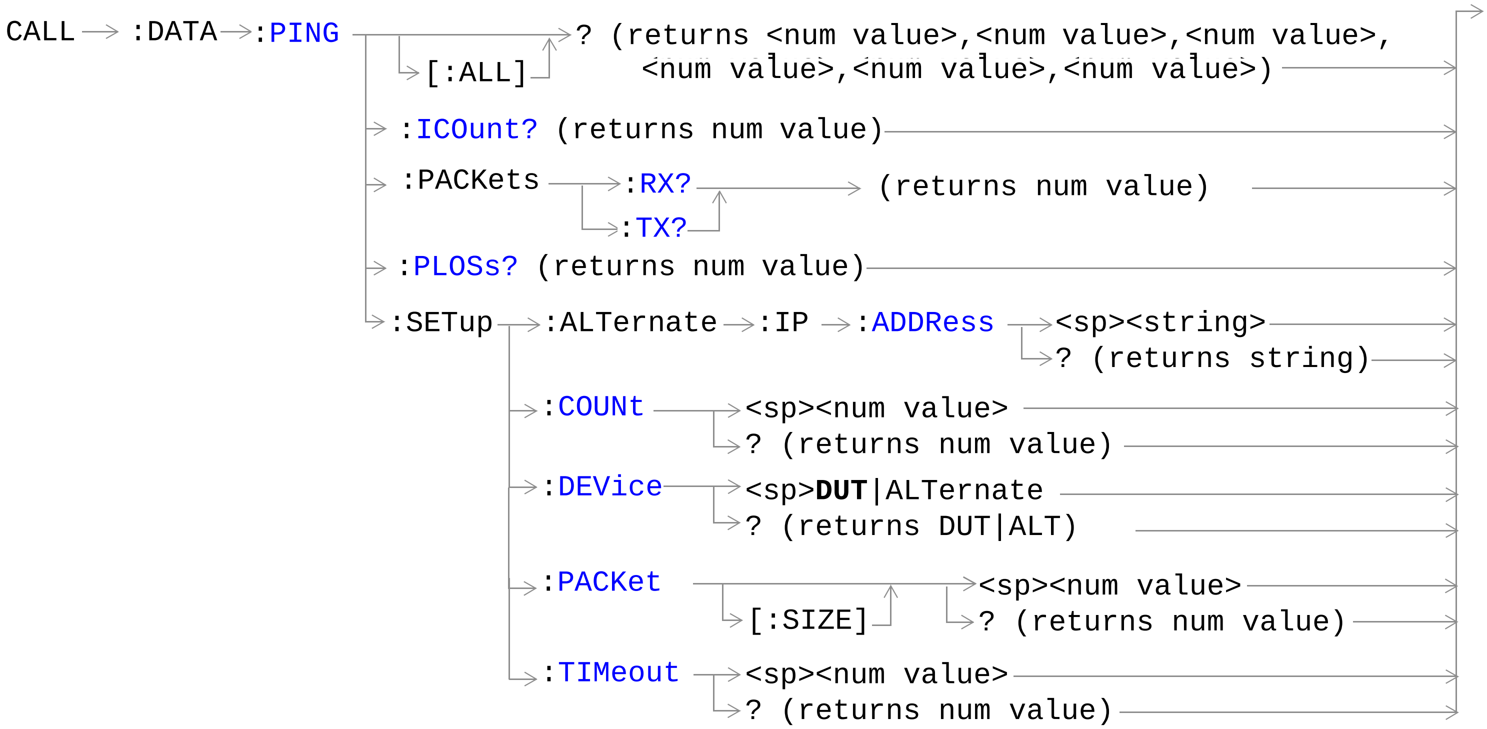
Programming Example

```
OUTPUT 714;"CALL:COUNt:RACH?" !Returns the number of RACH bursts received by the base
                              !station emulator during call setup/data connection attempts.
```

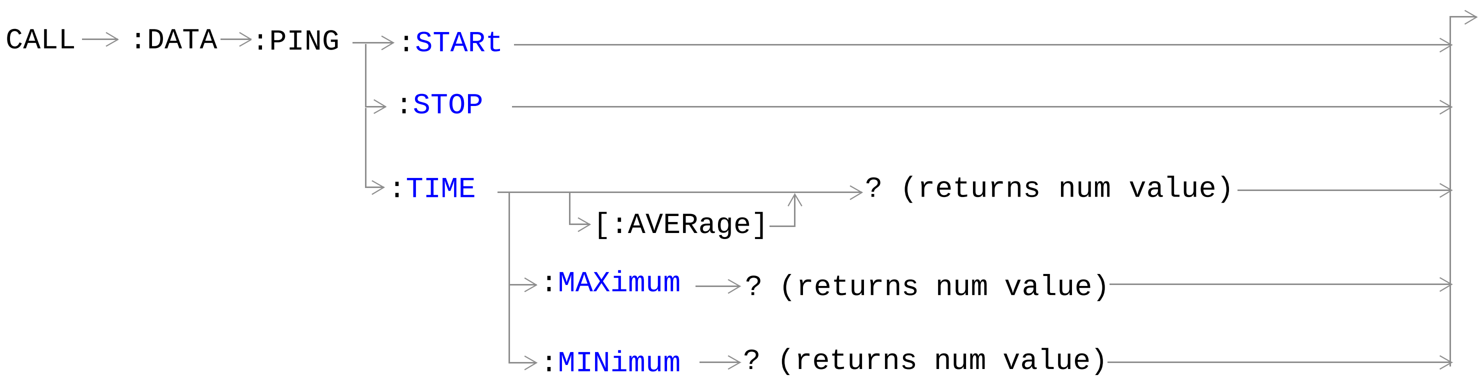
CALL:COUNt:TDMA:FNUMber[:SELected]?

Function	GSM	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Returns the number of the current TDMA frame within a hyperframe.
	EGPRS LA	
Query		Range: 0 to 2715647 Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01.00 and above
	EGPRS LA	Revision: A.01.00 and above
Programming Example `OUTPUT 714;"CALL:COUNt:TDMA:FNUMber?"`		

CALL:DATA:PING



These commands are only applicable to the GSM/GPRS and EGPRS lab applications.



These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

"Diagram Conventions" on page 1

CALL:DATA:PING[:ALL]?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	This command returns the following results: packets transmitted, packets received, percentage of packets lost, minimum round trip time (in seconds), average round trip time (in seconds), maximum round trip time (in seconds). This command will return 9.91 E+37 (NAN) if the `Connection Type` is not set to `AUTO`, or if ping results are not available. See "CALL:FUNCtion:CONNection:TYPE" on page 538 for more information.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:DATA:PING:ALL?"`		
`ENTER 714;Pxmit,Prcvd,Plost,Min_time,Avg_time,Max_time`		

CALL:DATA:PING:ICOunt?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	This command queries the number of packets that have been transmitted at the moment this query is received by the test set.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:DATA:PING:ICOUNT?"`		
`ENTER 714;variable_name`		

CALL:DATA:PING:PACKets:RX?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	This command queries the number of packets received from the DUT or from the alternate device if "CALL:DATA:PING:SETup:DEVice" is set to ALTernate. This command will return 9.91 E+37 (NAN) if the Connection Type is not set to AUTO, or if ping results are not available. See "CALL:FUNCtion:CONNection:TYPE" on page 538 for more information.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:DATA:PING:PACKETS:RX?"` `ENTER 714;variable_name` `!Queries the number of packets received from the device being tested.`		

CALL:DATA:PING:PACKets:TX?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	This queries the number of packets transmitted from the test set. This command will return 9.91 E+37 (NAN) if the Connection Type is not set to AUTO, or if ping results are not available. See "CALL:FUNCtion:CONNection:TYPE" on page 538 for more information.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:DATA:PING:PACKETS:TX?"` `ENTER 714;variable_name` `!Queries the number of packets transmitted from the test set.`		

CALL:DATA:PING:PLOSs?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	This command queries the percentage of packets lost during the ping session. This command will return 9.91 E+37 (NAN) if the `Connection Type` is not set to `AUTO`, or if ping results are not available. See "CALL:FUNCtion:CONNection:TYPE" on page 538 for more information.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:DATA:PING:PLOSS?" !Queries the percentage of lost packets.
ENTER 714;variable_name
```

CALL:DATA:PING:SETup:ALTernate:IP:ADDRess

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	This sets/queries the alternate internet protocol (IP) address. This address will be used as the address to ping instead of the device under test if the "CALL:DATA:PING:SETup:DEVice" command is set to ALT.
Setting		Range: IP v4 address in dotted decimal format.
Query		Range: IP v4 address in dotted decimal format.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:DATA:PING:SETUP:ALTERNATE:IP:ADDRESS '192.168.16.57'"
```

CALL:DATA:PING:SETup:COUNt

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This command set/queries the number of ping IP messages sent for each uninterrupted invocation of the "CALL:DATA:PING:STARt" command.
	EGPRS LA	
Setting		Range: 1 to 1000
Query		Range: 1 to 1000
*RST Setting		10
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:DATA:PING:SETUP:COUNT 20"`		

CALL:DATA:PING:SETup:DEVice

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This command sets/queries which device address is used in the ping IP packets, the address of the device under test, or the address of an alternate device.
	EGPRS LA	
Setting		Range: DUT | ALTernate
Query		Range: DUT | ALT
*RST Setting		DUT
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:DATA:PING:SETUP:DEVice ALT"`		

CALL:DATA:PING:SETup:PACKet[:SIZE]

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This command sets or queries the number of bytes to be sent by the test set in each ping packet.
	EGPRS LA	
Setting		Range: 8 to 4076 bytes Resolution: 1
Query		Range: 8 to 4076 bytes
*RST Setting		64 bytes
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:DATA:PING:SETup:PACKet 10"`		

CALL:DATA:PING:SETup:TIMeout

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This command sets or queries how long the test set will wait before ending a ping session.
	EGPRS LA	
Setting		Range: 1 to 100 seconds
Query		Range: 1 to 100 seconds
*RST Setting		5 seconds
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:DATA:PING:SETUP:TIMEOUT 10"`		

CALL:DATA:PING:STARt

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This command starts a ping session.
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:DATA:PING:START"`		

CALL:DATA:PING:STOP

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This command immediately stops a ping session. The ping results will not include counts for any ping message that has not yet received a response.
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:DATA:PING:STOP"`		

CALL:DATA:PING:TIME[:AVERage]?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This command queries the average round trip time (in seconds) for a series of pings. This command will return 9.91 E+37 (NAN) if the `Connection Type` is not set to `AUTO`, or if ping results are not available. See "CALL:FUNCtion:CONNection:TYPE" on page 538 for more information.
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:DATA:PING:TIME:AVERAGE?"` `ENTER 714;variable_name`		

CALL:DATA:PING:TIME:MAXimum?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	This command queries the maximum round trip time (in seconds) for a series of pings. This command will return 9.91 E+37 (NAN) if the `Connection Type` is not set to `AUTO`, or if ping results are not available. See "CALL:FUNCtion:CONNection:TYPE" on page 538 for more information.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:DATA:PING:TIME:MAXIMUM?"
ENTER 714;variable_name
```

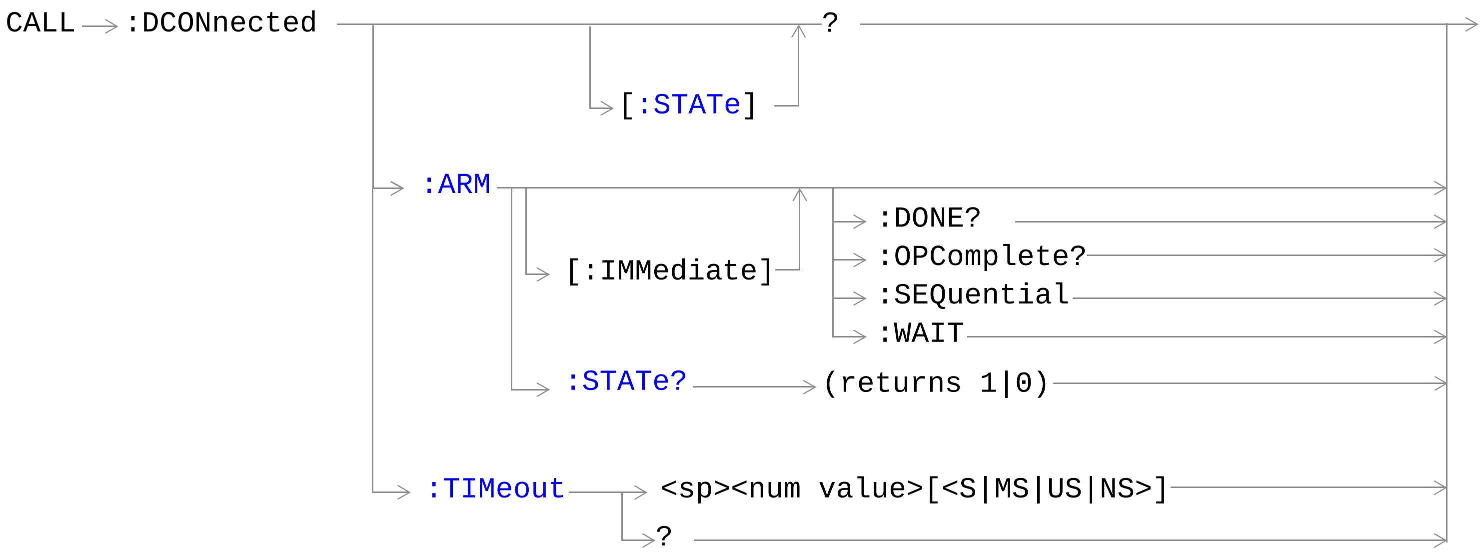
CALL:DATA:PING:TIME:MINimum?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	This command queries the minimum round trip time (in seconds). This command will return 9.91 E+37 (NAN) if the `Connection Type` is not set to `AUTO`, or if ping results are not available. See "CALL:FUNCtion:CONNection:TYPE" on page 538 for more information.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:DATA:PING:TIME:MINIMUM?"
ENTER 714;variable_name
```

CALL:DCONnected



These commands are not applicable to the GSM TA.

"Diagram Conventions" on page 1

CALL:DCONnected[:STATe]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	Queries the data connection state.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 | 1
*RST Setting		0, disconnected
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:DCONnected?" !Returns data connection state; 0=disconnected, 1=connected.`		

CALL:DCONnected:ARM[:IMMediate]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	Sets (arms) the data connection state change detector. Arming the data connection state change detector allows the control program to tell the test set that it is expecting a change to the state of a data connection prior to initiating the state change. Once armed, the detector remains armed until there is a data connection state change to Idle, Attached or Transferring, from one of the transitory states. The data connection state change detector is not disarmed by a connection state change to one of the transitory states, nor is it disarmed by any transitions from Idle to Idle, Attached to Attached or Transferring to Transferring. When this command is used in conjunction with CALL:ATTached:STATe?, CALL:TRANsferring:STATe?, and CALL:DCONnected:TIMeout, it allows the control program to synchronize to data connection/disconnection. See “Data Connection Processing State Synchronization” on page 445. Additional commands can be appended to aid in controller/Mobile Station synchronization. See “Data Connection Processing Event Synchronization” on page 441.
	GSM/GPRS LA	
	EGPRS LA	
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:DCONnected:ARM:IMMediate" !Arms the data connection state change detector.`		

CALL:DCONnected:ARM:STATe?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	Queries whether the data connection state change detector is armed or not. This command immediately returns a 1 if the data connection state change detector is armed and a 0 if it is not armed. See “Data Connection Processing State Synchronization” on page 445.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 | 1
*RST Setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:DCONnected:ARM:STATe?” !Returns arm state of
                                        !data connection state change detector
```

CALL:DCONnected:TIMeout

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the maximum time the test set will wait for a hanging CALL:ATTached[:STATe]? and CALL:TRANsferring[:STATe]? query to complete. The default setting units are seconds. A timeout timer is started whenever the data connection state change detector becomes armed. You can set the duration of the timeout using this command. The timeout should be greater than the maximum amount of time the control program needs to wait between arming the data connection state change detector and the connect/disconnect operation starting. Once the process starts and the data connection state has moved into one of the transitory states the pre-defined GPRS timers prevent the data connection state from staying in a transitory state forever. See "Data Connection Processing State Synchronization" on page 445.
Setting		Range: 0 to 100 seconds Resolution: 0.1 seconds
Query		Range: 0 to 100 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Related Topics		"Data Connection Processing State Synchronization" on page 445
		"Data Connection Processing Event Synchronization" on page 441
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:DCONnected:TIMeout 3" !Sets the CALL:DCONected: STSTe? query timeout time to 3
                                       !seconds.
```

CALL:DEModulation

CALL:DEModulation:DELay

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to the GSM Test Application.</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to the GPRS Test Application.</td></tr>
<tr><td>GSM/GPRS LA</td><td rowspan="2">Sets the value of the demodulation trigger delay. The demodulation trigger will be delayed by the number of symbols specified with this command.</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 0 to 200 symbols
Resolution: 1 symbol</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 to 200 symbols
Resolution: 1 symbol</td></tr>
<tr><td colspan="2">*RST Setting</td><td>0</td></tr>
<tr><td rowspan="2">Requirements</td><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example:
<code>OUTPUT 714;”CALL:DEModulation:DELay 100”</code></td></tr>
</table>

CALL:END

CALL :END

This command is not applicable to the GPRS TA.

"Diagram Conventions" on page 1

CALL:END

Function	GSM TA	Terminates the active voice or CSD call.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:END" !Terminate the call.`		

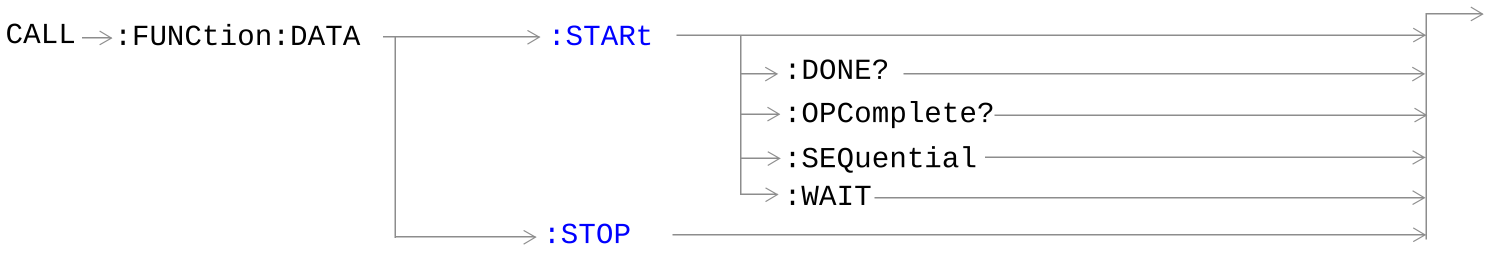
CALL:FUNCtion

```
CALL :FUNCtion:CONNection:TYPE <sp>A°|B°|ACKB°|BLER°|AUTO|SRBL#°
                               ? (returns A|B|ACKB|BLER|AUTO|SRBL)
```

```
o Not applicable to GSM TA.
# Only applicable to EGPRS.
```

```
CALL :FUNCtion:DATA :BLER :LLC :FCSequence <sp>VALid|CORRupt
                                           ? (returns VAL|CORR)
                          :POLLing :INTerval <sp><num value>
                                             ?
                    :DETach
                    :FRAMe :STARt <sp>RELative|ABSolute|IMMediate
                                  ? (returns REL|ABS|IMM)
                    :PAYLoad:PATTern :BLER <sp>GMMinfo|ZEROs|ONES|
                                           ABITs|APAirs|AQUads|
                                           PRBS15|FIXED2B
                                           ?
                                     :ETSIB <sp>ZEROs|ONES|ABITs|
                                            APAirs|AQUads|PRBS15|
                                            FIXED2B
                                            ?
```

These commands are not applicable to GSM.



These commands are not applicable to GSM.

"Diagram Conventions" on page 1

CALL:FUNCtion:CONNection:TYPE

Function	GSM TA	This command sets/queries the type of connection. This is always set to AUTO for the GSM test application.
	GPRS TA	This command sets/queries the type of connection that is used when you use the command “CALL:FUNCtion:DATA:START” on page 546 to start a data connection. If you set this parameter to ETSI Type A, no packet data traffic channel (PDTCH) bursts will be transmitted on the downlink. Setting this parameter to ETSI Type B (unacknowledged) ensures that one or more downlink (PDTCH) bursts are present, which can be used to loopback data through the uplink. The number of downlink bursts is determined by the setting of the command “CALL:PDTCH:MSLot:CONFig” on page 634. The ETSI Type B Acknowledged connection type (ACKB) is almost identical to the ETSI Type B (Unacknowledged) connection type, except that it features an acknowledged downlink. The acknowledged downlink ensures maximum compatibility with different mobile station types. ETSI Type B (unacknowledged) or ETSI Type B Acknowledged is required if you want to perform BER measurements in active cell mode. Setting this parameter to BLER ensures that an Agilent proprietary data connection type is used which allows the test set to obtain BLock Error Rate (BLER) measurement reports from the mobile station (see “Block Error Rate (BLER) Reports Description” on page 92). In addition, the BLER data connection type allows you to perform other GPRS measurements at the same time (except BER and ORFS due to Modulation). It is recommended you always end the data connection (using “CALL:FUNCtion:DATA:STOP” on page 546) before changing the data connection type. If you change this parameter while the data connection status is transferring, the data connection will be dropped (changing the data connection status to attached), and an error message will be generated.

<table>
<tr><td rowspan="2"></td><td>GSM/GPRS LA</td><td>In addition to the functions of the GPRS TA (above), the GSM/GPRS lab application has the following effects:
• When the data connection type is AUTO (formerly known as IP Data), BER measurements will not be accurate due to synchronization problems. However, BLER measurements are not affected.</td></tr>
<tr><td>EGPRS LA</td><td>This command sets/queries the type of connection that is used when you use the command “CALL:FUNCtion:DATA:START” on page 546 to start a data connection.

If you set this parameter to ETSI Type A, no packet data traffic channel (PDTCH) bursts will be transmitted on the downlink.

Setting this parameter to ETSI Type B (unacknowledged) ensures that one or more downlink (PDTCH) bursts are present, which can be used to loopback data through the uplink. The number of downlink bursts is determined by the setting of the command “CALL:PDTCH:MSLot:CONFig” on page 286. The ETSI Type B Acknowledged connection type (ACKB) is almost identical to the ETSI Type B (Unacknowledged) connection type, except that it features an acknowledged downlink. The acknowledged downlink ensures maximum compatibility with different mobile station types.

ETSI Type B (unacknowledged) or ETSI Type B Acknowledged is required if you want to perform BER measurements in active cell mode.

Each of the ETSI test modes are extended with EGPRS header information.

Setting this parameter to BLER ensures that an Agilent proprietary data connection type is used which allows the test set to obtain BLock Error Rate (BLER) measurement reports from the mobile station (see “Block Error Rate (BLER) Reports Description” on page 92). In addition, the BLER data connection type allows you to perform other GMSK modulated EGPRS measurements at the same time (except Bit Error Rate and ORFS due to Modulation).

Setting this parameter to SRBL ensures that the Switched Radio Block (SRB) Loopback mode is used for the data connection. This connection type is only available in Active Cell operating mode.

It is recommended you always end the data connection (using “CALL:FUNCtion:DATA:STOP” on page 546) before changing the data connection type. If you change this parameter while the data connection status is transferring, the data connection will be dropped (changing the data connection status to attached), and an error message will be generated.

When the data connection type is AUTO (formerly known as IP Data), BER measurements will not be accurate due to synchronization problems. However, BLER measurements are not affected.</td></tr>
<tr><td rowspan="4">Setting</td><td>GSM TA</td><td>Range: AUTO</td></tr>
<tr><td>GPRS TA</td><td rowspan="2">Range: A | B | ACKB |BLER | AUTO</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td><td>Range: A | B | ACKB | BLER | AUTO | SRBL</td></tr>
</table>

Query	GSM TA	Range: AUTO
	GPRS TA	Range: A | B | ACKB | BLER | AUTO
	GSM/GPRS LA	
	EGPRS LA	Range: A | B | ACKB | BLER | AUTO | SRBL
*RST Setting	GPRS TA	BLER
	GSM TA	AUTO
	GSM/GPRS LA	
	EGPRS LA	
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:FUNCTION:CONNECTION:TYPE B” !Sets the connection type to ETSI Type B`		

CALL:FUNCtion:DATA:BLER:LLC:FCSequence

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries whether or not the Logical Link Control (LLC) Frame Check Sequence (FCS) is corrupted in order to establish a BLER mode data connection. Setting this parameter to VALid ensures that the cyclic redundancy check code within the FCS is valid. Setting this parameter to CORRupt causes the test set to transmit an invalid FCS to the mobile. This setting may enable some mobiles to establish a BLER mode data connection which would not otherwise be possible with a valid FCS. This parameter is only applicable when the data connection type is set to BLER using CALL:FUNCtion:CONNection:TYPE BLER. If you change this parameter while the data connection type is any type other than BLER, the setting has no effect until a new BLER mode data connection is established. This command along with "CALL:FUNCtion:DATA:BLER:POLLing:INTerval" on page 542 provides you with additional control over BLER data connection type settings. This may enable the test set to establish a BLER mode data connection with mobiles which cannot connect under normal conditions.
Setting		Range: VALid | CORRupt
Query		Range: VAL | CORR
*RST Setting		VALid
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:FUNCTION:DATA:BLER:LLC:FCSEQUENCE CORRUPT" !Sets the test set to transmit
                                                           ! an invalid FCS to the mobile.
```

CALL:FUNCtion:DATA:BLER:POLLing:INTerval

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the block polling interval during a BLER mode data connection. For example, if you set this parameter to a value of 4, polling is performed once in every four blocks. This parameter is only applicable when the connection type is set to BLER using "CALL:FUNCtion:CONNection:TYPE" on page 538. If you change this parameter while the connection type is any type other than BLER, the setting has no effect until a new BLER mode data connection is established. This command along with "CALL:FUNCtion:DATA:BLER:LLC:FCSequence" on page 541 provides you with additional control over BLER data connection type settings. This may enable the test set to establish a BLER mode data connection with mobiles which cannot connect under normal conditions.
Setting		Range: 1 to 32 Resolution: 1
Query		Range: 1 to 32 Resolution: 1
*RST setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:FUNCTION:DATA:BLER:POLLING:INTERVAL 8" !Sets block polling interval to 8.
```

CALL:FUNCtion:DATA:DETach

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command performs a test set initiated GPRS Detach.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:FUNCTION:DATA:DETACH" !Detaches the mobile from the test set.
```

CALL:FUNCtion:DATA:FRAMe:STARt

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the type of frame numbering scheme to be used when establishing a data connection. Changing the frame numbering scheme may enable the test set to establish a data connection with mobiles which cannot connect under normal conditions. When you set this command to: • RELative, the test set sends the starting frame number to the mobile as a relative offset from the current frame. • ABSolute, the test set sends the starting frame number to the mobile as an absolute frame number. • IMMediate, the test set sends the starting frame number as an immediate assignment. It is recommended that you should not change this parameter while the data connection status is Starting, as there is no guarantee whether the new setting or the previous setting will be used for the current data connection. If the type of data connection you want to establish is BLER, the commands "CALL:FUNCtion:DATA:BLER:LLC:FCSequence" on page 541 and "CALL:FUNCtion:DATA:BLER:POLLing:INTerval" on page 542 may also be helpful in enabling the test set to establish a data connection with mobiles which cannot establish a BLER data connection under normal conditions.
Setting		Range: RELative | ABSolute | IMMediate
Query		Range: REL | ABS | IMM
*RST Setting		REL
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:FUNCTION:DATA:FRAME:START ABSOLUTE" !Sets the frame number type to
                                                     !Absolute.
```

CALL:FUNCtion:DATA:PAYLoad:PATTern:BLER

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the type of downlink payload pattern to be sent to the mobile when the connection type is set to BLER (see "CALL:FUNCtion:CONNection:TYPE" on page 538) in Active CALL operating mode, and the LLC Frame Check Sequence parameter is set to CORRupt (see "CALL:FUNCtion:DATA:BLER:LLC:FCSequence" on page 541). When you set this command to: • GMMinfo, the payload pattern is set to send GMM Information messages. If "CALL:FUNCtion:DATA:BLER:LLC:FCSequence" on page 541 is set to VALid, this type of payload pattern is always sent irrespective of the setting of this command. • ZEROs, the payload pattern is set to to All Zeros. • ONES, the payload pattern is set to All Ones. • ABITs, the payload pattern is set to Alternate Bits. • APAIRs, the payload pattern is set to Alternate Pairs. • AQUads, the payload pattern is set to Alternate Quads. • PRBS15, the payload pattern is set to pseudo-random binary sequence 15 data. • FIXED2B, the payload pattern is set to Fixed 2B Hexadecimal data. **NOTE** If this command is set to any value other than GMMinfo, and you want to change the setting of the LLC Frame Check Sequence parameter from CORRupt to VALid, it is *strongly* recommended that you end the data connection before making this change. After the LLC Frame Check Sequence parameter has been set to VALid, the data connection can be restarted using "CALL:FUNCtion:DATA:START" on page 546.
Setting		Range: GMMinfo | ZEROs | ONES | ABITs | APAirs | AQUads | PRBS15 | FIXED2B
Query		Range: GMM | ZERO | ONES | ABIT | APA | AQU | PRBS15 | FIXED2B
*RST Setting		GMM
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:FUNCTION:DATA:PAYLoad:PATTern:BLER ONES" !Sets the payload pattern to
                                                         ! be All Ones.
```

CALL:FUNCtion:DATA:PAYLoad:PATTern:ETSIB

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the type of downlink payload pattern to be used when the test set's operating mode is set to either BCH+PDTCH Test Mode, or Active CALL operating mode with the data connection type set to ETSI Type B (see "CALL:FUNCtion:CONNection:TYPE" on page 538). Changes to the payload pattern setting become effective immediately. When you set this command to: • ZEROs, the payload pattern is set to to All Zeros. • ONES, the payload pattern is set to All Ones. • ABITs, the payload pattern is set to Alternate Bits. • APAIRs, the payload pattern is set to Alternate Pairs. • AQUads, the payload pattern is set to Alternate Quads. • PRBS15, the payload pattern is set to pseudo-random binary sequence 15 data. • FIXED2B, the payload pattern is set to Fixed 2B Hexadecimal data.
Setting		Range: ZEROs | ONES | ABITs | APAirs | AQUads | PRBS15 | FIXED2B
Query		Range: ZERO | ONES | ABIT | APA | AQU | PRBS15 | FIXED2B
*RST Setting		PRBS15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:FUNCTION:DATA:PAYLoad:PATTern:ETSIB AQUADS" !Sets the payload pattern to
                                                             ! be Alternate Quads.
```

CALL:FUNCtion:DATA:START

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command attempts to start the data connection. See "Data Connection Processing Event Synchronization" on page 441. Additional commands can be appended to aid in controller/mobile station synchronization. See "Call Processing Subsystem Overlapped Command Synchronization Commands" on page 442 for examples. If you have trouble getting the data connection to start, see "GPRS Data Connection Troubleshooting" on page 1469.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:FUNCTION:DATA:START" !Starts data connection.`		

CALL:FUNCtion:DATA:STOP

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command ends the data connection.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:FUNCTION:DATA:STOP" !Ends data connection.`		

CALL:HANDover|HANDoff

"Diagram Conventions" on page 1

CALL:HANDover | HANDoff[:IMMediate]

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command applies to GSM as described in the GPRS description. This command applies the deferred TCHannel parameters to the active TCH. These parameters are:

• Deferred TCH Timeslot
• Deferred mobile station TCH TX level [band]
• Deferred TCH ARFCN [band]
• Deferred TCH band
• Deferred TCH channel mode (full-rate, enhanced full-rate, or half-rate speech)
• Deferred TCH channel mode half-rate speech sub channel

For more information on the use of deferred parameters see “Using Deferred Parameters” on page 207.</td></tr>
<tr><td>GPRS TA</td><td rowspan="3">This command applies the deferred PDTCH parameters to the active PDTCH. These parameters are:

• Deferred PDTCH Band
• Deferred PDTCH ARFCN [band]
• Deferred mobile station TX Level [burst][band]
• Deferred Multislot Configuration
• Deferred Coding Scheme
• Deferred P0

For more information on the use of deferred parameters see “Using Deferred Parameters” on page 207.

The action taken when this command is set depends on the setting of the cell operating mode and the data connection status:

• When the cell operating mode is set to Active Cell (see “CALL:OPERating:MODE” on page 610) and the data connection status is Transferring, this command causes any necessary over-the-air signaling to modify the PDTCH resources (frequency, power level, timeslot assignment and coding scheme). The immediate settings are updated with the deferred settings just applied and the current downlink PDTCH levels are updated.
• When the cell operating mode is set to Active Cell (see “CALL:OPERating:MODE” on page 610) and the data connection status is any state other than Transferring, the handover command is ignored and the following error is displayed “Call operation rejected; Protocol request ignored.” The immediate settings are not updated.
• When the cell operating mode is not set to Active Cell, this command replaces any active PDTCHs with new PDTCHs using the new parameters. If there are no active PDTCHs, the new values will be remembered until there is an active PDTCH. In either case, the immediate settings are updated with the deferred settings just applied and the current downlink PDTCH levels are updated.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
</table>

Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:HANDover:IMMediate"
```

CALL:IMEI

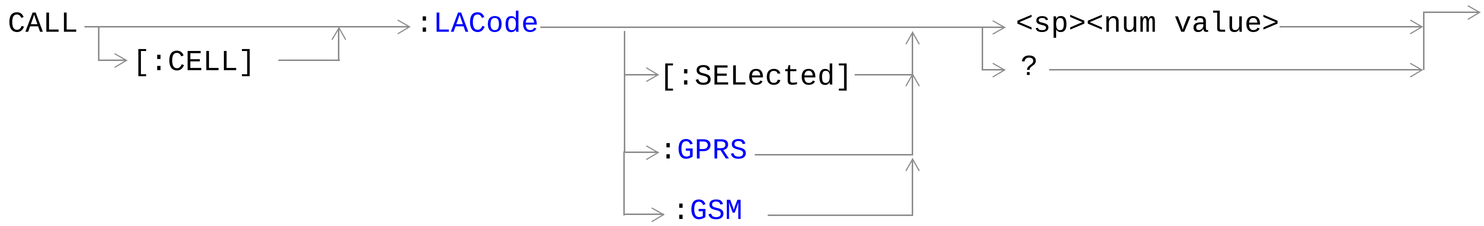
CALL → :IMEI:AUTO → <sp>**1**|**ON**|0|OFF
→ ? (returns 1|0)

“Diagram Conventions” on page 1

CALL:IMEI:AUTO

Function	GSM TA	Sets/queries whether or not the base station emulator should request the international mobile equipment identity (IMEI) on call setup.
	GSM/GPRS LA	
	GPRS TA	Not applicable to the GPRS TA
	EGPRS LA	Not applicable to the EGPRS LA
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST Setting		1
Related Topics		“Configuring the Broadcast Channel (BCH)” on page 196
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
OUTPUT 714;”CALL:IMEI:AUTO OFF” !Sets automatically request IMEI state to OFF.		

CALL:LACode



“Diagram Conventions” on page 1

CALL[:CELL]:LACode

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the value of the cell's Location Area Code (LAC). This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
Setting		Range: 0 to 65535 Resolution: 1
Query		Range: 0 to 65535 Resolution: 1
*RST Setting		1
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:CELL:LACODE 456" !Sets the cell's location area code 456.`		

CALL[:CELL]:LACode[:SELected]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the value of the cell's Location Area Code (LAC) for the active (that is the selected) format. This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
Setting		Range: 0 to 65535 Resolution: 1
Query		Range: 0 to 65535 Resolution: 1
*RST Setting		1
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:CELL:LACODE:SELECTED 456" !Sets the cell's location area code 456.`		

CALL[:CELL]:LACode:GPRS

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA EGPRS LA	Sets/queries the value of the cell's Location Area Code (LAC) for the GPRS format. This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
Setting		Range: 0 to 65535 Resolution: 1
Query		Range: 0 to 65535 Resolution: 1
*RST Setting		1
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:LACODE:GPRS 456" !Sets the cell's location area code 456.
```

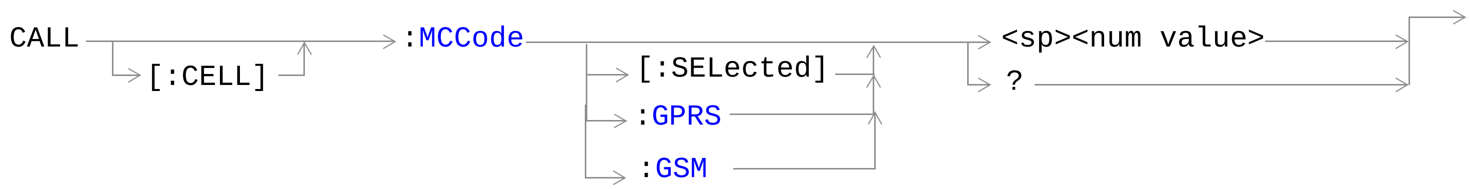
CALL[:CELL]:LACode:GSM

Function	GSM TA GSM/GPRS LA	Sets/queries the value of the cell's Location Area Code (LAC) for the GSM format. This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
	GPRS TA	This command is not applicable to the GPRS.
	EGPRS LA	This command is not applicable to the EGPRS.
Setting		Range: 0 to 65535 Resolution: 1
Query		Range: 0 to 65535 Resolution: 1
*RST Setting		1
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:LACODE:GSM 456" !Sets the cell's location area code 456.
```

CALL:MCCode



"Diagram Conventions" on page 1

CALL[:CELL]:MCCode[:SELected]

Function	GSM TA	Sets/queries the value of the Mobile Country Code (MCC) for the active (that is the selected) format. This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 999 Resolution: 1
Query		Range: 0 to 999 Resolution: 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:CELL:MCCODE:SELECTED 4" !Sets the cell's mobile country code to 4.`		

CALL[:CELL]:MCCode:GPRS

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the value of the Mobile Country Code (MCC) for the GPRS format. This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
Setting		Range: 0 to 999 Resolution: 1
Query		Range: 0 to 999 Resolution: 1
*RST Setting		1
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

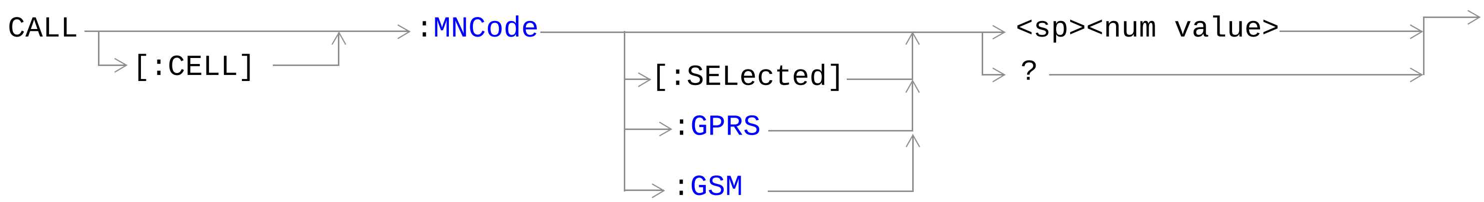
```
OUTPUT 714;"CALL:CELL:MCCODE:GPRS 4" !Sets the cell's mobile country code to 4.
```

CALL[:CELL]:MCCode:GSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the value of the Mobile Country Code (MCC) for the GSM format. This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
Setting		Range: 0 to 999 Resolution: 1
Query		Range: 0 to 999 Resolution: 1
*RST Setting		1
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:CELL:MCCODE:GSM 4" !Sets the cell's mobile country code to 4.
```

CALL:MNCode



“Diagram Conventions” on page 1

CALL[:CELL]:MNCode

Function	GSM TA	Sets/queries the value of the Mobile Network Code (MNC). This can only be set when the Cell Operating Mode parameter is set to Off (see “CALL:OPERating:MODE” on page 610).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 99 Resolution: 1
Query		Range: 0 to 99 Resolution: 1
*RST Setting		1
Related Topics		“Configuring the Broadcast Channel (BCH)” on page 196
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;”CALL:CELL:MNCODE 45” !Sets the cell’s mobile network code to 45.`		

CALL[:CELL]:MNCode[:SELected]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the value of the Mobile Network Code (MNC) for the active (that is the selected) format. This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
Setting		Range: 0 to 99 Resolution: 1
Query		Range: 0 to 99 Resolution: 1
*RST Setting		1
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:MNCODE:SELECTED 45" !Sets the cell's mobile network code to 45.
```

CALL[:CELL]:MNCode:GPRS

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA EGPRS LA	Sets/queries the value of the Mobile Network Code (MNC) for the GPRS format. This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
Setting		Range: 0 to 99 Resolution: 1
Query		Range: 0 to 99 Resolution: 1
*RST Setting		1
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:MNCODE:GPRS 45" !Sets the cell's mobile network code to 45.
```

CALL[:CELL]:MNCode:GSM

Function	GSM TA GSM/GPRS LA	Sets/queries the value of the Mobile Network Code (MNC) for the GSM format. This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
	GPRS TA	This command is not applicable to the GPRS.
	EGPRS LA	This command is not applicable to the EGPRS.
Setting		Range: 0 to 99 Resolution: 1
Query		Range: 0 to 99 Resolution: 1
*RST Setting		1
Related Topics		"Configuring the Broadcast Channel (BCH)" on page 196
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:MNCODE:GSM 45" !Sets the cell's mobile network code to 45.
```

CALL:MS

```
CALL :MS :CCHannel :POWer:OFFSet:DCS <sp>0|1|2|3
                                     ?
```

```
CALL :MS :DTX [:STATe] <sp>1|ON|0|OFF
                       ? (returns 1|0)
```

This command is not applicable to the GPRS test application and GPRS and EGPRS lab applications.

```
CALL :MS :IP :ADDRess <sp>'<string>'
                      ? (returns string)
```

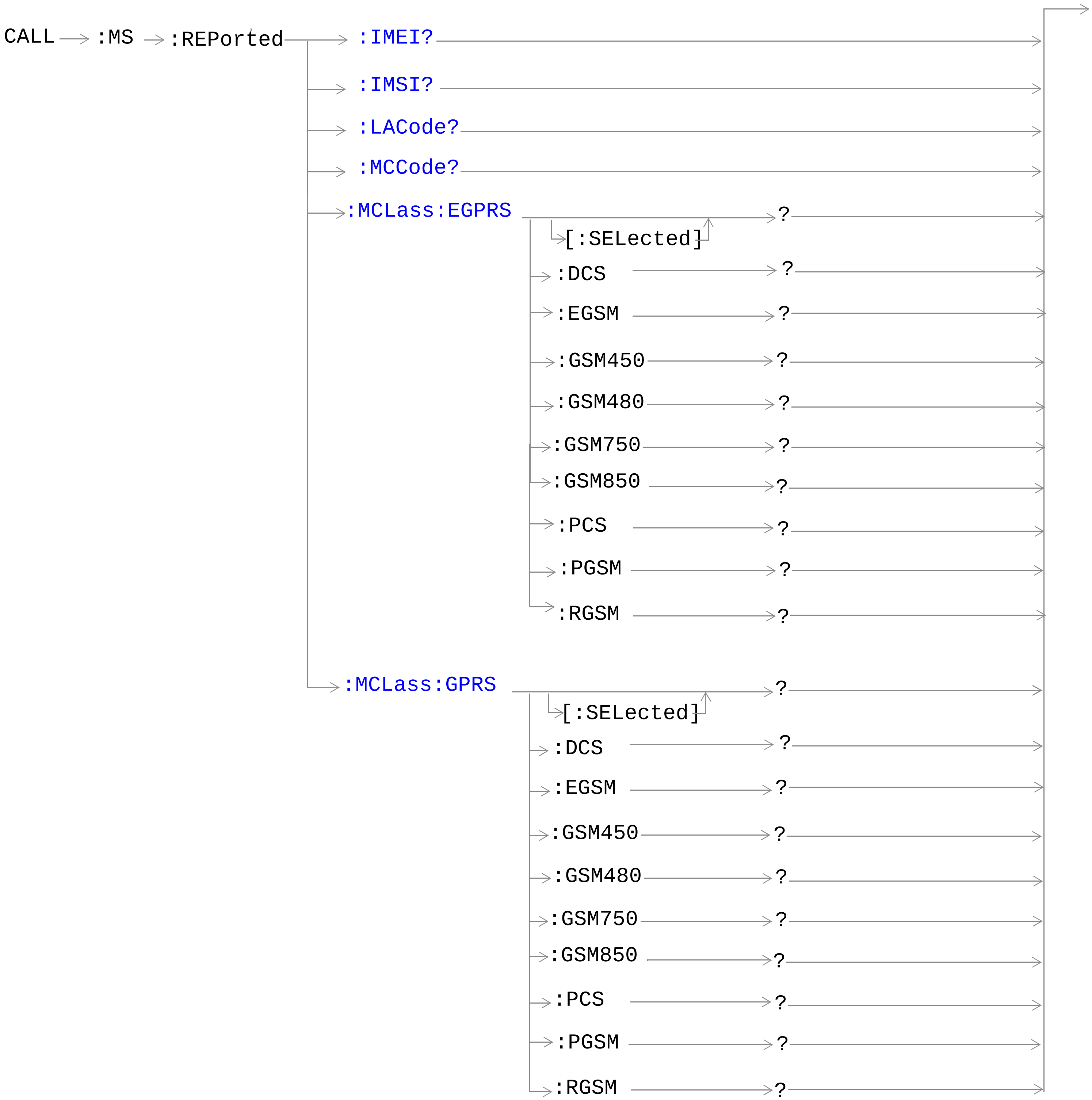
This command is applicable only to the GSM/GPRS and EGPRS lab applications.

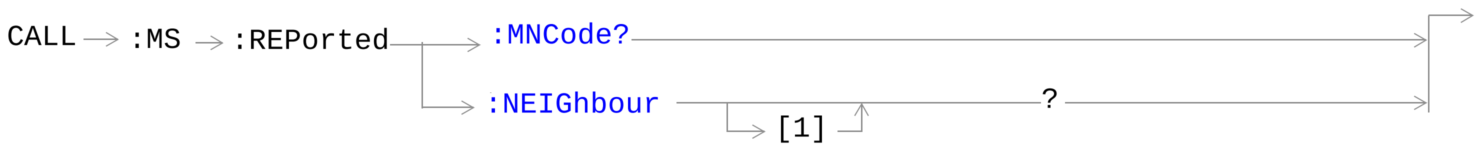
```
CALL :MS :REPorted :CLEar
```

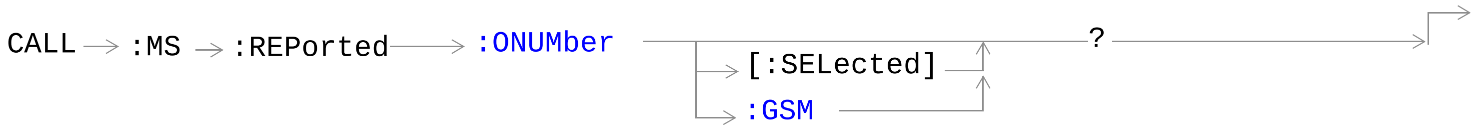
This command is not applicable to the GPRS test application.

```
CALL :MS :REPorted :CVALue :AVERage? (returns num value)
                   :ILEVel :TSLot<Timeslot number> :AVERage?
                                                  (returns num value)
```

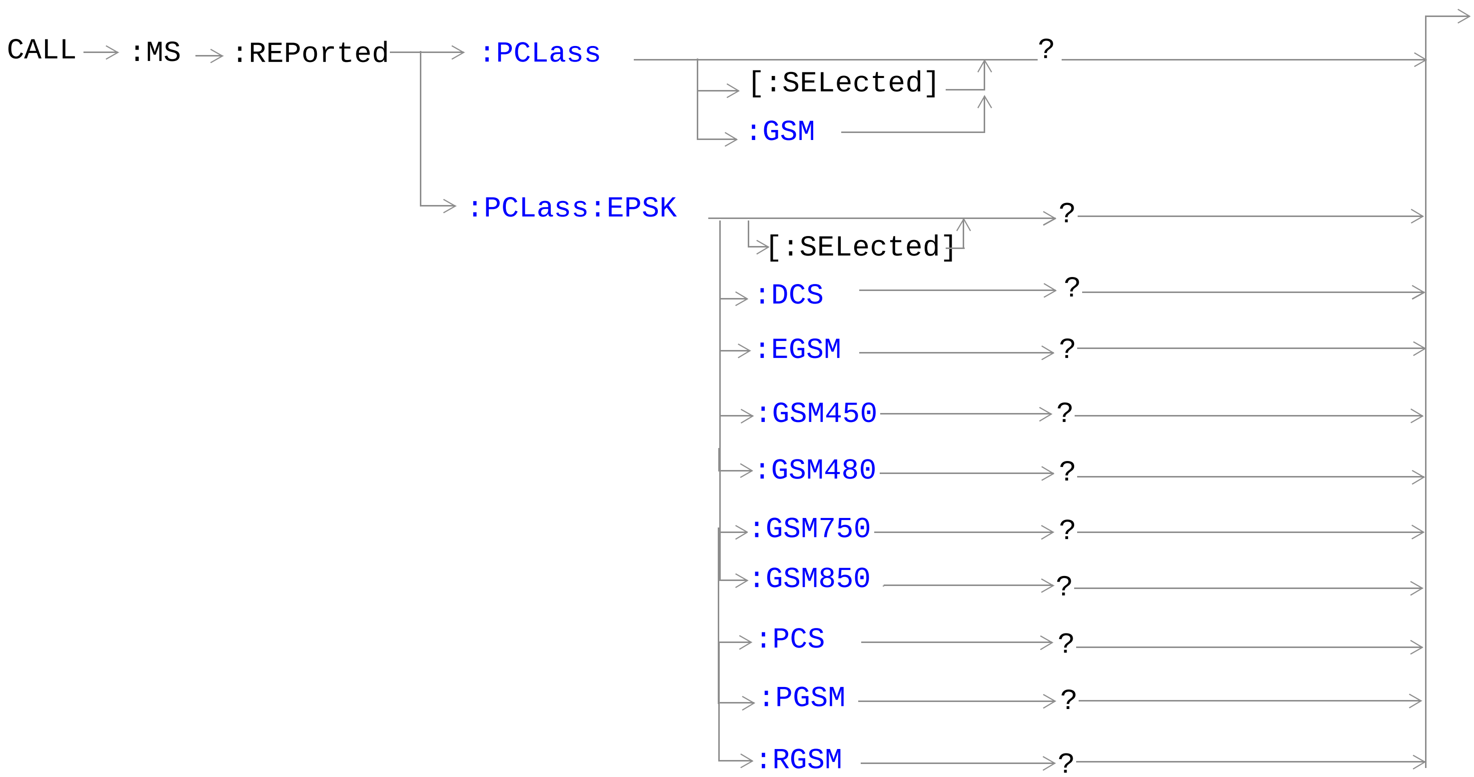
These commands apply only to the GSM/GPRS and EGPRS lab applications.


CALL
:MS
:REPorted
:IMEI?
:IMSI?
:LACode?
:MCCode?
:MCLass:EGPRS
?
[:SELected]
:DCS
:EGSM
:GSM450
:GSM480
:GSM750
:GSM850
:PCS
:PGSM
:RGSM
:MCLass:GPRS
?
[:SELected]
:DCS
:EGSM
:GSM450
:GSM480
:GSM750
:GSM850
:PCS
:PGSM
:RGSM





This command is not applicable to GPRS.



CALL :MS :REPorted :PCLass:GMSK [:SELected] ?
:DCS ?
:EGSM ?
:GSM450 ?
:GSM480 ?
:GSM750 ?
:GSM850 ?
:PCS ?
:PGSM ?
:RGSM ?

CALL :MS :REPorted :REVision :CHARacter :GSM?

This command is not applicable to GPRS.

CALL :MS :REPorted :REVision [:DIGital] [:SELected] ?
:GSM

CALL :MS :REPorted :RXLevel [:LAST] ?
:NEW?;NEW?;NEW?

This command is not applicable to GPRS.

CALL → :MS → :REPorted → :RXQuality → :AVERage? → (returns num value)

This command applies only to the GSM/GPRS and EGPRS lab applications

CALL → :MS → :REPorted → :RXQuality → [:LAST] → ?

CALL → :MS → :REPorted → :RXQuality → :NEW?;NEW?;NEW?

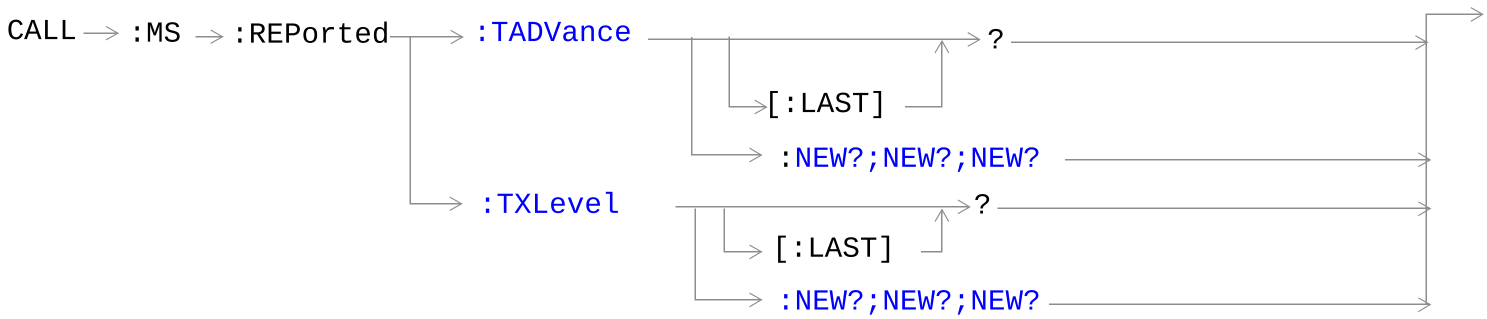
This command is not applicable to GPRS.

CALL → :MS → :REPorted → :SBANd[:GMSK]?

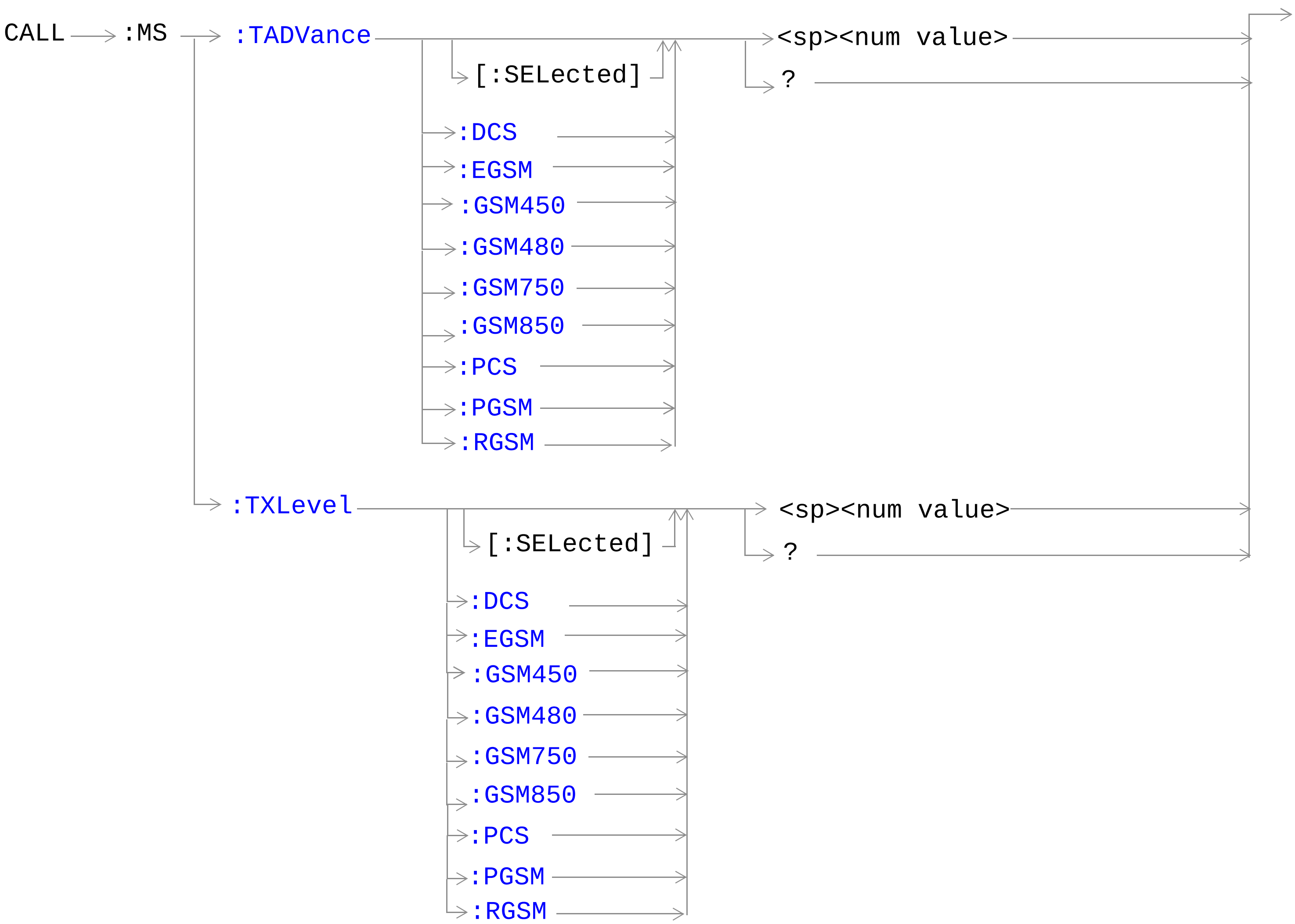
CALL → :MS → :REPorted → :SBANd:EPSK?

CALL → :MS → :REPorted → :SVARiance → :AVERage? → (returns num value)

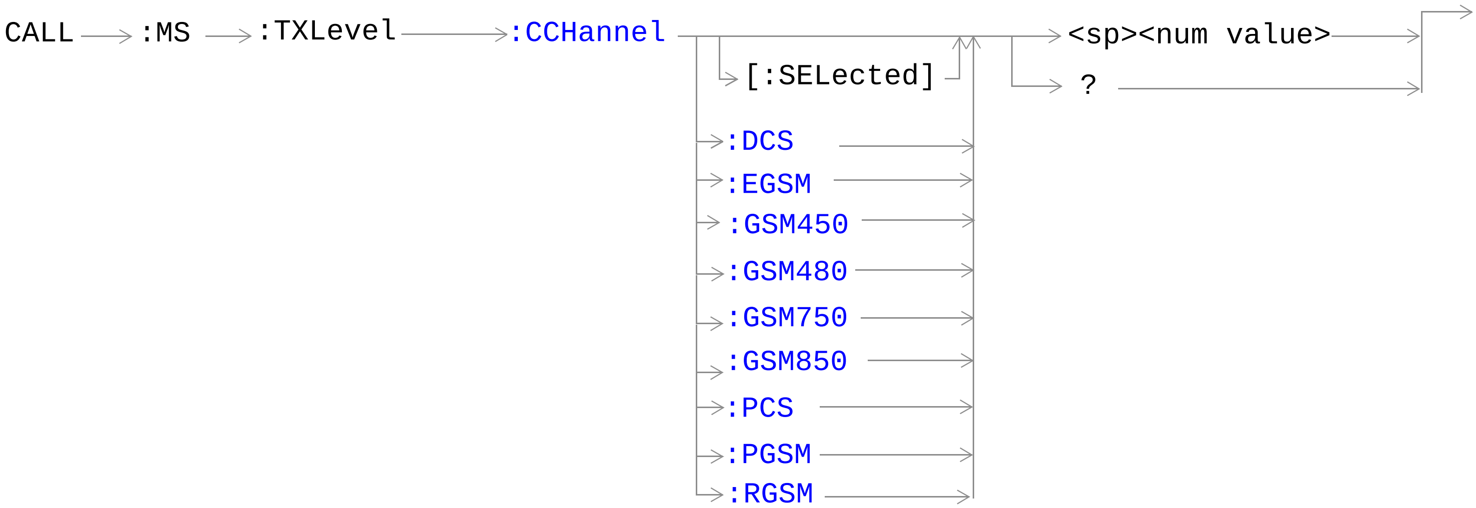
This command applies only to the GSM/GPRS and EGPRS lab applications

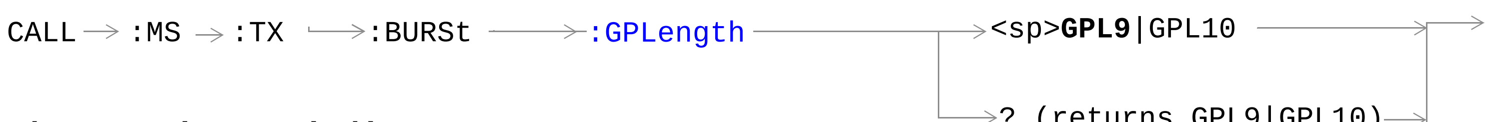


These commands are not applicable to GPRS.



These commands are not applicable to GPRS.





This command is not applicable to GSM.

"Diagram Conventions" on page 1

CALL:MS:CCHannel:POWer:OFFSet:DCS

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command defines an additional offset value that is used to increase the Max CCHannel value for DCS band only. See “Access Burst Power Control” on page 192. NOTE: “CALL:MS:TXLevel:CCHannel:DCS” must be set to 0 or this power offset command has no effect. Each unit parameter equates to an additional 2 dB power increase. The offset settings are: “0” = 0 dB, “1” = 2 dB, “2” = 4 dB, “3” = 6 dB. This can only be set when the Cell Operating Mode parameter is set to Off (see “CALL:OPERating:MODE” on page 610).
Setting		Range: 0 | 1 | 2 | 3
Query		Range: 0 | 1 | 2 | 3
*RST Setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:MS:TXLevel:CCHannel:DCS 0” !Sets control channel transmit level to 0
                              !to allow use of the following command.
OUTPUT 714;”CALL:MS:CCHannel:POWer:OFFSet:DCS 1” !Adds 2 dB power increase to the
                                    !control channel for the DCS band.
```

CALL:MS:DTX[:STATe]

Function	GSM TA	This command turns the mobile station Discontinuous Transmission (DTX) on or off. The query form returns a 1 (state = on) or a 0 (state = off). See “Configuring Mobile Station Operating Parameters” on page 202.
	GSM/GPRS LA	
	GPRS LA	This command is not applicable to GPRS.
	EGPRS LA	
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:MS:DTX OFF” !Turns mobile station discontinuous
                             !transmission OFF.
```

CALL:MS:IP:ADDRess

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to GPRS test application.
	GSM/GPRS LA	This command sets/queries the mobile station’s internet protocol (IP) address. The address is the IP v4 address written in dotted decimal format, for example 147.123.159.15. The entered address must be on the same subnet as the test set (but it cannot have an identical address). The subnet is defined through the combination of the test set’s LAN IP address (“SYSTem:COMMunicate:LAN[:SELF]:ADDRess”) and its subnet mask (“SYSTem:COMMunicate:LAN[:SELF]:SMASk”). Values entered for this command are stored in non-volatile memory and will persist after the instrument is reset or power-cycled. Any part of this address with leading zeros (for example, 145.156.063.12) will have the leading zeros removed. Most operating systems treat parts of IP addresses entered with leading zeros as octal numbers, the test set does not.
	EGPRS LA	
*RST Setting		none
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:MS:IP:ADDRESS ‘147.123.159.15’”
```

CALL:MS:REPorted:CLEar

Function	GSM TA	This command clears the mobile station SAACH reported items. The values of the four mobile reported items - that is, Timing Adv, Tx Level, Rx Level and Rx Qual - are set to 9.91E+37 (NAN).
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to the GPRS test application.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:CLEAR"`		

CALL:MS:REPorted:CVALue:AVERage?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Queries the C value reported by the MS.
	EGPRS LA	
Query		Range: 0 to 63 and 9.91E+37 0: (< -110 dBm) 1: (-110 dBm to -109 dBm) 2: (-109 dBm to -108 dBm) 3: (-108 dBm to -107 dBm) ... 62: (-49 dBm to -48 dBm) 63: (>-48 dBm) Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS LA	Revision C.01 and above
	EGPRS LA	Revision A.01 and above
Programming Example `OUTPUT 714;"CALL:MS:REPorted:CVALue:AVERage?"`		

CALL:MS:REPorted:ILEVel:TSLot<n>:AVERage?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Queries the interference level value reported by the MS for timeslot <n> (n can be 0 to 7).
	EGPRS LA	
Query		Range: 0 to 15 and 9.91E37 Resolution: 1 0: (Interference level > C) 1: (C >= Interference level > C- 2 dB) 2: (C - 2 dB >= Interference level > C - 4 dB) 3: (C - 4 dB >= Interference level > C - 6 dB) 4: (C - 6 dB >= Interference level > C - 8 dB) 5: (C - 8 dB >= Interference level > C - 10 dB) 6: (C - 10 dB >= Interference level > C - 12 dB) 7: (C - 12 dB >= Interference level > C - 14 dB) 8: (C - 14 dB >= Interference level > C - 16 dB) 9: (C - 16 dB >= Interference level > C - 18 dB) 10: (C - 18 dB >= Interference level > C - 20 dB) 11: (C - 20 dB >= Interference level > C - 22 dB) 12: (C - 22 dB >= Interference level > C - 24 dB) 13: (C - 24 dB >= Interference level > C - 26 dB) 14: (C - 26 dB >= Interference level > C - 28 dB) 15: (Interference level <= C)
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPorted:ILEVel:TSLot5:AVERage?" ! Queries the interference level value
                                                      !reported by the MS for timeslot 5.
```

CALL:MS:REPorted:IMEI?

Function	GSM TA GSM/GPRS LA EGPRS LA	This command queries the International Mobile Equipment Identity of the ME. An ME is a mobile station without a SIM. This parameter is reported if the IMEI:AUTO state is ON, see “CALL:IMEI” on page 550 or the mobile station has no SIM.
	GPRS TA	Not applicable to the GPRS TA
Query		Range: up to 15 decimal digits and ““ Resolution: 1
*RST Setting		““ (null string)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:MS:REPORTED:IMEI?”`		

CALL:MS:REPorted:IMSI?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command queries the International Mobile Subscriber Identity of the SIM in the mobile station.
Query		Range: up to 15 decimal digits and ““ Resolution: 1
*RST Setting		““ (null string)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:MS:REPORTED:IMSI?”`		

CALL:MS:REPorted:LACode?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command queries the last Location Area Code the mobile station was camped on.
Range		0 to 65535 (default: NAN)
Data Type		Real
Query		Range: 0 to 65535 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:LACODE?"`		

CALL:MS:REPorted:MCCode?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command queries the last Mobile Country Code the mobile station was camped on.
Query		Range: 0 to 999 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:MCCODE?"`		

CALL:MS:REPorted:MCLass:EGPRS[:SELected]?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command queries the last EGPRS multislot class for each band as reported by the mobile during its attach procedure. The band used is the PDTCH traffic band as determined by CALL:PDTCH:BAND.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 1 to 29 and 9.91E+37 (means the multislot class is not applicable for the band) Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:MS:REPORTED:MCLass:EGPRS?”`		

CALL:MS:REPorted:MCLass:EGPRS:<band>?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command queries the last EGPRS multislot class for the specified band as reported by the mobile during its attach procedure.
	GSM/GPRS LA	
	EGPRS LA	
Query		<band> Range: DCS | EGSM | GSM450 | GSM480 | GSM750 | GSM850 | PCS | PGSM | RGSM Range: 1 to 29 and 9.91E+37 (means the multislot class is not applicable for the band) Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:MS:REPORTED:MCLass:EGPRS?”`		

CALL:MS:REPorted:MCLass:GPRS[:SELected]?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command queries the last GPRS multislot class for each band as reported by the mobile during its attach procedure. The band used is the PDTCH traffic band as determined by CALL:PDTCH:BAND.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 1 to 29 and 9.91E+37 (means the multislot class is not applicable for the band) Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:MCLass:GPRS?"`		

CALL:MS:REPorted:MCLass:GPRS:<band>?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command queries the last GPRS multislot class for the specified band as reported by the mobile during its attach procedure.
	GSM/GPRS LA	
	EGPRS LA	
Query		<band> Range: DCS | EGSM | GSM450 | GSM480 | GSM750 | GSM850 | PCS | PGSM | RGSM Range: 1 to 29 and 9.91E+37 (means the multislot class is not applicable for the band) Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:MCLass:GPRS?"`		

CALL:MS:REPorted:MNCode?

Function	GSM TA	This command queries the last Mobile Network Code the mobile station was camped on.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 999 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:MNCODE?"
```

CALL:MS:REPorted:NEIGhbour[1]?

Function	GSM TA	This query will return 4 data items separated by commas for neighbor cell one. ARFCN, RFLEVEL,NCC,BCC are returned in that order.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 1 to 1023 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:NEIGHBOUR?"!Returns ARFCN,RFLEVEL,NCC,BCC in
                                        !that order.
```

CALL:MS:REPorted:ONUMber[:SELected]?

Function	GSM TA	This command queries the mobile station for the originated number keyed in on the mobile station for the active (that is the selected) format.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to the GPRS TA.
	EGPRS LA	This command is not applicable to the EGPRS LA.
Query		Range: up to 21 ASCII characters and ‘ ‘
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:ONUMBER:SELECTED?" !Returns the phone number of the last
                                                !MS that called the test set.
```

CALL:MS:REPorted:ONUMber:GSM?

Function	GSM TA	This command queries the mobile station for the originated number keyed in on the mobile station.
	GSM/GPRS LA	
	GPRS LA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: up to 21 ASCII characters and ‘ ‘
*RST Setting		‘ ‘ (null string)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:ONUMBER:GSM?" !Returns the phone number of the last
                                           !MS that called the test set.
```

CALL:MS:REPorted:PCLass[:SELected]?

Function	GSM TA	This command is not applicable to the GSM TA.
	GPRS TA	This command queries the mobile station for its Power Class mark for the active (that is the selected) format.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: PGSM | EGSM | RGSM | GSM450 | GSM480 | GSM750 | GSM850 = 1 to 5 and 9.91E+37 DCS | PCS = 1 to 3 and 9.91E+37 Resolution: 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:MS:REPORTED:PCLASS:SELECTED?" !Returns the mobile's power class.
```

CALL:MS:REPorted:PCLass:EPSK[:SELected]?

Function	GSM TA	This command queries the last EPSK or 8PSK power class for each band as reported by the mobile during its attach procedure. The band used is the PDTCH traffic band as determined by CALL:PDTCH:BAND.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 1 to 29 and 9.91E+37 (means the power class is not applicable for the band) Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;”CALL:MS:REPORTED:PCLass:EPSK?”
```

CALL:MS:REPorted:PCLass:EPSK:<band>?

Function	GSM TA	This command is not applicable to the GSM TA.
	GPRS TA	This command queries the last EPSK or 8PSK power class for the specified band as reported by the mobile during its attach procedure.
	GSM/GPRS LA	
	EGPRS LA	
Query		<band> Range: DCS | EGSM | GSM450 | GSM480 | GSM750 | GSM850 | PCS | PGSM | RGSM Query Range: 1 to 29 and 9.91E+37 (means the power class is not applicable for the band) Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:PCLass:EPSK:GSM480?"
```

CALL:MS:REPorted:PCLass:GMSK[:SELected]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command queries the last GMSK power class for each band as reported by the mobile during its attach procedure. The band used is the PDTCH traffic band as determined by CALL:PDTCH:BAND.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 1 to 29 and 9.91E+37 (means the power class is not applicable for the band) Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:PCLass:GMSK?"
```

CALL:MS:REPorted:PCLass:GMSK:<band>?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command queries the last GMSK power class for the specified band as reported by the mobile during its attach procedure.
	GSM/GPRS LA	
	EGPRS LA	
Query		<band> Range: DCS | EGSM | GSM450 | GSM480 | GSM750 | GSM850 | PCS | PGSM | RGSM Range: 1 to 29 and 9.91E+37 (means the power class is not applicable for the band) Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:PCLass:EGSM?"`		

CALL:MS:REPorted:PCLass:GSM?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command queries the GSM mobile station for its Power Class mark.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: PGSM | EGSM | GSM850 = 1 to 5 and 9.91E+37 DCS | PCS = 1 to 3 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:PCLASS:GSM?" !Returns the MS reported power class.`		

CALL:MS:REPorted:REVision:CHARacter:GSM?

Function	GSM TA GSM/GPRS LA	Prior to the A.07 revision you would have used the command CALL:MS:REPorted:REVision? to query which phase of the GSM standards your mobile complies with. However, this command had to change at A.07 to allow it to operate in the fast switching environment with AMPS/136. If you previously used the old command you will need to change it to this command to allow your code to run. Sorry for the inconvenience. If you are using GSM A.07 and had never used the original command, it is recommended that you don't use this command. Instead, you should use the "CALL:MS:REPorted:REVision[:DIGital]:GSM?" command.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: UNKNown | PHASe1 | PHASe2
*RST Setting		PHASe2
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:REVISION:CHARACTER:GSM?" !Returns the MS reported
                                                      ! protocol version.
```

CALL:MS:REPorted:REVision[:DIGital][:SELected]?

Function	GSM TA	This command queries the MS on the active (that is the selected) format to determine which phase of the standard it complies with.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 9.91E+37 (NAN) = Unknown revision level +1.00000000E+000 = Phase 1 +2.00000000E+000 = Phase 2 +3.00000000E+000 = R99 (1999 release of GSM standards)
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:REVISION:DIGITAL:SELECTED?" !Returns the MS reported
                                                         !protocol version.
```

CALL:MS:REPorted:REVision[:DIGital]:GSM?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command queries the mobile station to determine which phase of GSM standards it complies with.
Query		Range: 9.91E+37 (NAN) = Unknown revision level +1.00000000E+000 = Phase 1 +2.00000000E+000 = Phase 2 +3.00000000E+000 = R99 (1999 release of GSM standards)
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:REVISION:DIGITAL:GSM?" !Returns the MS reported
                                                   !protocol version.
```

CALL:MS:REPorted:RXLevel[:LAST]?

Function	GSM TA GSM/GPRS LA	This command queries the received level of the TCH in dB (relative to -110 dBm) which the mobile station measured during the last SACCH multiframe.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 63 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:MS:REPORTED:RXLEVEL:LAST?”
```

CALL:MS:REPorted:RXLevel:NEW?;NEW?;NEW?

Function	GSM TA GSM/GPRS LA	This command queries the received level of the TCH in dB (relative to -110 dBm) which the mobile station measured. Each time the :NEW? query is sent, the test set hangs until report results from that measurement period are sent or until 10 seconds have elapsed at which point the test set times out. This will return 3 variables; the first two are ignored while the value from the third new query is the valid variable.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 68 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:RXLEVEL:NEW?;NEW?;NEW?" !The third result is valid.
```

CALL:MS:REPorted:RXQuality:AVERage?

Function	GSM	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the received signal quality value reported by the MS.
Query		Range: 0 to 7 and 9.91E+37 0 (0% < BER < 0.2%) 1 (0.2% < BER < 0.4%) 2 (0.4% < BER < 0.8%) 3 (0.8% < BER < 1.6%) 4 (1.6% < BER < 3.2%) 5 (3.2% < BER < 6.4%) 6 (6.4% < BER < 12.8%) 7 (BER > 12.8%)
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPPRS LA	Revision A.01 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPorted:RXQuality:AVERage?"
```

CALL:MS:REPorted:RXQuality[:LAST]?

Function	GSM TA	This command queries the mobile station reported quality of the signal used for the RX Level during the last SACCH report.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 7 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:RXQUALITY:LAST?"`		

CALL:MS:REPorted:RXQuality:NEW?;NEW?;NEW?

Function	GSM TA	This command queries the mobile station reported received quality from the SACCH report. Each time the :NEW? query is sent the test set hangs until report results from that measurement period are sent or until 10 seconds have elapsed at which point the test set times out. This will return 3 variables; the first two are ignored while the value from the third new query is the valid variable.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 7 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:RXQUALITY:NEW?;NEW?;NEW?" !The third result is valid.`		

CALL:MS:REPorted:SBANd[:GMSK]?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">This command queries for the frequency bands supported by the mobile station. A comma separated list of supported bands is listed following each location update. If you change bands and do a subsequent query, the new band will be appended to the list of bands if not already present in the list. It is recommended you perform a GPRS attach procedure which provides a more comprehensive band list (if the phone is capable and the TA or LA is GPRS licensed) to yield the best possible supported band information. It is also recommended that you clear this band information when you change phones using the CALL:MS:REPorted:CLEar command to prevent the return of band information from the previous phone.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Range: PGSM | EGSM | DCS | PCS | GSM450 | GSM480 | GSM750 | GSM850 | RGSM | ““</td></tr>
<tr><td colspan="2">*RST Setting</td><td>““ (null string)</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
OUTPUT 714;”CALL:MS:REPORTED:SBAND?”</td></tr>
</table>

CALL:MS:REPorted:SBANd:EPSK?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">This command queries for the frequency bands supported by the mobile station for the 8PSK (EDGE) modulation schemes. The 8PSK supported band information is aquired during the GPRS attach procedure only. The phone under test must be GPRS capable and the TA or LA must be licensed for GPRS or EGPRS or this query will return an empty string (““ null string).</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Range: PGSM | EGSM | DCS | PCS | GSM450 | GSM480 | GSM750 | GSM850 | RGSM | ““</td></tr>
<tr><td colspan="2">*RST Setting</td><td>““ (null string)</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
OUTPUT 714;”CALL:MS:REPORTED:SBAND:EPSK?”</td></tr>
</table>

CALL:MS:REPorted:SVARiance:AVERage?

Function	GSM	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Queries the value reported by the MS representing the average received signal level variance.
	EGPRS LA	
Query		Range: 0 to 63 and 9.91E+37 Resolution: 1 The formula: SVAR * 0.25 dB^2 maps the MS reported value to the actual received signal level variance.
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example OUTPUT 714;"CALL:MS:REPorted:SVARiance:AVERage?"		

CALL:MS:REPorted:TADVance[:LAST]?

Function	GSM TA	This command queries the mobile station for the last TCH Timing Advance actually used by the mobile station. See "CALL:PDTChannel:MS:TADVance[:SELected]" on page 633.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 63 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example OUTPUT 714;"CALL:MS:REPORTED:TADVANCE:LAST?"		

CALL:MS:REPorted:TADVance:NEW?;NEW?;NEW?

Function	GSM TA GSM/GPRS LA	This command queries the mobile station reported timing advance from the SACCH report. Each time the :NEW? query is sent the test set hangs until report results from that measurement period are sent or until 10 seconds have elapsed at which point the test set times out. This will return 3 variables; the first two are ignored while the value from the third new query is the valid variable.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 63 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:TADVANCE:NEW?;NEW?;NEW?" !The third result is valid.
```

CALL:MS:REPorted:TXLevel[:LAST]?

Function	GSM TA GSM/GPRS LA	This command queries the mobile station for the last reported transmit level.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 31 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:TXLEVEL:LAST?"
```

CALL:MS:REPORTED:TXLEVEL:NEW?;NEW?;NEW?

Function	GSM TA GSM/GPRS LA	This command queries the mobile station reported transmit level from the SACCH report. Each time the :NEW? query is sent the test set hangs until report results from that measurement period are sent or until 10 seconds have elapsed at which point the test set times out. This will return 3 variables; the first two are ignored while the value from the third new query is the valid variable.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 31 and 9.91E+37 Resolution: 1
*RST Setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPORTED:TXLEVEL:NEW?;NEW?;NEW?" !The third result is valid.
```

CALL:MS:TADVance[:SELected]

Function	GSM TA GSM/GPRS LA	This command sets the mobile station's uplink TCH timing advance for the band already selected. See "GSM Frequency Banded Parameters" on page 250.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 63 Resolution: 1
*RST Setting		zero
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:TADVANCE 3" !Sets the mobile station TCH Timing Advance to 3 on
                                !the uplink.
```

CALL:MS:TADVance:DCS

Function	GSM TA GSM/GPRS LA	This command sets the mobile station's uplink TCH timing advance for the DCS band. See "GSM Frequency Banded Parameters" on page 250.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 10) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TADVance: 10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TADVANCE:DCS 8"`		

CALL:MS:TADVance:EGSM

Function	GSM TA GSM/GPRS LA	This command sets the mobile station's uplink TCH timing advance for the EGSM band. See "GSM Frequency Banded Parameters" on page 250.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TADVance: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TADVANCE:EGSM 20"`		

CALL:MS:TADVance:GSM450

Function	GSM TA GSM/GPRS LA	This command sets the mobile station's uplink TCH timing advance for the GSM450 band. See "GSM Frequency Banded Parameters" on page 250.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TADVance: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TADVANCE:GSM450 20"`		

CALL:MS:TADVance:GSM480

Function	GSM TA GSM/GPRS LA	This command sets the mobile station's uplink TCH timing advance for the GSM480 band. See "GSM Frequency Banded Parameters" on page 250.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TADVance: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TADVANCE:GSM480 20"`		

CALL:MS:TADVance:GSM750

Function	GSM TA	This command sets the mobile station's uplink TCH timing advance for the GSM750 band. See "GSM Frequency Banded Parameters" on page 250.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TADVance: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TADVANCE:GSM750 20"`		

CALL:MS:TADVance:GSM850

Function	GSM TA	This command sets the mobile station's uplink TCH timing advance for the GSM850 band. See "GSM Frequency Banded Parameters" on page 250.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TADVance: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TADVANCE:GSM850 20"`		

CALL:MS:TADVance:PCS

Function	GSM TA GSM/GPRS LA	This command sets the mobile station's uplink TCH timing advance for the PCS band. See “GSM Frequency Banded Parameters” on page 250.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 10) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TADVance: 10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;”CALL:MS:TADVANCE:PCS 31”`		

CALL:MS:TADVance:PGSM

Function	GSM TA GSM/GPRS LA	This command sets the mobile station's uplink TCH timing advance for the PGSM band. See “GSM Frequency Banded Parameters” on page 250.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TADVance: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;”CALL:MS:TADVANCE:PGSM 22”`		

CALL:MS:TADVance:RGSM

Function	GSM TA	This command sets the mobile station's uplink TCH timing advance for the RGSM band. See "GSM Frequency Banded Parameters" on page 250.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TADVance: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:MS:TADVANCE:RGSM 20"
```

CALL:MS:TX:BURSt:GPLength

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command defines the width of the guard period between the two uplink bursts. The command and parameters to use are determined by the mobile station segmentation of the TDMA frame and the particular bursts transmitted in the multislot configuration. Whether or not you need to use this command depends on your mobile station. If the mobile station segments the frame into six bursts of 156 bit duration and two bursts of 157 bit duration then this command should be set as follows: • Use GPL10 if the first burst in the multislot configuration is timeslot 4 or 7. • Use GPL9 if the first burst in the multislot configuration is in any other timeslot.
Setting		Range: GPL9 | GPL10
Query		Range: GPL9 | GPL10
*RST Setting		GPL9
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:MS:TX:BURSt:GPLength GPL9" !Sets the Guard Period
                                              !length to 9 bits.
```

CALL:MS:TXLevel[:SELected]

Function	GSM TA	This command selects the mobile station uplink power control level for the band already selected. See “GSM Frequency Banded Parameters” on page 250.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		Band: PGSM TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:SELECTED 10"`		

CALL:MS:TXLevel:DCS

Function	GSM TA	This command selects the mobile station uplink power control level for the DCS band. See “GSM Frequency Banded Parameters” on page 250.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 10) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:DCS 8"`		

CALL:MS:TXLevel:EGSM

Function	GSM TA	This command selects the mobile station uplink power control level for the EGSM band. See “GSM Frequency Banded Parameters” on page 250.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;”CALL:MS:TXLEVEL:EGSM 20”`		

CALL:MS:TXLevel:GSM450

Function	GSM TA	This command selects the mobile station uplink power control level for the GSM450 band. See “GSM Frequency Banded Parameters” on page 250.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;”CALL:MS:TXLEVEL:GSM450 20”`		

CALL:MS:TXLevel:GSM480

Function	GSM TA	This command selects the mobile station uplink power control level for the GSM480 band. See “GSM Frequency Banded Parameters” on page 250.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:GSM480 20"`		

CALL:MS:TXLevel:GSM750

Function	GSM TA	This command selects the mobile station uplink power control level for the GSM750 band. See “GSM Frequency Banded Parameters” on page 250.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:GSM750 20"`		

CALL:MS:TXLevel:GSM850

Function	GSM TA	This command selects the mobile station uplink power control level for the GSM850 band. See "GSM Frequency Banded Parameters" on page 250.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:GSM850 20"`		

CALL:MS:TXLevel:PCS

Function	GSM TA	This command selects the mobile station uplink power control level for the PCS band. See "GSM Frequency Banded Parameters" on page 250.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 10) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:PCS 31"`		

CALL:MS:TXLevel:PGSM

Function	GSM TA GSM/GPRS LA	This command selects the mobile station uplink power control level for the PGSM band. See "GSM Frequency Banded Parameters" on page 250.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:PGSM 22"`		

CALL:MS:TXLevel:RGSM

Function	GSM TA GSM/GPRS LA	This command selects the mobile station uplink power control level for the RGSM band. See "GSM Frequency Banded Parameters" on page 250.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:RGSM 20"`		

CALL:MS:TXLevel:CCHannel[:SELected]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets the maximum Control Channel power that the mobile station can use for access bursts for the band already selected. See “GSM Frequency Banded Parameters” on page 250. This can only be set when the Cell Operating Mode parameter is set to Off (see “CALL:OPERating:MODE” on page 610).
Setting		Range: 0 to 31 Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		Band: PGSM TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;”CALL:MS:TXLEVEL:CCHannel:SELECTED 10”`		

CALL:MS:TXLevel:CCHannel:DCS

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets the maximum Control Channel power that the mobile station can use for access bursts for the DCS band. See "Access Burst Power Control" on page 192. This must be set to 0 if you want to use the DCS power offset command "CALL:MS:CCHannel:POWer:OFFSet:DCS" to set the control channel power level in 2 dB steps from 0 to 6 dB. Setting a value with CALL:MS:TXL:CCH:DCS will not allow use of the power offset command. This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
Setting		Range: 0 to 28 (default 10) Resolution: 1
Query		Range: 0 to 28 Resolution: 1
*RST Setting		TXLevel: 10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:CCHannel:DCS 8"`		

CALL:MS:TXLevel:CCHannel:EGSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610). This command sets the maximum Control Channel power that the mobile station can use for access bursts for the EGSM band. See "GSM Frequency Banded Parameters" on page 250.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:CCHannel:EGSM 20"`		

CALL:MS:TXLevel:CCHannel:GSM450

Function	GSM TA	This command sets the maximum Control Channel power that the mobile station can use for access bursts for the GSM450 band. See “GSM Frequency Banded Parameters” on page 250. This can only be set when the Cell Operating Mode parameter is set to Off (see “CALL:OPERating:MODE” on page 610).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:MS:TXLEVEL:CCHannel:GSM450 20”`		

CALL:MS:TXLevel:CCHannel:GSM480

Function	GSM TA	This command sets the maximum Control Channel power that the mobile station can use for access bursts for the GSM480 band. See “GSM Frequency Banded Parameters” on page 250. This can only be set when the Cell Operating Mode parameter is set to Off (see “CALL:OPERating:MODE” on page 610).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:MS:TXLEVEL:CCHannel:GSM480 20”`		

CALL:MS:TXLevel:CCHannel:GSM750

Function	GSM TA	This command sets the maximum Control Channel power that the mobile station can use for access bursts for the GSM750 band. See “GSM Frequency Banded Parameters” on page 250. This can only be set when the Cell Operating Mode parameter is set to Off (see “CALL:OPERating:MODE” on page 610).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:MS:TXLEVEL:CCHannel:GSM750 20”`		

CALL:MS:TXLevel:CCHannel:GSM850

Function	GSM TA	This command sets the maximum Control Channel power that the mobile station can use for access bursts for the GSM850 band. See “GSM Frequency Banded Parameters” on page 250. This can only be set when the Cell Operating Mode parameter is set to Off (see “CALL:OPERating:MODE” on page 610).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:MS:TXLEVEL:CCHannel:GSM850 20”`		

CALL:MS:TXLevel:CCHannel:PCS

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets the maximum Control Channel power that the mobile station can use for access bursts for the PCS band. See "GSM Frequency Banded Parameters" on page 250. This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
Setting		Range: 0 to 15 and 30 to 31 (default 10) Resolution: 1
Query		Range: 0 to 15 and 30 to 31 Resolution: 1
*RST Setting		TXLevel: 10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:CCHannel:PCS 31"`		

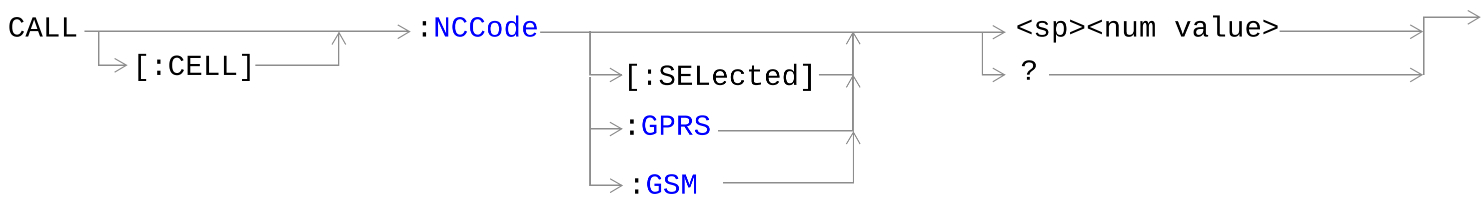
CALL:MS:TXLevel:CCHannel:PGSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets the maximum Control Channel power that the mobile station can use for access bursts for the PGSM band. See "GSM Frequency Banded Parameters" on page 250. This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:CCHannel:PGSM 22"`		

CALL:MS:TXLevel:CCHannel:RGSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets the maximum Control Channel power that the mobile station can use for access bursts for the RGSM band. See "GSM Frequency Banded Parameters" on page 250". This can only be set when the Cell Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:MS:TXLEVEL:CCHannel:RGSM 20"`		

CALL:NCCode



"Diagram Conventions" on page 1

CALL[:CELL]:NCCode[:SELected]

Function	GSM TA	Sets/queries the Network Color Code for the active (that is the selected) format. See “Configuring the Broadcast Channel (BCH)” on page 196. This can only be set when the Cell Operating Mode is set to Off (see “CALL:OPERating:MODE” on page 610).
	GPRA TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 7 Resolution: 1
Query		Range: 0 to 7 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:CELL:NCCODE:SELECTED 2”`		

CALL[:CELL]:NCCode:GPRS

Function	GSM TA	This command is not applicable to GSM
	GPRS TA	Sets/queries the Network Color Code for the GPRS format. See “Configuring the Broadcast Channel (BCH)” on page 196. This can only be set when the Cell Operating Mode is set to Off (see “CALL:OPERating:MODE” on page 610).
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 7 Resolution: 1
Query		Range: 0 to 7 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:CELL:NCCODE:GPRS 2”`		

CALL[:CELL]:NCCode:GSM

Function	GSM TA GSM/GPRS LA	Sets/queries the Network Color Code. See “Configuring the Broadcast Channel (BCH)” on page 196. This can only be set when the Cell Operating Mode is set to Off (see “CALL:OPERating:MODE” on page 610).
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 7 Resolution: 1
Query		Range: 0 to 7 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;”CALL:CELL:NCCODE 2”`		

CALL:OPERating

CALL :OPERating:MODE <sp>**CALL**|EBPTest#|EBTest#|GBTest|GBTTest|PBTesto|PBPTesto|CW|OFF

?

Only applicable to EGPRS

o Not applicable to GSM TA

"Diagram Conventions" on page 1

CALL:OPERating:MODE

Function	GSM TA	This command sets/queries the operating mode (behavior) of the test set: • CALL sets the operating mode to Active Cell (see “Active Cell For GSM” on page 176). • GBTest sets the operating mode to GSM BCH Test Mode (see “GSM Test Mode Operation” on page 179). • GBTTest sets the operating mode to GSM BCH+TCH Test Mode. • CW sets the operating mode to continuous wave. • OFF sets the operating mode to OFF (see “OFF Behavior” on page 185).
	GPRS TA	This command sets/queries the operating mode (behavior) of the test set: • CALL sets the operating mode to Active Cell (see “Active Cell For GPRS” on page 177). The query returns CALL. • PBTest sets the operating mode to GPRS BCH Test Mode (see “GPRS BCH Test Mode Behavior” on page 185). • PBPTest sets the operating mode to GPRS BCH+PDTCH Test Mode (see “GPRS BCH+PDTCH Test Mode Behavior” on page 185). • CW sets the operating mode to continuous wave • OFF sets the operating mode to OFF (see “OFF Behavior” on page 185).
	GSM/GPRS LA	This command sets/queries the operating mode (behavior) of the test set: • CALL sets the operating mode to Active Cell (see “Active Cell For GPRS” on page 177). The query returns CALL. • GBTest sets the operating mode to GSM BCH Test Mode (see “GSM Test Mode Operation” on page 179). • GBTTest sets the operating mode to GSM BCH+TCH Test Mode. • PBTest sets the operating mode to GPRS BCH Test Mode (see “GPRS BCH Test Mode Behavior” on page 185). • PBPTest sets the operating mode to GPRS BCH+PDTCH Test Mode (see “GPRS BCH+PDTCH Test Mode Behavior” on page 185). • CW sets the operating mode to continuous wave • OFF sets the operating mode to OFF (see “OFF Behavior” on page 185).

	EGPRS LA	This command sets/queries the operating mode (behavior) of the test set: • CALL sets the operating mode to Active Cell (see "Active Cell For GPRS" on page 177). The query returns CALL. • GBTest sets the operating mode to GSM BCH Test Mode (see "GSM Test Mode Operation" on page 179). • GBTTest sets the operating mode to GSM BCH+TCH Test Mode. • PBTest sets the operating mode to GPRS BCH Test Mode (see "GPRS BCH Test Mode Behavior" on page 185). • PBPTest sets the operating mode to GPRS BCH+PDTCH Test Mode (see "GPRS BCH+PDTCH Test Mode Behavior" on page 185). • EBTest sets the operating mode to EGPRS BCH Test Mode (see "EGPRS BCH Test Mode Behavior" on page 186). • EBPTest sets the operating mode to EGPRS BCH+PDTCH Test Mode (see "EGPRS BCH + PDTCH Test Mode Behavior" on page 186). • CW sets the operating mode to continuous wave • OFF sets the operating mode to OFF (see "OFF Behavior" on page 185).
Setting (must have license for the application to access the setting)	GSM TA	Range: CALL | CW | GBTest | GBTTest | OFF
	GPRS TA	Range: CALL | CW | PBTest | PBPTest | OFF
	GSM/GPRS LA	Range: CALL | CW | GBTest | GBTTest | PBTest | PBPTest | OFF
	EGPRS LA	Range: CALL | CW | EBTest | EBPTest | GBTest | GBTTest | OFF | PBTest | PBPTest | OFF
Query	GSM TA	Range: CALL | CW | GBTest | GBTTest | OFF
	GPRS TA	Range: CALL | CW | PBTest | PBPTest | OFF
	GSM/GPRS LA	Range: CALL | CW | GBTest | GBTTest | PBTest | PBPTest | OFF
	EGPRS LA	Range: CALL | CW | EBTest | EBPTest | GBTest | GBTTest | OFF | PBTest | PBPTest | OFF
*RST Setting		CALL
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example (GSM)

```
OUTPUT 714;"CALL:OPERATING:MODE GBTest" !Sets the operating mode to GBTest Mode.
```

Programming Example (GPRS)

```
OUTPUT 714;"CALL:OPERATING:MODE PBPTest" !Sets the operating mode to GPRS Test Mode BCH +
PDTCH.
```

CALL:ORIGinate

These commands are not applicable to the GPRS TA.

"Diagram Conventions" on page 1

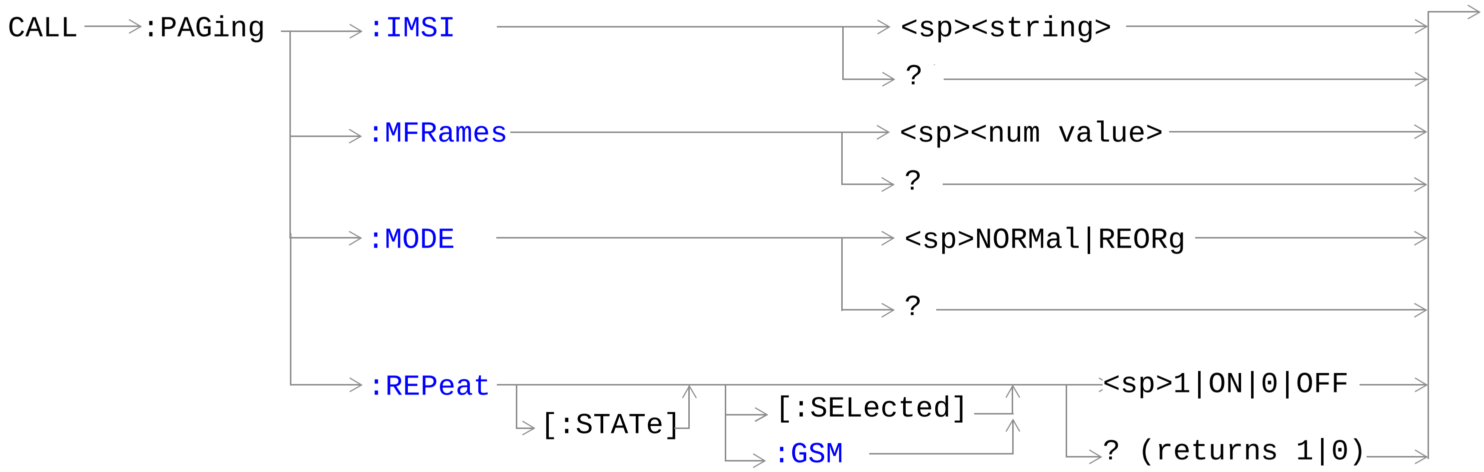
CALL:ORIGinate

Function	GSM TA GSM/GPRS LA EGPRS LA	Performs a BS Originated call. See "Call Processing Event Synchronization" on page 428. Additional commands can be appended to aid in controller/Mobile Station synchronization. See "Call Processing Subsystem Overlapped Command Synchronization Commands" on page 429 for examples.
	GPRS TA	This command is not applicable to GPRS.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:ORIGINATE:SEQUENTIAL" !Orignates a base station call.
                                       !Appending SEQUENTIAL to this command
                                       !causes the command to be
                                       !performed sequentially.
```

CALL:PAGing



These commands are not applicable to the GPRS TA.

“Diagram Conventions” on page 1

CALL:PAGing:IMSI

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the paging IMSI (International Mobile Subscriber Identity) field, used for paging the MS. The test set will stay in Active Cell Status (Setup Request), see "Call Processing State Synchronization" on page 433 until the paging IMSI is returned if the state is on. The paging IMSI is automatically updated by the test set during an MS originated call using the IMSI reported by the MS. If the MS has no SIM, the paging IMSI is left unchanged.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: up to 15 decimal digits Resolution: 1
Query		Range: up to 15 decimal digits Resolution: 1
*RST Setting		001012345678901
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:PAGing:IMSI '01012345678901'"!Set paging IMSI
                                              !to 01012345678901.
```

CALL:PAGing:MODE

Function	GSM TA	Sets/queries the paging mode that the test set will use to page the MS. Some mobile stations can be set to a discontinuous reception mode (DRX), which configures the MS to look for a page in a pre-defined paging subchannel only. When paging mode is set to Reorg (DRX off), the test set will page the MS on the paging channel in the next available paging subchannel without waiting for the defined paging group. When paging mode is set to Normal (DRX on), the test set will page the MS on the correct paging subchannel defined by the mobile station's paging group.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: REORg | NORMal
Query		Range: REOR | NORM
*RST Setting		NORMal
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:PAGING:MODE REOR" ! MS will be sent a page on the
                                   ! next available paging subchannel
```

CALL:PAGing:MFRames

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the number of multiframes between paging subchannels. This parameter is used when the paging mode is normal. MFRames and IMSI are used to define the mobile station's paging group. The paging group determines when an MS can expect a page if paging mode is normal.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 2 to 9 Resolution: 1
Query		Range: 2 to 9 Resolution: 1
*RST Setting		2
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:PAGING:MFRAMES 5" ! Sets the number of multiframes
                                   ! between paging subchannels.
```

CALL:PAGing:REPeat[:STATe][:SELected]

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries repeat paging state for the active (that is the selected) format. When the state is ON paging repeats until the test set receives a RACH. When the state is OFF the test set returns the No response to page timer T3113 expiry. See "Fixed Timer Messages" on page 1476.
	GPRS TA	This command is not applicable to GPRS.
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:PAGING:REPEAT:STATE:SELECTED ON" !Turns paging repeat ON.
```

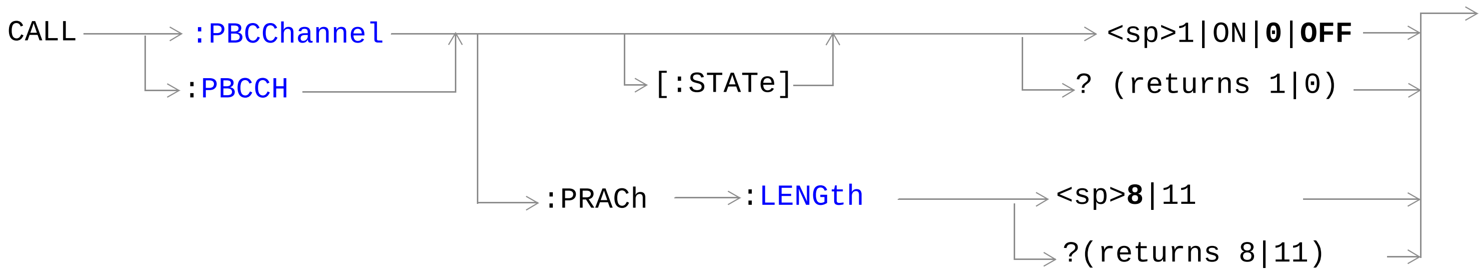
CALL:PAGing:REPeat[:STATe]:GSM

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries repeat paging state for the GSM format. When the state is ON paging repeats until the test set receives a RACH. When the state is OFF the test set returns the No response to page timer T3113 expiry. See “Fixed Timer Messages” on page 1476.
	GPRS TA	This command is not applicable to GPRS.
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:PAGING:REPEAT:STATE:GSM ON” !Turns paging repeat ON.
```

CALL:PBCChannel



These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

"Diagram Conventions" on page 1

CALL:PBCChannel[:STATe]

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	This command sets/queries the PBCCH channel state. The PBCCH can only be enabled in the Cell Off operating mode. Attempting to change this setting while in any mode other than Cell Off results in the following error message: "GPRS operation rejected; Attempting to set BCH parameter while generating a BCH."
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0|OFF
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;”CALL:PBCCH ON” !Enables the PBCCH channel.
```

CALL:PBCChannel:PRACh:LENGth

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	This command sets/queries the number of bits in the PRACh of the PBCCH. This setting can only be changed while in the Cell Off operating mode. Attempting to change this setting while in any mode other than Cell Off results in the following error message: "GPRS operation rejected; Attempting to set BCH parameter while generating a BCH."
Setting		Range: 8 or 11
Query		Range: 8 or 11
*RST Setting		8
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;”CALL:PBCCH:PRACh:LENGth?” !Queries the PRACH length.
```

CALL:PBPTest

```
CALL → :PBPTest → :RLCMac ──────────── :STATe ──→ <sp>1|ON|0|OFF
                           └→ [:HEADer] ┘      └→ ? (returns 1|0)
```

This command is not applicable to GSM.

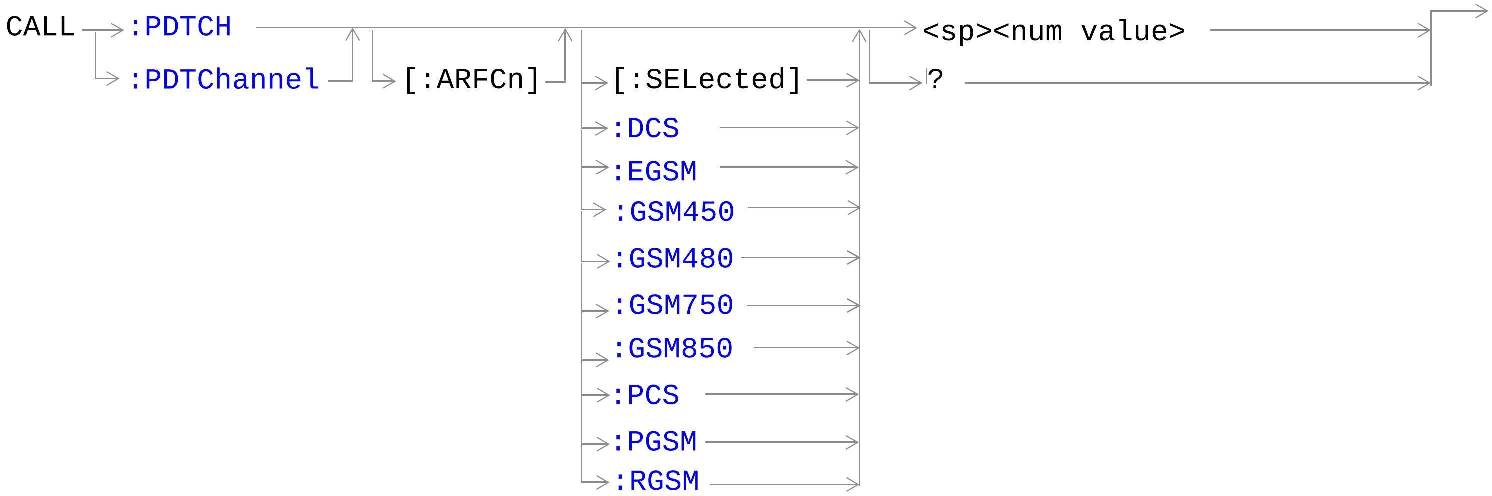
"Diagram Conventions" on page 1

CALL:PBPTest:RLCMac[:HEADer]:STATe

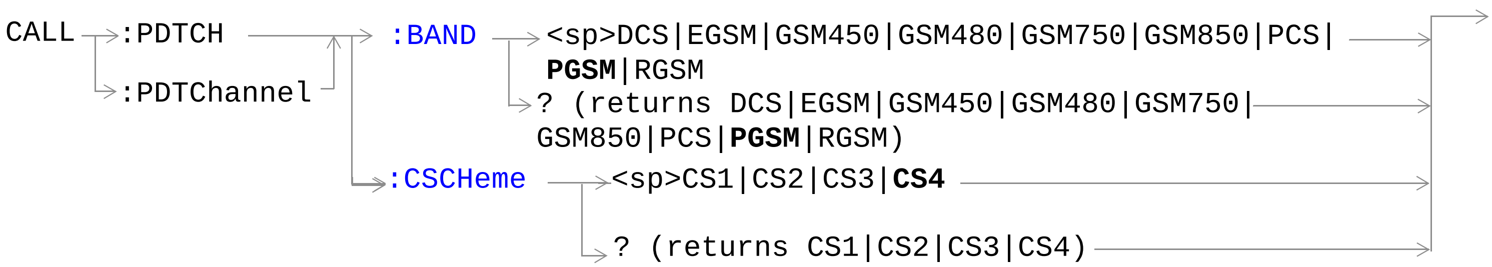
Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the RLC/MAC header state. This setting is only applicable when the operating mode is set to GPRS Test Mode BCH+PDTCH (PBPTest). If the RLC/MAC header state is changed when the operating mode is any mode other than GPRS Test Mode BCH+PDTCH, the setting is remembered until the next time you use GPRS Test Mode BCH+PDTCH.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0|OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:PBPTest:RLCMac:HEADer:STATe ON" !Enables the RLC/MAC header.
```

CALL:PDTCH|PDTChannel



These commands are not applicable to GSM.



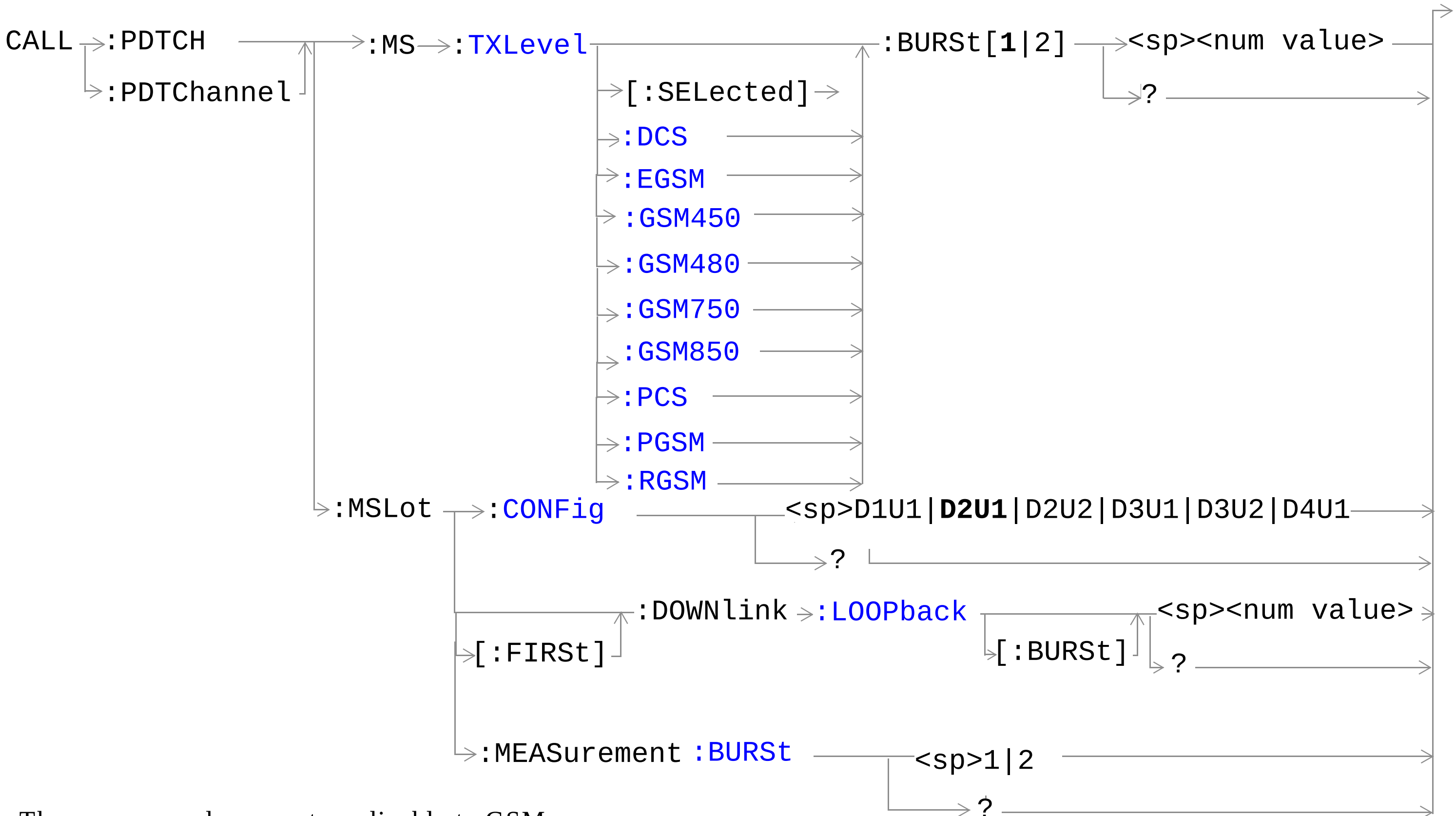
These commands are not applicable to GSM.

```
CALL :PDTCH       :MACCess   <sp>DYNamic|FIXed
     :PDTChannel             ?
                  [:DYNamic]   :USFLag   <sp><num value>
                                         ?
                  :FIXed   :MOALlocation
                     :STATe   <sp>1|ON|0|OFF
                              ? (returns 1|0)
                     :NUMBer          <sp><num value>
                        [:SNUMber]    ?
```

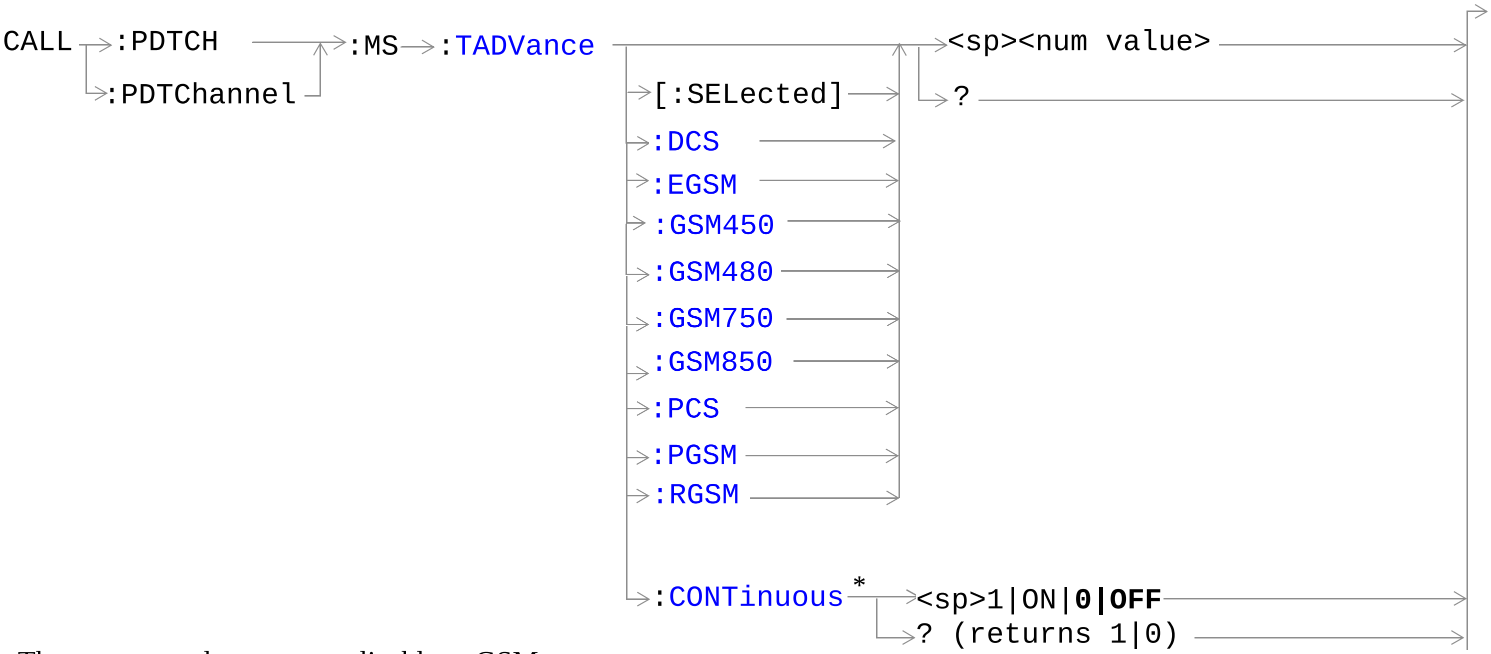
These commands are applicable only to the GSM/GPRS and EGPRS lab applications.

```
CALL :PDTCH       :MCScheme  <sp>MCS1|MCS2|MCS3|MCS4|MCS5|MCS6|MCS7|MCS8|MCS9
     :PDTChannel             |UPLink, MCS1|MCS2|MCS3|MCS4|MCS5|MCS6|MCS7|MCS8
                             |MCS9
                             ? (returns MCS1|MCS2|MCS3|MCS4|MCS5|MCS6|MCS7|MCS8
                              |MCS9|UPLink, MCS1|MCS2|MCS3|MCS4|MCS5|MCS6|MCS7
                              |MCS8|MCS9)
          :EBPTest  <sp>MCS1P1|MCS1P2|MCS2P1|MCS2P2|MCS3P1|MCS3P2|MCS3P3|MCS4P1
                    |MCS4P2|MCS4P3|MCS5P1|MCS5P2|MCS6P1|MCS6P2|MCS7P1_1|MCS7P1_2
                    |MCS7P1_3|MCS7P2_1|MCS7P2_2|MCS7P2_3|MCS7P3_1|MCS7P3_2
                    |MCS7P3_3|MCS8P1_1|MCS8P1_2|MCS8P1_3|MCS8P2_1|MCS8P2_2
                    |MCS8P2_3|MCS8P3_1|MCS8P3_2|MCS8P3_3|MCS9P1_1|MCS9P1_2
                    |MCS9P1_3|MCS9P2_1|MCS9P2_2|MCS9P2_3|MCS9P3_1|MCS9P3_2
                    |MCS9P3_3
                       ? (returns modulation coding scheme and downlink
                       puncturing scheme used for transmission in EGPRS
                       BCH+PDTCH test mode)
```

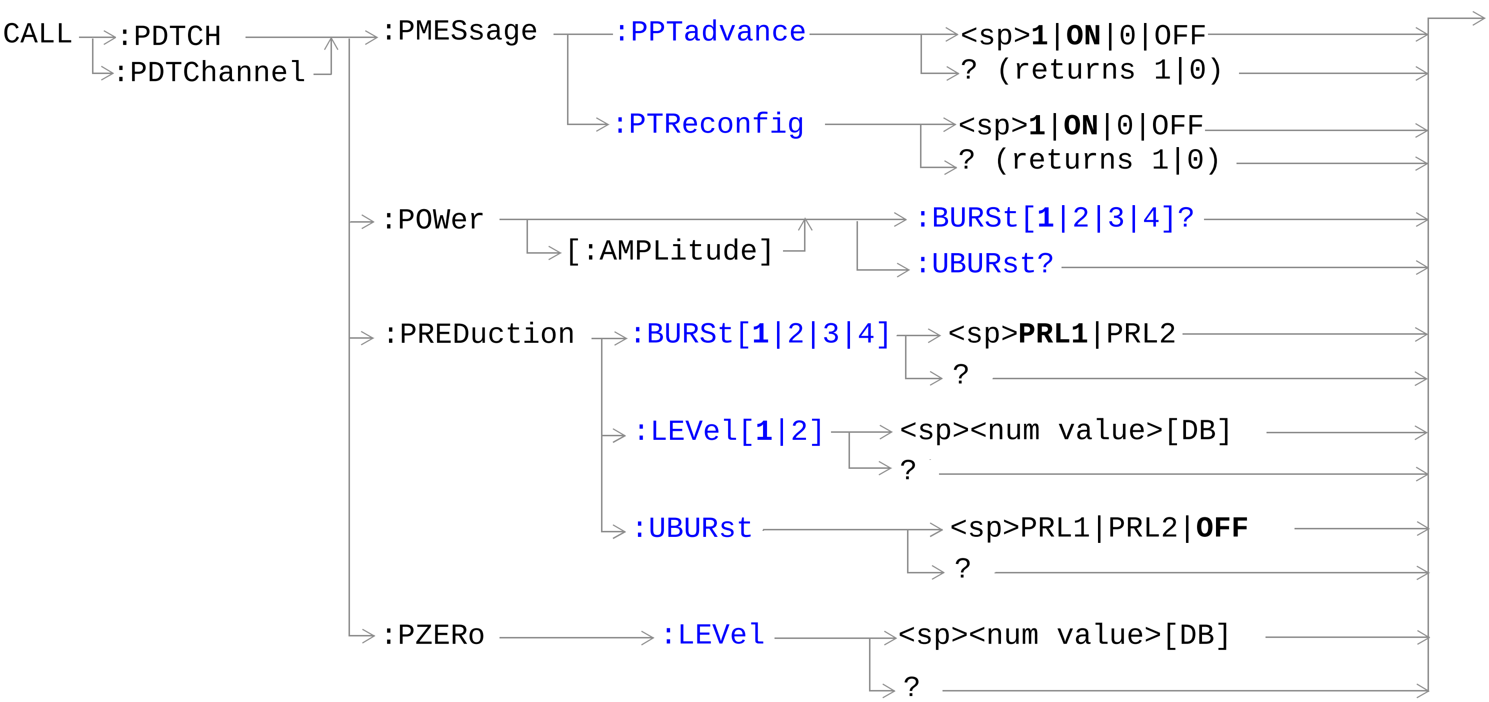
These commands are only applicable to the EGPRS lab application.



These commands are not applicable to GSM.



These commands are not applicable to GSM.
*Only applicable to the GSM/GPRS and EGPRS LAs.



These commands are not applicable to GSM.

"Diagram Conventions" on page 1

NOTE The CALL:PDTCH:MACCess[:DYNamic]:USFLag command replaces the CALL:PDTCH:USFLag command.

CALL:PDTCH[:ARFCn][:SELected]
CALL:PDTChannel[:ARFCn][:SELected]

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command sets/queries the ARFCN of the downlink and uplink PDTCH for the band already selected.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: • DCS band, channels 512 to 885 • EGSM band, channels 0 to 124 and 975 to 1023 • GSM450 band, channels 259 to 293 • GSM480 band, channels 306 to 340 • GSM750 band, channels 438 to 511 • GSM850 band, channels 128 to 251 • PCS band, channels 512 to 810 • PGSM band, channels 1 to 124 • RGSM band, channels 0 to 124 and 955 to 1023 Resolution: 1
Query		Range: • DCS band, channels 512 to 885 • EGSM band, channels 0 to 124 and 975 to 1023 • GSM450 band, channels 259 to 293 • GSM480 band, channels 306 to 340 • GSM750 band, channels 438 to 511 • GSM850 band, channels 128 to 251 • PCS band, channels 512 to 810 • PGSM band, channels 1 to 124 • RGSM band, channels 0 to 124 and 955 to 1023 Resolution: 1

*RST setting		PGSM, EGSM and RGSM bands: 30, DCS and PCS bands: 698, GSM450: 280, GSM480: 320, GSM750: 460, GSM850: 160
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:PDTCH:ARFCn:SELected 512" !Sets the ARFCN of the selected band to
                                           !512, if 512 is valid for the selected
                                              !band.
```

CALL:PDTCH:BAND
CALL:PDTChannel:BAND

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command sets/queries the PDTCH band, therefore constraining the range of PDTCH ARFCNs.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: PGSM	EGSM	GSM450	GSM480	GSM750	GSM850	DCS	PCS	RGSM
Query		Range: PGSM	EGSM	GSM450	GSM480	GSM750	GSM850	DCS	PCS	RGSM
*RST setting		PGSM
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:PDTCH:BAND DCS" !Sets the band to DCS.`		

CALL:PDTCH:CSCHeme
CALL:PDTChannel:CSCHeme

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command sets/queries the PDTCH coding scheme for GPRS. When you make a coding scheme change, all the measurements and the Block Error Rate (BLER) reports are stopped before the change is made. They are then re-started after the change has taken effect.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: CS1	CS2	CS3	CS4
Query		Range: CS1	CS2	CS3	CS4
*RST setting		CS4
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:PDTCHannel:CSCHeme CS1" !Sets the PDTCH coding scheme to CS1.`		

CALL:PDTCH:MACCess

CALL:PDTChannel:MACCess

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	Sets the Allocation Mode.
	GSM/GPRS LA	
	EGPRS LA	
Setting		DYNamic | FIXed
Query		DYN | FIX
*RST setting		DYN
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:PDTCH:MACCess[:DYNamic]:USFLag

CALL:PDTChannel:MACCess[:DYNamic]:USFLag

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command sets/queries the uplink state flag (USF). The USF allows multiple mobile stations to share over-the-air resources.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 7 Resolution: 1
Query		Range: 0 to 7 Resolution: 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:PDTCH:MACCess:FIXed:MOALlocation:STATe

CALL:PDTChannel:MACCess:FIXed:MOALlocation:STATe

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	Enables the Maximum Octet Allocation.
	GSM/GPRS LA	
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:PDTCH:MACCess:FIXed:MOALlocation:NUMBer

CALL:PDTChannel:MACCess:FIXed:MOALlocation:NUMBer

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	Sets the maximum number of octets to be allocated.
	GSM/GPRS LA	
	EGPRS LA	
Setting		range 1-9999, step size 10
Query		range 1-9999
*RST setting		1024
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:PDTCH:MCScheme
CALL:PDTChannel:MCScheme

Function	GSM TA	This command is not applicable to the GSM TA.
	GPRS TA	This command is not applicable to the GPRS TA.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command sets/queries the modulation coding scheme used for transmission on the downlink and uplink in Active Cell operating mode. Modulation coding schemes MCS1 through MCS4 use GMSK modulation, while MCS5 to MCS9 use 8PSK modulation.
Setting		Range: <downlink>, <uplink> <downlink> can be set to one of the following values: • MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 | MCS9 | UPLink <uplink> can be set to one of the following values: • MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 | MCS9
Query		Range: <downlink>, <uplink> <downlink> returns one of the following values: • MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 | MCS9 | UPLink <uplink> returns one of the following values: • MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 | MCS9
*RST setting		MCS4
Requirements	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;"CALL:PDTCH:MCScheme MCS1, MCS1" !Sets the PDTCH modulation coding scheme
!for the downlink and uplink to MCS1.
```

CALL:PDTCH:MCSCheme:EBPTest
CALL:PDTChannel:MCSCheme:EBPTest

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to the GSM TA.</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to the GPRS TA.</td></tr>
<tr><td>GSM/GPRS LA</td><td>This command is not applicable to the GSM/GPRS LA.</td></tr>
<tr><td>EGPRS LA</td><td>This command sets/queries the modulation coding scheme and downlink puncturing scheme used for transmission in EGPRS BCH+PDTCH test mode. Modulation coding schemes MCS1 through MCS4 use GMSK modulation, while MCS5 to MCS9 use 8PSK modulation. The set of puncturing schemes available is different across different modulation coding schemes as follows:
<table>
<tr><th>Coding Scheme</th><th>P1 available</th><th>P2 available</th><th>P3 available</th></tr>
<tr><td>MCS9</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>MCS8</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>MCS7</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>MCS6</td><td>Yes</td><td>Yes</td><td>No</td></tr>
<tr><td>MCS5</td><td>Yes</td><td>Yes</td><td>No</td></tr>
<tr><td>MCS4</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>MCS3</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>MCS2</td><td>Yes</td><td>Yes</td><td>No</td></tr>
<tr><td>MCS1</td><td>Yes</td><td>Yes</td><td>No</td></tr>
</table></td></tr>
<tr><td colspan="2">Setting</td><td>Range:

MCS1P1 | MCS1P2 | MCS2P1 | MCS2P2 | MCS3P1 | MCS3P2 | MCS3P3 | MCS4P1 | MCS4P2 | MCS4P3 | MCS5P1 | MCS5P2 | MCS6P1 | MCS6P2 | MCS7P1_1 | MCS7P1_2 | MCS7P1_3 | MCS7P2_1 | MCS7P2_2 | MCS7P2_3 | MCS7P3_1 | MCS7P3_2 | MCS7P3_3 | MCS8P1_1 | MCS8P1_2 | MCS8P1_3 | MCS8P2_1 | MCS8P2_2 | MCS8P2_3 | MCS8P3_1 | MCS8P3_2 | MCS8P3_3 | MCS9P1_1 | MCS9P1_2 | MCS9P1_3 | MCS9P2_1 | MCS9P2_2 | MCS9P2_3 | MCS9P3_1 | MCS9P3_2 | MCS9P3_3</td></tr>
<tr><td colspan="2">Query</td><td>Range:

MCS1P1 | MCS1P2 | MCS2P1 | MCS2P2 | MCS3P1 | MCS3P2 | MCS3P3 | MCS4P1 | MCS4P2 | MCS4P3 | MCS5P1 | MCS5P2 | MCS6P1 | MCS6P2 | MCS7P1_1 | MCS7P1_2 | MCS7P1_3 | MCS7P2_1 | MCS7P2_2 | MCS7P2_3 | MCS7P3_1 | MCS7P3_2 | MCS7P3_3 | MCS8P1_1 | MCS8P1_2 | MCS8P1_3 | MCS8P2_1 | MCS8P2_2 | MCS8P2_3 | MCS8P3_1 | MCS8P3_2 | MCS8P3_3 | MCS9P1_1 | MCS9P1_2 | MCS9P1_3 | MCS9P2_1 | MCS9P2_2 | MCS9P2_3 | MCS9P3_1 | MCS9P3_2 | MCS9P3_3</td></tr>
<tr><td colspan="2">*RST setting</td><td>MCS4P1</td></tr>
<tr><td>Requirements</td><td>EGPRS LA</td><td>Revision A.01.00</td></tr>
<tr><td colspan="3">Programming Example

<code>OUTPUT 714;”CALL:PDTCH:MCSCheme:EBPTest MCS1P2” !Sets the PDTCH modulation coding scheme</code>
<code>!to MCS1, puncturing scheme P2 for EGPRS BCH+PDTCH test mode.</code></td></tr>
</table>

CALL:PDTCH:MS:TXLevel[:SELected]:BURSt[1|2]

CALL:PDTChannel:MS:TXLevel[:SELected]:BURSt[1|2]

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA GSM/GPRS LA EGPRS LA	This command selects the mobile station uplink power control level for the band already selected. See “GPRS and EGPRS Frequency Banded Parameters” on page 252. If you do not specify a burst then burst one is assumed.
Setting		Range (all bands): 0 to 31 Resolution (all bands): 1
Query		Range (all bands): 0 to 31 Resolution (all bands): 1
*RST Setting		PGSM, EGSM, RGSM, GSM450, GSM480, GSM750 and GSM850 bands: 15, DCS and PCS bands: 10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;”CALL:PDTCH:MS:TXLevel:BURSt 10” !Sets the uplink power level of burst one in the
                                            !selected band to 10.
```

CALL:PDTCH:MS:TADVance[:SELected]
CALL:PDTChannel:MS:TADVance[:SELected]

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	This command sets/queries the timing advance that is sent to the device under test. This value tells the device how much to offset its transmission to simulate the effects of propagation delays.
Setting		Range (all bands): 0 to 63 Resolution (all bands): 1
Query		Range (all bands): 0 to 63 Resolution (all bands): 1
*RST Setting		0
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:PDTCH:MS:TADVance:PCS 10" !Sets timing advance to 10 for the PCS band.`		

CALL:PDTCH:MS:TADVance:CONTinuous
CALL:PDTChannel:MS:TADVance:CONTinuous

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA EGPRS LA	This command sets/queries the timing advance mode. If this is set to ON, a continuous timing advance procedure is used. If this is set to OFF, messages are used to assign timing advance values to the MS. See "Timing Advance" on page 209 for more information.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0FF
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:PDTCH:MS:TADVance:CONT 1" !Sets continuous timing advance to ON.`		

CALL:PDTCH:MSLot:CONFig

CALL:PDTChannel:MSLot:CONFig

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the multislot configuration. The effect this command has on the number of uplink and downlink timeslots depends on the Connection Type (see "CALL:FUNCtion:CONNection:TYPE" on page 538): • Type A - The multislot configuration command only affects the number of uplink timeslots, therefore configurations D1U1, D2U1, D3U1 and D4U1 will appear similar. • Type B - The multislot configuration command constrains the number of uplink timeslots to be less than or equal to the number of downlink timeslots. • BLER - The multislot configuration command only affects the number of downlink timeslots, therefore D2U2 and D2U1 will appear similar. The actual timeslots used in each configuration are fixed as follows: *Multislot Configuration* / *Downlink Timeslots Used* / *Uplink Timeslots Used* D1U1 / 3 / 3 D2U1 / 3, 4 / 4 D2U2 / 3, 4 / 3, 4 D3U1 / 3, 4, 5 / 4 D3U2 / 3, 4, 5 / 4, 5 D4U1 / 3, 4, 5, 6 / 5 When a multislot configuration change is executed, all measurements will be stopped before the change is made, and re-started after the change has taken effect.
Setting		Range: D1U1 | D2U1 | D2U2 | D3U1 | D3U2 | D4U1
Query		Range: D1U1 | D2U1 | D2U2 | D3U1 | D3U2 | D4U1
*RST Setting		D2U1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:PDTCH:MSLot:CONFig D2U1" !Sets the multislot configuration to be 2
                                          !downlink PDTCHs and 1 uplink PDTCH.
```

CALL:PDTCH:MSLot[:FIRSt]:DOWNlink:LOOPback[:BURSt]
CALL:PDTChannel:MSLot[:FIRSt]:DOWNlink:LOOPback[:BURSt]

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to the GSM Test Application.</td></tr>
<tr><td>GPRS TA</td><td rowspan="3">This command sets/queries the first downlink burst to be looped back in the first uplink burst. Subsequent downlink bursts are looped back in subsequent uplink bursts.

When the operating mode is set to Active Cell, any attempt to change this setting while the data connection state is Transferring and the data connection type is Type B will be rejected.

If the multislot configuration is set to a value that has a number of downlink bursts less than the current setting of this parameter, the downlink burst looped back will be determined by the calculation:

(First Downlink Burst to Loop) modulo (current number of downlink bursts)

For example, if the setting of First Downlink Burst to Loop is 4, and the multislot configuration is set to D3U2, then the first downlink burst looped on the uplink will be 1 (4 modulo 3).</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 1 to 4</td></tr>
<tr><td colspan="2">Query</td><td>Range: 1 to 4</td></tr>
<tr><td colspan="2">*RST Setting</td><td>1</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example</td></tr>
</table>

```
OUTPUT 714;"CALL:PDTCH:MSLot:DOWNlink:LOOPback 2" ! Sets downlink burst 2 as the first
                                                  ! downlink burst to be looped back.
```

CALL:PDTCH:MSLot:MEASurement:BURSt
CALL:PDTChannel:MSLot:MEASurement:BURSt

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command sets/queries which uplink burst will be measured for single slot measurements on dual uplink PDTCH's when the receiver measurement burst control is AUTO. This setting has no effect on GSM calls; the measurement burst will always be 1.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 | 2
Query		Range: 1 | 2
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:PDTCH:MSLot:MEASurement:BURSt 2” ! Sets uplink burst 2 will be measured
                                                     ! for single slot measurements.
```

CALL:PDTCH:PMESsage:PPTadvance

CALL:PDTChannel:PMESsage:PPTadvance

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to the GSM Test Application.</td></tr>
<tr><td>GPRS TA</td><td rowspan="3">This command sets/queries whether or not to send a Packet Power Timing Advance (PPTA) message to the mobile when applying deferred or immediate PDTCH parameters to an active data connection (that is, data connection status is Transferring).

Setting this command to On ensures that a PPTA message is sent.

If you set this command while the data connection status is Transferring, any changes you make will take effect immediately during the current data connection.

This command along with “CALL:PDTCH:PMESsage:PTReconfig” on page 638 provides you with power control settings for mobiles that do not fully support the Packet Timeslot Reconfigure (PTR) message.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 0 | OFF | 1 | ON</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 | 1</td></tr>
<tr><td colspan="2">*RST Setting</td><td>ON</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

<code>OUTPUT 714;”CALL:PDTCH:PMESsage:PPTadvance OFF” !Sets the PPTA message state to ON.</code></td></tr>
</table>

CALL:PDTCH:PMESsage:PTReconfig
CALL:PDTChannel:PMESsage:PTReconfig

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to the GSM Test Application.</td></tr>
<tr><td>GPRS TA</td><td rowspan="3">This command sets/queries whether or not to send a Packet Timeslot Reconfigure (PTR) message to the mobile. Setting this command to:
• On, sends a PTR message to the mobile when applying deferred or immediate PDTCH parameters to an active data connection (that is, data connection status is Transferring).
• Off, sends an alternative message to the mobile instead of a PTR message. The alternative message that is sent to the mobile depends on the type of data connection (set using “CALL:FUNCtion:CONNection:TYPE” on page 538):
— If the data connection type is BLER, a Packet Downlink Assignment (PDA) message is sent.
— If the data connection type is ETSI Type A, a Packet Uplink Assignment (PUA) message is sent.
— If the data connection type is ETSI Type B, both PDA and PUA messages are sent.
If you set this command while the data connection status is Transferring, any changes you make will take effect immediately during the current data connection.
This command along with “CALL:PDTCH:PMESsage:PPTadvance” on page 637 provides you with power control settings for mobiles that do not fully support the Packet Timeslot Reconfigure (PTR) message.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 0 | OFF | 1 | ON</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 | 1</td></tr>
<tr><td colspan="2">*RST Setting</td><td>OFF</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
<code>OUTPUT 714;”CALL:PDTCH:PMESsage:PTReconfig ON” !Sets the PTR message state to ON.</code></td></tr>
</table>

CALL:PDTCH:POWer[:AMPLitude]:BURSt[1|2|3|4]?
CALL:PDTChannel:POWer[:AMPLitude]:BURSt[1|2|3|4]?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA GSM/GPRS LA EGPRS LA	This query returns the current absolute power level of the downlink PDTCH burst. The level is calculated from the current BCH Level, current power reduction reference level P0 and the current power reduction level. For more detail on these power levels, refer to “Testing a GPRS Mobile Station” on page 316. If you do not specify a burst then burst one is assumed.
Query		Range: -182.0 to -10.0 dBm and 9.91 E+37 (NAN) Resolution: 0.1 dBm
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:PDTCH:POWer:BURSt?" !Returns current power level of downlink PDTCH
                                        burst 1.
```

CALL:PDTCH:POWer[:AMPLitude]:UBURst?
CALL:PDTChannel:POWer[:AMPLitude]:UBURst?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA GSM/GPRS LA EGPRS LA	This query returns the current absolute power level of the unused bursts on the downlink PDTCH ARFCN. The level is calculated from the current BCH Level, current power reduction reference level P0 and the current power reduction level specified for unused bursts. NAN is returned if no power is present on the unused downlink PDTCH ARFCN. For more detail on these power levels, refer to “Testing a GPRS Mobile Station” on page 316.
Query		Range: -182.0 to -10.0 dBm and 9.91 E+37 (NAN) Resolution: 0.1 dBm
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:PDTCH:POWer:UBURst?"
```

CALL:PDTCH:PREDuction:BURSt[1|2|3|4]
CALL:PDTChannel:PREDuction:BURSt[1|2|3|4]

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the power reduction level for any of the downlink bursts. You can define the levels of PRL1 and PRL2 using “CALL:PDTCH:PREDuction:LEVel[1|2]” on page 641. For further information see “Downlink PDTCH Power Control” on page 320. If you do not specify a burst then burst one is assumed.
Setting		Range: PRL1 | PRL2
Query		Range: PRL1 | PRL2
*RST setting		PRL1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:PDTCH:PRED:BURS PRL1” !Sets the power reduction level of the first burst to
                                          !PRL1.
```

CALL:PDTCH:PREDuction:LEVel[1|2]
CALL:PDTChannel:PREDuction:LEVel[1|2]

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA GSM/GPRS LA EGPRS LA	In GPRS, power levels are referred to as power reduction levels relative to the BCCH. This command sets/queries two power reduction levels. These levels can then be applied to up to four downlink PDTCH bursts using "CALL:PDTCH:PREDuction:BURSt[1|2|3|4]" on page 640. In addition, they can be applied to the unused downlink bursts using "CALL:PDTCH:PREDuction:UBURst" on page 642. For further information see "Downlink PDTCH Power Control" on page 320. If you do not specify a burst then burst one is assumed. **NOTE** If the actual measured difference between two power reduction levels exceeds 20 dB, the test set's source specifications may no longer be valid. When the Test Set's operating mode is set to GPRS Test Mode BCH+PDTCH and the RLC/MAC Header is turned ON, information is included in the PR field of the RLC/MAC Header to indicate a power reduction level to the mobile. When the Test Set's operating mode is set to GPRS Test Mode BCH+PDTCH and the RLC/MAC Header is turned Off, no information relating to power control is sent to the mobile. (When the operating mode is set to Active Cell the RLC/MAC header containing the PR field is always sent to the mobile.) 3GPP TS 04.60 section 10 Release 1999 defines that a maximum power reduction level of 10 dB can be indicated to the mobile in the PR field of the RLC/MAC header. If your mobile adheres strictly to the standards, and you set this command to a value greater than 10 dB, it is possible your mobile may not respond correctly to the power reduction level you set.
Setting		Range: 0 to 25 dB Resolution: 0.1 dB
Query		Range: 0 to 25 dB Resolution: 0.1 dB
*RST setting		0 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:PDTCH:PRED:LEV2 3" !Sets the second power reduction level (PRL2) to 3 dB.
```

CALL:PDTCH:PREDuction:UBURst
CALL:PDTChannel:PREDuction:UBURst

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the power reduction level for the unused bursts on the downlink PDTCH ARFCN. In addition, it can also be used to turn power reduction off (no power transmitted) for the unused bursts. When this command is set to PRL1 or PRL2, the power reduction level for unused bursts is the value specified using "CALL:PDTCH:PREDuction:LEVel[1|2]" on page 641. Note: In order to make use of power reduction levels, you must set the downlink PDTCHs to be on a different ARFCN from the broadcast channel (BCH). This is because the power level across all timeslots on the BCH must remain constant. Therefore, power reduction levels are ignored if the BCH and PDTCH are on the same ARFCN.
Setting		Range: PRL1 | PRL2 | OFF
Query		Range: PRL1 | PRL2 | OFF
*RST setting		OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:PDTCH:PRED:UBUR PRL2" !Sets the power reduction level of the unused bursts
                                        !to PRL2.
```

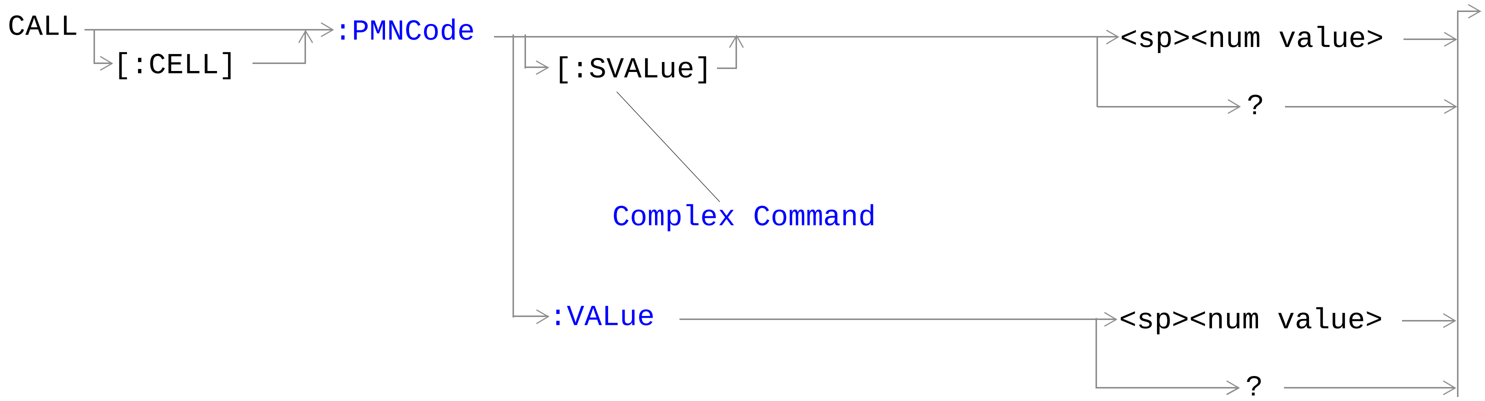
CALL:PDTCH:PZERo:LEVel
CALL:PDTChannel:PZERo:LEVel

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the power reduction reference level (ETSI refers to this as P0) for downlink PDTCH power control. For further information see "Downlink PDTCH Power Control" on page 320.
Setting		Range: 0 to 30 dB Resolution: 2 dB
Query		Range: 0 to 30 dB Resolution: 2 dB
*RST setting		0 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:PDTCH:PZERo:LEVel 30" !Sets the power reduction reference level (P0) to
                                        !30 dB.
```

CALL:PMNCode



"Diagram Conventions" on page 1

CALL[:CELL]:PMNCode[:SVALue]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the 3 digit mobile network code. This command is used for the PCS band only. This command sets the PMNCode state to ON. This can only be set when the Call Operating Mode is set to Off (see "CALL:OPERating:MODE" on page 610).
Setting		Range: 0 to 999 Resolution: 1
Query		Range: 0 to 999 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:PMNCODE:SVALUE 798" !Sets the value to 798 and the state
                                          !to ON. Only used for PCS 1900 band.
```

CALL[:CELL]:PMNCode:VALue

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the 3 digit mobile network code value. This command is used for PCS band only.
Setting		Range: 0 to 999 Resolution: 1
Query		Range: 0 to 999 Resolution: 1
*RST Setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:PMNCODE:VALUE 798" !Sets the 3 digit MNCode for PCS 1900 to 798.
```

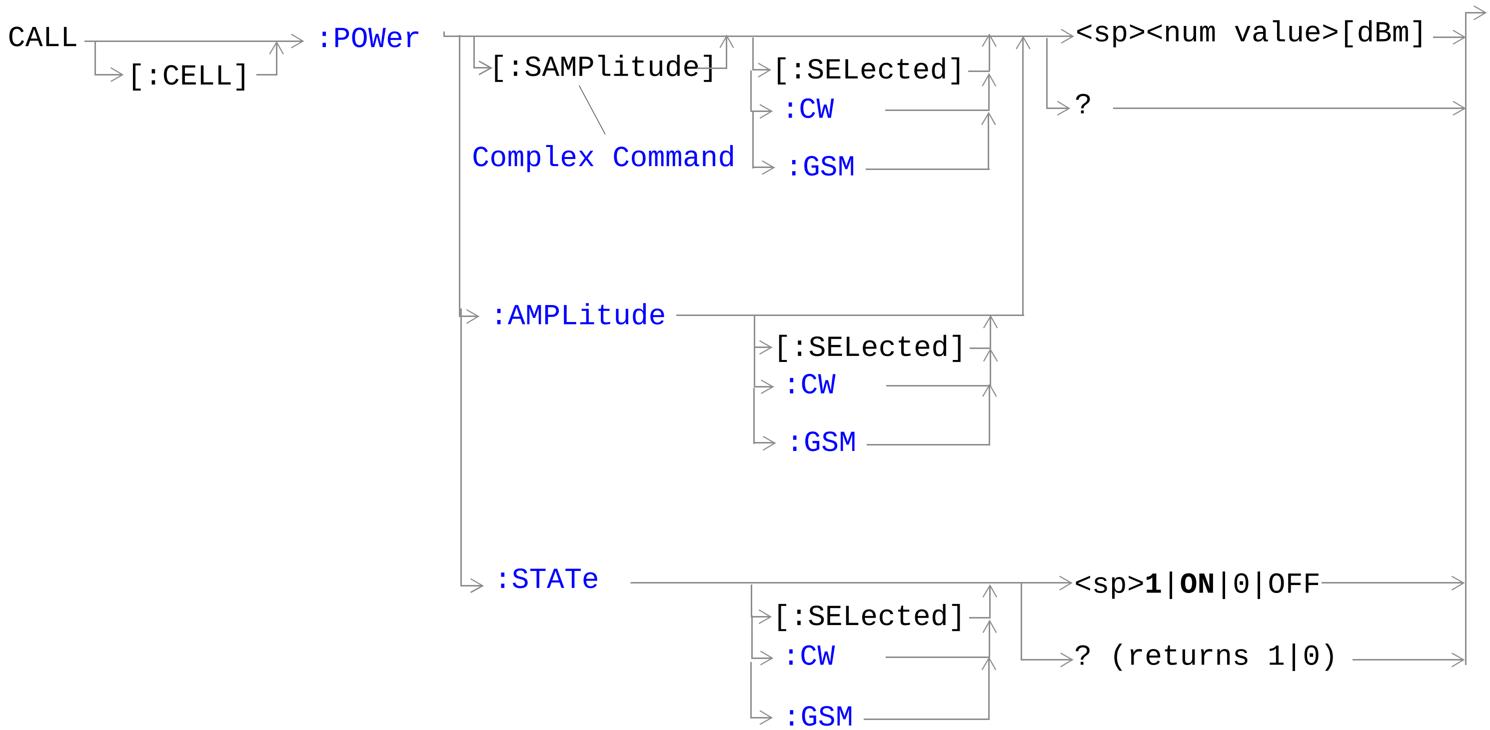
CALL[:CELL]:PMNCode:STATe

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the MNC state in the active (that is the selected) format. This command is used for the PCS band only. Setting it to ON configures the BCCH to use the 3 digit MNC. Note, this command can only be used when the Cell Operating Mode is OFF. If the test set is in active cell operating mode, this command cannot be set unless the Call Operating Mode is OFF.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:PMNCode:STATe ON" !Enables the 3 digit MNCode for PCS 1900.
```

CALL:POWer



"Diagram Conventions" on page 1

CALL[:CELL]:POWer[:SAMPlitude][:SELected]

Function	GSM TA	This command sets/queries the Cell Power for the active (that is the selected) format and turns the state to ON. This is a complex command combining the cell power state and amplitude commands. The cell power state is automatically set to ON when this command is used. The suffix dBm is optional. The Cell Power is affected when there is an amplitude offset (see “Amplitude Offset” on page 156). The power level of the TCH is also affected by the setting of this command. However, the TCH level is also affected by other settings (see “CALL:PDTChannel:PREDuction:LEVel[1|2]” on page 641). TCH burst power = BCH power - (PRL1 | PRL2).
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the Cell Power for the active (that is the selected) format. This is a complex command combining the cell power state and amplitude commands. The cell power state is automatically set to ON when this command is used. The suffix dBm is optional. The power level of the PDTCH is also affected by the setting of this command. However, the PDTCH level is also affected by other settings (see “Configuring the Packet Data Traffic Channel (PDTCH)” on page 205). The Cell Power is affected when there is an amplitude offset (see “Amplitude Offset” on page 156).
Setting		Range: -10 dBm to -127 dBm Resolution: .01 dBm
Query		Range: -10 dBm to -127 dBm Resolution: .01 dBm
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:CELL:POWer:SAMPlitude:SELected -50dBm” !Sets the value to -50dBm
                                                         ! and the state to ON.
```

CALL[:CELL]:POWer[:SAMPlitude]:CW

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the Cell Power for a continuous wave format whether or not that format is active. This is a complex command combining the cell power state and amplitude commands. The cell power state is automatically set to ON when this command is used. The suffix dBm is optional. The Cell Power is affected when there is an amplitude offset (see “Amplitude Offset” on page 156).
Setting		Range: -10 dBm to -127 dBm Resolution: .01 dBm
Query		Range: -10 dBm to -127 dBm Resolution: .01 dBm
*RST Setting		-85 dBm
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:CELL:POWer:SAMPlitude:CW -50dBm” !Sets the value to -50dBm
                                                    !and the state to ON.
```

CALL[:CELL]:POWer[:SAMPlitude]:GSM

Function	GSM TA	This command sets/queries the Cell Power for the GSM format whether or not that format is active. This is a complex command combining the cell power state and amplitude commands. The cell power state is automatically set to ON when this command is used. The suffix dBm is optional. The Cell Power is affected when there is an amplitude offset (see “Amplitude Offset” on page 156). The power level of the TCH is also affected by the setting of this command. However, the TCH level is also affected by other settings (see “CALL:PDTChannel:PREDuction:LEVel[1 | 2]” on page 641). TCH burst power = BCH power - (PRL1 | PRL2).
	GSM/GPRS LA	
	GPRS TA	
	EGPRS LA	
Setting		Range: -10 dBm to -127 dBm Resolution: .01 dBm
Query		Range: -10 dBm to -127 dBm Resolution: .01 dBm
*RST Setting		-85 dBm
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:POWer:SAMPlitude:GSM -50dBm" !Sets the value to -50dBm
                                                    !and the state to ON.
```

CALL[:CELL]:POWer:AMPLitude[:SELected]

Function	GSM TA	This command sets/queries the Cell Power for the active (that is the selected) format. The suffix dBm is optional. The Cell Power is affected when there is an amplitude offset (see "Amplitude Offset" on page 156). The power level of the TCH is also affected by the setting of this command. However, the TCH level is also affected by other settings (see "CALL:PDTChannel:PREDuction:LEVel[1 | 2]" on page 641). TCH burst power = BCH power - (PRL1 | PRL2).
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the Cell Power (BCH) for the active (that is the selected) format. The suffix dBm is optional. The power level of the PDTCH is also affected by the setting of this command. However, the PDTCH level is also affected by other settings (see "Configuring the Packet Data Traffic Channel (PDTCH)" on page 205). The Cell Power is affected when there is an amplitude offset (see "Amplitude Offset" on page 156).
Setting		Range: -10 dBm to -127 dBm Resolution: .01 dBm
Query		Range: -10 dBm to -127 dBm Resolution: .01dBm
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:POWer:AMPLitude:SELected -50dBm" !Set the cell power from test
                                                        !set to -50dBm.
```

CALL[:CELL]:POWer:AMPLitude:CW

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the Cell Power for a continuous wave format whether or not that format is active. The suffix dBm is optional. The Cell Power is affected when there is an amplitude offset (see “Amplitude Offset” on page 156).
Setting		Range: -10 dBm to -127 dBm Resolution: .01 dBm
Query		Range: -10 dBm to -127 dBm Resolution: .01dBm
*RST Setting		-85 dBm
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:CELL:POWer:AMPLitude:CW -50dBm” !Set the cell power from test
                                                  !set to -50dBm.
```

CALL[:CELL]:POWer:AMPLitude:GSM

Function	GSM TA GSM/GPRS LA GPRS TA EGPRS LA	This command sets/queries the Cell Power for the GSM format whether or not that format is active. The suffix dBm is optional. The Cell Power is affected when there is an amplitude offset (see “Amplitude Offset” on page 156). The power level of the TCH is also affected by the setting of this command. However, the TCH level is also affected by other settings (see “CALL:PDTChannel:PREDuction:LEVel[1 | 2]” on page 641). TCH burst power = BCH power - (PRL1 | PRL2).
Setting		Range: -10 dBm to -127 dBm Resolution: .01 dBm
Query		Range: -10 dBm to -127 dBm Resolution: .01dBm
*RST Setting		-85 dBm
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:CELL:POWer:AMPLitude:GSM -50dBm” !Set the cell power from test
                                              !set to -50dBm.
```

CALL[:CELL]:POWer:STATe[:SELected]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the Cell Power state for the active (that is the selected) format. When set to 1|ON, the RF power for the cell is turned on.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:POWer:STATe:SELected 1" !Sets the cell power state to ON.
```

CALL[:CELL]:POWer:STATe:CW

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the Cell Power state in a continuous wave format whether or not that format is active. When set to 1 | 0, the RF power for the cell is turned on.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:POWer:STATe:CW 1" !Sets the cell power state to ON.
```

CALL[:CELL]:POWer:STATe:GSM

Function	GSM TA GSM/GPRS LA GPRS TA EGPRS LA	This command sets/queries the Cell Power state in the GSM format whether or not that format is active. When set to 1 | 0, the RF power for the cell is turned on.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:CELL:POWer:STATe:GSM 1” !Sets the cell power state to ON.
```

CALL:PPRocedure

Syntax Diagrams and Command Descriptions

CALL:PPRocedure:ATTach

```
CALL → :PPRocedure → :ATTach ┬→ :ACCept → :IAReject ┬→ :GMMCause<sp><num value> →┬→
                             │                      └→ :STATe<sp>0|OFF|1|ON      →┤
                             └→ :REJect → :IAReject ┬→ :GMMCause<sp><num value> →┤
                                                    └→ :STATe<sp>0|OFF|1|ON      →┘
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

“Diagram Conventions” on page 1

CALL:PPRocedure:ATTach:ACCept:IAReject:GMMCause

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets the GMM Cause for Rejecting IMSI attach for non-GPRS services.
	EGPRS LA	
Setting		Range: 0 to 255 (decimal) See “GMM Cause Information Element” on page 217.
Query		Range: 0 to 255
*RST setting		111
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example:		

```
OUTPUT 714;"CALL:PPROCEDURE:ATTACH:ACCEPT:IAREJECT:GMMCAUSE 3" ! The test set sends this GMM cause
value to the MS as the reason for rejecting its attach attempt.
```

CALL:PPRocedure:ATTach:ACCept:IAReject:STATe

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets/Queries IMSI attach accept state.
	EGPRS LA	
Setting		Range: 0| OFF | 1 | ON
Query		Range: 0 | 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: OUTPUT 714;”CALL:PPROCEDURE:ATTACH:ACCEPT:IAREJECT:STATE 1” ! The test set will now reject any attach attempt that is not for GPRS only.		

CALL:PPRocedure:ATTach:REJect:GMMCause

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets the GMM Cause for rejecting IMSI attach.
	EGPRS LA	
Setting		Range: 0 to 255 (decimal) See "GMM Cause Information Element" on page 217.
Query		Range: 0 to 255
*RST setting		111
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPROCEDURE:ATTACH:REJECT:GMMCAUSE 3" ! The test set sends this GMM cause value to the MS as the reason for rejecting its attach attempt.
```

CALL:PPRocedure:ATTach:REJect:STATe

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets/Queries IMSI attach reject state.
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPROCEDURE:ATTACH:REJECT:STATE 1" ! Turns state on.  Now the test set will reject all attach attempts.
```

CALL:PPRocedure:DETach

```
CALL---:PPRocedure--+                                                           +->
                    |                                                           |
 +------------------+                                                           |
 |                                                                              |
 +-+:DETach---:REQuest--+------------+------------------------------------------+
                        +[:IMMediate]+                                          |
                        |                                                       |
                        +:GMMCause-----+------------------<sp><num value>--+
                                       +------------? returns <num value>--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

"Diagram Conventions" on page 1

CALL:PPRocedure:DETach:REQuest[:IMMediate]

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sends detach request.
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: OUTPUT 714;"CALL:PPROCEDURE:DETACH:REQUEST" ! Sends a network initiated Detach Request.		

CALL:PPRocedure:DETach:REQuest:GMMCause

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets the GMM Cause for Rejecting the detach request.
	EGPRS LA	
Setting		Range: 0 to 255 (decimal) See “GMM Cause Information Element” on page 217.
Query		Range: 0 to 255
*RST setting		111
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPROCEDURE:DETACH:REQUEST:GMMCAUSE 96" ! The test set sends the MS this GMM
! Cause value as the reason for requesting a detach.
```

CALL:PPRocedure:IDEntity

```
CALL---:PPRocedure--+                                                      +->
                    |                                                      |
 +------------------+                                                      |
 |                                                                         |
 +--:IDENtity---:REQuest--+------------+-----------------------------------+
                          +[:IMMediate]+                                   |
                          |                                                |
                          +:RESults------+------------? returns 4x<string>--+
                          |              +:CLEar---------------------------+
                          |                                                |
                          +:TYPE---------+----------<sp>EISV|IMEI|IMSI|TMSI--+
                                         +----? returns EISV|IMEI|IMSI|TMSI--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

“Diagram Conventions” on page 1

CALL:PPRocedure:IDENtity:REQuest[:IMMediate]

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sends identity request.
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;”CALL:PPROCEDURE:IDENTITY:REQUEST” ! Sends an identity request to the MS.`		

CALL:PPRocedure:IDENtity:REQuest:RESults?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Queries identity results and returns four string values for IMSI, IMEI, IMEISV, TMSI in order.
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;”CALL:PPROCEDURE:IDENTITY:REQUEST:RESULTS”! Queries identity results.`		

CALL:PPRocedure:IDENtity:REQuest:RESults:CLEar

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Clears identity results.
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;”CALL:PPROCEDURE:IDENTITY:REQUEST:RESULTS:CLEAR”! Queries identity results.`		

CALL:PPRocedure:IDENtity:REQuest:TYPE

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets/Queries the Identity to Request.
	EGPRS LA	
Setting		IMSI|IMEI|EISV|TMSI
Query		IMSI|IMEI|EISV|TMSI
*RST Setting		IMSI
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPROCEDURE:IDENTITY:REQUEST:TYPE IMEI"! Sets IMEI as the identity type to request`		

CALL:PPRocedure:PDPContext

```
CALL---:PPRocedure---:PDPContext---:AACCept--+                              +->
                                             |                              |
 +-------------------------------------------+                              |
 |                                                                          |
 +--:QOService---:RClass--+:ENForce-----+---------+-+-------<sp><num value>--+
                          |             +[:SVALue]+ +-? returns <num value>--+
                          |             |                                    |
                          |             +:STATe-----+--------<sp>1|ON|0|OFF--+
                          |             |           +---------? returns 1|0--+
                          |             |                                    |
                          |             +:VALue-----+-------<sp><num value>--+
                          |                         +-? returns <num value>--+
                          |                                                  |
                          +:SUBScribed--+------------------<sp><num value>--+
                                        +-------------? returns <num value>--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

```
CALL---:PPRocedure---:PDPContext--+              +->
                                  |              |
 +--------------------------------+              |
 |                                               |
 +--:AREJect--+:SMCause--+-------<sp><num value>--+
              |          +-? returns <num value>--+
              |                                   |
              +:STATe----+--------<sp>1|ON|0|OFF--+
                         +---------? returns 1|0--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

“Diagram Conventions” on page 1

CALL:PPRocedure:PDPContext:AACCept:QOService:RCLass:SUBScribed

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets/Queries PDP Context Accept QOS Subscribed Reliability Class which represents Quality of Service Reliability Class that will be supplied to the MS if it requests its subscribed value. See GSM 05.08 for specific values. Some values are listed below.
Setting		Range: 1 to 5 (decimal) 1: (Ack GTP, LLC, RLC;Protected Data) 2: (Unack GTP, ack LLC, RLC;Protected Data) 3: (Unack GTP, LLC, ack RLC;Protected Data) 4: (Unack GTP, LLC, RLC;Protected Data) 5: (Unack GTP, LLC, RLC;Unprotected Data)
Query		1 to 5
*RST Setting		3
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPROCEDURE:PDPCONTEXT:AACCEPT:QOSERVICE:RCLASS:SUBSCRIBED 5"! Sets the subscribed
QoS Reliability Class to 5
```

CALL:PPRocedure:PDPContext:AACCept:QOService:RCLass:ENForce

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Complex command to both set the PDP Context Accept Override Reliability Class state to On and set/query the PDP Context Accept Override Reliability Class Value. See GSM 04.08 for specific values. The values are listed below.
Setting		Range: 1 to 5 (decimal) 1: (Ack GTP, LLC, RLC;Protected Data) 2: (Unack GTP, ack LLC, RLC;Protected Data) 3: (Unack GTP, LLC, ack RLC;Protected Data) 4: (Unack GTP, LLC, RLC;Protected Data) 5: (Unack GTP, LLC, RLC;Unprotected Data)
Query		1 to 5
*RST Setting		3
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPROCEDURE:PDPCONTEXT:AACCEPT:QOSERVICE:RCLASS:ENFORCE 1"! The test set will now
override the QoS requested by the MS.
```

CALL:PPRocedure:PDPContext:AACCept:QOService:RCLass:ENForce:STATe

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets/Queries the PDP Context Accept Override Requested Reliability Class State.
Setting		Range: 0|OFF|1|ON
Query		Range: 0|1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPROCEDURE:PDPCONTEXT:AACCEPT:QOSERVICE:RCLASS:ENFORCE:STATE 1"! The test set will
now override the QoS requested by the MS.
```

CALL:PPRocedure:PDPContext:AACCept:QOService:RClass:ENForce:VALue

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets/Queries the PDP Context Accept Override Reliability Class Value which represents Quality of Service Reliability Class that will be supplied to the DUT when the Override Requested Reliability Class State is set to ON. See GSM 04.08 for specific values. The values are listed below.
Setting		Range: 1 to 5 (decimal) 1: (Ack GTP, LLC, RLC;Protected Data) 2: (Unack GTP, ack LLC, RLC;Protected Data) 3: (Unack GTP, LLC, ack RLC;Protected Data) 4: (Unack GTP, LLC, RLC;Protected Data) 5: (Unack GTP, LLC, RLC;Unprotected Data)
Query		1 to 5
*RST Setting		3
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPROCEDURE:PDPCONTEXT:AACCEPT:QOSERVICE:RCLASS:ENFORCE:STATE 1"! The test set will
now override the QoS requested by the MS.
```

CALL:PPRocedure:PDPContext:AREJect:SMCause

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets/Queries the SM Cause for Rejecting PDP Context.
Setting		Range: 0 to 255 (decimal) See “SM Cause Information Element” on page 218.
Query		Range: 0 to 255
*RST setting		111
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPROCEDURE:PDPCONTEXT:AREJECT:SMCAUSE 37"! The test set sends SM Cause value 37 to
the MS when it rejects its PDP Context Request
```

CALL:PPRocedure:PDPContext:AREJect:STATe

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets/Queries the PDP Context Reject state.
	EGPRS LA	
Setting		Range: 0|OFF|1|ON
Query		Range: 0|1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;”CALL:PPROCEDURE:PDPCONTEXT:AREJECT:STATE 1”! Sets the test set to reject all PDP Context Requests`		

CALL:PPRocedure:PMEasurement:ADATa

```
CALL---:PPRocedure---:PMEasurement--+                +->
                                    |                |
 +----------------------------------+                |
 |                                                   |
 +--:ADATa--+:ACKNowledged------------? returns 1|0--+
            +:MAData--------+---<sp>EXCLude|INCLude--+
            |               +---? returns EXCL|INCL--+
            |                                        |
            +:MORE----------+-------<sp><num value>--+
            |               +-? returns <num value>--+
            |                                        |
            +:RAData--------+---<sp>EXCLude|INCLude--+
            |               +---? returns EXCL|INCL--+
            |                                        |
            +:RELease98-----+---<sp>EXCLude|INCLude--+
            |               +---? returns EXCL|INCL--+
            |                                        |
            +:SEND-----------------------------------+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

“Diagram Conventions” on page 1

CALL:PPRocedure:PMEasurement:ADATa:ACKNowledged?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the status of the last Assistance Data message sent to the MS. This query returns a “0” when the a message has been sent but an acknowledgment has not been received from the MS. A “1” is returned after an acknowledgment has been received and before another Assistance Data message is sent.
Query		0 | 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;”CALL:PPRocedure:PMEasurement:ADATa:ACKNowledged?”`		

CALL:PPRocedure:PMEasurement:ADATa:MAData

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Includes or excludes the optional E-OTD Measurement Assistance Data element from the Assistance Data component.
Setting		INCLude | EXCLude
Query		INCL | EXCL
*RST setting		EXCL
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;”CALL:PPRocedure:PMEasurement:ADATa:MAData INCL”`		

CALL:PPRocedure:PMEasurement:ADATa:MORE

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets the value of the More Assistance Data To Be Sent element of the Assistance Data component. This is used to indicate to the MS if more Assistance Data components will be sent in order to deliver the entire set of assistance data.
	EGPRS LA	
Setting		0 | 1
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;”CALL:PPRocedure:PMEasurement:ADATa:MORE 1”`		

CALL:PPRocedure:PMEasurement:ADATa:RAData

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Includes or excludes the optional E-OTD Reference BTS for Assistance Data element from the Assistance Data component.
	EGPRS LA	
Setting		INCLude | EXCLude
Query		INCL | EXCL
*RST setting		EXCL
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;”CALL:PPRocedure:PMEasurement:ADATa:RAData INCL”`		

CALL:PPRocedure:PMEasurement:ADATa:REL98|RELEASE98

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Includes or excludes the optional Release 98 Extension element from the Assistance Data component. You can set the value of these fields using the following commands: "CALL:PPRocedure:PMEasurement:MPRequest:REL98|RELEASE98:BTS[<n>]:EOTDiff" "CALL:PPRocedure:PMEasurement:MPRequest:REL98|RELEASE98:BTS[<n>]:EOTDiff:UNCertainty"
Setting		INCLude|EXCLude
Query		INCL|EXCL
*RST setting		EXCL
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:ADATa:REL98 INCL"
```

CALL:PPRocedure:PMEasurement:ADATa:SEND

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sends the Assistance Data component in an RRLP message.
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:ADATa:SEND"
```

CALL:PPRocedure:PMEasurement:MPRequest

```
CALL---:PPRocedure---:PMEasurement---:MPRequest---:MAData--+               +->
                                                           |               |
 +---------------------------------------------------------+               |
 |                                                                         |
 +-+--------------------------------------------------<sp>EXCLude|INCLude--+
   +--------------------------------------------------? returns EXCL|INCL--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

```
CALL---:PPRocedure---:PMEasurement---:MPRequest---:MAData--+               +->
                                                           |               |
 +---------------------------------------------------------+               |
 |                                                                         |
 +-+:BTS<n>--+:BCHCarrier---+-----------------------------<sp><num value>--+
             |              +-----------------------? returns <num value>--+
             |                                                             |
             +:BSICode------+-----------------------------<sp><num value>--+
             |              +-----------------------? returns <num value>--+
             |                                                             |
             +:CASSistance--+-------------------------<sp>EXCLude|INCLude--+
             |              +-------------------------? returns EXCL|INCL--+
             |              +:FRTDiff----+----------------<sp><num value>--+
             |              |            +-----------? returns <num value>--+
             |              |                                              |
             |              +:RALTitude--+------------<sp>EXCLude|INCLude--+
             |              |            +------------? returns EXCL|INCL--+
             |              |            +:VALue--+-------<sp><num value>--+
             |              |                     +-? returns <num value>--+
             |              |                                              |
             |              +:REASt------+----------------<sp><num value>--+
             |              |            +-----------? returns <num value>--+
             |              |                                              |
             |              +:RNORth-----+----------------<sp><num value>--+
             |                           +-----------? returns <num value>--+
             |                                                             |
             +:MOFFset------+-----------------------------<sp><num value>--+
                            +-----------------------? returns <num value>--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

CALL:PPRocedure:PMEasurement:MPRequest

```
CALL---:PPRocedure---:PMEasurement---:MPRequest---:MAData--+               +->
                                                           |               |
 +---------------------------------------------------------+               |
 |                                                                         |
 +-+:BTS-----+:NUMBer-------+----------------------------<sp><num value>--+
                            +-----------------------? returns <num value>--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

```
CALL---:PPRocedure---:PMEasurement---:MPRequest---:MAData--+               +->
                                                           |               |
 +---------------------------------------------------------+               |
 |                                                                         |
 +-+:BTS<n>--+:RRTDiff------+----------------------------<sp><num value>--+
             |              +-----------------------? returns <num value>--+
             |                                                             |
             +:TSSCheme-----+----------------------------<sp><num value>--+
                            +-----------------------? returns <num value>--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

```
CALL---:PPRocedure---:PMEasurement---:MPRequest--+                  +->
                                                 |                  |
 +-----------------------------------------------+                  |
 |                                                                  |
 +--:PINStruction--+:ACCuracy----+------------<sp>EXCLude|INCLude--+
                   |             +------------? returns EXCL|INCL--+
                   |             +:VALue--+-------<sp><num value>--+
                   |                      +-? returns <num value>--+
                   |                                               |
                   +:ECHaracter--+------------<sp>EXCLude|INCLude--+
                   |             +------------? returns EXCL|INCL--+
                   |             +:VALue--+-------<sp><num value>--+
                   |                      +-? returns <num value>--+
                   |                                               |
                   +:MSETs-------+----------------<sp><num value>--+
                   |             +----------? returns <num value>--+
                   |                                               |
                   +:MTYPe-------+----------------<sp><num value>--+
                   |             +----------? returns <num value>--+
                   |                                               |
                   +:RTIMe-------+----------------<sp><num value>--+
                                 +----------? returns <num value>--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

CALL:PPRocedure:PMEasurement:MPRequest

```
 CALL---:PPRocedure---:PMEasurement---:MPRequest--+                             +->
                                                  |                             |
  +-----------------------------------------------+                             |
  |                                                                             |
  +--:RAData--+--------------------------------------------<sp>EXCLude|INCLude--+
              +--------------------------------------------? returns EXCL|INCL--+
              +:BTSPosition--+-----------------------------<sp>EXCLude|INCLude--+
                             +-----------------------------? returns EXCL|INCL--+
                             +:ALTitude---+--------------------<sp><num value>--+
                             |            +--------------? returns <num value>--+
                             |            +:DIRection--+-------<sp>ABOVe|BELow--+
                             |                         +----? returns ABOV|BEL--+
                             |                                                  |
                             +:LATitude---+:DEGRees----+-------<sp><num value>--+
                             |            |            +-? returns <num value>--+
                             |            |                                     |
                             |            +:SIGN-------+-------<sp>NORTh|SOUTh--+
                             |                         +---? returns NORT|SOUT--+
                             |                                                  |
                             +:LONGitude---:DEGRees----+-------<sp><num value>--+
                             |                         +-? returns <num value>--+
                             |                                                  |
                             +:TYPe-------+--------------<sp>EPALtitude|EPOint--+
                                          +-----------------? returns EPAL|EPO--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

```
CALL---:PPRocedure---:PMEasurement---:MPRequest--+                             +->
                                                 |                             |
 +-----------------------------------------------+                             |
 |                                                                             |
 +-+:RELease98--+-----------------------------------------<sp>EXCLude|INCLude--+
   |            +-----------------------------------------? returns EXCL|INCL--+
   |            +:BTS[1-8]---:EOTDiff--+----------------------<sp><num value>--+
   |                                   +----------------? returns <num value>--+
   |                                   +:UNCertainty--+-------<sp><num value>--+
   |                                                  +-? returns <num value>--+
   |                                                                           |
   +:SEND----------------------------------------------------------------------+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

“Diagram Conventions” on page 1

CALL:PPRocedure:PMEasurement:MPRequest:MAData

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Includes or excludes the optional E-OTD Measurement Assistance Data element from the Measure Position Request component.
	EGPRS LA	
Setting		INCLude | EXCLude
Query		INCL | EXCL
*RST setting		EXCL
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData INCL"`		

CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:BCHCarrier

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets the value of the BCCH Carrier field in the E-OTD Measurement Assistance Data element. This field indicates the absolute RF channel number of the BTS indicated by the [<n>] mnemonic, where n can range from 1 to 8. The E-OTD Measurement Assistance Data element is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:MAData" command to have it included.
	EGPRS LA	
Setting		Range: 0 to 1023 Resolution: 1
Query		Range: 0 to 1023 Resolution: 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS2:BCHCarrier 556"`		

CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:BSICode

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the BSIC field in the E-OTD Measurement Assistance Data element. This field indicates the BSIC the BTS indicated by the [<n>] mnemonic, where n can range from 1 to 8. The E-OTD Measurement Assistance Data element is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:MAData" command to have it included.
Setting		Range: 0 to 63 Resolution: 1
Query		Range: 0 to 63 Resolution: 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example:		

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS2:BCICode 8"
```

CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Includes or excludes the optional Calculation Assistance Data fields from the E-OTD Reference BTS for Assistance Data element for the BTS indicated by the [<n>} mnemonic, where n can range from 1 to 8. You can set the value of these fields using the following commands: "CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance:FRTDiff" "CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance:RNORth" "CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance:REASt"
Setting		INCLude | EXCLude
Query		INCL | EXCL
*RST setting		EXCL
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS2:CASSistance INCL"`		

CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance:FRTDiff

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the optional Fine RTD field in the E-OTD Measurement Assistance Data element. This field indicates the fine RTD value between the BTS indicated by the [<n>] mnemonic (where n can range from 1 to 8) and the reference BTS. This field is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance" command to have it included.
Setting		Range: 0 to 255 Resolution: 1 bit
Query		Range: 0 to 255 Resolution: 1 bit
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS2:CASSistance:FRTDiff 220"
```

CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance:RALTitude

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Includes or excludes the optional Calculation Assistance Data Relative Altitude field from the E-OTD Reference BTS for Assistance Data element for the BTS indicated by the [<n>] mnemonic, where n can range from 1 to 8. You can set the value of this field using the "CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance:RALTitude:VALue" command.
Setting		INCLude | EXCLude
Query		INCL | EXCL
*RST setting		EXCL
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS2:CASSistance INCL"
```

CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance:RALTitude:VALue

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the Relative Altitude field in the E-OTD Measurement Assistance Data element. This field indicates the altitude of the BTS indicated by the [<n>] mnemonic (where n can range from 1 to 8) relative to the reference BTS in meters. This field is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance:RALTitude" command to have it included. or excludes the optional E-OTD Measurement Assistance Data element from the Measure Position Request component.
Setting		Range: -4000 to 4000 Resolution: 1
Query		Range: -4000 to 4000 Resolution: 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS2:CASSistance:RALTitude:VALue 2000"
```

CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance:REASt

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the optional Relative East field in the E-OTD Measurement Assistance Data element. This field indicates the distance between the BTS indicated by the [<n>] mnemonic (where n can range from 1 to 8) and the reference BTS in the east-west direction. This field is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance" command to have it included.
Setting		Range: -200000 to 200000 Resolution: 1
Query		Range: -200000 to 200000 Resolution: 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS2:CASSistance:REASt -200"
```

CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance:RNORth

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the optional Relative North field in the E-OTD Measurement Assistance Data element. This field indicates the distance between the BTS indicated by the [<n>] mnemonic (where n can range from 1 to 8) and the reference BTS in the north-south direction. This field is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:CASSistance" command to have it included.
Setting		Range: -200000 to 200000 Resolution: 1
Query		Range: -200000 to 200000 Resolution: 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS2:CASSistance:RNORth -22000"
```

CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:MOFFset

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the Multiframe Offset field in the E-OTD Measurement Assistance Data element. This field indicates the frame offset between the BTS indicated by the [<n>] mnemonic (where n can range from 1 to 8) and the reference BTS. The E-OTD Measurement Assistance Data element is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:MAData" command to have it included.
Setting		Range: 0 to 51 Resolution: 1
Query		Range: 0 to 51 Resolution: 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example:		

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS2:MOFFset 30"
```

CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS:NUMBer

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the Number of BTS field in the E-OTD Measurement Assistance Data element. This field indicates how many BTS are included in this information element. The E-OTD Measurement Assistance Data element is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:MAData" command to have it included.
Setting		Range: 1 to 8 Resolution: 1
Query		Range: 1 to 8 Resolution: 1
*RST setting		1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example:		

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS:NUMBer 3"
```

CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:RRTDiff

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the Rough RTD field in the E-OTD Measurement Assistance Data element. This field indicates the rough RTD value between the BTS indicated by the [<n>] mnemonic (where n can range from 1 to 8) and the reference BTS. The E-OTD Measurement Assistance Data element is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:MAData" command to have it included.
Setting		Range: 0 to 1250 Resolution: 1 bit
Query		Range: 0 to 1250 Resolution: 1 bit
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS2:RRTDiff 120"
```

CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS[<n>]:TSSCheme

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the Time Slot Scheme field in the E-OTD Measurement Assistance Data element. This field indicates the type of transmission scheme used by the BTS indicated by the [<n>] mnemonic, where n can range from 1 to 8. The E-OTD Measurement Assistance Data element is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:MAData" command to have it included.
Setting		Range: 0 to 1 Resolution: 1 0: All timeslots are 156.25 bits long 1: Time slots 0 and 4 are 157 bits long, all other are 156 bits long
Query		Range: 0 to 1 Resolution: 1
*RST setting		1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:MAData:BTS2:TSSCheme 0"`		

CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ACCuracy

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Includes or excludes the optional Accuracy field from the Positioning Instructions element. You can set the value of this field using the "CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ACCuracy:VALue" command.
Setting		INCLude | EXCLude
Query		INCL | EXCL
*RST setting		EXCL
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ACCuracy INCL"`		

CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ACCuracy:VALue

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the Accuracy field in the Positioning Instructions element. This indicates the required accuracy of the latitude and longitude for the location estimate. This field is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ACCuracy" command to have it included.
Setting		Range: 0 to 127 Resolution: 1
Query		0 to 127
*RST setting		127
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ACCuracy:VALue 55"
```

CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ECHaracter

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Includes or excludes the optional Environment Characterization field from the Positioning Instructions element. You can set the value of this field using the "CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ECHaracter:VALue" command.
Setting		INCLude | EXCLude
Query		INCL | EXCL
*RST setting		EXCL
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ECHaracter INCL"
```

CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ECHaracter:VALue

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the Environment Characterization field in the Positioning Instructions element. This field provides the MS with information about expected multipath in the current area. This field is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ECHaracter" command to have it included.
Setting		Range: 0 to 3 0: Heavy multipath 1: Light multipath 2: Not Defined 3: Reserved
Query		0 to 3
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ECHaracter:VALue 0"`		

CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:MSETs

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the Multiple Sets field in the Positioning Instructions element. This indicates if the MS should send multiple E-OTD Measurement Information Sets.
Setting		0 | 1 0: Sending of multiple sets is allowed 1: Sending of multiple sets is not allowed
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:MSETs 1"`		

CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:MTYPe

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets the Method Type field in the Positioning Instructions element.
	EGPRS LA	
Setting		Range: 0 to 3 0: MS assisted 1: MS based 2: MS based preferred, but MS assisted is allowed 3: MS assisted preferred, but MS based is allowed
Query		0 to 3
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:MTYPe 1"`		

CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:RTIMe

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets the Response Time field in the Positioning Instructions element. This indicates the desired time for the MS to respond to the RRLP message.
	EGPRS LA	
Setting		Range: 0 to 7 The response time is 2^N seconds, where N is the value of the Response Time field. Therefore, 0: 1 second 4: 16 seconds 1: 2 seconds 5: 32 seconds 2: 4 seconds 6: 64 seconds 3: 8 seconds 7: 128 seconds
Query		0 to 7
*RST setting		2
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:RTIMe 1"`		

CALL:PPRocedure:PMEasurement:MPRequest:RAData

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Includes or excludes the optional E-OTD Reference BTS for Assistance Data element from the Measure Position Request component.
	EGPRS LA	
Setting		INCLude | EXCLude
Query		INCL | EXCL
*RST setting		EXCL
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:RAData INCL"`		

CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Includes or excludes the optional BTS Position field from the E-OTD Reference BTS for Assistance Data element. You can set the value of this field using the "CALL:PPRocedure:PMEasurement:MPRequest:PINStruction:ECHaracter:VALue" command.
	EGPRS LA	
Setting		INCLude | EXCLude
Query		INCL | EXCL
*RST setting		EXCL
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition INCL"`		

CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition:ALTitude

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the Degrees Altitude for the BTS Position field. The BTS Position field is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition" command to have it included.
Setting		Range: 0 to 32767 Resolution: 1
Query		Range: 0 to 32767 Resolution: 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition:ALTitude 456"`		

CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition:ALTitude:DIRection

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the Direction of Altitude for the BTS Position field. The BTS Position field is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition" command to have it included.
Setting		ABOVe|BELow
Query		ABOV|BEL
*RST setting		ABOV
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition:ALTitude:DIRection BELow"`		

CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition:LATitude:DEGRees

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the Degrees Latitude for the BTS Position field. The BTS Position field is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition" command to have it included.
Setting		Range: 0 to 2147483647 Resolution: 1
Query		Range: 0 to 2147483647 Resolution: 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example:		

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition:LATitude:DEGRees 4567131"
```

CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition:LATitude:SIGN

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Includes Sets the Direction of Latitude for the BTS Position field. The BTS Position field is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition" command to have it included. excludes the optional E-OTD Measurement Assistance Data element from the Measure Position Request component.
Setting		NORTh | SOUTh
Query		NORT | SOUT
*RST setting		NORT
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example:		

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition:LATitude:SIGN NORTh"
```

CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition:LONGitude:DEGRees

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the Degrees Longitude for the BTS Position field. The BTS Position field is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition" command to have it included.
Setting		Range: -2147483647 to 2147483647 Resolution: 1
Query		Range: -2147483647 to 2147483647 Resolution: 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition:LONGitude:DEGRees 4567131"
```

CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition:TYPe

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the Type of Description for the BTS Position field. The type of description is either "Ellipsoid Point" or "Ellipsoid Point with Altitude". The BTS Position field is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition" command to have it included.
Setting		EPOint | EPALitude EPOint: Ellipsoid Point EPALitude: Ellipsoid Point with Altitude
Query		EPO | EPAL
*RST setting		EPO
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:RAData:BTSPosition:TYPe EPAL"
```

CALL:PPRocedure:PMEasurement:MPRequest:REL98|RELEASE98

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Includes or excludes the optional Release 98 Extension element from the Measure Position Request component. You can set the value of these fields using the following commands: "CALL:PPRocedure:PMEasurement:MPRequest:REL98 | RELEASE98:BTS[<n>]:EOTDiff" "CALL:PPRocedure:PMEasurement:MPRequest:REL98 | RELEASE98:BTS[<n>]:EOTDiff:UNCertainty"
Setting		INCLude | EXCLude
Query		INCL | EXCL
*RST setting		EXCL
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:REL98 INCL"`		

CALL:PPRocedure:PMEasurement:MPRequest:REL98|RELEASE98:BTS[<n>]:EOTDiff

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the Expected OTD field in the Release 98 Extension element. This field indicates the OTD value that the MS is expected to measure between the BTS indicated by the [<n>] mnemonic and the reference BTS. The Release 98 Extension element is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:REL98 | RELEASE98" command to have it included.
Setting		Range: 0 to 1250 Resolution: 1 bit
Query		Range: 0 to 1250 Resolution: 1 bit
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:REL98:BTS2:EOTDiff 1010"`		

CALL:PPRocedure:PMEasurement:MPRequest:REL98|RELEASE98:BTS[<n>]:EOTDiff:UNCertainty

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sets the value of the Uncertainty of Expected OTD field in the Release 98 Extension element. This field indicates the uncertainty in the Expected OTD value. The Release 98 Extension element is optional. Use the "CALL:PPRocedure:PMEasurement:MPRequest:REL98|RELEASE98" command to have it included.
Setting		Range: 0 to 7 Resolution: 1
Query		Range: 0 to 7 Resolution: 1
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:REL98:BTS2:EOTDiff:UNCertainty 5"`		

CALL:PPRocedure:PMEasurement:MPRequest:SEND

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Sends the Measure Position Request component in an RRLP message.
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:MPRequest:SEND"`		

CALL:PPRocedure:PMEasurement:PERRor

```
CALL---:PPRocedure---:PMEasurement--+         +->
                                    |         |
 +----------------------------------+         |
 |                                            |
 +--:PERRor--+:CODE--+-------<sp><num value>--+
             |       +-? returns <num value>--+
             |                                |
             +:SEND---------------------------+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

“Diagram Conventions” on page 1

CALL:PPRocedure:PMEasurement:PERRor:CODE

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets the value of the Protocol Error component.
	EGPRS LA	
Setting		Range: 0 to 5 Resolution: 1 0: Undefined 1: Missing Component 2: Incorrect Data 3: Missing Information Element or Component Element 4: Message Too Short 5: Unknown Reference Number
Query		0 to 5
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PERRor:CODE 3"`		

CALL:PPRocedure:PMEasurement:PERRor:SEND

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sends the Protocol Error component in an RRLP message.
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PERRor:SEND"`		

CALL:PPRocedure:PMEasurement:PRESponse:AVAilable?

```
CALL---:PPRocedure---:PMEasurement---:PRESponse--+    +->
                                                 |    |
 +-----------------------------------------------+    |
 |                                                    |
 +-+:AVAilable------------------------? returns 1|0--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

“Diagram Conventions” on page 1

CALL:PPRocedure:PMEasurement:PRESponse:AVAilable?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the status of the Measurement Position Response from the mobile station. This query returns a “0” when the a request message has been sent but an acknowledgment has not been received from the mobile station. A “1” is returned after an acknowledgment has been received and before another Measurement Posistion Request message is sent.
Query		0 | 1 0: No results are available 1: Results are available
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;”CALL:PPRocedure:PMEasurement:PRESponse:AVAilable?”`		

CALL:PPRocedure:PMEasurement:PRESponse:LIERror

```
CALL---:PPRocedure---:PMEasurement---:PRESponse--+    +->
                                                 |    |
 +-----------------------------------------------+    |
 |                                                    |
 +--:LIERror----+:INCLuded-------------? returns 1|0--+
                +:REASon-------? returns <num value>--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

"Diagram Conventions" on page 1

CALL:PPRocedure:PMEasurement:PRESponse:LIERror:INCLuded?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries to determine if the optional Location Information Error element is included in the Measurement Position Response component from the MS. If this element is not included, none of the values in this element will be available. The will instead all return NAN (Not a number).
Query		0 | 1 0: Not included 1: Included
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LIERror:INCLuded?"`		

CALL:PPRocedure:PMEasurement:PRESponse:LIERror:REASon?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Error Reason field of the optional Location Information Error element. If the Location Information Error element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LIERror:INCLuded?" to determine if the element is included.
Query		Range: 0 to 10 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:LIERror:REASon?"
```

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation

```
CALL---:PPRocedure---:PMEasurement---:PRESponse--+                                      +->
                                                 |                                      |
 +-----------------------------------------------+                                      |
 |                                                                                      |
 +--:LINFormation--+:FTYPe----------------------------------------? returns <num value>--+
                  +:INCLuded---------------------------------------------? returns 1|0--+
                  +:PESTimate--+:ALTitude------+-----------------? returns <num value>--+
                  |            |               +:DIRection-------? returns <num value>--+
                  |            |               +:UNCertainty-----? returns <num value>--+
                  |            |                                                        |
                  |            +:CONFidence----------------------? returns <num value>--+
                  |            +:LATitude------+:DEGRees---------? returns <num value>--+
                  |            |               +:SIGN------------? returns <num value>--+
                  |            |                                                        |
                  |            +:LONGitude------:DEGRees---------? returns <num value>--+
                  |            +:MAJor----------:ORIentation-----? returns <num value>--+
                  |            +:SMAJor---------:UNCertainty-----? returns <num value>--+
                  |            +:SMINor---------:UNCertainty-----? returns <num value>--+
                  |            +:TYPe----------------------------? returns <num value>--+
                  |            +:UCODe---------------------------? returns <num value>--+
                  |                                                                     |
                  +:RFRame---------------------------------------? returns <num value>--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

"Diagram Conventions" on page 1

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:FTYPe?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Fix Type field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 1 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:FTYPe?"`		

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries to determine if the optional Location Information element is included in the Measurement Position Response component from the MS. If this element is not included, none of the values in this element will be available. The will instead all return NAN (Not a number).
Query		0 | 1 0: Not included 1: Included
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?"`		

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:RFRame?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Reference Frame field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 65535 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:RFRame?"`		

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:ALTitude?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Altitude element of the Shape Description information contained in the Position Estimate field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 32767 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:ALTitude?"`		

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:ALTitude:DIRection?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Direction of Altitude element of the Shape Description information contained in the Position Estimate field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 1 and 9.91E+37 (NAN) Resolution: 1 0: Altitude expresses height 1: Altitude expresses depth
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:ALTitude:DIRection?"
```

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:ALTitude:UNCertainty?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Uncertainty for the Altitude element of the Shape Description information contained in the Position Estimate field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 127 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:ALTitude:UNCertainty?"
```

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:CONFidence?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Confidence element of the Shape Description information contained in the Position Estimate field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 99 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:CONFidence?"`		

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:LATitude:DEGRees?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Degrees of Latitude element of the Shape Description information contained in the Position Estimate field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 2147483647 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:LATitude:DEGRees?"`		

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:LATitude:SIGN?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Sign of Latitude element of the Shape Description information contained in the Position Estimate field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 1 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:LATitude:SIGN?"
```

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:LONGitude:DEGRees?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Degrees of Longitude element of the Shape Description information contained in the Position Estimate field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?" to determine if the element is included.
Query		Range: -2147483647 to 2147483647 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:LONGitude:DEGRees?"
```

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:MAJor:ORIentation?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Orientation of the Major Axis element of the Shape Description information contained in the Position Estimate field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See “CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?” to determine if the element is included.
Query		Range: 0 to 127and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:SMINor:UNCertainty?"`		

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:SMAJor:UNCertainty?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Uncertainty for the Semi Major element of the Shape Description information contained in the Position Estimate field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See “CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?” to determine if the element is included.
Query		Range: 0 to 127and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:SMAJor:UNCertainty?"`		

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:SMINor:UNCertainty?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Uncertainty for the Semi Minor element of the Shape Description information contained in the Position Estimate field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 127and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:SMINor:UNCertainty?"`		

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:TYPE?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Type of Shape information contained in the Position Estimate field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 10 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:TYPE?"`		

CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:UCODe?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Uncertainty Code element of the Shape Description information contained in the Position Estimate field of the optional Location Information element. If the Location Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 127and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:LINFormation:PESTimate:UCODe?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation

```
CALL---:PPRocedure---:PMEasurement---:PRESponse---:MINFormation--+    +->
                                                                 |    |
 +---------------------------------------------------------------+    |
 |                                                                    |
 +--:INCLuded-----------------------------------------? returns 1|0--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation

```
CALL---:PPRocedure---:PMEasurement---:PRESponse---:MINFormation--+                      +->
                                                                 |                      |
 +---------------------------------------------------------------+                      |
 |                                                                                      |
 +--:SET[1-3]--+:BTS-----------+:BSICode-----------------------? returns 10x<num value>--+
               |               +:CARRier-----------------------? returns 10x<num value>--+
               |               +:CIDentity---------------------? returns 10x<num value>--+
               |               +:CITYpe------------------------? returns 10x<num value>--+
               |               +:LACode------------------------? returns 10x<num value>--+
               |               +:MEASurements--+:NUMBer--------? returns 10x<num value>--+
               |               |               +:SDEViation----? returns 10x<num value>--+
               |               |                                                        |
               |               +:MOFFset-----------------------? returns 10x<num value>--+
               |               +:NIPResent---------------------? returns 10x<num value>--+
               |               +:NUMBer---------------------------? returns <num value>--+
               |               +:OTDifference------------------? returns 10x<num value>--+
               |               +:RINDex------------------------? returns 10x<num value>--+
               |               +:SIINdex-----------------------? returns 10x<num value>--+
               |               +:TSLot-------------------------? returns 10x<num value>--+
               |                                                                        |
               +:FNUMber--------------------------------------------? returns <num value>--+
               +:MREFerence----+:INCLuded---------------------------------? returns 1|0--+
               |               +:NUMBer---------------------------? returns <num value>--+
               |               +:QUALity--------------------------? returns <num value>--+
               |                                                                        |
               +:SRESolution----------------------------------------? returns <num value>--+
               +:TACorrection--+----------------------------------? returns <num value>--+
               |               +:INCLuded---------------------------------? returns 1|0--+
               |                                                                        |
               +:TSLot----------------------------------------------? returns <num value>--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

“Diagram Conventions” on page 1

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries to determine if the optional E-OTD Measurement Information element is included in the Measurement Position Response component from the MS. If this element is not included, none of the values in this element will be available. Therefore, all the queries for the fields on this element will return NAN (Not a number).
Query		0 | 1 0: Not included 1: Included
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:BSICode?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Neighbor BSIC field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included. This query returns a Neighbor BSIC value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.
Query		Range: 0 to 63 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:BSICode?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:CARRier?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Neighbor BCCH Carrier field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included. This query returns a Neighbor BCCH value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.
Query		Range: 0 to 1023 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example:		

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:CARRier?"
```

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:CIDentity?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Neighbor CI field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included. This query returns a Neighbor CI value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.
Query		Range: 0 to 65535 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example:		

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:CIDentity?"
```

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:CITYpe?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Cell ID Type field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included. This query returns a Cell ID Type value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.
Query		Range: 0 to 5 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:CITYpe?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:LACode?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Neighbor LAC field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included. This query returns a Neighbor LAC value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.
Query		Range: 0 to 65535 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:LACode?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:MEASurements:NUMBer?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Number of EOTD Measurements field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See “CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?” to determine if the element is included. This query returns a Number of EOTD Measurements value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.
Query		Range: 0 to 7 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;”CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:MEASurements:NUMBer?”`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:MEASurements:SDEViation?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Standard Deviation of EOTD Measurements field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included. This query returns a Standard Deviation of EOTD Measurements value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.
Query		Range: 0 to 31 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:MEASurements:SDEViation?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:MOFFset?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Neighbor Multiframe Offset field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included. This query returns a Neighbor Multiframe Offset value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.
Query		Range: 0 to 51 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example:		

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:MOFFset?"
```

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:NIPResent?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Neighbor Identity Present field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 2 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See “CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?” to determine if the element is included. This query returns a Neighbor Identity Present value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.
Query		Range: 0 to 1 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;”CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:NIPResent?”`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:NUMBer?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Number of Measured Neighbors field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See “CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?” to determine if the element is included.
Query		Range: 0 to 10 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;”CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:NUMBer?”`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:OTDifference?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the OTD field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included. This query returns a OTD value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.
Query		Range: 0 to 39999 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:OTDifference?"
```

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:RINDex?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Request Index field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included. This query returns a Request Index value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.
Query		Range: 0 to 16 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example:		

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:RINDex?"
```

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:SIINdex?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the System Info Index field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included. This query returns a System Info Index value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.
Query		Range: 0 to 32 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:SIINDex?"
```

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:BTS:TSLot?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to the GSM Test Application.</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to the GPRS Test Application.</td></tr>
<tr><td>GSM/GPRS LA</td><td rowspan="2">Queries the Neighbor Time Slot field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included.

This query returns a Neighbor Time Slot value for each of the ten neighboring BTS that can be included in the Measurement Information element. The values are returned the order BTS1, BTS2, BTS3, BTS4, BTS5, BTS6, BTS7, BTS8, BTS9, BTS10. NAN (9.91E+37) will be returned for any neighbor that was not specified in the Measurement Information element.</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 to 3 and 9.91E+37 (NAN)
Resolution: 1</td></tr>
<tr><td rowspan="2">Requirements</td><td>GSM/GPRS LA</td><td>Revision: C.01 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision: A.01 and above</td></tr>
<tr><td colspan="3">Programming Example:
<code>OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:BTS:TSLot?"</code></td></tr>
</table>

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:FNUMber?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to the GSM Test Application.</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to the GPRS Test Application.</td></tr>
<tr><td>GSM/GPRS LA</td><td rowspan="2">Queries the Reference Frame Number field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included.</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 to 42431and 9.91E+37 (NAN)
Resolution: 1</td></tr>
<tr><td rowspan="2">Requirements</td><td>GSM/GPRS LA</td><td>Revision: C.01 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision: A.01 and above</td></tr>
<tr><td colspan="3">Programming Example:
<code>OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:FNUMBer?"</code></td></tr>
</table>

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:MREFerence:INCLuded?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries to determine if the Measurements of Reference BTS field is included in the E-OTD Measurement Information element of the Measurement Position Response component. If this field is not included, none of the values for this field will be available. Therefore, "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:MREFerence:QUALity?" and "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:MREFerence:NUMBer?" will all return NAN (Not a number).
Query		0 | 1 0: Not included 1: Included
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:MREFerence:INCLuded?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:MREFerence:NUMBer?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Number of Measurements field of the optional Measurements of Reference BTS field for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the Measurements of Reference BTS field is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:MREFerence:INCLuded?" to determine if the element is included.
Query		Range: 0 to 7 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:MREFerence:NUMBer?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:MREFerence:QUALity?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Reference Quality field of the optional Measurements of Reference BTS field for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the Measurements of Reference BTS field is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:MREFerence:INCLuded?" to determine if the element is included.
Query		Range: 0 to 31and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:MREFerence:QUALity?"
```

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:SRESolution?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Standard Resolution field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 3and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:SRESolution?"
```

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:TACorrection?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the value of the optional TA Correction field for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the TA Correction field is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:TACorrection:INCLuded?" to determine if the element is included.
Query		Range: 0 to 960 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:TACorrection?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:TACorrection:INCLuded?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries to determine if the TA Correction field is included in the E-OTD Measurement Information element of the Measurement Position Response component. If this field is not included, the value for this field will not be available. Therefore, "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:TACorrection?" will return NAN (Not a number).
Query		0 | 1 0: Not included 1: Included
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:TACorrection:INCLuded?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET[<n>]:TSLot?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Reference Time Slot field of the optional E-OTD Measurement Information element for the measurement information set indicated by the [<n>] mnemonic, where n can range from 1 to 3. If the E-OTD Measurement Information element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:INCLuded?" to determine if the element is included.
Query		Range: 0 to 3 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MINFormation:SET2:TSLot?"
```

CALL:PPRocedure:PMEasurement:PRESponse:MSETs

```
CALL---:PPRocedure---:PMEasurement---:PRESponse--+                +->
                                                 |                |
 +-----------------------------------------------+                |
 |                                                                |
 +-+:MSETs------+:INCLuded------------------------? returns 1|0--+
                +:RBTS-------+:NUMBer------? returns <num value>--+
                |            +:RELation----? returns <num value>--+
                |                                                 |
                +:SETS--------:NUMBer------? returns <num value>--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

“Diagram Conventions” on page 1

CALL:PPRocedure:PMEasurement:PRESponse:MSETs:INCLuded?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries to determine if the optional Multiple Sets element is included in the Measurement Position Response component from the MS. If this element is not included, none of the values in this element will be available. Therefore, "CALL:PPRocedure:PMEasurement:PRESponse:MSETs:SETS:NUMBer?" , "CALL:PPRocedure:PMEasurement:PRESponse:MSETs:RBTS:NUMBer?" , and "CALL:PPRocedure:PMEasurement:PRESponse:MSETs:RBTS:RELation?" will all return NAN (Not a number).
Query		0 | 1 0: Not included 1: Included
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MSETS:INCLuded?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MSETs:RBTS:NUMBer?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Number of Reference BTS field of the optional Multiple Sets element. If the Multiple Sets element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MSETs:INCLuded?" to determine if the element is included.
Query		Range: 1 to 3 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MSETS:RBTS:NUMBer?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MSETs:RBTS:RELation?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Queries the Reference BTS Relation to Measurement Elements field of the optional Multiple Sets element. If the Multiple Sets element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MSETs:INCLuded?" to determine if the element is included.
	EGPRS LA	
Query		Range: 0 to 2 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MSETS:RBTS:RELation?"`		

CALL:PPRocedure:PMEasurement:PRESponse:MSETs:SETS:NUMBer?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Queries the Reference BTS Relation to Measurement Elements field of the optional Multiple Sets element. If the Multiple Sets element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:MSETs:INCLuded?" to determine if the element is included.
	EGPRS LA	
Query		Range: 2 to 3 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:MSETS:SETS:NUMBer?"`		

CALL:PPRocedure:PMEasurement:PRESponse:RIDentity

```
CALL---:PPRocedure---:PMEasurement---:PRESponse--+                +->
                                                 |                |
 +-----------------------------------------------+                |
 |                                                                |
 +-+:RIDentity--+:BSICode----------------? returns 3x<num value>--+
                +:CARRier----------------? returns 3x<num value>--+
                +:CIDentity--------------? returns 3x<num value>--+
                +:CITYpe-----------------? returns 3x<num value>--+
                +:INCLuded-------------------------? returns 1|0--+
                +:LACode-----------------? returns 3x<num value>--+
                +:RINDex-----------------? returns 3x<num value>--+
                +:SIINdex----------------? returns 3x<num value>--+
```

These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

"Diagram Conventions" on page 1

CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:BSICode?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Reference BSIC field of the optional Reference BTS Identity element. If the Reference BTS Identity element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:INCLuded?" to determine if the element is included. This query returns the BSIC for the three potential reference BTS that can be included in the Reference BTS Identity element. The values are returned the order BTS1, BTS2, BTS3.
Query		Range: 0 to 63 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:BSICode?"`		

CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:CARRier?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Reference BCCH Carrier field of the optional Reference BTS Identity element. If the Reference BTS Identity element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:INCLuded?" to determine if the element is included. This query returns the BCCH Carrier for the three potential reference BTS that can be included in the Reference BTS Identity element. The values are returned the order BTS1, BTS2, BTS3.
Query		Range: 0 to 1023 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:CARRier?"`		

CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:CIDentity?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to the GSM Test Application.</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to the GPRS Test Application.</td></tr>
<tr><td>GSM/GPRS LA</td><td rowspan="2">Queries the Reference CI field of the optional Reference BTS Identity element. If the Reference BTS Identity element is not included, values for this field will not be available. See “CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:INCLuded?” to determine if the element is included.

This query returns the CI for the three potential reference BTS that can be included in the Reference BTS Identity element. The values are returned the order BTS1, BTS2, BTS3.</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 to 65535 and 9.91E+37 (NAN)
Resolution: 1</td></tr>
<tr><td rowspan="2">Requirements</td><td>GSM/GPRS LA</td><td>Revision: C.01 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision: A.01 and above</td></tr>
<tr><td colspan="3">Programming Example:
<code>OUTPUT 714;”CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:CIDentity?”</code></td></tr>
</table>

CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:CITYpe?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to the GSM Test Application.</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to the GPRS Test Application.</td></tr>
<tr><td>GSM/GPRS LA</td><td rowspan="2">Queries the Cell ID Type field of the optional Reference BTS Identity element. If the Reference BTS Identity element is not included, values for this field will not be available. See “CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:INCLuded?” to determine if the element is included.

This query returns the Cell ID Type for the three potential reference BTS that can be included in the Reference BTS Identity element. The values are returned the order BTS1, BTS2, BTS3.</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 to 4 and 9.91E+37 (NAN)
Resolution: 1</td></tr>
<tr><td rowspan="2">Requirements</td><td>GSM/GPRS LA</td><td>Revision: C.01 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision: A.01 and above</td></tr>
<tr><td colspan="3">Programming Example:
<code>OUTPUT 714;”CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:CITYpe?”</code></td></tr>
</table>

CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:INCLuded?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries to determine if the optional Reference BTS Identity element is included in the Measurement Position Response component from the MS. If this element is not included, none of the values in this element will be available. Therefore, "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:CITYpe?" , "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:LACode?" , "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:CIDentity?" , "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:CARRier?" , "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:BSICode?" , "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:RINDex?" and "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:SIINdex?" will all return NAN (Not a number).
Query		0 | 1 0: Not included 1: Included
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:INCLuded?"
```

CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:LACode?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Reference LAC field of the optional Reference BTS Identity element. If the Reference BTS Identity element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:INCLuded?" to determine if the element is included. This query returns the LAC for the three potential reference BTS that can be included in the Reference BTS Identity element. The values are returned the order BTS1, BTS2, BTS3.
Query		Range: 0 to 65535 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:LACode?"
```

CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:RINDex?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the Request Index field of the optional Reference BTS Identity element. If the Reference BTS Identity element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:INCLuded?" to determine if the element is included. This query returns an index for each of the three potential reference BTS that can be included in the Reference BTS Identity element. The values are returned the order BTS1, BTS2, BTS3.
Query		Range: 0 to 16 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:RINDex?"`		

CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:SIINdex?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Queries the System Info Index field of the optional Reference BTS Identity element. If the Reference BTS Identity element is not included, values for this field will not be available. See "CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:INCLuded?" to determine if the element is included. This query returns an index for each of the three potential reference BTS that can be included in the Reference BTS Identity element. The values are returned the order BTS1, BTS2, BTS3.
Query		Range: 0 to 32 and 9.91E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:PPRocedure:PMEasurement:PRESponse:RIDentity:SIINDex?"`		

CALL:RACode

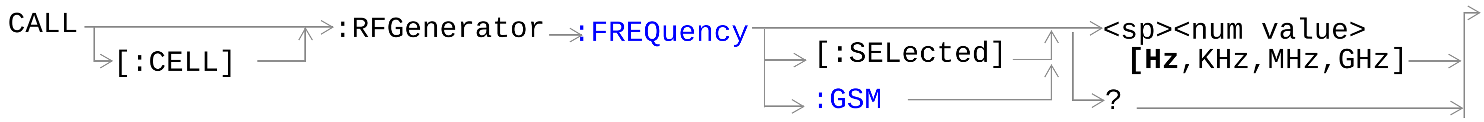
"Diagram Conventions" on page 1

CALL[:CELL]:RACode

Function	GSM TA	Sets/queries the value of the Routing Area Code (RAC). This can only be set when the Call Operating Mode parameter is set to Off (see "CALL:OPERating:MODE" on page 610).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 255 Resolution: 1
Query		Range: 0 to 255 Resolution: 1
*RST Setting		1
Related Topics		See "Configuring the Broadcast Channel (BCH)" on page 196.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:CELL:RACODE 111" !Sets the cell's routing area code to 111.
```

CALL:RFGenerator



"Diagram Conventions" on page 1

CALL[:CELL]:RFGenerator:FREQuency[:SELected]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the RF Generator Frequency for the active (that is the selected) format. Operating mode = Test Mode and Downlink Function = CW. See "CW Operating Mode Behavior" on page 183. The units (Hz|kHz|MHz|GHz) are optional, if no units are specified then units default to Hz.
Setting		Range: 292 MHz to 2700 MHz Resolution: 1
Query		Range: 292 MHz to 2700 MHz Resolution: 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:RFGENERATOR:FREQUENCY:SELECTED 896.2MHZ" !Sets RF Gen frequency.
```

CALL[:CELL]:RFGenerator:FREQuency:GSM

Function	GSM TA GSM/GPRS LA	Sets/queries the RF Gen Frequency for the GSM format whether or not that format is active. Operating mode = Test Mode and Downlink Function = CW. See “CW Operating Mode Behavior” on page 183. The units (Hz|kHz|MHz|GHz) are optional, if no units are specified then units default to Hz.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 292 MHz to 2700 MHz Resolution: 1
Query		Range: 292 MHz to 2700 MHz Resolution: 1
*RST Setting		939 MHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:CELL:RFGENERATOR:FREQUENCY:GSM 896.2MHZ" !Sets RF Gen frequency.
```

CALL:SETup

CALL :SETup :PDTCh | :PDTChannel [:ARFCn] [:SELected] | :DCS | :EGSM | :GSM450 | :GSM480 | :GSM750 | :GSM850 | :PCS | :PGSM | :RGSM <sp><num value> | ?

These commands are not applicable to GSM.

CALL :SETup :PDTCh | :PDTChannel

:BAND <sp>DCS|EGSM|GSM450|GSM480|GSM750|GSM850|PCS|**PGSM**|RGSM

? (returns DCS|EGSM|GSM450|GSM480|GSM750|GSM850|PCS|**PGSM**|RGSM

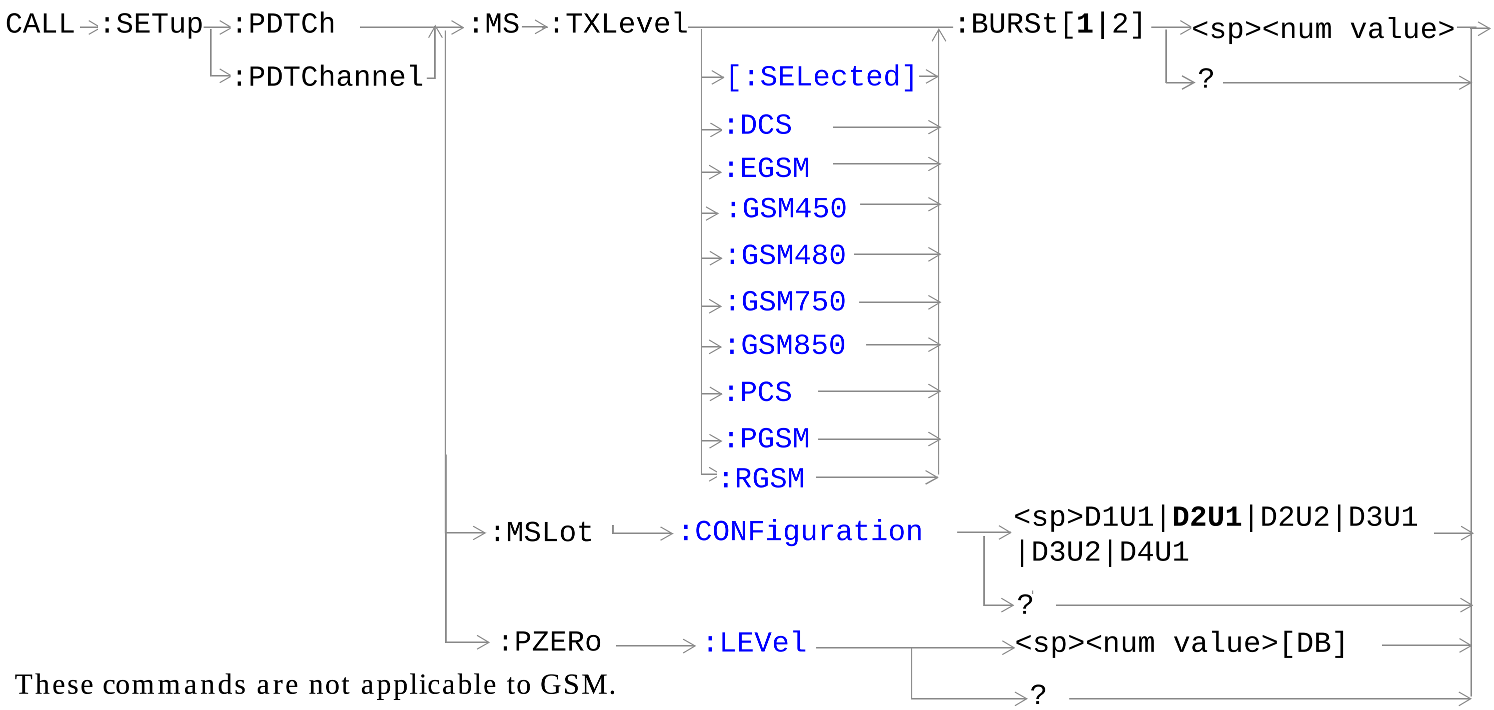
:CSCHeme <sp>CS1|CS2|CS3|**CS4**

? (returns CS1|CS2|CS3|CS4)

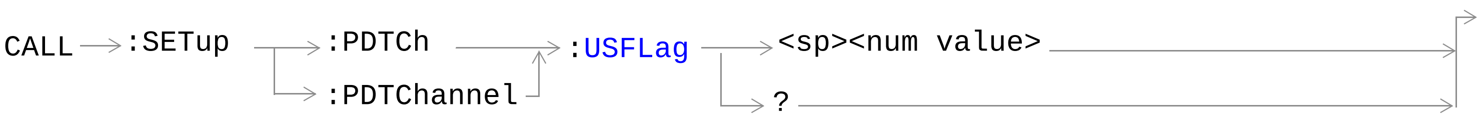
:MCSCheme* <sp>MCS1|MCS2|MCS3|**MCS4**|MCS5|MCS6|MCS7|MCS8|MCS9|UPLink, MCS1|MCS2|MCS3|**MCS4**|MCS5|MCS6|MCS7|MCS8|MCS9

? (returns MCS1|MCS2|MCS3|MCS4|MCS5|MCS6|MCS7|MCS8|MCS9|UPLink, MCS1|MCS2|MCS3|MCS4|MCS5|MCS6|MCS7|MCS8|MCS9)

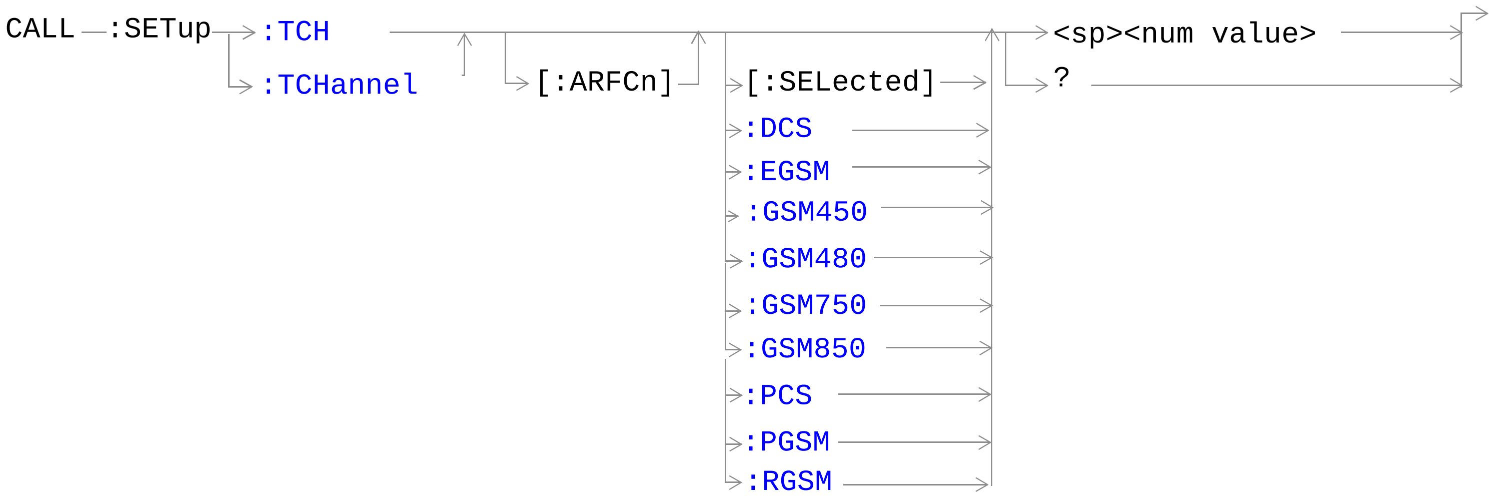
These commands are not applicable to GSM.
* This command is only applicable to the EGPRS lab application

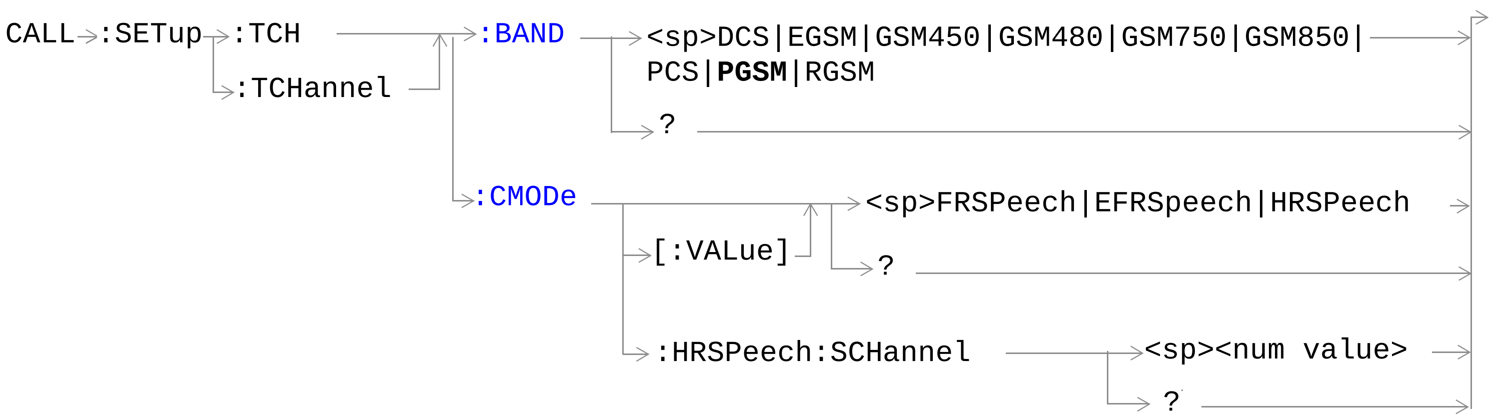


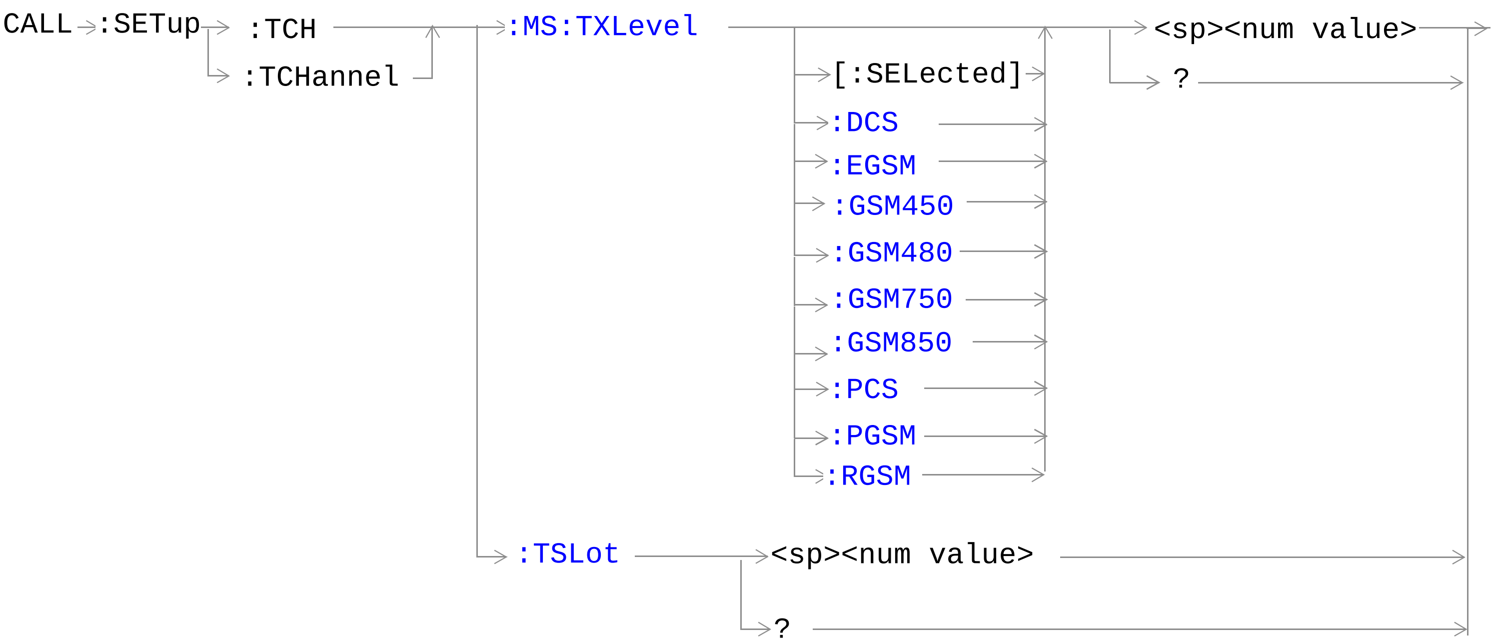
These commands are not applicable to GSM.



This command is applicable only to the GSM/GPRS and EGPRS lab applications.


CALL
:SETup
:TCH
:TCHannel
[:ARFCn]
[:SELected]
:DCS
:EGSM
:GSM450
:GSM480
:GSM750
:GSM850
:PCS
:PGSM
:RGSM
<sp><num value>
?


CALL
:SETup
:TCH
:TCHannel
:BAND
<sp>DCS|EGSM|GSM450|GSM480|GSM750|GSM850|
PCS|PGSM|RGSM
?
:CMODe
<sp>FRSPeech|EFRSpeech|HRSPeech
[:VALue]
?
:HRSPeech:SCHannel
<sp><num value>
?



“Diagram Conventions” on page 1

CALL:SETup:PDTCh[:ARFCn][:SELected]
CALL:SETup:PDTChannel[:ARFCn][:SELected]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred PDTCH ARFCN for the band specified using the command “CALL:SETup:PDTCh:BAND” on page 758. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548). The ARFCN range varies with the selected PDTCH band. The correspondence between ARFCN and frequency differs for each band and that a single ARFCN specifies a separate frequency for uplink and downlink. The PDTCH ARFCN selects the ARFCN for all the PDTCHs which you can configure. The PDTCH ARFCN is a frequency banded parameter. Refer to “Frequency Banded Parameters” on page 250 for a detailed description of the implications of being a banded parameter.
Setting		Range: • DCS band, channels 512 to 885 • EGSM band, channels 0 to 124 and 975 to 1023 • PCS band, channels 512 to 810 • PGSM band, channels 1 to 124 • RGSM band, channels 0 to 124 and 955 to 1023 • GSM450 band, channels 259 to 293 • GSM480 band, channels 306 to 340 • GSM750 band, channels 438 to 511 • GSM850 band, channels 128 to 251 Resolution: 1
Query		Range: • DCS band, channels 512 to 885 • EGSM band, channels 0 to 124 and 975 to 1023 • PCS band, channels 512 to 810 • PGSM band, channels 1 to 124 • RGSM band, channels 0 to 124 and 955 to 1023 • GSM450 band, channels 259 to 293 • GSM480 band, channels 306 to 340 • GSM750 band, channels 438 to 511 • GSM850 band, channels 128 to 251 Resolution: 1

*RST setting		PGSM, EGSM and RGSM bands: 30, DCS and PCS bands: 698, GSM450 band: 280, GSM480 band: 320, GSM750 band: 460, GSM850 band: 160
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;”CALL:SETup:PDTCh 515” !Sets the ARFCN to 515 if it is
                                     !appropriate in the current band.
```

CALL:SETup:PDTCH[:ARFCn]:DCS
CALL:SETup:PDTChannel[:ARFCn]:DCS

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred PDTCH ARFCN within the DCS band when selected. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548). The ARFCN range varies with the selected PDTCH band. A single ARFCN specifies a separate frequency for uplink and downlink The PDTCH ARFCN selects the ARFCN (and thus carrier frequency) for all the PDTCHs which you can configure. The PDTCH ARFCN is a frequency banded parameter. Refer to “Frequency Banded Parameters” on page 250 for a detailed description of the implications of being a banded parameter.
Setting		Range: 512 to 885 Resolution: 1
Query		Range: 512 to 885 Resolution: 1
*RST setting		698
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00
Programming Example		
`OUTPUT 714;”CALL:SETup:PDTCh:ARFCn:DCS 600 !Sets the ARFCN to 600 in the DCS band.`		

CALL:SETup:PDTCh[:ARFCn]:EGSM
CALL:SETup:PDTChannel[:ARFCn]:EGSM

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred PDTCH ARFCN within the EGSM band when selected. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548). The ARFCN range varies with the selected PDTCH band. A single ARFCN specifies a separate frequency for uplink and downlink The PDTCH ARFCN selects the ARFCN for all the PDTCHs which you can configure. The PDTCH ARFCN is a frequency banded parameter. Refer to “Frequency Banded Parameters” on page 250 for a detailed description of the implications of being a banded parameter.
Setting		Range: 0 to 124 | 975 to 1023 Resolution: 1
Query		Range: 0 to 124 | 975 to 1023 Resolution: 1
*RST setting		30
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;”CALL:SETup:PDTCh:ARFCn:EGSM 987” !Sets the ARFCN to 987 in the EGSM band.
```

CALL:SETup:PDTCh[:ARFCn]:GSM450
CALL:SETup:PDTChannel[:ARFCn]:GSM450

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred PDTCH ARFCN within the GSM450 band when selected. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see "CALL:HANDover | HANDoff[:IMMediate]" on page 548). The ARFCN range varies with the selected PDTCH band. A single ARFCN specifies a separate frequency for uplink and downlink The PDTCH ARFCN selects the ARFCN for all the PDTCHs which you can configure. The PDTCH ARFCN is a frequency banded parameter. Refer to "Frequency Banded Parameters" on page 250 for a detailed description of the implications of being a banded parameter.
Setting		Range: 259 to 293 Resolution: 1
Query		Range: 259 to 293 Resolution: 1
*RST setting		280
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00
Programming Example		
`OUTPUT 714;"CALL:SETup:PDTCh:ARFCn:GSM450 280" !Sets the ARFCN to 280 in the GSM450 band.`		

CALL:SETup:PDTCh[:ARFCn]:GSM480
CALL:SETup:PDTChannel[:ARFCn]:GSM480

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred PDTCH ARFCN within the GSM480 band when selected. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see "CALL:HANDover | HANDoff[:IMMediate]" on page 548). The ARFCN range varies with the selected PDTCH band. A single ARFCN specifies a separate frequency for uplink and downlink The PDTCH ARFCN selects the ARFCN for all the PDTCHs which you can configure. The PDTCH ARFCN is a frequency banded parameter. Refer to "Frequency Banded Parameters" on page 250 for a detailed description of the implications of being a banded parameter.
Setting		Range: 306 to 340 Resolution: 1
Query		Range: 306 to 340 Resolution: 1
*RST setting		320
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;"CALL:SETup:PDTCh:ARFCn:GSM480 320" !Sets the ARFCN to 320 in the GSM480 band.
```

CALL:SETup:PDTCh[:ARFCn]:GSM750
CALL:SETup:PDTChannel[:ARFCn]:GSM750

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred PDTCH ARFCN within the GSM750 band when selected. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548). The ARFCN range varies with the selected PDTCH band. A single ARFCN specifies a separate frequency for uplink and downlink The PDTCH ARFCN selects the ARFCN for all the PDTCHs which you can configure. The PDTCH ARFCN is a frequency banded parameter. Refer to “Frequency Banded Parameters” on page 250 for a detailed description of the implications of being a banded parameter.
Setting		Range: 438 to 511 Resolution: 1
Query		Range: 438 to 511 Resolution: 1
*RST setting		460
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;”CALL:SETup:PDTCh:ARFCn:GSM750 500” !Sets the ARFCN to 500 in the GSM750 band.
```

CALL:SETup:PDTCh[:ARFCn]:GSM850

CALL:SETup:PDTChannel[:ARFCn]:GSM850

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred PDTCH ARFCN within the GSM850 band when selected. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see "CALL:HANDover | HANDoff[:IMMediate]" on page 548). The ARFCN range varies with the selected PDTCH band. A single ARFCN specifies a separate frequency for uplink and downlink The PDTCH ARFCN selects the ARFCN for all the PDTCHs which you can configure. The PDTCH ARFCN is a frequency banded parameter. Refer to "Frequency Banded Parameters" on page 250 for a detailed description of the implications of being a banded parameter.
Setting		Range: 128 to 251 Resolution: 1
Query		Range: 128 to 251 Resolution: 1
*RST setting		160
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00
Programming Example `OUTPUT 714;"CALL:SETup:PDTCh:ARFCn:GSM850 230" !Sets the ARFCN to 230 in the GSM850 band.`		

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred PDTCH ARFCN within the PCS band when selected. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see "CALL:HANDover | HANDoff[:IMMediate]" on page 548). The ARFCN range varies with the selected PDTCH band. A single ARFCN specifies a separate frequency for uplink and downlink The PDTCH ARFCN selects the ARFCN (and thus carrier frequency) for all the PDTCHs you can configure. The PDTCH ARFCN is a frequency banded parameter. Refer to "Frequency Banded Parameters" on page 250 for a detailed description of the implications of being a banded parameter.

Setting		Range: 512 to 810 Resolution: 1
Query		Range: 512 to 810 Resolution: 1
*RST setting		698
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;"CALL:SETup:PDTCh:ARFCn:PCS 608" !Sets the ARFCN to 608 in the PCS band.
```

CALL:SETup:PDTCh[:ARFCn]:PGSM
CALL:SETup:PDTChannel[:ARFCn]:PGSM

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred PDTCH ARFCN within the PGSM band when selected. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548). The ARFCN range varies with the selected PDTCH band. A single ARFCN specifies a separate frequency for uplink and downlink The PDTCH ARFCN selects the ARFCN for all the PDTCHs which you can configure. The PDTCH ARFCN is a frequency banded parameter. Refer to “Frequency Banded Parameters” on page 250 for a detailed description of the implications of being a banded parameter.
Setting		Range: 1 to 124 Resolution: 1
Query		Range: 1 to 124 Resolution: 1
*RST setting		30
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00
Programming Example		

```
OUTPUT 714;”CALL:SETup:PDTCh:ARFCn:PGSM 44” !Sets the ARFCN to 44 in the PGSM band.
```

CALL:SETup:PDTCh[:ARFCn]:RGSM
CALL:SETup:PDTChannel[:ARFCn]:RGSM

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred PDTCH ARFCN within the RGSM band when selected. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548). The ARFCN range varies with the selected PDTCH band. A single ARFCN specifies a separate frequency for uplink and downlink The PDTCH ARFCN selects the ARFCN for all the PDTCHs which you can configure. The PDTCH ARFCN is a frequency banded parameter. Refer to “Frequency Banded Parameters” on page 250 for a detailed description of the implications of being a banded parameter.
Setting		Range: 0 to 124 | 955 to 1023 Resolution: 1
Query		Range: 0 to 124 | 955 to 1023 Resolution: 1
*RST setting		30
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00
Programming Example		
`OUTPUT 714;”CALL:SETup:PDTCh:ARFCn:RGSM 100” !Sets the ARFCN to 100 in the RGSM band.`		

CALL:SETup:PDTCh:BAND

CALL:SETup:PDTChannel:BAND

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the deferred GSM band. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see "CALL:HANDover | HANDoff[:IMMediate]" on page 548).
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: PGSM | EGSM | GSM450 | GSM480 | GSM750 | GSM850 | DCS | PCS | RGSM
Query		Range: PGSM | EGSM | GSM450 | GSM480 | GSM750 | GSM850 | DCS | PCS | RGSM
*RST setting		PGSM
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00
Programming Example `OUTPUT 714;"CALL:SETup:PDTCh:BAND DCS" !Sets the deferred band to DCS`		

CALL:SETup:PDTCh:CSCHeme
CALL:SETup:PDTChannel:CSCHeme

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the deferred PDTCH coding scheme. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see "CALL:HANDover | HANDoff[:IMMediate]" on page 548). When a Coding Scheme change is executed, all measurements and BLER reports are stopped before the change is made, and re-started after the change has taken effect.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: CS1 | CS2| CS3 | CS4
Query		Range: CS1 | CS2 | CS3 | CS4
*RST setting		CS4
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;"CALL:SETup:PDTCh:CSCHeme CS4" !Sets the PDTCH deferred coding scheme to CS4
```

CALL:SETup:PDTCh:MCSCheme
CALL:SETup:PDTChannel:MCSCheme

Function	GSM TA	This command is not applicable to the GSM TA.
	GPRS TA	This command is not applicable to the GPRS TA.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command sets/queries the deferred modulation coding scheme used for transmission on the downlink and uplink in Active Cell operating mode. Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548).
Setting		Range: <downlink>, <uplink> <downlink> can be set to one of the following values: • MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 | MCS9 | UPLink <uplink> can be set to one of the following values: • MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 | MCS9
Query		Range: <downlink>, <uplink> <downlink> returns one of the following values: • MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 | MCS9 | UPLink <uplink> returns one of the following values: • MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 | MCS9
*RST setting		MCS4
Requirements	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;"CALL:SETup:PDTCh:MCSCheme MCS2, MCS2" !Sets the PDTCH deferred modulation coding scheme for the downlink and uplink to MCS2.
```

CALL:SETup:PDTCh:MS:TXLevel[:SELected]:BURSt[1|2]

CALL:SETup:PDTChannel:MS:TXLevel[:SELected]:BURSt[1|2]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred mobile station transmit power level for the deferred PDTCH band. The transmit power is set individually for each uplink burst. Depending on the “Multislot Configuration” setting, there will be either one or two uplink bursts (burst 1 and burst 2) - burst 1 is in the first uplink slot specified, not timeslot 1, similarly burst 2 is in the second slot specified, not timeslot 2 (see “CALL:SETup:PDTCh:MS:TXLevel[:SELected]:BURSt[1|2]” on page 761). Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548). The mobile station transmit power level is a frequency banded parameter. Refer to “Frequency Banded Parameters” on page 250 for a detailed description of the implications of being a banded parameter. The mobile station transmit power level is a bursted parameter. Refer to “Bursted Parameters” on page 208 for a detailed description of being a bursted parameter.
Setting		Range: 0 to 31 Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST setting		PGSM, EGSM RGSM, GSM450, GSM480, GSM750 and GSM850 bands:15, DCS and PCS bands: 10
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;”CALL:SETup:PDTCh:MS:TXLevel:BURSt2 13”! Sets the deferred mobile station TX
                                                  !level for the 2nd uplink burst in
                                                     !the currently selected band.
```

CALL:SETup:PDTCh:MS:TXLevel:DCS:BURSt[1|2]
CALL:SETup:PDTChannel:MS:TXLevel:DCS:BURSt[1|2]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred mobile station transmit power level for the DCS band. The transmit power is set individually for each uplink burst. Depending on the “Multislot Configuration” setting, there will be either one or two uplink bursts (burst 1 and burst 2) - burst 1 is in the first uplink slot specified, not timeslot 1, similarly burst 2 is in the second slot specified, not timeslot 2 (see “CALL:SETup:PDTCh:MS:TXLevel[:SELected]:BURSt[1|2]” on page 761). Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548). The mobile station transmit power level is a frequency banded parameter. Refer to “Frequency Banded Parameters” on page 250 for a detailed description of the implications of being a banded parameter. The mobile station transmit power level is a bursted parameter. Refer to “Bursted Parameters” on page 208 for a detailed description of being a bursted parameter.
Setting		Range: 0 to 31 Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST setting		10
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;"CALL:SETup:PDTCh:MS:TXLevel:DCS:BURST1 13" !Sets the deferred mobile station
                                                       !TX level for the 1st uplink
                                                          !burst to 13 in the DCS band.
```

CALL:SETup:PDTCh:MS:TXLevel:EGSM:BURSt[1|2]
CALL:SETup:PDTChannel:MS:TXLevel:EGSM:BURSt[1|2]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred mobile station transmit power level for the EGSM band. The transmit power is set individually for each uplink burst. Depending on the "Multislot Configuration" setting, there will be either one or two uplink bursts (burst 1 and burst 2) - burst 1 is in the first uplink slot specified, not timeslot 1, similarly burst 2 is in the second slot specified, not timeslot 2 (see "CALL:SETup:PDTCh:MS:TXLevel[:SELected]:BURSt[1|2]" on page 761). Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see "CALL:HANDover | HANDoff[:IMMediate]" on page 548). The mobile station transmit power level is a frequency banded parameter. Refer to "Frequency Banded Parameters" on page 250 for a detailed description of the implications of being a banded parameter. The mobile station transmit power level is a bursted parameter. Refer to "Bursted Parameters" on page 208 for a detailed description of being a bursted parameter.
Setting		Range: 0 to 31 Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST setting		15
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;"CALL:SETup:PDTCh:MS:TXLevel:EGSM:BURSt1 19"! Sets the deferred mobile
                                                        !station TX level for the 1st
                                                        !uplink burst to 19 in the EGSM
                                                           !band.
```

CALL:SETup:PDTCh:MS:TXLevel:GSM450:BURSt[1|2]
CALL:SETup:PDTChannel:MS:TXLevel:GSM450:BURSt[1|2]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred mobile station transmit power level for the GSM450 band. The transmit power is set individually for each uplink burst. Depending on the "Multislot Configuration" setting, there will be either one or two uplink bursts (burst 1 and burst 2) - burst 1 is in the first uplink slot specified, not timeslot 1, similarly burst 2 is in the second slot specified, not timeslot 2 (see "CALL:SETup:PDTCh:MS:TXLevel[:SELected]:BURSt[1|2]" on page 761). Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see "CALL:HANDover | HANDoff[:IMMediate]" on page 548). The mobile station transmit power level is a frequency banded parameter. Refer to "Frequency Banded Parameters" on page 250 for a detailed description of the implications of being a banded parameter. The mobile station transmit power level is a bursted parameter. Refer to "Bursted Parameters" on page 208 for a detailed description of being a bursted parameter.
Setting		Range: 0 to 31 Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST setting		15
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;"CALL:SETup:PDTCh:MS:TXLevel:GSM450:BURSt1 19"! Sets the deferred mobile
                                                        !station TX level for the 1st
                                                        !uplink burst to 19 in the GSM450
                                                            !band.
```

CALL:SETup:PDTCh:MS:TXLevel:GSM480:BURSt[1|2]
CALL:SETup:PDTChannel:MS:TXLevel:GSM480:BURSt[1|2]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred mobile station transmit power level for the GSM480 band. The transmit power is set individually for each uplink burst. Depending on the “Multislot Configuration” setting, there will be either one or two uplink bursts (burst 1 and burst 2) - burst 1 is in the first uplink slot specified, not timeslot 1, similarly burst 2 is in the second slot specified, not timeslot 2 (see “CALL:SETup:PDTCh:MS:TXLevel[:SELected]:BURSt[1|2]” on page 761). Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548). The mobile station transmit power level is a frequency banded parameter. Refer to “Frequency Banded Parameters” on page 250 for a detailed description of the implications of being a banded parameter. The mobile station transmit power level is a bursted parameter. Refer to “Bursted Parameters” on page 208 for a detailed description of being a bursted parameter.
Setting		Range: 0 to 31 Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST setting		15
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;"CALL:SETup:PDTCh:MS:TXLevel:GSM480:BURSt1 19"! Sets the deferred mobile
                                                          !station TX level for the 1st
                                                          !uplink burst to 19 in the GSM480
                                                             !band.
```

CALL:SETup:PDTCh:MS:TXLevel:GSM750:BURSt[1|2]
CALL:SETup:PDTChannel:MS:TXLevel:GSM750:BURSt[1|2]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred mobile station transmit power level for the GSM750 band. The transmit power is set individually for each uplink burst. Depending on the "Multislot Configuration" setting, there will be either one or two uplink bursts (burst 1 and burst 2) - burst 1 is in the first uplink slot specified, not timeslot 1, similarly burst 2 is in the second slot specified, not timeslot 2 (see "CALL:SETup:PDTCh:MS:TXLevel[:SELected]:BURSt[1|2]" on page 761). Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see "CALL:HANDover | HANDoff[:IMMediate]" on page 548). The mobile station transmit power level is a frequency banded parameter. Refer to "Frequency Banded Parameters" on page 250 for a detailed description of the implications of being a banded parameter. The mobile station transmit power level is a bursted parameter. Refer to "Bursted Parameters" on page 208 for a detailed description of being a bursted parameter.
Setting		Range: 0 to 31 Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST setting		15
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;"CALL:SETup:PDTCh:MS:TXLevel:GSM750:BURSt1 19"! Sets the deferred mobile
                                                     !station TX level for the 1st
                                                     !uplink burst to 19 in the GSM750
                                                        !band.
```

CALL:SETup:PDTCh:MS:TXLevel:PCS:BURSt[1|2]
CALL:SETup:PDTChannel:MS:TXLevel:PCS:BURSt[1|2]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred mobile station transmit power level for the PCS band. The transmit power is set individually for each uplink burst. Depending on the “Multislot Configuration” setting, there will be either one or two uplink bursts (burst 1 and burst 2) - burst 1 is in the first uplink slot specified, not timeslot 1, similarly burst 2 is in the second slot specified, not timeslot 2 (see “CALL:SETup:PDTCh:MS:TXLevel[:SELected]:BURSt[1|2]” on page 761). Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548). The mobile station transmit power level is a frequency banded parameter. Refer to “Frequency Banded Parameters” on page 250 for a detailed description of the implications of being a banded parameter. The mobile station transmit power level is a bursted parameter. Refer to “Bursted Parameters” on page 208 for a detailed description of being a bursted parameter.
Setting		Range: 0 to 31 Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST setting		10
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;”CALL:SETup:PDTCh:MS:TXLevel:PCS:BURST2 12” !Sets the deferred mobile station
                                                       !TX Level for the 2nd uplink
                                                          !burst to 12 in the PCS band.
```

CALL:SETup:PDTCh:MS:TXLevel:PGSM:BURSt[1|2]
CALL:SETup:PDTChannel:MS:TXLevel:PGSM:BURSt[1|2]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred mobile station transmit power level for the PGSM band. The transmit power is set individually for each uplink burst. Depending on the “Multislot Configuration” setting, there will be either one or two uplink bursts (burst 1 and burst 2) - burst 1 is in the first uplink slot specified, not timeslot 1, similarly burst 2 is in the second slot specified, not timeslot 2 (see “CALL:SETup:PDTCh:MS:TXLevel[:SELected]:BURSt[1|2]” on page 761). Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548). The mobile station transmit power level is a frequency banded parameter. Refer to “Frequency Banded Parameters” on page 250 for a detailed description of the implications of being a banded parameter. The mobile station transmit power level is a bursted parameter. Refer to “Bursted Parameters” on page 208 for a detailed description of being a bursted parameter.
Setting		Range: 0 to 31 Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST setting		15
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;”CALL:SETup:PDTCh:MS:TXLevel:PGSM:BURSt2 21” !Sets the deferred mobile
                                                        !station TX Level for the 2nd
                                                        !uplink burst to 21 in the PGSM
                                                           !band.
```

CALL:SETup:PDTCh:MS:TXLevel:RGSM:BURSt[1|2]
CALL:SETup:PDTChannel:MS:TXLevel:RGSM:BURSt[1|2]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred mobile station transmit power level for the RGSM band. The transmit power is set individually for each uplink burst. Depending on the “Multislot Configuration” setting, there will be either one or two uplink bursts (burst 1 and burst 2) - burst 1 is in the first uplink slot specified, not timeslot 1, similarly burst 2 is in the second slot specified, not timeslot 2 (see “CALL:SETup:PDTCh:MS:TXLevel[:SELected]:BURSt[1|2]” on page 761). Deferred parameters are applied when a channel change is executed using the CALL:HANDover command (see “CALL:HANDover | HANDoff[:IMMediate]” on page 548). The mobile station transmit power level is a frequency banded parameter. Refer to “Frequency Banded Parameters” on page 250 for a detailed description of the implications of being a banded parameter. The mobile station transmit power level is a bursted parameter. Refer to “Bursted Parameters” on page 208 for a detailed description of being a bursted parameter.
Setting		Range: 0 to 31 Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST setting		15
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;”CALL:SETup:PDTCh:MS:TXLevel:RGSM:BURSt1 19”! Sets the deferred mobile
                                                      !station TX level for the 1st
                                                      !uplink burst to 19 in the RGSM
                                                         !band.
```

CALL:SETup:PDTCh:MSLot:CONFiguration

CALL:SETup:PDTChannel:MSLot:CONFiguration

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to GSM.</td></tr>
<tr><td>GPRS TA</td><td rowspan="3">This command sets/queries the deferred number of downlink and uplink PDTCHs. These deferred PDTCHs are only applied when the Execute Channel Change action is initiated using “CALL:HANDover | HANDoff[:IMMediate]” on page 548.

The effect this command has on the number of uplink and downlink timeslots depends on the Data Connection Type:
Type A - The multislot configuration command only affects the number of uplink timeslots, therefore configurations D1U1, D2U1, D3U1, and D4U1 will appear similar.
Type B - The multislot configuration command constrains the number of uplink timeslots to be less than or equal to the number of downlink timeslots.
BLER - The multislot configuration command only affects the number of downlink timeslots, therefore D2U2 and D2U1 will appear similar.
The actual timeslots used in each configuration are fixed as follows:<table><tr><th>Multislot Configuration</th><th>Downlink Timeslots Used</th><th>Uplink Timeslots Used</th></tr><tr><td>D1U1</td><td>3</td><td>3</td></tr><tr><td>D2U1</td><td>3, 4</td><td>4</td></tr><tr><td>D2U2</td><td>3, 4</td><td>3, 4</td></tr><tr><td>D3U1</td><td>3, 4, 5</td><td>4</td></tr><tr><td>D3U2</td><td>3, 4, 5</td><td>4, 5</td></tr><tr><td>D4U1</td><td>3, 4, 5, 6</td><td>5</td></tr></table>
When the Multislot Configuration is set to D1U1, D2U1, D3U1 or D4U1 the measurement burst is set to 1.

When a multislot configuration change is executed, all measurements are stopped before the change is made, and restarted after the change has taken effect.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>D1U1 | D2U1 | D2U2 | D3U1 | D3U2 | D4U1

“D<n>U<m>” corresponds to “Downlink<n>Uplink<m>”, where <n> indicates the number of downlink timeslots and <m> represents the number of uplink timeslots.</td></tr>
<tr><td colspan="2">Query</td><td>Range: D1U1 | D2U1 | D2U2 | D3U1 | D3U2 | D4U1</td></tr>
<tr><td colspan="2">*RST Setting</td><td>D2U1</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00</td></tr>
<tr><td colspan="3">Programming Example
<pre>OUTPUT 714;”CALL:SETup:PDTCh:MSLot:CONFiguration D2U2” !Sets the number of downlink
                                                      !timeslots to 2 and uplink
                                                         !timeslots to 2.</pre></td></tr>
</table>

CALL:SETup:PDTCh:PZERo:LEVel
CALL:SETup:PDTChannel:PZERo:LEVel

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the deferred Power Reduction reference level to be used for connections. Deferred parameters are applied when the Execute Channel Change action is initiated using “CALL:HANDover | HANDoff[:IMMediate]” on page 548. When Data Connection Type “ETSI Type A” is used, there is no downlink PDTCH and therefore changing this parameter has no effect other than remembering the new value until the Data Connection Type “ETSI Type B” or “BLER” is used.
Setting		Range: 0 to 30 dB Resolution: 2 dB
Query		Range: 0 to 30 dB Resolution: 2 dB
*RST setting		0 dB
Requirements	GSM/GPRS TA	Revision A.01.00
	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;”CALL:SETup:PDTCh:PZERo:LEVel 15 dB” ! Sets the deferred Power Reduction
                                                  ! reference level to 15 dB.
```

CALL:SETup:PDTCh:USFLag
CALL:SETup:PDTChannel:USFLag

Function	GSM	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	This command sets/queries the uplink state flag (USF) for handoffs. The USF allows multiple mobiles to share over-the-ari resources. The USF allows you to verify that your device under test only responds when required.
	EGPRS LA	
Setting		Range: 0 to 7 Resolution: 1
Query		Range: 0 to 7 Resolution: 1
*RST Setting		0
Requirements	GSM/GPRS LA	Revision C.01.00
	EGPRS LA	Revision A.01.00

Programming Example

```
OUTPUT 714;”CALL:SETUP:PDTCh:USFLAG 5” !Sets the handoff uplink state flag to 5.
```

CALL:SETup:TCH[:ARFCn][:SELected]
CALL:SETup:TCHannel[:ARFCn][:SELected]

Function	GSM TA	Sets/queries the channel number of downlink and uplink TCH for the band already selected.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: • DCS band, channels 512 to 885 (default: 698) • EGSM band, channels 0 to 124 and 975 to 1023 (default: 30) • GSM450 band, channels 259 to 293 (default: 280) • GSM480 band, channels 306 to 340 (default: 320) • GSM750 band, channels 438 to 511 (default: 460) • GSM850 band, channels 128 to 251 (default: 160) • PCS band, channels 512 to 810 (default: 698) • PGSM band, channels 1 to 124 (default: 30) • RGSM band, channels 0 to 124 and 955 to 1023 (default: 30) Resolution: 1
Query		Range: • DCS band, channels 512 to 885 • EGSM band, channels 0 to 124 and 975 to 1023 • GSM450 band, channels 259 to 293 • GSM480 band, channels 306 to 340 • GSM750 band, channels 438 to 511 • GSM850 band, channels 128 to 251 • PCS band, channels 512 to 810 • PGSM band, channels 1 to 124 • RGSM band, channels 0 to 124 and 955 to 1023 Resolution: 1
*RST Setting		PGSM, EGSM and RGSM bands: 30, DCS and PCS bands: 698, GSM450: 280, GSM480: 320, GSM750: 460, GSM850: 160
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:SETup:TCH 515" !Sets the ARFCN to 515 if it is
                                  !appropriate in the current band.
```

CALL:SETup:TCH[:ARFCn]:DCS
CALL:SETup:TCHannel[:ARFCn]:DCS

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for the DCS band. See "Configuring the Traffic Channel (TCH)" on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATe][:VOICe]?" on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 512 to 885 (default: 698) Resolution: 1
Query		Range: 512 to 885 Resolution: 1
*RST Setting		698
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:SETup:TCH:ARFCn:DCS 600 !Sets the ARFCN to 600 in the DCS band.
```

CALL:SETup:TCH[:ARFCn]:EGSM
CALL:SETup:TCHannel[:ARFCn]:EGSM

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for EGSM band. See "Configuring the Traffic Channel (TCH)" on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATe][:VOICe]?" on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 124 | 975 to 1023 (default: 30) Resolution: 1
Query		Range: 0 to 124 | 975 to 1023 Resolution: 1
*RST Setting		30
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:SETup:TCH:ARFCn:EGSM 987" !Sets the ARFCN to 987 in the EGSM band.
```

CALL:SETup:TCH[:ARFCn]:GSM450
CALL:SETup:TCHannel[:ARFCn]:GSM450

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for GSM450 band. See "Configuring the Traffic Channel (TCH)" on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATe][:VOICe]?" on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 259 to 293 Resolution: 1
Query		Range: 259 to 293 Resolution: 1
*RST Setting		280
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:SETup:TCH:ARFCn:GSM450 280" !Sets the ARFCN to 280 in the GSM450 band.`		

CALL:SETup:TCH[:ARFCn]:GSM480
CALL:SETup:TCHannel[:ARFCn]:GSM480

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for GSM480 band. See "Configuring the Traffic Channel (TCH)" on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATe][:VOICe]?" on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 306 to 340 Resolution: 1
Query		Range: 306 to 340 Resolution: 1
*RST Setting		320
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:SETup:TCH:ARFCn:GSM480 320" !Sets the ARFCN to 320 in the GSM480 band.`		

CALL:SETup:TCH[:ARFCn]:GSM750
CALL:SETup:TCHannel[:ARFCn]:GSM750

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for GSM750 band. See "Configuring the Traffic Channel (TCH)" on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATe][:VOICe]?" on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 438 to 511 Resolution: 1
Query		Range: 438 to 511 Resolution: 1
*RST Setting		460
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:SETup:TCH:ARFCn:GSM750 500" !Sets the ARFCN to 500 in the GSM750 band.`		

CALL:SETup:TCH[:ARFCn]:GSM850

CALL:SETup:TCHannel[:ARFCn]:GSM850

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for the GSM850 band. See "Configuring the Traffic Channel (TCH)" on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATe][:VOICe]?" on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 128 to 251 Resolution: 1
Query		Range: 128 to 251 Resolution: 1
*RST Setting		160
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:SETup:TCH:ARFCn:GSM850 230" !Sets the ARFCN to 230 in the GSM850 band.`		

CALL:SETup:TChannel[:ARFCn]:PCS

Function	GSM TA	Sets/queries the channel number for downlink and uplink TCH for the PCS band. See “Configuring the Traffic Channel (TCH)” on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see “CALL:STATus[:STATe][:VOICe]?” on page 808.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 512 to 810 (default: 698) Resolution: 1
Query		Range: 512 to 810 Resolution: 1
*RST Setting		698
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;”CALL:SETup:TCH:ARFCn:PCS 608” !Sets the ARFCN to 608 in the PCS band.
```

CALL:SETup:TCH[:ARFCn]:PGSM
CALL:SETup:TChannel[:ARFCn]:PGSM

Function	GSM TA	Sets/queries the channel number for downlink and uplink TCH for the PGSM band. See “Configuring the Traffic Channel (TCH)” on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see “CALL:STATus[:STATe][:VOICe]?” on page 808.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 to 124 (default: 30) Resolution: 1
Query		Range: 1 to 124 Resolution: 1
*RST Setting		30
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;”CALL:SETup:TCH:ARFCn:PGSM 44” !Sets the ARFCN to 44 in the PGSM band.
```

CALL:SETup:TCH[:ARFCn]:RGSM
CALL:SETup:TCHannel[:ARFCn]:RGSM

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for the RGSM band. See “Configuring the Traffic Channel (TCH)” on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see “CALL:STATus[:STATe][:VOICe]?” on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 124 | 955 to 1023 Resolution: 1
Query		Range: 0 to 124 | 955 to 1023 Resolution: 1
*RST Setting		30
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:SETup:TCH:ARFCn:RGSM 100" !Sets the ARFCN to 100 in the RGSM band.
```

CALL:SETup:TCH:BAND

CALL:SETup:TCHannel:BAND

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries which GSM band the BS Emulator should use for the TCH. The test set may be queried for the current TCH band when the CALL:STATUS:STATE is idle or connected, see “CALL:STATus[:STATe][:VOICe]?” on page 808. The test set uses this command to perform a channel assignment, see “How the Test Set Performs a Dualband Handover” on page 249 when the MS will support the band and the CALL:STATUS:STATE is CONNected.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: PGSM | DCS | EGSM | GSM450 | GSM480 | GSM750 | GSM850 | PCS | RGSM Resolution: 1
Query		Range: PGSM | DCS | EGSM | GSM450 | GSM480 | GSM750 | GSM850 | PCS | RGSM Resolution: 1
*RST Setting		PGSM
Related Topic		See “Traffic Band Parameter” on page 254.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;”CALL:SETup:TCH:BAND DCS” !Sets the deferred band to DCS
```

CALL:SETup:TCH:CMODe[:VALue]
CALL:SETup:TCHannel:CMODe[:VALue]

Function	GSM TA	Sets/queries which channel mode the mobile station should use for speech data. This setting is either full rate speech (FRSPeech), enhanced full rate speech (EFRSpeech) or half rate speech (HRSPeech). See "Programming a Channel Mode Change" on page 322.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: FRSPeech | EFRSpeech | HRSPeech
Query		Range: FRSPeech | EFRSpeech | HRSPeech
*RST Setting		FRSPeech
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:SETup:TCH:CMODe EFRSpeech" !Sets the TCH coding mode to EFRSpeech
```

CALL:SETup:TCH:CMODe:HRSPeech:SCHannel
CALL:SETup:TCHannel:CMODe:HRSPeech:SCHannel

Function	GSM TA	Sets/queries the half rate sub channel for half rate speech.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 | 1
Query		Range: 0 | 1
*RST Setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:SETup:TCH:CMODe:HRSPeech:SCH 1" !Sets TCH half rate speech sub channel
```

CALL:SETup:TCH:MS:TXLevel[:SELected]
CALL:SETup:TCHannel:MS:TXLevel[:SELected]

Function	GSM TA	This command selects the mobile station uplink power control level for the band already selected. See “Frequency Banded Parameters” on page 250.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 31 Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		Band: PGSM TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:SETup:TCH:MS:TXLevel 19”! Sets the deferred mobile station
                                         ! TX level for the currently selected band.
```

CALL:SETup:TCH:MS:TXLevel:DCS
CALL:SETup:TCHannel:MS:TXLevel:DCS

Function	GSM TA	This command selects the mobile station uplink power control level for the DCS band. See "Frequency Banded Parameters" on page 250.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 31 (default 10) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:SETup:TCH:MS:TXLevel:DCS 19" !Sets the deferred mobile station
                                              !TX level for the DCS band.
```

CALL:SETup:TCH:MS:TXLevel:EGSM
CALL:SETup:TCHannel:MS:TXLevel:EGSM

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="3">This command selects the mobile station uplink power control level for the EGSM band. See “Frequency Banded Parameters” on page 250.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 0 to 31 (default 15)
Resolution: 1</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 to 31
Resolution: 1</td></tr>
<tr><td colspan="2">*RST Setting</td><td>TXLevel: 15</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
OUTPUT 714;”CALL:SETup:TCH:MS:TXLevel:EGSM 19”! Sets the deferred mobile station
! TX level for the EGSM band.</td></tr>
</table>

CALL:SETup:TCH:MS:TXLevel:GSM450
CALL:SETup:TCHannel:MS:TXLevel:GSM450

Function	GSM TA	This command selects the mobile station uplink power control level for the GSM450 band. See “Frequency Banded Parameters” on page 250.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:SETup:TCH:MS:TXLevel:GSM450 19”! Sets the deferred mobile station
                                               ! TX level for the GSM450 band.
```

CALL:SETup:TCH:MS:TXLevel:GSM480
CALL:SETup:TCHannel:MS:TXLevel:GSM480

Function	GSM TA	This command selects the mobile station uplink power control level for the GSM480 band. See "Frequency Banded Parameters" on page 250.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:SETup:TCH:MS:TXLevel:GSM480 19"! Sets the deferred mobile station
                                                ! TX level for the GSM480 band.
```

CALL:SETup:TCH:MS:TXLevel:GSM750
CALL:SETup:TCHannel:MS:TXLevel:GSM750

Function	GSM TA	This command selects the mobile station uplink power control level for the GSM750 band. See "Frequency Banded Parameters" on page 250.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:SETup:TCH:MS:TXLevel:GSM750 19"! Sets the deferred mobile station
                                                ! TX level for the GSM750 band.
```

CALL:SETup:TCHannel:MS:TXLevel:GSM850

Function	GSM TA	This command selects the mobile station uplink power control level for the GSM850 band. See "Frequency Banded Parameters" on page 250.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:SETup:TCH:MS:TXLevel:GSM850 19"! Sets the deferred mobile station
                                                ! TX level for the GSM850 band.
```

CALL:SETup:TCH:MS:TXLevel:PCS
CALL:SETup:TChannel:MS:TXLevel:PCS

Function	GSM TA	This command selects the mobile station uplink power control level for the PCS band. See “Frequency Banded Parameters” on page 250.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 31 (default 10) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:SETup:TCH:MS:TXLevel:PCS 19" !Sets the deferred mobile station
                                              !TX Level for the PCS band.
```

CALL:SETup:TCH:MS:TXLevel:PGSM
CALL:SETup:TCHannel:MS:TXLevel:PGSM

Function	GSM TA	This command selects the mobile station uplink power control level for the PGSM band. See “Frequency Banded Parameters” on page 250.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:SETup:TCH:MS:TXLevel:PGSM 19” !Sets the deferred mobile station
                                               !station TX Level for the PGSM band.
```

CALL:SETup:TCH:MS:TXLevel:RGSM
CALL:SETup:TCHannel:MS:TXLevel:RGSM

Function	GSM TA	This command selects the mobile station uplink power control level for the RGSM band. See “Frequency Banded Parameters” on page 250.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 31 (default 15) Resolution: 1
Query		Range: 0 to 31 Resolution: 1
*RST Setting		TXLevel: 15
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”CALL:SETup:TCH:MS:TXLevel:RGSM 19”! Sets the deferred mobile station
                                               ! station TX level for the RGSM band.
```

CALL:SETup:TCH:TSLot

CALL:SETup:TCHannel:TSLot

Function	GSM TA	Sets the Timeslot number used for downlink and uplink Traffic Channel. See "Configuring the Traffic Channel (TCH)" on page 198.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 | 2 | 3 | 4 | 5 | 6 | 7 Resolution: 1
Query		Range: 1 | 2 | 3 | 4 | 5 | 6 | 7 Resolution: 1
*RST Setting		4
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:SETup:TCH:TSLot 2" ! Sets the number of downlink timeslots to 2
                                     ! and uplink timeslots to 2.
```

CALL:SIGNaling

```
CALL ──> :SIGNaling ──> :MS ──> :TXLevel ──> :FACCH ─┬─> <sp><1|ON|0|OFF> ───────>┐──>
                                                     └─> ? (returns 1|0) ────────>┘
```

This command is not applicable to GPRS.

"Diagram Conventions" on page 1

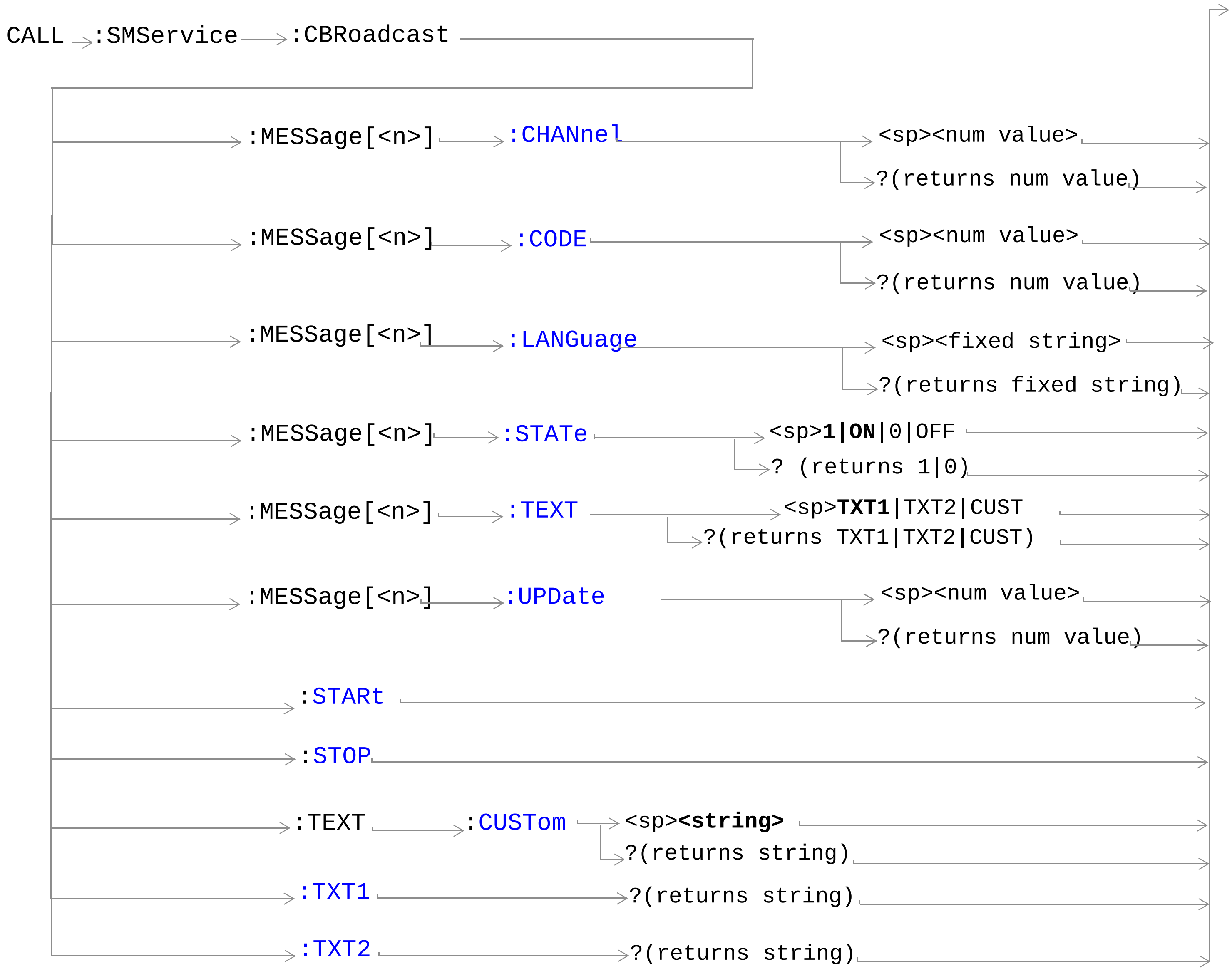
CALL:SIGNaling:MS:TXLevel:FACCH

Function	GSM TA	Sets/queries the TX Level FACCH Signaling parameter.
	GSM/GPRS LA	When TX Level FACCH Signaling is set to on, the base station emulator uses both a FACCH (Fast Associated Control CHannel) channel assignment and an update to the SACCH (Slow Associated Control CHannel) header to signal the mobile to change to a new power level. When TX Level FACCH Signaling is set to off, the base station emulator uses only an update to the SACCH header to signal the mobile to change to a new power level. A FACCH channel assignment message is not sent. This setting is useful if you want to update the SACCH header's TX Level field without performing a channel assignment. The setting of TX Level FACCH Signaling can be changed in either of the test set's two operating modes, Active Cell or Test mode.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 1 | ON | 0 | OFF
Query		1 | 0
*RST Setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"CALL:SIGNALING:MS:TXLEVEL:FACCH 0"`		

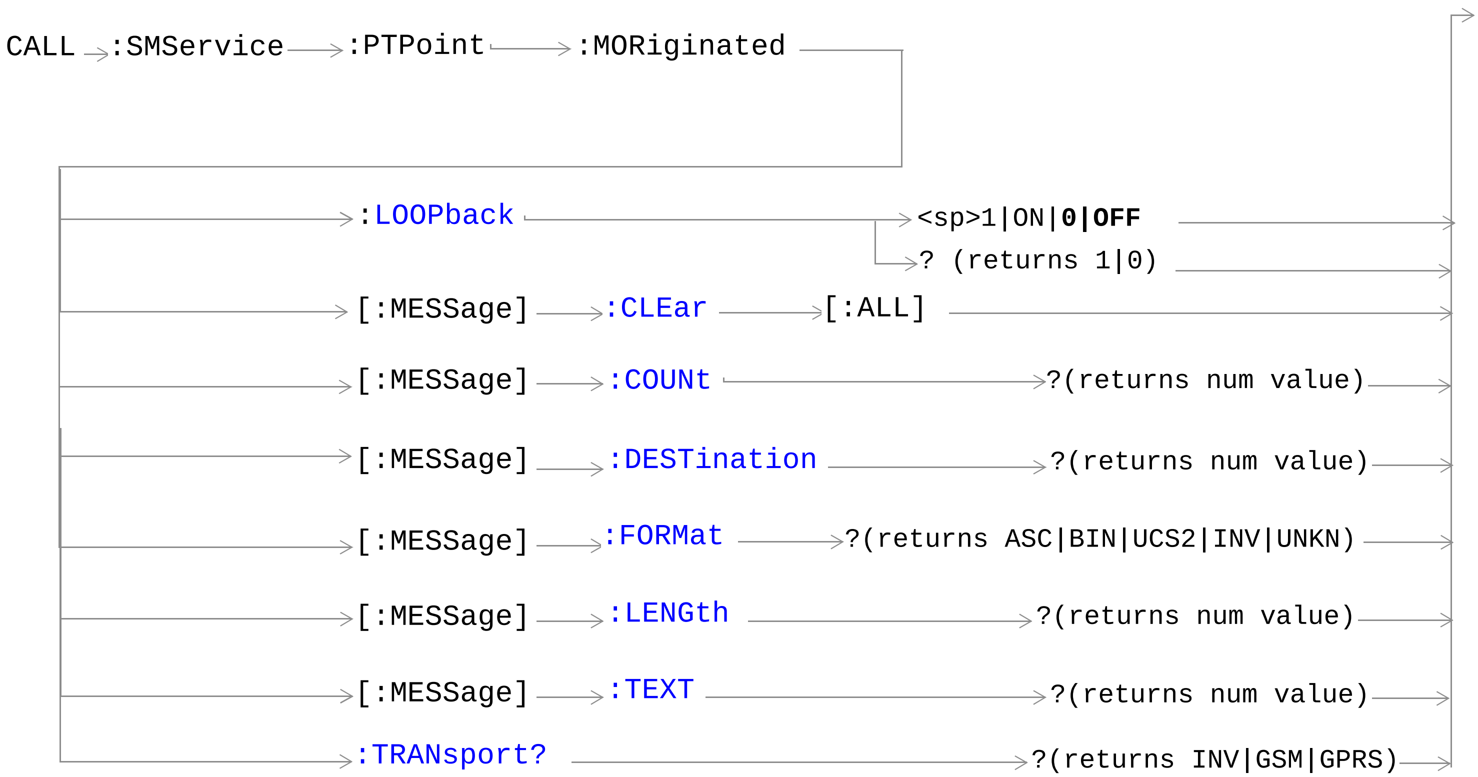
Related Topics

"Configuring the Broadcast Channel (BCH)" on page 196

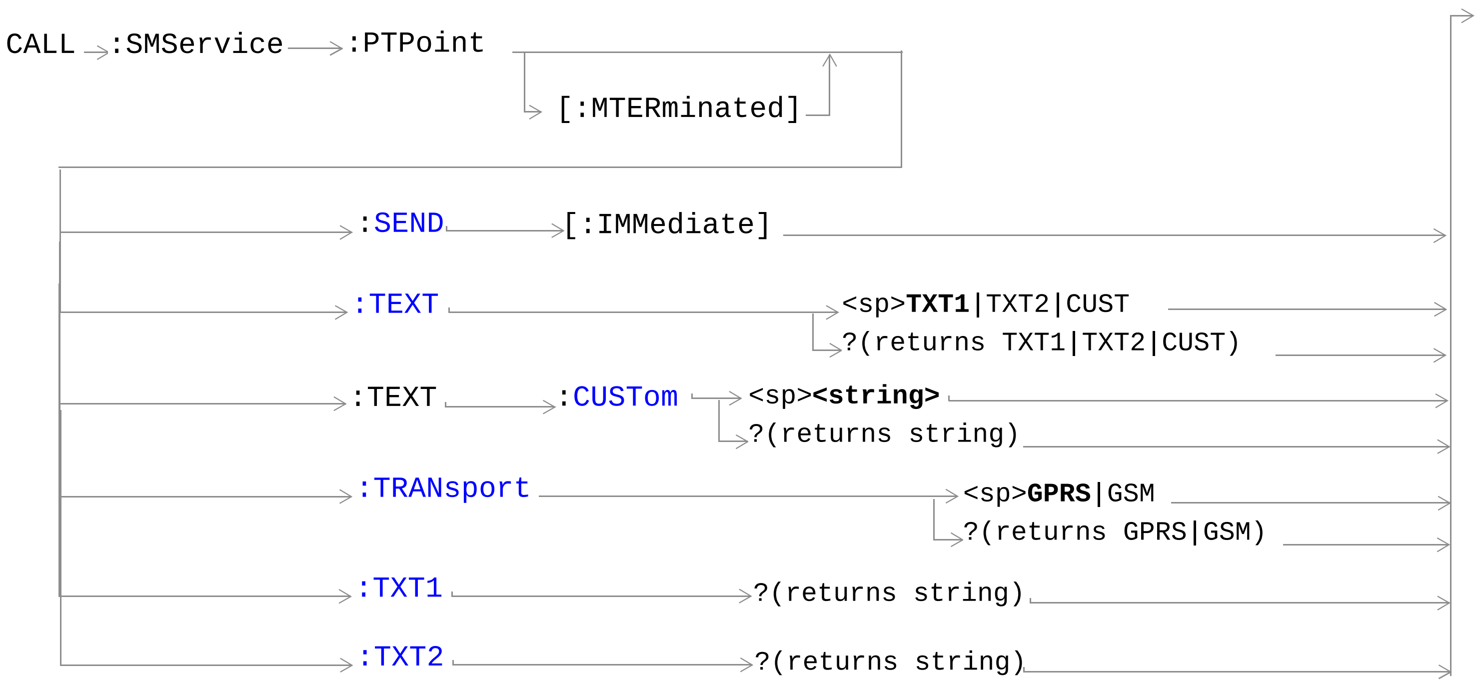
CALL:SMService



These commands are only applicable to the GSM/GPRS and EGPRS lab applications.



These commands are only applicable to the GSM/GPRS and EGPRS lab applications.



These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

“Diagram Conventions” on page 1

CALL:SMService:CBRoadcast:MESSage[<n>]:CHANnel

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This sets the channel number for Cell Broadcast Message n (where n can be 1,2, or 3).
	EGPRS LA	
Setting		Range: 0 to 65534
Query		Range: 0 to 65534
*RST setting		0
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:CBRoadcast:MESSage[<n>]:CODE

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This sets the code for Cell Broadcast Message n, where n can be 1, 2, or 3.
	EGPRS LA	
Setting		Range: 0 to 1023
Query		Range: 0 to 1023
*RST setting		0
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:CBRoadcast:MESSage[<n>]:LANGuage

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This sets the language for Cell Broadcast Message n, where n can be 1, 2, or 3.
	EGPRS LA	
Setting		Fixed string (see table below)
Query		Fixed string
*RST setting		ENGLish
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Table 8. Language values

Parameter Form	Query Value
GERMan	GERM
ENGLish	ENGL
ITALian	ITAL
FRENch	FREN
SPANish	SPAN
DUTCh	DUTC
SWEDish	SWED
DANish	DAN

Table 8. Language values

Parameter Form	Query Value
PORTugese	PORT
FINNish	FINN
NORWegian	NORW
GREek	GRE
TURKish	TURK
HUNGarian	HUNG
POLish	POL
UNSPecified	UNSP

CALL:SMService:CBRoadcast:MESSage[<n>]:STATe

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Enables Cell Broadcast Message n, where n is 1, 2 or 3. Cell Broadcast service must be started for message to be sent. See "CALL:SMService:CBRoadcast:STARt" on page 800.
Setting		0|OFF|1|ON
Query		0| |1
*RST setting		Message 1 is ON; Messages 2 and 3 are OFF
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:CBRoadcast:MESSage[<n>]:TEXT

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA EGPRS LA	Selects the text to be transmitted for Cell Broadcast Message n, where n is 1, 2 or 3.
Setting		TXT1|TXT2|CUST
Query		TXT1|TXT2|CUST
*RST setting		Message 2 is TXT2; Messages 1and 3 are TXT1
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:CBRoadcast:MESSage[<n>]:UPDate

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to the GSM Test Application.</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to the GPRS Test Application.</td></tr>
<tr><td>GSM/GPRS LA</td><td rowspan="2">This sets the Update number for Cell Broadcast Message n, where n can be 1, 2, or 3.</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 0 to 15</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 to 15</td></tr>
<tr><td colspan="2">*RST setting</td><td>0</td></tr>
<tr><td rowspan="2">Requirements</td><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
</table>

CALL:SMService:CBRoadcast:STARt

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Starts the Cell Broadcast Service
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:CBRoadcast:STOP

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Stops the Cell Broadcast Service
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:CBRoadcast:TEXT:CUSTom

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This sets the string of the custom text which can be sent with any of the Cell Broadcast Messages.
	EGPRS LA	
Setting		String: 7 bit ACSII characters up to 93 characters in length in quotes.
Query		String: 7 bit ACSII characters up to 93 characters in length.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example: `OUTPUT 714;”CALL:SMS:CBR:TEXT:CUST ‘Hello World’”`		

CALL:SMService:CBRoadcast:TXT1?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This queries the fixed Text Message 1.
	EGPRS LA	
Query		Returns a string.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:CBRoadcast:TXT2?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This queries the fixed Text Message 2.
	EGPRS LA	
Query		Returns a string.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:PTPoint[:MTERminated]:SEND[:IMMediate]

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sends a Point to Point SMS message.
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:PTPoint[:MTERminated]:TEXT

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This selects the message to be sent.
	EGPRS LA	
Setting		Range: TXT1 | TXT2 | CUST
Query		Range: TXT1 | TXT2 | CUST
*RST Setting		TXT1
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:PTPoint[:MTERminated]:TEXT:CUSTom

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This sets the text of the custom message to be sent.
	EGPRS LA	
Setting		String: 7 bit ACSII characters up to 160 characters in length in quotes.
Query		String: 7 bit ACSII characters up to 160 characters in length.
*RST Setting		“Enter your text here”
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example: `OUTPUT 714;”CALL:SMS:PTP:TEXT:CUST ‘Hello World’”`		

CALL:SMService:PTPoint[:MTERminated]:TRANsport

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Selects the transportation mechanism to be used.
	EGPRS LA	
Setting		Range: GPRS|GSM
Query		Range: GPRS|GSM
*RST Setting		GPRS
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:PTPoint[:MTERminated]:TXT1?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This queries the fixed Text Message 1.
	EGPRS LA	
Query		Returns a string.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:PTPoint[:MTERminated]:TXT2?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	This queries the fixed Text Message 2.
	EGPRS LA	
Query		Returns a string.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:PTPoint:MORiginated:LOOPback

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Enables the loopback of a point-to-point message. The message is sent to the mobile station with the same parameters as the most recently received text message.
	EGPRS LA	
Setting		0|OFF|1|ON
Query		0|1
*RST setting		0
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:PTPoint:MORiginated[:MESSage]:CLEar[:ALL]

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Clears all Received Message data.
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:PTPoint:MORiginated[:MESSage]:COUNt?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Queries the number of messages received by the test set.
	EGPRS LA	
Query		Returns a number.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:PTPoint:MORiginated[:MESSage]:DESTination?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Queries the destination address of the last SMS message received by the test set.
	EGPRS LA	
Query		Returns a string.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:PTPoint:MORiginated[:MESSage]:FORMat?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Queries the Last Received Message Format.
	EGPRS LA	
Query		ASC|BIN|UCS2|INV|UNKN ASC: 7 bit ASCII string BIN: Binary data UCS2: Unicode Character Set 2 INV: Invalid (returned when no messages have been received UNKN: Unknown message format
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

CALL:SMService:PTPoint:MORiginated[:MESSage]:LENGth?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Queries the Last Received Message Length.
	EGPRS LA	
Query		Returns a number value or 9.91E+37 (NAN). ASCII - the number of characters in the ASCII text message Binary/UCS2 - the number of octets of data in the message No message received - NAN
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

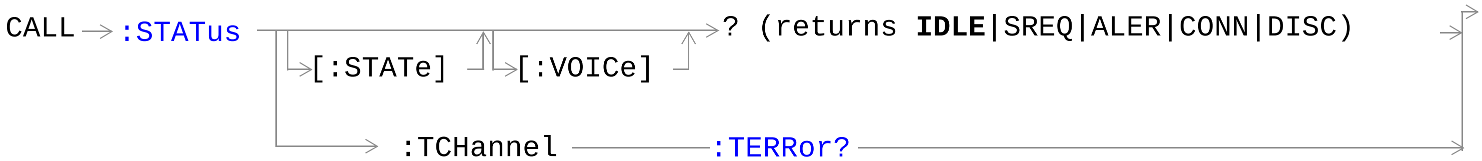
CALL:SMService:PTPoint:MORiginated[:MESSage]:TEXT?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Queries the text from the last SMS message received by the test set.
	EGPRS LA	
Query		Returns a string.
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

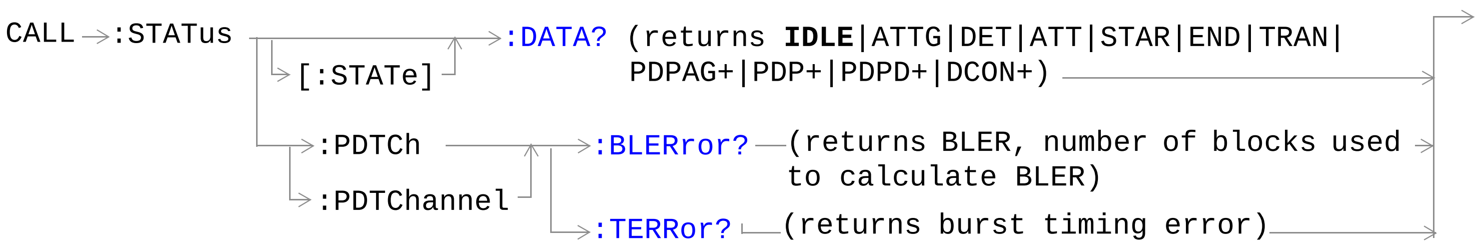
CALL:SMService:PTPoint:MORiginated:TRANsport?

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Queries the reported transportation mechanism used by the mobile station when it originates a point-to-point SMS message.
	EGPRS LA	
Query		Range: INV|GSM|GPRS INV: Invalid (returned when no messages have been received by the test set) GSM: GSM protocol layers were used GPRS: GPRS protocol layers were used
*RST Setting		INV
Requirements	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

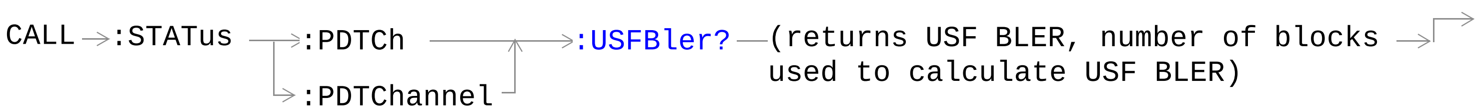
CALL:STATus



These commands are not applicable to GPRS.



These commands are not applicable to GSM.
+Only applicable to the GSM/GPRS and EGPRS LAs.



This command is applicable only to the GSM/GPRS and EGPRS lab applications.

"Diagram Conventions" on page 1

CALL:STATus[:STATe][:VOICe]?

Function	GSM TA	This query returns the status of the call. For details on the call states see “Call Processing State Synchronization” on page 433.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: IDLE | SREQ | ALER | CONN | DISC
*RST setting		IDLE
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:STATE?"`		

CALL:STATus[:STATe]:DATA?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the status of the data connection. For details on the data connection states see “Data Connection Processing State Synchronization” on page 445.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: • GPRS Test Application: IDLE | ATTG | DET |ATT | STAR | END | TRAN • GSM/GPRS Lab Application: IDLE | ATTG | DET |ATT | STAR | END | TRAN | PDPAG | PDP | PDPD| DCON
Query		Range: • GPRS Test Application: IDLE | ATTG | DET |ATT | STAR | END | TRAN • GSM/GPRS Lab Application: IDLE | ATTG | DET |ATT | STAR | END | TRAN | PDPAG | PDP | PDPD | DCON
*RST setting		IDLE
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:DATA?"`		

CALL:STATus:PDTCh | PDTChannel:BLERror?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This query returns the block error rate (BLER) result and the number of blocks tested to calculate the BLER result. The BLER result is only available when the data connection type is set to BLER (see “CALL:FUNCtion:CONNection:TYPE” on page 538). The BLER result is only updated when the data connection state is transferring (TRAN). See “CALL:STATus[:STATe]:DATA?” on page 808. To reset the BLER result you must use “SYSTem:MEASurement:RESet” on page 1296. The BLER result does not reset automatically when you connect a different GPRS mobile station. If you require more details on BLER, see “Block Error Rate (BLER) Reports Description” on page 92.
Query		Block error rate • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 1 Blocks tested • Range: 0 to 100000 and 9.91E+37 (NAN) • Resolution: 1
*RST setting		Block error rate: 9.91E+37 (NAN), Blocks tested: 9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example `OUTPUT 714;”CALL:STATus:PDTCh:BLERror?”`		

CALL:STATus:PDTCh | PDTChannel:TERRor?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This query returns the burst timing error report which provides a course indication of the difference between the actual and expected burst reception times. The error is calculated on a burst by burst basis from the adaptive equalization filter coefficients. The reporting period for burst timing error is approximately 0.5 seconds, and the value returned is the peak timing error occurring during the period. Note that this report is not based on a demodulated midamble position. When there are no active PDTCHs, Burst Timing Error results are not available
Query		Range: -8 to +30 T and 9.91 E+37 (NAN) Resolution: 0.25 T
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example		

```
OUTPUT 714;"CALL:STATus:PDTCh:TERRor?"
```

CALL:STATus:TChannel:TERRor?

Function	GSM TA	This query returns the last burst timing error measurement.
	GSM/GPRS LA	This indicates the worst case timing error of all bursts received in a reporting period. If all of the bursts reporting in a period are missing, the query returns 9.91E+37 (NAN).
	EGPRS LA	The reference for burst timing error measurements is with respect to the (downlink TCH slot) + (3 slot TX/RX delay (468.75 bits)) - (TCH Timing Advance). The CALL:STATUS:STATE must be connected, see "CALL:STATus[:STATe][:VOICe]?" on page 808. Burst timing error is continuously updated every 480 ms. Burst timing error is displayed in the Call Setup window.
	GPRS TA	This command is not applicable to GPRS.
Query		Range: -8 to +30 T and 9.91E+37 (NAN) Resolution: 0.25 T
*RST setting		9.91E+37 (NAN)
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATus:TCHANnel:TERRor?" ! Returns Burst Timing Error.
```

CALL:STATus:PDTCh | PDTChannel:USFBler?

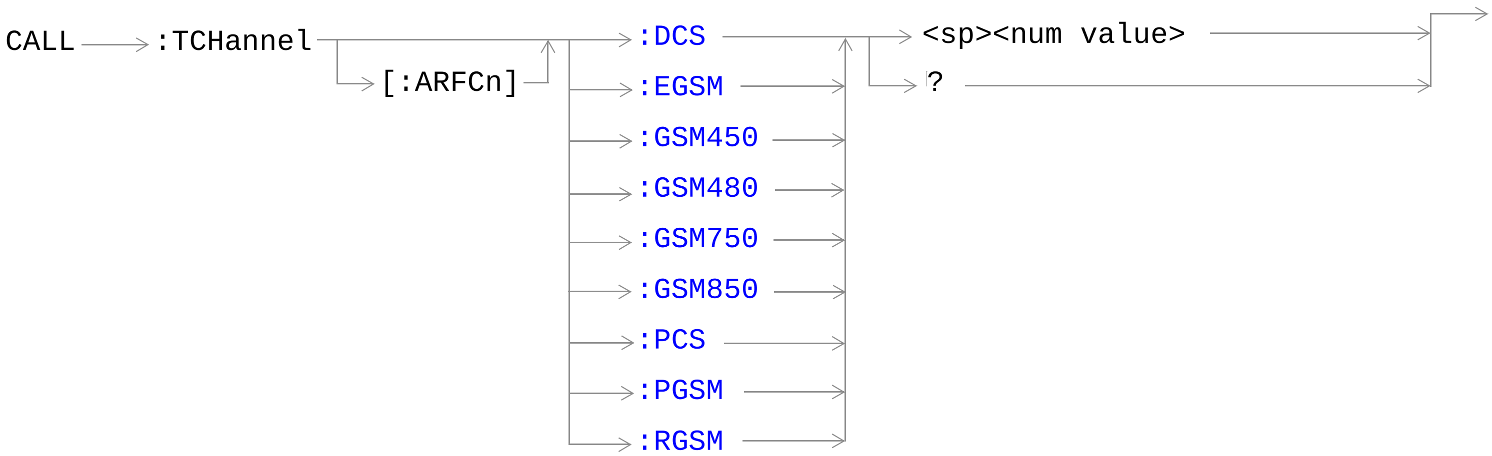
Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA EGPRS LA	This query returns the USF block error rate (USF BLER) result and the number of blocks tested to calculate the USF BLER result. The USF BLER result is only updated when the data connection state is transferring (TRAN). See “CALL:STATus[:STATe]:DATA?” on page 808. To reset the USF BLER result you must use “SYSTem:MEASurement:RESet” on page 1296. The USF BLER result does not reset automatically when you connect a different GPRS mobile station.
Query		Block error rate • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 1 Blocks tested • Range: 0 to 100000 and 9.91E+37 (NAN) • Resolution: 1
*RST setting		Block error rate: 9.91E+37 (NAN), Blocks tested: 9.91E+37 (NAN)
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example

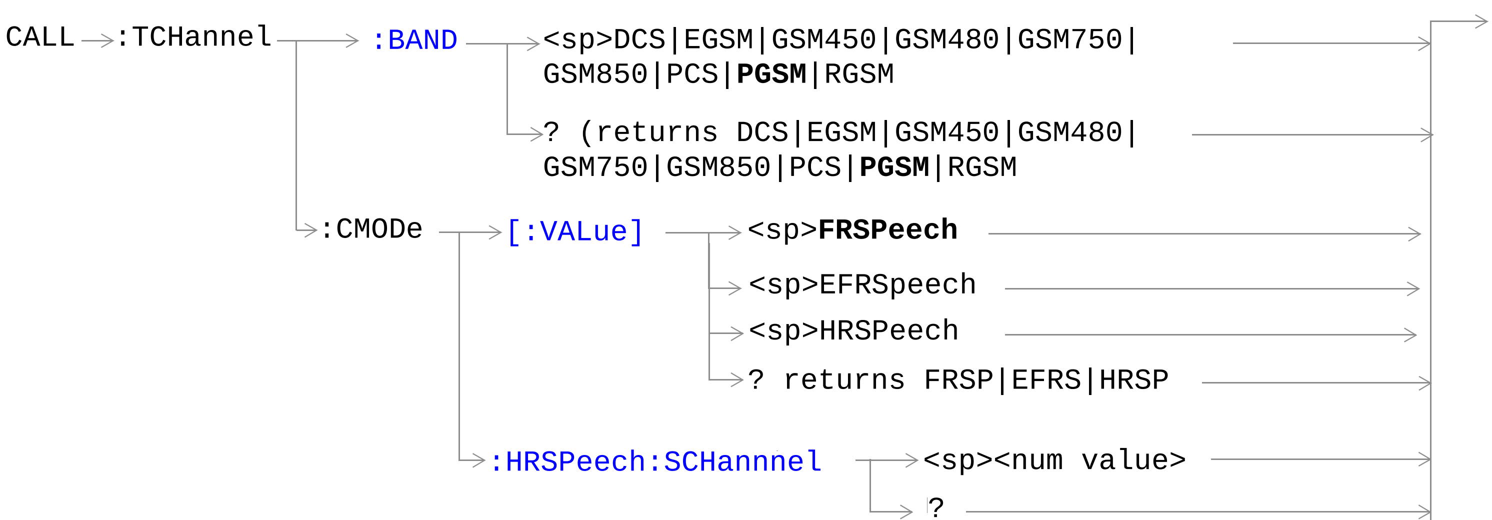
```
OUTPUT 714;”CALL:STATus:PDTCh:USFBler?”
```

CALL:TCHannel

These commands are not applicable to GPRS.

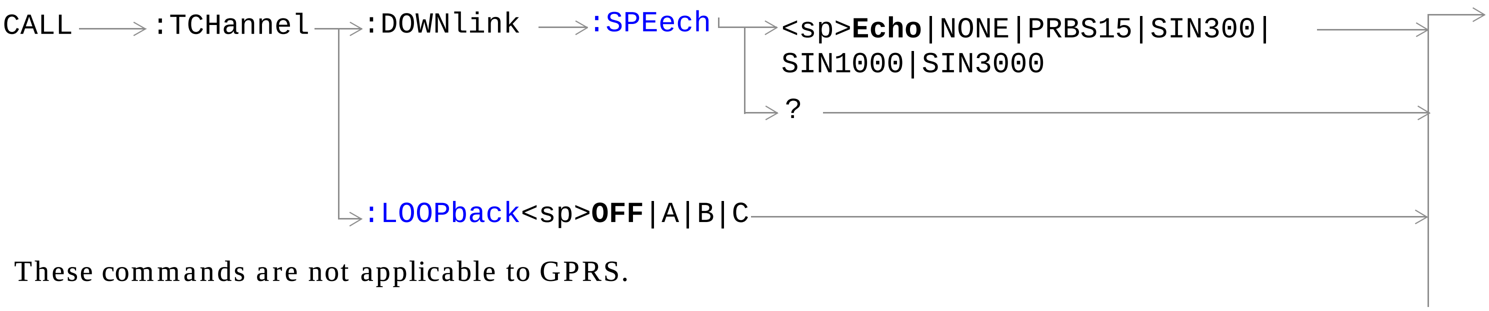


These commands are not applicable to GPRS.

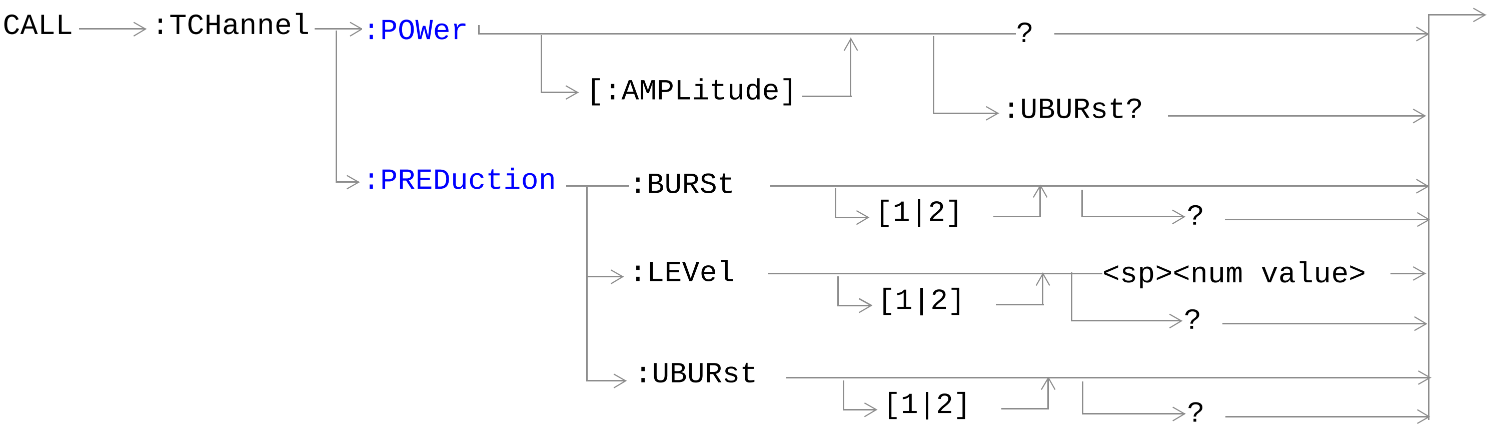


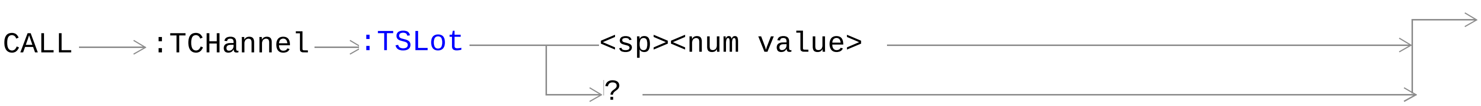
These commands are not applicable to GPRS.

CALL:TCHannel



These commands are not applicable to GPRS.





These commands are not applicable to GPRS.

“Diagram Conventions” on page 1

CALL:TCHannel[:ARFCn][:SELected]

Function	GSM TA	Sets/queries the channel number of downlink and uplink TCH for the band already selected.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: • DCS band, channels 512 to 885 (default: 698) • EGSM band, channels 0 to 124 and 975 to 1023 (default: 30) • GSM450 band, channels 259 to 293 (default: 280) • GSM480 band, channels 306 to 340 (default: 320) • GSM750 band, channels 438 to 511 (default: 460) • GSM850 band, channels 128 to 251 (default: 160) • PCS band, channels 512 to 810 (default: 698) • PGSM band, channels 1 to 124 (default: 30) • RGSM band, channels 0 to 124 and 955 to 1023 (default: 30) Resolution: 1
Query		Range: • DCS band, channels 512 to 885 • EGSM band, channels 0 to 124 and 975 to 1023 • GSM450 band, channels 259 to 293 • GSM480 band, channels 306 to 340 • GSM750 band, channels 438 to 511 • GSM850 band, channels 128 to 251 • PCS band, channels 512 to 810 • PGSM band, channels 1 to 124 • RGSM band, channels 0 to 124 and 955 to 1023 Resolution: 1
*RST Setting		PGSM, EGSM and RGSM bands: 30, DCS and PCS bands: 698, GSM450: 280, GSM480: 320, GSM750: 460, GSM850: 160
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"CALL:TCHANNEL:ARFCN:SELECTED 512" !Selects ARFCN of 512 on the
                                             !test set.
```

CALL:TCHannel[:ARFCn]:DCS

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for the DCS band. See “Configuring the Traffic Channel (TCH)” on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see “CALL:STATus[:STATe][:VOICe]?” on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 512 to 885 (default: 698) Resolution: 1
Query		Range: 512 to 885 Resolution: 1
*RST Setting		698
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:TCHANNEL:ARFCN:DCS 512"`		

CALL:TCHannel[:ARFCn]:EGSM

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for EGSM band. See “Configuring the Traffic Channel (TCH)” on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see “CALL:STATus[:STATe][:VOICe]?” on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 124 | 975 to 1023 (default: 30) Resolution: 1
Query		Range: 0 to 124 | 975 to 1023 Resolution: 1
*RST Setting		30
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:TCHANNEL:ARFCN:EGSM 124"`		

CALL:TCHannel[:ARFCn]:GSM450

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for GSM450 band. See "Configuring the Traffic Channel (TCH)" on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATe][:VOICe]?" on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 259 to 293 Resolution: 1
Query		Range: 259 to 293 Resolution: 1
*RST Setting		280
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example OUTPUT 714;"CALL:TCHANNEL:ARFCN:GSM450 124"		

CALL:TCHannel[:ARFCn]:GSM480

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for GSM480 band. See "Configuring the Traffic Channel (TCH)" on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATe][:VOICe]?" on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 306 to 340 Resolution: 1
Query		Range: 306 to 340 Resolution: 1
*RST Setting		320
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example OUTPUT 714;"CALL:TCHANNEL:ARFCN:GSM480 330"		

CALL:TCHannel[:ARFCn]:GSM750

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="3">Sets/queries the channel number for downlink and uplink TCH for GSM750 band. See “Configuring the Traffic Channel (TCH)” on page 198.
TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see “CALL:STATus[:STATe][:VOICe]?” on page 808.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 438 to 511
Resolution: 1</td></tr>
<tr><td colspan="2">Query</td><td>Range: 438 to 511
Resolution: 1</td></tr>
<tr><td colspan="2">*RST Setting</td><td>460</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
<code>OUTPUT 714;”CALL:TCHANNEL:ARFCN:EGSM 444”</code></td></tr>
</table>

CALL:TCHannel[:ARFCn]:GSM850

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="3">Sets/queries the channel number for downlink and uplink TCH for the GSM850 band. See “Configuring the Traffic Channel (TCH)” on page 198.
TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see “CALL:STATus[:STATe][:VOICe]?” on page 808.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 128 to 251
Resolution: 1</td></tr>
<tr><td colspan="2">Query</td><td>Range: 128 to 251
Resolution: 1</td></tr>
<tr><td colspan="2">*RST Setting</td><td>160</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
<code>OUTPUT 714;”CALL:TCHANNEL:ARFCN:GSM850 135”</code></td></tr>
</table>

CALL:TCHannel[ARFCN]:PCS

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for the PCS band. See “Configuring the Traffic Channel (TCH)” on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see “CALL:STATus[:STATe][:VOICe]?” on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 512 to 810 (default: 698) Resolution: 1
Query		Range: 512 to 810 Resolution: 1
*RST Setting		698
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:TCHANNEL:ARFCN:PCS 512”`		

CALL:TCHannel[:ARFCn]:PGSM

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for the PGSM band. See “Configuring the Traffic Channel (TCH)” on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see “CALL:STATus[:STATe][:VOICe]?” on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 to 124 (default: 30) Resolution: 1
Query		Range: 1 to 124 Resolution: 1
*RST Setting		30
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:TCHANNEL:ARFCN:PGSM 124”`		

CALL:TCHannel[:ARFCn]:RGSM

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the channel number for downlink and uplink TCH for the RGSM band. See "Configuring the Traffic Channel (TCH)" on page 198. TCH ARFCN may be set and queried when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATe][:VOICe]?" on page 808.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 124 | 955 to 1023 Resolution: 1
Query		Range: 0 to 124 | 955 to 1023 Resolution: 1
*RST Setting		30
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:TCHANNEL:ARFCN:RGSM 960"`		

CALL:TCHannel:BAND

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries which GSM band the BS Emulator should use for the TCH. The test set may be queried for the current TCH band when the CALL:STATUS:STATE is idle or connected, see "CALL:STATus[:STATe][:VOICe]?" on page 808. The test set uses this command to perform a channel assignment, see "How the Test Set Performs a Dualband Handover" on page 249 when the MS will support the band and the CALL:STATUS:STATE is CONNected.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: PGSM | DCS | EGSM | GSM450 | GSM480 | GSM750 | GSM850 | PCS | RGSM Resolution: 1
Query		Range: PGSM | DCS | EGSM | GSM450 | GSM480 | GSM750 | GSM850 | PCS | RGSM Resolution: 1
*RST Setting		PGSM
Related Topic		See "Traffic Band Parameter" on page 254.

CALL:TCHannel

Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:TCHANNEL:BAND DCS”`		

CALL:TCHannel:CMODe[:VALue]

Function	GSM TA	Sets/queries which channel mode the mobile station should use for speech data. This setting is either full rate speech (FRSPeech), enhanced full rate speech (EFRSpeech) or half rate speech (HRSPeech). See "Programming a Channel Mode Change" on page 322.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: FRSPeech | EFRSpeech | HRSPeech
Query		Range: FRSP | EFRS | HRSP
*RST Setting		FRSPeech
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:TCHANNEL:CMODE EFRSPEECH"`		

CALL:TCHannel:CMODe:HRSPeech:SChannel

Function	GSM TA	Sets/queries the half rate sub channel for half rate speech.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 | 1
Query		Range: 0 | 1
*RST Setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:TCHANNEL:CMODE:HRSPEECH:SCHANNEL 1"`		

CALL:TCHannel:DOWNlink:SPEech

Function	GSM TA	Set which kind of Speech data is transmitted on the downlink TCH.
	GSM/GPRS LA	See “Configuring the Traffic Channel (TCH)” on page 198 or “Fast Bit Error Measurement Description” on page 100 or “Test Mode Operating Modes” on page 179.
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: ECHO | NONE | PRBS15 | SIN300 | SIN1000 | SIN3000
Query		Range: ECHO | NONE | PRBS15 | SIN300 | SIN1000 | SIN3000
*RST Setting		ECHO
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:TCHANNEL:DOWNLINK:SPEECH ECHO”`		

CALL:TCHannel:LOOPback

Function	GSM TA	Sets traffic channel loopback state and type for the MS.
	GSM/GPRS LA	The loopback type must be set before a Fast Bit Error or a Bit Error measurement will function.
	EGPRS LA	The test set will automatically set the correct loopback type if the signalling loopback control is set to on, after the measurement the test set will automatically set the loopback to off. See "SETup:BERRor:SLControl[:STATe]" on page 1054 or "SETup:FBERror:SLControl[:STATe]" on page 1098. See "Fast Bit Error Measurement Description" on page 100 or "GSM Bit Error Measurement" on page 85.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: • OFF - Sets the TCH Loop state for the MS to OFF. The loop back is open. • A- Sets the TCH Loop state for the MS to type A. Full-rate speech TCH loopback with signaling of erased frames, (residual). • B- Sets the TCH Loop state for the MS to type B. Full-rate speech TCH loopback without signalling of erased frames, (non-residual). • C - Sets the TCH Loop state for the MS to type C. TCH burst by burst loopback.
*RST Setting		OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:TCHANNEL:LOOPBACK C" !Sets loopback type.`		

CALL:TCHannel:POWer[:AMPLitude]?

Function	GSM TA	Queries the downlink traffic channel used burst power amplitude in dB.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 30 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:TCHANNEL:POWer?" !Queries traffic channel power level of used bursts.`		

CALL:TCHannel:POWer[:AMPLitude]:UBURst?

Function	GSM TA	Queries the downlink traffic channel unused burst power amplitude in dB.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:TCHANNEL:POWer:UBURst?" !Queries traffic channel power level of Unused !bursts.`		

CALL:TCHannel:PREDuction:BURSt

Function	GSM TA	Specifies the power reduction level to use for the downlink traffic channel burst power. One of two power reduction levels can be selected; PRL1 or PRL2.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: PRL1 | PRL2
Query		Range: PRL1 | PRL2
*RST Setting		PRL1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"CALL:TCHANNEL:PREDuction:BURSt PRL2" !Selects traffic channel power reduction level 2 for used bursts`		

CALL:TCHannel:PREDuction:LEVel[1|2]

Function	GSM TA	Sets the value in dB to the traffic channel power reduction levels PRL1 and PRL2.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 25 dB Resolution: 0.1 dB
Query		Range: 0 to 25 dB
*RST Setting		0 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:TCHANNEL:PREDuction:LEVel2 5" !Sets traffic channel power reduction level 2
to 5 dB.
```

CALL:TCHannel:PREDuction:UBURst

Function	GSM TA	Specifies the power reduction level to use for the downlink traffic channel unused burst power. One of two power reduction levels can be selected; PRL1 or PRL2.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: PRL1 | PRL2
Query		Range: PRL1 | PRL2
*RST Setting		PRL2
Related Commands		CALL:TCHannel:PREDuction
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"CALL:TCHANNEL:PREDuction:UBURst PRL1" !Selects the traffic channel power
reduction level 1 for unused bursts.
```

CALL:TCHannel:TSLot

Function	GSM TA	Sets the Timeslot number used for downlink and uplink Traffic Channel. See “Configuring the Traffic Channel (TCH)” on page 198.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 | 2 | 3 | 4 | 5 | 6 | 7 Resolution: 1
Query		Range: 1 | 2 | 3 | 4 | 5 | 6 | 7 Resolution: 1
*RST Setting		4
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”CALL:TCHANNEL:TSLOT 5” !Sets timeslot number.`		

CALL:TRANsferring

```
CALL ──> :TRANsferring ──────────────> ? (returns 1|0) ──────>
                       └─> [:STATe] ─┘
```

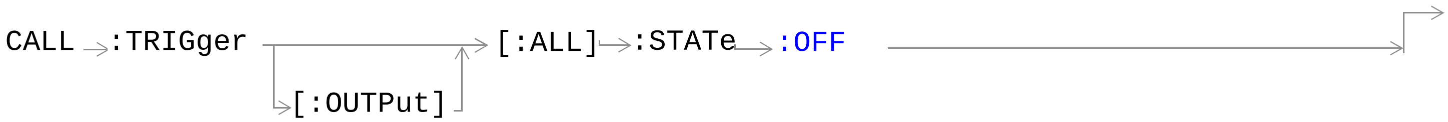
This command is not applicable to GSM.

“Diagram Conventions” on page 1

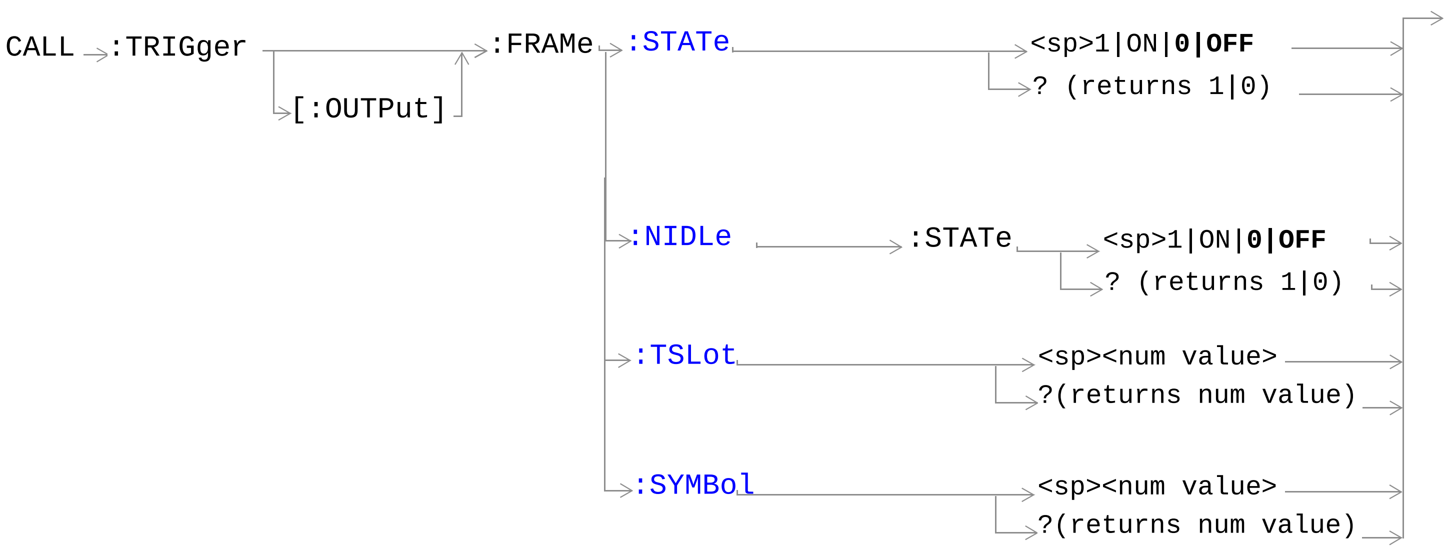
CALL:TRANsferring[:STATe]?

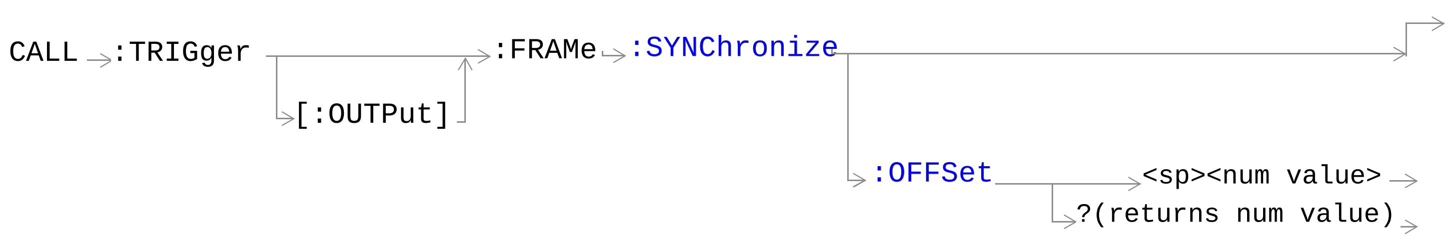
Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries whether or not the data connection is in the transferring state. 1 is returned if the data connection is in the transferring state. 0 is returned if the data connection is in any other non-transitory state. For more details on the Transferring State query or the data connection states, see “Data Connection Processing State Synchronization” on page 445.
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"CALL:TRANsferring:STATe?"`		

CALL:TRIGger

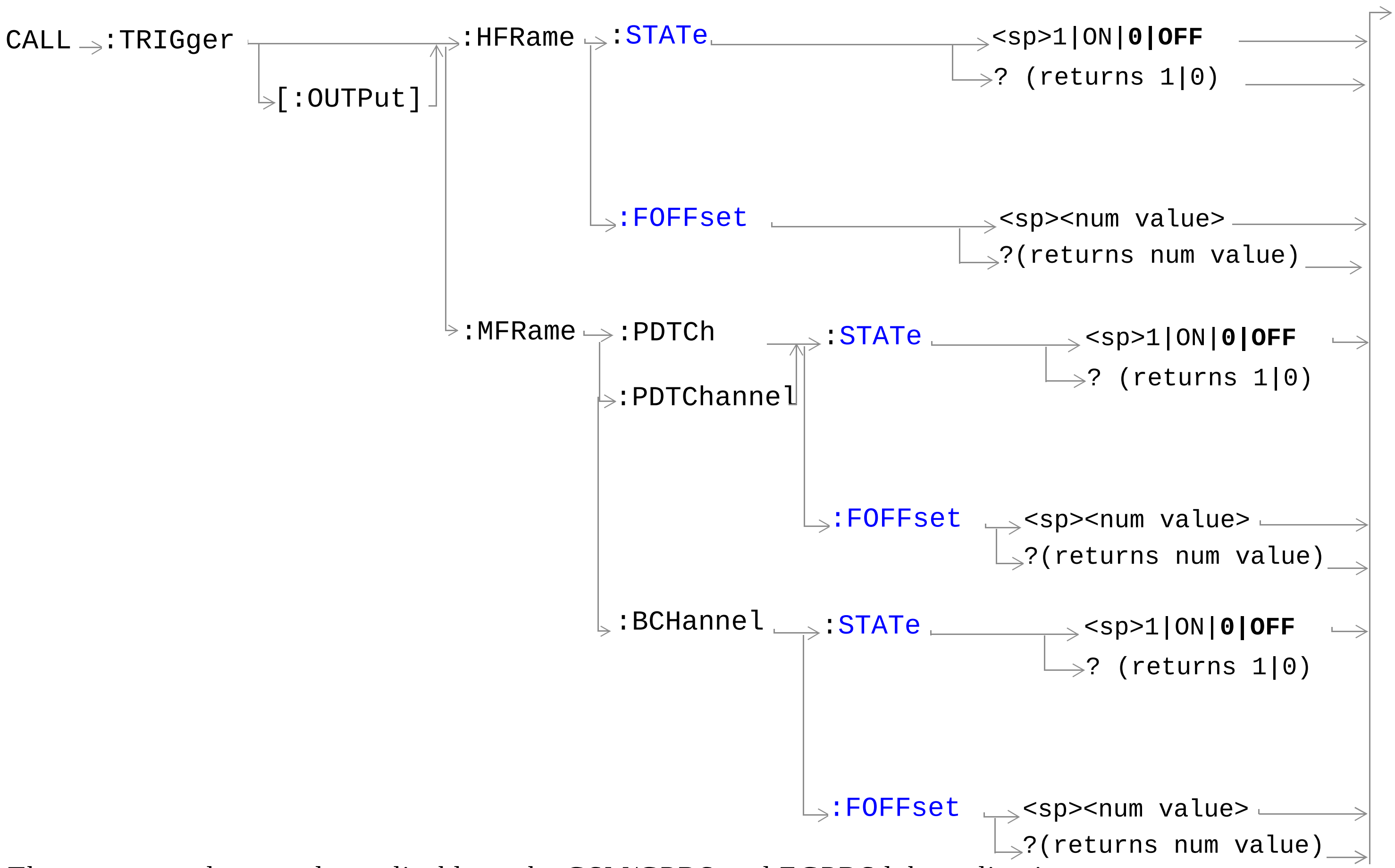


This command is only applicable to the GSM/GPRS and EGPRS lab applications.

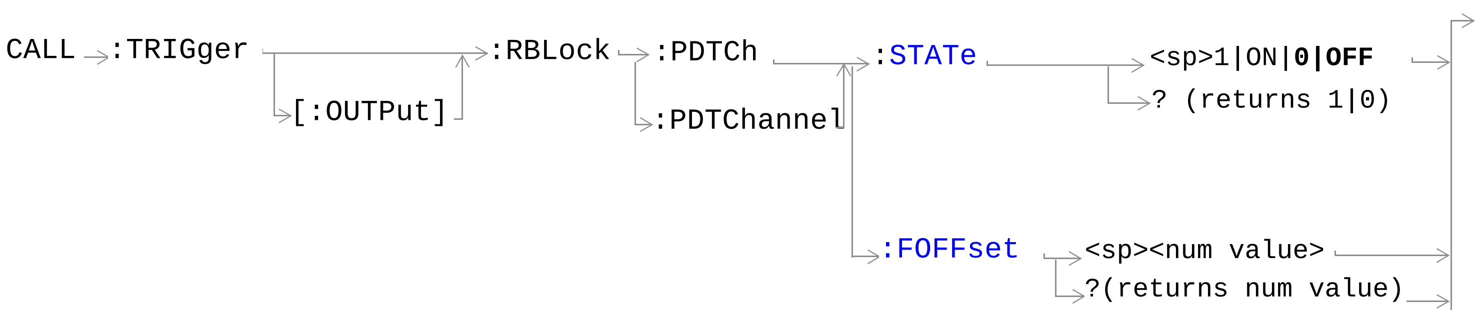




These commands are only applicable to the GSM/GPRS and EGPRS lab applications.



These commands are only applicable to the GSM/GPRS and EGPRS lab applications.



These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

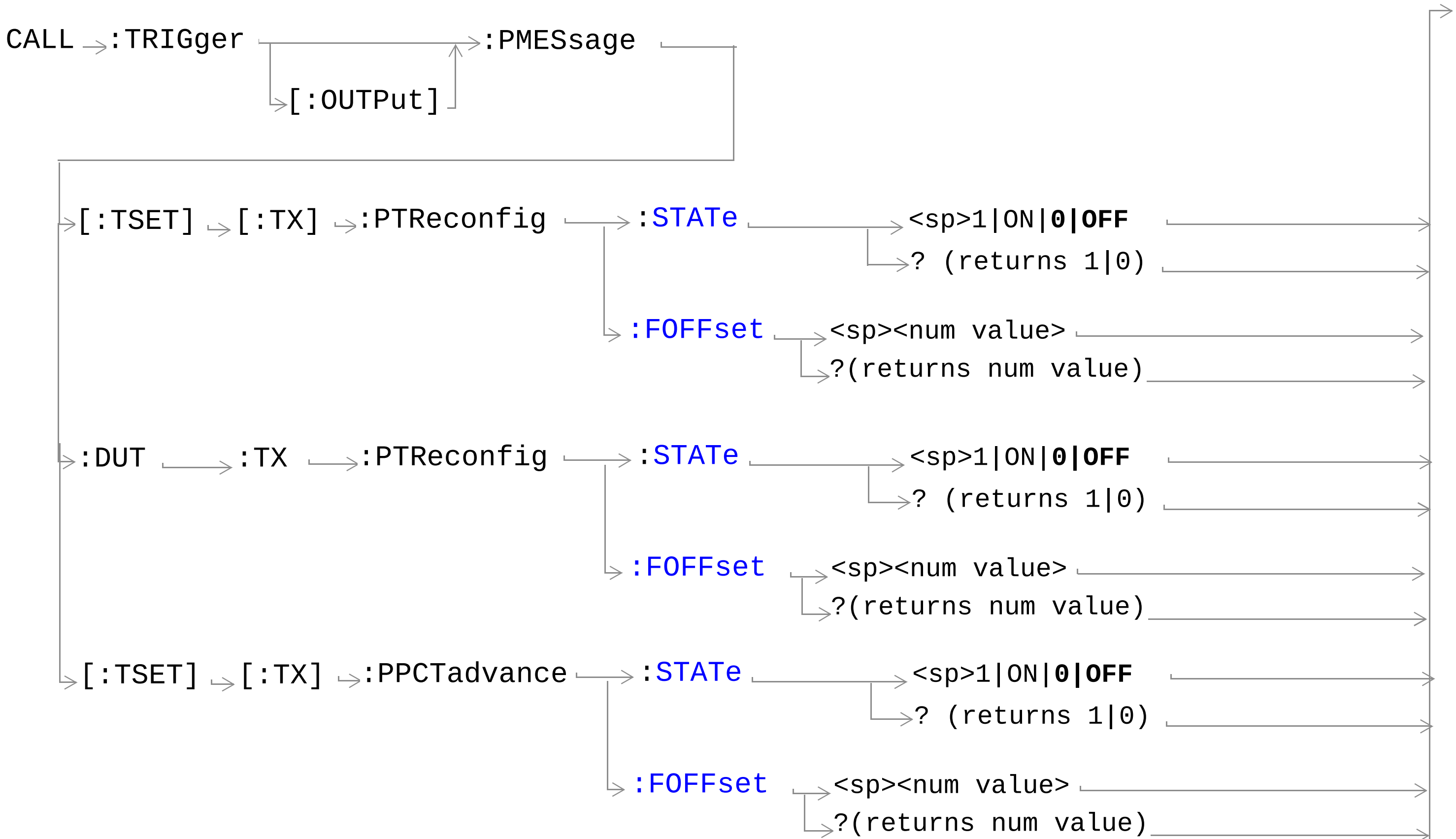
CALL:TRIGger

```
CALL :TRIGger [:OUTPut] :PMESsage
  [:TSET] [:TX] :PUASsignment :STATe   <sp>1|ON|0|OFF
                                       ? (returns 1|0)
                              :FOFFset <sp><num value>
                                       ?(returns num value)
  :DUT :TX :PUASsignment :STATe        <sp>1|ON|0|OFF
                                       ? (returns 1|0)
                         :FOFFset      <sp><num value>
                                       ?(returns num value)
```

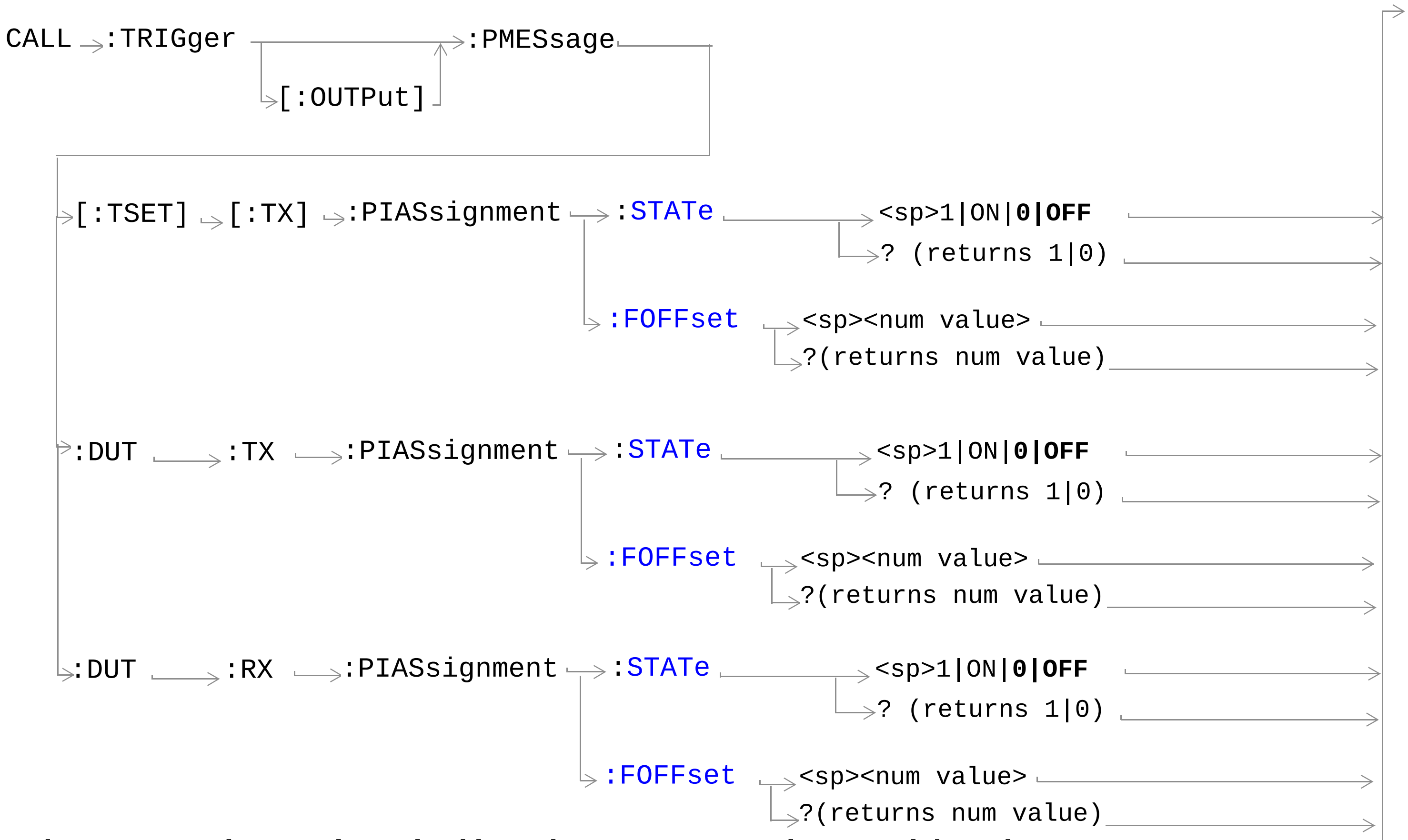
These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

```
CALL :TRIGger [:OUTPut] :PMESsage
  [:TSET] [:TX] :PDASsignment :STATe   <sp>1|ON|0|OFF
                                       ? (returns 1|0)
                              :FOFFset <sp><num value>
                                       ?(returns num value)
  :DUT :RX :PDASsignment :STATe        <sp>1|ON|0|OFF
                                       ? (returns 1|0)
                         :FOFFset      <sp><num value>
                                       ?(returns num value)
```

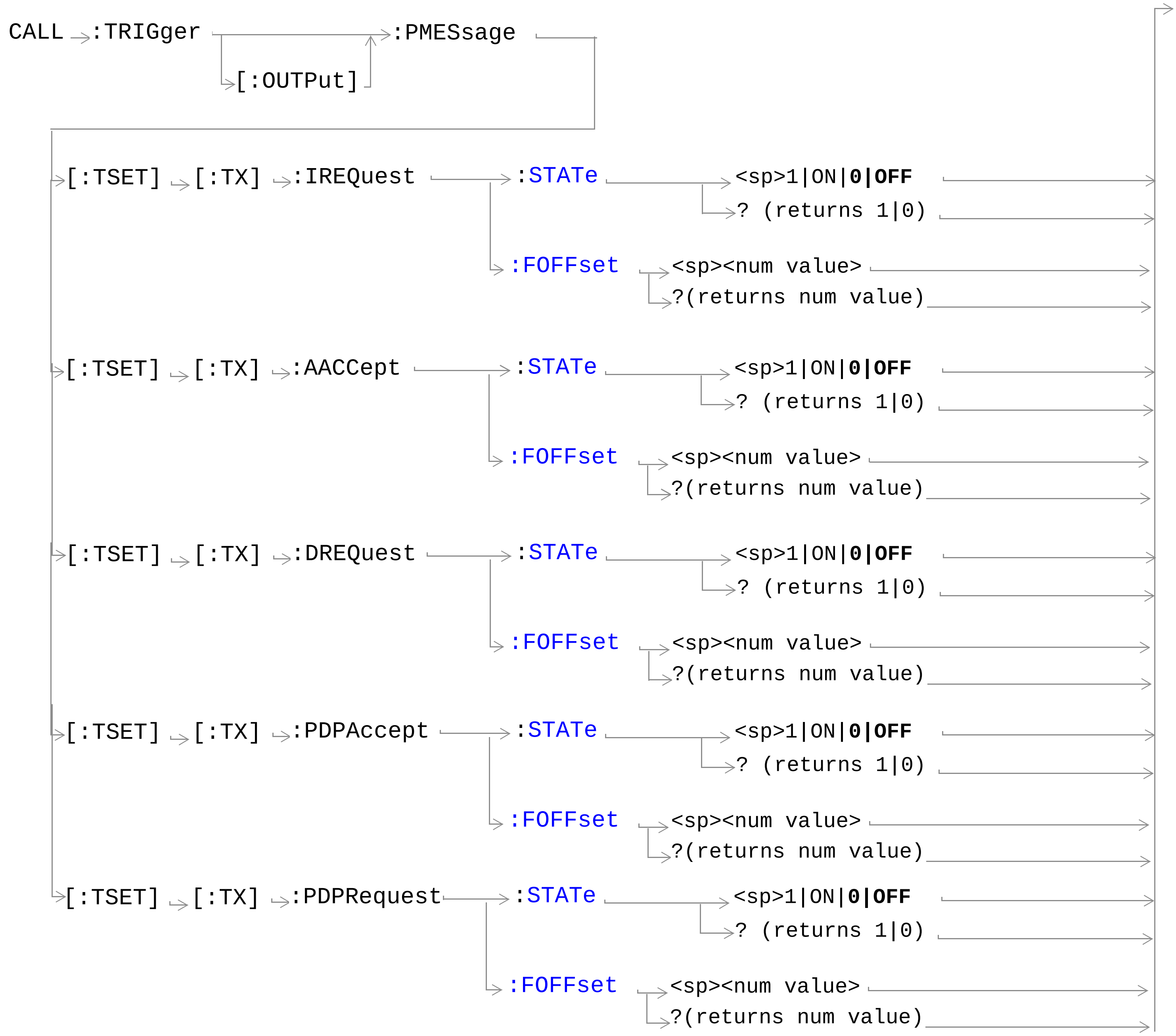
These commands are only applicable to the GSM/GPRS and EGPRS lab applications.



These commands are only applicable to the GSM/GPRS and EGPRS lab applications.



These commands are only applicable to the GSM/GPRS and EGPRS lab applications.



These commands are only applicable to the GSM/GPRS and EGPRS lab applications.

"Diagram Conventions" on page 1

CALL:TRIGger[:OUTPut][:ALL]:STATe:OFF

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Disable all triggers.
	EGPRS LA	
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:TRIGGER:STATE:OFF"! Disable all triggers
```

CALL:TRIGger[:OUTPut]:FRAMe:NIDLe:STATe

Function	GSM TA	Enables a trigger signal on every frame except the Idle Frame.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:TRIGGER:FRAME:NIDLE:STATE 1"! Enable the Every Frame except Idle trigger
```

CALL:TRIGger[:OUTPut]:FRAMe:STATe

Function	GSM TA	Enables a trigger signal on every frame.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:FRAMe:SYMBol

Function	GSM TA	Sets the symbol position on the Every Frame trigger.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 1250
Query		Range: 0 to 1250
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:FRAMe:SYNChronize

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sends the neighbor cell synchronization trigger output.
	EGPRS LA	
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:TRIGger:FRAMe:SYNChronize"! Send the neighbor cell synchronization trigger
```

CALL:TRIGger[:OUTPut]:FRame:SYNChronize:OFFSet

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the symbol offset prior to the 0'th frame for the neighbor cell synchronization trigger.
	EGPRS LA	
Setting		Range: 0 to 150 symbols Resolution: 1 symbol
Query		Range: 0 to 150 symbols Resolution: 1 symbol
*RST setting		0
Requirements	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:TRIG:FRAM:SYNC:OFFS 5"! Causes the synchronization trigger to occur 5 symbols before the first symbol of the 0'th frame`		

CALL:TRIGger[:OUTPut]:FRAMe:TSLot

Function	GSM TA	Sets the timeslot on the Every Frame trigger.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 7
Query		Range: 0 to 7
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:TRIGger:FRAMe:TSLot 5"! Set the timeslot of the Every Frame trigger to 5`		

CALL:TRIGger[:OUTPut]:HFRame:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on every hyperframe.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:TRIGGER:HFRAME:STATE 1"! Enable the hyperframe trigger
```

CALL:TRIGger[:OUTPut]:HFRame:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the hyperframe trigger.
	EGPRS LA	
Setting		Range: 0 to 2715647
Query		Range: 0 to 2715647
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:TRIGGER:HFRAME:FOFFSET 2000"! Set the hyperframe trigger to occur at frame 2000
```

CALL:TRIGger[:OUTPut]:MFRame:PDTCh:STATe

CALL:TRIGger[:OUTPut]:MFRame:PDTChannel:STATe

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Enables a trigger signal on every PDTCH multiframe.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example:		

```
OUTPUT 714;"CALL:TRIGger:MFRame:PDTCh:STATe 1"! Enable the multiframe trigger
```

CALL:TRIGger[:OUTPut]:MFRame:PDTCh:FOFFset

CALL:TRIGger[:OUTPut]:MFRame:PDTChannel:FOFFset

Function	GSM TA	This command is not applicable to the GSM Test Application.
	GPRS TA	This command is not applicable to the GPRS Test Application.
	GSM/GPRS LA	Sets the frame offset on the PDTCH multiframe trigger.
	EGPRS LA	
Setting		Range: 0 to 51
Query		Range: 0 to 51
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example:		

```
OUTPUT 714;"CALL:TRIGger:MFRame:PDTCh:FOFFset 25"! Set the multiframe trigger to occur at frame 25
```

CALL:TRIGger[:OUTPut]:MFRame:BCHannel:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on every BCH multiframe.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:TRIGGER:MFRAME:BCHANNEL:STATE 1"! Enables the BCH multiframe trigger
```

CALL:TRIGger[:OUTPut]:MFRame:BCHannel:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the BCH multiframe trigger.
	EGPRS LA	
Setting		Range: 0 to 50
Query		Range: 0 to 50
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;"CALL:TRIGGER:MFRAME:BCHANNEL:FOFFSET 24"! Sets the BCH multiframe trigger to occur on
frame 24
```

CALL:TRIGger[:OUTPut]:RBLock:PDTCH:STATe

CALL:TRIGger[:OUTPut]:RBLock:PDTChannel:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on a Radio Block.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:TRIGGER:RBLOCK:PDTCH:STATE 1"! Enables the Radio Block trigger`		

CALL:TRIGger[:OUTPut]:RBLock:PDTCH:FOFFset

CALL:TRIGger[:OUTPut]:RBLock:PDTChannel:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame to trigger on within the Radio Block.
	EGPRS LA	
Setting		Range: 0 to 3
Query		Range: 0 to 3
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above
Programming Example: `OUTPUT 714;"CALL:TRIGGER:RBLOCK:PDTCH:FOFFSET 2"! Sets the Radio Block trigger to occur on frame 2 of each radio block`		

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PUASsignment:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on the Packet Uplink Assignment message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;”CALL:TRIGGER:PMESSAGE:PUASSIGNMENT:STATE 1”! Enables the Packet Uplink Assignment Message
trigger
```

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PUASsignment:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the trigger for the Packet Uplink Assignment message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

Programming Example:

```
OUTPUT 714;”CALL:TRIGGER:PMESSAGE:PUASSIGNMENT:FOFFSET 10000”! Sets the Packet Uplink Assignment
Message trigger to occur on frame 10000
```

CALL:TRIGger[:OUTPut]:PMESsage:DUT:TX:PUASsignment:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables the Expected DUT TX trigger signal on the Packet Uplink Assignment message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage:DUT:TX:PUASsignment:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the Expected DUT TX trigger for the Packet Uplink Assignment message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PDASsignment:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on the Packet Downlink Assignment message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PDASsignment:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the trigger for the Packet Downlink Assignment message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage:DUT:RX:PDASsignment:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA EGPRS LA	Enables the First DUT RX trigger signal on the Packet Downlink Assignment message.
Setting		0	OFF	1	ON
Query		0	1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage:DUT:RX:PDASsignment:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA EGPRS LA	Sets the frame offset on the First DUT RX trigger for the Packet Downlink Assignment message.
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PTReconfig:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on the Packet Timeslot Reconfigure message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PTReconfig:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the trigger for the Packet Timeslot Reconfigure message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage:DUT:TX:PTReconfig:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables the Expected DUT TX trigger signal on the Packet Timeslot Reconfigure message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage:DUT:TX:PTReconfig:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the Expected DUT TX trigger for the Packet Timeslot Reconfigure message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PPCTadvance:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on the Packet Power Control/Timing Advance message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PPCTadvance:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the trigger for the Packet Power Control/Timing Advance message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PIASsignment:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on the Packet Immediate Assignment message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PIASsignment:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the trigger for the Packet Immediate Assignment message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage:DUT:TX:PIASsignment:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables the DUT TX trigger signal on the Packet Immediate Assignment message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage:DUT:TX:PIASsignment:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the DUT TX trigger for the Packet Immediate Assignment message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage:DUT:RX:PIASsignment:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables the DUT RX trigger signal on the Packet Immediate Assignment message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage:DUT:RX:PIASsignment:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the DUT RX trigger for the Packet Immediate Assignment message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:IREQuest:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on the Identity Request message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:IREQuest:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the trigger for the Identity Request message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:AACCept:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on the Attach Accept message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:AACCept:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the trigger for the Attach Accept message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:DREQuest:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on the Detach Request message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:DREQuest:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the trigger for the Detach Request message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PDPAccept:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on the PDP Context Activation Accept message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PDPAccept:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the trigger for the PDP Context Activation Accept message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PDPRequest:STATe

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Enables a trigger signal on the Request PDP Context Activation message.
	EGPRS LA	
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

CALL:TRIGger[:OUTPut]:PMESsage[:TSET][:TX]:PDPRequest:FOFFset

Function	GSM TA	This command is not applicable to the GSM test application.
	GPRS TA	This command is not applicable to the GPRS test application.
	GSM/GPRS LA	Sets the frame offset on the trigger for the Request PDP Context Activation message.
	EGPRS LA	
Setting		Range: 0 to 20000
Query		Range: 0 to 20000
*RST setting		0
Requirements	GSM/GPRS TA	Revision: A.01 and above
	GSM/GPRS LA	Revision: C.01 and above
	EGPRS LA	Revision: A.01 and above

DISPlay Subsystem

Description

The DISPlay subsystem is used to configure the test set's display mode or display brightness . Use of the DISPlay subsystem is not required to set or query any data or results.

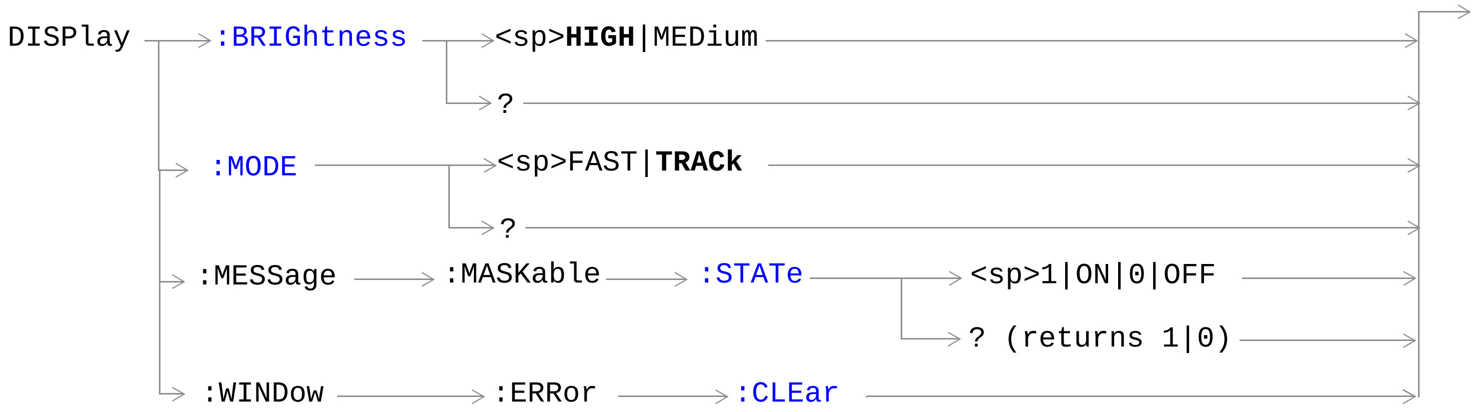
Display Backlight Dimming

The test set's display brightness parameter has two settings at this time, high and medium. The life of the display's backlight will be maximized when brightness is set to medium. The test set has an auto dimming feature that will lower the display brightness automatically if approximately 10 minutes pass without a key being pressed on the test set's front panel. The display will return to the brightness level shown in the Display Brightness field when the test set is set to local and any front panel key is pressed. There is no other user control for this feature.

Syntax Diagram and Command Descriptions

"DISPlay"

DISPlay



"Diagram Conventions" on page 1

DISPlay:BRIGhtness

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the test set's display brightness. A display backlight dimming feature lowers the display brightness after approximately 10 minutes without any manual user interaction with the test set. See "Display Backlight Dimming" on page 859.
Setting		Range: MEDium | HIGH
Query		Range: MED | HIGH
Factory setting		HIGH (this parameter is not affected by any reset operation and can only be changed by direct user access)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"DISPLAY:BRIGHTNESS MEDIUM" !Sets display brightness to medium.
```

DISPlay:MODE

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the test set's display mode. See "Display Mode (Track/Fast)" on page 1518.
Setting		Range: FAST | TRACK
Query		Range: FAST | TRAC
*RST setting		TRACK
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"DISPLAY:MODE FAST" !Sets display mode to fast.
```

DISPlay:MESSage:MASKable:STATe

Function	GSM TA	Blocks maskable messages from appearing on the test set display screen but not from the Message Log. Maskable messages are reported to the Message Log in either state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | ON | 0 | OFF
Factory setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"DISPLAY:MESSAGE:MASKABLE:STATE OFF" !Prevents certain messages from appearing on the display.`		

DISPlay:WINDow:ERRor:CLEar

Function	GSM TA	Clears the error message from the display screen but not from the Message Log.
	GPRS TA	
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"DISPLAY:WINDOW:ERROR:CLEAR" !Clears an error message from the display.`		

FETCh? Subsystem

Description

The FETCh? query is a function that allows users to query results from a measurement that was previously INITiated or READ. It does NOT begin a measurement. If no measurement is in progress it will return the integrity and measurement values from the last measurement made, or return an integrity of No Result Available and results of NAN. If a measurement is in process, the query will hang until the results are available, or the measurement fails or times out. The exact results returned with a FETCh? will depend on the specific measurement. A measurement may have a number of different results or combination of results for a FETCh?. The FETCh? queries are intended to be used to provide overlapped operation access to measurement results from the test set. When used along with SETup and INITiate commands , FETCh? is the primary way for the user to retrieve measurement results. In order to use the test set's concurrent test capabilities the overlapped commands of INITiate and FETCh? must be used. Overlapped commands allow the user to send commands and not wait for completion.

Syntax Diagrams and Command Descriptions

	Applicable to:			
	GSM TA	**GPRS TA**	**GSM/GPRS LA**	**EGPRS LA**
"FETCh:AAUDio" on page 865	Yes	No	Yes	Yes
"FETCh:BERRor" on page 877	Yes	No	Yes	Yes
"FETCh:BLERror" on page 888	No	Yes	Yes	Yes (includes support for 8PSK modulation coding schemes)
"FETCh:DAUDio" on page 892	Yes	No	Yes	Yes
"FETCh:DPOWer" on page 897	Yes	Yes	Yes	Yes
"FETCh:ETXPower" on page 901	No	No	No	Yes (includes support for 8PSK modulation coding schemes)

	Applicable to:			
	GSM TA	GPRS TA	GSM/GPRS LA	EGPRS LA
"FETCh:FBERror" on page 907	Yes	No	Yes	Yes
"FETCh:GBERror" on page 911	No	Yes	Yes	Yes (includes support for 8PSK modulation coding schemes)
"FETCh:IQTuning" on page 915	Yes	Yes	Yes	Yes
"FETCh:ORFSpectrum" on page 920	Yes	Yes	Yes	Yes
"FETCh:PFERror" on page 934	Yes	Yes	Yes	Yes
"FETCh:PVTime" on page 947	Yes	Yes	Yes	Yes
"FETCh:SMONitor" on page 981	Yes	Yes	Yes	Yes
"FETCh:TXPower" on page 983	Yes	Yes	Yes	Yes

FETCh:AAUDio

```
FETCh :AAUDio [:ALL] ? (returns Integrity,Avg Audio Level,Avg
                       SINAD,Avg Distortion,Avg Audio Freq)
              :DIStortion [:AVERage] ? (returns Avg Dist)
                          :ALL? (returns Min Dist,Max Dist,
                                 Avg Dist,Std Dev Dist)
                          :MAXimum? (returns Max Dist)
                          :MINimum? (returns Min Dist)
                          :SDEViation? (returns Std Dev Dist)
```

These commands are not applicable to GPRS.

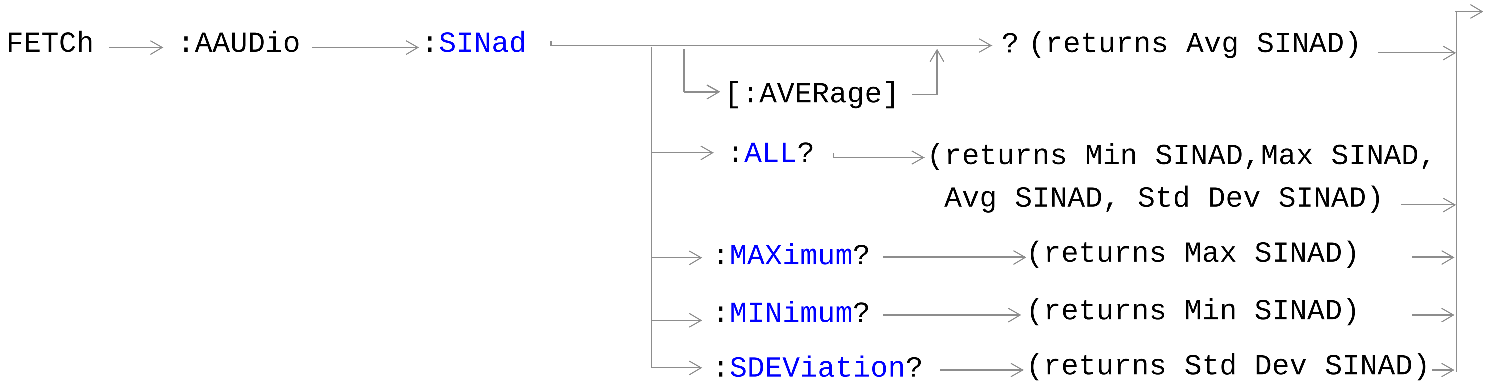
```
FETCh :AAUDio :FREQuency [:AVERage] ? (returns Avg Freq)
                         :ALL? (returns Min Freq,Max Freq,
                                Avg Freq,Std Dev Freq)
                         :MAXimum? (returns Max Freq)
                         :MINimum? (returns Min Freq)
                         :SDEViation? (returns Std Dev Freq)
```

These commands are not applicable to GPRS.

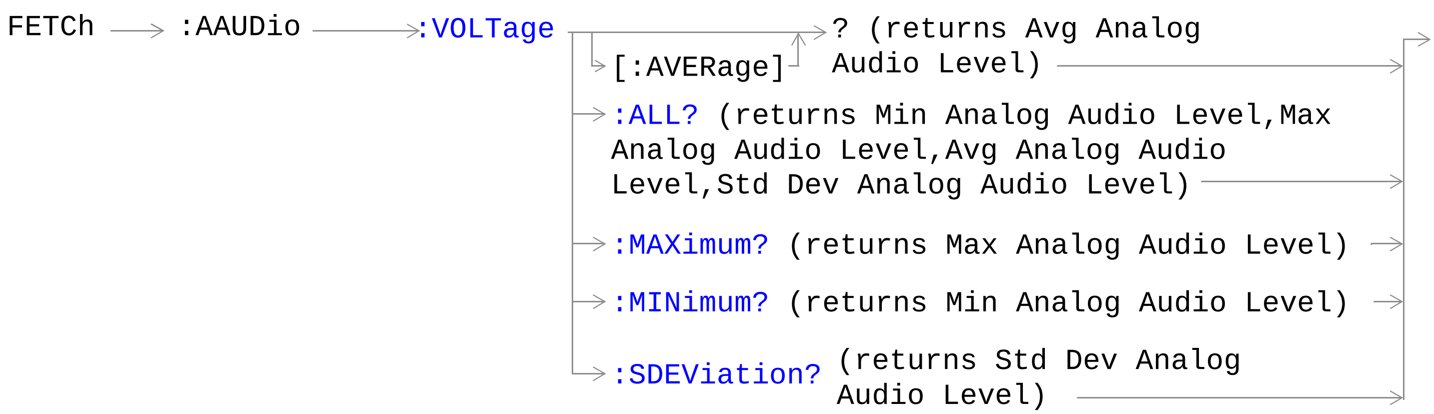
```
FETCh :AAUDio :ICOunt? (returns Intermediate Count)
              :INTegrity? (returns INTegrity)
```

These commands are not applicable to GPRS.

FETCh:AAUDio



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

“Diagram Conventions” on page 1

FETCh:AAUDio[:ALL]?

Function	GSM TA GSM/GPRS LA EGPRS LA	This query returns the analog audio measurement results. This query returns an integrity indicator (see “Integrity Indicator” on page 411), average analog audio level, average SINAD, average distortion and the average audio frequency. Values are returned in a comma-separated list. If the analog audio Multi-Measurement Count field is off, the level returned by this command is displayed in the Analog Audio In Level field. If the analog audio multi-measurement count is on, the level returned by this command is displayed in the Analog Audio Average field.
	GPRS TA	This command is not applicable to GPRS.

Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Average analog audio level • Range: 5 mV_{rms} to 14.1 V_{rms} • Resolution: 0.1 mV_{rms} Average SINAD • Range: -99 to 99 dB, 9.91 E+37 • Resolution: 0.01 dB Average distortion • Range: 0 to 99% • Resolution: 0.01% Average audio frequency • Range: 0 to 99999 Hz • Resolution: 0.01 Hz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:DISTortion[:AVERage]?

Function	GSM TA GSM/GPRS LA EGPRS LA	This query returns the average audio distortion measurement.
	GPRS TA	This command is not applicable to GPRS.
Query		Average audio distortion • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.01%
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:DISTortion:ALL?

Function	GSM TA GSM/GPRS LA EGPRS LA	This query returns the audio distortion measurements. The measurement results are returned in the following order: minimum distortion, maximum distortion, average distortion, and standard deviation distortion.
	GPRS TA	This command is not applicable to GPRS.
Query		Minimum, maximum, and average audio distortion: • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.01% Standard deviation audio distortion: • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.001%
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:DISTortion:MAXimum?

Function	GSM TA	This query returns the maximum audio distortion.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 99%, 9.91 E+37 Resolution: 0.01%
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:DISTortion:MINimum?

Function	GSM TA	This query returns the minimum audio distortion.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 99%, 9.91 E+37 Resolution: 0.01%
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:DISTortion:SDEViation?

Function	GSM TA	This query returns the standard deviation audio distortion.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 99%, 9.91 E+37 Resolution: 0.001%
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:FREQuency[:AVERage]?

Function	GSM TA	This query returns the average audio frequency measurement.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Average audio frequency • Range: 0 to 99999 Hz, 9.91 E+37 • Resolution: 0.01 Hz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:FREQuency:ALL?

Function	GSM TA	This query returns the audio frequency measurements. The measurement results are returned in the following order: minimum frequency, maximum frequency, average frequency, standard deviation frequency.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Minimum, maximum, and average audio frequency: • Range: 0 to 99999 Hz, 9.91 E+37 • Resolution: 0.01 Hz Standard deviation audio frequency: • Range: 0 to 99999 Hz, 9.91 E+37 • Resolution: 0.001 Hz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:FREQuency:MAXimum?

Function	GSM TA	This query returns the maximum audio frequency.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 99999 Hz, 9.91 E+37 Resolution: 0.01 Hz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:FREQuency:MINimum?

Function	GSM TA	This query returns the minimum audio frequency.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 99999 Hz, 9.91 E+37 Resolution: 0.01 Hz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:FREQuency:SDEViation?

Function	GSM TA	This query returns the standard deviation audio frequency.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 99999 Hz, 9.91 E+37 Resolution: 0.01 Hz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:ICOunt?

Function	GSM TA GSM/GPRS LA EGPRS LA	This query returns the intermediate count of analog audio multi-measurements completed. This value is not available over the manual interface.
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 1 to 999 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:INTegrity?

Function	GSM TA GSM/GPRS LA EGPRS LA	This query returns the integrity indicator for the last analog audio measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 411 for descriptions of non-zero integrity indicators.
	GPRS TA	This command is not applicable to GPRS.
Query		Range: See "Integrity Indicator" on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:SINad[:AVERage]?

Function	GSM TA GSM/GPRS LA EGPRS LA	This query returns the average SINAD measurement.
	GPRS TA	This command is not applicable to GPRS.
Query		Average SINAD • Range:-99 to 99 dB, 9.91 E+37 • Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:SINad:ALL?

Function	GSM TA	Queries the SINAD measurements. Measurement results are returned in the following order: minimum SINAD, maximum SINAD, average SINAD, and standard deviation SINAD.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Minimum, maximum, average SINAD: • Range: -99 to 99 dB, 9.91 E+37 • Resolution: 0.01 dB Standard deviation SINAD • Range: -99 to 99 dB, 9.91 E+37 • Resolution: 0.001 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:SINad:MAXimum?

Function	GSM TA	This query returns the maximum SINAD measurement.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: -99 to 99 dB, 9.91 E+37 Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:SINad:MINimum?

Function	GSM TA	This query returns the minimum SINAD measurement.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: -99 to 99 dB, 9.91 E+37 Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:SINad:SDEViation?

Function	GSM TA	This query returns the standard deviation SINAD measurements.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 99 dB, 9.91 E+37 Resolution: 0.001 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:VOLTage[:AVERage]?

Function	GSM TA	This query returns the average analog audio level. Value is returned in units of V_{rms}.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 5 mV_{rms} to 14.1 V_{rms} Resolution: 0.1 mV_{rms}
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:VOLTage:ALL?

Function	GSM TA	This query returns the analog audio multi-measurement minimum, maximum, average and standard deviation. Values are returned in a comma-separated list.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Minimum • Range: 10 mV_{rms} to 20 V_{rms} • Resolution: 0.1 mV_{rms} Maximum • Range: 10 mV_{rms} to 20 V_{rms} • Resolution: 0.1 mV_{rms} Average • Range: 10 mV_{rms} to 20 V_{rms} • Resolution: 0.1 mV_{rms} Standard deviation • Range: 0 V to 14.14214 V • Resolution: 0.01 mV
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:VOLTage:MAXimum?

Function	GSM TA	This query returns the analog audio multi-measurement maximum analog audio voltage.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 10 mV_{rms} to 20 V_{rms} Resolution: 0.1 mV_{rms}
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:VOLTage:MINimum?

Function	GSM TA	This query returns the analog audio multi-measurement minimum analog audio voltage.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 10 mV_{rms} to 20 V_{rms} Resolution: 0.1 mV_{rms}
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:AAUDio:VOLTage:SDEViation?

Function	GSM TA	This query returns the analog audio multi-measurement standard deviation.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 V to 14.14214 V Resolution: 0.01 mV
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:BERRor

```
FETCh→:BERRor→[:ALL]→? (returns integrity,bits tested, bit error ratio, bit error count)
              →:BITS→? (returns the number of bits tested)
                    →:TYPEIA? (returns the number of TypeIA bits tested)
                    →:TYPEIB? (returns the number of TypeIB bits tested)
                    →:TYPEII? (returns the number of TypeII bits tested)
              →:DELay? (returns speech frame delay count)
              →:FULL? (returns integrity, bits tested for Type Ia, bit error ratio for Type Ia, bit error count for Type Ia, bits tested for Type Ib, bit error ratio for Type Ib, bit error count for Type Ib, bits tested for Type II, bit error ratio for Type II, bit error count for Type II)
              →:ICOunt? (returns intermediate count)
              →:INTegrity? (returns integrity)
```

These commands are not applicable to GPRS or EGPRS.

```
FETCh→:BERRor→:COUNt→[:BITS]→? (returns bit error count)
                    →:CRC? (returns CRC bit error count for non-residual type measurements)
                    →:FE? (returns frame erasure (FE) bit error count for residual type measurements)
                    →:TYPEIA? (returns the number of TypeIA bits in error)
                    →:TYPEIB? (returns the number of TypeIB bits in error)
                    →:TYPEII? (returns the number of TypeII bits in error)
```

These commands are not applicable to GPRS or EGPRS.

```
FETCh→:BERRor→:RATio ──────────→? (returns bit error ratio) ──────────→
                      └→[:BITS]─┘
                     →:CRC? (returns CRC bit error ratio for
                      non-residual type measurements) ──────────→
                     →:FE? (returns frame erasure (FE) bit error
                      ratio for residual type measurements) ──────────→
                     →:TYPEIA? (returns the ratio of TypeIA bits in error)→
                     →:TYPEIB? (returns the ratio of TypeIB bits in error)→
                     →:TYPEII? (returns the ratio of TypeII bits in error)→
```

These commands are not applicable to GPRS or EGPRS.

“Diagram Conventions” on page 1

FETCh:BERRor[:ALL]?

Function	GSM TA GSM/GPRS LA	Queries the bit error measurement. Query returns integrity indicator, bits tested, bit error ratio, and bit error count. (A similar query, “FETCh:BERRor:FULL?” on page 883, returns the same results but for all bit types simultaneously.) See “Bit Error Measurement Description” on page 85.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Bits tested • Range: 0 to 999,131 and 9.91 E+37 (NAN) • Resolution: 1 Bit error ratio • Range: 0 to 100 and 9.91 E+37 (NAN) • Resolution: 0.01 Bit error count • Range: 1 to 999,131 and 9.91 E+37 (NAN) • Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BERRor:BITS?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA
GSM/GPRS LA</td><td>Queries the number of bits actually tested. This query only returns the result of the bit type set using the SETup:BERRor[:TYPE] command.
The number of bits actually tested will exceed the number requested because the test set rounds up the number requested to the nearest number that results in an integral number of speech frames. One speech frame is 132 bits. The test set measures complete a speech frame and it is queried for bits. See “Bit Error Measurement Description” on page 85</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td>EGPRS LA</td><td>This command is not applicable to EGPRS.</td></tr>
<tr></tr>
<tr><td colspan="2">Query</td><td>Bits tested
• Range: 0 to 999,131 and 9.91 E+37 (NAN)
• Resolution: 1</td></tr>
<tr><td colspan="2">*RST Setting</td><td>10,000</td></tr>
<tr><td rowspan="2">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
</table>

FETCh:BERRor:BITS:TYPEIA|TYPEIB|TYPEII?

<table>
<tr><td rowspan="3">Function</td><td>GSM TA
GSM/GPRS LA</td><td>Queries the number of bits which have been tested. This query allows you to select the bit type you want to query; either Type Ia, Type Ib or Type II. See “Bit Error Measurement Description” on page 85</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td>EGPRS LA</td><td>This command is not applicable to EGPRS.</td></tr>
<tr><td colspan="2">Query</td><td>Range for Type Ia: 0 to 999,000 and 9.91 E+37 (NAN)
Range for Type Ib: 0 to 2,637,369 and 9.91 E+37 (NAN)
Range for Type II: 0 to 1,558,440 and 9.91 E+37 (NAN)
Resolution: 1</td></tr>
<tr><td rowspan="2">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
</table>

FETCh:BERRor:COUNt[:BITS]?

Function	GSM TA GSM/GPRS LA	Queries the number of bits that were in error during the last bit error test. See "Bit Error Measurement Description" on page 85 The manual user must set the measurement unit to count.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 1 to 999,131 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BERRor:COUNt:CRC?

Function	GSM TA GSM/GPRS LA	Queries the number of bad cyclic redundancy checks (CRCs) for a non-residual measurement type, loopback type B test. See "Bit Error Measurement Description" on page 85 The mobile station re-transmits the CRC it received from the test set on the uplink. A bad CRC occurs when the CRC transmitted by the test set does not match what is received back from the mobile station. The manual user must set the measurement unit to count.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 19,980 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BERRor:COUNt:FE?

Function	GSM TA GSM/GPRS LA	Queries the number of frames erased during a residual measurement type, looback type A test. The manual user must set the measurement's unit to count.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 19,980 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BERRor:COUNt:TYPEIA|TYPEIB|TYPEII?

Function	GSM TA GSM/GPRS LA	Queries the number of bits in error. This query allows you to select the bit type you want to query; either Type Ia, Type Ib or Type II. See "Bit Error Measurement Description" on page 85
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range for Type Ia: 0 to 999,000 and 9.91 E+37 (NAN) Range for Type Ib: 0 to 2,637,369 and 9.91 E+37 (NAN) Range for Type II: 0 to 1,558,440 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BERRor:DELay?

Function	GSM TA GSM/GPRS LA	Queries the delay (in speech frames) that the test set used during the last bit error measurement to correlate uplink information bits with downlink information bits. This value is displayed in the Speech Frames Delay field. This value can be determined automatically, or manually set by the user. See "SETup:BERRor:MANual:DELay" on page 1053 and "SETup:BERRor:LDControl:AUTO" on page 1052. Refer also to the "Bit Error Measurement Description" on page 85 for a description of frame delay and how it is used in the bit error measurement.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 15 and 9.91 E+37 (NAN) Resolution: 1
*RST Setting		Auto
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BERRor:FULL?

Function	GSM TA GSM/GPRS LA	Queries the bit error measurement. Returns Integrity Indicator see “Integrity Indicator” on page 411, Bits Tested, Bit Error Ratio and Bit Error Count for Type Ia, Type Ib and Type II bits. (A similar query, “FETCh:BERRor[:ALL]?” on page 878, returns the same results but only for the bit type previously set using the SETup:BERRor[:TYPE] command.) See “Bit Error Measurement Description” on page 85
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.

Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Type Ia Bits tested • Range: 0 to 999,000 and 9.91E+37 (NAN) • Resolution: 1 Type Ia Bit error ratio • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 0.01 Type Ia Bit error count • Range: 0 to 999,000 and 9.91E+37 (NAN) • Resolution: 1 Type Ib Bits tested • Range: 0 to 2,637,369 and 9.91E+37 (NAN) • Resolution: 1 Type Ib Bit error ratio • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 0.01 Type Ib Bit error count • Range: 0 to 2,637,369 and 9.91E+37 (NAN) • Resolution: 1 Type II Bits tested • Range: 0 to 15,584,400 and 9.91E+37 (NAN) • Resolution: 1 Type II Bit error ratio • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 0.01 Type II Bit error count • Range: 0 to 1,558,440 and 9.91E+37 (NAN) • Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BERRor:ICOunt?

Function	GSM TA GSM/GPRS LA	Queries the intermediate count of bits tested (measurement progress report). See “Measurement Progress Report” on page 403
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 999 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BERRor:INTegrity?

Function	GSM TA GSM/GPRS LA	Returns the integrity indicator value for the last bit error measurement performed. Zero indicates a normal result. See “Integrity Indicator” on page 411 for descriptions of non-zero integrity indicators.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: See “Integrity Indicator” on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BERRor:RATio[:BITS]?

Function	GSM TA GSM/GPRS LA	Queries the ratio of bits in error to the number of bits tested during the last bit error test and returns it as a percentage. See “Bit Error Measurement Description” on page 85 The manual user must set the measurement unit to %.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 1 to 100 and 9.91 E+37 (NAN) Resolution: 0.01
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BERRor:RATio:CRC?

Function	GSM TA	Queries the ratio of bad cyclic redundancy checks (CRCs) to the total number of CRCs received for a non-residual measurement type, looback type B test and returns it as a percentage. See “Bit Error Measurement Description” on page 85 The mobile station re-transmits the CRC it received from the test set on the uplink. A bad CRC occurs when the CRC transmitted by the test set does not match what is received back from the mobile station. The manual user must set the measurement’s unit to %.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 100 and 9.91 E+37 (NAN) Resolution: 0.01
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BERRor:RATio:FE?

Function	GSM TA	Queries the ratio of erased frames to the total number of frames received for a residual measurement type, looback type A test and returns them as a percentage. See “Bit Error Measurement Description” on page 85 The manual user must set the measurement’s unit to %.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 100 and 9.91 E+37 (NAN) Resolution: 0.01
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BERRor:RATio:TYPEIA|TYPEIB|TYPEII?

Function	GSM TA	Queries the number of bits in error to the number of bits tested. This query allows you to select the bit type you want to query; either Type Ia, Type Ib or Type II. The result is returned as a percentage. See “Bit Error Measurement Description” on page 85
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 to 100 and 9.91 E+37 (NAN) Resolution: 0.01
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:BLERror

```
FETCh ──> :BLERror ──┬──────────────> ? (returns Integrity, Blocks Tested, Block
                     │ └> [:ALL] ─┘     Error Ratio, Block Error Count)
                     ├> :BLOCks? (returns Blocks Tested)
                     ├> :COUNt? (returns Block Error Count)
                     ├> :DELay? (returns Block Delay used)
                     ├> :ICOunt? (returns Intermediate Count)
                     ├> :INTegrity? (returns Integrity)
                     └> :RATio? (returns Block Error Ratio)
```

These commands are not applicable to GSM.

"Diagram Conventions" on page 1

FETCh:BLERror[:ALL]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the block error measurement results. The integrity indicator, blocks tested, block error ratio, and block error count are returned.
	GSM/GPRS LA	
	EGPRS LA	
Query		Integrity indicator: • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Blocks tested: • Range: 0 to 99127 and 9.91 E+37 (NAN) • Resolution: 1 Block error ratio: • Range: 0 to 100 and 9.91 E+37 (NAN) • Resolution: 0.01 Block error count: • Range: 0 to 99127 and 9.91 E+37 (NAN) • Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:BLERror:BLOCks?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the total number of information blocks tested during the last block error measurement. See “FETCh:BLERror:COUNt?” on page 890.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 99127 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:BLERror:COUNt?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the count of erroneous blocks found during the last block error measurement.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 99127 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:BLERror:DELay?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the block delay the test set used during the last block error measurement. This value can be determined automatically by the test set, or you can set it manually. See "SETup:BLERror:MANual:DELay" on page 1059 and "SETup:BLERror:LDControl:AUTO" on page 1059 for setting this value manually. This query is not applicable when the data connection type is set to BLER.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 1 to 6 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:BLERror:ICOunt?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	Queries the intermediate count (measurement progress report) of blocks tested.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 99127 and 9.91 E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:BLERror:INTegrity?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the integrity indicator value for the last block error measurement performed. Zero indicates a normal result. See "Integrity Indicator" on page 411 for descriptions of non-zero integrity indicators.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: See "Integrity Indicator" on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:BLERror:RATio?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the ratio of erroneous blocks found during the last block error measurement.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 100 and 9.91 E+37 (NAN) Resolution: 0.01
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:DAUDio

```
FETCh :DAUDio [:ALL] ? (returns Integrity,Avg Decoded Audio
                         Level)
              :ICOunt? (returns Intermediate Count)
              :INTegrity? (returns INTegrity)
              :AMPLitude [:AVERage] ? (returns Avg Decoded
                                      Audio Level)
                         :ALL? (returns Min Decoded Audio Level,Max
                         Decoded Audio Level,Avg Decoded Audio
                         Level,Std Dev Decoded Audio Level)
                         :MAXimum? (returns Max Decoded Audio Level)
                         :MINimum? (returns Min Decoded Audio Level)
                         :SDEViation? (returns Std Dev Decoded
                                      Level)
```

These commands are not applicable to GPRS.

“Diagram Conventions” on page 1

FETCh:DAUDio[:ALL]?

Function	GSM TA	Queries integrity indicator and average decoded audio results. Values are returned in a comma-separated list.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Integrity indicator: • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Decoded audio: • Range: 0 to 100% • Resolution: 0.01% FS
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:DAUDio:ICOunt?

Function	GSM TA	Queries the intermediate count of decoded audio multi-measurements completed. This value is not displayed on the test set.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 1 to 999 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:DAUDio:INTegrity?

Function	GSM TA GSM/GPRS LA EGPRS LA	Queries the integrity indicator for the last decoded audio measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 411 for descriptions of non-zero integrity indicators.
	GPRS TA	This command is not applicable to GPRS.
Query		Range: See "Integrity Indicator" on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:DAUDio:AMPLitude[:AVERage]?

Function	GSM TA GSM/GPRS LA EGPRS LA	Queries the average decoded audio result from an uplink speech level measurement in percent full scale. If the decoded audio multi-measurement count field is off, the level returned by this command is displayed in the Decoded Audio Level field. If the decoded audio multi-measurement count is on, the level returned by this query is displayed in the Average field.
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 100% Resolution: 0.01% FS
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:DAUDio:AMPLitude:ALL?

Function	GSM TA	Queries the decoded audio multi-measurement minimum, maximum, average and standard deviation. Values are returned in a comma-separated list. The values returned are displayed in the Minimum, Maximum, Average, and Std. Dev. fields, which are displayed when the decoded audio multi-measurement count is not off.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Minimum: • Range: 0 to 100% • Resolution: 0.01% FS Maximum: • Range: 0 to 100% • Resolution: 0.01% FS Average: • Range: 0 to 100% • Resolution: 0.01% FS Standard deviation: • Range: 0 to 71% • Resolution: 0.001% FS
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:DAUDio:AMPLitude:MAXimum?

Function	GSM TA	Queries the decoded audio multi-measurement maximum decoded audio voltage. The value returned is displayed in the Decoded Audio Maximum field, which is displayed when the decoded audio multi-measurement count is not off.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 100% Resolution: 0.01% FS
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

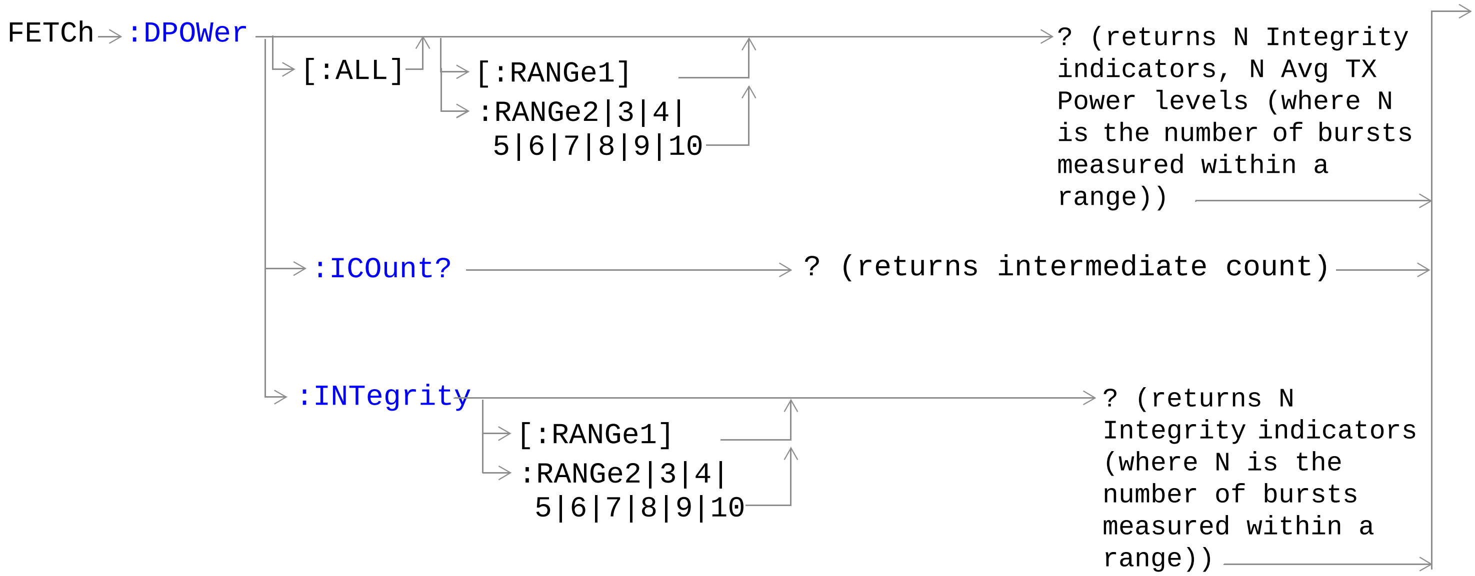
FETCh:DAUDio:AMPLitude:MINimum?

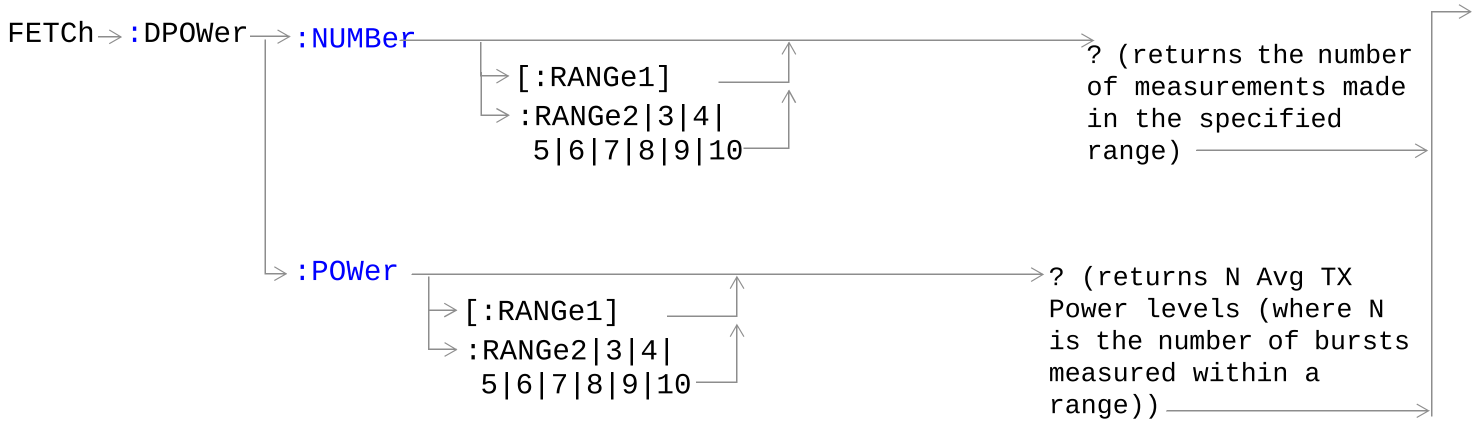
Function	GSM TA GSM/GPRS LA EGPRS LA	Queries the decoded audio multi-measurement minimum decoded audio voltage The value returned is displayed in the Decoded Audio Minimum field, which is displayed when the decoded audio multi-measurement count is not off.
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 100% Resolution: 0.01% FS
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:DAUDio:AMPLitude:SDEViation?

Function	GSM TA GSM/GPRS LA EGPRS LA	Queries the decoded audio multi-measurement standard deviation. The value returned is displayed in the Decoded Audio Std Dev. field, which is displayed when the Decoded Audio multi-measurement count is not off.
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 71% Resolution: 0.001% FS
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:DPOWer





"Diagram Conventions" on page 1

FETCh:DPOWer[:ALL][:RANGe1]?
FETCh:DPOWer[:ALL]:RANGe2|3|4|5|6|7|8|9|10?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the Dynamic Power measurement results. Query returns N integrity indicators and N average TX power levels (where N is the number of bursts measured). To set the number of bursts you want to measure, use “SETup:DPOWer:COUNt:NUMBer[:SELected]” on page 1073. Each of the ranges can query up to 100 bursts. Therefore if you have set up to measure 250 bursts you must use range 1, range 2 and range 3 to obtain all your results.
Query		Integrity indicators for each individual burst • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Average TX power levels for each individual burst • Range: -100 to +100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dBm
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"FETCh:DPOWer?" !Queries the Dynamic Power measurement results for the first 100 bursts.`		

FETCh:DPOWer:ICOunt?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the intermediate count of measurements completed in a multi-measurement.
Query		Range: 0 to 999
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;”FETCH:DPOWER:ICOUNT?”`		

FETCh:DPOWer:INTegrity[:RANGe1]?
FETCh:DPOWer:INTegrity:RANGe2|3|4|5|6|7|8|9|10?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Returns N integrity indicators (where N is the number of bursts measured). To set the number of bursts you want to measure, use “SETup:DPOWer:COUNt:NUMBer[:SELected]” on page 1073. Each of the ranges can query up to 100 bursts. Therefore if you have set up to measure 160 bursts you must use range 1 and range 2 to obtain all the integrity indicators.
Query		Range: See “Integrity Indicator” on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"FETCh:DPOWer:INTegrity:RANGe3?" !Queries the integrity results for bursts 201 through 300.
```

FETCh:DPOWer:NUMBer[:RANGe1]?
FETCh:DPOWer:POWer:NUMBer:RANGe2|3|4|5|6|7|8|9|10?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the number of measurements made in the specified range. Each of the ranges can query up to 100 bursts. Therefore if you have set up to measure 400 bursts you must use range 1, range 2, range 3 and range 4 to obtain all your TX power level results.
Query		Range: 1 to 100 (per range)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"FETCh:DPOWer:NUMBer:RANGe2?" !Queries the number of measurements made in range 2.
```

FETCh:DPOWer:POWer[:RANGe1]?
FETCh:DPOWer:POWer:RANGe2|3|4|5|6|7|8|9|10?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the average TX power levels for the Dynamic Power measurement. Returns N average power levels (where N is the number of bursts measured. To set the number of bursts you want to measure, see “SETup:DPOWer:COUNt:NUMBer[:SELected]” on page 1073. Each of the ranges can query up to 100 bursts. Therefore if you have set up to measure 400 bursts you must use range 1, range 2, range 3 and range 4 to obtain all your TX power level results.
Query		Range: -100 to +100 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCh:DPOWer:POWer:RANGe2?" !Queries the average TX power for bursts 101 through 200.
```

FETCh:ETXPower

```
FETCh :ETXPower [:ALL]? (returns Integrity,Average Burst Power,
                         Average Estimated Carrier Power)
                :ICOunt? (returns Intermediate Count)
                :INTegrity? (returns Integrity)
                :POWer :ALL? (returns Min Burst Power, Max Burst
                             Power, Avg Burst Power, Std Dev Burst Power,
                             Min Carrier Power, Max Carrier Power, Avg
                             Carrier Power, Std Dev Carrier Power)
                       :BURSt [:AVERage]? (returns Avg Burst
                                          Power)
                              :MAXimum? (returns Max Burst Power)
                              :MINimum? (returns Min Burst Power)
                              :SDEViation? (returns Std Dev Burst Power)
```

These commands are only applicable to EGPRS.

```
FETCh :ETXPower :POWer :CARRier [:AVERage]? (returns Avg TX Power)
                                :MAXimum? (returns Max TX Power)
                                :MINimum? (returns Min TX Power)
                                :SDEViation? (returns Std Dev TX Power)
```

These commands are only applicable to EGPRS.

“Diagram Conventions” on page 1

FETCh:ETXPower[:ALL]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	Queries integrity indicator and average EGPRS transmit power measurement. A value of zero for the integrity indicator is normal. See “Integrity Indicator” on page 411 for non-zero integrity indicators.
Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Burst power (average) • Range: –100 to +100 dBm and 9.91E+37 (NAN) • Resolution: 0.01 dB Estimated carrier power (average) • Range: –100 to +100 dBm and 9.91E+37 (NAN) • Resolution: 0.01 dB
Requirements	EGPRS LA	Revision A.01.00 and above

FETCh:ETXPower:ICOunt?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	Queries the intermediate count of EGPRS transmit power measurements completed.
Query		Range: 1 to 999 Resolution: 1
Requirements	EGPRS LA	Revision A.01.00 and above

FETCh:ETXPower:INTegrity?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	Queries the integrity indicator. Zero indicates normal. For non-zero integrity indicators, refer to "Integrity Indicator" on page 411.
Query		Range: See "Integrity Indicator" on page 411. Resolution: 1
Requirements	EGPRS LA	Revision A.01.00 and above

FETCh:ETXPower:POWer:ALL?

Function	GSM TA	GSM TA
	GPRS TA	GPRS TA
	GSM/GPRS LA	GSM/GPRS LA
	EGPRS LA	Queries average, minimum, maximum and standard deviation of burst power multi-measurement results.
Query		Average: • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Minimum: • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Maximum: • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Standard deviation: • Range: 0 dB to 100 dB and 9.91 E+37 (NAN) • Resolution: 0.001 dB
Requirements	EGPRS LA	Revision A.01.00 and above

FETCh:ETXPower:POWer:BURSt[:AVERage]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	Queries average burst power.
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	EGPRS LA	Revision A.01.00 and above

FETCh:ETXPower:POWer:BURSt:MAXimum?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	Queries maximum burst power results from a multi-measurement.
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	EGPRS LA	Revision A.01.00 and above

FETCh:ETXPower:POWer:BURSt:MINimum?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	Queries minimum burst power results from a multi-measurement.
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	EGPRS LA	Revision A.01.00 and above

FETCh:ETXPower:POWer:BURSt:SDEViation?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	Queries the standard deviation from a burst power multi-measurement.
Query		Range: 0 dB to 100 dB and 9.91 E+37 (NAN) Resolution: 0.001 dB
Requirements	EGPRS LA	Revision A.01.00 and above

FETCh:ETXPower:POWer:CARRier[:AVERage]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	Queries average carrier power.
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	EGPRS LA	Revision A.01.00 and above

FETCh:ETXPower:POWer:CARRier:MAXimum?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	Queries maximum carrier power results from a multi-measurement.
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	EGPRS LA	Revision A.01.00 and above

FETCh:ETXPower:POWer:CARRier:MINimum?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	Queries minimum carrier power results from a multi-measurement.
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	EGPRS LA	Revision A.01.00 and above

FETCh:ETXPower:POWer:CARRier:SDEViation?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	Queries the standard deviation from a carrier power multi-measurement.
Query		Range: 0 dB to 100 dB and 9.91 E+37 (NAN) Resolution: 0.001 dB
Requirements	EGPRS LA	Revision A.01.00 and above

FETCh:FBERror

```
FETCh ──> :FBERror ─┬──────────────> ? (returns Integrity,Fast Bit Error Rate
                    │ └─> [:ALL] ─┘    Bits Tested, FBER Ratio, FBER Count)
                    ├─> :BITS? (returns number of bits tested)
                    ├─> :COUNt? (returns number of bits failed)
                    ├─> :DELay? (returns TDMA frame delay)
                    ├─> :ICOunt? (returns Intermediate Count)
                    ├─> :INTegrity? (returns INTegrity)
                    └─> :RATio? (returns bit error ratio)
```

These commands are not applicable to GPRS.

"Diagram Conventions" on page 1

FETCh:FBERror[:ALL]?

Function	GSM TA GSM/GPRS LA EGPRS LA	Queries the fast bit error measurement. Query returns integrity indicator, bits tested, bit error ratio, and bit error count. Bit error ratio is displayed in the Fast Bit Error field. The other values returned by this query are not available on the front panel display.
	GPRS TA	This command is not applicable to GPRS.
Query		Integrity indicator: • See "Integrity Indicator" on page 411. • Resolution: 1 Bits tested: • Range: 1 to 999,455 and 9.91 E+37 (NAN) • Resolution: 1 Bit error ratio: • Range: 0 to 100 and 9.91 E+37 (NAN) • Resolution: 0.01 Fast bit error count: • Range: 1 to 999,455 and 9.91 E+37 (NAN) • Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:FBERror:BITS?

Function	GSM TA GSM/GPRS LA EGPRS LA	Queries the total number of information bits tested during the last fast bit error measurement. See "SETup:FBERror:COUNt" on page 1095 This value is not available on the front panel display.
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 1 to 999,455 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:FBERror:COUNt?

Function	GSM TA	Queries the number of information bits that were deemed errors during the last fast bit error test. This value is not available on the front panel display.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 1 to 999,455 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:FBERror:DELay?

Function	GSM TA	Queries the delay (in TDMA frames) the test set used during the last fast bit error measurement to correlate uplink information bits with downlink information bits. This value is displayed in the TDMA Frame Delay field. This value can be determined automatically, or set by the user. See "SETup:FBERror:MANual:DELay" on page 1097 and "SETup:FBERror:LDControl:AUTO" on page 1096 for setting this value manually. Refer also to the "Fast Bit Error Measurement Description" on page 100 for a description of frame delay and how it is used in the fast bit error measurement.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 26 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:FBERror:ICOunt?

Function	GSM TA	Queries the intermediate count (measurement progress report) of bits tested
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 999,455 and 9.91 E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:FBERror:INTegrity?

Function	GSM	Returns the integrity indicator value for the last fast bit error measurement performed. Zero indicates a normal result. See "Integrity Indicator" on page 411 for descriptions of non-zero integrity indicators.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: See "Integrity Indicator" on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:FBERror:RATio?

Function	GSM TA	Queries the ratio of bits deemed bad to total bits tested during the last fast bit error measurement performed.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Range: 0 to 100 and 9.91 E+37 (NAN) Resolution: 0.01
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:GBERror

```
FETCh :GBERror [:ALL] ? (returns Integrity, Bits Tested, Bit
                        Error Ratio, Bit Error Count)
               :BITS? (returns Bits Tested)
               :COUNt? (returns Bit Error Count)
               :DELay? (returns Block Delay used)
               :ICOunt? (returns Intermediate Count)
               :INTegrity? (returns Integrity)
               :RATio? (returns Bit Error Ratio)
```

These commands are not applicable to GSM.

"Diagram Conventions" on page 1

FETCh:GBERror[:ALL]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the bit error measurement results. The integrity indicator, bits tested, bit error ratio, and bit error count are returned.
	GSM/GPRS LA	
	EGPRS LA	
Query		Integrity indicator: • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Bits tested: • Range: 0 to 999,427 and 9.91 E+37 (NAN) • Resolution: 1 Bit error ratio: • Range: 0 to 100 and 9.91 E+37 (NAN) • Resolution: 0.01 Bit error count: • Range: 0 to 999,427 and 9.91 E+37 (NAN) • Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:GBERror:BITS?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the total number of information bits tested during the last bit error measurement. See “FETCh:GBERror:COUNt?” on page 913.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 999,427 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:GBERror:COUNt?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the count of erroneous bits found during the last bit error measurement.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 999,427 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:GBERror:DELay?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the block delay the test set used during the last bit error measurement. This value can be determined automatically by the test set, or you can set it manually. See “SETup:GBERror:MANual:DELay” on page 1103 and “SETup:GBERror:LDControl:AUTO” on page 1102 for setting this value manually. Refer also to the “GPRS Bit Error Measurement” on page 88 for a description of block delay and how it is used in the bit error measurement.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 1 to 6 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:GBERror:ICOunt?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	Queries the intermediate count (measurement progress report) of bits tested.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 999,455 and 9.91 E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:GBERror:INTegrity?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the integrity indicator value for the last bit error measurement performed. Zero indicates a normal result. See "Integrity Indicator" on page 411 for descriptions of non-zero integrity indicators.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: See "Integrity Indicator" on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:GBERror:RATio?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This query returns the ratio of erroneous bits found during the last bit error measurement.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 100 and 9.91 E+37 (NAN) Resolution: 0.01
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:IQTuning

```
FETCh :IQTuning [:ALL] ? (returns integrity, signal level relative to
                         the desired signal at 9 different frequencies)
                :ICOunt? (returns Intermediate Count)
                :INTegrity? (returns Integrity)
                :POWer [:ALL] ? (returns the relative power at
                                9 frequencies)
                :REFerence :FREQuency? (returns reference frequency)
                :SPUR :POWer? (returns power level of
                               spur frequency)
```

"Diagram Conventions" on page 1

FETCh:IQTuning[:ALL]?

Function	GSM TA	Queries the I/Q Tuning measurement results. Query returns the integrity indicator and the relative power level at the following offset frequencies: carrier frequency, +/-67.7083 kHz, +/-135.417 kHz, +/-203.125 kHz, +/-270.833 kHz. The spur measurement result is also returned.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	

Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Signal level relative to the desired signal at 9 different frequencies • Range: -100 to +100 dB and 9.91 E+37 (NAN) • Resolution: 0.01 dB The order of the signal level results are: • -270.833 kHz • -203.125 kHz • -135.417 kHz • -67.7083 kHz • carrier frequency • +67.7083 kHz • +135.417 kHz • +203.125 kHz • +270.833 kHz Relative power of the spur frequency: • Range: -100 to +100 dB and 9.91E+37 (NAN) • Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:IQTuning:ICOunt?

Function	GSM TA	Queries the intermediate number of I/Q Tuning multi-measurements completed.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 999 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:IQTuning:INTegrity?

Function	GSM TA	Returns the integrity indicator value for the last I/Q Tuning measurement performed. Zero indicates a normal result.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: See “Integrity Indicator” on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:IQTuning:POWer[:ALL]?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the I/Q Tuning measurement results. Query returns the relative power level at the following offset frequencies: carrier frequency, ±67.7083 kHz, ±135.417 kHz, ±203.125 kHz, ±270.833 kHz. The spur measurement result is also returned.
Query		Signal level relative to the desired signal at 9 different frequencies • Range: -100 to +100 dB and 9.91 E+37 (NAN) • Resolution: 0.01 dB The order of the signal level results are: • -270.833 kHz • -203.125 kHz • -135.417 kHz • -67.7083 kHz • carrier frequency • +67.7083 kHz • +135.417 kHz • +203.125 kHz • +270.833 kHz Relative power of the spur frequency: • Range: -100 to +100 dB and 9.91E+37 (NAN) • Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:IQTuning:REFerence:FREQuency?

Function	GSM TA	Queries the offset frequency being used as the reference for the measurement.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		NEG67KHZ | ZEROKHZ | POS67KHZ | UNKNOWN
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:IQTuning:SPUR:POWer?

Function	GSM TA	Queries the relative power level of the spur frequency.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: -100 to +100 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:ORFSpectrum

FETCh :ORFSpectrum

- ? (returns Integrity,TX Power,Max Switching Offset Results,30 kHz BW Power,Avg Mod Offset Results)
- [:ALL]
- :ICOunt? (returns Intermediate Count)
- :INTegrity? (returns Integrity)
- :LIMit? (returns 0|1)
  - :ALL? (returns pass/fail and limits used, for all modulation and switching level results)

FETCh :ORFSpectrum :MODulation

- ? (returns 30 kHz BW Power,Avg Mod Offset Results)
- [:ALL]
- :FREQuency [:OFFSet]? <sp><num value> (returns Avg Mod Results at Specified Offset)
- :LIMit? (returns 0|1)
  - :ALL? (returns pass/fail and limits used, for all modulation level results)

FETCh :ORFSpectrum :POWer

- ? (returns TX Power)
- [:TXPower]
- :BWIDth? (returns 30 kHz BW Power)

FETCh:ORFSpectrum:SWITching [:ALL] [:MAXimum] ? (returns Max Switching Offset Results)

:AVERage? (returns Avg Switching Offset Results)

:SDEViation? (returns Std Dev Switching Offset Results)

:FREQuency [:OFFSet] [:MAXimum] ? <sp><num value> (returns Max Switching Results at Specified Offsets)

:AVERage? <sp><num value> (returns Avg Switching Results at Specified Offsets)

:SDEViation? <sp><num value> (returns Std Dev Switching Results at Specified Offsets)

FETCh:ORFSpectrum:SWITching:LIMit ? (returns 0|1)

:ALL? (returns pass/fail and limits used, for all switching level results)

“Diagram Conventions” on page 1

FETCh:ORFSpectrum[:ALL]?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Queries integrity indicator, TX carrier power, up to eight comma-separated output RF spectrum due to switching (max) results, 30 kHz bandwidth power, and up to 22 output RF spectrum due to modulation (average) results.

The “SETup:ORFSpectrum:SWITching:FREQuency[:OFFSet]” command sets up the number of output RF spectrum due to switching offsets that are turned on and their frequency values. The “SETup:ORFSpectrum:SWITching:FREQuency:POINts?” queries the number of output RF spectrum due to switching points that are turned on, indicating the number of output RF spectrum due to switching (max) values to expect when you FETCh results.

The “SETup:ORFSpectrum:MODulation:FREQuency[:OFFSet]” command sets up the number of output RF spectrum due to modulation offsets that are turned on and their frequency values. The “SETup:ORFSpectrum:MODulation:FREQuency:POINts?” command queries the number of output RF spectrum due to modulation points that are turned on, indicating the number of output RF spectrum due to modulation (average) values to expect when you FETCh results.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Integrity indicator
• Range: See “Integrity Indicator” on page 411.
• Resolution: 1
TX Carrier Power
• Range: –100 dBm to +100 dBm and 9.91 E+37
• Resolution: 0.01 dB
Output RF Spectrum Due to Switching (Max)
• Range: –100 dBm to +100 dBm and 9.91 E+37
• Resolution: 0.01 dB
30 kHz Bandwidth Power
• Range: –100 dBm to +100 dBm and 9.91 E+37
• Resolution: 0.01 dB
Output RF Spectrum due to Modulation (Average)
• Range: –200 dB to +100 dB and 9.91 E+37
• Resolution: 0.01 dB</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
</table>

FETCh:ORFSpectrum:ICOunt?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the intermediate count of ORFS multi-measurements completed. This number will climb to the number returned by “SETup:ORFSpectrum:ICOunt:MAXimum?” on page 1135.
Query		Range: 0 to 29971 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:ORFSpectrum:INTegrity?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the integrity indicator for the output RF spectrum analyzer measurement. Zero indicates a normal result. See “Integrity Indicator” on page 411 for descriptions of non-zero integrity indicators.
Query		Range: See “Integrity Indicator” on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:ORFSpectrum:LIMit?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries both the ORFS switching and modulation offset results for an overall pass/fail result.
Query		Range: 0 (pass), 1 (fail), and 9.91 E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:ORFSpectrum:LIMit:ALL?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Queries the results for all enabled ORFS due to switching offsets and enabled ORFS due to modulation offsets.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>For each switching enabled result the following is returned in a comma-separated:
• 0 (pass), 1 (fail), and 9.91 E+37 (NAN)
• limit used
For each modulation enabled result the following is returned in a comma-separated:
• 0 (pass), 1 (failed due to relative limit), -1 (failed due to absolute limit) and 9.91 E+37 (NAN)
• relative limit used (in dB)
• absolute limit used (in dBm)</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
</table>

FETCh:ORFSpectrum:MODulation[:ALL]?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Queries TX Carrier Power, 30 kHz BW Power, and up to 22 comma-separated output RF spectrum due to modulation (average) results

The “SETup:ORFSpectrum:MODulation:FREQuency[:OFFSet]” command sets up the number of output RF spectrum due to modulation offsets that are turned on and their frequency values. The “SETup:ORFSpectrum:MODulation:FREQuency:POINts?” command queries the number of output RF spectrum due to modulation points that are turned on, indicating the number of output RF spectrum due to modulation (average) values to expect when you FETCh output RF spectrum due to modulation results.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>TX Carrier Power
• Range: –100 dBm to +100 dBm and 9.91 E+37
• Resolution: 0.01 dB
30 kHz Bandwidth Power
• Range: –100 dBm to +100 dBm and 9.91 E+37
• Resolution: 0.01 dB
Output RF Spectrum due to Modulation (Average)
• Range: –200 dB to +100 dB and 9.91 E+37
• Resolution: 0.01 dB</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
</table>

FETCh:ORFSpectrum:MODulation:FREQuency[:OFFSet]?

Function	GSM TA	Queries the ORFS due to modulation measurement, allowing frequency offset values to be appended to the command. Returns ORFS due to modulation (average) measurements at the frequencies listed, in the order they are listed. Frequencies must have a one-to-one correspondence to ORFS due to modulation frequency offsets that are currently turned on. Frequencies must be separated by commas. (See “SETup:ORFSpectrum:MODulation:FREQuency[:OFFSet]” for the command that turns on frequency offsets.) Each frequency value is (optionally) followed by: HZ|KHZ|MHZ|GHZ . The default units are HZ (hertz).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –200 dB to +100 dB and 9.91 E+37 Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”FETCH:ORFSPECTRUM:MODULATION:FREQUENCY:OFFSET? 200 KHZ, 400 KHZ”
!Returns the ORFS due to modulation (average) measurement
!results at the 200 kHz and 400 kHz offsets only, assuming
these offsets are turned on.
```

FETCh:ORFSpectrum:MODulation:LIMit?

Function	GSM TA	Queries the ORFS modulation offset results for an overall pass/fail result.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 (pass), 1 (fail), and 9.91 E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:ORFSpectrum:MODulation:LIMit:ALL?

Function	GSM TA	Queries the results for all enabled ORFS due to modulation offsets.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		For each modulation enabled result the following is returned in a comma-separated: • 0 (pass), 1 (failed due to relative limit), -1 (failed due to absolute limit), and 9.91 E+37 (NAN) • relative limit used (in dB) • absolute limit used (in dBm)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:ORFSpectrum:POWer?

Function	GSM TA	Returns the TX carrier power measurement result from the last ORFS measurement. This measurement is made using the method described in the “Transmit Power Measurement Description” on page 144.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –100 dBm to +100 dBm and NAN. Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”FETCH:ORFSPECTRUM:POWER:TXPOWER?” !Returns TX carrier power.`		

FETCh:ORFSpectrum:POWer:BWIDth?

Function	GSM TA	Queries the ORFS 30 kHz bandwidth power measurement. See “Output RF Spectrum Measurement Description” on page 106.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –100 dBm to +100 dBm and NAN. Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:ORFSpectrum:SWITChing[:ALL][:MAXimum]?

Function	GSM TA	Queries output RF spectrum due to switching (maximum) measurement results at all frequency offsets currently turned on (there can be up to eight). The “SETup:ORFSpectrum:SWITching:FREQuency[:OFFSet]” command sets up the number of output RF spectrum due to switching offsets that are turned on and their frequency values. The “SETup:ORFSpectrum:SWITching:FREQuency:POINts?” queries the number of output RF spectrum due to switching points that are turned on, indicating the number of output RF spectrum due to switching (max) values to expect when you FETCh results.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –100 dBm to +100 dBm and 9.91 E+37 Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”FETCH:ORFSPECTRUM:SWITCHING:ALL:MAXIMUM?”  !Returns the ORFS due to
                                                       !switching (maximum)
                                                       !measurement results at
                                                       !all frequency offsets
                                                        !currently turned on.
```

FETCh:ORFSpectrum:SWITChing[:ALL]:AVERage?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries output RF spectrum due to switching (average) measurement results at all frequency offsets currently turned on (there can be up to eight). The "SETup:ORFSpectrum:SWITching:FREQuency[:OFFSet]" command sets up the number of output RF spectrum due to switching offsets that are turned on and their frequency values. The "SETup:ORFSpectrum:SWITching:FREQuency:POINts?" queries the number of output RF spectrum due to switching points that are turned on, indicating the number of output RF spectrum due to switching values to expect when you FETCh results.
Query		Range: –100 dBm to +100 dBm and 9.91 E+37 Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:ORFSPECTRUM:SWITCHING:ALL:AVERAGE?"  !Returns the ORFS due to
                                                        !switching (average)
                                                        !measurement results at
                                                        !all frequency offsets
                                                                !currently turned on.
```

FETCh:ORFSpectrum:SWITChing:FREQuency[:OFFSet][:MAXimum]?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the ORFS due to switching measurement, allowing frequency offset values to be appended to the command. Returns ORFS due to switching (maximum) measurements at the frequencies listed, in the order they are listed. Frequencies must have a one-to-one correspondence to ORFS due to switching frequency offsets that are currently turned on. Frequencies must be separated by commas. (See "SETup:ORFSpectrum:SWITching:FREQuency[:OFFSet]" for the command that turns on frequency offsets.) Each value is (optionally) followed by: HZ | KHZ | MHZ | GHZ . The default units are HZ (hertz).
Query		Range: –100 dB to +100 dB and 9.91 E+37 Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:ORFSPECTRUM:SWITCHING:FREQUENCY:OFFSET:MAXIMUM? 200 KHZ,
400 KHZ" !Returns the ORFS due to switching (maximum) measurement results
         !at the 200 kHz and 400 kHz offsets only, assuming these offsets are
         !turned on
```

FETCh:ORFSpectrum:SWITChing:FREQuency[:OFFSet]:AVERage?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the ORFS due to switching measurement, allowing frequency offset values to be appended to the command. Returns ORFS due to switching (average) measurements at the frequencies listed, in the order they are listed. Frequencies must have a one-to-one correspondence to ORFS due to switching frequency offsets that are currently turned on. Frequencies must be separated by commas. (See "SETup:ORFSpectrum:SWITching:FREQuency[:OFFSet]" for the command that turns on frequency offsets.) Each value is (optionally) followed by: HZ | KHZ | MHZ | GHZ . The default units are HZ (hertz).
Query		Range: –100 dB to +100 dB and 9.91 E+37 Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:ORFSPECTRUM:SWITCHING:FREQUENCY:OFFSET:AVERAGE? 200 KHZ,
400 KHZ" !Returns the ORFS due to switching (average) measurement results at the
         !200 kHz and 400 kHz offsets only, assuming these offsets are turned on.
```

FETCh:ORFSpectrum:SWITChing:FREQuency[:OFFSet]:SDEViation?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the ORFS due to switching measurement, allowing frequency offset values to be appended to the command. Returns ORFS due to switching (standard deviation) measurements at the frequencies listed, in the order they are listed. Frequencies must have a one-to-one correspondence to ORFS due to switching frequency offsets that are currently turned on. Frequencies must be separated by commas. (See "SETup:ORFSpectrum:SWITching:FREQuency[:OFFSet]" for the command that turns on frequency offsets.) Each value is (optionally) followed by: HZ | KHZ | MHZ | GHZ . The default units are HZ (hertz).
Query		Range: 0 dB to +150 dB and 9.91 E+37 Resolution: 0.001 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:ORFSPECTRUM:SWITCHING:FREQUENCY:OFFSET:STDEVIATION? 200 KHZ, 400 KHZ"
!Returns the ORFS due to switching (standard deviation) measurement
         !results at the 200 kHz and 400 kHz offsets only, assuming these
         !offsets are turned on.
```

FETCh:ORFSpectrum:SWITChing[:ALL]:SDEViation?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries output RF spectrum due to switching (standard deviation) measurement results at all frequency offsets currently turned on (there can be up to eight). The "SETup:ORFSpectrum:SWITching:FREQuency[:OFFSet]" command sets up the number of output RF spectrum due to switching offsets that are turned on and their frequency values. The "SETup:ORFSpectrum:SWITching:FREQuency:POINts?" queries the number of output RF spectrum due to switching points that are turned on, indicating the number of output RF spectrum due to switching values to expect when you FETCh results.
Query		Range: –100 dBm to +100 dBm and 9.91 E+37 Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:ORFSPECTRUM:SWITCHING:ALL:SDEVIATION?"  !Returns the ORFS due
                                                          !to switching
                                                          !(standard
                                                          !deviation)
                                                          !measurement
                                                          !results at all
                                                          !frequency offsets
                                                          !currently turned on.
```

FETCh:ORFSpectrum:SWITching:LIMit?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the ORFS switching offset results for an overall pass/fail result.
Query		Range: 0 (pass), 1 (fail), and 9.91 E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:ORFSpectrum:SWITching:LIMit:ALL?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Queries the results for all enabled ORFS due to switching offsets.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>For each switching enabled result the following is returned in a comma-separated:
• 0 (pass), 1 (fail), and 9.91 E+37 (NAN)
• limit used</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
</table>

FETCh:PFERror

```
FETCh :PFERror [:ALL] ? (returns Integrity,Max RMS Phase Error,Max
                        Peak Phase Error,Worst Freq Error)
                      :FAIL? (returns Integrity, RMS Phase Error
                             pass/fail result, Peak Phase Error
                             pass/fail result,Freq Error pass/fail
                             result, number of measurements.)
               :COUNt :TESTed? (returns number of measurements made)
```

```
FETCh :PFERror :FERRor [:WORSt] ? (returns Worst Freq Error)
                       :ALL? (returns Min Freq Error, Max Freq
                       Error, Avg Freq Error,Worst Freq Error)
                       :AVERage? (returns Avg Freq Error)
                       :FAIL? (returns 0|1)
                       :MAXimum? (returns Max Freq Error)
                       :MINimum? (returns Min Freq Error)
               :ICOunt? (returns Intermediate Count)
               :INTegrity? (returns Integrity)
```

```
FETCh :PFERror :PEAK ? (returns Max Peak Phase Error)
                      [:MAXimum]
                      :ALL? (returns Min Peak Phase Error,Max
                      Peak Phase Error,Avg Peak Phase Error)
                      :AVERage? (returns Avg Peak Phase Error)
                      :FAIL? (returns 0|1)
                      :MINimum? (returns Min Peak Phase Error)
               :RMS  ? (returns Max RMS Phase Error)
                      [:MAXimum]
                      :ALL? (returns Min RMS Phase Error,Max
                      RMS Phase Error, Avg RMS Phase Error)
                      :FAIL? (returns 0|1)
                      :AVERage? (returns Avg RMS Phase Error)
                      :MINimum? (returns Min RMS Phase Error)
```

“Diagram Conventions” on page 1

FETCh:PFERor[:ALL]?

Function	GSM TA	Queries integrity indicator, maximum RMS phase error, maximum peak phase error and worst frequency error.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	

Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Maximum RMS Phase Error • Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) • Resolution: 0.01 degrees Maximum Peak Phase Error • Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) • Resolution: 0.01 degrees Worst Frequency Error • Range: –750 kHz to +750 kHz and 9.91 E+37 (NAN) • Resolution: 0.1 kHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:PFERROR:ALL?" !Returns integrity, maximum RMS phase error,
                                !maximum peak phase error and worst
                                !frequency error.
```

FETCh:PFERor[:ALL]:FAIL?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries integrity indicator, RMS phase error pass/fail indicator, peak phase error pass/fail indicator, frequency error pass/fail indicator and the number of measurements taken. The number of measurements taken may be of interest to you if you are using the confidence level feature. For more information on using confidence levels refer to "Confidence Levels" on page 1524.
Query		Integrity indicator • Range: See "Integrity Indicator" on page 411. • Resolution: 1 RMS Phase Error pass/fail indicator • Range: 0 | 1 Peak Phase Error pass/fail indicator • Range: 0 | 1 Frequency Error pass/fail indicator • Range: 0 | 1 Number of measurements taken • Range: 0 to 999 and 9.91 E+37 (NAN) • Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:PFERROR:ALL:FAIL?" !Returns integrity, RMS phase error pass/fail result,
                                  !peak phase error pass/fail result, frequency error
                                  !pass/fail result and the number of measurements made.
```

FETCh:PFERror:COUNt:TESTed?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the number of measurements taken. If you are *not* using the confidence level feature then the value returned, after a successful measurement completes, is the same as that returned by the query of “SETup:PFERror:COUNt:NUMBer” on page 1154. However if you are using the confidence level feature then this value may be lower than that set for multi-measurements.
Query		Range: 0 to 999 and 9.91 E+37 (NAN) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:FERRor:ALL?

Function	GSM TA	Queries minimum, maximum, average, and worst frequency error, in Hz. The minimum frequency error is the value closest to negative infinity from the last multi-measurement cycle. The maximum frequency error is the value closest to positive infinity from the last multi-measurement cycle.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Minimum Frequency Error • Range: –750 kHz to +750 kHz and 9.91 E+37 (NAN) • Resolution: 0.1 kHz Maximum Frequency Error • Range: –750 kHz to +750 kHz and 9.91 E+37 (NAN) • Resolution: 0.1 kHz Average Frequency Error • Range: –750 kHz to +750 kHz and 9.91 E+37 (NAN) • Resolution: 0.1 kHz Worst Frequency Error • Range: –750 kHz to +750 kHz and 9.91 E+37 (NAN) • Resolution: 0.1 kHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:PFERROR:FERROR:ALL?" !Returns minimum, maximum, average and
                                       !worst frequency error results.
```

FETCh:PFERror:FERRor:AVERage?

Function	GSM TA	Queries the single or average (from a multi-measurement) frequency error measurement result, in Hz.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:FERRor:FAIL?

Function	GSM TA	Queries whether the frequency error passed or failed the value set using either of the following commands: • "SETup:PFERror:FERRor[:LIMit]:GSM" on page 1155, or • "SETup:PFERror:FERRor[:LIMit][:SELected]" on page 1156
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 (pass), 1 (fail), and 9.91 E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:FERRor: MAXimum?

Function	GSM TA	Queries the maximum (from a multi-measurement) frequency error measurement result, in Hz.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:FERRor:MINimum?

Function	GSM TA	Queries the minimum (from a multi-measurement) frequency error measurement result, in Hz.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:FERRor[:WORSt]?

Function	GSM TA	Queries the frequency error from the individual multi-measurements that is furthest from 0 Hz. If the most positive and the most negative frequency errors are the same, the positive value will be returned.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –750 kHz to +750 kHz and 9.91 E+37 (NAN) Resolution: 0.1 kHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:ICOunt?

Function	GSM TA	Queries the intermediate count of phase and frequency multi-measurements completed. This number will increase to the value returned by "SETup:PFERror:COUNt:NUMBer" on page 1154.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 999 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:INTegrity?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the integrity indicator for the phase and frequency error measurement. Zero indicates a normal result. See "Integrity Indicator" on page 411 for descriptions of non-zero integrity indicators.
Query		Range: See "Integrity Indicator" on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:PEAK:ALL?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the minimum, maximum, and average peak phase error measurement result, in degrees.
Query		Minimum Peak Phase Error • Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) • Resolution: 0.01 degrees Maximum Peak Phase Error • Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) • Resolution: 0.01 degrees Average Peak Phase Error • Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) • Resolution: 0.01 degrees
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"FETCH:PFERROR:PEAK:ALL?" !Returns minimum, maximum, and average peak phase error results.`		

FETCh:PFERror:PEAK:AVERage?

Function	GSM TA	Queries the single or average (from a multi-measurement) peak phase error measurement result, in degrees.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:PEAK:FAIL?

Function	GSM TA	Queries whether the peak phase error passed or failed the value set using either of the following commands: • "SETup:PFERror:PEAK[:LIMit]:GSM" on page 1156, or • "SETup:PFERror:PEAK[:LIMit][:SELected]" on page 1157
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 (pass), 1 (fail), and 9.91 E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:PEAK[:MAXimum]?

Function	GSM TA	Queries the maximum (from a multi-measurement) peak phase error result, in degrees.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:PEAK:MINimum?

Function	GSM TA	Queries the minimum (from a multi-measurement) peak phase error measurement result, in degrees.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:RMS:ALL?

Function	GSM TA	Queries the minimum, maximum, and average RMS phase error measurement result, in degrees.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Minimum RMS Phase Error • Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) • Resolution: 0.01 degrees Maximum RMS Phase Error • Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) • Resolution: 0.01 degrees Average RMS Phase Error • Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) • Resolution: 0.01 degrees
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:PFERROR:RMS:ALL?" !Returns minimum, maximum, and average
                                    !RMS phase error.
```

FETCh:PFERror:RMS:AVERage?

Function	GSM TA	Queries the single or average (from a multi-measurement) RMS phase error measurement result, in degrees.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:RMS:FAIL?

Function	GSM TA	Queries whether the RMS phase error passed or failed the value set using either of the following commands: • "SETup:PFERror:RMS[:LIMit]:GSM" on page 1157, or • "SETup:PFERror:RMS[:LIMit][:SELected]" on page 1158
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 (pass), 1 (fail), and 9.91 E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PFERror:RMS[:MAXimum]?

Function	GSM TA	Queries the Maximum (from a multi-measurement) RMS phase error measurement result, in degrees.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:PFERROR:RMS:MAXIMUM?" !Returns the maximum RMS phase error.
```

FETCh:PFERror:RMS:MINimum?

Function	GSM TA	Queries the minimum (from a multi-measurement) RMS phase error measurement result, in degrees.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 degrees to 180 degrees and 9.91 E+37 (NAN) Resolution: 0.01 degrees
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime

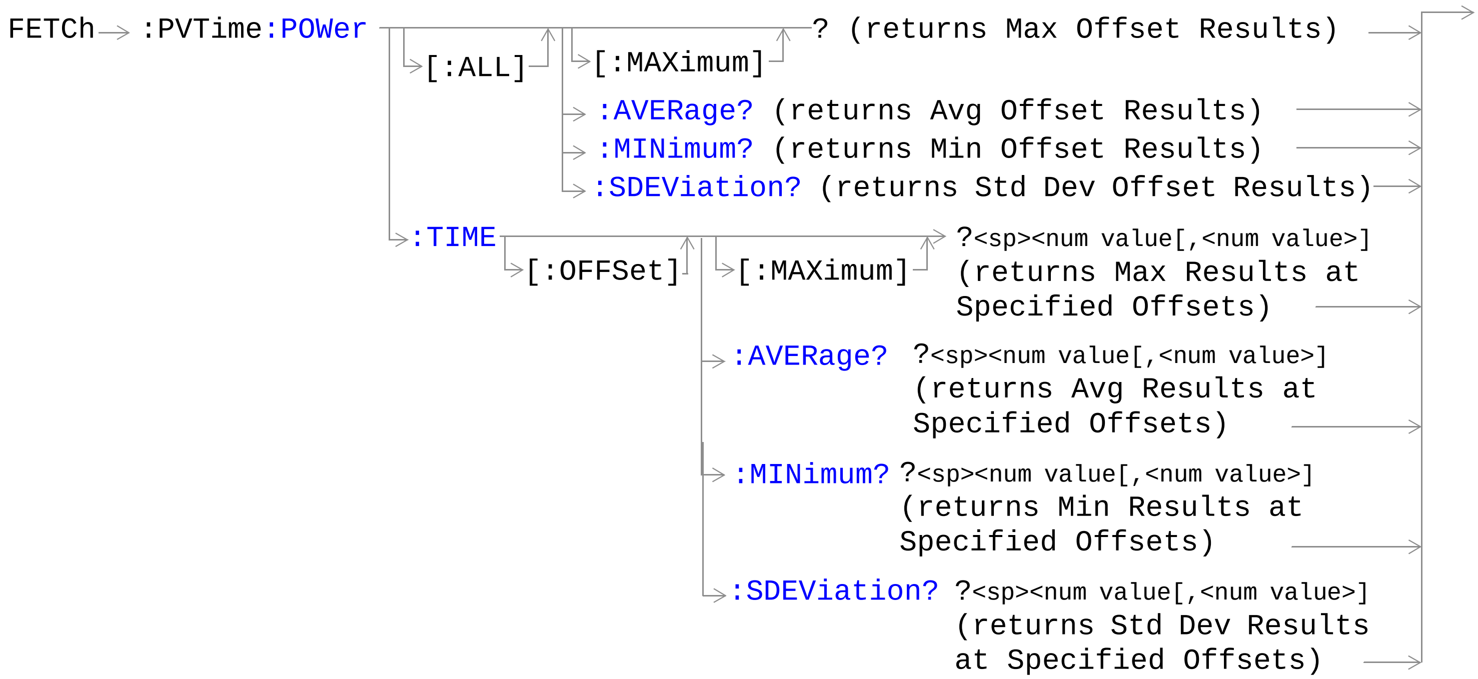
```
FETCh :PVTime [:ALL] ? (returns Integrity,Mask Pass/Fail,Avg TX Power,Max Offset Results)
              :ICOunt? (returns Intermediate Count)
              :INTegrity? (returns Integrity)
              :TXPower [:AVERage] ? (returns Avg TX Power)
                       :ALL? (returns Min TX Power,Max TX Power,Avg TX Power,Std Dev TX Power)
                       :MAXimum? (returns Max TX Power)
                       :MINimum? (returns Min TX Power)
                       :SDEViation? (returns Std Dev TX Power)
```

These commands are not applicable to GPRS or EGPRS.

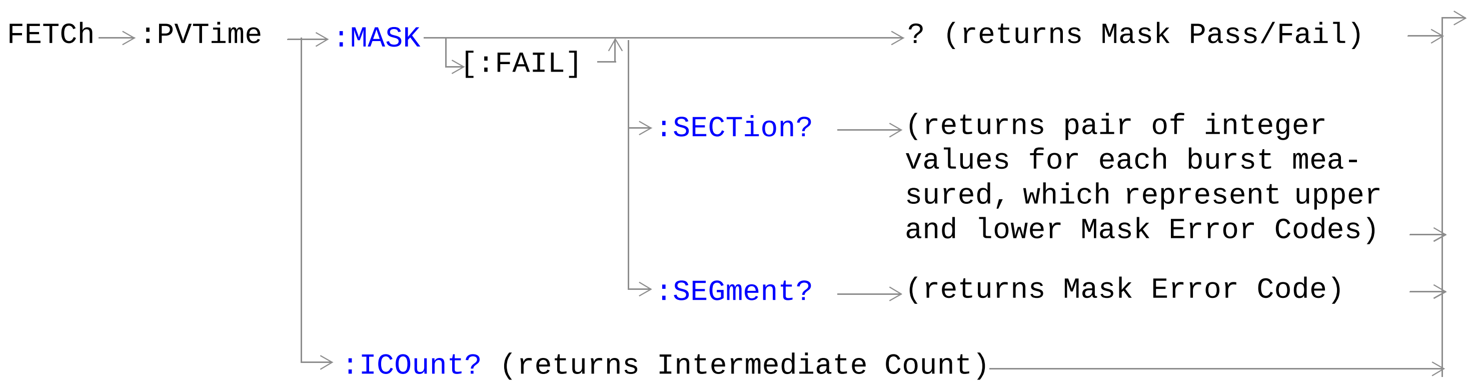
```
FETCh :PVTime:MASK [:FAIL] ? (returns Mask Pass/Fail)
                   :ALL? (returns Mask Pass/Fail,Mask Upper Margin,Mask Upper Margin Time,
                   Mask Lower Margin,Mask Lower Margin Time)
                   :LOWer [:MARGin] ? (returns Mask Lower Margin)
                          :TIME? (returns Mask Lower Margin Time)
                   :UPPer [:MARGin] ? (returns Mask Upper Margin)
                          :TIME? (returns Mask Upper Margin Time)
```

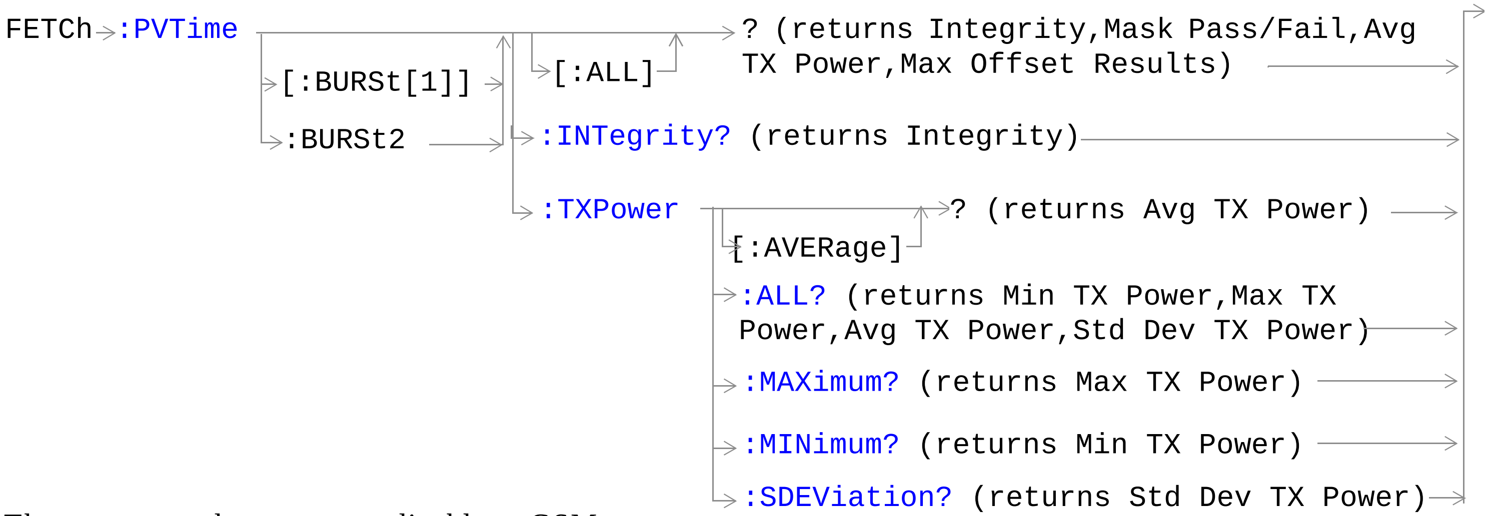
These commands are not applicable to GPRS or EGPRS.

FETCh:PVTime

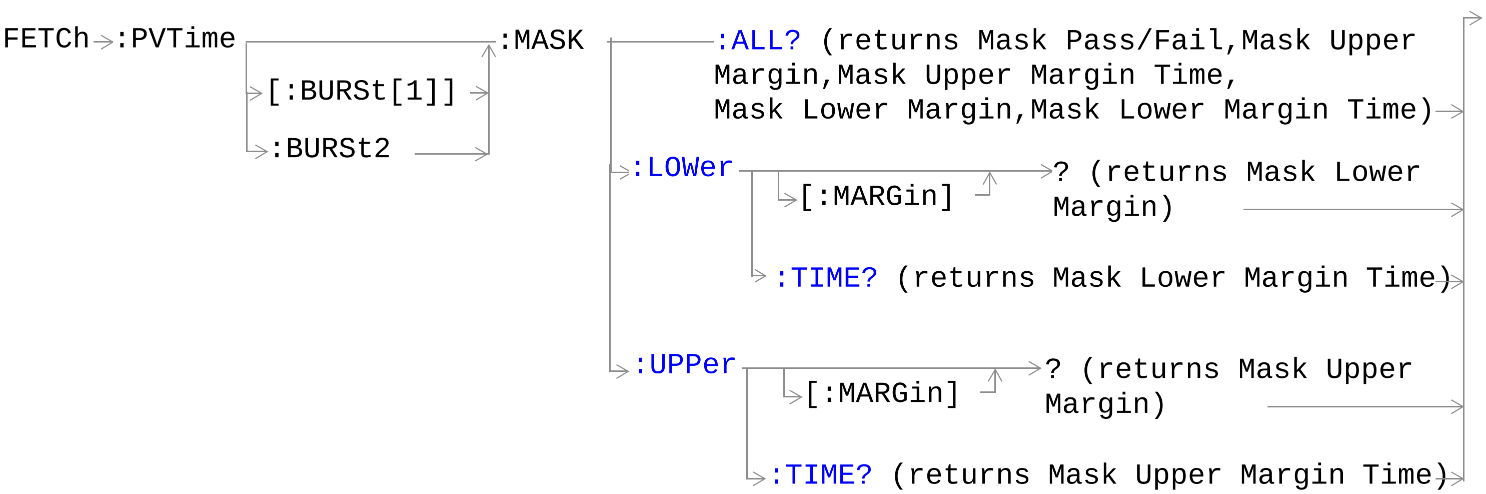


These commands are not applicable to GPRS or EGPRS.



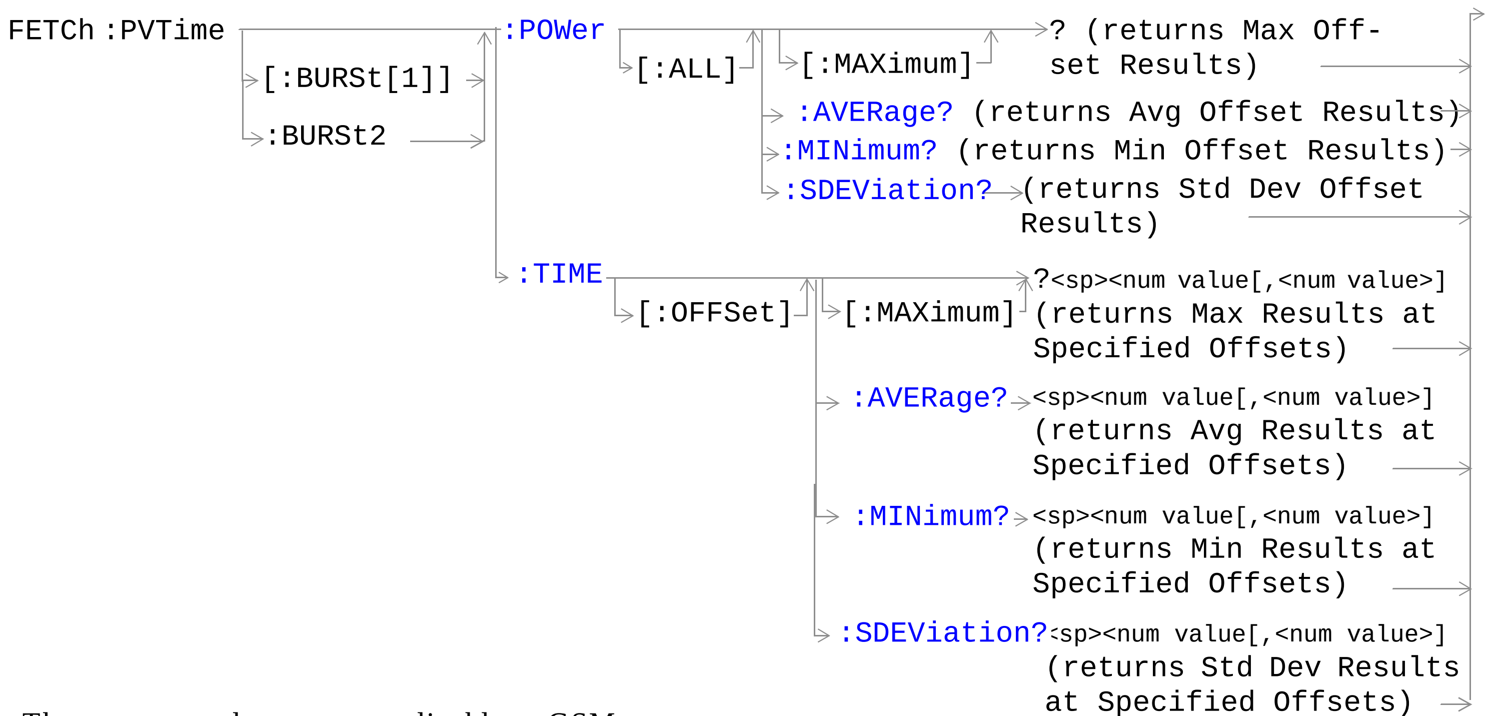


These commands are not applicable to GSM.



These commands are not applicable to GSM.

FETCh:PVTime



These commands are not applicable to GSM.

“Diagram Conventions” on page 1

FETCh:PVTime[:ALL]?

Function	GSM TA	Queries integrity indicator, mask pass/fail indicator, power versus time (PvT) transmit power (average), and PvT power (maximum) at up to 12 time offsets. The number of PvT measurement offsets that will be returned can be queried using the “SETup:PVTime:TIME:POINts?” on page 1190. The time offsets are set up using the command “SETup:PVTime:TIME[:OFFSet][:SELected]” on page 1183.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.

Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Power versus time mask pass/fail • Range: 0 (pass) or 1 (fail) and 9.91 E+37 (NAN) Power versus time TX carrier power • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Power versus time power (maximum) - up to 12 individual results depending on the number of time offsets • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:TXPower:ALL?

Function	GSM TA	Queries power versus time carrier power (average), power versus time carrier power (minimum), power versus time carrier power (maximum), and power versus time carrier power (standard deviation).
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Power versus time carrier power (average) • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Power versus time carrier power (minimum) • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Power versus time carrier power (maximum) • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Power versus time carrier power (standard deviation) • Range: 0 dB to 100 dB and 9.91 E+37 (NAN) • Resolution: 0.001 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:TXPower:MINimum?

Function	GSM TA	Queries power versus time carrier power (minimum).
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:TXPower:MAXimum?

Function	GSM TA	Queries power versus time carrier power (maximum).
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:TXPower[:AVERage]?

Function	GSM TA	Queries power versus time carrier power (average).
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:TXPower:SDEViation?

Function	GSM TA	Queries power versus time carrier power (standard deviation).
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 dB to 100 dB and 9.91 E+37 (9.91 E+37 (NAN)) Resolution: 0.001 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:MASK:ALL?

Function	GSM TA GSM/GPRS LA	Queries the power versus time measurement mask pass/fail indicator and the following worst case margins: • Upper limit margin time • Upper limit margin result • Lower limit margin time • Lower limit margin result Margin time is the point in time, relative to burst bit 0, that corresponds with the worst case measurement result (the measurement with the least difference between measured power and the power level boundary specified by the power versus time mask). See the "Typical GSM PvT Measurement" on page 121. Margin result is the difference between the measured power and the power level boundary specified by the power versus time mask. See the "Typical GSM PvT Measurement" on page 121.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Power versus time mask pass/fail • Range: 0 (pass) or 1 (fail) and 9.91 E+37 (NAN) Power versus time upper limit margin time worst case result • Range: –50 µs to 593 µs and 9.91 E+37 (NAN) • Resolution: 1 ns Power versus time upper limit margin worst case result: • Range: –100 dB to 0 dB and 9.91 E+37 (NAN) • Resolution: 0.01 dB Power versus time lower limit margin time worst case result • Range: –50 µs to 593 µs and 9.91 E+37 (NAN) • Resolution: 1 ns Power versus time lower limit margin worst case result • Range: –100 dB to 0 dB and 9.91 E+37 (NAN) • Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:MASK[:FAIL]?

Function	GSM TA	Queries power versus time measurement mask pass/fail indicator.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 (pass) or 1 (fail) and 9.91 E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime:MASK[:FAIL]:SECTion?

Function	GSM TA	This query returns a pair of mask error codes for the upper and lower mask sections. The number of pairs returned depends upon the number of bursts within the measurement. The error code represents a bit field with one bit for each section of the mask. The error codes are: • 0 = No Mask Failures • 1 (bit 1) = First section of the mask failed • 2 (bit 2) = Second section of the mask failed • 4 (bit 3) = Third section of the mask failed • -1 = Thirty-second section of the mask failed The above list shows values which can be returned if any single error occurs. Note that the value returned could indicate a combination of errors. For example, if 5 is returned, this indicates that the first and third sections have caused the failure.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: -1 to 31
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime:MASK[:FAIL]:SEGment?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This query returns the mask error code for the entire multislot configuration. This error code indicates which parts, if any are causing the multislot configuration to fail the power versus time mask. The error codes are: • 0 = No Mask Failures • 1 (bit 1) = Rising Edge Failure • 2 (bit 2) = Falling Edge Failure • 4 (bit 3) = Active Part of First Burst • 8 (bit 4) = First Guard Period • 16 (bit 5) = Active Part of Second Burst The above list shows values which can be returned if any single error causes the multislot configuration to fail the mask. (For example, if 4 is returned the failure is due to the active part of the first burst. Note that the value returned could indicate a combination of errors which is causing the multislot configuration to fail. For example, if 9 is returned, this indicates that a rising edge failure and the first guard period has caused the failure.
Query		Range: 0 to 31
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime:MASK:UPPer[:MARGin]?

Function	GSM TA GSM/GPRS LA	Queries the power versus time measurement upper limit margin worst case result. The upper limit margin, worst case result is the power versus time measurement with the least difference between measured power and the power level boundary specified by the power versus time mask. See the “Typical GSM PvT Measurement” on page 121.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: –100 dB to 0 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:MASK:UPPer:TIME?

Function	GSM TA GSM/GPRS LA	Queries the power versus time measurement's upper limit margin time, worst case result. The upper limit margin time result is the point in time, relative to bit 0 in the GSM burst, that corresponds with the worst case measurement result (the measurement with the least difference between measured power and the upper power level boundary specified by the power versus time mask). See the “Typical GSM PvT Measurement” on page 121.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: –50 µs to 593 µs and 9.91 E+37 (NAN) Resolution: 1 ns
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:MASK:LOWer[:MARGin]?

Function	GSM TA GSM/GPRS LA	Queries the power versus time measurement's lower limit margin, worst case result. The lower limit margin, worst case result is the power versus time measurement with the least difference between measured power and the lower power level boundary specified by the power versus time mask. See the “Typical GSM PvT Measurement” on page 121.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: –100 dB to 0 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:MASK:LOWer:TIME?

Function	GSM TA GSM/GPRS LA	Queries the power versus time measurement's lower limit margin time, worst case result. The lower limit margin time result is the point in time, relative to bit 0 in the GSM burst, that corresponds with the worst case measurement (the measurement with the least difference between measured power and the lower power level boundary specified by the power versus time mask). See the "Typical GSM PvT Measurement" on page 121.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: –50 µs to 593 µs and 9.91 E+37 (NAN) Resolution: 1 ns
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:POWer[:ALL]:MINimum?

Function	GSM TA GSM/GPRS LA	Queries the minimum power levels, from a number of multi-measurements, at each user-settable time offset that is currently turned on. Power levels are relative to the power versus time carrier power measurement. The "SETup:PVTime:TIME[:OFFSet][:SELected]" command sets up the number of offsets that are turned on and their time values. The "SETup:PVTime:TIME:POINts?" queries the number of offset points that are turned on, indicating the number of values to expect when you send this command.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: –100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:POWer[:ALL][:MAXimum]?

Function	GSM TA GSM/GPRS LA	Queries the maximum power levels, from a number of multi-measurements, at each user-settable time offset that is currently turned on. Power levels are relative to the power versus time carrier power measurement. The "SETup:PVTime:TIME[:OFFSet][:SELected]" command sets up the number of offsets that are turned on and their time values. The "SETup:PVTime:TIME:POINts?" queries the number of offset points that are turned on, indicating the number of values to expect when you send this command.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: –100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:POWer[:ALL]:AVERage?

Function	GSM TA GSM/GPRS LA	Queries the average power levels, from a number of multi-measurements, at each user-settable time offset that is currently turned on. Results are relative to the power versus time carrier power measurement. The "SETup:PVTime:TIME[:OFFSet][:SELected]" command sets up the number of offsets that are turned on and their time values. The "SETup:PVTime:TIME:POINts?" queries the number of offset points that are turned on, indicating the number of values to expect when you send this command.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: –100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:POWer[:ALL]:SDEViation?

Function	GSM TA GSM/GPRS LA	Queries the standard deviation, from a number of multi-measurements, at each user-settable time offset that is currently turned on. The "SETup:PVTime:TIME[:OFFSet][:SELected]" command sets up the number of offsets that are turned on and their time values. The "SETup:PVTime:TIME:POINts?" queries the number of offset points that are turned on, indicating the number of values to expect when you send this command.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: 0 dBc to +100 dBc and 9.91 E+37 (NAN) Resolution: 0.001 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime:POWer:TIME[OFFSet]:MINimum?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA
GSM/GPRS LA</td><td>Queries the minimum power levels, from a number of multi-measurements, at each user-settable time offset appended to this command. Specified time values must correspond to user-settable time offsets that are currently turned on, and must be rounded to the same values. (9.91 E+37 (NAN) will be returned for specified offsets that do not correspond to offsets currently turned on).

Power levels are relative to the power versus time carrier power measurement.

The "SETup:PVTime:TIME[:OFFSet][:SELected]" command sets up the number of offsets that are turned on and their time values. Measurements will be returned by this query in the same order they are listed in the command.</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td>EGPRS LA</td><td>This command is not applicable to EGPRS.</td></tr>
<tr><td colspan="2">Query</td><td>Power levels:
• Range: –100 dBc to +10 dBc and 9.91 E+37 (NAN)
• Resolution: 0.01 dB
Time offsets:
• Range: Up to 12 time offset values, corresponding to entries in the Power vs Time table of user-defined time offsets currently turned on. The default units are s (seconds).
• Resolution: Rounded to the same value as displayed in the Power vs Time table and returned by the "SETup:PVTime:TIME[:OFFSet][:SELected]" query.</td></tr>
<tr><td rowspan="2">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example</td></tr>
</table>

```
OUTPUT 714;"FETCH:PVTIME:POWER:TIME:OFFSET:MINIMUM? 0 US, 570.8 US"
!Returns the !minimum of power versus time measurements at the 0.0 ms and
!570.8 ms offsets.
```

FETCh:PVTime:POWer:TIME[:OFFSet][:MAXimum]?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="2">Queries the maximum power levels, from a number of multi-measurements, at each user-settable time offset appended to this command. Specified time values must correspond to user-settable time offsets that are currently turned on, and must be rounded to the same values. (9.91 E+37 (NAN) will be returned for specified offsets that do not correspond to offsets currently turned on).

Power levels are relative to the power versus time carrier power measurement.

The “SETup:PVTime:TIME[:OFFSet][:SELected]” command sets up the number of offsets that are turned on and their time values. Measurements will be returned by this query in the same order they are listed in the command.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td>EGPRS LA</td><td>This command is not applicable to EGPRS.</td></tr>
<tr><td colspan="2">Query</td><td>Power levels:

• Range: –100 dBc to +10 dBc and 9.91 E+37 (NAN)
Resolution: 0.01 dB

Time offsets:

• Range: Up to 12 time offset values, corresponding to entries in the Power vs Time table of user-defined time offsets currently turned on. The default units are s (seconds).
• Resolution: Rounded to the same value as displayed in the Power vs Time table and returned by the “SETup:PVTime:TIME[:OFFSet][:SELected]” query.</td></tr>
<tr><td rowspan="2">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example</td></tr>
</table>

```
OUTPUT 714;"FETCH:PVTIME:POWER:TIME:OFFSET:MAXIMUM? 0 US, 570.8 US"
!Returns the maximum of power versus time measurements at the 0.0 ms
!and 570.8 ms offsets.
```

FETCh:PVTime:POWer:TIME[:OFFSet]:AVERage?

Function	GSM TA GSM/GPRS LA	Queries the average power levels, from a number of multi-measurements, at each user-settable time offset appended to this command. Specified time values must correspond to user-settable time offsets that are currently turned on, and must be rounded to the same values. (9.91 E+37 (NAN) will be returned for specified offsets that do not correspond to offsets currently turned on). Power levels are relative to the power versus time carrier power measurement. The "SETup:PVTime:TIME[:OFFSet][:SELected]" command sets up the number of offsets that are turned on and their time values. Measurements will be returned by this query in the same order they are listed in the command.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Power levels: • Range: –100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB Time offsets: • Range: Up to 12 time offset values, corresponding to entries in the Power vs Time table of user-defined time offsets currently turned on. The default units are s (seconds). • Resolution: Rounded to the same value as displayed in the Power vs Time table and returned by the "SETup:PVTime:TIME[:OFFSet][:SELected]" query.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:PVTIME:POWER:TIME:OFFSET:AVERAGE? 0 US, 570.8 US"
!Returns the average of power versus time measurements at the
!0.0 ms and 570.8 ms offsets.
```

FETCh:PVTime:POWer:TIME[:OFFSet]:SDEViation?

Function	GSM TA GSM/GPRS LA	Queries the standard deviation, from a number of multi-measurements, at each user-settable time offset appended to this command. Specified time values must correspond to user-settable time offsets that are currently turned on, and must be rounded to the same values. (9.91 E+37 (NAN) will be returned for specified offsets that do not correspond to offsets currently turned on). Power levels are relative to the power versus time carrier power measurement. The "SETup:PVTime:TIME[:OFFSet][:SELected]" command sets up the number of offsets that are turned on and their time values. Measurements will be returned by this query in the same order they are listed in the command.
	GPRS LA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Power levels: • Range: 0 dBc to +100 dBc and 9.91 E+37 (NAN) • Resolution: 0.001 dB Time offsets: • Range: Up to 12 time offset values, corresponding to entries in the Power vs Time table of user-defined time offsets currently turned on. The default units are s (seconds). • Resolution: Rounded to the same value as displayed in the Power vs Time table and returned by the "SETup:PVTime:TIME[:OFFSet][:SELected]" query.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:PVTIME:POWER:TIME:OFFSET:SDEVIATION? 0 US, 570.8 US"
!Returns the standard deviation of power versus time measurements
at the 0.0 ms and 570.8 ms offsets.
```

FETCh:PVTime:ICOunt?

Function	GSM TA	Queries the intermediate count of power versus time multi-measurements completed.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 999 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime:INTegrity?

Function	GSM TA GSM/GPRS LA	Queries the integrity indicator for the power versus time measurement. Zero indicates a normal result. See “Integrity Indicator” on page 411 for descriptions of non-zero integrity indicators.
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Query		Range: See “Integrity Indicator” on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

FETCh:PVTime[:BURSt[1]][:ALL]?
FETCh:PVTime:BURSt2[:ALL]?

Function	GSM	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries integrity indicator, mask pass/fail indicator, power versus time (PvT) transmit power (average), and PvT power (maximum) at up to 12 time offsets for the burst of the multislot configuration that you specify. The number of PvT measurement offsets that will be returned can be queried using the "SETup:PVTime[BURSt[1]]:TIME:POINts[:SELected]? SETup:PVTime:BURSt2:TIME:POINts[:SELected]?" on page 1190. The time offsets are set up using the command "SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]" on page 1186.
Query		Integrity indicator • Range: See "Integrity Indicator" on page 411. • Resolution: 1 Power versus time mask pass/fail • Range: 0 (pass) or 1 (fail) and 9.91 E+37 (NAN) Power versus time TX carrier power • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Power versus time power (maximum) - up to 12 individual results depending on the number of time offsets • Range: –100 dBc to 100 dBc and 9.91 E+37 (NAN) • Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:TXPower:ALL?
FETCh:PVTime:BURSt2:TXPower:ALL?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	Queries the power versus time carrier power results for the burst of the multislot configuration that you specify. It returns the average, minimum, maximum, and standard deviation.
	GSM/GPRS LA	
	EGPRS LA	
Query		Power versus time carrier power (average) • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Power versus time carrier power (minimum) • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Power versus time carrier power (maximum) • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Power versus time carrier power (standard deviation) • Range: 0 dB to 100 dB and 9.91 E+37 (NAN) • Resolution: 0.001 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:TXPower:MINimum?
FETCh:PVTime:BURSt2:TXPower:MINimum?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	Queries power versus time minimum carrier power for the burst of the multislot configuration that you specify.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:TXPower:MAXimum?
FETCh:PVTime:BURSt2:TXPower:MAXimum?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	Queries power versus time maximum carrier power for the burst of the multislot configuration that you specify.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:TXPower[:AVERage]?
FETCh:PVTime:BURSt2:TXPower[:AVERage]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	Queries power versus time average carrier power for the burst of the multislot configuration that you specify.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:TXPower:SDEViation?
FETCh:PVTime:BURSt2:TXPower:SDEViation?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	Queries power versus time standard deviation for the burst of the multislot configuration that you specify.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 dB to 100 dB and 9.91 E+37 (NAN) Resolution: 0.001 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:MASK:ALL?
FETCh:PVTime:BURSt2:MASK:ALL?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the mask pass/fail indicator and the following worst case margins for the specified burst of the multislot configuration: • Upper limit margin time • Upper limit margin result • Lower limit margin time • Lower limit margin result Margin time is the point in time, relative to burst bit 0, that corresponds with the worst case measurement result (the measurement with the least difference between measured power and the power level boundary specified by the power versus time mask). See the “Typical PvT Mask for a Two Burst Multislot Configuration” on page 127. Margin result is the difference between the measured power and the power level boundary specified by the power versus time mask. See the “Typical PvT Mask for a Two Burst Multislot Configuration” on page 127.
Query		Power versus time mask pass/fail • Range: 0 (pass) or 1 (fail) and 9.91 E+37 (NAN) Power versus time upper limit margin time worst case result • Range: –50 µs to 593 µs and 9.91 E+37 (NAN) • Resolution: 1 ns Power versus time upper limit margin worst case result: • Range: –100 dB to 0 dB and 9.91 E+37 (NAN) • Resolution: 0.01 dB Power versus time lower limit margin time worst case result • Range: –50 µs to 593 µs and 9.91 E+37 (NAN) • Resolution: 1 ns Power versus time lower limit margin worst case result • Range: –100 dB to 0 dB and 9.91 E+37 (NAN) • Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:MASK[:FAIL]?
FETCh:PVTime:BURSt2:MASK[:FAIL]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	Queries power versus time measurement mask pass/fail indicator for the burst of the multislot configuration that you specify.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 (pass) or 1 (fail) and 9.91 E+37 (NAN)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:MASK:UPPer[:MARGin]?
FETCh:PVTime:BURSt2:MASK:UPPer[:MARGin]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	Queries the power versus time measurement upper limit margin worst case result for the burst of the multislot configuration that you specify. The upper limit margin, worst case result is the power versus time measurement with the least difference between measured power and the power level boundary specified by the power versus time mask. See the "Typical PvT Mask for a Two Burst Multislot Configuration" on page 127.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –100 dB to 0 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:MASK:UPPer:TIME?
FETCh:PVTime:BURSt2:MASK:UPPer:TIME?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the power versus time measurement's upper limit margin time, worst case result for the burst of the multislot configuration that you specify. The upper limit margin time result is the point in time, relative to bit 0 in the burst, that corresponds with the worst case measurement result (the measurement with the least difference between measured power and the upper power level boundary specified by the power versus time mask). See the "Typical PvT Mask for a Two Burst Multislot Configuration" on page 127.
Query		Range: –50 µs to 593 µs and 9.91 E+37 (NAN) Resolution: 1 ns
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:MASK:LOWer[:MARGin]?
FETCh:PVTime:BURSt2:MASK:LOWer[:MARGin]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the power versus time measurement's lower limit margin, worst case result for the burst of the multislot configuration that you specify. The lower limit margin, worst case result is the power versus time measurement with the least difference between measured power and the lower power level boundary specified by the power versus time mask. See the "Typical PvT Mask for a Two Burst Multislot Configuration" on page 127.
Query		Range: –100 dB to 0 dB and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:MASK:LOWer:TIME?
FETCh:PVTime:BURSt2:MASK:LOWer:TIME?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the power versus time measurement's lower limit margin time, worst case result for the burst of the multislot configuration that you specify. The lower limit margin time result is the point in time, relative to bit 0 in the GSM burst, that corresponds with the worst case measurement (the measurement with the least difference between measured power and the lower power level boundary specified by the power versus time mask). See the "Typical PvT Mask for a Two Burst Multislot Configuration" on page 127.
Query		Range: –50 µs to 593 µs and 9.91 E+37 (NAN) Resolution: 1 ns
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:POWer[:ALL]:MINimum?
FETCh:PVTime:BURSt2:POWer[:ALL]:MINimum?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the minimum power levels, from a number of multi-measurements, at each user-settable time offset that is currently turned on for the burst of the multislot configuration that you specify. Power levels are relative to the power versus time carrier power measurement. The "SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]" command sets up the number of offsets that are turned on and their time values. The "SETup:PVTime[BURSt[1]]:TIME:POINts[:SELected]? SETup:PVTime:BURSt2:TIME:POINts[:SELected]?" queries the number of offset points that are turned on, indicating the number of values to expect when you send this command.
Query		Range: –100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:POWer[:ALL][:MAXimum]? FETCh:PVTime:BURSt2:POWer[:ALL][:MAXimum]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the maximum power levels, from a number of multi-measurements, at each user-settable time offset that is currently turned on for the burst of the multislot configuration that you specify. Power levels are relative to the power versus time carrier power measurement. The “SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]” command sets up the number of offsets that are turned on and their time values. The “SETup:PVTime[BURSt[1]]:TIME:POINts[:SELected]? SETup:PVTime:BURSt2:TIME:POINts[:SELected]?” queries the number of offset points that are turned on, indicating the number of values to expect when you send this command.
Query		Range: –100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:POWer[:ALL]:AVERage? FETCh:PVTime:BURSt2:POWer[:ALL]:AVERage?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the average power levels, from a number of multi-measurements, at each user-settable time offset that is currently turned on for the burst of the multislot configuration that you specify. Results are relative to the power versus time carrier power measurement. The “SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]” command sets up the number of offsets that are turned on and their time values. The “SETup:PVTime[BURSt[1]]:TIME:POINts[:SELected]? SETup:PVTime:BURSt2:TIME:POINts[:SELected]?” queries the number of offset points that are turned on, indicating the number of values to expect when you send this command.
Query		Range: –100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:POWer[:ALL]:SDEViation?
FETCh:PVTime:BURSt2:POWer[:ALL]:SDEViation?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the standard deviation, from a number of multi-measurements, at each user-settable time offset that is currently turned on for the burst of the multislot configuration that you specify. The "SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]" command sets up the number of offsets that are turned on and their time values. The "SETup:PVTime[BURSt[1]]:TIME:POINts[:SELected]? SETup:PVTime:BURSt2:TIME:POINts[:SELected]?" queries the number of offset points that are turned on, indicating the number of values to expect when you send this command.
Query		Range: 0 dBc to +100 dBc and 9.91 E+37 (NAN) Resolution: 0.001 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:PVTime[:BURSt[1]]:POWer:TIME[OFFSet]:MINimum?
FETCh:PVTime:BURSt2:POWer:TIME[OFFSet]:MINimum?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to GSM.</td></tr>
<tr><td>GPRS TA</td><td rowspan="3">Queries the minimum power levels, from a number of multi-measurements, at each user-settable time offset appended to this command. The query returns the results for the burst that you specify. Specified time values must correspond to user-settable time offsets that are currently turned on, and must be rounded to the same values. (9.91 E+37 (NAN) is returned for specified offsets that do not correspond to offsets currently turned on).

Power levels are relative to the power versus time carrier power measurement.

The “SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]” command sets up the number of offsets that are turned on and their time values. Measurements will be returned by this query in the same order they are listed in the command.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Power levels:
• Range: –100 dBc to +10 dBc and 9.91 E+37 (NAN)
• Resolution: 0.01 dB
Time offsets:
• Range: Up to 12 time offset values, corresponding to entries in the Power vs Time table of user-defined time offsets currently turned on. The default units are s (seconds).
• Resolution: Rounded to the same value as displayed in the Power vs Time table and returned by the “SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]” query.</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

<code>OUTPUT 714;"FETCH:PVTIME:POWER:TIME:OFFSET:MINIMUM? 0US, 570.8US"
!Returns the minimum of power versus time measurements at the 0.0 us and
!570.8 us offsets.</code></td></tr>
</table>

FETCh:PVTime[:BURSt[1]]:POWer:TIME[:OFFSet][:MAXimum]?
FETCh:PVTime:BURSt2:POWer:TIME[:OFFSet][:MAXimum]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the maximum power levels, from a number of multi-measurements, at each user-settable time offset appended to this command. The query returns the results for the burst that you specify. Specified time values must correspond to user-settable time offsets that are currently turned on, and must be rounded to the same values. (9.91 E+37 (NAN) is returned for specified offsets that do not correspond to offsets currently turned on). Power levels are relative to the power versus time carrier power measurement. The "SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]" command sets up the number of offsets that are turned on and their time values. Measurements are returned by this query in the same order they are listed in the command.
Query		Power levels: • Range: –100 dBc to +10 dBc and 9.91 E+37 (NAN) • Resolution: 0.01 dB Time offsets: • Range: Up to 12 time offset values, corresponding to entries in the Power vs Time table of user-defined time offsets currently turned on. The default units are s (seconds). • Resolution: Rounded to the same value as displayed in the Power vs Time table and returned by the "SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]" query.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:PVTIME:POWER:TIME:OFFSET:MAXIMUM? 0US, 570.8US"
!Returns the maximum of power versus time measurements at the 0.0 us
!and 570.8 us offsets.
```

FETCh:PVTime[:BURSt[1]]:POWer:TIME[:OFFSet]:AVERage?
FETCh:PVTime:BURSt2:POWer:TIME[:OFFSet]:AVERage?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the average power levels, from a number of multi-measurements, at each user-settable time offset appended to this command. The query returns the results for the burst that you specify. Specified time values must correspond to user-settable time offsets that are currently turned on, and must be rounded to the same values. (9.91 E+37 (NAN) is returned for specified offsets that do not correspond to offsets currently turned on). Power levels are relative to the power versus time carrier power measurement. The "SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]" command sets up the number of offsets that are turned on and their time values. Measurements are returned by this query in the same order they are listed in the command.
Query		Power levels: • Range: –100 dBc to +10 dBc and 9.91 E+37 (NAN) Resolution: 0.01 dB Time offsets: • Range: Up to 12 time offset values, corresponding to entries in the Power vs Time table of user-defined time offsets currently turned on. The default units are s (seconds). • Resolution: Rounded to the same value as displayed in the Power vs Time table and returned by the "SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]" query.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:PVTIME:BURSt2:POWER:TIME:OFFSET:AVERAGE? 0US, 570.8US"
!Returns the average of power versus time measurements at the
!0.0 us and 570.8 us offsets.
```

FETCh:PVTime[:BURSt[1]]:POWer:TIME[:OFFSet]:SDEViation?
FETCh:PVTime:BURSt2:POWer:TIME[:OFFSet]:SDEViation?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the standard deviation, from a number of multi-measurements, at each user-settable time offset appended to this command. The query returns the results for the burst that you specify. Specified time values must correspond to user-settable time offsets that are currently turned on, and must be rounded to the same values. (9.91 E+37 (NAN) is returned for specified offsets that do not correspond to offsets currently turned on). Power levels are relative to the power versus time carrier power measurement. The "SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]" command sets up the number of offsets that are turned on and their time values. Measurements are returned by this query in the same order they are listed in the command.
Query		Power levels: • Range: 0 dBc to +100 dBc and 9.91 E+37 (NAN) • Resolution: 0.001 dB Time offsets: • Range: Up to 12 time offset values, corresponding to entries in the Power vs Time table of user-defined time offsets currently turned on. The default units are s (seconds). • Resolution: Rounded to the same value as displayed in the Power vs Time table and returned by the "SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]" query.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"FETCH:PVTIME:POWER:TIME:OFFSET:SDEVIATION? 0US, 570.8US"
!Returns the standard deviation of power versus time measurements
at the 0.0 us and 570.8 us offsets.
```

FETCh:PVTime[:BURSt[1]]:INTegrity?
FETCh:PVTime:BURSt2:INTegrity?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries the integrity indicator for the power versus time measurement. This query returns the integrity indicator for the burst that you specify. Zero indicates a normal result. See “Integrity Indicator” on page 411 for descriptions of non-zero integrity indicators.
Query		Range: See “Integrity Indicator” on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:SMONitor

```
FETCh → :SMONitor → :INTegrity? (returns integrity)
                  → :TRACe → ? (returns 401 points of trace data)
```

"Diagram Conventions" on page 1

FETCh:SMONitor:INTegrity?

Function	GSM TA	Returns the integrity indicator value for the last spectrum monitor measurement performed. Zero indicates a normal result. See "Integrity Indicator" on page 411 for descriptions of non-zero integrity indicators.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: See "Integrity Indicator" on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:SMONitor:TRACe?

Function	GSM TA	Queries the spectrum monitor and returns 401 points representing the amplitude results (in dBm) of the trace data.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: • For spans of 125 kHz and 500 kHz — frequency of point: within the current span (relative to the center frequency) — amplitude of point: -50 to +55 dB • For all other spans — frequency of point: within the current span (relative to the center frequency) — amplitude of point: (reference level - 60 dB) to +55 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:TXPower

```
FETCh :TXPower
    [:ALL] ? (returns Integrity,Avg TX Power)
    :ICOunt? (returns Intermediate Count)
    :INTegrity? (returns Integrity)
    :POWer
        [:AVERage] ? (returns Avg TX Power)
        :ALL? (returns Min TX Power,Max TX Power,Avg TX Power,Std Dev TX Power)
        :MAXimum? (returns Max TX Power)
        :MINimum? (returns Min TX Power)
        :SDEViation? (returns Std Dev TX Power)
```

"Diagram Conventions" on page 1

FETCh:TXPower[:ALL]?

Function	GSM TA	Queries integrity indicator and average transmit power. A value of zero for the integrity indicator is normal. See “Integrity Indicator” on page 411 for non-zero integrity indicators.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Integrity: • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Transmit power: • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:TXPower:ICOunt?

Function	GSM TA	Queries the intermediate count of transmit power measurements completed.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 1 to 999 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:TXPower:INTegrity?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the integrity indicator. Zero indicates normal. For non-zero integrity indicators, refer to "Integrity Indicator" on page 411.
Query		Range: See "Integrity Indicator" on page 411. Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:TXPower:POWer[:AVERage]?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries average transmit power.
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:TXPower:POWer:ALL?

Function	GSM TA	Queries average, minimum, maximum and standard deviation of transmit power multi-measurement results.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Average: • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Minimum: • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Maximum: • Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dB Standard deviation: • Range: 0 dB to 100 dB and 9.91 E+37 (NAN) • Resolution: 0.001 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:TXPower:POWer:MAXimum?

Function	GSM TA	Queries maximum transmit power results from a multi-measurement.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:TXPower:POWer:MINimum?

Function	GSM TA	Queries minimum transmit power results from a multi-measurement.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: –100 dBm to 100 dBm and 9.91 E+37 (NAN) Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

FETCh:TXPower:POWer:SDEViation?

Function	GSM TA	Queries the standard deviation from a transmit power multi-measurement.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 dB to 100 dB and 9.91 E+37 (NAN) Resolution: 0.001 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

INITiate Subsystem

Syntax Diagrams and Command Descriptions

"INITiate" on page 990

Description

INITiate Command Functions

The INITiate subsystem is used to:

- Start (activate) individual or multiple (concurrent) measurements.
- Turn individual measurements off.
- Determine the number of measurements currently active (INIT:COUNT?).
- Determine the names of the measurements currently active (INIT:ON?).
- Determine which measurements are finished (INIT:DONE?).

What Happens When a Measurement is INITiated?

When a measurement is started using INITiate commands, a new measurement cycle is started. If the selected measurement is currently in a measurement cycle, it is aborted. If a timeout is specified, the timeout period begins when a measurement is initiated.

NOTE The INITiate subsystem is derived from SCPI, but has some modifications to make it more compatible with the manual operation of the test set. Most notably, the choice of single or continuous measurement triggering is made using the SETup subsystem.

INITiate Programming Examples (how INIT commands are used)

The INITiate command is used to start measurements. INITiate commands allow multiple measurements to be started without waiting for other measurement processes to complete. For example, the following code starts the Transmit Power and PFER measurements, and then uses the INITiate:DONE? command in a loop to query the status of these measurements, see "Measurement Event Synchronization" on page 424.

When the measurements are done, the FETCh command is used to acquire the results, and the results are entered into variables in the controlling application. The program ends when the INITiate:DONE? command returns the string "NONE" indicating that all initiated measurements have gone through the measuring state see "Measurement States" on page 406.

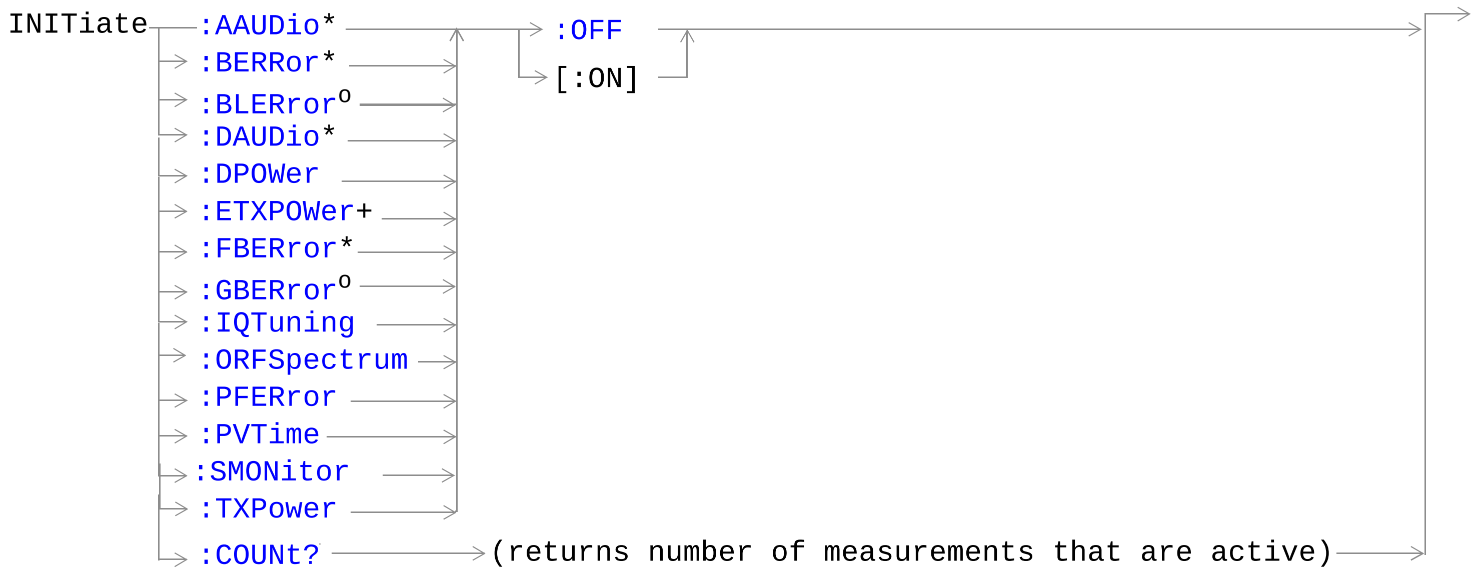
NOTE Trigger arming for each measurement is controlled in the SETup subsystem. The choices are single or continuous. The best practice (during remote operation) is to use single measurement mode. This simplifies the tasks of starting concurrent measurements, then using the INIT subsystem commands to determine which measurements are ready to be FETChed.

```
10 OUTPUT 714;”SETup:ALL:CONTinuous:OFF” ! selects single measurement mode
20 OUTPUT 714;”INITiate:TXPower;PFERror” ! starts TX power/phase frequency error measurement
30 LOOP
40 OUTPUT 714;”INITiate:DONE?” !query to find out if any measurements are done
50 ENTER 714;Meas_complete
60 SELECT Meas_complete$$
70 CASE “TXP” !tests for the string “TXP” which would indicate TX power measurement is done
80 OUTPUT 714;”FETCh:TXPower:POWer?” !Queries average TX power measurement
90 ENTER 714;Avg_tx_power
100 CASE “PFER”!tests for the string “PFER” which would indicate phase/frequency error
measurement is done
110 OUTPUT 714;”FETCh:PFERror:RMS?” !Queries PFER maximum phase error measurement
120 ENTER 714;Max_phs_error
130 END SELECT
140 EXIT IF Meas_complete$ = “NONE”
150 END LOOP
160 END
```

INITiate commands should be sent only when the test set has finished performing any operations, such as handovers, that require settling. For example, the following code performs a handover to a new traffic channel using the :SEQ (sequential) appendage, then initiates a TX power measurement.

```
OUTPUT 714;”CALL:TCH:SEQ 65” !Hands over traffic channel to channel 65, waits for process
                             !to complete before accepting next command.
OUTPUT 714;”INITiate:TXPower” !Initiates TX power measurement
```

INITiate



* Not applicable to the GPRS test application

° Not applicable to the GSM test application

+ Only applicable to EGPRS

```
INITiate  :DONE   ? (returns AAUD*|BERR*|BLERº|DAUD*|DPOW|ETXP⁺|FBER*|
                  GBERº|IQT|ORFS|PFER|PVT|SMON|TXP|NONE|WAIT)
          :CLEar
          :FLAG   <sp>INCLude|EXCLude
                  [:ALL]
                  :AAUDio*
                  :BERRor*
                  :BLERrorº
                  :DAUDio*
                  :DPOWer
                  :ETXPOWer⁺
                  :FBERror*
                  :GBERrorº
                  :IQTuning
                  :ORFSpectrum
                  :PFERror
                  :PVTime
                  :SMONitor
                  :TXPower
          :ON?    ? (returns AAUD*|BERR*|BLERº|DAUD*|DPOW|ETXP⁺|FBER*|
                  GBERº|IQT|ORFS|PFER|PVT|SMON|TXP|NONE)
```

* Not applicable to the GPRS test application

[o] Not applicable to the GSM test application

[+] Only applicable to EGPRS

"Diagram Conventions" on page 1

INITiate:<measurement mnemonic>[:ON]

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Starts measurements with the test set.

The INITiate command is associated with the SETup command, and the FETCh? command, see “SETup Subsystem” on page 1032 and “FETCh? Subsystem” on page 863.

One or more measurements may be initiated on the same program line. See “Concurrent Measurements” on page 397.

This command is also used to activate a measurement. See “INITiate Programming Examples (how INIT commands are used)” on page 988.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

OUTPUT 714;”INITIATE:TXPOWER:ON” !Initiates a TX Power measurement.
OUTPUT 714;”INITIATE:TXPOWER;PFERROR:ON” !Initiates TX Power and
!phase and frequency error measurements.
OUTPUT 714;”INITIATE:PVTIME;ORFSPECTRUM;FBERROR:ON” !Initiates power
!versus time output RF spectrum, and fast bit error rate measurements.</td></tr>
</table>

INITiate:<measurement mnemonic>:OFF

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Deactivates the selected measurement. See “Measurement States” on page 406.

Only one measurement can be deactivated at a time. To stop one or more measurements and leave them in the active state, see “ABORt” on page 451.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

OUTPUT 714;”INITIATE:TXPOWER:OFF” !Deactivates TX power measurement.</td></tr>
</table>

INITiate:COUNt?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the number of measurements that have been initiated (that are activate). See “Measurement States” on page 406.
Query		Range: 0 to 10 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

INITiate:DONE?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries (one at a time) which measurements if any are available or have timed out. See“Measurement Event Synchronization” on page 424 for details on how to use this command. See “Measurement States” on page 406 to understand the test set’s measurement states. See “INITiate:DONE:FLAG:<measurement mnemonic>” on page 995 for include or exclude commands. Note that WAIT is returned when no measurements are done. NONE is returned when all measurements are done.
Query	GSM TA	Range: NONE | AAUD | BERR | DAUD | DPOW | FBER | IQT | ORFS | PFER | PVT | SMON | TXP | WAIT
	GPRS TA	Range: NONE | BLER | DPOW | GBER | IQT | ORFS | PFER | PVT | SMON | TXP | WAIT
	GSM/GPRS LA	Range: NONE | AAUD | BERR | BLER | DAUD | DPOW | FBER | GBER | IQT | ORFS | PFER | PVT | SMON | TXP | WAIT
	EGPRS LA	Range: NONE | AAUD | BERR | BLER | DAUD | DPOW | ETXP | FBER | GBER | IQT | ORFS | PFER | PVT | SMON | TXP | WAIT
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

INITiate:DONE:CLEar

Function	GSM TA	Clears the done flag from all measurements. See"INITiate:DONE?" on page 993.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"INITIATE:DONE:CLEAR" !clears done flag.
```

INITiate:DONE:FLAG[:ALL]

Function	GSM TA	Specifies that all measurements are considered, (included or excluded) when the DONE? query is sent. If a measurements trigger arm, see "Trigger Arm (Single or Continuous) Description" on page 406, has been left in continuous mode, the done flag for that measurement will toggle between DONE and WAIT, see "INITiate:DONE?" on page 424. The INITiate:DONE? query will probably not be able to catch the measurement at the instant it is done, therefore the measurement will never appear to be done. If a measurement trigger arm must be left in continuous mode the user should (exclude) it, using this command, from the INITiate:DONE? query results. Once the INITiate:DONE:FLAG has been set to EXCLude for a measurement, you must send the INCLude command for that measurement in order to query that measurement with, the INITiate:DONE? query. The test set will not reset any (excluded measurement) to be an (included measurement) with any form of preset, see "Preset Descriptions" on page 367.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range • INCLude: include all measurements • EXCLude: exclude all measurements
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"INITIATE:DONE:FLAG:ALL EXCLUDE" !Excludes all measurements from
                                            !contributing the INITIATE:DONE?
                                            !query, see "INITiate:DONE?" on
                                             !page 6.
```

INITiate:DONE:FLAG:<measurement mnemonic>

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Specifies which measurements are considered, (included or excluded) when the DONE? query is sent. If a measurements trigger arm, see “Trigger Arm (Single or Continuous) Description” on page 406, has been left in continuous mode, the done flag for that measurement will toggle between DONE and WAIT, see “INITiate:DONE?” on page 424. The INITiate:DONE? query will probably not be able to catch the measurement at the instant it is done, therefore the measurement will never appear to be done. If a measurement trigger arm must be left in continuous mode the user should (exclude) it, using this command, from the INITiate:DONE? query results. Once the INITiate:DONE:FLAG has been set to EXCLude for a measurement, the user must send the INCLude command for that measurement in order to query that measurement with, the INITiate:DONE? query. The test set will not reset any (excluded measurement) to be an (included measurement) with any form of preset, see “Preset Descriptions” on page 367.

Setting	GSM TA	Range • INCLude :AAUDio | :BERRor | :DAUDio | :DPOWer | :FBERror | :IQTuning | :ORFSpectrum | :PFERror | :PVTime | :SMONitor | :TXPower • EXCLude :AAUDio | :BERRor | :DAUDio | :DPOWer | :FBERror | :IQTuning | :ORFSpectrum | :PFERror | :PVTime | :SMONitor | :TXPower
	GPRS TA	Range • INCLude :BLERror | :DPOWer | :GBERror | :IQTuning | :ORFSpectrum | :PFERror | :PVTime | :SMONitor | :TXPower • EXCLude :BLERror | :DPOWer | :GBERror | :IQTuning | :ORFSpectrum | :PFERror | :PVTime | :SMONitor | :TXPower
	GSM/GPRS LA	Range • INCLude :AAUDio | :BERRor | :BLERror | :DAUDio | :DPOWer | :FBERror | :GBERror | :IQTuning | :ORFSpectrum | :PFERror | :PVTime | :SMONitor | :TXPower • EXCLude :AAUDio | :BERRor | :BLERror | :DAUDio | :DPOWer | :FBERror | :GBERror | :IQTuning | :ORFSpectrum | :PFERror | :PVTime | :SMONitor | :TXPower
	EGPRS LA	Range • INCLude :AAUDio | :BERRor | :BLERror | :DAUDio | :DPOWer | :ETXPower | :FBERror | :GBERror | :IQTuning | :ORFSpectrum | :PFERror | :PVTime | :SMONitor | :TXPower • EXCLude :AAUDio | :BERRor | :BLERror | :DAUDio | :DPOWer | :ETXPower | :FBERror | :GBERror | :IQTuning | :ORFSpectrum | :PFERror | :PVTime | :SMONitor | :TXPower
Related Topics		“INITiate:DONE?” on page 993
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"INITIATE:DONE:FLAG:PFERROR EXCLUDE" !excludes PFERROR measurements
                                              !from contributing to the
                                              !INITIATE:DONE? query.
```

INITiate:ON?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the names of the measurements (none, one, or more than one) that are ON in a comma separated list of measurement mnemonics. See “INITiate:<measurement mnemonic>[:ON]” on page 992.
Query	GSM TA	Range: AAUD | BERR | DAUD | DPOW | FBER | IQT | NONE | ORFS | PFER | PVT | SMON | TXP
	GPRS TA	Range: BLER | DPOW | GBER | NONE | IQT | ORFS | PFER | PVT | SMON | TXP
	GSM/GPRS LA	Range: AAUD | BERR | BLER | DAUD | DPOW | FBER | GBER | IQT | NONE | ORFS | PFER | PVT | SMON | TXP
	EGPRS LA	Range: AAUD | BERR | BLER | DAUD | DPOW | ETXP | FBER | GBER | IQT | NONE | ORFS | PFER | PVT | SMON | TXP
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

READ? Subsystem

Syntax Diagram and Command Descriptions

"READ"

Description

The READ? command provides a sequential method to make measurements and retrieve the results. READ? will hang the GPIB bus until the measurement is completed, or until the timeout value has been exceeded. Associated SETup commands (for each measurement) are used with the READ? command to retrieve desired measurement results in a sequential manner.

Sending a READ? command is equivalent to an INITiate/FETCh cycle for a measurement. A READ? command executes an abort action on that measurement followed by an INITiate and a FETCH?.

READ? commands can be mixed with FETCH? queries in order to make combinations of sequential and overlapped operations. One measurement can be issued a READ? command (sequential), and the next measurement can be issued INITiate/FETCh? commands (overlapped), if necessary.

The advantage of using the READ? commands to obtain measurement results, as opposed to the INITiate/FETCh method is:

- It is simpler. Fewer commands are required to obtain measurement results.

Some disadvantages of using READ? over INITiate and FETCh are:

- The test set does not process any additional GPIB commands until the requested measurement results are available.
- The sequential nature of the READ? command does not allow the user to make concurrent measurements. Concurrent measurements require the overlapped commands INITiate, DONE? and FETCh? .
- The READ? command does not provide measurement results such as statistics that are available using the INITiate/FETCh method.
- The READ? commands have pre-defined measurement results. If additional results are needed from a measurement they may be obtained with a FETCh? query.

NOTE	Trigger arming for each measurement is controlled in the SETup subsystem. Best practice during remote operation is to set trigger arm to single (Continuous Off).

Programming Example

```
OUTPUT 714;"READ:TXPower?" !Starts TX power measurement. As soon as the
                           !measurement cycle has completed, the test set
                           !provides the TX power measurement results to the
                           !controlling application.
ENTER 714;integrity, tx_carrier_power !Enters the integity indicator and
                                      !TX carrier power measurement into
                                      !controlling application.
```

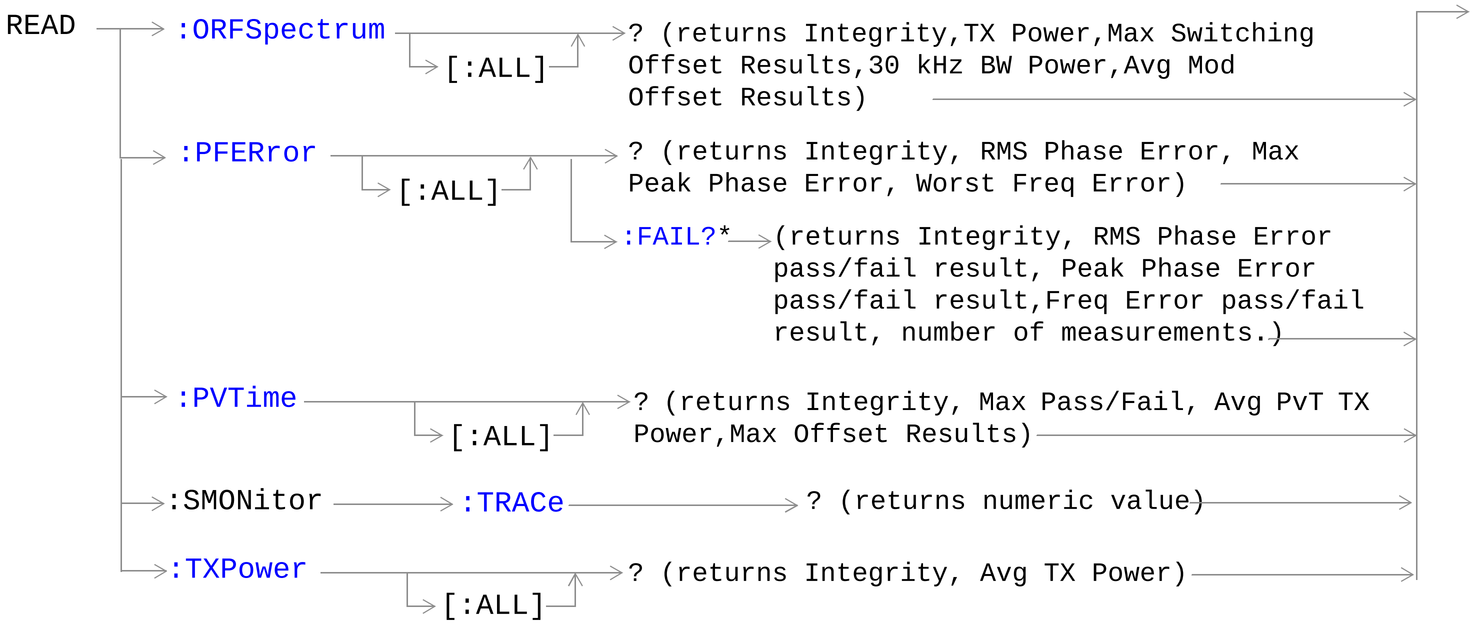
READ

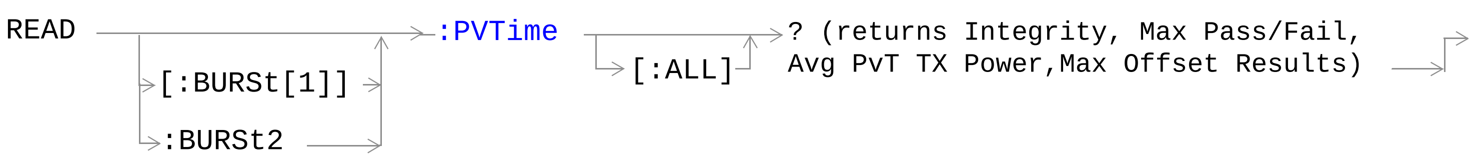
```
READ
  :AAUDio* [:ALL]   ? (returns Integrity,Avg Audio Level,Avg SINAD,Avg Distortion,Avg Audio Freq)
  :BERRor* [:ALL]   ? (returns Integrity, Bits Tested, Bit Error Ratio, Bit Error Count)
           :FULL    ? (returns integrity, bits tested for Type Ia, bit error ratio for Type Ia, bit error count for Type Ia, bits tested for Type Ib, bit error ratio for Type Ib, bit error count for Type Ib, bits tested for Type II, bit error ratio for Type II, bit error count for Type II)
  :DAUDio* [:ALL]   ? (returns Integrity,Avg Decoded Audio Level)
  :DPOWer [:ALL]    ? (returns N Integrity indicators, N Avg TX Power levels (where N is the number of bursts measured))
  :FBERror* [:ALL]  ? (returns Integrity, Bits Tested, Bit Error Ratio, Fast Bit Error Count)
  :IQTuning [:ALL]  ? (returns Integrity, signal level relative to desired signal at 9 different frequencies, plus the spur)
```

* These commands are not applicable to GPRS.

```
READ
  :BLERror* [:ALL]    ? (returns Integrity, Blocks Tested, Block Error Ratio, Block Error Count)
  :ETXPower+ [:ALL]   ? (returns Integrity, Average Burst Power, Average Estimated Carrier Power)
  :GBERror* [:ALL]    ? (returns Integrity, Bits Tested, Bit Error Ratio, Bit Error Count)
```

* These commands are not applicable to GSM.
+ This command is only applicable to EGPRS.





This command is not applicable to GSM.

“Diagram Conventions” on page 1

READ:AAUDio[:ALL]?

Function	GSM TA	Queries (initiates and fetches) one analog audio measurement as a sequential operation. Returns an integrity indicator (see “Integrity Indicator” on page 411), average analog audio level, average SINAD, average distortion and the average audio frequency. Values are returned in a comma-separated list.
	GSM/GPRS LA	
	EGPRS LA	Returns Integrity Indicator, see “Integrity Indicator” on page 411 and analog audio (average). The FETCh command should be used to obtain other measurement results. See “FETCh:AAUDio” on page 865.
	GPRS TA	This command is not applicable to GPRS.

Query		Integrity indicator • Range: See "Integrity Indicator" on page 411. • Resolution: 1 Analog audio (average) • Range: 0 to 20 volts • Resolution: 0.1mv
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

READ:BERRor[:ALL]?

Function	GSM TA GSM/GPRS LA EGPRS LA	Queries (initiates and fetches) one RX bit error measurement as a sequential operation. Returns Integrity Indicator see “Integrity Indicator” on page 411, Bits Tested, Bit Error Ratio and Bit Error Count, for the bit type set using “SETup:BERRor[:TYPE]” on page 1050. (A similar query, “READ:BERRor:FULL?” on page 1005, returns the same results but for all residual, or all non-residual bit types simultaneously.) The FETCh command should be used to obtain other measurement results. See “FETCh:BERRor” on page 877.
	GPRS TA	This command is not applicable to GPRS.
Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Bits tested • Range: 0 to (<RX bits to test +131) and 9.91E+37 (NAN) • Resolution: 1 Bit error ratio • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 1 Bit error count • Range: 0 to (<RX bits to test +131) and 9.91E+37 (NAN) • Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

READ:BERRor:FULL?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="3">Queries (initiates and fetches) one RX bit error measurement as a sequential operation. Either all of the residual or non-residual results are returned, depending on the type of bit error measurement set using “SETup:BERRor[:TYPE]” on page 1050.

Returns Integrity Indicator (see “Integrity Indicator” on page 411), Bits Tested, Bit Error Ratio and Bit Error Count for Type Ia, Type Ib and Type II.

(A similar query, “READ:BERRor[:ALL]?” on page 1004, returns the same results but only for the bit type previously set using “SETup:BERRor[:TYPE]” on page 1050.)

The FETCh command should be used to obtain other measurement results. See “FETCh:BERRor” on page 877.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td colspan="2">Query</td><td>Integrity indicator
• Range: See “Integrity Indicator” on page 411.
• Resolution: 1
Type Ia Bits tested
• Range: 0 to 999000 and 9.91E+37 (NAN)
• Resolution: 1
Type Ia Bit error ratio
• Range: 0 to 100 and 9.91E+37 (NAN)
• Resolution: 0.01
Type Ia Bit error count
• Range: 0 to 999000 and 9.91E+37 (NAN)
• Resolution: 1
Type Ib Bits tested
• Range: 0 to 2637369 and 9.91E+37 (NAN)
• Resolution: 1
Type Ib Bit error ratio
• Range: 0 to 100 and 9.91E+37 (NAN)
• Resolution: 0.01
Type Ib Bit error count
• Range: 0 to 2637369 and 9.91E+37 (NAN)
• Resolution: 1
Type II Bits tested
• Range: 0 to 15584400 and 9.91E+37 (NAN)
• Resolution: 1
Type II Bit error ratio
• Range: 0 to 100 and 9.91E+37 (NAN)
• Resolution: 0.01
Type II Bit error count
• Range: 0 to 1558440 and 9.91E+37 (NAN)
• Resolution: 1</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
</table>

READ:BLERror[:ALL]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries (initiates and fetches) one block error measurement as a sequential operation. Returns Integrity Indicator (see “Integrity Indicator” on page 411), Blocks Tested, Block Error Ratio, and Block Error Count. The FETCh command should be used to obtain other measurement results. See “FETCh:BLERror” on page 888.
Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Blocks tested • Range: 0 to 99127 and 9.91E+37 (NAN) • Resolution: 1 Block error ratio • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 1 Block error count • Range: 0 to 99127 and 9.91E+37 (NAN) • Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

READ:DAUDio[:ALL]?

Function	GSM TA	Queries (initiates and fetches) one decoded audio (uplink speech level) measurement as a sequential operation.
	GSM/GPRS LA EGPRS LA	Returns Integrity Indicator see "Integrity Indicator" on page 411 and decoded audio (average). The FETCh command should be used to obtain other measurement results. See "FETCh:DAUDio" on page 892.
	GPRS TA	This command is not applicable to GPRS.
Query		Integrity indicator • Range: See "Integrity Indicator" on page 411. • Resolution: 1 Decoded audio (average) • Range: 0 to 100% FS (full scale) • Resolution: 0.01% FS
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

READ:DPOWer[:ALL]?

Function	GSM TA GSM/GPRS LA GPRS TA EGPRS LA	Queries the Dynamic Power measurement results. Query returns N integrity indicators and N average TX power levels (where N is the number of bursts measured). To set the number of bursts you want to measure, use "SETup:DPOWer:COUNt:NUMBer[:SELected]" on page 1073. The maximum number of results that can be returned is 99. Measurement result 100 and above must be retreived using the FETCh command.
Query		Integrity indicators for each individual burst • Range: See "Integrity Indicator" on page 411. • Resolution: 1 Average TX power levels for each individual burst • Range: -100 to +100 dBm and 9.91 E+37 (NAN) • Resolution: 0.01 dBm
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

READ:ETXPower[:ALL]?

Function	GSM TA	This command is not applicable to the GSM TA.
	GPRS TA	This command is not applicable to the GPRS TA.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	Queries (initiates and fetches) one EGPRS TX power measurement as a sequential operation. Returns Integrity Indicator (see "Integrity Indicator" on page 411), average burst power, and average estimated carrier power. When the selected modulation format is set to GMSK, Burst Power and Carrier Power measurements are equivalent so both results return the same value.
Query		Integrity indicator • Range: See "Integrity Indicator" on page 411. • Resolution: 1 Burst power (average) • Range: –100 to +100 dBm and 9.91E+37 (NAN) • Resolution: 0.01 dB Estimated carrier power (average) • Range: –100 to +100 dBm and 9.91E+37 (NAN) • Resolution: 0.01 dB
Requirements	EGPRS LA	Revision A.01.00 and above

READ:FBERror[:ALL]?

Function	GSM	Queries (initiates and fetches) one fast bit error measurement as a sequential operation.
	GSM/GPRS LA	Returns Integrity Indicator see “Integrity Indicator” on page 411, Bits Tested, Bit Error Ratio, and Fast Bit Error Count using mobile station burst-by-burst looback (type C loopback). The FETCh command should be used to obtain other measurement results. See “FETCh:BERRor” on page 877.
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Bits tested • Range: 0 to (RX Fast BER bits to test + 455) and 9.91E+37 (NAN) • Resolution: 1 Bit error ratio • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 1 Fast bit error count • Range: 0 to (RX Fast BER bits to test + 455) and 9.91E+37 (NAN) • Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

READ:GBERror[:ALL]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	Queries (initiates and fetches) one bit error measurement as a sequential operation. Returns Integrity Indicator see “Integrity Indicator” on page 411, Bits Tested, Bit Error Ratio, and Bit Error Count. The FETCh command should be used to obtain other measurement results. See “FETCh:GBERror” on page 911.
Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Bits tested • Range: 0 to 999,427 and 9.91E+37 (NAN) • Resolution: 1 Bit error ratio • Range: 0 to 100 and 9.91E+37 (NAN) • Resolution: 1 Bit error count • Range: 0 to 999,427 and 9.91E+37 (NAN) • Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

READ:IQTuning[:ALL]?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Queries (initiates and fetches) the I/Q Tuning measurement results. Query returns the integrity indicator and the relative power level at the following offset frequencies: carrier frequency, ±67.7083 kHz, ±135.417 kHz, ±203.125 kHz, ±270.833 kHz. The spur measurement result is also returned.

The FETCh command should be used to return other measurement results. See “FETCh:IQTuning” on page 915.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Integrity indicator
• Range: See “Integrity Indicator” on page 411.
• Resolution: 1
Signal level relative to the desired signal at 9 different frequencies
• Range: -100 to +100 dB and 9.91 E+37 (NAN)
• Resolution: 0.01 dB
The order of the signal level results are:
• -270.833 kHz
• -203.125 kHz
• -135.417 kHz
• -67.7083 kHz
• carrier frequency
• +67.7083 kHz
• +135.417 kHz
• +203.125 kHz
• +270.833 kHz
Relative power of the spur frequency:
• Range: -100 to +100 dB and 9.91E+37 (NAN)
• Resolution: 0.01 dB</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
</table>

READ:ORFSpectrum[:ALL]?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries (initiates and fetches) one output RF spectrum measurement as a sequential operation. Returns Integrity Indicator see “Integrity Indicator” on page 411, TX Power, Output RF Spectrum due to Switching (Max), 30 kHz Bandwidth Power, and Output RF Spectrum due to Modulation (Average). The FETCh command should be used to obtain other measurement results. See “FETCh:ORFSpectrum” on page 920.
Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 TX power • Range: –100 to +100 dBm and 9.91E+37 (NAN) • Resolution: 0.01 dB Output RFspectrum due to switching (Max) • Range: 0 to 8 comma separated values –100 to +100 dBm and 9.91E+37 (NAN) • Resolution: 0.01 dB 30 kHz bandwidth power • Range: –100 to +100 dBm and 9.91E+37 (NAN) • Resolution: 0.01 dB Output RF spectrum due to modulation (average) • Range: 0 to 22 comma separated values –200 to +100 dBm and 9.91E+37 (NAN) • Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

READ:PFERror[:ALL]?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Queries (initiates and fetches) one Phase and Frequency Error measurement as a sequential operation.

Returns Integrity Indicator see “Integrity Indicator” on page 411, RMS Phase Error (Max), Peak Phase Error(Max), Frequency Error (Worst). The FETCh command should be used to obtain other measurement results. See “FETCh:PFERror” on page 934.

Worst frequency error (negative or positive) is the value furthest from zero.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Integrity indicator
• Range: See “Integrity Indicator” on page 411.
• Resolution: 1
rms phase error (max)
• Range: 0 to 180 degrees and 9.91E+37 (NAN)
• Resolution: 0.01 dB
Peak phase error (max)
• Range: 0 to 180 degrees and 9.91E+37 (NAN)
• Resolution: 0.01 degrees
Frequency error (worst)
• Range: –750 kHz to +750 kHz and 9.91E+37 (NAN)
• Resolution: 0.01 Hz</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
</table>

READ:PFERror[:ALL]:FAIL?

<table>
<tr><td rowspan="4">Function</td><td>GSM</td><td rowspan="4">Queries (initiates and fetches) one Phase and Frequency Error measurement as a sequential operation.

Returns Integrity Indicator see “Integrity Indicator” on page 411, RMS Phase Error pass/fail indicator, Peak Phase Error pass/fail indicator, Frequency Error pass/fail indicator, and the number of measurements taken. The number of measurements taken may be of interest to you if you are using the confidence level feature. For more information on using confidence levels refer to “Confidence Levels” on page 1524.

The FETCh command should be used to obtain other measurement results. See “FETCh:PFERror” on page 934.

Worst frequency error (negative or positive) is the value furthest from zero.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td colspan="2">Query</td><td>Integrity indicator
• Range: See “Integrity Indicator” on page 411.
• Resolution: 1

RMS phase error pass/fail indicator
• Range: 0 | 1

Peak phase error pass/fail indicator
• Range: 0 | 1

Frequency error pass/fail indicator
• Range: 0|1

Number of measurements taken
• Range: 0 to 999 and 9.91 E+37 (NAN)
• Resolution: 1</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
</table>

READ:PVTime[:ALL]?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries (initiates and fetches) one power versus time measurement as a sequential operation. Returns Integrity Indicator see “Integrity Indicator” on page 411, Mask pass/fail, power versus time transmit power and up to 12 power versus time offset (max) results. The FETCh command should be used to obtain other measurement results. See “FETCh:PVTime” on page 947.
Query		Integrity indicator • Range: See “Integrity Indicator” on page 411. • Resolution: 1 Mask pass/fail • Range: 0 | 1 and 9.91E+37 (NAN) Power versus time transmit power • Range: –100 to +100 dBm and 9.91E+37 (NAN) • Resolution: 0.01 dB Power versus time offset (max) • Range: Up to 12 comma-separated power versus time values returned with max power = –100 dBc to +100 dBc (relative to power versus time carrier power) and 9.91E+37 (NAN) • Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

READ:SMONitor:TRACe?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries (initiates and fetches) one spectrum monitor measurement as a sequential operation. Returns a comma separated list of 401 points representing the amplitude results of the trace data.
Query		Range: • For spans of 125 kHz and 500 kHz — frequency of point: within the current span (relative to the center frequency) — amplitude of point: -50 to +55 dB • For all other spans — frequency of point: within the current span (relative to the center frequency) — amplitude of point: (reference level - 60 dB) to +55 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

READ[:BURSt[1]]:PVTime[:ALL]?
READ:BURSt2:PVTime[:ALL]?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable for GSM.</td></tr>
<tr><td>GPRS TA</td><td rowspan="3">Queries (initiates and fetches) one power versus time measurement as a sequential operation for the burst in the multislot configuration that you specify.

Returns Integrity Indicator see “Integrity Indicator” on page 411, Mask pass/fail, power versus time transmit power and up to 12 power versus time offset (max) results. The FETCh command should be used to obtain other measurement results. See “FETCh:PVTime” on page 947.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Integrity indicator
• Range: See “Integrity Indicator” on page 411.
• Resolution: 1

Mask pass/fail
• Range: 0 | 1 and 9.91E+37 (NAN)

Power versus time transmit power
• Range: –100 to +100 dBm and 9.91E+37 (NAN)
• Resolution: 0.01 dB

Power versus time offset (max)
• Range: Up to 12 comma-separated power versus time values returned with max power = –100 dBc to +100 dBc (relative to power versus time carrier power) and 9.91E+37 (NAN)
• Resolution: 0.01 dB</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
</table>

READ:TXPower[:ALL]?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries (initiates and fetches) one TX power measurement as a sequential operation. Returns Integrity Indicator see "Integrity Indicator" on page 411 and transmit power (average). The FETCh command should be used to obtain other measurement results. See "FETCh:TXPower" on page 983.
Query		Integrity indicator • Range: See "Integrity Indicator" on page 411. • Resolution: 1 Transmit power (average) • Range: –100 to +100 dBm and 9.91E+37 (NAN) • Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

RFANalyzer Subsystem

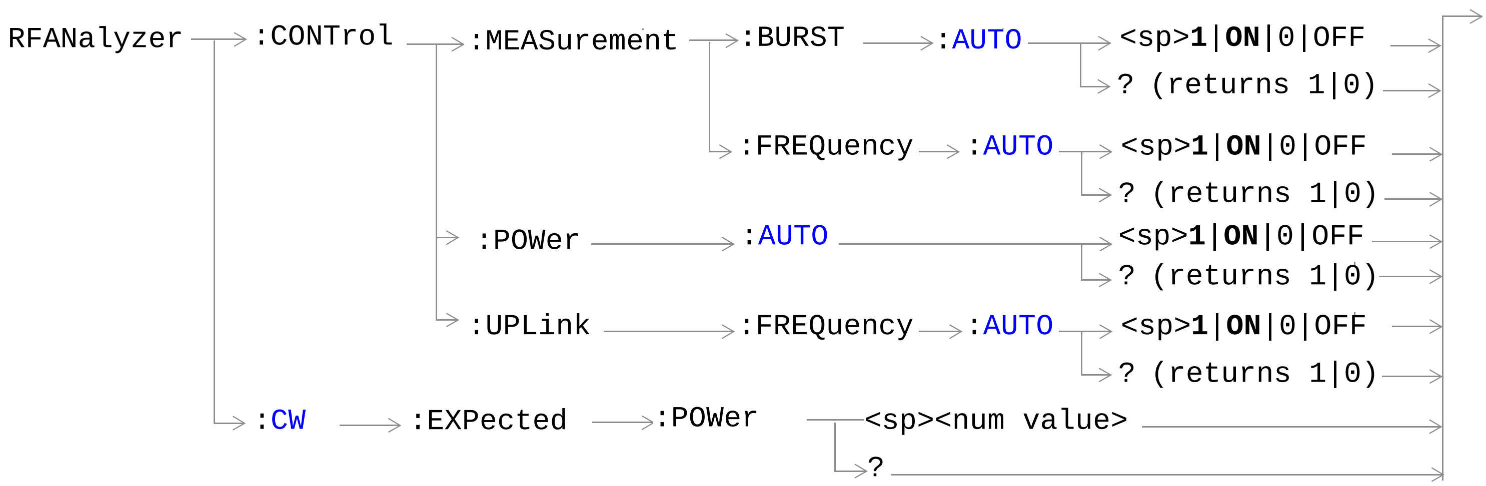
Description

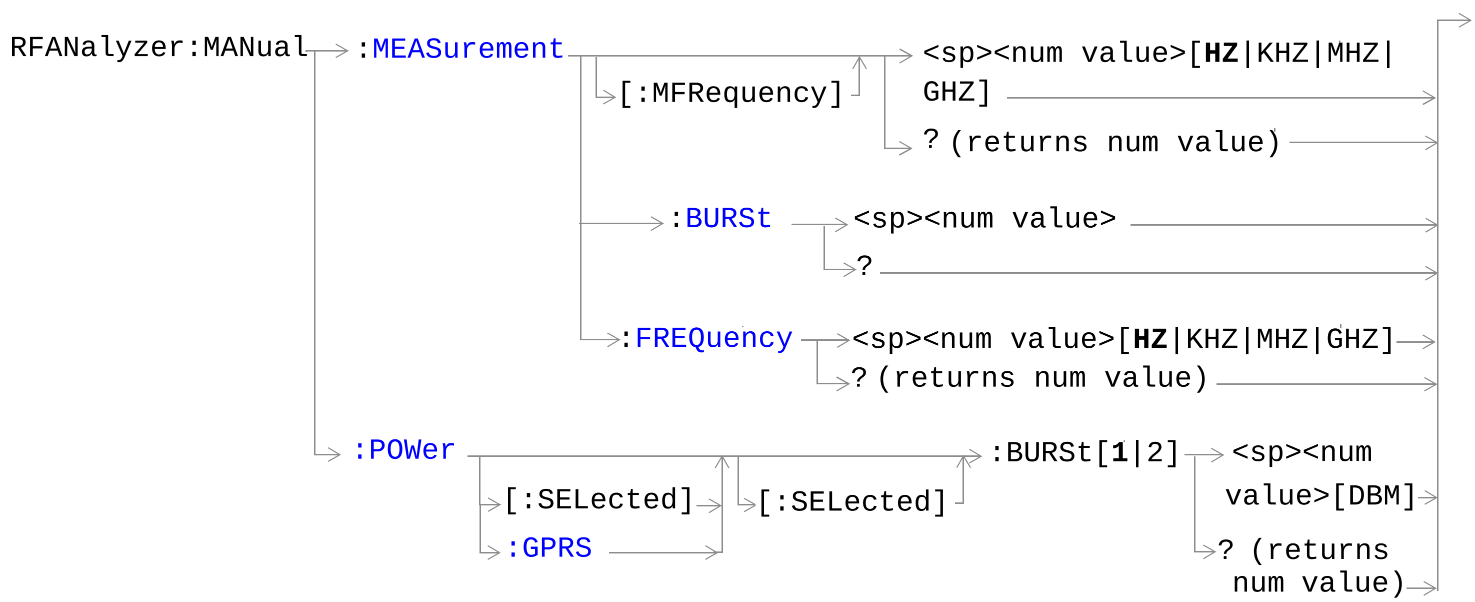
The RFANalyzer command subsystem performs “lower-level” functions that control the Test Set's measuring receiver. Most of these functions are normally controlled indirectly by commands in other subsystems. One exception would be when operating in Test Mode. For example, the command CALL:TCHannel:<channel number> would set the RFANalyzer:EXPected:FREQuency parameter to the frequency that maps to the uplink traffic channel specified.

Syntax Diagrams and Command Descriptions

“RFANalyzer” on page 1020

RFANalyzer


RFANalyzer
:CONTrol
:MEASurement
:BURST
:AUTO
<sp>1|ON|0|OFF
? (returns 1|0)
:FREQuency
:AUTO
<sp>1|ON|0|OFF
? (returns 1|0)
:POWer
:AUTO
<sp>1|ON|0|OFF
? (returns 1|0)
:UPLink
:FREQuency
:AUTO
<sp>1|ON|0|OFF
? (returns 1|0)
:CW
:EXPected
:POWer
<sp><num value>
?


RFANalyzer:MANual
:MEASurement
[:MFRequency]
<sp><num value>[HZ|KHZ|MHZ|
GHZ]
? (returns num value)
:BURSt
<sp><num value>
?
:FREQuency
<sp><num value>[HZ|KHZ|MHZ|GHZ]
? (returns num value)
:POWer
[:SELected]
:GPRS
[:SELected]
:BURSt[1|2]
<sp><num
value>[DBM]
? (returns
num value)

```
RFANalyzer →:MANual →:UPLink ─┬─[:MFRequency]─┬→<sp><num value>[HZ|KHZ|MHZ|GHZ] →
                              │               └→? (returns num value) →
                              └→:FREQuency ─┬→<sp><num value>[HZ|KHZ|MHZ|GHZ] →
                                            └→? (returns num value) →
```

“Diagram Conventions” on page 1

RFANalyzer:CONTrol:MEASurement:BURSt:AUTO

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries whether the test set's receiver is set to automatic (AUTO ON) or manual (AUTO OFF) uplink burst measurement control. See "Receiver Control" on page 370. If set to the default (AUTO ON) state, the measurement burst will be determined automatically. When in manual (AUTO OFF), the uplink burst to be measured is set by "RFANalyzer:MANual:MEASurement:BURSt" on page 1025.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"RFANalyzer:CONTrol:MEASurement:BURSt:AUTO OFF"
!Enables manual control of which uplink burst the receiver measures.
```

RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries whether the test set's receiver is set to automatic (AUTO ON) or manual (AUTO OFF) measurement frequency control. See "Receiver Control" on page 370.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO OFF"
!Enables manual control of the measurement receiver's frequency.
```

RFANalyzer:CONTrol:POWer:AUTO

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries whether the test set receiver's expected power setting is set to automatic (AUTO ON) or manual (AUTO OFF) power control. See "Receiver Control" on page 370.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"RFANalyzer:CONTrol:POWer:AUTO OFF"
```

RFANalyzer:CONTrol:UPLink:FREQuency:AUTO

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries whether the test set's demodulation receiver is set to automatic (AUTO ON) or manual (AUTO OFF) uplink frequency control. See "Receiver Control" on page 370.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"RFANalyzer:CONTrol:UPLink:FREQuency:AUTO OFF" !The test set's demodulation
                                                           !receiver is set to manual
                                                           !uplink frequency control.
```

RFANalyzer:CW:EXPected:POWer

Function	GSM TA	Sets/queries the power level in DBM that the mobile station is expected to transmit in CW mode. The units DBM are optional. The test set will set up its input signal path to measure this power level when a user is in manual control. See “Expected Power” on page 372.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: -60 to +53 dBm, after the Amplitude Offset (optional) has been factored in. see “Amplitude Offset” on page 156. Resolution: .01 dBm
Query		Range: -60 to +53 dBm, after the Amplitude Offset (optional) has been factored in. see “Amplitude Offset” on page 156. Resolution: .01 dBm
*RST setting		Expected Power: +13 dBm
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”RFANalyzer:CW:EXPected:POWer -20 DBM”
!Sets the expected power transmit level to -20 dBm.
```

RFANalyzer:MANual:MEASurement[:MFRequency]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the frequency used to tune the test set's measuring receiver,when manual mode is selected (RFAN:CONTrol:MEASurement:FREQuency:AUTO OFF). This command automatically sets the receiver to manual mode and changes the measurement frequency.
Setting		Range: 292.5 MHz to 2700 MHz Resolution: 1 Hz
Query		Range: 292.5 MHz to 2700 MHz Resolution: 1 Hz
*RST setting		896.000 MHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"RFANalyzer:MANual:MEASurement:MFRequency 942.6 MHZ"` `!Enables manual receiver control and sets the test set's receiver frequency to 942.6 MHz.`		

RFANalyzer:MANual:MEASurement:BURSt

Function	GSM TA GSM/GPRS LA GPRS TA EGPRS LA	Sets/queries the mobile station uplink burst number that will be measured when the receiver burst control setting is set to OFF (Manual). See "RFANalyzer:CONTrol:MEASurement:BURSt:AUTO" on page 1022. The TXP measurement will report and integrity error of "Parameter Error" if a burst 2 measurement is attempted while on a GSM call.
Setting		Range: 1 | 2
Query		Range: 1 | 2
*RST setting		1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"RFANalyzer:MANual:MEASurement:BURSt 2" !Sets the measurement burst number to !2`		

RFANalyzer:MANual:MEASurement:FREQuency

Function	GSM TA	Sets/queries the frequency used to tune the test set’s measuring receiver, when manual mode is selected (RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO OFF).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 292.5 MHz to 2700 MHz Resolution: 1 Hz
Query		Range: 292.5 MHz to 2700 MHz Resolution: 1 Hz
*RST setting		896.000 MHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”RFANalyzer:MANual:MEASurement:FREQency 942.6 MHZ”
!Sets the test set’s receiver frequency to 942.6 MHz when manual control is used.
```

RFANalyzer:MANual:POWer[:SELected][:SELected]:BURSt[1|2]

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Sets/queries the power level in dBm that the test set's receiver is expecting the mobile station uplink burst to transmit at for the active (that is the selected) format. for GSM TCHannel measurements

This command automatically sets the test set to manual mode, see “Receiver Control” on page 370.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Requirement</td><td>This setting should always be set to BURST1 for GSM TCH measurements.</td></tr>
<tr><td colspan="2">Setting</td><td>Range: -60 dBm to +53 dBm, after the Amplitude Offset (optional) has been included, see “Amplitude Offset” on page 156.

Resolution: 0.01 dBm</td></tr>
<tr><td colspan="2">Query</td><td>Range: -60 dBm to +53 dBm, after the Amplitude Offset (optional) has been included, see “Amplitude Offset” on page 156.

Resolution: 0.01 dBm</td></tr>
<tr><td colspan="2">*RST setting</td><td>PGSM, EGSM RGSM, GSM450, GSM480, GSM750, and GSM850 bands: 13 dBm, DCS and PCS bands: 10 dBm</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example</td></tr>
</table>

```
OUTPUT 714;"RFANalyzer:MANual:POWer:BURSt 7" ! Sets the test set expected burst power
                                               !level to 7 dBm.
```

RFANalyzer:MANual:POWer:GPRS[:SELected]:BURSt[1|2]

Function	GSM TA	Sets/queries the burst power level in dBm that the test set's receiver is expecting the mobile station uplink burst to transmit at for the GPRS format. It does this for the GPRS format whether or not that format is active.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Requirement		This setting should always be set to BURST1 for GSM TCH measurements.
Setting		Range: -60 dBm to +53 dBm, after the Amplitude Offset (optional) has been included, see “Amplitude Offset” on page 156.
Query		Range: -60 dBm to +53 dBm, after the Amplitude Offset (optional) has been included, see “Amplitude Offset” on page 156. Resolution: 0.01 dBm
*RST setting		PGSM, EGSM RGSM, GSM450, GSM480, GSM750, and GSM850 bands: 13 dBm, DCS and PCS bands: 10 dBm
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”RFANalyzer:MANual:POWer:GPRS:BURSt 7” ! Sets the test set receiver expected
                                                  !GPRS burst power level to 7 dBm.
```

RFANalyzer:MANual:UPLink[:MFRequency]

Function	GSM TA	Sets/queries the test set’s demodulation receiver frequency, used to demodulate information from the mobile’s reverse channel transmission.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 292.5 MHz to 2700 MHz Resolution: 1 Hz
Query		Range: 292.5 MHz to 2700 MHz
*RST setting		896.000 MHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"RFANalyzer:MANual:UPLink:MFRequency 1955.030 MHz" !Enables manual
                                                         !demodulation receiver control
                                                         !and sets the test set's
                                                         !demodulation receiver
                                                            !frequency to 1955.030 MHz.
```

RFANalyzer:MANual:UPLink:FREQuency

Function	GSM TA	Sets/queries the test set’s demodulation receiver frequency used to demodulate information from the mobile’s reverse channel transmission when manual mode is selected (RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO OFF).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 292.5 MHz to 2700 MHz Resolution: 1 Hz
Query		Range: 292.5 MHz to 2700 MHz Resolution: 1 Hz
*RST setting		896.000 MHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"RFANalyzer:MANual:UPLink:FREQuency 942.6 MHZ"
!Sets the test set's demodulation receiver frequency to 942.6 MHz.
```

RFGenerator Subsystem

This subsystem is not applicable to GSM.

Description

The RFGenerator subsystem selects the RF generator output port on test sets equipped with both the RF IN/OUT port and the RF OUT ONLY port. If the test set does not have the RF OUT ONLY port, an error message is generated when attempting to switch output ports.

The RF OUT ONLY port may not be used with some test applications or lab applications. In that case, a message is displayed that tells you that the port could not be switched.

Syntax Diagrams and Command Descriptions

"RFGenerator: OUTPut" on page 1031 *GPRS Only*

RFGenerator:OUTPut

```
RFGenerator  —> :OUTPut —┬——————————————————————┬—┬—> <sp>[IO|OUT]
                         └—> [:DESTination] ————┘ └—> ? (returns IO|OUT)
```

“Diagram Conventions” on page 1

RFGenerator:OUTPut[:DESTination]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the RF output port destination: RF IN/OUT (IO) or RF OUT ONLY (OUT). The correct hardware for a requested setting must be present or an error is generated. For example, trying to change to the RF OUT ONLY port when this port is not installed causes the test set to display the following error: `Hardware error; RFIO version does not support RF out only selection.` The query form of this command will always return a result, regardless of the hardware version.
Setting		Range: IO | OUT
Query		Range: IO | OUT
*RST Setting		IO
Requirements	GSM/GPRS TA	Revision A.01.00 and above Hardware: RF Input/Output module with second RF output connector, modified front panel.
	GSM/GPRS LA	Revision C.01.00 and above Hardware: RF Input/Output module with second RF output connector, modified front panel.
	EGPRS LA	Revision A.01.00 and above Hardware: RF Input/Output module with second RF output connector, modified front panel.

Programming Example

```
OUTPUT 714;"RFGENERATOR:OUTPUT:DESTINATION OUT"
!Sets the RF generator’s output destination to the RF Out Only port.
!Will return an error if the RF Out Only port is not present.
```

SETup Subsystem

Description

The SETup subsystem is used to configure the test set for each measurement. Typical settings include:

- Multi-Measurement Count, how many measurements will be made each time a measurement is initiated.
- Trigger Arm, determines if a measurement will make one measurement then return to idle (single), or automatically rearm on completion of a measurement and repeat the process (continuous).
- Trigger Source, how a measurement is triggered.
- Trigger Delay, controls the delay time between the trigger and the start of sampling.
- Measurement Timeout, length of time before a measurement times out.

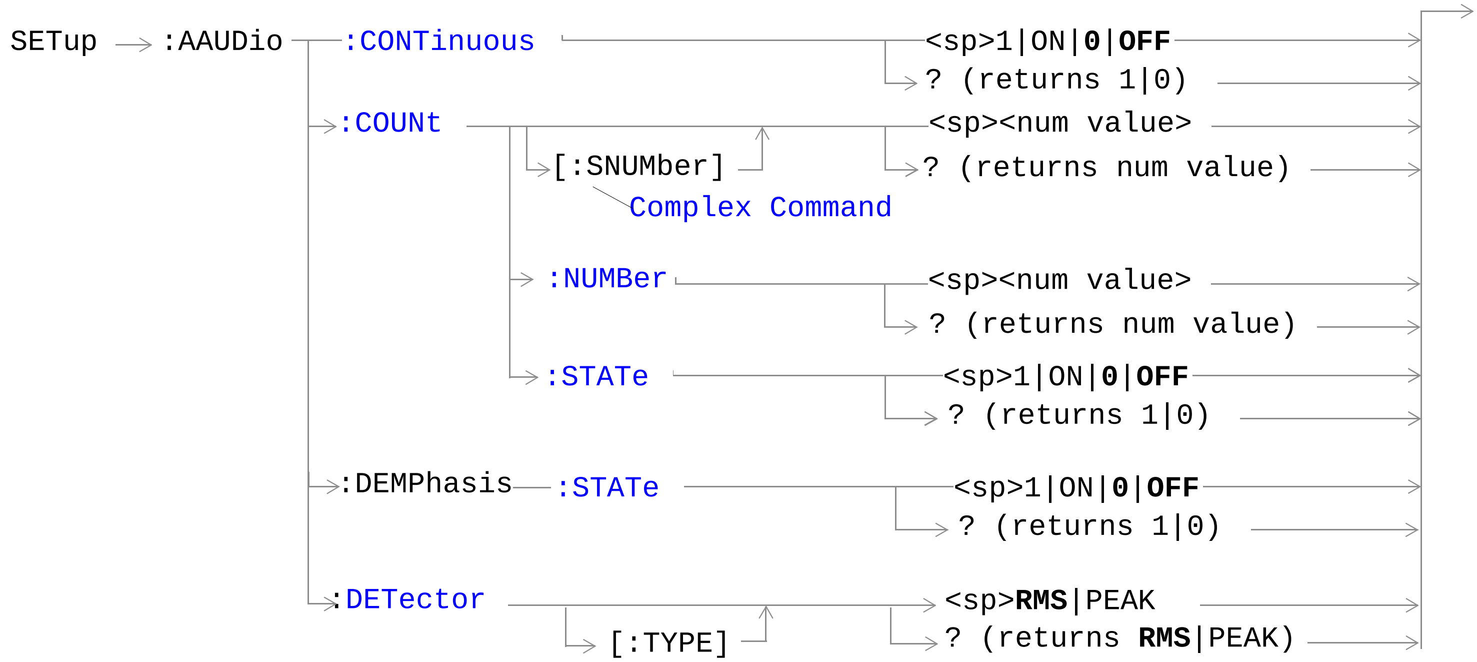
NOTE Trigger arming for each measurement is controlled in the SETup subsystem. The choices are single or continuous. In most cases, it is a best practice (during remote operation) to use “single” measurement mode. This simplifies the tasks of starting concurrent measurements, using the INIT subsystem commands to determine which measurements are ready to be fetched, then using the FETCh subsystem to obtain results. The command “SETup:CONTinuous:OFF sets all measurements to “single” trigger mode.

Syntax Diagrams and Command Descriptions

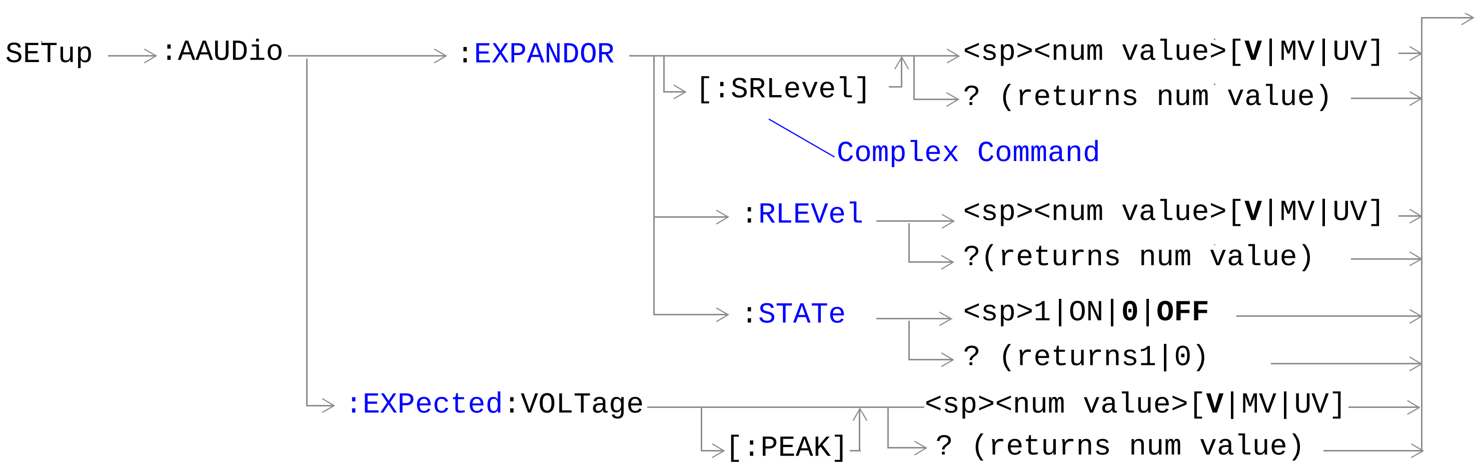
	Applicable to:			
	GSM TA	GPRS TA	GSM/GPRS LA	EGPRS LA
“SETup:AAUDio” on page 1035	Yes	No	Yes	Yes
“SETup:BERRor” on page 1047	Yes	No	Yes	Yes (includes support for 8PSK modulation coding schemes)
“SETup:BLERror” on page 1057	No	Yes	Yes	Yes (includes support for 8PSK modulation coding schemes)
“SETup:CONTinuous” on page 1062	Yes	Yes	Yes	Yes
“SETup:DAUDio” on page 1063	Yes	No	Yes	Yes
“SETup:DPOWer” on page 1070	Yes	Yes	Yes	Yes
“SETup:ETXPower” on page 1081	No	No	No	Yes (includes support for 8PSK modulation coding schemes)
“SETup:FBERror” on page 1090	Yes	No	Yes	Yes
“SETup:GBERror” on page 1100	No	Yes	Yes	Yes
“SETup:IQTuning” on page 1106	Yes	Yes	Yes	Yes
“SETup:ORFSpectrum” on page 1130	Yes	Yes	Yes	Yes
“SETup:PFERror” on page 1147	Yes	Yes	Yes	Yes
“SETup:PVTime” on page 1163	Yes	Yes	Yes	Yes

	Applicable to:			
	GSM TA	GPRS TA	GSM/GPRS LA	EGPRS LA
"SETup:SMONitor" on page 1195	Yes	Yes	Yes	Yes
"SETup:TXPower" on page 1207	Yes	Yes	Yes	Yes

SETup:AAUDio

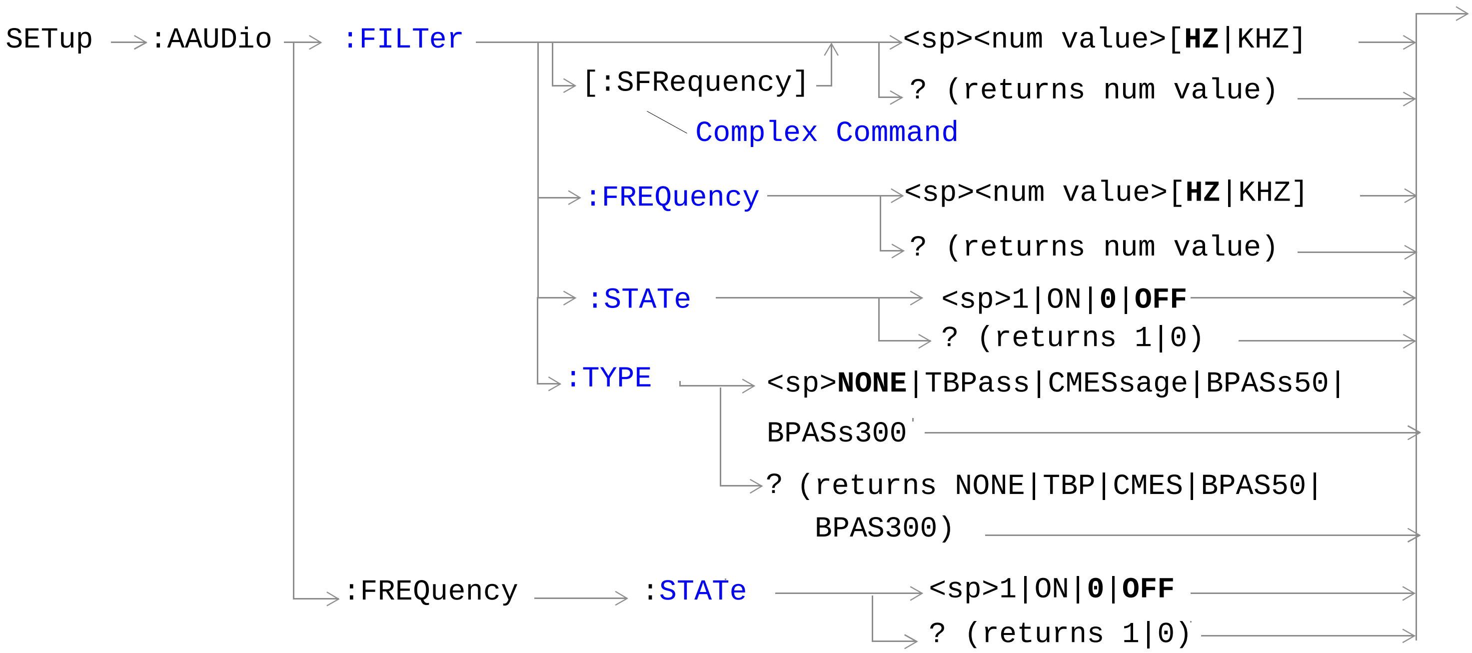


These commands are not applicable to GPRS.

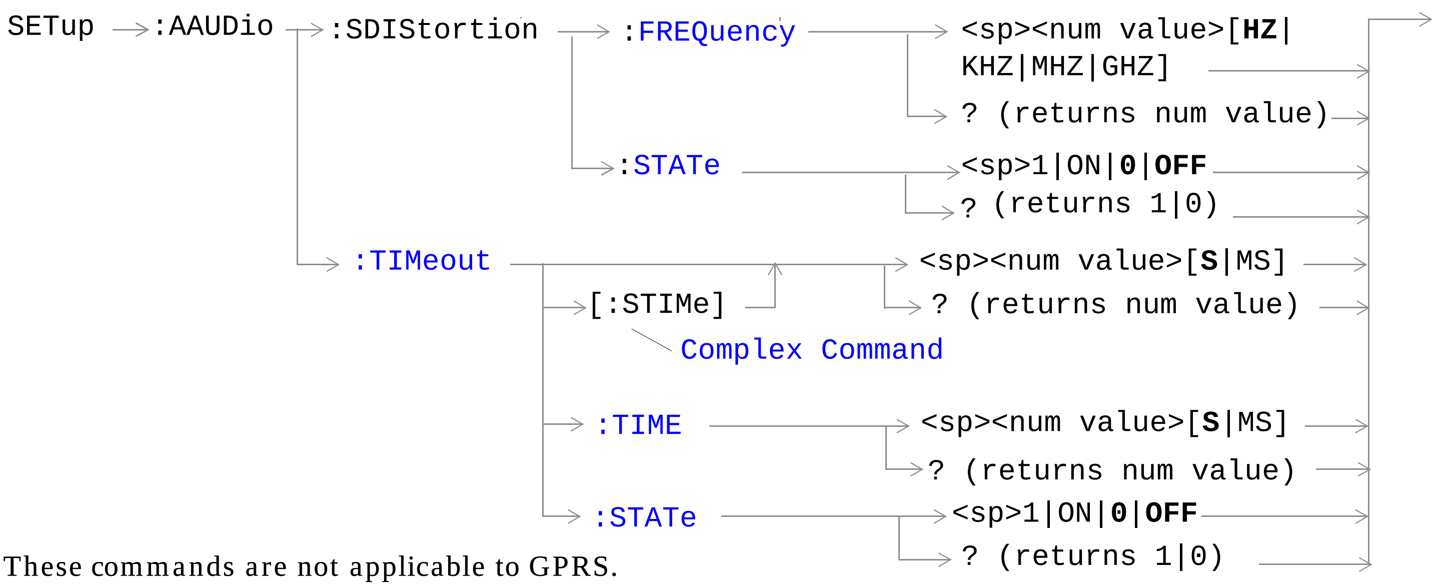


These commands are not applicable to GPRS.

SETup:AAUDio



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

“Diagram Conventions” on page 1

SETup:AAUDio:CONTinuous

Function	GSM TA	Selects/queries the trigger arm state for Analog Audio measurements.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: • Continuous trigger arm mode = 1 | ON • Single trigger arm mode = 0 | OFF
Query		Range: 0 | 1
*RST setting		Single | 0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;”SETUP:AAUDIO:CONTINUOUS OFF” !Selects single trigger mode.`		

SETup:AAUDio:COUNt[:SNUMber]

Function	GSM TA	Selects the number of Analog Audio multi-measurements the test set will make and sets the count state to ON.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;”SETUP:AAUDIO:COUNT:SNUMBER 5” !Sets the value to 5 and the state to on.`		

SETup:AAUDio:COUNt:NUMBer

Function	GSM TA GSM/GPRS LA EGPRS LA	Selects/queries the number of Analog Audio measurements the test set will make when the "SETup:AAUDio:COUNt:STATe" is ON.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"ABORT:ALL" !Aborts all active measurements in progress.
OUTPUT 714;"SETUP:AAUDIO:COUNT:NUMBER 10" !Sets the audio multi-measurement
                                          !count number to 10.
```

SETup:AAUDio:COUNt:STATe

Function	GSM TA GSM/GPRS LA EGPRS LA	Selects/queries the Analog Audio multi-measurement count state.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:AAUDIO:COUNT:STATE ON" !Turns the analog audio measurement
                                         !multi-measurement count state on.
```

SETup:AAUDIO:DEMPhasis:STATe

Function	GSM TA	Sets/queries whether 750 us de-emphasis is enabled.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETUP:AAUDIO:DEMPhasis:STATE ON" !Turns the de-emphasis on.`		

SETup:AAUDio:DETector[:TYPE]

Function	GSM TA	Sets/queries the detector type for audio level measurements.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: RMS | PEAK
Query		Range: RMS | PEAK
*RST setting		RMS
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETUP:AAUDIO:DETECTOR:TYPE PEAK"`		

SETup:AAUDio:EXPANDOR[:SRLevel]

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the expandor's reference level and automatically sets the expandor's state to ON. The units (V|MV|UV) are optional, if no units are specified then units default to V.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 10 mV to 10 V Resolution: 1 mV
Query		Range: 10 mV to 10 V Resolution: 1 mV
*RST setting		1 V
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:AAUDIO:EXPANDOR:SRLEVEL 5V"
!Sets expandor state to on and level to 5 V.
```

SETup:AAUDio:EXPANDOR:RLEVel

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the expandor's reference level to be used when the expandor's state is set to ON. The units (V|MV|UV) are optional, if no units are specified then units default to V.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 10 mV to 10 V Resolution: 1 mV
Query		Range: 10 mV to 10 V Resolution: 1 mV
*RST setting		1 V
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:AAUDIO:EXPANDOR:RLEVEL 5V" !Sets expandor reference level to 5 V.
```

SETup:AAUDio:EXPANDOR:STATe

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries whether the expandor is enabled.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:AAUDIO:EXPANDOR:STATE ON"
```

SETup:AAUDio:EXPected:VOLTage[:PEAK]

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the maximum expected peak voltage (clipping level) of the Analog Audio signal to be measured. The units (V|MV|UV) are optional, if no units are specified then units default to V. See "SETup:AAUDio" on page 1035.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 10 mV to 20 V peak Resolution: 0.1 mV
Query		Range: 10 mV to 20 V peak Resolution: 0.1 mV
*RST setting		20 V
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:AAUDIO:EXPECTED:VOLTAGE 5V" !Sets the clipping level of
                                              !Analog Audio measurements
                                              !to 5 volts.
```

SETup:AAUDio:FILTer[:SFRequency]

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the center frequency for the 100 Hz bandpass filter applied to Analog Audio measurements and sets the state to on. Units (KHZ | HZ) are optional, if no units are specified then units default to Hz.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 200 Hz to 20.0 kHz Resolution: 0.1 Hz
Query		Range: 200 Hz to 20.0 kHz Resolution: 0.1 Hz
*RST setting		1000 Hz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SETUP:AAUDIO:FILTER:SFREQUENCY 1000” !This sets the aaudio filter state
                                                 !to on and sets the bandpass
                                                 !filter frequency to 1 kHz.
```

SETup:AAUDio:FILTer:FREQuency

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the center frequency for the 100 Hz bandpass filter applied to Analog Audio measurements. Units (KHZ | HZ) are optional, if no units are specified then units default to Hz. See “SETup:AAUDio” on page 1035.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 200 Hz to 20.0 kHz Resolution: 0.1 Hz
Query		Range: 200 Hz to 20.0 kHz Resolution: 0.1 Hz
*RST setting		1000 Hz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SETUP:AAUDIO:FILTER:FREQUENCY 217HZ” !Set aaudio bandpass filter to 217 hz.
```

SETup:AAUDio:FILTer:STATe

Function	GSM TA	Selects/queries the state of the Analog Audio bandpass filter. see "SETup:AAUDio" on page 1035
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST setting		0 (off)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETUP:AAUDIO:FILTER:STATE ON" !Sets filter state on.`		

SETup:AAUDio:FILTer:TYPE

Function	GSM TA	Sets/queries the filter type for audio measurements.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: NONE | TBPass | CMESsage | BPASs50 | BPASs300
Query		Range: NONE | TBP | CMES | BPAS50 | BPAS300
*RST setting		NONE
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETUP:AAUDIO:FILTER:TYPE BPASS50"` `!Selects the 50 Hz to 15 kHz bandpass filter.`		

SETup:AAUDio:FREQuency:STATe

Function	GSM TA	Sets/queries whether the audio frequency measurement is enabled.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SETUP:AAUDIO:FREQUENCY:STATE ON”
```

SETup:AAUDio:SDIStortion:FREQuency

Function	GSM TA	Sets/queries the fundamental frequency setting for the SINAD/distortion measurement. Units (KHZ|HZ) are optional, if no units are specified then units default to Hz.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 100.0 to 10000 Hz Resolution: 0.1 Hz
Query		Range: 100.0 to 10000 Hz Resolution: 0.1 Hz
*RST setting		1000 Hz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
10 OUTPUT 714;SETUP:AAUDIO:SDISTORTION:FREQUENCY 300HZ”
```

SETup:AAUDio:SDIStortion:STATe

Function	GSM TA	Sets/queries whether the SINAD/distortion measurement is enabled.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
10 OUTPUT 714;SETUP:AAUDIO:SDISTORTION:STATE ON”
```

SETup:AAUDio:TIMEout[:STIME]

Function	GSM TA	Selects/queries the timeout value in seconds that will be used for Analog Audio measurements and sets the timeout state to ON. Units (S|MS) are optional, if no units are specified then units default to S.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;”SETUP:AAUDIO:TIMEOUT:STIME 3” !Sets the timeout
                                         !state to on and sets the
                                         !timeout value.
```

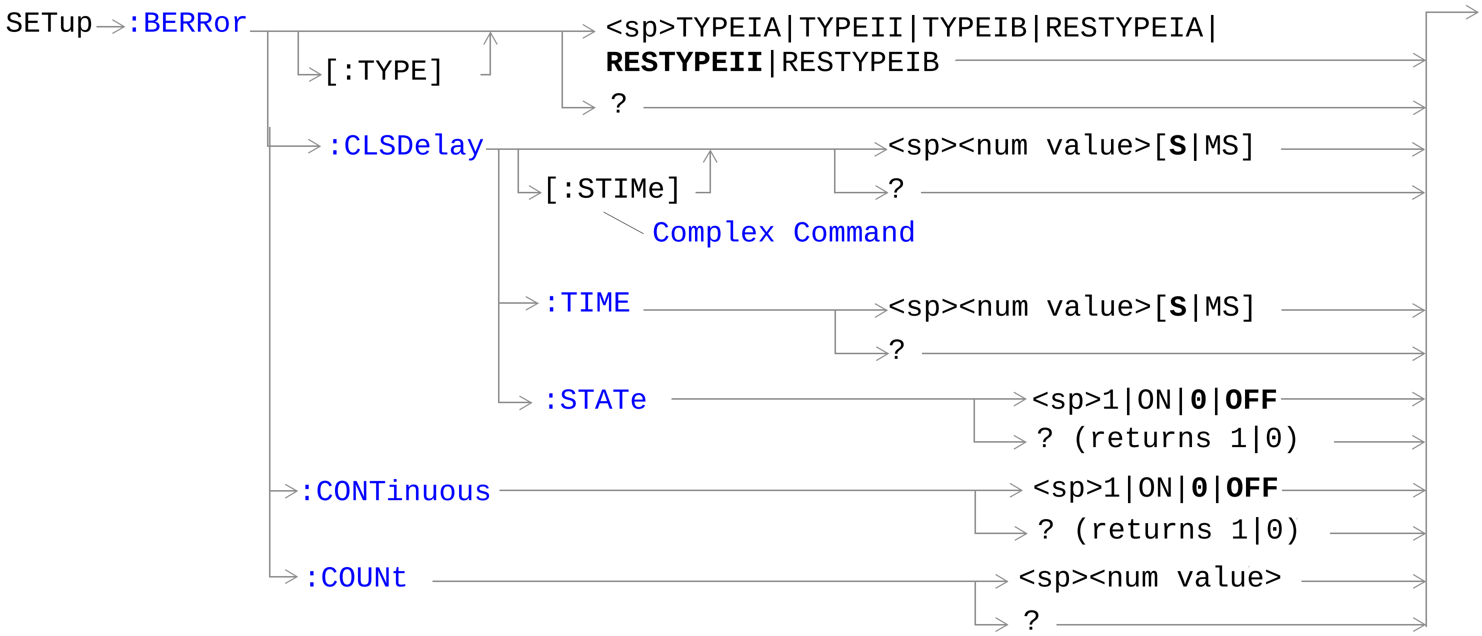
SETup:AAUDio:TIMEout:STATe

Function	GSM TA	Selects/queries the Analog Audio measurement timeout state.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:AAUDIO:TIMEOUT:STATE ON" !Sets timeout state to on.`		

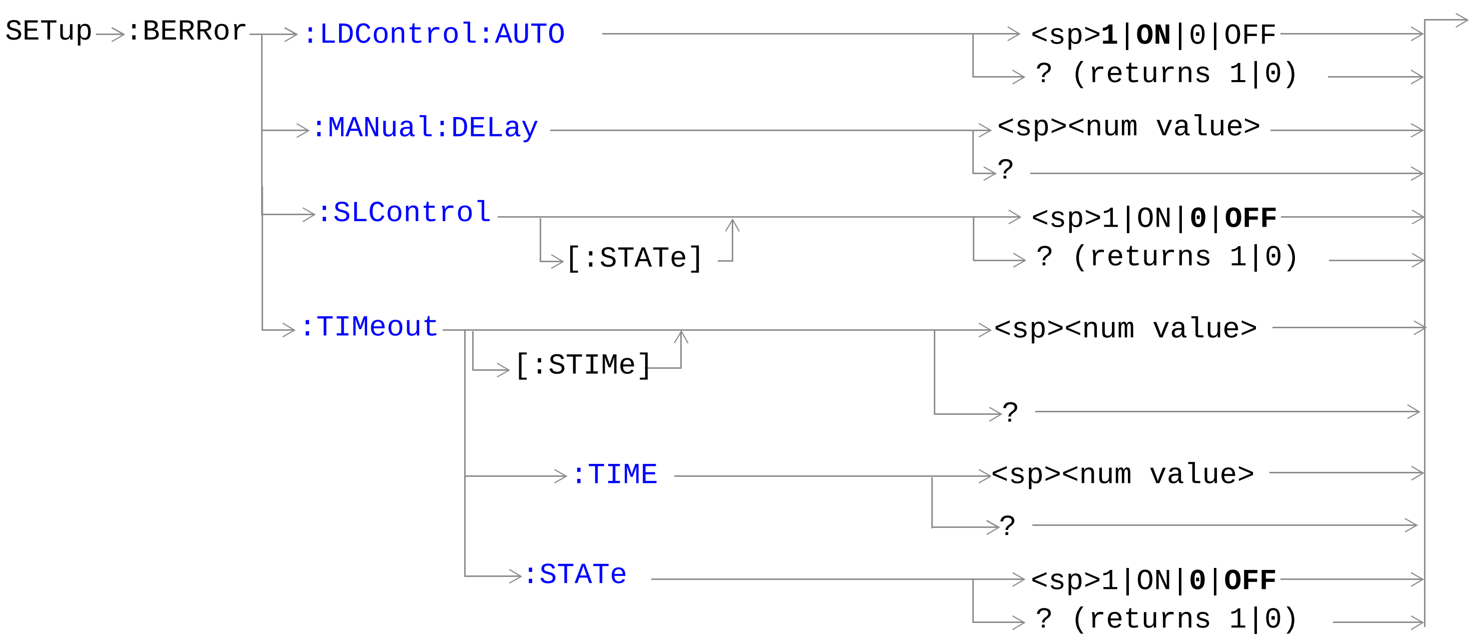
SETup:AAUDio:TIMEout:TIME

Function	GSM TA	Selects/queries the timeout value in seconds that will be used for Analog Audio measurements when the timeout state is ON. Unit (S|MS) are optional, if no units are specified then units default to S.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:AAUDIO:TIMEOUT:TIME 5" !Sets timeout value to 5 seconds.`		

SETup:BERRor



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

"Diagram Conventions" on page 1

SETup:BERRor:CLSDelay[:STIMe]

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="3">Selects/queries the closed loop signalling delay time in seconds for Bit Error measurements and sets the delay state to ON. The units (S|MS) are optional, if no units are specified than units default to S.

The delay time defines how long the test set should wait before starting a BERR measurement. The downlink signalling operation must be completed and the test set must send a close loop command to the MS before the measurement can begin. The delay time allows time for the loop to close.

When a close loop message is set to the MS the closed loop signalling delay time will hold off the BERR measurement from starting for the specified time period.</td></tr>
<tr><td>GSM/GPRS TA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 0 to 5 seconds

Resolution: 100 ms</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 to 5 seconds

Resolution: 100 ms</td></tr>
<tr><td colspan="2">*RST Setting</td><td>500 ms</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

<code>OUTPUT 714;”SETUP:BERROR:CLSDELAY:STIME 400 MS” ! Set state to on</code>
<code>! and delay time</code></td></tr>
</table>

SETup:BERRor:CLSDelay:TIME

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="3">Selects/queries the closed loop signalling delay time in seconds for Bit Error measurements. The units (S|MS) are optional, if no units are specified than units default to S.

The delay time defines how long the test set should wait before starting a BERR measurement. The downlink signalling operation must be completed and the test set must send a close loop command to the MS before the measurement can begin. The delay time allows time for the loop to close.

When a close loop message is set to the MS the closed loop signalling delay time will hold off the BERR measurement from starting for the specified time period.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 0 to 5 seconds

Resolution: 100 ms</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 to 5 seconds

Resolution: 100 ms</td></tr>
<tr><td colspan="2">*RST Setting</td><td>500 ms</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

<code>OUTPUT 714;”SETUP:BERROR:CLSDELAY:TIME 600MS” ! Set delay time</code></td></tr>
</table>

SETup:BERRor:CLSDelay:STATe

Function	GSM TA GSM/GPRS LA EGPRS LA	Selects/queries the closed loop signalling delay state for Bit Error measurements. If the state is off the test set will not wait to start a BERR measurement after a downlink signalling operation has completed. The delay time defines how long the test set should wait before starting and BERR measurement after a downlink signalling operation has completed and after the test set has sent a close loop command to the MS. When a close loop message is set to the MS the closed loop signalling delay time will hold off the BERR measurement from starting for the specified time period.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST Setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:BERROR:CLSDELAY:STATE ON"`		

SETup:BERRor[:TYPE]

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets the measurement type for BER measurements including Type A (residual) and Type B (non-residual).
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: TYPEIA | TYPEII |TYPEIB | RESTYPEIA | RESTYPEII | RESTYPEIB
Query		Range: TYPEIA | TYPEII |TYPEIB | RESTYPEIA | RESTYPEII | RESTYPEIB
*RST Setting		RESTYPEII
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:BERROR:TYPE TYPEIA" !Sets type of BER measurement.`		

SETup:BERRor:CONTinuous

Function	GSM TA	Sets/queries the trigger state to single trigger mode or continuous trigger mode for BER measurement.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:BERROR:CONTINUOUS OFF" !Sets BER measurement to single trigger mode.
```

SETup:BERRor:COUNt

Function	GSM TA	Sets/queries the number of BER measurements the test set will make when the count state is on
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 to 999,000 Resolution: 1
Query		Range: 1 to 999,000 Resolution: 1
*RST Setting		10,000
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:BERROR:COUNT 880" !Set BER multi-measurement count
                                     !to 880.
```

SETup:BERRor:LDControl:AUTO

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries speech frames delay control mode. If speech frames delay control mode is automatic (Auto), the test set will determine the frame delay value that will allow correlation between uplink information bits with downlink information bits. If speech frames delay control mode is manual (not Auto), the test set will use the frame delay value entered in the Speech Frames Delay field. Refer to. see"SETup:BERRor:MANual:DELay" on page 1053 Refer also to the "Bit Error Measurement Description" on page 85 for a description of frame delay and its use in the BER measurement.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 | OFF | 1 | ON
Query		0 | 1
*RST Setting		1 (automatic)
Related Topics		"SETup:BERRor:MANual:DELay" on page 1053
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:BERROR:LDCONTROL:AUTO OFF" !sets BER delay to manual the user
                                            !must select the manual frame
                                            !delay number.
```

SETup:BERRor:MANual:DELay

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="3">Sets/queries the number of frames the test set will use to correlate uplink information bits with downlink information bits when loop delay control mode is manual (AUTO OFF). To set the delay mode to manual, refer to "SETup:BERRor:LDControl:AUTO" on page 1052.

This value is displayed in the Speech Frames Delay field when Auto is not displayed. (If you want to display this value and Auto is currently displayed, press the front-panel key labeled **OFF**).

Refer to "Bit Error Measurement Description" on page 85 for a description of frame delay and how it is used in this measurement.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 1 to 15

Resolution : 1</td></tr>
<tr><td colspan="2">Query</td><td>Range: 1 to 15

Resolution : 1</td></tr>
<tr><td colspan="2">*RST Setting</td><td>5</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

<code>OUTPUT 714;"SETUP:BERROR:MANUAL:DELAY 4" !Set delay of 4 speech frames.</code></td></tr>
</table>

SETup:BERRor:SLControl[:STATe]

Function	GSM TA GSM/GPRS LA EGPRS LA	Selects/queries the Signalling loopback control state for an BER measurement. When signalling loopback control is set to on, the test set will automatically send the loopback for Type A (residual) or Type B (non-residual) loopback to the MS, based on the measurement type selected, and then set loopback to off when the measurement is complete. The loopback type is controlled manually using **Mobile Loopback** (**F12**) on **Call Parms** menu **1 of 4**. See “CALL:TCHannel:LOOPback” on page 825 for a programming example and details about the command.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST Setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:BERROR:SLCONTROL ON" ! Test set will send
                                       ! loopback type automatically
```

SETup:BERRor:TIMeout[:STIMe]

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the timeout value in seconds for the trigger state during BER measurements and turns the timeout state on. The units (S|MS) are optional, if no units are specified than units default to S.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0.1 to 999 Resolution: 0.1
Query		Range: 0.1 to 999 Resolution: 0.1
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:BERR:TIMEOUT:STIME 8" !Sets BER measurement timeout to
                                        !8 seconds and the state to on.
```

SETup:BERRor:TIMeout:TIME

Function	GSM TA GSM/GPRS LA EGPRS LA	Sets/queries the timeout value in seconds for the trigger state during BER measurements. The units (S|MS) are optional, if no units are specified than units default to S (seconds).
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0.1 to 999 Resolution: 0.1
Query		Range: 0.1 to 999 Resolution: 0.1
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

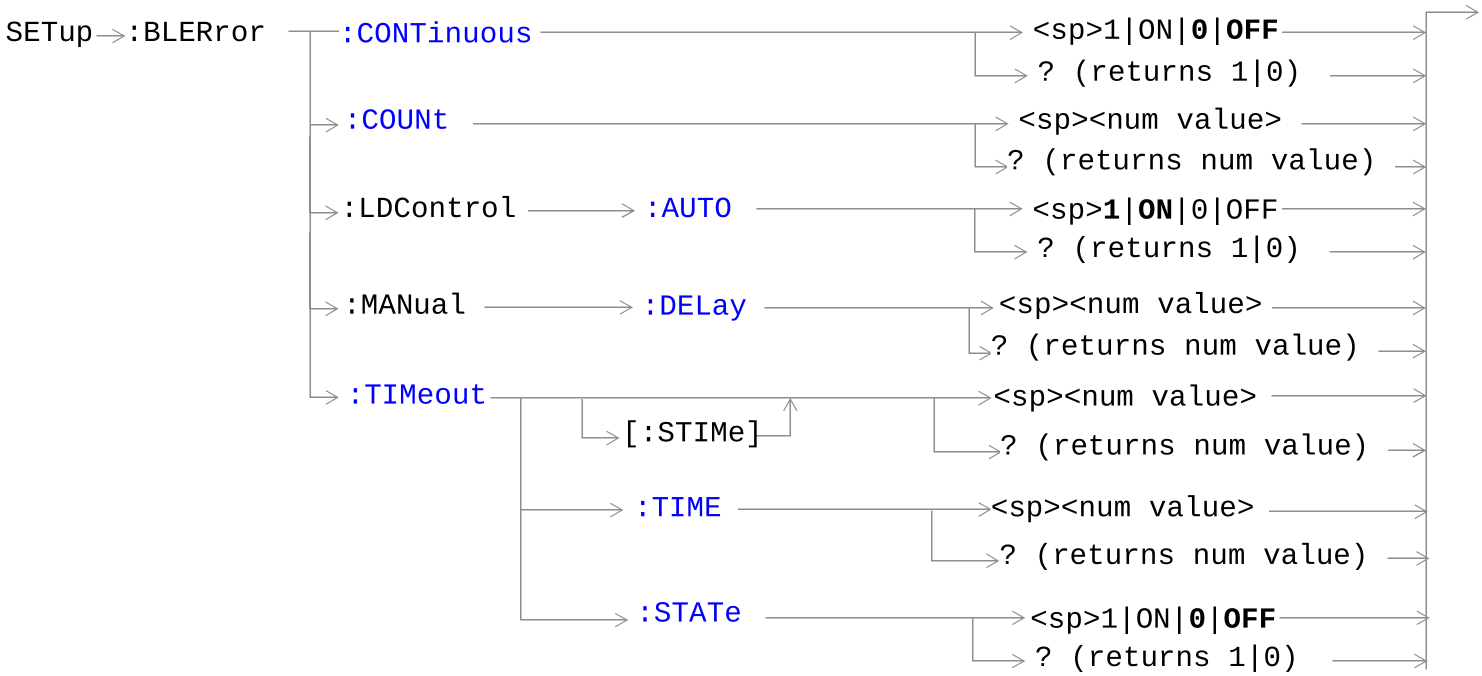
Programming Example

```
OUTPUT 714;"SETUP:BERR:TIMEOUT:TIME 8" !Sets BER measurement timeout to
                                       !8 seconds.
```

SETup:BERRor:TIMeout:STATe

Function	GSM TA	Sets/queries the timeout state for BER measurements.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETUP:BERR0R:TIMEOUT:STATE ON" !Sets the timeout state to on.`		

SETup:BLERror



These commands are not applicable to GSM.

“Diagram Conventions” on page 1

SETup:BLERror:CONTinuous

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the trigger state to single trigger mode or continuous trigger mode for the BLER measurement.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETup:BLERror:CONTinous OFF" !Sets BLER measurement to single trigger mode.`		

SETup:BLERror:COUNt

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the number of blocks to measure. When the Data Connection Type is set to BLER, and depending on the block polling interval setting (see “CALL:FUNCtion:DATA:BLER:POLLing:INTerval” on page 542), the number of blocks actually tested may be larger than the number you specify using this command. The actual number of blocks tested is returned by “FETCh:BLERror:BLOCks?” on page 889.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 99000 Resolution: 1
Query		Range: 1 to 99000 Resolution: 1
*RST Setting		500
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETup:BLERror:COUNt 880" !Sets the number of blocks to measure to 880.`		

SETup:BLERror:LDControl:AUTO

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the loopback delay control mode. If loopback delay control mode is automatic (ON), the test set determines the block delay value that allows the correlation between uplink and downlink data. If loopback delay control mode is manual (OFF), the test set uses the block delay you specify using "SETup:BLERror:MANual:DELay" on page 1059.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:BLERror:LDControl:AUTO OFF"
!Sets the loopback delay control mode to manual.
```

SETup:BLERror:MANual:DELay

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the block delay when loopback delay control mode is manual. To set the delay mode to manual, refer to "SETup:BLERror:LDControl:AUTO" on page 1059. This command is not applicable when the data connection type is set to BLER.
Setting		Range: 1 to 6 Resolution : 1
Query		Range: 1 to 6 Resolution : 1
*RST Setting		2
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:BLERror:MANual:DELay 6" !Sets the number of blocks to 6.
```

SETup:BLERror:TIMeout[:STIMe]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the timeout value in seconds for the trigger state during BLER measurements and turns the timeout state to On. The units (S|MS) are optional. If no units are specified then units default to S (seconds).
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 Resolution: 0.1
Query		Range: 0.1 to 999 Resolution: 0.1
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:BLERror:TIMeout:STIMe 12"
!Sets BLER measurement timeout to 12 seconds and the state to on.
```

SETup:BLERror:TIMeout:TIME

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the timeout value in seconds for the trigger state during BLER measurements. The units (S|MS) are optional. If no units are specified then units default to S (seconds).
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 Resolution: 0.1
Query		Range: 0.1 to 999 Resolution: 0.1
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:BLERror:TIMeout:TIME 8"
!Sets BLER measurement timeout to 8 seconds.
```

SETup:BLERror:TIMeout:STATe

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the timeout state for BLER measurements.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETup:BLERror:TIMEout:STATe ON" !Sets the timeout state to on.`		

SETup:CONTinuous

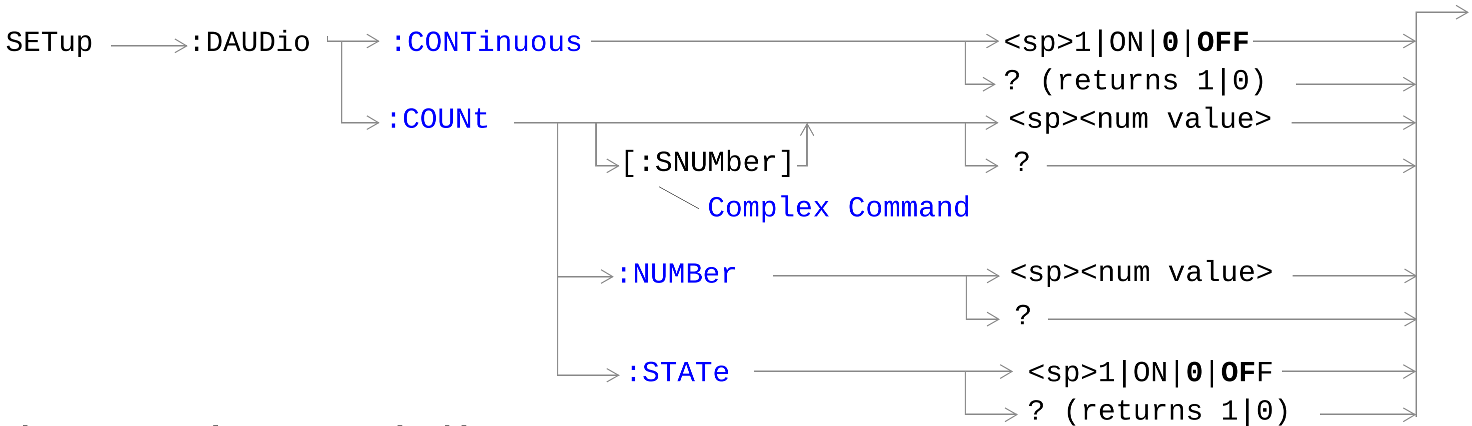
```
SETup ──┬──────────────┬──> :CONTinuous ──────> :OFF|:ON ──────>
        └─> [:ALL] ────┘
```

“Diagram Conventions” on page 1

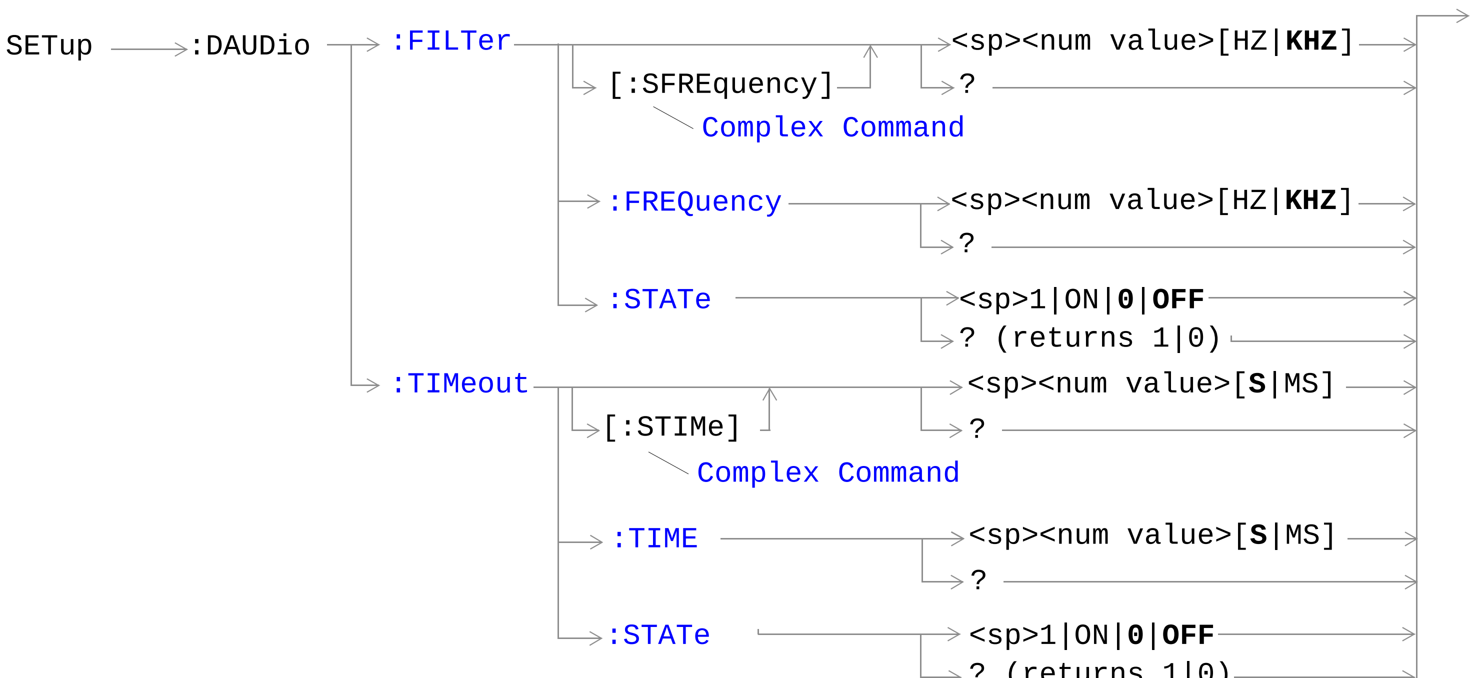
SETup[:ALL]:CONTinuous

Function	GSM	This command sets trigger arm to OFF (single trigger) or ON (continuous trigger) for all measurements. See “Trigger Arm (Single or Continuous) Description” on page 406. At power-on and a (manual user) full preset the trigger arm is set to continuous. Partial preset has no effect on the trigger arm state. See “Preset Descriptions” on page 367. Remote full preset sets the trigger arm to single, this is the recommended trigger arm for any remote measurements. Trigger arm may be set and queried for each individual measurement. For GPIB command syntax, see the measurement’s SETup<meas-mnemonic>:CONTinuous command description. (For example, “SETup:PVTime:CONTinuous[:SELected]” on page 1167 allows you to set the trigger arm for the Power versus Time measurement.)
	GPRS	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: • Continuous trigger = ON • Single trigger = OFF
*RST Setting		Single
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:ALL:CONTINUOUS:OFF"   !Sets trigger arm for all measurements` `!to single.`		

SETup:DAUDio



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

"Diagram Conventions" on page 1

SETup:DAUDio:CONTinuous

Function	GSM TA	This command selects/queries the trigger state for Decoded Audio measurements.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: • Continuous = 1|ON • Single = 0|OFF
Query		Range: 1|0
*RST Setting		0 (single)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SETUP:DAUDIO:CONTINUOUS OFF” !Set DAUDIO measurement to single
                                         !trigger mode.
```

SETup:DAUDio:COUNt[:SNUMber]

Function	GSM TA	This command selects/queries the number of Decoded Audio multi-measurements the Test Set will make. This command sets the count state to ON.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SETUP:DAUDIO:COUNT:SNUMBER 10” !Sets the value to 10 and the state
                                           !to on.
```

SETup:DAUDio:COUNt:NUMBer

Function	GSM TA	This command selects/queries the number of Decoded Audio measurements the test set will make when the multi-measurement count state is on.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SETUP:DAUDIO:COUNT:NUMBER 25” !Sets the number of DAUDIO
                                          !measurements that will be made.
```

SETup:DAUDio:COUNt:STATe

Function	GSM TA	This command selects/queries the Decoded Audio multi-measurement count state.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1|ON | 0|OFF
Query		Range: 1|0
*RST Setting		0 (off)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SETUP:DAUDIO:COUNT:STATE OFF” !Sets trigger state for
                                          !DAUDIO measurement.
```

SETup:DAUDio:FILTer [:SFREquency]

Function	GSM TA GSM/GPRS LA EGPRS LA	This command sets/queries the center frequency for the 100 Hz bandpass filter applied to Decoded Audio measurements. This command sets the count state to ON. The units (HZ|KHZ) are optional, if no units are specified then units default to KHZ. see "Decoded Audio Measurement Description" on page 95
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 200 Hz to 3.6 kHz Resolution: 1 Hz
Query		Range: 200 Hz to 3.6 kHz Resolution: 1 Hz
*RST Setting		1000 Hz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:DAUDIO:FILTER:SFREQUENCY 2.2KHZ" !This is a complex command
                                                   !that sets the value and the
                                                   !state to on.
```

SETup:DAUDio:FILTer:FREQuency

Function	GSM TA GSM/GPRS LA EGPRS LA	This command sets/queries the center frequency for the 100 Hz bandpass filter applied to Decoded Audio measurements. The units (HZ|KHZ) are optional, if no units are specified then units default to KHZ. see "Decoded Audio Measurement Description" on page 95
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 200 Hz to 3.6 kHz Resolution: 1 Hz
Query		Range: 200 Hz to 3.6 kHz Resolution: 1 Hz
*RST Setting		1000 Hz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"DAUDIO:FILTER:FREQUENCY 217HZ" !Sets bandpass filter frequency.
```

SETup:DAUDio:FILTer:STATe

Function	GSM TA	This command selects/queries the Decoded Audio bandpass filter state. see "Decoded Audio Measurement Description" on page 95
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1|ON |0|OFF
Query		Range: 1|0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"ABORT:ALL" !Aborts all active measurements in progress.`		
Programming Example `OUTPUT 714;"SETUP:DAUDIO:FILTER:STATE OFF" !Sets bandpass filter state to off.`		

SETup:DAUDio:TIMeout[:STIMe]

Function	GSM TA GSM/GPRS LA EGPRS LA	This command selects/queries the timeout value in seconds that will be used for Decoded Audio measurements. This command sets the timeout state to ON. The units (S|MS) are optional, if no units are specified then units default to S.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0.1 to 999 Resolution: 0.1
Query		Range: 0.1 to 999 Resolution: 0.1
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SETUP:DAUDIO:TIMEOUT:STIME 6” !Sets the value to 6 seconds and the
                                          !state to on.
```

SETup:DAUDio:TIMeout:TIME

Function	GSM TA GSM/GPRS LA EGPRS LA	This command selects/queries the timeout value used for Decoded Audio measurements when the timeout state is ON. The units (S|MS) are optional, if no units are specified then units default to S.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SETUP:DAUDIO:TIMEOUT:TIME 15” !Sets timeout value to 15 seconds.
```

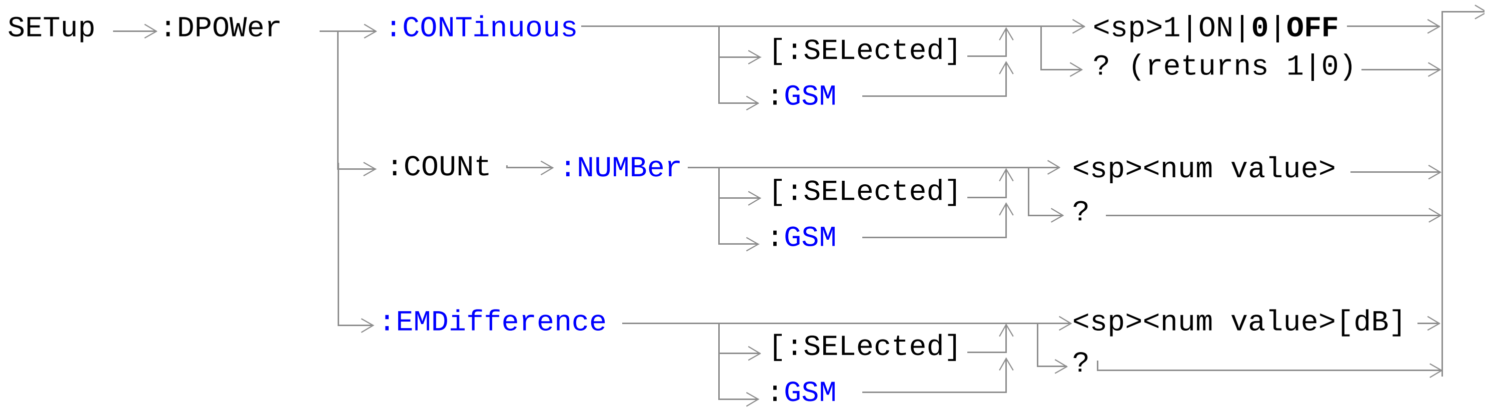
SETup:DAUDio:TIMeout:STATe

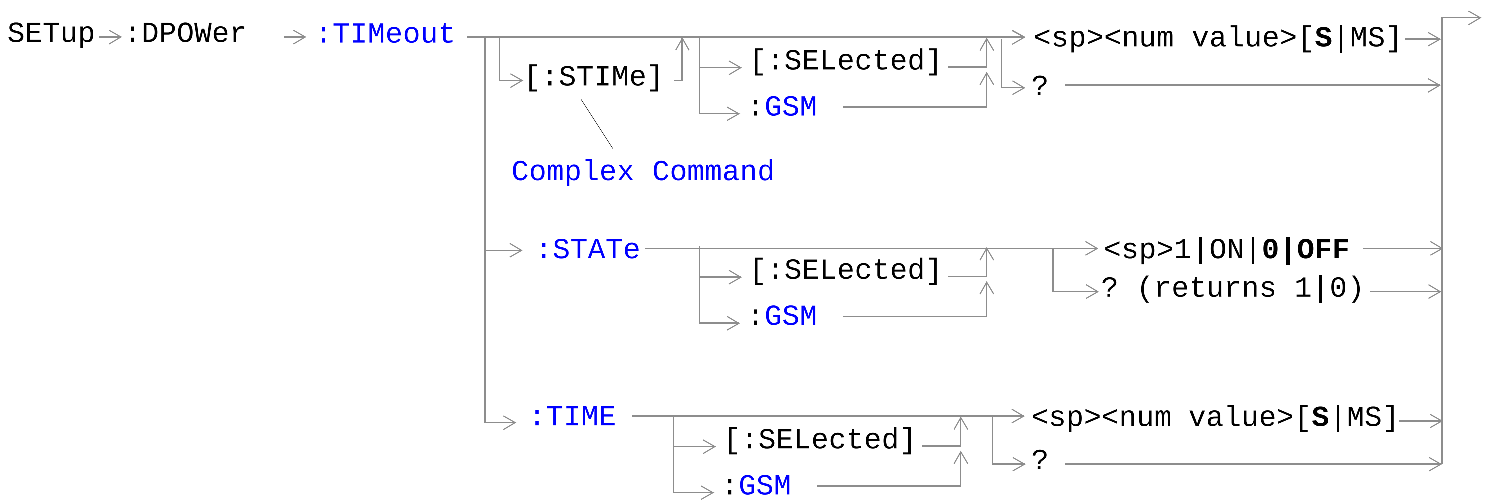
Function	GSM TA GSM/GPRS LA EGPRS LA	This command selects/queries the Decoded Audio measurement timeout state.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1|ON | 0|Off
Query		Range: 1|0
*RST Setting		0 (off)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SETUP:DAUDIO:TIMEOUT:STATE ON” !Sets timeout state to on.
```

SETup:DPOWer





"Diagram Conventions" on page 1

SETup:DPOWer:CONTinuous[:SELected]

Function	GSM TA	This command selects/queries the trigger state for Dynamic Power measurements in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	

Setting		Range: • Continuous trigger mode: 1 | ON • Single trigger mode: 0 | OFF
Query		Range: 1 | 0
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:DPOWER:CONTINUOUS:SELECTED ON" !Sets trigger mode to Continuous.
```

SETup:DPOWer:CONTinuous:GSM

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">This command selects/queries the trigger state for Dynamic Power measurement in the GSM format whether or not that format is active.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range:
• Continuous trigger mode: 1 | ON
• Single trigger mode: 0 | OFF</td></tr>
<tr><td colspan="2">Query</td><td>Range: 1 | 0</td></tr>
<tr><td colspan="2">*RST Setting</td><td>0 (off)</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
<code>OUTPUT 714;"SETUP:DPOWER:CONTINUOUS:GSM ON" !Sets trigger mode to Continuous.</code></td></tr>
</table>

SETup:DPOWer:COUNt:NUMBer[:SELected]

Function	GSM TA	This command sets/queries the number of bursts for the Dynamic Power measurement in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:DPOWER:COUNT:NUMBER:SELECTED 25" !Sets the number of measurement bursts.
```

SETup:DPOWer:COUNt:NUMBer:GSM

Function	GSM TA	This command sets/queries the number of bursts for the Dynamic Power measurement in the GSM format whether or not that format is active.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:DPOWER:COUNT:NUMBER:GSM 50" !Sets the number of measurement bursts.
```

SETup:DPOWer:EMDifference[:SELected]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the Expected Maximum Difference from Previous Measurement parameter for the Dynamic Power measurement in the active (that is the selected) format. The units dB are optional. The Expected Maximum Difference from Previous Measurement parameter is used with the measured transmit power from the previous burst to set the maximum RF power that the base station emulator is expecting the mobile to transmit in the next burst. The setting of this parameter does not affect the receiver Expected Power parameter. See "RFANalyzer:CW:EXPected:POWer" on page 1024.
Setting		Range: -30 dB to +30 dB Resolution: 0.01 dB
Query		Range: -30 dB to +30 dB Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:DPOWER:EMDIFFERENCE:SELECTED 20" !Sets the Expected Maximum Difference
                                                  !in measurement value.
```

SETup:DPOWer:EMDifference:GSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the Expected Maximum Difference from Previous Measurement parameter for the Dynamic Power measurement in the GSM format whether or not that format is active. The units dB are optional. The Expected Maximum Difference from Previous Measurement parameter is used with the measured transmit power from the previous burst to set the maximum RF power that the base station emulator is expecting the mobile to transmit in the next burst. The setting of this parameter does not affect the receiver Expected Power parameter. See “RFANalyzer:CW:EXPected:POWer” on page 1024.
Setting		Range: -30 dB to +30 dB Resolution: 0.01 dB
Query		Range: -30 dB to +30 dB Resolution: 0.01 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:DPOWER:EMDIFFERENCE:GSM 10" !Sets the Expected Maximum Difference
                                              !in measurement value.
```

SETup:DPOWer:TIMeout[:STIMe][:SELected]

Function	GSM TA	This command sets/queries the Dynamic Power measurement timeout value in seconds and sets the time-out state to on for the active (that is the selected) format. The units (S|MS) are optional, if no units are specified then the default is S.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example OUTPUT 714;"SETUP:DPOWER:TIMEOUT:STIME:SELECTED 12S" !Sets the timeout state and value.		

SETup:DPOWer:TIMeout[:STIMe]:GSM

Function	GSM TA	This command sets/queries the Dynamic Power measurement timeout value in seconds and sets the time-out state to on for the GSM format whether or not that format is active. The units (S |MS) are optional, if no units are specified then the default is S.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:DPOWER:TIMEOUT:STIME:GSM 20" !Sets the timeout state and value.`		

SETup:DPOWer:TIMeout:STATe[:SELected]

Function	GSM TA	This command sets/queries the time-out state for the Dynamic Power measurement in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:DPOWER:TIMEOUT:STATE:SELECTED ON" !Sets the timeout state.`		

SETup:DPOWer:TIMeout:STATe:GSM

Function	GSM TA	This command sets/queries the time-out state for the Dynamic Power measurement in the GSM format whether or not that format is active.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 (off)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:DPOWER:TIMEOUT:STATE:GSM ON" !Sets the timeout state.
```

SETup:DPOWer:TIMeout:TIMe[:SELected]

Function	GSM TA	This command sets/queries the time-out value in seconds that is used for the Dynamic Power measurement for the active (that is the selected) format. The time-out state must be ON. The units (S|MS) are optional, if no units are specified then the default is S.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:DPOWER:TIMEOUT:TIME:SELECTED 15" !Sets the timeout value.
```

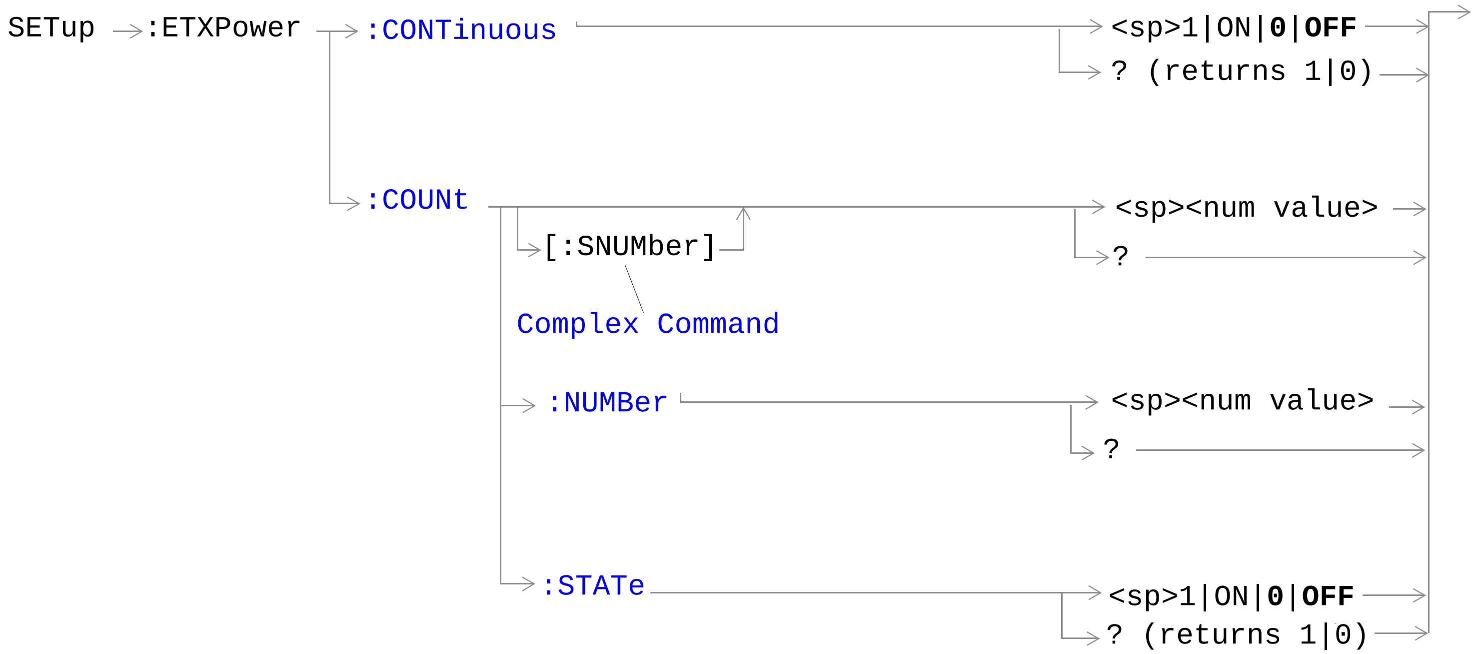
SETup:DPOWer:TIMeout:TIMe:GSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the time-out value in seconds that is used for the Dynamic Power measurements when the time-out state is ON for the GSM format whether or not that format is active. The units (S|MS) are optional, if no units are specified then the default is S.
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

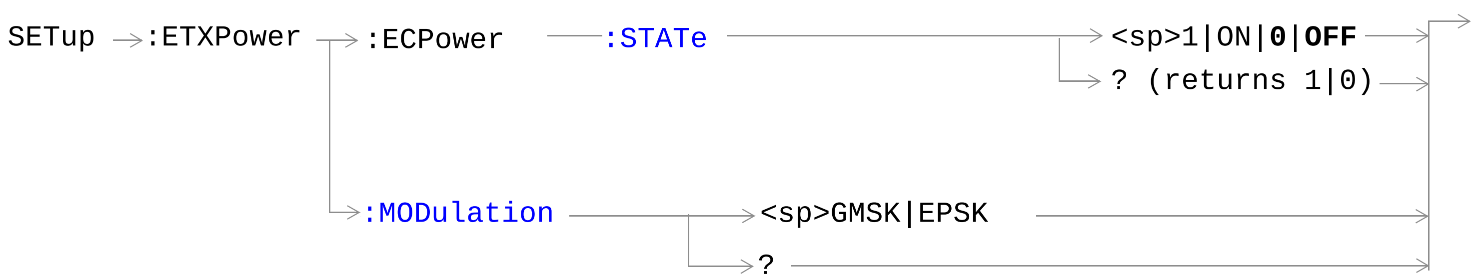
Programming Example

```
OUTPUT 714;"SETUP:DPOWER:TIMEOUT:TIME:GSM 10S" !Sets the timeout value.
```

SETup:ETXPower

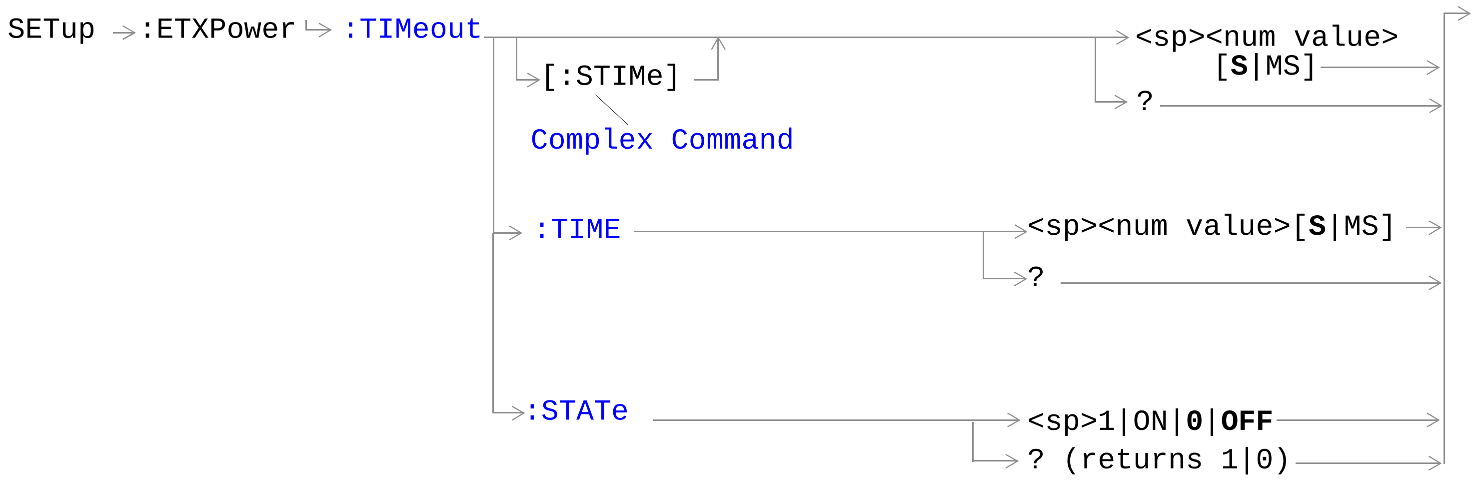


These commands are only applicable to EGPRS.

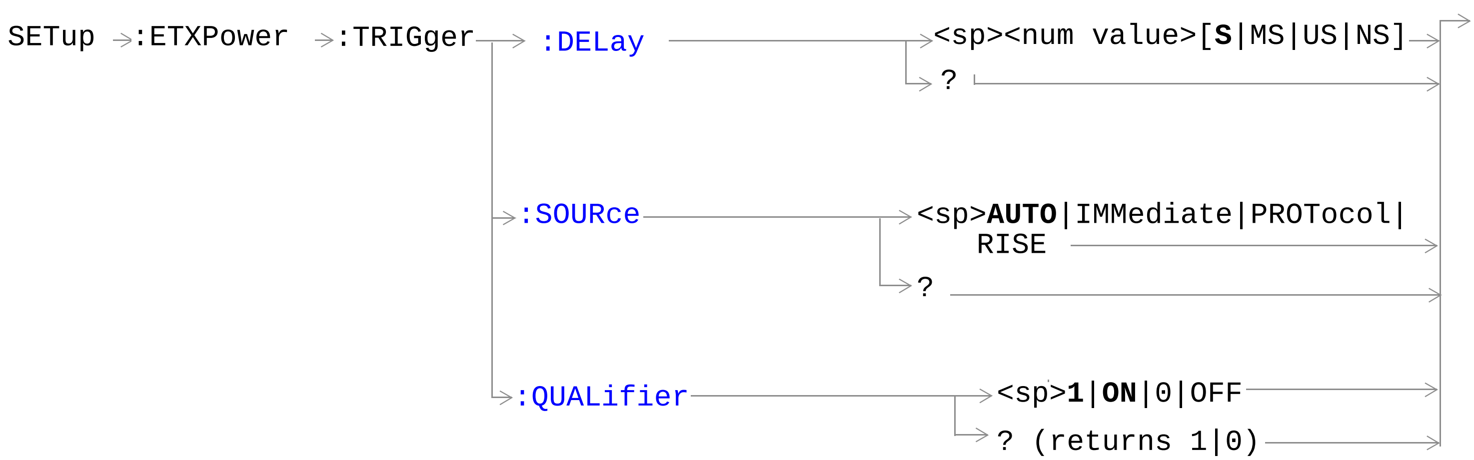


These commands are only applicable to EGPRS.

SETup:ETXPower



These commands are only applicable to EGPRS.



These commands are only applicable to EGPRS.

"Diagram Conventions" on page 1

SETup:ETXPower:CONTinuous

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command sets/queries the trigger state for EGPRS TX carrier power measurements.
Setting		Range: • Single trigger mode = 0 | OFF • Continuous trigger mode = 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETup:ETXPower:CONTinuous ON"` !Specifies continuous trigger mode for EGPRS TX carrier power measurements.		

SETup:ETXPower:COUNt[:SNUMber]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command sets/queries the number of EGPRS TX carrier power measurements made by the test set. This command sets the count state to ON.
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETup:ETXPower:COUNt:SNUMber 99"` `!Sets the state to on and the multi-measurement count value to 99.`		

SETup:ETXPower:COUNt:NUMBer

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command sets/queries the number of EGPRS TX power measurements the test set makes in the active (that is the selected) format. The multi-measurement count state must be on.
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:ETXPower:COUNt:NUMBer 5"
!Sets the EGPRS TX Power multi-measurementcount number to 5.
```

SETup:ETXPower:COUNt:STATe

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command sets/queries the EGPRS TX power multi-measurement count state.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:ETXPower:COUNt:STATe ON" !Sets the multi-measurement count state to on.
```

SETup:ETXPower:ECPower:STATe

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command sets/queries the EGPRS TX power estimated carrier power state. When set to ON (1) and the modulation format is set to 8PSK (using the command “SETup:ETXPower:MODulation” on page 1086), the estimated carrier power measurement is calculated and the result is available via GPIB and on the test set’s front panel. When set to OFF (0) and the modulation format is set to 8PSK (using the command “SETup:ETXPower:MODulation” on page 1086), the estimated carrier power measurement is not calculated. The power measurement completes in a shorter time when this command is set to OFF. If the modulation format is set to GMSK, only the transmit power value is displayed on the test ste’s front panel, and the transmit power is returned via GPIB when the estimated carrier power result is queried.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETup:ETXPower:COUNt:STATe ON" !Sets the multi-measurement count state to on.`		

SETup:ETXPower:MODulation

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command sets/queries the modulation format for the EGPRS TX carrier power measurement. If you expect your mobile to transmit a GMSK (Gaussian Minimum Shift Keying) signal, you should set this command to GMSK. EGPRS modulation coding schemes MCS1 through MCS4 use a GMSK modulated signal. If you expect your mobile to transmit an 8PSK (Eight Phase Shift Keying) signal, you should set this command to EPSK. EGPRS modulation coding schemes MCS5 through MCS9 use an 8PSK modulated signal. If the modulation format is set to GMSK, but an 8PSK signal is applied the measurement disgards all bursts until it locates a GMSK burst. The measurement does not complete until it locates a burst of the type it expects.
Setting		Range: GMSK | EPSK
Query		Range: GMSK | EPSK
*RST Setting		GMSK
Requirements	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:ETXPower:MODulation EPSK" !Sets the modulation format to 8PSK.
```

SETup:ETXPower:TIMeout[:STIMe]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command sets/queries the EGPRS TX carrier power measurement timeout value. This command also sets the count state to on. The units (S|MS) are optional, if no units are specified then units default to S.
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:ETXPower:TIMeout:STIMe 20"
!Sets the state to on and the timeout value to 20 seconds.
```

SETup:ETXPower:TIMeout:TIME

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command sets/queries the timeout value in seconds that will be used for EGPRS TX power measurements in the active (that is the selected) format. The units (S|MS) are optional, if no units are specified then units default to S.
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:ETXPower:TIMeout:TIME 20"
!Sets the EGPRS TX power measurement timeout to 20 seconds.
```

SETup:ETXPower:TIMeout:STATe

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command selects/queries EGPRS TX carrier power measurement timeout state in the active (that is the selected) format.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:ETXPower:COUNt:STATe 1"
!Turns the EGPRS TX carrier power timeout state on.
```

SETup:ETXPower:TRIGger:DELay

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command sets/queries the trigger delay in seconds for EGPRS TX carrier power measurements in the active (that is the selected) format. The units (S|MS|US|NS) are optional, if no units are specified then units default to S.
Setting		Range: –2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater
Query		Range: –2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater
*RST Setting		0 seconds
Requirements	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:ETXPower:TRIGger:DELay 1.5MS" !Set trigger delay time to 1.5 milliseconds
```

SETup:ETXPower:TRIGger:QUALifier

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command sets/queries the trigger qualification for EGPRS TX carrier power measurements in the active (that is the selected) format. When ON, an automatic trigger re-arm occurs if a measurement is triggered when no valid signal (burst) is present. See “Trigger Qualifier Description” on page 407.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		1 | ON
Requirements	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:ETXPower:TRIGger:QUALifier ON" !Sets trigger qualifier state to on.
```

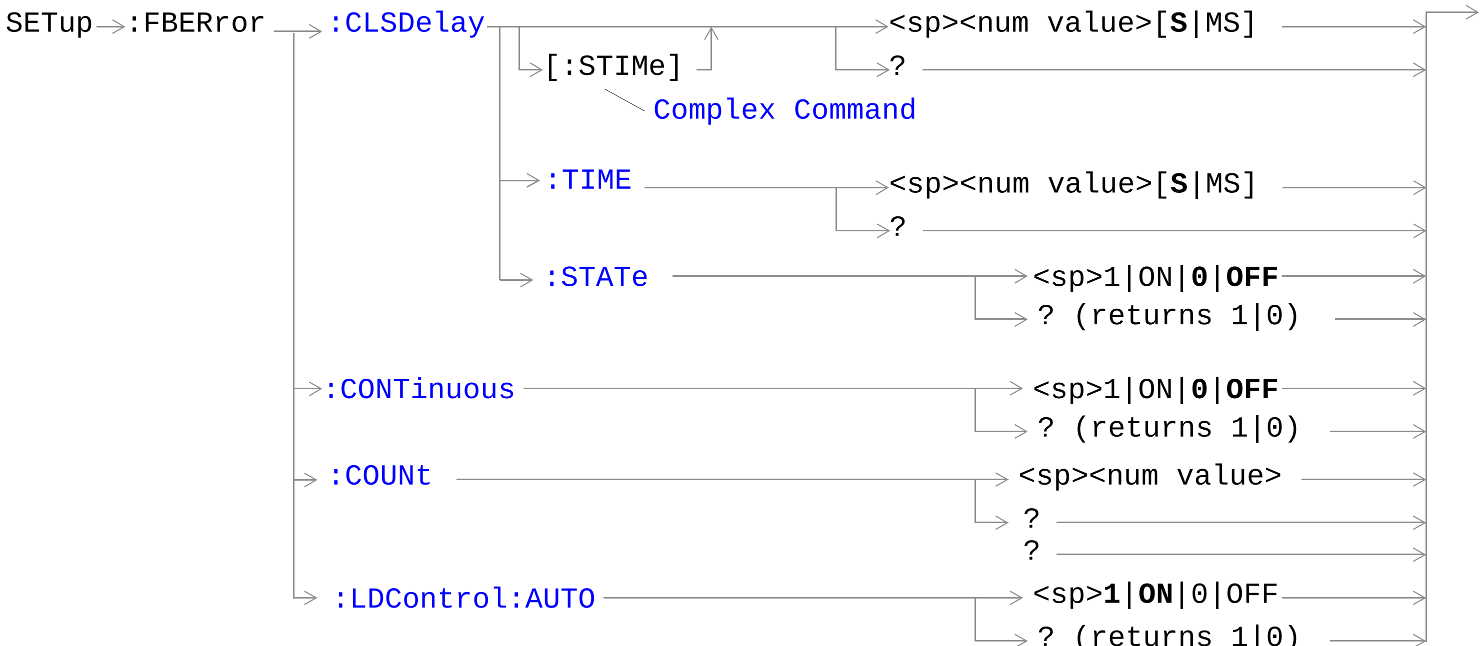
SETup:ETXPower:TRIGger:SOURce

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	This command is not applicable to the GSM/GPRS LA.
	EGPRS LA	This command selects/queries the trigger source for EGPRS TX carrier power measurements in the active (that is the selected) format. See “Triggering of Measurements” on page 404.
Setting		AUTO | PROTocol | RISE | IMMediate
Query		AUTO | PROT | RISE | IMM
*RST Setting		AUTO
Requirements	EGPRS LA	Revision A.01.00 and above

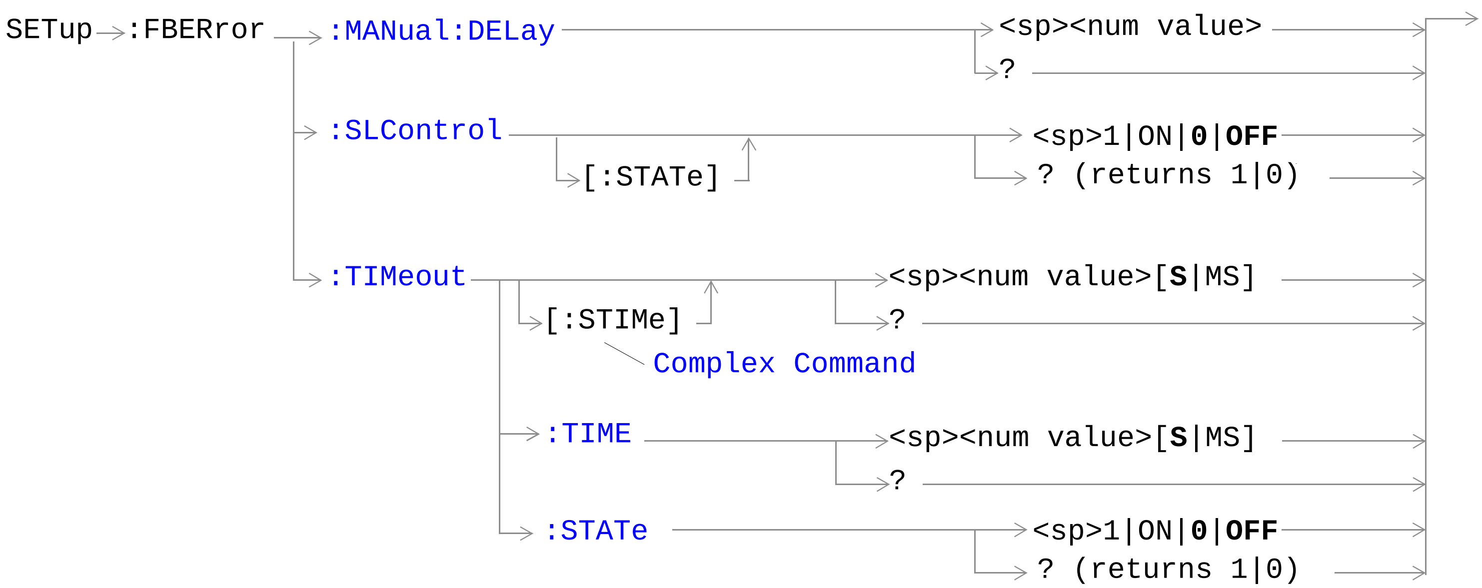
Programming Example

```
OUTPUT 714;"SETup:ETXPower:TRIGger:SOURce AUTO" !Sets trigger source to automatic.
```

SETup:FBERror



These commands are not applicable to GPRS.



These commands are not applicable to GPRS.

"Diagram Conventions" on page 1

SETup:FBERror:CLSDelay[:STIMe]

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="3">This command selects/queries the closed loop signalling delay time in seconds for Fast Bit Error measurements and sets the delay state to ON. The units (S|MS) are optional, if no units are specified than units default to S.

The delay time defines how long the test set should wait before starting a FBER measurement. The downlink signalling operation must be completed and the test set must send a close loop command to the MS before the measurement can begin. The delay time allows time for the loop to close.

When a close loop message is set to the MS the closed loop signalling delay time will hold off the FBER measurement from starting for the specified time period.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 0 to 5 seconds
Resolution: 100 ms</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 to 5 seconds
Resolution: 100 ms</td></tr>
<tr><td colspan="2">*RST Setting</td><td>500 ms</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example</td></tr>
</table>

```
OUTPUT 714;”SETUP:FBERROR:CLSDELAY:STIME 500 MS” ! Sets the Close Loop Delay
                                                 ! to 500 ms.
```

SETup:FBERror:CLSDelay:TIME

Function	GSM TA GSM/GPRS LA EGPRS LA	This command selects/queries the closed loop signalling delay time in seconds for Fast Bit Error measurements. The units (S|MS) are optional, if no units are specified than units default to S. The delay time defines how long the test set should wait before starting a FBER measurement. The downlink signalling operation must be completed and the test set must send a close loop command to the MS before the measurement can begin. The delay time allows time for the loop to close. When a close loop message is set to the MS the closed loop signalling delay time will hold off the FBER measurement from starting for the specified time period.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 5 seconds Resolution: 100 ms
Query		Range: 0 to 5 seconds Resolution: 100ms
*RST Setting		500 ms
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:FBERROR:CLSDELAY:TIME 500 MS" ! Sets the Close Loop Delay
                                                ! to 500 ms.
```

SETup:FBERror:CLSDelay:STATe

Function	GSM TA GPRS TA EGPRS LA	This command selects/queries the closed loop signalling delay state for Fast Bit Error measurements. If the state is off the test set will not wait to start a FBER measurement after a downlink signalling operation has completed. The delay time defines how long the test set should wait before starting and FBER measurement after a downlink signalling operation has completed and after the test set has sent a close loop command to the MS. When a close loop message is set to the MS the closed loop signalling delay time will hold off the FBER measurement from starting for the specified time period.
	GSM/GPRS LA	This command is not applicable to GPRS.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST Setting		1 (on)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:FBERROR:CLSDELAY:STATE ON" ! Sets the Close Loop Delay
                                             ! state to on.
```

SETup:FBERror:CONTinous

Function	GSM TA	This command selects/queries the trigger state for Fast Bit Error Rate tests.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: • Continuous trigger mode = 1 | ON • Single trigger mode = 0 | OFF
Query		Range: 1 | 0
*RST Setting		0 (single)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:FBERROR:CONTINUOUS 0" !Specifies single trigger mode for Fast
                                        !BER measurements.
```

SETup:FBERror:COUNt

Function	GSM TA	This command sets/queries the number of bits to test during each Fast Bit Error Rate test.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 to 999,000 Resolution: 1
Query		Range: 1 to 999,000 Resolution: 1
*RST Setting		10,000
Comments		The actual number of bits that are tested will be determined by the number of frames tested, and will be at least as great as this count
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;‘‘SETUP:FBERROR:COUNT 10000” !Specifies the number of Fast BER bits
                                        !to test at 10,000 bits.
```

SETup:FBERror:LDControl:AUTO

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="3">This command sets/queries loopback delay control mode. If loopback control mode is automatic (auto on), the test set will determine the frame delay value that will allow correlation between uplink information bits with downlink information bits. .

If loopback delay control mode is manual (auto off) , the test set will use the frame delay value entered in the TDMA Frames Delay field. Refer to “SETup:FBERror:MANual:DELay” on page 1097 .

Refer also to the “Fast Bit Error Measurement Description” on page 100 for a description of frame delay and its use in the fast bit error rate measurement.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td>GPRS TA</td><td>This command is not applicable to GPRS.</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 1 | ON | 0 | OFF</td></tr>
<tr><td colspan="2">Query</td><td>Range: 1 | 0</td></tr>
<tr><td colspan="2">*RST Setting</td><td>1 (automatic)</td></tr>
<tr><td colspan="2">Related Topics</td><td>see “SETup:FBERror:MANual:DELay” on page 1097</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

<code>OUTPUT 714;”SETUP:FBERROR:LDCONTROL OFF” !Set delay control to manual the user
!must select the manual frame
!delay number.</code></td></tr>
</table>

SETup:FBERror:MANual:DELay

Function	GSM TA GSM/GPRS LA EGPRS LA	This command sets/queries the number of frames the test set will use to correlate uplink information bits with downlink information bits when loopback delay control mode is manual (auto off). To set the loopback delay mode to manual, refer to "SETup:FBERror:LDControl:AUTO" on page 1096. This value is displayed in the TDMA Frames Delay field when Auto is not displayed. (If you want to display this value and Auto is currently displayed, press the front panel key labeled MANUAL). Refer to "Fast Bit Error Measurement Description" on page 100 for a description of frame delay and how it is used in this measurement.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 to 26 Resolution: 1
Query		Range: 0 to 26 Resolution: 1
*RST Setting		5 (loopback delay control is reset to automatic (auto on)).
Related Topics		See "SETup:FBERror:LDControl:AUTO" on page 1096.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:FBERROR:MANUAL:DELAY 6" !Set frame delay to 6 frames.
```

SETup:FBERror:SLControl[:STATe]

Function	GSM TA GSM/GPRS LA EGPRS LA	This command selects/queries the Signalling loopback control state for an FBER measurement. When the state is set to on, the test set will automatically send the command for Type C (burst-by-burst) loopback to the MS when a FBER measurement is activated, and then set loopback to off when the measurement is complete. The loopback type is controlled manually from the Mobile Loopback F12 key, see “CALL:TCHannel:LOOPback” on page 825 for a program example and details about the command.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST Setting		1 (on)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SETUP:FBERROR:SLCONTROL ON” ! Sets the Signal Loop Control state to on.
```

SETup:FBERror:TIMeout[:STIMe]

Function	GSM TA GSM/GPRS LA EGPRS LA	This command selects/queries the timeout value in seconds for the trigger state during Fast Bit Error measurements and sets the timeout state to ON. The units (S|MS) are optional, if no units are specified than units default to S.
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SETUP:FBERROR:TIMEOUT:STIME 20” !Sets the timeout value to
                                           !20 seconds and the state to on.
```

SETup:FBERror:TIMeout:TIME

Function	GSM TA	This command selects/queries the timeout value in seconds for the trigger state during Fast Bit Error measurements. The units (S|MS) are optional, if no units are specified than units default to S.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:FBERROR:TIMEOUT:TIME 20" !Sets the timeout value to
                                           !20 seconds.
```

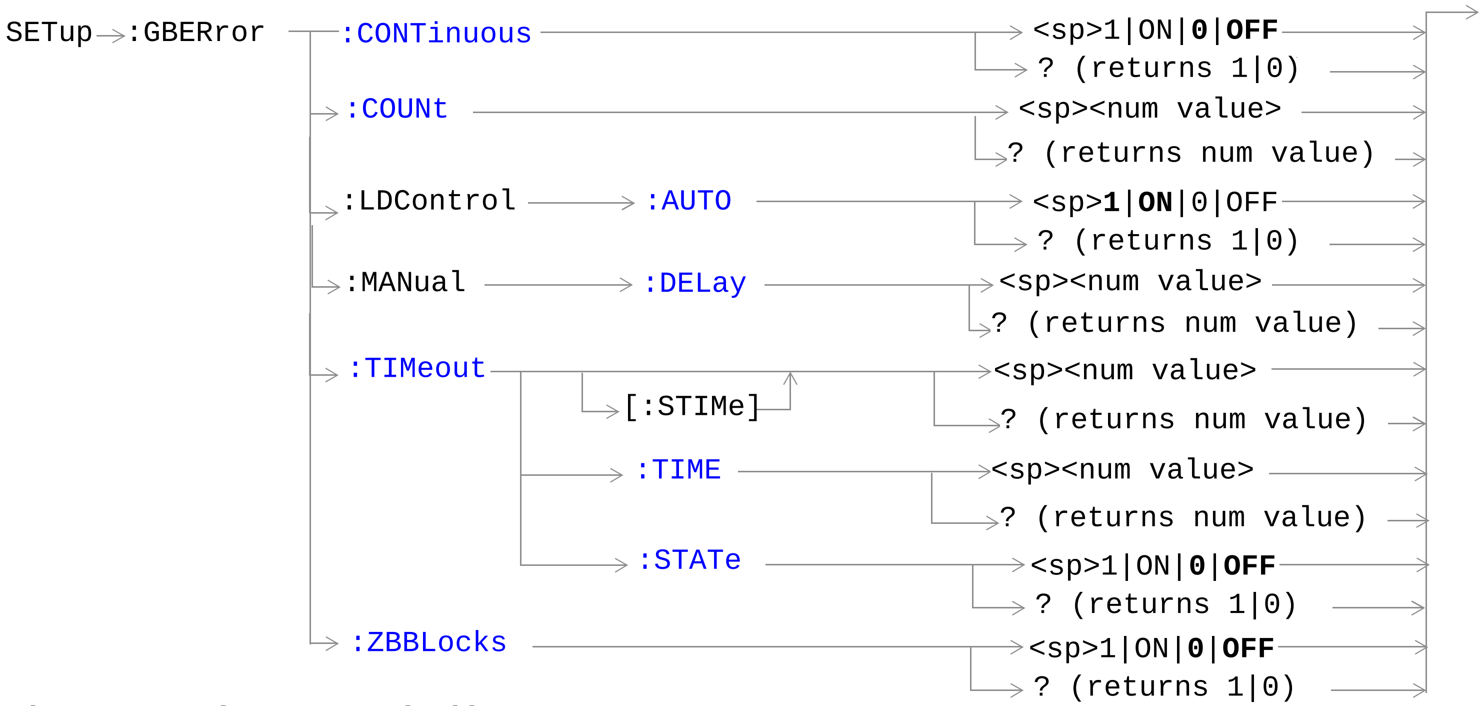
SETup:FBERror:TIMeout:STATe

Function	GSM TA	This command sets/queries the timeout state for Fast BER measurements.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0|OFF | 1|ON
Query		Range: 0|1
*RST Setting		0 (off)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:FBERROR:TIMEOUT:STATE ON" !Sets the timeout state to on.
```

SETup:GBERror



These commands are not applicable to GSM.

"Diagram Conventions" on page 1

SETup:GBERror:CONTinuous

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the trigger state to single trigger mode or continuous trigger mode for the BER measurement.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0|OFF | 1|ON
Query		Range: 0|1
*RST Setting		0 (off)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:GBERror:CONTinous OFF" !Sets BER measurement to single trigger mode.
```

SETup:GBERror:COUNt

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the number of bits to measure when the count state is ON.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999,000 Resolution: 1
Query		Range: 1 to 999,000 Resolution: 1
*RST Setting		10,000
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:GBERror:COUNt 880" !Sets the number of bits to measure to 880.
```

SETup:GBERror:LDControl:AUTO

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the loopback delay control mode. If loopback delay control mode is automatic (ON), the test set determines the block delay value that allows the correlation between uplink and downlink data. If loopback delay control mode is manual (OFF), the test set uses the block delay you specify using “SETup:GBERror:MANual:DELay” on page 1103. Refer to “How is a Bit Error (BER) Measurement Made?” on page 88 for a description of block delay and its use in the BER measurement.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		1 (on)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:GBERror:LDControl:AUTO OFF" !Sets the loopback delay control mode
                                              !to manual.
```

SETup:GBERror:MANual:DELay

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the block delay when loopback delay control mode is manual. To set the delay mode to manual, refer to “SETup:GBERror:LDControl:AUTO” on page 1102. Refer to “GPRS Bit Error Measurement” on page 88 for a description of block delay and how it is used in this measurement.
Setting		Range: 1 to 6 Resolution : 1
Query		Range: 1 to 6 Resolution : 1
*RST Setting		2
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:GBERror:MANual:DELay 6" !Sets the number of blocks to 6.
```

SETup:GBERror:TIMeout[:STIMe]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the timeout value in seconds for the trigger state during BER measurements and turns the timeout state on. The units (S|MS) are optional, if no units are specified than units default to S.
Setting		Range: 0.1 to 999 Resolution: 0.1
Query		Range: 0.1 to 999 Resolution: 0.1
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:GBERror:TIMeout:STIMe 12" !Sets BER measurement timeout to
                                        !12 seconds and the state to on.
```

SETup:GBERror:TIMeout:TIME

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the timeout value in seconds for the trigger state during BER measurements. The units (S|MS) are optional, if no units are specified than units default to S (seconds).
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 Resolution: 0.1
Query		Range: 0.1 to 999 Resolution: 0.1
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:GBERror:TIMeout:TIME 8" !Sets BER measurement timeout to
                                       !8 seconds.
```

SETup:GBERror:TIMeout:STATe

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the timeout state for BER measurements.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 (off)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

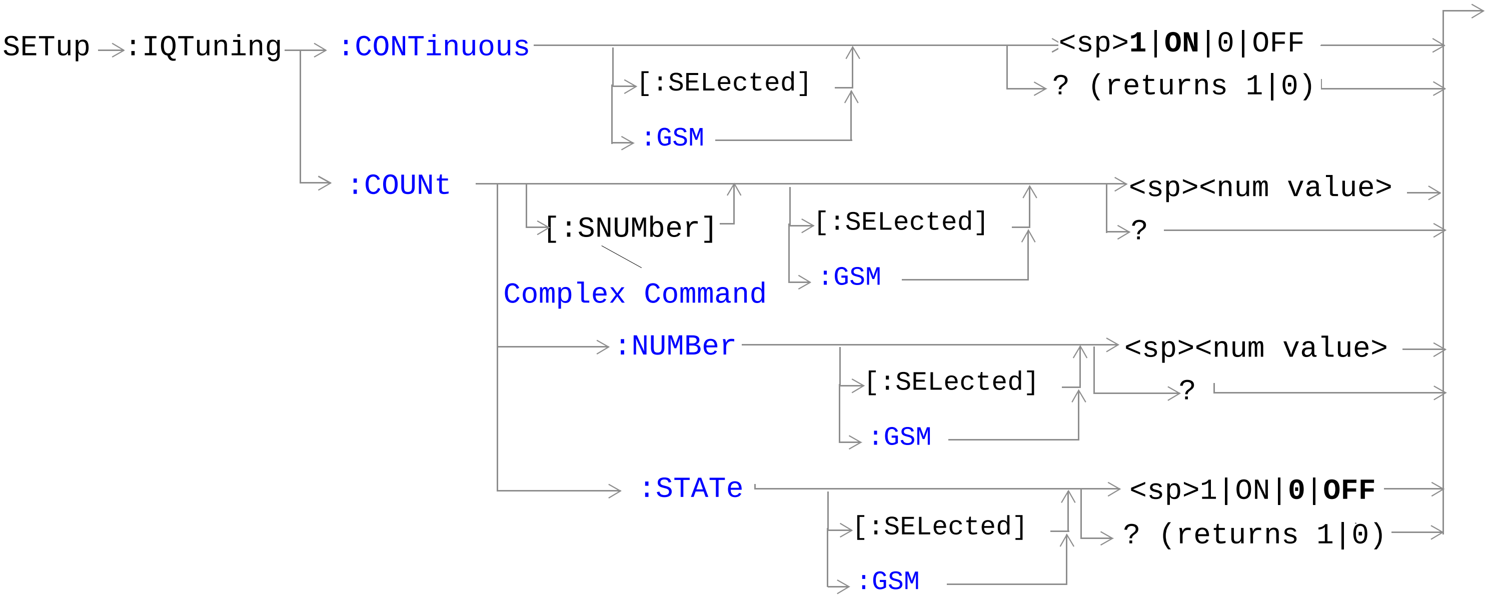
Programming Example

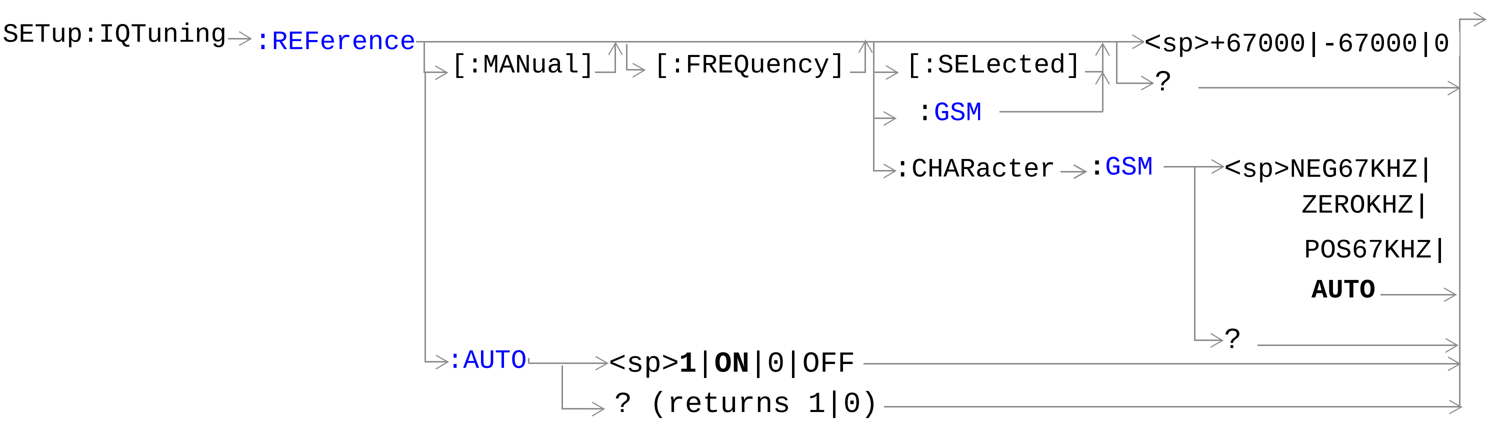
```
OUTPUT 714;"SETup:GBERror:TIMEout:STATe ON" !Sets the timeout state to on.
```

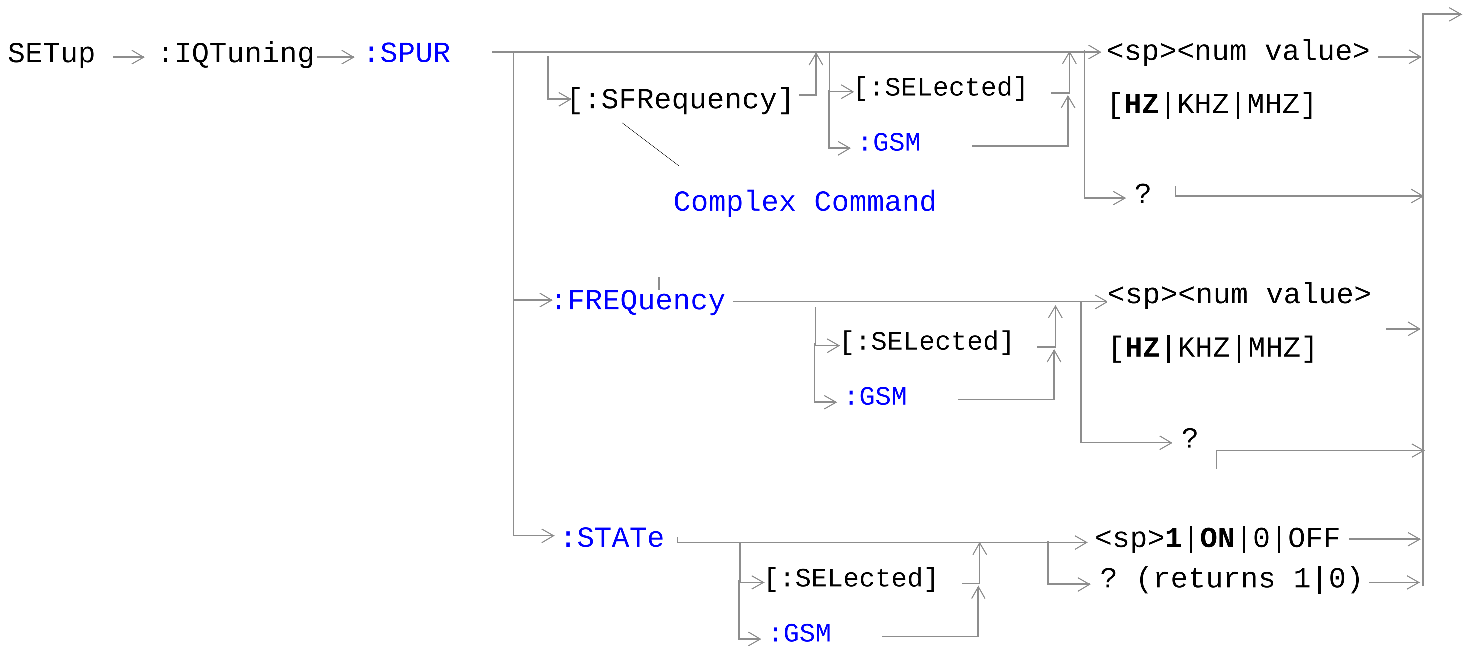
SETup:GBERror:ZBBLocks

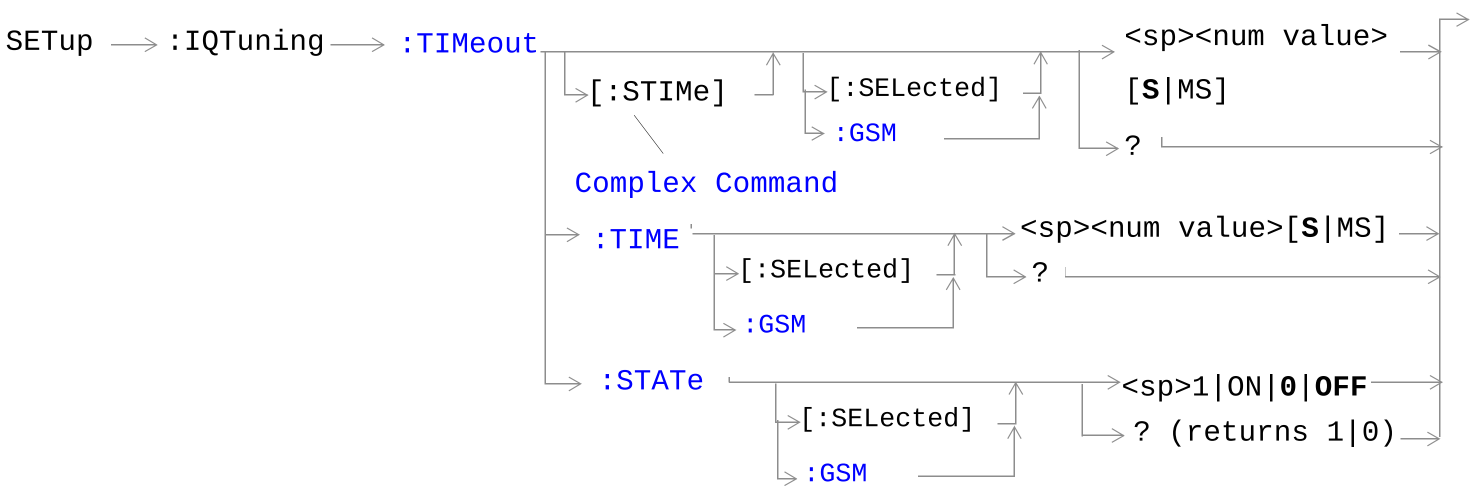
<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td>This command is not applicable to GSM.</td></tr>
<tr><td>GPRS TA</td><td rowspan="3">This command sets/queries the zero bad blocks state for BER measurements. The zero bad blocks state determines how a bad block is interpreted.
A block is defined as bad if either:
• At least one of the four expected bursts has not been received by the test set, or
• The demodulation quality of at least one of the bursts was questionable.
When set to On, all bits within a bad block are set to zero. This results in an average error rate of 50%.
When set to Off, the value of bits within a bad block are not altered before being measured. This lowers the overall BER value measured.</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 0 | OFF | 1 | ON</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 | 1</td></tr>
<tr><td colspan="2">*RST Setting</td><td>1 (on)</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
<code>OUTPUT 714;"SETup:GBERror:ZBBLocks:STATe OFF" !Sets the zero bad blocks state to off.</code></td></tr>
</table>

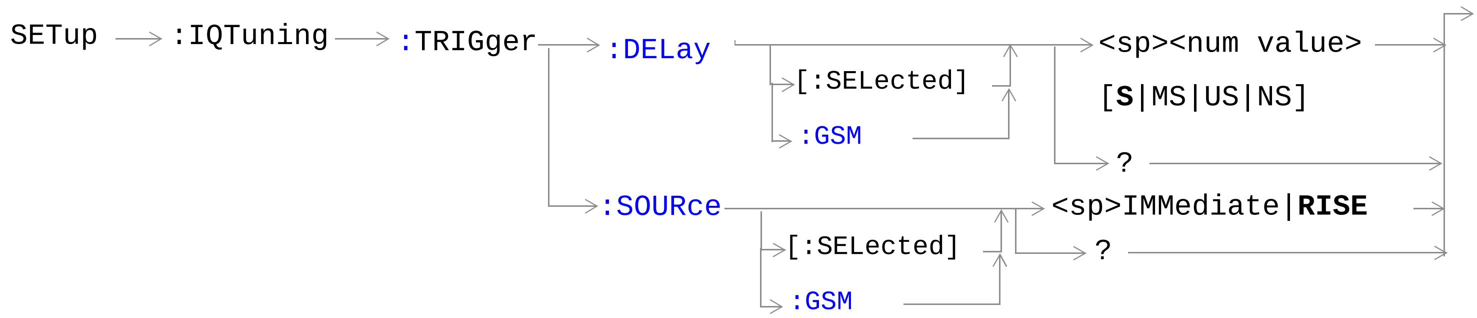
SETup:IQTuning






SETup
:IQTuning
:SPUR
[:SFRequency]
[:SELected]
:GSM
Complex Command
<sp><num value>
[HZ|KHZ|MHZ]
?
:FREQuency
[:SELected]
:GSM
<sp><num value>
[HZ|KHZ|MHZ]
?
:STATe
[:SELected]
:GSM
<sp>1|ON|0|OFF
? (returns 1|0)


SETup
:IQTuning
:TIMeout
[:STIMe]
[:SELected]
:GSM
Complex Command
<sp><num value>
[S|MS]
?
:TIME
[:SELected]
:GSM
<sp><num value>[S|MS]
?
:STATe
[:SELected]
:GSM
<sp>1|ON|0|OFF
? (returns 1|0)



"Diagram Conventions" on page 1

SETup:IQTuning:CONTinuous[:SELected]

Function	GSM TA	Sets/queries the trigger arm state for the IQ tuning measurement in the active (that is the selected) format. Determines whether measurement will make one measurement then stop (0|OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1|ON (continuous)).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: • Continuous trigger mode = 1 | ON • Single trigger mode = 0 | OFF
Query		Range: 1 | 0
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:CONTINUOUS:SELECTED ON" !Sets measurement to continuous trigger mode.
```

SETup:IQTuning:CONTinuous:GSM

Function	GSM TA	Sets/queries the trigger arm state for the IQ tuning measurement in the GSM format whether or not that format is active. Determines whether measurement will make one measurement then stop (0|OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1|ON (continuous)).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: • Continuous trigger mode = 1 | ON • Single trigger mode = 0 | OFF
Query		Range: 1 | 0
*RST Setting		1 (on)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:IQTUNING:CONTINUOUS:GSM ON" !Sets measurement to continuous trigger mode.
```

SETup:IQTuning:COUNt:STATe[:SELected]

Function	GSM TA	Sets/queries the multi-measurement state for the IQ tuning measurement in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		0 | 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:IQTUNING:COUNT:STATE:SELECTED ON" !Turns on multi-measurements.
```

SETup:IQTuning:COUNt:STATe:GSM

Function	GSM TA	Sets/queries the multi-measurement state for the IQ tuning measurement in the GSM format whether or not that format is active.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		0 | 1
*RST Setting		0 (off)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:COUNT:STATE:GSM ON" !Turns on multi-measurements.
```

SETup:IQTuning:COUNt:NUMBer[:SELected]

Function	GSM TA	This command sets/queries the number of I/Q Tuning multi-measurements the test set makes in the active (that is the selected) format. The multi-measurement count state must be on. See "I/Q Tuning Measurement Description" on page 103.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:COUNT:NUMBER:SELECTED 30"
!Sets the number of multi-measurements.
```

SETup:IQTuning:COUNt:NUMBer:GSM

Function	GSM TA	This command sets/queries the number of I/Q Tuning multi-measurements the test set makes in the GSM format whether or not that format is active. The multi-measurement count state must be on. See "I/Q Tuning Measurement Description" on page 103.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:COUNT:NUMBER:GSM 30"
!Sets the number of multi-measurements.
```

SETup:IQTuning:COUNt[:SNUMBer][:SELected]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the number of I/Q Tuning multi-measurements the test set makes in the active (that is the selected) format. This command sets the count state to ON.
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:COUNT:SNUMBER:SELECTED 30"
!Turns on multi-measurement and sets the number of multi-measurements to 30.
```

SETup:IQTuning:COUNt[:SNUMBer]:GSM

Function	GSM TA	This command sets/queries the number of I/Q Tuning multi-measurements the test set makes in the GSM format whether or not that format is active. This command sets the count state to ON.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:COUNT:SNUMBER:GSM 30"
!Turns on multi-measurement and sets the number of multi-measurements to 30.
```

SETup:IQTuning:REFerence:AUTO

Function	GSM TA	This command allows you to specify whether or not the test set selects the most appropriate offset to be used for the measurement.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		0 | 1
*RST Setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:REFERENCE:AUTO 1"
!Sets the test set to select the reference offset.
```

SETup:IQTuning:REFerence[:MANual][:FREQuency][:SELected]

Function	GSM TA	This command sets/queries the reference offset frequency to be used for the measurement in the active (that is the selected) format. If your mobile is transmitting all ones you should set this command to -67000, and if your mobile is transmitting all zeros it should be set to +67000.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		-67000 | +67000 | 0
Query		-67000 | +67000 | 0
*RST Setting		This command is not affected by *RST.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:REFERENCE:MANUAL:FREQUENCY:SELECTED -67000"
!Sets reference frequency for IQ Tuning measurement.
```

SETup:IQTuning:REFerence[:MANual][:FREQuency]:GSM

Function	GSM TA	This command sets/queries the reference offset frequency to be used for the measurement in the GSM format whether or not that format is active. This means that if your mobile is transmitting all ones you should set this command to -67000, and if your mobile is transmitting all zeros it should be set to +67000.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		-67000 | +67000 | 0
Query		-67000 | +67000 | 0
*RST Setting		This command is not affected by *RST.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:REFERENCE:MANUAL:FREQUENCY:GSM +67000"
!Sets reference frequency for IQ Tuning measurement.
```

SETup:IQTuning:REFerence[:MANual][:FREQuency]:CHARacter:GSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the reference offset frequency to be used for the measurement in the GSM format whether or not that format is active. This means that if your mobile is transmitting all ones, you should set this command to NEG67KHZ, and if your mobile is transmitting all zeros, it should be set to POS67KHZ. Alternatively, you could select AUTO which allows the test set to select the most appropriate offset.
Setting		NEG67KHZ | ZEROKHZ | POS67KHZ | AUTO
Query		NEG67KHZ | ZEROKHZ | POS67KHZ | AUTO
*RST Setting		AUTO
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:REFERENCE:MANUAL:FREQUENCY:CHARACTER:GSM AUTO"
!Sets reference frequency for IQ Tuning measurement (old command).
```

SETup:IQTuning:SPUR:FREQuency[:SELected]

Function	GSM TA	This command sets/queries the spur frequency for the I/Q Tuning measurement in the active (that is the selected) format. The units (HZ|KHZ|MHZ) are optional, if no units are specified then the default is HZ.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: -13.0 MHz to -1.0 MHz and +1.0 MHz to +13 MHz Resolution: 100 Hz
Query		Range: -19 MHz to +19 MHz Resolution: 100 Hz
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:SPUR:FREQUENCY:SELECTED 10MHZ"
!Sets spur measurement frequency.
```

SETup:IQTuning:SPUR:FREQuency:GSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the spur frequency for the I/Q Tuning measurement in the GSM format whether or not that format is active. The units (HZ|KHZ|MHZ) are optional, if no units are specified then the default is HZ.
Setting		Range: -13.0 MHz to -1.0 MHz and +1.0 MHz to +13 MHz Resolution: 100 Hz
Query		Range: -19 MHz to +19 MHz Resolution: 100 Hz
*RST Setting		0 MHz
Requirements	GSM/GPRS TA1	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:SPUR:FREQUENCY:GSM 10MHZ"
!Sets spur measurement frequency.
```

SETup:IQTuning:SPUR:STATe[:SELected]

Function	GSM TA	This command sets/queries the spur state for the I/Q Tuning measurement in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:SPUR:STATE:SELECTED ON"
!Sets state for spur measurement.
```

SETup:IQTuning:SPUR:STATe:GSM

Function	GSM TA	This command sets/queries the spur state for the I/Q Tuning measurement in the GSM format whether or not that format is active.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 (off)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:SPUR:STATE:GSM ON"
!Sets state for spur measurement.
```

SETup:IQTuning:SPUR[:SFRequency][:SELected]

Function	GSM TA	This command sets/queries the spur frequency for the I/Q Tuning measurement in the active (that is the selected) format. The units (HZ|KHZ|MHZ) are optional, if no units are specified then the default is HZ. This command sets the spur state to ON.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: -13.0 MHz to -1.0 MHz and +1.0 MHz to +13 MHz Resolution: 100 Hz
Query		Range: -13.0 MHz to -1.0 MHz and +1.0 MHz to +13 MHz Resolution: 100 Hz
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:IQTUNING:SPUR:SFREQUENCY:SELECTED 10MHZ"
!Sets frequency value and state for spur measurement.
```

SETup:IQTuning:SPUR[:SFRequency]:GSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the spur frequency for the I/Q Tuning measurement in the GSM format whether or not that format is active. The units (HZ|KHZ|MHZ) are optional, if no units are specified then the default is HZ. This command sets the spur state to ON.
Setting		Range: -13.0 MHz to -1.0 MHz and +1.0 MHz to +13 MHz Resolution: 100 Hz
Query		Range: -13.0 MHz to -1.0 MHz and +1.0 MHz to +13 MHz Resolution: 100 Hz
*RST Setting		0 (off)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:SPUR:SFREQUENCY:GSM 10MHZ"
!Sets frequency value and state for spur measurement.
```

SETup:IQTuning:TIMeout:STATe[:SELected]

Function	GSM TA	This command sets/queries the timeout state for the I/Q Tuning measurement in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:IQTUNING:TIMEOUT:STATE:SELECTED 25"
!Sets timeout state.
```

SETup:TIMeout:STATe:GSM

Function	GSM TA	This command sets/queries the timeout state for the I/Q Tuning measurement in the GSM format whether or not that format is active.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 (off)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:IQTUNING:TIMEOUT:STATE:GSM 25"
!Sets timeout state.
```

SETup:IQTuning:TIMeout[:STIMe][:SELected]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the I/Q Tuning measurement time-out value in seconds in the active (that is the selected) format. This command sets the time-out state to on. The units (S|MS) are optional, if no units are specified then the default is S.
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:TIMEOUT:STIME:SELECTED 25"
!Sets timeout value and state.
```

SETup:IQTuning:TIMeout[:STIMe]:GSM

Function	GSM TA	This command sets/queries the I/Q Tuning measurement time-out value in seconds for the GSM format whether or not that format is active. This command sets the timeout state to on. The units (S|MS) are optional, if no units are specified then the default is S.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:TIMEOUT:STIME:GSM 25"
!Sets timeout value and state.
```

SETup:IQTuning:TIMeout:TIMe[:SELected]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the time-out value in seconds that is used for the I/Q Tuning measurements in the active (that is the selected) format. The timeout state must be on. The units (S|MS) are optional, if no units are specified then the default is S.
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: .1 to 999 seconds Resolution: .1 seconds
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:TIMEOUT:TIME:SELECTED 25"
!Sets timeout time value.
```

SETup:IQTuning:TIMeout:TIMe:GSM

Function	GSM TA	This command sets/queries the time-out value in seconds that is used for the I/Q Tuning measurements in the GSM format whether or not that format is active. The time-out state must be on. The units (S |MS) are optional, if no units are specified then the default is S.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: .1 to 999 seconds Resolution: .1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:TIMEOUT:TIME:GSM 25"
!Sets timeout time value.
```

SETup:IQTuning:TRIGger:DELay[:SELected]

Function	GSM TA	This command sets/queries the trigger delay time in seconds for an I/Q Tuning measurement in the active (that is the selected) format. The units (S|MS|US|NS) are optional, if no units are specified then the default is S.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater
Query		Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:IQTUNING:TRIGGER:DELAY:SELECTED 1.1MS"
!Sets trigger delay time.
```

SETup:IQTuning:TRIGger:DELay:GSM

Function	GSM TA	This command sets/queries the trigger delay time in seconds for an I/Q Tuning measurement in the GSM format whether or not that format is active. The units (S | MS | US | NS) are optional, if no units are specified then the default is S.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater
Query		Range: -2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater
*RST Setting		zero seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:TRIGGER:DELAY:GSM 1.1MS"
!Sets trigger delay time.
```

SETup:IQTuning:TRIGger:SOURce[:SELected]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the trigger source for an I/Q Tuning measurement in the active (that is the selected) format.
Setting		RISE | IMMediate See “Triggering of Measurements” on page 404.
Query		RISE | IMM
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:IQTUNING:TRIGGER:SOURCE:SELECTED IMMEDIATE"
!Sets trigger delay source.
```

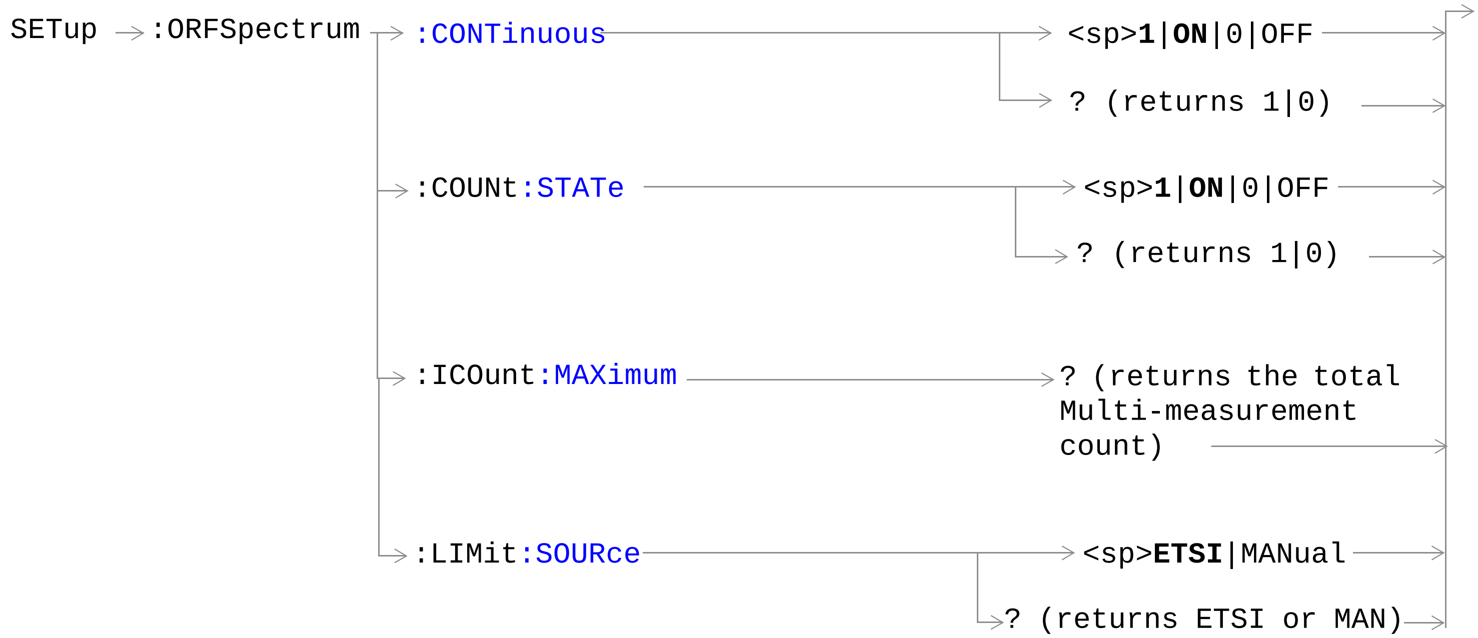
SETup:IQTuning:TRIGger:SOURce:GSM

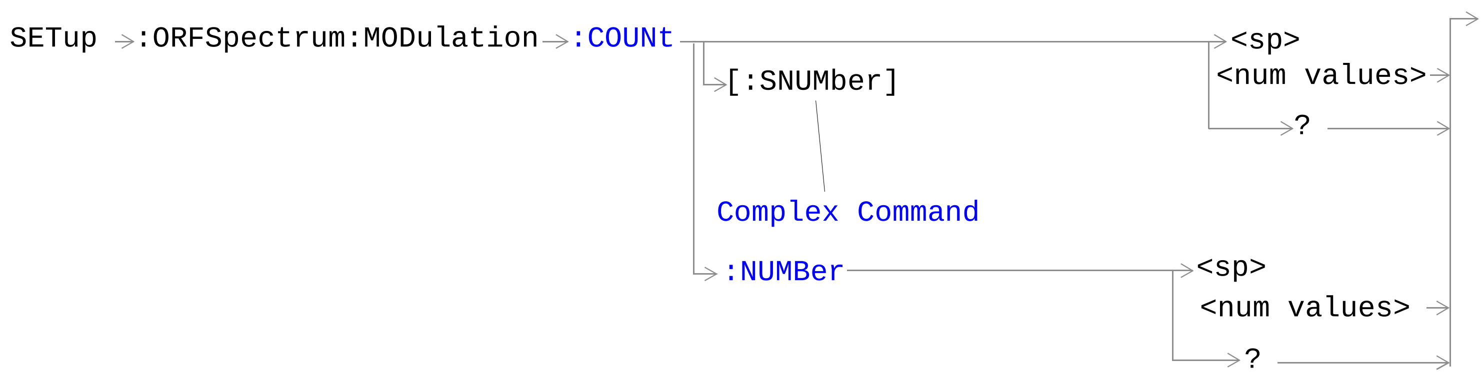
Function	GSM TA	This command sets/queries the trigger source for an I/Q Tuning measurement in the GSM format whether or not that format is active.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		RISE | IMMediate See “Triggering of Measurements” on page 404.
Query		RISE | IMM
*RST Setting		RISE
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

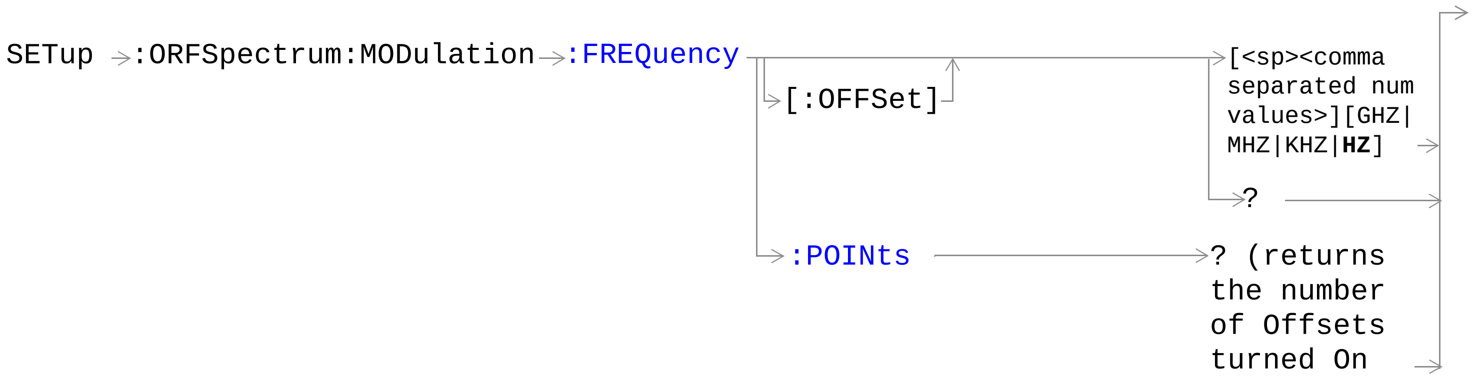
Programming Example

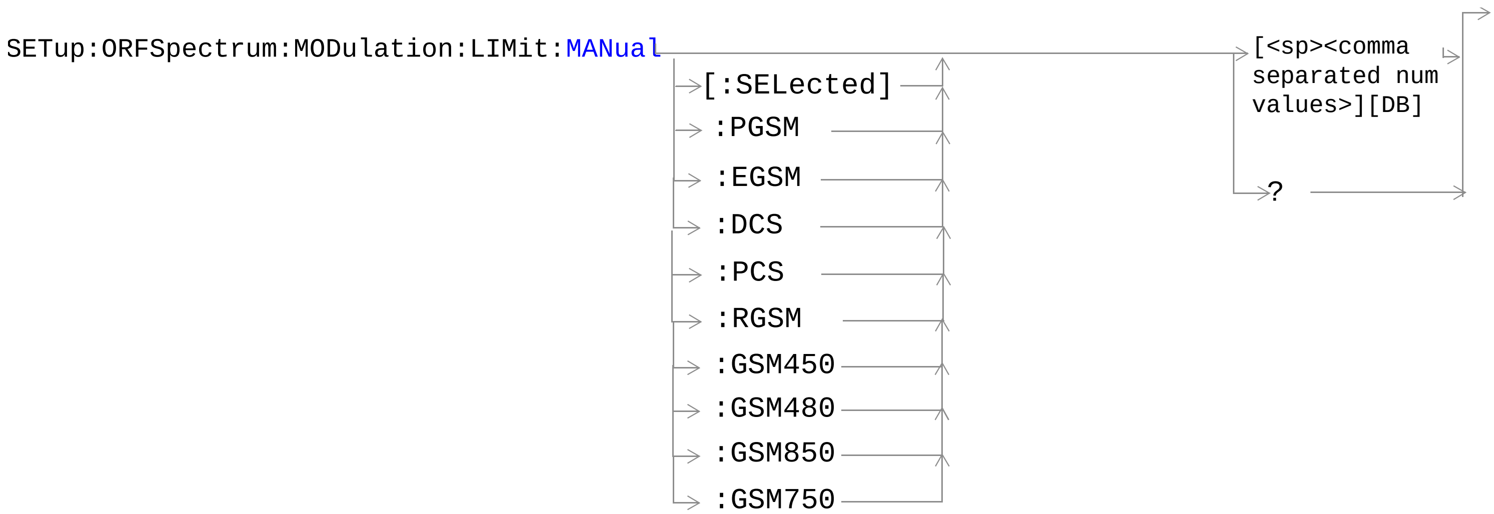
```
OUTPUT 714;"SETUP:IQTUNING:TRIGGER:SOURCE:GSM IMMEDIATE"
!Sets trigger delay source.
```

SETup:ORFSpectrum

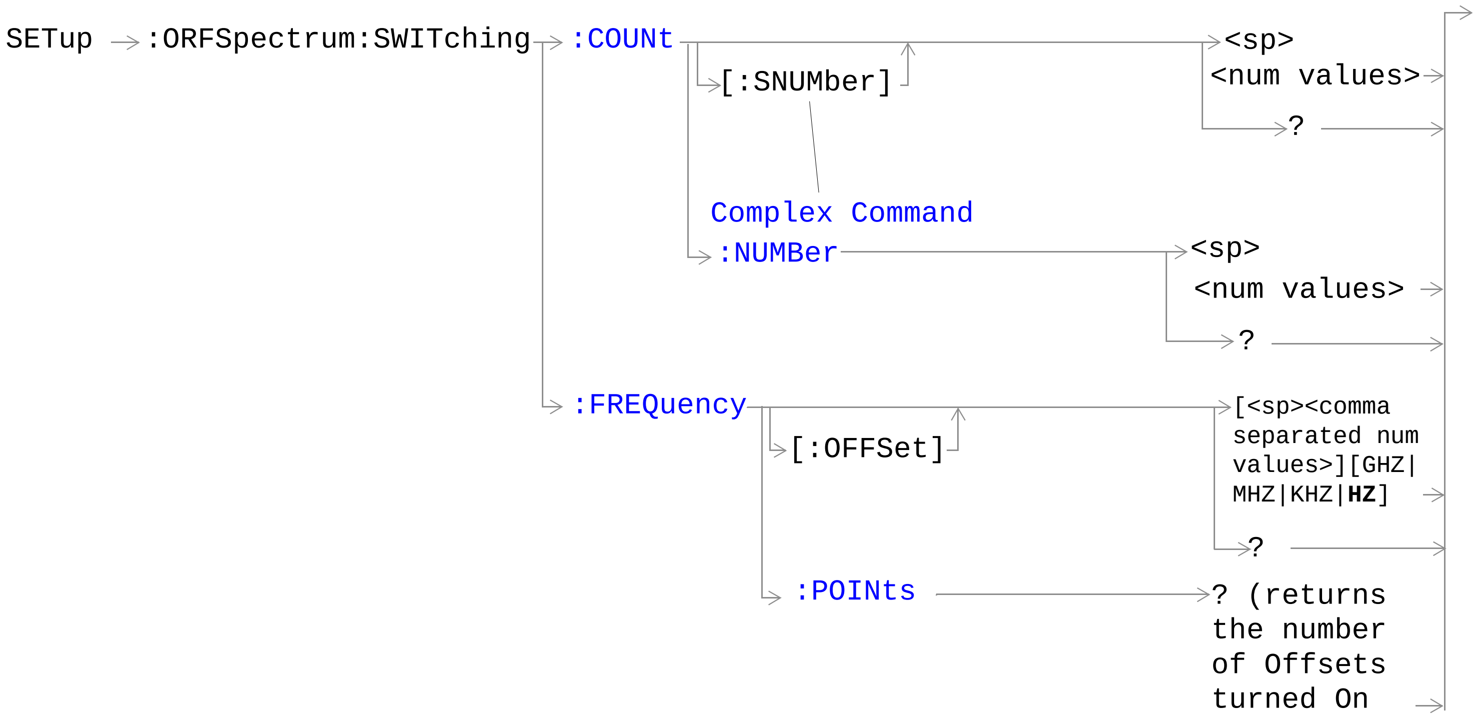


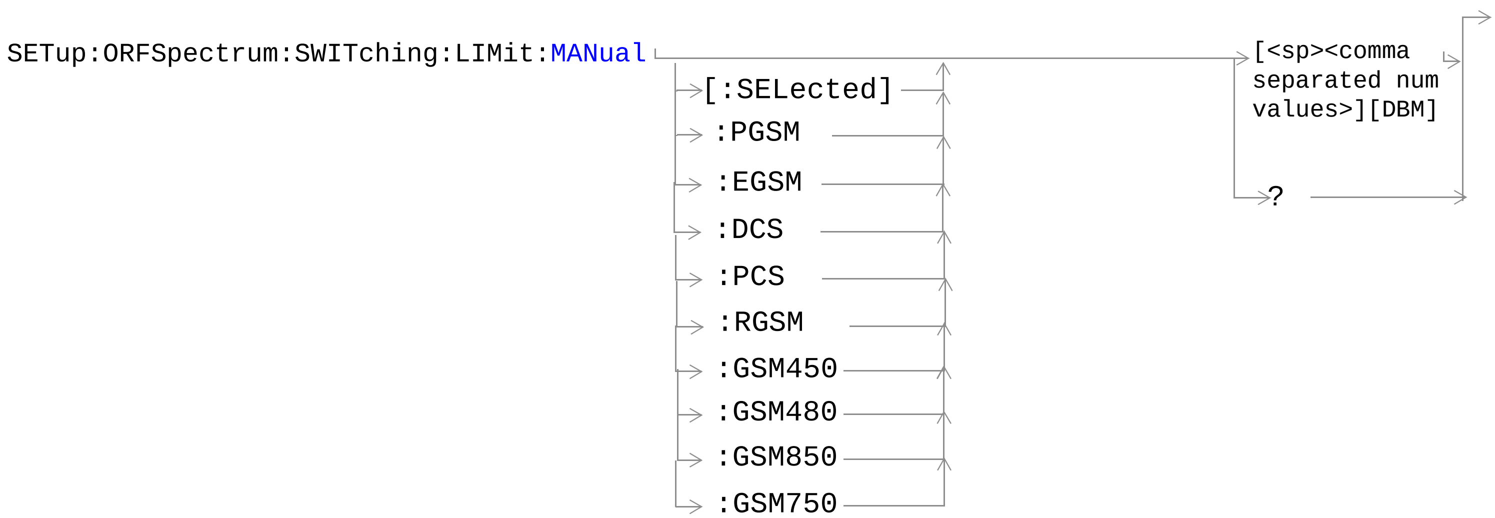


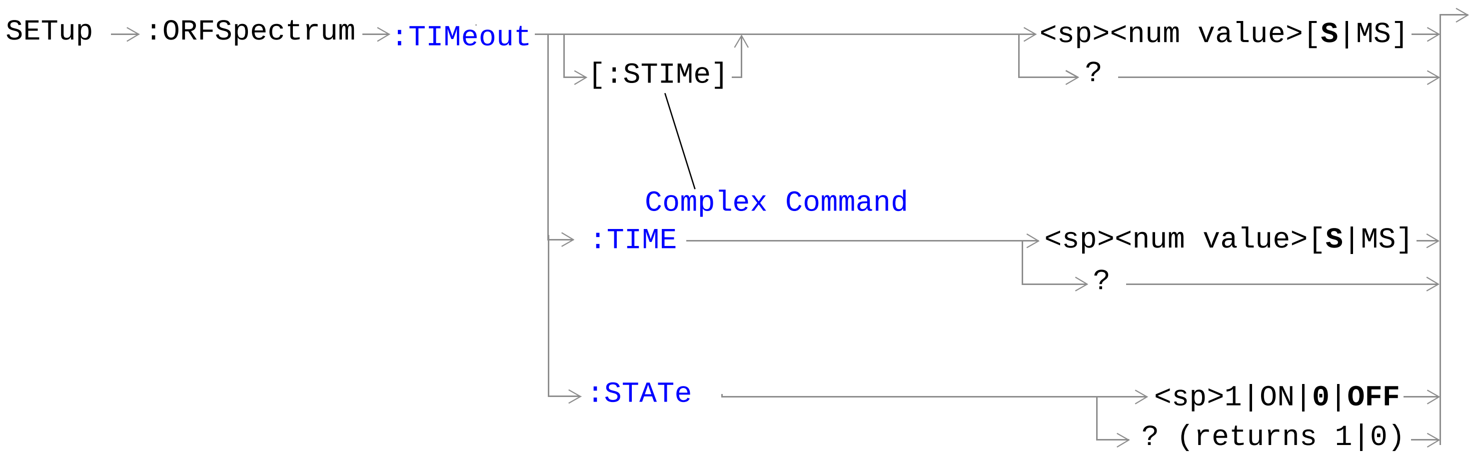

SETup
:ORFSpectrum:MODulation
:FREQuency
[:OFFSet]
[<sp><comma
separated num
values>][GHZ|
MHZ|KHZ|**HZ**]
?
:POINts
? (returns
the number
of Offsets
turned On

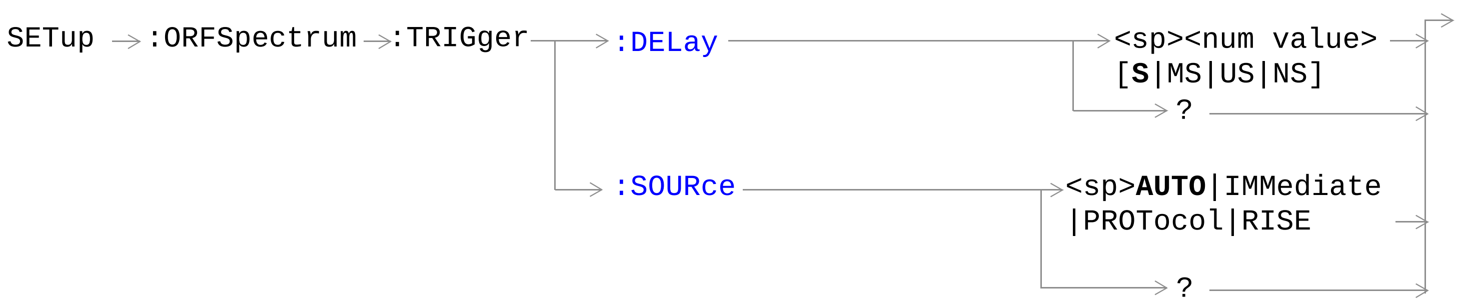

SETup:ORFSpectrum:MODulation:LIMit:MANual
[:SELected]
:PGSM
:EGSM
:DCS
:PCS
:RGSM
:GSM450
:GSM480
:GSM850
:GSM750
[<sp><comma
separated num
values>][DB]
?

SETup:ORFSpectrum









“Diagram Conventions” on page 1

SETup:ORFSpecturm:CONTinuous

Function	GSM TA	This command selects/queries the trigger state for output RF spectrum measurements.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: • Continuous trigger mode = 1 | ON • Single trigger mode = 0 | OFF
Query		Range: 1 | 0
*RST Setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"ABORT:ALL" !Aborts all active measurements in progress.
OUTPUT 714;"SETUP:CONTINUOUS OFF" !Sets trigger mode to single for an ORFS measurement.
```

SETup:ORFSpectrum:COUNt:STATe

Function	GSM TA	This command selects/queries the ORFS due to switching and modulation multi-measurement count state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		1 | ON5.5
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:ORFSPECTRUM:COUNT:STATE ON"
!Sets count state for both ORFS due to switching and modulation measurements.
```

SETup:ORFSpectrum:ICOunt:MAXimum?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command queries the total number of measurements made each time an ORFS measurement is initiated. This number will vary depending on the number of offsets and number of multi-measurements that you choose. The total number of measurements is calculated using the following formula: ICO MAX = 1 + M + S *Where:* M= (*the number of modulation offsets*) $\times$ (*the number of multi-measurements for ORFS due to modulation*). S= (*the number of switching offsets*) $\times$ (*the number of multi-measurements for ORFS due to switching*) . See "Output RF Spectrum Measurement Description" on page 106 for a description of modulation and switching offsets.
Query		Range: 1 to 29971 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SETup:ORFSpectrum:LIMit:SOURce

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command selects whether the ORFS measurement uses the ETSI defined limits or those which you can set using the commands: "SETup:ORFSpectrum:MODulation:LIMit:MANual[:SELected]" on page 1139 and "SETup:ORFSpectrum:SWITching:LIMit:MANual[:SELected]" on page 1143. This command is implemented in the active (that is the selected) format.
Setting		Range: ETSI | MANual
Query		Range: ETSI | MANual
*RST Setting		ETSI
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714"SETUP:ORFSPECTRUM:LIMIT:SOURCE MAN"
!Allows you to manually set the limits.
```

SETup:ORFSpectrum:MODulation:COUNt[:SNUMber]

Function	GSM TA	This command sets/queries the number of ORFS due to modulation multi-measurements the test set will make. This command sets the count state to ON.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		20
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714"SETUP:ORFSPECTRUM:MODULATION:COUNT:SNUMBER 99"
!Sets the value to 99 multi-measurements and the state to on.
```

SETup:ORFSpectrum:MODulation:COUNt:NUMBer

Function	GSM TA	This command sets/queries the number of ORFS due to modulation multi-measurements the test set will make when the multi-measurement count state is on. See “Output RF Spectrum Measurement Description” on page 106.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		20
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:ORFSPECTRUM:MODULATION:COUNT:NUMBER 75"
!Sets the multi-measurement count number for ORFS due to modulation measurements to 75.
```

SETup:ORFSpectrum:MODulation:FREQuency[:OFFSet]

Function	GSM TA	This command sets/queries the list of ORFS due to modulation frequency offsets. Each offset listed in the command is turned on by default. If no frequency offsets (null list) are sent, the output RF spectrum due to modulation measurement will not be made. The units (GHZ|MHZ|KHZ|HZ) are optional, if no units are specified than units default to HZ. see “Output RF Spectrum Measurement Description” on page 106.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 22 comma-separated values ranging from –1.8 MHz to –10 Hz, and +10 Hz to +1.8 MHz Resolution: 10 Hz
Query		Range: 0 to 22 comma-separated values ranging from –1.8 MHz to –10 Hz, and +10 Hz to +1.8 MHz Resolution: 10 Hz
*RST Setting		Offset 1: 400.0 kHz Offset 2: 600.0 kHz Offsets 3 to 22: off
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:ORFSPECTRUM:MODULATION:FREQUENCY:OFFSET 400 KHZ, 700 KHZ"
!Turns on the first two ORFS due to modulation measurement offsets and sets
!them to 400 kHz and 700 kHz offsets. All other offsets are in the off state.

OUTPUT 714;"SETUP:ORFSPECTRUM:MODULATION:FREQUENCY:OFFSET 700 KHZ"
!Turns on the first ORFS due to modulation measurement offset and sets it to  A 700 kHz
!offset. All other offsets are in the off state.

OUTPUT 714;"SETUP:ORFSPECTRUM:MODULATION:FREQUENCY:OFFSET"
!Turns all offsets for ORFS due to modulation measurement to the off state.
```

SETup:ORFSpectrum:MODulation:FREQuency:POINts?

Function	GSM TA	This command queries the number of frequency offsets currently on during an ORFS due to modulation measurement in the active (that is the selected) format. See “Output RF Spectrum Measurement Description” on page 106.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 22 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SETup:ORFSpectrum:MODulation:LIMit:MANual[:SELected]

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">This command allows you to set the limits for the ORFS due to modulation measurement. You can enter up to 22 limit values, one for each of the ORFS due to modulation offset frequencies. The n^{th} limit value is the value for the n^{th} offset frequency, regardless of whether the offset frequency is switched on or off. Changing the offset value has no effect on the limit value. If you supply fewer than 22 limit values, the remainder of the limit values remain unchanged.

The optional [:SELected] node allows you to select which traffic channel band the setting is implemented in. The default band is the currently selected band, otherwise you can specify PGSM, EGSM, DCS, PCS, RGSM, GSM450, GSM480, GSM850, or GSM750.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 1 to 22 comma-separated values ranging from -200 dB to +100 dB

Resolution: 0.1</td></tr>
<tr><td colspan="2">Query</td><td>Range: 22 comma-separated values ranging from -200 dB to +100 dB

Resolution: 0.1</td></tr>
<tr><td colspan="2">*RST Setting</td><td>Offset 1: -60 dB
Offset 2: -60 dB
Offset 3: +0.5 dB
Offset 4: +0.5 dB
Offset 5: -30 dB
Offset 6: -30 dB
Offset 7: -33 dB
Offset 8: -33 dB
Offset 9: -60 dB
Offset 10: -60 dB
Offset 11: -60 dB
Offset 12: -60 dB
Offset 13: -60 dB
Offset 14: -60 dB
Offset 15: -60 dB
Offset 16: -60 dB
Offset 17: -60 dB
Offset 18: -60 dB
Offset 19: -60 dB
Offset 20: -60 dB
Offset 21: -60 dB
Offset 22: -60 dB</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

<code>OUTPUT 714;"SETUP:ORFSPECTRUM:MODULATION:LIMIT:MANUAL -58DB,-58DB"</code>
<code>!Sets the first two offsets to -58 dB and -58 dB respectively.</code></td></tr>
</table>

SETup:ORFSpectrum:SWITching:COUNt[:SNUMber]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the ORFS due to switching multi-measurement count value and turns the state on.
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:ORFSPECTRUM:SWITCHING:COUNT:SNUMBER 55"
!Sets the multi-measurment value to 10 and the state to on.
```

SETup:ORFSpectrum:SWITching:COUNt:NUMBer

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the ORFS due to switching multi-measurement count value. See “Output RF Spectrum Measurement Description” on page 106.
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:ORFSPECTRUM:SWITCHING:COUNT:NUMBER 15"
!Sets the multi-measurement count number for ORFS due to switching to 15.
```

SETup:ORFSpectrum:SWITching:FREQuency[:OFFSet]

Function	GSM TA	This command sets/queries the list of ORFS due to switching frequency offsets in the active (that is the selected) format. Each offset listed in the command is turned on by default. If no frequency offsets (null list) are sent, the output RF spectrum due to switching measurement will not be made. The units (GHZ|MHZ|KHZ|HZ) are optional, if no units are specified than units default to HZ. See "Output RF Spectrum Measurement Description" on page 106.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 8 comma-separated values ranging from −1.8 MHz to −10 Hz, and +10 Hz to +1.8 MHz Resolution: 10 Hz
Query		Range: 0 to 8 comma-separated values ranging from −1.8 MHz to −10 Hz, and +10 Hz to +1.8 MHz Resolution: 10 Hz
*RST Setting		Offset 1 = 400.0 kHz Offset 2 = 600.0 kHz Offsets 3 to 8 off
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:ORFSPECTRUM:SWITCHING:FREQUENCY:OFFSET 400 KHZ, 700 KHZ"
!Turns on the first two ORFS due to switching measurement offsets and sets them
!to 400 kHz and 700 kHz offsets. All other offsets are in the off state.

OUTPUT 714;"SETUP:ORFSPECTRUM:SWITCHING:FREQUENCY:OFFSET 700 KHZ"
!Turns on the first ORFS due to switching measurement offset and sets it to 700 kHz
!offsets. All other offsets are in the off state.

OUTPUT 714;"SETUP:ORFSPECTRUM:SWITCHING:FREQUENCY:OFFSET"
!Turns all of the ORFS due to switching measurements offsets to off.
```

SETup:ORFSpectrum:SWITching:FREQuency:POINts?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command queries the number of frequency offsets currently on during an ORFS due to switching measurement. See "Output RF Spectrum Measurement Description" on page 106.
Query		Range: 0 to 8 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SETup:ORFSpectrum:SWITching:LIMit:MANual[:SELected]

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">This command allows you to set the limits for the ORFS due to switching measurement. You can enter up to eight limit values, one for each of the ORFS due to switching offset frequencies. The n^{th} limit value is the value for the n^{th} offset frequency, regardless of whether the offset frequency is switched on or off. Changing the offset value has no effect on the limit value. If you supply fewer than eight limit values, the remainder of the limit values remain unchanged.

The optional [:SELected] node allows you to select which traffic channel band the setting is implemented in. The default band is the currently selected band, otherwise you can specify PGSM, EGSM, DCS, PCS, RGSM, GSM450, GSM480, GSM850, or GSM750.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 1 to 8 comma-separated values ranging from -200 dBm to +100 dBm

Resolution: 0.1</td></tr>
<tr><td colspan="2">Query</td><td>Range:8 comma-separated values ranging from -200 dBm to +100 dBm

Resolution: 0.1</td></tr>
<tr><td colspan="2">*RST Setting</td><td>Offset 1: -23 dBm
Offset 2: -26 dBm
Offset 3: -23 dBm
Offset 4: -26 dBm
Offset 5: -32 dBm
Offset 6: -32 dBm
Offset 7: -36 dBm
Offset 8: -36 dBm</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

<code>OUTPUT 714;"SETUP:ORFSPECTRUM:SWITCHING:LIMIT:MANUAL -30DBM,-32DBM"</code>
<code>!Sets the first two offsets to -30 dBm and -32 dBm respectively.</code></td></tr>
</table>

SETup:ORFSpectrum:TIMeout:TIME

Function	GSM TA	This command selects/queries the timeout value in seconds that will be used for ORFS measurements when the "SETup:ORFSpectrum:TIMeout:STATe" is ON. The units (S | MS) are optional. Units default to S if units are not specified.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:ORFSPECTRUM:TIMEOUT:TIME 15"
!Sets the timeout value to 15 seconds.
```

SETup:ORFSpectrum:TIMeout[:STIMe]

Function	GSM TA	This command sets/queries the timeout value in seconds that will be used for ORFS measurements and turns the timeout state on. The units (S|MS) are optional. If no units are specified than units default to S.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:ORFSPECTRUM:TIMEOUT:STIME 12"
!Sets the timeout value to 12 seconds and the state to on.
```

SETup:ORFSpectrum:TIMeout:STATe

Function	GSM TA	This command selects/queries the ORFS measurement timeout state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:ORFSPECTRUM:TIMEOUT:STATE ON" !Sets timeout state to on.`		

SETup:ORFSpectrum:TRIGer:DELay

Function	GSM TA	This command sets/queries the trigger delay for ORFS measurements. The units (S | MS | US | NS) are optional, units default to S if units are not specified.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: –2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 nanoseconds whichever is greater
Query		Range: –2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 nanoseconds whichever is greater
*RST Setting		0 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:ORFSPECTRUM:TRIGGER:DELAY 1MS"` `!Sets the trigger delay value to 1 millisecond.`		

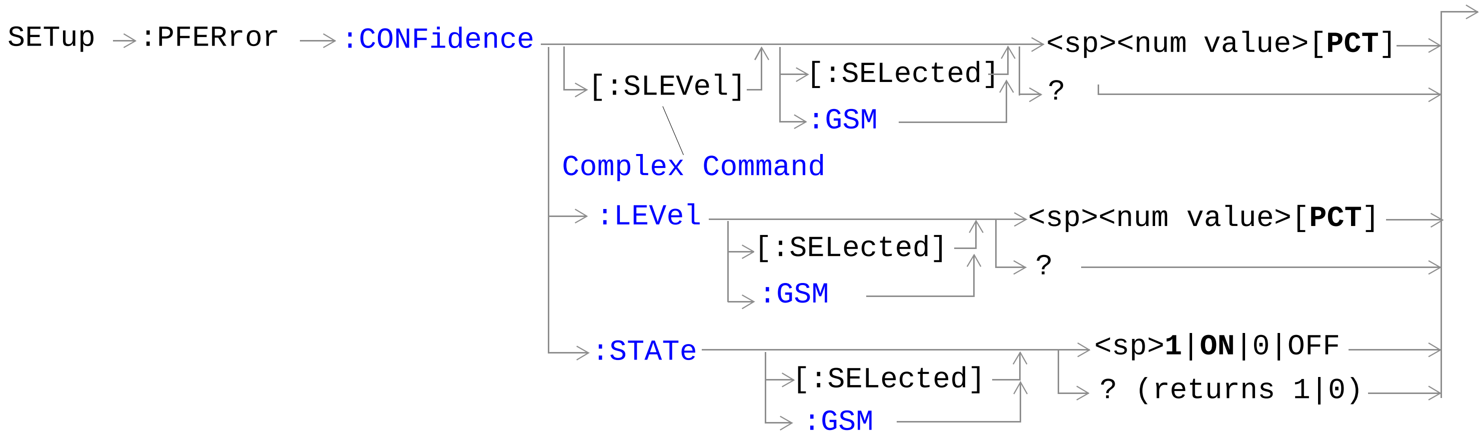
SETup:ORFSpectrum:TRIGger:SOURce

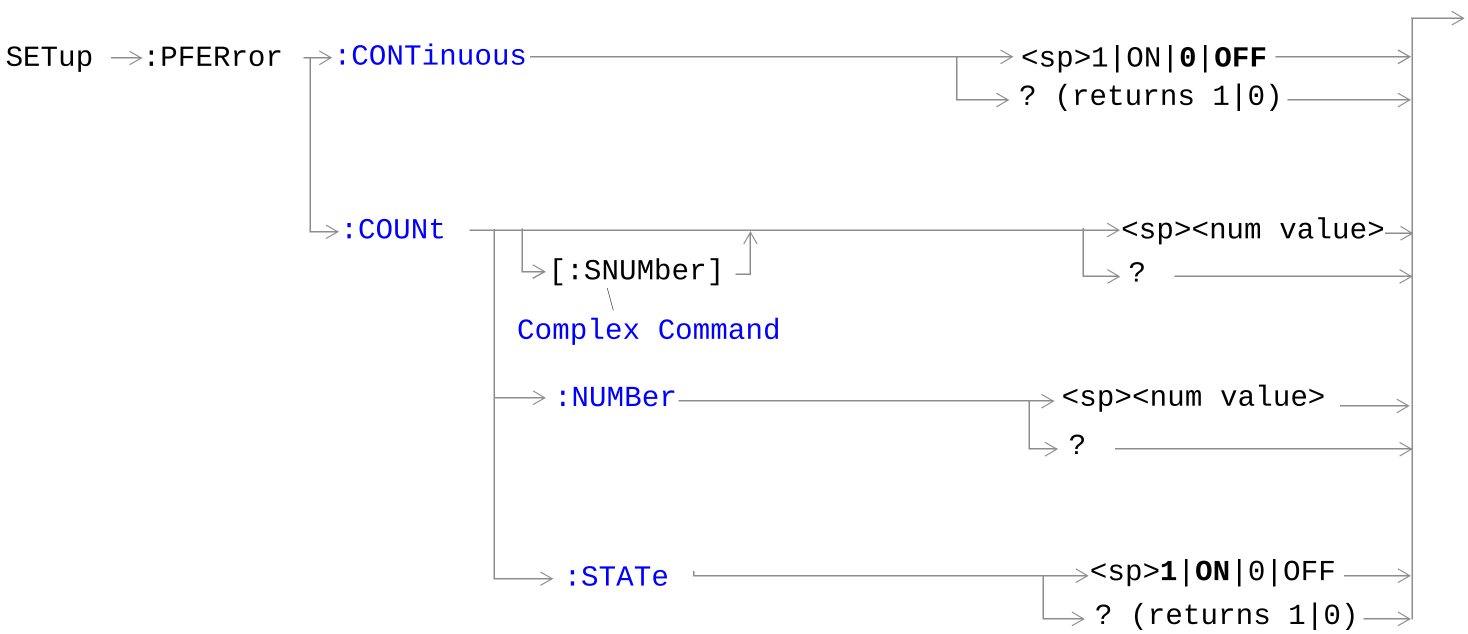
Function	GSM TA	This command selects/queries the trigger source for ORFS measurements. See "Output RF Spectrum Measurement Description" on page 106.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: AUTO | IMMediate | PROTocol | RISE See "Triggering of Measurements" on page 404.
Query		Range: AUTO | IMM | PROT | RISE
*RST Setting		AUTO
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

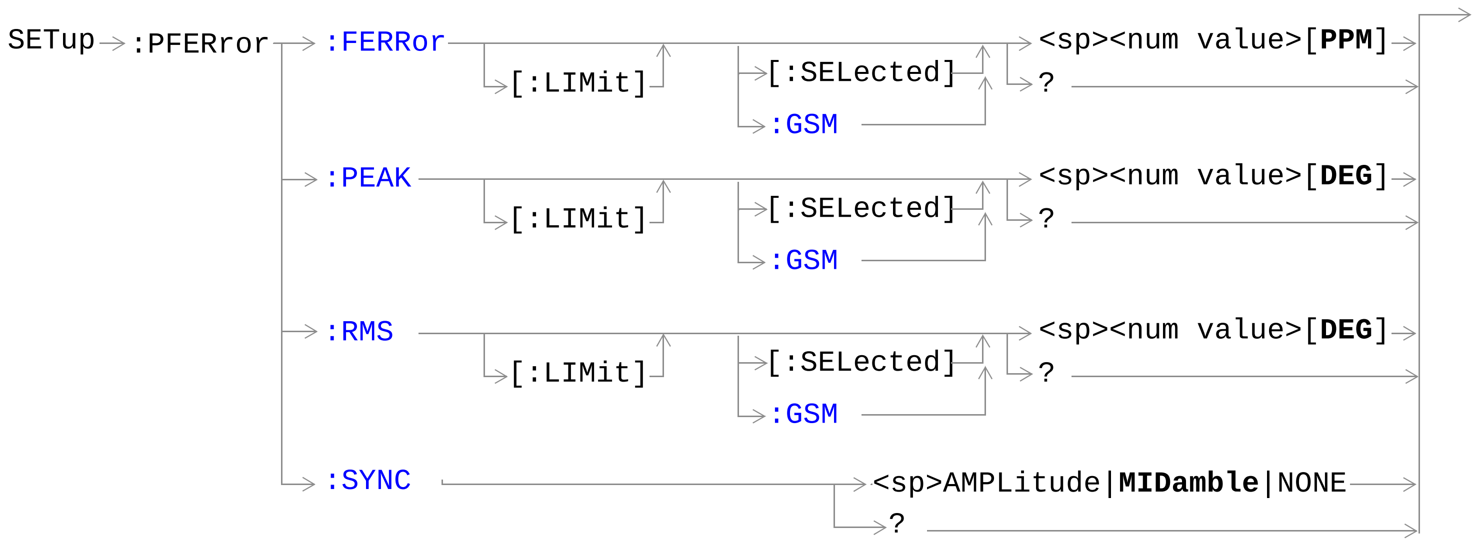
```
OUTPUT 714;"SETUP:ORFSPECTRUM:TRIGGER:SOURCE AUTO"
!Sets the trigger source to automatic.
```

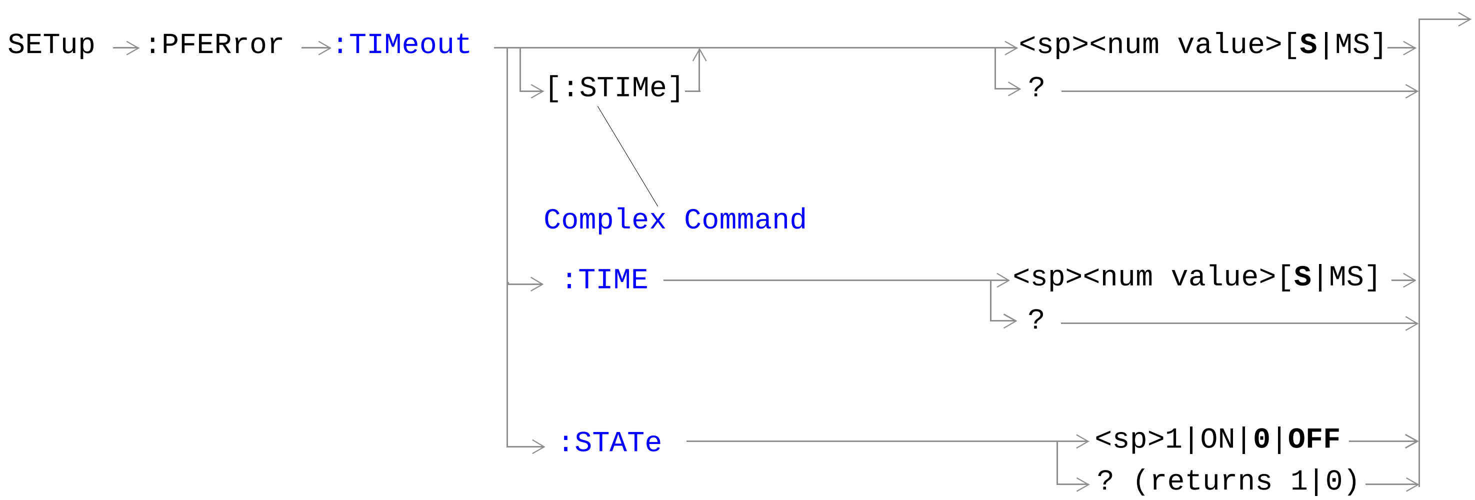
SETup:PFERror

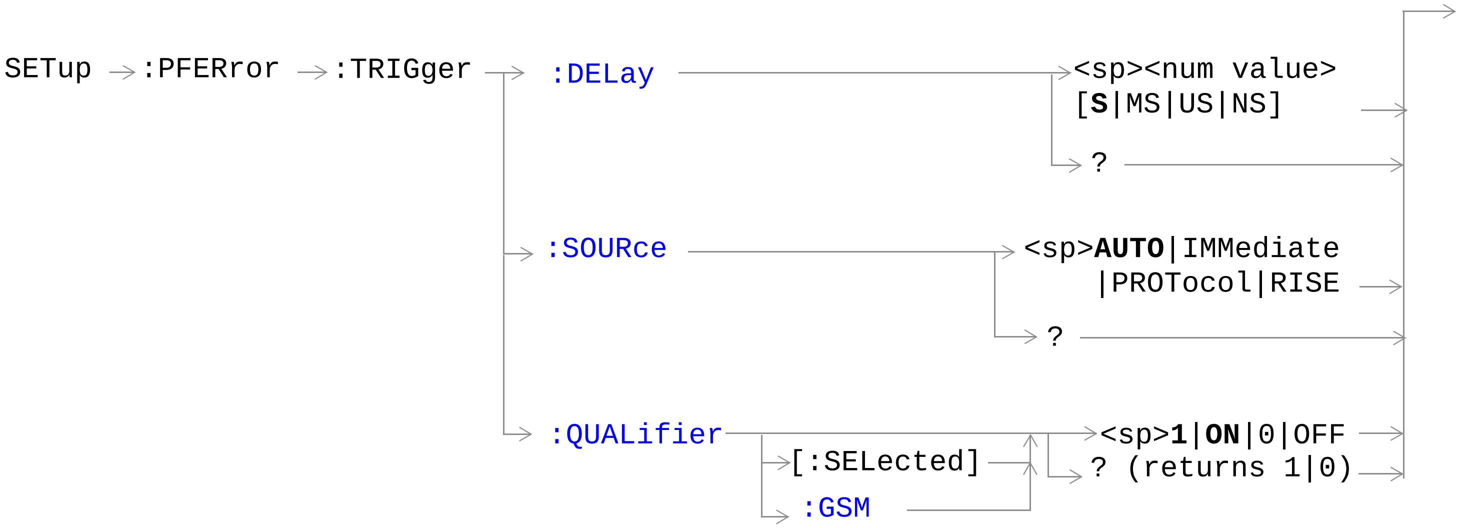




SETup:PFERror







“Diagram Conventions” on page 1

SETup:PFERror:CONFidence:LEVel[:SELected]

Function	GSM TA	This command sets/queries the active (that is the selected) format's confidence level (in %) with which to end the measurement early. This level applies to the RMS Phase Error, the Peak Phase Error, and the Frequency Error. For more information on using confidence levels refer to "Confidence Levels" on page 1524.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 80.00 to 99.99 Resolution: 0.01
Query		Range: 80.00 to 99.99 Resolution: 0.01
*RST Setting		99.00
Requirements	GSM/GPRS TA	Revison A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETUP:PFERROR:CONFIDENCE:LEVel 90" !Sets the confidence level to 90%.`		

SETup:PFERror:CONFidence:LEVel:GSM

Function	GSM TA	This command sets/queries the GSM format's confidence level (in %) with which to end the measurement early, whether or not the GSM format is active. This level applies to the RMS Phase Error, the Peak Phase Error, and the Frequency Error. For more information on using confidence levels refer to "Confidence Levels" on page 1524.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 80.00 to 99.99 Resolution: 0.01
Query		Range: 80.00 to 99.99 Resolution: 0.01
*RST Setting		99.00
Requirements	GSM/GPRS TA	Revison A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETUP:PFERROR:CONFIDENCE:LEVEL:GSM 90" !Sets the confidence level to 90%.`		

SETup:PFERror:CONFidence[:SLEVel][:SELected]

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">This command sets/queries the active (that is the selected) format's confidence level with which to end the measurement early and turns the confidence state on. This level applies to the RMS Phase Error, the Peak Phase Error, and the Frequency Error.

This command also turns the multi-measurement state on.

For more information on using confidence levels refer to "Confidence Levels" on page 1524.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range: 80.00 to 99.99

Resolution: 0.01</td></tr>
<tr><td colspan="2">Query</td><td>Range: 80.00 to 99.99

Resolution: 0.01</td></tr>
<tr><td colspan="2">*RST Setting</td><td>99.00</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revison A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

<code>OUTPUT 714;"SETUP:PFERROR:CONFIDENCE 95" !Sets the confidence level to 95% and the state to on.</code></td></tr>
</table>

SETup:PFERror:CONFidence[:SLEVel]:GSM

Function	GSM TA	This command sets/queries the GSM format’s confidence level with which to end the measurement early and turns the confidence state on. It does this in the GSM format whether or not that format is active. This level applies to the RMS Phase Error, the Peak Phase Error, and the Frequency Error. This command also turns the multi-measurement state on. For more information on using confidence levels refer to “Confidence Levels” on page 1524.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 80.00 to 99.99 Resolution: 0.01
Query		Range: 80.00 to 99.99 Resolution: 0.01
*RST Setting		99.00
Requirements	GSM/GPRS TA	Revison A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:PFERROR:CONFIDENCE:GSM 90" !Sets the confidence level to 90% and the state to on.`		

SETup:PFERror:CONFidence:STATe[:SELected]

Function	GSM TA	This command sets/queries whether the active (that is the selected) format’s confidence level feature for the phase and frequency error measurement is on or off. This command also turns the multi-measurement state on. For more information on using confidence levels refer to “Confidence Levels” on page 1524.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0	OFF	1	ON
Query		Range: 0	1
*RST Setting		0	OFF
Requirements	GSM/GPRS TA	Revison A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:PFERROR:CONFIDENCE:STATE 1" !Sets the confidence state on.`		

SETup:PFERror:CONFidence:STATe:GSM

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries whether the GSM format's confidence level feature for the phase and frequency error measurement is on or off, whether or not that format is active. This command also turns the multi-measurement state on. For more information on using confidence levels refer to "Confidence Levels" on page 1524.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revison A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:PFERROR:CONFIDENCE:STATE:GSM OFF" !Sets the confidence state off.`		

SETup:PFERror:CONTinuous

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the trigger state for phase and frequency error measurements.
Setting		Range: • Single trigger mode = 0 | OFF • Continuous trigger mode = 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:PFERROR:CONTINUOUS OFF" !Specifies single trigger mode for` `!phase/frequency measurements.`		

SETup:PFERror:COUNt[:SNUMber]

Function	GSM TA	This command sets/queries the number of phase and frequency error measurements the test set will make and turns the multi-measurement count state on.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PFERROR:COUNT:SNUMBER 100" !Sets the value to 100 and the state to on.
```

SETup:PFERror:COUNt:NUMBer

Function	GSM TA	This command sets/queries the number of phase and frequency error measurements the Test Set will make when the multi-measurement count state is on.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PFERROR:COUNT:NUMBER 55"
!Sets the multi-measurement count value to 55.
```

SETup:PFERror:COUNt:STATe

Function	GSM TA	This command sets/queries the phase and frequency error multi-measurement count state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PFERROR:COUNT:STATE ON"
!Turns on multi-measurement mode for the phase/frequency measurement.
```

SETup:PFERror:FERRor[:LIMit]:GSM

Function	GSM TA	This command sets/queries the frequency error limit (in ppm) in the GSM format whether or not that format is active.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.01 to 0.1 Resolution: 0.01
Query		Range: 0.01 to 0.1 Resolution: 0.01
*RST Setting		0.1
Requirements	GSM/GPRS TA	Revison A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PFERROR:FERROR:GSM 0.05"
!Sets the frequency error limit to 0.05 ppm.
```

SETup:PFERror:FERRor[:LIMit][:SELected]

Function	GSM TA	This command sets/queries the frequency error limit (in ppm) in the active (that is currently selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.01 to 0.1 Resolution: 0.01
Query		Range: 0.01 to 0.1 Resolution: 0.01
*RST Setting		0.1
Requirements	GSM/GPRS TA	Revison A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PFERROR:FERROR 0.1"
!Sets the frequency error limit to 0.1 ppm.
```

SETup:PFERror:PEAK[:LIMit]:GSM

Function	GSM TA	This command sets/queries the peak phase error limit (in degrees) in the GSM format whether or not that format is active.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.00 to 20.00 Resolution: 0.01
Query		Range: 0.00 to 20.00 Resolution: 0.01
*RST Setting		20.00
Requirements	GSM/GPRS TA	Revison A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PFERROR:PEAK:GSM 15"
!Sets the peak phase error to 15 degrees.
```

SETup:PFERror:PEAK[:LIMit][:SELected]

Function	GSM TA	This command sets/queries the peak phase error limit (in degrees) in the active (that is currently selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.00 to 20.00 Resolution: 0.01
Query		Range: 0.00 to 20.00 Resolution: 0.01
*RST Setting		20.00
Requirements	GSM/GPRS TA	Revison A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PFERROR:PEAK 18"
!Sets the peak phase error to 18 degrees.
```

SETup:PFERror:RMS[:LIMit]:GSM

Function	GSM TA	This command sets/queries the RMS phase error limit (in degrees) in the GSM format whether or not that format is active.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.00 to 5.00 Resolution: 0.01
Query		Range: 0.00 to 5.00 Resolution: 0.01
*RST Setting		5.00
Requirements	GSM/GPRS TA	Revison A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PFERROR:RMS:GSM 3"
!Sets the RMS phase error to 3 degrees.
```

SETup:PFERror:RMS[:LIMit][:SELected]

Function	GSM TA	This command sets/queries the RMS phase error limit (in degrees) in the active (that is currently selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.00 to 5.00 Resolution: 0.01
Query		Range: 0.00 to 5.00 Resolution: 0.01
*RST Setting		5.00
Requirements	GSM/GPRS TA	Revison A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:PFERROR:RMS 3.5"` `!Sets the RMS phase error to 3.5 degrees.`		

SETup:PFERror:SYNC

Function	GSM TA	This command sets/queries the burst synchronization mode for phase and frequency error measurements in the active (that is the selected) format. See "Burst Synchronization of Measurements" on page 408.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		MIDamble | AMPLitude | NONE
Query		MID | AMPL | NONE
*RST Setting		MID
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:PFERROR:SYNC MIDAMBLE"` `!Selects burst synchronization to midamble for power versus time measurements.`		

SETup:PFERror:TIMeout[:STIMe]

Function	GSM TA	This command sets/queries the phase and frequency error measurement timeout value in seconds and sets the timeout state to on in the active (that is the selected) format. The units (S|MS) are optional, if no units are specified then unit default to S (seconds).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:PFERROR:TIMEOUT:STIME 3"
!Sets the timeout state to on and the timeout value to 3 seconds.
```

SETup:PFERror:TIMeout:TIME

Function	GSM TA	This command sets/queries the timeout value in seconds that will be used for phase and frequency error measurements when the timeout state is ON in the active (that is the selected) format. The units (S|MS) are optional, if no units are specified then unit default to S (seconds).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:PFERROR:TIMEOUT:TIME 4" !Sets the timeout value to 4 seconds.
```

SETup:PFERror:TIMeout:STATe

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command selects/queries the timeout state for a phase and frequency error measurement in the active (that is the selected) format.
Setting		0 | OFF | 1 | ON
Query		0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PFERROR:TIMEOUT:STATE ON"
!Sets the timeout state to on for a Phase/Frequency measurement.
```

SETup:PFERror:TRIGger:DELay

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the trigger delay time in seconds for a phase and frequency error measurement in the active (that is the selected) format. The units (S|MS|US|NS) are optional, if no units are specified then units default to S (seconds). See “Phase and Frequency Error Measurement Description” on page 113.
Setting		Range: –2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater
Query		Range: –2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater
*RST Setting		0 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PFERROR:TRIGGER:DELAY 1.2MS"
!Sets trigger delay time to 1.2 milliseconds
```

SETup:PFERror:TRIGer:SOURce

Function	GSM TA	This command sets/queries the trigger source for phase and frequency error measurements in the active (that is the selected) format. See "Phase and Frequency Error Measurement Description" on page 113.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		AUTO | PROTocol | RISE | IMMediate See "Triggering of Measurements" on page 404.
Query		AUTO | PROT | RISE | IMM
*RST Setting		AUTO
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETUP:PFERROR:TRIGGER:SOURCE AUTO" !Sets trigger source to automatic.`		

SETup:PFERror:TRIGger:QUALifier[:SELected]

Function	GSM TA	This command selects/queries the trigger qualifier for phase and frequency error measurements. See "Trigger Qualifier Description" on page 407.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETUP:PFERROR:TRIGGER:QUALIFIER OFF" !Sets trigger qualifier state to off.`		

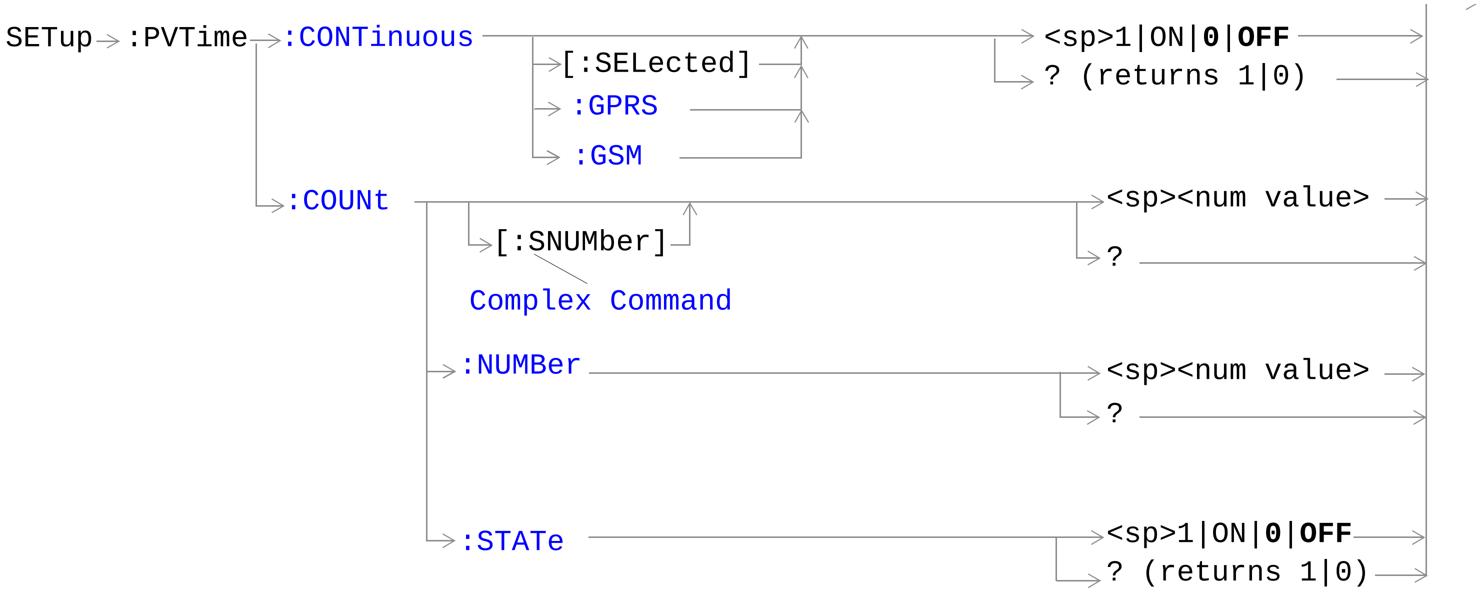
SETup:PFERror:TRIGger:QUALifier:GSM

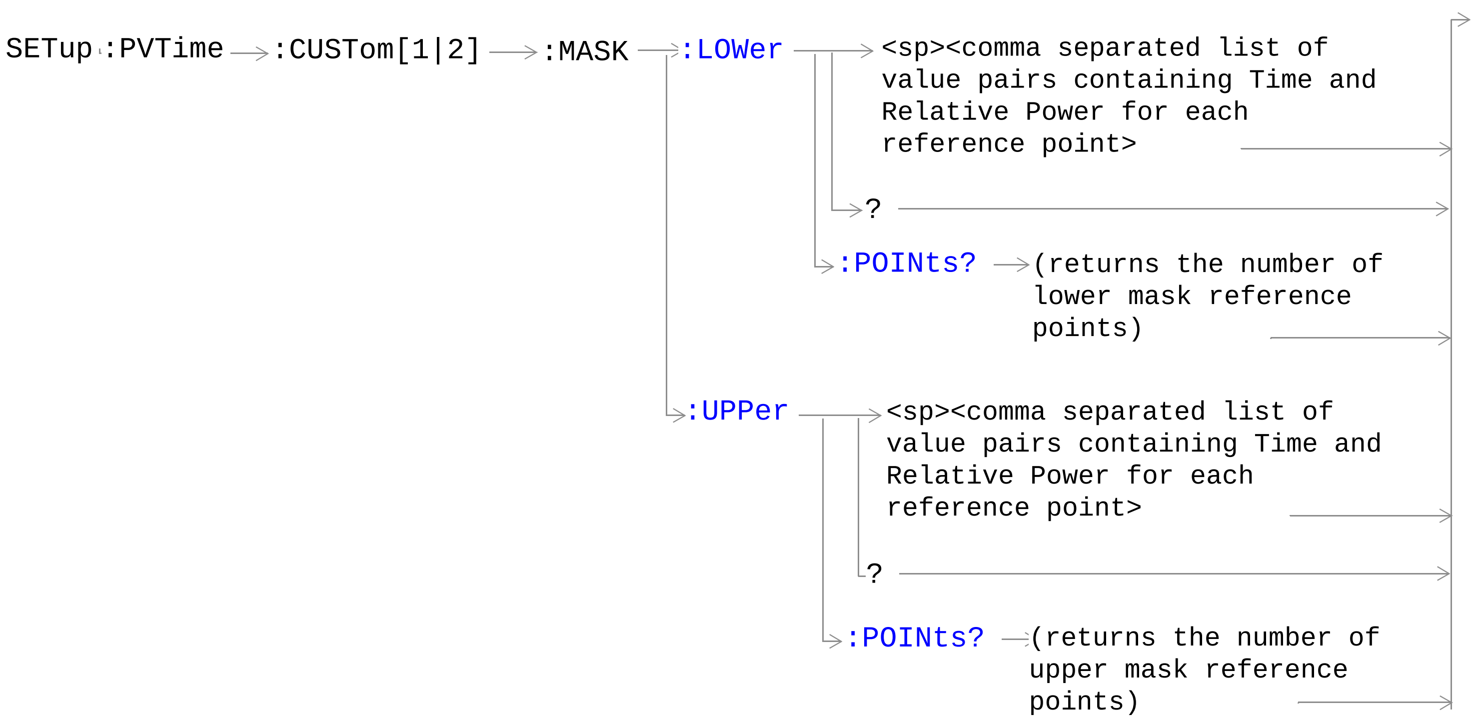
Function	GSM TA	This command selects/queries the trigger qualifier for phase and frequency error measurements in the GSM format whether or not that format is active. See "Trigger Qualifier Description" on page 407.
	GSM/GPRS LA	
	EGPRS LA	
	GPRS TA	This command is not applicable to GPRS.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		1 | ON
Requirements	GSM/GPRS TA	Revison A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

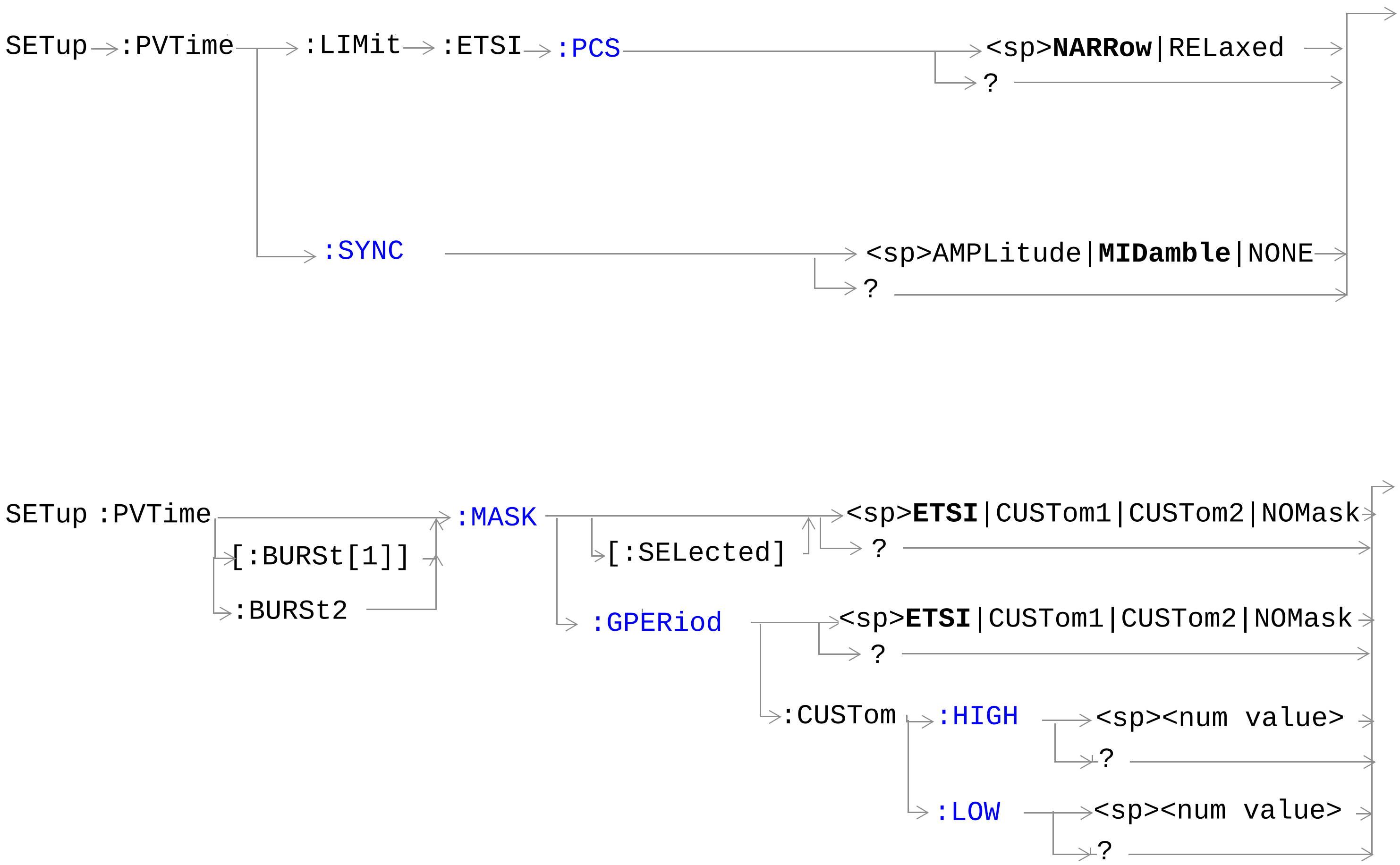
```
OUTPUT 714;"SETUP:PFERROR:TRIGGER:QUALIFIER:GSM OFF" !Sets trigger qualifier state to off.
```

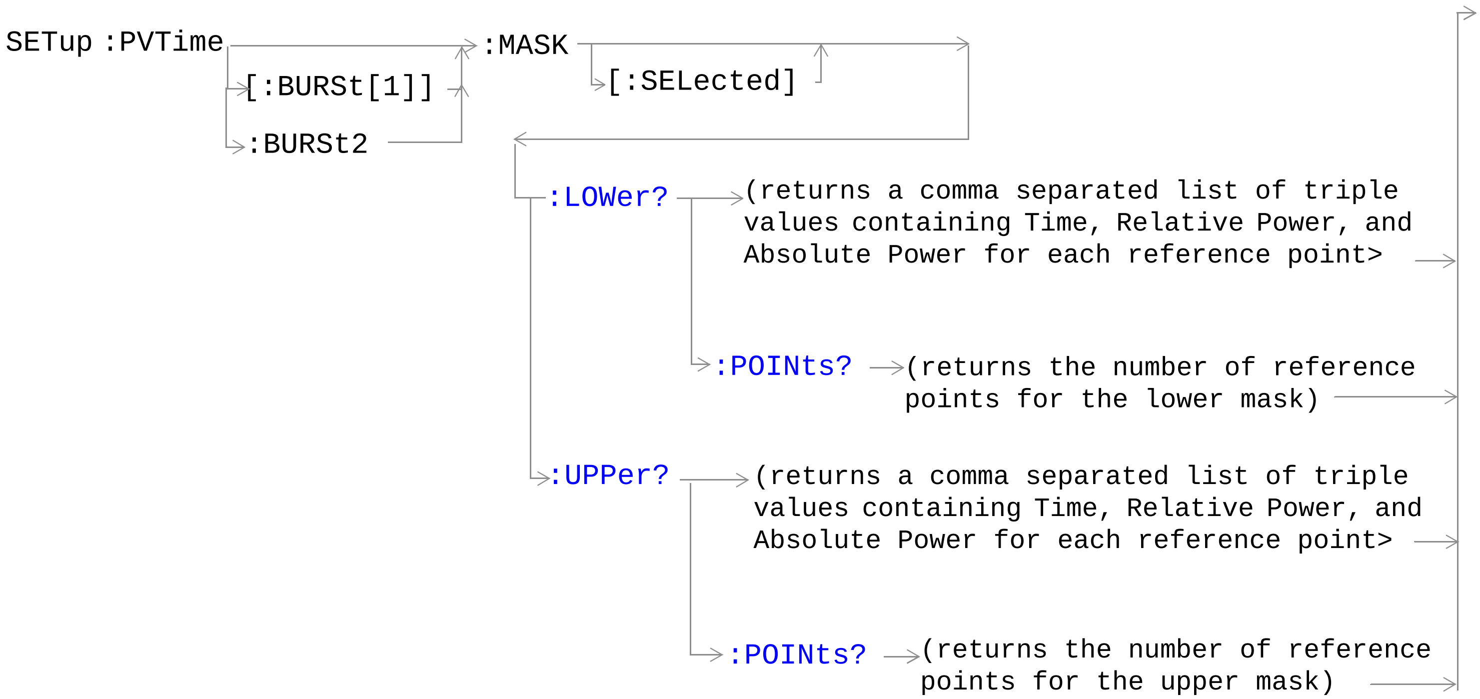
SETup:PVTime

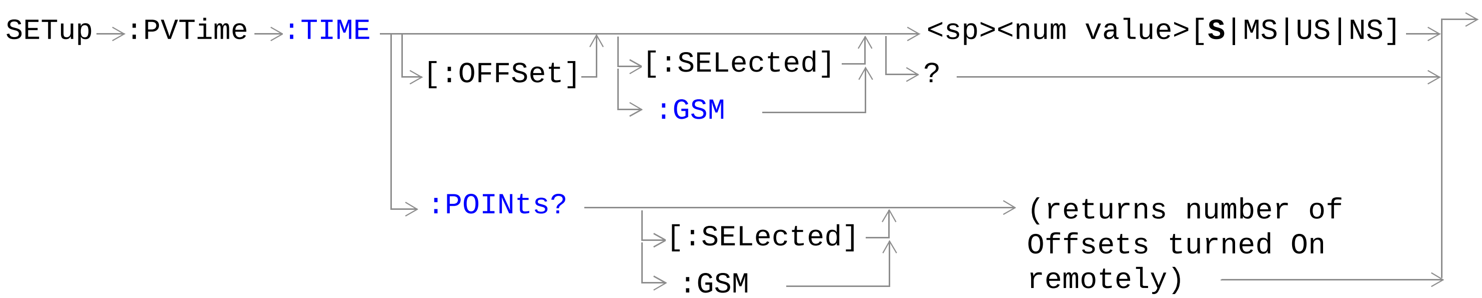




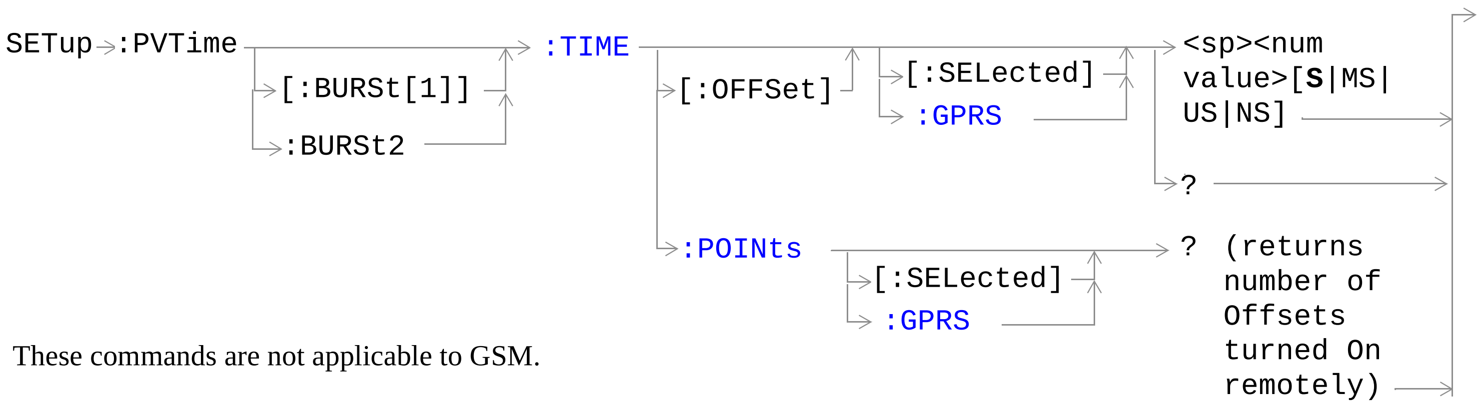
SETup:PVTime



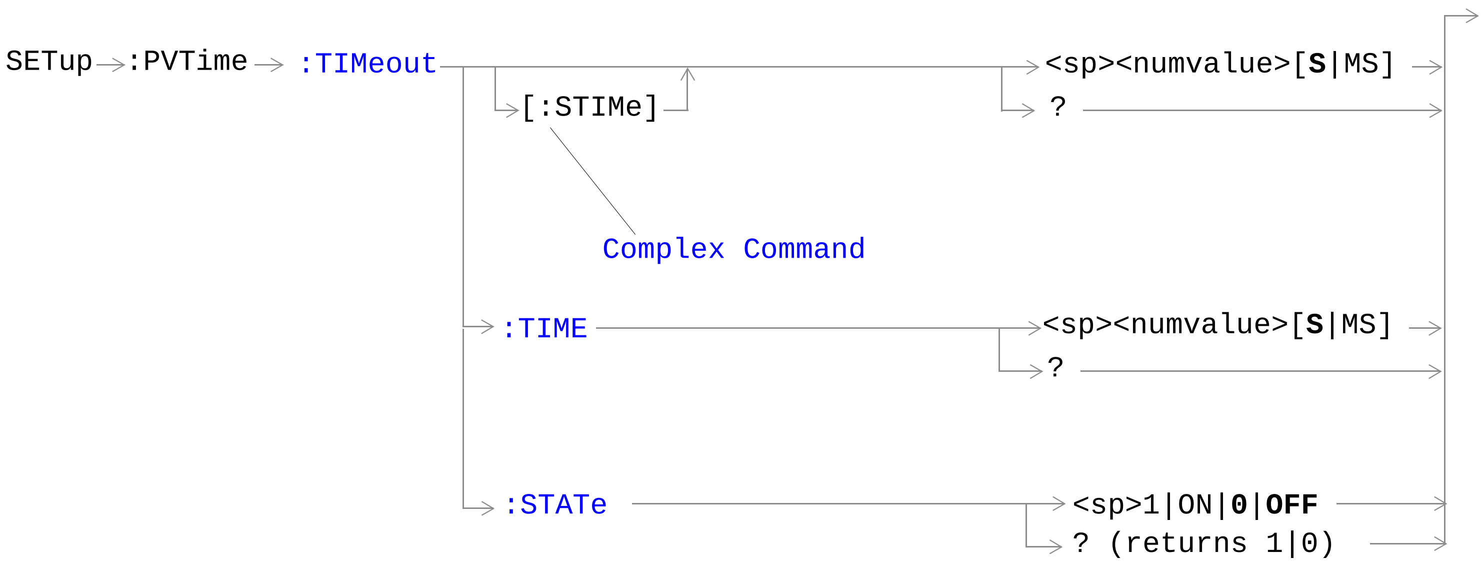




These commands are not applicable to GPRS.



These commands are not applicable to GSM.



```
SETup :PVTime :TRIGger :DELay   <sp><num value>[S|MS|US|NS]
                                ?
                       :SOURce  <sp>AUTO|IMMediate|
                                    PROTocol|RISE
                                ?
```

“Diagram Conventions” on page 1

SETup:PVTime:CONTinuous[:SELected]

Function	GSM TA	This command sets/queries the trigger state for power versus time measurements in the active (that is the selected) format. See “Measurement States” on page 406.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: • Single trigger mode = 0 | OFF • Continuous trigger mode = 1 | ON
Query		Range: 0 | 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:CONTINUOUS OFF"
!Specifies single trigger mode for power versus time measurements.
```

SETup:PVTime:CONTinuous:GPRS

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the trigger state for power versus time measurements in the GPRS format whether or not that format is active. See "Measurement States" on page 406.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: • Single trigger mode = 0 | OFF • Continuous trigger mode = 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:CONTINUOUS:GPRS OFF"
!Specifies single trigger mode for the GPRS power versus time measurements.
```

SETup:PVTime:CONTinuous:GSM

Function	GSM TA	This command sets/queries the trigger state for power versus time measurements in the GSM format whether or not that format is active. See “Measurement States” on page 406.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: • Single trigger mode = 0 | OFF • Continuous trigger mode = 1 | ON
Query		Range: 0 | 1
*RST Setting		0 (off)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:CONTINUOUS:GSM OFF"
!Specifies single trigger mode for the GSM power versus time measurements.
```

SETup:PVTime:COUNt[:SNUMber]

Function	GSM TA	This command sets/queries the number of power versus time measurements made by the test set. This command sets the count state to ON.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:COUNT:SNUMBER 25"
!Sets the state to on and the multi-measurement count value to 25.
```

SETup:PVTime:COUNt:NUMBer

Function	GSM TA	This command sets/queries the number of Power vs Time measurements made by the test set. The multi-measurement count state must be on.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:COUNT:NUMBER 20" !Sets multi-measurement count value to 20.
```

SETup:PVTime:COUNt:STATe

Function	GSM TA	This command sets/queries the power versus time multi-measurement count state in the active (that is the selected) format.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:PVTIME:COUNT:STATE ON" !Sets multi-measurement count state to on.
```

SETup:PVTime:CUSTom1:MASK:LOWer?
SETup:PVTime:CUSTom2:MASK:LOWer?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the lower limits for the specified custom mask to be used with the Power versus Time measurement. A total of 32 reference points are available to you when defining a custom mask. All custom masks have a step profile rather than a linearly interpolated profile. Each custom mask has a fixed starting point which is located -50 us relative to the middle of the zero-th symbol (that is, T_0). All mask reference points that you specify are end points of one section of the custom mask. If you use this command without specifying any parameters, the previously defined mask is cleared.
Setting		Range: 0 to 32 comma-separated value pairs containing Time and Relative Power within the following ranges: • Time: -50 us to 593 us • Relative Power and Absolute Power: -200 to +200 dBc Resolution: • Time: 1 ns • Relative Power: 0.1 dB
Query		Range: 0 to 32 comma-separated value pairs containing Time and Relative Power within the following ranges: • Time: -50 us to 593 us and 9.91E+37 (NAN) if no offsets are specified • Relative Power and Absolute Power: -200 to +200 dBc Resolution: • Time: 1 ns • Relative Power: 0.1 dB
*RST Setting		ETSI GMSK Mask
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:CUSTOM1:MASK:LOWER 0us, -2, 300us, 3
!Sets the first 2 points of the lower custom mask.  All other points are blanked.
```

SETup:PVTime:CUSTom1:MASK:LOWer:POINts?
SETup:PVTime:CUSTom2:MASK:LOWer:POINts?

Function	GSM TA	This query returns the number of reference points for the specified user settable lower mask.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 32 Resolution: 1
*RST Setting		0
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SETup:PVTime:CUSTom1:MASK:UPPer?
SETup:PVTime:CUSTom2:MASK:UPPer?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the upper limits for the specified custom mask to be used with the Power versus Time measurement. A total of 32 reference points are available to you when defining a custom mask. All custom masks have a step profile rather than a linearly interpolated profile. Each custom mask has a fixed starting point which is located -50 us relative to the middle of the zero-th symbol (that is, T_0). All mask reference points that you specify are end points of one section of the custom mask. If you use this command without specifying any parameters, the previously defined mask is cleared.
Setting		Range: 0 to 32 comma-separated value pairs containing Time and Relative Power within the following ranges: • Time: -50 us to 593 us • Relative Power and Absolute Power: -200 to +200 dBc Resolution: • Time: 1 ns • Relative Power: 0.1 dB
Query		Range: 0 to 32 comma-separated value pairs containing Time and Relative Power within the following ranges: • Time: -50 us to 593 us and 9.91E+37 (NAN) if no offsets are specified • Relative Power and Absolute Power: -200 to +200 dBc Resolution: • Time: 1 ns • Relative Power: 0.1 dB
*RST Setting		ETSI GMSK Mask
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:CUSTOM1:MASK:UPPER -40us, 50, -20us, 10, 0us, 1, 300us, 2"
!Sets the first 4 points of the upper custom mask.  All other points are blanked.
```

SETup:PVTime:CUSTom1:MASK:UPPer:POINts?
SETup:PVTime:CUSTom2:MASK:UPPer:POINts?

Function	GSM TA	This query returns the number of reference points for the specified user settable upper mask.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 32 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SETup:PVTime:LIMit:ETSI:PCS

Function	GSM TA	This command sets/queries the mask specification used for the PCS band in the active (that is the selected) format. ETSI define a relaxed mask specification for the PCS band in 3GPP 51.010-1 section 13.3.5(c).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		NARRow | RELaxed
Query		NARR | REL
*RST Setting		NARRow
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:LIMIT:ETSI:PCS REL"
!Selects the relaxed mask specification for power versus time measurements in the PCS band.
```

SETup:PVTime[BURSt[1]]:MASK[:SELected]
SETup:PVTime:BURSt2:MASK[:SELected]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the the type of mask to be used for the specified burst in the single slot or multislot configuration. Setting this command to ETSI selects the appropriate ETSI compliant mask for the specified burst. Setting this command to CUSTom1 selects the user-defined CUSTOM 1 mask for the specified burst. Setting this command to CUSTom2 selects the user-defined CUSTOM 2 mask for the specified burst. Setting this command to NOMask disables mask checking for the specified burst. Note that if you want to use a select a custom mask (CUSTOM 1 or CUSTOM 2), you need to configure the mask settings before use.
Setting		ETSI | CUSTom1|CUSTom2|NOMask
Query		ETSI | CUST1|CUST2|NOM
*RST Setting		ETSI
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:BURST:MASK CUSTOM1"
!Sets burst 1 to use the custom1 mask for the pass/fail comparison
```

SETup:PVTime[BURSt[1]]:MASK:GPERiod
SETup:PVTime:BURSt2:MASK:GPERiod

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the guard period mask type for Power versus Time measurements. Setting this command to ETSI selects the ETSI compliant mask for the guard period. Setting this command to CUSTom selects the user-defined CUSTOM mask for the guard period. Setting this command to NOMask disables mask checking for the guard period.
Setting		ETSI | CUSTom|NOMask
Query		ETSI | CUST||NOM
*RST Setting		ETSI
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVT:BURST1:MASK:GPERIOD CUSTOM
!Sets the measurement to use the custom guard period settings
!for the guard period between bursts 1 and 2
```

SETup:PVTime[BURSt[1]]:MASK:GPERiod:CUSTom:HIGH
SETup:PVTime:BURSt2:MASK:GPERiod:CUSTom:HIGH

Function	GSM TA	This command sets/queries the custom guard period high level offset. This is the guard period level in dBc relative to the first burst’s carrier power level.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: -200 dB to +200 dB Resolution: 0.01 dB
Query		Range: -200 dB to +200 dB Resolution: 0.01 dB
*RST Setting		+1 dBc (relative to Burst 1)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:BURST1:MASK:GPERIOD:CUSTOM:HIGH 2"
!Sets the custom guard period high value to be 2 dBc
```

SETup:PVTime[BURSt[1]]:MASK:GPERiod:CUSTom:LOW
SETup:PVTime:BURSt2:MASK:GPERiod:CUSTom:LOW

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the custom guard period low level offset. This is the guard period level in dBc relative to the second burst’s carrier power level.
Setting		Range: -200 dB to +200 dB Resolution: 0.01 dB
Query		Range: -200 dB to +200 dB Resolution: 0.01 dB
*RST Setting		+4 dBc (relative to Burst 2)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:BURST1:MASK:GPERIOD:CUSTOM:LOW 5"
!Sets the custom guard period low value to be 5dBc
```

SETup:PVTime[BURSt[1]]:MASK[:SELected]:LOWer?
SETup:PVTime:BURSt2:MASK[:SELected]:LOWer?

Function	GSM TA	This query returns the lower limits for the actual mask being used by the specified burst.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 32 comma-separated triple values containing Time, Relative Power, and Absolute Power within the following ranges: • Time: -50 us to 593 us • Relative Power and Absolute Power: -200 to +200 dBc and 9.91E+37 (NAN) for Absolute Power values if custom mask is used Resolution: • Time: 1 ns • Relative Power and Absolute Power: 0.1 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SETup:PVTime[BURSt[1]]:MASK[:SELected]:LOWer:POINts?
SETup:PVTime:BURSt2:MASK[:SELected]:LOWer:POINts?

Function	GSM TA	This query returns the number of reference points for the lower mask being used by the specified burst.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 32 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SETup:PVTime[BURSt[1]]:MASK[:SELected]:UPPer?
SETup:PVTime:BURSt2:MASK[:SELected]:UPPer?

Function	GSM TA	This query returns the upper limits for the actual mask being used by the specified burst.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 32 comma-separated triple values containing Time, Relative Power, and Absolute Power within the following ranges: • Time: -50 us to 593 us • Relative Power and Absolute Power: -200 to +200 dBc and 9.91E+37 (NAN) for Absolute Power values if custom mask is used Resolution: • Time: 1 ns • Relative Power and Absolute Power: 0.1 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SETup:PVTime:BURSt2:MASK[:SELected]:UPPer:POINts?

Function	GSM TA	This query returns the number of reference points for the lower mask being used by the specified burst.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 32 Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SETup:PVTime:SYNC

Function	GSM TA	This command sets/queries the burst synchronization mode for power versus time measurements in the active (that is the selected) format. See "Burst Synchronization of Measurements" on page 408.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		MIDamble | AMPLitude | NONE
Query		MID | AMPL | NONE
*RST Setting		MID
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:SYNC MIDAMBLE"
!Selects burst synchronization to midamble for GPRS power versus time measurements.
```

SETup:PVTime:TIME[:OFFSet][:SELected]

Function	GSM TA	This command sets/queries the time offsets in seconds for power vs time power measurement, (not the mask measurement) in the active (that is the selected) format. All 12 time offsets are set to on by default. If less than 12 values are sent with this command, the remaining offsets are turned off, see "Power versus Time Measurement Description" on page 117. These values are referenced to the occurrence of bit 0 in a normal burst. The units (S|MS|US|NS) are optional, if no units are specified then units default to S.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 12 comma-separated values ranging from: –50 us to 593 us Resolution: 1 ns
Query		Range: 1 to 12 comma-separated values ranging from: –50 us to 593 us and 9.91E+37 (NAN) if no offsets are specified Resolution: 1 ns
*RST Setting		Time offsets 1 through 12 are on and set to these values: time offset 1 = –28 us time offset 2 = –18 us time offset 3 = –10 us time offset 4 = 0 us time offset 5 = 321.2 us time offset 6 = 331.2 us time offset 7 = 339.2 us time offset 8 = 349.2 us time offset 9 = 542.8 us time offset 10 = 552.8 us time offset 11 = 560.8 us time offset 12 =570.8 us
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:TIME:OFFSET -28.0US, -18.0US, -10.0US, 0"

!Configures the first four time offset points and turns the remaining eight off.
!Using the query form of this command would return four time offset values

OUTPUT 714;"SETUP:PVTIME:TIME:OFFSET -28.0US"  !Configures the first time offset
                                               !point and turns the remaining
                                               !eleven off. Using the query form
                                               !of this command would return one
                                                !time offset value

OUTPUT 714;"SETUP:PVTIME:TIME:OFFSET" !Turns all 12 offset points off. Using the
                                      !query form of this command would return
                                      !9.91E+37 (NAN)
```

SETup:PVTime:TIME[:OFFSet]:GSM

Function	GSM TA	This command sets/queries the time offsets in seconds for power vs time power measurement, (not the mask measurement) in the GSM format whether or not that format is active. All 12 time offsets are set to on by default. If less than 12 values are sent with this command, the remaining offsets are turned off, see “Power versus Time Measurement Description” on page 117. These values are referenced to the occurrence of bit 0 in a normal burst. The units (S | MS | US | NS) are optional, if no units are specified then units default to S.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 12 comma-separated values ranging from: –50 us to 593 µs Resolution: 1 ns
Query		Range: 1 to 12 comma-separated values ranging from: –50 us to 593 µs and 9.91E+37 (NAN) if no offsets are specified Resolution: 1 ns
*RST Setting		Time offsets 1 through 12 are on and set to these values: time offset 1 = –28 us time offset 2 = –18 us time offset 3 = –10 us time offset 4 = 0 us time offset 5 = 321.2 us time offset 6 = 331.2 us time offset 7 = 339.2 us time offset 8 = 349.2 us time offset 9 = 542.8 us time offset 10 = 552.8 us time offset 11 = 560.8 us time offset 12 =570.8 us
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:TIME:OFFSET:GSM -28.0US, -18.0US, -10.0US, 0"

!Configures the first four time offset points and turns the remaining eight off.
!Using the query form of this command would return four time offset values

OUTPUT 714;"SETUP:PVTIME:TIME:OFFSET:GSM -28.0US"  !Configures the first time offset
                                                   !point and turns the remaining
                                                   !eleven off. Using the query form
                                                   !of this command would return one
                                                   !time offset value

OUTPUT 714;"SETUP:PVTIME:TIME:OFFSET:GSM" !Turns all 12 offset points off. Using the
                                          !query form of this command would return
                                          !9.91E+37 (NAN)
```

SETup:PVTime:BURSt2:TIME[:OFFSet][:SELected]

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the time offsets (for the specified burst of the multislot configuration) for the power vs time power measurement, (not the mask measurement) in the active (that is the selected) format. All 12 time offsets are set to on by default. If less than 12 values are sent with this command, the remaining offsets are turned off, see “Power versus Time Measurement Description” on page 117. These values are referenced to the occurrence of bit 0 in a normal burst. The units (S | MS | US | NS) are optional, if no units are specified then units default to S.
Setting		Range: 0 to 12 comma-separated values ranging from: –50 us to 593 µs Note that there is a further restriction on this range to ensure that a valid result is returned when testing a GPRS mobile which supports a multislot configuration with two uplink timeslots. For more details, see “Time Offset Range Restrictions for GPRS and EGPRS Mobiles” on page 1464. Resolution: 1 ns
Query		Range: 1 to 12 comma-separated values ranging from: –50 us to 593 µs and 9.91E+37 (NAN) if no offsets are specified Resolution: 1 ns
*RST Setting		Time offsets 1 through 12 are on and set to these values: **Burst 1** time offset 1 = –28 us time offset 2 = –18 us time offset 3 = –10 us time offset 4 = 0 us time offset 5 = 321.2 us time offset 6 = 331.2 us time offset 7 = 339.2 us time offset 8 = 349.2 µs time offset 9 = 542.8 us time offset 10 = 552.8 us time offset 11 = 560.8 us time offset 12 = 570.8 us **Burst 2** time offset 1 = 0 us time offset 2 = 0 us time offset 3 = 0 us time offset 4 = 0 us time offset 5 = 321.2 us time offset 6 = 331.2 us time offset 7 = 339.2 us time offset 8 = 349.2 us time offset 9 = 542.8 us time offset 10 = 552.8 us time offset 11 = 560.8 us time offset 12 = 570.8 us
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example
`OUTPUT 714;"SETUP:PVTIME:BURSt2:TIME:OFFSET 0US, 0US, 0US, 0US, 321.2.0US, 331.2US"`
`!Configures the first six time offset points and turns the remaining six off for burst 2.` `!Using the query form of this command would return six time offset values.`

SETup:PVTime:BURSt2:TIME[:OFFSet]:GPRS

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the time offsets (for the specified burst of the multislot configuration) for the power vs time power measurement, (not the mask measurement) in the GPRS format whether or not that format is active. All 12 time offsets are set to on by default. If less than 12 values are sent with this command, the remaining offsets are turned off, see "Power versus Time Measurement Description" on page 117. These values are referenced to the occurrence of bit 0 in a normal burst. The units (S | MS | US | NS) are optional, if no units are specified then units default to S.
Setting		Range: 0 to 12 comma-separated values ranging from: –50 us to 593 µs Note that there is a further restriction on this range to ensure that a valid result is returned when testing a GPRS mobile which supports a multislot configuration with two uplink timeslots. For more details, see "Time Offset Range Restrictions for GPRS and EGPRS Mobiles" on page 1464. Resolution: 1 ns
Query		Range: 1 to 12 comma-separated values ranging from: –50 us to 593 µs and 9.91E+37 (NAN) if no offsets are specified Resolution: 1 ns
*RST Setting		Time offsets 1 through 12 are on and set to these values: **Burst 1** time offset 1 = –28 us time offset 2 = –18 us time offset 3 = –10 us time offset 4 = 0 us time offset 5 = 321.2 us time offset 6 = 331.2 us time offset 7 = 339.2 us time offset 8 = 349.2 µs time offset 9 = 542.8 us time offset 10 = 552.8 us time offset 11 = 560.8 us time offset 12 = 570.8 us **Burst 2** time offset 1 = 0 us time offset 2 = 0 us time offset 3 = 0 us time offset 4 = 0 us time offset 5 = 321.2 us time offset 6 = 331.2 us time offset 7 = 339.2 us time offset 8 = 349.2 us time offset 9 = 542.8 us time offset 10 = 552.8 us time offset 11 = 560.8 us time offset 12 = 570.8 us

Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:BURSt2:TIME:OFFSET:GPRS 0US, 0US, 0US, 0US, 321.2.0US, 331.2US"

!Configures the first six time offset points and turns the remaining six off for burst 2.
!Using the query form of this command would return six time offset values.
```

SETup:PVTime:TIME:POINts?

Function	GSM TA	This command queries the number of Measurement Offset points that are turned on during a power versus time measurement in the active (that is the selected) format. This command is useful for determining how many time values are returned in a comma-separated list when the "SETup:PVTime:TIME[:OFFSet][:SELected]" query is sent, and how many power values are returned when the "FETCh:PVTime:POWer[:ALL][:MAXimum]?" on page 959 command is sent.
	GPRS TA	This command is not applicable to GPRS.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 12 Resolution: 1
*RST Setting		12
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SETup:PVTime[BURSt[1]]:TIME:POINts[:SELected]?
SETup:PVTime:BURSt2:TIME:POINts[:SELected]?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command queries the number of the specified burst's Measurement Offset points that are turned on during a power versus time measurement in the active (that is the selected) format. This command is useful for determining how many time values are returned in a comma-separated list when the "SETup:PVTime:TIME[:OFFSet][:SELected]" query is sent, and how many power values are returned when the "FETCh:PVTime:POWer[:ALL][:MAXimum]?" on page 959 command is sent.
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 0 to 12 Resolution: 1
*RST Setting		The *RST value of this command depends on the format that is currently active. For example, if the GSM format is currently active, the *RST value for this command is the same value as the equivalent command containing the :GSM format identifier.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SETup:PVTime[BURSt[1]]:TIME:POINts:GPRS?
SETup:PVTime:BURSt2:TIME:POINts:GPRS?

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA GSM/GPRS LA EGPRS LA	This command queries the number of the specified burst's Measurement Offset points that are turned on during a power versus time measurement in the GPRS format whether or not that format is active. This command is useful for determining how many time values are returned in a comma-separated list when the "SETup:PVTime:TIME[:OFFSet][:SELected]" query is sent, and how many power values are returned when the "FETCh:PVTime:POWer[:ALL][:MAXimum]?" on page 959 command is sent.
Query		Range: 0 to 12 Resolution: 1
*RST Setting		12
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SETup:PVTime:TIMeout[:STIMe]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the timeout value in seconds that is used for power versus time measurements in the active (that is the selected) format. This command also sets the timeout state to on. The units (S|MS) are optional, if no units are specified then units default to S.
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:TIMEOUT:STIME 4" !Sets the state to on and the timeout
                                          !value to 4 seconds.
```

SETup:PVTime:TIMeout:TIME

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the timeout value in seconds that will be used for power versus time measurements in the active (that is the selected) format. The units (S|MS) are optional, if no units are specified then units default to S.
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:TIMEOUT:TIME 6" !Sets the timeout value to 6 seconds.
```

SETup:PVTime:TIMeout:STATe

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries power versus time timeout state in the active (that is the selected) format.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:TIMEOUT:STATE ON" !Sets timeout state to on.
```

SETup:PVTime:TRIGger:DELay

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command selects/queries the trigger delay in seconds for power versus time measurements in the active (that is the selected) format. The units (S|MS|US|NS) are optional, if no units are specified then units default to S.
Setting		Range: –2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater
Query		Range: –2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater
*RST Setting		0 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:PVTIME:TRIGGER:DELAY 1.1MS" !Sets trigger delay value to 1.1
                                              !milli-seconds.
```

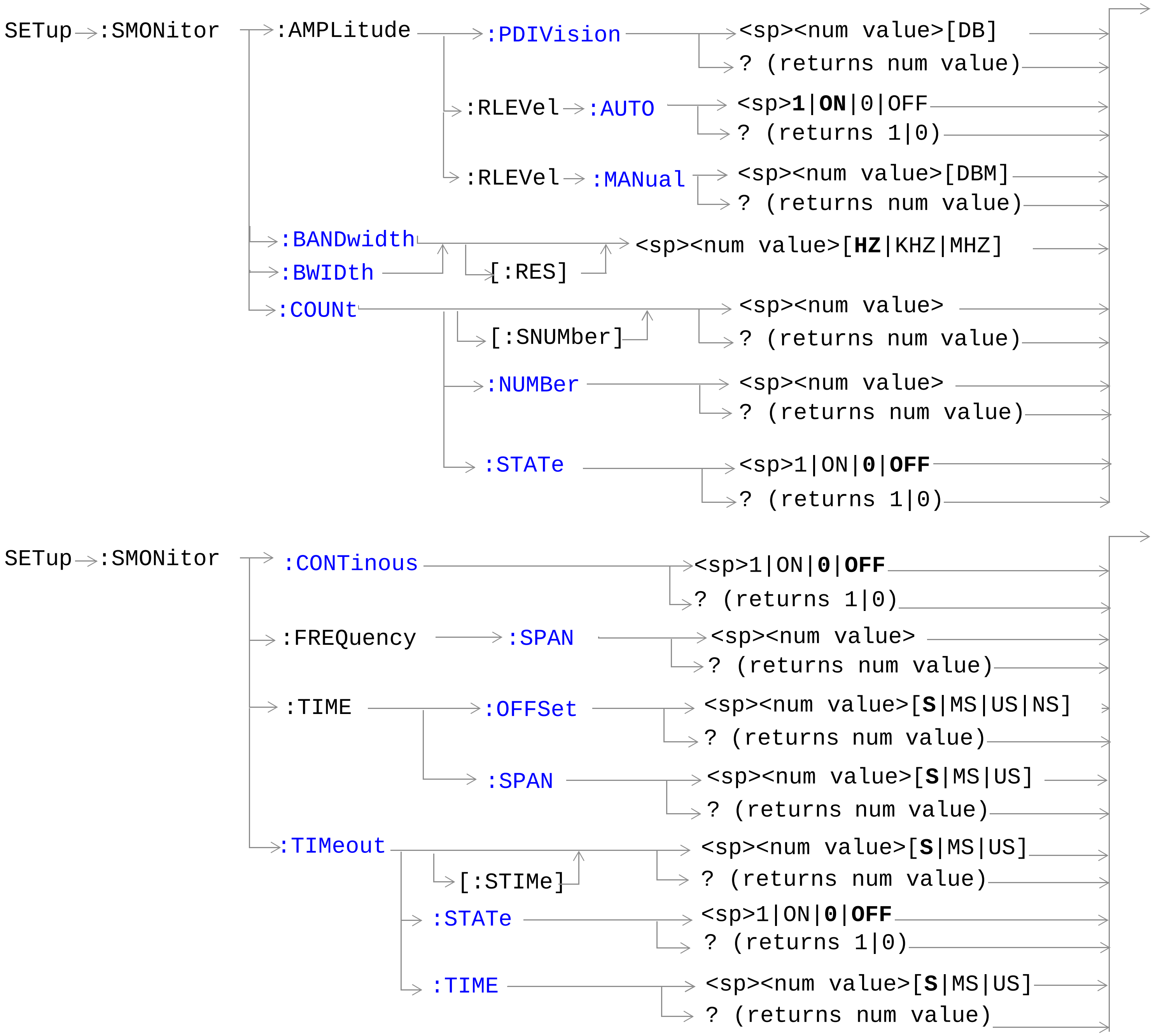
SETup:PVTime:TRIGger:SOURce

Function	GSM TA	This command selects/queries the trigger source for power versus time measurements in the active (that is the selected) format. See “Triggering of Measurements” on page 404.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		AUTO | PROTocol | RISE | IMMediate
Query		AUTO | PROT | RISE | IMM
*RST Setting		AUTO
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

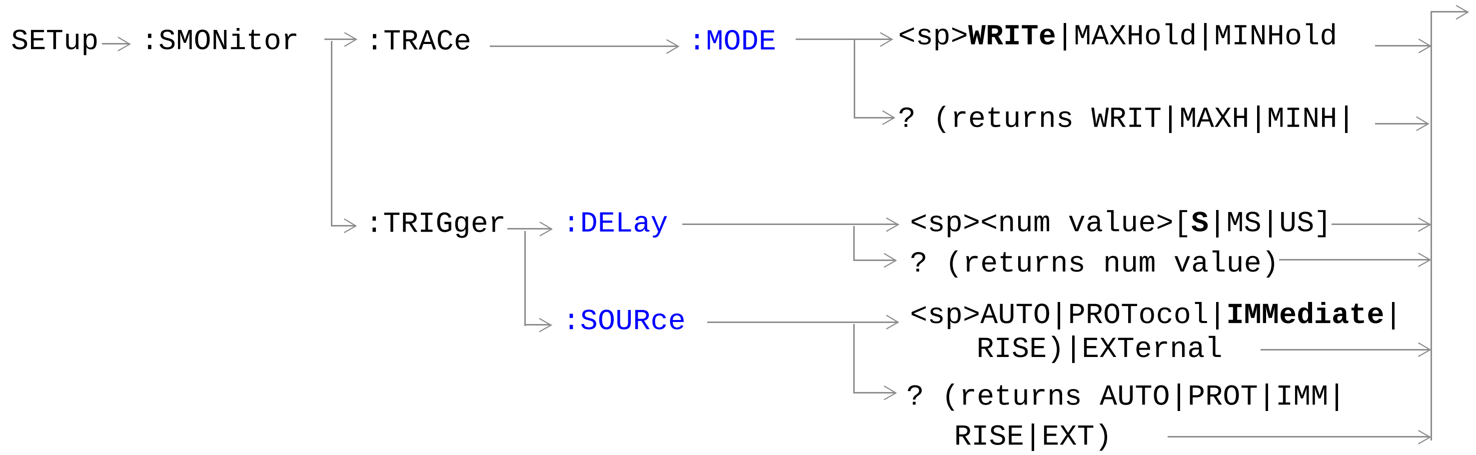
Programming Example

```
OUTPUT 714;"SETUP:PVTIME:TRIGGER:SOURCE AUTO" !Sets trigger source to automatic.
```

SETup:SMONitor



SETup:SMONitor



“Diagram Conventions” on page 1

SETup:SMONitor:AMPLitude:PDIVision

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets the scale of the spectrum monitor's display in dB per division (dB/div).
Setting		Range: 0.1 to 20 dB Resolution: 0.1
Query		Range: 0.1 to 20 dB Resolution: 0.1
*RST Setting		10 dB
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:AMPLitude:PDIVision 1DB"
!Sets scale of the spectrum monitor's display to 1 dB per division.
```

SETup:SMONitor:AMPLitude:RLEVel:AUTO

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command allows you to set whether or not the spectrum monitor's reference level is selected automatically by the test set.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST Setting		OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:AMPLitude:RLEVel:AUTO ON"
!Sets spectrum monitor's reference level to set automatically.
```

SETup:SMONitor:AMPLitude:RLEVel:MANual

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command allows you to set the spectrum monitors actual reference level in dBm. The range settings are coupled to the amplitude offset value for the current value of the expected frequency (set using "SYSTem:CORRection:[:SGAin]" on page 1280). Changing the amplitude offset value does not change the reference value, unless the new value for the amplitude offset forces the current value of the reference level to exceed the range limits. If this happens the reference level is set to its limit.
Setting		Range: (-50 dBm + Amplitude Offset) to +37 dBm Resolution: 0.1 dB
Query		Range: (-50 dBm + Amplitude Offset) to +37 dBm Resolution: 0.1 dB
*RST Setting		+37 dB + Amplitude Offset
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:AMPLitude:RLEVel:MANual -20DBM"
!Sets spectrum monitor's reference level to -20 dBm.
```

SETup:SMONitor:BWIDth[:RES]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the resolution bandwidth. To measure the total power of a signal you must select a resolution bandwidth greater than or equal to the signal bandwidth. To resolve two spectral components the resolution bandwidth must be less than the difference between them. The units (HZ|KHZ|MHZ) are optional, if no units are specified then the default is HZ. To set a resolution bandwidth the command "SETup:SMONitor:FREQuency:SPAN" on page 1201, must be set to 0 Hz. Any setting you enter is rounded to the hearest of the three settings.
Setting		Range: 100 kHz | 300 kHz | 1 MHz
Query		Range: 100 kHz | 300 kHz | 1 MHz
*RST Setting		300 kHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:BAND 100 KHZ"
!Sets spectrum monitor's resolution bandwidth to 100 kHz.
```

SETup:SMONitor:COUNt[:SNUMber]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the averaging count and turns on averaging.
Setting		Range: 1 to 999
Query		Range: 1 to 999
*RST Setting		100
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:COUNt 200"
!Sets the averaging count to 200 and sets the averaging the state to on.
```

SETup:SMONitor:COUNt:NUMber

Function	GSM TA	This command sets/queries the averaging count used when the averaging is turned on.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999
Query		Range: 1 to 999
*RST Setting		100
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETup:SMONitor:COUNt:NUMBer 200" !Sets the averaging count to 200.`		

SETup:SMONitor:COUNt:STATe

Function	GSM TA	This command sets/queries the averaging state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST Setting		OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SETup:SMONitor:COUNt:STATe 1" !Turns on averaging.`		

SETup:SMONitor:CONTinous

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command arms triggering for a measurement sweep. Trigger arming can be single (OFF) or continuous (ON). With single triggering, the measurement sweep starts when an INITiate or READ command is received. With continuous triggering, measurement sweeps initiate immediately and continuously. The *RST (remote full preset) default setting is single triggering. At power-on or after a front-panel preset, the default setting is continuous triggering.
Setting		Range: ON | 1 | OFF | 0
Query		Range: 1 | 0
*RST Setting		OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:CONTinuous ON" ! Sets the trigger mode to continuous.
```

SETup:SMONitor:FREQuency:SPAN

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the spectrum monitor’s frequency span.
Setting		Range: A value in the range 125 kHz to 100 MHz can be entered, however the value is rounded to the nearest of: • 125 kHz, 500 kHz, 1.25 MHz, 2.5 MHz, 4 MHz, 5 MHz, 10 MHz, 12 MHz, 20 MHz, 40 MHz, 80 MHz, 100 MHz
Query		Range: Same as setting range.
*RST Setting		5 MHz
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:FREQuency:SPAN 10MHZ" ! Sets the frequency span to 10 MHz.
```

SETup:SMONitor:TIME:OFFSet

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the time offset. You can specify the time window for viewing the signal using this command and the "SETup:SMONitor:TIME:SPAN" on page 1202. The measurement is made for the duration of the time span, beginning at the time defined by the trigger event plus the trigger delay plus the time offset. The units (S|MS|US|NS) are optional, if no units are specified then the default is S.
Setting		Range: 0 us to 10 s Resolution: 0.1 us
Query		Range: 0 us to 10 s Resolution: 0.1 us
*RST Setting		0 us
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:TIME:OFFSet 25 MS"
! Sets the spectrum monitor’s time offset to 25 millisecond.
```

SETup:SMONitor:TIME:SPAN

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the span of the time display. The units (S|MS|US) are optional, if no units are specified then the default is S.
Setting		Range: 50 us to 70 ms Resolution: 0.250 us
Query		Range: 50 us to 70 ms Resolution: 0.250 us
*RST Setting		10 ms
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:TIME:SPAN 30MS"
! Sets the spectrum monitor’s time span to 30 millisecond.
```

SETup:SMONitor:TIMeout[:STIMe]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the spectrum monitor's timeout interval and turns on the timeout state. The units (S|MS|US) are optional, if no units are specified then the default is S.
Setting		Range: 1 to 999 seconds Resolution: 0.1 second
Query		Range: 1 to 999 seconds Resolution: 0.1 second
*RST Setting		10 s
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:TIMeout:STIMe 12S"
! Turns on the timeout timer and sets the timer to expire in 12 seconds.
```

SETup:SMONitor:TIMeout:STATe

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the state of the spectrum monitor's timeout timer.
Setting		Range: 1 | ON | 0 | OFF
Query		Range: 1 | 0
*RST Setting		OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:TIMeout:STATe 1" ! Turns on the timeout timer.
```

SETup:SMONitor:TIMeout:TIME

Function	GSM TA	This command sets/queries the spectrum monitor's timeout interval. The units (S|MS|US) are optional, if no units are specified then the default is S.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:TIMeout:TIME 20S"
! Generates a timeout error if no results are reported within 20 seconds.
```

SETup:SMONitor:TRACe:MODE

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">This command sets/queries the trace update parameter.
WRITe (Clear-write) erases any data previously stored in the selected trace.
MAXHold (maximum hold) maintains the maximum level for each trace point of the selected trace and updates each trace point if a new maximum level is detected in successive sweeps.
MINHold (minimum hold) maintains the minimum level for each trace point of the selected trace and updates each trace point if a new minimum level is detected in successive sweeps.
If you change the center, start, or the frequency span, or the resolution bandwidth, the MAXHold and MINHold traces are restarted. These traces are not restarted if you change only the reference level or the scale.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range: WRITe | MAXHold | MINHold</td></tr>
<tr><td colspan="2">Query</td><td>Range: WRIT | MAXH | MINH</td></tr>
<tr><td colspan="2">*RST Setting</td><td>WRITe</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
<code>OUTPUT 714;"SETup:SMONitor:TRACe:MODE MAXH"</code>
<code>! Sets the update method to maximim hold.</code></td></tr>
</table>

SETup:SMONitor:TRiGger:DELay

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the trigger delay. This command allows you to add a time delay following the trigger event before samples are taken. The delay can be positive or negative. The units (S|MS|US) are optional, if no units are specified then the default is S.
Setting		Range: -50 ms to +50 ms Resolution: 5 significant digits or 100 ns, whichever is greater
Query		Range: -50 ms to +50 ms Resolution: 5 significant digits or 100 ns, whichever is greater
*RST Setting		350 us
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETup:SMONitor:TRIGger:DELay 1MS" ! Sets the trigger delay to 1 millisecond.
```

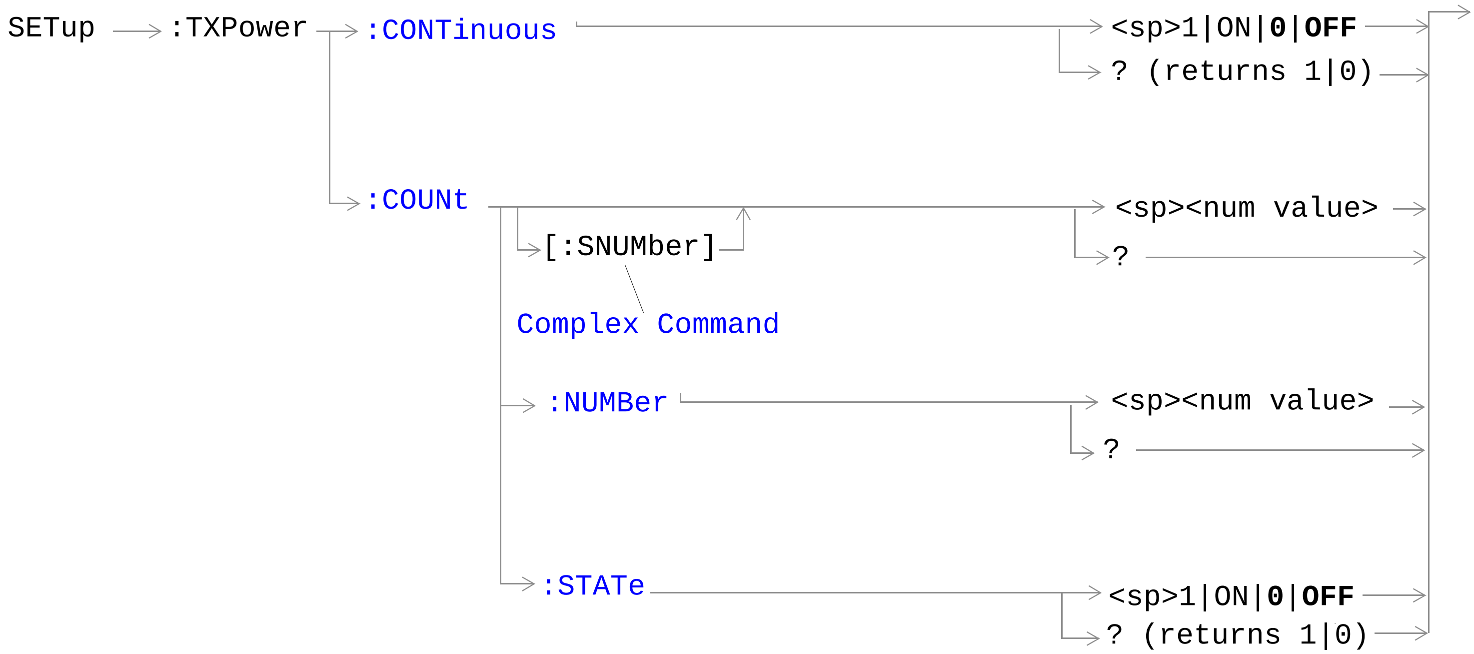
SETup:SMONitor:TRiGger:SOURce

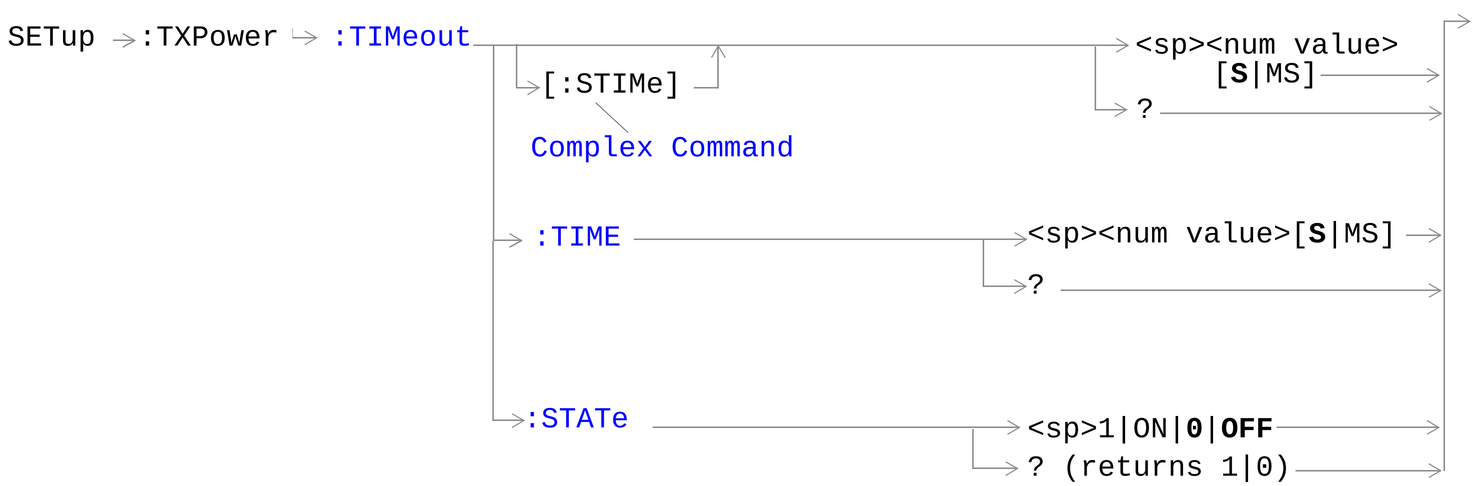
Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets the trigger source. Immediate triggering happens as soon as the measurement is armed. RF rise triggering is initiated by the rising edge of an RF burst. With protocol triggering, sampling is initiated by a signaling event such as the start of a burst. An external trigger is used when set to external. Auto triggering will select protocol if a protocol trigger is available, otherwise it will select RF rise triggering.
Setting		Range: AUTO | IMMediate | PROTocol | RISE | EXTernal
Query		Range: AUTO | IMM | PROT | RISE | EXT
*RST Setting		IMMediate
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

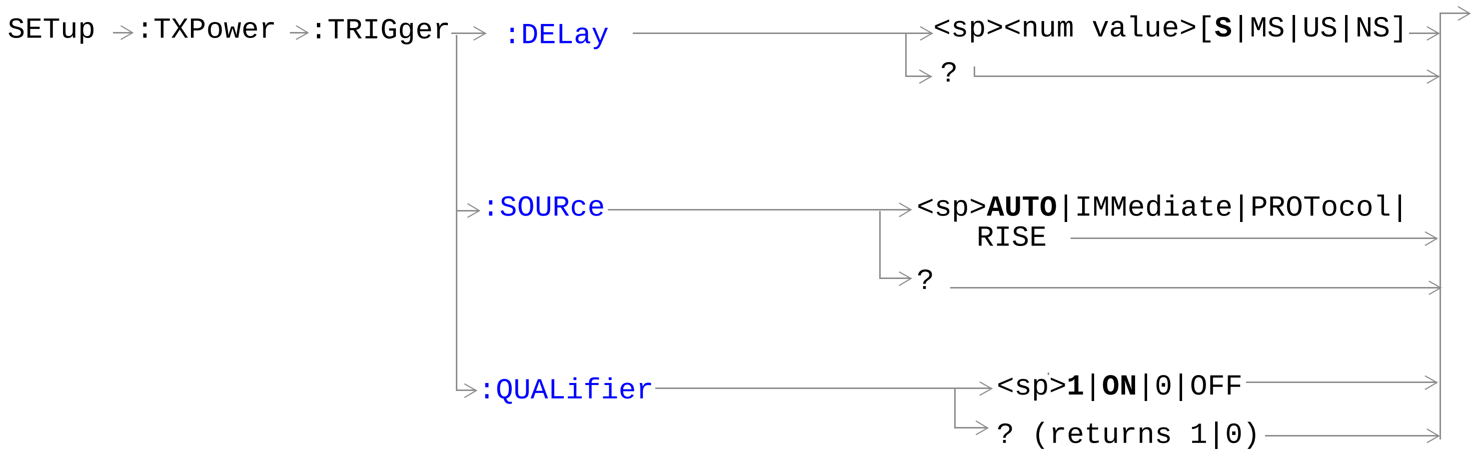
```
OUTPUT 714;"SETup:SMONitor:TRIGger:SOURce RISE"
! Sets the measurement to trigger on the rising edge of an RF burst.
```

SETup:TXPower





SETup:TXPower



"Diagram Conventions" on page 1

SETup:TXPower:CONTinuous

Function	GSM TA	This command sets/queries the trigger state for TX carrier power measurements.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: • Single trigger mode = 0 | OFF • Continuous trigger mode = 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:TXPOWER:CONTINUOUS OFF" !`Specifies single trigger mode for TX carrier power measurements.		

SETup:TXPower:COUNt[:SNUMber]

Function	GSM TA	This command sets/queries the number of TX carrier power measurements made by the test set. This command sets the count state to ON.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:TXPOWER:COUNT:SNUMBER 99"` `!Sets the state to on and the multi-measurement count value to 99.`		

SETup:TXPower:COUNt:NUMBer

Function	GSM TA	This command sets/queries the number of TX power measurements the test set makes in the active (that is the selected) format. The multi-measurement count state must be on.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 1 to 999 Resolution: 1
Query		Range: 1 to 999 Resolution: 1
*RST Setting		10
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:TXPOWER:COUNT:NUMBER 5"
!Sets the TX Power multi-measurementcount number to 5.
```

SETup:TXPower:COUNt:STATe

Function	GSM TA	This command sets/queries the TX power multi-measurement count state.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:TXPOWER:COUNT:STATE ON" !Sets the multi-measurement count state to on.
```

SETup:TXPower:TIMeout[:STIMe]

Function	GSM TA	This command sets/queries the TX carrier power measurement timeout value. This command also sets the count state to on. The units (S|MS) are optional, if no units are specified then units default to S.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:TXPOWER:TIMEOUT:STIME 20"
!Sets the state to on and the timeout value to 20 seconds.
```

SETup:TXPower:TIMeout:TIME

Function	GSM TA	This command sets/queries the timeout value in seconds that will be used for TX power measurements in the active (that is the selected) format. The units (S|MS) are optional, if no units are specified then units default to S.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query		Range: 0.1 to 999 seconds Resolution: 0.1 seconds
*RST Setting		10 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SETUP:TXPOWER:TIMEOUT:TIME 20"
!Sets the TX power measurement timeout to 20 seconds.
```

SETup:TXPower:TIMeout:STATe

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command selects/queries TX carrier power measurement timeout state in the active (that is the selected) format.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:TXPOWER:COUNT:STATE 1"` `!Turns the TX carrier power timeout state on.`		

SETup:TXPower:TRIGger:DELay

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the trigger delay in seconds for TX carrier power measurements in the active (that is the selected) format. The units (S|MS|US|NS) are optional, if no units are specified then units default to S.
Setting		Range: –2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater
Query		Range: –2.31 ms to +2.31 ms Resolution: 5 significant digits or 100 ns, whichever is greater
*RST Setting		0 seconds
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SETUP:TXPOWER:TRIGGER:DELAY 1.5MS" !Set trigger delay time to 1.5 milliseconds`		

SETup:TXPower:TRIGger:QUALifier

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command sets/queries the trigger qualification for TX carrier power measurements in the active (that is the selected) format. When ON, an automatic trigger re-arm occurs if a measurement is triggered when no valid signal (burst) is present. See "Trigger Qualifier Description" on page 407.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:TXPOWER:TRIGGER:QUALIFIER ON" !Sets trigger qualifier state to on.
```

SETup:TXPower:TRIGger:SOURce

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	This command selects/queries the trigger source for TX carrier power measurements in the active (that is the selected) format. See "Triggering of Measurements" on page 404.
Setting		AUTO | PROTocol | RISE | IMMediate
Query		AUTO | PROT | RISE | IMM
*RST Setting		AUTO
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;"SETUP:TXPOWER:TRIGGER:SOURCE AUTO" !Sets trigger source to automatic.
```

STATus Subsystem Description

Description

The STATus subsystem is used to communicate current test set status information to the controlling application program.

Syntax Diagrams and Command Descriptions

Status Register Bit Definitions

STATus:OPERation

```
STATus :OPERation
    [:EVENt]? (reads event register)
    :CONDition? (reads condition register)
    :ENABle
        <sp><num value> (writes to enable register)
        ? (reads enable register)
    :NTRansition
        <sp><num value> (writes to Negative Transition Filter register)
        ? (reads Negative Transition Filter register)
    :PTRansition
        <sp><num value> (writes to Positive Transition Filter register)
        ? (reads Positive Transition Filter register)
```

```
STATus :OPERation:CALL
    [:EVENt]? (reads event register)
    :CONDition? (reads condition register)
    :ENABle
        <sp><num value> (writes to enable register)
        ? (reads enable register)
    :NTRansition
        <sp><num value> (writes to Negative Transition Filter register)
        ? (reads Negative Transition Filter register)
    :PTRansition
        <sp><num value> (writes to Positive Transition Filter register)
        ? (reads Positive Transition Filter register)
```

STATus:OPERation

```
STATus ──> :OPERation:CALL:COMMon ──┬──────────────> ? (reads event register) ──>┐──>
                                    │└>[:EVENt] ┘↑                                │
                                    ├─> :CONDition? (reads condition register) ──>│
                                    ├─> :ENABle ──┬─> <sp><num value> (writes to  │
                                    │             │            enable register) ─>│
                                    │             └─> ? (reads enable register) ─>│
                                    ├─> :NTRansition ─┬─> <sp><num value> (writes │
                                    │                 │    to Negative Transition │
                                    │                 │    Filter register) ─────>│
                                    │                 └─> ? (reads Negative       │
                                    │                      Transition Filter      │
                                    │                      register) ────────────>│
                                    └─> :PTRansition ─┬─> <sp><num value> (writes │
                                                      │   to Positive Transition  │
                                                      │   Filter register) ──────>│
                                                      └─> ? (reads Positive       │
                                                            Transition Filter     │
                                                            register) ───────────>┘
```

```
STATus ─> :OPERation:CALL:COMMon:DATA ──┬──────────> ? (reads event register) ──>┐──>
                                        │└>[:EVENt] ┘↑                           │
                                        ├─> :CONDition? (reads condition register)>│
                                        ├─> :ENABle ──┬─> <sp><num value> (writes to│
                                        │             │          enable register) ─>│
                                        │             └─> ? (reads enable register)─>│
                                        ├─> :NTRansition ─┬─> <sp><num value> (writes│
                                        │                 │   to Negative Transition │
                                        │                 │   Filter register) ─────>│
                                        │                 └─> ? (reads Negative      │
                                        │                      Transition Filter     │
                                        │                      register) ───────────>│
                                        └─> :PTRansition ─┬─> <sp><num value> (writes│
                                                          │   to Positive Transition │
                                                          │   Filter register) ─────>│
                                                          └─> ? (reads Positive      │
                                                                Transition Filter    │
                                                                register) ──────────>┘
```

```
STATus :OPERation:CALL:GSM
    [:EVENt] ? (reads event register)
    :CONDition? (reads condition register)
    :ENABle <sp><num value> (writes to enable register)
            ? (reads enable register)
    :NTRansition <sp><num value> (writes to Negative Transition Filter register)
                 ? (reads Negative Transition Filter register)
    :PTRansition <sp><num value> (writes to Positive Transition Filter register)
                 ? (reads Positive Transition Filter register)
```

```
STATus :OPERation:HARDware
    [:EVENt] ? (reads event register)
    :CONDition? (reads condition register)
    :ENABle <sp><num value> (writes to enable register)
            ? (reads enable register)
    :NTRansition <sp><num value> (writes to Negative Transition Filter register)
                 ? (reads Negative Transition Filter register)
    :PTRansition <sp><num value> (writes to Positive Transition Filter register)
                 ? (reads Positive Transition Filter register)
```

STATus:OPERation

```
STATus:OPERation:KEYPressed
    [:EVENt]? (reads event register)
    :CONDition? (reads condition register)
    :ENABle <sp><num value> (writes to enable register)
    :ENABle? (reads enable register)
    :NTRansition <sp><num value> (writes to Negative Transition Filter register)
    :NTRansition? (reads Negative Transition Filter register)
    :PTRansition <sp><num value> (writes to Positive Transition Filter register)
    :PTRansition? (reads Positive Transition Filter register)
```

```
STATus:OPERation:NMRReady
    [:EVENt]? (reads event register)
    :CONDition? (reads condition register)
    :ENABle <sp><num value> (writes to enable register)
    :ENABle? (reads enable register)
    :NTRansition <sp><num value> (writes to Negative Transition Filter register)
    :NTRansition? (reads Negative Transition Filter register)
    :PTRansition <sp><num value> (writes to Positive Transition Filter register)
    :PTRansition? (reads Positive Transition Filter register)
```

```
STATus :OPERation:NMRReady:COMMon
    ? (reads event register)
    [:EVENt]
    :CONDition? (reads condition register)
    :ENABle <sp><num value> (writes to enable register)
            ? (reads enable register)
    :NTRansition <sp><num value> (writes to Negative Transition Filter register)
                 ? (reads Negative Transition Filter register)
    :PTRansition <sp><num value> (writes to Positive Transition Filter register)
                 ? (reads Positive Transition Filter register)
```

```
STATus :OPERation:NMRReady:GPRS
    ? (reads event register)
    [:EVENt]
    :CONDition? (reads condition register)
    :ENABle <sp><num value> (writes to enable register)
            ? (reads enable register)
    :NTRansition <sp><num value> (writes to Negative Transition Filter register)
                 ? (reads Negative Transi-tion Filter register)
    :PTRansition <sp><num value> (writes to Positive Transition Filter register)
                 ? (reads Positive Transi-tion Filter register)
```

These commands are not applicable to GSM.

```
STATus :OPERation:NMRReady:GSM
    ? (reads event register)
    [:EVENt]
    :CONDition? (reads condition register)
    :ENABle
        <sp><num value> (writes to enable register)
        ? (reads enable register)
    :NTRansition
        <sp><num value> (writes to Negative Transition Filter register)
        ? (reads Negative Transition Filter register)
    :PTRansition
        <sp><num value> (writes to Positive Transition Filter register)
        ? (reads Positive Transition Filter register)
```

“Diagram Conventions” on page 1

STATus:OPERation Condition Register Bit Assignment

The OPERation status register set contains bits which give an indication of conditions that are part of the test set's normal operation.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Processing SYSTem:SYNChronized Command	This condition bit is "pulsed" by the SYSTem:SYNChronized command. This allows the status system to indicate that the input buffer is synchronized to the point where this command is parsed and that all prior sequential commands are completed and all prior overlapped commands have started.
11	2048	Reserved for future use	This bit is always 0.
10	1024	CALL Summary	This bit is the summary bit for the STATus:OPERation:CALL register.
9	512	NMRReady (New Measurement Result Ready) Summary	This bit is the summary bit for the STATus:OPERation:NMRReady register.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	Reserved for future use.	This bit is always 0.
2	4	Reserved for future use.	This bit is always 0.
1	2	Reserved for future use.	This bit is always 0.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation

```
OUTPUT 714;”STATUS:OPERATION:EVENT?” !Queries and clears the Operation
                                     !Event Register
OUTPUT 714;”STATUS:OPERATION:CONDITION?” !Queries and clears the Operation
                                         !Condition Register
OUTPUT 714;”STATUS:OPERATION:ENABLE 1024” !Sets the Operation
                                          !Enable
                                          !Register for bit 10
OUTPUT 714;”STATUS:OPERATION:NTRANSITION 2” !Sets the Operation
```

```
                                              !Negative Transition
                                              !Filter Register for bit 1
OUTPUT 714;"STATUS:OPERATION:PTRANSITION 2"  !Sets the Operation
                                              !Positive Tranasition
                                              !Filter Register for bit 1
```

STATus:OPERation:CALL Condition Register Bit Assignment

The STATus:OPERation:CALL register bits are used to indicate status of processes that occur during normal call processing operations.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	GPRS Summary bit	This bit is the summary bit for the STATus:OPERation:CALL:GPRS register.
11	2048	WCDMa Summary bit	This bit is the summary bit for the STATus:OPERation:CALL:WCDMa register.
10	1024	FDD Summary bit	This bit is the summary bit for the STATus:OPERation:CALL:FDD register.
9	512	TA2000 Summary bit	This bit is the summary bit for the STATus:OPERation:CALL:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary bit for the STATus:OPERation:CALL:CDMA register.
7	128	DIGital2000 Summary bit.	This bit is the summary bit for the STATus:OPERation:CALL:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary bit for the STATus:OPERation:CALL:DIGital95 register.
5	32	TA136 Summary bit	This bit is the summary bit for the STATus:OPERation:CALL:TA136 register.
4	16	DIGital136 Summary bit	This bit is the summary bit for the STATus:OPERation:CALL:DIGital136 register.
3	8	AMPS Summary bit	This bit is the summary bit for the STATus:OPERation:CALL:AMPS register.
2	4	GSM Summary bit	This bit is the summary bit for the STATus:OPERation:CALL:GSM register.
1	2	COMMon Summary bit	This bit is the summary bit for the STATus:OPERation:CALL:COMMon register.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:CALL

```
OUTPUT 714;"STATUS:OPERATION:CALL:EVENT?" !Queries and clears the Operation Call Event
                                          !Register
OUTPUT 714;"STATUS:OPERATION:CALL:CONDITION?" !Queries and clears the Operation Call
                                              !Condition Register
OUTPUT 714;"STATUS:OPERATION:CALL:ENABLE 4" !Sets the Operation Call Enable
                                            !Register for bit 2
OUTPUT 714;"STATUS:OPERATION:CALL:NTR 4" !Sets the Negative Transition Filter
                                         !Register for bit 2
OUTPUT 714;"STATUS:OPERATION:CALL:PTR 256" !Sets the Positive Transition Filter
                                           !Register for bit 8
```

STATus:OPERation:CALL:COMMon Condition Register Bit Assignment

The STATus:OPERation:CALL:COMMon register bits are used to indicate status of processes that occur during normal call processing operations.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Data Summary	This bit is the summary bit for the STATus:QUEStionable:CALL:GSM:DATA register.
13	8192	Call Control Status Access Probe	This bit is a 1 when the test set is in the call control status access probe state.
12	4096	Call Control Status Set Up Request	This bit is a 1 when the test set is in the call control status set up request state.
11	2048	Call Control Status Releasing	This bit is a 1 when the test set is in the call control status releasing state.
10	1024	Call Control Status Paging	This bit is a 1 when the test set is in the call control status paging state.
9	512	Registering (BS initiated)	This bit is set to a 1 when the Base Station initiates registration.
8	256	Reserved for future use.	This bit is always 0.
7	128	BS Originating	This bit is a 1 when: • Active Cell mode - the call processing state leaves the idle state • Test mode - the test set has noted a base station origination.
6	64	Call Control Status Changing	This bit is set to a 1 when the call control status change detector has been armed.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
3	8	Call Control Status Alerting	This bit is a 1 when the test set is in the call alerting state (ringing).
2	4	Call Control Status Connected	This bit is a 1 when the test set is in the call connected state.
1	2	Call Control Status Idle	This bit is a 1 when the test set is in the call idle state.
0	1	Extension Bit	This bit is always 0.

Program Examples STATus:OPERation:CALL:COMMon

```
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:EVENT?" !Queries and clears the Operation
                                                 !Call
                                                 !Common Event Register
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:CONDITION?" !Queries and clears the Operation
                                                     !Call
                                                     !Common Condition Register
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:ENABLE 1024" !Sets the Operation
                                                      !Call
                                                      !Common Enable
                                                      !Register for bit 10
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:NTRANSITION 2" !Sets the Operation
                                                        !Call
                                                        !Common Negative Transition
                                                        !Filter Register for bit 1
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:PTRANSITION 2" !Set the Operation
                                                        !Call
                                                        !Common Positive Transition
                                                        !Filter Register for bit 1
```

STATus:OPERation:CALL:COMMon:DATA Condition Register Bit Assignment

The STATus:OPERation:CALL:COMMon:DATA register bits are used to indicate status of processes that occur during normal data connection processing operations.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Ping active.	This bit is a 1 when a Ping session is active.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
9	512	Reserved for future use.	This bit is always 0.
8	256	PDP Active state	This bit is a 1 when the PDP is active, zero when inactive.
7	128	Starting Data Connection	This bit is a 1 when: • Active Cell mode - the data connection status leaves the idle state • Test mode - the test set has noted a base station origination.
6	64	Data Connection Status Changing	This bit is set to a 1 when the data connection status change detector has been armed.
5	32	Data Connection Status Off	This bit is set to 1 when the test set is in the call control status handover/handoff state.
4	16	Data Connection Status Data Connected	This bit is set to 1 when: • data connection status data is in the connected state. • a circuit switched data (CSD) connection is active.
3	8	Data Connection Status Transferring	This bit is a 1 when the data connection status is Transferring.
2	4	Data Connection Status Attached	This bit is a 1 when the data connection status is Attached.
1	2	Data Connection Status Idle	This bit is a 1 when the data connection status is Idle.
0	1	Extension Bit	This bit is always 0.

Program Examples STATus:OPERation:CALL:COMMon:DATA

```
OUTPUT 714;”STATUS:OPERATION:CALL:COMMON:DATA:EVENT?” !Queries and clears the Operation
                                                      !Call Common Data Event Register
OUTPUT 714;”STATUS:OPERATION:CALL:COMMON:DATA:CONDITION?” !Queries and clears the Operation
                                                          !Call Common Data Condition
                                                          !Register
OUTPUT 714;”STATUS:OPERATION:CALL:COMMON:DATA:ENABLE 128” !Sets the Operation Call Common
                                                          !Data Enable Register for bit 7
OUTPUT 714;”STATUS:OPERATION:CALL:COMMON:NTRANSITION 2” !Sets the Operation Call Common
                                                        !Data Negative Transition Filter
                                                        !Register for bit 1
OUTPUT 714;”STATUS:OPERATION:CALL:COMMON:PTRANSITION 2” !Set the Operation Call Common
                                                        !Data Positive Transition Filter
                                                        !Register for bit 1
```

STATus:OPERation:CALL:GSM Condition Register Bit Assignment

The STATus:OPERation:CALL:GSM register bits are used to indicate status of processes that occur during normal GSM call processing operations. These register bits are not applicable to GPRS.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	BS Disconnecting	This bit is a 1 when: • Active Cell mode - the call processing state reaches (or is in) the idle state • Test mode - the test set has noted a base station termination.
7	128	BS Originating	This bit is a 1 when: • Active Cell mode - the call processing state leaves the idle state • Test mode - the test set has noted a base station origination.
6	64	Call Control Status Changing	This bit is set to a 1 when the call control status change detector has been armed.
5	32	TCH Assignment in Progress	This bit is a 1 when: • The channel assignment is successfully completed (when a call is established). • The test set notes a change in the TCH ARFCN, cell band, TCH timeslot, or mobile station timing advance. • An error message is generated.
4	16	BCH Changing	This bit is a 1 when: • The downlink signal is transmitting on the new broadcast channel. • The test set has noted a change in cell band.
3	8	Call Control Status Alerting	This bit is a 1 when the test set is in the call alerting state (ringing).

Bit Number	Binary Weighting	Condition	Description
2	4	Call Control Status Connected	This bit is a 1 when: • the test set is in the call connected state. • a circuit switched data (CSD) connection is active.
1	2	Call Control Status Idle	This bit is a 1 when the test set is in the call idle state.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:CALL:GSM

```
OUTPUT 714;"STATUS:OPERATION:CALL:GSM:EVENT?" !Queries and clears the Operation
                                              !Call GSM Event Register
OUTPUT 714;"STATUS:OPERATION:CALL:GSM:CONDITION?" !Queries and clears the Operation
                                                  !Call GSM Condition Register
OUTPUT 714;"STATUS:OPERATION:CALL:GSM:ENABLE 1024" !Sets the Operation
                                                   !Call GSM Enable
                                                   !Register for bit 10
OUTPUT 714;"STATUS:OPERATION:CALL:GSM:NTRANSITION 2" !Sets the Operation
                                                     !Call GSM Negative Transition
                                                     !Filter Register for bit 1
OUTPUT 714;"STATUS:OPERATION:CALL:GSM:PTRANSITION 2" !Sets the Operation
                                                     !Call GSM Positive Tranasition
                                                     !Filter Register for bit 1
```

STATus:OPERation:HARDware Register Bit Assignments

The STATus:OPERation:HARDware register bits indicate information about the test set’s hardware during normal operation.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	Reserved for future use.	This bit is always 0.
2	4	Reserved for future use.	This bit is always 0.
1	2	External Timebase in use	This bit is a 1 if a suitable external timebase is connected to the test set's 10 MHz REF IN connector on the rear panel of the test set.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:HARDware

```
OUTPUT 714;”STATUS:OPERATION:HARDWARE:EVENT?” !Queries the Hardware Event Register.
OUTPUT 714;”STATUS:OPERATION:HARDWARE:CONDITION?” !Queries the Hardware Condition Register.
OUTPUT 714;”STATUS:OPERATION:HARDWARE:ENABLE 16” !Sets New Measurement Results Hardware for
bit 16.
OUTPUT 714;”STATUS:OPERATION:HARDWARE:NTR 2” !Sets the Hardware Negative Transition
                                             !Register for bit 4.
OUTPUT 714;”STATUS:OPERATION:HARDWARE:PTR 4” !Sets the Hardware Positive Transition
                                             !Register for bit 4.
```

STATus:OPERation:KEYPressed Register Bit Assignments

The STATus:OPERation:KEYpressed register bits indicate when a softkey on the test set's front panel has been pressed while the test set is in remote operating mode.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	F12 softkey	This bit is a 1 when the F12 softkey has been pressed.
10	1024	F11 softkey	This bit is a 1 when the F11 softkey has been pressed.
9	512	F10 softkey	This bit is a 1 when the F10 softkey has been pressed.
8	256	F9 softkey	This bit is a 1 when the F9 softkey has been pressed.

Bit Number	Binary Weighting	Condition	Description
7	128	F8 softkey	This bit is a 1 when the F8 softkey has been pressed.
6	64	F7 softkey	This bit is a 1 when the F7 softkey has been pressed.
5	32	F6 softkey	This bit is a 1 when the F6 softkey has been pressed.
4	16	F5 softkey	This bit is a 1 when the F5 softkey has been pressed.
3	8	F4 softkey	This bit is a 1 when the F4 softkey has been pressed.
2	4	F3 softkey	This bit is a 1 when the F3 softkey has been pressed.
1	2	F2 softkey	This bit is a 1 when the F2 softkey has been pressed.
0	1	F1 softkey	This bit is a 1 when the F1 softkey has been pressed.

Program Examples - STATus:OPERation:KEYPressed

```
OUTPUT 714;"STATUS:OPERATION:KEYPRESSED:EVENT?" !Queries the Keypressed Event Register.
```

STATus:OPERation:NMRReady Condition Register Bit Assignment

The STATus:OPERation:NMRReady register bits indicate when a measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	GPRS Summary bit	This bit is the summary bit for the STATus:OPERation:NMRReady:GPRS register.
11	2048	WCDMa Summary bit	This bit is the summary bit for the STATus:OPERation:NMRReady:WCDMa register.
10	1024	FDD Summary bit	This bit is the summary bit for the STATus:OPERation:NMRReady:FDD register.
9	512	TA2000 Summary bit	This bit is the summary bit for the STATus:OPERation:NMRReady:TA2000 register.

Bit Number	Binary Weighting	Condition	Description
8	256	CDMA Summary bit	This bit is the summary bit for the STATus:OPERation:NMRReady:CDMA register.
7	128	DIGital2000 Summary bit	This bit is the summary bit for the STATus:OPERation:NMRReady:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary bit for the STATus:OPERation:NMRReady:DIGital95 register.
5	32	TA136 Summary bit	This bit is the summary bit for the STATus:OPERation:NMRReady:TA136 register.
4	16	DIGital136 Summary bit	This bit is the summary bit for the STATus:OPERation:NMRReady:DIGital136 register.
3	8	AMPS Summary bit	This bit is the summary bit for the STATus:OPERation:NMRReady:AMPS register.
2	4	GSM Summary bit	This bit is the summary bit for the STATus:OPERation:NMRReady:GSM register.
1	2	COMMon Summary bit	This bit is the summary bit for the STATus:OPERation:NMRReady:COMMon register.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady

```
OUTPUT 714;”STATUS:OPERATION:NMRREADY:EVENT?” !Queries and clears the New Measurement
                                              !Results Ready Event Register
OUTPUT 714;”STATUS:OPERATION:NMRREADY:CONDITION?” !Queries and clears the New Measurement
                                                  !Results Ready
                                                  !Condition Register
OUTPUT 714;”STATUS:OPERATION:NMRREADY:ENABLE 16” !Sets New Measurement Results
                                                 !Ready Enable Regigter
                                                 !for bit 4
OUTPUT 714;”STATUS:OPERATION:NMRREADY:NTR 2” !Sets the New Measurement Results
                                             !Ready Negative Transition Filter
                                             !Register for bit 1
OUTPUT 714;”STATUS:OPERATION:NMRREADY:PTR 4” !Sets the New Measurement
                                             !Results Ready Positive
                                             !Transition Filter Register
                                             !for bit 2
```

STATus:OPERation:NMRReady:COMMon Condition Register Bit Assignment

The STATus:OPERation:NMRReady:COMMon register bits indicate when a measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	Spectrum Monitor	This is the summary bit for the STATus:OPERation:NMRReady:COMMon Spectrum Monitor register.
2	4	Reserved for future use.	This bit is always 0.
1	2	Audio Analyzer	This is the summary bit for the STATus:OPERation:NMRReady:COMMon Audio Analyzer register.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady:COMMon

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:EVENT?" !Queries and clears the Operation
                                                     !New Measurement Results Ready
                                                     !Common Event Register
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:CONDITION?" !Queries and clears the Operation
                                                         !New Measurement Results Ready
                                                         !Common Condition Register
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:ENABLE 1024" !Sets the Operation
                                                          !New Measurement Results Ready
                                                          !Common Enable
                                                          !Register for bit 10
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:NTRANSITION 2" !Sets the Operation
                                                            !New Measurement Results Ready
                                                            !Common Negative Transition
                                                            !Filter Register for bit 1
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:PTRANSITION 2" !Set the Operation
```

```
!New Measurement Results Ready
!Common Positive Tranasition
!Filter Register for bit 1
```

STATus:OPERation:NMRReady:GPRS Condition Register Bit Assignment

The STATus:OPERation:NMRReady:GPRS register bits indicate when a GPRS measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	ETXPower New Measurement Result Ready.	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See “Triggering of Measurements” on page 404.
12	4096	BLERror New Measurement Result Ready.	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See “Triggering of Measurements” on page 404.
11	2048	GBERror New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See “Triggering of Measurements” on page 404.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	ORFSpectrum New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See “Triggering of Measurements” on page 404.

Bit Number	Binary Weighting	Condition	Description
3	8	PFERror New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 404.
2	4	PVTime New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 404.
1	2	TXPower New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 404.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady:GPRS

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:GPRS:EVENT?" !Queries and clears the Operation
                                                   !New Measurement Results Ready
                                                   !GPRS Event Register
OUTPUT 714;"STATUS:OPERATION:NMRREADY:GPRS:CONDITION?" !Queries and clears the Operation
                                                       !New Measurement Results Ready
                                                       !GPRS Condition Register
OUTPUT 714;"STATUS:OPERATION:NMRREADY:GPRS:ENABLE 1024" !Sets the Operation
                                                        !New Measurement Results Ready
                                                        !GPRS Enable
                                                        !Register for bit 10
OUTPUT 714;"STATUS:OPERATION:NMRREADY:GPRS:NTRANSITION 2" !Sets the Operation
                                                          !New Measurement Results Ready
                                                          !GPRS Negative Transition
                                                          !Filter Register for bit 1
OUTPUT 714;"STATUS:OPERATION:NMRREADY:GPRS:PTRANSITION 2" !Sets the Operation
                                                          !New Measurement Results Ready
                                                          !GPRS Positive Tranasition
                                                            !Filter Register for bit 1
```

STATus:OPERation:NMRReady:GSM Condition Register Bit Assignment

The STATus:OPERation:NMRReady:GSM register bits indicate when a GSM measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	DPOWer New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See “Triggering of Measurements” on page 404.
9	512	I/Q Tuning New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See “Triggering of Measurements” on page 404.
8	256	BERRor New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See “Triggering of Measurements” on page 404.
7	128	FBERror New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See “Triggering of Measurements” on page 404.
6	64	DAUDio New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See “Triggering of Measurements” on page 404.
5	32	AAUDio New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See “Triggering of Measurements” on page 404.

Bit Number	Binary Weighting	Condition	Description
4	16	ORFSpectrum New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 404.
3	8	PFERror New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 404.
2	4	PVTime New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 404.
1	2	TXPower New Measurement Result Ready	This bit is a 1 if the measurement has been completed and has produced new results. This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 404.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady:GSM

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:GSM:EVENT?" !Queries and clears the Operation
                                                  !New Measurement Results Ready
                                                  !GSM Event Register
OUTPUT 714;"STATUS:OPERATION:NMRREADY:GSM:CONDITION?" !Queries and clears the Operation
                                                      !New Measurement Results Ready
                                                      !GSM Condition Register
OUTPUT 714;"STATUS:OPERATION:NMRREADY:GSM:ENABLE 1024" !Sets the Operation
                                                       !New Measurement Results Ready
                                                       !GSM Enable
                                                       !Register for bit 10
OUTPUT 714;"STATUS:OPERATION:NMRREADY:GSM:NTRANSITION 2" !Sets the Operation
                                                         !New Measurement Results Ready
                                                         !GSM Negative Transition
                                                         !Filter Register for bit 1
OUTPUT 714;"STATUS:OPERATION:NMRREADY:GSM:PTRANSITION 2" !Sets the Operation
                                                         !New Measurement Results Ready
                                                         !GSM Positive Tranasition
                                                         !Filter Register for bit 1
```

Related Topics

"Triggering of Measurements" on page 404

STATus:PRESet

STATus → :PRESet →

“Diagram Conventions” on page 1

STATus:PRESet

Function	GSM TA	Presets the Status Subsystem Sets all Enable Registers to 0 (not enabled). Sets all Positive Transition Registers (PTR) to 1 (positive transitions enabled). Sets all Negative Transition Registers (NTR) to 0 (negative transitions disabled).
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	

STATus:QUEStionable

STATus :QUEStionable
- ? (reads event register)
- [:EVENt]
- :CONDition? (reads condition register)
- :ENABle
  - <sp><num value> (writes to enable register)
  - ? (reads enable register)
- :NTRansition
  - <sp><num value> (writes to Negative Transition Filter register)
  - ? (reads Negative Transition Filter register)
- :PTRansition
  - <sp><num value> (writes to Positive Transition Filter register)
  - ? (reads Positive Transition Filter register)

STATus :QUEStionable:CALL
- ? (reads event register)
- [:EVENt]
- :CONDition? (reads condition register)
- :ENABle
  - <sp><num value> (writes to enable register)
  - ? (reads enable register)
- :NTRansition
  - <sp><num value> (writes to Negative Transition Filter register)
  - ? (reads Negative Transition Filter register)
- :PTRansition
  - <sp><num value> (writes to Positive Transition Filter register)
  - ? (reads Positive Transition Filter register)

STATus :QUEStionable:CALL:COMMon

[:EVENt] ? (reads event register)

:CONDition? (reads condition register)

:ENABle <sp><num value> (writes to enable register)

? (reads enable register)

:NTRansition <sp><num value> (writes to Negative Transition Filter register)

? (reads Negative Transition Filter register)

:PTRansition <sp><num value> (writes to Positive Transition Filter register)

? (reads Positive Transition Filter register)

```
STATus:QUEStionable:CALL:GPRS
    [:EVENt]? (reads event register)
    :CONDition? (reads condition register)
    :ENABle <sp><num value> (writes to enable register)
            ? (reads enable register)
    :NTRansition <sp><num value> (writes to Negative Transition Filter register)
                 ? (reads Negative Transition Filter register)
    :PTRansition <sp><num value> (writes to Positive Transition Filter register)
                 ? (reads Positive Transition Filter register)
```

These commands are not applicable to GSM.

STATus :QUEStionable:CALL:GSM
- [:EVENt] ? (reads event register)
- :CONDition? (reads condition register)
- :ENABle
  - <sp><num value> (writes to enable register)
  - ? (reads enable register)
- :NTRansition
  - <sp><num value> (writes to Negative Transition Filter register)
  - ? (reads Negative Transition Filter register)
- :PTRansition
  - <sp><num value> (writes to Positive Transition Filter register)
  - ? (reads Positive Transition Filter register)

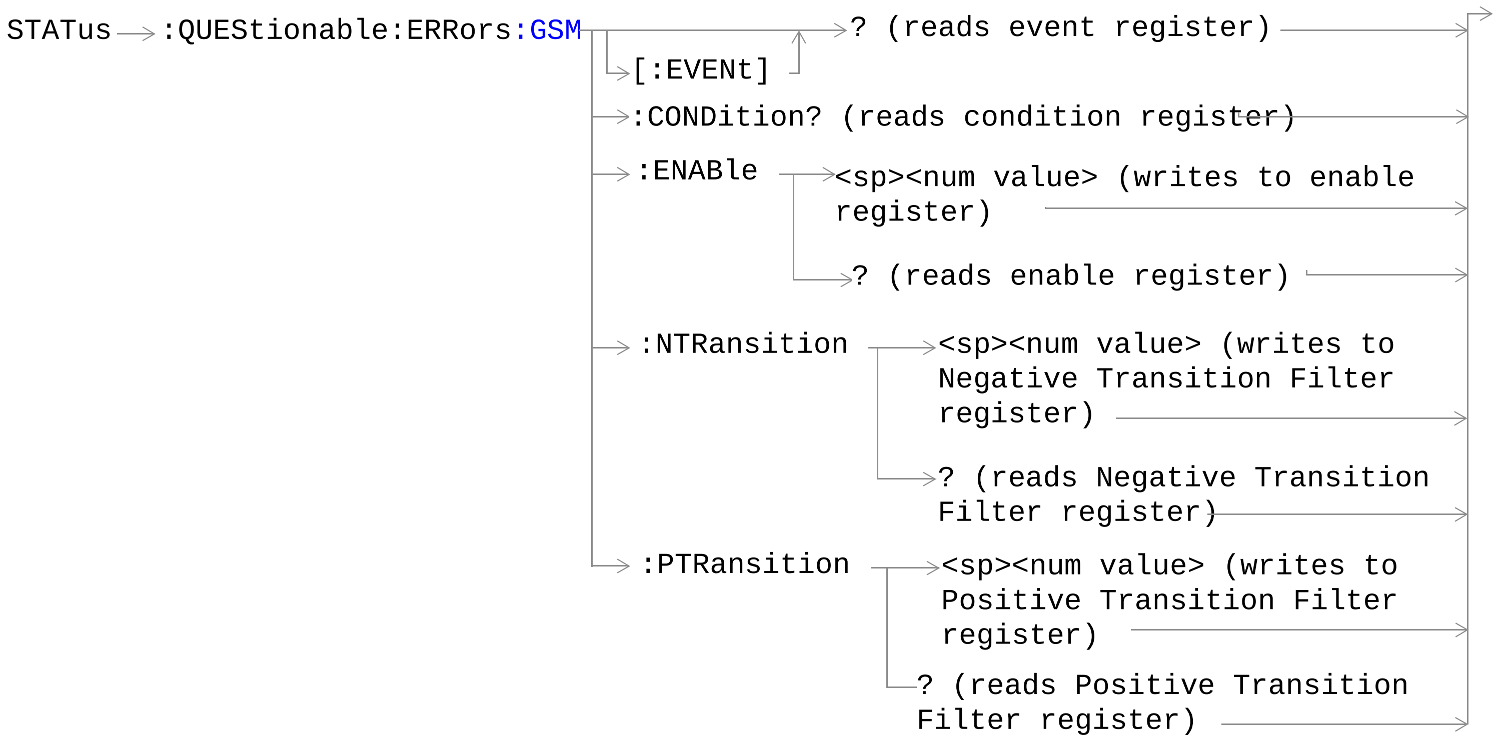
STATus :QUEStionable:ERRors
- [:EVENt] ? (reads event register)
- :CONDition? (reads condition register)
- :ENABle
  - <sp><num value> (writes to enable register)
  - ? (reads enable register)
- :NTRansition
  - <sp><num value> (writes to Negative Transition Filter regis-ter)
  - ? (reads Negative Transition Filter register)
- :PTRansition
  - <sp><num value> (writes to Positive Transition Filter register)
  - ? (reads Positive Transition Filter register)

STATus:QUEStionable

```
STATus:QUEStionable:ERRors:COMMon
    ? (reads event register)
    [:EVENt]
    :CONDition? (reads condition register)
    :ENABle
        <sp><num value> (writes to enable register)
        ? (reads enable register)
    :NTRansition
        <sp><num value> (writes to Negative Transition Filter register)
        ? (reads Negative Transition Filter register)
    :PTRansition
        <sp><num value> (writes to Positive Transition Filter register)
        ? (reads Positive Transition Filter register)
```

```
STATus:QUEStionable:ERRors:GPRS
    ? (reads event register)
    [:EVENt]
    :CONDition? (reads condition register)
    :ENABle
        <sp><num value> (writes to enable register)
        ? (reads enable register)
    :NTRansition
        <sp><num value> (writes to Negative Transition Filter register)
        ? (reads Negative Transition Filter register)
    :PTRansition
        <sp><num value> (writes to Positive Transition Filter register)
        ? (reads Positive Transition Filter register)
```

These commands are not applicable to GSM.



These commands are not applicable to GPRS.

```
STATus -> :QUEStionable:HARDware -+---------------------> ? (reads event register) ------------>
                                  |  +-> [:EVENt] -+
                                  +-> :CONDition? (reads condition register) ------------------>
                                  +-> :ENABle  -+- <sp><num value> (writes to enable
                                  |             |  register) ---------------------------------->
                                  |             +-> ? (reads enable register) ----------------->
                                  +-> :NTRansition -+- <sp><num value> (writes to
                                  |                 |  Negative Transition Filter reg-
                                  |                 |  ister) ----------------------------------->
                                  |                 +- ? (reads Negative Transition
                                  |                    Filter register) ------------------------>
                                  +-> :PTRansition -+- <sp><num value> (writes to
                                                    |  Positive Transition Filter
                                                    |  register) -------------------------------->
                                                    +- ? (reads Positive Transition
                                                       Filter register) ------------------------>
```

"Diagram Conventions" on page 1

STATus:QUEStionable Condition Register Bit Assignment

The STATus:QUEStionable register contains bits which give an indication that the data currently being acquired or generated is of questionable quality due to some condition affecting the functionality associated with that bit.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	QUEStionable:HARDware summary	This bit is the summary bit for the STATus:QUEStionable:HARDware register.
10	1024	QUEStionable:CALL summary	This bit is the summary bit for the STATus:QUEStionable:CALL register.
9	512	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	Reserved for future use.	This bit is always 0.
2	4	Reserved for future use.	This bit is always 0.
1	2	QUEStionable:ERRors summary	This bit is the summary bit for the STATus:QUEStionable:ERRors register.
0	1	Reserved for future use.	This bit is always 0.

Program Example - STATus:QUEStionable Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:EVENT?" !Queries and clears the Questionable Event
                                        !Register
OUTPUT 714;"STATUS:QUESTIONABLE:CONDITION?" !Queries and clears the Questionable Condition
                                            !Register
OUTPUT 714;"STATUS:QUESTIONABLE:ENABLE 1024" !Sets the Questionable Enable Register
                                             !for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:NTRANSITION 2" !Sets the Questionable Negative
                                               !Transition Filter Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:PTRANSITION 2" !Sets the Questionable Positive
                                               !Transition Filter Register for bit 1
```

STATus:QUEStionable:CALL Condition Register Bit Assignment

The STATus:QUEStionable:CALL registers contain information about which event(s) occurred during call processing that indicate what call processing procedure failed.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	GPRS Summary bit	This bit is the summary bit for the STATus:QUEStionable:CALL:GPRS register.
11	2048	WCDMa Summary bit	This bit is the summary bit for the STATus:QUEStionable:CALL:WCDMa register.
10	1024	FDD Summary bit	This bit is the summary bit for the STATus:QUEStionable:CALL:FDD register.

Bit Number	Binary Weighting	Condition	Description
9	512	TA2000 Summary bit	This bit is the summary bit for the STATus:QUEStionable:CALL:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary bit for the STATus:QUEStionable:CALL:CDMA register.
7	128	DIGital2000 Summary bit	This bit is the summary bit for the STATus:QUEStionable:CALL:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary bit for the STATus:QUEStionable:CALL:DIGital95 register.
5	32	TA136 Summary bit	This bit is the summary bit for the STATus:QUEStionable:CALL:TA136 register.
4	16	DIGital136 Summary bit	This bit is the summary bit for the STATus:QUEStionable:CALL:DIGital136 register.
3	8	AMPS Summary bit	This bit is the summary bit for the STATus:QUEStionable:CALL:AMPS register.
2	4	GSM Summary bit	This bit is the summary bit for the STATus:QUEStionable:CALL:GSM register.
1	2	COMMon Summary bit	This bit is the summary bit for the STATus:QUEStionable:CALL:COMMon register.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:CALL Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:EVENT?"
  !Queries and clears the Questionable Call Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:CONDITION?"
  !Queries and clears the Questionable Call Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:ENABLE 1024"
  !Sets the Questionable Call Enable Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:NTRANSITION 2"
  !Sets the Questionable Call Negative Transition Filter Registerfor bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:PTRANSITION 2"
  !Sets the Questionable Call Positive Transition Filter Register for bit 1
```

STATus:QUEStionable:CALL:COMMon Condition Register Bit Assignment

The STATus:QUEStionable:CALL:COMMon registers contain information about which event(s) occurred during normal call processing that indicate why the call processing procedure failed.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	Reserved for future use.	This bit is always 0.
2	4	Reserved for future use.	This bit is always 0.
1	2	Reserved for future use.	This bit is always 0.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:CALL:COMMon Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:COMMON:EVENT?" !Queries and clears the Questionable
                                                   !Call Common Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:COMMON:CONDITION?" !Queries and clears the Questionable
                                                       !Call Common Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:COMMON:ENABLE 1024" !Sets the Questionable Call Common
                                                        !Enable Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:COMMON:NTRANSITION 2" !Sets the Questionable Call
                                                          !Common Negative Transition
                                                          !Filter Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GSM:PTRANSITION 2" !Sets the Questionable Call
                                                       !Common Positive Transition
                                                       !Filter Register for bit 1
```

STATus:QUEStionable:CALL:GPRS Condition Register Bit Assignment

The STATus:QUEStionable:CALL:GPRS registers contain information about which event(s) occurred during GSM call processing, relating to a data connection, that indicate why the call processing procedure failed. These register bits are not applicable to GSM.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	End Data Connection Failure	This bit is a 1 if the test set timed out waiting for the data connection to end.
9	512	MS Unexpectedly Ended TBF	This bit is a 1 if the mobile station unexpectedly ended the TBF (temporary block flow).
8	256	Downlink Immediate Assignment Failure	This bit is a 1 if the mobile station did not respond to the downlink immediate assignment.
7	128	Uplink Immediate Assignment Failure	This bit is a 1 if the mobile station did not respond to the uplink immediate assignment.
6	64	Downlink Timed Out	This bit is a 1 if the mobile station timed out ACK (Acknowledged) or NACK (Not Acknowledged) exchanges and released the TBF (temporary block flow).
5	32	No Data Received Recently	This bit is a 1 if no data was received from the mobile station in the allowed time.
4	16	Start Data Connection Failure	This bit is a 1 if the GPRS test application was unable to start the data connection with the DUT (Device Under Test).
3	8	Routing Area Update Failure	This bit is a 1 if the Routing Area Update procedure failed after five attempts. The Data Connection Status will not be changed.
2	4	Detach Failure	This bit is a 1 if the Detach procedure failed after five attempts. The Data Connection Status is set to Idle.
1	2	Attach Failure	This bit is a 1 if the Attach procedure failed after five attempts. The Data Connection Status is set to Idle.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:CALL:GPRS Condition Register Bit Assignment

```
OUTPUT 714;”STATUS:QUESTIONABLE:CALL:GPRS:EVENT?” !Queries and clears the Questionable
                                                  !Call GPRS Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:CALL:GPRS:CONDITION?” !Queries and clears the
                                                      !Questionable Call GPRS
                                                      !Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:CALL:GPRS:ENABLE 1024” !Sets the Questionable Call GPRS
```

```
                                                              !Enable Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GPRS:NTRANSITION 2" !Sets the Questionable Call
                                                              !GPRS Negative Transition Filter
                                                              !Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GPRS:PTRANSITION 2" !Sets the  Questionable Call GPRS
                                                                !Positive Transition Filter
                                                                  !Register for bit 1
```

STATus:QUEStionable:CALL:GSM Condition Register Bit Assignment

The STATus:QUEStionable:CALL:GSM registers contain information about which event(s) occurred during GSM call processing that indicate why the call processing procedure failed.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Call disconnected: Channel Mode not supported	This bit is a 1 if the mobile station is not capable of supporting the selected channel mode.
8	256	Identification failure	This bit is a 1 if the identity request timer (T3270) has expired. The timer expires if the mobile does not respond to identity request message, within 5 seconds.
7	128	Channel Assignment exceeded specified number of frames	This bit is a 1 if the channel assignment exceeded the specified number of frames.
6	64	Call disconnected: No Response to Page	This bit is a 1 if the paging timer (T3113) has expired. The timer expires if the mobile does not respond to a paging request message, within 5 seconds.
5	32	Call disconnected: Handover Failure	This bit is a 1 if the physical information timer (T3105) has expired. The timer expires if the mobile does not respond to a physical information message, within 50 ms. If the timer has expired and correctly decoded data or a TCH frame has not been received, newly allocated channels are released.
4	16	Call disconnected: Channel Assignment Failure	This bit is a 1 if the channel assignment timer (T3107) has expired. The timer expires if the mobile does not respond to an assignment command message within 3 seconds.

Bit Number	Binary Weighting	Condition	Description
3	8	Call disconnected: Immediate Assignment Failure	This bit is a 1 if the immediate assignment timer (T3101) has expired. The timer expires after 1 second if a signaling link is not established when an immediate assignment or immediate assignment extended message is sent. If the timer expires, newly allocated channels are released.
2	4	Call disconnected: Radio Link Failure	This bit is a 1 if the radio link time out (T100) has expired. The timer expires if a radio link is not detected within four SACCH mulitframes (1.92 seconds if no SACCH is present).
1	2	Call disconnected: Data Link Failure	This bit is a 1 if the data link timer (T200) has expired. This timer is used for retransmission on the data link. The expiration period of the timer depends on the message type (for FACCH, 155 ms).
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:CALL:GSM Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GSM:EVENT?" !Queries and clears the Questionable
                                                 !Call GSM Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GSM:CONDITION?" !Queries and clears the Questionable
                                                     !Call GSM Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GSM:ENABLE 1024" !Sets the Questionable
                                                      !Call GSM Enable Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GSM:NTRANSITION 2" !Sets the Questionable Call
                                                     !GSM Negative Transition Filter Register
                                                        !for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:GSM:PTRANSITION 2" !Sets the Questionable Call
                                                     !GSM Positive Transition Filter Register
                                                        !for bit 1
```

STATus:QUEStionable:ERRors Condition Register Bit Assignment

The STATus:QUEStionable:ERRors register bits are used to indicate information about test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	GPRS Summary bit	This bit is the summary bit for the QUEStionable:ERRors:GPRS register.

Bit Number	Binary Weighting	Condition	Description
11	2048	WCDMa Summary bit	This bit is the summary bit for the QUEStionable:ERRors:WCDMa register.
10	1024	FDD Summary bit	This bit is the summary bit for the QUEStionable:ERRors:FDD register.
9	512	TA2000 Summary bit	This bit is the summary bit for the QUEStionable:ERRors:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary bit for the QUEStionable:ERRors:CDMA register.
7	128	DIGital2000 Summary bit	This bit is the summary bit for the QUEStionable:ERRors:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary bit for the QUEStionable:ERRors:DIGital95 register.
5	32	TA136 Summary bit	This bit is the summary bit for the QUEStionable:ERRors:TA136 register.
4	16	DIGital136 Summary bit	This bit is the summary bit for the QUEStionable:ERRors:DIGital136 register.
3	8	AMPS Summary bit	This bit is the summary bit for the QUEStionable:ERRors:AMPS register.
2	4	GSM Summary bit	This bit is the summary bit for the QUEStionable:ERRors:GSM register.
1	2	COMMon Summary bit	This bit is the summary bit for the QUEStionable:ERRors:COMMon register.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:ERRors Condition Register Bit Assignment

```
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:EVENT?”
  !Queries and clears the Questionable Errors Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:CONDITION?”
  !Queries and clears the Questionable Errors Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:ENABLE 1024”
  !Sets the Questionable Errors Enable Register for bit 10
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:NTRANSITION 2”
  !Sets the Questionable Errors Negative Transition Filter Register for bit 1
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:PTRANSITION 2”
  !Sets the Questionable Errors Positive Transition Filter Register for bit 1
```

STATus:QUEStionable:ERRors:COMMon Condition Register Bit Assignment

The STATus:QUEStionable:ERRors:COMMon register bits are used to indicate information about the

COMMon test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	RUI Maskable Messages.	This bit is a 1 when a Maskable Message occurs.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	+900 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:ERRors:COMMon Condition Register Bit Assignment

```
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:COMMON:EVENT?” !Queries and clears the Questionable
                                                      !Errors Common Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:COMMON:CONDITION?” !Queries the and clears the
                                                          !Questionable Errors
                                                          !Common Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:COMMON:ENABLE 1024” !Sets the Questionable
                                                           !Errors Common Enable
                                                           !Register for bit 10
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:COMMON:NTRANSITION 2” !Sets the Questionable Errors
                                                             !Common Negative Transition
                                                             !Register for bit 1
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:COMMON:PTRANSITION 2” !Sets the Questionable Errors
                                                             !Common Positive Tranasition
                                                             !Register for bit 1
```

STATus:QUEStionable:ERRors:GPRS Condition Register Bit Assignment

The STATus:QUEStionable:ERRors:GPRS register bits are used to indicate information about GPRS test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	+900 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:ERRors:GPRS Condition Register Bit Assignment

```
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:GPRS:EVENT?” !Queries and clears the Questionable
                                                    !Errors GPRS Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:GPRS:CONDITION?” !Queries and clears the Questionable
                                                        !Errors Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:GPRS:ENABLE 1024” !Sets the Questionable
                                                         !Errors Enable Register for bit 10
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:GPRS:NTRANSITION 2” !Sets the Questionable Errors
                                                    !GPRS Negative Transition Filter Register
                                                    !for bit 1
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:GPRS:PTRANSITION 2” !Sets the Questionable Errors
                                                    !GPRS Positive Transition Filter Register
                                                         !for bit 1
```

STATus:QUEStionable:ERRors:GSM Condition Register Bit Assignment

The STATus:QUEStionable:ERRors:GSM register bits are used to indicate information about GSM test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	+900 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:ERRors:GSM Condition Register Bit Assignment

```
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:GSM:EVENT?” !Queries and clears the Questionable
                                                   !Errors GSM Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:GSM:CONDITION?” !Queries and clears the Questionable
                                                       !Errors Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:GSM:ENABLE 1024” !Sets the Questionable
                                                        !Errors Enable Register for bit 10
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:GSM:NTRANSITION 2” !Sets the Questionable Errors
                                                     !GSM Negative Transition Filter Register
                                                          !for bit 1
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:GSM:PTRANSITION 2” !Sets the Questionable Errors
                                                     !GSM Positive Transition Filter Register
                                                          !for bit 1
```

STATus:QUEStionable:HARDware Condition Register Bit Assignment

The STATus:QUEStionable:HARDware register bits give an indication that the data/signals currently being acquired or generated are of questionable quality.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Power-up Self Test(s) Failed	This bit is a 1 if the power-up self tests failed.
3	8	Reserved for future use.	This bit is always 0.
2	4	Reserved for future use.	This bit is always 0.
1	2	Reserved for future use.	This bit is always 0.
0	1	Extension Bit.	This bit is always 0.

Program Example - STATus:QUEStionable:HARDware Condition Register Bit Assignment

```
OUTPUT 714;”STATUS:QUESTIONABLE:HARDWARE:EVENT?” !Queries and clears the Questionable
                                                 !Hardware Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:HARDWARE:CONDITION?” !Queries and clears the Questionable
                                                     !Hardware Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:HARDWARE:ENABLE 1024” !Sets the Questionable
                                                      !Hardware Enable
                                                      !Register for bit 10
OUTPUT 714;”STATUS:QUESTIONABLE:HARDWARE:NTRANSITION 2” !Sets the Questionable
                                                        !Hardware Negative Transition Filter
                                                        !Register for bit 1
OUTPUT 714;”STATUS:QUESTIONABLE:HARDWARE:PTRANSITION 2” !Sets the Questionable
                                                        !Hardware Positive Transition Filter
                                                        !Register for bit 1
```

Status Byte Register

*STB?

*STB?

NOTE The Status Byte Register can also be read with a serial poll. For example, the command "Status_byte = SPOLL(714)" would perform a serial poll of the Status Byte Register, returning and releasing RQS (bit 6).

Status Byte Register Bit Assignments

Note that only certain bit numbers in the Status Byte Register are applicable to GPRS as indicated in the "Description" column in the table below.

Bit Number	Binary Weighting	Label	Description
7	128	STATus: OPERation	This bit number is not applicable to GPRS. Summarizes the STATus: OPERation Status Register, which fans out to the NMRReady and CALL Status Registers.
6	64	RQS (SRQ TRUE?)/Master Summary Status	RQS is read by a serial poll (SPOLL). Master Summary Status is read by a *STB? query - defined by IEEE 488.2
5	32	Standard Event Status Register	Summarizes the Standard Event Status Register
4	16	Message Available	SCPI - Defined
3	8	STATus: QUEStionable Status Register	This bit number is not applicable to GPRS. Summary Message comes from the STATus: QUEStionable Status Register, which fans out to the CALL and HARDware Status Registers.
2	4	Error/ Event Queue	SCPI - Defined
1	2	Reserved	
0	1	Reserved	

Program Example - Status Byte Register Bit Assignments

```
OUTPUT 714;"*STB?" !Queries the Status Byte.
```

Standard Event Status Register

*ESR?

*ESR? → Reads and clears the Std Event Status Register.

*ESE?

*ESE? → Reads the Std Event Status Register Enable Register

*ESE

*ESE → Writes to the Std Event Status Register Enable Register

"Diagram Conventions" on page 1

Standard Event Status Register Bit Assignment

Bit Number	Binary Weighting	Condition	Description
15	32768	Reserved by IEEE.	This bit will always be 0.
14	16384	Reserved by IEEE.	This bit will always be 0.
13	8192	Reserved by IEEE.	This bit will always be 0.
12	4096	Reserved by IEEE.	This bit will always be 0.
11	2048	Reserved by IEEE.	This bit will always be 0.
10	1024	Reserved by IEEE.	This bit will always be 0.
9	512	Reserved by IEEE.	This bit will always be 0.
8	256	Reserved by IEEE.	This bit will always be 0.
7	128	Power On	This bit is set to 1 if the power supply has been turned off and on since the last time this register was read or otherwise cleared. Defined in "IEEE Std. 488.2-1992",11.5.1.1.2
6	64	Reserved for future use.	This bit will always be 0.
5	32	Command Error	This bit is set to 1 if the test set detects an error while trying to process a command. The following events cause a command error: • An IEEE 488.2 syntax error. The test set received a message that did not follow the syntax defined by the standard. • A semantic error. For example the test set received an incorrectly spelled command. • The test set received a group execution trigger (GET) inside a program message
4	16	Execution Error	This bit is set to 1 if the test set detects an error while trying to execute a command. The following events cause a execution error: • A <PROGRAM DATA> element received in a command is outside the legal range for the test set, or it is inconsistent with the operation of the test set. • The test set could not execute a valid command due to some test set hardware/firmware condition.
3	8	Device Dependent Error	This bit is set to 1 if a test set operation does not execute properly due to an internal condition (such as, overrange). This bit indicates that the error was not a command, query, or execution error.

Standard Event Status Register

Bit Number	Binary Weighting	Condition	Description
2	4	Query Error	This bit is set to 1 if an error has occurred while trying to read the test set's output queue. The following events cause a query error: • An attempt is made to read data from the output queue when no data is present or is pending. • Data in the output queue has been lost. An example of this would be an output queue overflow.
1	2	Reserved for future use.	This bit will always be 0.
0	1	Operation Complete	This bit is set to 1 when the test set has completed all pending operations and is ready to accept new commands. This bit is only generated in response to the *OPC IEEE 488.2 common command.

Program Example - Standard Event Status Register

```
OUTPUT 714;"*ESR?" !Queries (reads) the Standard Event Status Register.
```

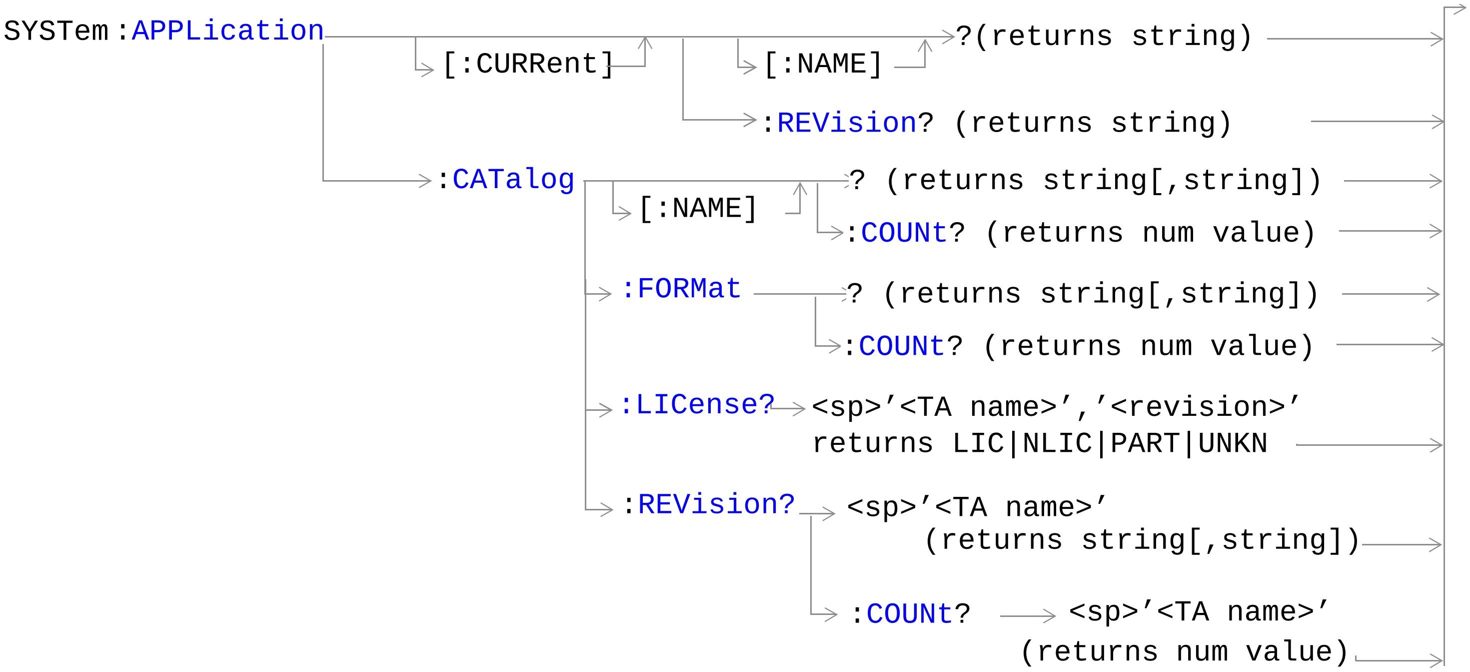
SYSTem Subsystem

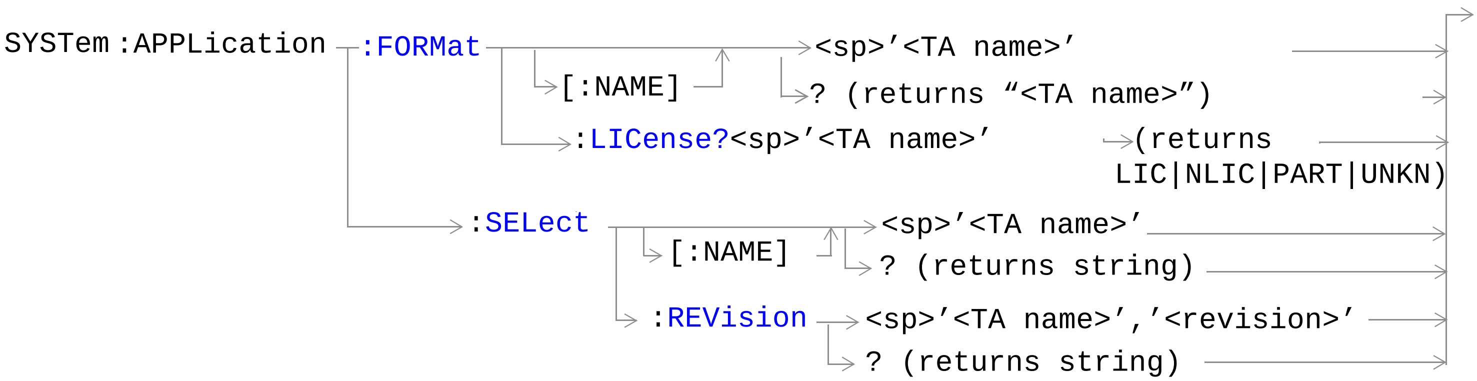
Description

The SYSTem subsystem collects the functions that are not related to test set performance. Examples include functions for performing general housekeeping and functions related to setting global configurations, such as TIME or CORRection (amplitude offset).

Syntax Diagrams and Command Descriptions

SYSTem:APPLication





"Diagram Conventions" on page 1

SYSTem:APPLication[:CURRent][:NAME]?

Function	GSM TA	Queries the test set for the name of the currently running test application.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: A string up to 25 characters including null. See "SYSTem:APPLication:CATalog[:NAME]?" on page 1266.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:NAME?"`		

SYSTem:APPLication[:CURRent]:REVision?

Function	GSM TA	Queries the test set for the currently running test application revision number.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: Any string up to 20 characters including null. A typical example would be A.01.01 for a licensed version.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
`OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:REVISION?"`		

SYSTem:APPLication:CATalog[:NAME]?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Queries the test set for all of the names of the test applications stored on the hard drive.
This query returns one or more strings, each string is separated by a comma.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Range:
• AMPS/136 Mobile Test
• CDMA 2000 Mobile Test
• GSM/GPRS Mobile Test
• GSM_AMPS/136_GPRS_WCDMA
• WCDMA Mobile Test</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
<code>OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:NAME?”</code></td></tr>
</table>

SYSTem:APPLication:CATalog[:NAME]:COUNt?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Queries the test set for the total number test application names stored on the hard drive. Up to 30 test applications can be stored.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 through 30</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
<code>OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:NAME:COUNT?”</code></td></tr>
</table>

SYSTem:APPLication:CATalog:FORMat?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Queries the test set for the names of all formats that are available in a fast switching or multi-partitioned test application. A licensed fast switching or multi-partitioned test application must be selected to use this command.

This query returns one or more strings, each string is separated by a comma.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Range: A string up to 25 characters, or the null string.
• "GSM" if only the GSM TA is licensed
• "GPRS" if only the GPRS TA is licensed or if both the GPRS TA and GSM/GPRS LA are licensed
• "AMPS/136"
• "IS-2000/IS-95/AMPS"
• "WCDMA"</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
<code>OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:FORMAT?"</code></td></tr>
</table>

SYSTem:APPLication:CATalog:FORMat:COUNt?

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Queries the test set for the total number of formats available in a fast switching test application. A licensed fast switching or multi-partitioned test application must be selected to use this command.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Query</td><td>Range: 0 to 3</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example
<code>OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:FORMAT:COUNT?"</code></td></tr>
</table>

SYSTem:APPLication:CATalog:LICense? ‘<test application name>’,’<revision>’

Function	GSM TA	Queries the license status for a selected revision. The query must include two strings separated by a comma. The test application name and revision must be entered as they appear in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters. The returned values are: • “LIC” indicates this is a licensed test application. • “NLIC” indicates this is not a licensed test application. • “PART” only part of the test application with multiple radio formats is licensed • “UNKN” indicates that license status is unknown.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: LIC | NLIC | PART | UNKN
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:LICENSE? ‘GSM mobile test’,’A.04.00’”
```

SYSTem:APPLication:CATalog:REVision? ‘<test application name>’

Function	GSM TA	Queries the test set for all of the revision numbers stored on the test set’s hard drive. You must specify a test application. The test application name must be entered as it appears in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: One or more comma separated strings or a null string
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:REVISION? ‘AMPS/136 MOBILE TEST’”
```

SYSTem:APPLication:CATalog:REVision:COUNt? ‘<test application name>’

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Queries the test set for the number of revisions present on the hard disk for a specified test application. Up to 30 revisions can be stored for a test application. The test application name must be entered as it appears in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.
Query		Range: 0 through 30
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:REVISION:COUNT? ‘AMPS/136 MOBILE TEST’”
```

SYSTem:APPLication:FORMat[:NAME]

Function	Switches formats in a fast switching test application or switches between licensed formats. A licensed fast switching or integrated test application must be selected to use this command. Queries the test set for the name of the currently active format. This string is not case sensitive.
Setting	Range: • ‘GSM’ (either ‘GSM’ or ‘GPRS’ will switch to the GSM/GPRS TA) • ‘GPRS’ • ‘AMPS/136’ • ‘IS-2000/IS-95/AMPS’ • ‘WCDMA’
Query	Range: A string up to 25 characters, or the null string. • ‘GSM’ if only the GSM TA license is present • ‘GPRS’ if only the GPRS TA license is present or if both the GPRS TA and GSM/GPRS LA licenses are present • ‘AMPS/136’ • ‘IS-2000/IS-95/AMPS’ • ‘WCDMA’
Programming Example	

```
OUTPUT 714;”SYSTEM:APPLICATION:FORMAT:NAME ‘GSM/GPRS’” !Switches to the GSM/GPRS TA
OUTPUT 714;”SYSTEM:APPLICATION:FORMAT:NAME?”    !Returns the active application name
```

SYSTem:APPLication:FORMat:LICense? ‘<format name>’

<table>
<tr><td>Function</td><td>Queries the test set for the license status of the fast switching test application.

The returned values are:

• LIC indicates this is a licensed test application.
• NLIC indicates this is not a licensed test application.
• PART indicates that only part of the test application with multiple formats is licensed.
• UNKN indicates that license status is unknown.</td></tr>
<tr><td>Query</td><td>Range: LIC | NLIC | PART | UNKN</td></tr>
<tr><td colspan="2">Programming Example

<code>OUTPUT 714;”SYSTEM:APPLICATION:FORMAT:LICENSE? ‘AMPS/136’”</code></td></tr>
</table>

SYSTem:APPLication:SELect[:NAME] ‘<test application name>’

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Selects a test application and reboots the test set. This will switch the test application to the revision already selected. There is no need to re-select the revision before switching. The reboot process takes about 1 minute.

Queries the test set for the test application that is selected and will run after the next reboot of the test set.

The test application name must be entered as it appears in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.

NOTE Selecting the correct name and the desired revision of a test application is important. This information should be reviewed before proceeding. The directions for how to determine test application name and revision are found in this document.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range: See “SYSTem:APPLication:CATalog[:NAME]?” on page 1266.</td></tr>
<tr><td colspan="2">Query</td><td>Range: See “SYSTem:APPLication:CATalog[:NAME]?” on page 1266.</td></tr>
<tr><td colspan="3">Programming Example

<code>OUTPUT 714;”SYSTEM:APPLICATION:SELECT:NAME ‘AMPS/136 MOBILE TEST’”</code>

<code>OUTPUT 714;”SYSTEM:APPLICATION:SELECT:NAME?”</code></td></tr>
</table>

SYSTem:APPLication:SELect:REVision ‘<test application name>’,’<revision>’

<table>
<tr><td rowspan="4">Function</td><td>GSM TA</td><td rowspan="4">Selects a test application revision and a test application.

The revision does not need to be set in order to switch test applications. The only time you select revisions is to change revisions.

Queries the test set for the revision of a specified test application.

The test application name and revision must be entered as they appear in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.

NOTE GSM Mobile Test; revisions before A.04.00 did not have test application switching and provide no way to return to revisions that have switching. You will need to reload a revision that has test application switching following the download process for upgrading firmware.</td></tr>
<tr><td>GPRS TA</td></tr>
<tr><td>GSM/GPRS LA</td></tr>
<tr><td>EGPRS LA</td></tr>
<tr><td colspan="2">Setting</td><td>Range: A valid test application name and revision number for any licensed test application.</td></tr>
<tr><td colspan="2">Query</td><td>Range: A string up to 20 characters, or the null string.</td></tr>
<tr><td rowspan="3">Requirements</td><td>GSM/GPRS TA</td><td>Revision A.01.00 and above</td></tr>
<tr><td>GSM/GPRS LA</td><td>Revision C.01.00 and above</td></tr>
<tr><td>EGPRS LA</td><td>Revision A.01.00 and above</td></tr>
<tr><td colspan="3">Programming Example

OUTPUT 714;”SYSTEM:APPLICATION:SELECT:REVISION ‘GSM MOBILE TEST’,’A.04.00’”

OUTPUT 714;”SYSTEM:APPLICATION:SELECT:REVISION? ‘GSM MOBILE TEST’”</td></tr>
</table>

Related Topics

“Application Switching” on page 1528

“Application Revisions and Licenses” on page 1530

“Application Name” on page 1532

SYSTem:BEEPer

```
SYSTem ——:BEEPer ——> :STATe ———┬——> <sp>1|ON|0|OFF ———> 
                               └——> ? (returns 1|0) ———> 
```

"Diagram Conventions" on page 1

SYSTem:BEEPer:STATe

Function	GSM TA	Sets/queries the beeper state of the test set.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		1 | ON
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SYSTEM:BEEPER:STATE OFF" !Sets beeper state to off.`		

SYSTem:CONFigure

```
SYSTem → :CONFigure → :INFormation → :HARDware → :VERBose? → (returns model number,
                                                              serial number, revision
                                                              number, board ID and
                                                              Cal file information)
```

"Diagram Conventions" on page 1

SYSTem:CONFigure:INFormation:HARDware:VERBose?

Function	GSM TA	Queries the manufacturer, model number, model number of the test application running, serial number, revision, board ID, and cal file information. The information provided by the query represents the configuration that existed when the test set was powered up. For an example of how to use this command, see "Hardware Configuration Report" on page 1515.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
*RST Setting		Resets have no effect on this information. The information is gathered during the power up cycle.

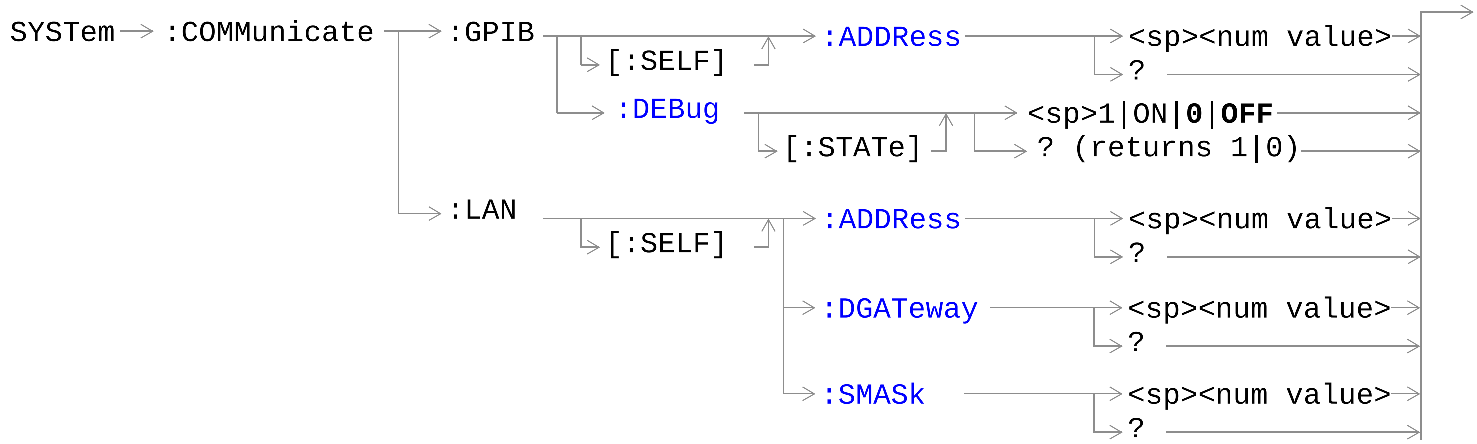
Related Topics

"Hardware Configuration Report" on page 1515

"SYSTem:CURRent:TA" on page 1286

"Obtaining Identification Information *IDN?" on page 1514

SYSTem:COMMunicate



“Diagram Conventions” on page 1

SYSTem:COMMunicate:GPIB:[:SELF]:ADDRess

Function	GSM TA	Sets/queries the test set’s GPIB address.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 30 Resolution: 1
Query		Range: 0 to 30 Resolution: 1
Factory setting		14 (this parameter is not affected by any reset operation and can only be changed by direct user access)
Related Topics		“Configuring the Test Set’s GPIB Address” on page HIDDEN
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		
OUTPUT 714;”SYSTEM:COMMUNICATE:GPIB:SELF:ADDRESS 14” !Sets the GPIB address to 14.		

SYSTem:COMMunicate:GPIB:DEBug[:STATe]

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the test set’s SCPI debugger state. When the state is on, enhanced error messages (generated from GPIB commands with syntax errors) are shown on the test set display. The error message is printed along with the syntax. <ERR> is displayed at the end of the incorrect node. Non-printable characters will be replaced with the $ symbol. See “Error Messages” on page 1472 for a list of the errors. The debugger state should be set to on only during GPIB code development. Test times will increase if the debugger state is left on.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example		

```
OUTPUT 714;”SYSTEM:COMMUNICATE:GPIB:DEBUG:STATE ON” !Sets debugger to on.
```

SYSTem:COMMunicate:LAN[:SELF]:ADDRess

Function	GSM TA	Sets/queries the test set's LAN IP address. The value of A is used to determine the subnet mask, see "SYSTem:COMMunicate:LAN[:SELF]:SMASk" on page 1278. If the LAN address is changed the subnet mask should be checked to insure that it is set to the proper class for that LAN address.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces)
Query		Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces)
Factory setting		0.0.0.0 (this parameter is not affected by any reset operation and can only be changed by direct user access)
Related Topics		"LAN IP Address" on page 1521
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:COMMUNICATE:LAN:SELF:ADDRESS '130.015.156.255'" !Sets the
                                                                  !LAN IP
                                                                  !address.
```

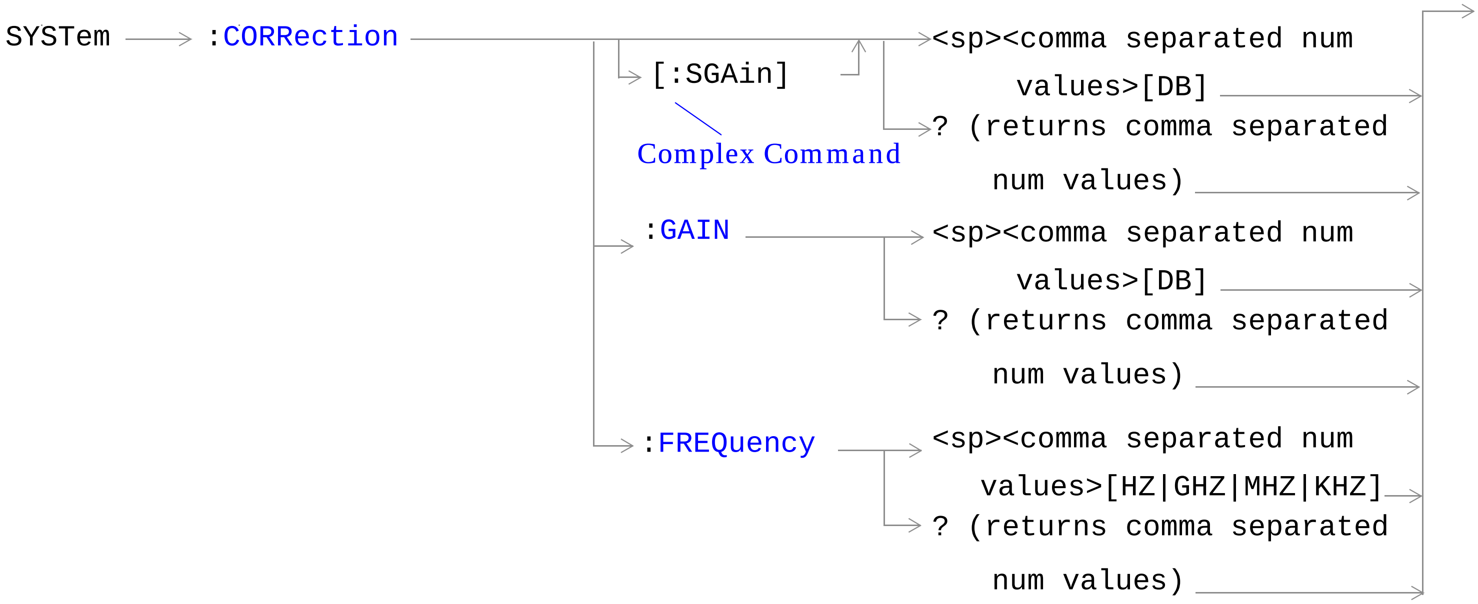
SYSTem:COMMunicate:LAN[:SELF]:DGATeway

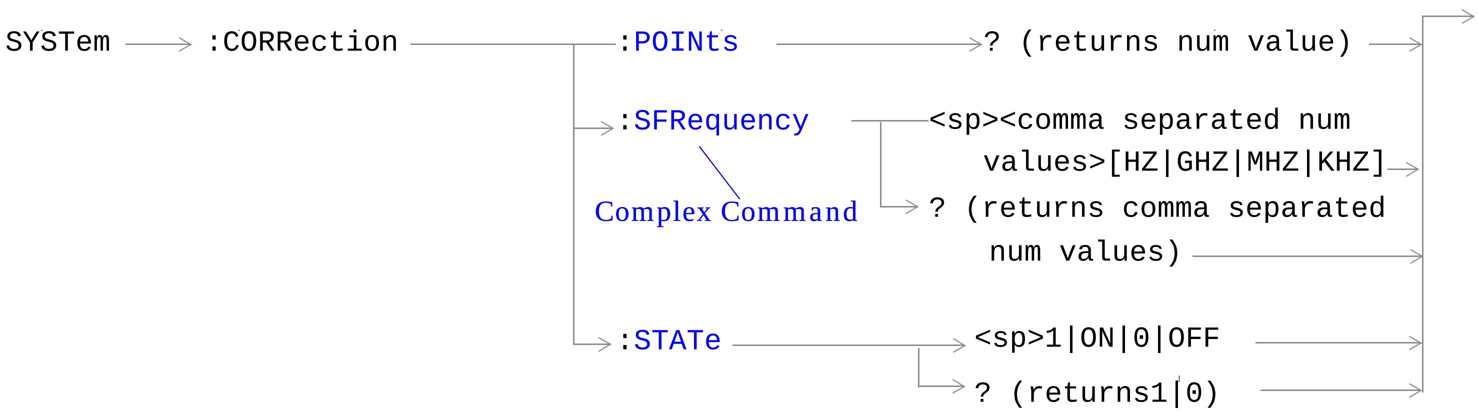
Function	GSM TA	Sets/queries the LAN IP router/gateway address for the test set.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces), blank field
Query		Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D = 0 to 255 (no embedded spaces). blank field
Factory setting		blank field, (this parameter is not affected by any reset operation)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SYSTEM:COMMUNICATE:LAN:SELF:DGATEWAY '130.2.6.200'"`		

SYSTem:COMMunicate:LAN[:SELF]:SMASk

Function	GSM TA	Sets/queries the subnet mask of the test set based on the LAN IP address selected. The subnet mask changes according to the value of A used for the LAN IP address. If A is less than or equal to 127, the subnet mask is 255.0.0.0. If A is greater than 127 and less or equal to 191, the subnet mask is 222.255.0.0. If A is grater than 191, the subnet mask is 255.255.255.0. If the LAN address is changed the subnet mask should be checked to insure that it is set to the proper class for that LAN address.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D are between = 0 to 255 (no embedded spaces)
Query		Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D are between = 0 to 255 (no embedded spaces)
Factory setting		0.0.0.0 (this parameter is not affected by any reset operation and can only be changed by direct user access)
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”SYSTEM:COMMUNICATE:LAN:SELF:SMASK '255.2.6.200'’”`		

SYSTem:CORRection





“Diagram Conventions” on page 1

SYSTem:CORRection:[:SGAin]

Function	GSM TA	Sets/queries the up to 20 comma separated offset values in dB. This command sets the state to On. See "Amplitude Offset" on page 156. The units, dB, are optional. If no units are specified then units default to dB. Sending a null list (no values) sets the state of all offsets to Off.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 20 values between –100 to +100 Resolution: 0.01
Query		Range: 1 to 20 values between –100 to +100, and NAN (9.91E+37) Resolution: 0.01
Factory Setting		Offsets 1 through 20, are set to 0.00 dB, state is set to Off
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:SGAIN -2.55,-3.12,-3.68,-4.23,-4.74,-5.3"
!A complex command that sets up to 20 comma separated offsets
!and sets the state to On for the frequencies, offsets and
!RF IN/OUT Amplitude Offset State

OUTPUT 714;"SYSTEM:CORRECTION:SGAIN"
!Sets the state for all frequencies and offsets to Off
```

SYSTem:CORRection:FREQuency

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries up to 20 comma separated frequency values in MHz. The units, (GHz, MHz, kHz, Hz) are optional. If no units are specified, units default to Hz. See "Amplitude Offset" on page 156. Sending a null list (no values) sets the state of all frequencies to Off.
Setting		Range: 0 to 20 comma separated values ranging from 292.5 MHz to 2700 MHz Resolution: 1 Hz
Query		Range: 1 to 20 comma separated values ranging from 292.5 MHz to 2700 MHz, and NAN (9.91E+37) Resolution: 1 HZ
Factory Setting		1. 800.00 MHz Off 2. 810.00 MHz Off 3. 820.00 MHz Off 4. 830.00 MHz Off 5. 840.00 MHz Off 6. 850.00 MHz Off 7. 860.00 MHz Off 8. 870.00 MHz Off 9. 880.00 MHz Off 10. 890.00 MHz Off 11. 900.00 MHz Off 12. 910.00 MHz Off 13. 920.00 MHz Off 14. 930.00 MHz Off 15. 940.00 MHz Off 16. 950.00 MHz Off 17. 960.00 MHz Off 18. 970.00 MHz Off 19. 980.00 MHz Off 20. 990.00 MHz Off

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:FREQUENCY 1784.8 MHZ,1879.8 MHZ"
!Sets up to 20 comma separated frequencies

OUTPUT 714;"SYSTEM:CORRECTION:FREQUENCY"
!Sets the state for all frequencies and offsets to Off
```

SYSTem:CORRection:GAIN

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the up to 20 comma separated offset values in dB. See "Amplitude Offset" on page 156. The units, dB, are optional. If no units are specified, units default to dB. Sending a null list (no values) sets the state of all offsets to Off.
Setting		Range: 0 to 20 values between –100 to +100 Resolution: 0.01
Query		Range: 1 to 20 values between –100 to +100, and NAN (9.91E+37) Resolution: 0.01
Factory Setting		Offsets 1 through 20, are set to 0.00 dB, state is set to off
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:GAIN -3.12,-3.68,-4.23"
!Sets up to 20 comma separated offset values

OUTPUT 714;"SYSTEM:CORRECTION:GAIN"
!Sets the state for all frequencies and offsets to Off
```

SYSTem:CORRection:POINts

Function	GSM TA	Queries the number of offsets that are in their On state when the RF IN/OUT Amplitude Offset State is also set to On. See “Amplitude Offset” on page 156.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: 1 to 20, and NAN (9.91E+37) Resolution: 1
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SYSTEM:CORRECTION:POINTS?”
!Returns the number of frequencies and offsets
!with their state set to On
```

SYSTem:CORRection:SFRequency

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries up to 20 comma separated frequency values in MHz. This command sets the state to On. The units (GHz, MHz, kHz, Hz) are optional. If no units are specified, units default to MHz. See “Amplitude Offset” on page 156. Sending a null list (no values) sets the state of all frequencies to Off.
Setting		Range: 0 to 20 comma separated values from 292.5 MHz to 2700 MHz Resolution: 1 Hz
Query		Range: 1 to 20 comma separated values from 292.5 MHz to 2700 MHz, and NAN (9.91E+37) Resolution: 1 HZ
Factory Setting		1. 800.00 MHz Off 2. 810.00 MHz Off 3. 820.00 MHz Off 4. 830.00 MHz Off 5. 840.00 MHz Off 6. 850.00 MHz Off 7. 860.00 MHz Off 8. 870.00 MHz Off 9. 880.00 MHz Off 10. 890.00 MHz Off 11. 900.00 MHz Off 12. 910.00 MHz Off 13. 920.00 MHz Off 14. 930.00 MHz Off 15. 940.00 MHz Off 16. 950.00 MHz Off 17. 960.00 MHz Off 18. 970.00 MHz Off 19. 980.00 MHz Off 20. 990.00 MHz Off
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;”SYSTEM:CORRECTION:SFREQUENCY 1710.2 MHZ,1805.2 MHZ,1784.8 MHZ,1879.8 MHZ”
!Sets up to 20 comma separated frequencies and sets the state to On for the frequency,
!offset, and RF IN/OUT Amplitude Offset State


OUTPUT 714;”SYSTEM:CORRECTION:SFREQUENCY”
!Sets the state for all frequencies and offsets to Off
```

SYSTem:CORRection:STATe

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets/queries the RF IN/OUT Amplitude Offset State. The state must be On before any of the offsets are active regardless of the state for any of the frequencies or offsets. When the RF IN/OUT Amplitude Offset State is On, the Instrument Status Area will indicate "Offset" regardless of the state for any of the frequencies or offsets. Setting any of the frequency or offset states to On will set the RF IN/OUT Amplitude Offset State to On. See "Amplitude Offset" on page 156.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
Factory Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:STATE ON" !Sets the RF IN/OUT
                                        !Amplitude Offset State to On
```

SYSTem:CURRent:TA

```
SYSTem → :CURRent:TA → :MODel?    (returns model number of test application currently running)
                     → :NAME?     (returns name of test application currently running)
                     → :REVision? (returns code revision of test application currently running)
```

"Diagram Conventions" on page 1

SYSTem:CURRent:TA:MODel?

Function	GSM TA	Queries the model number of the test application running. Printable ASCII characters up to a 15 character string.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: ASCII codes 32 - 126 decimal excluding comma and semicolon
*RST Setting		non volatile, read from the test set's hard disk
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SYSTem:CURRent:TA:NAME?

Function	GSM TA	Queries the name of the test application running. Printable ASCII characters up to a 25 character string. This is not the recommended command, see "SYSTem:APPLication" on page 1264 for the recommended command.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: ASCII codes 32 - 126 decimal excluding comma and semicolon
*RST Setting		non volatile, read from the test set's hard disk
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SYSTem:CURRent:TA:REVision?

Function	GSM TA	Queries the coordinated codeware revision for the test application running. Printable ASCII characters up to a 20 character string. This is not the recommended command, see "SYSTem:APPLication" on page 1264 for the recommended command.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Query		Range: ASCII codes 32 - 126 decimal excluding comma and semicolon
*RST Setting		non volatile, read from the test set's hard disk.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SYSTem:DATE

```
SYSTem ──:DATE ──> <sp><year>,<month>,<day>
                └─> ? (returns <year>, <month>, <day>)
```

"Diagram Conventions" on page 1

SYSTem:DATE

Function	Sets/queries the date.
Setting	Range: • <year> 2000 to 2099 • <month> 1 to 12 (the number 1 corresponds to January) • <day> 1 to the number of days in the month specified by the <month> parameter
Query	Range: • <year> 2000 to 2099 • <month> 1 to 12 (the number 1 corresponds to January) • <day> 1 to the number of days in the month specified by the <month> parameter
*RST Setting	This feature is not affected by instrument preset
Requirements	GSM/GPRS TA Revision A.01.00 and above
	GSM/GPRS LA Revision C.01.00 and above
	EGPRS LA Revision A.01.00 and above
Programming Example	

```
OUTPUT 714;"SYSTEM:DATE 2001,9,27" !Sets the date to September 27,2001.
OUTPUT 714;"SYSTEM:DATE? !Returns "+2001,+9,+27" if the date has been set to September
27,2001.
```

Related Topics

"SYSTem:UTC:DATE"

SYSTem:ERRor?

```
SYSTem ──> :ERRor? ───(returns contents of error/event queue)──────────>
```

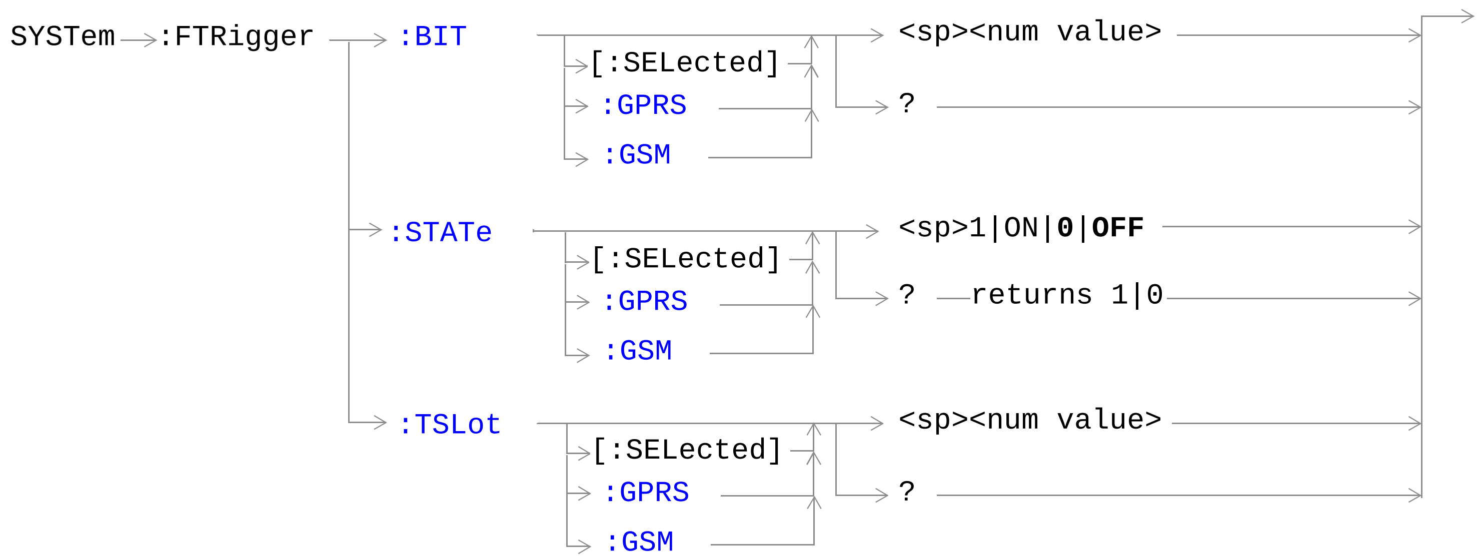
“Diagram Conventions” on page 1

SYSTem:ERRor?

Function	GSM GPRS	Queries the contents of the Error/Event Queue. The Error/Event Queue may contain one or more messages with an error or event description. Manual users may view the Message Log from the SYSTEM CONFIG screen. The contents of the Error/Event Queue and the Message log may not match. Example, manual user errors are not displayed with SYSTem:ERRor? they are viewed from the Message Log. See “Error Messages” on page 1472.
Query		Error/Event Queue • Range: 0 to 100 messages up to 255 characters in length

SYSTem:FTRigger

NOTE	This command has been replaced by the command CALL:TRIGger[:OUTPut].



"Diagram Conventions" on page 1

SYSTem:FTRigger:BIT[:SELected]

Function	GSM TA	This command selects/queries which bit, after zero, will be used for frame trigger pulse positioning in the active (that is the selected) radio format.. See "Frame Trigger Parameters" on page 416
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 1250 Resolution: 1
Query		Range: 0 to 1250 Resolution: 1
*RST Setting		zero
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:FRTIGGER:BIT 14"
!Would cause external frame trigger pulses to occur 14 bits after bit 0 of the selected
!timeslot.
```

SYSTem:FTRigger:BIT:GPRS

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command selects/queries which bit, after zero, will be used for frame trigger pulse positioning in the GPRS radio format whether or not that format is active. See “Frame Trigger Parameters” on page 416
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 1250 Resolution: 1
Query		Range: 0 to 1250 Resolution: 1
*RST Setting		zero
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:FRTIGGER:BIT:GPRS 7"
!Would cause external frame trigger pulses to occur 7 bits after bit 0 of the selected
!timeslot.
```

SYSTem:FTRigger:BIT:GSM

Function	GSM TA	This command selects/queries which bit, after zero, will be used for frame trigger pulse positioning in the GSM radio format whether or not that format is active. See “Frame Trigger Parameters” on page 416.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 1250 Resolution: 1
Query		Range: 0 to 1250 Resolution: 1
*RST Setting		zero
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:FRTIGGER:BIT:GSM 12"
!Would cause external frame trigger pulses to occur 12 bits after bit 0 of the selected
!timeslot.
```

SYSTem:FTRigger:STATe[:SELected]

Function	GSM TA	This command sets/queries the frame trigger state in the active (that is the selected) radio format. See “Frame Trigger Parameters” on page 416.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”SYSTEM:FRTIGGER:STATE ON” !Set frame trigger state to on.`		

SYSTem:FTRigger:STATe:GPRS

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command sets/queries the frame trigger state in the GPRS radio format whether or not that format is active. See “Frame Trigger Parameters” on page 416.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”SYSTEM:FRTIGGER:STATE:GPRS ON” !Set frame trigger state to on.`		

SYSTem:FTRigger:STATe:GSM

Function	GSM TA	This command sets/queries the frame trigger state in the GSM radio format whether or not that format is active. See "Frame Trigger Parameters" on page 416.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 | OFF | 1 | ON
Query		Range: 0 | 1
*RST Setting		0 | OFF
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
Programming Example `OUTPUT 714;"SYSTEM:FRTIGGER:STATE:GSM ON" !Set frame trigger state to on.`		

SYSTem:FTRigger:TSLot[:SELected]

Function	GSM TA	This command selects/queries the timeslot for frame trigger pulse positioning in the active (that is the selected) radio format. See "Frame Trigger Parameters" on page 416.
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 7 Resolution: 1
Query		Range: 0 to 7 Resolution: 1
*RST Setting		zero
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SYSTEM:FRTIGGER:TSLOT 5" !Sets the frame trigger timeslot to 5.`		

SYSTem:FTRigger:TSLot:GPRS

Function	GSM TA	This command is not applicable to GSM.
	GPRS TA	This command selects/queries the timeslot for frame trigger pulse positioning in the GPRS radio format whether or not that format is active. See "Frame Trigger Parameters" on page 416.
	GSM/GPRS LA	
	EGPRS LA	
Setting		Range: 0 to 7 Resolution: 1
Query		Range: 0 to 7 Resolution: 1
*RST Setting		zero
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:FRTIGGER:TSLOT:GPRS 2" !Sets the frame trigger timeslot to 2.
```

SYSTem:FTRigger:TSLot:GSM

Function	GSM TA	This command selects/queries the timeslot for frame trigger pulse positioning in the GSM radio format whether or not that format is active. See "Frame Trigger Parameters" on page 416.
	GSM/GPRS LA	
	GPRS TA	This command is not applicable to GPRS.
	EGPRS LA	This command is not applicable to EGPRS.
Setting		Range: 0 to 7 Resolution: 1
Query		Range: 0 to 7 Resolution: 1
*RST Setting		zero
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:FRTIGGER:TSLOT:GSM 6" !Sets the frame trigger timeslot to 6.
```

SYSTem:MEASurement

SYSTem → :MEASurement → :RESet

"Diagram Conventions" on page 1

SYSTem:MEASurement:RESet

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Sets all measurements to abort, if the trigger arm is set to continuous the measurements will begin a new measurement cycle. See "Trigger Arm (Single or Continuous) Description" on page 406. Any measurement results are cleared and the Integrity Indicator is set to 1 (No_Result_Available). See "Integrity Indicator" on page 411.
Setting	GSM TA GSM/GPRS LA	These results are set to their default values: • RACH Count • Page Count • Missing Burst Count • Corrupted Burst Count • Channel Decoder Error Count • MS TX Level Reported • TCH Timing Advance Reported • RX Level • RX Qual
	GPRS TA EGPRS LA	These results are set to their default values: • Block Error Rate (BLER) • Blocks Tested
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:MEASUREMENT:RESET" !Resets current measurements.
```

SYSTem:PRESet

```
SYSTem ─┬─> :PRESet[1] ───────────────────────────────────────────────┬──>
        ├─> :PRESet2 ──── (full preset trigger arm continuous) ───────┤
        └─> :PRESet3 ──── (partial preset trigger arm no change) ─────┘
```

"Diagram Conventions" on page 1

SYSTem:PRESet[1] (not recommended for use)

Function	GSM TA	Not recommended for use at this time, use the SYSTEM:PRESET3 command for partial preset.
	GPRS TA	Performs a partial preset. This is the recommended command when you want to change from remote operation to manual operation and a partial preset is needed.
	GSM/GPRS LA	Any call in process is disconnected and all measurements are aborted and inactivated. Measurement parameters are not changed.
	EGPRS LA	A partial preset will not modify any measurement settings including trigger arm. See "Trigger Arm (Single or Continuous) Description" on page 406.
Related Topics		See "Partial Preset" on page 367 for more details
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;"SYSTEM:PRESET" !Partial preset when changing from remote to manual operation.`		

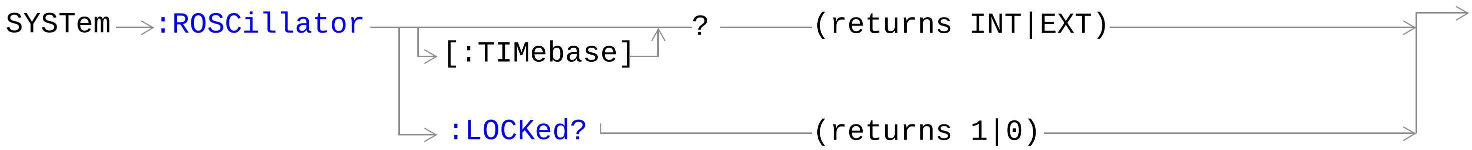
SYSTem:PRESet2

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Performs a full preset of the test set. This is the remote equivalent of pressing the SHIFT Preset keys on the front panel of the test set. All parameters are set to their default values. All measurements are aborted the trigger arm is set to continuous. See “Trigger Arm (Single or Continuous) Description” on page 406. The *RST command will set the trigger arm to single.
Related Topics		See “Full Preset” on page 368 for more details.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”SYSTEM:PRESET2” !Full preset.`		

SYSTem:PRESet3

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Performs a partial preset. This is the recommended command when a partial preset is needed during remote operation of the test set. Any call in process is disconnected and all measurements are aborted and inactivated. Measurement parameters are not changed. A partial preset will not modify any measurement settings including trigger arm. See “Trigger Arm (Single or Continuous) Description” on page 406.
Related Topics		See “Partial Preset” on page 367 for more details.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above
Programming Example `OUTPUT 714;”SYSTEM:PRESET3” !Partial preset when in remote operation.`		

SYSTem:ROSCillator



"Diagram Conventions" on page 1

SYSTem:ROSCillator[:TIMebase]?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Query to indicate if the test set's internal source or a suitable external source has been chosen to drive the test set's time base. A suitable external source must have: • an output level of 0 to +13DBM • frequency of 10 MHZ
Query		Range: • INT = internal source • EXT = external source
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SYSTem:ROSCillator:LOCKed?

Function	GSM TA GPRS TA GSM/GPRS LA EGPRS LA	Query the status of the reference oscillator and indicate if it is locked or unlocked.
Query		Range: • 0 = unlocked • 1 = locked
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

SYSTem:SYNChronized

"Diagram Conventions" on page 1

SYSTem:SYNChronized

Function	GSM TA	Sets/queries the test set that all prior sequential commands have completed and all prior overlapped commands have started indicating that the input buffer is synchronized. (See "Call Processing Event Synchronization" on page 428 or "Data Connection Processing Event Synchronization" on page 441.)
	GPRS TA	
	GSM/GPRS LA	
	EGPRS LA	
Setting		Bit 12 of the status operation condition register is pulsed. See "STATus:OPERation:CALL Condition Register Bit Assignment" on page 1222.
Query		1
Related Topics		See "Status Subsystem Overview" on page 376. See "Call Processing Event Synchronization" on page 428 or "Data Connection Processing Event Synchronization" on page 441.
Requirements	GSM/GPRS TA	Revision A.01.00 and above
	GSM/GPRS LA	Revision C.01.00 and above
	EGPRS LA	Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:SYNCHRONIZED"  !Pulses bit 12 of the status operation
                                  !condition register.
OUTPUT 714;"SYSTEM:SYNCHRONIZED?" !Returns a 1 indicating all prior sequential
                                  !commands have completed and all overlapped
                                  !commands have started.
```

SYSTem:TIME

```
SYSTem ──── :TIME ──┬──> <sp><hour>,<minute>,<second> ──────┐──>
                    └──> ? (returns <hour>, <minute>, <second>) ┘
```

"Diagram Conventions" on page 1

SYSTem:TIME

Function	Sets/queries the local time of day. UTC time will track changes made directly to local time settings. Also, if new settings are made to UTC time, local time will track UCT time. Changes to time zone will cause changes to local time, but will not directly affect UTC time.
Setting	Range: • <hour> 0 to 23 • <minute> 0 to 59 • <second> 0 to 59 **NOTE** The resolution of local time setting is minutes. A number within the parameter range must be entered for <second> but it will not affect the minute setting.
Query	Range: • <hour> 0 to 23 • <minute> 0 to 59 • <second> 0 to 59 **NOTE** The resolution of the local time setting is minutes. The value returned for <second> will not provide useful information.
*RST Setting	This feature is not affected by instrument preset
Requirements	GSM/GPRS Lab Application: Revision C.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:TIME 7,30,0" !Sets local time to 7:30
OUTPUT 714;"SYSTEM:TIME?” !Returns “+7,+30,+0" if local time has been set to 7:30.
```

Related Topics

"SYSTem:UTC[:TIME]"

"SYSTem:TZONe"

SYSTem:TZONe

```
SYSTem :TZONe <sp><hour>,<minute>
              ? (returns <hour>, <minute>)
```

“Diagram Conventions” on page 1

SYSTem:TZONe

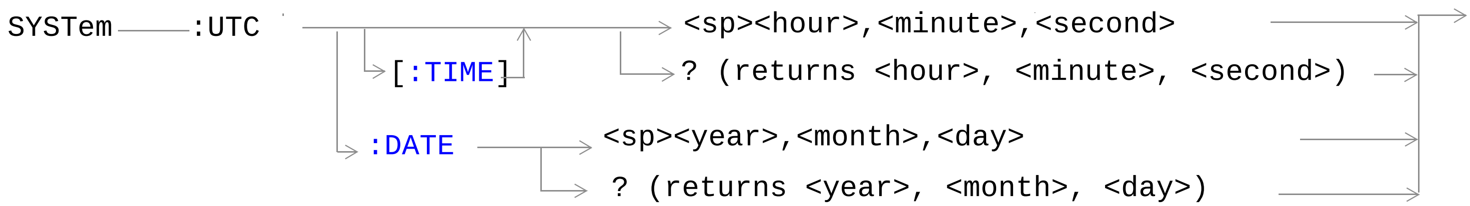
Function	Sets/queries the time zone. Changes to time zone will cause changes to local time, but will not directly affect UTC time.
Setting	Range: • <hour> -12 to +15 • <minute> 0 to 59
Query	Range: • <hour> -12 to +15 • <minute> 0 to 59
*RST Setting	This feature is not affected by instrument preset
Requirements	GSM/GPRS Lab Application: Revision C.01.00 and above
Programming Example	

```
OUTPUT 714;"SYSTEM:TZONe 8,0" !Sets time zone to 8 hours and 0 minutes.
OUTPUT 714;"SYSTEM:TZONe?” !Returns “+8,+0" if time zone has been set to 8 hours.
```

Related Topics

“SYSTem:TIME”

SYSTem:UTC



“Diagram Conventions” on page 1

SYSTem:UTC[:TIME]

Function	Sets/queries the Universal Coordinated Time (UTC) time of day. (UTC is also known as UCT, Zulu, and Greenwich Mean Time.) Local time will track UTC time settings. Also, if new settings are made to local time, UTC time will track local time.
Setting	Range: • <hour> 0 to 23 • <minute> 0 to 59 • <second> 0 to 59 **NOTE** The resolution of the UTC time setting is minutes. A number within the parameter range must be entered for <second> but it will not affect the minute setting.
Query	Range: • <hour> 0 to 23 • <minute> 0 to 59 • <second> 0 to 59 **NOTE** The resolution of the UTC time setting is minutes. The value returned for <second> will not provide useful information.
*RST Setting	This feature is not affected by instrument preset
Requirements	GSM/GPRS TA Revision A.01.00 and above
	GSM/GPRS LA Revision C.01.00 and above
	EGPRS LA Revision A.01.00 and above

Programming Example

```
OUTPUT 714;"SYSTEM:UTC:TIME 7,30,0" !Sets UCT time to 7:30
OUTPUT 714;"SYSTEM:UTC:TIME?” !Returns “+7,+30,+0" if UTC time has been set to 7:30.
```

SYSTem:UTC:DATE

<table>
<tr><td>Function</td><td>Sets/queries the Universal Coordinated Time (UTC) date. (UTC is also known as UCT, Zulu, and Greenwich Mean Time.)</td></tr>
<tr><td>Setting</td><td>Range:
• <year> 2000 to 2099
• <month> 1 to 12 (the number 1 corresponds to January)
• <day> 1 to the number of days in the month specified by the <month> parameter</td></tr>
<tr><td>Query</td><td>Range:
• <year> 2000 to 2099
• <month> 1 to 12 (the number 1 corresponds to January)
• <day> 1 to the number of days in the month specified by the <month> parameter</td></tr>
<tr><td>*RST Setting</td><td>This feature is not affected by instrument preset</td></tr>
<tr><td>Requirements</td><td>GSM/GPRS Lab Application: Revision C.01.00 and above</td></tr>
<tr><td colspan="2">Programming Example
OUTPUT 714;"SYSTEM:UTC:DATE 2001,9,27" !Sets the UTC date to September 27,2001.
OUTPUT 714;"SYSTEM:UTC:DATE? !Returns “+2001,+9,+27” if the UTC date has been set to September 27,2001.</td></tr>
</table>

Related Topics

“SYSTem:DATE”

“SYSTem:TIME”

IEEE 488.2 Common Commands

Description

*CLS

The *CLS, clear status command, is defined in “IEEE Std 488.2-1992”, 10.3. This command will also clear and close the error message screen on the test set’s display.

*ESE

The *ESE, standard event status enable command, is defined in “IEEE Std 488.2-1992”, 10.10.

*ESE?

The *ESE?, standard event status enable query, is defined in “IEEE Std 488.2-1992”, 10.11.

*ESR?

The *ESR?, standard event status register query, is defined in “IEEE Std 488.2-1992 “,10.12.

*IDN?

The *IDN?, identification query, is defined in “IEEE Std 488.2-1992”, 10.14.*IDN? is used to retrieve information about the test set in ASCII format.

*IDN?, returns ASCII codes 32 through 126 excluding comma and semicolon in four comma separated fields. Field 1 returns the manufacturer, field 2 returns the instrument model number, field 3 returns the serial number, field 4 returns 0.

*OPC

The *OPC, operation complete command, is defined in “IEEE 488.2-1992”, 10.18. *OPC causes the test set to continuously sense the No Operation Pending flag. When the No Operation Pending flag becomes TRUE, the OPC event bit in the standard event status register (ESR) is set to indicate that the state of all pending operations is completed. The *OPC common command is not recommended for use as an overlapped command.

*OPC?

The *OPC?, operation complete query, is defined in “IEEE Std 488.2-1992”, 10.19. The *OPC? query allows synchronization between the controller and the test set using either the message available (MAV) bit in the status byte, or a read of the output OPC?. The *OPC? query does not effect the OPC event bit in the Standard Event Status Register (ESR). The *OPC? common command is not recommended for use as an overlapped command.

*OPT?

The *OPT?, option identification query, is defined in “IEEE Std 488.2-1992”, 10.20. Each option will have a unique name, that name will be retuned with the query.

*RST

The *RST, full preset command, is defined in “IEEE Std 488.2-1992”, 10.32. *RST is the recommended command when performing a full preset on the test set. A *RST restores the majority of settings to their default values.

- *RST sets trigger arm to single
- PRESet2 sets trigger arm to continuous

*SRE

The *SRE, service request enable command, is defined in “IEEE Std 488.2-1992”, 10.34. The parameter range for this command is 0 through 255.

*SRE?

The *SRE?, service request enable query, is defined in “IEEE Std 488.2-1992”, 10.35. Values returned by this query range from 0 through 255.

*STB?

The *STB?, read status byte query, is defined in “IEEE Std 488.2-1992”, 10.36. Values returned by this query range from 0 through 255.

*WAI

The *WAI, wait-to-continue command, is defined in “IEEE Std 488.2-1992”, 10.39. The *WAI command prevents the test set from executing any further commands or queries until all pending operation flags are false. The *WAI common command is not recommended for use as an overlapped command.

Related Topics

“Call Processing Event Synchronization” on page 428

“Preset Descriptions” on page 367

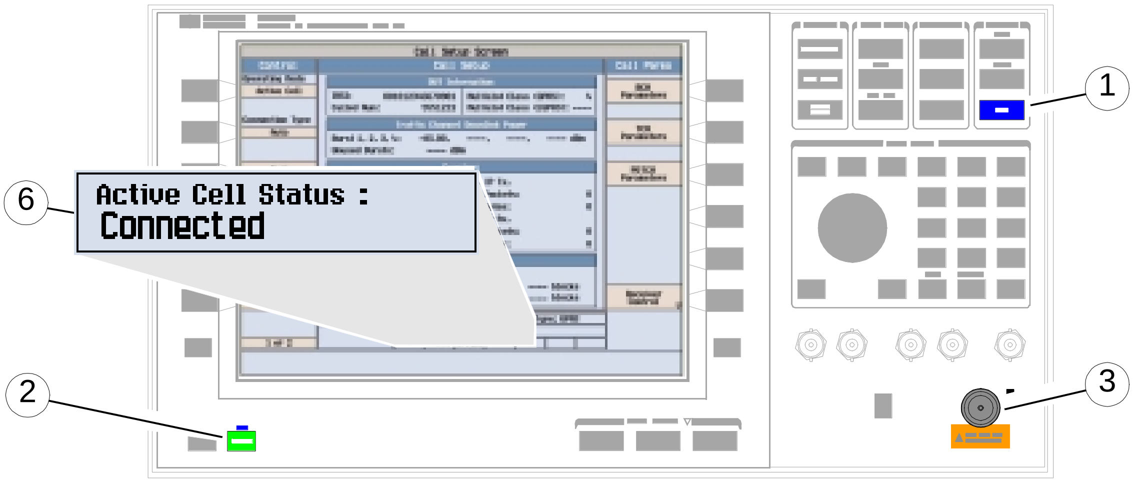
“Obtaining Identification Information *IDN?” on page 1514

Manual Operation

GSM Manual Operation

How Do I Make Measurements on a Mobile?

A. Establish a call.



1. Press the blue **SHIFT** key.
2. Press the green **Preset** key.
3. Connect the mobile.
4. Turn on the mobile and wait for it to camp.

NOTE If the mobile does not camp check that it is using the test set default PGSM cell band.

---

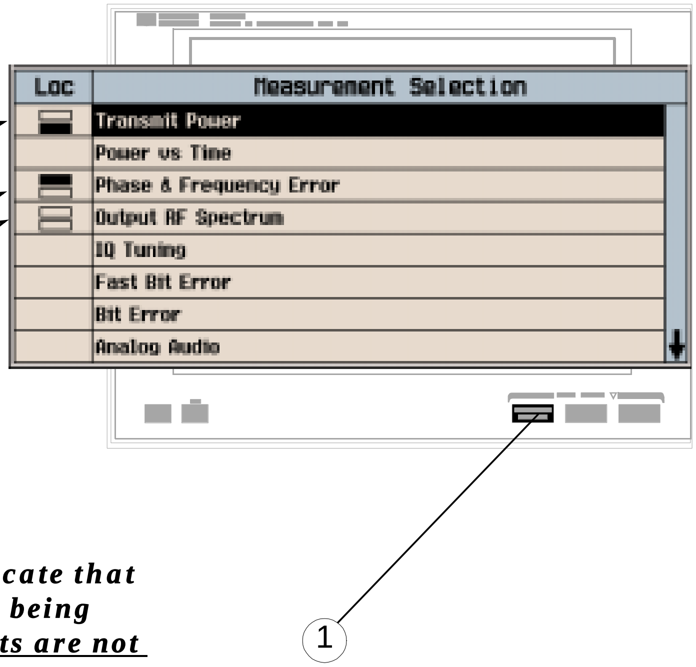
5. On the mobile press **1**, **2**, **3**, and then press send.
6. Check for `Connected` in the `Active Cell Status:` field.

B. Select measurements.

Black boxes indicate the measurements displayed and their screen location.

Transmit power measurement results are being displayed in the lower measurement window.

Phase and frequency error measurement results are being displayed in the upper measurement window.

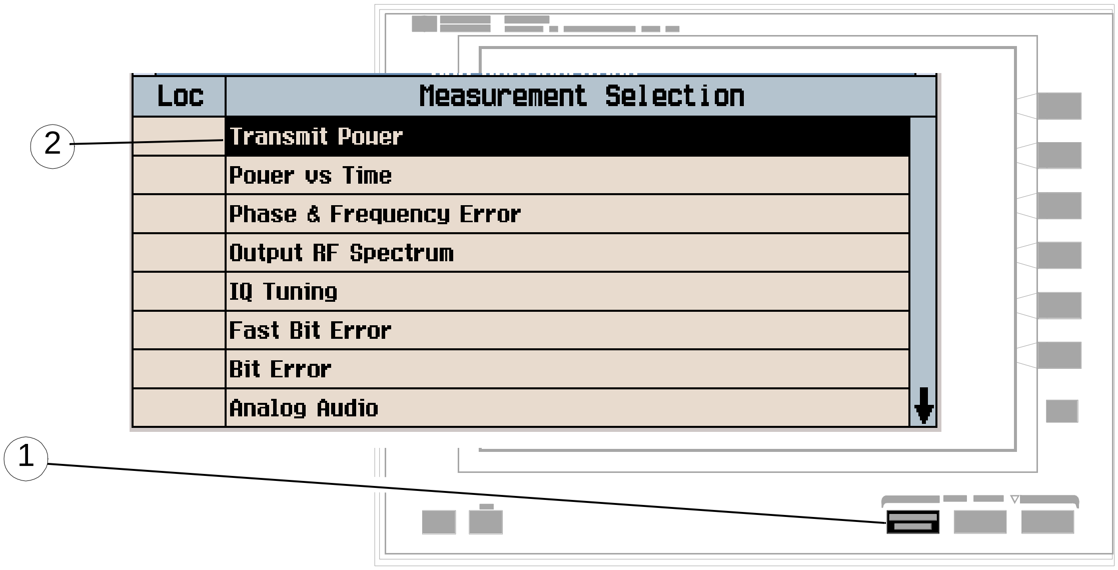


The gray boxes indicate that the measurement is being made, but the results are not being displayed.

1. Press the **Measurement selection** key.
2. Highlight a measurement and press the knob.
3. Repeat pressing the **Measurement selection** key, highlight a measurement and press the knob to add measurements.

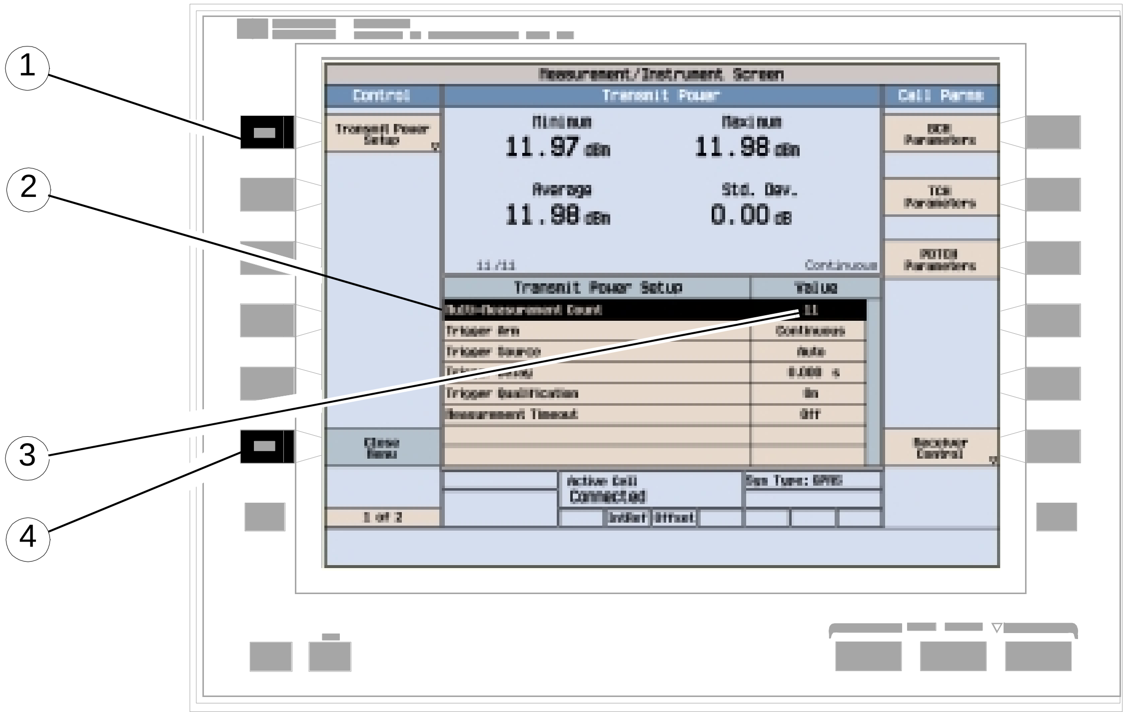
How Do I Change a Measurement's Setup?

A. Select a measurement.



1. Press the **Measurement selection** key.
2. Highlight the measurement to be set up and press the knob.

B. Set up the measurement.



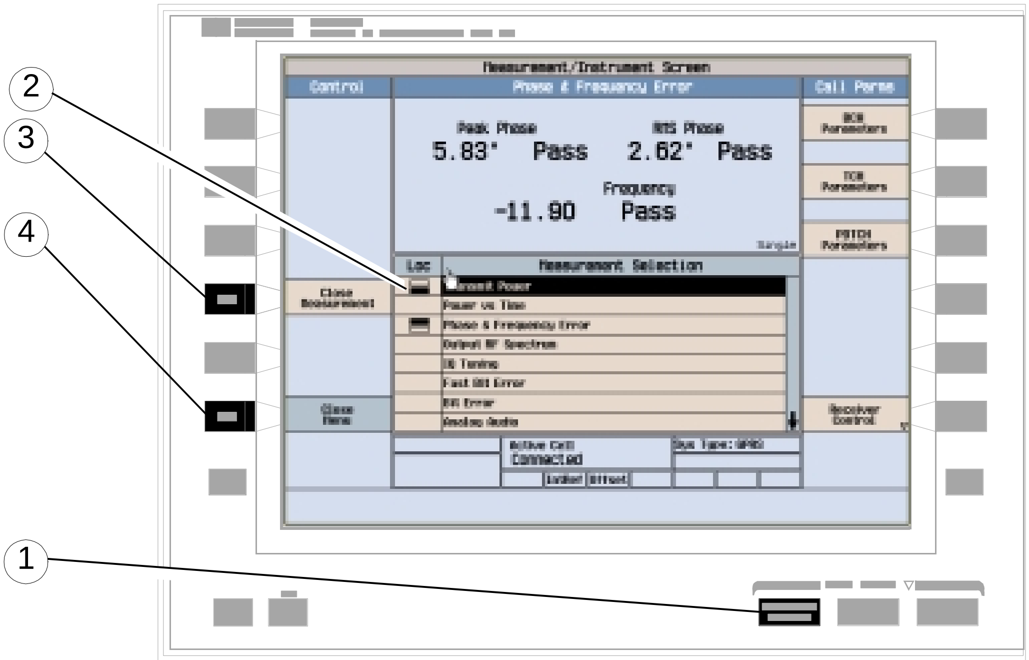
1. Press the setup key (**F1**) for the measurement selected.
2. Highlight a parameter and press the knob.
3. Enter a value or make a selection and press the knob.

NOTE For statistical measurement results, change the Multi-Measurement Count parameter from `Off` to a number >1.

---

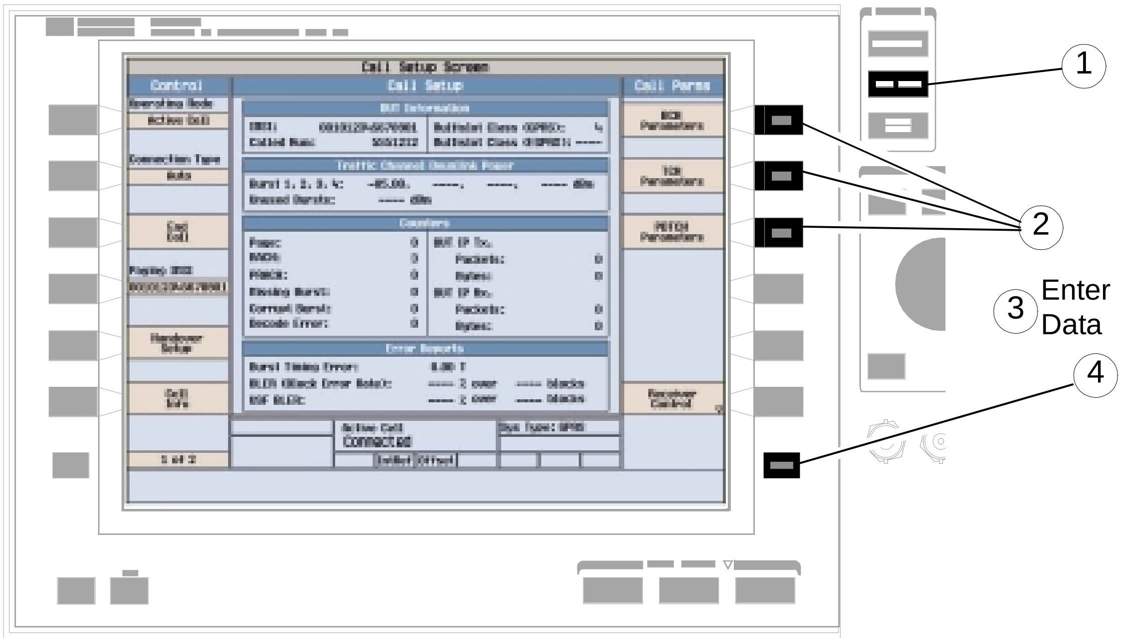
4. Press the Close Menu (**F6**) key.

How Do I Turn Off a Measurement?



1. Press the **Measurement selection** key.
2. Highlight the measurement you want to turn off.
3. Press the Close Measurement (**F4**) key.
4. Press the Close Menu (**F6)** key.

How Do I Change Call Parameters?



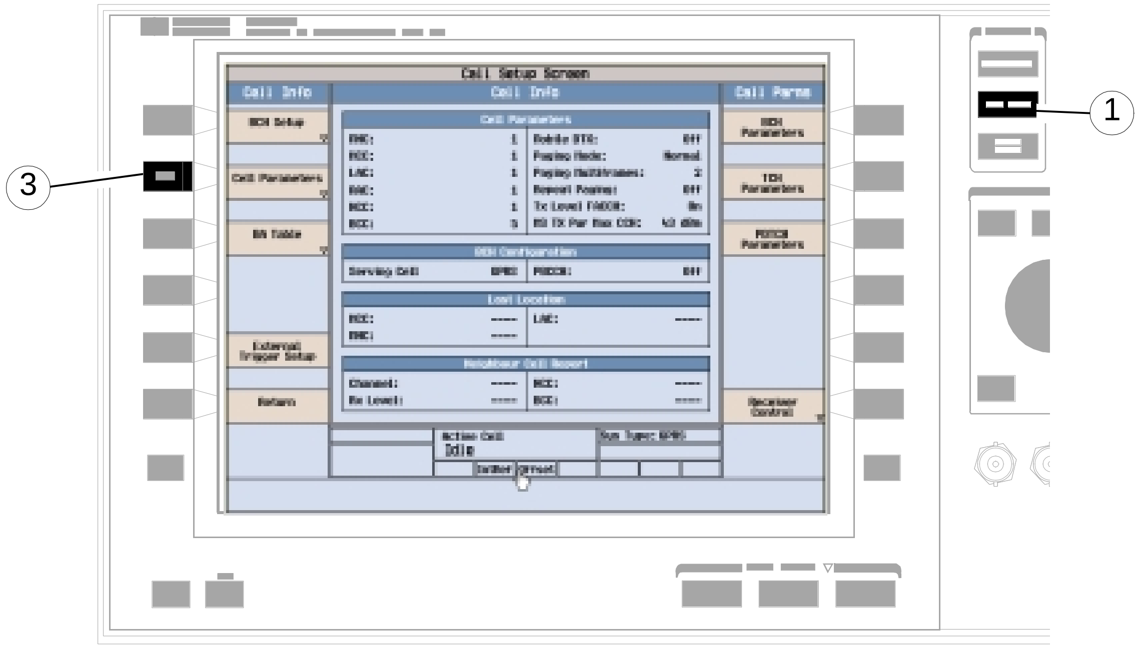
1. Press the **CALL SETUP** key.
2. Press **F7**, **F8**, or **F9** for BCH, TCH or PDTCH respectively.
3. Enter a value or highlight a selection and press the knob.
4. Press the **More** key for additional call parameters.

NOTE For a dual-band handover, change the `Traffic Band` selection (`Call Parms` (**F8 -** TCH Parameters).

5. Press **F12** (**Return** key) to return to Call Parms selections.

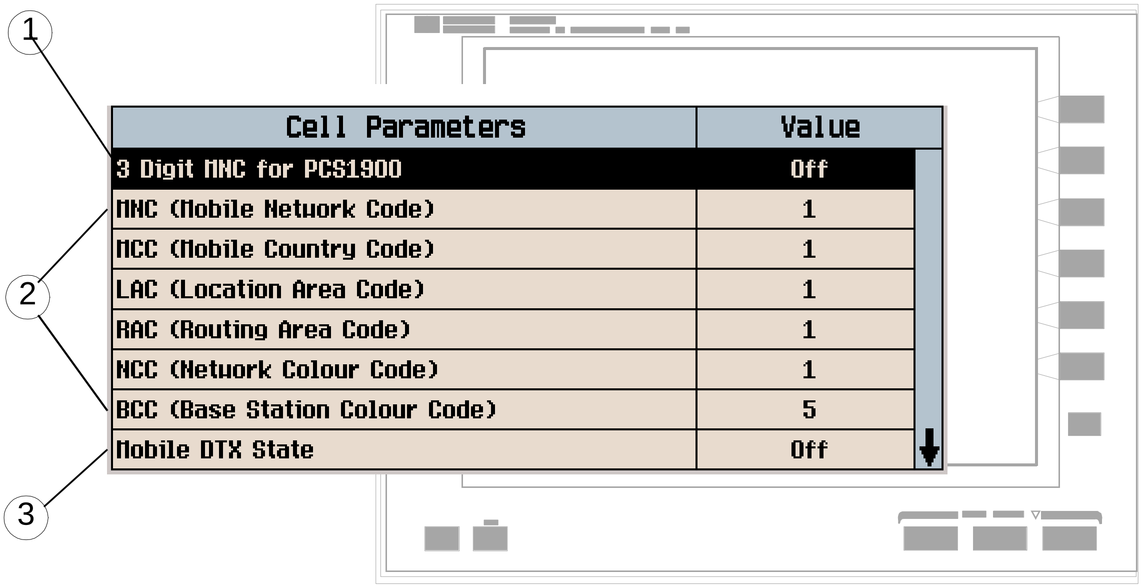
How Do I Change Cell Parameters?

A. Select the Cell Parameters menu.



1. Press the **CALL SETUP** key.
2. Press the `Cell Info` (**F6**) key.
3. Press the Cell Parameters (**F2**) key.

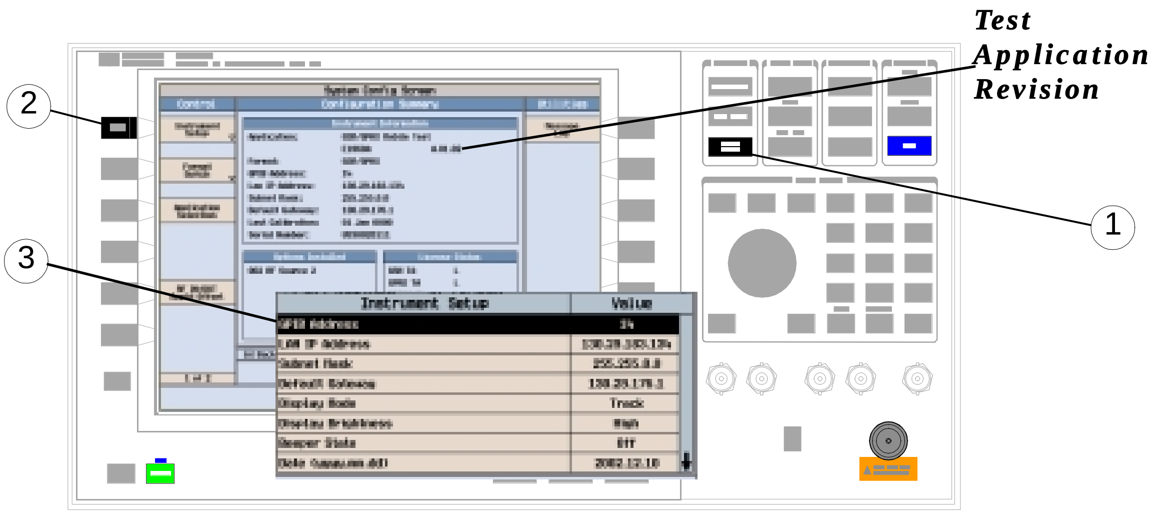
B. Set a cell parameter.



- To change “network” cell parameters:
  1. The BCH cell band must be set to PCS to change 3 Digit MNC for PCS1900 (see Call Parms > BCH Parameters > Cell Band).
  2. The operating mode must be set to “Cell Off” to change MNC, MCC, LAC, RAC, NCC or BCC (see Operating Mode in the Call Setup Screen).
  3. Set network cell parameter to the desired value. (Highlight the parameter, press the knob.)
- To change all other cell parameters:
  1. Highlight the parameter, press the knob, enter a value, and press the knob.

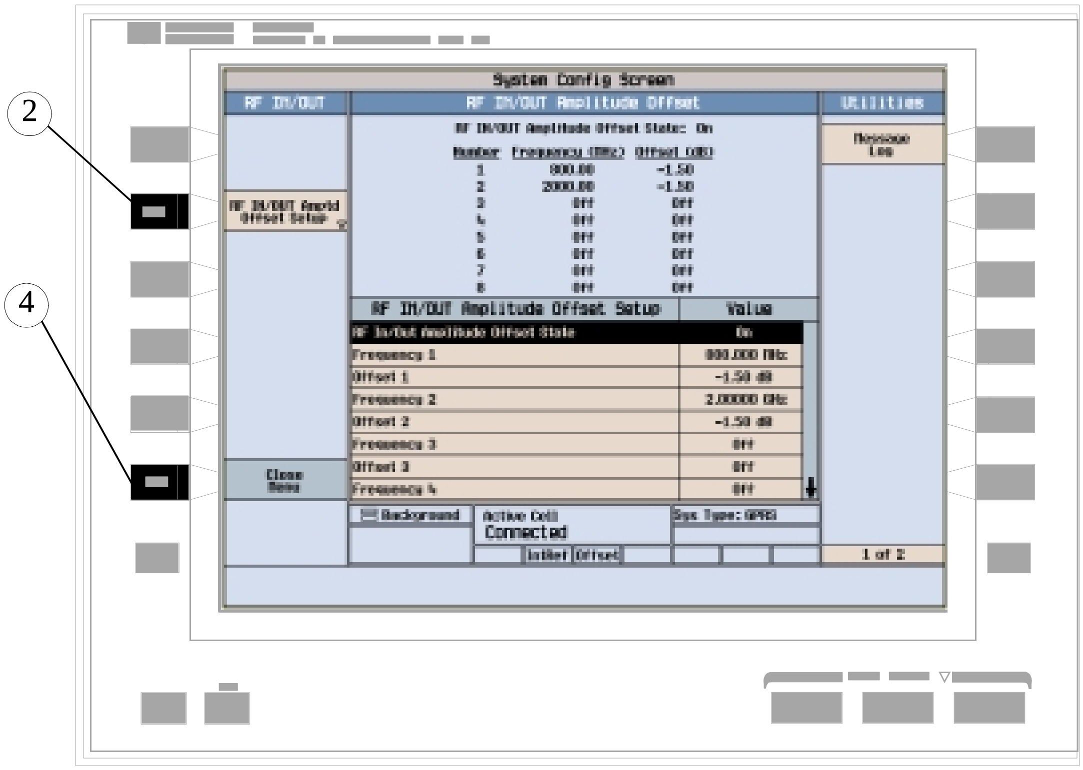
How Do I Configure the Test Set for My Test System?

A. Configure instrument information and setup.



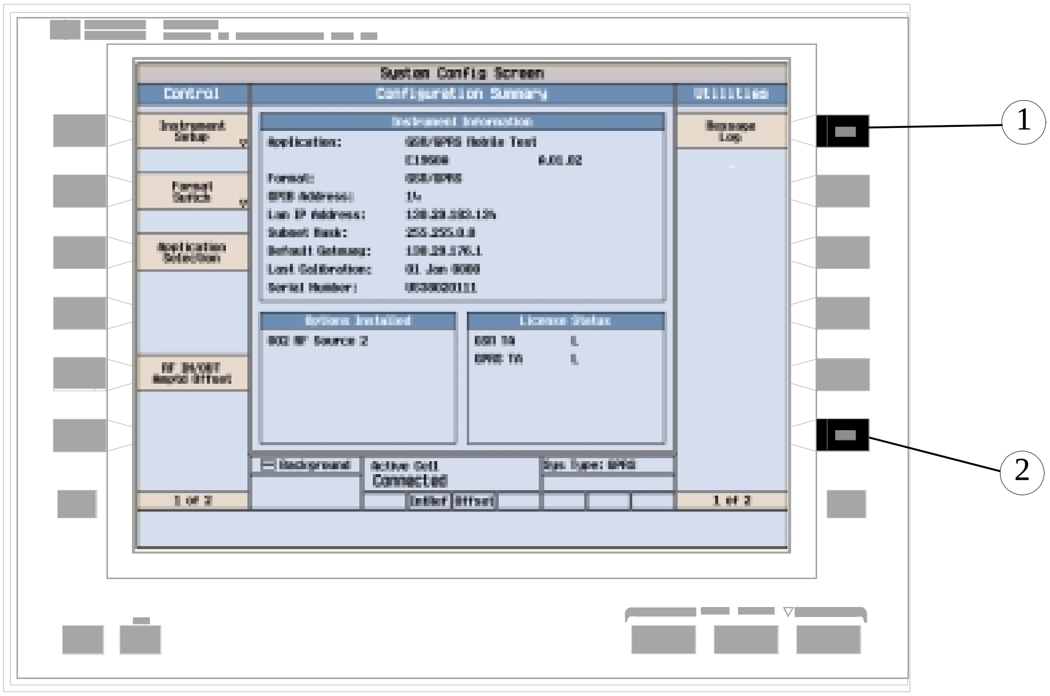
1. Press the **SYSTEM CONFIG** key.
2. Press the `Instrument Setup` (**F1**) key.
3. Change an Instrument Setup Value and then press the `Close Menu` (**F6**) key.

B. Set amplitude offsets.



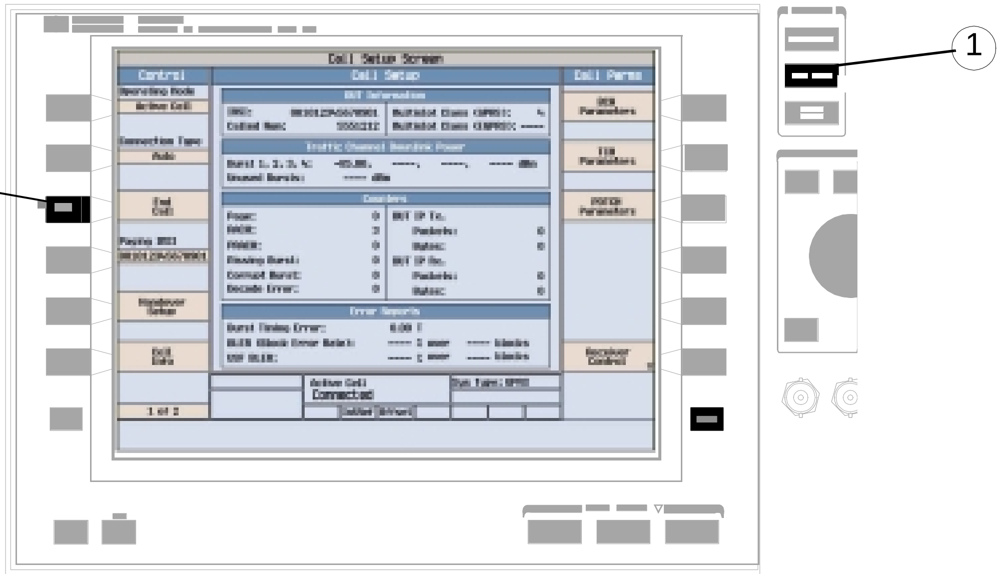
1. Press the `RF IN/OUT Amptd Offset` (**F5**) key on the Configuration Summary screen shown in part A.
2. On the RF IN/OUT Amplitude Offset screen, press the `RF IN/OUT Amptd Offset Setup` (**F2**) key.
3. Enter the test frequencies and their associated amplitude offsets. Twenty test frequencies and amplitude offsets can be set.
4. Press the `Close Menu` (**F6**) key.
5. Press the `Return` (**F6**) key to return to the Configuration Summary screen.

C. Check the message log.



1. Press the `Message Log` (**F7**) key and view the message log.
2. Press the `Return` (**F12**) key.

How Do I End a Call?



1. Press the **CALL SETUP** key.
2. Press the `End Call` (**F3**) key, or end the call from the mobile.
3. Check for `Idle` in the `Active Cell Status:` field.

GSM Mobile Measurements

The following step-by-step procedures explain how to perform specific measurements available on the GSM Test Application. A detailed description of each measurement is given in the *Reference* information on the documentation CD-ROM and at the Agilent 8960 support website (http://www.agilent.com/find/8960support/).

Setup parameters for each measurement are assumed to be set to their default (Full preset) values unless otherwise stated.

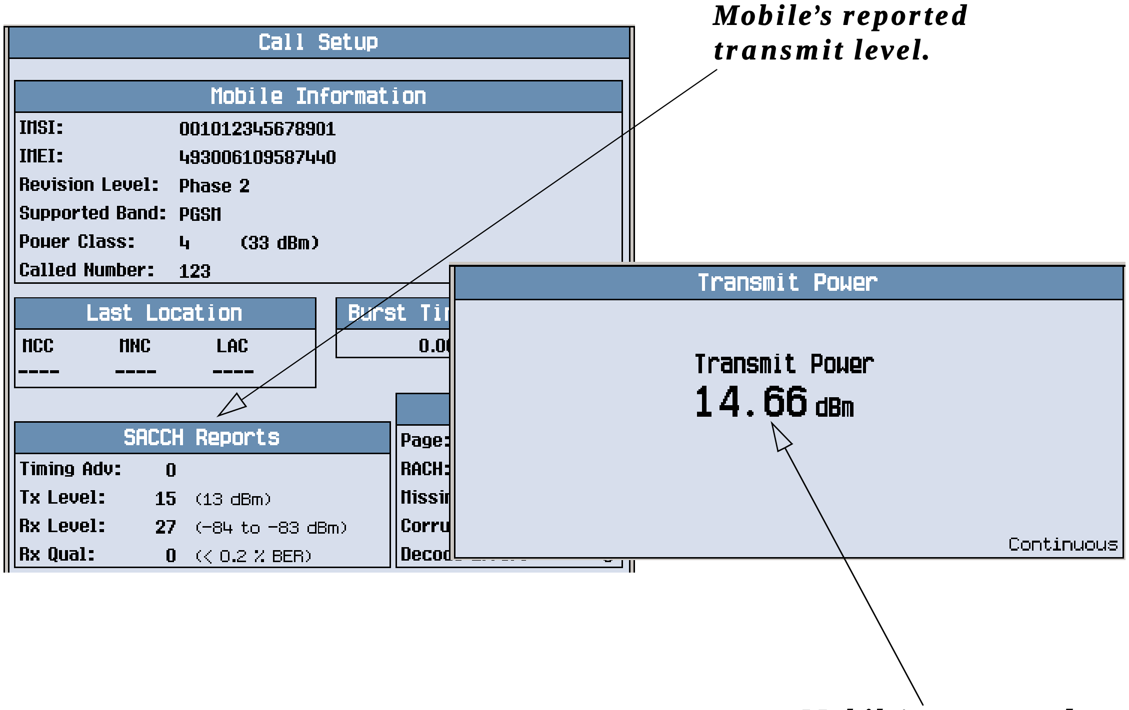
The following measurement procedures are provided:

Measuring Transmit Power

1. Establish a call with the mobile.
2. Press the **Measurement selection** key.
3. Select the `Transmit Power` measurement.
4. Press the `Transmit Power Setup` (**F1**) key.

5. Set the measurement parameters as needed for your measurement situation, including:
   `Measurement Timeout = 5.0 s`

Mobile's reported transmit level.



Mobile's measured transmit power.

A typical measurement result is shown above.

Press the **CALL SETUP** key and using the `SACCH Reports` window, compare the mobile's reported `Tx Level` with the real measured `Transmit Power`.

Measuring Power versus Time

1. Establish a call with the mobile.
2. Press the **Measurement selection** key.
3. Select the `Power vs Time` measurement.
4. Press the `Power vs Time Setup (F1)` key.
5. Press the `Measurement Setup (F1)` key.
6. Set the measurement parameters as needed for your measurement situation, including:
   `Measurement Timeout = 10 s`
7. Press the `Measurement Offsets` (**F2**) key.

NOTE For statistical analysis the test set allows you to set up to 12 time markers. These markers *do not* define the mask but allow you to obtain measurement results from specified points on the mask. If you want to define your own custom mask, you can do this using the Custom Mask Setup parameters within the `Power vs Time Setup` menu.

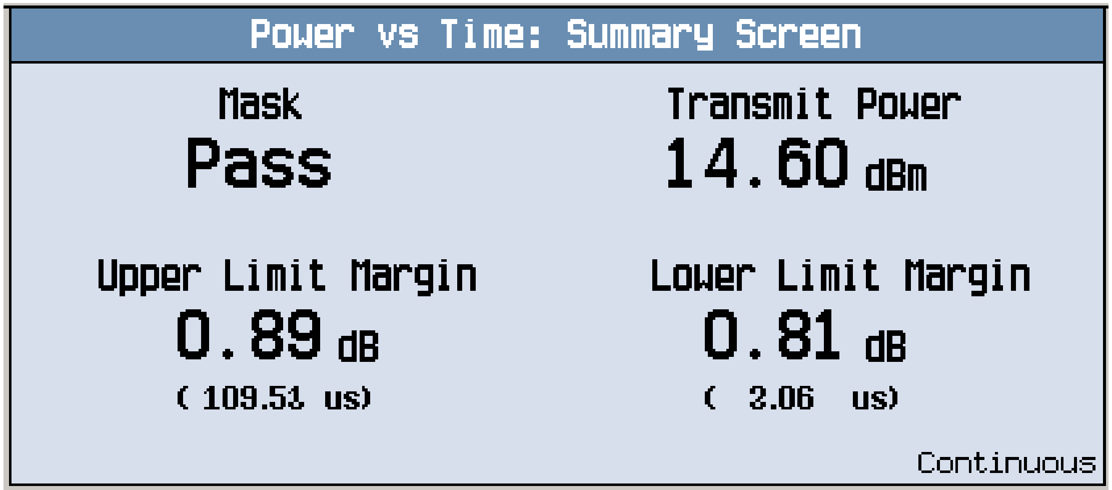
---

8. Enter the required time offset values.

NOTE Offsets are referenced to bit zero in a normal burst. To obtain results from measurement points before bit zero, enter negative offset values.

---

9. Press the `Close Menu` (**F6**) key.

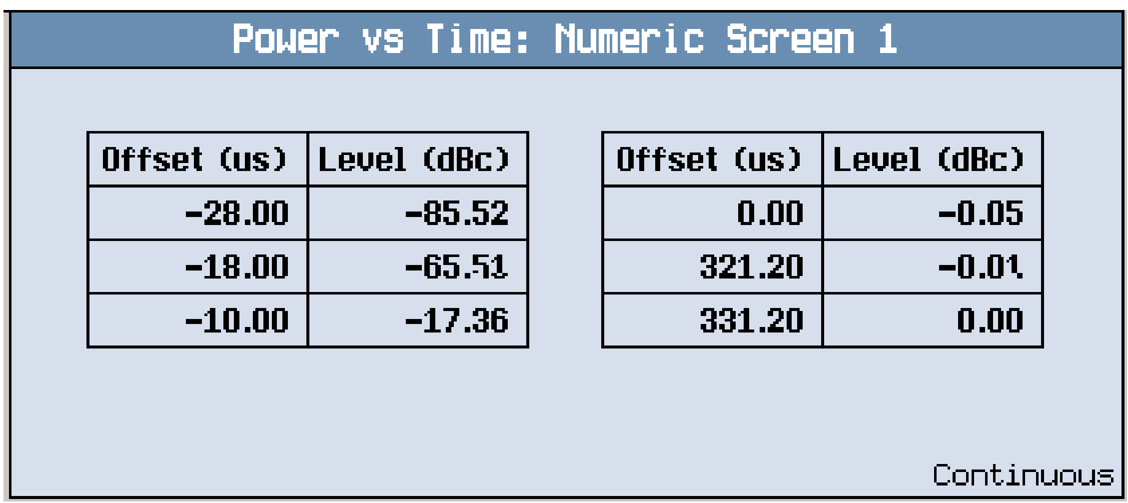


The displayed screen shows whether the burst is within the `Mask` (Pass or Fail), broad-band carrier `Transmit Power`, the `Upper Limit Margin`, and the `Lower Limit Margin`.

10. Press the `Return to PvT Control` (**F6**) key.

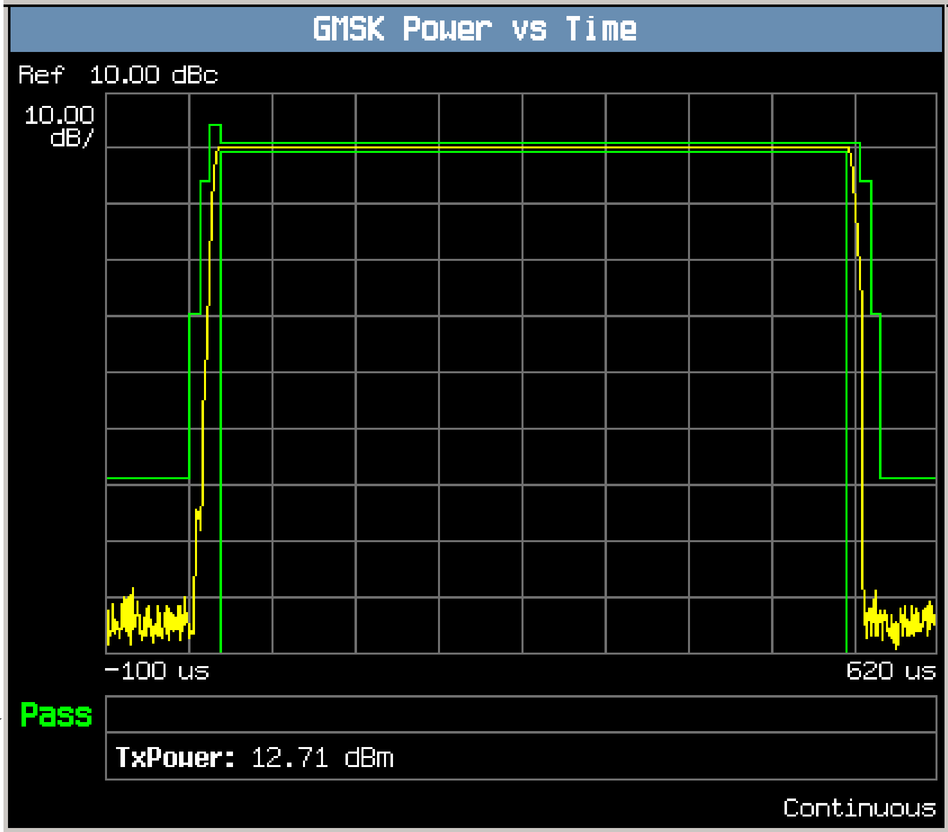
11. Press the `Change View` (**F2**) key.

12. Press the `Numeric 1 of 2` (**F2**) key to view the measurement results for offsets 1 through 6, or `Numeric 2 of 2` (**F3**) key to view measurement results for offsets 7 through 12.



A typical numeric measurement results screen for offsets 1 through 6 is shown above.

13.Press the `Graph` (**F4**) key to access the full graph of the uplink burst.

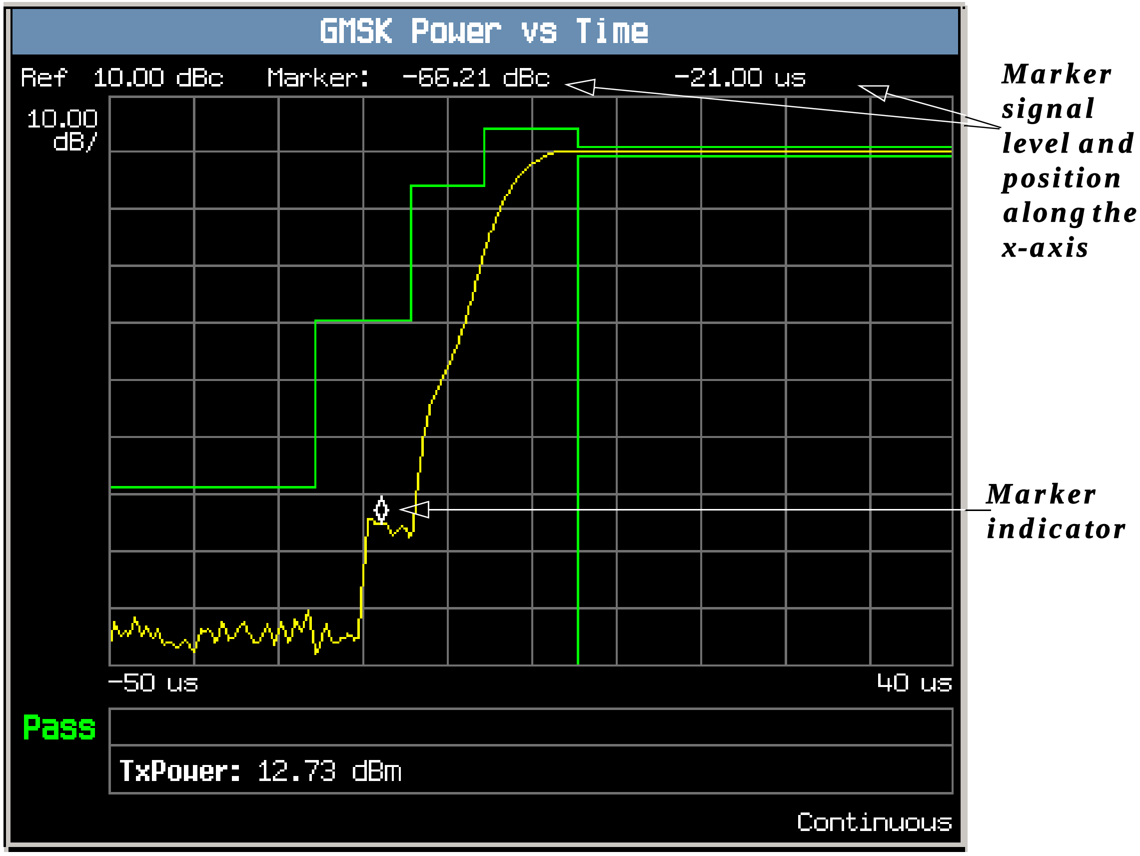


Overall Pass/Fail indicator

A typical full graph view of the burst is shown above. An overall pass/fail indicator is positioned in the bottom left corner of the display:

- The text “Pass” is shown in a green-colored font if the measurement has passed the entire mask.
- The text “Fail” is shown in a red-colored font if the measurement has failed any part of the mask.

You can zoom in to individual sections of the graph by pressing the `Full` (**F1**), `Rising Edge` (**F2**), `Falling Edge` (**F3**), or `Useful` (**F4**) keys. In addition, you can control a marker or change axis values by pressing the `Graph Control` (**F5**) key.

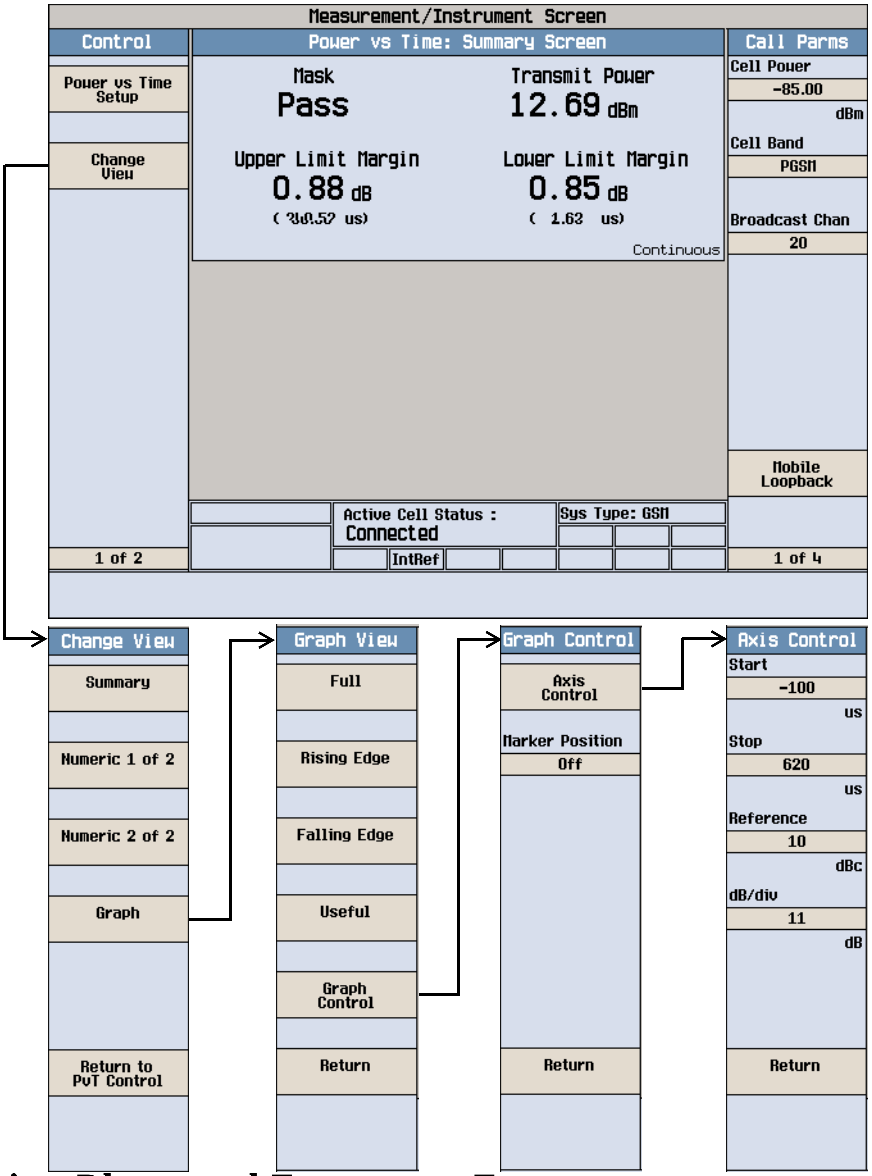


A typical graph view of the rising edge of the burst is shown above. You can access this view by pressing the `Rising Edge` (**F2**) key.

In this case, the marker is turned on and positioned on the rising edge. The marker can be turned on by pressing the `Graph Control` (**F5**) key then the `Marker Position` (**F2**) key. Set the required marker position using the knob or the numeric entry keys. The signal level at the marker and its position along the x-axis are shown at the top of the display above the graph.

If you require details on how to navigate through the Power versus Time graph menus, see "Power versus Time Graph Menus" on page 1326.

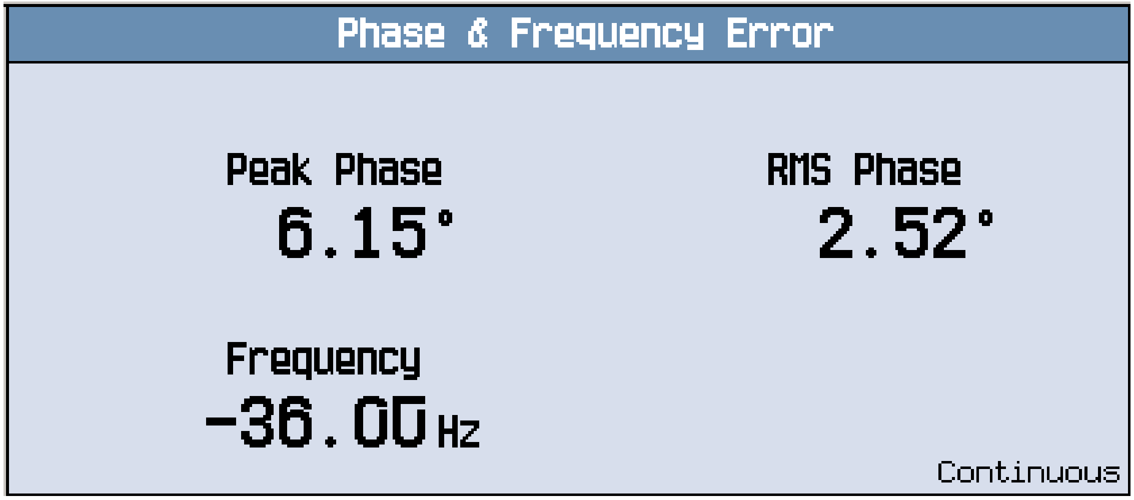
Power versus Time Graph Menus



Measuring Phase and Frequency Error

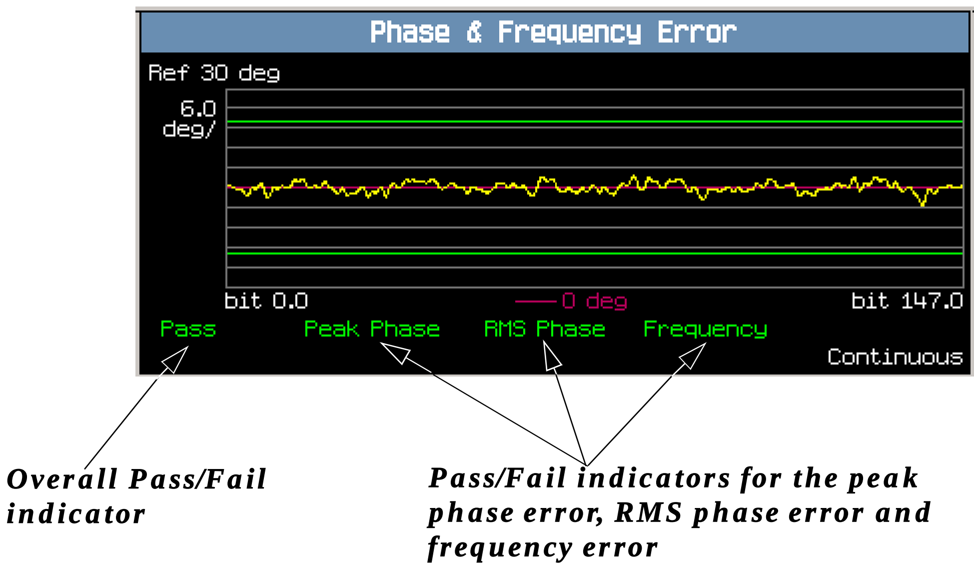
1. Establish a call with the mobile.
2. Press the **Measurement selection** key.
3. Select the `Phase & Frequency Error` measurement.
4. Press the `Phase & Freq. Setup` (**F1**) key.

5. Set the measurement parameters as needed for your measurement situation, including:
   `Measurement Timeout = 10 s`



A typical phase and frequency error measurement result is shown above.

6. Press the `Change View` (**F2**) key.
7. Press the `Graph` (**F2**) key to access the peak phase error graph.



A typical peak phase error graph is shown above.

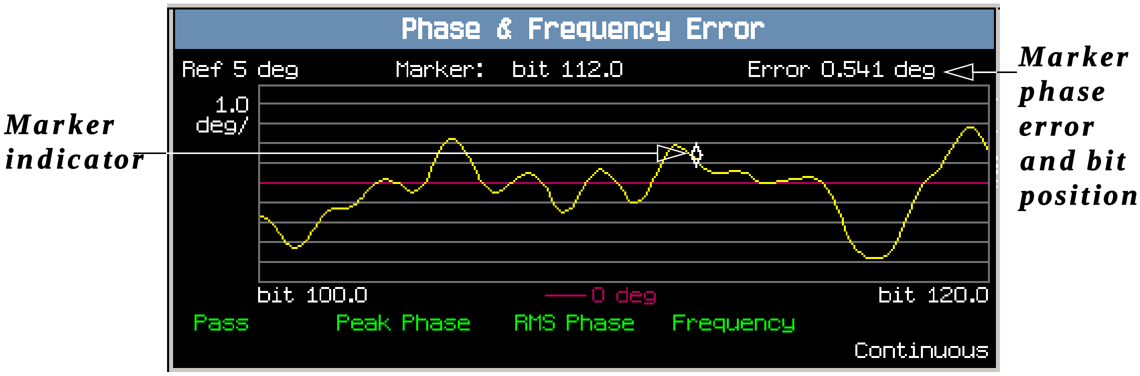
Two types of pass/fail results are provided:

- An overall measurement pass/fail indicator is positioned in the bottom left corner of the display:
  - — The text “Pass” is shown in a green-colored font if the all of the phase and frequency error measurements (peak phase error, RMS phase error, and frequency error) have passed.
  - — The text “Fail” is shown in a red-colored font if any of the phase and frequency error measurements have failed.

- Individual pass/fail indicators are provided for the peak phase error, RMS phase error, and frequency error. On the display, text labels corresponding to these measurements change color to indicate a pass or fail (green indicates a pass; red indicates a fail).

NOTE When the Multi-Measurement Count parameter is set to a number greater than 1, it is possible for some, or all of the individual pass/fail indicators to show a pass while the overall pass/fail indicator shows a fail. This is because the individual pass/fail indicators relate to the last of the multi-measurements made, whereas the overall measurement pass/fail indicator is an accumulative result from all the multi-measurements made.

The marker can be turned on by pressing the `Graph Control` (**F5**) key then the `Marker Position` (**F2**) key. Set the required marker position using the knob or the numeric entry keys. In addition, the axis values can be changed by pressing the `Axis Control` (**F1**) key. This allows you to zoom in or out to look at particular sections of the graph in more detail.

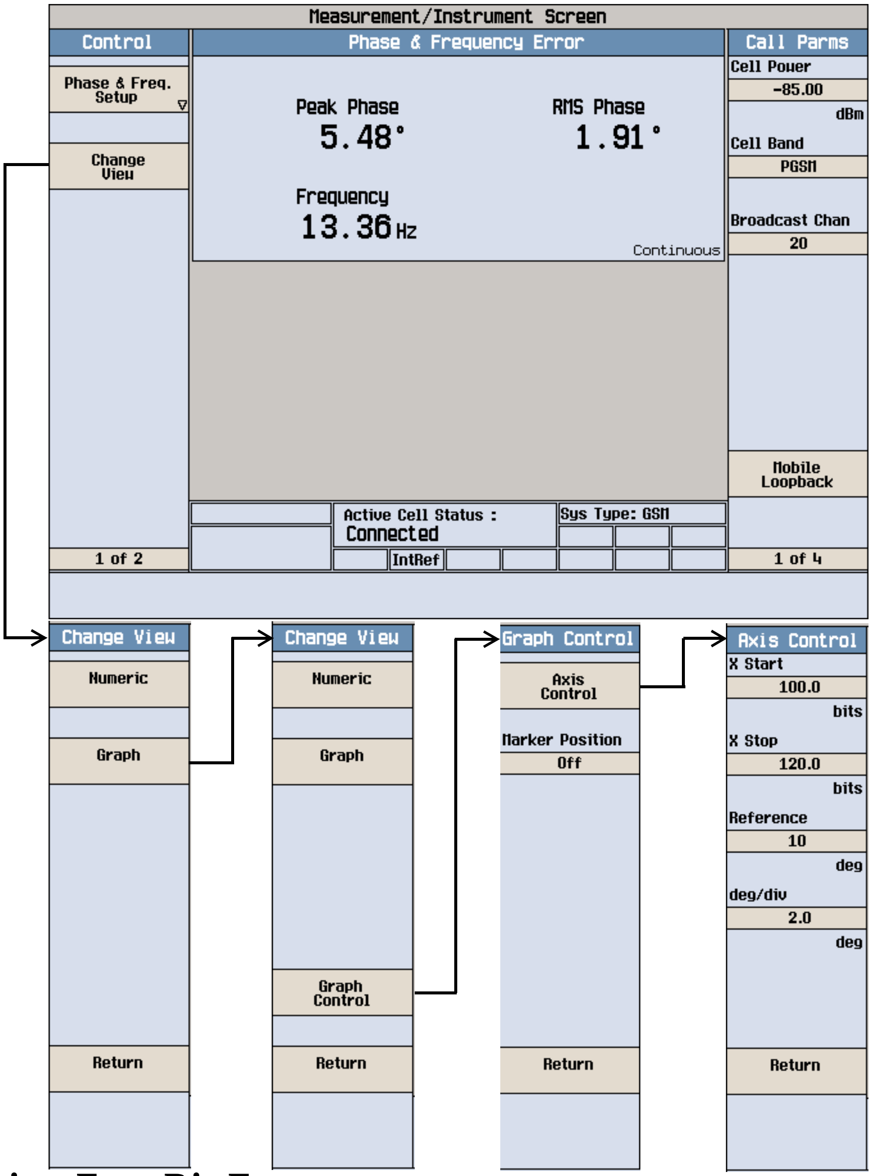


A typical peak phase error graph is shown above. This graph is zoomed in to show bits ranging from 100.0 to 120.0 at a 1.0 degrees per division setting. The Y-axis reference point is changed to 5.0 degrees.

In this case, the marker is turned on and positioned at bit 112. The phase error at the marker and its bit position are shown at the top of the display above the graph.

If you require details on how to navigate through the phase and frequency error graph menus, see “Phase and Frequency Error Graph Menus” on page 1329.

Phase and Frequency Error Graph Menus



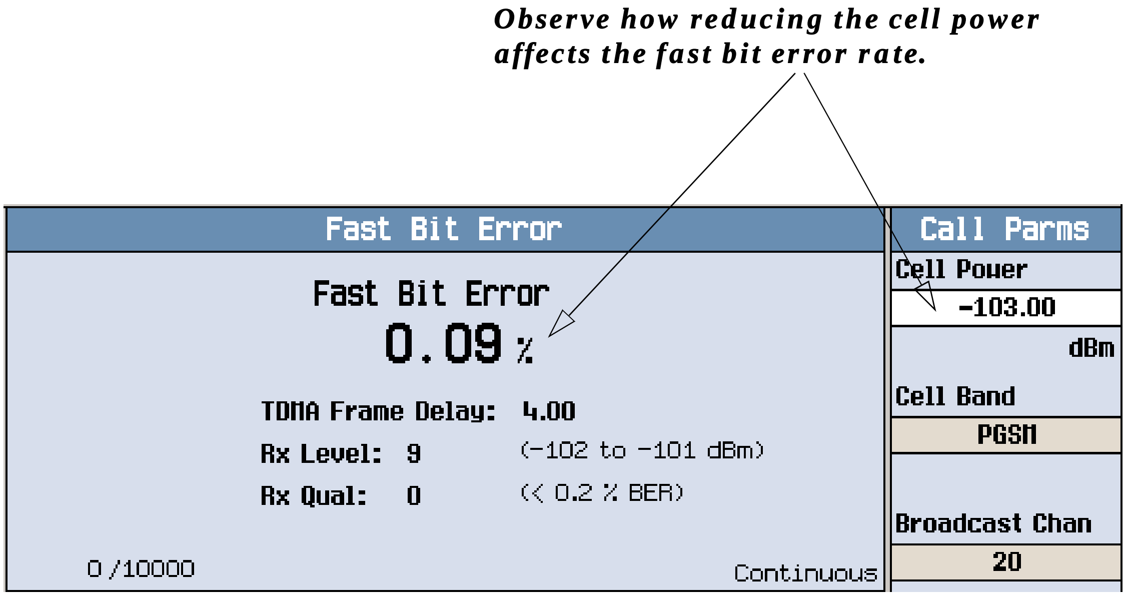
Measuring Fast Bit Error

NOTE To make fast bit error measurements your mobile must be fitted with a Test SIM card.

1. Establish a call with the mobile.
2. Press the **Measurement selection** key.
3. Select the `Fast Bit Error` measurement.

   You should hear a warbling sound from the mobile's loudspeaker. This is the PRBS-15 data which the test set sends to the mobile.
4. Press the `Fast Bit Error Setup` (**F1**) key.

5. Set the measurement parameters as needed for your measurement, including:
   `Measurement Timeout = 13.0 s`



To see the effect of cell power on fast bit error rate, press the Cell Power (**F7**) key and slowly reduce the power while observing Fast Bit Error display.

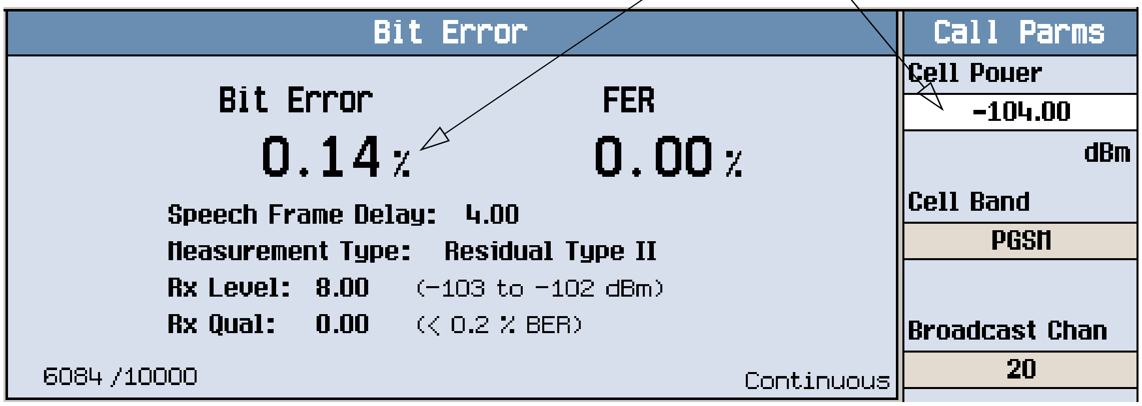
Measuring Bit Error

NOTE To make bit error measurements your mobile must be fitted with a Test SIM card.

1. Establish a call with the mobile.
2. Press the **Measurement selection** key.
3. Select the `Bit Error` measurement.
4. Press the `Bit Error Setup` (**F1**) key.

5. Set the measurement parameters as needed for your measurement situation, including:
   `Measurement Timeout = 13.0 s`

Observe how reducing the cell power affects the bit error rate.



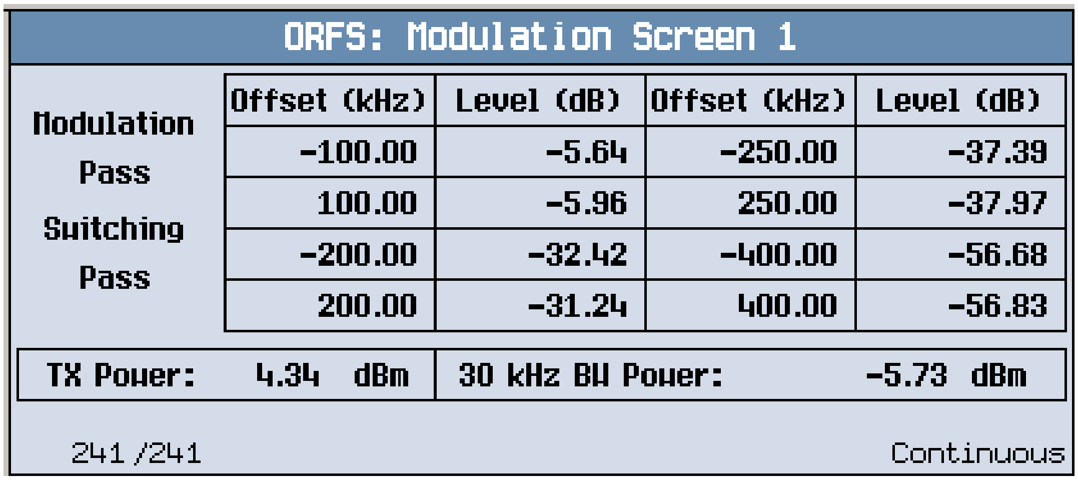
The display shows the bit error rate measurement and depending on the loopback type selected (A residual or B non-residual), either a frame erasure (FER) or cyclic redundancy check (CRC) measurement.

To see the effect of cell power on Bit Error Rate, press the `Cell Power` (**F7**) key and slowly reduce the power while observing the Bit Error display.

Measuring Output RF Spectrum

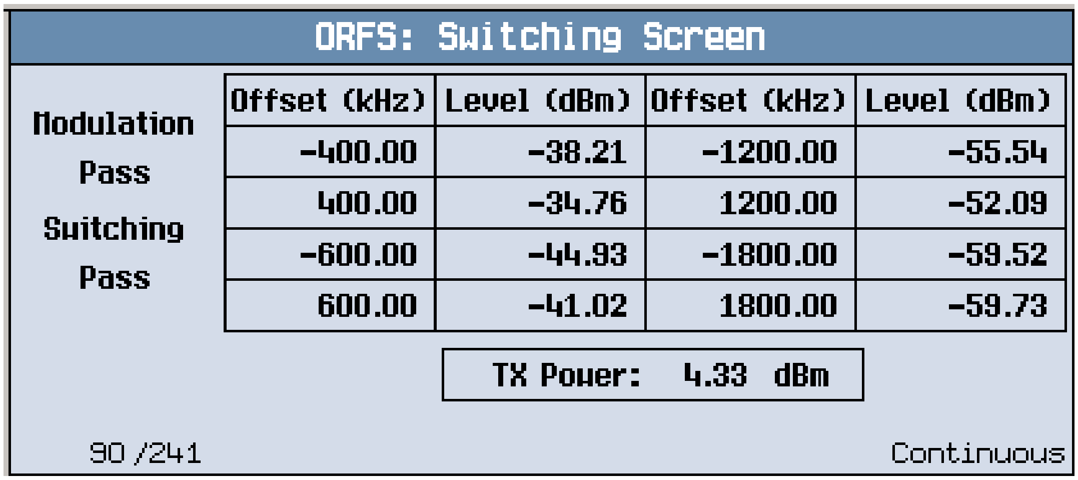
1. Establish a call with the mobile.
2. Press the **Measurement selection** key.
3. Select the `Output RF Spectrum` measurement.
4. Press the `ORFS Setup` (**F1**) key.
5. Press the `Measurement Setup` (**F1**) key.
6. Set the measurement parameters as needed for your measurement, including:
   `Measurement Timeout = 20 s.`
7. Press the `Modulation Frequencies` (**F2**) key and set up your required offset frequencies for ORFS due to modulation.
8. Press the `Switching Frequencies` (**F3**) key and set up your required offset frequencies for ORFS due to Switching.
9. Press the `Close Menu` (**F6**) key.
10. Press the `Return to ORFS Control` (**F6**) key.
11. Press the `Change View` (**F2**) key.

12.Press the `Modulation Numeric 1 of 3` (**F1**) key.



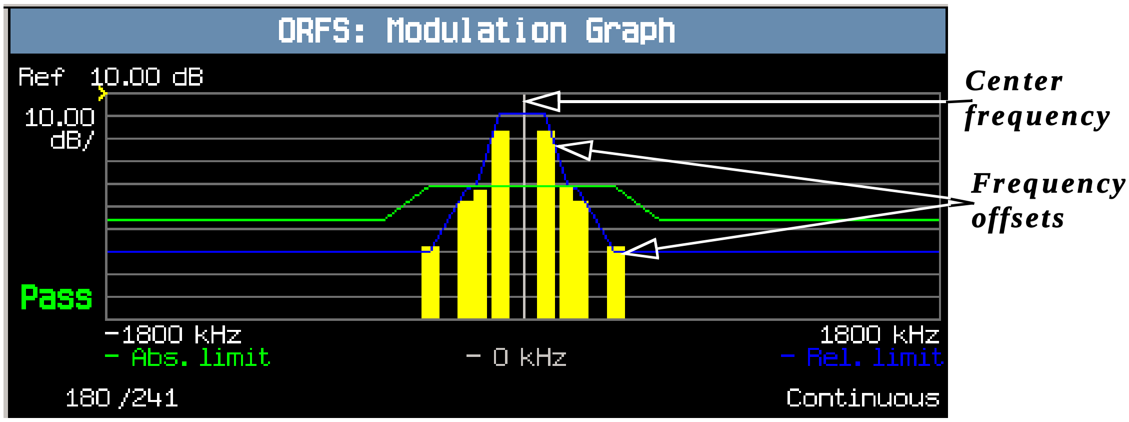
The measurement results for the first eight positions in the ORFS due to modulation table are displayed. You can view the results for the remaining 14 positions by pressing the `Modulation Numeric 2 of 3` (**F2**) key or the `Modulation Numeric 3 of 3` (**F3**) key. Note that the results are in dB relative to the 30 kHz BW Power shown on the screen.

13.Press the `Switching Numeric` (**F4**) key to display the measurement results for ORFS due to switching.



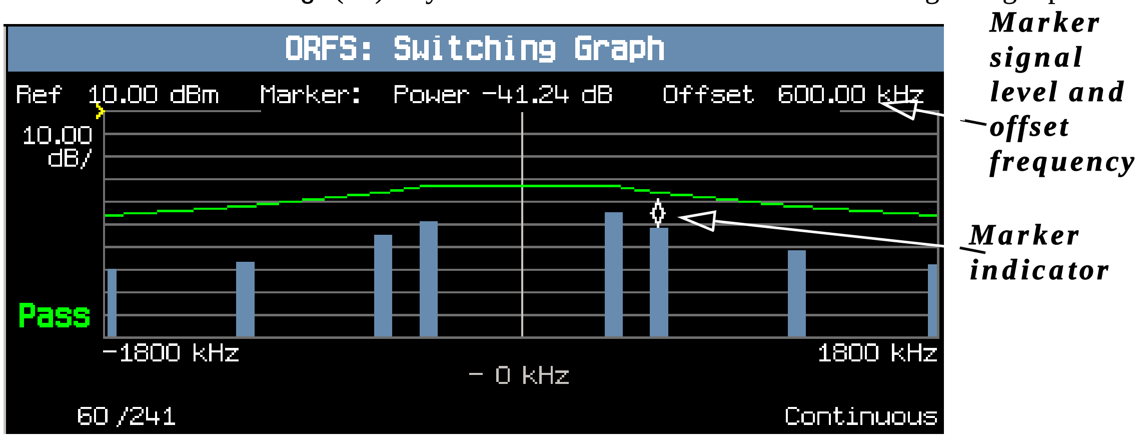
A typical measurement results screen for ORFS due to switching is shown above.

14.Press the `Graph` (**F5**) key then the `Modulation` (**F1**) key to access the ORFS due to modulation bar graph.



A typical ORFS due to modulation graph is shown above. On the display, the bar representing each offset is shown in yellow and the center frequency is indicated by a white vertical line. There are two limit lines displayed; the absolute limit line is green and the relative limit line is blue. The pass/fail result is relevant to the displayed measurement.

15.Press the `Switching` (**F2**) key to access the ORFS due to switching bar graph.

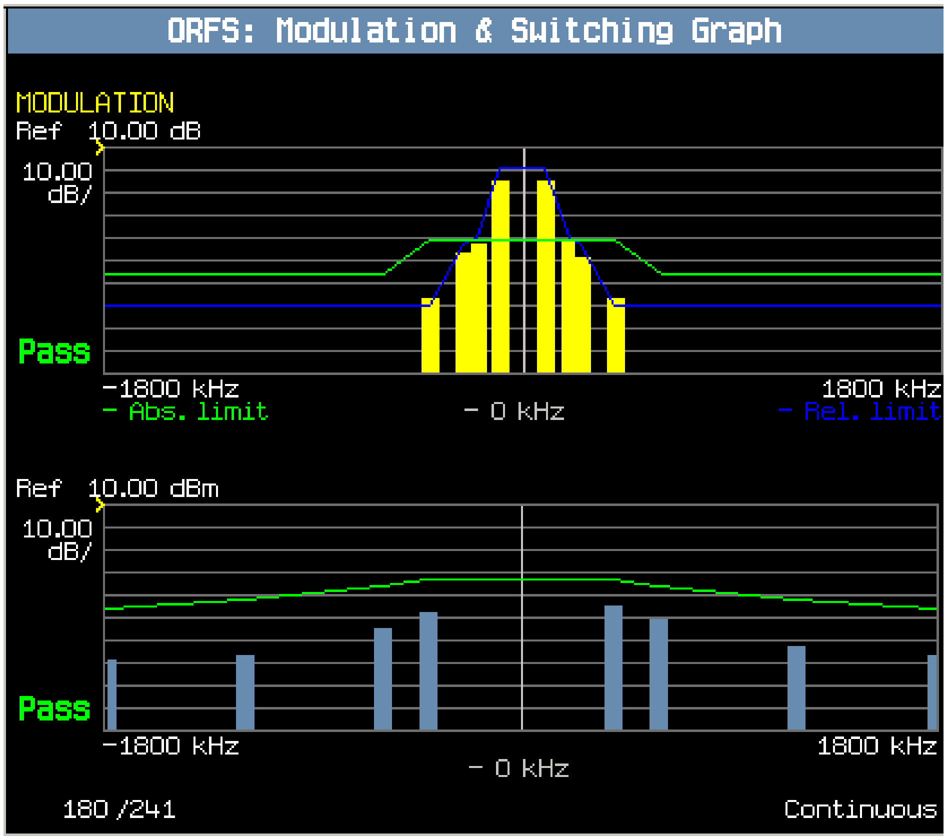


A typical ORFS due to switching graph is shown above. On the display, the bar representing each offset is shown in blue and the center frequency is indicated by a white vertical line.

In this case, the marker is turned on and positioned at the 600 kHz offset. The signal level and frequency of the offset where the marker is positioned, are shown at the top of the display above the graph.

The marker can be turned on by pressing the `Graph Control` (**F5**) key then the `Marker Position` (**F2**) key. Set the required marker position using the knob or the numeric entry keys. In addition, the axis values can be changed by pressing the `Axis Control` (**F1**) key. This allows you to zoom in or out to look at particular sections of the graph in more detail.

16. Press the `Modulation and Switching` (**F3**) key to access a screen displaying both graphs, as shown in the example below.



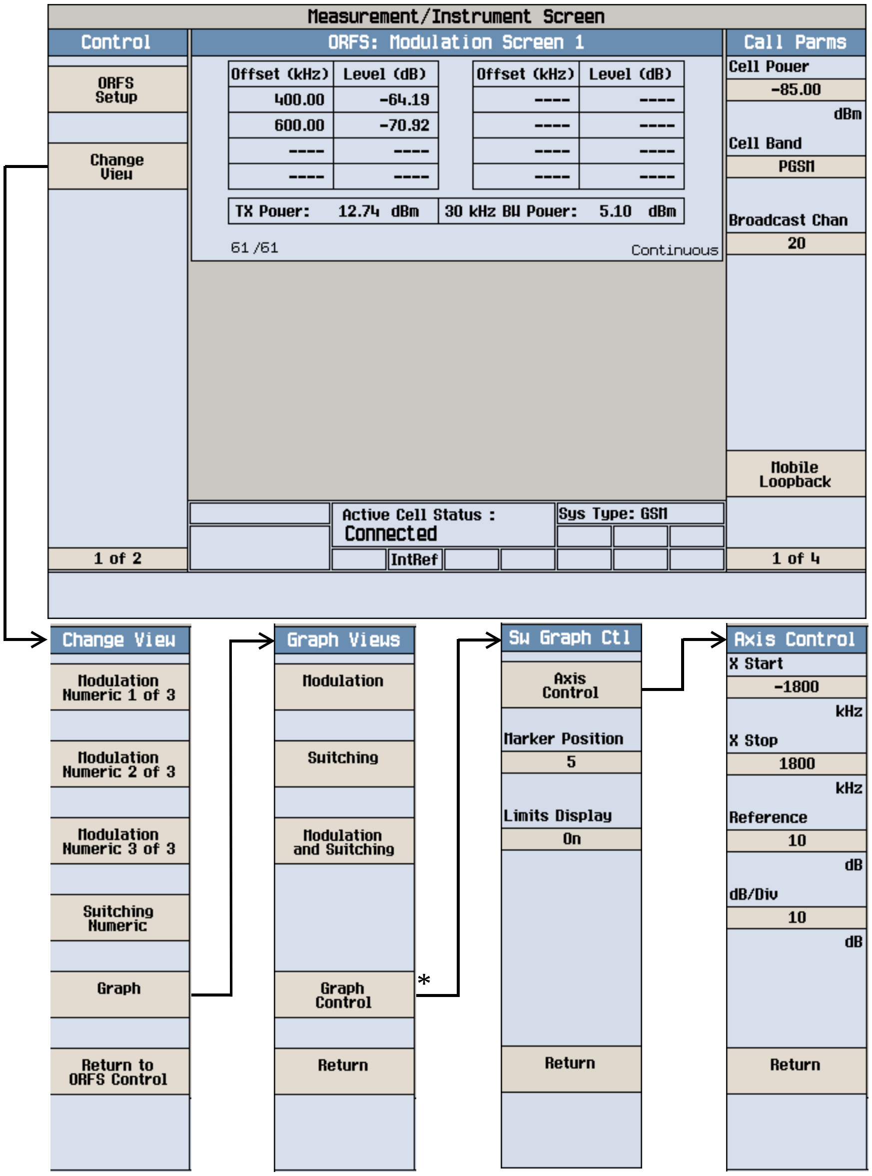
Note that each of the graphs have their own graph controls on **F4** and **F5**.

Any failing results are displayed in red.

If you require details on how to navigate through the Output RF Spectrum graph menus, see “Output RF Spectrum Graph Menus” on page 1335.

17. To set your own limits for each offset use the Measurement Setup menu and set `Limit Source` to `Manual`. You can then use `Modulation Limits` (**F4**) and `Switching Limits` (**F5**) to set your required limits for each offset.

Output RF Spectrum Graph Menus



* May show 2 Graph Control keys

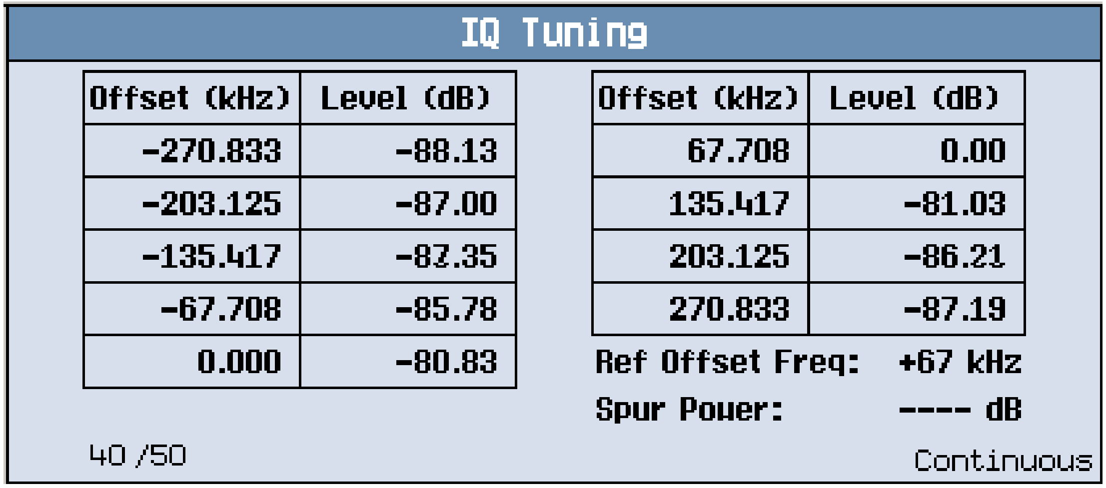
Measuring IQ Tuning

NOTE This measurement can only be performed with your mobile in test mode and transmitting either all ones or all zeros.

---

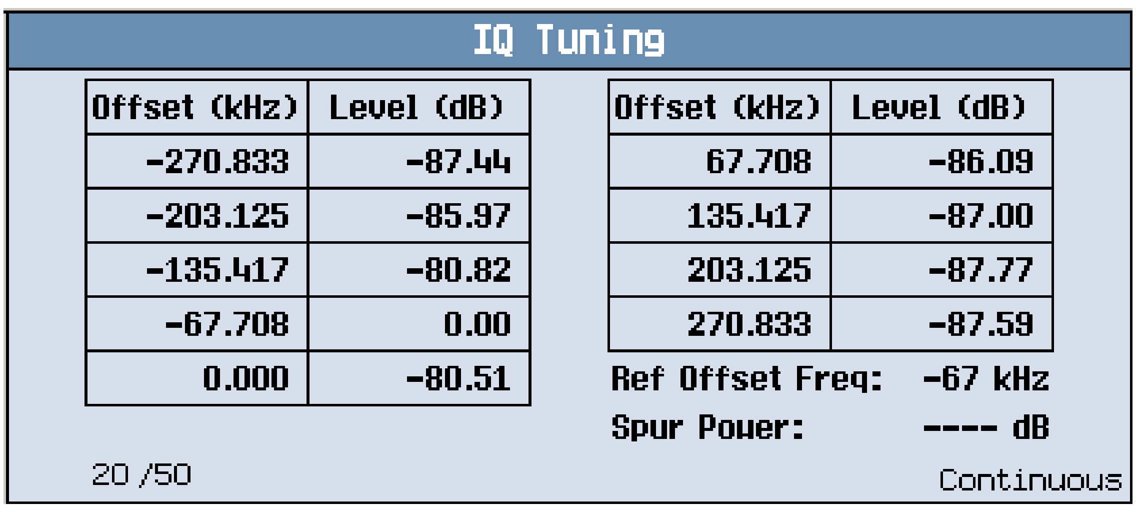
1. Press the **Measurement selection** key.
2. Select the `IQ Tuning` measurement.
3. Press the **More** key (bottom right) to obtain the Call Parms (3 of 4) screen.
4. Press the `Receiver Control` (**F7**) key and select `Manual`.

5. Press the (**F11**) key and set the expected power level from your mobile.
6. Press the `IQ Tuning Setup` (**F1**) key.
7. Set the measurement parameters as needed for your measurement, including:
   `Multi-Measurement Count = 50`
   `Trigger Source = Immediate`
8. Switch on your mobile and set it to transmit a series of all zeros.



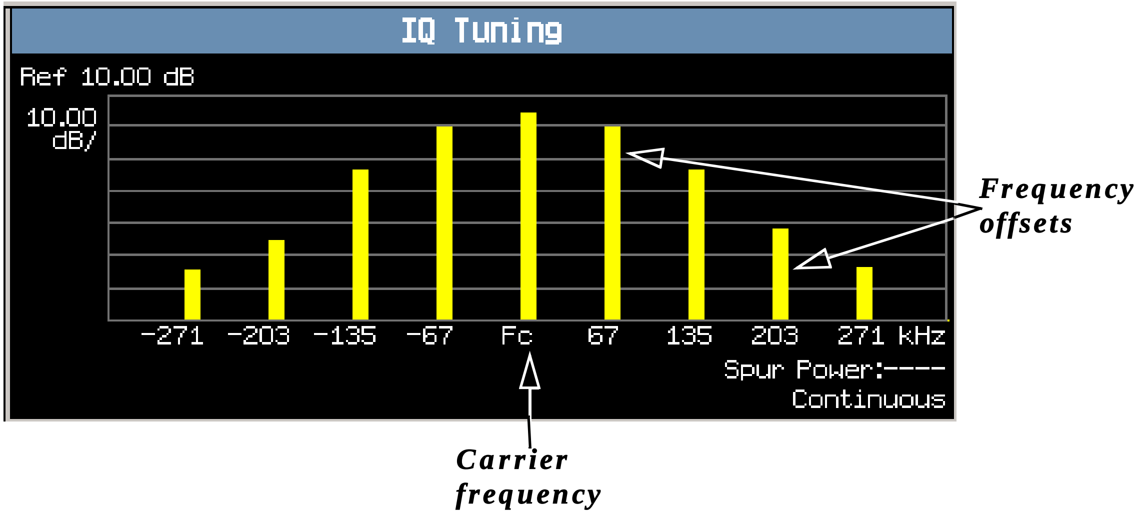
The results are displayed on the IQ Tuning screen. Notice that when the mobile is transmitting a series of all zeros the carrier offset is at +67.708 kHz.

9. Change the settings on the mobile to transmit a series of all ones.



The results are displayed on the IQ Tuning screen. Notice that when the mobile is transmitting a series of all ones the carrier offset is at -67.708 kHz.

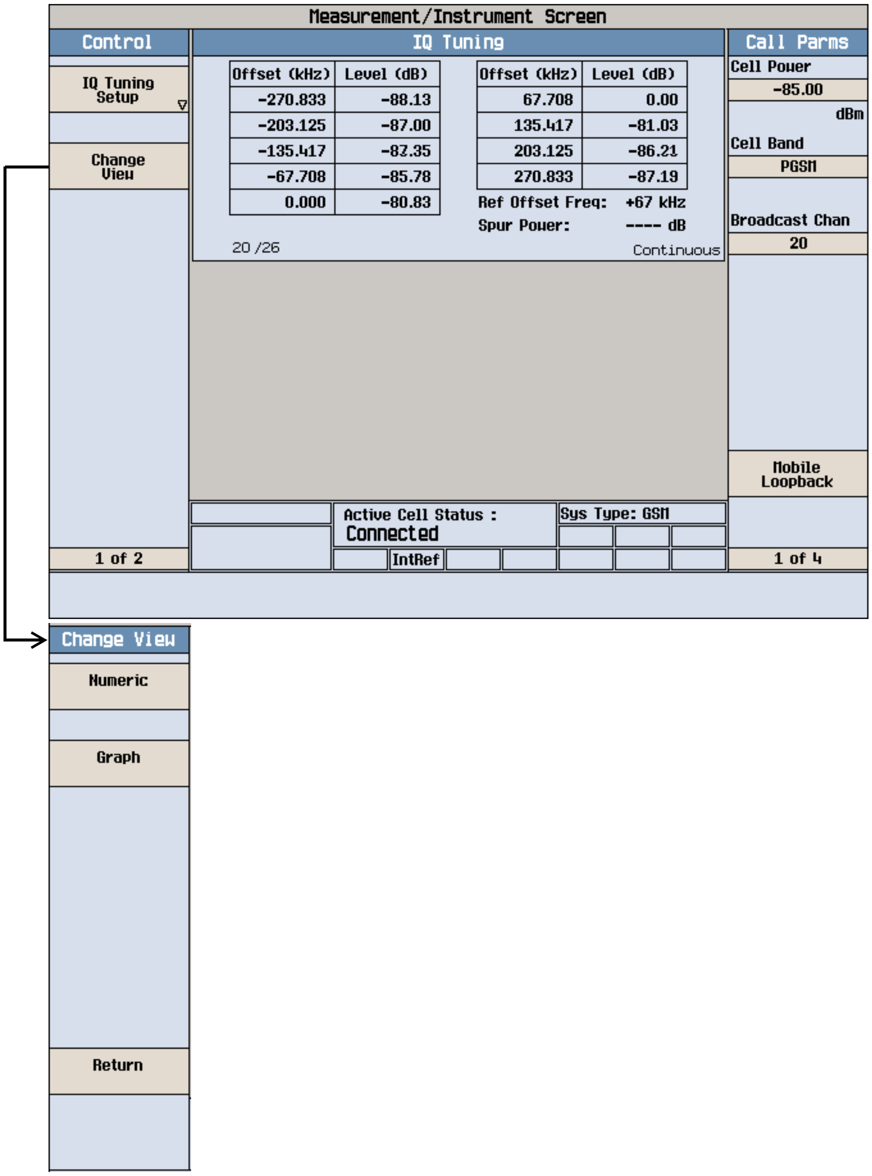
10.Press the `Graph` (**F2**) key to access the IQ Tuning bar graph.



A typical IQ Tuning graph is shown above. On the display, the bar representing each offset and the carrier frequency (Fc) is shown in yellow.

If you require details on how to navigate through the Output RF Spectrum graph menus, see "IQ Tuning Graph Menus" on page 1338.

IQ Tuning Graph Menus



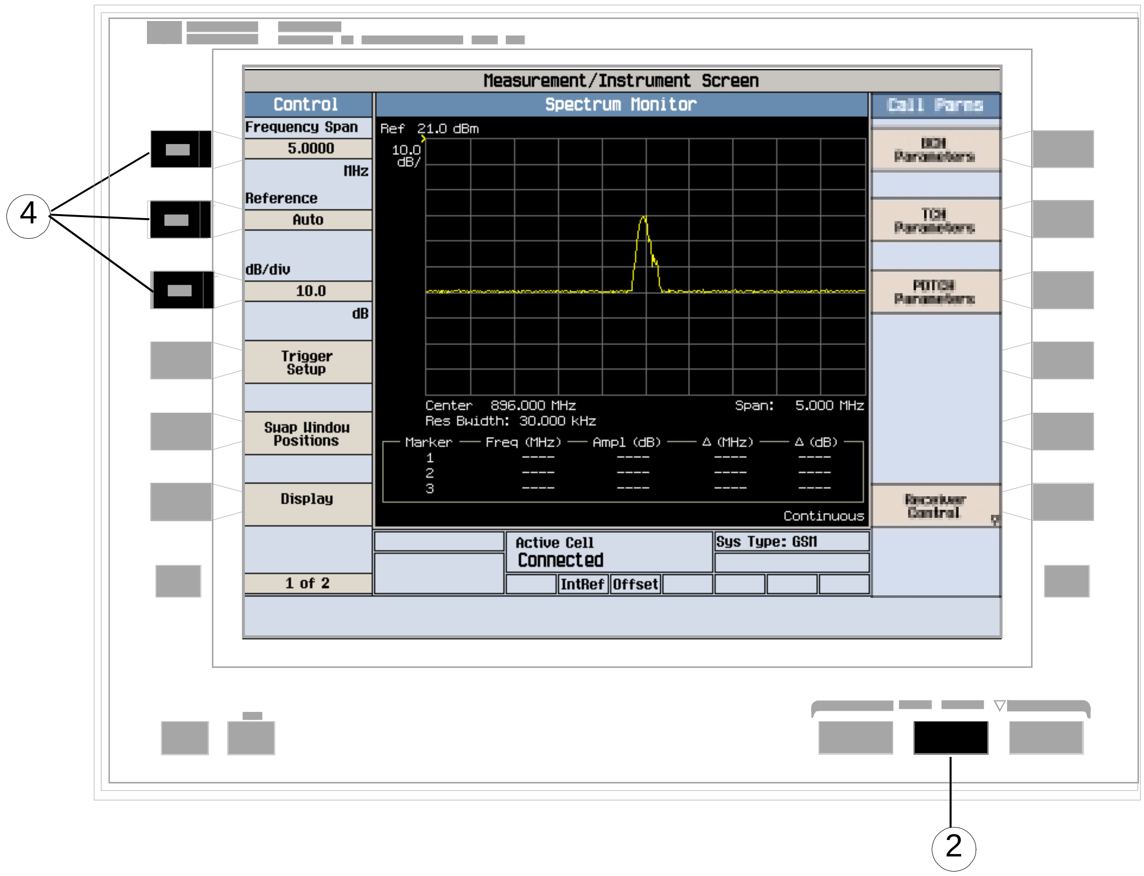
How Do I Use the Spectrum Monitor?

The following procedure shows a typical usage of the spectrum monitor in each of its two modes of operation; Swept Mode and Zero Span mode.

1. Establish a call with the mobile.

NOTE	The spectrum monitor can also be used with any of the test set's test mode operating modes.

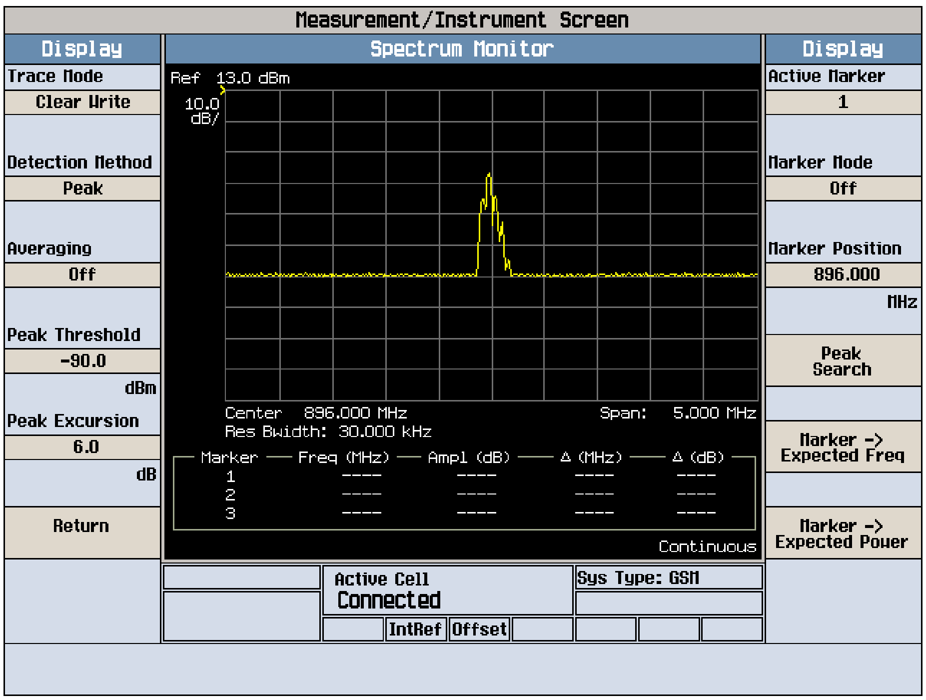
2. Press the **Instrument selection** key.
3. Select `Spectrum Monitor`.



The spectrum monitor is displayed with the default settings as shown above. The center frequency is initially set at the expected frequency maintained by the test set's base station emulator. The `Swap Window Positions` (**F5**)key is only displayed when other measurements are active at the same time as the spectrum monitor.

4. Set the axis control as needed for your testing situation using the `Frequency Span` (**F1**), `Reference` (**F2**), and `dB/div` (**F3**) keys. For example, if you want to set the reference level manually (`Auto` is the default), press the `Reference` (**F2**) key then use the DATA ENTRY keys to enter the value you want.

5. Press the `Trigger Setup` (**F4**) key to access the `Trigger Setup` menu.
6. Set the trigger settings to meet your testing needs. For example:
   - If you want the Spectrum Monitor to sweep immediately and continuously, ensure that `Trigger Arm` (**F4**) is set to `Continuous`.
   - If you want to use external triggering, so that the Spectrum Monitor is triggered from a signal applied to the TRIG IN connector on the test set's rear panel, set `Trigger Source` (**F1**) to `External`.
   - `Trigger Delay` (**F2**) allows you to specify the point, relative to the trigger event where samples are taken (a negative trigger delay value collects pre-trigger samples). The same trigger delay setting is used for swept mode and zero span mode.
7. Press the `Return` (**F6**) key to exit the `Trigger Setup` menu.
8. Press the `Display` (**F6**) key to access the display settings.

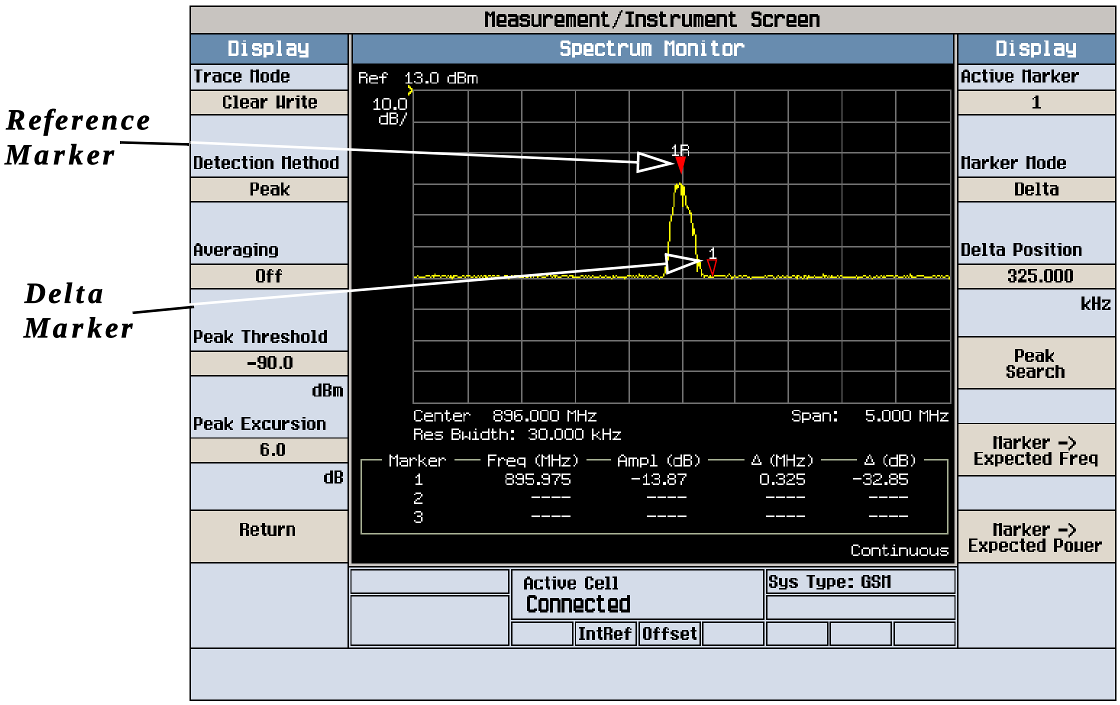


A typical spectrum monitor trace display is shown above. In this case, the `Display` menu is open allowing you to access all of the display control settings using the (**F1**) through (**F12**) keys.

The following list provides examples of some of the settings you may want to adjust:

- `Peak Threshold` (**F4**) and `Peak Excursion` (**F5**) set the peak threshold and peak excursion levels respectively. A peak is identified by using the peak threshold and peak excursion value. A point is only marked as a peak if it rises and falls more than the peak excursion value from the peak threshold value.
- `Marker Mode` (**F8**) sets the mode of the active marker. `Position` mode activates a single frequency marker at the center frequency. (Note that the center frequency can be changed by setting the `Receiver Control` to `Manual`, and changing the `Manual Freq` setting.) `Delta` mode freezes the active marker at its current location and uses it as a reference marker. A second marker is created at the position of the reference marker and is used as a delta marker, reporting any change in amplitude or frequency from that of the reference marker.

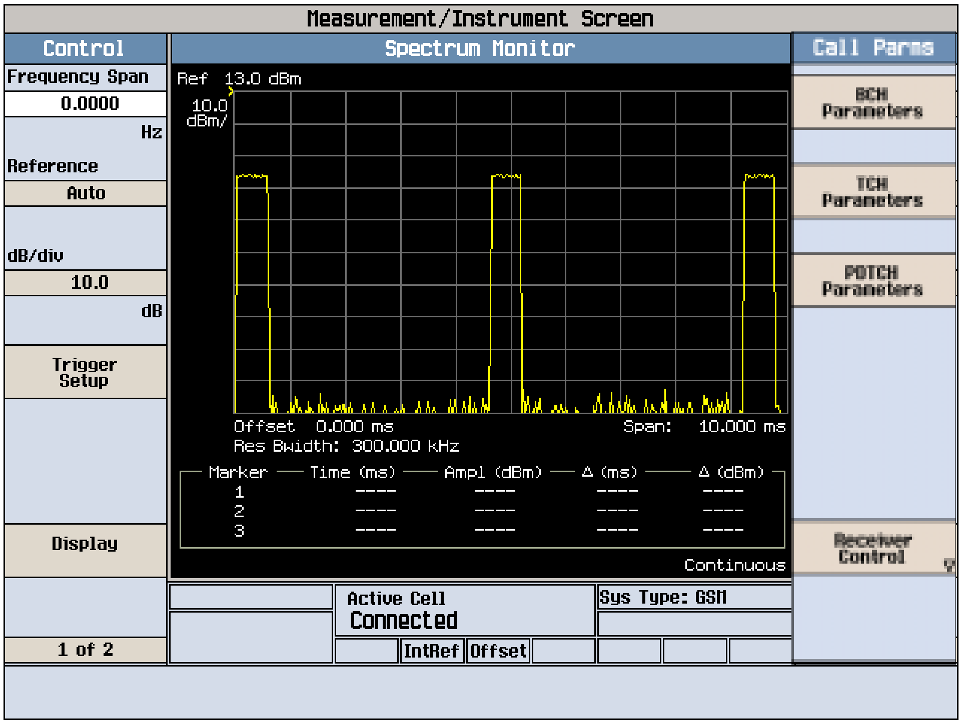
- `Peak Search` (**F10**) moves the active marker to the highest peak on the spectrum monitor display, returning the numeric amplitude and frequency values.
- `Marker -> Expected Freq` (**F11**) sets the base station emulator’s expected frequency to the frequency of the active marker.
- `Marker -> Expected Power` (**F12**) sets the base station emulator’s expected power level to the amplitude of the active marker.



A typical swept mode spectrum monitor display is shown above. In this case, the active marker is marker 1, which is set to Delta mode.

9. Press the `Return` (**F6**) key to exit the `Display` menu.

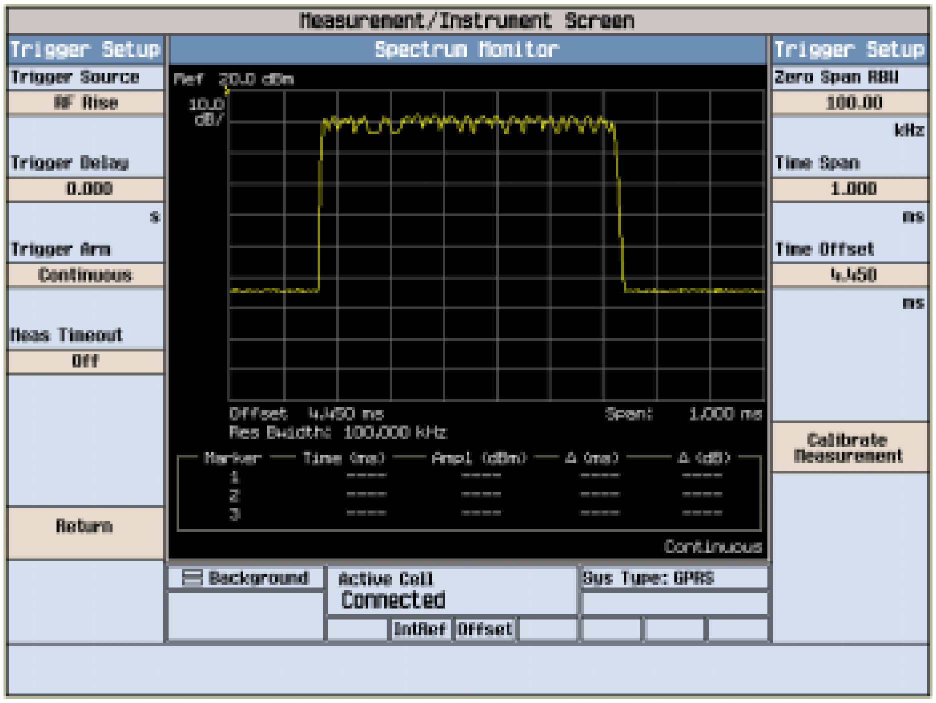
10. To set the spectrum monitor to zero span mode, press the `Frequency Span` (**F1**) key and use the numeric DATA ENTRY keys to enter a value of `0 MHz`, or use the down-arrow key to reduce the span to zero.



A typical zero span mode spectrum monitor display is shown above. Like swept mode, the Y-axis represents absolute amplitude. However, the X-axis now represents time rather than frequency.

11. Press the `Trigger Setup` (**F6**) key. In zero span mode, additional trigger setup controls are available to you:

- If you want to change the view window over which you are looking at the signal, use the `Time Span` (**F8**) and `Time Offset` (**F9**) keys. The measurement is made for the duration of the time span, beginning at the time defined by the trigger event plus the trigger delay plus the time offset.
- If you want to change the resolution bandwidth, press the `Zero Span RBW` (**F7**) key and select a value. (To measure the total power of a signal you must select a resolution bandwidth greater than or equal to the signal bandwidth.) Note that changing the zero span resolution bandwidth does not modify the swept mode resolution bandwidth.



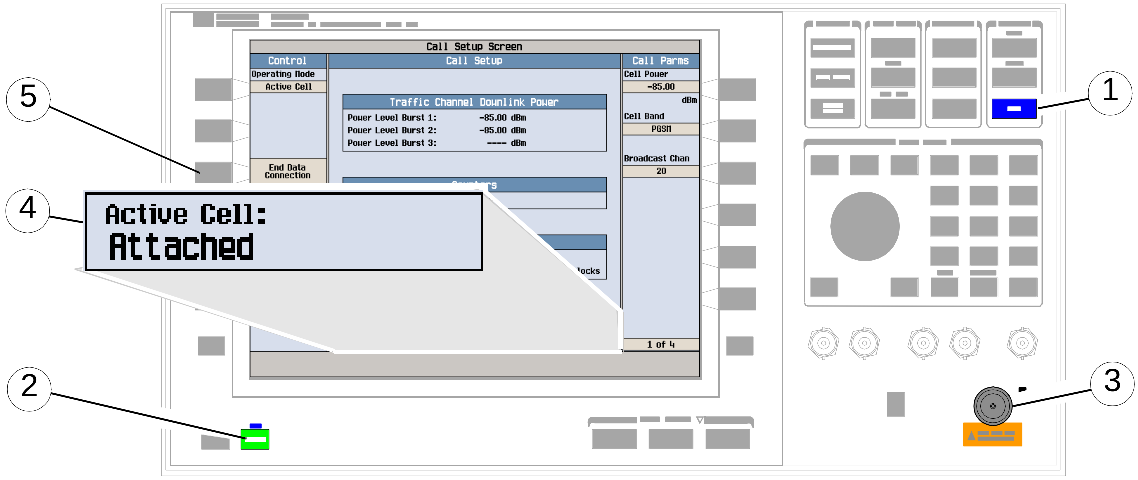
A typical zero span mode spectrum monitor display showing a bursted signal. The viewing window has been adjusted to zoom in on a single burst.

If the temperature of the test set drifts outwith the calibrated temperature range of the spectrum monitor, a `Measurement Uncalibrated` message is displayed. To calibrate the spectrum monitor for the curremt temperature, press the `Calibrate Measurement` (**F11**) key on the `Trigger Setup` menu.

GPRS Manual Operation

How Do I Make Measurements on a Mobile?

A. Establish a data connection.



1. Press the blue **SHIFT** key.
2. Press the green **Preset** key.
3. Connect the mobile.
4. Turn the mobile on and wait for `Attached` in the `Active Cell:` field.

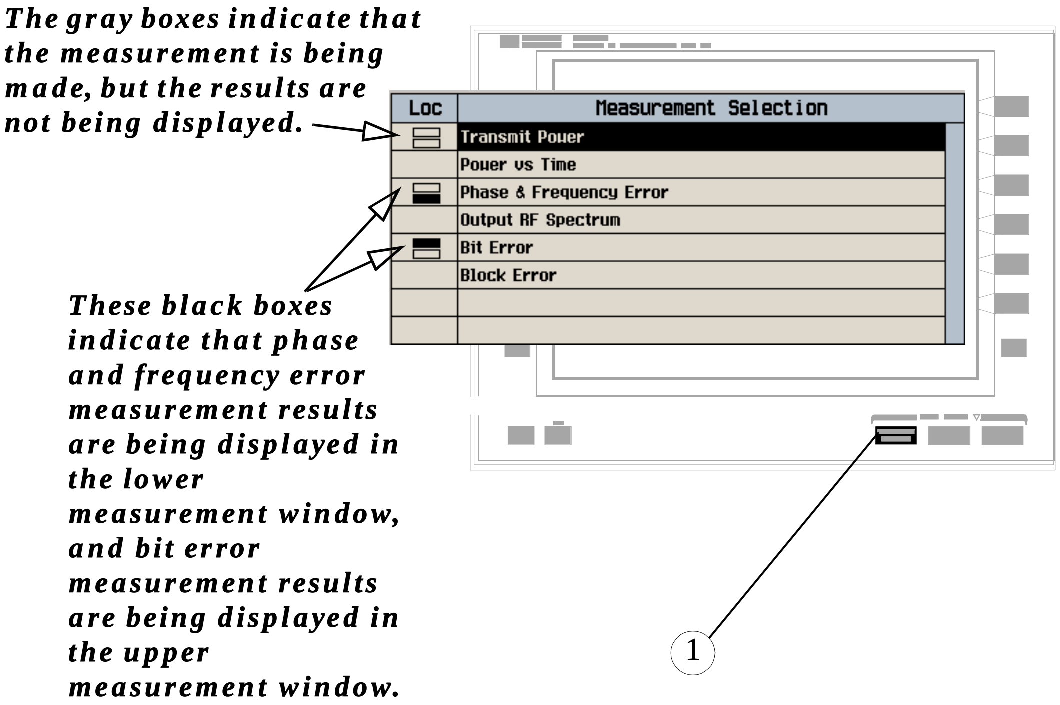
NOTE For mobiles that don’t perform GPRS attach automatically, set the mobile to data mode.

---

5. Press the `Start Data Connection` (**F3**) key and watch for the `Active Cell:` field changing to `Transferring`.

NOTE If you have problems establishing a data connection using the default BLER Data Connection Type (that is, `Data Conn Type` (**F4**) is set to BLER), you may want to change the setting of the BLER FCS `(Frame Check Sequence)` or the `Block Poll Rate`. To change these settings, press the **More** key to access the `Control` menu (`2 of 2`), then press the `Protocol Control` (**F4**) key. Block Poll Rate is available under the RLC/MAC (**F1**) key and BLER FCS is available under the LLC (**F2**) key. Select a parameter and change its setting.

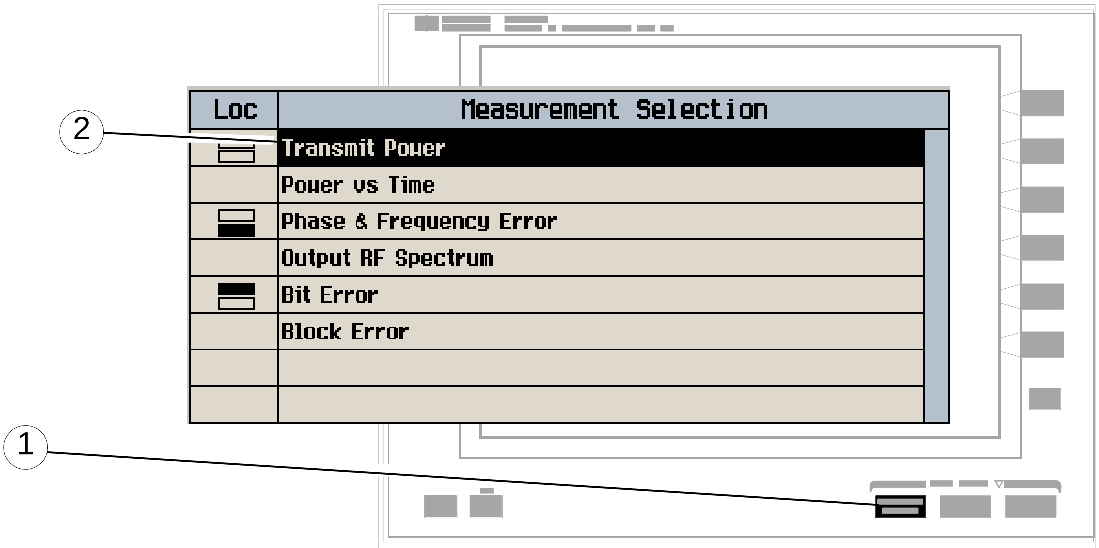
B. Select measurements.



1. Press the **Measurement selection** key.
2. Highlight a measurement and press the knob.
3. Repeat steps 1 and 2 to add measurements.

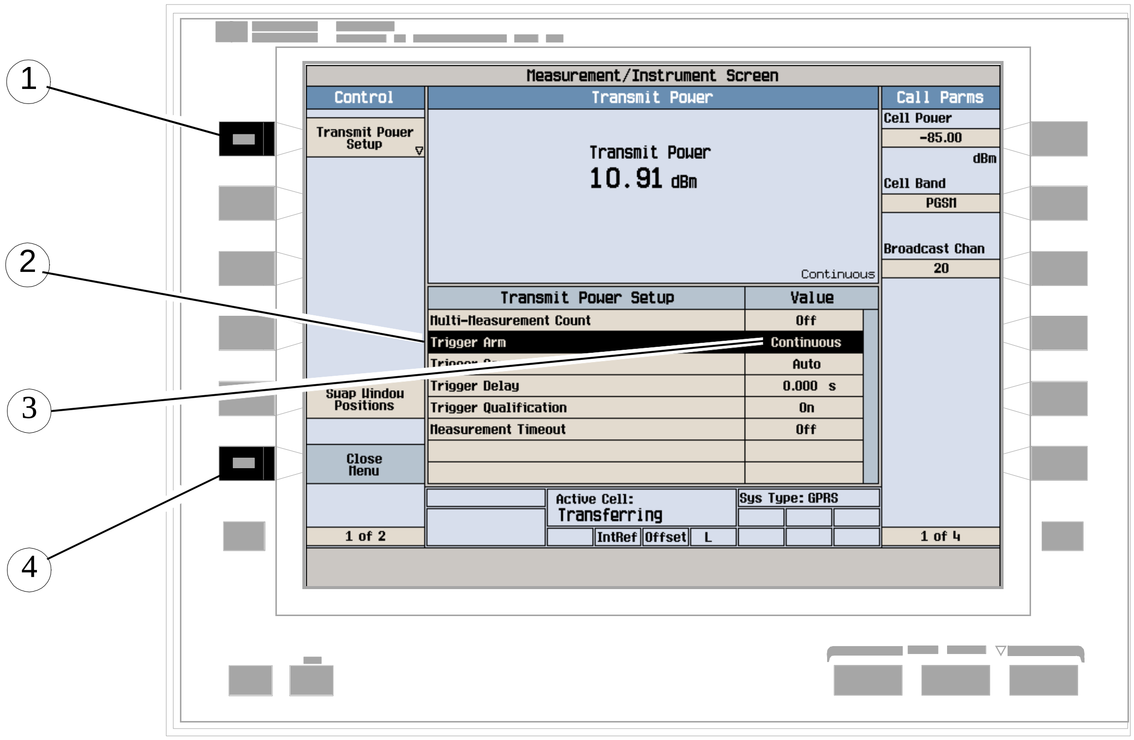
How Do I Change Measurement Setup?

A. Select a measurement.



1. Press the **Measurement selection** key.
2. Highlight a measurement to set up and press the knob.

B. Set up the measurement.



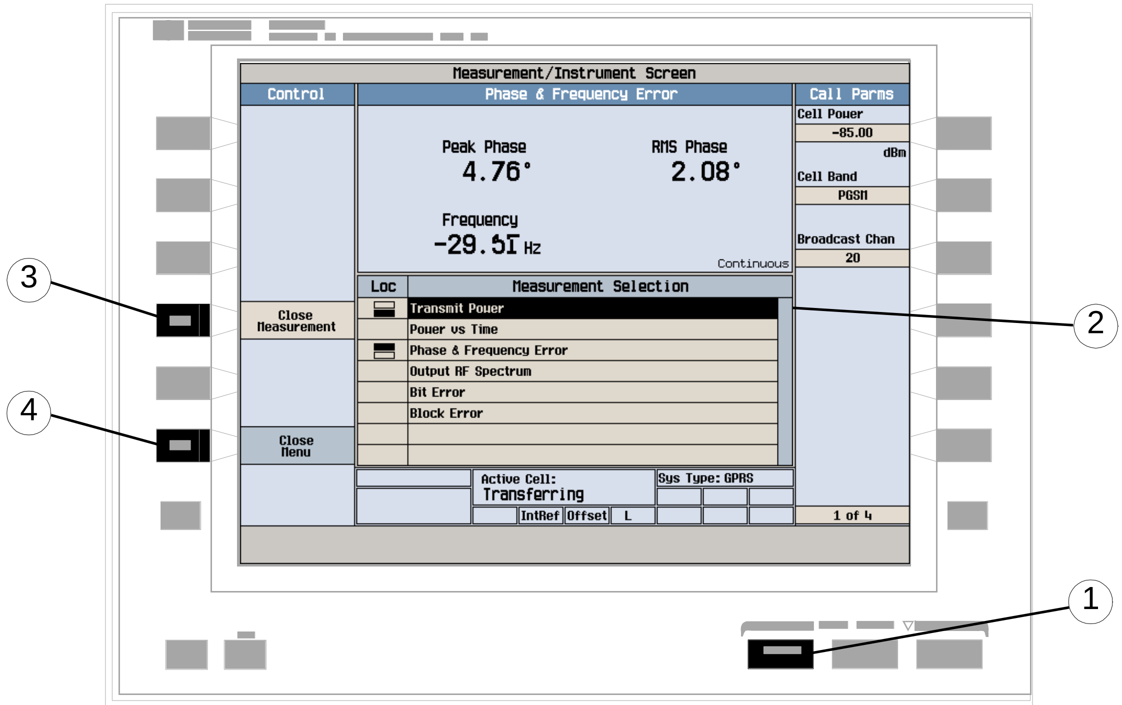
1. Press the measurement's setup (**F1**) key.
2. Highlight a parameter and press the knob.
3. Enter a value or make a selection and press the knob.

NOTE For Statistical measurement results, change the `Multi-Measurement Count` parameter from `Off` to a number >1.

---

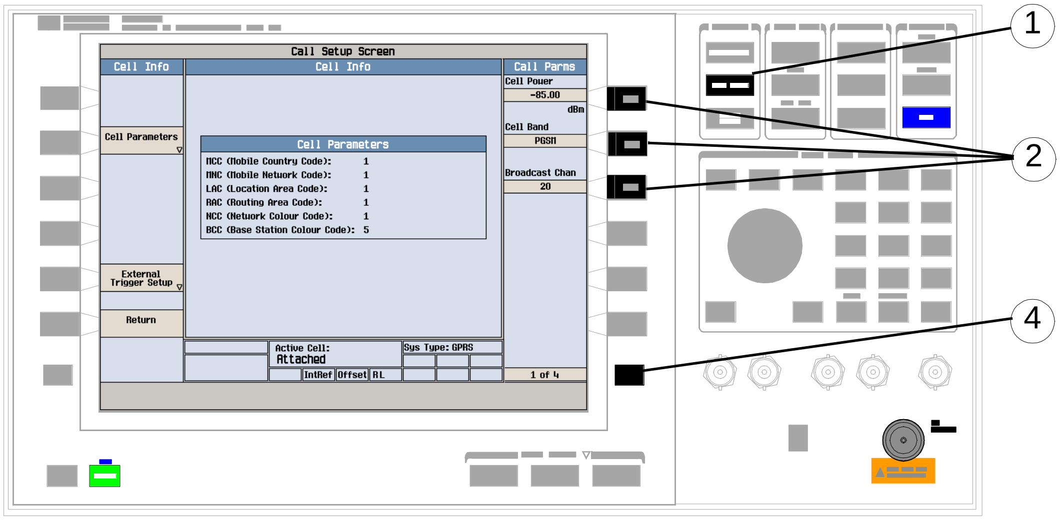
4. Press the `Close Menu` (**F6**) key.

How Do I Turn Off a Measurement?



1. Press the **Measurement selection** key.
2. Highlight the measurement you want to turn off.
3. Press the `Close Measurement` (**F4**) key.
4. Press the `Close Menu` (**F6**) key.

How Do I Change Call Parameters?



1. Press the **CALL SETUP** key.

NOTE When the mobile is transferring data (`Active Cell:` field is `Transferring`) some call parameters cannot be changed.

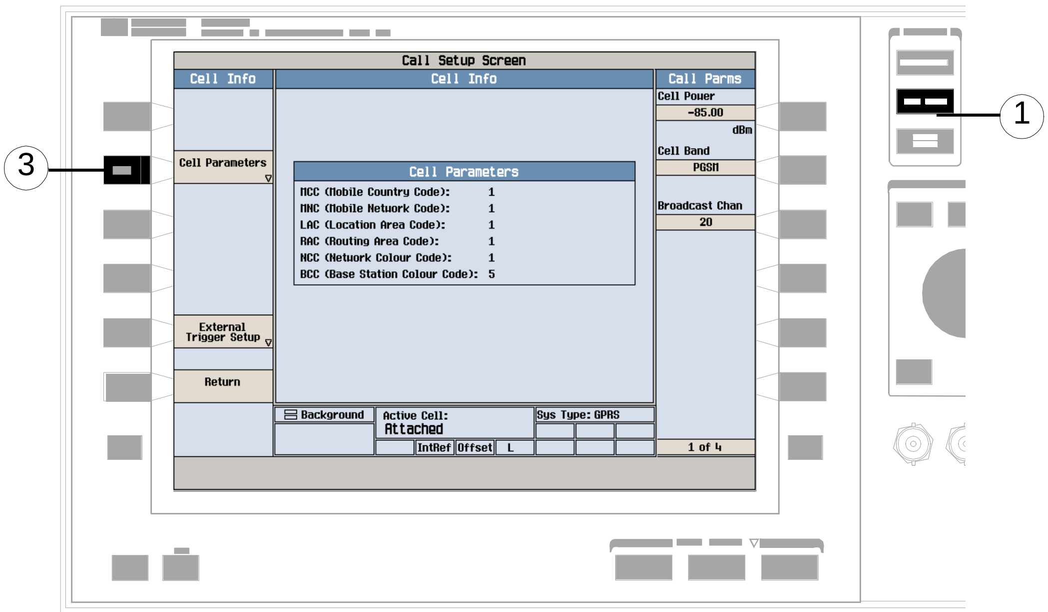
---

2. On the Call Parms menu (1 of 3) press **F7**, **F8** or **F9**.
3. Enter a value or highlight a selection and press the knob.
4. Press the **More** key for additional call parameters.

How Do I Change Cell Parameters?

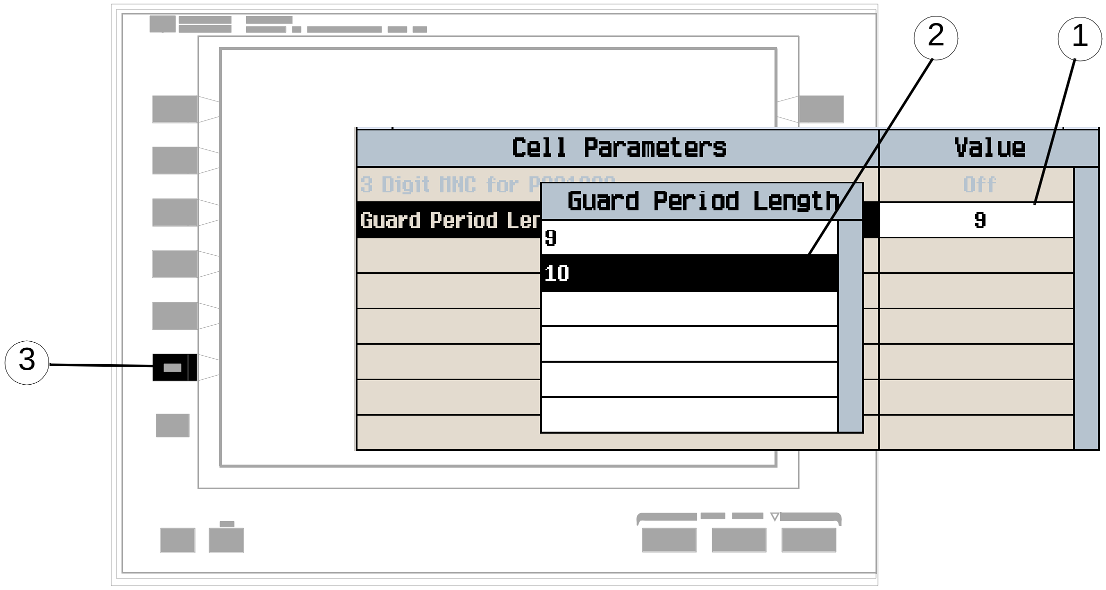
NOTE You can only change two cell parameters - 3 Digit MNC for PCS1900 and Guard Period Length. Other cell parameters such as MCC, MNC, and LAC are fixed. To change the 3 digit MNC for PCS1900 the cell must be set to off by pressing the **CALL SETUP** key, then `Operating Mode` (**F1**), and then selecting `Cell Off`.

A. Select the Cell Parameters menu.



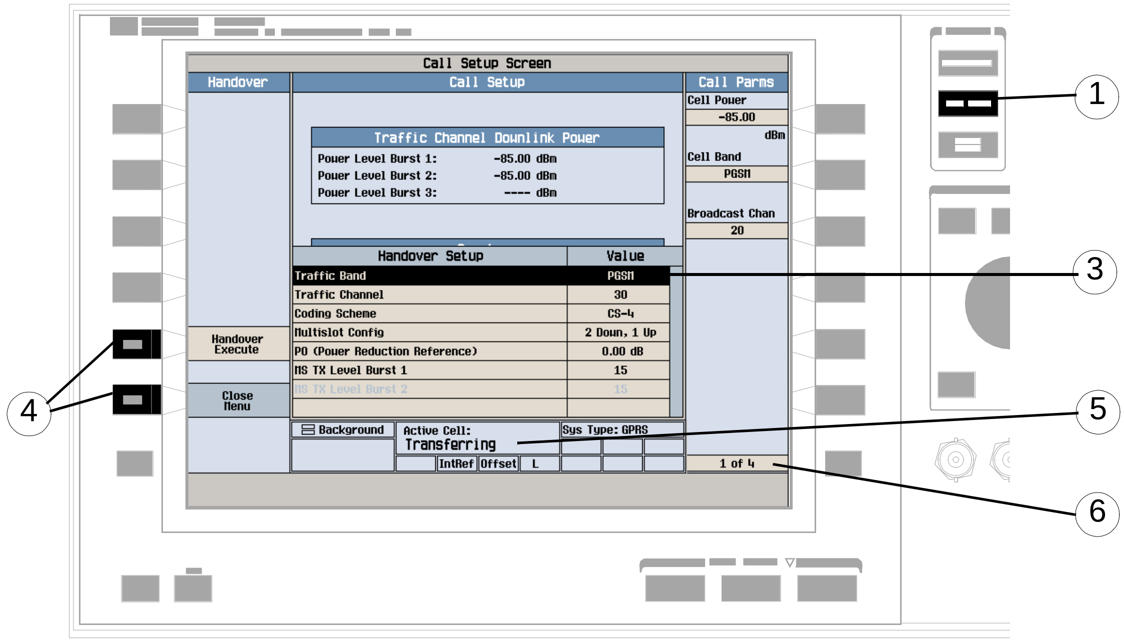
1. Press the **CALL SETUP** key.
2. Press the `Cell Info` (**F6**) key.
3. Press the `Cell Parameters` (**F2**) key.

B. Set a cell parameter.



1. Highlight a parameter and press the knob.
2. Enter a value or selection and press the knob.
3. Press the `Close Menu` (**F6**) key.

How Do I Perform a Handover?



1. Press the **CALL SETUP** key.
2. Press the `Handover Setup` (**F5**) key.
3. Change the various parameters, for example `Traffic Band`.
4. Press the `Handover Execute` (**F5**) key to complete the handover, or press the `Close Menu` (**F6**) key to abort the handover.
5. Check for `Transferring` in the `Active Cell:` field.
6. Press the **More** key to check that the changes have been implemented on the Call Parms menus (2 of 3) and (3 of 3).

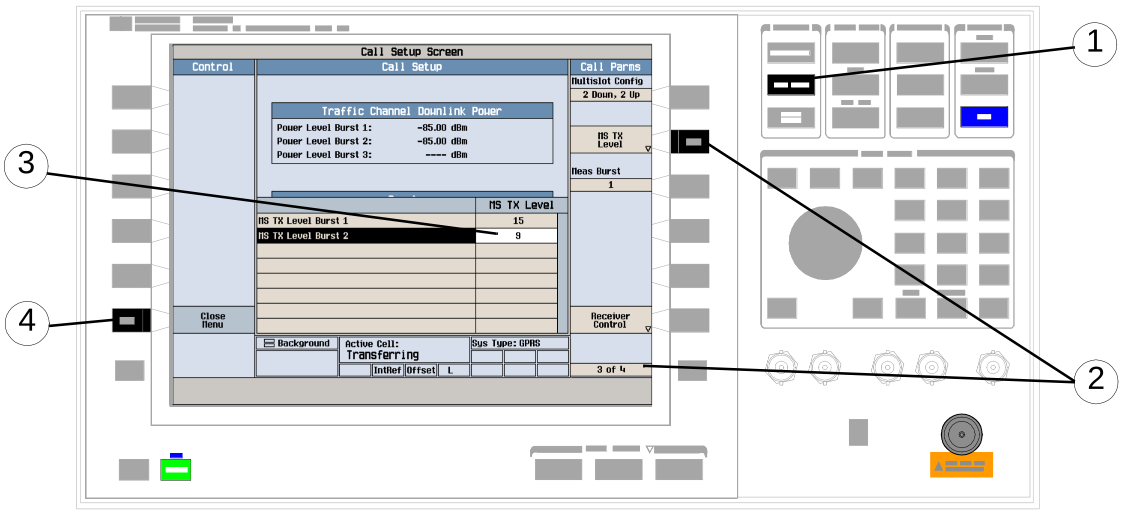
How Do I Change the MS TX Level?

There are two ways to change the MS TX Level:

- Change the level immediately
- Change the level during a handover

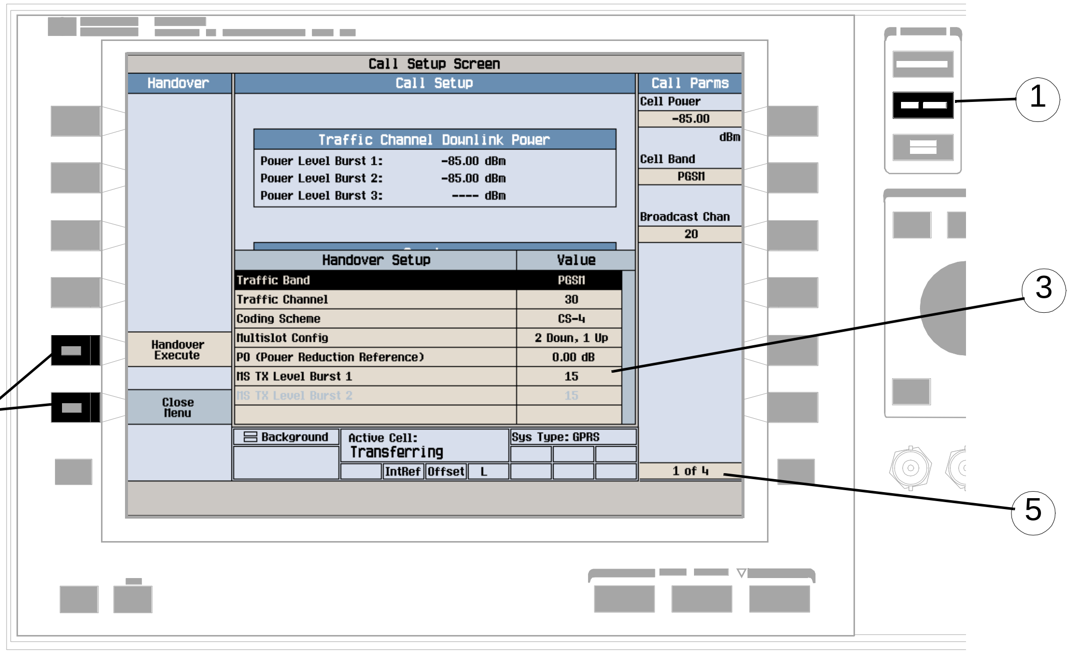
Both are explained below.

A. Change the MS TX level immediately.



1. Press the **CALL SETUP** key.
2. On the Call Parms menu (3 of 3) press the `MS TX Level` (**F8**) key.
3. Set a new MS TX level and press the knob.
4. Press the `Close Menu` (**F6**) key.

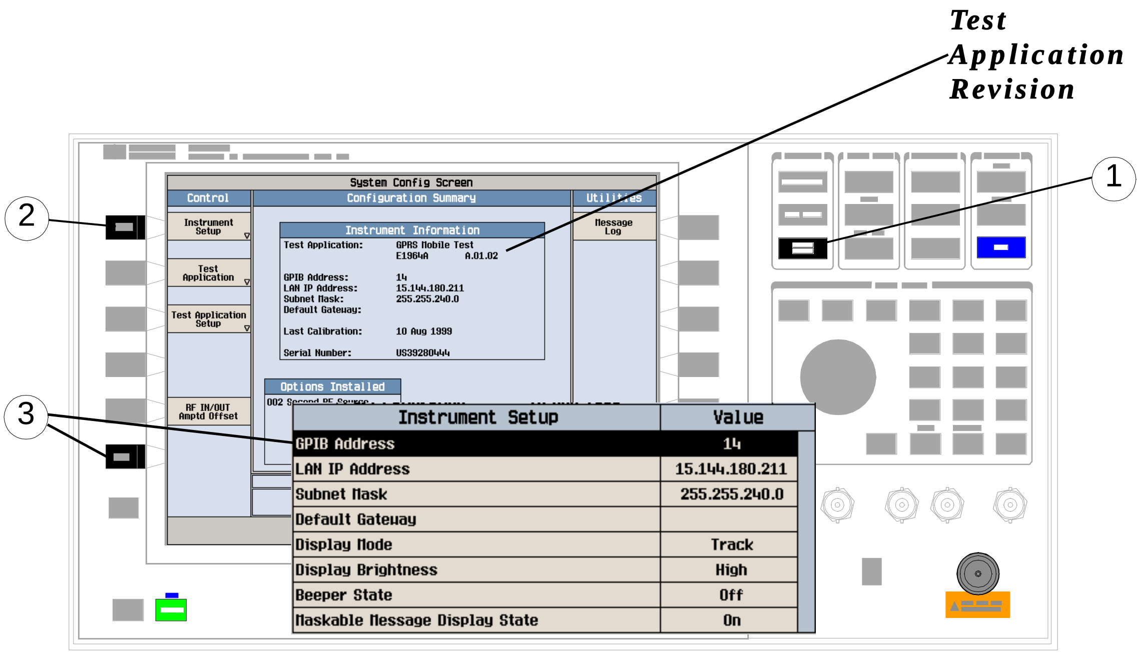
B. Change the MS TX level during a handover.



1. Press the **CALL SETUP** key.
2. On Control menu, press the `Handover Setup` (**F5**) key.
3. Select and change the `MS TX Level`.
4. Press the `Handover Execute` (**F5**) key to change the MS TX level, or press the `Close Menu` (**F6**) key to leave the level unchanged.
5. Use the **More** key to check that the MS TX level has been changed on the Call Parms menu (3 of 3).

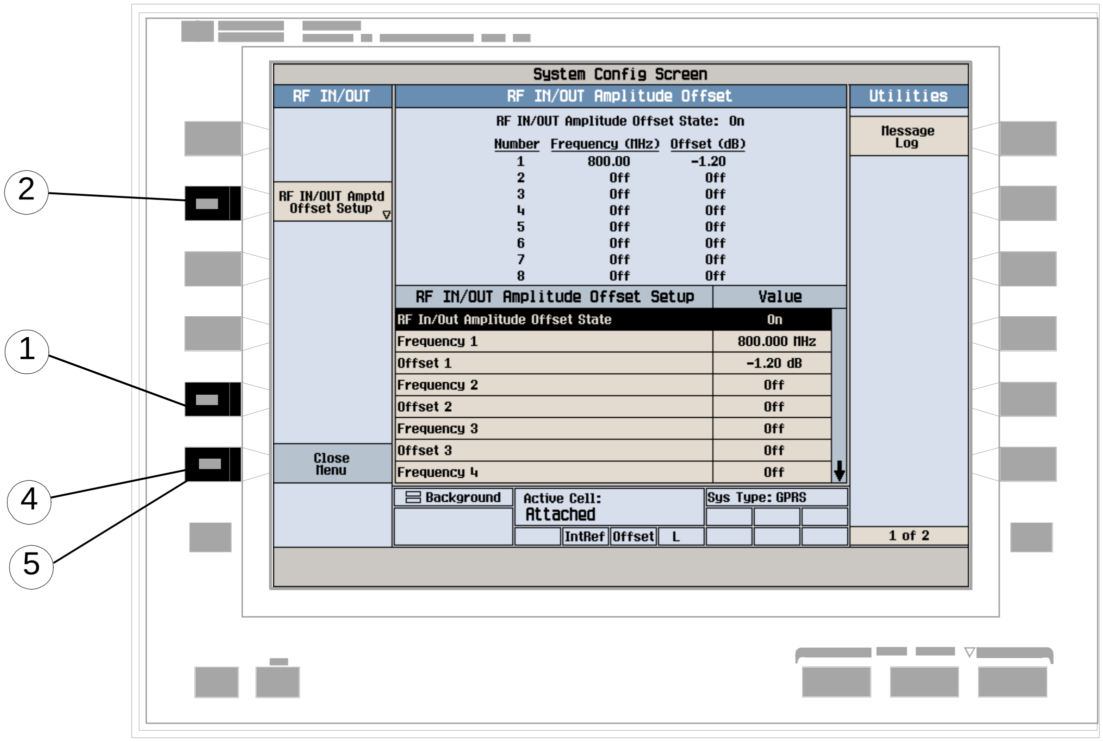
How Do I Configure the Test Set for My Test System?

A. Configure instrument information and setup.



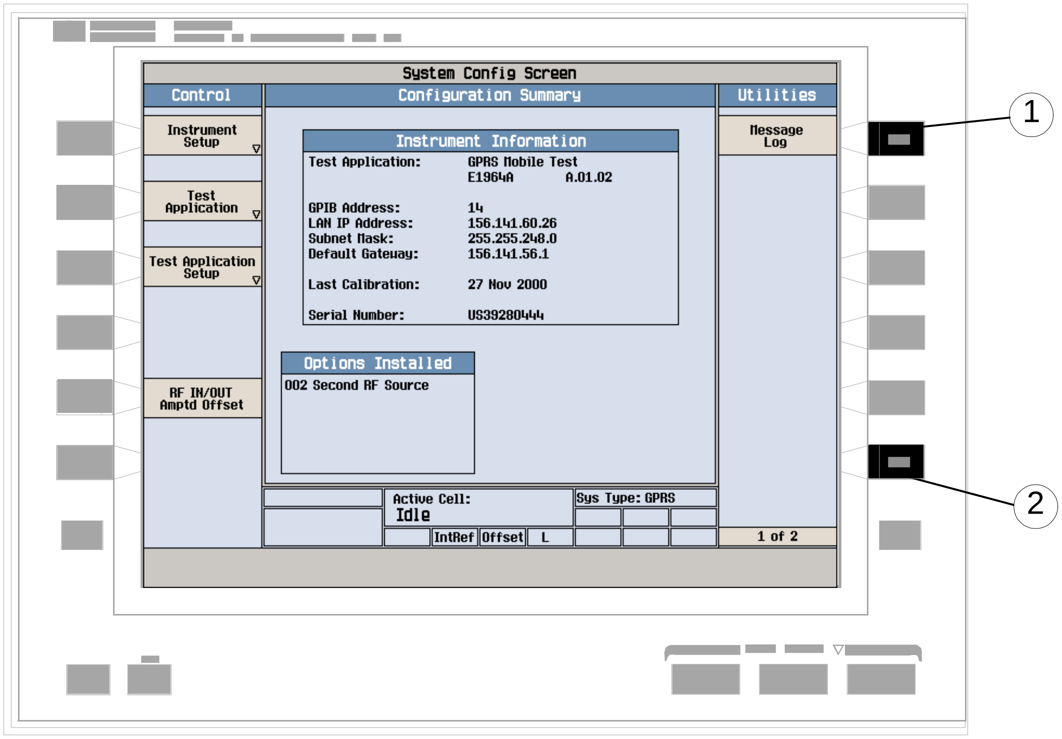
1. Press the **SYSTEM CONFIG** key.
2. Press the `Instrument Setup` (**F1**) key.
3. Adjust an instrument setting and then press the `Close Menu` (**F6**) key.

B. Set amplitude offsets.



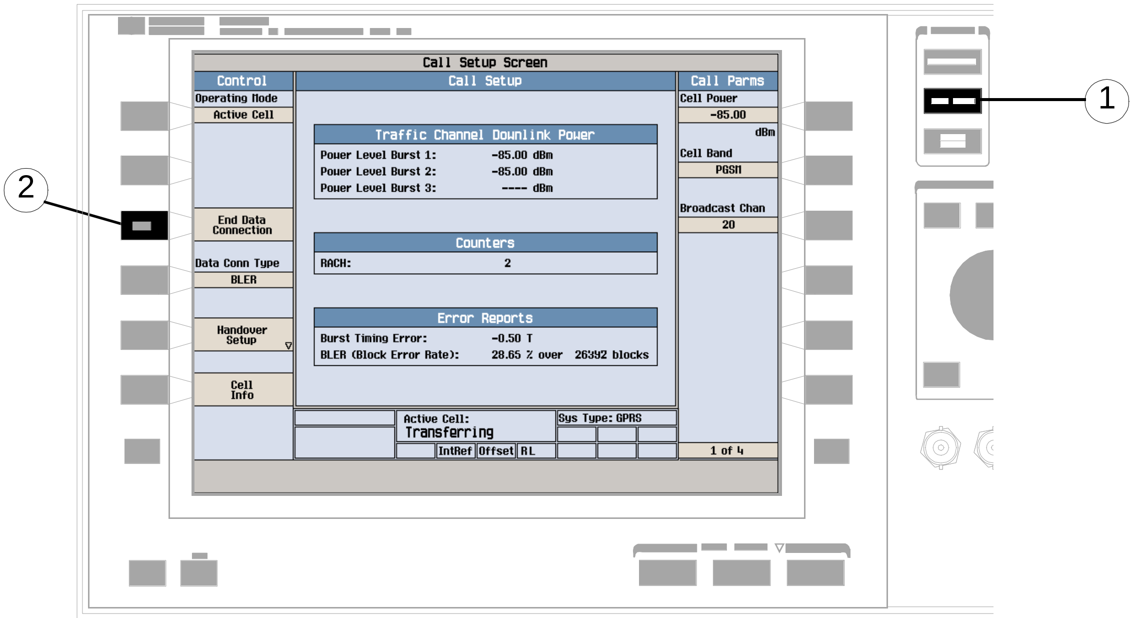
1. On the Configuration Summary screen, press the `RF IN/OUT Amptd Offset` (**F5**) key.
2. On the RF IN/OUT Amplitude Offset screen, press the `RF IN/OUT Amptd Offset Setup` (**F2**) key.
3. Enter the amplitude offsets for the test frequencies you use.
4. Press the `Close Menu` (**F6**) key.
5. Press the `Return` (**F6**) key to return to the Configuration Summary screen.

C. Check the message log.



1. Press the `Message Log` (**F7**) key and view the message log.
2. Press the `Return` (**F12**) key.

How Do I End the Data Connection?



1. Press the **CALL SETUP** key.
2. Press the `End Data Connection` (**F3**) key, or end the data connection from the mobile.
3. To ensure the data connection has ended check for `Attached` in the `Active Cell:` field.

GPRS Mobile Measurements

The following step-by-step procedures explain how to perform specific measurements available on the GPRS Test Application. A detailed description of each measurement is given in the *Reference* information on the documentation CD-ROM and at the Agilent 8960 support website (http://www.agilent.com/find/8960support/).

Setup parameters for each measurement are assumed to be set to their default (Full preset) values unless otherwise stated.

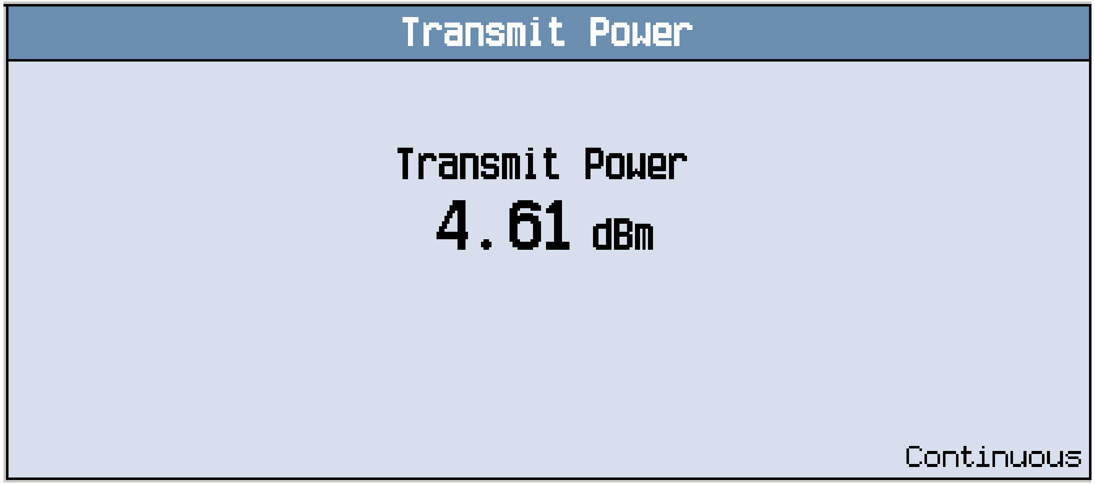
The following measurement procedures are provided:

- "Measuring Transmit Power" on page 1360
- "Measuring Power versus Time" on page 1361
- "Measuring Phase and Frequency Error" on page 1367
- "Measuring Output RF Spectrum" on page 1370
- "Measuring Bit Error" on page 1375
- "Measuring Block Error" on page 1376

Measuring Transmit Power

1. Connect the mobile.
2. Turn the mobile on and wait for `Attached` in the `Active Cell:` field.
   Note: For mobiles that don't perform a GPRS attach automatically, set the mobile to data mode.
3. Press the `Start Data Connection` (**F3**) key and watch for the `Active Cell:` field changing to `Transferring`.
4. Press the **Measurement selection** key.
5. Select the `Transmit Power` measurement.
6. Press the `Transmit Power Setup` (**F1**) key.

7. Set the measurement parameters as needed for your measurement situation, including:
   `Measurement Timeout = 5.0 s`



A typical measurement result is shown above.

Measuring Power versus Time

NOTE This measurement procedure assumes that your mobile supports two adjacent uplink timeslots.

1. Press the **CALL SETUP** key.
2. Press the **More** key (bottom right) to obtain the Call Parms (3 of 3) screen.
3. Press the `Multislot Config` (**F7**) key and select `2 down, 2 up`.
4. Connect the mobile.
5. Turn the mobile on and wait for `Attached` in the `Active Cell:` field.
   Note: For mobiles that don't perform a GPRS attach automatically, set the mobile to data mode.
6. Press the `Start Data Connection` (**F3**) key and watch for the `Active Cell:` field changing to `Transferring`.
7. Press the **Measurement selection** key.
8. Select the `Power vs Time` measurement.
9. Press the `Power vs Time Setup (F1)` key.
10. Press the `Measurement Setup (F1)` key.
11. Set the measurement parameters as needed for your measurement situation, including:
    `Measurement Timeout = 10 s`

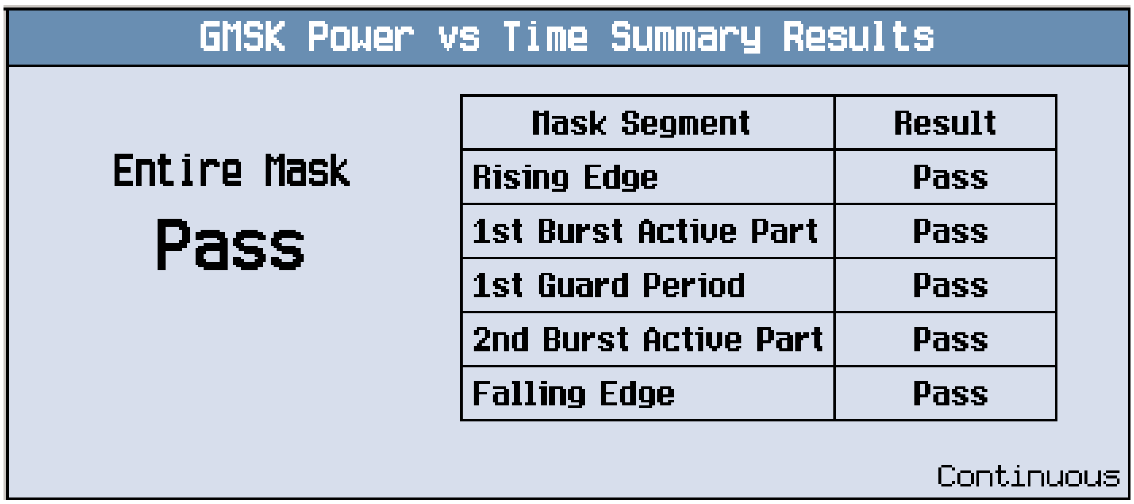
12.Press the `Burst1 Meas Offsets` (**F2**) key and set up your required time offset values for burst 1.

NOTE For statistical analysis the test set allows you to set up to 12 time markers. These markers *do not* define the mask but allow you to obtain measurement results from specified points on the mask. If you want to define your own custom mask, you can do this using the Custom Mask Setup parameters within the `Power vs Time Setup` menu.

13.Press the `Burst2 Meas Offsets` (**F3**) key and set up your required time offset values for burst 2.

NOTE Offsets are referenced to bit zero in a normal burst. To obtain results from measurement points before bit 0, enter negative offset values.

14.Press the `Close Menu` (**F6**) key.

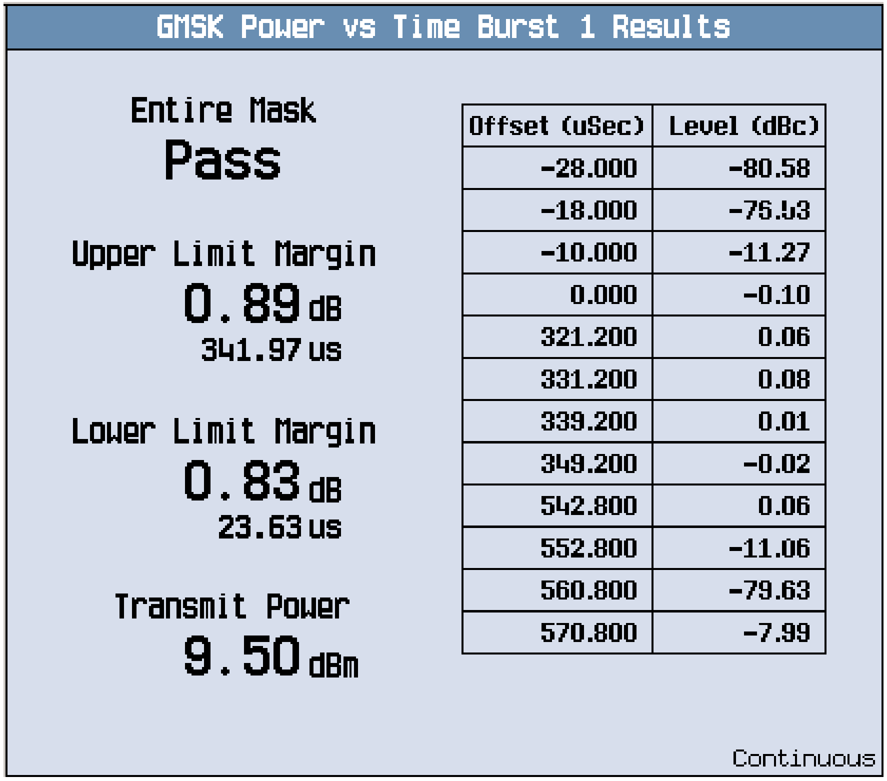


A typical summary results screen is shown above.

15.Press the `Return` (**F6**) key.

16.Press the `Change View` (**F2**) key.

17.Press the `Burst 1 numeric Results` (**F2**) key to view the offset measurement results for burst 1.



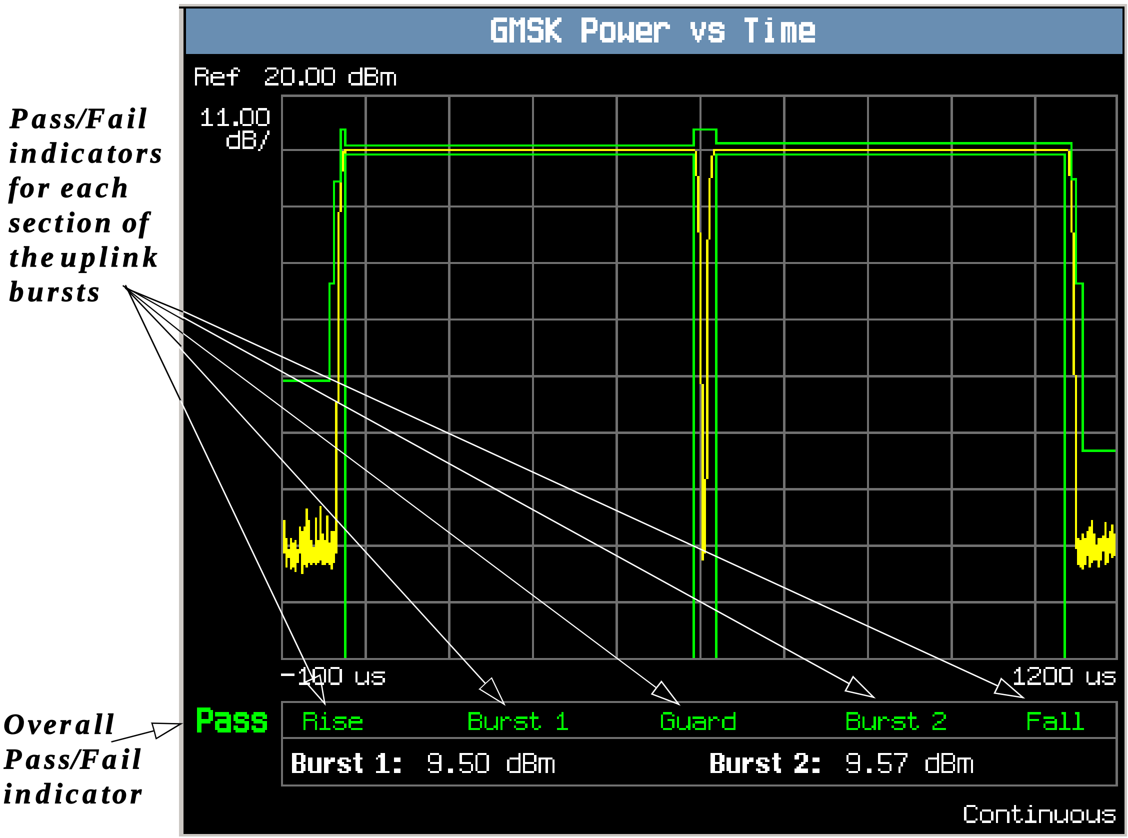
A typical numeric measurement results screen for offsets is shown above.

18. Press the `Burst 2 numeric Results` (**F3**) key to view the offset measurement results for burst 2.

19. Press the `Graph` (**F4**) key to access the full graph view of the two adjacent uplink bursts.

The structure of the Power versus Time graph menus are slightly different depending on the number of uplink bursts in the multislot configuration. If you require details on how to navigate through the Power versus Time graph menus, see either:

- "Power versus Time Graph Menus (one uplink burst)" on page 1366, or
- "Power versus Time Graph Menus (two uplink bursts)" on page 1367.



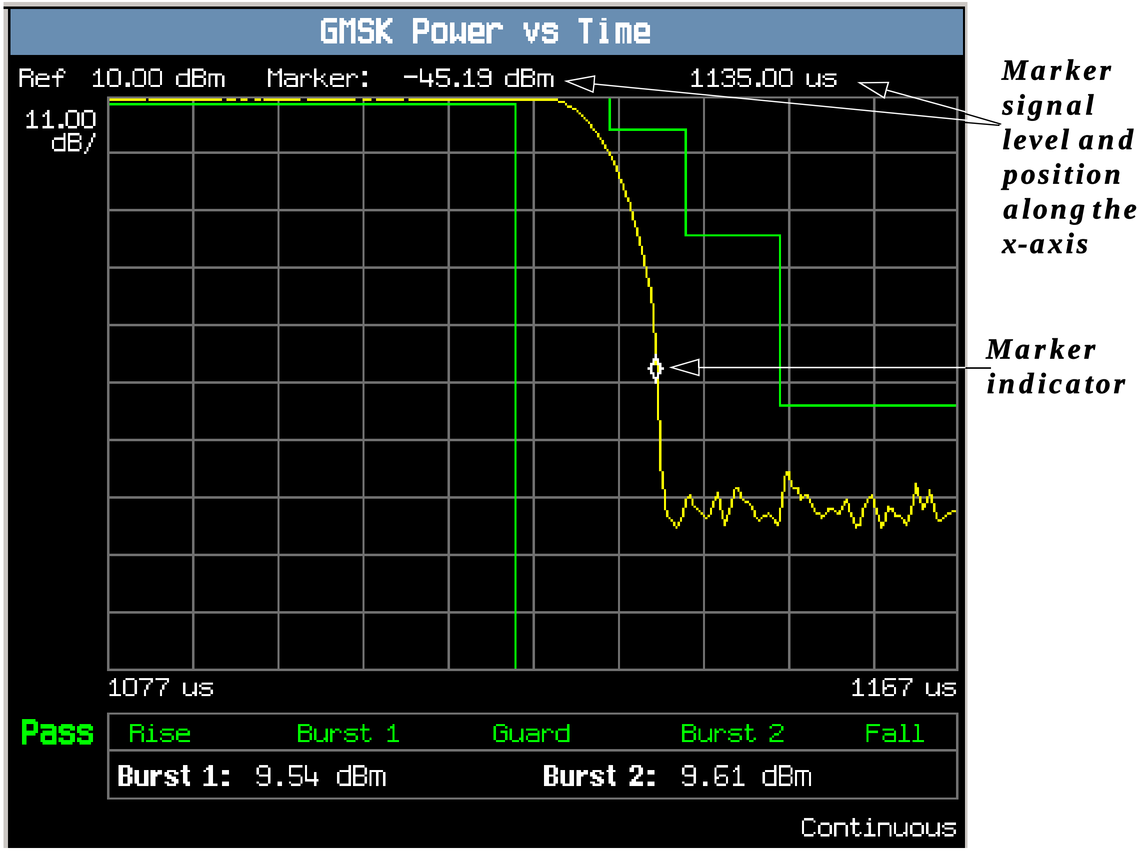
A typical full graph view of two adjacent uplink bursts is shown above.

Two types of pass/fail results are provided:

- An overall measurement pass/fail indicator is positioned in the bottom left corner of the display:
  - — The text “Pass” is shown in a green-colored font if the measurement has passed the entire mask.
  - — The text “Fail” is shown in a red-colored font if the measurement has failed any part of the mask.
- Individual pass/fail indicators are provided for each section of the mask. On the display, text labels corresponding to the following sections change color to indicate a pass or fail (green indicates a pass; red indicates a fail):
  - — *Rise* section of burst 1
  - — Active (useful) section of *Burst 1*
  - — *Guard* period between burst 1 and 2 (Note: this indicator is only available if you are measuring two uplinks)
  - — Active (useful) portion of *Burst 2* (Note: this is only available if you are measuring two uplinks)
  - — *Fall* section

NOTE When the Multi-Measurement Count parameter is set to a number greater than 1, it is possible for some, or all of the individual pass/fail indicators to show a pass while the overall pass/fail indicator shows a fail. This is because the individual pass/fail indicators relate to the last of the multi-measurements made, whereas the overall mask pass/fail indicator is an accumulative result from all the multi-measurements made.

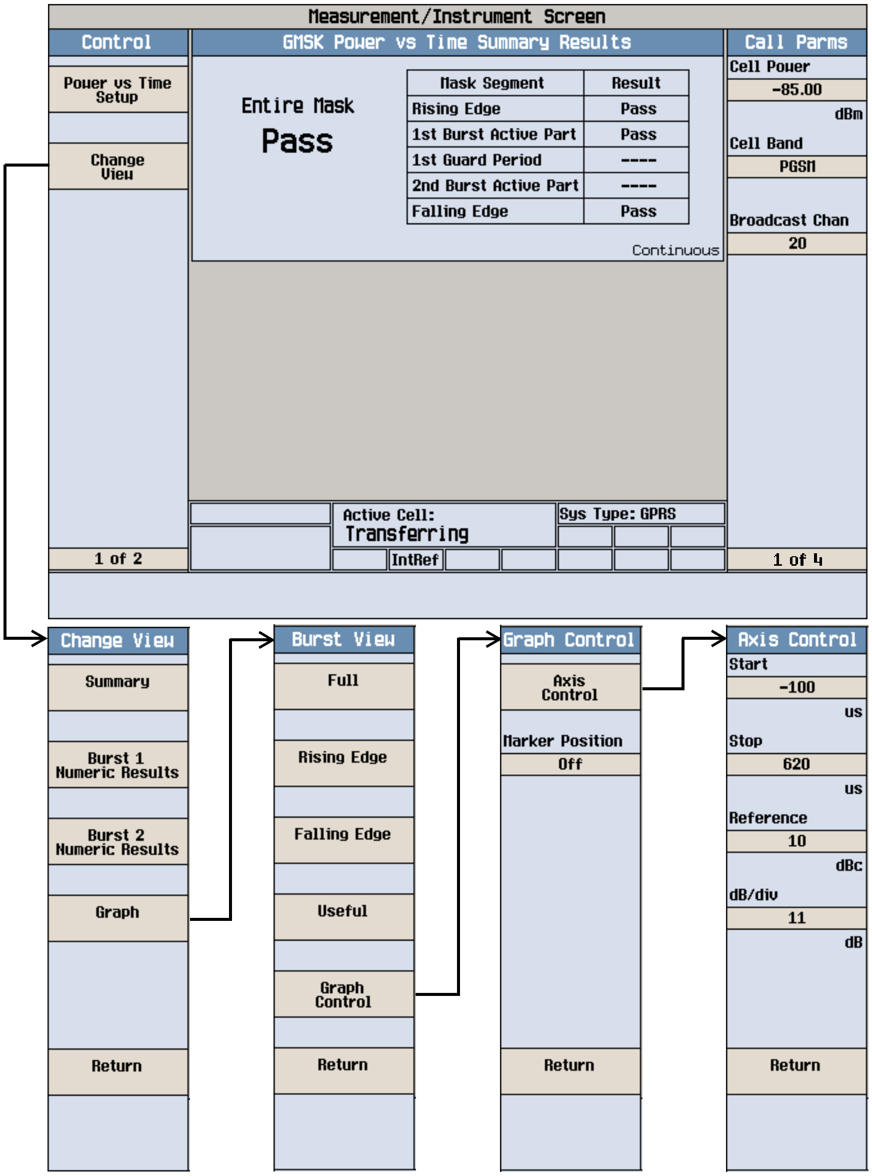
You can zoom in to individual sections of the graph by pressing the `Guard Period` (**F2**), `Burst 1 Views` (**F3**), or `Burst 2 Views` (**F4**) keys. In addition, you can control a marker or change axis values by pressing the `Graph Control` (**F5**) key.



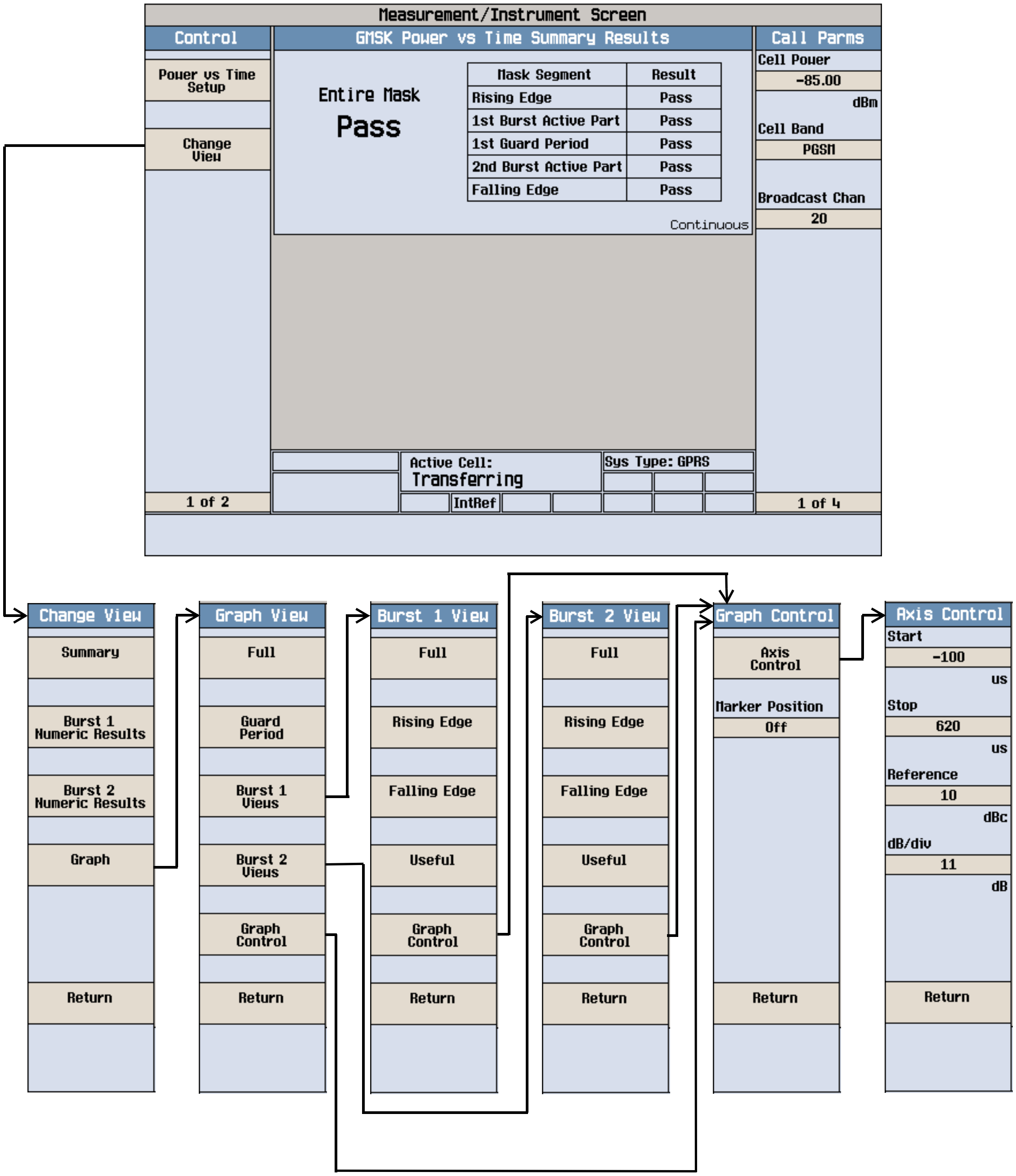
A typical graph view of the falling edge of burst 2 is shown above. You can access this view by pressing the `Burst 2 Views` (**F4**) key then the `Falling Edge` (**F3**) key.

In this case, the marker is turned on and positioned on the falling edge. The marker can be turned on by pressing the `Graph Control` (**F5**) key then the `Marker Position` (**F2**) key. Set the required marker position using the knob or the numeric entry keys. The signal level at the marker and its position along the x-axis are shown at the top of the display above the graph.

Power versus Time Graph Menus (one uplink burst)



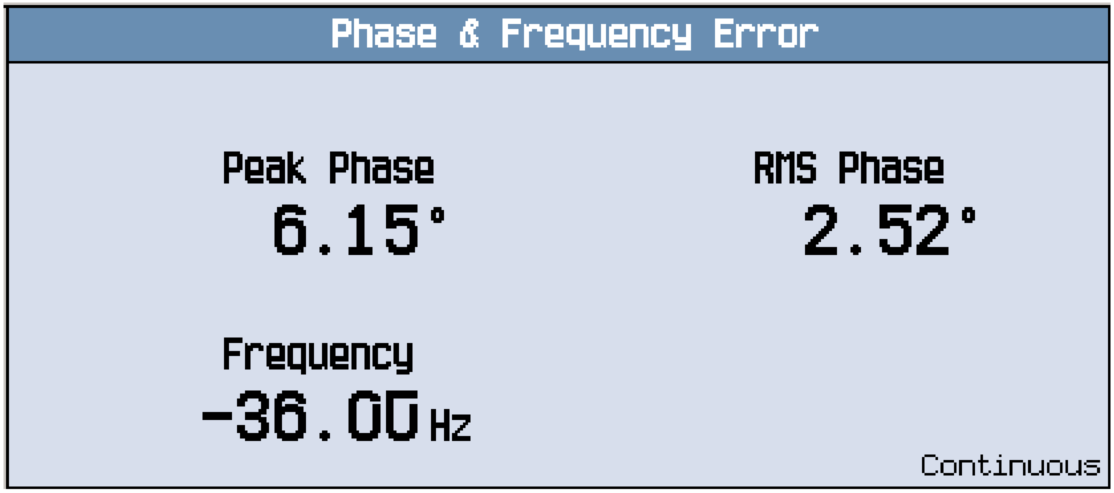
Power versus Time Graph Menus (two uplink bursts)



Measuring Phase and Frequency Error

1. Connect the mobile.
2. Turn the mobile on and wait for `Attached` in the `Active Cell:` field.
   Note: For mobiles that don't perform a GPRS attach automatically, set the mobile to data mode.
3. Press the `Start Data Connection` (**F3**) key and watch for the `Active Cell:` field changing to `Transferring`.

4. Press the **Measurement selection** key.
5. Select the `Phase & Frequency Error` measurement.
6. Press the `Phase & Freq. Setup` (**F1**) key.
7. Set the measurement parameters as needed for your measurement situation, including:
   `Measurement Timeout = 10 s`

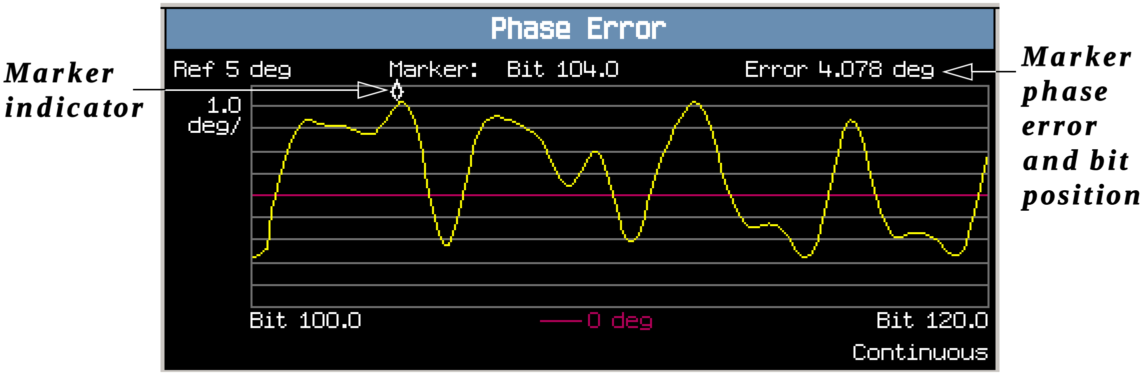


A typical phase and frequency error measurement result is shown above.

8. Press the `Change View` (**F2**) key.
9. Press the `Graph` (**F2**) key to access the peak phase error graph.

A typical peak phase error graph is shown above.

The marker can be turned on by pressing the `Graph Control` (**F5**) key then the `Marker Position` (**F2**) key. Set the required marker position using the knob or the numeric entry keys. In addition, the axis values can be changed by pressing the `Axis Control` (**F1**) key. This allows you to zoom in or out to look at particular sections of the graph in more detail.

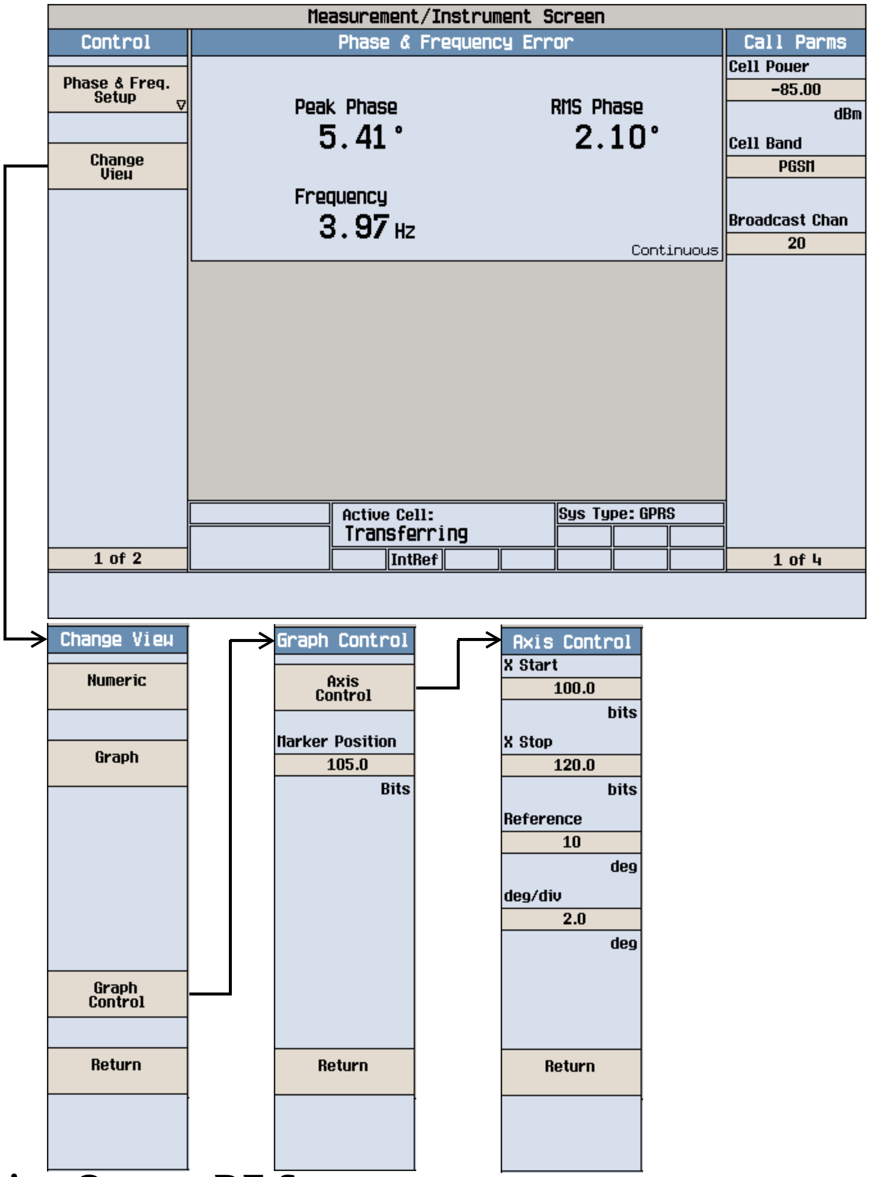


A typical peak phase error graph is shown above. This graph is zoomed in to show bits ranging from 100.0 to 120.0 at a 1.0 degrees per division setting. The Y-axis reference point is changed to 5.0 degrees.

In this case, the marker is turned on and positioned at bit 104. The phase error at the marker and its bit position are shown at the top of the display above the graph.

If you require details on how to navigate through the phase and frequency error graph menus, see "Phase and Frequency Error Graph Menus" on page 1370.

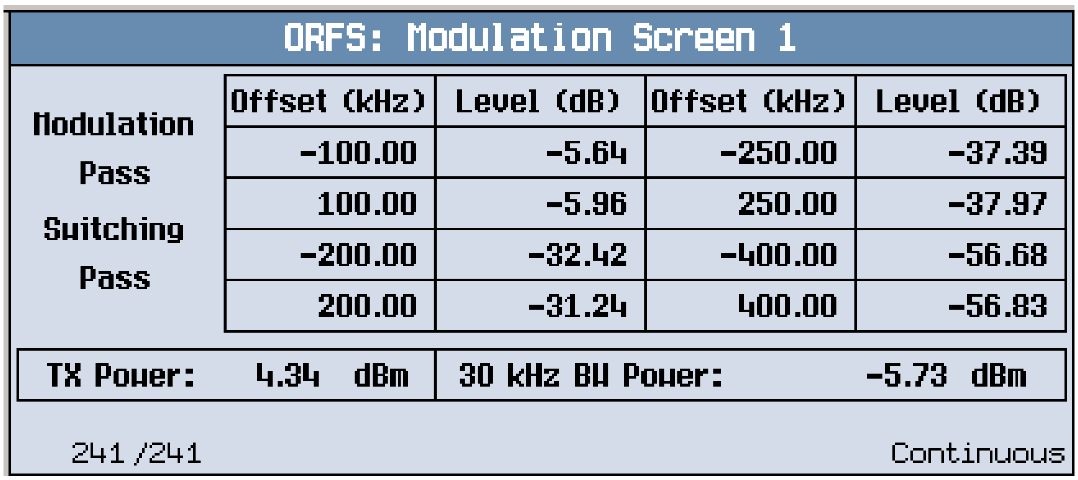
Phase and Frequency Error Graph Menus



Measuring Output RF Spectrum

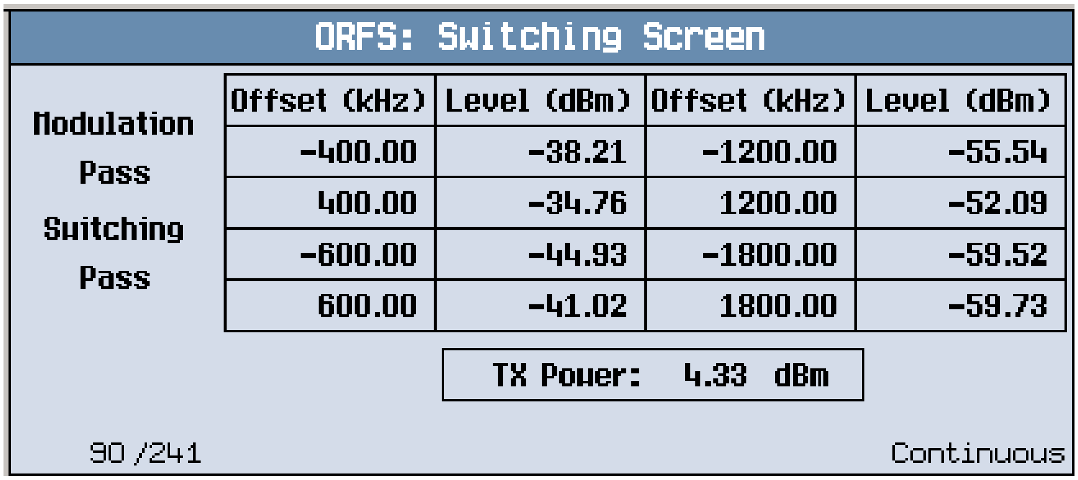
1. Connect the mobile.
2. Turn the mobile on and wait for `Attached` in the `Active Cell:` field.
   Note: For mobiles that don't perform a GPRS attach automatically, set the mobile to data mode.
3. Press the `Start Data Connection` (**F3**) key and watch for the `Active Cell:` field changing to `Transferring`.
4. Press the **Measurement selection** key.
5. Select the `Output RF Spectrum` measurement.
6. Press the `ORFS Setup` (**F1**) key.
7. Press the `Measurement Setup` (**F1**) key.

8. Set the measurement parameters as needed for your measurement, including:
   `Measurement Timeout = 20 s.`
9. Press the `Modulation Frequencies` (**F2**) key and set up your required offset frequencies for ORFS due to modulation.
10. Press the `Switching Frequencies` (**F3**) key and set up your required offset frequencies for ORFS due to switching.
11. Press the `Close Menu` (**F6**) key.
12. Press the `Return` (**F6**) key.
13. Press the `Change View` (**F2**) key.
14. Press the `Modulation Numeric 1 of 3` (**F1**) key.



The measurement results for the first eight positions in the ORFS due to modulation table are displayed. You can view the results for the remaining 14 positions by pressing the `Modulation Numeric 2 of 3` (**F2**) key or the `Modulation Numeric 3 of 3` (**F3**) key. Note that the results are in dB relative to the `30 kHz BW Power` shown on the screen.

15.Press the `Switching Numeric` (**F4**) key to display the measurement results for ORFS due to switching.



ORFS: Switching Screen

Modulation Pass

Switching Pass

Offset (kHz)	Level (dBm)	Offset (kHz)	Level (dBm)
-400.00	-38.21	-1200.00	-55.54
400.00	-34.76	1200.00	-52.09
-600.00	-44.93	-1800.00	-59.52
600.00	-41.02	1800.00	-59.73

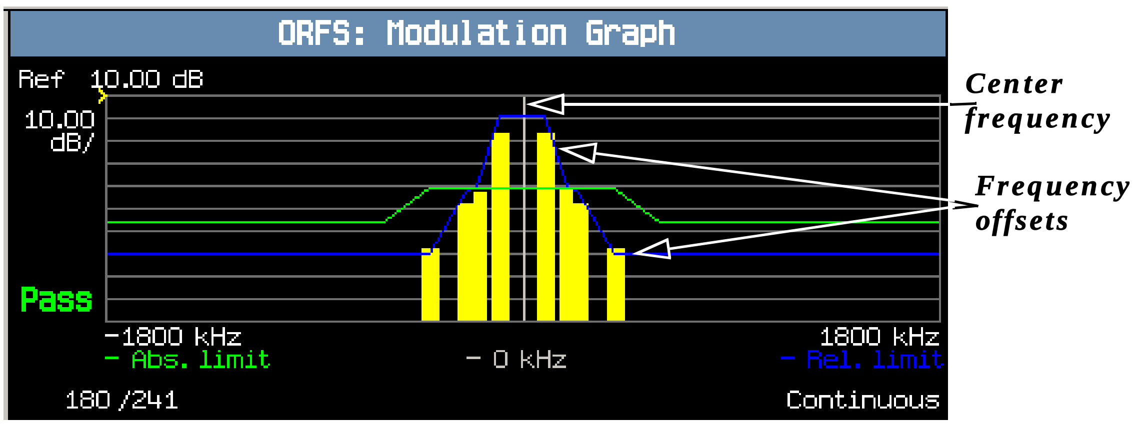
TX Power: 4.33 dBm

90 /241

Continuous

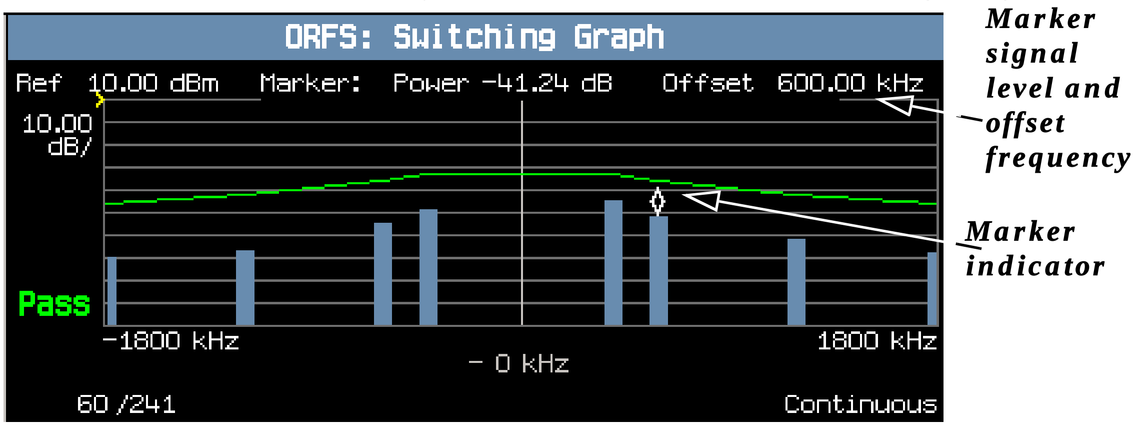
A typical measurement results screen for ORFS due to switching is shown above.

16.Press the `Graph` (**F5**) key then the `Modulation` (**F1**) key to access the ORFS due to modulation bar graph.



A typical ORFS due to modulation graph is shown above. On the display, the bar representing each offset is shown in yellow and the center frequency is indicated by a white vertical line. There are two limit lines displayed; the absolute limit line is green and the relative limit line is blue. The pass/fail result is relevant to the displayed measurement.

17. Press the `Switching` (**F2**) key to access the ORFS due to switching bar graph.

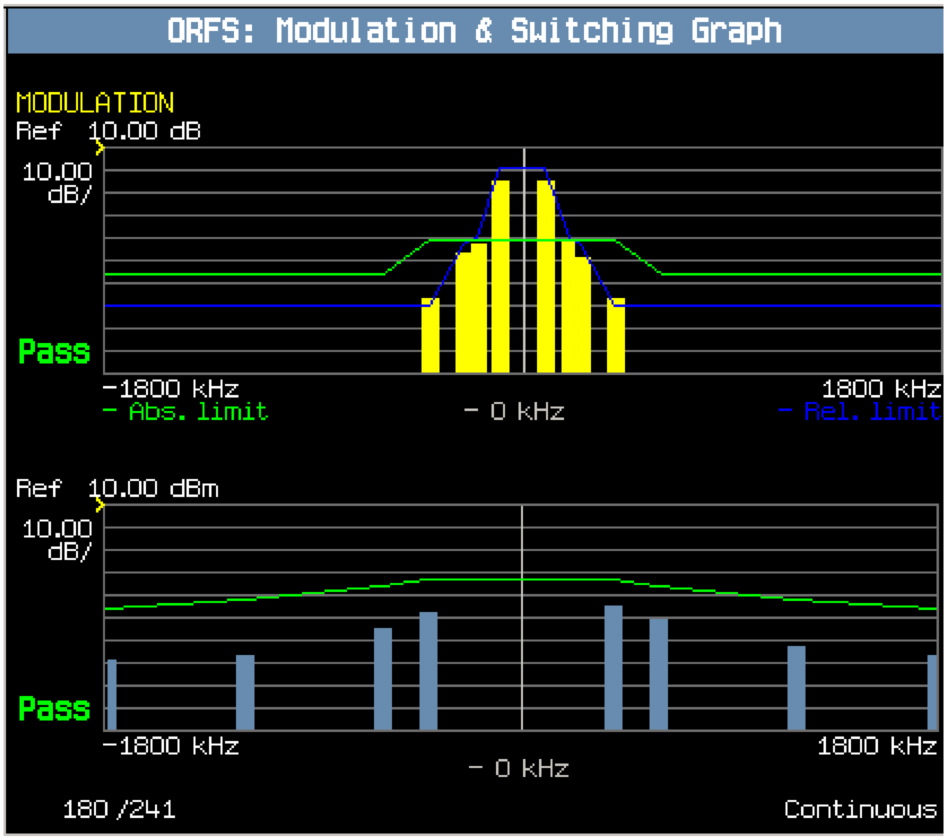


A typical ORFS due to switching graph is shown above. On the display, the bar representing each offset is shown in blue and the center frequency is indicated by a white vertical line.

In this case, the marker is turned on and positioned at the 600 kHz offset. The signal level and frequency of the offset where the marker is positioned, are shown at the top of the display above the graph.

The marker can be turned on by pressing the `Graph Control` (**F5**) key then the `Marker Position` (**F2**) key. Set the required marker position using the knob or the numeric entry keys. In addition, the axis values can be changed by pressing the `Axis Control` (**F1**) key. This allows you to zoom in or out to look at particular sections of the graph in more detail.

18.Press the `Modulation and Switching` (**F3**) key to access a screen displaying both graphs, as shown in the example below.



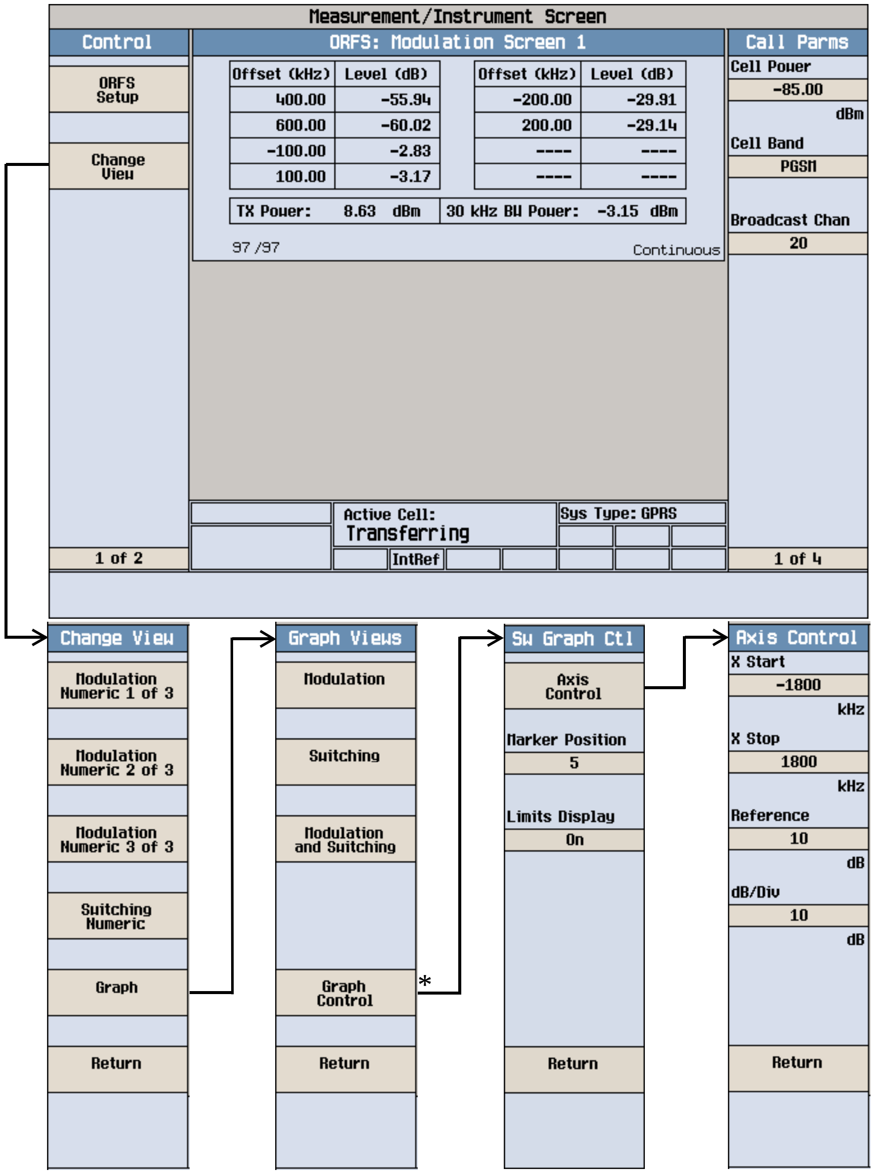
Note that each of the graphs have their own graph controls on **F4** and **F5**.

Any failing results are displayed in red.

If you require details on how to navigate through the Output RF Spectrum graph menus, see “Output RF Spectrum Graph Menus” on page 1375.

19. To set your own limits for each offset use the Measurement Setup menu and set `Limit Source` to `Manual`. You can then use `Modulation Limits` (**F4**) and `Switching Limits` (**F5**) to set your required limits for each offset.

Output RF Spectrum Graph Menus



* May show 2 Graph Control keys

Measuring Bit Error

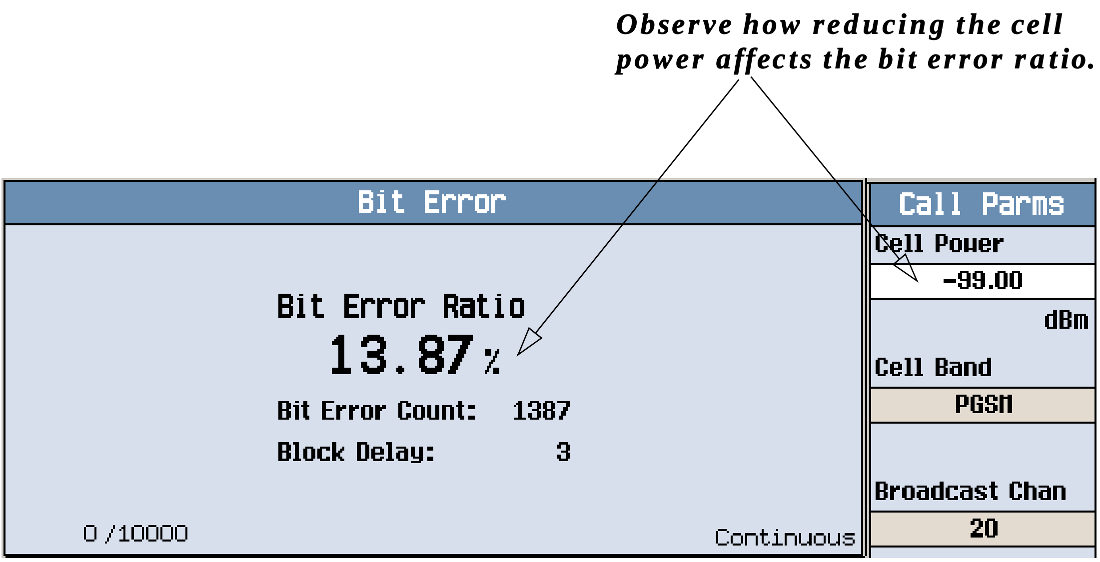
NOTE To make bit error measurements your mobile must be fitted with a Test SIM card and have ETSI Type B connection capability.

1. Press the **CALL SETUP** key.
2. Press the **More** key (bottom right) to obtain the Call Parms (3 of 3) screen.
3. Press the `Multislot Config` (**F7**) key and select `1 down, 1 up`.
4. Press the `Data Conn Type` (**F4**) key and select `ETSI Type B`.
5. Connect the mobile.

6. Turn the mobile on and wait for Attached in the Active Cell: field.

NOTE For mobiles that don't perform GPRS attach automatically, set the mobile to data mode.

7. Press the Start Data Connection (**F3**) key and watch for the Active Cell: field changing to Transferring.
8. Press the **Measurement selection** key.
9. Select the Bit Error measurement.
10. Press the Bit Error Setup (**F1**) key.
11. Set the measurement parameters as needed for your measurement situation, including: Measurement Timeout = 13.0 s



A typical bit error ratio measurement result is shown above.

To see the effect of cell power on the bit error ratio, press the Cell Power (**F7**) key on the Call Parms (1 of 3) screen and slowly reduce the power while observing the Bit Error display.

Measuring Block Error

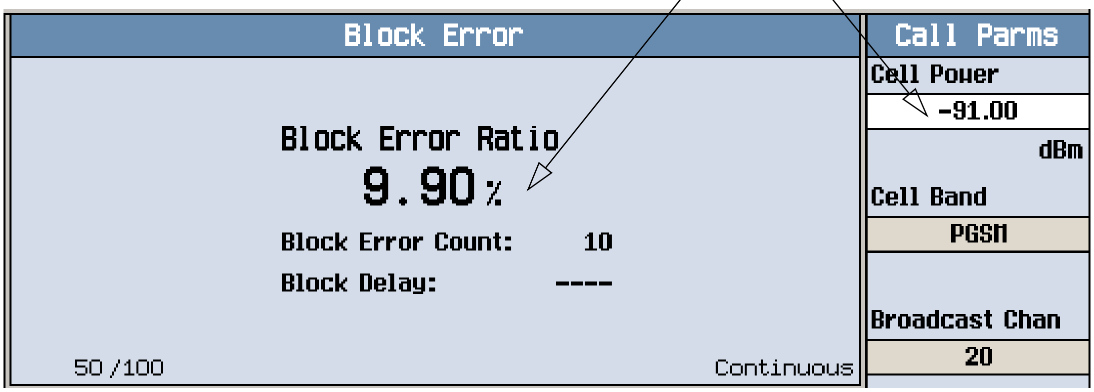
NOTE Block error (BLER) measurements cannot be run concurrently with bit error (BER) measurements. Starting a BLER measurement while a BER measurement is currently running, closes the BER measurement.

1. Press the **CALL SETUP** key.
2. Press the **More** key (bottom right) to obtain the Call Parms (3 of 3) screen.
3. Connect the mobile.
4. Turn the mobile on and wait for Attached in the Active Cell: field.

NOTE For mobiles that don't perform GPRS attach automatically, set the mobile to data mode.

5. Press the `Start Data Connection` (**F3**) key and watch for the `Active Cell:` field changing to `Transferring`.
6. Press the **Measurement selection** key.
7. Select the `Block Error` measurement.
8. Press the `Block Error Setup` (**F1**) key.
9. Set the measurement parameters as needed for your measurement situation, including:
   `Measurement Timeout = 13.0 s`
   `Number of blocks to test = 100`

Observe how reducing the cell power affects the block error ratio.



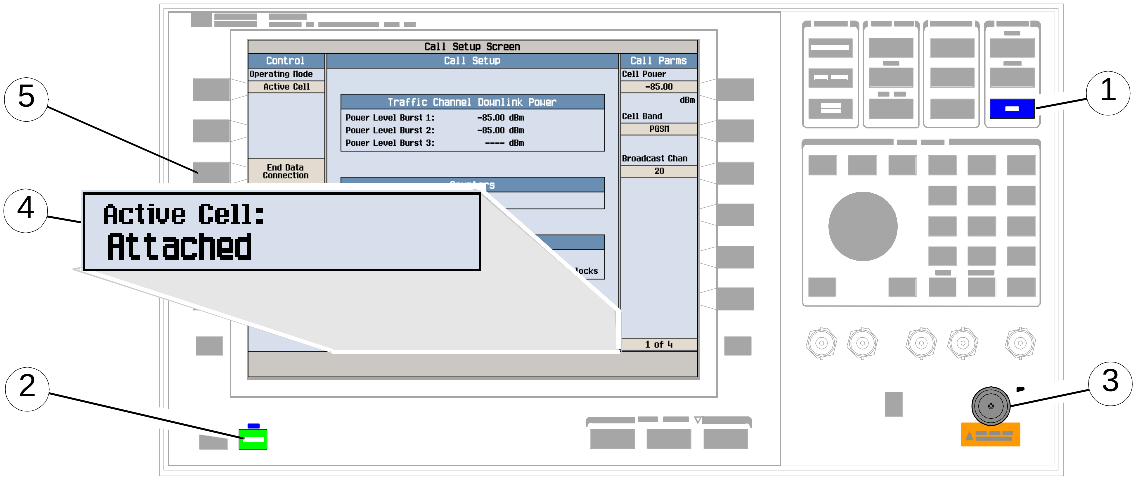
A typical block error measurement result is shown above.

To see the effect of cell power on the block error, press the `Cell Power` (**F7**) key on the Call Parms (1 of 3) screen and slowly reduce the power while observing the Block Error Ratio display.

EGPRS Manual Operation

How Do I Make EGPRS Measurements on a Mobile?

A. Establish a data connection.



1. Press the blue **SHIFT** key.
2. Press the green **Preset** key.
3. Connect the mobile.
4. Turn the mobile on and wait for `Attached` in the `Active Cell:` field.

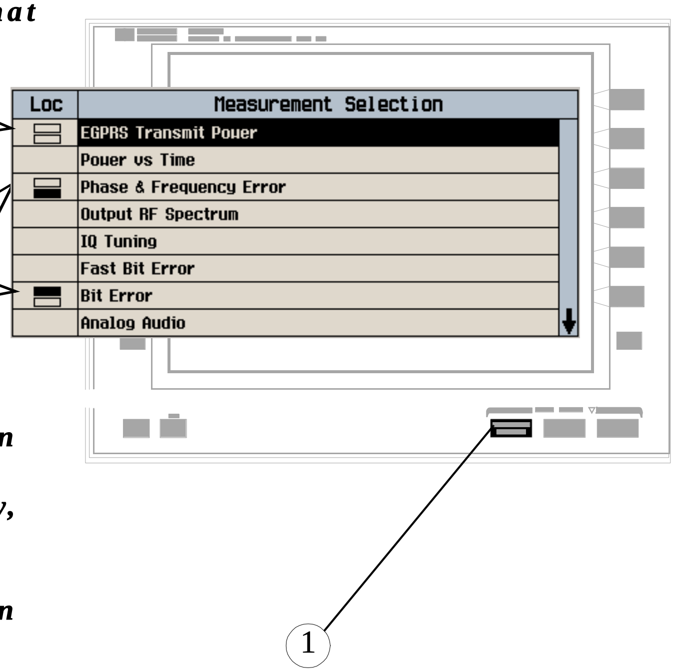
NOTE For mobiles that don't perform EGPRS attach automatically, set the mobile to data mode.

---

5. Press the `Start Data Connection` (**F3**) key and watch for the `Active Cell:` field changing to `Transferring`.

B. Select measurements.

The gray boxes indicate that the measurement is being made, but the results are not being displayed.

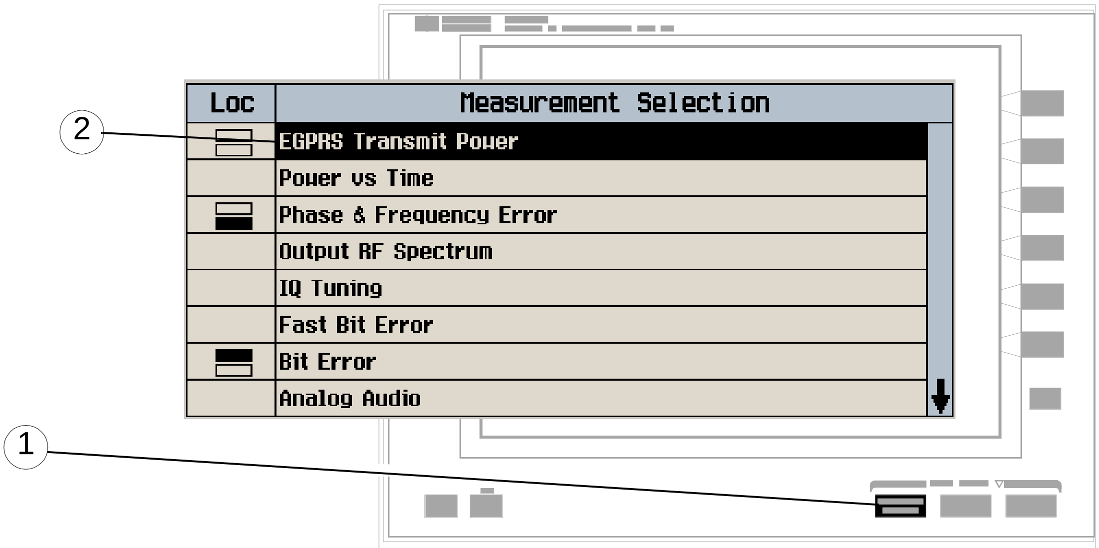


These black boxes indicate that phase and frequency error measurement results are being displayed in the lower measurement window, and bit error measurement results are being displayed in the upper measurement window.

1. Press the **Measurement selection** key.
2. Highlight a measurement and press the knob.
3. Repeat steps 1 and 2 to add measurements.

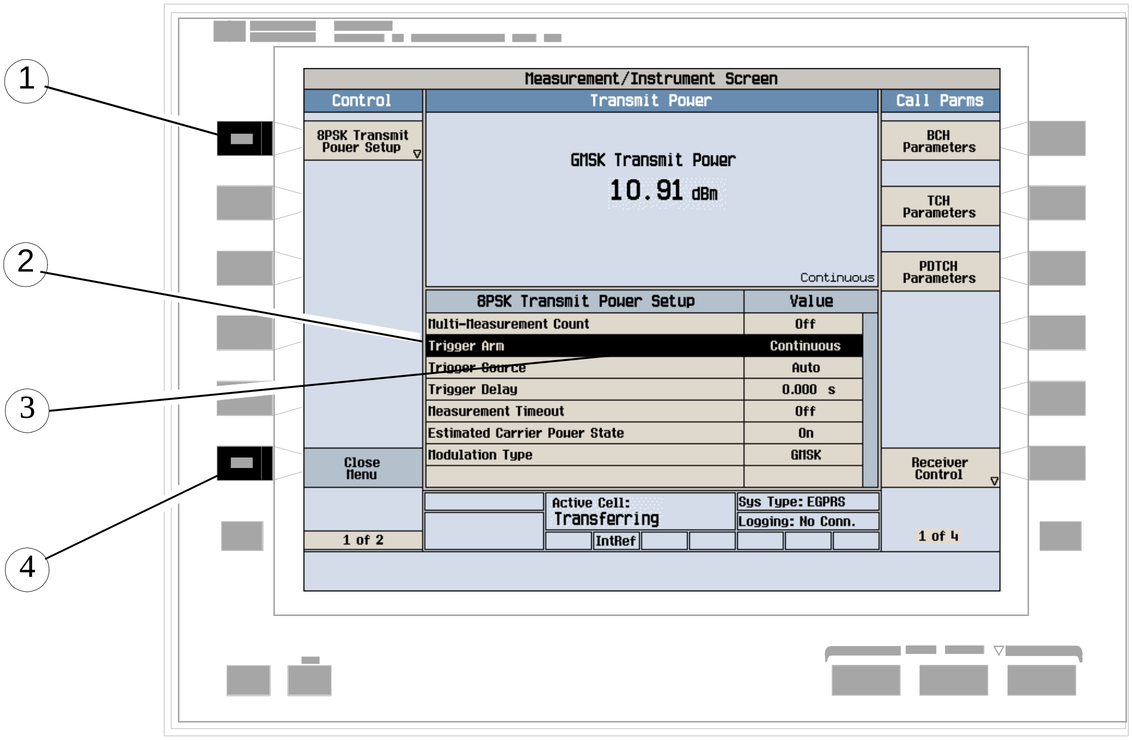
How Do I Change Measurement Setup in EGPRS?

A. Select a measurement.



1. Press the **Measurement selection** key.
2. Highlight a measurement to set up and press the knob.

B. Set up the measurement.

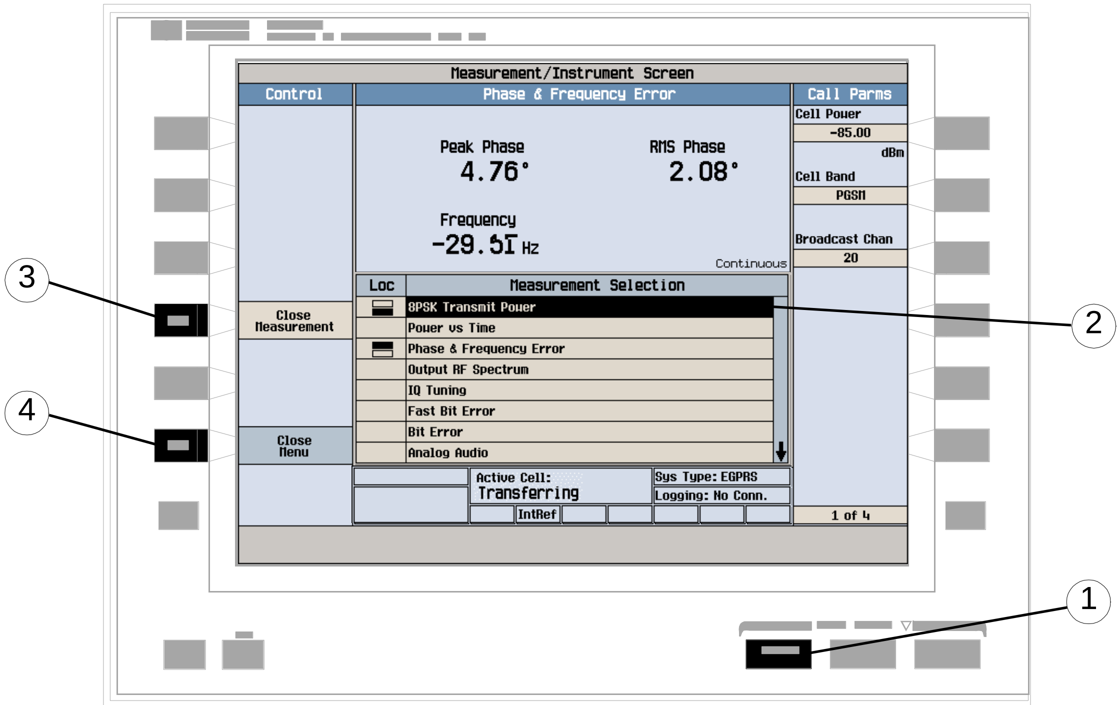


1. Press the measurement's setup (**F1**) key.
2. Highlight a parameter and press the knob.
3. Enter a value or make a selection and press the knob.

NOTE For Statistical measurement results, change the `Multi-Measurement Count` parameter from `Off` to a number >1.

4. Press the `Close Menu` (**F6**) key.

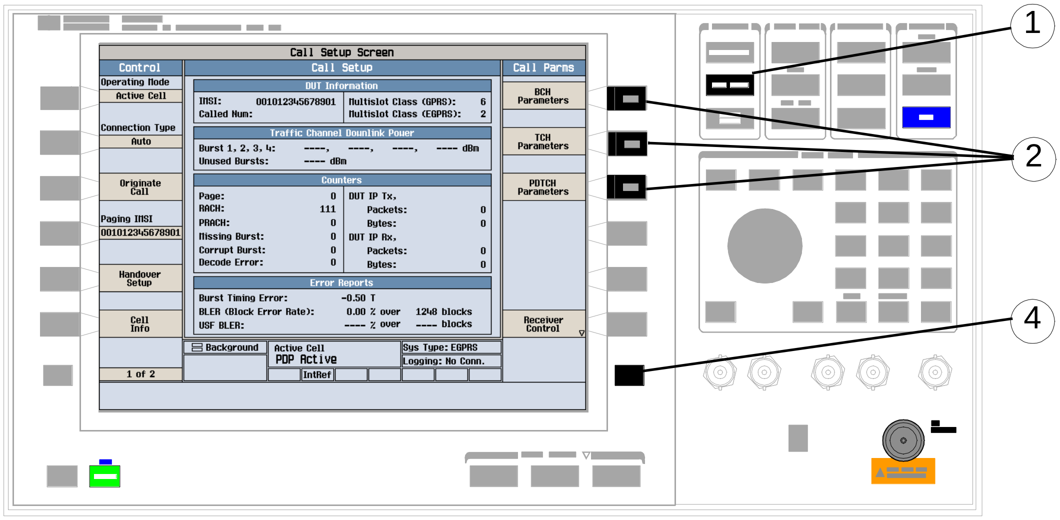
How Do I Turn Off a Measurement in EGPRS?



1. Press the **Measurement selection** key.
2. Highlight the measurement you want to turn off.
3. Press the `Close Measurement` (**F4**) key.
4. Press the `Close Menu` (**F6**) key.

How Do I Change EGPRS Call Parameters?

This section is *not* applicable to GSM or GPRS.



1. Press the **CALL SETUP** key.

NOTE When the mobile is transferring data (`Active Cell:` field is `Transferring`) some call parameters cannot be changed.

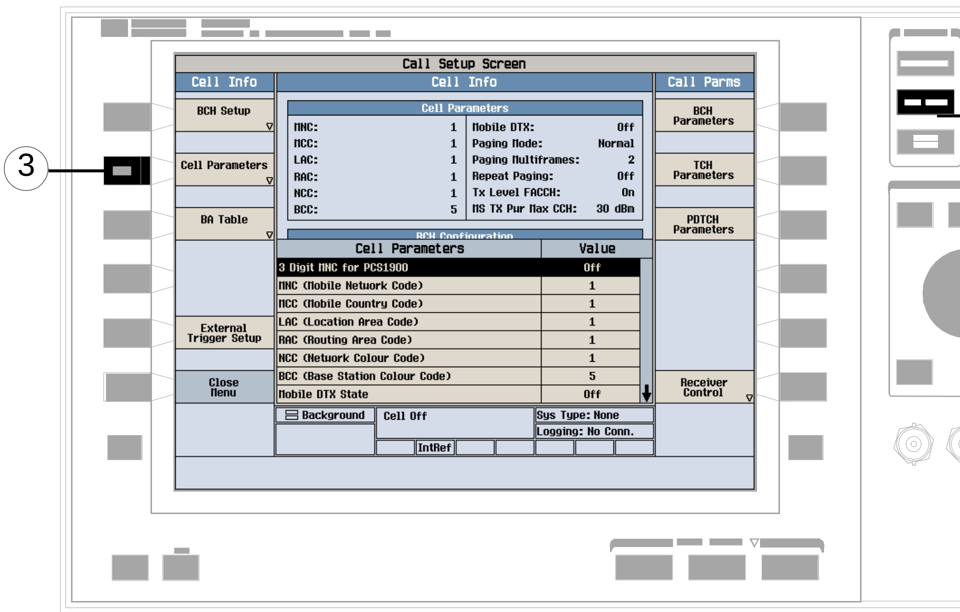
---

2. On the Call Parms menu press **F7**, **F8** or **F9** and select a call parameter to change.
3. Enter a value or highlight a selection and press the knob.
4. Press the **More** key for additional call parameters.

How Do I Change EGPRS Cell Parameters?

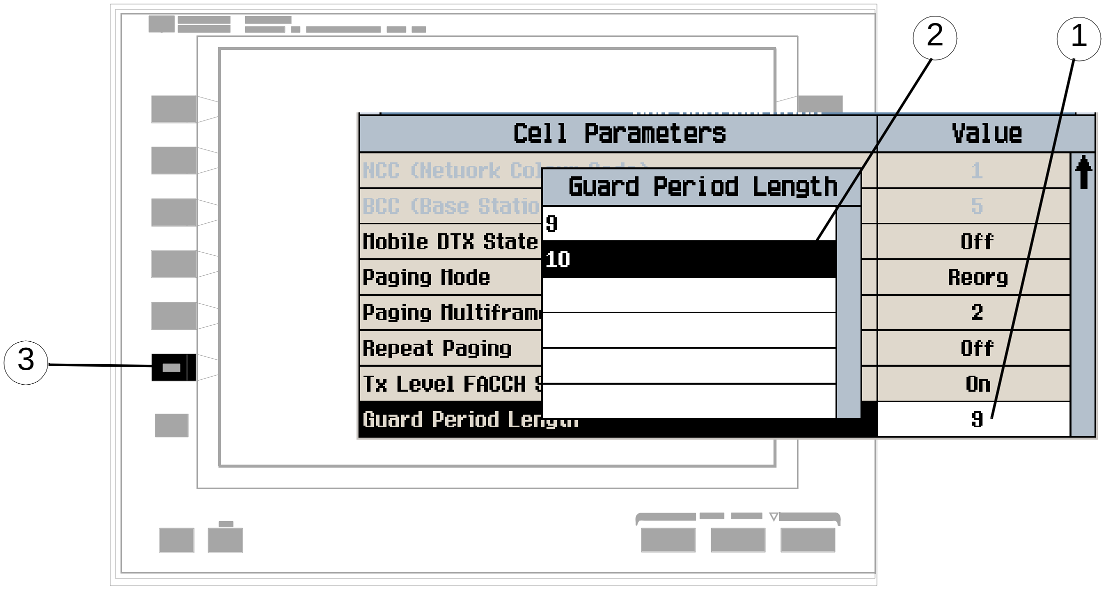
NOTE Some cell parameters (such as the 3 Digit MNC for PCS1900 and the Mobile Network Code) can only be changed when the cell is turned off. To do this, press the **CALL SETUP** key, then `Operating Mode` (**F1**), and select `Cell Off`.

A. Select the Cell Parameters menu.



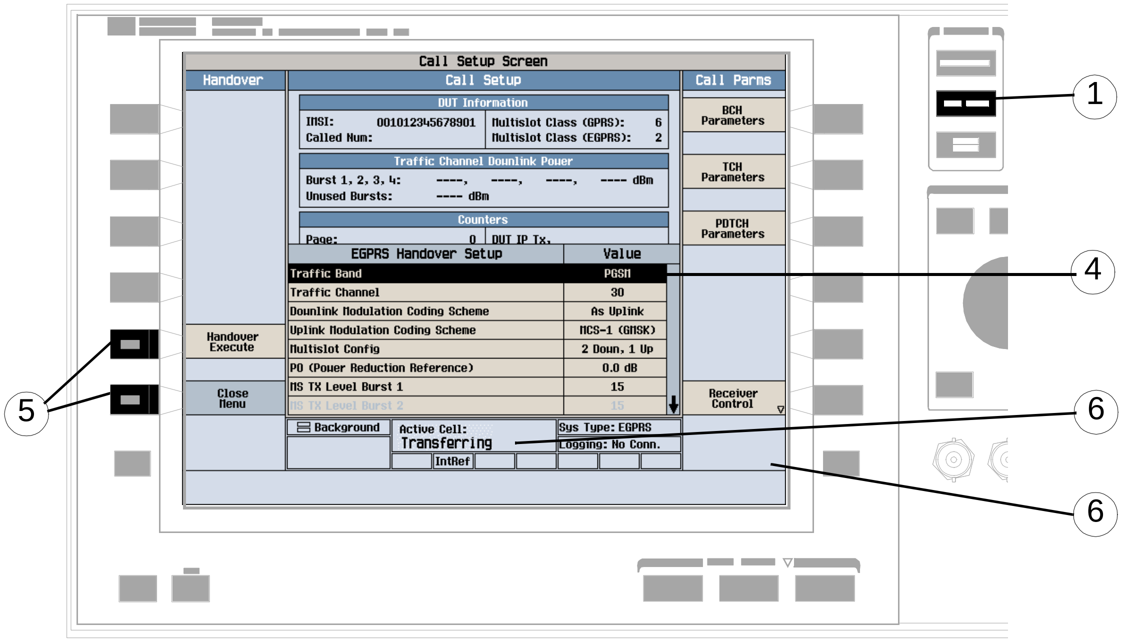
1. Press the **CALL SETUP** key.
2. Press the `Cell Info` (**F6**) key.
3. Press the `Cell Parameters` (**F2**) key.

B. Set a cell parameter.



1. Highlight a parameter and press the knob.
2. Enter a value or selection and press the knob.
3. Press the `Close Menu` (**F6**) key.

How Do I Perform an EGPRS Handover?



1. Press the **CALL SETUP** key.
2. Press the `Handover Setup` (**F5**) key.
3. Press the `EGPRS Handover Setup` (**F2**) key.
4. Change the various parameters, for example `Traffic Band`.
5. Press the `Handover Execute` (**F5**) key to complete the handover, or press the `Close Menu` (**F6**) key to abort the handover.
6. Check for `Transferring` in the `Active Cell` field.
7. After the handover is executed, press the `PDTCH Parameters` (**F9**) key to check that the changes have been implemented on the PDTCH Parms menus (1 of 2) and (2 of 2).

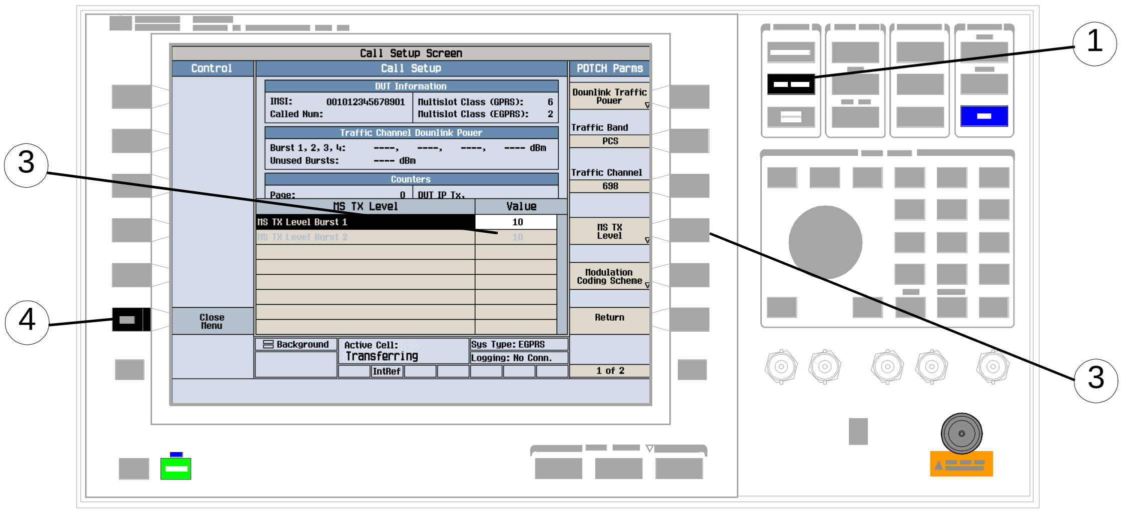
How Do I Change the MS TX Level in EGPRS?

There are two ways to change the MS TX Level:

- Change the level immediately
- Change the level during a handover

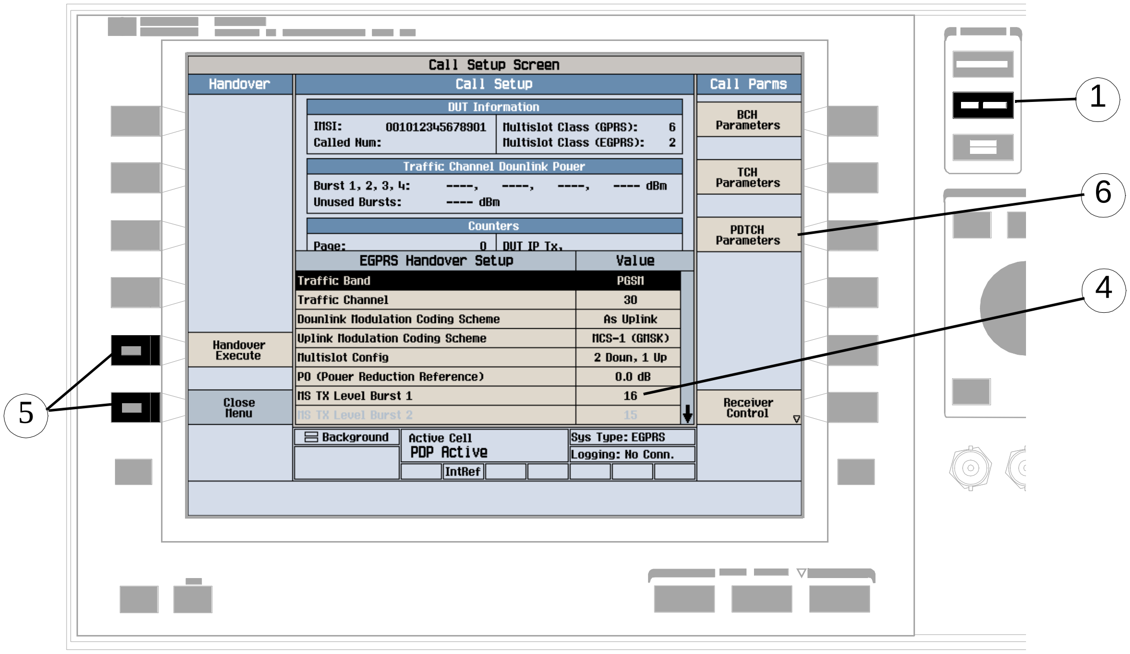
Both are explained below.

A. Change the MS TX level immediately



1. Press the **CALL SETUP** key.
2. Press the `PDTCH Parameters` (**F9**) key.
3. Press the `MS TX Level` (**F10**) key.
4. Set a new MS TX level and press the knob.
5. Press the `Close Menu` (**F6**) key.

B. Change the MS TX level during a handover



1. Press the **CALL SETUP** key.
2. On the Control menu, press the `Handover Setup` (**F5**) key.
3. Press the `EGPRS Handover Setup` (**F2**) key.
4. Select and change the `MS TX Level`.
5. Press the `Handover Execute` (**F5**) key to change the MS TX level, or press the `Close Menu` (**F6**) key to leave the level unchanged.
6. Press the `PDTCH Parameters` (**F9**) key, then `MS TX Level` (**F10**) to check that the MS TX Level has been changed.

How Do I Change the EGPRS Modulation Coding Scheme?

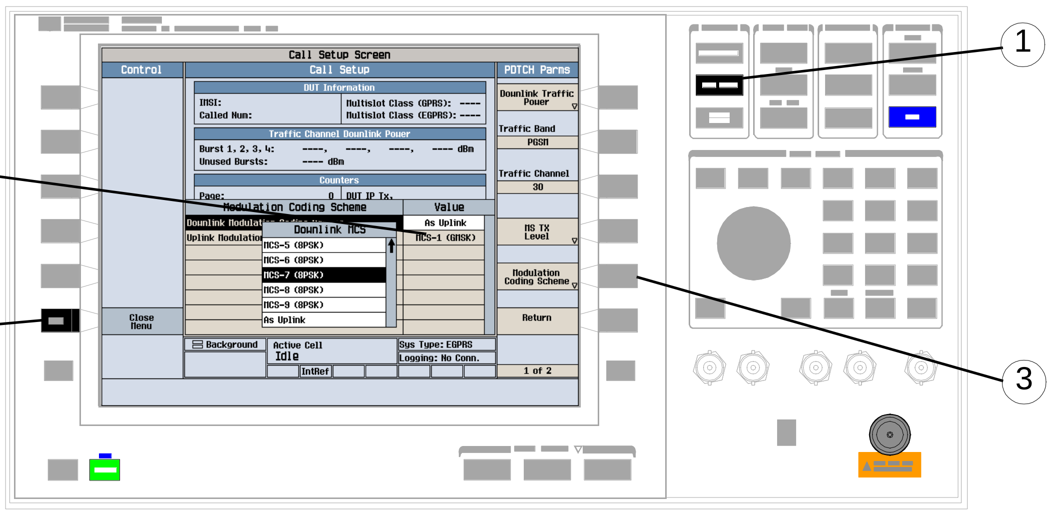
This section is *not* applicable to GSM or GPRS.

There are two ways to change the EGPRS downlink and uplink Modulation Coding Schemes (MCS):

- Change the MCS immediately
- Change the MCS during a handover

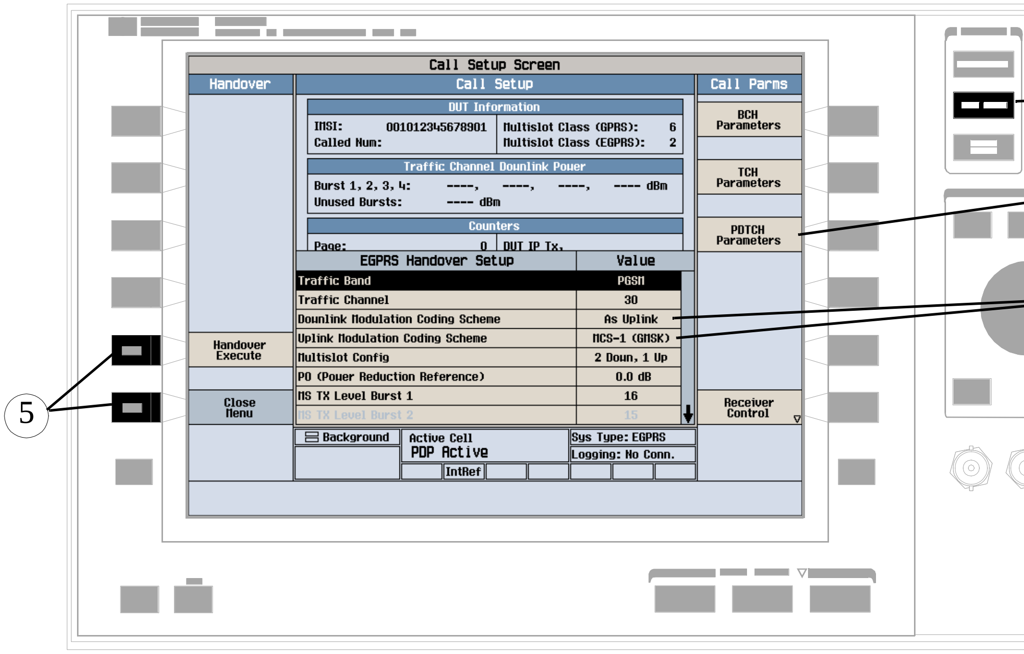
Both are explained below.

A. Change the MCS immediately



1. Press the **CALL SETUP** key.
2. Press the `PDTCH Parameters` (**F9**) key.
3. Press the `Modulation Coding Scheme` (**F11**) key.
4. Select either `Downlink Modulation Coding Scheme` or `Uplink Modulation Coding Scheme` and set the value you want. The modulation format is different depending on the MCS you select:
   - MCS-1 through MCS-4 use a GMSK modulation format.
   - MCS-5 through MCS-9 use an 8PSK modulation format.
5. Press the `Close Menu` (**F6**) key.

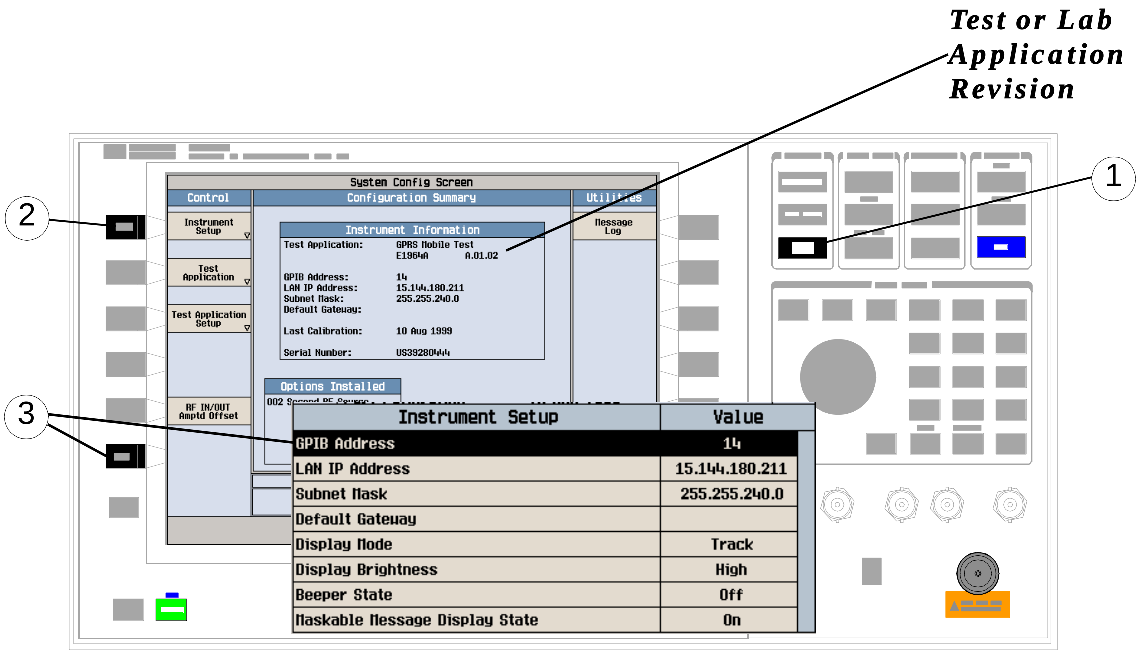
B. Change the MCS during a handover



1. Press the CALL SETUP key.
2. On the Control menu, press the `Handover Setup` (**F5**) key.
3. Press the `EGPRS Handover Setup` (**F2**) key.
4. Select either `Downlink Modulation Coding Scheme` or `Uplink Modulation Coding Scheme` and set the value you want. The modulation format is different depending on the MCS you select:
   - MCS-1 through MCS-4 use a GMSK modulation format.
   - MCS-5 through MCS-9 use an 8PSK modulation format.
5. Press the `Handover Execute` (**F5**) key to change the MCS, or press the `Close Menu` (**F6**) key to leave the MCS unchanged.
6. After the handover is executed, press the `PDTCH Parameters` (**F9**) key, then `Modulation Coding Scheme` (**F11**) to check that the MCS has been changed.

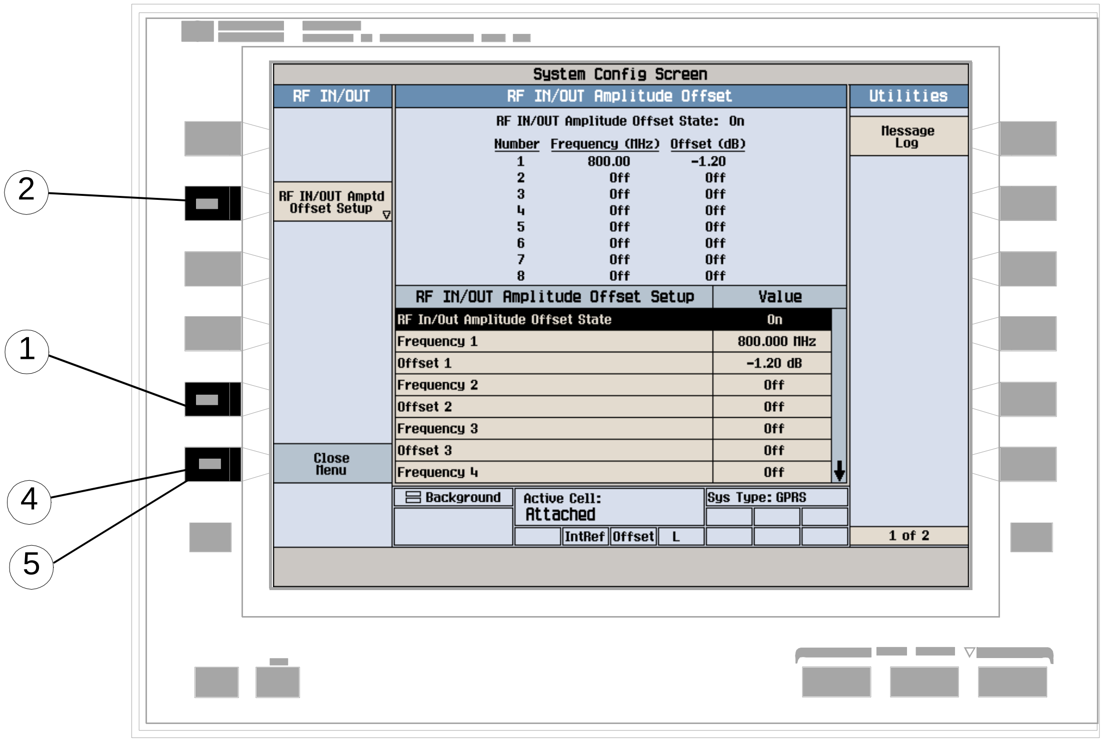
How Do I Configure the Test Set for My Test System in EGPRS?

A. Configure instrument information and setup.



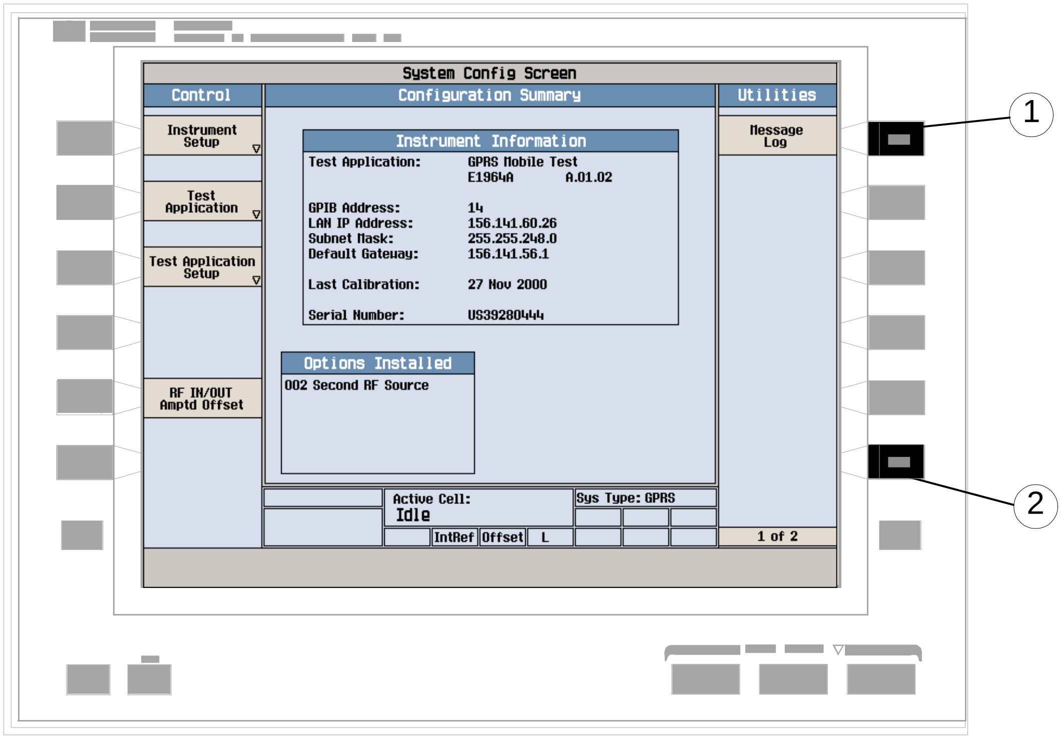
1. Press the **SYSTEM CONFIG** key.
2. Press the `Instrument Setup` (**F1**) key.
3. Adjust an instrument setting and then press the `Close Menu` (**F6**) key.

B. Set amplitude offsets.



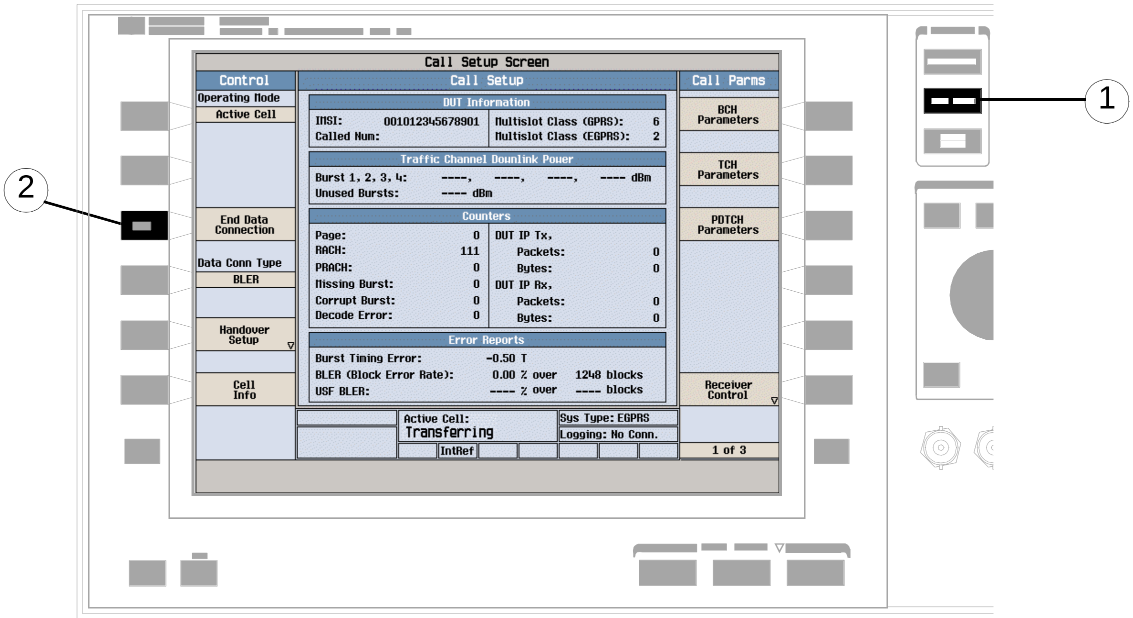
1. On the Configuration Summary screen, press the `RF IN/OUT Amptd Offset` (**F5**) key.
2. On the RF IN/OUT Amplitude Offset screen, press the `RF IN/OUT Amptd Offset Setup` (**F2**) key.
3. Enter the amplitude offsets for the test frequencies you use.
4. Press the `Close Menu` (**F6**) key.
5. Press the `Return` (**F6**) key to return to the Configuration Summary screen.

C. Check the message log.



1. Press the `Message Log` (**F7**) key and view the message log.
2. Press the `Return` (**F12**) key.

How Do I End the EGPRS Data Connection?



1. Press the **CALL SETUP** key.
2. Press the `End Data Connection` (**F3**) key, or end the data connection from the mobile.
3. To ensure the data connection has ended check for `Attached` in the `Active Cell` field.

EGPRS Mobile Measurements

The following step-by-step procedures explain how to perform specific measurements available on the EGPRS Lab Application. A detailed description of each measurement is given in the *Reference* information on the documentation CD-ROM and at the Agilent 8960 support website (http://www.agilent.com/find/8960support/).

Setup parameters for each measurement are assumed to be set to their default (Full preset) values unless otherwise stated.

The following measurement procedures are provided:

- "Measuring EGPRS Transmit Power" on page 1396 (8PSK or GMSK)
- "Measuring Power versus Time" on page 1397 (GMSK Only)
- "Measuring Phase and Frequency Error" on page 1403 (GMSK Only)
- "Measuring Output RF Spectrum" on page 1406 (GMSK Only)
- "Measuring Block Error" on page 1410 (8PSK or GMSK)
- "Measuring IQ Tuning" on page 1411 (GMSK Only)

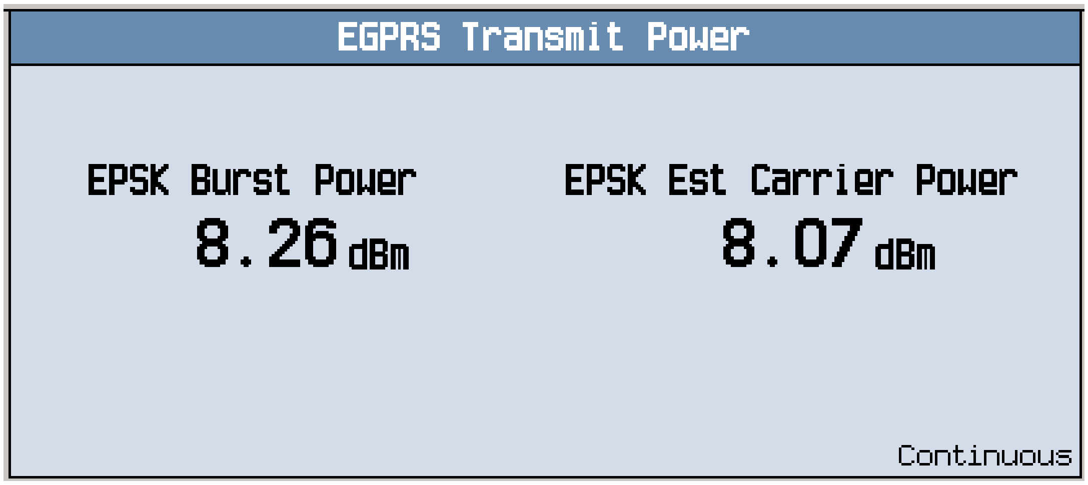
Measuring EGPRS Transmit Power

1. Press the **CALL SETUP** key.
2. Press the `Connection Type` (**F2**) key, and select `BLER`.
3. Connect the mobile.
4. Turn the mobile on and wait for `Attached` in the `Active Cell:` field.

NOTE For mobiles that don't perform an EGPRS attach automatically, set the mobile to data mode.

5. Press the `Start Data Connection` (**F3**) key and watch for the `Active Cell:` field changing to `Transferring`.
6. Press the **Measurement selection** key.
7. Select the `EGPRS Transmit Power` measurement.
8. Press the `EGPRS TX Power Setup` (**F1**) key.

9. You can set the measurement parameters as needed for your measurement situation, for example: `Measurement Timeout = 5.0 s`



A typical 8PSK measurement result is shown above.

Measuring Power versus Time

NOTE When using the Power versus Time measurement with your EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). The Power versus Time measurement does *not* support 8PSK modulation coding schemes at this time (MCS5 through MCS9).

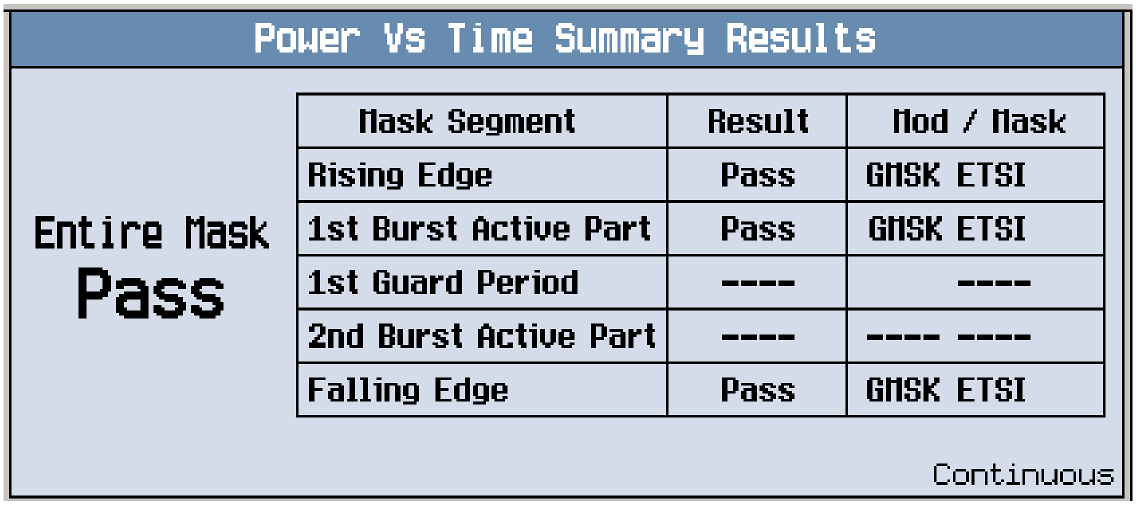
1. Press the **CALL SETUP** key.
2. Press the `Connection Type` (**F2**) key, and select `BLER`.
3. Connect the mobile.
4. Turn the mobile on and wait for `Attached` in the `Active Cell:` field.

NOTE For mobiles that don't perform an EGPRS attach automatically, set the mobile to data mode.

5. Press the `Start Data Connection` (**F3**) key and watch for the `Active Cell:` field changing to `Transferring`.
6. Press the **Measurement selection** key.
7. Select the `Power vs Time` measurement.
8. Press the `Power vs Time Setup (F1)` key.
9. Press the `Measurement Setup (F1)` key.
10. You can set the measurement parameters as needed for your measurement situation, for example: `Measurement Timeout = 10 s`
11. Press the `Burst1 Meas Offsets` (**F2**) key and set up your required time offset values for burst 1.

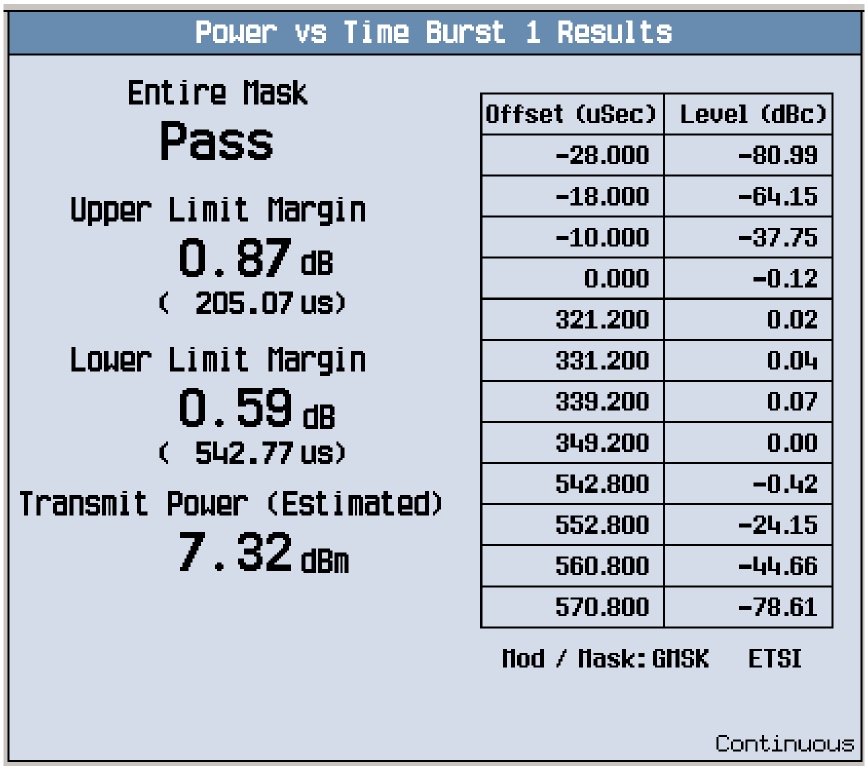
NOTE For statistical analysis the test set allows you to set up to 12 time markers. These markers *do not* define the mask but allow you to obtain measurement results from specified points on the mask. If you want to define your own custom mask, you can do this using the Custom Mask Setup parameters within the `Power vs Time Setup` menu.

12. Press the `Close Menu` (**F6**) key.



A typical summary results screen is shown above.

13. Press the `Return` (**F6**) key.
14. Press the `Change View` (**F2**) key.
15. Press the `Burst 1 numeric Results` (**F2**) key to view the offset measurement results for burst 1.

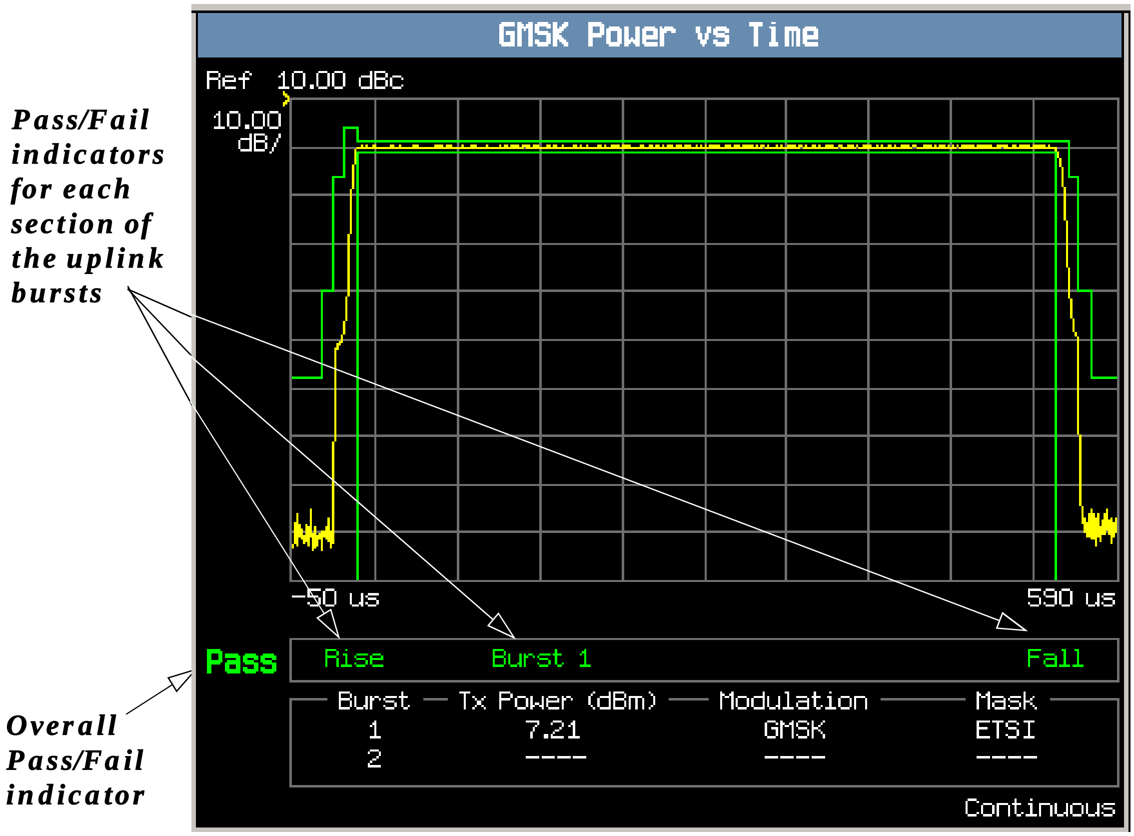


A typical numeric measurement results screen for offsets is shown above.

16. Press the `Graph` (**F4**) key to access the full graph view of the uplink burst.

The structure of the Power versus Time graph menus are slightly different depending on the number of uplink bursts in the multislot configuration. If you require details on how to navigate through the Power versus Time graph menus, see either:

- "Power versus Time Graph Menus (one uplink burst)" on page 1402, or
- "Power versus Time Graph Menus (two uplink bursts)" on page 1403.



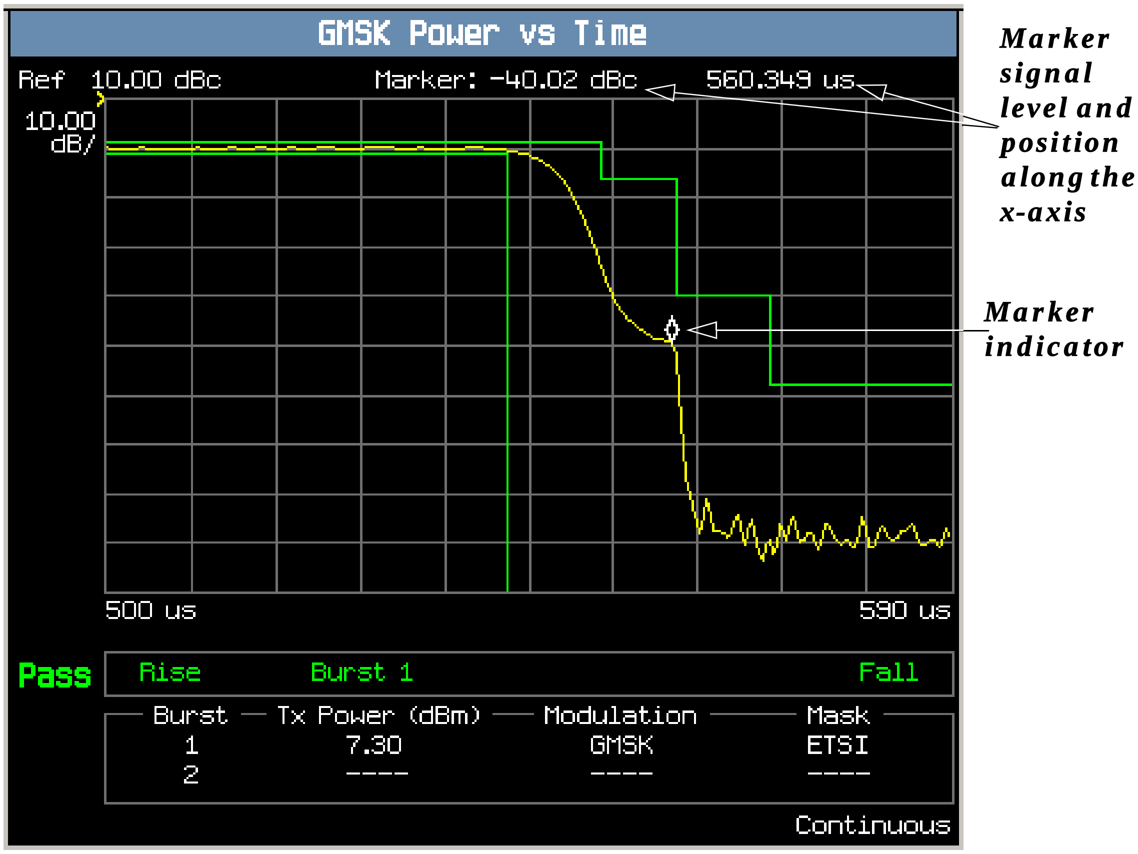
A typical full graph view of a single uplink burst is shown above.

Two types of pass/fail results are provided:

- An overall measurement pass/fail indicator is positioned in the bottom left corner of the display:
  - — The text “Pass” is shown in a green-colored font if the measurement has passed the entire mask.
  - — The text “Fail” is shown in a red-colored font if the measurement has failed any part of the mask.
- Individual pass/fail indicators are provided for each section of the mask. On the display, text labels corresponding to the following sections change color to indicate a pass or fail (green indicates a pass; red indicates a fail):
  - — *Rise* section of burst 1
  - — Active (useful) section of *Burst 1*
  - — *Guard* period between burst 1 and 2 (Note: this indicator is only available if you are measuring two uplinks)
  - — Active (useful) portion of *Burst 2* (Note: this is only available if you are measuring two uplinks)
  - — *Fall* section

NOTE When the Multi-Measurement Count parameter is set to a number greater than 1, it is possible for some, or all of the individual pass/fail indicators to show a pass while the overall pass/fail indicator shows a fail. This is because the individual pass/fail indicators relate to the last of the multi-measurements made, whereas the overall mask pass/fail indicator is an accumulative result from all the multi-measurements made.

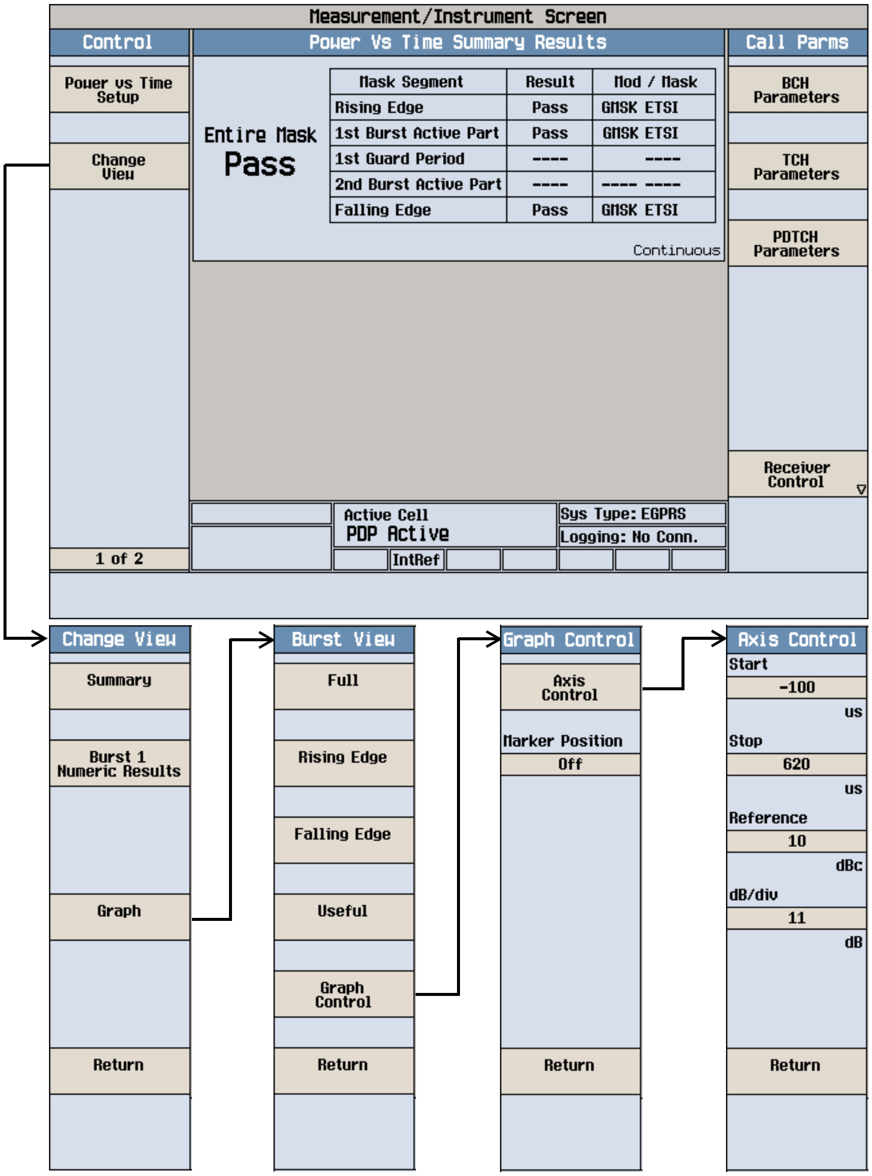
You can zoom in to individual sections of the graph by pressing the `Full` (**F1**), `Rising Edge` (**F2**), `Falling Edge` (**F3**), or `Useful` (**F4**) keys. In addition, you can control a marker or change axis values by pressing the `Graph Control` (**F5**) key.



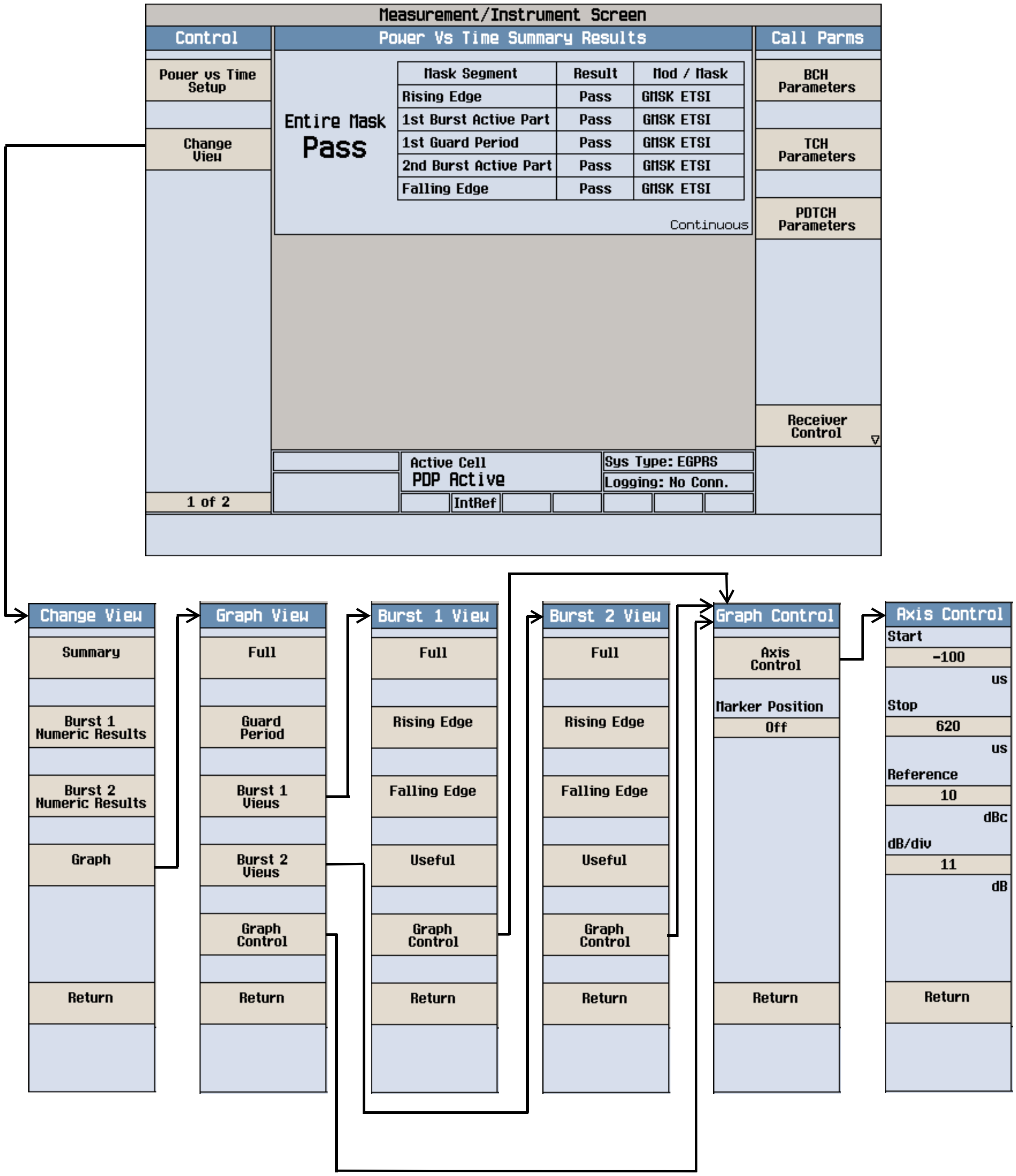
A typical graph view of the falling edge of the uplink burst is shown above. For a single uplink burst configuration, you can access this view by pressing the `Falling Edge` (**F3**) key.

In this case, the marker is turned on and positioned on the falling edge. The marker can be turned on by pressing the `Graph Control` (**F5**) key then the `Marker Position` (**F2**) key. Set the required marker position using the knob or the numeric entry keys. The signal level at the marker and its position along the x-axis are shown at the top of the display above the graph.

Power versus Time Graph Menus (one uplink burst)



Power versus Time Graph Menus (two uplink bursts)



Measuring Phase and Frequency Error

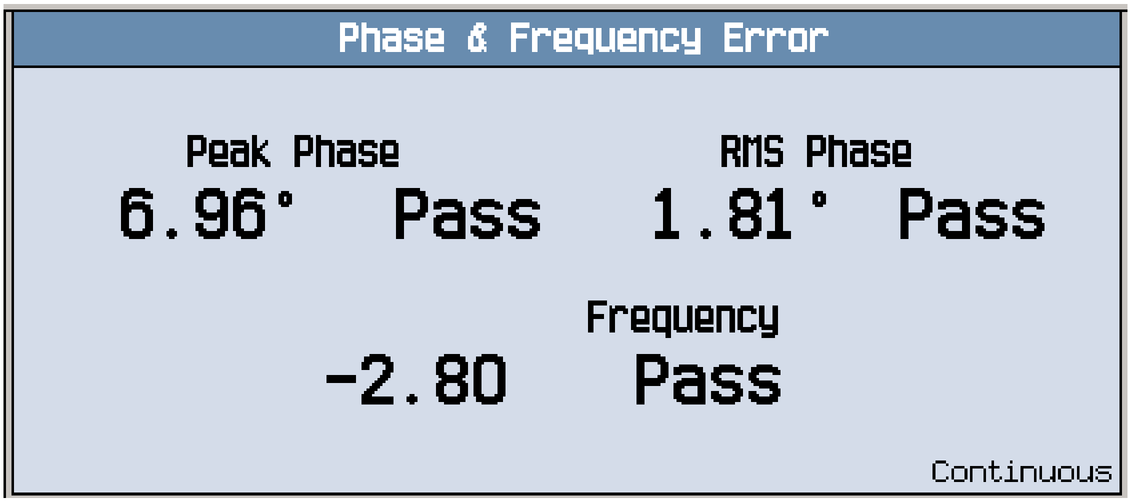
NOTE When using the Phase and Frequency measurement with your EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). The Phase and Frequency measurement does *not* support 8PSK modulation coding schemes at this time (MCS5 through MCS9).

---

1. Press the **CALL SETUP** key.
2. Press the `Connection Type` (**F2**) key, and select BLER.
3. Connect the mobile.
4. Turn the mobile on and wait for `Attached` in the `Active Cell:` field.

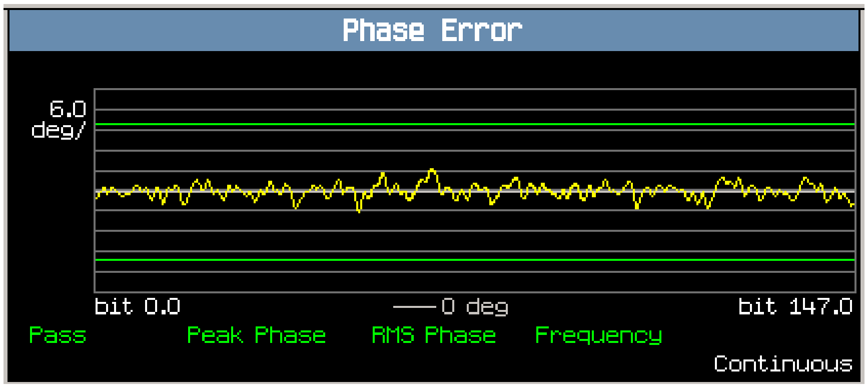
NOTE For mobiles that don't perform an EGPRS attach automatically, set the mobile to data mode.

5. Press the `Start Data Connection` (**F3**) key and watch for the `Active Cell:` field changing to `Transferring`.
6. Press the **Measurement selection** key.
7. Select the `Phase & Frequency Error` measurement.
8. Press the `Phase & Freq. Setup` (**F1**) key.
9. You can set the measurement parameters as needed for your measurement situation, for example: `Measurement Timeout = 10 s`



A typical phase and frequency error measurement result is shown above.

10. Press the `Change View` (**F2**) key.
11. Press the `Graph` (**F2**) key to access the peak phase error graph.

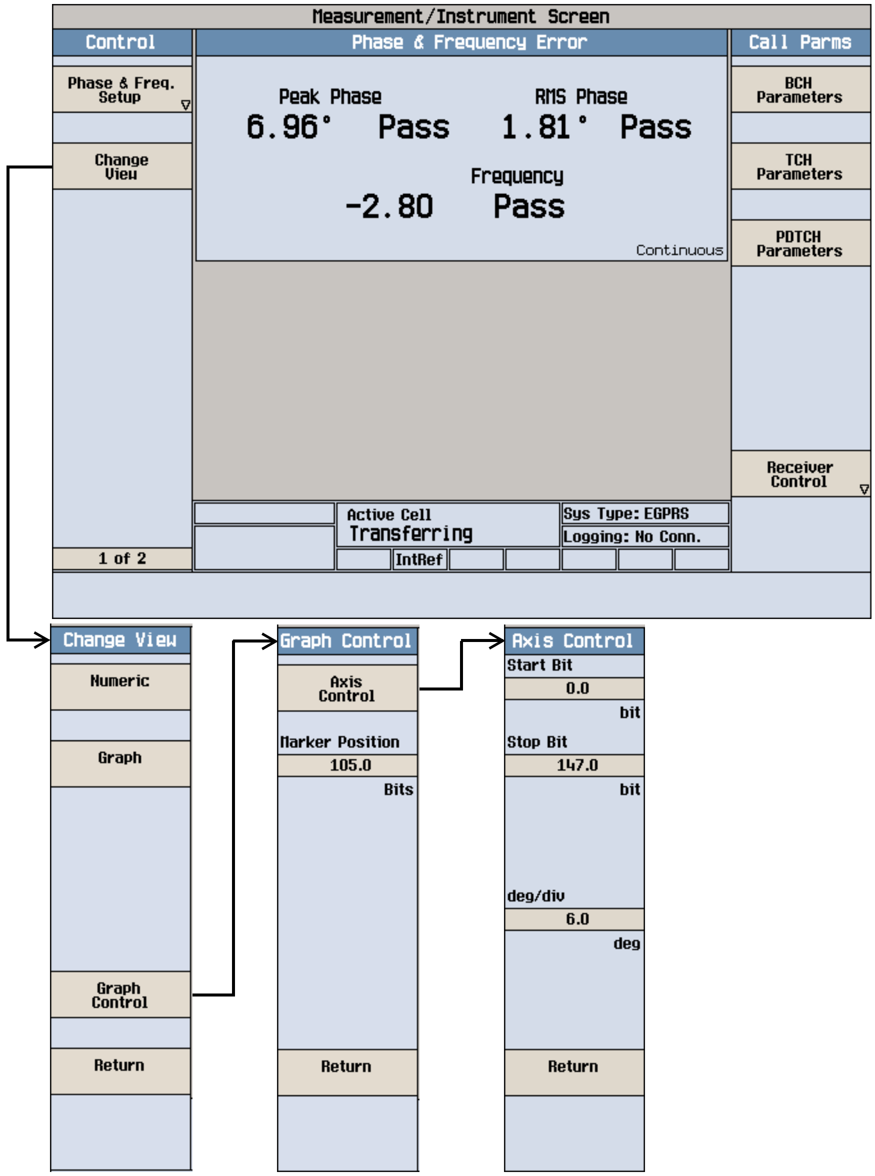


A typical phase error graph is shown above.

The marker can be turned on by pressing the `Graph Control` (**F5**) key then the `Marker Position` (**F2**) key. Set the required marker position using the knob or the numeric entry keys. In addition, the axis values can be changed by pressing the `Axis Control` (**F1**) key. This allows you to zoom in or out to look at particular sections of the graph in more detail.

If you require details on how to navigate through the phase and frequency error graph menus, see "Phase and Frequency Error Graph Menus" on page 1405.

Phase and Frequency Error Graph Menus



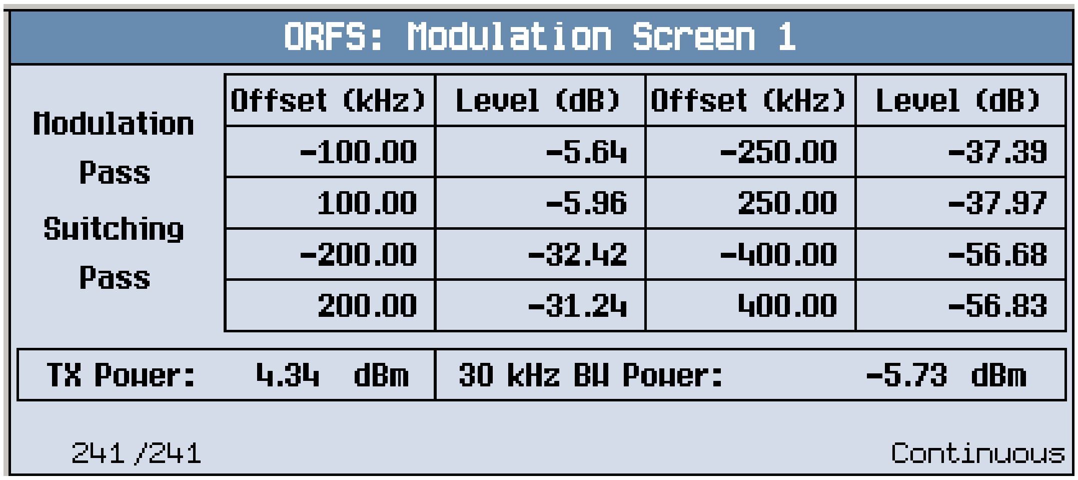
Measuring Output RF Spectrum

NOTE When using the Output RF Spectrum measurement with your EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). The Output RF Spectrum measurement does *not* support 8PSK modulation coding schemes at this time (MCS5 through MCS9).

1. Press the **CALL SETUP** key.
2. Press the `Connection Type` (**F2**) key, and select `BLER`.
3. Connect the mobile.
4. Turn the mobile on and wait for `Attached` in the `Active Cell:` field.

NOTE For mobiles that don't perform an EGPRS attach automatically, set the mobile to data mode.

5. Press the `Start Data Connection` (**F3**) key and watch for the `Active Cell:` field changing to `Transferring`.
6. Press the **Measurement selection** key.
7. Select the `Output RF Spectrum` measurement.
8. Press the `ORFS Setup` (**F1**) key.
9. Press the `Measurement Setup` (**F1**) key.
10. You can set the measurement parameters as needed for your measurement, for example: `Measurement Timeout = 20 s.`
11. Press the `Modulation Frequencies` (**F2**) key and set up your required offset frequencies for ORFS due to modulation.
12. Press the `Switching Frequencies` (**F3**) key and set up your required offset frequencies for ORFS due to switching.
13. Press the `Close Menu` (**F6**) key.
14. Press the `Return` (**F6**) key.
15. Press the `Change View` (**F2**) key.
16. Press the `Modulation Numeric 1 of 3` (**F1**) key.



ORFS: Modulation Screen 1

Modulation Pass

Switching Pass

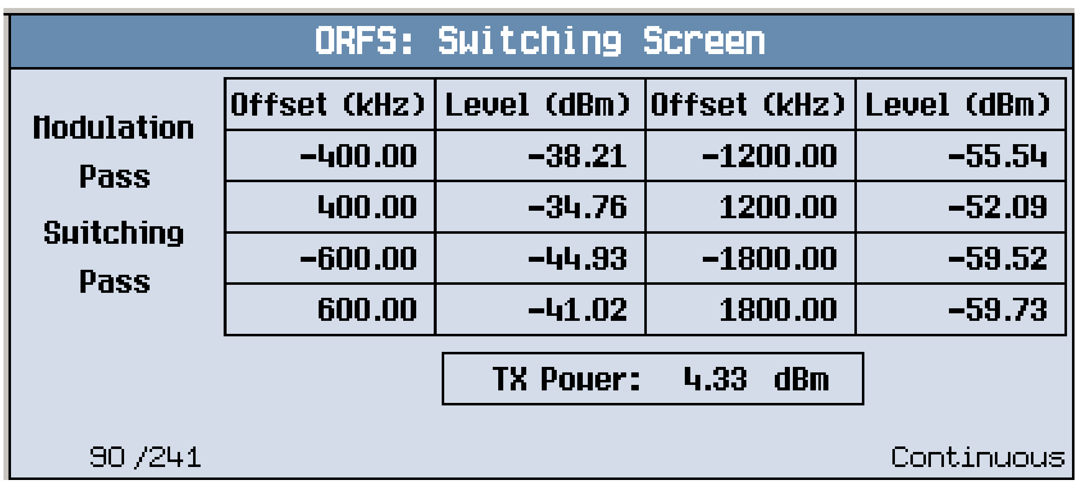
Offset (kHz)	Level (dB)	Offset (kHz)	Level (dB)
-100.00	-5.64	-250.00	-37.39
100.00	-5.96	250.00	-37.97
-200.00	-32.42	-400.00	-56.68
200.00	-31.24	400.00	-56.83

TX Power: 4.34 dBm	30 kHz BW Power: -5.73 dBm

241 /241 Continuous

The measurement results for the first eight positions in the ORFS due to modulation table are displayed. You can view the results for the remaining 14 positions by pressing the `Modulation Numeric 2 of 3` (**F2**) key or the `Modulation Numeric 3 of 3` (**F3**) key. Note that the results are in dB relative to the `30 kHz BW Power` shown on the screen.

17. Press the `Switching Numeric` (**F4**) key to display the measurement results for ORFS due to switching.



ORFS: Switching Screen

Modulation Pass

Switching Pass

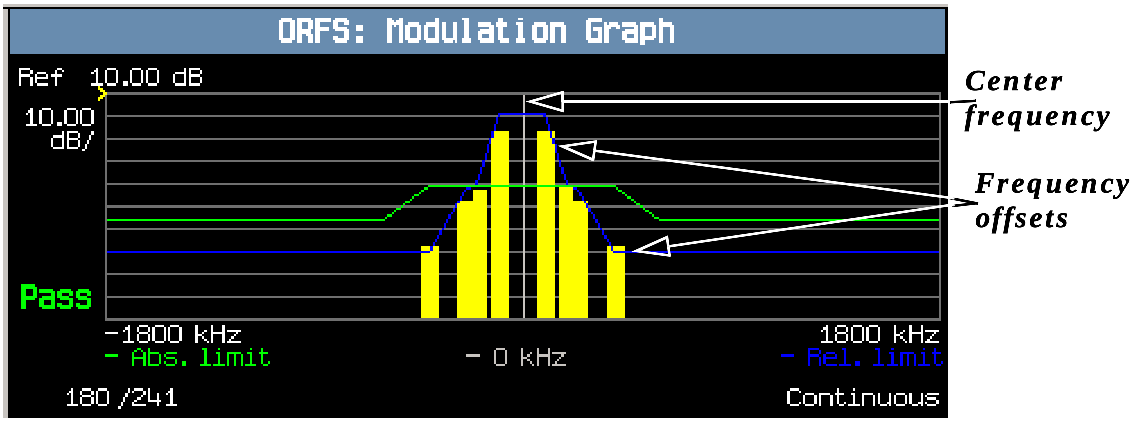
Offset (kHz)	Level (dBm)	Offset (kHz)	Level (dBm)
-400.00	-38.21	-1200.00	-55.54
400.00	-34.76	1200.00	-52.09
-600.00	-44.93	-1800.00	-59.52
600.00	-41.02	1800.00	-59.73

TX Power: 4.33 dBm

90 /241 Continuous

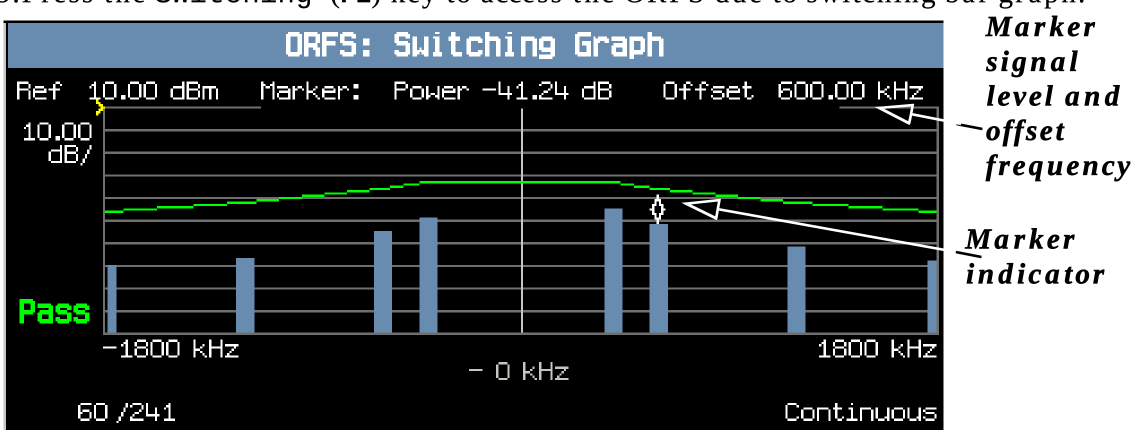
A typical measurement results screen for ORFS due to switching is shown above.

18. Press the `Graph` (**F5**) key then the `Modulation` (**F1**) key to access the ORFS due to modulation bar graph.



A typical ORFS due to modulation graph is shown above. On the display, the bar representing each offset is shown in yellow and the center frequency is indicated by a white vertical line. There are two limit lines displayed; the absolute limit line is green and the relative limit line is blue. The pass/fail result is relevant to the displayed measurement.

19. Press the `Switching` (**F2**) key to access the ORFS due to switching bar graph.

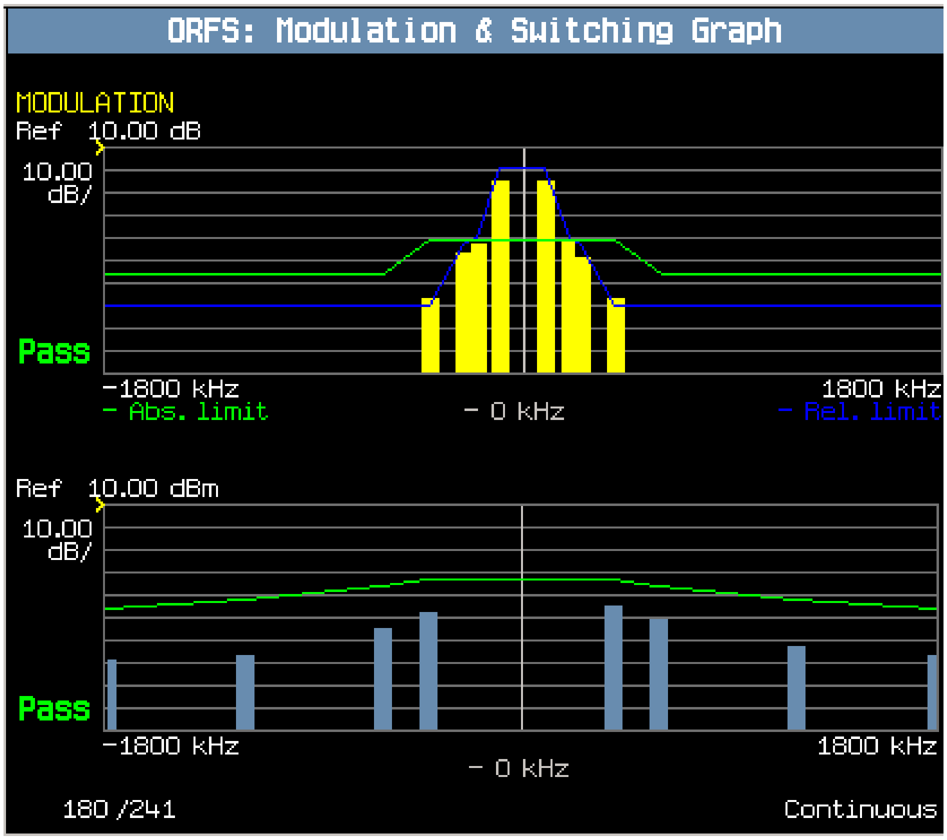


A typical ORFS due to switching graph is shown above. On the display, the bar representing each offset is shown in blue and the center frequency is indicated by a white vertical line.

In this case, the marker is turned on and positioned at the 600 kHz offset. The signal level and frequency of the offset where the marker is positioned, are shown at the top of the display above the graph.

The marker can be turned on by pressing the `Graph Control` (**F5**) key then the `Marker Position` (**F2**) key. Set the required marker position using the knob or the numeric entry keys. In addition, the axis values can be changed by pressing the `Axis Control` (**F1**) key. This allows you to zoom in or out to look at particular sections of the graph in more detail.

20. Press the `Modulation and Switching` (**F3**) key to access a screen displaying both graphs, as shown in the example below.



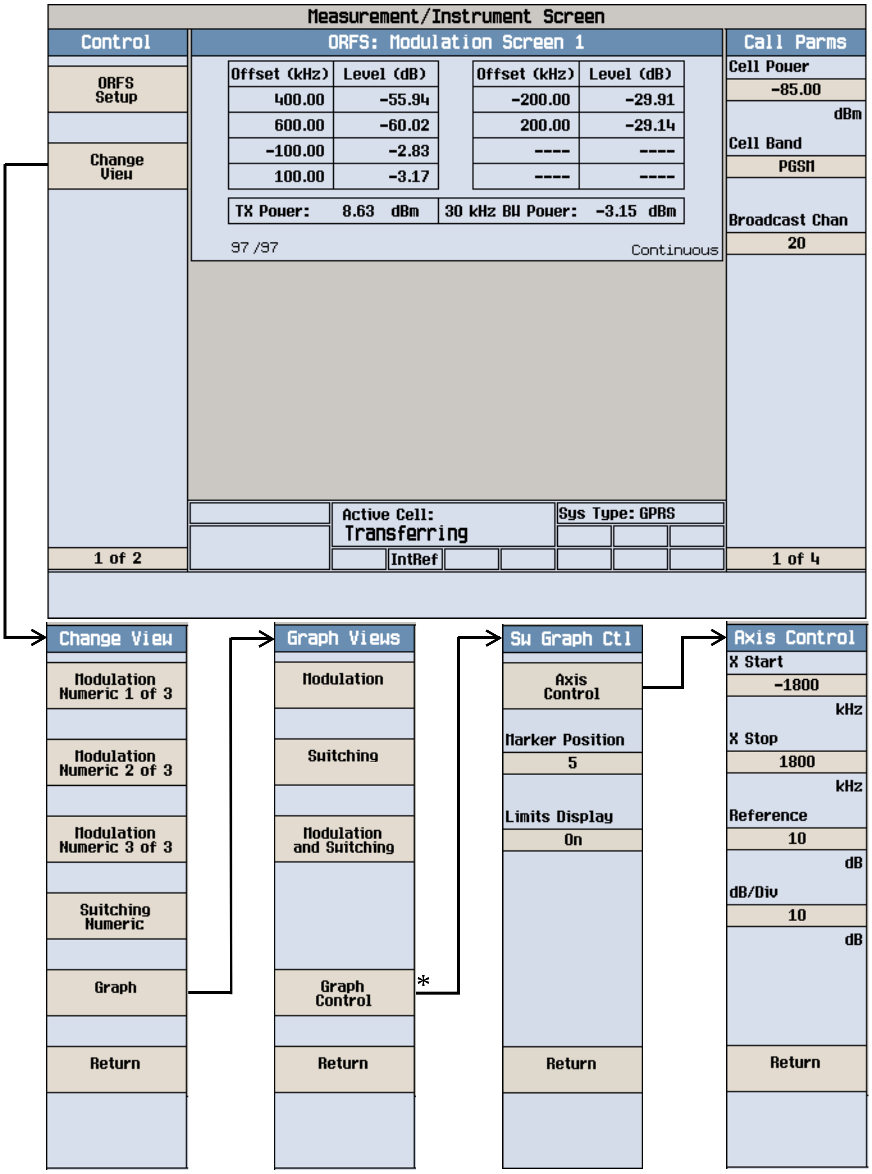
Note that each of the graphs have their own graph controls on **F4** and **F5**.

Any failing results are displayed in red.

If you require details on how to navigate through the Output RF Spectrum graph menus, see "Output RF Spectrum Graph Menus" on page 1410.

21. To set your own limits for each offset use the Measurement Setup menu and set `Limit Source` to `Manual`. You can then use `Modulation Limits` (**F4**) and `Switching Limits` (**F5**) to set your required limits for each offset.

Output RF Spectrum Graph Menus



* May show 2 Graph Control keys

Measuring Block Error

NOTE Block error (BLER) measurements cannot be run concurrently with GPRS bit error (GBER) measurements. Starting a BLER measurement while a GPRS bit error measurement is currently running, closes the GPRS bit error measurement.

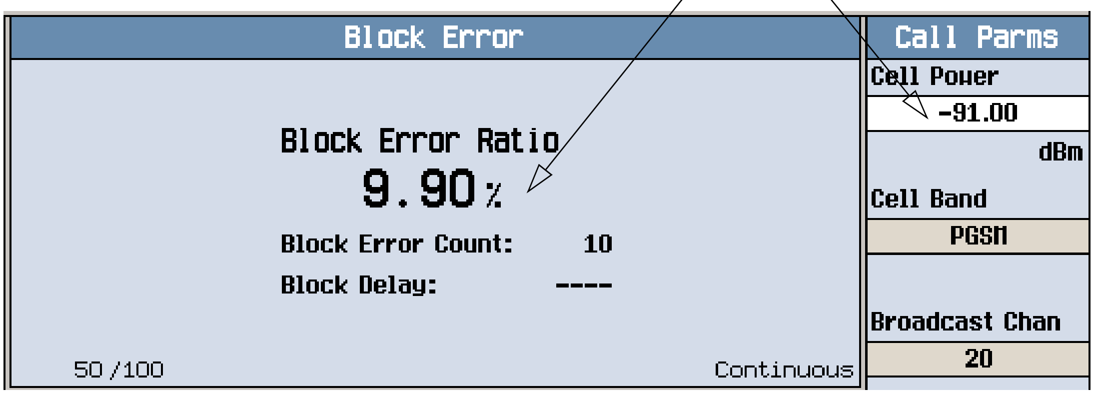
---

1. Press the **CALL SETUP** key.
2. Press the `Connection Type` (**F2**) key, and select BLER.
3. Connect the mobile.
4. Turn the mobile on and wait for `Attached` in the `Active Cell:` field.

NOTE For mobiles that don't perform an EGPRS attach automatically, set the mobile to data mode.

5. Press the `Start Data Connection` (**F3**) key and watch for the `Active Cell:` field changing to `Transferring`.
6. Press the **Measurement selection** key.
7. Select the `Block Error` measurement.
8. Press the `Block Error Setup` (**F1**) key.
9. You can set the measurement parameters as needed for your measurement situation, for example:
   `Measurement Timeout = 13.0 s`
   `Number of blocks to test = 100`

Observe how reducing the cell power affects the block error ratio.



A typical block error measurement result is shown above.

To see the effect of cell power on the block error, press the `BCH Parameters` (**F7**) key, and the `Cell Power` (**F7**) key. Slowly reduce the cell power while observing the Block Error Ratio display.

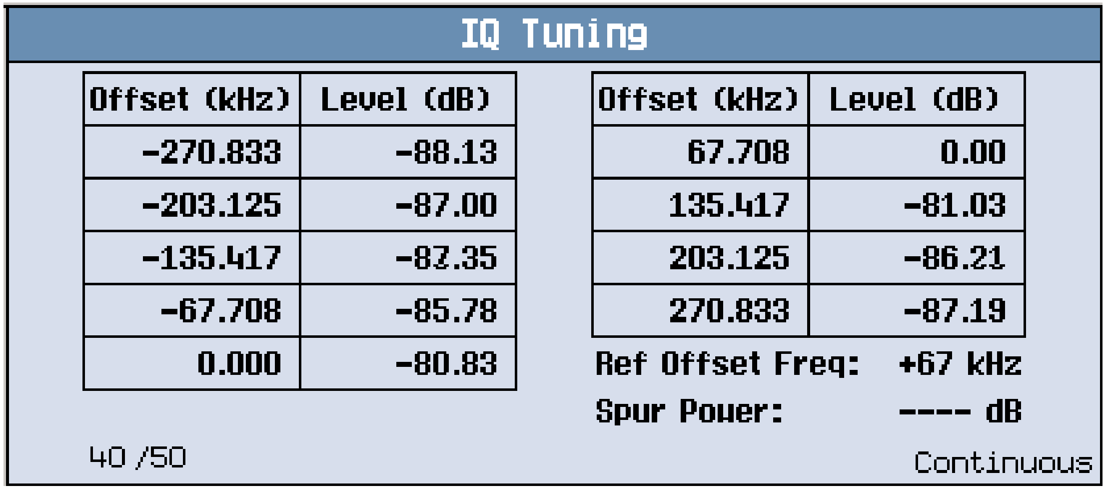
Measuring IQ Tuning

NOTE When using the IQ Tuning measurement with your EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). The IQ Tuning measurement does *not* support 8PSK modulation coding schemes (MCS5 through MCS9).

This measurement can only be performed with your mobile in test mode and transmitting either all ones or all zeros.

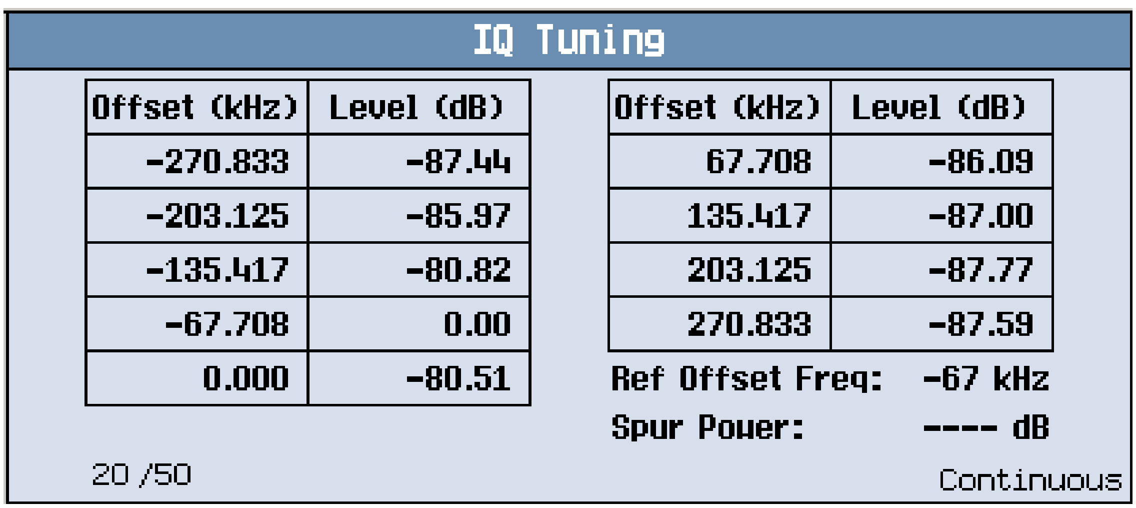
1. Press the **Measurement selection** key.
2. Select the `IQ Tuning` measurement.
3. Press the `Receiver Control` (**F12**) key and set the `Expected Power Control` to `Manual`.

4. Select `Manual Power Burst 1` and set the expected power level from your mobile.
5. Press the `IQ Tuning Setup` (**F1**) key.
6. You can set the measurement parameters as needed for your measurement, for example:
   `Multi-Measurement Count = 50`
   `Trigger Source = Immediate`
7. Switch on your mobile and set it to transmit a series of all zeros.



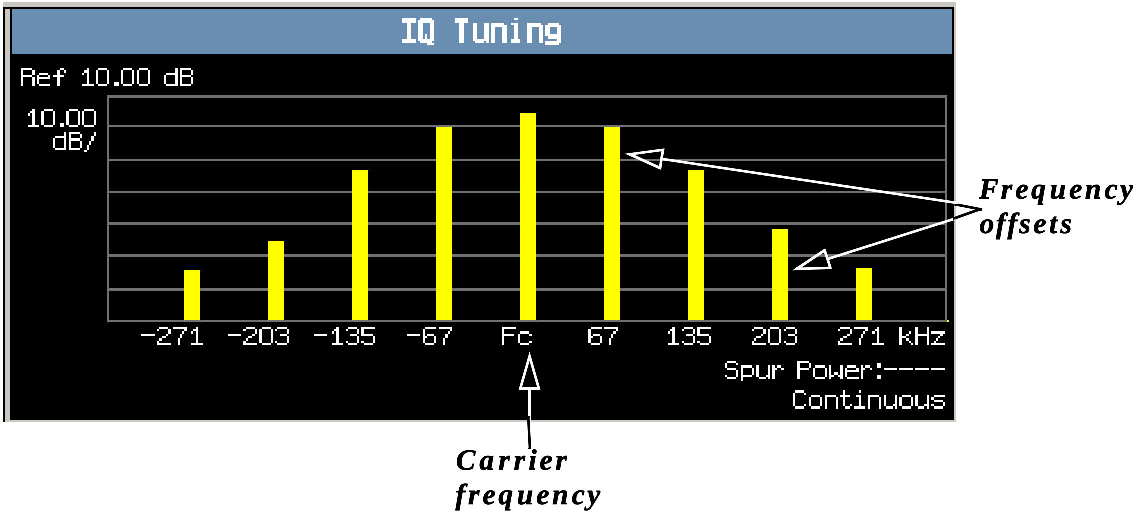
The results are displayed on the IQ Tuning screen. Notice that when the mobile is transmitting a series of all zeros the carrier offset is at +67.708 kHz.

8. Change the settings on the mobile to transmit a series of all ones.



The results are displayed on the IQ Tuning screen. Notice that when the mobile is transmitting a series of all ones the carrier offset is at -67.708 kHz.

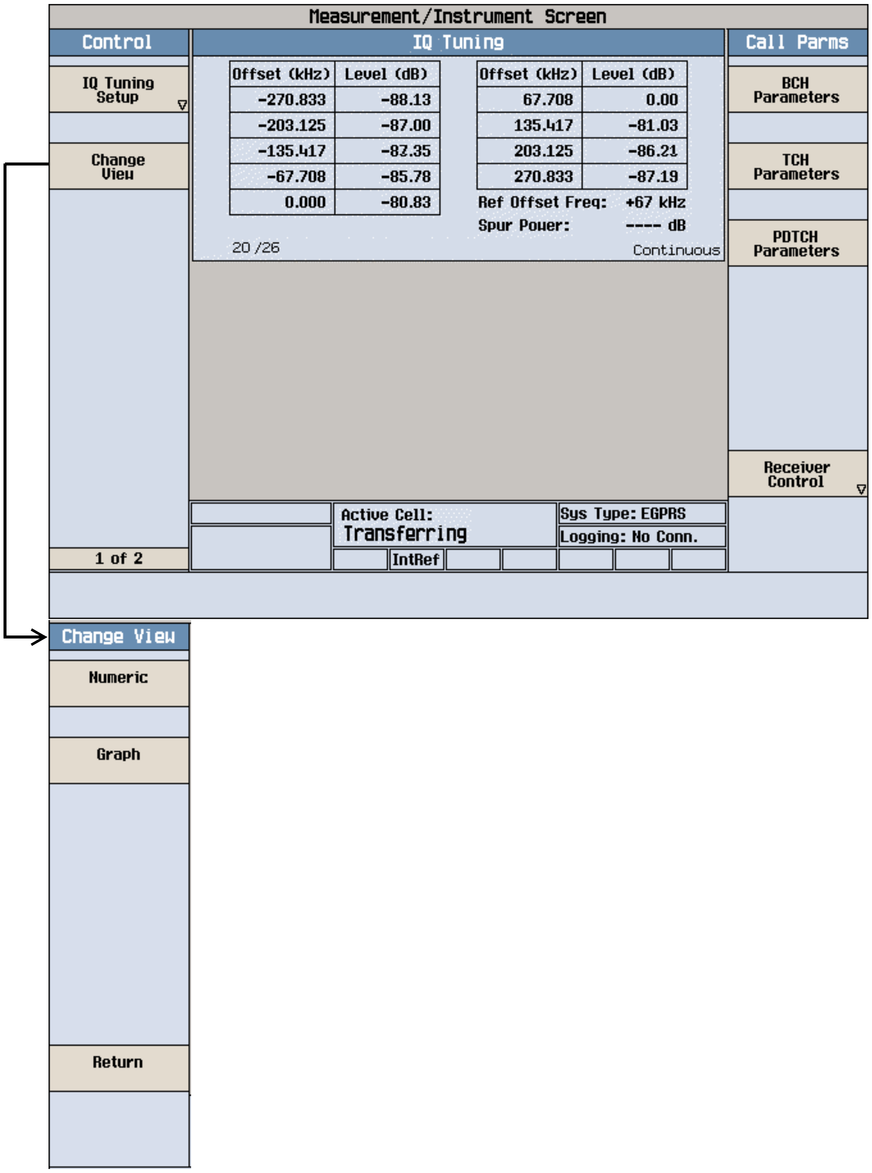
9. Press the `Graph` (**F2**) key to access the IQ Tuning bar graph.



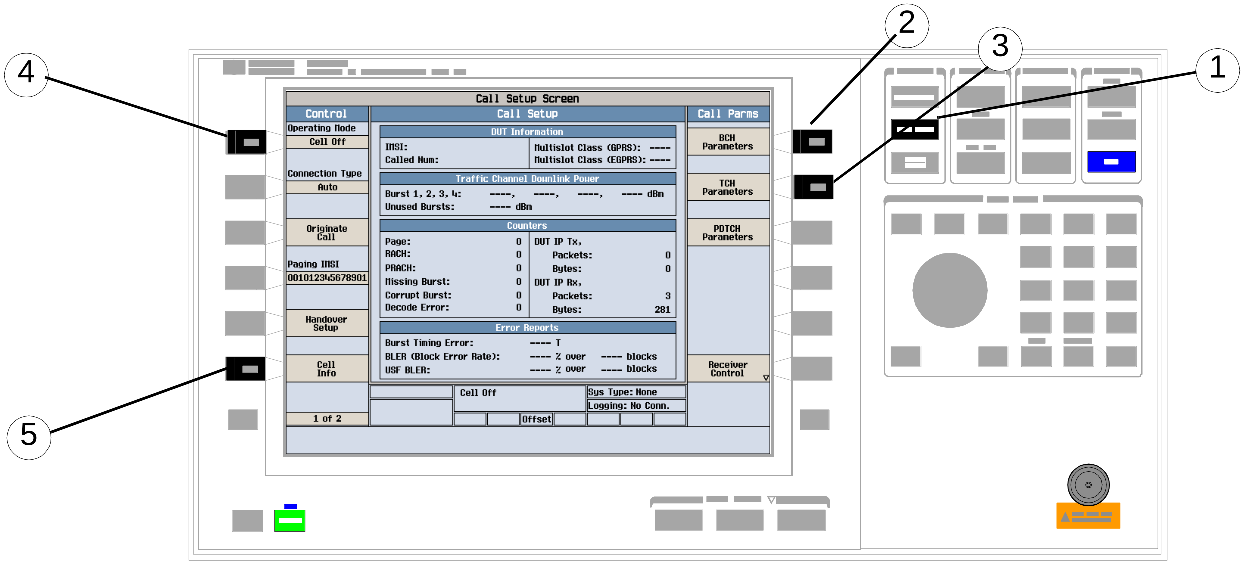
A typical IQ Tuning graph is shown above. On the display, the bar representing each offset and the carrier frequency (Fc) is shown in yellow.

If you require details on how to navigate through the IQ Tuning graph menus, see "IQ Tuning Graph Menus" on page 1414.

IQ Tuning Graph Menus



How to Configure Access Burst Power Control

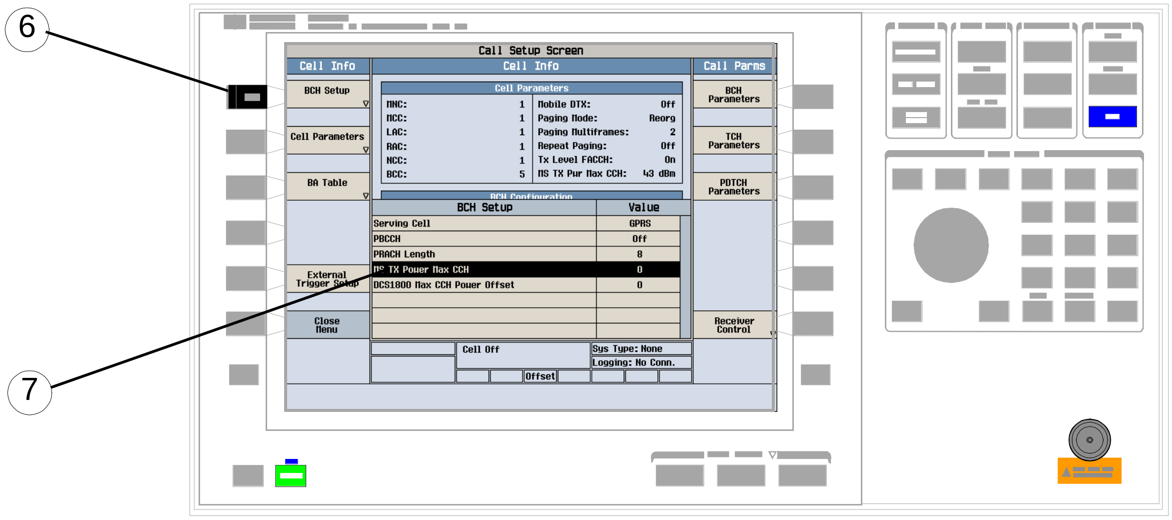


1. Press the **Call Setup** key.
2. Press BCH Parameters (F7). The menu on the right now displays the BCH Parms.
3. Press Cell Band (F8) and select the appropriate cell band from the popup menu.

NOTE If you selected DCS, please see “How to Configure Access Burst Power Control for DCS” on page 1418 for configuration instructions for the DCS 1800 band.

---

4. Press `Operating Mode` (**F1**) and select `Cell Off` from the popup menu. The configurable parameters for controlling access burst power are only available when the test set’s operating mode is `Cell Off`.
5. Select `Cell Info` (**F6**).

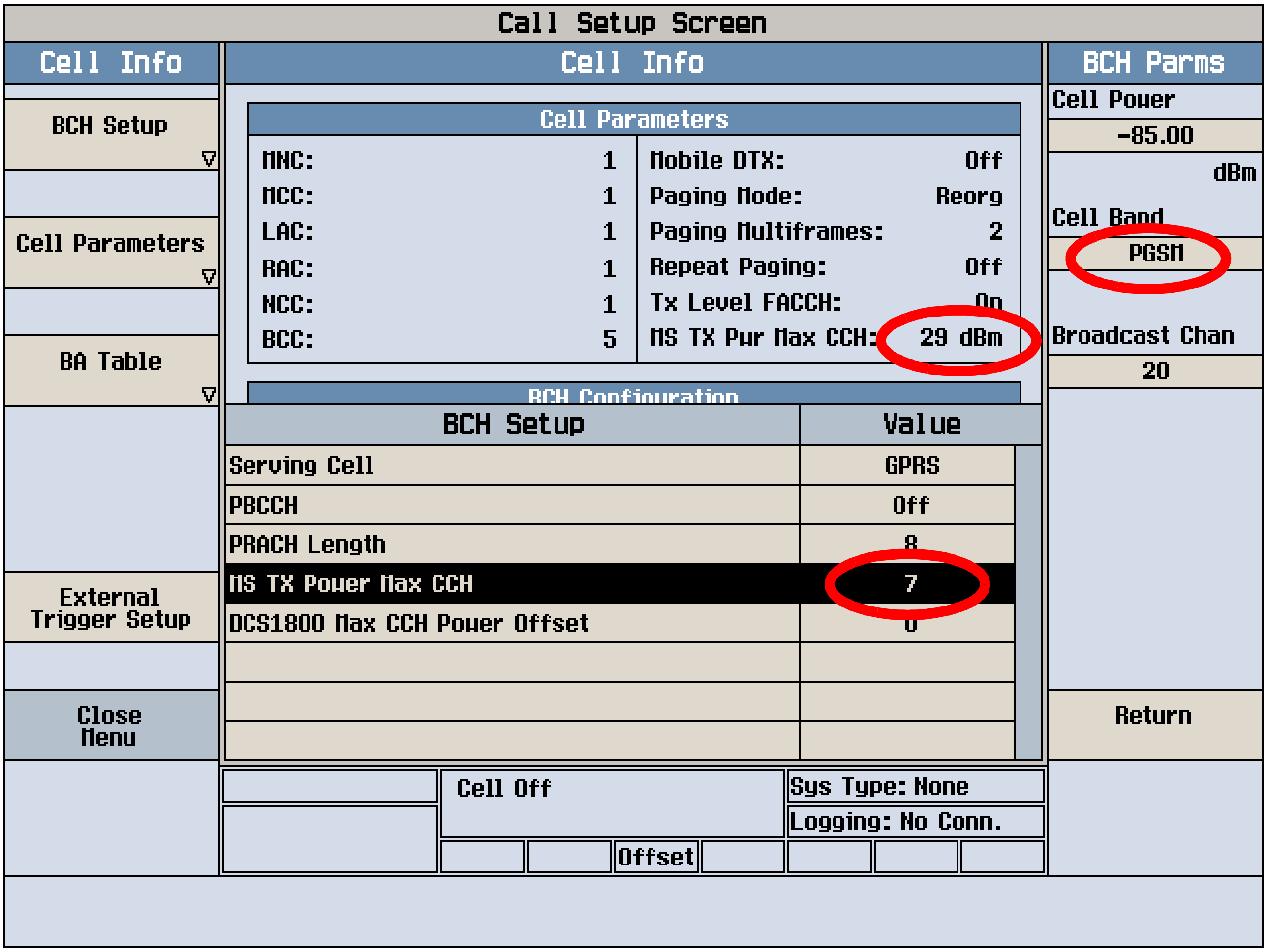


6. Select `BCH Setup` (**F1**). This displays the Cell parameters that are configured during the inital setup of the test set, before establishing a connection with the mobile station.

NOTE All the parameters are available. If the operating mode was set to `Active Cell`, most of these parameters would be greyed out.

---

7. Scroll to `MS TX Power Max CCH` and select it. The parameter area should become white.
8. Scroll or use the keypad to enter the power level you want. Once you've entered a new value, notice that the value of MS TX Pwr Max CCH in the `Cell Parameters` area of the display changes to match the power level you've specified.



For PGSM, power level 7 is 29 dBm.

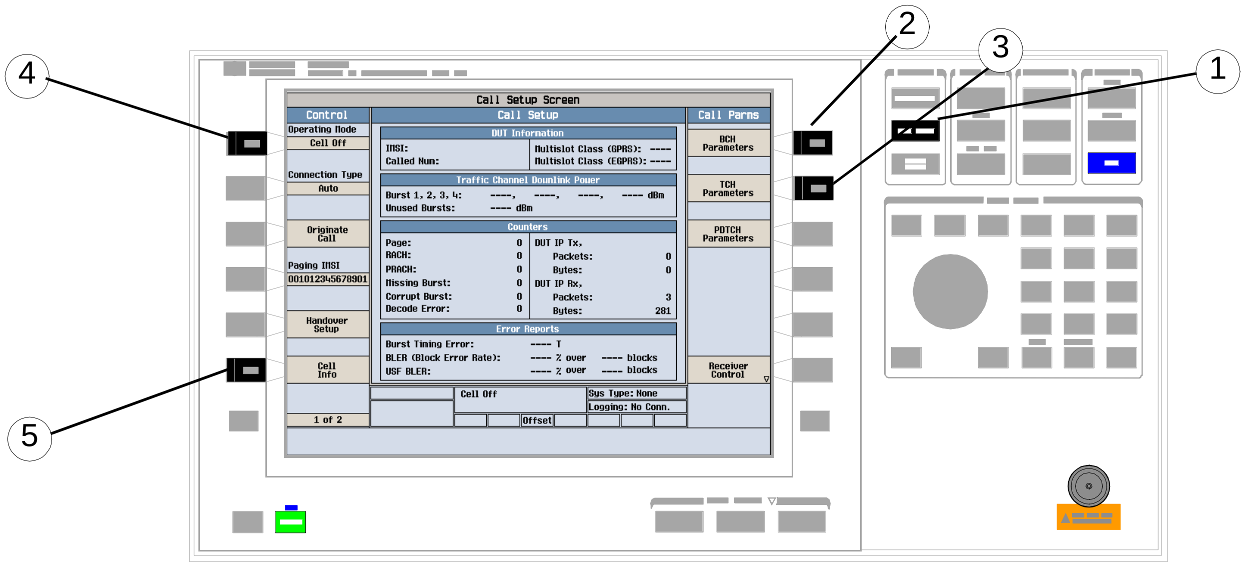
Therefore, the maximum power the mobile station is allowed to transmit on the control channel is 29 dBm.

9. Press `Close Menu` (**F6**) and then `Return` (**F6**).
10. Press `Operating Mode` (**F1**) and select `Active Cell` from the popup menu.

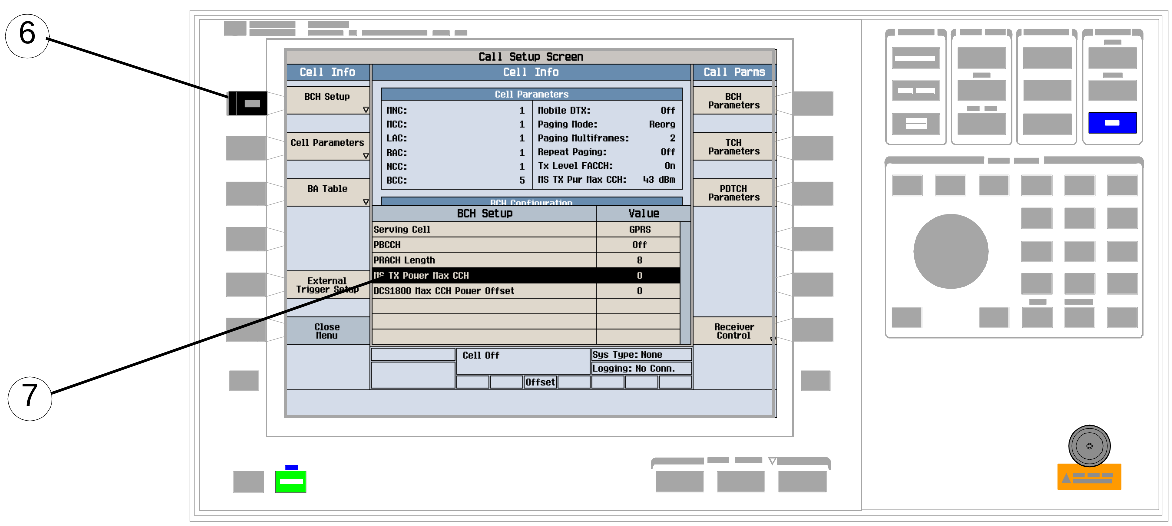
Related Links

"Access Burst Power Control" on page 192

How to Configure Access Burst Power Control for DCS



1. Press the **Call Setup** key.
2. Press BCH Parameters (F7). The menu on the right now displays the BCH Parms.
3. Press Cell Band (F8) and select `DCS` from the popup menu.
4. Press `Operating Mode` (**F1**) and select `Cell Off` from the popup menu. The configurable parameters for controlling access burst power are only available when the test set's operating mode is `Cell Off`.
5. Select `Cell Info` (**F6**).



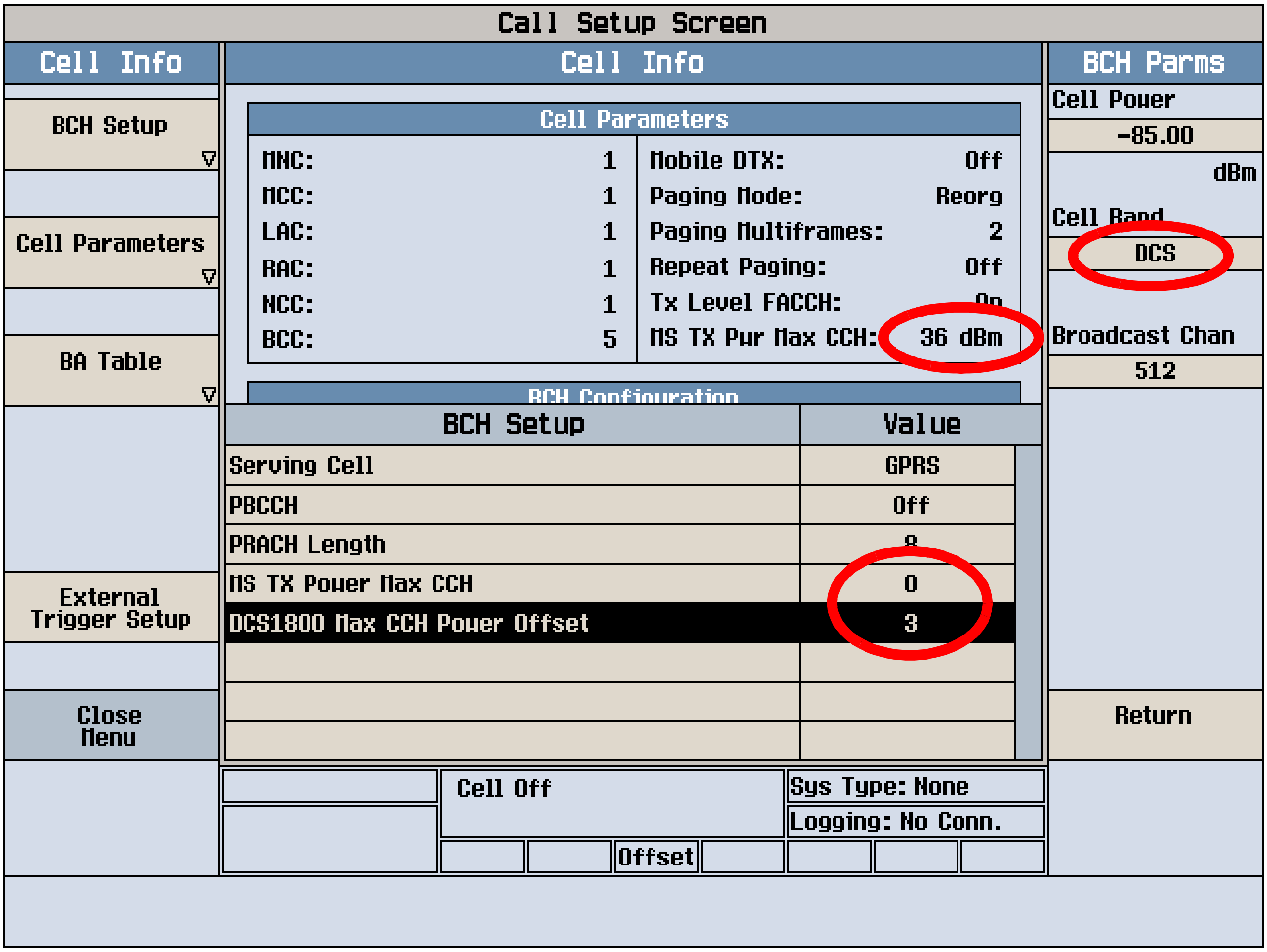
6. Select `BCH Setup` (**F1**). This displays the Cell parameters that are configured during the inital setup of the test set, before establishing a connection with the mobile station.

NOTE All the parameters are available. If the operating mode was set to `Active Cell`, most of these parameters would be greyed out.

7. Scroll to `MS TX Power Max CCH` and select it. The parameter area should become white.
8. Scroll or use the keypad to enter the power level you want.
Once you've entered a new value, notice that the value of MS TX Pwr Max CCH in the `Cell Parameters` area of the display changes to match the power level you've specified.

NOTE If you want to set the power to correspond to levels 29, 30, or 31, leave the MS TX Pwr Max CCH parameter set at 0.

9. Scroll to `DCS1800 Max CCH Power Offset` and select it. The parameter area should become white.
10. Scroll to or use the keypad to enter the value you want. See "DCS1800 Max CCH Power Offset" on page 192 for more information.
Once you've entered a value, notice that the value of MS TX Pwr Max CCH in the `Cell Parameters` area of the display changes according to the value you've chosen.



For DCS, power level 0 is 30 dBm. Setting the DCS 1800 Max CCH Power Offset to 3 corresponds to a 6 dB offset.

Therefore, the maximum power the mobile station is allowed to transmit on the control channel is 36 dBm.

11. Press `Close Menu` (**F6**) and then `Return` (**F6**).
12. Press `Operating Mode` (**F1**) and select `Active Cell` from the popup menu.

How to use Allocation Control

You can configure the medium access mode used and the associated parameters from the front panel using the following procedures.

Fixed Allocation

1. Press the **Call Setup** key.
2. Press Conn Type (**F4**) on Control menu (1 of 1).
3. Select Auto from the list.
4. Press the left **More** key to advance to Control menu (2 of 2).
5. Select Protocol Control (**F4**).
6. Select RLC/MAC (**F1**).
7. Select Allocation Control (**F2**).
8. Select Medium Access Mode.
9. Select Fixed from the list.

Maximum Octet Allocation

The Maximum Octet Allocation can also be changed on the Allocation Control menu.

1. Select Maximum Octet Allocation.
2. Enter a number.

Dynamic Allocation

1. Press the **Call Setup** key.
2. Press the left **More** key to advance to Control menu (2 of 2).
3. Select Protocol Control (**F4**).
4. Select RLC/MAC (**F1**).
5. Select Allocation Control (**F2**).
6. Select Medium Access Mode.
7. Select Dynamic from the list.

Changing the value of the Uplink State Flag (USF)

You can also change the uplink state flag value from the Allocation Control menu.

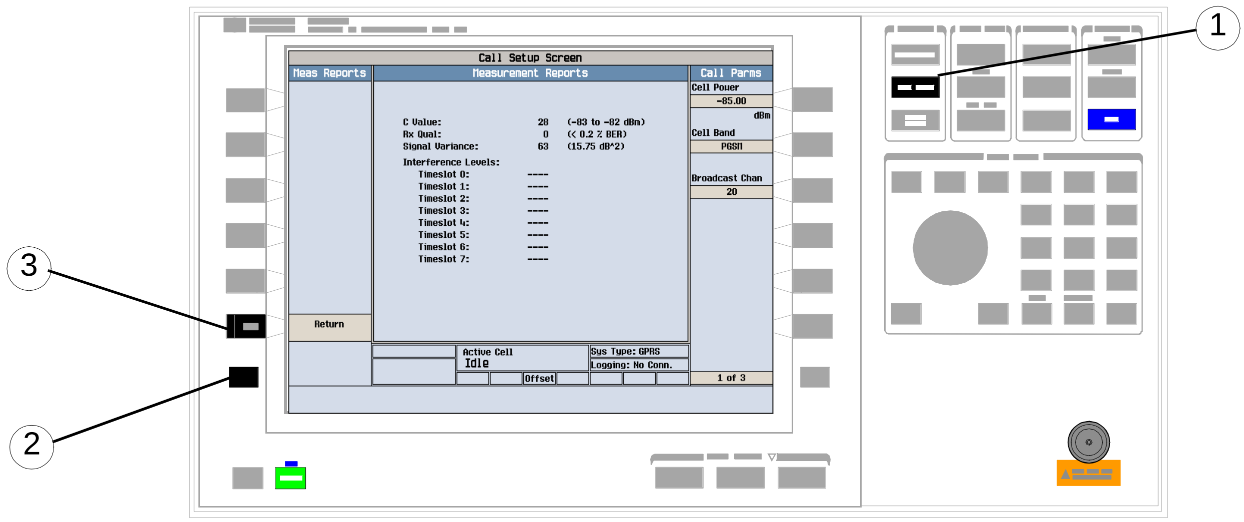
1. Select Uplink State Flag.
2. Enter a number.

NOTE After you begin transferring data, you may prefer to change the USF using a handover. See “Uplink State Flag (USF)” on page 213 for the procedure.

Related Links

- “Medium Access Control Mode” on page 211

How to view Measurement Reports



1. Press the **Call Setup** key.
2. Press the left **More** key to advance the `Control` menu to (`2 of 2`).
3. Select `Measurement Reports(`**F6**`)`. The `Measurement Reports` screen shall display.

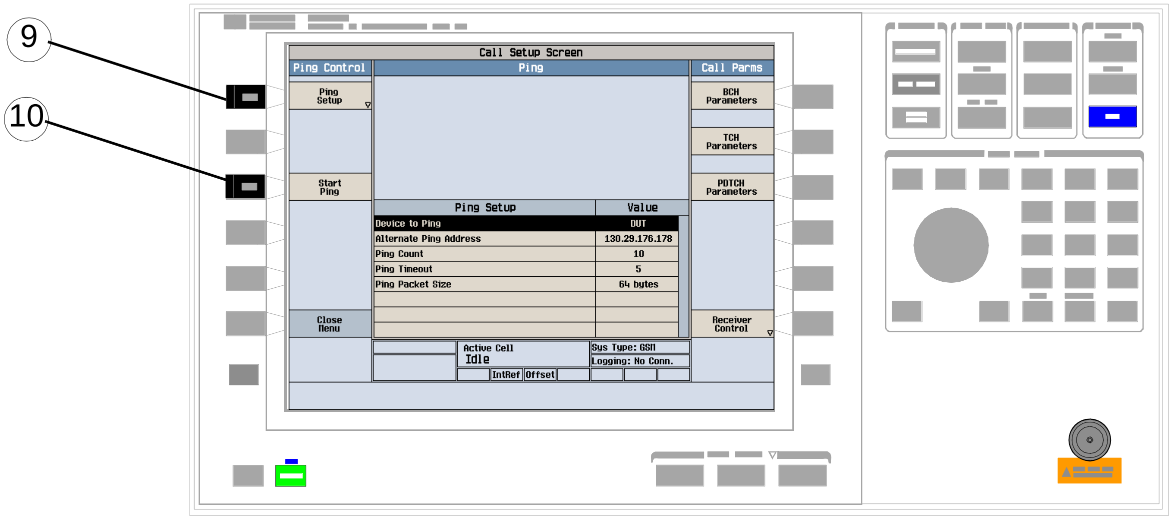
How to “ping” an IP address from the test set

This section is only applicable to the lab applications.

You can use the ping feature of the test set to:

- “Ping the DUT from the test set” on page 1424
- “Ping an alternate address from the test set” on page 1425

Ping the DUT from the test set

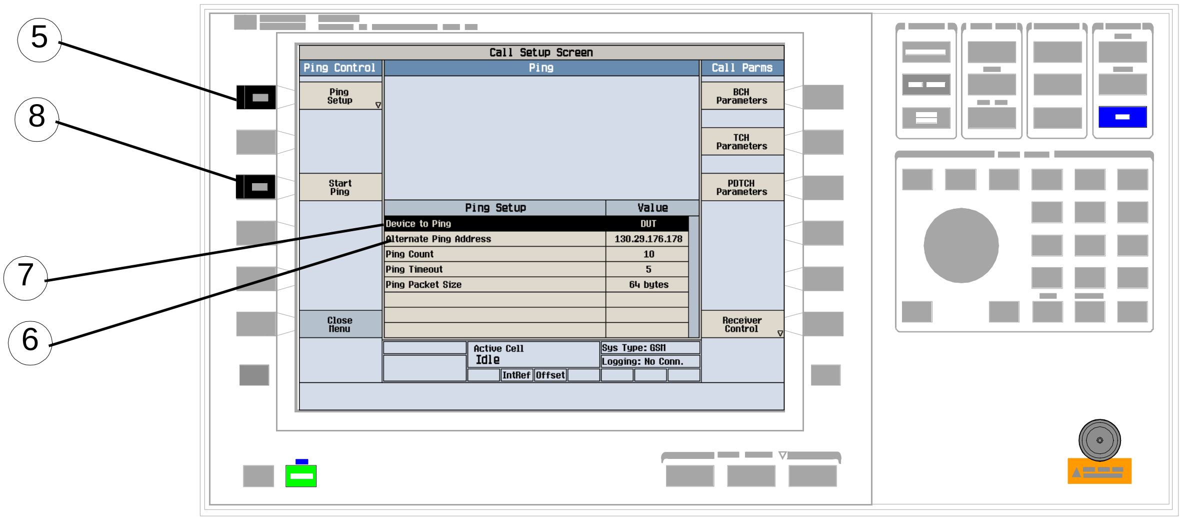


1. Press the **Call Setup** key.
2. Select `Operating Mode` (**F1**) and set it to `Active Cell`.
3. Select `Connection Type` (**F2**) and set it to `Auto`.
4. Press the **More** key to display the second page of the Control Menu.
5. Select `DUT PDP Setup` (**F2**).
6. Enter the DUT IP address.

NOTE The DUT’s IP address must be on the same subnet as the test set’s IP Address.

7. Press **F6** (`Close Menu`) to close the DUT PDP Setup menu.
8. Select `Ping` (**F3**).
9. Select `Ping Setup` (**F1**) and verify that `Device to Ping` is set to `DUT`.
10. Initiate some type of data exchange with the mobile station. For example, access the internet from the mobile station’s user interface.
11. Select `Start Ping(`**F3**`)`.

Ping an alternate address from the test set



1. Press the **Call Setup** key.
2. Select `Operating Mode` (**F1**) and set it to `Active Cell`.
3. Select `Connection Type` (**F2**) and set it to `Auto`.
4. Press the **More** key to display the second page of the Control Menu.
5. Select `Ping Setup(`**F1**`)`.
6. Set the `Alternate Ping Address` to your desired target IP address.
7. Set `Device to Ping` to `Alternate`.
8. Select `Start Ping(`**F3**`)`.

Related Topics

“Ping” on page 57

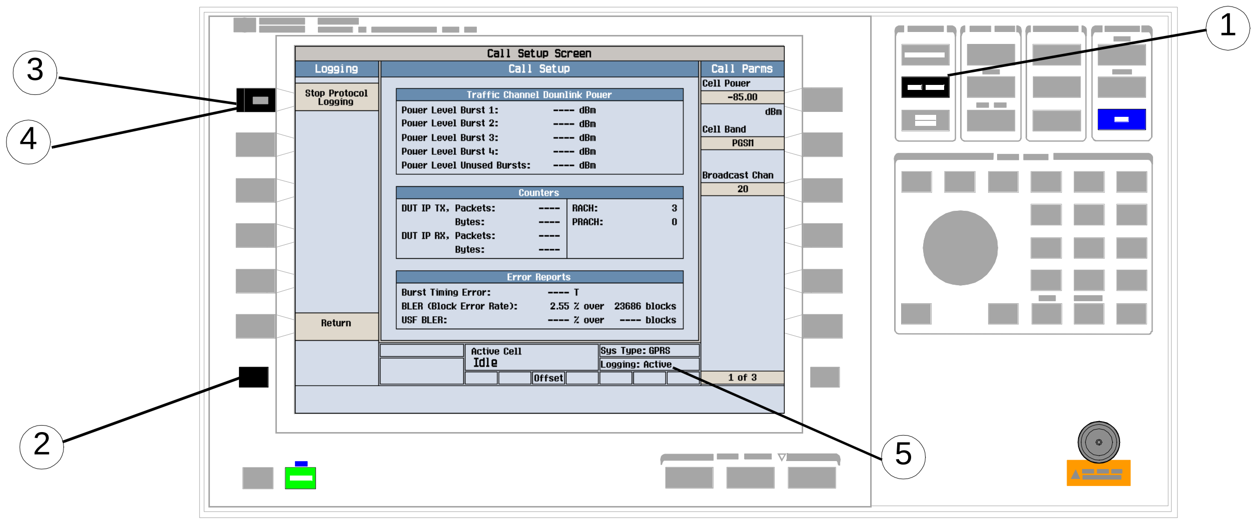
“Protocol Logging During Ping” on page 59

“Protocol Logging and Data Channel Troubleshooting” on page 1471

How to use Protocol Logging

This section is only applicable to the lab applications.

Start protocol logging from the test set

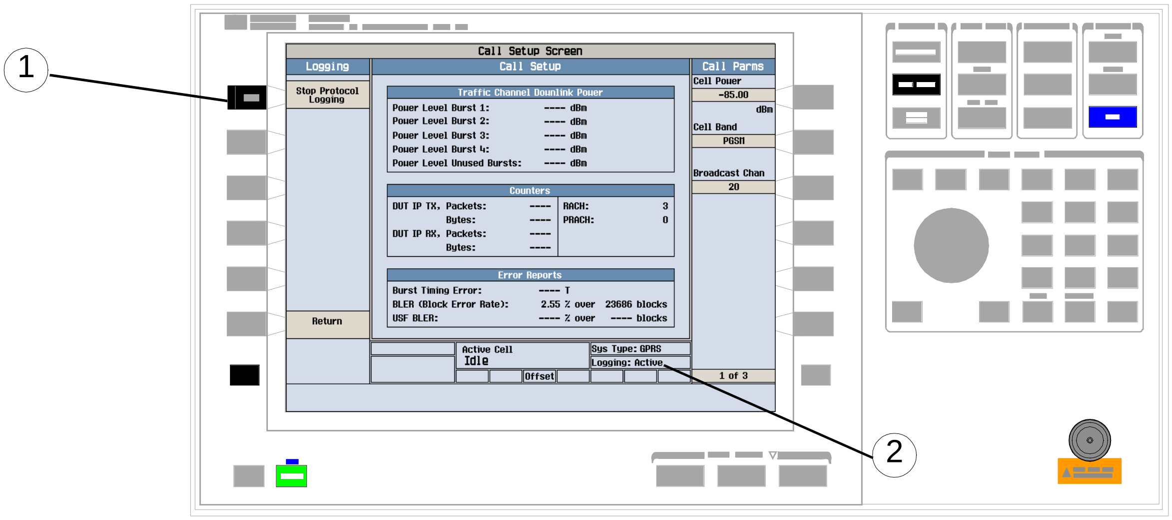


NOTE If a PC with the WPA software has not yet connected with the test set, an error message will be generated. Exactly one PC running the WPA software can be connected to a test set at one time.

---

1. Press the **CALL SETUP** key to go to the Call Setup screen.
2. Press the **More** key on the left hand Control menu to go to menu 2 of 2.
3. Press `Protocol Logging` (**F1**).
4. Press `Start Protocol Logging` (**F1**) to begin logging.
5. The Logging annunciator at the bottom of the screen shows `Active`. The WPA’s traffic overview window begins displaying messages. When the messages start displaying and how many are displayed is determined by the trigger and filter setup in the WPA. Refer to the WPA on-line help for more information.

Stop protocol logging from the test set



1. From the `Logging` menu, press `Stop Protocol Logging` (**F1**).
2. The Logging annunciator at the bottom of the screen shows `Idle`.

You can now view the protocol log on the Traffic Overview window of the WPA software (See “Protocol Logging” on page 40 for more information about protocol logging).

How to use the Short Message Service Features

This section is only applicable to the lab applications.

This section describes general procedures for using SMS features.

- "Mobile Terminated Point-to-Point Message Transfer" on page 1428
- "Mobile Originated Point-to-Point Message Transfer" on page 1428
- "Cell Broadcast Message Transfer" on page 1429
- "Cell Broadcast Updated Message Transfer" on page 1430

Mobile Terminated Point-to-Point Message Transfer

1. If you would like a log of the protocol messages exchanged between the test set and the mobile station, set up the Wireless Protocol Advisor (WPA) and start logging. See "Logging SMS Messages" on page 230.
2. Connect the mobile station to the test set and power it on.
3. After the mobile station has camped (and attached if it supports GPRS), go to the `Call Setup` screen by pressing the **Call Setup** key.
4. Go to menu (`2 of 2`) of the `Call Control` menu by pressing the **More** key on the lower left corner of the test set.
5. Select `Short Message Service` by pressing the softkey **F5**.
6. Select the `Point to Point SMS` messaging by pressing the softkey **F1**.
7. Choose the message to send using the `Message Text` softkey (**F2**). For information about the text message options available, see "Short Message Service (SMS) Messages" on page 236.
8. Choose to use either GSM or GPRS protocol layers to be used for sending the SMS message using the `Transportation` softkey (**F3**).
9. Press the `Send Message` softkey (**F1**) to send the message. Observe the mobile station for indications that the message has been received. The test set display also gives an indication.
10. If you are capturing a log, stop logging.

Mobile Originated Point-to-Point Message Transfer

1. If you would like a log of the protocol messages exchanged between the test set and the mobile station, set up the Wireless Protocol Advisor (WPA) and start logging. See "Logging SMS Messages" on page 230.
2. Connect the mobile station to the test set and power it on.
3. After the mobile station has camped (and attached if it supports GPRS), go to the `Call Setup` screen by pressing the **Call Setup** key.
4. Go to the second page of the `Call Control` menu by pressing the **More** key on the lower left corner of the test set.
5. Select `Short Message Service` by pressing the softkey **F5**.

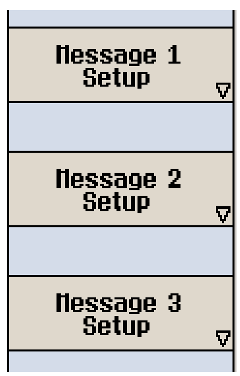
6. If you want the message received by the test set to be resent to the mobile station, first, select the `Point to Point SMS` messaging by pressing the softkey **F1** and then change the Loopback option to `On` using the `Loopback` softkey (**F4**).
7. Using the mobile station's interface, set the mobile station to send either GPRS SMS or GSM SMS.
8. Use the mobile station to send a point-to-point message to any address.
9. Observe the test set for indications that the message has been received. If the loopback option is enabled, observe the mobile station for indications that the message has been received.
10. If you are capturing a log, stop logging.

Cell Broadcast Message Transfer

1. If you would like a log of the protocol messages exchanged between the test set and the mobile station, set up the Wireless Protocol Advisor (WPA) and start logging. See "Logging SMS Messages" on page 230.
2. Connect the mobile station to the test set and power it on.

NOTE The mobile station does not have to attach.

3. Go to the `Call Setup` screen by pressing the **Call Setup** key.
4. Go to the second page of the `Call Control` menu by pressing the **More** key on the lower left corner of the test set.
5. Select `Short Message Service` by pressing the softkey **F5**.
6. Select `Cell Broadcast` by pressing the softkey **F2**. The `Broadcast SMS` menu appears. You can select setup menus for three different messages.



7. To select the setup menu, press the softkey next to the menu item labeled `Message X Setup` where X can be 1, 2, or 3. The menu for the selected message appears:

Message 1 Setup	Value
Message State	On
Message Text	Text1
Message Code	0
Message Channel Number	0
Message Update Number	0
Message Language	English

8. See “Message Setup” on page 228 for more information about each parameter in the message setup.
9. Set the parameters as desired for each message.
10. Start the broadcast message using the `Start Cell Broadcast` softkey (**F1**).
11. Observe the display on the mobile station to confirm that the message(s) were received.

NOTE This could take up to 30 seconds.

---

12. If required, stop the broadcast by pressing the `Stop Cell Broadcast` softkey (**F1**).
13. If you are capturing a log, stop logging.

Cell Broadcast Updated Message Transfer

1. If you would like a log of the protocol messages exchanged between the test set and the mobile station, set up the Wireless Protocol Advisor (WPA) and start logging. See “Logging SMS Messages” on page 230.
2. Connect the mobile station to the test set and power it on.

NOTE The mobile station does not have to attach.

---

3. Go to the `Call Setup` screen by pressing the **Call Setup** key.
4. Go to the second page of the `Call Control` menu by pressing the **More** key on the lower left corner of the test set.
5. Select `Short Message Service` by pressing the softkey **F5**.
6. Select `Cell Broadcast` by pressing the softkey **F2**.
7. Set parameters as desired. To choose the messages to be sent, select `Message Setup` for that message and set `Message State` to `On`.
8. Select the message to be sent using the `Message Text` menu for each message.
9. Start the broadcast message using the `Start Cell Broadcast` softkey (**F1**).
10. Observe the display on the mobile station to confirm that the message(s) were received.

11.Select `Message Setup` for each message to be sent as an update.

12.Set the `Update Number` for these messages higher than their previous value. The update number wraps from 15 to 0.

13.Observe the display on the mobile station to confirm that the updated message(s) have replaced the first versions.

14.If required, stop the broadcast by pressing the `Stop Cell Broadcast` softkey (**F1**).

15. If you are capturing a log, stop logging.

Related Topics

"Short Message Service (SMS)" on page 227

"Point-to-Point SMS" on page 242

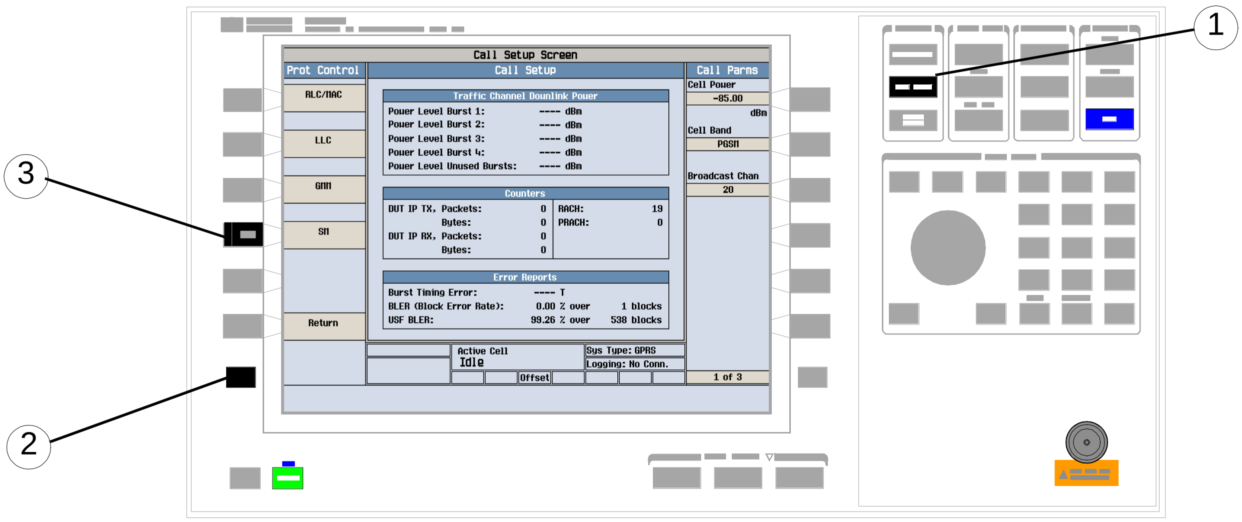
"Cell Broadcast Service (CBS)" on page 228

"Logging SMS Messages" on page 230

"Short Message Service (SMS) Messages" on page 236

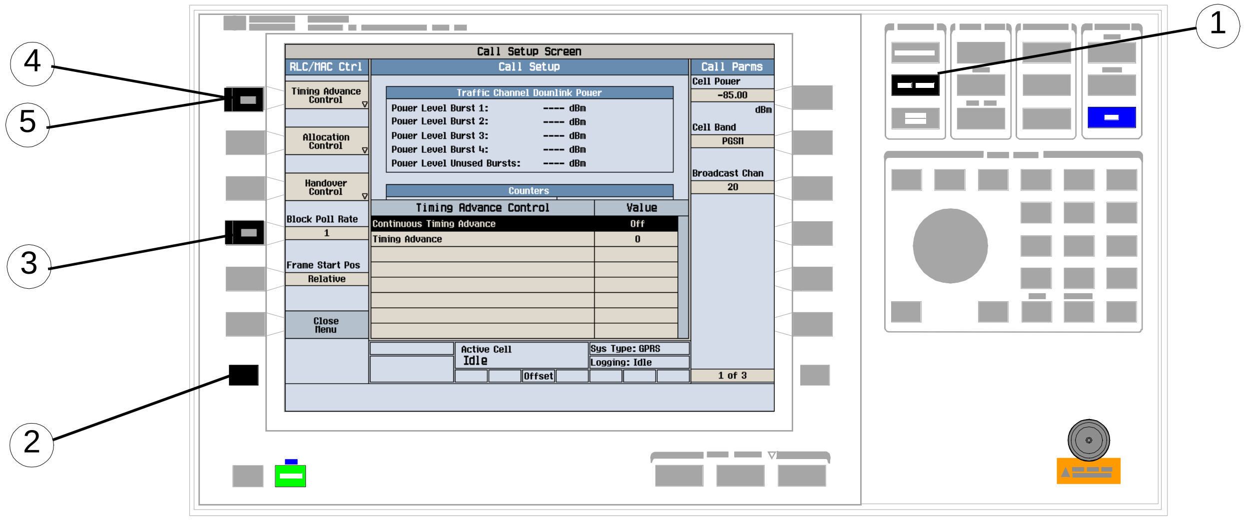
How to access Protocol Control

Accessing the Protocol Control menu



1. Press the **Call Setup** key.
2. Press the **More** key on the lower left corner to display the `Control` menu (`2 of 2`).
3. Press the `Protocol Control` softkey (**F4**) to display a list of protocol layers.

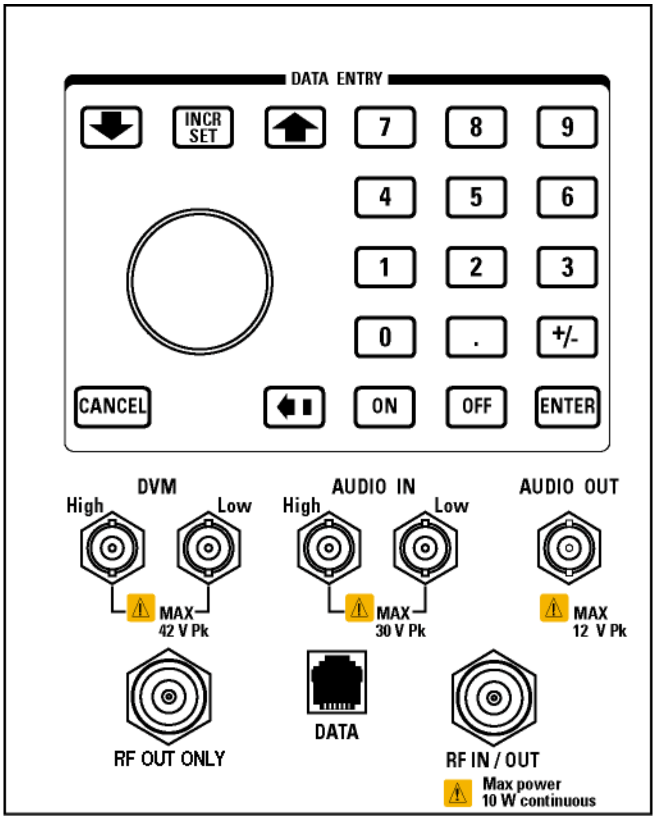
How to use Timing Advance Control



1. Press the **Call Setup** key.
2. Press the left **More** key to advance the `Control` menu.
3. On `Control` menu (`2 of 2`), select `Protocol Control` (**F4**).
4. Select `RLC/MAC` (**F1**).
5. Select `Timing Advance Control` (**F1**).
6. Set Timing Advance as desired.

Front Panel Connectors

Description



AUDIO IN

The input to the audio analyzer is a floating input differential amplifier. Both the AUDIO IN High and AUDIO IN Low BNC connectors should be connected to provide noise immunity. Refer to the technical specifications for more information.

AUDIO OUT

This BNC connector accesses the test set's Audio Generator and FM Demod signals. The Audio Generator is used to stimulate a system to measure audio performance characteristics. The FM Demod allows the user to access the demodulated FM signal for external analysis and baseband processing. Refer to the technical specifications for more information.

NOTE There will be no guaranteed performance for the signal present at the AUDIO OUT connector when FM Demod signal is selected for output.

DATA

This RJ-45 connector provides front panel access to the rear panel LAN connection. This connector is used for downloading firmware upgrades, or new test applications into the test set. No other types of communication are possible with the LAN port.

The the DATA connector on the front panel is connected internally to the ETHERNET TO FRONT PANEL connector on the rear panel. In order to use the front panel DATA connector, connect the rear panel LAN PORT, to the rear panel ETHERNET TO FRONT PANEL connector with the LAN jumper cable.

The LAN jumper cable, part number E5515-61160, is supplied with the test set.

DVM

Not functional for this release.

RF IN/OUT

This Type-N connector is the default path for all RF signals out of the test set, and is *always* used as the RF input. Refer to the technical specifications for more information. See also “RF OUT ONLY” .

RF OUT ONLY

NOTE This port cannot be used with the E1960A GSM test application or with the GSM personality in a test application suite (such as the E1985A GSM_AMPS/136_GPRS suite).

This Type-N connector is an optional path for all RF signals out of the test set. It is intended to be used for duplexed testing. Front panel selection of this port is provided by the `RF Output Port` (F6) control on the System Config screen, and by the RFGenerator:OUTPut[:DESTination] IO/OUT command. The same amplitude offsets and output power settings are used for either selected port (RF IN/OUT or RF OUT ONLY). Refer to the technical specifications for more information.

Related Topics

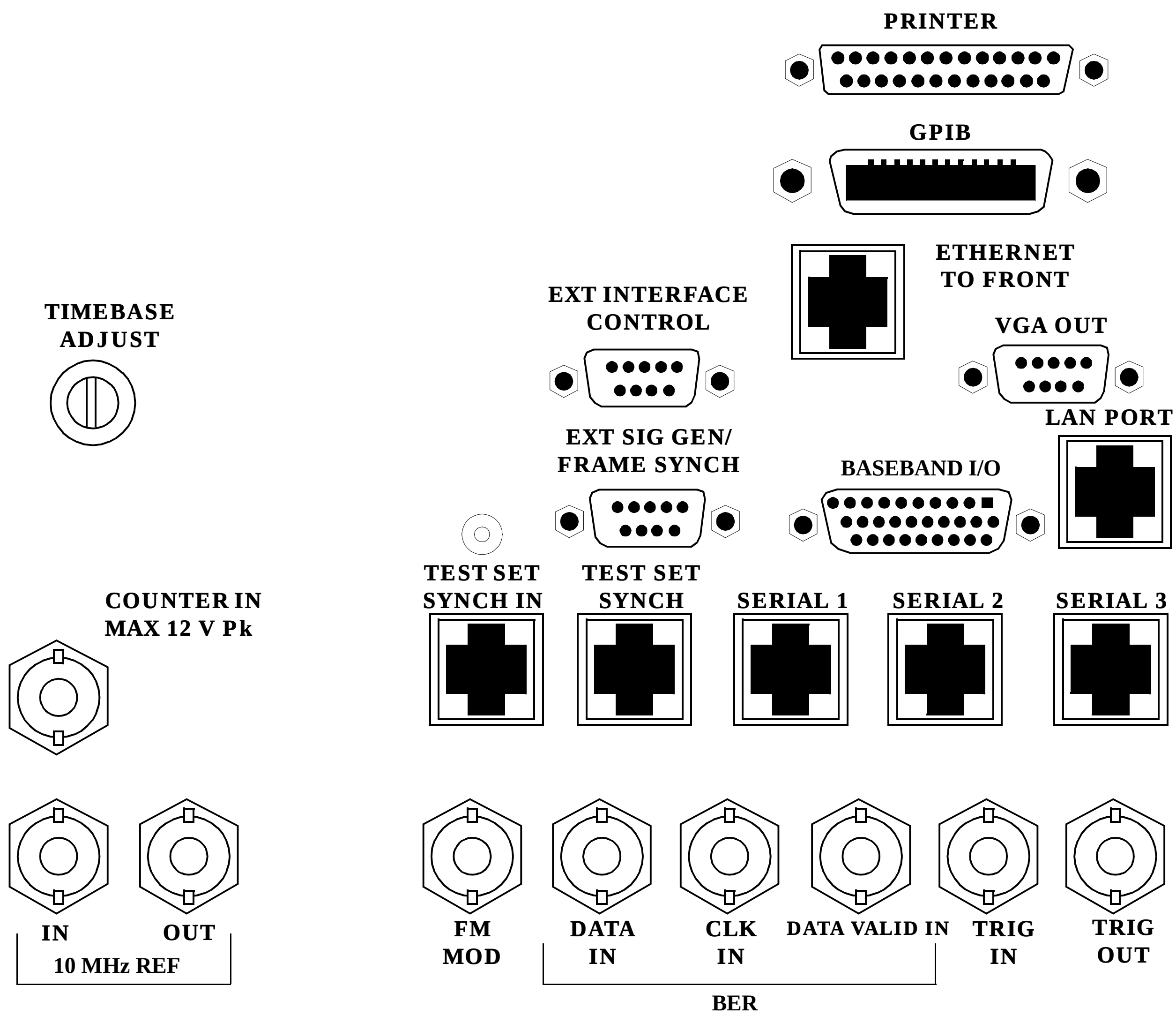
“Analog Audio Measurement Description” on page 80

“AFGenerator” on page 455

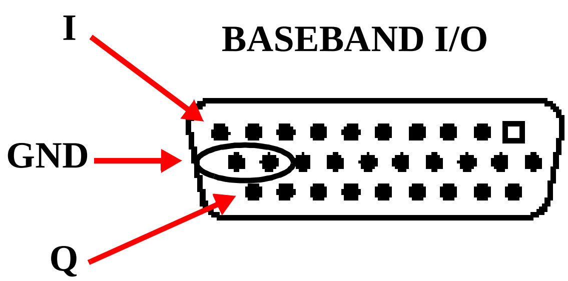
“Configuring the Test Set’s LAN” on page 1521

Rear Panel Connectors

Description



BASEBAND I/O



Four pins are functional on this connector:

- I channel (pin 9)
- Q channel (pin 26)
- Ground
- Ground

CLK IN

Not functional for this release.

COUNTER IN

Not functional for this release.

DATA IN

Not functional for this release.

DATA VALID IN

Not functional for this release.

ETHERNET TO FRONT PANEL

This RJ-45 connector is used with a separate LAN jumper cable to connect the front panel DATA connector to the rear panel LAN PORT.

The the DATA connector on the front panel is connected internally to the ETHERNET TO FRONT PANEL connector on the rear panel. In order to use the front panel DATA connector the user must connect the rear panel LAN PORT, to the rear panel ETHERNET TO FRONT PANEL connector with the LAN jumper cable.

The LAN jumper cable, part number E5515-61160, is supplied with the test set.

EXT INTERFACE CONTROL

Not functional for this release.

EXT SIG GEN/FRAME SYNCH

Not functional for this release.

FM MOD IN

This BNC connector allows you to use an external signal to frequency modulate the test set's RF generator. It has a fixed sensitivity of 20 KHz/volt, and a frequency range of 100Hz to 20 KHz.

GPIB

This GPIB connector allows test set control with compatible devices.

LAN PORT

This RJ-45 connector provides connection for downloading firmware upgrades, or new test applications into the test set. No other types of communication are possible with the LAN port.

PRINTER

Not functional for this release.

SERIAL 1

Not functional for this release.

SERIAL 2

Not functional for this release.

SERIAL 3

Not functional for this release.

TEST SET SYNCH IN

Not functional for this release.

TEST SET SYNCH OUT

Not functional for this release.

TIMEBASE ADJUST

This is the timebase adjust cover. Removing this screw allows access for timebase adjustment.

TRIG IN

This BNC connector provides the capability for you to trigger measurements or instruments from an external source. Setting the Trigger Source setting to External for measurements or instruments which support this feature causes the measurement or instrument to trigger when a positive-going TTL compatible pulse is applied to this connector. Currently, the only measurement or instrument which supports this feature is the Spectrum Monitor.

TRIG OUT

This BNC connector allows you to synchronize the test set to other equipment and is configured by setting Frame Trigger Parameters.

VGA OUT

This DB-15 connector allows you to simultaneously route the test set’s display to another monitor.

10 MHZ REF IN

This BNC connector accepts an external 10 MHz timebase signal. The nominal input impedance is 50 ohm. This version of test set can only accept a 10 MHz timebase signal.

10 MHZ REF OUT

This BNC connector provides a 10 MHz timebase signal to external test equipment. The accuracy of this signal is determined by the timebase used. The nominal output impedance is 50 ohm with a typical level of 0.5 V rms.

Related Topics

“Frame Trigger Parameters” on page 416

“Timebase Description/Configuration” on page 1520

“SYSTem:ROSCillator” on page 1299

“Configuring the Test Set’s GPIB Address” on page HIDDEN

“Configuring the Test Set’s LAN” on page 1521

Remote/Local Mode

Description

Remote Mode

When the test set is operated remotely, all of the keys on the front panel of the test set are disabled (except the LOCAL key and the power switch). During remote operation the test set is controlled by the Remote User Interface, (RUI).

Any open menus are be closed, and any manual entries are be aborted when the test set transitions from local mode to remote mode.

The remote annunciator (R) will appear in the Instrument Status Area of the test set's display indicating that the test set is in remote mode.

When the test set is in remote mode press the LOCAL key on the front panel in order to gain manual control.

Local Mode

During local mode all front panel keys and the knob are enabled. During local operation the test set is controlled by the Manual User Interface, (MUI).

The remote annunciator (R) is turned off when the test set is operated in local mode.

Related Topics

"Configuring the Test Set's GPIB Address" on page HIDDEN

Printing and Saving Screen Images

Printing and Saving Screen Images

The test set's local area network (LAN) connection can be used to dump the currently-displayed screen image into a personal computer's web browser. The computer must either be connected to an existing LAN or have a LAN adapter installed that can be connected directly to the test set.

Computer Requirements for LAN Communications with the Test Set

The computer used to capture screen images from the test set must meet the following requirements:

- 10 Base-T, IEEE 802.3 compliant, ethernet network interface using TCP/IP protocol and configured to run in half-duplex mode.
- Windows 95, 98, 2000 or NT 4.0 (Windows 95, Windows 98, Windows 2000 and Windows NT 4.0 are U.S. registered trademarks of Microsoft Corporation.)

Test Set to Computer Connections

The test set's LAN connection can be made at either the rear-panel LAN PORT or at the front-panel DATA port. When using the DATA port, be sure to have the factory supplied jumper cable installed between the rear-panel LAN PORT and the ETHERNET TO FRONT PANEL port.

Connections from the test set to the computer must be made using the *correct type* of LAN cable:

- If the test set is being connected to the computer through an existing network, use a *standard* LAN cable.
- If the test set is being connected directly to the computer's LAN adapter, use a *crossover* LAN cable (such as the one shipped with the test set or with an older test application upgrade kit).

Capturing the Screen Image

1. Press the test set's **SYSTEM CONFIG** key to display the test set's LAN settings, and record the `LAN IP Address` for use later in this procedure.
2. Start a web browser application on your computer.
3. Display the test set screen that you want to capture.
4. Enter the following address/location into your web browser: `http://<lan address>/display.htm` where <lan address> is the LAN IP address of the *test set*.
5. Within a few seconds, the test set's screen image appears in your browser. If the image does not appear on your browser within 30 seconds, refer to "Test Your LAN Connections and Configuration by "Pinging" the Test Set" below.
6. To print the image, select `File`, `Print`.
7. To save the file:
   a. Select `File`, or right-click on the image, and select `Save As` or `Save Picture As`.
   b. Enter the desired file name and directory path for saving the image as a GIF file.

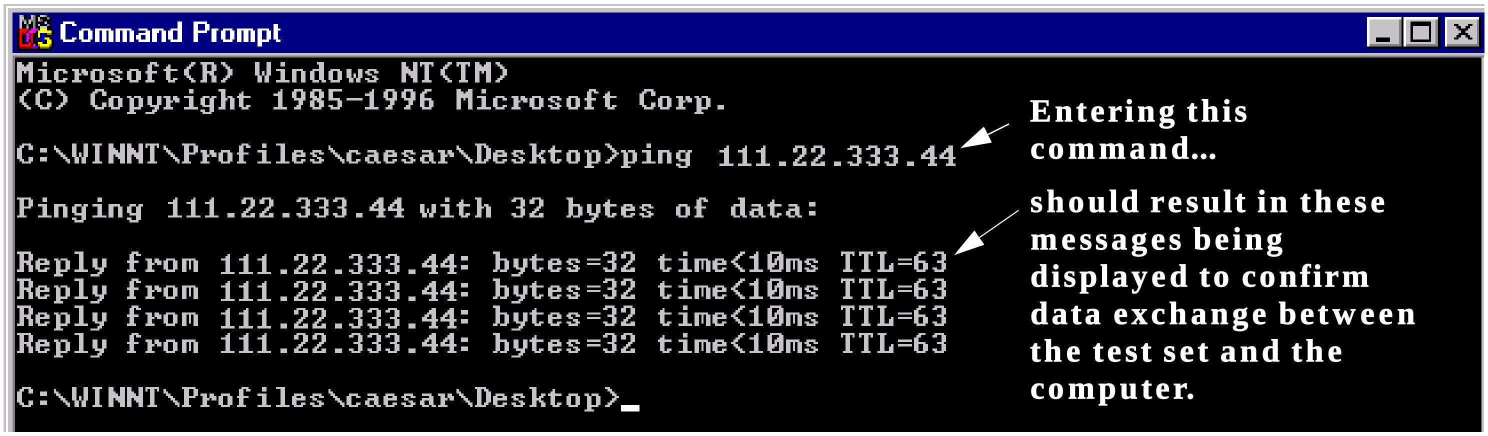
The image can now be retrieved from your directory and used as needed.

Test Your LAN Connections and Configuration by “Pinging” the Test Set

Perform this operation only if you were not successful in downloading the test set screen image into your browser.

1. Display the Command Prompt window on your computer. This is typically done in the Microsoft Windows operating system by selecting `Start` -> `Programs` -> `Command Prompts`.
2. At the command prompt, enter the following command: `ping` <lan address>. The <lan address> is the test set’s LAN IP address. (The command prompt does not have to be at the root (c:\) level before entering the command.)

   This example shows what should happen when you enter the ping command for a test set with the LAN IP address of 111.22.333.44. The test set should reply back to the Command Prompt screen indicating that data was received.



3. If the message “`Request Timed Out`” is displayed instead of a reply from the test set, try entering the command again. If the request times out again, your LAN connections are incorrect and/or your LAN settings for the two devices do not match.

Troubleshooting LAN Connections

If your web browser did not display the test set’s screen, or you could not “ping” your test set from your browser, refer to the following information to find the cause and fix the problem.

Try Altering Connections

- If you are using the test set’s front panel DATA port, make sure the jumper between the rear-panel LAN PORT and ETHERNET TO FRONT PANEL port is in place; or try connecting directly to the rear-panel LAN PORT.
- Try using a different type of LAN cable. If you were using a crossover cable, try using a standard LAN cable; if using a standard LAN cable, try using a crossover cable. If this doesn’t fix the problem, be sure to replace the cable with the type recommended in “Test Set to Computer Connections” above.

Reconfigure the Computer and Test Set LAN Settings

If the test set’s image is still not displayed on your web browser, and the ping command still indicates that the test set is not communicating with the computer, you need to verify that the LAN settings for the computer and the test set are compatible. The following sections provide general guidelines in getting the LAN settings configured for both instruments to communicate with each other.

Perform the configuration in the following order:

1. Configure the computer's LAN settings.
2. Restart Windows on the computer to start using the new LAN configuration.
3. Configure the test set's LAN settings to work with the computer's settings. (It is important that the computer be configured and re-started before configuring the test set's LAN settings.)
4. Turn the test set off and back on to make sure it finds the computer's newly-configured LAN card on power up.

LAN Setting Guidelines

- It is highly recommended that the Subnet Mask be set to 255.255.248.0 for the test set and the computer when using a direct computer-to-test set connection.
- The first three groups of numbers for the LAN IP Address of the test set and the computer must match. Example; if the test set's LAN IP Address is set to 130.29.189.33, the computer's LAN IP address must begin with 130.29.189.

  The number in the fourth group of digits in the computer's and test set's LAN IP Addresses must NOT match. Example; if the test set is set to LAN IP Address 130.29.189.33, set the computer's LAN IP Address to 130.29.183.34 (or 130.29.183.77, 130.29.183.42…- just so the last number is not also set to 33). The last entry in the IP Address must not be >254 or 0.

Changing the LAN Setting on Your Computer

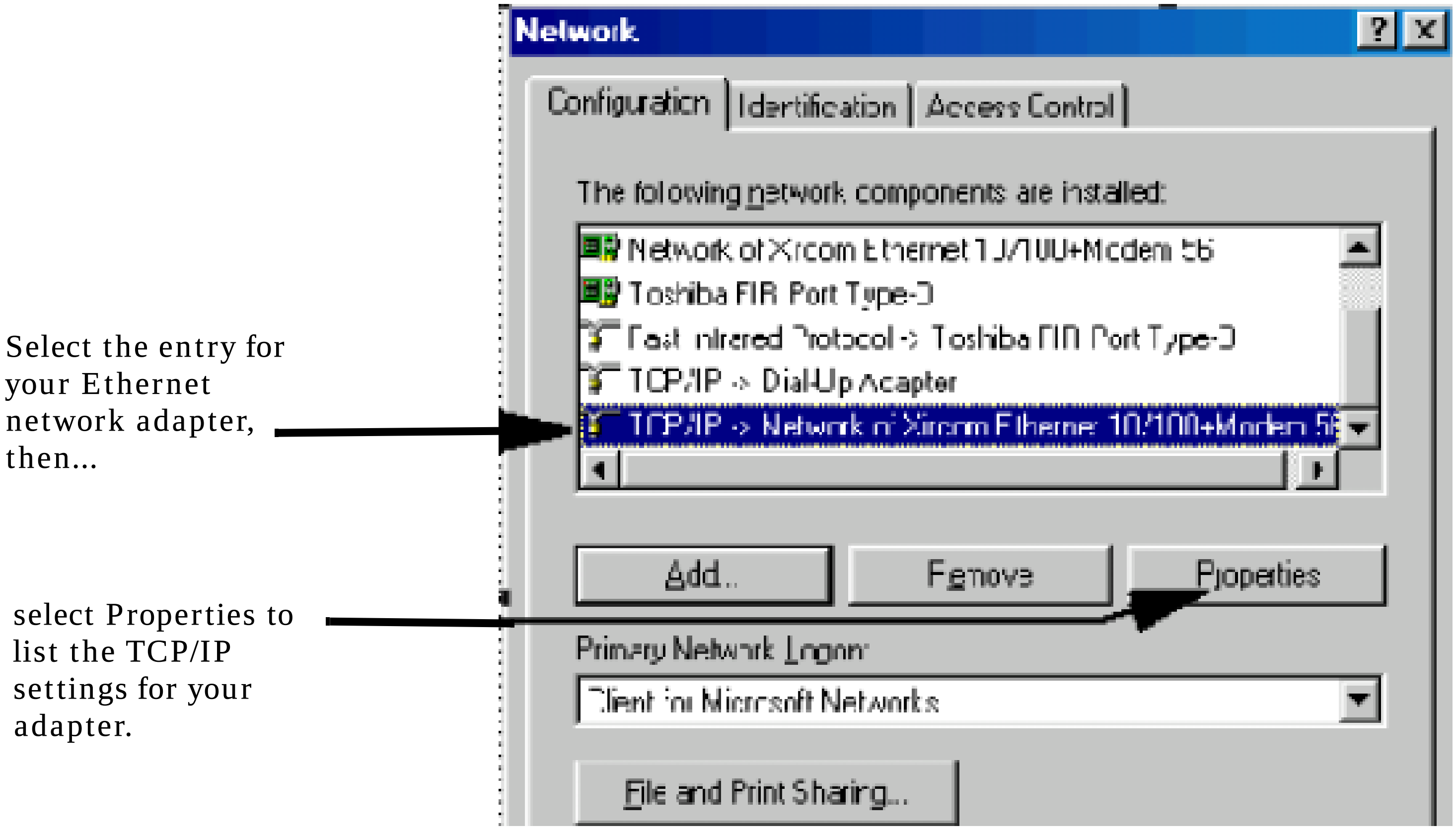
Network configuration procedures vary between operating systems. You may have to refer to your computer's help system, or your LAN adapter card's documentation, for assistance.

Perform the following steps to alter the network settings for most PCs using a Microsoft Windows operating system.

Access the Network Settings

1. Double-click on the `My Computer` icon on the Windows desk top.
2. Double-click on the `Control Panel` icon.
3. Double-click on the `Network` icon.
4. Select the `TCP/IP`-> [your Ethernet network adapter] entry from the list of components. Note: Do not select `TCP/IP Dial-Up Adapter` settings if present.
5. Select `Properties` to access the TCP/IP settings screen.

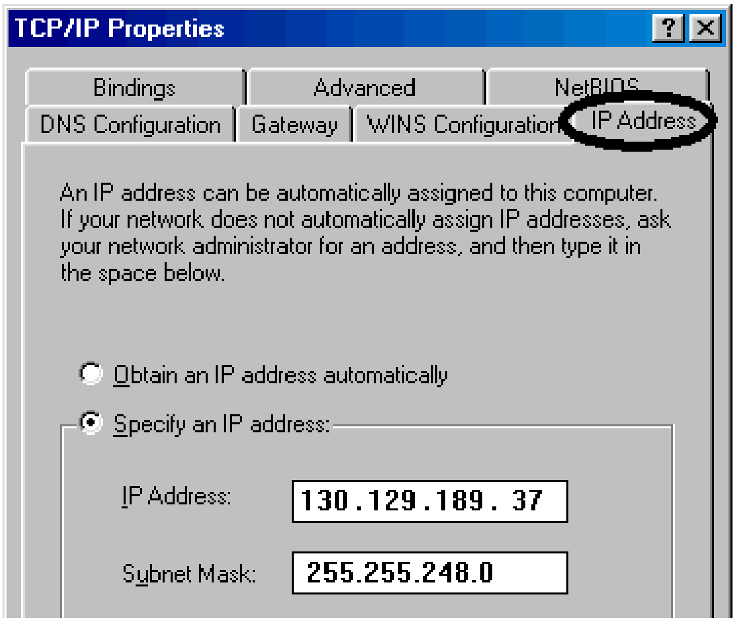
Figure 4. Accessing Your Computer’s LAN Settings



Set the IP Address and Subnet Mask

1. Select the `IP Address` tab on the TCP/IP Properties screen.
2. Select `Specify an IP Address`.
3. Enter the IP Address for the computer. Remember, the last entry in the IP Address must not be >254 or 0.
4. Enter the Subnet Mask (255.255.248.0).

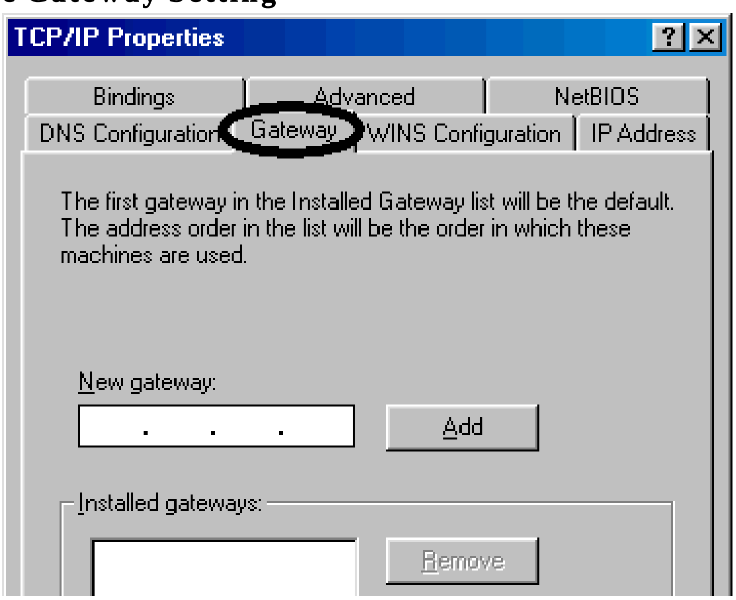
Figure 5. Specifying the Computer's IP Address and Subnet Mask



Remove Any Gateway Setting

1. Select the `Gateway` tab.
2. If present, remove any existing setting.
3. Click `OK` until you have closed the Network settings window.

Figure 6. Accessing the Gateway Setting

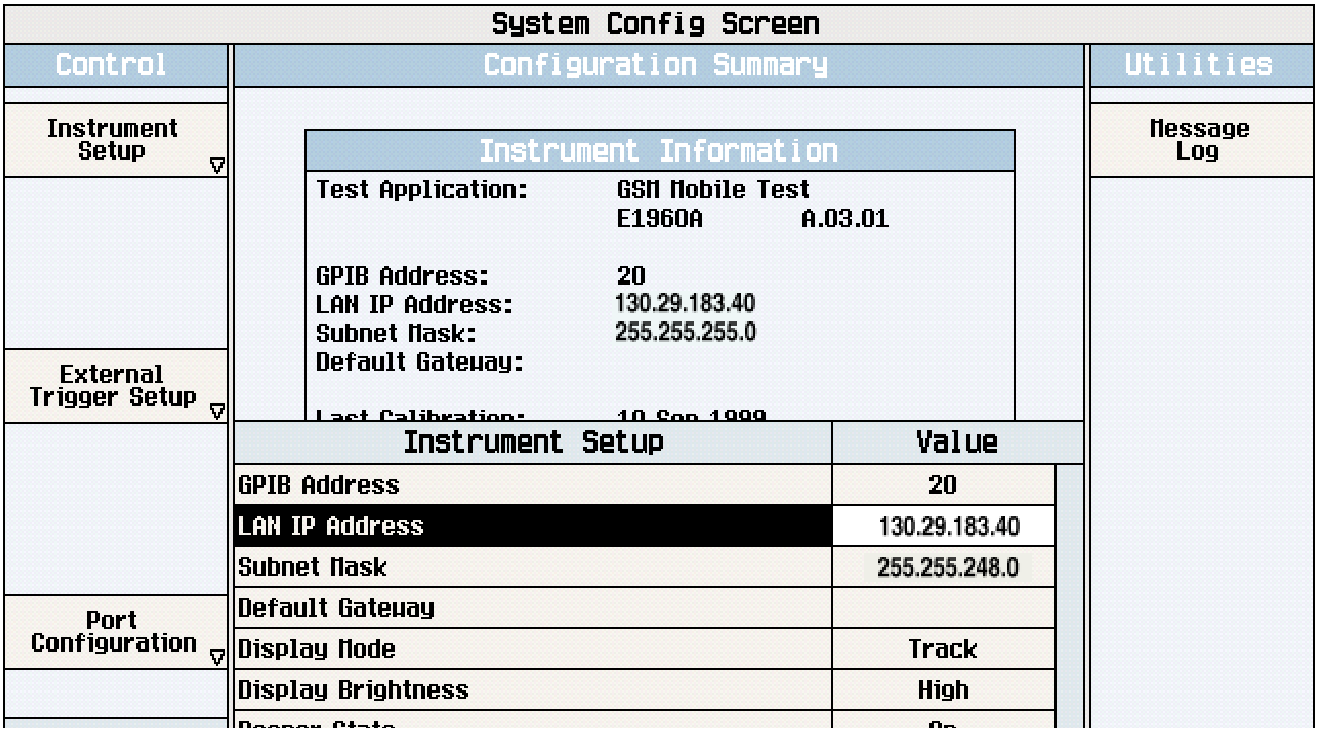


Restart Windows

Depending on your LAN network adapter, your computer may or may not apply the network configuration changes as they are made. It is import that you restart Windows NOW to make sure new LAN settings are in effect when you try to connect to the test set.

Changing the LAN Settings on Your Test Set

1. Press the **SYSTEM CONFIG** key on the test set to display the current LAN settings.



2. Press the **F1** (`Instrument Setup`) key.

NOTE Changing the LAN IP Address may alter the Subnet Mask setting. Therefore, change the LAN IP Address first, then change the Subnet Mask. Also, The last entry in the IP Address must not be >254 or 0.

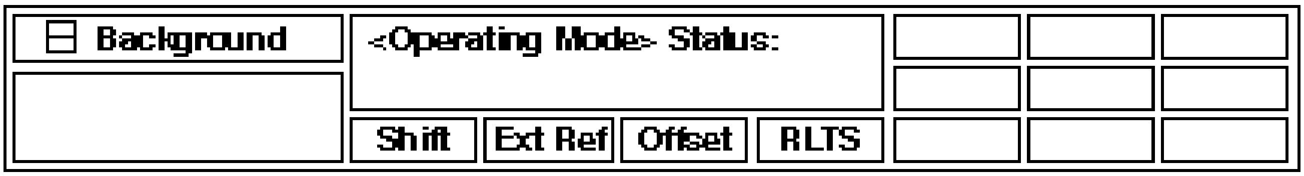
3. Turn the knob to highlight the setting you want to change.
4. Press the knob to select the setting.
5. Enter the new value using the keypad, and press the knob to complete the setting.
6. Turn the test set off and back on to start using the new settings.

Instrument Status Area

Description

The Instrument status area is found on the bottom center of the test set's display.

Figure 7. Status Area of the Test Set Display



Background

Users are able to initiate more than one measurement at a time with the test set. The test set's display will show a maximum of 2 measurements. When 3 or more measurements are initiated, or the MEASUREMENT screen is not displayed, the Background annunciator reminds you that measurements are active but not displayed.

<Operating Mode> Status

The call processing status and the operating modes are displayed in this area. This area may change (depending on the TA that is active) in order to provide TA specific information.

Shift

This annunciator indicates that the blue SHIFT key has been pressed, and that the next key you press will perform the shifted function indicated, also in blue.

Ext Ref

When a suitable external time base is connected to the rear panel 10MHz REF IN connector, this annunciator will turn on.

Int Ref

When a suitable external time base is not connected to the rear panel 10MHz REF IN connector, this annunciator will turn on.

Offset

Indicates that the Amplitude Offset state is set to On.

R L T S

This annunciator indicates the state of four different conditions of the test set:

- Remote annunciator. 'R' turns on when the test set is operated remotely.

Instrument Status Area

- Listen annunciator. ‘L’ turns on when the test set is listening to a command.
- Talk annunciator. ‘T’ turns on when the test set is providing information over GPIB.
- SRQ annunciator. ‘S’ turns on when an SRQ is active.

Help Mode

Description

This section explains:

- "What is Help Mode?"
- "How do I use the help mode?"

What is Help Mode?

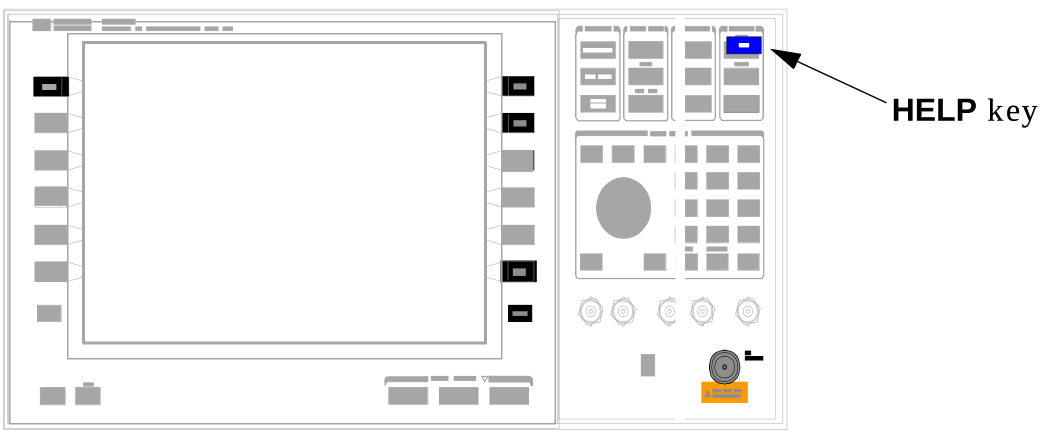
The help mode implemented in your test set provides context sensitive GPIB command syntax assistance. When you put the test set into help mode, the test set displays the GPIB command syntax necessary to perform an action remotely for each action you perform from the front panel.

For example, if you put the test set into help mode and then select the test set's GPIB address, the GPIB command syntax for changing it remotely appears in the bottom left hand corner of the test set's screen.

NOTE Operating the test set in Help Mode does not prevent you from changing parameters from the front panel. The parameters you change while in Help Mode are applied just as they would be normally.

How do I use the help mode?

1. Put the test set into help mode by pressing the **HELP** key on the front panel.



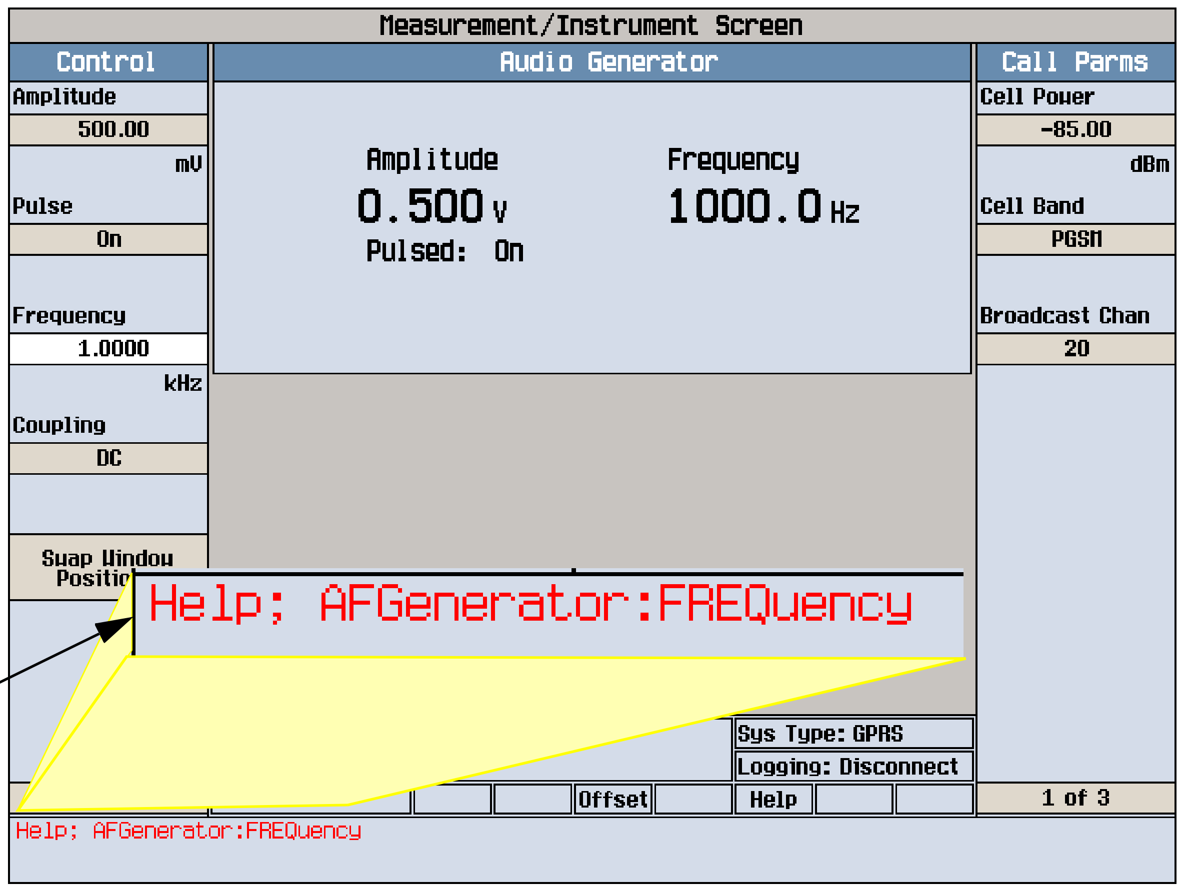
Help Mode

The Help annunciator should now be displayed in the bottom of the screen.

Indicates the test set is in HELP mode.

2. Navigate to the screen and perform the action for which you would like to know the GPIB command syntax. For example, you could navigate to the Audio Generator instrument, and select Frequency (F3). The GPIB command syntax to perform this action remotely appears in the bottom left of the screen.

Select Frequency (**F3**)



GPIB command syntax to set the frequency remotely.

Refer to the user documentation on each command for more information.

Functions Currently Supporting Help Mode

- System Configuration
  — Instrument Setup
  — Application Selection

- Amplitude Offset
- Audio Generator
- Audio Analyzer
- Swept Audio
- Spectrum Monitor
- Measurement Control
  - Measurement Reset
  - Continuous Trigger ON

Troubleshooting

Analog Audio Troubleshooting

Possible Setup Issues

During remote operation of the analog audio measurements, you should always set the Trigger Arm to Single. The length of time required to return a measurement over GPIB using continuous triggering varies, but is always longer than when using single triggering. Continuous triggering can also cause problems when the “INITiate:DONE?” on page 993 is used.

If any other measurements are active, turn them off or set their trigger source to Immediate.

The Detector Type selected (Peak or RMS) also sets how analog audio level measurements are displayed; as a peak value or an rms value. When comparing returned values over GPIB to your specifications, be sure to take into account the type of detector being used.

The Expected Peak Voltage is always set in V_{peak}, regardless of the Detector Type selected, and cannot exceed 20 V_{peak} (14.1 V_{rms}).

For accurate measurements, always set all the analog audio measurement setup parameters to their proper settings for the measurement being made. The SINAD and Distortion measurements typically use different settings than the analog audio level measurement. See “Analog Audio Measurement Description” on page 80 and “Analog Audio Measurement Block Diagram” on page 82.

For very low level audio signals, use the 100 Hz BW BPF filter to reduce the effects of noise (see “Audio Level Measurement Description” on page 84).

For accurate analog audio frequency measurements where more than one signal may be present, use the 100 Hz BW BPF filter to isolate the desired signal (see “Audio Level Measurement Description” on page 84).

Interpreting Integrity Indicator Values

See “Integrity Indicator” on page 411.

If over range (5) is returned, the input level is greater than 4.9 dB above the Expected Peak Amplitude value or the maximum input level of 20 volts peak.

If under range (6) is returned, the input level is lower than 8 dB below the Expected Peak Amplitude value.

If the signal has both over range and under range conditions, only the over range condition (5) is indicated.

Bit Error Troubleshooting

Possible Setup Issues

GSM

During remote operation of the bit error measurement you should configure the trigger arm to single, see "SETup:BERRor:CONTinuous" on page 1051.

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the fetch query may not be synchronized to the measurement cycle, see "Measurement States" on page 406.

If you have a BER measurement active and your mobile drops the call it may be that you have the "SETup:BERRor:SLControl[:STATe]" on page 1054 command set to OFF. This is likely to occur with mobiles that do not respond to downlink signalling when loopback is closed. To solve this problem set the command to ON.

GPRS

The error correction which is a feature of channel coding scheme CS-1 will mask low to medium bit error rates if used during BER measurements. This will result in measurement results which are not ideal. Therefore, CS-4 is the recommended coding scheme for BER measurements. You use the command "CALL:PDTCH:CSCHeme" on page 627 to set the channel coding scheme.

During remote operation of the bit error measurement you should configure the trigger arm to single, see "SETup:GBERror:CONTinuous" on page 1101.

The BER measurement only provides results when the test set's operating mode is:

- GPRS BCH+PDTCH test mode, or
- Active Cell, and the Data Connection Type is set to ETSI Type B or ETSI Type B Acknowledged. For details on setting the Connection Type see "CALL:FUNCtion:CONNection:TYPE" on page 538. For details on setting the cell operating mode, see "CALL:OPERating:MODE" on page 610.

BER measurements cannot be run concurrently with BLER measurements. Starting a BER measurement while a BLER measurement is currently running, closes the BLER measurement.

Interpreting Integrity Indicator values

See "Integrity Indicator" on page 411.

Block Error Troubleshooting

Possible Setup Issues

This measurement is *not* applicable to GSM.

To run this measurement ensure the test set is configured for GPRS or EGPRS measurements.

GPRS

The error correction which is a feature of channel coding scheme CS-1 will mask low to medium block error rates if used during BLER measurements. This will result in measurement results which are not ideal. Therefore, CS-4 is the recommended coding scheme for BLER measurements. You use the command "CALL:PDTCH:CSCHeme" on page 627 to set the channel coding scheme.

During remote operation of the block error measurement you should configure the trigger arm to single, see "SETup:BLERror:CONTinuous" on page 1058.

The BLER measurement only provides results when the test set's operating mode is:

- GPRS BCH+PDTCH test mode, or
- Active Cell, and the Data Connection Type is set to ETSI Type B, ETSI Type B Acknowledged, or BLER. For details on setting the Connection Type see "CALL:FUNCtion:CONNection:TYPE" on page 538. For details on setting the cell operating mode, see "CALL:OPERating:MODE" on page 610.

Changing the test set's operating mode while a block error measurement is running causes the measurement to abort and restart.

Any change to the multislot configuration or the channel coding scheme affects the rate at which bits are tested. Increasing the number of uplink timeslots per frame enables more blocks to be tested per second, whereas decreasing the number of uplink timeslots per frame reduces the number of blocks that can be tested per second. Changing the coding scheme does not affect the rate at which blocks can be tested, but does alter the performance of the link. In order to correctly handle these changes, the BLER measurement aborts and restarts whenever a multislot configuration or channel coding scheme change occurs.

BLER measurements cannot be run concurrently with BER measurements. Starting a BLER measurement while a BER measurement is currently running, closes the BER measurement.

EGPRS

During remote operation of the block error measurement you should configure the trigger arm to single, see "SETup:BLERror:CONTinuous" on page 1058.

The BLER measurement only provides results when the test set's operating mode is:

- EGPRS BCH+PDTCH test mode, or
- Active Cell, and the Data Connection Type is set to ETSI Type B (unacknowledged), ETSI Type B Acknowledged, or BLER. For details on setting the Connection Type see "CALL:FUNCtion:CONNection:TYPE" on page 538. For details on setting the cell operating mode, see "CALL:OPERating:MODE" on page 610.

Changing the test set's operating mode while a block error measurement is running causes the measurement to abort and restart.

Any change to the multislot configuration or the modulation coding scheme affects the rate at which bits are tested. Increasing the number of uplink timeslots per frame enables more blocks to be tested per second, whereas decreasing the number of uplink timeslots per frame reduces the number of blocks that can be tested per second. Changing the modulation coding scheme does not affect the rate at which blocks can be tested, but does alter the performance of the link. In order to correctly handle these changes, the BLER measurement aborts and restarts whenever a multislot configuration or channel coding scheme change occurs.

BLER measurements cannot be run concurrently with BER measurements. Starting a BLER measurement while a BER measurement is currently running, closes the BER measurement.

Interpreting Integrity Indicator values

See "Integrity Indicator" on page 411.

Decoded Audio Troubleshooting

Possible Setup Issues

This measurement is *not* applicable to GPRS. To run this measurement ensure the test set is configured for GSM measurements.

During remote operation of the analog audio measurement you should configure the trigger arm to single, see "SETup:DAUDio:CONTinuous" on page 1064.

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the fetch query may not be synchronized to the measurement cycle, see "Measurement States" on page 406.

The audio signal expected by the DAUDio measurement is, pulsed at a 10 Hz rate and has a 50% duty cycle. The device under test should have echo cancellation disabled.

The signal measured is whatever is coming back in the speech frames, this includes any electrical or acoustical coupling from the downlink signal, earpiece or any noise coupled from the microphone of the MS.

Interpreting Integrity Indicator values

See "Integrity Indicator" on page 411.

If PCM Full Scale Warning (14) is returned the measurement is accurate, however you may want to reduce the signal level applied to the test set to achieve an integrity indicator of zero.

If the DAUDio measurement is active when the channel mode is set to EFRSpeech (see "CALL:TCHannel:CMODe[:VALue]" on page 823), Questionable Result Due To Channel Mode (16) is returned. This is because the DAUDio measurement is not supported in this channel mode.

Dynamic Power Troubleshooting

Possible Setup Issues

The Dynamic Power measurement closes all other currently active measurements when it is initiated. When this happens, the test set beeps and a measurement specific closure warning is reported via GPIB for each measurement that has been closed (see "+700 to +799 Test Application Measurement Device-Specific Error" on page 1505).

Interpreting Integrity Indicator Values

See "Integrity Indicator" on page 411.

Fast Bit Error Troubleshooting

Possible Setup Issues

This measurement is *not* applicable to GPRS or EGPRS. To run this measurement ensure the test set is configured for GSM measurements.

During remote operation of the Fast BER measurement you should configure the trigger arm to single, see "SETup:FBERror" on page 1090.

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the fetch query may not be synchronized to the measurement cycle, see "Measurement States" on page 406.

Set signalling loopback control to on; if signalling loopback control is off, set loopback to Type C, see "CALL:TCHannel:LOOPback" on page 825.

The test set may never correlate the uplink and downlink, see "SETup:FBERror:LDControl:AUTO" on page 1096 so that the measurement appears to hang. The mobile station may not have closed its loop after the loopback type was set. You must allow sufficient time for the mobile station to close its loop and set time out mechanisms see "SETup:FBERror:TIMeout[:STIMe]" on page 1098.

Interpreting Integrity Indicator values

See "Integrity Indicator" on page 411.

Questionable Result for PGSM (15) Fast BER measurement appears to work but it is only possible on a Phase 2 GSM system.

I/Q Tuning Troubleshooting

Possible Setup Issues

On most occasions the test set will be able to select the correct reference frequency when "SETup:IQTuning:REFerence[:MANual][:FREQuency][:SELected]" is set to AUTO. However, if the I/Q Modulator is very badly calibrated, it is possible that the test set selects the wrong offset. This could be confirmed by using the "SETup:IQTuning:REFerence[:MANual][:FREQuency][:SELected]" query.

If your measurement results are invalid or look as if they are centered around the wrong frequency, it may be that the carrier frequency is not correctly specified. You must input the carrier frequency into the test set. Invalid measurements may also be caused by modulation data other than all 1s or all 0s, for example, it may be that a midamble is being transmitted.

Interpreting Integrity Indicator Values

See "Integrity Indicator" on page 411.

ORFS Troubleshooting

Possible Setup Issues

During remote operation of the Output RF Spectrum measurement you should configure the trigger arm to single, see “SETup:ORFSpectrum” on page 1130.

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the fetch query may not be synchronized to the measurement cycle, see “Measurement States” on page 406.

ORFS due to modulation measurements: Averaging for each measurement, including the zero offset measurement, is performed over 40 or more bits on the front and back of the burst, from bit 15 to 60 and bit 87 to 132. ETSI standards only require measuring the back bits 87 to 132. By making measurements on the front and back of the burst, two measurements per burst are achieved.

When fetching (frequency offsets) for ORFS due to modulation or switching remotely, the values for the offsets are entered after the “ ? ”, see “FETCh:ORFSpectrum:MODulation:FREQuency[:OFFSet]?” on page 926 or “FETCh:ORFSpectrum:SWITChing:FREQuency[:OFFSet][:MAXimum]?” on page 930 for GPIB commands.

GPRS and EGPRS Only

In order for the test set to return a valid switching measurement result when measuring two adjacent uplink bursts, you should ensure that the burst you have selected to measure has a higher expected power level than the other uplink burst in the multislot configuration. If the selected burst has a lower expected power level, the same hardware range settings cannot be used for both the modulation and switching measurements and the test set returns NAN for the switching measurement. The expected power can be set manually using “RFANalyzer:MANual:POWer:GPRS[:SELected]:BURSt[1|2]” on page 1028.

NOTE When using the Output RF Spectrum measurement with an EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). The Output RF Spectrum measurement does *not* support 8PSK modulation coding schemes (MCS5 through MCS9).

Interpreting Integrity Indicator values

See “Integrity Indicator” on page 411.

If over range (5) is returned the input signal is likely to clip during the useful part of the burst or the ORFS TX Power measurement has detected an over range.

If signal too noisy (10) is returned, the actual power at certain offsets is > 8 dB off from the expected level.

If under range (6) is returned; the measured power result is more than 10 dB below the expected input power level. Under range is also indicated if, the input power is more than 2 dB below the calibrated range of the test set’s power detector for the RF Range setting. RF Range is automatically set based on the input power setting. Input power is a combination of amplitude offset and expected power settings. See “Mobile Station Receiver Example” on page 157.

Phase and Frequency Error Troubleshooting

Possible Setup Issues

During remote operation of the Phase and Frequency Error measurement you should configure the trigger arm to single, see "SETup:PFERror:CONTinuous" on page 1153.

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the FETCh query may not be synchronized to the measurement cycle, see "Measurement States" on page 406.

The Manual Frequency must be offset by +/- 67.7083 kHz in order to measure non-bursted or non-GMSK modulated signals.

If the Trigger Source is set to RF Rise and the signal measured is not burst modulated the measurement will wait until aborted or timed out.

If the input signal is more than 10 dB below the Expected Power, see "Expected Power" on page 372 or if the input signal is below -30 dBm there is not enough power to generate an RF Rise trigger so the measurement will hang.

When using the Phas and Frequency measurement with an EGPRS mobile, you must select a modulation coding scheme which uses GMSK modulation (MCS1 through MCS4). The PFER measurement does *not* support 8PSK modulation coding schemes (MCS5 through MCS9). For more details on setting the modulation coding scheme, see "CALL:PDTCH:MCSCheme" on page 630.

Interpreting Integrity Indicator values

See "Integrity Indicator" on page 411.

If the signal has both over range (5) and under range (6) conditions only the over range (5) is indicated.

Syn Not Found (11) will be returned if the measurement Burst Synchronization is set to Midamble synchronized and Expected Burst pattern is not set to TSC0 through TSC7, or RACH. see "CALL:BURSt" on page 510.

Power versus Time Troubleshooting

Possible Setup Issues

During remote operation of the Power versus Time measurement you should configure the trigger arm to single, see “SETup:PVTime:CONTinuous[:SELected]” on page 1167.

If the trigger arm is not set to single, the measurement may not return a result. When trigger arm is continuous the measurement rearms itself and starts another measurement cycle, during remote operation the FETCh query may not be synchronized to the measurement cycle, see “Measurement States” on page 406.

If the Trigger Source is set to RF Rise and the signal measured is not burst modulated the measurement will wait until aborted or timed out.

If the input signal does not rise above the threshold set at 20 to 30 dB below the Expected Power, see “Expected Power” on page 372 there is not enough power to generate an RF Rise trigger so the measurement may hang.

Time Offset Range Restrictions for GPRS and EGPRS Mobiles

When you want to perform a Power versus Time measurement on a GPRS or EGPRS mobile which supports a two uplink multislot configuration, there are restricted ranges for the power offset times to ensure that a valid result is returned. This restriction is a function of the expected power for each burst and the guard period as shown in the table below.

Table 9. Restricted Ranges for GMSK Multislot Power Offset Times

	Expected Power of Burst 1 is less than or equal to Burst 2	
Guard Period	**Burst 1**	**Burst 2**
9 bits	-50 us to 542.8 us	-33.2 us to 593 us
10 bits	-50 us to 542.8 us	-36.9 us to 593 us

Interpreting Integrity Indicator values

See “Integrity Indicator” on page 411.

If over range (5) is returned; the PvT input power has exceeded the test set’s internal sampler maximum value during some part of the sampling or the input power has exceeded the calibrated range of the test set’s power detector for the RF Range setting. RF Range is automatically set based on the input power setting. Input power is a combination of amplitude offset and expected power settings. See “Mobile Station Receiver Example” on page 157.

If the signal has both over range and under range conditions only the over range (5) will be indicated.

If under range (6) is returned; the PvT Transmit Power result is more than 10 dB below the expected input power level. Under range is also indicated if, the input power is more than 2 dB below the calibrated range of the test set’s power detector for the RF Range setting. RF Range is automatically set based on the input power setting. Input power is a combination of amplitude offset and expected power settings. See “Mobile Station Receiver Example” on page 157.

GSM Only

Sync Not Found (11) will be returned if the measurement Burst Synchronization is set to Midamble synchronized and the Expected Burst pattern is not set to TSC0 through TSC7, or RACH. Note that the Expected Burst parameter is only used when the test set's operating mode is set to Test Mode or when the Cell Activated state is set to Off. See “CALL:BURSt:TYPE[:SELected]” on page 510.

GPRS and EGPRS Only

Sync Not Found (11) is returned if a valid midamble cannot be found when measuring two adjacent uplink bursts. The measurement still completes on a best effort basis using RF Amplitude synchronization. See “Burst Synchronization of Measurements” on page 408.

Parameter Error (21) is returned if you set a value outside the restricted range of offset times when testing a GPRS or EGPRS mobile station with a two uplink multislot configuration. For more details, see “Time Offset Range Restrictions for GPRS and EGPRS Mobiles” on page 1464.

RACH Troubleshooting

Possible Setup Issues

Ensure that the multi-measurement count is set to Off for a RACH measurement in either manual or remote operation. The measurement will not complete if multi-measurement count is set to On.

For more information, refer to one of the commands listed below if necessary:

- "SETup:PVTime:COUNt:STATe" on page 1171
- "SETup:TXPower:COUNt:STATe" on page 1210
- "SETup:PFERror:COUNt:STATe" on page 1155

Interpreting Integrity Indicator values

See "Integrity Indicator" on page 411.

Spectrum Monitor Troubleshooting

Possible Setup Issues

During remote operation of the Spectrum Monitor you should configure the trigger arm to single, see “SETup:SMONitor” on page 1195.

The Spectrum Monitor may not return a result when the trigger arm is set to a setting other than single. When trigger arm is continuous, the Spectrum Monitor rearms itself and starts another measurement cycle. The fetch query may not be synchronized to the measurement cycle during remote operation (see “Measurement States” on page 406).

The results returned will be unreliable if Trigger Source Immediate is used for burst modulated signals. Burst modulated signals should be measured with Trigger Source set to RF Rise or Auto. For RF Rise triggering to work correctly, the signal should be no less than 20 dB below the reference and greater than -20 dBm.

Interpreting Integrity Indicator values

See “Integrity Indicator” on page 411.

Transmit Power Troubleshooting

Possible Setup Issues

Configure the trigger arm to single during remote operation of the Transmit Power measurement, see "SETup:TXPower" on page 1207 for GSM and GPRS, or "SETup:ETXPower" on page 1081 for EGPRS.

The measurement may not return a result if the trigger arm is not set to single. When trigger arm is continuous, the measurement rearms itself and starts another measurement cycle. The fetch query may not be synchronized to the measurement cycle during remote operation, see "Measurement States" on page 406.

The results returned will be unreliable if Trigger Source Immediate is used for burst modulated signals. Burst modulated signals should be measured with Trigger Source set to RF Rise or Auto.

EGPRS Only

When using the EGPRS Transmit Power (ETXP) measurement, you must ensure that the Modulation Format parameter (see "SETup:ETXPower:MODulation" on page 1086) is set to the correct format for the signal that is being applied. If this parameter is set incorrectly, the measurement will not complete because all bursts of the wrong modulation format are ignored.

Interpreting Integrity Indicator values

See "Integrity Indicator" on page 411.

If over range (5) is returned; the input power has exceeded the test set's internal sampler maximum value during some part of the sampling or the input power has exceeded the calibrated range of the test set's power detector for the RF Range setting. RF Range is automatically set based on the input power setting. Input power is a combination of amplitude offset and expected power settings. See "Mobile Station Receiver Example" on page 157.

If the signal has both over range and under range conditions, only the over range (5) will be indicated.

If under range (6) is returned; the Transmit Power result is more than 10 dB below the expected input power level. Under range is also indicated if, the input power is more than 2 dB below the calibrated range of the test set's power detector for the RF Range setting. RF Range is automatically set based on the input power setting. Input power is a combination of amplitude offset and expected power settings. See "Mobile Station Receiver Example" on page 157.

GPRS Data Connection Troubleshooting

This section is *not* applicable to GSM or EGPRS.

Problems Getting the Mobile to Perform a GPRS Attach

If you have problems getting the mobile to perform a GPRS Attach, try working through some or all of the following troubleshooting hints:

- Ensure that a GSM Test SIM card, or a standard GSM SIM card is installed correctly and is working properly.
- Some mobiles may not perform a GPRS attach automatically. You may have to instruct the mobile to go into a data mode. The method for doing this varies from one mobile to another. For example, you may have to press a key on the mobile's keypad, or make a selection from the mobile's on-screen menu system.
- Ensure that any cable loss or gain between the test set's RF IN/OUT front panel connector and the mobile's RF connector is correctly specified in the RF IN/OUT Amplitude Offset table (see “Amplitude Offset” on page 156 or “How Do I Configure the Test Set for My Test System?” on page 1317).
- Check that the cell power is set to a level that is sufficient to overcome any interference (for example, -35 dBm), especially if an indirect RF connection is being used between the test set and the mobile (see “CALL:POWer” on page 647).
- Try using coding scheme CS-1 which has the highest degree of error correction (see “CALL:PDTChannel:CSCHeme” on page 627). To set the coding scheme manually, press the **More** key to access the `Call Parms` menu (`2 of 3`), then press the `Coding Scheme` (**F11**) key.
- Ensure that you have selected a multislot configuration that your GPRS mobile supports (see “CALL:PDTCH:MSLot:CONFig” on page 634). Try starting with a multislot configuration of 1 down, 1 up (D1U1) because all GPRS mobiles support this configuration. Initially, you should avoid using a multislot configuration with two uplinks because fewer mobiles support more than one uplink. To set the multislot configuration manually, press the **More** key to access the `Call Parms` menu (`3 of 3`), then press the `Multislot Config` (**F7**) key.
- Verify that your mobile supports the test set’s default frame numbering scheme (starting position) setting. The default is RELative which your mobile may not support. Try the ABSolute or IMMediate settings (see “CALL:FUNCtion:DATA:FRAMe:STARt” on page 543). To set the frame numbering scheme manually, press the **More** key to access the `Control` menu (`2 of 2`), press `Protocol Control` (**F4**), `RLC/MAC` (**F1**), then press the `Frame Start Pos` (**F5**) key.

Problems Establishing a BLER Data Connection

If you have problems establishing a data connection using the BLER Data Connection Type specifically, you may want to change the setting of the LLC Frame Check Sequence (see “CALL:FUNCtion:DATA:BLER:LLC:FCSequence” on page 541) or the BLER Block Polling Interval (see “CALL:FUNCtion:DATA:BLER:POLLing:INTerval” on page 542).

For example, if your mobile is not capable of a high level of GMM_INFORMATION messaging (the type of messaging used to stimulate the mobile to send ACK/NACK responses to the test set), then the data connection will timeout. One possible solution to this is to set the LLC Frame Check Sequence to CORRupt preventing the messaging while still forcing the mobile to send ACK/NACK responses. The BLER Block

Polling Interval is the rate at which the RLC/MAC blocks have the MAC header poll bit set, forcing a response (Packet Downlink ACK/NACK) from the mobile.

To change the LLC Frame Check Sequence or BLER Block Polling Interval settings manually, press the **More** key to access the `Control` menu (`2 of 2`), then press the `Protocol Control` (**F4**) key. `Block Poll Rate` is available under the RLC/MAC (**F1**) key and BLER FCS is available under the LLC (**F2**) key. Select a parameter and change its setting.

Problems with Measurements in ETSI Test Mode A or B

In order to perform measurements in Active Cell operating mode with the Data Connection Type set to ETSI Type A or ETSI Type B test modes, your mobile must fully support these connection types as defined in the standards. ETSI Type B is required if you want to perform BER measurements in active cell mode.

You can specify the first downlink burst to be looped back in the first uplink burst using the command "CALL:PDTCH:MSLot[:FIRSt]:DOWNlink:LOOPback[:BURSt]" on page 635.

In ETSI Type B test mode, the BLER measurement is performed using a different method from that used when the test set's data connection type is set to BLER. For more details on the BLER measurement see "Block Error Measurement Description" on page 90.

Protocol Logging and Data Channel Troubleshooting

Protocol Logging

- Error message appears when you start Protocol Logging on the test set: The test set must be connected via a LAN or WAN to a PC running the E6581A Wireless Protocol Advisor (WPA). Check connections, installation of software, IP addresses and gateway addresses.
- WPA is no longer connected to the test set: Anytime you preset the test set, the connection to the WPA is lost. Reestablish the connection from the configuration view of the WPA.

Data Channel

- If your data channel application does not seem to be working, try pinging the device. The test set has a ping feature, and so do most computer operating systems. See "Ping" on page 57 for more information.
- Ping log has an unknown IP address: If you log a Ping that originated from the test set, the Ping Downlink Source Address and the Uplink Destination Address have a fixed address of 130.29.181.203. This is because the test set uses an internal address to originate IP data from the test set to the mobile station. See "Protocol Logging During Ping" on page 59 for more information.
- Ping does not work: Verify that your device supports ping. The device must have a PDP context established for GPRS or EGPRS or a PPP connection for GSM CSD in order for ping to work. This may require that you initiate a data transfer from the mobile station. Also, Ping and Data Channel are only available in when the connection type is set to `Auto`.
- Can't find where to set the mobile station IP address: Switch the `Connection Type` to `Auto` first.
- BER and FBER measurements are invalid when using the data channel: The BER and FBER measurements are not supported during data connections.
- What is the APN (Access Point Name) that I need to include with the dial string when using dial-up? No APN is needed.

Related Topics

"Protocol Logging" on page 40

"Data Channel" on page 55

Error Messages

Error Message Descriptions

Description

Reading Error Messages

Each error message that is generated is recorded in either the error/event queue or the message log or both. Error messages are shown in a message window at the center of the test set's display.

When an error message is displayed an audio beep occurs, the beeper state of the test set can be set to on or off.

The error/event queue is read remotely using the SYSTem:ERRor? query. The error/event queue is able to hold 100 messages. To read the entire error/event queue use the following program.

```
10 DIM Err_msg$[255]
20 REPEAT
30 OUTPUT 714;"SYSTEM:ERROR?"
40 ENTER 714; Err_num,Err_msg$
50 PRINT Err_num,Err_msg$
60 UNTIL Err_num = 0
```

The message log may be viewed on the test set's display by pressing the SYSTEM CONFIG screen's Message Log key. The message log can display up to 24 entries over two pages.

Error messages can be cleared from the test set's display using the DISPlay:WINDow:ERRor:CLEar command. Pressing any functional front panel key, i.e. the LOCAL key, will clear an error message for the test set's display.

Classes of Errors

Error messages are divided into classes, each class of error is handled differently by the test set. The message log is cleared when the test set is power cycled.

Measurement Integrity Indicators These messages occur as a result of a measurement, they indicate the validity of the measurement. Measurement integrity indicators are read with the FETCh command.

Non-Persistent Errors These messages are generated when a condition occurs that is incorrect, but has no serious or long lasting effect on the test set's operation. Examples could include an out of range value to a parameter, or an invalid GPIB mnemonic. The message window is cleared when any front panel key is pressed.

Persistent Errors These errors are generated when a non-transitory error condition exists. Persistent errors occur when a hardware failure is found, or when damage or injury to a person or the test set may occur.

The test set displays these errors in the error message window and as a prompt at the bottom of the display screen where it remains until the error condition no longer exists.

Fatal Errors When these errors occur no further operation of the test set is possible without cycling the power switch. Fatal errors are not saved in the error message log. The test set display will provide the user with information about what to do next and some details about what the test set was doing when the fatal error occurred.

Maskable Messages These messages are intended to inform the user of a condition within the test set. They are generally meant to provide information to the user. The user will need to decide if this condition is undesirable and if they want the message to appear.

Maskable Message Display State The Maskable Messages Display State found in the Instrument Setup menu gives users a way to block these messages and the associated beep from ever happening. When the state is Off these messages and their associated beep will be blocked. The Maskable Message Display State can be set manually or with the following GPIB command:

```
OUTPUT 714;"DISPLAY:MESSAGE:MASKABLE:STATE OFF" !Prevents certain messages from appearing on the
display.
```

Instrument Maskable Messages

- Instrument warning: Audio Generator instrument has been closed.
- Instrument warning: Audio Analyzer instrument has been closed.
- Instrument warning: Analog Audio instrument has been closed.

GSM Mobile Test Maskable Messages

- GSM measurement warning; TX Power measurement has been closed.
- GSM measurement warning; Power vs Time measurement has been closed.
- GSM measurement warning; Phase Frequency Error measurement has been closed.
- GSM measurement warning; Output RF Spectrum measurement has been closed.
- GSM measurement warning; Fast Bit Error measurement has been closed.
- GSM measurement warning; Decoded Audio measurement has been closed.
- GSM measurement warning; IQ Tuning measurement has been closed.

GPRS Mobile Test Maskable Messages

- GPRS measurement warning; TX Power measurement has been closed.
- GPRS measurement warning; Power vs Time measurement has been closed.
- GPRS measurement warning; Phase Frequency Error measurement has been closed.
- GPRS measurement warning; Output RF Spectrum measurement has been closed.
- GPRS measurement warning; Bit Error measurement has been closed.

Related Topics

"SYSTem:COMMunicate:GPIB:DEBug[:STATe]" on page 1275

"Test Set Beeper" on page 1519

"SYSTem:ERRor?" on page 1289

"DISPlay:WINDow:ERRor:CLEar"

"DISPlay:MESSage:MASKable:STATe" on page 862

"Integrity Indicator" on page 411

"FETCh? Subsystem" on page 863

Error Message Log

Description

When an error message is displayed, it is also logged in the error message log. This log is only accessible manually; it is not available through GPIB. The error message log can be displayed by pressing the F7 menu key from the SYSTEM CONFIG screen. Next Page and Previous Page controls are provided.

All errors and events that are generated are displayed in the error message log. When the log is full a new message is sent to the log and the oldest message is removed from the log. The log is cleared when the test set powers up or when you press F10 (Clear Error Message Log).

Related Topics

"Error Messages" on page 1472

Fixed Timer Messages

Description

This is the list of fixed timers with a brief explanation and their values. A timer expiry message appears in its own window, on the test set display. The user has no access to these values and can not change them. None of the fixed timers are active when operating mode is Test Mode.

Timer Name	**Description**	**Value**
T100 RADIO-LINK-TIMEOUT	Detects the presence of the radio link by detecting SACCH frames every 480 ms.	4 SACCH multiframes. That is 1.92 seconds if the SACCH is completely absent.
T200 Data link timer	Used for re-transmission on the data link. The value varies depending on the message type.	155 ms for FACCH
T301 Alerting (ringing) timer	Timer used to limit the amount of time a user has to answer a call.	20 seconds
T303 Mobility Management connection timer	Time the network waits after sending a CM SERVICE REQUEST until receiving a response. This occurs before initiating call clearing procedures towards the MS.	10 seconds
T305 Release timer	Time the network waits after transmitting a DISCONNECT message until receiving a RELEASE message.	10 seconds
T306 In-band tones release timer	Time the network waits after transmitting a DISCONNECT message while in-band tones/announcements are provided, until receiving a RELEASE message.	10 seconds
T308 Release timer	Time the network waits after sending a RELEASE message until receiving a RELEASE COMPLETE message. This occurs before re-transmitting the RELEASE or releasing the Mobility Management connection.	10 seconds
T310 Call proceeding timer	Time the network waits after receiving a CALL CONFIRMED message until receiving a ALERTING, CONNECT, or DISCONNECT message before initiating clearing procedures towards the MS.	10 seconds

Timer Name	Description	Value
T313 Connect acknowledge timer	Time the network waits after transmitting a CONNECT message until receiving the CONNECT ACKNOWLEDGE message before performing clearing procedures with the MS.	10 seconds
T323 Modify complete timer	Time the network waits after sending a MODIFY message during call mode changes, until receiving a MODIFY COMPLETE or MODIFY REJECT message before initiating call clearing procedures.	10 seconds
T3101 Immediate assignment timer	Time the network waits after sending the IMMEDIATE ASSIGNMENT or IMMEDIATE ASSIGNMENT EXTENDED message until the main signalling link is established before releasing the newly allocated channels.	1 second
T3103 Handover timer	Time the network waits after transmitting a HANDOVER COMMAND message until receiving HANDOVER COMPLETE or HANDOVER FAILURE or the MS re-establishes the call before the old channels are released. If the timer expires and the network has not received a correctly decoded L2 (format A or B) or TCH frame, then the newly allocated channels are released.	2 seconds
T3105 Physical information repetition timer	Time the network waits after sending the PHYSICAL INFORMATION message until receiving a correctly decoded L2 (format A or B) or TCH frame. This occur before re-transmitting the PHYSICAL INFORMATION message or releasing the newly allocated channels.	50 ms
T3107 Channel assignment timer	Time the network waits after transmitting an ASSIGNMENT COMMAND message until receiving the ASSESSMENT FAILURE message or the MS re-establishes the call before releasing the old and the new channels.	3 seconds
T3109 Signalling disconnection timer	Time the network waits after sending the CHANNEL RELEASE message before disconnecting the signalling link.	5 seconds
T3111 Channel deactivation after disconnection timer	Time the network waits after disconnecting the signalling link before deactivating the channel.	500 ms

Fixed Timer Messages

Timer Name	Description	Value
T3113 Paging timer	Time the network waits after transmitting the PAGING REQUEST message until receiving the PAGING RESPONSE message. This occurs before re-transmitting the PAGING REQUEST (if the maximum number of re-transmissions have not been exceeded).	5 seconds
T3212 Location update timer	The location update timer is set to zero, periodic location update by the MS are disabled. If the MS camps to the BCH and decodes a new MCC or MNC from the one it last camped on, it should perform a location update.	zero = infinite time
T3250 TMSI reallocation timer	Time the network waits after sending the TMSI REALLOCATION COMMAND until receiving TMSI REALLOCATION COMPLETE. This occurs before aborting the procedure and releasing the Radio Resource connection.	5 seconds
T3260 Authentication response timer	Time the network waits after an AUTHENTICATION REQUEST until receiving AUTHENTICATION RESPONSE. This occurs before aborting the procedure and releasing the Radio Resource connection.	5 seconds

Manual User Error Messages

Description

These messages are intended to be displayed on the manual user interface only, and are not entered into the Error/Event Queue.

Error Message	**Description**
The function you requested is not yet available.	The test set does not have this capability.
IQ Calibration completed successfully for modulator <N>	<N> is the IQ modulator number that you are attempting to calibrate, <N> is 1 or 2.
IQ Calibration failed for modulator <N>	<N> is the IQ modulator number that you are attempting to calibrate, <N> is 1 or 2.
The function you requested is not available in this TA.	This function is used in another Test Application.
IQ Calibration for modulator 1 in progress (10 minutes). Call processing disabled.	This error is cleared by either the; IQ Calibration completed successfully for modulator <N>, or IQ Calibration failed for modulator <N>.
IQ Calibration for modulator 2 in progress (6 minutes). Call processing disabled.	This error is cleared by either the; IQ Calibration completed successfully for modulator <N>, or IQ Calibration failed for modulator <N>.
Instrument warning: Audio generator instrument has been closed.	The audio generator instrument was closed automatically by the test set.
Measurement warning: Audio Analyzer instrument has been closed.	The audio analyzer instrument was closed automatically by the test set.
Measurement warning: Analog audio measurement has been closed.	Analog audio measurements have been closed by the test set.
Protocol warning: Setting change has terminated the link with the DUT	Some setting change has caused the call to disconnect.
Warning; Call processing disabled	The call processing functions are not active because the test set is performing calibration operations.
IQ first modulator calibration X%	IQ modulator calibration in progress, X represents the percent complete.
IQ second modulator calibration X%	IQ modulator calibration in progress, X represents the percent complete.

GSM and GPRS Mobile Test Manual User Messages

These messages are maskable so that they can be blocked from appearing on the display. See "Error Messages" on page 1472.

Table 10.

Message	Description
GSM measurement warning; TX power measurement has been closed GPRS measurement warning; TX power measurement has been closed	Indicates that a measurement has been inactivated because of a resource conflict.
GSM measurement warning; Power vs time measurement has been closed GPRS measurement warning; Power vs time measurement has been closed	Indicates that a measurement has been inactivated because of a resource conflict.
GSM measurement warning; Phase frequency error measurement has been closed GPRS measurement warning; Phase frequency error measurement has been closed	Indicates that a measurement has been inactivated because of a resource conflict.
GSM measurement warning; Output RF spectrum measurement has been closed GPRS measurement warning; Output RF spectrum measurement has been closed	Indicates that a measurement has been inactivated because of a resource conflict.
GSM measurement warning; Fast bit error measurement has been closed	Indicates that a measurement has been inactivated because of a resource conflict.
GSM measurement warning; Bit error measurement has been closed	Indicates that a measurement has been inactivated because of a resource conflict.
GSM measurement warning; Decoded audio measurement has been closed	Indicates that a measurement has been inactivated because of a resource conflict.
GSM measurement warning; IQ tuning measurement has been closed	Indicates that a measurement has been inactivated because of a resource conflict.
Protocol warning; Setting change has terminated the link with the DUT	Indicates that a user setting has caused the link with the device under test (DUT) to be dropped. (For example, this may occur if you change the ETSI Test Mode Type parameter while the data connection status is Transferring.)

-400 to -499 Query Errors

Description

A Query error is generated either when data in the instrument’s GPIB output queue has been lost, or when an attempt is being made to read data from the output queue when no output is present or pending.

Error Message	Description
-400 Query error	This event bit (Bit 2) indicates that an attempt to read data from the Output Queues when no output is present or pending, to data in the Output Queue has been lost see IEEE488.2, 11.5.1.1.7.
-410 Query INTERRUPTED	Indicates the test set has been interrupted by a new program message before it finishes sending a RESPONSE MESSAGE see IEEE 488.2, 6.3.2.3.
-420 Query UNTERMINATED	Indicates an incomplete Query in the program see IEEE 488.2, 6.3.2.2.
-430 Query DEADLOCKED	Indicates that the Input Buffer and Output Queue are full see IEEE 488.2, 6.3.1.7.
-440 Query UNTERMINATED after indefinite response	Indicates that a query was received in the same program message after a query requesting an indefinite response was executed see IEEE 488.2, 6.5.7.5.

-300 to -399 SCPI Specified Device-Specific Errors

Description

A device-specific error indicates that the instrument has detected an error that occurred because some operations did not properly complete, possibly due to an abnormal hardware or firmware condition. For example, an attempt by the user to set an out of range value will generate a device specific error. When one of these errors is generated, the device specific error bit in the event status register is set.

Error Message	Description
-300 Device specific error	This event bit (Bit 3) indicates that a device operation did not properly complete due to some condition, such as overrange see IEEE 488.2, 11.5.1.1.6.
-311 Memory error	Indicates some physical fault in the devices memory, such as a parity error.
-312 PUD memory lost	Indicates protected user data saved by the *PUD command has been lost, see IEEE 488.2, 10.27.
-313 Calibration memory lost	Indicates that nonvolatile calibration data used by the *CAL? command has been lost, see IEEE 488.2, 10.2.
-314 Save/recall memory lost	Indicates that the nonvolatile data saved by the *SAV command has been lost, see IEEE 488.2, 10.33.
-315 Configuration memory lost	Indicates that nonvolatile configuration data saved by the device has been lost.
-320 Storage fault	Indicates that the firmware detected a fault when using data storage. This is not an indication of physical damage or failure of any mass storage element.
-321 Out of memory	An internal operation needed more memory than was available
-330 Self test failed	Indicates a problem with the device that is not covered by a specific error message. The device may require service.
-340 Calibration failed	Indicates a problem during calibration of the device that is not covered by a specific error.
-350 Queue overflow	Indicates that there is no room in the queue and an error occurred but was not recorded. This code is entered into the queue in lieu of the code that caused the error.
-360 Communication error	This is the generic communication error for devices that cannot detect the more specific errors described for error -361 through -363.

Error Message	Description
-361 Parity error in program message	Parity bit not correct when data received for example, on a serial port.
-362 Framing error in program message	A stop bit was not detected when data was received for example, on a serial port (for example, a baud rate mismatch).
-363 Input buffer overrun	Software or hardware input buffer on serial port overflows with data caused by improper or nonexistent pacing.

Related Topics

"Standard Event Status Register" on page 1260

-200 to -299 Execution Errors

Description

These errors are generated when something occurs that is incorrect in the current state of the instrument. These errors may be generated by a user action from either the remote or the manual user interface.

Error Message	Description
-200 Execution error	This event bit (Bit 4) indicates a PROGRAM DATA element following a header was outside the legal input range or otherwise inconsistent with the device's capabilities, see IEEE 488.2, 11.5.1.1.5.
-203 Command protected	Indicates that a legal password-protected program command or query could not be executed because the command was disabled.
-220 Parameter error	Indicates that a program data element related error occurred.
-221 Setting conflict	Indicates that a legal program data element was parsed but could not be executed due to the current device state.
-222 Data out of range	Indicates that a legal program data element was parsed but could not be executed because the interpreted value was outside the legal range defined by the devices
-223 Too much data	Indicates that a legal program data element of block, expression, or string type was received that contained more data than the device could handle due to memory or related device-specific requirements.
-224 Illegal parameter value	Indicates that the value selected was not part of the list of values given.
-225 Out of memory	The device has insufficient memory to perform the requested operation.
-226 Lists not the same length	Attempted to use LIST structure having individual LIST's of unequal lengths.
-230 Data corrupt or stale	Indicates invalid data, a new reading started but not completed since the last access.
-231 Data questionable	Indicates that measurement accuracy is suspect.
-233 Invalid version	Indicates that a legal program data element was parsed but could not be executed because the version of the data is incorrect to the device. For example, a not supported file version, a not supported instrument version.

Error Message	Description
-240 Hardware error	Indicates that a legal program command or query could not be executed because of a hardware problem in the device.
-241 Hardware missing	Indicates that a legal program command or query could not be executed because of missing device hardware. For example, an option was not installed.
-250 Mass storage error	Indicates that a mass storage error occurred. The device cannot detect the more specific errors described for errors -251 through -259.
-251 Missing mass storage	Indicates that a legal program command or query could not be executed because of missing mass storage.
-252 Missing media	Indicates that a legal program command or query could not be executed because of missing media. For example, no disk.
-253 Corrupt media	Indicates that a legal program command or query could not be executed because of corrupt media. For example, bad disk or wrong format.
-254 Media full	Indicates that a legal program command or query could not be executed because the media is full. For example, there is no room left on the disk.
-255 Directory full	Indicates that a legal program command or query could not be executed because the media directory was full.
-256 File name not found	Indicates that a legal program command or query could not be executed because the file name was not found on the media.
-257 File name error	Indicates that a legal program command or query could not be executed because the file name on the device media was in error. For example, an attempt was made to read or copy a nonexistent file.
-258 Media protected	Indicates that a legal program command or query could not be executed because the media was protected. For example, the write-protect switch on a memory card was set.
-270 Macro error	Indicates that a macro related execution error occurred.
-271 Macro syntax error	Indicates that a syntactically legal macro program data sequence, according to IEEE 488.2, 10.7.2, could not be executed due to a syntax error within the macro definition.
-272 Macro execution error	Indicates that a syntactically legal macro program data sequence could not be executed due to some error in the macro definition, see IEEE 488.2, 10.7.6.3.

-200 to -299 Execution Errors

Error Message	Description
-273 Illegal macro label	Indicates that the macro label was not accepted, it did not agree with the definition in IEEE 488.2, 10.7.3
-274 Macro parameter error	Indicates that the macro definition improperly used a macro parameter placeholder, see IEEE 4882, 10.7.3.
-275 Macro definition too long	Indicates that a syntactically legal macro program data sequence could not be executed because the string of block contents were too long for the device to handle, IEEE 488.2, 10.7.6.1.
-276 Macro recursion error	Indicates that a syntactically legal macro program data sequence count not be executed because it would be recursive, see IEEE 488.2, 10.7.6.6.
-277 Macro redefinition not allowed	Indicates that redefining an existing macro label, see IEEE 488.2, 10.7.6.4.
-278 Macro header not found	Indicates that a legal macro label in the *GMS?, see IEEE 488.2, 10.13, could not be executed because the header was not previously defined.

-100 to -199 Command Errors

Description

A command error indicates that the test set's GPIB parser has detected an IEEE 488.2 syntax error.

When one of these errors is generated, the command error bit in the event status register is set.

Error Message	Description
-100 Command error	This event bit (Bit 5) indicates a syntax error, or a semantic error, or a GET command was entered, see IEEE 488.2, 11.5.1.1.4.
-101 Invalid character	Indicates a syntactic elements contains a character which is invalid for that type.
-102 Syntax error	Indicates that an unrecognized command or data type was encountered. For example, a string was received when the device does not accept strings.
-103 Invalid separator	The parser was expecting a separator and encountered an illegal character. For example, the semicolon was omitted after a program message unit.
-104 Data type error	The parser recognized a data element different than one allowed. For example, numeric or string data was expected but block data was encountered.
-105 Get not allowed	Indicates a Group Execute Trigger was received within a program message. Correct the program so that the GET does not occur within the program code.
-108 Parameter not allowed	Indicates that more parameters were received than expected for the header. For example, *ESE common command only accepts one parameter, so *ESE 0,1 is not allowed.
-109 Missing parameter	Indicates that less parameters were received than required for the header. For example, *ESE requires one parameter, *ESE is not allowed.
-110 Command header error	Indicates an error was detected in the header. This error is used when the device cannot detect the more specific errors -111 through -119.
-111 Header separator error	Indicates that a character that is not a legal header separator was encountered while parsing the header.
-112 Program mnemonic too long	Indicates that the header contains more that twelve characters, see IEEE 488.2, 7.6.1.4.1.

-100 to -199 Command Errors

Error Message	Description
-113 Undefined header	Indicates the header is syntactically correct, but it is undefined for this specific device. For example, *XYZ is not defined for any device.
-114 Header suffix out of range	Indicates the value of a header suffix attached to a program mnemonic makes the header invalid.
-120 Numeric data error	This error, as well as errors -121 through -129, are generated when parsing a data element which appears to be numeric, including non-decimal numeric types. This particular error is used if the device cannot detect a more specific error.
-121 Invalid character in number	Indicates an invalid character for the data type being parsed was encountered. For example, an alpha in a decimal numeric or a "9" in octal data.
-123 Exponent too large	Indicates the magnitude of an exponent was greater than 32000, see IEEE 488.2, 7.7.2.4.1.
-124 Too many digits	Indicates the mantissa of a decimal numeric data element contained more than 255 digits excluding leading zeros, see IEEE 488.2, 7.7.2.4.1.
-128 Numeric data not allowed	Indicates that a legal numeric data element was received, but the device does not accept one in this position for the header.
-130 Suffix error	This error, as well as errors -131 through -139, are generated when parsing a suffix. This particular error message is used if the device cannot detect a more specific error.
-131 Invalid suffix	Indicates the suffix does not follow the syntax described in IEEE 488.2, 7.7.3.2, or the suffix is inappropriate for this device.
-134 Suffix too long	Indicates the suffix contain more than 12 characters, see IEEE 488.2, 7.7.3.4.
-138 Suffix not allowed	Indicates that a suffix was encountered after a numeric element that does not allow suffixes.
-140 Character data error	This error, as well as errors -141 through -149, are generated when parsing a character data element. This particular error message is used if the device cannot detect a more specific error.
-141 Invalid character data	Indicates that the character data element contains an invalid character or the particular element received is not valid for the header.
-144 Character data too long	Indicates the character data element contains more than twelve characters, see IEEE 488.2, 7.7.1.4.

Error Message	Description
-148 Character not allowed	Indicates a legal character data element was encountered where prohibited by the device.
-150 String data error	This error, as well as errors -151 through -159, are generated when parsing a string data element. This particular error message is used if the device cannot detect a more specific error.
-151 Invalid string data	Indicates that a string data element was expected, but was invalid, see IEEE 488.2, 7.7.5.2. For example, an END message was received before the terminal quote character.
-158 String data not allowed	Indicates that a string data element was encountered but was not allowed by the device at this point in parsing.
-160 Block data error	This error, as well as errors -161 through -169, are generated when parsing a block data element. This particular error message is used if the device cannot detect a more specific error.
-161 Invalid block data	Indicates a block data element was expected, but was invalid, see IEEE 488.2, 7.7.6.2. For example, and END message was received before the end length was satisfied.
-168 Block data not allowed	Indicates a legal block data element was encountered, but not allowed by the device at this point in parsing.
-170 Expression error	This error, as well as errors -171 through -179, are generated when parsing an expression data element. This particular error message is used if the device cannot detect a more specific error.
-171 Invalid expression	Indicates the expression data element was invalid, see IEEE 488.2, 7.7.7.2. For example, unmatched parentheses or an illegal character.
-178 Expression data not allowed	Indicates a legal expression data was encountered, but was not allowed by the device at this point in parsing.
-180 Macro error	This error, as well as error -181 through -189, are generated when defining a macro or execution a macro. This particular error message is used if the device cannot detect a more specific error.
-181 Invalid output macro definition	Indicates that a macro parameter place holder was encountered outside of a macro definition.
-183 Invalid inside macro definition	Indicates that the program message unit sequence, sent with a *DDT or a *DMC command, is syntactically invalid, see IEEE 488.2, 10.7.6.3.

Error Message	Description
-184 Macro parameter error	Indicates that a command inside the macro definition had the wrong number or type of parameters.

Related Topics

"Standard Event Status Register" on page 1260

+100 to +199 Core Device-Specific Error

Description

A device-specific error indicates that the instrument has detected an error that occurred because some operations did not properly complete, possibly due to an abnormal hardware or firmware condition. For example, an attempt by the user to set an out of range value will generate a device specific error.

These are general errors generated by the core instrument. When one of these errors is generated, the ‘+100 errors’ bit in the questionable error status register is set.

Error Message	Description
+101 Assert; Cycle power. Assert message<message1>	<message1> will appear as: If the DSP generated the assert: ;P:DSP T:<task ID> E:<error code> C:<error classif.> F1:<flag 1> F2:<flag 2> If the Protocol processor generated the assert: ;P:Protocol T:<task ID> L:<line number> F:<file name> If the Host processor generated the assert: ;P:Host T:<task ID> L:<line number> F:<file name>
+102 Exception; Cycle power. Exception message<message2>	<message2> will appear as: T:<task ID> or V:<vector number> or PC:<program counter> or DA:<data adrs reg value>. Vector number, program counter and data address register values are hexadecimal format.
+103 Failure; No measurements or settings can be made	Indicates none of the VI’s are operational because a serious problem exists.
+104 Failure; No settling operations will take place	Indicates none of the VI’s are operational because a serious problem exists.
+105 Failure; No measurements or setting can be made for the function selected	Indicates none of the VI’s are operational because a serious problem exists.
+110 Input pacing; Internal communication queue overflow likely	Indicates that GPIB commands are too fast for the device input queue and should be slowed.
+111 Input pacing; Internal communication queue overflow imminent. Pacing increased	Indicates that GPIB commands were too fast and the device input queue has not kept pace.
+112 Internal error; Protocol error <message3>	<message3> is an eight digit hexadecimal number that is the error code reported by protocol.

+100 to +199 Core Device-Specific Error

Error Message	Description
+113 Internal error; <VI NAME> forced inactive	Indicates that a VI is inactivated when not executed. <VI NAME> includes : “IntVmVI”,”GprsBsEmulVI”, “GsmComBsEmulVI”,“GSMFixedVI”, “MiscVI”, “GSMSacchMriVI”, “IQSelfCalVI1”, “IQSelfCalVI2”, “TA RevisionVI”, “TdmaTaBsEmulVI”.
+114 Internal error; <VI NAME> not responding	Indicates that a VI has not been instantiated or the state is not available. <VI NAME> includes : “IntVmVI”,”GprsBsEmulVI”, “GsmComBsEmulVI”, “GSMFixedVI”, “MiscVI”, “GSMSacchMriVI”, “IQSelfCalVI1”, “IQSelfCalVI2”, “TA RevisionVI”, “TdmaTaBsEmulVI” , “RfHwAccessVI”.
+115 Internal error; <VI NAME> inactive	Indicates that a VI has been made inactive. <VI NAME> includes : “IntVmVI”, “GSMFixedVI”, “MiscVI”, “GSMSacchMriVI”, “IQSelfCalVI1”, “IQSelfCalVI2”, “TA RevisionVI”.
+120 Warning; Receiver over range due to requested settings	Indicates the total received power (a combination of received power and amplitude offset) is above the range of the test set.
+121 Warning; Receiver under range due to requested settings	Indicates the total received power (a combination of received power and amplitude offset) is below the range of the test set.
+122 Warning; Reference out of lock	Indicates the test set’s internal reference is out of lock.
+123 Warning; Duplicate RF IN/OUT Amplitude Offset Frequency entry. First frequency entry in RF IN/OUT Amplitude Offset table will be used.	Indicates that an amplitude offset value for that frequency has already been entered. The test set will use the amplitude offset value entered first.
+124 Warning; Source over range due to requested settings	The setting selected for total transmit power (a combination of cell power, awgn power, amplitude offset) is above the test set’s range.
+125 Warning; Source under range due to requested settings	The setting selected for total transmit power (a combination of cell power, awgn power, amplitude offset) is below the test set’s range.
+130 Configuration error; Unable to switch to indicated Test Application	The test application selected is not available for this test set.
+131 Configuration error; Current Test Application is not licensed (License = N). Select another Test Application	The test application selected is not licensed. Select another revision or test application that is licensed (License = L).

Error Message	Description
+132 Configuration error; Selected Test Application Format is not available.	Indicates that the fast switching operation will not activate a particular radio format. Check the revision number of the test application associated with the radio format, does the revision correspond with what the fast switching test application needs?
+133 Configuration error; Selected Test Application Format is not licensed, (License = N).	The radio format selected is not licensed. Select another revision or obtain a licensed revision of the test application test application that is licensed (License = L).
+134 Configuration error; Unable to switch to selected Test Application Format	The Test Application Format name used is correct but for some reason the test set can not switch to that format.
+142 Configuration error; Functionality not available	An attempt has been made to access lab application functions from a test application.
+150 Calibration operation; Recalibrating due to present temperature	Indicates that the test set is recalibrating due to hardware inaccuracies based on temperature changes. Any measurements that are running will be temporarily aborted and then restarted after the recalibration is complete.
+160 Save/Recall error; File operation error	Occurs if there is any disk read or write problems when trying to save, recall or delete a register.
+161 Save/Recall error; Recalling available (empty) register	Occurs if an attempt is made to recall any register that has not been saved.
+162 Save/Recall error; Functionality is not yet available for current application.	Occurs when an attempt to save a save/recall register while using an application that has not implemented this feature.

+200 to +299 Call Processing Device-Specific Error

These errors are generated when a problem occurs maintaining the link between the test set and the DUT. These errors generally occur as a result of a problem on the link such as if the DUT did not respond to a message, or the user attempted to perform an invalid operation in the current instrument state.

Errors with a description beginning with “GSM call disconnected” mean that the call is dropped when the error occurs. Errors beginning with “GSM protocol failure” mean that the call is not necessarily dropped, these are informational messages.

Error Message	Description
+201 GSM call disconnected; Radio link failure (Timer T100 expiry)	“Fixed Timer Messages” on page 1476
+202 GSM call disconnected; Immediate assignment failure (Timer T3101 expiry)	“Fixed Timer Messages” on page 1476
+203 GSM call disconnected; Handover failure (Timer T3103 expiry)	“Fixed Timer Messages” on page 1476
+204 GSM call disconnected; Channel assignment failure (Timer T3107 expiry)	“Fixed Timer Messages” on page 1476
+205 GSM call disconnected; No response to page (Timer T3113 expiry)	“Fixed Timer Messages” on page 1476
+206 GSM call disconnected; No answer (Timer T301 expiry)	“Fixed Timer Messages” on page 1476
+207 GSM call disconnected; No response to setup (Timer T303 expiry)	“Fixed Timer Messages” on page 1476
+210 GSM call disconnected; No response to release 2 times (Timer T308 expiry)	“Fixed Timer Messages” on page 1476
+211 GSM call disconnected; No alert from mobile (Timer T310 expiry)	“Fixed Timer Messages” on page 1476
+212 GSM call disconnected; No response to connect (Timer T313 expiry)	“Fixed Timer Messages” on page 1476
+213 GSM call disconnected; Data link failure (Timer T200 expiry)	“Fixed Timer Messages” on page 1476
+214 GSM call disconnected; Physical information repetition failed (Timer T3105 expiry)	“Fixed Timer Messages” on page 1476
+217 GSM call disconnected; TMSI (Temporary Mobile Subscriber Identity) reallocation failed (Timer T3250 expiry)	“Fixed Timer Messages” on page 1476
+218 GSM call disconnected; Authentication failed (Timer T3260 expiry)	“Fixed Timer Messages” on page 1476

Error Message	Description
+219 GSM Call disconnected; Mobile not capable of supporting the selected Channel Mode	Indicates that the mobile station cannot support the requested channel mode.
+220 GSM call processing failure; (Call processing not available	Indicates the BS Emulator VI cannot be instantiated.
+230 GSM operation rejected; Call processing disabled	Indicates an attempt to perform a BS Emulator action when the BS emulator VI is inactive.
+231 GSM/GPRS operation rejected; Attempting to set MCC while generating a BCH	Indicates that the Cell Activated State is still On. The Cell Activated State must be turned Off before setting the MCC.
+232 GSM/GPRS operation rejected; Attempting to set LAC while generating a BCH	Indicates that the Cell Activated State is still On. The Cell Activated State must be turned Off before setting the LAC.
+233 GSM/GPRS operation rejected; Attempting to set BCC while generating a BCH	Indicates that the Cell Activated State is still On. The Cell Activated State must be turned Off before setting the BCC.
+234 GSM/GPRS operation rejected; Attempting to set NCC while generating a BCH	Indicates that the Cell Activated State is still On. The Cell Activated State must be turned Off before setting the NCC.
+235 GSM/GPRS operation rejected; Attempting to set MNC while generating a BCH	Indicates that the Cell Activated State is still On. The Cell Activated State must be turned Off before setting the MNC.
+236 GSM operation rejected; Only one call can be supported at a time	Indicates an attempt at a second call being activated.
+237 GSM operation rejected; Requested TCH Band is invalid in current state	Indicates that there is not an active link between the MS and the test set.
+238 GPRS operation rejected; Attempting to set RAC while generating a BCH	Indicates that the Cell Activated State is still On. The Cell Activated State must be turned Off before setting the RAC.
+239 GPRS operation rejected; Attempting to start ping while data connection type is not IP data	Indicates the CALL:DATA:PING:STARt command was received when the data connection type was not IP Data.
+240 GPRS operation rejected; DUT PDP context request rejected due to invalid DUT IP address	Indicates DUT IP address is invalid. May be address setting, subnet mask, or incorrect LAN IP address.
+241 GPRS operation rejected; DUT PDP context request rejected due to data connection type not being IP data	Indicates PDP context request occurred when the data connection type was not IP Data.
+242 GPRS operation rejected; DUT and instrument are in incompatible states	Indicates that the instrument and the DUT were not able to meet the other’s requests.
+243 GPRS operation rejected; Activate PDP context request procedure failed (Timer T3385 expired 5 times)	Context request timed out.

+200 to +299 Call Processing Device-Specific Error

Error Message	Description
+244 GPRS operation rejected; Modify PDP context request procedure failed (Timer T3386 expired 5 times)	Change request for PDP context timed out.
+245 GPRS operation rejected; Deactivate PDP context request procedure failed (Timer T3395 expired 5 times)	Deactivation request timed out.
+246 GPRS operation rejected; Request PDP context activation rejected by DUT	Request to send PDP activation request rejected by DUT.
+250 GSM protocol failure; No response to disconnect (Timer T305 expiry)	"Fixed Timer Messages" on page 1476
+251 GSM protocol failure; No response to release (Timer T308 expiry)	"Fixed Timer Messages" on page 1476
+252 GSM protocol failure; Channel release failed (Timer T3109 expiry)	"Fixed Timer Messages" on page 1476
+253 GSM protocol failure; (Timer T3270 expiry)	"Fixed Timer Messages" on page 1476
+254 GSM protocol failure; Unknown identity type received from mobile	Indicates that an identity type other than 1, 2, 3 or 4 was received from the MS.
+255 GSM protocol failure; Unexpected identity type received from mobile	Indicates that the MS has responded with an unexpected identity type. Example MS returned IMSI when IMEI was queried. See "CALL:MS:REPorted:IMEI?" on page 571.
+256 GSM protocol failure; Channel assignment exceeded specified number of frames	Indicates that the max frames allowed for assignment parameter should be increased.
+257 GSM call disconnected; Invalid TMSI received from MS	Indicates that some of the bits received were not set to their normal or expected value for a TMSI (Temporary Mobile Subscriber Identity).
+258 GSM protocol failure; Out-of-range for timing advance	Indicates that there is a likely issue with the mobile's protocol board which is causing its timing advance to be out of the expected range.
+259 GPRS protocol failure; Received ACK/NACK for a block that has not been sent to the MS	Indicates that there is a likely issue with the mobile's protocol board as it is responding to messages that haven't been sent.
+260 GSM RR Cause; <cause identifier>	The <cause identifier> is a 4 digit hexadecimal number
+261 GSM MM Cause; <cause identifier>	The <cause identifier> is a 4 digit hexadecimal number
+262 GSM CC Cause; <cause identifier>	The <cause identifier> is a 4 digit hexadecimal number
+270 GSM protocol failure; Cell Change procedure failed	Indicates that the BCH ARFCN or Cell Band was changed while the mobile station was attached (thus initiating a cell change. The mobile station had not completed the cell change procedure after 5 seconds.

Error Message	Description
+271 GPRS data connection terminated; Data connection failed to start	Indicates that the GPRS test application was unable to start the data connection with the DUT (Device Under Test).
+272 GPRS data connection terminated; Detach failure (Timer T3322 expired 5 times)	Indicates that the Detach procedure failed after five attempts. The Data Connection Status will be set to Idle.
+273 GPRS data connection terminated; Attach failure (Timer T3350 expired 5 times)	Indicates that the Attach procedure failed after five attempts. The Data Connection Status will be set to Idle.
+274 GPRS data connection terminated; Routing Area Update failure (Timer T3350 expired 5 times)	Indicates that the Routing Area Update procedure failed after five attempts. The Data Connection Status will not be changed.
+275 GPRS data connection terminated; MS unexpectedly ended TBF	Indicates that the mobile station unexpectedly ended the TBF (temporary block flow).
+276 GPRS data connection terminated; Test set timed out waiting for data from the MS	Indicates that no data was received from the mobile station in the allowed time.
+277 GPRS data connection terminated; MS timed out ACK/NACK exchanges and released the TBF	Indicates that the mobile station timed out ACK (Acknowledged) or NACK (Not Acknowledged) exchanges and released the TBF (temporary block flow). For more details about the cause of this error and suggestions on how to resolve it, see "GPRS Data Connection Troubleshooting" on page 1469.
+278 GPRS data connection terminated; MS did not respond to uplink immediate assignment	Indicates that the mobile station did not respond to the uplink immediate assignment.
+279 GPRS data connection terminated; MS did not respond to downlink immediate assignment	Indicates that the mobile station did not respond to the downlink immediate assignment.
+280 GPRS data connection terminated; Test set timed out waiting for data from the MS	Indicates that the mobile station did not respond to the test set within the allowed time.
+281 GPRS data connection terminated; MS did not respond to packet timeslot reconfigure	Indicates that the mobile station did not respond to a packet timeslot reconfiguration request from the test set.
+286 GPRS data connection terminated; MS did not respond to packet downlink assignment	Indicates that the mobile station did not respond to a packet downlink assignment.
+287 GPRS data connection terminated; MS did not respond to packet uplink	Indicates that the mobile station did not respond to a packet uplink assignment.
+290 GPRS protocol warning; No IMSI received from MS (using default IMSI)	This warning message occurs with some GPRS mobiles and not with others. It is an advisory message only and does not indicate failure of the test set or the mobile.
???? Protocol Error; RRLP Protocol Error Received from MS. Error Code 0	This error is generated if a 'Protocol Error' RRLP message is received from the mobile station containing error code 0 (Undefined).

+200 to +299 Call Processing Device-Specific Error

Error Message	Description
???? Protocol Error; RRLP Protocol Error Received from MS. Error Code 1	This error is generated if a ‘Protocol Error’ RRLP message is received from the mobile station containing error code 1(Missing Component).
???? Protocol Error; RRLP Protocol Error Received from MS. Error Code 2	This error is generated if a ‘Protocol Error’ RRLP message is received from the mobile station containing error code 2(Incorrect Data).
???? Protocol Error; RRLP Protocol Error Received from MS. Error Code 3	This error is generated if a ‘Protocol Error’ RRLP message is received from the mobile station containing error code 3(Missing IE or component element).
???? Protocol Error; RRLP Protocol Error Received from MS. Error Code 4	This error is generated if a ‘Protocol Error’ RRLP message is received from the mobile station containing error code 4(Message Too Short).
???? Protocol Error; RRLP Protocol Error Received from MS. Error Code 5	This error is generated if a ‘Protocol Error’ RRLP message is received from the mobile station containing error code 5(Unknown Reference Number).
???? GSM Operation Rejected; Attempt to send RRLP Message outside of Active Cell operating mode	This error is generated if an attempt is made to send any RRLP message when not in Active Cell operating mode.
???? Protocol Error; DUT did not respond to Measure Position Request within specified time	This error is generated if the mobile station does not respond to the user initiated measure position request message within the specified time limit. This time limit is the Response Time specified in the Measure Position Request message plus an additional 2 seconds.
??? Protocol Error; DUT did not acknowledge receipt of Assistance Data	This error is generated if the mobile station does not acknowledge receipt of an Assistance Data message within a period of 5 seconds.
???? GSM Operation Rejected; The PBCCH must be disabled before sending a RRLP message	This error is generated if an attempt is made to send an RRLP message from the test set while the PBCCH is turned on and the mobile station could be monitoring it.
???? GSM Operation Rejected; DUT is in an incompatible state to receive the RRLP message	This error is generated if the mobile station is not in a valid state to receive a user initiated RRLP message. Mobile stations must be in idle mode, in a speech call, or transferring circuit switched data (CSD) to not generate this error.
???? GPRS protocol warning; DUT did not send SMS CP Acknowledgement	This warning is generated if the mobile station responds to an SMS CP Data message with an SMS RP Acknowledgement rather than an SMS CP Acknow-ledgement followed by an SMS RP Acknowldegement.

+300 to +399 Link Control Device-Specific Error

These errors are generated when a problem occurs in maintaining the link between the test set and a DUT. These errors generally occur when a message is received from the DUT that is unexpected.

When one of these errors is generated, the '+300 errors' bit in the questionable error status register is set. Refer to "Standard Event Status Register" on page 1260 for information on this register.

Error Message
+303 GSM data link failure; Unsolicited DM response, multiple frame established state
+309 GSM data link failure; N(R) sequence error

+400 to +499 Core Hardware Device-Specific Error

Description

These errors are generated when a problem occurs in one of the test set's hardware modules that is part of the test set's core instrument.

When one of these errors is generated, the '+400 errors' bit in the questionable error status register is set.

Error Message	Description
+400 Hardware failure; Hardware is not available	
+401 Hardware failure; Protocol processor hardware is not responding	
+402 Hardware failure; Demod receiver hardware is not responding	
+403 Hardware failure; Measurement receiver hardware is not responding	
+404 Hardware failure; RF source 1 hardware is not responding	
+405 Hardware failure; RF source 1 digital modulation hardware is not responding	
+406 Hardware failure; RF source 1 level hardware is not responding	
+407 Hardware failure; DSP demod control hardware is not responding	
+408 Hardware failure; 2nd demod receiver hardware is not responding	
+409 Hardware failure; Base station emulator trigger hardware is not responding	
+410 Hardware failure; Audio source hardware is not responding	
+411 Hardware failure; RF source 2 hardware is not responding	
+412 Hardware failure; Internal voltmeter hardware is not responding	
+413 Hardware failure; Fixed timebase input is not responding	
+414 Hardware failure; Fixed external reference output is not responding	

Error Message	Description
+415 Hardware failure; Instrument reference is not responding	
+416 Hardware failure; Bit clock A is not responding	
+417 Hardware failure; RF source 2 frequency hardware is not responding	
+418 Hardware failure; RF source 2 digital modulation hardware is not responding	
+419 Hardware failure; RF source 2 level hardware is not responding	
+420 Hardware failure; RF source hopping hardware is not responding	
+421 Hardware failure; Digital demod hopping hardware is not responding	
+422 Hardware failure; Misc VI hardware is not responding	
+423 Hardware failure; Unable to access networking information	
+424 Hardware failure; Bit clock B is not responding	
+425 Hardware failure; Invalid EEPROM checksum <EEPROM board ID>	See the list of EEPROM board ID names below.
+426 Hardware failure; Unable to write to EEPROM <EEPROM board ID>	See the list of EEPROM board ID names below.
+427 Hardware failure; Unable to read from EEPROM <EEPROM board ID>	See the list of EEPROM board ID names below.
+428 Hardware failure; Board not identified <board ID>	See the list of board ID names below.
+429 Hardware failure; Could not create board identification <board ID>	See the list of board ID names below.
+430 Hardware failure; Control version not compatible with FW <board ID>	See the list of board ID names below.
+431 Hardware failure; RF IO DAC cannot be calibrated due to present temperature	
+432 Hardware failure; RF hardware is not responding	
+433 Hardware failure; RF source FM hardware is not responding	
+434 Hardware failure; Audio source FM hardware is not responding	

+400 to +499 Core Hardware Device-Specific Error

Error Message	Description
+460 Hardware failure; Hardware doesn't support requested operation	This error occurs when a setting is attempted that is not possible with the test set's hardware. The current firmware needs new hardware in order to work.
+461 Hardware failure; Link subsystem hardware is not responding. Call processing functionality not operational.	This error occurs any time the link subsystem is not operating correctly. The message is persistent to warn the user that any call processing operations will not work.
+462 Hardware error; Hardware not supported; <board ID><part_number>	This error appears when an operation was attempted that requires hardware that is not installed in the test set.
+463 Hardware error: RFIO version does not support loopback switching.	
+464 Hardware error: RFIO version does not support RF out only selection.	This error occurs when trying to select the RF OUT ONLY port when the test set has the RF I/O module that only has the RF IN/OUT port.

<board ID> names

3 GHZ ATTENUATOR 1| ;3GHZ ATTENUATOR 2| ;AUDIO BD| ;ROM BASEBAND GENERATOR 1| ;ROM BASEBAND GENERATOR 2| ;DEMOD DOWNCONVERTER| ;VECTOR OUTPUT BOARD 1| ;VECTOR OUTPUT BOARD 2| ;IVF MEASUREMENT| ;MEASUREMENT DOWCONVERTER| ;RF POWER DETECTORS| ;REFERENCE MODULE| ;SYNTH DOUBLER 1| ;SYNTH DOUBLER 2| ;TIMING REF| ;MOMENTUM INSTRUMENT| ;RF MOTHER BOARD| ;JUMPER BOARD| ;DIGITAL MOTHER BOARD| ;FLAT PANEL ADAPTER| ;REAR PANEL BOARD

<EEPROM board ID> names

Instrument Eeprom ID State| ;Atten 1 Eeprom ID State| ;Atten 2 Eeprom ID State| ;Audio Eeprom ID State| ;BaseBandGen 1 Eeprom ID State| ;BaseBandGen 2 Eeprom ID State| ;Demod DC Eeprom ID State| ;Digital Mother Board Eeprom ID State| ;IQ Output 1 Eeprom ID State| ;IQ Output 2 Eeprom ID State| ;IVF Meas Eeprom ID State| ; Jumper Board Eeprom ID State| ; Meas DC Eeprom ID State| ;RF Mother Board Eeprom ID State| ;RF Interface Eeprom ID State| ; Ref Mod Eeprom ID State| ;Sig Gen 1 Eeprom ID State| ; Sig Gen 2 Eeprom ID State| ;Time Ref Eeprom ID State| ;Display Interface Eeprom ID State| ;Rear Panel Eeprom ID State

Related Topics

"Standard Event Status Register" on page 1260

+500 to +599 Test Application Hardware Device-Specific Error

Description

These errors are generated when a problem occurs with a hardware module that is required for a particular test application.

When one of these errors is generated, the '+500 errors' bit in the questionable error status register is set.

Table 11. Test Application Hardware Device Specific Errors

Error Message	Description
+520 DUT IP address must be on same subnet as instrument	IP addresses of the DUT and the test set are on different subnets. This may be caused by incorrect IP addresses or the subnet mask may be incorrect.
+521 DUT IP address cannot be the same as instrument LAN address	The DUT and the instrument have the same IP address.
+522 Operation rejected due to invalid IP address	Indicates that and attempt was made to start a ping session before a valid IP address is entered for the device to be pinged.

Related Topics

"Standard Event Status Register" on page 1260

+600 to +699 Instrument Device-Specific Error

Description

These errors are generated when a problem occurs that is specific to one of the test set's instruments. These errors are part of the test set's core. Note that these measurements may not be present in every test application and therefore, these errors may not be present in every test application. There is no plan at present to support test application specific instruments.

An instrument in this context refers to the measurement-like functionality such as the audio generator and not to the test set as a whole.

When one of these errors is generated, the '+600 errors' bit in the questionable error status register is set.

Error Message	Description
+601 Instrument failure; Audio generator hardware is not responding	Indicates a problem occurs when attempting to control the test set's audio generator.
+603 Measurement failure; Spectrum Monitor hardware is not responding	Indicates that there is a problem with the hardware associated with the spectrum monitor measurement.

Related Topics

"Standard Event Status Register" on page 1260

+700 to +799 Test Application Measurement Device-Specific Error

These errors are generated when a problem occurs that is specific to one of the test set's measurements (such as BERR, or TX power). These are test application specific.

When one of these errors is generated, the '+700 errors' bit in the questionable error status register is set. Refer to "Standard Event Status Register" on page 1260 for information on this register.

Error Message	Description
+701 GSM measurement failure; TX power hardware is not responding +701 GPRS measurement failure; TX power hardware is not responding	This indicates a problem with your test set's hardware. Please call your local Agilent Service Center.
+702 GSM measurement failure; Power vs time hardware is not responding +702 GPRS measurement failure; Power vs time hardware is not responding	This indicates a problem with your test set's hardware. Please call your local Agilent Service Center.
+703 GSM measurement failure; Phase frequency error hardware is not responding +703 GPRS measurement failure; Phase frequency error hardware is not responding	This indicates a problem with your test set's hardware. Please call your local Agilent Service Center.
+704 GSM measurement failure; Output RF spectrum hardware is not responding +704 GPRS measurement failure; Output RF spectrum hardware is not responding	This indicates a problem with your test set's hardware. Please call your local Agilent Service Center.
+705 GSM measurement failure; Fast bit error hardware is not responding	This indicates a problem with your test set's hardware. Please call your local Agilent Service Center.
+706 GSM measurement failure; Bit error hardware is not responding	This indicates a problem with your test set's hardware. Please call your local Agilent Service Center.
+707 GSM measurement failure; Decoded audio hardware is not responding	This indicates a problem with your test set's hardware. Please call your local Agilent Service Center.
+708 GSM measurement failure; IQ tuning hardware is not responding	This indicates a problem with your test set's hardware. Please call your local Agilent Service Center.
+709 GSM measurement failure; Dynamic power hardware is not responding	This indicates a problem with your test set's hardware. Please call your local Agilent Service Center.
+729 GSM measurement warning; Dynamic Power measurement has been closed	Indicates that a measurement has been inactivated because of a resource conflict.

+800 to +899 Core Measurement Device-Specific Error

Description

These errors are generated when a problem occurs that is specific to one of the test set's core measurements (such as analog audio).

When one of these errors is generated, the '+800 errors' bit in the questionable error status register is set.

Error Message	Description
+801 Measurement failure; Analog audio hardware is not responding	Indicates that a problem occurs when attempting to control the measurement's hardware.
+802 Measurement failure; Audio analyzer hardware is not responding	Indicates that a problem occurs when attempting to control the measurement's hardware.

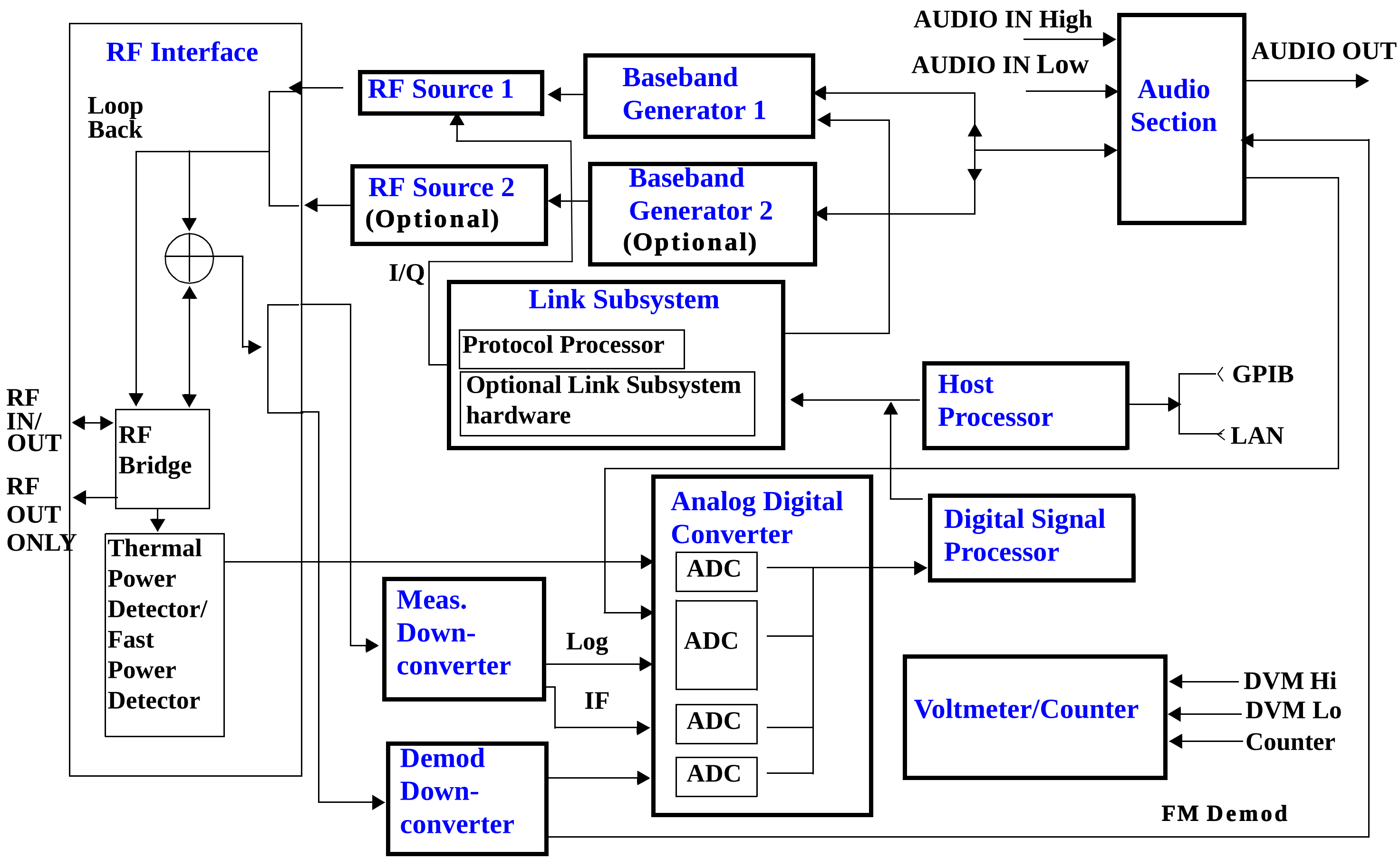
Related Topics

"Standard Event Status Register" on page 1260

Block Diagram

The hardware architecture of the test set provides a number of parallel signal paths through the instrument. This parallel architecture allows the measurement hardware to run some measurements concurrently. See "Concurrent Measurements" on page 397.

Description



RF Interface Module

Input and output signals are routed through the RF Interface module. The RF Interface module consists of:

- A directional bridge for sampling incoming power.
- Hybrid power splitters which create 4 bidirectional ports (two receiver ports and two source ports). The directional bridge couples power to the Power Detector.
- RF amplifiers.
- Video gain circuits.
- Fast and thermal power detectors.

The RF Interface module provides two identical RF Source path connections to the In/Out port of the instrument. There is about 25 dB of isolation between the two source paths. There is about 35 dB of isolation between the source paths and either receiver path. The RFIO module has nominally 23 dB of insertion loss in the source path. A temperature sensing circuit facilitates compensation for path loss variation with temperature.

The source signals can be looped back through the input signal path to cross-calibrate the Measurement Downconverter and the Power Detector.

The sampled input power from the directional bridge can be amplified by as many as two 18 dB range amplifiers and then can be directed to the fast detector or the thermal detector. The input power to the fast detector is detected by a diode detector that is part of a feedback loop. The input to the thermal detector is measured in a bridge using a pair of RMS thermal detectors in a feedback loop.

Signal Downconversion

The test set's downconversion receiver section has two downconversion modules; a Measurement Downconversion Module for making measurements, and a Demodulation Downconversion Module for maintaining the radio link.

Demodulation Downconverter Module

The Demodulation Downconverter module is used as part of the demodulation receiver that maintains the radio link.

Measurement Downconverter Module

The Measurement Downconverter module provides high quality (wide dynamic range, spurious free) signals to the Analog To Digital Converter module's measurement sampler input.

The Measurement Downconverter module is designed for very high performance operation to ensure accurate and repeatable measurement results. The Measurement Downconverter module contains two downconversion stages, two local oscillators, and a logarithmic IF envelope detector . Both first and second LO synthesizers are tunable. The first LO is used when tuning to the RF input frequency, and the second LO is used when setting second IF frequency, which is fed to the measurement sampler on the Analog To Digital Converter module.

Link Subsystem

The Link Subsystem maintains the radio link for all CDMA formats. The Link Subsystem has two parts:

- Protocol Processor
- Optional Link Subsystem hardware

The Protocol Processor module is responsible for maintaining the radio link between the test set and the mobile station under test. The primary tasks of the Protocol Processor module are:

- Generating the protocol messaging necessary for the forward channel and sending that protocol stream to the test set's RF source for transmission to the mobile station.
- Decoding the protocol messaging received from the mobile station under test on the reverse channel.
- Computing measurement results which are associated with data bits contained within the mobile stations messaging, such as bit error ratio and frame error rate.

The optional Link Subsystem hardware provides additional signaling link control for CDMA signaling formats. These include:

- Layer 1 digital signal processing.
- Providing I/Q baseband signals which are sent to the I/Q modulator in the RF Source

Analog To Digital Converter Module

Following the Measurement Downconverter and Demodulation Downconverter IF 1 is the Analog to Digital Converter module. The purpose of the Analog to Digital Converter module is to convert the downconverted analog signals into digital data streams which can be processed by the Digital Signal Processing module.

In order to maintain the radio link of non-CDMA formats, the downconversion path through the Demodulation Downconverter module has a dedicated A/D conversion path.

To optimize measurement throughput, the fast RF power detector also has a single dedicated A/D path. This allows power measurements, in many cases, to be made concurrently with other measurements. The two outputs from the Measurement Downconverter module and the Audio In signal share a single multiplexed A/D path.

The outputs of the various analog to digital converters on the Analog to Digital Converter module share a common data bus with the Digital Signal Processing module.

Digital Signal Processing Module

The Digital Signal Processing (DSP) module is responsible for a variety of tasks within the overall test set architecture. These tasks are:

- Demodulate data from the radio under test (data received from the Demodulation Downconverter module) and sending the demodulated data bits to the Protocol Processor module.
- For some systems, perform audio measurements using audio information sent to the DSP module from the Protocol Processor module.
- Execute a variety of signal processing algorithms to perform measurements on the radio system of the currently loaded TA (data received from the power detector ADC, the measurement ADC and, in some cases, data received from the Demodulation Downconverter ADC).

The DSP processor communicates with the Host Processor and the Protocol Processor, as well as controlling the configuration and synchronization of the Analog To Digital Converter module.

Host Processor Module

The Host Processor module is responsible for a variety of tasks within the overall test set architecture. These tasks include:

- Control of the manual user interface (MUI).
- Executing commands and processing data received from the LAN interface.
- Executing commands and processing data received from the GPIB interface.
- Controlling hard disk access.
- Control of all RF and audio hardware modules.
- Routing measurement results received form the Digital Signal Processing and Protocol Processor modules to the appropriate output device (display, GPIB, LAN, serial, etc.).

Voltmeter/Counter

Voltmeter

The voltmeter is used to measure internal voltages for instrument self-diagnostics.

Frequency Counter

The Frequency Counter is used to measure external frequencies from the front panel Audio IN, High or Low BNC connectors, and to measure internal signals for diagnostics. The external input can receive a signal between 20 Hz and 50 MHz, with a level from 25 mV to 8 V rms.

Audio Section

Audio Analysis Path

Externally applied audio signals can be analyzed through the test set's DSP module for such characteristics as AC level, SINAD, or distortion.

The audio signal to be analyzed is input to the test set using the front panel Audio IN High/Low connectors. The signal is then routed to the Analog To Digital Converter module's measurement sampler for analysis by the DSP module.

The Audio In connector accepts signals from 20 Hz to 15 KHz, at input levels from 10 mV to 20 V peak.

Audio 1 Path

The Audio 1 path provides analog baseband signals used for frequency modulation of the test set's RF sources. Up to four separate audio sources may be summed together in any combination to provide the composite Audio 1 output. These include the external FM input, internal direct digital synthesis (DDS,) regenerated SAT, and audio echo input.

The external FM input accepts an externally supplied audio signal with a peak voltage between 0.25 and 2 V peak.

The internal DDS generates low distortion audio signals from DC to 20 KHz with 0.1 Hz resolution. One to four signals may be generated and internally summed, with independent level control of each waveform.

The SAT regeneration circuit outputs a signal which is phase-locked to a received SAT signal. This is useful for testing situations where the test set needs to emulate a mobile station.

The audio echo input is used for retransmitting the received audio after a selectable time delay, to check both radio transmit and receive paths simultaneously.

For most applications, only one or two of these Audio 1 path sources are enabled at any given time.

Audio 2 Path

The Audio 2 path provides a secondary means for sending analog baseband signals to the FM modulator. Audio 2 contains only one source, a DDS similar to that used for Audio 1.

Typically, the Audio 2 path DDS is used for cases where multiple signals must be summed together with the lowest possible distortion. Another potential use of Audio 2 would be to obtain higher output levels than Audio 1 is capable of (up to twice as much), assuming the two outputs are set to the same frequency and phase, and then summed together at the Baseband Generator module.

Audio 2 is rarely used in practice because the DDS used for Audio 2 is the same DDS that is used for the front panel audio output.

Audio Out Path

Any one of four inputs may be coupled to the front panel audio output connector. These include a 4 channel DDS (shared with Audio 2), receiver discriminator audio from the Demodulation Downconverter module, audio echo from the Analog To Digital Converter module, and audio vocoder.

The front panel output is capable of providing signal levels up to 9 V peak into > 600 ohm loads, and up to 0.8 V peak into an 8 ohm load (e.g. speaker). The output level is calibrated for all modes except discriminator audio,
The discriminator audio has an uncalibrated volume control provided due to the high tolerances involved.

Typically the DDS mode is used to feed the MIC input of a radio, or it may simply be used as a general purpose low distortion function generator.

Audio echo can be selected to route the received audio to the front panel audio output connector.

RF Sources

The test set has up to two identical RF sources. The RF sources are used to provide analog or digitally modulated RF carriers for use in parametric testing of mobile stations encompassing a variety of cellular radio formats. In general, the sources have a frequency range of 292 MHz to 2.7 GHz and an amplitude range of -10 dBm to -127 dBm.

The RF sources consist of a Synthesized Signal Generator module followed by a Vector Output module and an RF Attenuator module. Baseband modulation information is supplied to the RF sources from a Baseband Generator module preceded by an Audio Section module.

Baseband Generators

The purpose of the Baseband Generator module is to provide, for the modulation type currently in effect, properly formatted baseband signals to the modulation circuits on the RF Source modules.

The Baseband Generator performs several functions related to the generation and processing of these base-band modulation signals. These are:

- Transform data and clock signals from the Protocol Processor module into base-band analog I/Q modulation signals for the I/Q modulator in the Vector Output module
- Transform data from the Protocol Processor module into baseband FSK modulation for the FM modulator in the Signal Generator module
- Provide baseband FM path source selection, gain adjustment and summing node for analog FM signals from the Audio module and internally generated baseband FSK signals which are output to the FM modulator in the Signal Generator module
- Transform burst and adjacent timeslot signals from the Protocol Processor module into baseband burst modulation signals for the burst modulator in the Vector Output module

Configuration

Obtaining Identification Information *IDN?

Description

Test set information is returned from a *IDN? query. The *IDN? query provides information about the Manufacturer, Model Number, Serial Number, and Firmware Revision. *IDN? is defined in IEEE Std. 488.2-1992, 10.14.

Test Set Information

*IDN? query returns identification information as a comma separated string.

```
DIM A$[100]
OUTPUT 714;"*IDN?" !returns manufacturer,model number, serial number and "0"
                   !separated by commas
ENTER 714;A$
PRINT A$           !prints, for example "Agilent Technologies, 8960 Series 10 E5515B,
                   !US38020105,0
```

- Agilent Technologies is the manufacturer.
- Printable ASCII characters excluding comma and semicolon up to a 25-character string.
  Model number example: 8960 Series 10 E5515B
- Printable ASCII characters excluding comma and semicolon up to a 10-character string.
  Serial number example: US00000123
- Printable ASCII characters excluding comma and semicolon up to a 20-character string.
  Firmware revision example: 0

NOTE The *IDN? query will always indicate that the firmware revision is zero. SYSTem:APPLication[:CURRent]:REVision? is the recommended way to query the firmware revision.

Related Topics

"*IDN?" on page 1305

"CALibration:DATE" on page 464

"SYSTem:CURRent:TA" on page 1286

"SYSTem:COMMunicate" on page 1274

Hardware Configuration Report

Description

You can generate a list of the test set's hardware configuration over the LAN or GPIB.

The LAN query is the easiest and most direct way to query the test set's hardware configuration. This method uses your web browser to display a formatted report.

The GPIB query returns an unformatted character string that must be buffered and saved to an HTML file to provide formatted text.

LAN Query

1. Refer to the SYSTEM CONFIG screen to determine the LAN address.
2. Open a web browser and enter <LAN address>/iconfig. For example, if your LAN address is 130.2.2.147, you would enter:

   130.2.2.147/iconfig
3. The web browser will then display formatted text. A partial list of the hardware configuration information is shown below:

Agilent Technologies 8960 Series 10 E5515A

Serial Number: US00000097

Current Test Application: E1960A, GSM Mobile Test, A.04.01

Instrument Options Installed: RF Source 2

HOST BOOT ROM REV: A.02.03_BOOT
PROTOCOL BOOT ROM REV: MOM_PROTOCOL_BSP_1.7
DSP BOOT ROM REV: A.00.01

GPIB Query

Use the following Basic example as a model to store the test set's configuration as an HTML file.

GPIB Example:

```
10    DIM Buf1$[20000],Buf2$[20000] ! This is the minimum space for the arrays
20    OUTPUT 714;"SYSTEM:CONFIGURE:INFORMATION:HARDWARE:VERBOSE?"
30    ENTER 714;Buf1$,Buf2$
40    CREATE "HW.htm",1              ! Create an HTML file
50    ASSIGN @File TO "HW.htm"
60    OUTPUT @File;Buf1$,Buf2$
70    END
```

In the future, the hardware configuration report may increase in length. More space would then need to be allocated for the arrays.

Display the HTML file using a web browser or HTML text editor.

Related Topics

"SYSTem:CONFigure" on page 1273

"SYSTem:CURRent:TA" on page 1286

"SYSTem:APPLication" on page 1264

"Obtaining Identification Information *IDN?" on page 1514

"Rear Panel Connectors" on page 1436

Display Brightness

Description

This parameter allows you to adjust the brightness of the test set’s display. The test set’s display screen has two brightness settings:

- medium brightness
- high brightness

Example

```
OUTPUT 714;”DISPLAY:BRIGHTNESS MEDIUM” ! sets screen brightness to medium.
```

Related Topics

“DISPlay:BRIGhtness” on page 861

Display Mode (Track/Fast)

Description

There are two display modes to select from when operating the test set remotely.

- Display mode fast
- Display mode track

Fast Mode

When operating remotely, there is often no need for the display to be updated as measurements are made. Using the fast display mode will increase the speed of the test set when it is operated remotely.

Fast mode is designed for remote use only. The test set returns to track mode if you change to manual operation.

- No screen or menu items are visible (except error messages).
- Error messages will be displayed in their normal location.
- “This instrument is being operated remotely” will be displayed at the bottom of the screen.

Example

```
OUTPUT 714;”DISPLAY:MODE FAST” !Selects fast mode
```

Track Mode

The track display mode is used to allow users to see what the test set is doing while it is being controlled remotely. Track mode is the default mode of the test set.

- Any changes made remotely will be updated on the screen if that screen is displayed.
- The error message window will be displayed as required when an error occurs.

Example

```
OUTPUT 714;”DISPLAY:MODE TRACK”!Selects track mode
```

Related Topics

“DISPlay:MODE” on page 861

Test Set Beeper

Description

This parameter allows you to change the beeper state to on or off. A beep will indicate error conditions caused during manual or remote operation of the test set.

A 100 ms, 1.24 kHz audible tone (beep) is generated when an error message is logged and the beeper state is set to on. If two errors are generated in quick succession, two beeps are generated to indicate that more than one error has been logged.

The beeper state can be manually set in the Instrument Setup window found in the SYSTEM CONFIG screen.

Example

```
OUTPUT 714;"SYSTEM:BEEPER:STATE OFF"
```

Related Topics

"SYSTem:BEEPer" on page 1272

"Error Messages" on page 1472

Timebase Description/Configuration

Description

The time base source is selected by the test set, either an internal time base or an external source (if a suitable signal is detected) is used as the reference oscillator. If a 10 MHz +/- 100 ppm signal, that has an input level from 0 to +13 dBm is connected to the 10 MHz REF IN connector on the rear panel, the test set will automatically select the external timebase.

You can read the status window at the bottom of the test set display for the EXT REF indicator, or query the test set to verify if it is using an external time base or an internal time base. You may also query the test set to verify if the time base is locked. The reference oscillator functionality is controlled through the SYSTEM subsystem.

Example:

```
OUTPUT 714;"SYSTEM:ROSCILLATOR[:TIMEBASE]?" !returns INT or EXT
                                            !(internal or external) timebase.
OUTPUT 714;"SYSTEM:ROSCILLATOR:LOCKED?" !returns 1 or 0 (locked or unlocked)
                                        !condition for timebase
```

Related Topics

"SYSTem:ROSCillator" on page 1299

"Rear Panel Connectors" on page 1436

Configuring the Test Set’s LAN

Description

LAN IP Address

The LAN address is a character string with a maximum of 15 characters and a format of A, B, C, D, where A is between 0 and 223, and B, C, and D are between 0 and 255. No embedded spaces are allowed. The address may be manually set/viewed in the system configuration screen. The LAN address can be set/queried using the SYSTem subsystem.

The LAN address is a non-volatile parameter. The LAN address is not affected by any reset operation and can only be changed by direct access to the parameter itself.

NOTE If the LAN address is set to a different network class, the subnet mask will change to the default net mask for the new network class.

For convenience the DATA port on the front panel may be configured as a LAN port. When a RJ45 jumper cable, (part number E5515-61160) is connected from the LAN PORT on the rear panel, to the ETHERNET TO FRONT PANEL port also on the rear panel, the user has LAN access from the front panel of the test set. Without the RJ45 jumper cable, the test set connection to a LAN is the rear-panel, LAN PORT connector.

LAN Default Gateway

The LAN router, (default gateway), is a character string with a maximum of 15 characters and a format of A, B, C, D, where A is between 0 and 223 , and B, C, and D are between 0 and 255, no embedded spaces are allowed. If the default gateway is set to a format not allowed with the LAN address or the subnet mask that have been selected, the default gateway will be set to a null string, indicated by a blank field on the test set display. The address may be manually set/viewed in the system configuration screen. The LAN default gateway can be set/queried using the SYSTem subsystem.

The LAN default gateway is the address of a router that routes messages between networks and or subnets. If this value is not specified, LAN communications will be limited to the network and subnet specified by the LAN IP address and the subnet mask. Your network administrator will know if a default gateway is needed and if so, the address of the router. If the default gateway address is not needed by your network, it may be disabled by entering any of the following values: “0” (zero), ““ (null string), “0.0.0.0”

The LAN default gateway is a non-volatile parameter. The LAN default gateway is not affected by any reset operation and can only be changed by direct access to the parameter itself.

LAN Subnet Mask

The LAN subnet mask address is a character string with a maximum of 15 characters and a format of A, B, C, D, where A , B, C, and D are between 0 and 255. No embedded spaces are allowed. The address may be manually set/viewed in the system configuration screen. The LAN subnet mask address can be set/queried using the SYSTem subsystem.

The subnet mask number combined with the IP address identifies which network and subnet your computer is on. Contact your system administrator for the correct subnet mask for your network.

The subnet mask determines the boundaries between the subnet ID and the host ID.

The LAN subnet mask is a non-volatile parameter. The LAN subnet mask is not affected by any reset operation and can only be changed by direct access to the parameter itself.

NOTE If the LAN address is set to a different network class, the subnet mask will change to the default net mask for the new network class.

The subnet mask number is obtained from your network administrator.

Related Topics

"SYSTem:COMMunicate:LAN[:SELF]:ADDRess" on page 1276

"SYSTem:COMMunicate:LAN[:SELF]:DGATeway" on page 1277

"SYSTem:COMMunicate:LAN[:SELF]:SMASk" on page 1278

Description

The GPIB address is an integer between 0 and 30. The test set comes with a default address of 14 and may be set/queried using the SYSTem subsystem or manually through the system configuration screen by selecting the parameter and changing the number with the knob or the keypad.

The GPIB address is a non-volatile parameter. The GPIB address is not affected by any reset operation and can only be changed by direct access to the parameter itself.

Related Topics

"SYSTem:COMMunicate:GPIB:[:SELF]:ADDRess" on page 1274

Confidence Levels

What are Confidence Levels?

Using confidence levels for your measurements can reduce your test time. Confidence levels simply end the measurement early, that is, before all the multi-measurements you specified are taken. It ends the measurement early *only* if it determines statistically that the rest of the measurements should pass. You specify the level of certainty that you are satisfied with, for example, you may decide that you are satisfied in passing a measurement on your mobile if the test set is 95% confident that the rest of the measurements will pass.

Note, the test set only reduces your test time if it determines that the measurement *will* pass. If it determines that a future measurement may fail, or if a measurement does actually fail, the test set continues as normal executing your test plan.

It is not possible to determine the amount of time by which confidence levels reduce your test time as this is determined by a number of factors, some of which cannot be controlled. The following list details some of the factors:

- The confidence level that you select. This can be set between 80% to 99.99%. Obviously, the lower the level you select, the greater the potential for a reduction in test time.
- The stability of the mobile station's results. That is, if the individual results are variable (that is, differ significantly but are still within the limits), then the measurement will take longer. However, if the results returned are very similar and well within the limits then the measurement will end sooner.
- The test limits that you select. For example, the tighter your test limits the longer the measurement will take.

To ensure that the prediction of the measurement result is accurate there is a minimum number of measurements made by the test set. This number is independent of the confidence level you set. However, this number is dependent on the multi-measurement count and is shown below.

Table 12. Minimum Number of Measurements

Multi-Measurement Count	Minimum Number of Measurements
1-4	Same as multi-measurement count
5-999	4

How do you set Confidence Levels?

You can set confidence levels for a measurement using its relevant SETup subsystem. Currently the only measurement in GSM with the confidence level feature is Phase and Frequency Error.

Confidence levels are only relevant when the measurement’s multi-measurement count is on. Therefore if you turn on the confidence level feature for a measurement the test set automatically enables that measurement’s multi-measurement count feature.

The following procedure and example show the steps needed when you are using confidence intervals via the GPIB.

1. Set-up the mobile station and the test set for your required measurement.
2. Use the SETup subsystem to turn the measurement’s multi-measurement count on and specify the count number.
3. Use the SETup subsystem to turn on the measurement’s confidence state and set its confidence level.
4. If required, use the SETup subsystem to set the measurements pass/fail limits. The test set uses the defaults pass/fail values if you do not specify any.
5. Start the measurement using the INITiate subsystem.
6. Use the FETCh? command to obtain the measurement results.

Programming Example

The following example uses the GSM Phase and Frequency Error measurement to demonstrate the use of confidence levels.

```
10  OUTPUT 714;”SETUP:PFERROR:CONTINUOUS OFF” !Configures a PFER measurement to
20                                            !single trigger mode.
30  OUTPUT 714;”SETUP:PFERROR:TRIGGER:SOURCE AUTO”!Configure trigger source
40                                                !to auto.
50  OUTPUT 714;”SETUP:PFERROR:SYNC MIDAMBLE” !Configures a PFER measurement so
60                                           !that burst synchronization, which
70                                           !will synchronize the timing of the
80                                           !measurement algorithm relative to
90                                           !the data sample, will be set
100                                          !to midamble.
110 OUTPUT 714; "SETUP:PFERROR:COUNT 20" !Sets the multi-measurement count state on,
                                         !and the number of measurements to 20.
120 OUTPUT 714; "SETUP:PFERROR:CONFIDENCE 90" !Sets the confidence level feature on,
                                              !and the level to 90%.
130 OUTPUT 714;”INITIATE:PFERROR” !Starts the PFER measurement.
140 OUTPUT 714;”FETCH:PFERROR:FAIL?”
150 ENTER 714;Integrity, Rms_ph_err_fail, Peak_ph_err_fail, Freq_err_fail, Number_of_meas
160 END
```

Using Confidence Levels with the Phase and Frequency Error Measurement

Currently the only measurement in GSM with the confidence level feature is Phase and Frequency Error. The Phase and Frequency Error measurement actually consists of three measurements: RMS Phase Error, Peak Phase Error and Frequency Error. The test set will not end a Phase and Frequency Error measurement early until it determines statistically that all three individual measurements should pass, with a level of confidence that is at least as high as the confidence level you set.

For example, if you set the confidence level to 95%, the test set only ends the measurement when it is:

- at least 95% confident that the RMS Phase Error will pass, and
- at least 95% confident that the Peak Phase Error will pass, and
- at least 95% confident that the Frequency Error will pass.

The level of confidence with which the complete Phase and Frequency Error measurement passes early is equal to the product of the confidence levels with which each of the three individual measurements passed early. This means that for this example, the test set will only end the measurement early if there is at least an 85.74% (95% x 95% x 95%) level of confidence that the measurements that have still to be taken will pass.

Configuring System Time and Date

Description

The test set provides the following time and date settings:

- Time

  This field provides entry of the local time in hours and minutes.

  The `Universal Coordinated Time` field will track changes made to the `Time` field.

- Date

  This field provides entry of the local date.

- Universal Coordinated Time (UTC)

  Also known as Zulu, Greenwich Mean Time, or UCT, this field provides entry of universal time in hours and minutes.

  The `Time` field will track changes made to the `Universal Coordinated Time (UTC)` field.

- Universal Coordinated Time (UTC) Date
- Time Zone

  The `Time Zone` field provides entry of a time offset to the universal coordinated time (UTC). Based on each new time zone setting and the current UTC, a new local time value is calculated and automatically entered into the Time field.

These features are accessed by pressing the SYSTEM CONFIG hardkey followed by the `Instrument Setup` (F1) softkey.

Related Topics

"SYSTem:DATE"

"SYSTem:TIME"

"SYSTem:TZONe"

"SYSTem:UTC"

Application Switching

Description

Different radio formats (such as GSM, AMPS, CDMA 2000 or TIA/EIA 136) can be tested when additional applications are purchased from Agilent Technologies. The test set allows you to switch between different applications. A reboot is necessary to make a newly selected application functional. The reboot happens automatically when the you tell the test set to switch applications. Switching to another application takes about one minute.

Some radio formats are combined as fast switching applications. Switching formats in a fast switching application takes less than 2 seconds.

Application Switching GPIB Command

In order to switch to another application use this GPIB command:

```
OUTPUT 714;”SYSTEM:APPLICATION:SELECT:NAME ‘GSM MOBILE TEST’”
```

Sending this command causes the test set to reboot.

Application Revision and Licensing

Each application must have a valid license and revision to function. Licensed revisions of applications are available from Agilent Technologies.

It may take several seconds before revision, model, and name information is returned.

Application Switching Programming Example

This program example shows you how to switch to the GSM Mobile Test Application.

1. Query the list of application names to get exact spelling of the GSM Mobile Test Application. This is not necessary if you already know the exact name.
2. Query the test set to get a list of all revisions for "GSM Mobile Test." This is not necessary if you are not changing revisions.
3. Select a revision of "GSM Mobile Test." This is required if you are changing revisions.
4. Select the GSM test application. This will switch applications and cause the test set to reboot.

```
10     OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME?"
20     !Queries all of the application names
30     ENTER 714;N$
40     PRINT "The CATALOG names that are loaded are ";N$
50     OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION? 'GSM MOBILE TEST'"
60     !Queries all revisions of GSM MOBILE TEST
70     ENTER 714;Cat_rev$
80     PRINT "The revisions for the GSM Mobile Test Application are ";Cat_rev$
90     OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION 'GSM MOBILE TEST','A.04.01'"
100    !Selects a revision
110    OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME 'GSM MOBILE TEST'"
120    !Switches the application to GSM MOBILE TEST
130    END
```

Related Topics

"Application Revisions and Licenses" on page 1530

"SYSTem:APPLication" on page 1264

"SYSTem:CURRent:TA" on page 1286

"Application Name" on page 1532

Application Revisions and Licenses

Description

Different revisions of the applications in your test set provide different capabilities. The selected application revision is loaded after the next application switch or power cycle of the test set. Once you select a revision the revision does not change unless you select another revision.

You can query the selected revision, all available revisions, and the total count of available revisions for a selected application. These queries are helpful when selecting revisions but are not usually necessary when switching applications.

NOTE The Agilent E1960A GSM Mobile Test Application revisions prior to A.04.00 do not support application switching. If you select a revision prior to A.04.00 you will not have a path to switch back to later revisions.

If you accidentally switch to a non-supported revision, use the firmware upgrade process to load firmware with the correct revision.

Application Revision Queries and Commands

These are commands to query revision information or select a revision.

- To query a **selected** application revision (running or not) use this GPIB command:

  `OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION? 'AMPS/136 MOBILE TEST'"`

- To query the revision of the application **currently running** use this GPIB command:

  `OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:REVISION?"`

- To query **all** of the revisions available for a application use this GPIB command:

  `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION? 'AMPS/136 MOBILE TEST'"`

- To **select** a revision of a application use this GPIB command:

  `OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION 'GSM mobile test','A.04.01'"`

- To query the number of revisions for a specified application:

  `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION:COUNT? 'GSM MOBILE TEST'"`

Application License Status Query

The application license status can be queried for a particular application and revision using the following GPIB query:

```
OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:LICENSE? 'GSM mobile test','A.04.01'"
```

This query returns one of the following:

- "LIC" - This revision of application appears to have a LICense. The application may have been developed before licensing and therefore needs no license.
- "NLIC" - This application does not appear to have a license. Selecting a Not LICensed revision will result in an error +130.
- "PART" - Some PART of the application does not appear to have a license.
- "UNKN" - This application has UNKNown license status.

NOTE If you switch to a not licensed revision the test set will reboot to the SYSTEM CONFIG screen. You will be unable to select any other screen or make any measurements. Query or view the Application Setup menu to determine the licensed versions of applications available.

Revision and license information can be viewed and selected from the SYSTEM CONFIG screen, by selecting the Application Setup menu. Revisions are shown with their license status. After the revision number is a letter. That letter indicates the revision license status; Licensed "L", Not Licensed "N", or Unknown "U".

- "L"- This revision of application appears to have a License. The application may have been developed before licensing and therefore needs no license.
- "N" - This application does not appear to have a license. Selecting a Not licensed revision will result in an error +130.
- "P" - Some Part of the application does not appear to have a license.
- "U" - This application has Unknown license status.

Related Topics

"Application Switching" on page 1528

"SYSTem:APPLication" on page 1264

Application Name

Description

The following queries give you details about the application name. To query or switch applications you must use the application's name as it appears in the catalog (without regard to case).

- To query the name of the all applications installed in the test set use this GPIB query.

  `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME?"`

- To query the name of the selected application (running or not) use this GPIB query.

  `OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME?"`

- To query the name of the currently running application use this GPIB query.

  `OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:NAME?"`

- To query the number of applications installed in the test set use this GPIB query.

  `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME:COUNT?"`

The application names can also be displayed in the Application Setup menu on the test set's display.

Related Topics

"SYSTem:APPLication" on page 1264

"Application Switching" on page 1528

Release Notes

GSM/GPRS (E1968A) Revision Information

This document describes features and functionality that are part of the E1968A GSM/GPRS Mobile Test Application releases. This document contains the original features, as well as enhancements that have been added in subsequent releases. Of great importance is the information regarding hardware compatibility and firmware changes and improvements that occur in the combined E1968A GSM/GPRS Mobile TA firmware as compared to the previous E1960A GSM Mobile TA firmware and the E1964A GPRS Mobile TA firmware.

Select the appropriate link below to view the required release.

- “A.01 Initial Release - January 2003” on page 1534

A.01 Initial Release - January 2003

This initial release combines the existing E1960A GSM Mobile Test Application version A.10.20 and the E1964A GPRS Mobile Test Application version A.04.20 into one GSM/GPRS Mobile Test Application (E1968A).

Hardware Requirements

- E5515A does not support E1968A.
- E5515B will support E1968A without a hardware upgrade under the following conditions:
  — Option 002 installed AND serial number is >= US40350362 or >= GB40470454, or
  — the test set is already running E1985A Fast Switching with GSM and/or GPRS.
- Instruments with Serial Numbers prior to US40350362 or GB40470454 (with option 002 installed) can be upgraded with upgrade product number E5515BU option 085 to be able to support the E1968A.
- E5515C requires option 002 to support the E1968A.

E1968A Functionality/License Summary

The E1968A is an integrated GSM/GPRS TA which replaces the E1960A GSM TA and the E1964A GPRS TA. There is no need for the E1985A/B to enable fast switching between GSM and GPRS as was required with the old E1960A and E1964A test applications. The E1968A contains both GSM and GPRS components and allows access to both components without the need to perform an explicit format switch (providing each component is licensed). If the E1968A has a GSM license, GSM calls are supported; if a GPRS license is present, GPRS data connections are supported; if both licenses are present, there is access to all capabilities. An added benefit of the integrated GSM and GPRS in the E1968A GSM/GPRS Mobile Test Application is there is no loss of BCH when going from GSM to GPRS testing or vice-versa; this allows the mobile to stay camped/attached.

Product Number/License summary:

- E1968A, GSM/GPRS Mobile Test Application, shell product, no technologies enabled
- E1968A-101 GSM Functionality, enables GSM
- E1968A-102 GPRS Functionality, enables GPRS
- E1968A-201 GSM and GPRS Functionality, enables both GSM and GPRS

Issues that can affect compatibility and test times changing from E1960A and/or E1964A to the E1968A

- Hardware compatibility - see “Hardware Requirements” above
- Prior single-partition (E1960A and E1964A) and fast switching (E1985A/B) will not run on future test sets
- Technologies must be licensed within the E1968A to gain their functionality
- Compatibility of GPIB commands from E1960A/E1964A to E1968A is maintained where possible however, some GPIB changes were required as well as the added improvements to test features in the E1968A
- Overlapped commands in the E1968A are not equivalent to those in the E1960A/E1964A. In many E1968A commands they are no longer needed and will only slow the test run when running old overlapped GPIB command code on the E1968A. This has been improved in the E1968A by new commands/methods for channel reconfiguration which possibly produce a reduction in test times.

Advantages to integrating, qualifying and moving to the E1968A

- All future GSM, GPRS and EGPRS (EDGE) test applications and lab applications will be based on this format. Follow-on versions of the E1968A will incorporate new features but the E1960A GSM and E1964A GPRS Mobile Test Applications will not be updated.
- The new GSM, GPRS and EGPRS (EDGE) format applications have a new firmware architecture that improves application performance.
- The new E1968A combined format provides the potential for a reduction in test times.
- The new E1968A combined format provides improvements to measurements and measurement features.
- Using the E1968A will not require a format switch for GSM, GPRS, and EGPRS (EDGE) testing because all of these formats are integrated in the E1968A.

GSM Functionality Now Available in GPRS

- IQ Tuning and Dynamic Power measurements are now available in GPRS. See “SETup:IQTuning” on page 1106 and “SETup:DPOWer” on page 1070.
- PFER CIFT functionality
- Expected Burst Type RACH supported in test mode.

  “CALL:BURSt:TYPE[:SELected]” on page 510
- The following network parameters may now be configured in the GPRS TA (previously available only in the GSM TA and GPRS LA): MCC, MNC, LAC, RAC, NCC, BCC. See the following respective commands:

  “CALL:MCCode” on page 555

  “CALL:MNCode” on page 557

  “CALL:LACode” on page 551

  “CALL:RACode” on page 740

  “CALL:NCCode” on page 606

  “CALL:BCCode” on page 496
- Repeat Paging may be enabled or disabled

  “CALL:PAGing:REPeat[:STATe][:SELected]” on page 616
- Display IMSI and IMEI (previously available only in the GPRS LA)
  Note: IMEI is not currently displayed in the GPRS TA.

  “CALL:MS:REPorted:IMSI?” on page 571

  “CALL:MS:REPorted:IMEI?” on page 571
- Report supported bands information (RUI only)

  “CALL:MS:REPorted:SBANd[:GMSK]?” on page 585

  “CALL:MS:REPorted:SBANd:EPSK?” on page 585
- Display power class reported by the class mark message

  “CALL:MS:REPorted:PCLass:GSM?” on page 579

  “CALL:MS:REPorted:PCLass[:SELected]?” on page 577
- Display power class reported for each band by both GSMK and EPSK (8PSK - EDGE) modulation schemes.

  “CALL:MS:REPorted:PCLass:EPSK[:SELected]?” on page 577

  “CALL:MS:REPorted:PCLass:EPSK:<band>?” on page 578

  “CALL:MS:REPorted:PCLass:GMSK[:SELected]?” on page 578

  “CALL:MS:REPorted:PCLass:GMSK:<band>?” on page 579

- Display corrupt burst, page count, decode error, missing burst information

  Note: Page counter is not relevant for GPRS data connections.

- Audio Generator instrument

  “AFGenerator” on page 455

GPRS Functionality Now Available in GSM

- Auxiliary RF Output port

- Power in unused bursts

  “CALL:TCHannel:PREDuction:UBURst” on page 827

Additional Functionality Changes

- The GPRS Data Connection Type setting has been renamed to Connection Type and has been extended by adding an Auto option (GSM TA and GSM/GPRS LA only)

  “CALL:FUNCtion” on page 536

- Over-lapped command functionality no longer available in GSM for some commands and is replaced by deferred parameter handover scheme as in GPRS

- Operating Mode command extended to add GSM BCH, GSM BCH+TCH, and CW modes. GSM banded RFGenerator commands removed.

  “CALL:OPERating” on page 609

- Display mobile multi-slot class if available. Multislot class is obtained during the attach procedure so isn’t available to the GSM TA.

  “CALL:MS:REPorted:MCLass:EGPRS[:SELected]?” on page 573

  “CALL:MS:REPorted:MCLass:EGPRS:<band>?” on page 573

  “CALL:MS:REPorted:MCLass:GPRS[:SELected]?” on page 574

  “CALL:MS:REPorted:MCLass:GPRS:<band>?” on page 574

GPIB Command Changes Resulting From Combining the E1960A and the E1964A into the E1968A GSM/GPRS Mobile Test Application

- “E1968A GSM/GPRS GPIB COMMAND CHANGES” on page 162

Other

Control over the power used by the mobile station for access bursts has been added to this release. For more details, refer to “Access Burst Power Control” on page 192

GSM (E1960A) Revision Information

This document describes features and functionality that are part of the E1960A GSM Mobile Test Application releases. This document contains the original features, as well as enhancements that have been added over time.

Select the appropriate link below to view the required release.

A.10 Release June 2002

This firmware release adds new frequency bands, half rate speech mode and a spectrum monitor.

This firmware release will run on an E5515C chassis with Option 002. If you have previously been using any revision of the E1960A GSM test application on an E5515A or E5515B chassis then this revision will also run.

For access to the spectrum monitor feature you require your chassis to be one of the following:

- an E5515C.
- an E5515B with serial number US40350362 or GB40470454 or higher.
- an E5515B with E5515BU option 085.
- an E5515A with E5515BU option 085.

Call Processing

- This release provides you with the GSM450, GSM480, GSM750 and RGSM frequency bands.
- Half rate speech channel mode has been added. For more details refer to "Testing a Mobile for Enhanced Full Rate Speech and Half Rate Speech Channel Modes" on page 201.

Measurements

A Spectrum Monitor measurement feature has been added. This allows you to find, identify and measure transmitted signals from your mobile phone. It can also be used for spur measurements in the transmit band. For more details refer to "Spectrum Monitor Description" on page 142.

Other

None

A.09 Release March 2002

This firmware release adds new features to the Output RF Spectrum and Power versus Time measurements.

This firmware release will run on an E5515C chassis with Option 002. If you have previously been using any revision of the E1960A GSM test application on an E5515A or E5515B chassis then this revision will also run. However, if you wish to run this test application on an E5515A or E5515B chassis for the first time, contact your local sales representative.

Call Processing

No new features in this release.

Measurements

- The Power versus Time measurement has been enhanced to provide a relaxed mask specification for the PCS band, as defined in 3GPP 51.010-1 section 13.3.5(c). For more information refer to "SETup:PVTime:LIMit:ETSI:PCS" on page 1175.
- The Output RF Spectrum measurement has been enhanced to allow you to select to either test to the ETSI defined, or your own specified limits. The commands used to set up your own limits are:

  — "SETup:ORFSpectrum:LIMit:SOURce" on page 1135

  — "SETup:ORFSpectrum:SWITching:LIMit:MANual[:SELected]" on page 1143

  — "SETup:ORFSpectrum:MODulation:LIMit:MANual[:SELected]" on page 1139

A.08 Release July 2001

Call Processing

This release provides you with the GSM850 frequency band.

Measurements

- The Phase and Frequency Error measurement has been enhanced to include a confidence level feature. Using confidence levels for your measurements can reduce your test time. Confidence levels simply end the measurement early, that is, before all the multi-measurements you specified are taken. It ends the measurement early *only* if it determines statistically that the rest of the measurements should pass. You can set the confidence level and the measurement limits. For more information on this feature refer to "Confidence Levels" on page 1524.

Other

- This release gives you the first revision of GSM which can be used for the E1985A GSM_AMPS/136_GPRS fast switching test application. The previous GSM release (A.07) only allowed you to switch quickly between GSM and AMPS/136, whereas this GSM revision also allows you to also switch quickly between GPRS.
- Internal graphical measurements for: Power versus Time, Output RF Spectrum, Phase and Frequency Error and I/Q Tuning.

  For more details on these graphical measurements refer to one of the following step-by-step measurement procedures:

  — "Measuring Power versus Time" on page 1322

  — "Measuring Output RF Spectrum" on page 1331

  — "Measuring Phase and Frequency Error" on page 1326

  — "Measuring IQ Tuning" on page 1335
- Screen images can be captured and saved as .GIF files. This is useful when you want to save copies of measurement results or other screen images. See "Printing and Saving Screen Images" on page 1441 for a complete explanation of this procedure.

A.07 Release May 2001

Call Processing

No new features in this release.

Measurements

No new measurements in this release.

Other

This release gives you the first revision of GSM which can be used for the E1985A GSM_AMPS/136 fast switching test application. To allow the GSM test application to operate in the fast switching environment with AMPS/136 two existing GSM commands had to be changed. These commands were:

- `SETUP:IQTUNING:REFERENCE:FREQUENCY`
- `CALL:MS:REPORTED:REVISION?`

If you previously used either of these commands you must change them to the new commands to allow your code to run.

Table 13. Command Changes in the A.07 Release

Previous Commands	New Commands
SETUP:IQTUNING:REFERENCE:FREQUENCY	"SETup:IQTuning:REFerence[:MANual][:FREQuency]:CHARacter:GSM" on page 1115. This command allows you to use the same settings as with the previous command, that is NEG67KHZ, ZEROKHZ, POS67KHZ, and AUTO. You can use this command for the GSM I/Q Tuning measurement whether or not the GSM test application is the currently active format.
	Alternatively you can use the following commands which are consistent with the format of the commands and settings in AMPS/136: "SETup:IQTuning:REFerence[:MANual][:FREQuency]:GSM" on page 1114. This command allows you to use the settings -67000, 0, and + 67000. You can use this command for the GSM I/Q Tuning measurement whether or not the GSM test application is the currently active format. "SETup:IQTuning:REFerence[:MANual][:FREQuency][:SELected]" on page 1114. This command allows you to use the settings -67000, 0, and + 67000. You can only use this command for the GSM I/Q Tuning measurement if GSM is the currently active format. "SETup:IQTuning:REFerence:AUTO" on page 1113.
CALL:MS:REPORTED:REVISION?	"CALL:MS:REPorted:REVision:CHARacter:GSM?" on page 580. This command returns the same values as with the previous command, that is, UNKNown, PHASe1, and PHASe2. You can use this command for the mobile's revision whether or not the GSM test application is the currently active format.
	Alternatively you can use the following commands which are consistent with the format of the command and setting in AMPS/136: "CALL:MS:REPorted:REVision[:DIGital]:GSM?" on page 582. This command returns the values; +1.00000000E+000 for phase 1, +2.00000000E+000 for phase 2, and NAN for unknown. You can use this command for the mobile's revision whether or not the GSM test application is the currently active format. "CALL:MS:REPorted:REVision[:DIGital][:SELected]?" on page 581. This command returns the values; +1.00000000E+000 for phase 1, +2.00000000E+000 for phase 2, and NAN for unknown. You can only use this command for the GSM revision if GSM is the currently active format.

A.06 Release February 2001

Call Processing

No new features in this release.

Measurements

- Analog Audio measurement
  In the previous revisions of this test application it was possible to make Analog Audio Level measurements. In this release we have increased the number of Analog Audio measurements to include Audio Frequency and Distortion. Although not typically a GSM mobile measurement we have also included SINAD measurements. For more information refer to "Analog Audio Measurement Description" on page 80.

Other

- RF Source Analyzer Level Compensation
  Amplitude offset is provided over a range of frequencies, in order to compensate for loss or gain of the external network between the test set and the DUT (device under test). For more information refer to "Amplitude Offset" on page 156.
- Dynamic Power measurement enhanced
  The number of bursts over which you can make this measurements has increased from 100 to 999. For more information on this measurement refer to "Dynamic Power Measurement Description" on page 98.
- Selectable AC or DC coupling between the Audio Generator and the front panel AUDIO OUT port.

A.05 Release May 2000

Call Processing

No new features in this release.

Measurements

No new measurements in this release.

Other

- Test Application Security
  A licensed version of each test application is required in order for the test application to operate. If you switch test applications to an unlicensed test application, the test set will reboot to the SYSTEM CONFIG screen. You will be unable to switch to any other screen, or make any measurements.

A.04 Release - March 2000

Call Processing

No new features in this release.

Measurements

No new measurements in this release.

Other

- Test Application selection for multi-format operation
  Menus have been added to the System Configuration screen which allow you to select between different Test Applications that are installed in the test set. This feature can also be accessed remotely within the SYSTem subsystem using the command "SYSTem:APPLication:SELect[:NAME] '<test application name>'" on page 1270.

NOTE It is not recommended that you switch to a GSM Test Application that has a revision earlier than A.04. Earlier revisions did not have the capability to select Test Applications.

There may be up to a three second delay between the time the Test Application is selected and it being implemented in the test set.

- Options installed display is now active
  The Options Installed display on the System Configuration screen has been activated to allow for the optional second source. Although the second source has been optional since the A.03 release, the Options Installed display has remained blank until this current release.
- Usability enhanced through gray fields
  Non-enabled menu items are now denoted as gray text, versus enabled menu items that are a standard black text. Currently there are no GSM Test Application menu items that use this feature.
- Measurement time-out resolution increased
  The measurement time-out resolution has been increased from 1 second to 0.1 seconds. The minimum time-out has also been reduced from 1 second to 0.1 seconds.
- Warning messages can be masked from the display
  A new command is available in the DISPlay subsystem which allows you to set whether or not the test set displays and beeps warning messages. For further information on this command refer to "DISPlay:MESSage:MASKable:STATe" on page 862. This feature is also available over the manual interface (the Maskable Messages Display State field is available in the Instrument Setup menu in the System Configuration screen).

A.03 Release - December 1999

Call Processing

- EFS
  The Enhanced Full-rate Speech (EFS) feature provides the ability to set up a call in EFS mode.
- SACCH Tx Level Signalling
  The mobile can now be commanded to use a different Tx level by signalling using the SACCH header alone. In previous releases a FACCH assignment as well as the updated SACCH header was used.

Measurements

- I/Q Tuning
  A new measurement that can be used to determine the quality of an I/Q modulator by measuring the power of spurious signals at harmonics of 67.7 kHz.
- Simultaneous BER results
  An enhancement to the BER measurement now allows all types of BER measurement results to be returned at the same time if required.
- Dynamic Power
  A new feature that performs a series of rapid power measurements on a mobile station. This is only available via the test set’s remote user interface.

Other

- Remote clear of error messages on screen
  A new command can be sent over the GPIB to clear error messages from the screen to enhance use of the test set in a remote situation. Previously, error messages on the screen could only be cleared through manual intervention, by pressing a key on the front panel. For further information on this command refer to “DISPlay:WINDow:ERRor:CLEar” on page 862.
- Status field indication of external or internal reference
  A status field has been implemented on the screen to indicate whether the test set has locked to an external or an internal reference.
- Beeper ON/OFF setting is non-volatile
  The ON/OFF setting of the beeper is now maintained through power-off. Previously, a power cycle would reset the beeper to its default state of OFF.
- Enhanced status subsystem for multi-format capability
  The status subsystem has been enhanced with radio system nodes where necessary for future multi-format capability. This will cause some status subsystem commands to be in error condition, unless they are replaced with the modified commands. The commands are:

  — STATus:QUEStionable:ERRors is now STATus:QUEStionable:ERRors:GSM

  — STATus:QUEStionable:CALL is now STATus:QUEStionable:CALL:GSM

  — STATus:OPERation:CALL is now STATus:OPERation:CALL:GSM

  — STATus:OPERation:NMRReady is now STATus:OPERation:NMRReady:GSM
- Instrument configuration information available remotely
  Information on the instrument hardware can be obtained through a remote command over the GPIB, and through a remote command via the LAN and a web browser. For further information on the commands refer to “Hardware Configuration Report” on page 1515.
- Enhanced instrument information on the Configuration Screen
  The Instrument Information display on the Configuration Screen, now includes Subnet Mask and Gateway Default information in a new, improved information display.
- *IDN? returns “Agilent Technologies” in the manufacturer’s field where previously it returned “Hewlett-Packard”.

- RF Generator frequency range is now matched to the RF Receiver frequency range
  Previously the RF Generator had a low end limit of 45 MHz, while the RF Receiver has always had a low end limit of 292.5 MHz. The RF Generator is now limited to 292.5 MHz to enhance testability and supportability of the test set.

A.02 Release - July 1999

Call Processing

- Paging Mode selectable between “Reorganisation” or “Normal”

Measurements

- Automatic closed loop settings as part of Normal BER and Fast BER measurements
- 3 kHz speech selection for Downlink Speech Source

Other

- LAN subnet mask and LAN Default Gateway settable
- Status Subsystem for GPIB queries of instrument status
- Display Brightness
- Display Automatic Backlight Dimming

A.01 Release - March 1999

Call Processing

No new features in this release.

Measurements

- Normal BER
- Pulsed Audio Source (For uplink speech measurement)

Other

Measurement Integrity on Manual User Interface

A.00 Initial Release - January 1999

Call Processing

- GSM 900 (Includes PGSM/EGSM), DCS1800, PCS1900
- MS and BS Originated Calls
- TCH, Timeslot, Timing Advance, MS Tx Level Assignments
- Dual-Band Handover
- Downlink Speech Source
- Test Mode - CW, BCH Only, BCH + TCH

Measurements

- Tx Power
- Output RF Spectrum
- Power versus Time
- Phase / Frequency Error
- Burst Timing
- Analog Audio
- Uplink Speech Measurement (requires pulsed audio source)
- Burst by Burst BER (Fast BER)

Other

- Audio Source
- User settable amplitude offset

GPRS (E1964A) Revision Information

This document describes features and functionality that are part of the E1964A GPRS Mobile Test Application releases. This document contains the enhancements that have been added over time.

Select the appropriate link below to view the required release.

A.04 Release June 2002

This firmware release adds new frequency bands, a spectrum monitor, and a multislot enhancement to the Output RF Spectrum measurement.

This firmware release will run on an E5515C chassis with Option 002. If you have previously been using any revision of the E1964A GPRS test application on an E5515A or E5515B chassis then this revision will also run. However, if you wish to run this test application on an E5515A or E5515B chassis for the first time, contact your local sales representative.

For access to the spectrum monitor feature you require your chassis to be one of the following:

- an E5515C.
- an E5515B with serial number US40350362 or GB40470454 or higher.
- an E5515B with E5515BU option 085.
- an E5515A with E5515BU option 085.

Call Processing

This release provides you with the GSM450, GSM480, GSM750 and RGSM frequency bands.

The BA Table can now accept multiple entries, whereas previously they could only accept one entry. For more information refer to "CALL:BA" on page 477.

Measurements

- A Spectrum Monitor measurement feature has been added. This allows you to find, identify and measure transmitted signals from your mobile phone. It can also be used for spur measurements in the transmit band. For more details refer to "Spectrum Monitor Description" on page 142.
- The Output RF Spectrum measurement has been enhanced, allowing you to measure multislot configurations with two adjacent uplink timeslots:
  - — The ORFS due to modulation measurement is performed for only one burst at a time in the multislot configuration, which you specify using the command "RFANalyzer:MANual:MEASurement:BURSt" on page 1025.
  - — The ORFS due to switching measurement is performed over both adjacent bursts in the multislot configuration.

  For more information refer to "GPRS and EGPRS Output RF Spectrum Measurement" on page 109.

Other

None

A.03 Release March 2002

This firmware release provides you with a new measurement; Block Error Rate, and adds new features to the existing Output RF Spectrum, Power versus Time, and Bit Error Rate measurements.

This firmware release will run on an E5515C chassis with Option 002. If you have previously been using any revision of the E1964A GPRS test application on an E5515A or E5515B chassis then this revision will also run. However, if you wish to run this test application on an E5515A or E5515B chassis for the first time, contact your local sales representative.

Call Processing

- Power in Unused Bursts on Downlink PDTCH ARFCN
  Two new commands are now provided which relate to the power levels in unused bursts on the downlink PDTCH ARFCN. These commands are:
  - — Unused Downlink Burst Power Reduction Selection (see "CALL:PDTCH:PREDuction:UBURst" on page 642)
    This command is used to set or query the power reduction level that is applied to all unused bursts on the downlink PDTCH ARFCN.
  - — Unused Downlink Burst Current Absolute Power Level (see "CALL:PDTCH:POWer[:AMPLitude]:UBURst?" on page 639)
    This query returns the current absolute power level of the unused bursts on the downlink PDTCH ARFCN.
- Additional Data Connection Commands
  Two new commands have been added which allow you to set the payload pattern for downlink data. These commands are:
  - — **CALL:FUNCtion:DATA:PAYLoad:PATTern:BLERCALL:FUNCtion:DATA:PAYLoad:PATTern:BLERCALL:FUNCtion:DATA:PAYLoad:PATTern:BLER**

CALL:FUNCtion:DATA:PAYLoad:PATTern:BLER

Payload Pattern (BLER) (see “CALL:FUNCtion:DATA:PAYLoad:PATTern:BLER” on page 544).
This command sets/queries the type of downlink payload pattern to be sent to the mobile when the data connection type is set to BLER in Active Cell operating mode, and the LLC Frame Check Sequence connection parameter is set to Corrupt.

— CALL:FUNCtion:DATA:PAYLoad:PATTern:BLERCALL:FUNCtion:DATA:PAYLoad:PATTern:BLERCALL:FUNCtion:DATA:PAYLoad:PATTern:BLER

CALL:FUNCtion:DATA:PAYLoad:PATTern:BLER

Payload Pattern (ETSI B) (see “CALL:FUNCtion:DATA:PAYLoad:PATTern:ETSIB” on page 545).
This command sets/queries the type of downlink payload pattern to be used when the test set’s operating mode is set to either BCH+PDTCH Test Mode, or Active Cell operating mode with the data connection type set to ETSI Type B.

Measurements

- Block Error Rate measurement (using either ETSI Test Mode B, BCH+PDTCH Test Mode, or the Agilent proprietary BLER mode).
  This measurement is based on GPRS receiver tests defined in 3GPP 51.010 section 14.16. For more information refer to “Block Error Measurement Description” on page 90.
- The Power versus Time measurement has been enhanced to provide an optional relaxed mask specification for the PCS band, as defined in 3GPP 51.010-1 section 13.3.5(c). For more information refer to “SETup:PVTime:LIMit:ETSI:PCS” on page 1175.
- The Output RF Spectrum measurement has been enhanced allowing you to test using either the ETSI defined, or your own specified limits. The commands used to set up your own limits are:

— “SETup:ORFSpectrum:LIMit:SOURce” on page 1135

— “SETup:ORFSpectrum:SWITching:LIMit:MANual[:SELected]” on page 1143

— “SETup:ORFSpectrum:MODulation:LIMit:MANual[:SELected]” on page 1139

- The Bit Error Rate measurement has been enhanced, allowing you to specify how the measurement interprets blocks with errors that are received from the mobile. For more information refer to “SETup:GBERror:ZBBLocks” on page 1105.

Other

- RF Out Only front panel connector
  This release enables control of the type-N RF Out Only connector on the test set’s front panel. This connector provides an optional path for the test set’s RF output. For more information refer to “RF OUT ONLY” on page 1435 and “RFGenerator: OUTPut” on page 1031.

A.02 Release July 2001

Call Processing

- This release provides you with GPRS operation in the GSM850 frequency band.
- Additional data connection commands
  Three new commands have been added that may enable the test set to establish a data connection with mobiles which cannot connect using the test application default settings. These commands are:

  — Data Connection Frame Number Type (see “CALL:FUNCtion:DATA:FRAMe:STARt” on page 543)
  This command relates to the GPRS Attach procedure allowing you to change the TBF (Temporary Block Flow) frame starting position type.

  — Data Connection LLC Frame Check Sequence (see “CALL:FUNCtion:DATA:BLER:LLC:FCSequence” on page 541)

  — BLER Block Polling Interval (see “CALL:FUNCtion:DATA:BLER:POLLing:INTerval” on page 542)

  “CALL:FUNCtion:DATA:FRAMe:STARt” on page 543 is applicable to all data connection types. “CALL:FUNCtion:DATA:BLER:LLC:FCSequence” on page 541 and “CALL:FUNCtion:DATA:BLER:POLLing:INTerval” on page 542 are only applicable when you want to establish a BLER mode data connection.
- Additional PDTCH protocol control commands
  Two new commands are now provided in case your mobile does not fully support the Packet Timeslot Reconfigure (PTR) message.
  The PTR message is a superset message which is used to change most of the connection related parameters (for example, MS TX Level, timeslot configuration, and power control). This message is described in 3GPP TS 04.60 section 11.2.31. The Packet Power Timing Advance (PPTA) message can be used as an alternative to the PTR message, but only for changes to the MS TX Level or timing advance. This message is described in 3GPP TS 04.60 section 11.2.13.

  The two new commands are:

  — Packet Timeslot Reconfigure State (see “CALL:PDTCH:PMESsage:PTReconfig” on page 638)

  — Packet Power Timing Advance State (see “CALL:PDTCH:PMESsage:PPTadvance” on page 637)

NOTE The recommended method for modifying PDTCH parameters during an active data connection is to use the “CALL:HANDover | HANDoff[:IMMediate]” on page 548 to apply deferred settings. If you currently use this method, note that you will need to amend your code to specifically set “CALL:PDTCH:PMESsage:PTReconfig” on page 638 to On.

- RLC/MAC Header State
  This command allows you to define whether or not a valid RLC/MAC (Radio Link Control/Medium Access Control) header is present on the downlink PDTCH bursts when using the BCH+PDTCH Test Mode. The RLC/MAC Header contains a PR field which is used to indicate a power reduction level to the mobile. When the RLC/MAC Header State command is set to Off, the PR field of the RLC/MAC Header is filled with random data. For further information on this command see “CALL:PBPTest:RLCMac[:HEADer]:STATe” on page 620.

- First Downlink Burst to Loop
  This command allows you to select which downlink burst of the multislot configuration you want to be looped back in the first uplink burst. Subsequent downlink bursts are looped back onto subsequent uplink bursts. This command is important for the Bit Error Rate (BER) measurement and BLock Error Rate (BLER) reports. For more details on this command, see "CALL:PDTCH:MSLot[:FIRSt]:DOWNlink:LOOPback[:BURSt]" on page 635.
- Network Initiated Detach
  This new command allows you to perform a GPRS Detach procedure from the test set rather than from the mobile. For details on this command refer to "CALL:FUNCtion:DATA:DETach" on page 542.
- Manual setting of the BA table entry
  Previously, you could only set the BA table entry using the command "CALL[:CELL]:BA:TABLe[:SELected]" on page 479. You can now set this entry using the test set's front panel. To do this, press the **CALL SETUP** key, press `Cell Info` (**F6**), press `BA Table` (**F3**) then press the knob and make a selection.
- Extended Range for Downlink Power Reduction Levels
  The downlink PDTCH power reduction level range has been extended. You can now specify a range from 0 to 25 dB (previously 0 to 12 dB). For details on this command refer to "CALL:PDTCH:PREDuction:LEVel[1|2]" on page 641.

Measurements

No new measurements in this release.

Other

- Internal graphical measurements for; Power versus Time, Output RF Spectrum and Phase and Frequency Error.
  For more details on these graphical measurements refer to one of the following step-by-step measurement procedures:

  — "Measuring Power versus Time" on page 1361

  — "Measuring Phase and Frequency Error" on page 1367

  — "Measuring Output RF Spectrum" on page 1370

GPRS (E1964A) Revision Information

- This release gives you the first revision of GPRS which can be used for the E1985A GSM_AMPS/136 fast switching test application. This release when used with the E1985A GSM_AMPS/136_GPRS fast switching test application allows you to switch quickly between GSM, AMPS/136, and GPRS formats.

  To allow the GPRS test application to operate in the fast switching environment with GSM and AMPS/136 a number of the existing GPRS commands had to be changed. The previous commands and their new replacements are shown in the table below. If you previously used any of these commands you must change them to the new commands to allow your code to run. Otherwise, you will receive an error message. Note, this error message only appears if you are using the individual E1964A GPRS Mobile Test Application. If you are using the E1985A GSM_AMPS/136_GPRS Fast Switching Test Application, you will not receive an error message as these commands are still valid for setting the inactive GSM format.

Table 14. Command Changes in the A.02 Release

Previous Commands	New Commands
CALL[:CELL]:POWer[:SAMPlitude]:GSM	"CALL[:CELL]:POWer[:SAMPlitude][:SELected]" on page 648
CALL[:CELL]:POWer:AMPLitude:GSM	"CALL[:CELL]:POWer:AMPLitude[:SELected]" on page 651
CALL[:CELL]:POWer:STATe:GSM	"CALL[:CELL]:POWer:STATe[:SELected]" on page 654
RFANalyzer:MANual:POWer:GSM[:SELected]:BURSt[1|2]	"RFANalyzer:MANual:POWer:GPRS[:SELected]:BURSt[1|2]" on page 1028
STATus:OPERation:NMRReady:GSM:CONDition STATus:OPERation:NMRReady:GSM:ENABle STATus:OPERation:NMRReady:GSM:NTRansition STATus:OPERation:NMRReady:GSM:PTRansition STATus:OPERation:NMRReady:GSM[:EVENt]	STATus:OPERation:NMRReady:GPRS:CONDition STATus:OPERation:NMRReady:GPRS:ENABle STATus:OPERation:NMRReady:GPRS:NTRansition STATus:OPERation:NMRReady:GPRS:PTRansition STATus:OPERation:NMRReady:GPRS[:EVENt] If you require more details on this status register, see "STATus:OPERation:NMRReady:GPRS Condition Register Bit Assignment" on page 1232.
STATus:QUEStionable:CALL:GSM:DATA:CONDition STATus:QUEStionable:CALL:GSM:DATA:ENABle STATus:QUEStionable:CALL:GSM:DATA:NTRansition STATus:QUEStionable:CALL:GSM:DATA:PTRansition STATus:QUEStionable:CALL:GSM:DATA[:EVENt]	STATus:QUEStionable:CALL:GPRS:CONDition STATus:QUEStionable:CALL:GPRS:ENABle STATus:QUEStionable:CALL:GPRS:NTRansition STATus:QUEStionable:CALL:GPRS:PTRansition STATus:QUEStionable:CALL:GPRS[:EVENt] If you require more details on this status register, see "STATus:QUEStionable:CALL:GPRS Condition Register Bit Assignment" on page 1247.

Table 14. Command Changes in the A.02 Release

Previous Commands	New Commands
`STATus:QUEStionable:ERRors:GSM:CONDition`	`STATus:QUEStionable:ERRors:GPRS:CONDition`
`STATus:QUEStionable:ERRors:GSM:ENABle`	`STATus:QUEStionable:ERRors:GPRS:ENABle`
`STATus:QUEStionable:ERRors:GSM:NTRansition`	`STATus:QUEStionable:ERRors:GPRS:NTRansition`
`STATus:QUEStionable:ERRors:GSM:PTRansition`	`STATus:QUEStionable:ERRors:GPRS:PTRansition`
`STATus:QUEStionable:ERRors:GSM[:EVENt]`	`STATus:QUEStionable:ERRors:GPRS[:EVENt]`
	If you require more details on this status register, see "STATus:QUEStionable:ERRors:GPRS Condition Register Bit Assignment" on page 1253.

- Screen images can be captured and saved as .GIF files. This is useful when you want to save copies of measurement results or other screen images. See "Printing and Saving Screen Images" on page 1441 for a complete explanation of this procedure.

A.01 Release February 2001

Call Processing

- ETSI Test mode A and B
  In the initial GPRS release the only type of data connection available was the Agilent proprietary BLER method. This enhancement gives you two additional options for data connection, namely the ETSI defined Type A and Type B. For more information refer to the command "CALL:FUNCtion:CONNection:TYPE" on page 538.
- Additional Timeslot Configurations
  A new command is available that allows you to select from a list of multiple timeslot configurations. These configurations are:

  — one downlink and one uplink

  — two downlinks and one uplink

  — two downlinks and two uplinks

  — three downlinks and one uplink

  — three downlinks and two uplinks

  — four downlinks and one uplink

  For more information refer to the command "CALL:PDTCH:MSLot:CONFig" on page 634.
- Coding Scheme Options for Data
  A new command is available that allows you to set the PDTCH coding scheme in ETSI test mode to either CS1, CS2, CS3 or CS4. For more information on this command refer to "CALL:PDTCH:CSCHeme" on page 627.

- Deferred Settings
  A new feature allows you to set-up all your PDTCH parameters but defers their implementation until you send one handover command. This has the advantage of increasing the speed of the PDTCH change as the signalling happens only once, at the handover command, and not at the change of each individual PDTCH parameter. For more information refer to the command "CALL:HANDover | HANDoff[:IMMediate]" on page 548.
- Operating Modes
  An additional two operating modes are available, namely, GPRS Test Mode BCH and GPRS Test Mode BCH + PDTCH. For more information refer to the command "CALL:OPERating" on page 609.

Measurements

- Output RF Spectrum due to modulation (using ETSI Test mode A or B)
  For more information on this measurement refer to "Output RF Spectrum Measurement Description" on page 106.
- Power versus Time multi-uplink mask
  For more information on this measurement refer to "GPRS and EGPRS Power versus Time Measurement" on page 123.
- Multislot BER (using ETSI Test mode B only)
  For more information on this measurement refer to "GPRS Bit Error Measurement" on page 88.
- Multislot tolerant Transmit Power
  For more information on this measurement refer to "Transmit Power Measurement Description" on page 144.
- Multislot tolerant Phase and Frequency Error
  For more information on this measurement refer to "Phase and Frequency Error Measurement Description" on page 113.

Other

- Manual User Interface
  The initial GPRS release only had remote user access. This release provides you with access to the measurements and configuration via the test set's front panel. For more information on using the test set manually refer to your GPRS Quick Guide which was delivered with your test set.

Note, due to the lack of commercially available GPRS mobile stations some of the features added to this release have not been fully verified.

GSM/GPRS Lab Application Revision Information

This document describes features and functionality that are part of the Agilent Technologies E6701 GSM/GPRS Lab Application releases. This document contains the original features, as well as enhancements that have been added over time.

Select the appropriate link below to view the required release.

C.01 Release - February 2003

The E6701C replaces the E6701B.

This firmware release provides you with integrated GSM and GPRS network emulation capability. In addition, support for GSM Circuit Switched Data (CSD) Channels, GSM Short Message Service, GSM Logging and Enhanced-Observed Time Difference (E-OTD) testing have also been added to this release.

This firmware release will run on an E5515C chassis with Option 002.

Protocol Logging

This release provides you with additional observation points for logging GSM protocol messages. The additional observation points include RLP, PPP, PPP HDLC, and RRLP. For more details, refer to "Protocol Layers and Messages" on page 41.

Data Channel

Support for GSM Circuit Switched Data (CSD) has been added to the existing GPRS data channel capability. For more details, refer to "GSM Circuit Switched Data (CSD)" on page 75

Call Processing

- GSM and GPRS network emulation have been integrated in this release. See "A.01 Initial Release - January 2003" on page 1534 for more information about the effects of this integration.
- Support for GSM Short Message Service has been added to the existing Short Message Service capability. For more details, refer to "Point-to-Point SMS" on page 242.
- It is now possible to use the test set to verify the Enhanced-Oberved Time Difference (E-OTD) capability of your mobile station. See "E-OTD (Enhanced Observed Time Difference)" on page 256 for more details about this feature.

B.01 Release - June 2002

The E6701B replaces the E6701A.

NOTE This information is PRELIMINARY and subject to change without notice. Consult your local Agilent sales office for the latest information.

Summary of Features

- Web-based Protocol Logging Replaced by Wireless Protocol Advisor Software
- **New:** Short Message Service (SMS)
- **New:** Protocol Event Trigger Output (PETO)
- **New:** PBCCH capability
- **New:** Continuous Timing Advance
- **New:** Fixed Allocation
- **New:** USF BLER
- **New:** Mobile Station Measurement Reports
- **New:** Enhanced Stack Configurations

Protocol Logging The previous protocol logging system has been replaced by the Wireless Protocol Advisor software, E6581A. This software expands the features available in protocol logging.

Log GPRS protocol messages using the GPRS Wireless Protocol Advisor software (included with the protocol application). Allows real-time logging of inter-layer and peer-to-peer messages. Includes powerful triggering, filtering, and search capabilities of logs, and decode view for viewing individual bit fields with appropriate labeling for each message.

Short Message Service Short messages can be sent to and from the DUT. This allows emulation of live GPRS point-to-point SMS (a short message is sent from one MS to another MS via the network), as well as cell broadcast SMS functionality. The cell broadcast SMS service allows short messages to be sent to every MS currently in a particular cell. Cell broadcast messages are repeated at intervals over a period of time, which allows an MS to receive the message even if entering the cell after the first transmission.

Protocol Event Trigger Output This feature provides a hardware trigger output from the rear panel of the test to control external instruments and devices. It is an extension of the trigger provided in earlier applications. Various frame triggers and protocol message-based triggers are available, based on the downlink in multiple layers of the protocol stack.

The original trigger could be set to trigger on every TDMA frame with user-settable timeslot and symbol positions. PETO offers additionally:

- Several more frame triggers with varying degrees of frequency
- Protocol message based triggers on specific downlink messages sent by the test set

PBCCH Packet Broadcast Control Channel (PBCCH) is a channel which is used when the test set is in Active Cell mode. When a PBCCH is present, the DUT will perform all requests for GPRS services via this channel.

Continuous Timing Advance Continuous Timing Advance is an alternate method to the previously available Timing Advance assignment method. This is available in the RLC/MAC layer of the Protocol Control Menu. Now the DUT is given parameters to look in a given timeslot for its timing advance value.

Fixed Allocation Fixed allocation provides more control over transferring data between the test set and the DUT. It provides the DUT with an allocation of uplink blocks which satisfies the number of octets that the DUT believes is necessary to transfer all of its data.

USF BLER USF BLER is a measurement report viewed on the Call Setup screen. It is an indication of the number of PDTCH blocks incorrectly decoded (USF bits only) by the MS receive path.

GPRS Infrequent Network Events - accept/reject options for key requests:

- Attach Accept
- Attach Reject (with cause)
- Detach Request (Mobile Terminated)
- Identity Request
- Activate PDP Context Accept
- Activate PDP Context Reject

Mobile Station Measurement Reports Measurement Reports display measurements from the DUT regarding the quality of the downlink channel. The following channel parameters have data provided:

Enhanced Stack Configuration Several elements of the protocol stack can now be controlled. See "Protocol Control" for instructions to use the menu.

Six controllable protocol events are listed below. These features are evaluated according to the GSM 04.08 standard.

- Attach Accept
- Attach Reject (with cause)
- Detach Request (Mobile Terminated)
- Identity Request
- Activate PDP Context Accept
- Activate PDP Context Reject

A.01 Release - November 2001

These are the original features of the E6701A.

The E6701A GPRS Lab Application is a firmware which enables the E5515C Agilent Technologies 8960 Series wireless communications test set to:

- Log GPRS protocol
- Use the test set as a data channel for transferring IP datagrams
- Provide parameter enhancements compared to the E1964 Mobile Test Application

Features

Contains all functionality of the E1964 GPRS Mobile Test Application, A.02 release.

Protocol Logging Features

Logs GPRS Protocol at the following layers:

- L1_Interface
- RLC/MAC
- LLC
- GMM/SM
- GSM/L3
- SNDCP
- IP

Provides Setup, Start and Stop of Protocol Logging from the front panel, Remote User Interface, and the test set's new Web User Interface. Multiple browser windows can be opened to one test set display, allowing users to share log data and control of logging at multiple locations.

Allows setup of logging to control any or all of seven observation points, corresponding to the logged layers listed above. Allows a user-defined log header. Allows choice between a cyclic or linear buffer, giving the opportunity to write over existing logged data or to stop when the buffer is full.

Displays log results in a web browser, currently supporting Internet Explorer 5.01.

Applicable Standards

Multiple standards apply to this Lab Application. The most relevant are listed here:

- GPRS 04.60 v. 7.3.1
- GSM 04.08 v. 7.6.1
- GSM 04.64 v. 7.3.0

Data Channel

Data Channel allows the test set to be used as a router for transferring IP datagrams between the DUT and anywhere on the network that the test set is connected to.

Includes the ability to set an IP address for the DUT, ping the DUT or any alternate address, control ping setup, and log protocol while using the data channel. All test set measurements except BER are available while using the data channel.

Data Channel is available through the front panel and the Remote User Interface.

Parameter Enhancements

Parameter Enhancements offer extended capability over the E1964 GPRS Mobile Test Application.

Parameter enhancements are available through the front panel and the Remote User Interface.

Parameters that are now variable are:

- MCC
- MNC
- LAC
- NCC
- BCC
- RAC

Other controllable features are:

- Timing Advance. Timing advance values can now be sent to the DUT, enabling simulation of propagation delays by telling the DUT how much it should offset its transmissions. Actual value is band-dependent.
- Uplink State Flag. The USF value is sent to the DUT in an immediate assignment message. The DUT can be instructed to transmit on the block corresponding to the new USF.

EGPRS Lab Application Revision Information

This document describes features and functionality that are part of the Agilent Technologies E6704 EGPRS Lab Application releases. This document contains the original features, as well as enhancements that have been added over time.

Select the appropriate link below to view the required release.

- "A.01 Release - February 2003"

A.01 Release - February 2003

These are the original features of the E6704A EGPRS Lab Application.

The E6704A EGPRS Lab Application is an extension of the E6701C GSM/GPRS Lab Application, C.01 release. The E6704A provides all of the functionality within the E6701C and additionally provides a number of EGPRS-specific Call Processing and Measurement features. For more information on the features inherited from the E6701C, refer to "GSM/GPRS Lab Application Revision Information" on page 1555.

Hardware Requirements

Special hardware requirements apply for the E6704A EGPRS Lab Application. Please contact your local sales representative for more details.

Features Specific to the E6704A EGPRS Lab Application

The following features are available in the E6704A EGPRS Lab Application over and above the features provided by the E6701C and E1968A:

Call Processing

- The following call processing commands have been added which are specific to EGPRS:
  - Modulation Coding and Puncturing Schemes
    For more details refer to "CALL:PDTChannel:MCSCheme" on page 630 and "CALL:PDTChannel:MCSCheme:EBPTest" on page 631.
  - Switched Radio Block (SRB) Loopback Connection Type
    For more details refer to "CALL:FUNCtion:CONNection:TYPE" on page 538.

Measurements

- The following measurements provide support for both GMSK and 8PSK EGPRS modulation coding schemes (MCS1 through MCS9):

  — EGPRS Transmit Power
  For more details refer to "EGPRS Transmit Power (ETXP) Measurement" on page 146.

  — Block Error
  For more details refer to "Block Error Measurement Description" on page 90.

- The following measurements provide support for GMSK EGPRS modulation coding schemes (MCS1 through MCS4):

  — Dynamic Power
  For more details refer to "Dynamic Power Measurement Description" on page 98.

  — Output RF Spectrum
  For more details refer to "Output RF Spectrum Measurement Description" on page 106.

  — Power versus Time
  For more details refer to "Power versus Time Measurement Description" on page 117.

  — Phase and Frequency Error
  For more details refer to "Phase and Frequency Error Measurement Description" on page 113.

  — I/Q Tuning
  For more details refer to "I/Q Tuning Measurement Description" on page 103.