Agilent Technologies 8960 Series 10 Wireless Communications Test Set
Agilent Technologies E1963A W-CDMA Mobile Test Application and E6703A Lab Application

Reference Guide

E1963A W-CDMA Mobile Test Application Revision A.03
E6703A W-CDMA Lab Application Revision A.01
1000-1864 (not orderable)

www.agilent.com/find/8960support/

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Safety/Regulatory Information

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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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ASSISTANCE

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

(81) 426 56 7832
(81) 426 56 7840 (FAX)

Latin America

(305) 267 4288 (FAX)

Australia/New Zealand

1 800 629 485 (Australia)
0800 738 378 (New Zealand)

Asia-Pacific

(852) 2599 7777
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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

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

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:	**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	
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	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
	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

01 May 2001

R M Evans

R.M. Evans / Quality Manager

01 May 2001

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

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 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

Once a connection is established between the PC running the WPA (Wireless Protocol Advisor) and the test set, a logging session can be activated (or deactivated) by selecting the start (or stop) softkey from the test set's front panel or by sending GPIB commands that perform the same functions:

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.

Test Set Control of Protocol Logging

If a PC with the WPA software has not yet connected with the test set, an error message will be generated if an attempt is made to start protocol logging. Exactly one PC/WPA can be connected to a test set at one time.

Front Panel Control of Protocol Logging

1. Press the **CALL SETUP** key to go to the `Call Setup` screen.
2. Press the **More** key on the left hand `Call Control` menu two times to go to menu 3.
3. Select `Protocol Logging` (**F1**).
4. Select `Start Protocol Logging` (**F1**) to begin logging.

Remote Control of Protocol Logging

The GPIB command to control Protocol Logging is "CALL:PLOGging" on page 350.

Data Channel

GPRS Packet Data Service

The WCDMA Lab Application’s packet data service is a complete end-to-end service conforming to the GPRS Packet Data Service described in 3GPP TS 23.060 specification. The lab application does not provide any applications support or network services above TCP/IP packet handling.

For an example of establishing a packet data connection, see “GPRS Packet Data Service Example Procedure”

Related Topics

“How Do I Set Up Data Channel Parameters?”

“GPRS Attach MSC”

GPRS Packet Data Service Example Procedure

The following procedure is an example of how to use the test set for IP packet data transfer. The following steps outline the requirements for data service using a WCDMA mobile station as a wireless modem. The mobile station will be connected to the USB port on a laptop computer (PC) running USB port software developed by the manufacturer of the mobile station.

All test sets capable of running the WCDMA Lab Application have an internal server with an 8960 web site. This web site provides screen capture images and supports printouts. This procedure will demonstrate how to access this web site via the RF interface using packet data service.

The purpose of this procedure is to serve as an overview of the tasks required for a typical data channel application. If your particular application involves accessing internet or intranet sites via the test set's LAN interface, additional requirements such as getting through corporate firewalls may complicate setup procedures.

A. PC Setup

Install and Configure Device Driver

The laptop has to be configured to include the wireless modem in its list of networks. In this application, the wireless modem manufacturer produced software that runs on the PC. When run for the first time, the software prompts the user for setup information. When properly configured, the PC will recognize the wireless modem on the USB (or other) port.

Configure the PC for a dial-up connection to the Internet via the mobile station

The laptop has to be configured to include the wireless modem in its list of networks. The network dial-up connection properties must be configured according to the requirements of the mobile station and the data port driver. When the PC is properly configured, the "Network and Dial-up Connections menu" should include the wireless modem in its list of connections.

Figure 1.

B. Hardware Connections

There are many different configurations for testing wireless modems (or other UE such as WAP enabled mobile stations) data handling performance. See “Modem Functional Test” for a diagram of the configuration used for this example.

RF (Wireless Modem to Test Set)

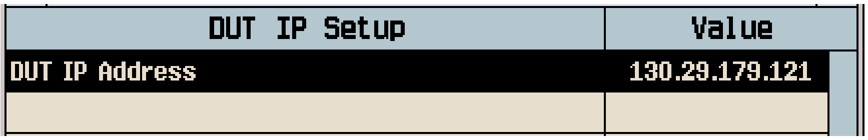
1. Connect the wireless modem RF cable to the test set’s RF In/Out port.

PC to Wireless Modem

1. For this example, the USB port provides the connection. Connect the USB port from the wireless modem to the PC.

C. Test Set Setup

1. Press the Call Setup key to go to the Call Setup screen on the test set.
2. Press the left **More** key to go to the 3 of 3 screen of the Control menu.
3. Select `DUT IP Setup` to open the DUT IP Setup menu on the test set.
4. Set the DUT IP Address in the DUT IP Setup menu on the test set. For this procedure, The DUT IP Address must be unique in that no other host on the network is using that same address. In this example the network consists of only two IP addresses, the PC and the Test Set. *The DUT IP Address must be different than the LAN IP Address found in the Instrument Setup menu*. See “IP Address Requirements” .



DUT IP Setup	Value
DUT IP Address	130.29.179.121

5. In this application, the DUT IP Address will be sent to the laptop computer if you set the Internet Protocol (TCP/IP) Properties to “Obtain an IP address automatically” menu.

6. The following script was used to set up the Test Set’s base station emulator for the wireless modem selected for this example. These settings are UE dependent, and are provided for reference only.

```
hpib "CALL:CELL:OPER:MODE OFF" !Operating Mode
hpib "CALL:UPLink:PRAChannel:TIMing:OFFSet Normal" !Uplink Timing Offset
hpib "CALL:CELL:MCCode:WCDMa 440" !Cell Parameters, MCC
hpib "CALL:CELL:MNCode:WCDMa 79" !Cell Parameters, MNC
hpib "CALL:CELL:LACode:WCDMa 9" !Cell Parameters, LAC
hpib "CALL:CELL:POWer:AMPLitude:FDD -60.0" !Cell Power
hpib "CALL:CHANnel 10563" !DL Channel
hpib "CALL:UPLink:CHANnel 9613" !Uplink Channel
hpib "CALL:CELL:SCODe:PRIMary 0" !Primary Scrambling Code
```

```
hpib "CALL:UPLink:PRAChannel:SCODe 2" !PRACH Scrambling Codeword
hpib "CALL:CELL:CLPControl:UPLink:ALGorithm ALG1" !UL CL Power Ctrl Algorithm
hpib "CALL:SECurity:AUTHenticate:ALGorithm RIJNdael" !Authentication Algorithm
hpib "CALL:SECurity:OPERation AUTHINT" !Security Operations, Authentication and Integrity On
hpib "CALL:MS:POWer:TARGet 5" !MS Target Power
hpib "CALL:CELL:RLC:RE_Establish OFF" !RLC Reestablish
hpib "CALL:CELL:OPER:MODE CALL" !Operating Mode
```

D. Functional Test

In order to test the functioning of the wireless modem, it must first complete a GPRS attach (see "GPRS Attach MSC").

1. Turn the wireless modem on and wait for Attached to appear in the Active Cell: field on the test set's front panel display. Some wireless modems may need to attempt data transfer before it attaches to the test set.

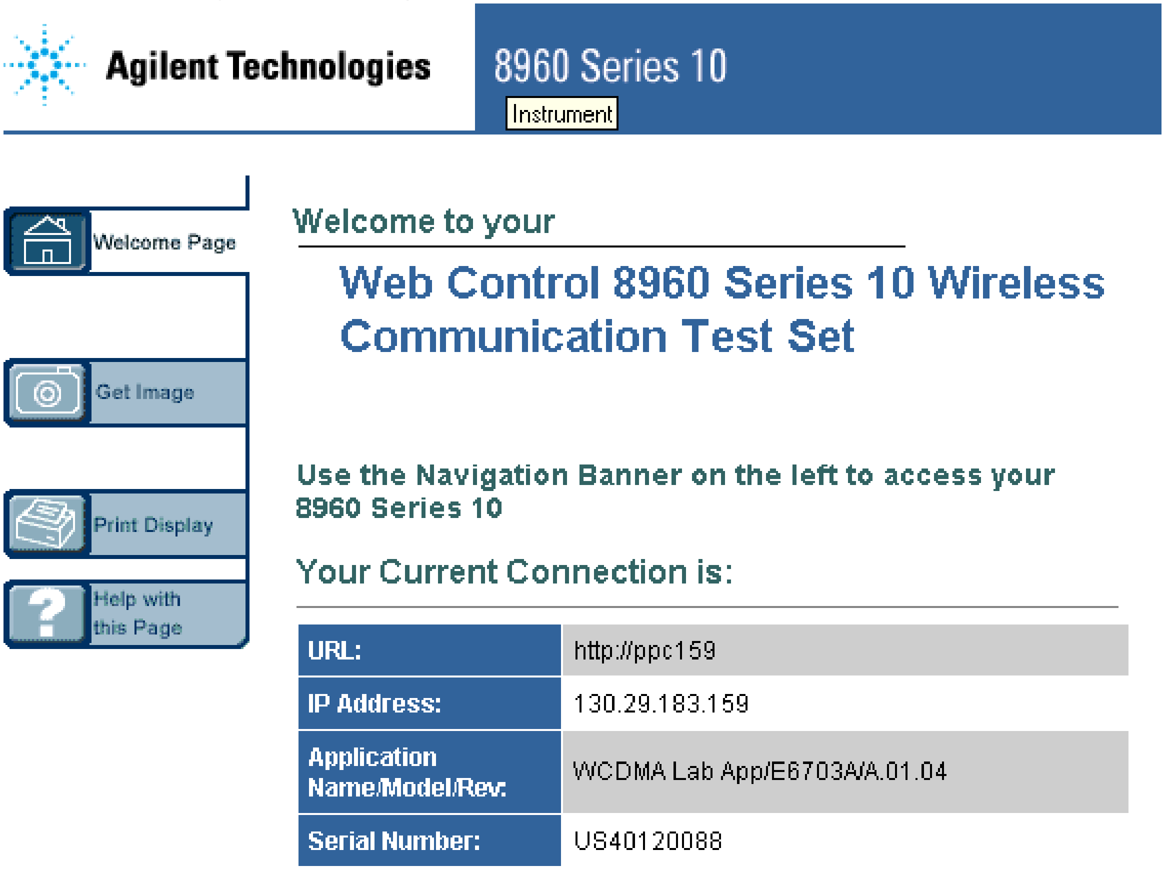
   Once a GPRS attach has occurred, packet data service can be started.

2. Use the laptop computer's "Network and Dial-up Connections" menu to make a dial up connection.

   The wireless modem will request an activation and the PDP Context will become active. This can be observed by looking for "PDP Active" in the Active Cell Status: field.

3. Open the browser on the PC. Enter the IP address of the test set in the PC browser Address window. The

PC browser should display the following screen:



Welcome to your

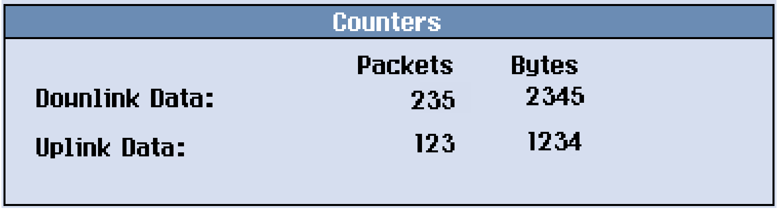
Web Control 8960 Series 10 Wireless Communication Test Set

Use the Navigation Banner on the left to access your 8960 Series 10

Your Current Connection is:

URL:	http://ppc159
IP Address:	130.29.183.159
Application Name/Model/Rev:	WCDMA Lab App/E6703A/A.01.04
Serial Number:	US40120088

4. As data is transferred, the Counters window keeps a running count of data in both the uplink and downlink:



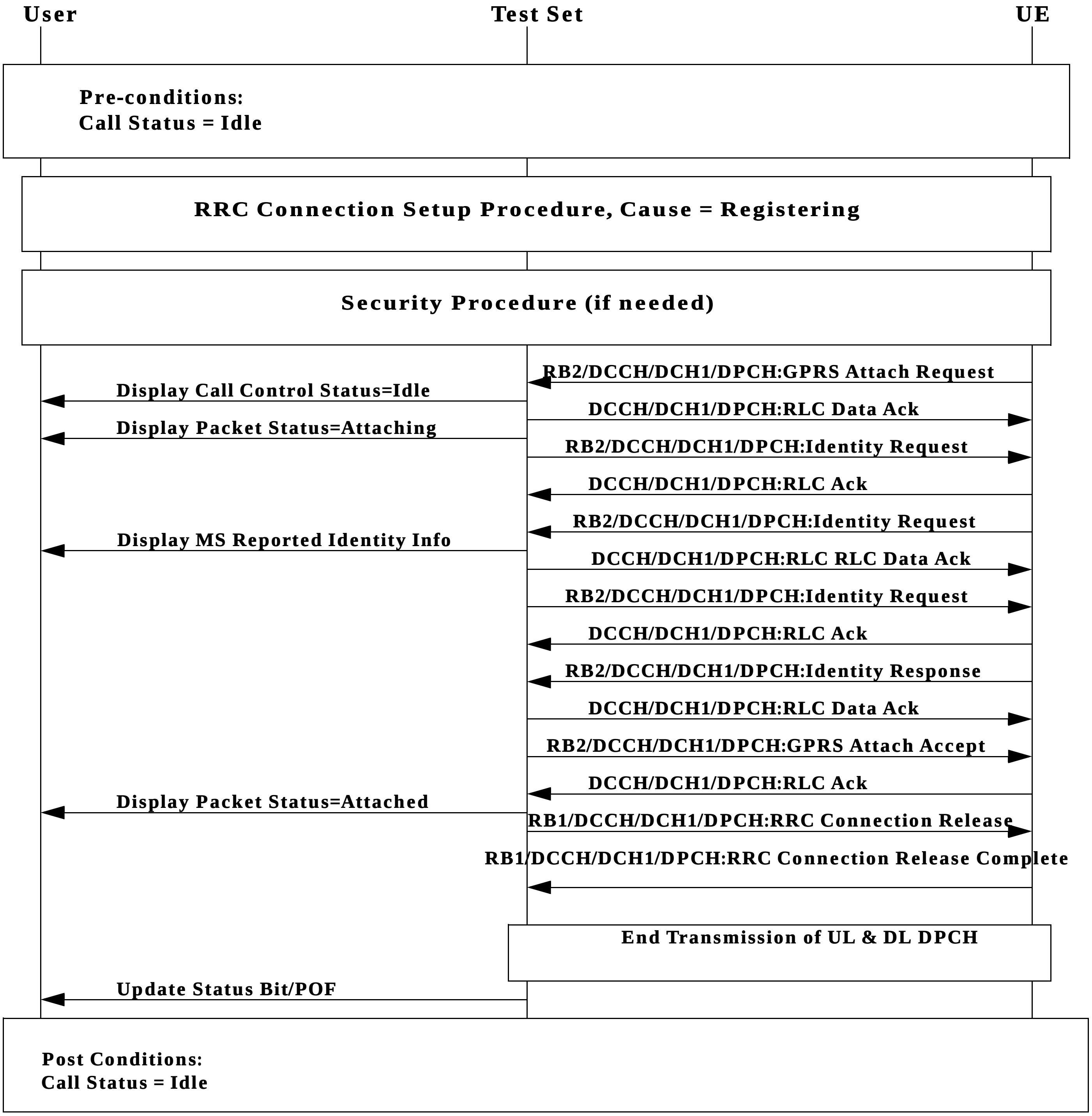
Counters

	Packets	Bytes
Downlink Data:	235	2345
Uplink Data:	123	1234

5. You can also perform all transmitter measurements with PDP Active. (BER measurements are not supported with PDP Active).

GPRS Attach MSC

Figure 2. Successful GPRS Attach



CS (Circuit Switched) Data Service

The CS Data Service provides a CS domain path for IP packet services. Only mobile station (UE) origination is supported for CS data.

The Radio Access Bearer type for the WCDMA lab application is commonly referred to as UDI 64k or UDI-1B.

The configuration of the WCDMA lab application PPP layer must be set to match the service configuration that will be requested by the UE (synchronous or asynchronous). The bearer must be transparent.

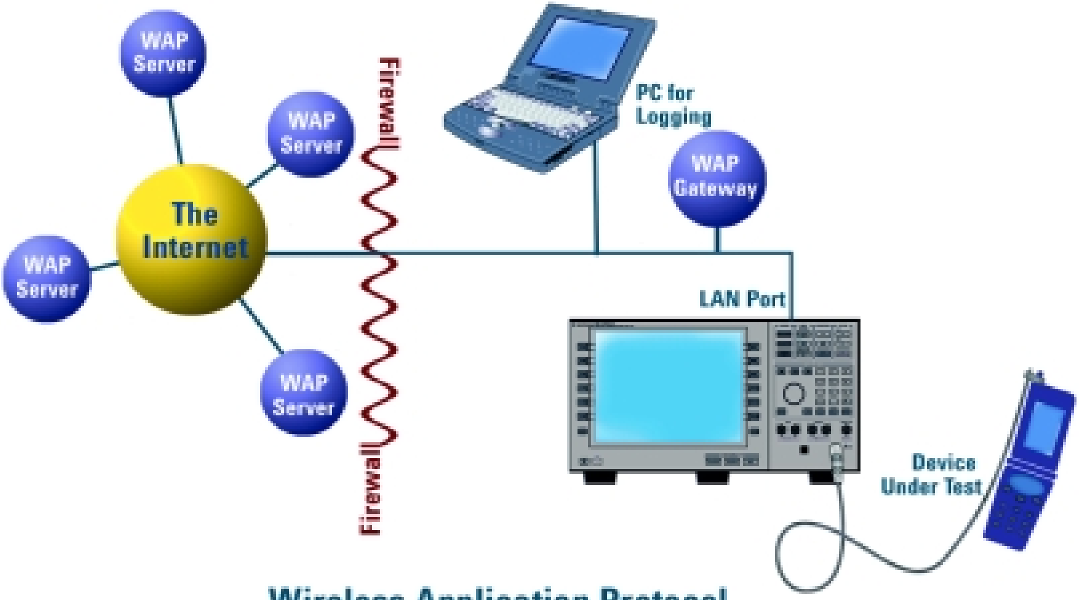
Related Topics

“How Do I Set Up Data Channel Parameters?”

Data Channel Applications

WAP Functional Test

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



Wireless Application Protocol (WAP) Test

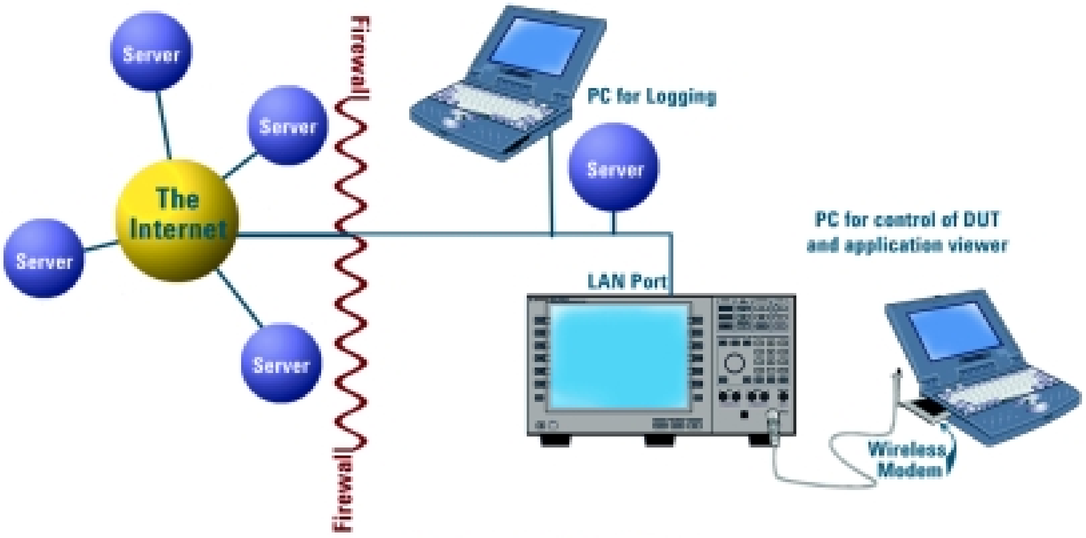
Logging data during this process provides protocol data at useful points in the stack, which may help in debugging a WCDMA device.

Before you use the data channel for WAP functional test, 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 WCDMA device)

Modem Functional Test

The data channel feature enables testing of wireless modems or WCDMA devices with built-in modems.This test typically involves using a dial-up connection. If the modem is not built-in, it is usually controlled from another device such as a PC.



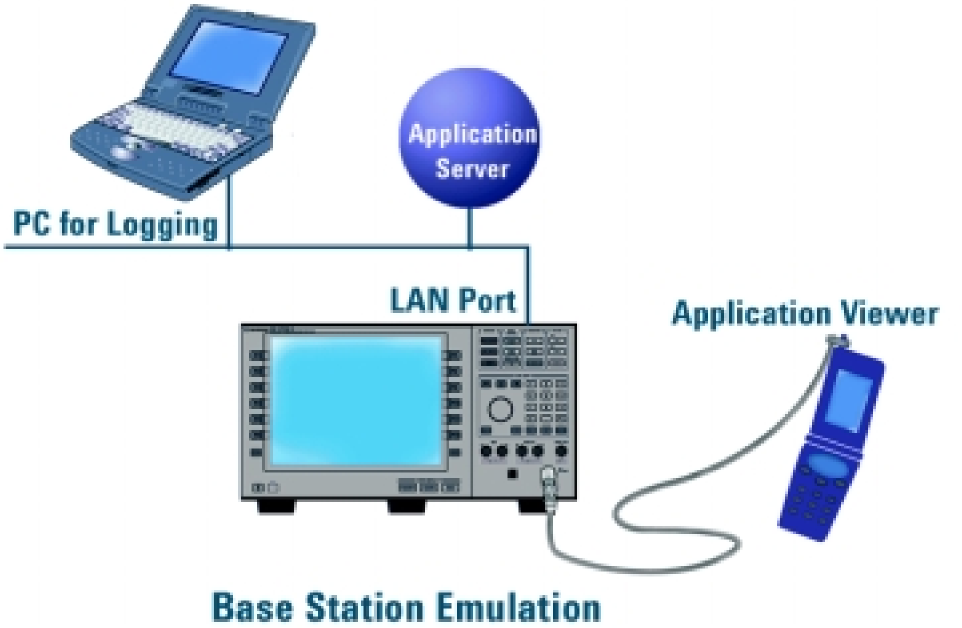
MODEM Functional Test

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)

Base Station Emulation

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.

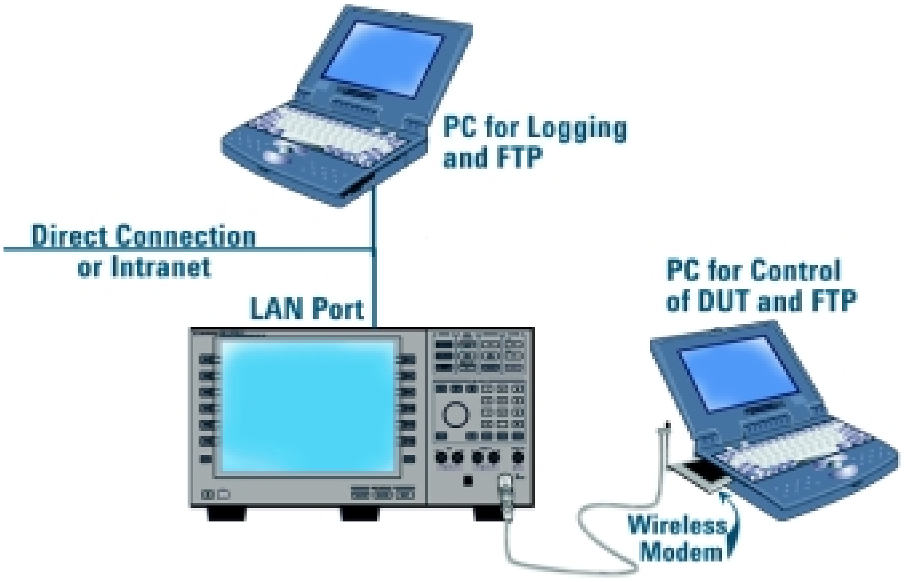


Before you use the Data Channel for Base Station Emulation, you must have the following information:

- 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

FTP Functional Test

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.



FTP Throughput Evaluation

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.

Measurements

Audio Analyzer Measurement Description

How is an analog audio measurement made?

The Audio Analyzer 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.

See “Audio Analyzer Block Diagram” .

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.

None of the analog audio measurement results are affected by the Amplitude Offset setting.

SINAD/Distortion State

Select On or Off to enable or disable the SINAD and Distortion measurements. When On, these measurement results are displayed below the Audio Level measurement and the SINAD/Distortion Fundamental Frequency must be entered to specify the audio frequency for the measurement (range: 100 Hz to 10 kHz). When Off, four dashes are displayed in place of the measurement results.

Audio Frequency State

Select On or Off to enable or disable the Audio Frequency measurement.

Filter Type

- None - no filtering is provided (default).
- 100 Hz BW Band Pass Filter (Tunable) - The 100 Hz BW BPF Center Frequency setting is available when this filter is selected, and can be set in the range of 300 Hz to 15 kHz.
- C-Message
- 50 Hz to 15 kHz
- 300 Hz to 15 kHz

Detector Type

Select either Peak or RMS (default) for making and displaying an 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 Amplitude 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

Audio Analyzer measurements use immediate triggering and are continuously re-triggered by the analyzer any time the Trigger Arm parameter is set to Continuous. Trigger timing is independent of any mobile protocol signaling.

Related Topics

"Audio Analyzer Block Diagram" on page 60

"AFANalyzer Troubleshooting" on page 861

"Audio Level Measurement Description" on page 62

"Audio Frequency Measurement Description" on page 61

"SINAD Measurement Description" on page 64

"Distortion Measurement Description" on page 63

"Programming an Audio Frequency Measurement" on page 224

"Programming an Audio Level Measurement" on page 225

"Programming a SINAD Measurement" on page 229

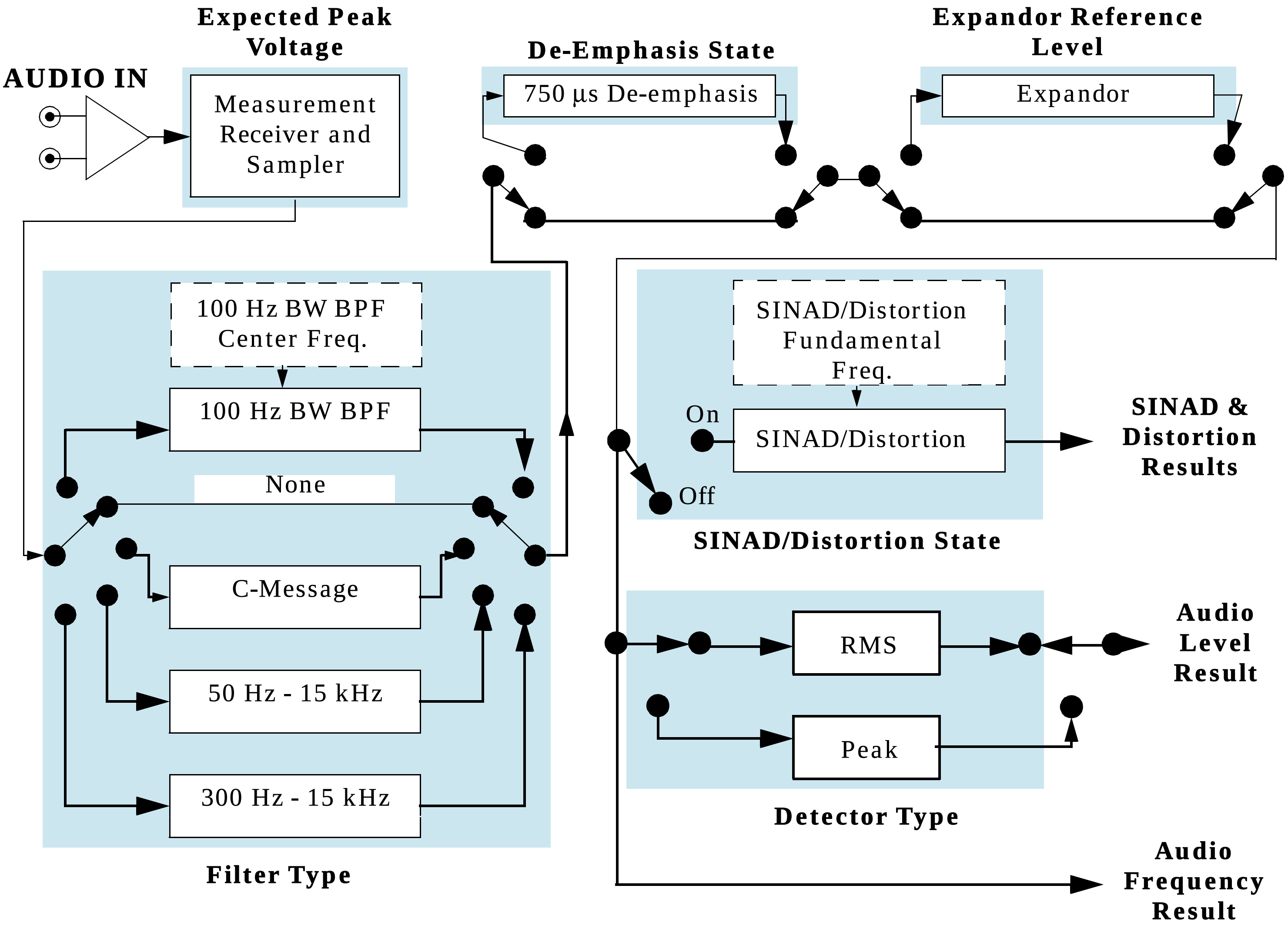
"Programming a Distortion Measurement" on page 227

"Statistical Measurement Results" on page 294 (Multi-measurements)

"Triggering of Measurements" on page 290

"Measurement Timeouts" on page 288

Audio Analyzer Block Diagram



Related Topics

"Audio Analyzer Measurement Description"

Audio Frequency Measurement Description

Related Topics

“Programming an Audio Frequency Measurement” on page 224

“Audio Analyzer Measurement Description” on page 58

“Audio Analyzer Block Diagram” on page 60

“AFANalyzer Troubleshooting” on page 861

Audio Level Measurement Description

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 Audio Analyzer measurements. Audio Level can be measured for signals in the frequency range of 100 Hz to 20 kHz, at levels from 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 Audio Analyzer's adjustable bandpass filter and the rms detector to reduce noise components.

This measurement is not affected by the Amplitude Offset setting.

Related Topics

"Programming an Audio Level Measurement" on page 225

"AFANalyzer Troubleshooting" on page 861

"Audio Analyzer Measurement Description" on page 58

"Audio Analyzer Block Diagram" on page 60

Distortion Measurement Description

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 into the Audio Analyzer. 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. For information on using the Audio Analyzer, see "Audio Analyzer Measurement Description" on page 58.

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

Related Topics

"Audio Analyzer Measurement Description" on page 58

"AFANalyzer Troubleshooting" on page 861

"Programming a Distortion Measurement" on page 227

"Test Adherence to Standards" on page 98

SINAD Measurement Description

How is a SINAD measurement made?

SINAD is a receiver audio quality measurement that is typically used for mobile stations operating on an analog system, such as AMPS. It is the ratio of Signal+Noise+Distortion divided by Noise+Distortion, expressed in dB. SINAD is measured using the test set's Audio Analyzer. SINAD can be measured in the range of 100 Hz to 10 kHz. For information on using the Audio Analyzer, see "Audio Analyzer Measurement Description" .

The SINAD measurement is used to determine receiver RF sensitivity. SINAD is usually measured 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 lower by up to 0.8 dB when measuring 12 dB SINAD. This is due to the more precise digital notch filter used by the 8960, causing a more accurate noise measurement to be made. The 8920B uses an analog filter that does not have as tight a filter notch as the 8960.

Related Topics

"Programming a SINAD Measurement"

"AFANalyzer Troubleshooting"

"Audio Analyzer Measurement Description"

"Test Adherence to Standards"

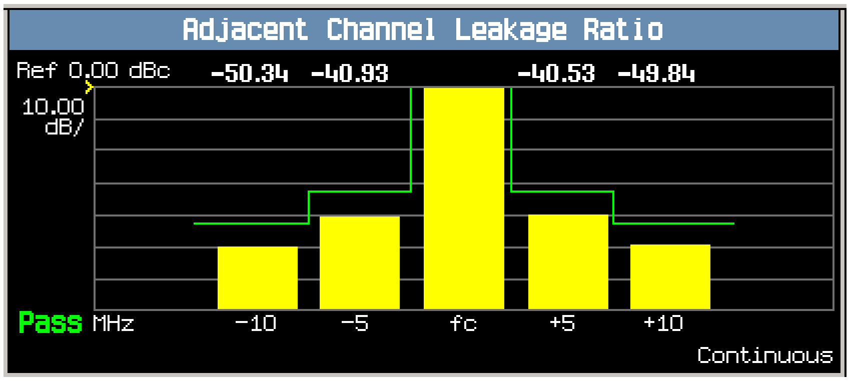
Adjacent Channel Leakage Ratio Measurement Description

How is an adjacent channel leakage ratio measurement made?

Adjacent channel leakage ratio measures the relative power at ± 5 MHz and ± 10 MHz offsets from the uplink channel. Power is measured through a Root-Raised Cosine (RRC) filter with a rolloff of α=0.22, and a bandwidth equal to the chip rate (3.84 MHz). The ± 5 MHz measurements are referred to as the upper and lower first adjacent channels; the ± 10 MHz measurements are referred to as the upper and lower second adjacent channels. This measurement is defined in 3GPP TS 34.121, section 5.10, v3.2.0, Adjacent Channel Power Leakage Ratio (ACLR).

Measurements for individual offsets can be turned off to increase measurement speed when these measurements are not needed.

Measurements can be displayed in either numeric or graphical form. When the graphical display is used (shown below), limits can be set for each offset to form a “limit line.” When a limit is exceeded, the status changes from “Pass” to “Fail.”



Input Signal Requirements

- For this measurement the test set’s receiver uses autoranging to adjust for the level of the signal being measured; therefore, the expected signal level does not need to be specified during measurement setup.
- The frequency of the signal being measured must be in the range of 800 MHz to 1000 MHz, or from 1700 MHz to 1990 MHz.
- The level into the test set’s RF IN/OUT connector must be in the range of +5 dBm to +28 dBm, in a 3.84 MHz bandwidth.

Trigger Source

The trigger source defaults to Auto for the adjacent channel leakage ratio measurement, and tries to use protocol triggering if the mobile station (UE) is synchronized to the test set. Immediate triggering is used if the mobile station is not synchronized.

Measurement Calibration

This measurement should be calibrated using the Calibrate Measurements function (“CALibration:MEASurements?” on page 387) when the temperature has changed by ± 10° C or more since the last calibration. If this situation exists, the integrity indicator value becomes 19 and a message is displayed indicating “Uncalibrated Due to Temperature”.

Related Topics

- “Programming an Adjacent Channel Leakage Ratio Measurement”
- “Adjacent Channel Leakage Ratio Troubleshooting”
- “Test Adherence to Standards”
- “What 3GPP W-CDMA Conformance Tests are supported?” on page 103
- “Triggering of Measurements”
- “Statistical Measurement Results”
- “Integrity Indicator”

Channel Power Measurement Description

How is a Channel Power Measurement Made?

The channel power measurement is made on the RF input signal after frequency downconversion and an analog to digital conversion (see “Block Diagram” on page 908). The actual power measurement is performed by the test set’s digital signal processor (DSP). The signal can be filtered in the DSP with a root-raised cosine (RRC) filter with a rolloff of 0.22 and a bandwidth equal to the chip rate (3.84 MHz) to comply with 3GPP 34.121 conformance specifications that require RRC filtered power. The filter can also be turned off for conformance specifications requiring a mean power measurement. When the RRC filter is Off, the bandwidth of the Channel Power measurement is greater than (1+alpha) times the chiprate, where alpha=0.22.

Differences between the Channel Power and Thermal Power Measurements

When the RRC filter for the channel power measurement is turned on, the results are typically about 0.25 dB lower than the thermal power measurement results.

Thermal power performance is only specified for signals down to -10 dBm, while the channel power measurement is able to accurately measure signals down to -61 dBm.

Input Signal Requirements

- This measurement does not autorange, therefore the expected power level from the mobile station (UE) is set using the current MS Target Power setting, or by using manual receiver power control and specifying the expected power level. See “Receiver Control” .
- The frequency of the signal being measured must be in the range of 800 MHz to 1000 MHz, or from 1700 MHz to 1990 MHz.
- The level into the test set’s RF IN/OUT connector must be in the range of -61 dBm to +28 dBm, measured in a 3.84 MHz bandwidth.

Trigger Source

The trigger source defaults to Auto for the channel power measurement, and tries to use protocol triggering if the mobile station (UE) is synchronized to the test set. Immediate triggering is used if the mobile station is not synchronized.

RF Rise triggering is provided to measure power during PRACH bursts. The burst’s on state level must be >-40 dBm, and the off state level must be <-60 dBm, for this trigger to work correctly.

This measurement can be made over a period of .1 ms to 10 ms (the default is 1 timeslot or 666.7 µs) by altering the Measurement Interval. The measurement can be made during a specific timeslot by changing the Trigger Delay.

Measurement Calibration

This measurement should be calibrated using the Calibrate Measurements function ("CALibration:MEASurements?" on page 387) when the temperature has changed by ± 10° C or more since the last calibration. If this situation exists, the integrity indicator value becomes 19 and a message is displayed indicating "Uncalibrated Due to Temperature".

Related Topics

- "Programming a Channel Power Measurement"
- "Channel Power Troubleshooting"
- "Test Adherence to Standards"
- "What 3GPP W-CDMA Conformance Tests are supported?" on page 103
- "Triggering of Measurements"
- "Statistical Measurement Results"
- "Integrity Indicator"

Code Domain Measurement Description

How is the code domain measurement made?

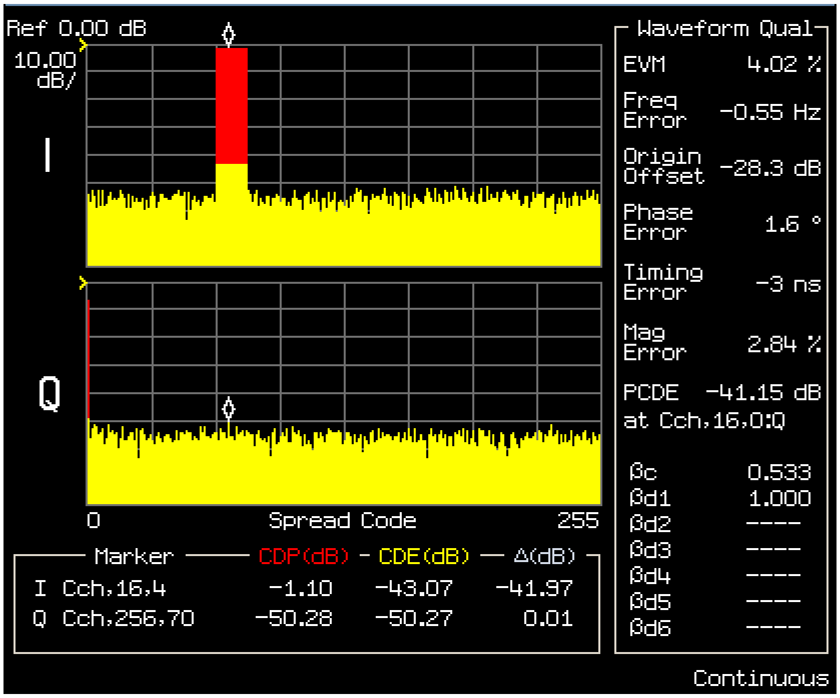
Code domain power (CDP) is an analysis of the distribution of signal power projected on a code-space of a particular dimension, normalized to the total signal power. To analyze the composite waveform, each channel is decoded using a code-correlation algorithm. This algorithm determines the correlation coefficient for each code. Once the channels are decoded, the power in each code channel is determined.

Code domain error (CDE) measurements are made by sampling the down-converted input signal, then applying DSP (Digital Signal Processing) techniques to determine the original data input to the UE transmitter's OVSF code spreading function for each channel. The DSP uses the original data and coding to generate a representation of the original waveform. This is the reference waveform for the code domain error measurements.

CDE is determined by comparing the reference waveform with the waveform being measured to determine the error vector. The error vector is projected onto the code domain at the same spreading factor used to determine CDP. The error vector for each power code is defined as the ratio to the mean power of the reference waveform expressed in dB.

Code domain measurement results

- Graph of Code Domain Power and Code Domain Error results.
  - — The x axis always has a resolution of 256 codes (SF=256).
  - — The CDP and CDE are computed in the correct spreading factor for the DPCCH and DPDCH as defined for the channel type used. For example, in the graph below the 64k RMC is used. Therefore, the DPDCH occupies $C_{ch,16,4}$ as defined in the 3GPP standards. ($C_{ch,\text{Spreading Factor},\text{Code Number}}$)



Waveform Qual

EVM	4.02 %
Freq Error	-0.55 Hz
Origin Offset	-28.3 dB
Phase Error	1.6 °
Timing Error	-3 ns
Mag Error	2.84 %
PCDE	-41.15 dB
at Cch,16,0:Q	
βc	0.533
βd1	1.000
βd2	----
βd3	----
βd4	----
βd5	----
βd6	----

Marker	CDP(dB)	CDE(dB)	Δ(dB)
I Cch,16,4	-1.10	-43.07	-41.97
Q Cch,256,70	-50.28	-50.27	0.01

Continuous

- Code Domain Power (CDP)
- Code Domain Error (CDE)
- All of the measurement results of the Waveform Quality measurement. See “Waveform Quality Measurement Description” on page 96.

Input Signal Requirements

- This measurement does not autorange, therefore the expected power level from the UE is set using the current MS Target Power setting, or by using manual receiver power control and specifying the manual power level. See “Receiver Control” .
- The frequency of the signal being measured must be in the range of 800 MHz to 1000 MHz, or from 1700 MHz to 1990 MHz.
- The level into the test set's RF IN/OUT connector must be in the range of +5 dBm to +28 dBm, in a 3.84 MHz bandwidth.
- Maximum measurable EVM = 35%
- Maximum measurable frequency error = ± 1 kHz

Trigger Source

Triggering choices for the Waveform Quality measurement are immediate, protocol, external, and auto. Auto triggering is the default choice. In most cases, auto triggering provides the optimum measurement triggering condition for the Waveform Quality measurement. For example, if the UE is synchronized to the test set, protocol triggering is used. Immediate triggering is used if the UE is not synchronized.

When immediate triggering is used, the measurement result returned for timing error is always `NAN` (Not a Number) because it is not possible to evaluate a timing error in this measurement situation.

The measurement is performed during one timeslot. The timeslot to use for the measurement is selectable (0 to 14).

Measurement Calibration

This measurement should be calibrated using the Calibrate Measurements function ("CALibration:MEASurements?" on page 387) when the temperature has changed by ± 10° C or more since the last calibration. If this situation exists, the integrity indicator value becomes 19 and a message is displayed indicating "Uncalibrated Due to Temperature".

Related Topics

- "Programming a Code Domain Measurement"
- "Code Domain Troubleshooting"
- "Test Adherence to Standards"
- "What 3GPP W-CDMA Conformance Tests are supported?" on page 103
- "Triggering of Measurements"
- "Statistical Measurement Results"
- "Integrity Indicator"

Inner Loop Power Measurement Description

What is the Inner Loop Power Control?

The inner loop power control in the uplink is the ability of the UE (mobile station) transmitter to adjust its output power in accordance with one or more TPC (transport power control) commands received in the downlink. When the UE is not in soft handover, only one TPC command will be received in each timeslot. UE can respond with TPC_cmd command which is derived based on the Power Control Algorithm used by the UE and the TPC command received in the downlink. TPC_cmd along with the Power Control Step size determine the UE transmit output power. The power change will be applied in the timeslot adjacent to the timeslot in which the TPC command is received. For example, the power change derived from a TPC command in 10th timeslot shall be applied to the 11th timeslot.

How is an Inner Loop Power Measurement Made?

The inner loop power measurement is made through a root-raised cosine (RRC) filter with a roll off of alpha=0.22 and a bandwidth equal to the chip rate (3.84 MHz). It measures the mean power in each timeslot excluding the transient duration. The transient duration is from 25 microseconds before the slot boundary to 25 microseconds after the slot boundary. The relative power difference is calculated for adjacent TPC_cmds and also for 10 TPC_cmd groups (10 timeslots if using algorithm 1 and 50 slots if using algorithm 2).

The inner loop power test process recommended in the standard consists of a series of test segments (referred to as Test Steps in the standard). The test set allows to run one segment at a time. You can run the measurement in Auto or Manual mode.

Auto Mode

Auto mode is used to run a single test segment as specified in the standard. This is achieved by selecting any one of the test segment (referred to as Test Steps in the standard) from the Test Segment menu. You can build the whole test profile by piecing the segments together. In auto mode,

- the following measurement settings: Start Power, Stop Power, Power Control Algorithm and Power Control Step Size, can not be changed.
- when test segment “A” is selected, the Start power is always -10dBm. The Number of Slots can be changed and the following sequence of TPC commands are used with the selected Number of Slots.
  - 100000101010101 (Number of Slots = 15)
  - 100000101010101111101000001010 (Number of Slots = 30)
  - 100000101010101111101000001010101011111010000 (Number of Slots = 45)
  - 100000101010101111101000001010101011111010000010101010111110 (Num of Slots = 60)

Manual Mode

Manual mode allows you to build a custom test segment. This is achieved by selecting `Manual` from the Test Segment menu. In manual mode, the UE will be instructed to go to start power before starting the test and test the UE’s response by sending the TPC commands with a step size and power control algorithm specified by the user until the expected target power is equal to stop power. In manual mode,

- you can change the following measurement settings: Start Power, Stop Power, Power Control Algorithm and Power Control Step Size (valid only when Algorithm 1 selected).
- if the Start Power is set to the same as Stop Power, the Power Control Algorithm and Power Control Step Size settings can not be changed and are set to Algorithm 2 and 1 dB step size. The Number of Slots setting can be changed and the following sequence of TPC commands are used with the selected Number of Slots.

— 100000101010101 (Number of Slots = 15)

— 100000101010101111101000001010 (Number of Slots = 30)

— 100000101010101111101000001010101011111010000 (Number of Slots = 45)

— 100000101010101111101000001010101011111010000010101010111110 (Num of Slots = 60)

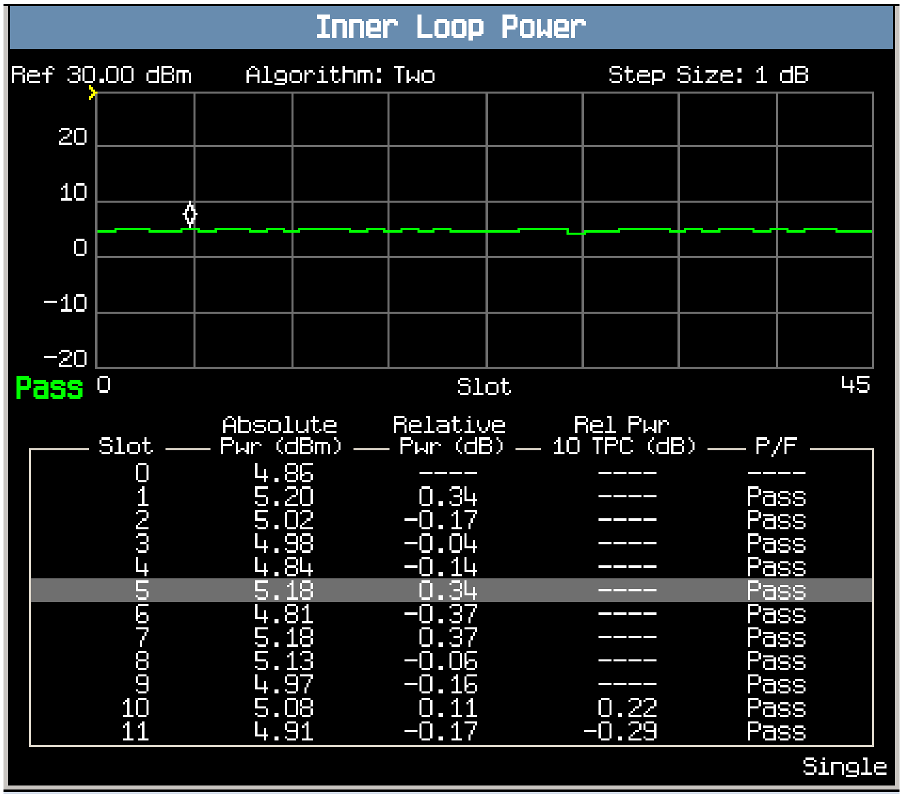
UE (Mobile Station) Control During FDD Test Operation Mode

When the measurement is made in FDD Test mode, UE should be capable of deriving TPC_cmd commands in test mode. You need to configure the UE to use the proper power control algorithm and the step size before initiating a measurement.

Measurement Results Display

The test set can run a single one of the test segments at a time resulting in a pass/fail and trace data that can be accessed via the MUI or RUI. Refer to “Inner Loop Power Measurement Display” for an example display for the test segment “A”.

Figure 3. Inner Loop Power Measurement Display



Inner Loop Power

Ref 30.00 dBm Algorithm: Two Step Size: 1 dB

Pass

Slot	Absolute Pwr (dBm)	Relative Pwr (dB)	Rel Pwr 10 TPC (dB)	P/F
0	4.86	-----	-----	-----
1	5.20	0.34	-----	Pass
2	5.02	-0.17	-----	Pass
3	4.98	-0.04	-----	Pass
4	4.84	-0.14	-----	Pass
5	5.18	0.34	-----	Pass
6	4.81	-0.37	-----	Pass
7	5.18	0.37	-----	Pass
8	5.13	-0.06	-----	Pass
9	4.97	-0.16	-----	Pass
10	5.08	0.11	0.22	Pass
11	4.91	-0.17	-0.29	Pass

Single

Inner Loop Power Measurement Description

- Overall Pass/Fail result for the specified test segment. If any timeslot in the test segment does not comply with the standard, the entire segment test fails.
- Number of slots: Indicates the total number of TPC commands (number of timeslots tested) sent for the chosen test segment.
- Results associated with each timeslot in which a TPC command is sent for making this measurement:
  - Slot number: Used as an index to the results reported in each timeslot. Slot 0 would be the reference timeslot. Response to the TPC command sequence are from Slot 1.
  - Absolute Pwr (dBm): Indicates mean output power level for the current slot excluding the transient time (25 us from either side of the slot boundary).
  - Relative Pwr (dB): The difference between the mean power in the current slot and the mean power in the previous slot.
  - Rel Pwr 10 TPC (dB): The change in mean power over 10 TPC_cmd groups. (NAN for the first 9 results when in Algorithm 1 mode and NAN for the first 49 results when in Algorithm 2 mode.)
  - P/F: Indicates whether the change in the UE transmit power level is within the prescribed range as specified in the 3GPP TS 34.121, section 5.4.2 standard. (Pass/Fail result: 0 = pass, 1 = fail adj TPC_cmds, 2 = fail 10 TPC_cmd groups result, 3 = fail in both adj TPC_cmds and 10 TPC_cmd groups test)
- Worst case results (closest to failing or farthest from the standard specifications if it failed). See FETCh:WILPower[:ALL]? command.
  - Timeslot number of the worst case adjacent TPC_cmds result in which the worst case relative power for adjacent TPC_cmds is returned.
  - Absolute power level associated with the worst case TPC_cmds timeslot
  - Relative power level for adjacent TPC_cmds associated with the worst case TPC_cmds timeslot
  - Relative power level for 10 TPC_cmd groups associated with the worst case TPC_cmds timeslot
  - Timeslot number of the worst case 10 TPC_cmd groups result in which the worst case relative power for 10 TPC_cmd groups is returned.
  - Absolute power level associated with the worst case 10 TPC_cmd groups timeslot
  - Relative power level for adjacent TPC_cmds associated with the worst case 10 TPC_cmd groups timeslot
  - Relative power level for 10 TPC_cmd groups associated with the worst case 10 TPC_cmd groups timeslot

You can use the `Axis Control` (**F2**) settings to control the graph trace window and use the `Marker` (**F3**) setting to control the range of measurement results shown in the measurement results list (up to 12 measurement results at one time). The measurement result list will scroll with the marker. If the marker setting is greater than the number of results that can be displayed, the result list will show the previous measurement results.

Measurement Behavior

No other measurements can be running during Inner Loop Power measurement. If any measurements are running when an Inner Loop Power measurement is initiated, they will be closed and a message will be displayed to indicate that they are closed.

To use this measurement in Active Cell mode, UE needs to be up on a call. To use the measurement in FDD Test Mode, UE should be capable of deriving TPC commands in FDD test mode. You needs to configure the UE to use the right power control algorithm and the step size before initiating a measurement.

The test set does not support testing the UE in compressed mode with this measurement, therefore 3 dB power control step size will not be allowed.

RF IN/OUT Amplitude Offset settings apply to any of the Inner Loop Power absolute power measurement and do NOT apply to the relative power measurement results.

Input Signal Requirements

- For this measurement the test set's receiver uses autoranging to adjust for the level of the signal being measured; therefore, the expected signal level does not need to be specified during measurement setup.
- The frequency of the signal being measured must be in the range of 800 MHz to 1000 MHz, or from 1700 MHz to 1990 MHz.
- The level into the test set's RF IN/OUT connector must be in the range of -61 dBm to +28 dBm, in a 3.84 MHz bandwidth.

Trigger Source

The trigger source is always protocol. You can adjust the beginning of the measurement interval relative to the protocol trigger by changing the Trigger Delay.

Measurement Calibration

This measurement should be calibrated using the Calibrate Measurements function ("CALibration:MEASurements?" on page 387) when the temperature has changed by ± 10° C or more since the last calibration. If this situation exists, the integrity indicator value becomes 19 and a message is displayed indicating "Uncalibrated Due to Temperature".

Related Topics

- "Programming an Inner Loop Power Measurement"
- "Inner Loop Power Troubleshooting"
- "Test Adherence to Standards"
- "What 3GPP W-CDMA Conformance Tests are supported?" on page 103
- "Triggering of Measurements"
- "Statistical Measurement Results"
- "Integrity Indicator"

IQ Tuning Measurement Description

How is an IQ Tuning Measurement Made?

The IQ tuning measurement is made during one user-selected timeslot (0 - 14). It includes all of the measurements available in the Waveform Quality measurement (see "Waveform Quality Measurement Description"), along with the following measurement results:

- IQ gain imbalance
- IQ phase imbalance
- Peak EVM
- Chip EVM
- IQ constellation diagram

IQ gain imbalance and IQ phase imbalance measurements are determined by comparing the received signal's IQ modulation characteristics with an ideal signal. Chip EVM is the calculated EVM at each chip in the measured timeslot. Peak EVM is the maximum chip EVM. The IQ constellation is the measured IQ signal with origin offset included.

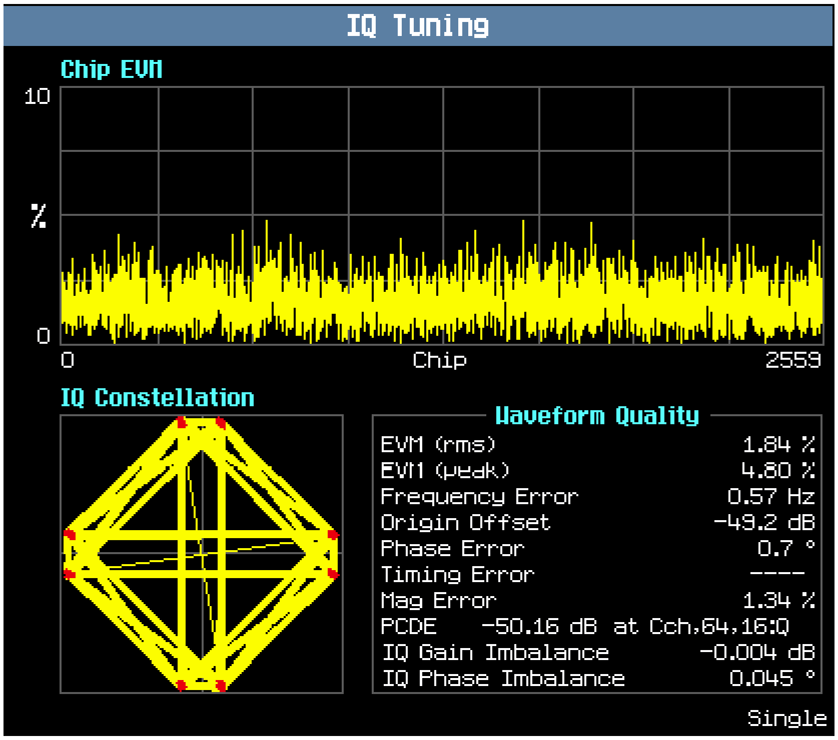
Chip EVM is measured as a 2560 element array of 32-bit floating point numbers. The first element in the array corresponds to the measured EVM for the first chip in the measured time slot, the second element to the EVM for the second chip in the measured time slot, and so on. These results will be available graphically on the front panel display and numerically via the GPIB commands.

IQ constellation is measured as a 2560 element array of ordered pairs. Each ordered pair consists of two 32-bit floating point numbers corresponding to one point in the IQ constellation. The first member in the ordered pair is the I coordinate, the second is the Q coordinate. The array is scaled so all points fall within a unit circle. The first ordered pair in the IQ constellation array corresponds to the first chip in the measured time slot, the second ordered pair in the array corresponds to the second chip in the measured time slot, and so on. The IQ constellation result will only be available graphically on the front panel display. It will not be accessible via the GPIB commands.

Measurement Results Display

Chip EVM and the IQ constellation will be graphed together on the same screen. See figure "IQ Tuning Graph Display" for an example display. You can use the `Axis Control` (**F2**) and the `Marker` (**F3**) settings to control the Chip EVM trace graph and the IQ constellation diagram. IQ constellation diagram will always be redrawn to reflect the latest Chip EVM settings. For example, if the chip EVM for chips 512 through 1023 are plotted, then the IQ constellation will be shown for just chips 512 through 1023. The I and Q values for the IQ constellation will all range between -1.0 and +1.0.

Figure 4. IQ Tuning Graph Display



Waveform Quality

EVM (rms) 1.84 %
EVM (peak) 4.80 %
Frequency Error 0.57 Hz
Origin Offset -49.2 dB
Phase Error 0.7 °
Timing Error ----
Mag Error 1.34 %
PCDE -50.16 dB at Cch,64,16:Q
IQ Gain Imbalance -0.004 dB
IQ Phase Imbalance 0.045 °

Single

Input Signal Requirements

- This measurement does not autorange, therefore the expected power level from the mobile station (UE) is set using the current MS Target Power setting, or by using manual receiver power control and specifying the manual power level. See "Receiver Control" .
- The frequency of the signal being measured must be in the range of 800 MHz to 1000 MHz, or from 1700 MHz to 1990 MHz.
- The level into the test set's RF IN/OUT connector must be in the range of -25 dBm to +28 dBm, in a 3.84 MHz bandwidth.
- Maximum measurable EVM = 35%

Trigger Source

The trigger source for the IQ tuning measurement defaults to Auto which provides the optimum measurement triggering condition. For example, if the UE is synchronized to the test set, protocol triggering is used. Immediate triggering is used if the UE is not synchronized.

When immediate triggering is used, the measurement result returned for timing error is always NAN (Not a Number) because it is not possible to evaluate a timing error in this measurement situation.

Measurement Calibration

This measurement should be calibrated using the Calibrate Measurements function (“CALibration:MEASurements?” on page 387) when the temperature has changed by ± 10° C or more since the last calibration. If this situation exists, the integrity indicator value becomes 19 and a message is displayed indicating “Uncalibrated Due to Temperature”.

Related Topics

- “Programming an IQ Tuning Measurement”
- “IQ Tuning Measurement Troubleshooting”
- “Test Adherence to Standards”
- “What 3GPP W-CDMA Conformance Tests are supported?” on page 103
- “Triggering of Measurements”
- “Statistical Measurement Results”
- “Integrity Indicator”

Loopback Bit Error Ratio Measurement Description

How is a Loopback Bit Error Ratio measurement made?

When the test set measures loopback bit error ratio, it sends a known data pattern on the downlink dedicated traffic channel (DTCH) to a mobile station (UE) that is configured in loopback mode 1 (see 3GPP TS 34.109. v3.1.0). The mobile station decodes the data and re-transmits it on the uplink DTCH. The test set analyzes the uplink data to see how closely it matches the data bits originally sent on the downlink. The measurement result is the ratio of incorrectly received bits to the total bits sent to the UE, expressed at a percentage (%).

This measurement is typically performed at low cell power levels to measure the sensitivity of the mobile station's receiver; the lower the level of signal that the mobile station can receive and still correctly decode the data, the better the sensitivity. The receiver sensitivity test is described in 3GPP TS 34.121, section 6.2, v3.2.0, *Reference Sensitivity Level*. This measurement can also be used for the *Maximum Input Level* test, 3GPP TS 34.121, section 6.2, v3.2.0.

The number of data bits to send during the measurement is selectable by the user. However, the actual number of bits used to analyze the data is always the largest even multiple of the number of bits needed to fill a DTCH transport block for the transmitted format. For the 12.2 kbps reference measurement channel (RMC) used in FDD Test operating mode, the transport block is 244 bits.

Mobile Station (UE) Control During FDD Test Mode Operation

The FDD Test operating mode does not provide radio bearer setup control of the mobile station (UE) for test mode operation. The operator must configure the mobile station in loopback mode 1 and synchronize it to the test set's downlink signal in order to make this measurement in FDD Test operating mode. Refer to "FDD Test Operating Mode" .

The uplink transport format must include both the DTCH and the DCCH; however, only the DTCH information is used for the loopback bit error ratio measurement.

Input Signal Requirements

- The expected power into the test set must be set in order to maintain the link with the mobile station. This is done using the MS Target Power setting or by using manual receiver power control and specifying the expected power level. See "Receiver Control" .

Trigger Source

The trigger source is always protocol.

Related Topics

"Programming a Loopback Bit Error Ratio Measurement"

"Loopback Bit Error Ratio Troubleshooting"

"Test Adherence to Standards"

"What 3GPP W-CDMA Conformance Tests are supported?" on page 103

Occupied Bandwidth Measurement Description

How is the occupied bandwidth measurement made?

As defined by 3GPP TS 34.121 section 5.8 Occupied Bandwidth (OBW) is the bandwidth containing 99% of the total integrated power of the transmitted spectrum, centered on the assigned channel frequency. The test set allows the percentage of total integrated power to be adjusted from 70.0 to 99.0%.

During this measurement, a Gaussian filter with a bandwidth greater than 10MHz and a resolution bandwidth (RBW) of 30 kHz or less is used to measure the distribution of the power spectrum.

First, the total power found in the measured frequency range is calculated. Then, starting at the lowest frequency in the range and moving upward, the power distributed in each frequency is summed until this sum is 0.5% of the total power. This gives the lower frequency value. Next, starting at the highest frequency in the range and moving downward, the power distributed in each frequency is summed until 0.5% of the total power is reached. This gives the upper frequency value. The bandwidth between the 0.5% power frequency points is the occupied bandwidth.

Input Signal Requirements

- For this measurement the test set's receiver uses autoranging to adjust for the level of the signal being measured; therefore the expected signal level does not need to be specified during measurement setup.
- The frequency of the signal being measured must be in the range of 800 MHz to 1000 MHz, or from 1700 MHz to 1990 MHz.
- The level into the test set's RF IN/OUT connector must be in the range of +5 dBm to +28 dBm, in a 3.84 MHz bandwidth.

Trigger Source

The trigger source defaults to `Auto` and tries to use protocol triggering if the UE is synchronized to the test set. Immediate triggering is used if the UE is not synchronized.

If you want to measure the occupied bandwidth for a specific timeslot, use the trigger delay parameter.

Measurement Calibration

This measurement should be calibrated using the Calibrate Measurements function (see “CALibration:MEASurements?” on page 387) when the temperature has changed by ± 10° C or more since the last calibration. If this situation exists, the integrity indicator value is changed to 19 and a message is displayed indicating "Uncalibrated Due to Temperature".

Related Topics

- "Programming an Occupied Bandwidth Measurement" on page 243
- "Occupied Bandwidth Troubleshooting" on page 868
- "Test Adherence to Standards" on page 98
- "What 3GPP W-CDMA Conformance Tests are supported?" on page 103
- "Triggering of Measurements" on page 290
- "Statistical Measurement Results" on page 294
- "Integrity Indicator" on page 295

PRACH Transmit On/Off Power Measurement Description

How is a PRACH Transmit On/Off Power Measurement Made?

When the PRACH transmit on/off power measurement is initiated, the test set pages the UE.

The test set then measures the “on” power of the first PRACH preamble from the UE. The test set measures the average power (without an RRC filter present) from 25 µs after the start of the PRACH access slot, to 25 µs before the end of the PRACH preamble (see “Burst On Power Measurement Interval” on page 82).

The test set then measures the “off” power before and after a subsequent PRACH preamble (“Pre Burst Off Power” and “Post Burst Off Power,” respectively). The test set measures the average power with an RRC filter in place (Root-Raised Cosine filter response with a roll off of alpha = 0.22 and a bandwidth equal to the chip rate). The Pre Burst Off Power is measured from 642 µs before the start of the PRACH access slot to 25 µs before the start of the PRACH access slot. The Post Burst Off Power is measured from 100 µs after the end of the PRACH preamble to 642 µs after the end of the PRACH preamble. See “Burst Off Power Measurement Intervals” on page 83.

Figure 5. Burst On Power Measurement Interval

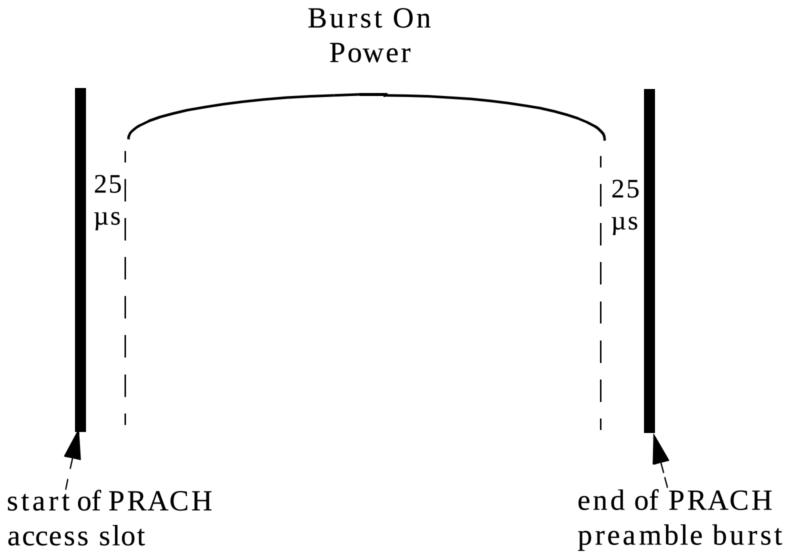
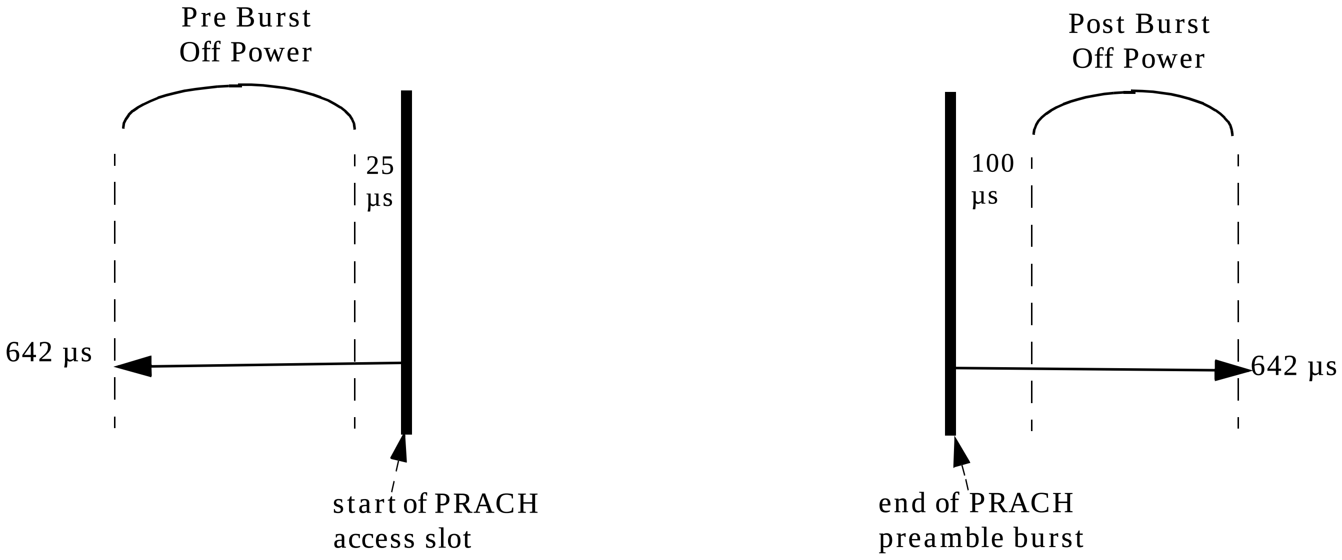


Figure 6. Burst Off Power Measurement Intervals



The PRACH transmit on/off power measurement is triggered by a combination of RF rise and protocol. The test set must first receive an RF rise which is at least -45 dBm, and which is no more than 9 dB below the expected `Initial PRACH Tx Power` (see "Initial PRACH Tx Power"). The test set then uses this RF rise to determine which PRACH access slot the PRACH preamble is contained in. The protocol trigger then triggers the measurement on that access slot.

The "on" power measurement tests the open loop power control of the UE (3GPP TS 34.121, 5.4.1), while the "off" power measurement tests for unnecessary system signal leakage power (3GPP TS 34.121, 5.5).

Measurement Behavior

Before performing a PRACH transmit on/off measurement:

- Set Operating Mode to Cell Off.
- Set Available Subchannels (Bit Mask) to 1.
- Set Operating Mode to Active Cell.
- Turn the UE on and wait for it to camp to the test set's signal.

No other measurements can be running when a PRACH transmit on/off power measurement is performed. If any measurements are running when a PRACH transmit on/off power measurement is initiated, they are closed and a message is displayed to indicate that they were closed.

PRACH Transmit On/Off Power Measurement Parameters

- Measurement Timeout: (see "Measurement Timeouts" on page 288)
- Off Power Limit: Sets the requirement (in dBm) for the "off" power (see Pre Burst Off Power and Post Burst Off Power in "PRACH Transmit On/Off Power Measurement Results" on page 84).
- Open Loop Power Error Limit: Sets the requirement (in dB) for the difference between the "on" power and the expected Initial PRACH Tx Power (see "PRACH Transmit On/Off Power Measurement Results" on page 84).

PRACH Transmit On/Off Power Measurement Results

- Pre Burst Off Power: This result returns the RRC filtered average "off" power (in dBm) before the PRACH preamble (see "How is a PRACH Transmit On/Off Power Measurement Made?" on page 82), as well as pass/fail, indicating whether the power is below the requirement set by Off Power Limit (see "PRACH Transmit On/Off Power Measurement Parameters" on page 84).
- Burst On Power: This result returns the average "on" power (in dBm) (see "How is a PRACH Transmit On/Off Power Measurement Made?" on page 82).
- Open Loop Power Error: This result returns the difference between the Burst On Power and the expected Initial PRACH Tx Power based on open loop power control, as well as pass/fail, indicating whether the error is within the limit set by Open Loop Power Error Limit (see "PRACH Transmit On/Off Power Measurement Parameters" on page 84).
- Post Burst Off Power: This result returns the RRC filtered average "off" power (in dBm) after the PRACH preamble (see "How is a PRACH Transmit On/Off Power Measurement Made?" on page 82), as well as pass/fail, indicating whether the power is below the requirement set by Off Power Limit (see "PRACH Transmit On/Off Power Measurement Parameters" on page 84).

Input Signal Requirements

- The frequency of the signal being measured must be in the range of 800 MHz to 1000 MHz, or from 1700 MHz to 1990 MHz.
- The level into the test set's RF IN/OUT connector must be in the range of -45 dBm to +28 dBm for "on" power, and in the range of -61 dBm to -50 dBm for "off" power.

Measurement Calibration

This measurement should be calibrated using the Calibrate Measurements function ("CALibration:MEASurements?" on page 387) when the temperature has changed by more than ± 10° C since the last calibration. If this situation exists, the integrity indicator value becomes 19 and a message is displayed indicating "Uncalibrated Due to Temperature".

Related Topics

- "Programming a PRACH Transmit On/Off Power Measurement"
- "PRACH Transmit On/Off Power Troubleshooting"
- "Test Adherence to Standards"
- "What 3GPP W-CDMA Conformance Tests are supported?" on page 103
- "Triggering of Measurements"
- "Integrity Indicator"

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 833.

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 290.

Related Topics

“How Do I Use the Spectrum Monitor?” on page 833

“Programming the Spectrum Monitor” on page 247

“Test Adherence to Standards”

“Spectrum Monitor Troubleshooting” on page 870

Swept Audio Measurement Description

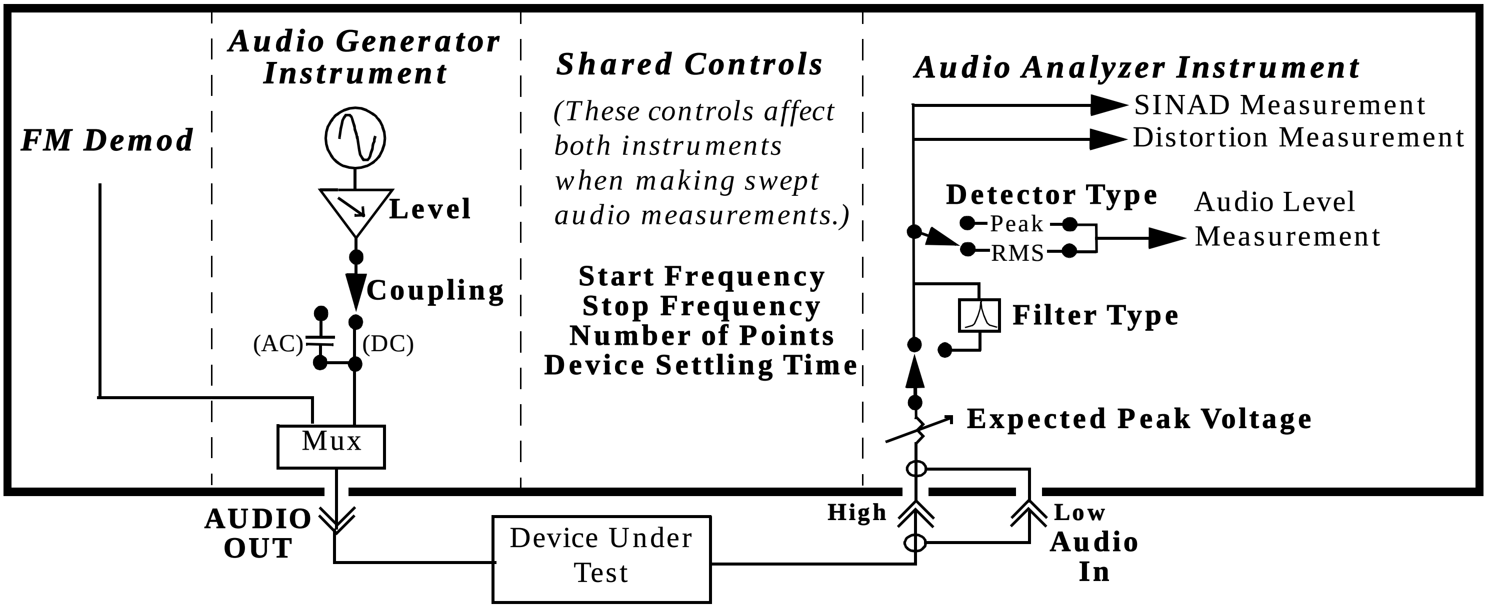
Description

How are swept audio measurements made?

Swept audio measurements synchronize the frequencies of the test set's audio generator and audio analyzer instruments to automatically make measurements at up to 60 frequency points. Audio level, SINAD, and distortion measurements can be performed at each measurement point in the sweep.

This measurement only generates and analyzes audio signals; no modulation of the RF generator, or demodulation by the receiver, is performed. A representation of this operation is shown below.

Figure 7. Swept Audio Measurements Block Diagram



To perform the swept audio measurements, you must route audio generator signal to the AUDIO OUT port (not the FM Demod signal). See "Interactions with the Audio Analyzer and Audio Generator Instruments" on page 89. The audio signal from the device under test is sent to the audio analyzer through the AUDIO IN ports.

The start and stop frequencies for the sweep define the frequency range. The user specifies the number of measurement points, which are evenly spaced through the specified frequency range.

Measurement settling time can be set to specify how long the audio signal is generated at each frequency before a measurement is made by the audio analyzer. This is used to account for settling time in the device being tested and any signal delay through the device. Increasing the settling time increases the sweep time.

If the 100 Hz BW bandpass filter is selected, the center frequency of the filter is synchronized to the audio generator and audio analyzer frequencies.

Typical applications include measuring the audio distortion of a mobile station across several frequencies and measuring the frequency response of an audio filter or amplifier.

This is not a measurement procedure specified in the EIA/TIA standards.

Operating Considerations

Front Panel Access

Swept Audio measurements are accessed manually by pressing the front-panel **Instrument selection** key.

Multi-measurement Use

When multi-measurements are used with the swept audio measurement, the AF analyzer makes the number of measurements specified at each point in the sweep. For example, if five measurement points are specified, and the multi-measurement count is set to 20, a total of 100 measurements are performed during the sweep.

Interactions with the Audio Analyzer and Audio Generator Instruments

To route Audio Generator signal to the front panel AUDIO OUT port, use the "SYSTem:AUDio:OUTPut:SOURce" command or press the **System Config** hardkey, then select `Audio Out Port` (**F1**) on the System Config Screen (2 of 2).

The Swept Audio *measurement* and the Audio Analyzer *instrument* cannot be used at the same time to make audio measurements. If you enable either function while the other function is already enabled, the first function is turned off and a message is displayed that informs you of this situation.

Selecting the Swept Audio measurement will automatically adjust Audio Generator instrument settings. These settings will not be restored to their original values when the Swept Audio measurement is closed.

The amplitude of the Audio Generator instrument can be changed while the Swept Audio measurement is enabled. However, trying to change the Audio Generator instrument's frequency while using swept audio measurements is not allowed, and causes an error message to be displayed.

Specifying a Specific Measurement Frequency Point Within a Sweep

If you need to make sure that a measurement is performed at a specific frequency within the sweep, you can use the following algorithms to calculate the values to enter:

To find which point in the sweep (***n***) corresponds to the frequency you want the sweep to make a measurement at (***F***), use the following algorithm -

$$\boldsymbol{n} = 1 + \boldsymbol{INT}\left(\frac{(\boldsymbol{F}\ \text{Ð}\ \boldsymbol{S})(\boldsymbol{P}\ \text{Ð}\ 1)}{\boldsymbol{Emin}\ \text{Ð}\ \boldsymbol{S}}\right)$$

S = sweep start frequency, ***P*** = number of measurement points to make in the sweep, ***F*** = specific frequency to make a measurement at during the sweep, ***n*** = measurement point corresponding to ***F***,
Emin = minimum upper sweep frequency

INT= the largest integer value that is less than or equal to the expression in parenthesis. For example, if the value of the expression is 3.65037, the integer value is 3.0; the value of **n** would therefore be 4.

To determine the actual stop frequency (**E**) to enter, use the following algorithm -

$$\boldsymbol{E} = \frac{(\boldsymbol{F}\ \text{Ð}\ \boldsymbol{S})(\boldsymbol{P}\ \text{Ð}\ 1)}{(\boldsymbol{n}\ \text{Ð}\ 1)} + \boldsymbol{S}$$

For example if you wanted to make a measurement at 1004 Hz (*F*) during a sweep of 15 points (*P*) that begins at 300 Hz (*S*) and ends after 3 kHz (*Emin*), the first algorithm tells you that 1004 Hz occurs at the fourth point in the sweep (*n*). Use the second algorithm to calculate the actual stop frequency (*E*) you would enter for that sweep (3585.333 Hz).

Related Topics

"Programming a Swept Audio Measurement" on page 249

"Swept Audio Measurement Troubleshooting" on page 871

"Audio Analyzer Measurement Description" on page 58

"Audio Level Measurement Description" on page 62

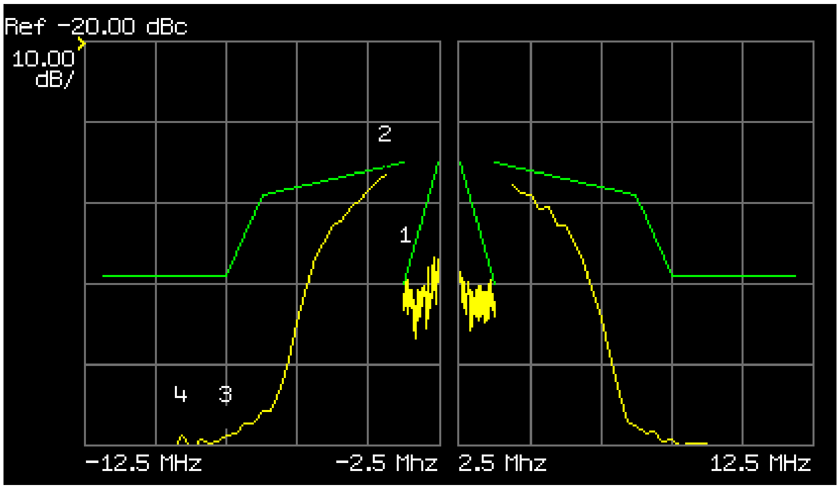
"Distortion Measurement Description" on page 63

"SINAD Measurement Description" on page 64

Spectrum Emission Mask Measurement Description

What is the spectrum emission mask?

The UE conformance specifications in 3GPP TS 34.121, Section 5.9 define a mask for out of channel emissions. This mask is defined relative to the in-channel power. The graphic below is an example of out-of-channel measurement results you might see on the test set. The spectrum emission mask for each of the four frequency bands is visible in green.



How is the spectrum emission mask measurement made?

In-channel power

The in-channel power is measured on the RF input signal which is filtered with a 3.84 MHz bandwidth Root-Raised Cosine (RRC) filter with a rolloff of alpha = 0.22.

Out-of-channel emissions

The out-of-channel emissions found in frequencies between 2.5 and 12.5 MHz away from the center channel frequency are determined in four symmetrical bands on each side of the carrier.

The emissions are measured with either a 30 kHz or 1 MHz bandwidth Gaussian measurement filter. The spectrum emission mask measurement's pass/fail limits for the 30 kHz bandwidth filter and 1 MHz bandwidth filter are settable. See Table 1. for details of the spectrum emission mask measurement in the E1963A.

Table 1. Spectrum Emission Mask in E1963A

	Frequency Offset from carrier	**Measurement Bandwidth**	**Resolution Bandwidth (RBW)**
Range 1	2.5 - 3.5 MHz	30 kHz	10 kHz
Range 2	3.5 - 7.5 MHz	1 MHz	250 kHz

Table 1. Spectrum Emission Mask in E1963A

	Frequency Offset from carrier	Measurement Bandwidth	Resolution Bandwidth (RBW)
Range 3	7.5 - 8.5 MHz	1 MHz	250 kHz
Range 4	8.5 - 12.5 MHz	1 MHz	250 kHz

NOTE The resolution bandwidth(RBW) may also be referred to as the measurement step size.

The compliance of Range 1 with the specified mask is determined using the following measurement procedure. A 30 kHz Gaussian measurement filter is centered 2.515 MHz away from the carrier frequency on both sides. The filter is shifted by 10 kHz for each measurement until the 30 kHz filter is centered at a 3.485 MHz offset from the carrier. This provides 98 measurement points on each side of the carrier for evaluating mask compliance.

The remaining frequency ranges are evaluated in the same manner. However, a 1 MHz Gaussian measurement filter is used and the resolution bandwidth is 250 kHz instead of 10 kHz. The measurements begin with the filter centered at 4 MHz and end with it centered at 12 MHz. This provides 33 unique measurement points on each side of the carrier for evaluating mask compliance. However, there are redundant points at 7.5 MHz and 8.5 MHz. Therefore, 35 measurement points are available when measurement results are queried via GPIB, while 33 points are visible on the test set’s spectrum emission mask measurement graphic.

Spectrum Emission Mask Measurement Results

- Pass/Fail for the overall spectrum emission mask. If any out-of-channel frequency range does not comply with the standard, the entire mask fails.
- In-channel power
- Pass/Fail for each of the four individual frequency ranges.
- Power level vectors relative to in-channel power for each frequency range. These vectors contain the power measured at each frequency offset in the individual ranges. The value of each frequency offset is determined by the starting measurement position and the resolution bandwidth. For example, range 3 (7.5 MHz to 8.5 MHz) starts at 7.5 MHz and has a resolution bandwidth of 250 kHz. Therefore, relative power measurements are returned for offsets 7.5, 7.75, 8, 8.25, and 8.5 MHz from the carrier frequency.
- Results for each frequency range. The relative power level and the frequency offset of the largest mask error, the margin of that error, and whether or not the range passed or failed the spectrum emission mask specifications are the available results.

Input Signal Requirements

- For this measurement the test set's receiver uses autoranging to adjust for the level of the signal being measured; therefore the expected signal level does not need to be specified during measurement setup.
- The frequency of the signal being measured must be in the range of 800 MHz to 1000 MHz, or from 1700 MHz to 1990 MHz.
- The level into the test set's RF IN/OUT connector must be in the range of +5 dBm to +28 dBm, in a 3.84 MHz bandwidth.

Trigger Source

The trigger source defaults to `Auto` and tries to use protocol triggering if the UE is synchronized to the test set. Immediate triggering is used if the UE is not synchronized.

If you want to measure the spectrum emissions for a specific timeslot, use the trigger delay parameter.

This measurement can be made over a period of 1 ms to 10 ms by altering the measurement interval parameter.

Measurement Calibration

This measurement should be calibrated using the Calibrate Measurements function (“CALibration:MEASurements?” on page 387) when the temperature has changed by ± 10° C or more since the last calibration. If this situation exists, the integrity indicator value becomes 19 and a message is displayed indicating “Uncalibrated Due to Temperature”.

Related Topics

- “Programming a Spectrum Emission Mask Measurement”
- “Spectrum Emission Mask Troubleshooting”
- “Test Adherence to Standards” on page 98
- “What 3GPP W-CDMA Conformance Tests are supported?” on page 103
- “Triggering of Measurements” on page 290
- “Statistical Measurement Results” on page 294
- “Integrity Indicator” on page 295

Thermal Power Measurement Description

How is a thermal power measurement made?

Thermal power is a broadband, unfiltered measurement that measures all power present at the test set’s RF IN/OUT connector using a thermal detector. Because of its high accuracy when measuring power up to +28 dBm, this is the preferred measurement to use for higher power measurements, such as the Maximum Output Power test (3GPP TS 34.121, section 5.2, v3.2.0).

The thermal power measurement automatically zeroes itself for each measurement; no other calibration is required. To meet specified performance, the test set must be operated in the temperature range of 20° C to 55° C.

The thermal power measurement is not as fast as the channel power measurement, and is not intended to measure signal levels below -10 dBm. Use the channel power measurement to measure power levels from -11 dBm to -61 dBm, or when maximum measurement speed is required. See “Channel Power Measurement Description” on page 67.

Differences in Thermal Power and Channel Power Measurement Results

Because the thermal power measurement is an unfiltered measurement, its results are typically about 0.25 dB higher than the filtered channel power measurement results.

Input Signal Requirements

- For this measurement the test set’s receiver uses auto-ranging to adjust for the level of the signal being measured; therefore the expected signal level does not need to be specified during measurement setup.
- For specified accuracy, the frequency of the signal being measured must be in the range of 800 MHz to 1000 MHz, or 1700 MHz to 1990 MHz.
- The level into the test set’s RF IN/OUT connector must be in the range of -10 dBm to +28 dBm for greatest accuracy (although signals can be measured down to -20 dBm with degraded accuracy).
- This measurement is unfiltered, so all signals present at the RF IN/OUT connector affect the measurement results.

Trigger Source

No synchronization between the test set and the mobile station (UE) is needed, so immediate triggering is always used for this measurement. No trigger delay is available.

Related Topics

"Programming a Thermal Power Measurement"

"Thermal Power Troubleshooting"

"Statistical Measurement Results"

"Triggering of Measurements"

"Test Adherence to Standards"

"What 3GPP W-CDMA Conformance Tests are supported?" on page 103

Waveform Quality Measurement Description

How is a waveform quality measurement made?

This measurement compares the received signal's IQ modulation characteristics to an ideal signal to determine the composite error vector magnitude (EVM), frequency error, origin offset, phase error, and magnitude error of the received signal. Results for timing error and peak code domain error are also available.

The frequency error result satisfies the requirements for 3GPP TS 34.121, section 5.3, v3.0.1, *Frequency Error*. The error vector magnitude result satisfies the requirements for 3GPP TS 34.121, section 5.13.1, v3.0.1, *Error Vector Magnitude*. For an explanation of the peak code domain error result's adherence to the 3GPP standard "Waveform Quality" on page 99.

The measurement is made during one user-selected timeslot.

Input Signal Requirements

- This measurement does not autorange, therefore the expected power level from the mobile station (UE) is set using the current MS Target Power setting, or by using manual receiver power control and specifying the manual power level. See "Receiver Control" .
- The frequency of the signal being measured must be in the range of 800 MHz to 1000 MHz, or from 1700 MHz to 1990 MHz.
- The level into the test set's RF IN/OUT connector must be in the range of -25 dBm to +28 dBm, in a 3.84 MHz bandwidth.
- Maximum measurable EVM = 35%
- Maximum measurable frequency error = ± 1 kHz

Trigger Source

Triggering choices for the Waveform Quality measurement are immediate, protocol, external, and auto. Auto triggering is the default choice. In most cases, auto triggering provides the optimum measurement triggering condition for the Waveform Quality measurement. For example, if the UE is synchronized to the test set, protocol triggering is used. Immediate triggering is used if the UE is not synchronized.

When immediate triggering is used, the measurement result returned for timing error is always `NAN` (Not a Number) because it is not possible to evaluate a timing error in this measurement situation.

The measurement is performed during one timeslot. The timeslot to use for the measurement is selectable (0 to 14).

Measurement Calibration

This measurement should be calibrated using the Calibrate Measurements function ("CALibration:MEASurements?" on page 387) when the temperature has changed by ± 10° C or more since the last calibration. If this situation exists, the integrity indicator value becomes 19 and a message is displayed indicating "Uncalibrated Due to Temperature".

Related Topics

- "Programming a Waveform Quality Measurement"
- "Waveform Quality Troubleshooting"
- "Test Adherence to Standards"
- "What 3GPP W-CDMA Conformance Tests are supported?" on page 103
- "Triggering of Measurements"
- "Statistical Measurement Results"
- "Integrity Indicator"

Test Adherence to Standards

The following information describes the implementation of the measurements in the E1963A Mobile Test Application and their compliance with established standards. Refer to "What 3GPP W-CDMA Conformance Tests are supported?" on page 103 for a list of 3GPP conformance tests supported in the W-CDMA Mobile Test Application.

Thermal Power

Standards Reference: 3GPP TS 34.121 section 5.2

Thermal power is an unfiltered, broadband RF power measurement, that is intended for the Maximum Output Power test (3GPP TS 34.121, section 5.2). The 3GPP standard specifies that this measurement be made over at least 1 timeslot (667 µs). The implementation of this measurement in the Agilent 8960 measures over 10 ms with the UE in power control algorithm 2.

Related Topics

"Thermal Power Measurement Description" on page 94

"Programming a Thermal Power Measurement" on page 253

Channel Power

Standards Reference: 3GPP TS 34.121 section 5.4.1, section 5.4.3, and section 5.5.1

When the RRC filter is Off, the bandwidth of the Channel Power measurement is greater than (1+alpha) times the chip rate, where alpha=0.22. This meets the mean power measurement requirements of the following tests: *Open Loop Power Control* (3GPP TS 34.121, section 5.4.1), *Minimum Output Power* (3GPP TS 34.121, section 5.4.3).

With the RRC filter on, channel power is a filtered RF power measurement, using a Root-Raised Cosine (RRC) filter with a rolloff of α=0.22, and a bandwidth equal to the chip rate (3.84 MHz). This measurement meets the RRC filtered mean requirements for the following tests: *Transmit Off Power* (3GPP TS 34.121, section 5.5.1).

Related Topics

"Channel Power Measurement Description" on page 67

"Programming a Channel Power Measurement" on page 233

Adjacent Channel Leakage Ratio

Standards Reference: 3GPP TS 34.121 section 5.10

Adjacent channel leakage ratio (ACLR) measures RF power at +/-5 MHz and +/-10 MHz offsets from the carrier (center) frequency, using a Root-Raised Cosine (RRC) filter with a rolloff of α=0.22, and a bandwidth equal to the chip rate (3.84 MHz). The measurement results are the ratios of the power at these offsets to the in-channel power. This measurement meets the requirements defined in 3GPP TS 34.121, section 5.10, Adjacent Channel Power Leakage Ratio (ACLR).

Related Topics

"Adjacent Channel Leakage Ratio Measurement Description" on page 65

"Programming an Adjacent Channel Leakage Ratio Measurement" on page 231

Waveform Quality

Standards References: 3GPP TS 34.121 section 5.13 and section 5.3

Waveform quality provides the following measurement results: error vector magnitude (EVM), frequency error, origin offset, phase error, magnitude error, timing error, peak code domain error, and β_c and β_{d1-6}. (β_c and β_{d1-6} are available through GPIB query only.) The frequency error result meets the requirements for 3GPP TS 34.121, section 5.3, Frequency Error.

Waveform quality conforms to the method of test for EVM and Peak Code Domain Error defined under Transmit Modulation (section 5.13) with the following exceptions:

- The measurement only works on the supported Reference Measurement Channels (RMC) which for this release are the 12.2 kbps RMC and the 64 kbps RMC.
- Peak Code Domain Error (section 5.13.2) specifies the use of the 768 kbps RMC which supports multiple DPDCHs. The peak code domain error (PCDE) is to be determined by projecting the error vector power onto the code domain at the maximum spreading factor, which is 4 for the 768 kbps RMC. The test set doesn't yet support the 768 kbps RMC, so the PCDE is computed by projecting the error vector power onto the code domain at the spreading factor equal to the DPDCH. Therefore, the PCDE for the 12.2 kbps RMC is determined uses a spreading factor of 64 while the PCDE for the 64 kbps RMC is calculated using a spreading factor of 16.

Related Topics

"Waveform Quality Measurement Description" on page 96

"Programming a Waveform Quality Measurement" on page 255

Loopback Bit Error Ratio

Standards References: 3GPP TS 34.121 section 6.2 - section 6.8

Loopback BER compares the data it sends on the downlink signal to the data it receives on the uplink signal, with the UE operating in loopback mode 1 (as per 3GPP TS 34.109, section 5.3.2.6.2, *Loopback of RLC SDUs*).

Loopback BER conforms to the method of test for the following measurements: *Reference Sensitivity Level* (3GPP TS 34.121, section 6.2) and *Maximum Input Level* (3GPP TS 34.121, section 6.3).

You can use Loopback BER in conjunction with additional test and measurement equipment to perform the following tests:

- Adjacent Channel Selectivity (ACS) (3GPP TS 34.121, section 6.4)
- Blocking Characteristics (3GPP TS 34.121, section 6.5)
- Spurious Response (3GPP TS 34.121, section 6.6)
- Intermodulation Characteristics (3GPP TS 34.121, section 6.7)

Related Topics

"Loopback Bit Error Ratio Measurement Description" on page 79

"Programming a Loopback Bit Error Ratio Measurement" on page 241

Spectrum Emission Mask

Standards Reference: 3GPP TS 34.121 section 5.9

The measurement algorithm implemented by the test set's Spectrum Emission Mask measurement conforms to the method of test defined in the 3GPP standard.

Related Topics

"Spectrum Emission Mask Measurement Description" on page 91

"Programming a Spectrum Emission Mask Measurement" on page 251

Code Domain

Code domain measurements are not specified by 3GPP for W-CDMA. Some of the measurement results are common with the Waveform Quality measurement. This is because the method of test is the Global In-Channel TX-Test defined in 3GPP 34.121 Annex B. Code domain power and code domain error are measurement results of this method, and are therefore provided in the test set even though they are not conformance specifications for W-CDMA UEs.

Related Topics

"Waveform Quality" on page 99

"Code Domain Measurement Description" on page 69

"Programming a Code Domain Measurement" on page 235

"Waveform Quality Measurement Description" on page 96

Occupied Bandwidth

Standards Reference: 3GPP TS 34.121 section 5.8

The measurement algorithm implemented in the test set's Occupied Bandwidth measurement conforms to the method of test defined in the 3GPP standards.

Related Topics

"Occupied Bandwidth Measurement Description" on page 80

"Programming an Occupied Bandwidth Measurement" on page 243

Inner Loop Power

Standards Reference: 3GPP TS 34.121 section 5.4.2

This measurement conforms to the method of test for *Inner Loop Power Control in the Uplink* defined under 3GPP TS 34.121, section 5.4.2 with the following exceptions:

- The inner loop power test process recommended in the standard consists of a series of test segments (referred to as Test Steps in the standard). The test set allows to run one segment at a time. You can build the whole test profile by combining them together.
- The test set does not support testing 3 dB inner loop power control step in this release.

Related Topics

“Inner Loop Power Measurement Description” on page 72

“Programming an Inner Loop Power Measurement”

PRACH Transmit On/Off Power

Standards Reference: 3GPP TS 34.121 section 5.5 and section 5.4.1

This measurement measures both the "on" power of the first PRACH preamble burst and the "off" power immediately prior to and just following any given PRACH preamble. It meets the requirements defined in *3GPP TS 34.121, section 5.5, Transmit ON/OFF Power* and *section 5.4.1, Open Loop Power Control in the Uplink*.

Related Topics

“PRACH Transmit On/Off Power Measurement Description” on page 82

“Programming a PRACH Transmit On/Off Power Measurement”

IQ Tuning

Standards References: 3GPP TS 34.121 section 5.13 and section 5.3

The IQ tuning measurement includes all of the measurements available in the Waveform Quality measurement, along with the following measurement results: IQ gain imbalance, IQ phase imbalance, peak EVM, chip EVM and an IQ constellation diagram.

IQ gain imbalance, IQ phase imbalance and Origin Offset are solved for using the parameter estimator described in *Estimation of Amplitude Imbalance, Phase Imbalance, and Origin Offset of a Complex Signal Relative to an Ideal Reference* by R. A. Birgenheier, Jan. 4, 2000. Chip EVM is the calculated EVM at each chip in the measured timeslot. Peak EVM is the maximum chip EVM. The IQ constellation is the measured IQ signal with origin offset included.

Related Topics

"Waveform Quality" on page 99

"IQ Tuning Measurement Description" on page 76

"Waveform Quality Measurement Description" on page 96

"Programming an IQ Tuning Measurement"

What 3GPP W-CDMA Conformance Tests are supported?

This table shows the standard tests as given in 3GPP TS 34.121. Shown are E1963A testing capabilities, as well as the E1963A measurements used to make the test.

Table 2. Transmitter Characteristics

3GPP TS 34.121	Test Description	Supported in A.03 Release?	E1963A Measurement
5.2	Maximum Output Power	Yes	Thermal Power
5.3	Frequency Error	Yes	Waveform Quality or Code Domain
5.4.1	Open Loop Power Control in the Uplink	Yes	PRACH Transmit On/Off Power
5.4.2	Inner Loop Power Control in the Uplink	Yes	Inner Loop Power
5.4.3	Minimum Output Power	Yes	Channel Power with RRC filter OFF
5.4.4	Out-of-synchronization handling of output power	No	
5.5.1	Transmit OFF Power	Yes	PRACH Transmit On/Off Power
5.5.2	Transmit ON/OFF Time mask	Yes	PRACH Transmit On/Off Power
5.6	Change of TFC	No	
5.7	Power setting in uplink compressed mode	No	
5.8	Occupied Bandwidth (OBW)	Yes	Occupied Bandwidth
5.9	Spectrum emission mask	Yes	Spectrum Emission Mask
5.10	Adjacent Channel Leakage Power Ratio (ACLR)	Yes	ACLR
5.11	Spurious Emissions	Yes**	Camp to E1963A. Use an external spectrum analyzer.
5.12	Transmit Intermodulation	Yes*, **	
5.13.1	Error Vector Magnitude (EVM)	Yes	Waveform Quality (or Code Domain)
5.13.2	Peak code domain error	Yes	Waveform Quality (or Code Domain)

Table 3. Receiver Characteristics

3GPP TS 34.121	Test Description	Supported in A.03 Release?	E1963A Measurement
6.2	Reference Sensitivity Level	Yes	Loopback Bit Error Ratio
6.3	Maximum Input Level	Yes	Loopback Bit Error Ratio

Table 3. Receiver Characteristics

3GPP TS 34.121	Test Description	Supported in A.03 Release?	E1963A Measurement
6.4	Adjacent Channel Selectivity (ACS)	Yes*	Loopback Bit Error Ratio (plus W-CDMA signal from a signal generator)
6.5	Blocking Characteristics	Yes*	Loopback Bit Error Ratio (plus W-CDMA signal from a signal generator)
6.6	Spurious Response	Yes*	Loopback Bit Error Ratio (plus a CW signal from a signal generator)
6.7	Intermodulation Characteristics	Yes*	Loopback Bit Error Ratio (plus 2 CW signals from signal generators)
6.8	Spurious Emissions	No	

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 98

"Thermal Power Measurement Description" on page 94

"Waveform Quality Measurement Description" on page 96

"Code Domain Measurement Description" on page 69

"Channel Power Measurement Description" on page 67

"Occupied Bandwidth Measurement Description" on page 80

"Spectrum Emission Mask Measurement Description" on page 91

"Adjacent Channel Leakage Ratio Measurement Description" on page 65

"Loopback Bit Error Ratio Measurement Description" on page 79

"Inner Loop Power Measurement Description"

"PRACH Transmit On/Off Power Measurement Description"

"IQ Tuning Measurement Description"

CALibrating the Test Set

Calibration Strategy

Various calibration routines must be run to ensure measurement accuracy. The type of calibration and appropriate intervals for performing calibrations vary with each application.

Description

There are two calibrations that must be performed periodically on the test set:

- I/Q calibration
- Measurement calibration

Calibration Procedures

- I/Q calibration

  This calibration is required if the baseband generator or the vector output modules are serviced or swapped. IQ calibration should not be used as part of frequent (i.e. daily, weekly or monthly) test set calibration.

  The IQ calibration routines can be manually initiated by pressing the SYSTEM CONFIG key, then pressing the 1 of 2 (**More**) key, then pressing the Service (**F7**) key.

- Measurement calibration

  Measurement calibration takes about two minutes.

  During this calibration no power should be applied to the front panel.

  This calibration generates calibration data for transmitter measurements.

  During calibration the internal temperature of the test set is measured and calibration data is generated for the measurement's amplitude and frequency ranges.

  An integrity bit is set true and is returned with measurement results when the measurement is uncalibrated due to temperature drift. See "Integrity Indicator" .

  You can remotely initiate the measurement calibration routines using "CALibration:MEASurements?" on page 387. The test set returns a numeric value indicating the outcome of the calibration attempt.

Table 4. Measurement Calibration Indicator values

Measurement Calibration Indicator	Measurement Calibration Message
0	Measurement's calibration completed successfully.
1	Measurement's calibration failed due to temperature drift. Wait for temperature to stabilize.
2	Measurement's calibration failed due to oven out of range.

Table 4. Measurement Calibration Indicator values

Measurement Calibration Indicator	Measurement Calibration Message
3	Measurement's calibration failed due to loopback switch problem.
4	Measurement's calibration failed due to under range condition.
5	Measurement's calibration failed due to over range condition.
6	Measurement's calibration failed due to correlation problem.
-340	Measurement's calibration failed. This is a SCPI defined value indicating an unexpected case.

You can also manually initiate the measurement calibration for individual measurements by selecting the measurement and pressing the `Calibrate Measurements` softkey. This calibration is not an option for the Thermal Power measurement or any receiver measurements.

Related Topics

"CALibration Subsystem"

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.

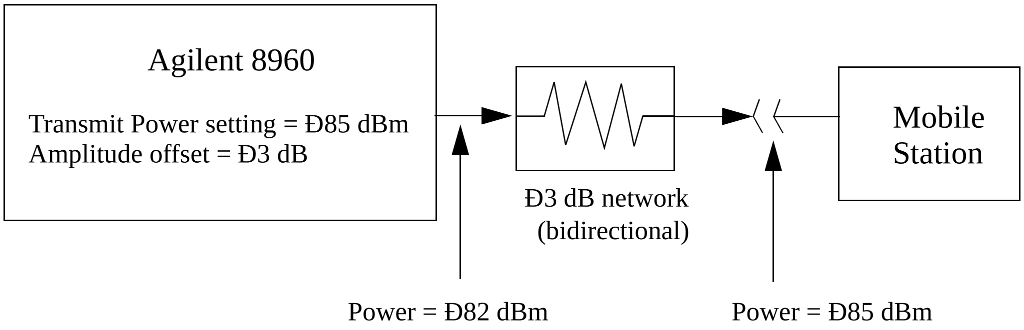
Amplitude Offset

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 8. "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 8. Amplitude Offset Mobile Station Receiver Example



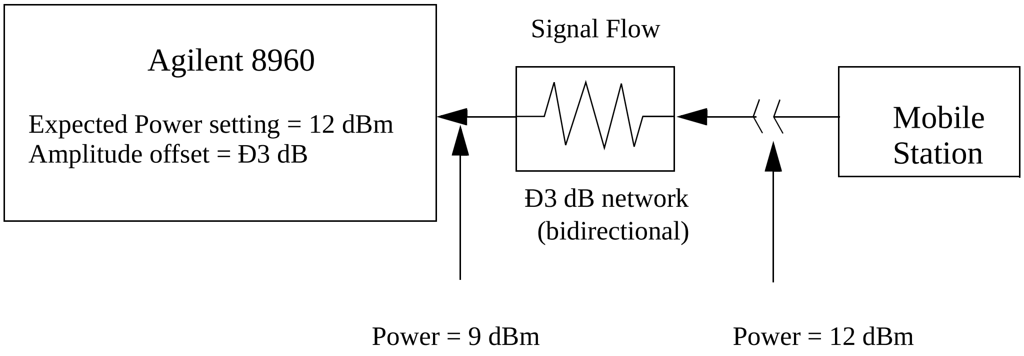
Mobile Station Transmitter Example

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 9. "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.

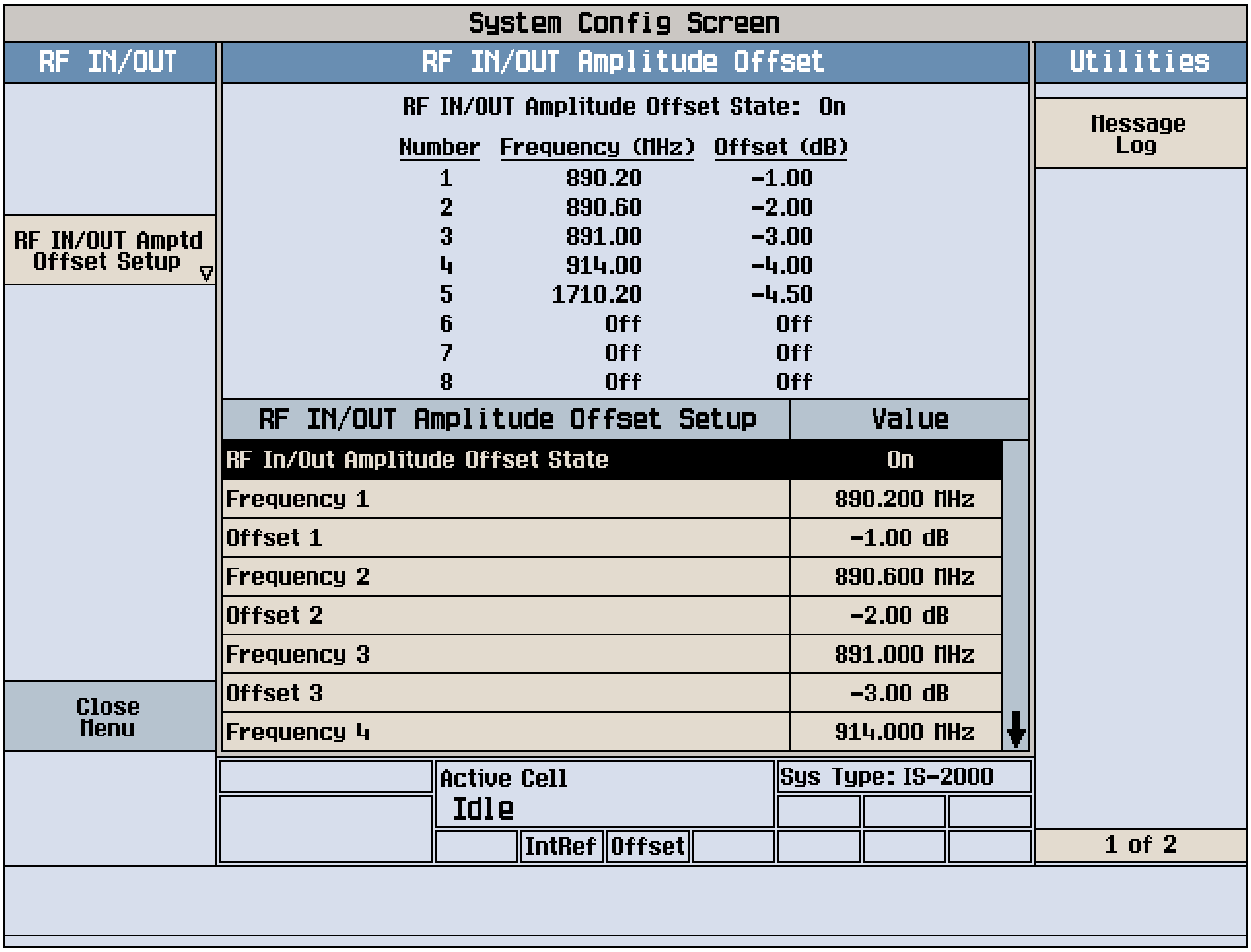
Figure 9. Amplitude Offset Mobile Station Transmitter Example



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 10. RF IN/OUT Amplitude Offset Setup



RF IN/OUT Amplitude Offset State: On

Number	Frequency (MHz)	Offset (dB)
1	890.20	-1.00
2	890.60	-2.00
3	891.00	-3.00
4	914.00	-4.00
5	1710.20	-4.50
6	Off	Off
7	Off	Off
8	Off	Off

RF IN/OUT Amplitude Offset Setup	Value
RF In/Out Amplitude Offset State	On
Frequency 1	890.200 MHz
Offset 1	-1.00 dB
Frequency 2	890.600 MHz
Offset 2	-2.00 dB
Frequency 3	891.000 MHz
Offset 3	-3.00 dB
Frequency 4	914.000 MHz

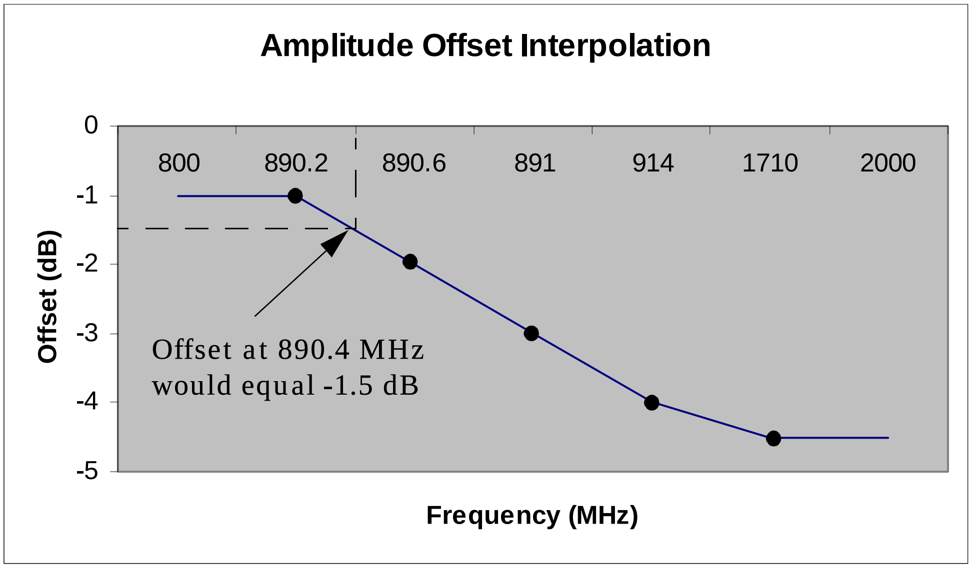
Active Cell
Idle

Sys Type: IS-2000

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 11. “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 10. “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 11. 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"

Call Processing

Soft Handoff

Cell 2 Overview

The lab application includes two sectors, cell 1 and cell 2. Cell 1 is a full sector, supporting all call processing functionality available in the test set. Cell 2 is provided to allow the test set to perform a soft handoff. Cell 2 can not be used for many call processing events, such as establishing a call or handing off to a new frequency. The table below summarizes the features of cell 1 and cell 2, and indicates if the features are user-settable.

Table 5. Cell 1 and Cell 2 Features

Feature		**Cell 1**	**Cell 2**
CPICH	Level	User-settable	User-settable (see "CALL:CELL2:CPIChannel" on page 327).
P-CCPCH/SCH	Level	User-settable	User-settable (see "CALL:CELL2:CCPChannel" on page 323).
S-CCPCH	Channelization Code	User-settable	No S-CCPCH
	Level	User-settable	No S-CCPCH
PICH	Channelization Code	User-settable	No PICH
	Level	User-settable	No PICH
AICH	Channelization Code	User-settable	No AICH
	Level	User-settable	No AICH
DPCH	Channelization Code	User-settable	Equals cell 1 setting
	Level	User-settable	User-settable (see "CALL:CELL2:DPCHannel" on page 329).
Composite OCNS		16 channels (see "Orthogonal Channel Noise Simulator (OCNS)" on page 136)	1 channel at OVSF [128,2] (see "CALL:CELL2:OCNSource" on page 331)
Primary Scrambling Code		User-settable	User-settable (see "CALL:CELL2:SCODe" on page 335).
Cell Power		User-settable	User-settable. Cell 2 power must be within 10 dB of cell 1 power. Cell 2 is turned off if cell 1 is turned off. (see "CALL:CELL2:POWer" on page 333)

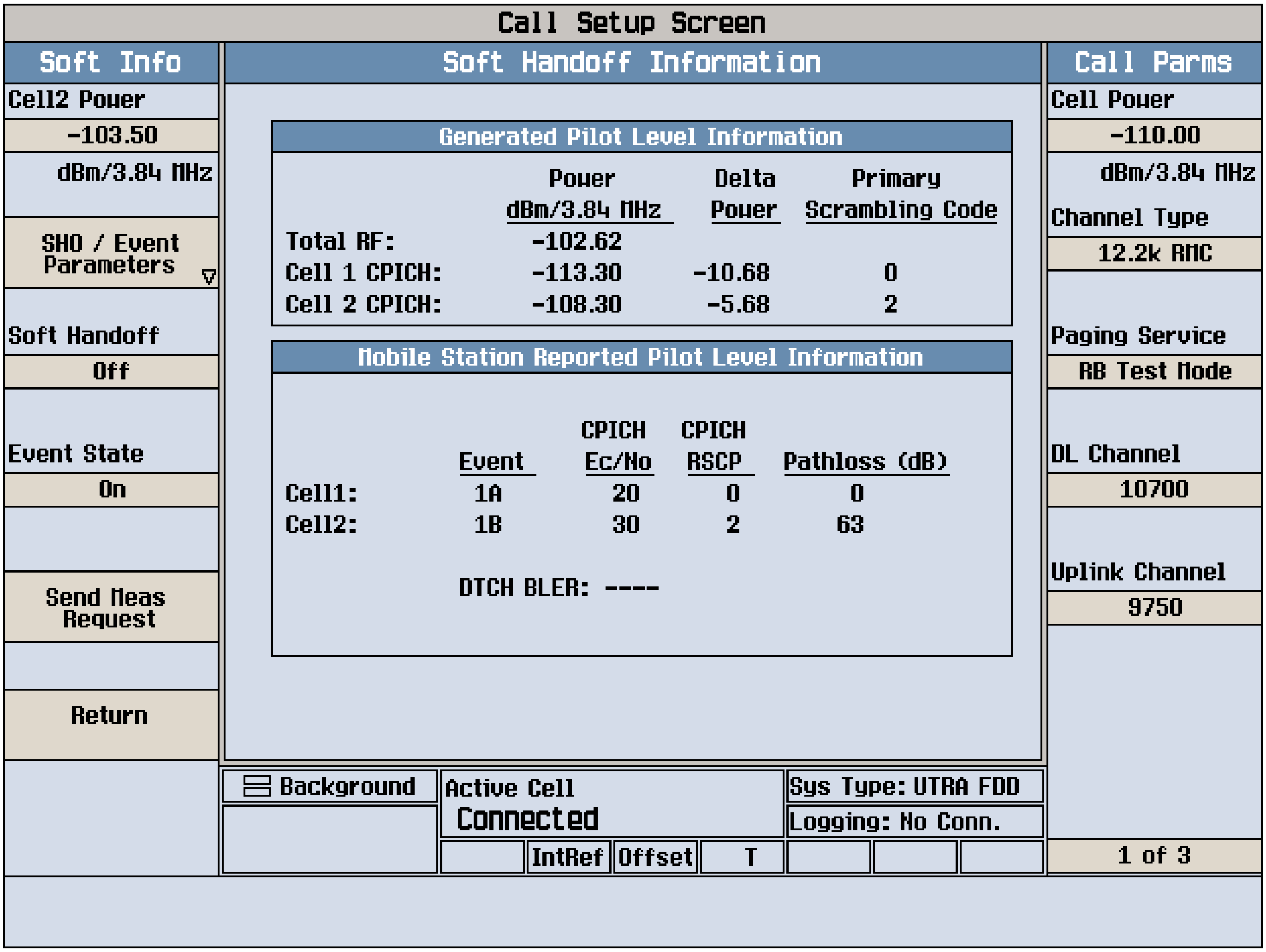
Table 5. Cell 1 and Cell 2 Features

Feature	Cell 1	Cell 2
Closed Loop Power Control	User-settable: All Up, All Down, Alternating, 10 Up/10 Down, Active, Single Up, Single Down.	User-settable: All Up, All Down, Alternating, 10 Up/10 Down, Active. When set to “Active,” the TPC bits transmitted are the same as those transmitted by cell 1 (see “CALL:CELL2:CLPControl” on page 326).
You can specify a time offset which offsets the cell 2 signal in time relative to the cell 1 signal (see “How Do I Configure Cell 2?” on page 790 and “CALL:CELL2:TOFFset” on page 336).		
See “How Do I Configure Cell 2?” on page 790 for more information about configuring cell 2 from the front panel. See “Setting Downlink Channel Codes and Levels” on page 135 for more information about cell 1 channelization codes and levels.		

The test set’s total RF output power is a combination of the power of cell 1, cell 2 and AWGN power:
Total RF Power (dBm/3.84 MHz) = [Cell 1 Power + Cell 2 Power + AWGN Power] (dBm/3.84 MHz)
(see “Setting Cell Power and AWGN Power Levels” on page 132 for more information about cell power and AWGN power).

Soft Handoff Overview

The soft handoff functionality is accessible through the `Soft Handoff Information` screen (**F1** on the `Call Control 2 of 3` menu)



Cell2 Power
-103.50
dBm/3.84 MHz

Soft Handoff
Off

Event State
On

Generated Pilot Level Information

	Power dBm/3.84 MHz	Delta Power	Primary Scrambling Code
Total RF:	-102.62		
Cell 1 CPICH:	-113.30	-10.68	0
Cell 2 CPICH:	-108.30	-5.68	2

Mobile Station Reported Pilot Level Information

	Event	CPICH Ec/No	CPICH RSCP	Pathloss (dB)
Cell1:	1A	20	0	0
Cell2:	1B	30	2	63

DTCH BLER: ----

Active Cell
Connected

Sys Type: UTRA FDD
Logging: No Conn.

Cell Power
-110.00
dBm/3.84 MHz

Channel Type
12.2k RMC

Paging Service
RB Test Mode

DL Channel
10700

Uplink Channel
9750

The `Generated Pilot Level Information` window reports:

- `Total RF Power`
- `Cell 1 CPICH Power`
- `Cell 2 CPICH Power` (Cell2 CPICH Power = Cell2 Power + Cell2 CPICH Level)
- `Delta Power` (the difference between the CPICH and Total RF Power)
- `Primary Scrambling Code`

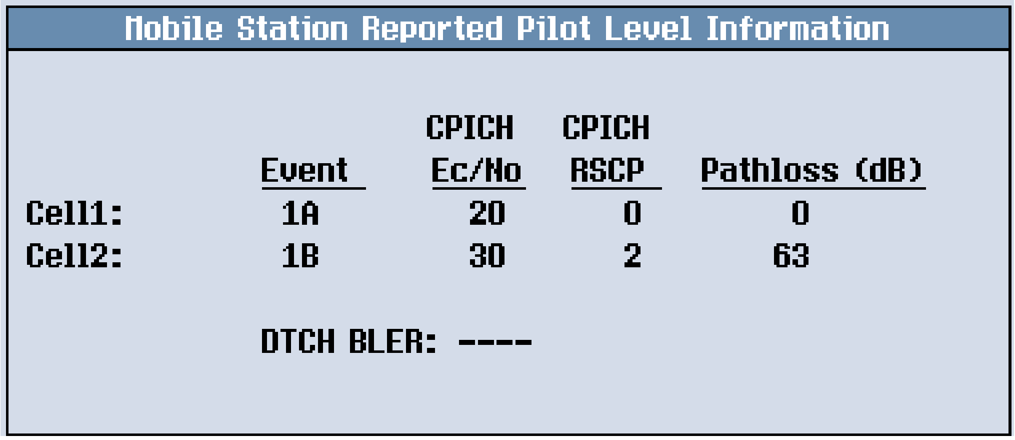
Mobile Station Reported Pilot Level Information

When a connection is established between the test set and UE, you may request MS reported measurement results from the UE (see “Mobile Station (UE) Reported Measurements” on page 152). When you request MS reported measurement results, results for CPICH RSCP, CPICH Ec/No and Pathloss are returned for both cell 1 and cell 2 (if cell 2 is set to a non-zero power level). You can retrieve the results for cell 2 using the following commands:

CPICH Ec/No: “CALL:MS:REPorted:CELL2:CPICh:ECNO?” on page 337

- CPICH RSCP: “CALL:MS:REPorted:CELL2:CPICh:RSCP?” on page 339
- Pathloss: “CALL:MS:REPorted:CELL2:PATHloss?” on page 339
- All three measurement results: “CALL:MS:REPorted:CELL2:ALL?” on page 337

or view them on the `Soft Handoff Information` screen in the `Mobile Station Reported Pilot Level Information` window. (MS reported measurement results are also displayed on this screen when an event is triggered, see “Event Triggering” on page 115).



Mobile Station Reported Pilot Level Information

	Event	CPICH Ec/No	CPICH RSCP	Pathloss (dB)
Cell1:	1A	20	0	0
Cell2:	1B	30	2	63

DTCH BLER: ----

If you have enabled soft handoff (see “Enabling Soft Handoff” on page 115), the DTCH BLER Report result includes both cell 1 and cell 2 (there is only one DTCH in soft handoff because soft combining of the two radio links in the UE occurs before the point where the DTCH is extracted and BLER is calculated).

Enabling Soft Handoff

After establishing a call between the test set’s cell 1 and the UE, and configuring cell 2 (power, primary scrambling code, time offset, etc., see “Cell 2 Overview” on page 112), you may turn soft handoff on (see “How Do I Perform a Soft Handoff?” on page 792 and “CALL:SHANdoff:ENABle” on page 343). This orders the UE to try to demodulate the signal from cell 2.

Loopback BER Testing in Soft Handoff

You can test Loopback BER while in soft handoff (see “How Do I Perform a Soft Handoff?” on page 792 and “Loopback Bit Error Ratio Measurement Description” on page 79). When soft handoff is not enabled, as you increase cell 2 power, you will see an increase in BER (because cell 2 acts as an interferer). When you enable soft handoff, the BER should improve, as the UE is then able to soft combine the signals from both cells. (If cell 2 level is too high, the messaging to order a soft handoff may not be properly received by the UE and an error will be posted. If this is the case, simply decrease cell 2 power, enable soft handoff, then return cell 2 its previous level).

Event Triggering

The soft handoff functionality present in the test set also allows you to enable/disable event reporting (by turning `Event State` on and off), and to configure event parameters (such as `Event 1a State`, R_{1a} etc.). When event reporting is enabled, the UE reports to the test set when an event occurs (if you have enabled that event by turning its state on. For example: if you have set `Event 1a State` to `On`, then the UE will report when a 1a event occurs). When you turn `Event State` on (enable event reporting), the test set sends a Measurement Control message to the UE with the following user-settable event information:

- 1a (A Primary CPICH enters the Reporting Range): Event 1a State, W, R_{1a}, H_{1a}
- 1b (A Primary CPICH leaves the Reporting Range): Event 1b State, W, R_{1b}, H_{1b}
- 1c (A Non-active Primary CPICH becomes better than an active Primary CPICH): Event 1c State, H_{1c}
- 1d (Change of best cell): Event 1d State, H_{1d}
- 1e (A Primary CPICH becomes better than an absolute threshold): Event 1e State, T_{1e}, H_{1e}
- 1f (A Primary CPICH becomes worse than an absolute threshold): Event 1f State, T_{1f}, H_{1f}

(see “How Do I Configure and Enable (Start) Event Reporting?” on page 794 and “CALL:SHANdoff” on page 340)

NOTE After changing event parameters, you must send a new Measurement Control message to the UE by selecting `Send Event Config` (**F5** when viewing the `SHO/Event Parameters` menu with `Event State` on) or by toggling `Event State` off and on.

The Measurement Control message sent by the test set orders the UE to use the RSCP measurement result to determine whether an event has occurred. When an event occurs, the UE reports all four MS reported measurement results - CPICH Ec/No, CPICH RSCP, Pathloss and DTCH BLER Report (see “Mobile Station Reported Pilot Level Information” on page 114).

Related Topics

“How Do I Configure Cell 2?” on page 790

“How Do I Configure and Enable (Start) Event Reporting?” on page 794

“How Do I Perform a Soft Handoff?” on page 792

“CALL:SHANdoff” on page 340

“Mobile Station (UE) Reported Measurements” on page 152

“Loopback Bit Error Ratio Measurement Description” on page 79

Active Cell Operating Mode

The Active Cell operating mode is used to emulate a base station (BS) in a network to page the UE (mobile station) and get it connected on a call. When connected, the UE's performance can be measured using the suite of measurements shown when the **Measurement selection** key is pressed. You can also perform handoffs to other uplink and downlink channels (UARFCN), or to the GSM system when E1968A test application is present in the test set. See "Performing a Handoff" on page 151.

The following example selects Active Cell operating mode via GPIB:

```
OUTPUT 714;"CALL:OPERating:MODE CALL"
```

Active Cell Features

While operating in Active Cell mode the test set is capable of performing the following call processing operations:

- Test set originated (paging) call, or disconnection. See "Establishing a Connection with the UE" on page 150.
- Intra-cell hard handoff between different W-CDMA UARFCNs, or Inter-system hard handoff from W-CDMA to GSM system. See "Performing a Handoff" on page 151.
- User selectable "Registration" or "IMSI Attach". See "Performing a Registration" on page 149.
- Security operation control (security procedure with authentication and integrity protection). See "Setting Security Parameters" on page 146.
- UE (mobile station) reported measurement results for current cell: DPCH BLER, CPICH RSCP, CPICH Ec/No, and Pathloss. See "Mobile Station (UE) Reported Measurements" .
- User selectable Radio Access Bearer (RAB) configuration. Supported RABs include 12.2k and 64k symmetrical Reference Measurement Channel (RMC). See "Setting Channel Type" .
- User selectable Signalling Radio Bear configuration: 3.4k and 13.6k DCCH configuration per 3GPP TS 34.108, and 2.2k DCCH configuration for no RLC Reset during Radio Bear Setup. See "Setting Signalling Radio Bearer (SRB)" .
- Open loop power control. See "UE (Mobile Station) Transmit Power Control" .
- Closed loop power control. See "UE (Mobile Station) Transmit Power Control" .
- Automatic or manual frequency control and power ranging of the test set's receiver. See "Receiver Control" .
- User control of RLC Re-establishment. See "Setting Other Downlink Parameters" on page 138.

Operating Considerations

Many of the settings *used* in active cell mode cannot be *changed* during active cell mode operation. A message is displayed to alert you to this situation if you try to change them. These are settings that must be set before attempting to get the UE connected on a call, or settings that are not normally changed during base station operation in a network. Use the Cell Off operating mode to change these settings. See "CALL:OPERating" to select operating modes.

Related Topics

"How Do I Set Up a Call?"

"Cell Off Operating Mode" on page 126

"FDD Test Operating Mode"

"W-CDMA Concepts"

FDD Test Operating Mode

In FDD Test (frequency division duplex) operating mode, the test set does not send any signalling information on the downlink. Any changes to the UE (mobile station) configuration, such as channel, uplink power level, or dedicated physical channel (DPCH) scrambling code, must be accomplished by directly sending commands to the UE from a system controller (usually a personal computer) through a proprietary digital interface.

Upon entry into test mode, the test set begins continuously transmitting a downlink signal which consists of a dedicated physical channel (DPCH) configured as a specified reference measurement channel (RMC) and several overhead channels required to allow the UE to synchronize to the test set and decode transmitted data (see “Downlink and Uplink Channels Overview”). The UE must then synchronize to the transmitted downlink channels and start transmitting a corresponding uplink signal, then the UE’s performance can be measured using the suite of measurements shown when the **Measurement selection** key is pressed. To emulate the interference from other cells or uses, two noise sources (OCNS and AWGN) can be added as desired.

NOTE As there is no signalling information is sent on the downlink by the test set while in FDD Test mode, there is no S-CCPCH and AICH downlink physical channels and PRACH uplink channel.

The following example selects FDD Test operating mode via GPIB:

```
OUTPUT 714;”CALL:OPERating:MODE FDDT”
```

Synchronizing the UE to the Test Set’s Downlink to Make Measurements

The following test set controls must match your UE configuration to be able to get it to synchronize to the test set’s downlink and transmit an uplink signal that the test set can receive and measure:

- “Setting Channel Type” - The UE must support the reference measurement channel (RMC) type.
- “Downlink Channel” - The UE must be set to receive the downlink signal on this channel.
- “Uplink Channel” - The UE must be set to transmit an uplink signal on this channel.
- Downlink “Channel Codes” - The UE must be set to expect the following code settings from the test set on the downlink:

  — Primary Scrambling Code

  — PICH Channelization Code (if the UE responds to this channel in Test Mode)

  — DPCH Channelization Code
- “Transport Format Combination Indicator Pattern” (TFCI) - The UE must be able to decode the TFCI and correctly configure itself to accept the downlink data (in this case, the format for the selected RMC).
- “Cell Power” - the power level out of the test set must be high enough for the UE to receive the downlink signal and decode the data.
- “Uplink Scrambling Code” - The scrambling code the UE is transmitting on the uplink signal.
- “MS Target Power” - The power level that the UE is expected to be transmitting at.

Downlink Channel Codes and Power Level Settings

In test mode, the test set can be configured to transmit a downlink signal which consists of a number of physical channels, and also OCNS and AWGN are available if desired. See "W-CDMA Channels" on page 156.

The relative level, desired level, spreading factor, and channel code for each of these channels, is displayed in the Downlink Code Channel Information window on the Call Setup Screen.

Channel Codes

The following downlink channel codes can be specified:

- Primary scrambling code ("CALL:SCODe"). *This value must match the UE expected downlink scrambling code in order for the UE to decode the downlink channels and synchronize to the test set.* The current setting is displayed in the Downlink Code Channel Information window on the test set. This value is used to configure the secondary synchronization channel (S-SCH).
- PICH channelization code ("CALL:PICHannel").
- DPCH 12.2k RMC channelization code ("CALL:DPCHannel")
- DPCH 64k RMC channelization code ("CALL:DPCHannel")

Channel Levels

The relative level of all FDD test channels can be individually set or turned off (although the P-CCPCH and the SCH are controlled together). The level of each active channel is a fraction of the total cell power, expressed in dB. If the summed level of all channels is less than one, OCNS is turned on to account for the difference. See "CALL:FDDTest" .

Noise Sources on the Downlink

- Additive White Gaussian Noise (AWGN) - used to simulate interference from other cells and mobiles when enabled. See "Setting Cell Power and AWGN Power Levels" on page 132.
- Orthogonal Channel Noise Simulator (OCNS) - used to simulate additional users on the downlink. OCNS is automatically enabled when the sum of the levels of all the enabled downlink physical channels is less than the cell power setting. See "Setting Downlink Channel Codes and Levels" on page 135.

Other Downlink Signal Settings

Cell Power

This setting specifies the combined power level of all code channels on the downlink from the test set, expressed in dBm/3.84 MHz (including OCNS, if used). *This does not include AWGN power.*

The Call Setup Screen displays a window entitled `Generated Power Level Information`. The `Total RF Power` listed in that window is the sum of the `Cell Power` and `AWGN Power` levels. The power level at the RF IN/OUT or RF OUT ONLY connector is the `Current Level` of the `Total RF Power plus` any amplitude offsets that have been entered. See "Amplitude Offset" for more information on entering amplitude offsets.

MS Target Power

This setting specifies the expected power level from the UE (mobile station). When using automatic receiver control (the default setting), the test set uses the MS Target Power setting to set the input range for its measurement and uplink receivers. If the transmitted level from the UE is above or below the range expected by the receivers, an Under Range or Over Range message and integrity indicator are produced. This setting is not used during manual receiver control.

This setting does not anticipate a change in UE power output when sending closed loop power control changes or transmit power control (TPC) commands during FDD Test mode operation. It is only used to indicate the expected power level from the UE as determined by the user. See "Receiver Control" for information on setting the expected power level into the test set.

Transport Format Combination Indicator Pattern

The TFCI pattern tells the UE which transport formats to use for communications between the downlink physical channels protocol layer (L1) and the medium access control (MAC) layer. In FDD Test mode, this value does not correspond to any specific transport channel format; it is provided to allow the user to determine if their UE is correctly decoding this value.

If the UE is configured to respond to the TFCI, this value must match the UE transport format configuration in order for the UE to decode the downlink channels and synchronize to the test set. See "CALL:FDDTest" .

Power Control Settings

Power control commands can be sent by specifying the uplink closed loop power control data or by sending transmit power control (TPC) step up/step down bit patterns. However, the user must verify that the UE correctly decoded the power control data, either by verifying that the power level from the UE did change or by looking at the UE decoded downlink data. If the UE power output does change in response to the change order, the user must change the test set's expected power level (MS Target Power) when making measurements that do not use autoranging. See "MS Target Power" . See also "CALL:CLPControl" and "CALL:FDDTest:CLPControl:UPLink:MODE" for a description of the GPIB commands for power control.

Paging Indicator Settings

Downlink paging indicator channel data can be set to all ones or all zeroes. However, the user must verify that the UE has correctly decoded the page indicator data. See "CALL:PICHannel:DATA" .

Traffic Channel (DTCH) Data

Downlink dedicated traffic channel (DTCH) data of various types can be sent. To determine if the UE has correctly decoded the data stream, you can use the test set's loopback bit error ratio measurement or use your UE built in bit error reporting (if available). See "CALL:DTCHannel:DATA" on page 429.

Downlink Channel

When the RF generator frequency control (RF Gen Freq Ctrl) is set to auto, the downlink channel setting automatically adjusts the center frequency for the test set's RF generator based on the specified channel number. See "CALL:CHANnel" .

RF Generator Frequency

To set a downlink frequency that does not correspond to a defined channel number, you can set the RF generator frequency control to manual. When manual RF generator control is used, the downlink channel (DL Channel) control is replaced by the RF generator frequency (RF Gen Freq Ctrl) control to allow manual entry of the RF generator frequency. See "CALL[:CELL]:CONTrol:DOWNlink:FREQuency:AUTO" and "CALL[:CELL]:RFGenerator:FREQuency" .

Uplink Settings

Closed Loop Power Control Data

Closed loop power control data can be set using four formats while in FDD Test operating mode: alternating (up/down) bits, all up bits, all down bits, 10 up bits & 10 down bits. See "CALL:FDDTest:CLPControl:UPLink:MODE" .

Uplink Channel

When the test set is using automatic receiver control (the default), the uplink channel setting sets the test set's receivers to the expected UE uplink channel frequency. If manual receiver control is selected, the Measurement Frequency and Uplink Frequency settings are used to manually enter the receiver frequencies. See "CALL:UPLink:CHANnel" . See also "Receiver Control" for information about automatic and manual receiver settings.

Uplink Scrambling Code

This setting tells the test set which scrambling code to use to decode the uplink signal from the UE (mobile station). *This setting must match the UE uplink scrambling code to make waveform quality and loopback bit error ratio measurements.* See "CALL:UPLink:DPCHannel:SCODe" .

Receiver Control Settings

The expected power into the test set, and the frequency of the signal being measured, can be set either automatically or manually. Automatic receiver control is the default mode, and provides the simplest form of operation. Manual control is typically used to enter values that are different from those normally set during automatic control. See "Receiver Control" for more information on how manual and automatic receiver control are used.

Operating Considerations

The test set can perform thermal power, channel power, waveform quality, and adjacent channel leakage ratio (ACLR) measurements on the uplink signal. Loopback bit error ratio (BER) can be tested if the UE provides a loopback mode that conforms to 3GPP TS 34.109, section 5.3.2.6.2, *Loopback of RLC SDUs*. For either the loopback BER or modulation quality measurements to function, the uplink dedicated physical data channel (DPDCH) spreading factor must be the minimum allowed for the channel type; which is 64 for the 12.2 kbps reference measurement channel. Additionally, for the loopback BER measurement, the uplink DPDCH transport format must be set so both the dedicated traffic channel (DTCH) and dedicated control channel (DCCH) are present (however, the test set will ignore the contents of the DCCH so the actual content of this channel is not relevant).

When the test set and the UE are synchronized, the UE uplink frame starts 1024 chips after the receiving the corresponding downlink frame. Measurements that require synchronization will not trigger correctly (or at all) if this timing relationship does not exist.

In FDD Test operating mode, the test set does not negotiate with the UE to set up a call, or provide any other form of interactive control of the UE. User-selected patterns of power control (TPC) or transport format indication (TFCI) commands can be sent to the UE on the downlink, but the test set does not assume or verify that the UE responded. The test set ignores transport format combination indicator (TFCI) and transmit power control (TPC) bits sent on the uplink.

Related Topics

“Setting Cell Power and AWGN Power Levels”

“Receiver Control”

“Active Cell Operating Mode”

CW Operating Mode

CW operating mode provides an unmodulated carrier of adjustable frequency and amplitude, manual adjustment of the measurement receiver and demodulation (uplink) receiver frequencies, and manual setting of the expected CW input power.

NOTE Manual receiver control settings made while using the CW operating mode can affect manual receiver settings made in other operating modes (such as FDD Test mode). When changing operating modes and using manual receiver settings, always verify that the manual receiver settings are correct for the new operating mode.

CW Test Mode Operation

When the test set's operating mode is set to CW:

- No over the air signaling is used. Therefore there is no synchronization between the mobile station (UE) and the test set.
- No demodulation or channel decoding is available.
- An unmodulated RF signal can be generated while analyzing another signal (at the same frequency or at a different frequency). No interaction exists between these controls.
- With the exception of mobile reported values (which are only available in Active Cell mode), all test set measurements are accessible. However, measurements requiring protocol triggering, such as waveform quality, cannot be made. Immediate triggering should be used for most measurements because no overhead signaling is occurring. Protocol triggering will time-out (if time-outs are enabled) or report an integrity indicator other than zero (0) and not provide valid results. RF Rise triggering is meant for bursted signals, such as a PRACH burst, and may or may not work with other signals.
- Expected CW power, measurement receiver frequency, and uplink receiver frequency are available as manual settings only; no automatic control is provided.

CW Mode Operation

The following command examples show you how to control each function for CW operating mode:

1. Select CW operating mode:
   ```
   OUTPUT 714;"CALL:OPERating:MODE CW"
   ```
2. Set the cell power output level to be transmitted by the test set:
   ```
   OUTPUT 714;"CALL:POWer -45 DBM"
   ```
3. Set the RF generator frequency:
   ```
   OUTPUT 714;"CALL:RFGenerator:FREQuency 870 MHZ"
   ```
4. Set the expected CW power level to be received by the test set:
   ```
   OUTPUT 714;"RFANalyzer:CW:EXPected:POWer 23 DBM"
   ```
5. Set the measurement receiver frequency:
   ```
   OUTPUT 714;"RFANalyzer:MANual:MEASurement 870.030 MHZ"
   ```

6. Set the uplink (demodulation) receiver frequency. (Not typically used in CW operating mode):
   OUTPUT 714;”RFANalyzer:MANual:UPLink 870.030 MHZ”

Related Topics

“FDD Test Operating Mode”

“Receiver Control”

Cell Off Operating Mode

Cell Off operating mode and Active Cell operating mode share the same settings. However, Cell Off mode allows you to change the parameters that cannot be changed during Active Cell operation but used for call processing, such as downlink and uplink channel number (UARFCN), reference measurement channel configuration (Channel Type), signalling radio bearer configuration, etc.

Use Cell Off operating mode to set up those downlink and uplink parameters before establishing a connection to the UE (mobile station). After making the settings, switch to Active Cell operating mode to begin generating the downlink signal. Use "CALL:OPERating" to select operating modes.

NOTE No signal is generated by the test set during Cell Off operation, regardless of the Cell Power setting. All settings are deferred until the Active Cell operating mode or FDD Test operating mode is used.

Related Topics

"Active Cell Operating Mode" on page 117

"FDD Test Operating Mode"

"Setting Downlink Channel Number (UARFCN)"

"Setting Uplink Channel Number (UARFCN)"

"Setting Channel Type"

"Setting Signalling Radio Bearer (SRB)"

"Setting Cell Parameters" on page 127

"Setting Downlink Channel Codes and Levels" on page 135

"Setting Uplink Parameters" on page 141

Setting Cell Parameters

The test set broadcasts cell specific information on the BCCH. They are needed by the UE (mobile station) to successfully communicate with the network. Changing some of the following settings while in active cell operating mode will result in the execution of the BCCH Update procedure (see "Broadcast Channel (BCCH) Update Procedure"). To access these parameters from the front panel, see "How do I Change Cell Parameters" on page 807.

- Cell or system specific information - such as mobile country code (MCC), mobile network code (MNC), and the local area code (LAC) parameters. See also "Performing a Registration" on page 149.
- Location update (registration) control - such as ATT (IMSI Attach) Flag State parameter. See also "Performing a Registration" on page 149.
- Paging control - such as Repeat Paging parameter. See also "CALL:PAGing:REPeat:STATe[:SELected]" .
- Open loop power control settings - such as Primary CPICH TX Power, Uplink Interference, and Constant Value. These settings are used by the UE to determine the initial transmit power of the first PRACH preamble. See also "Initial PRACH Tx Power" .

GPIB Commands for These Settings

- Mobile Country Code - "CALL:MCCode"
- Mobile Network Code - "CALL:MNCode"
- Local Area Code - "CALL:LACode"
- IMSI Attach Flag State - "CALL:ATTFlag"
- Repeat Paging - "CALL:PAGing:REPeat:STATe[:SELected]"
- Primary CPICH TX Power - "CALL:PCTPower"
- Uplink Interference - "CALL:UINTerferenc"
- Constant Value - "CALL:CVALue"

Operating Considerations

Some settings cannot be changed during Active Cell operation. Attempting to change these settings while in Active Cell operating mode results in an error issued and the test set will reject the change. Use the Cell Off operating mode when changing these settings. See "CALL:OPERating" to select operating modes.

Related Topics

"How do I Change Cell Parameters" on page 807

"Broadcast Channel (BCCH) Update Procedure"

"UE (Mobile Station) Transmit Power Control"

Setting SIB11 Cell Info List Parameters

The Inter and Intra-frequency cell info settings in System Information Block 11 (SIB11) are used to control the neighbor cells information that is broadcast on the BCCH. Changing any of the cell info list settings in SIB11 while in active cell operating mode will result in the execution of the BCCH Update procedure (see "Broadcast Channel (BCCH) Update Procedure").

You can set the contents of Inter and Intra-frequency cell info lists in SIB11 by pressing the `SIB11 Cell Info List` (**F5**) on the Call Control (3 of 3). When the `Cell Info List in SIB11` is set to "Present", the Intra-frequency cell info and Inter-frequency cell info lists will be included in (SIB) 11 on the BCCH. See "How Do I Change SIB11 Cell Info List?" on page 808 for the front panel operation.

The Inter-frequency cell info list contains only one cell, while the Intra-frequency cell info list contains three cells. You are allowed to set the primary scrambling codes of the 2nd and 3rd cells in the intra-frequency cell info list, and the primary scrambling code and the uplink/downlink UARFCN channel numbers in the intra-frequency cell info list. However, the test set does not actually generate any neighbor cells. These settings affect only the information broadcast on the BCCH, not the test set's call processing behavior. As required by the W-CDMA specifications, Cell 1 in this list is always the serving cell so the cell information is automatically set to match the test set's cell.

GPIB Commands for These Settings

- Cell Info List in SIB11 - "CALL[:CELL[1]]:BCCHannel:CELLlist"
- Intra Freq 2nd Cell Scrambling Code - "CALL[:CELL[1]]:BCCHannel:INTRAFREQ:CELL2:SCODe"
- Intra Freq 3rd Cell Scrambling Code - "CALL[:CELL[1]]:BCCHannel:INTRAFREQ:CELL3:SCODe"
- Inter Freq 1st Cell Scrambling Code - "CALL[:CELL[1]]:BCCHannel:INTERFREQ:SCODe"
- Inter Freq 1st Cell UL Channel - "CALL[:CELL[1]]:BCCHannel:INTERFREQ:UPLnk:CHANnel"
- Inter Freq 1st Cell DL Channel - "CALL[:CELL[1]]:BCCHannel:INTERFREQ:DOWNlink:CHANnel"

Related Topics

"How Do I Change SIB11 Cell Info List?" on page 808

"CALL:BCCHannel" on page 395

"Broadcast Channel (BCCH) Update Procedure"

Setting Channel Type

The W-CDMA specifications define a suite of uplink (UL) and downlink (DL) reference measurement channels (RMC) to use for UE transmitter and receiver conformance test. See “Radio Bearer Test Mode, TC, and Reference Measurement Channels” on page 155. The main difference between the RMCs is the information bit rate for the DTCH logical channel.

In Active Cell mode, the test set only supports symmetrical UL and DL RMC configuration (12.2 kbps and 64 kbps) at this time. For example, when you set the `Channel Type` to `12.2k RMC`, then both uplink and downlink DPCH is configured as 12.2 kbps RMC. This setting also determines the service type that will be started as a result of an CALL:ORIGinate command, and the radio access bear (RAB) configuration that will be used for that service.

In FDD Test operating mode, the test set also support 384 kbps RMC configuration for downlink in addition to the symmetrical UL and DL RMC configuration (12.2 kbps and 64 kbps).

To set the channel type from the front panel, see “How do I Change Call Parameters” on page 805.

To set the channel type with GPIB commands, see “CALL:DPCHannel:TYPe” on page 428.

Operating Considerations

These settings cannot be changed during Active Cell operation. Instead, use the Cell Off operating mode when changing these settings. Attempting to change these settings while in Active Cell operating mode results in an error issued and the test set will reject the change. See “CALL:OPERating” to select operating modes.

Related Topics

“How do I Change Call Parameters” on page 805

“CALL:DPCHannel:TYPe” on page 428

Setting Downlink Channel Number (UARFCN)

The `DL Channel` setting specify the downlink physical RF channel number (DL UARFCN) which determine the test set's RF generator at what frequency to transmit the downlink signal. The relationship between channel number (UARFCN) and actual carrier frequency for the downlink is:

- For DL UARFCNs in the range of 412 to 687, use the equation: UARFCN = 5 * ((frequency in MHz-0.1)-1850)
- For all other DL UARFCNs, use the equation: UARFCN = 5 * (frequency in MHz)

To set the downlink channel number from the front panel, see "How do I Change Call Parameters" on page 805.

To set the downlink channel number (UARFCN) with GPIB commands, see "CALL:CHANnel" on page 404.

When in FDD Test operating mode, the downlink frequency can also be changed by manual entry of the RF generator frequency (See "RF Generator Frequency").

Operating Considerations

- This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in an error issued and the test set will reject the change. Use the Cell Off operating mode when changing these settings. See "CALL:OPERating" to select operating modes.
- If the DL UARFCN setting results in a UL/DL offset of less than 30 MHz when compared with the UL UARFCN setting (see "Setting Uplink Channel Number (UARFCN)"), the warning message "Performance not specified for UL/DL frequency offset <30 MHz" will be issued.
- A hard handoff can be performed to change the downlink channels (DL UARFCN) while a call is connected. After successful completion of a handoff between different DL UARFCNs, this setting is overwritten with the value of Handoff DL UARFCN. See "CALL:SETup:CHANnel[:SELected]:DOWNlink" on page 470.

Related Topics

"How do I Change Call Parameters" on page 805

"CALL:CHANnel" on page 404

Setting Signalling Radio Bearer (SRB)

The test set supports 3.4k DCCH or 13.6 DCCH configuration of the signalling radio bearer (SRB) as specified in the W-CDMA specification. They are used during the RRC connection (see "Channels Used for Call Setup" on page 158). Once the RRC connection has been established, the downlink DPCH will be reconfigured as the selected reference measurement channel (RMC) in the `Channel Type` field (see "Setting Channel Type" on page 129) during Radio Bearer Setup portion of BS origination procedure.

The test set also provides an Agilent proprietary SRB configuration, 2.2k DCCH for the early UEs (mobile stations) which do not support the RLC reestablish during Radio Bearer Setup portions of BS origination procedure. To turn off the RLC reestablish function from the test set, see "Setting Other Downlink Parameters" .

To set the SRB configuration from the front panel, see "How do I Change Call Parameters" on page 805.

To change the SRB configuration with GPIB commands, see "CALL[:CELL]:SRBearer:CCHannel:DEDicated:DRATe" on page 473.

Operating Considerations

- These settings cannot be changed during Active Cell operation. Instead, use the Cell Off operating mode when changing these settings. Attempting to change these settings while in Active Cell operating mode results in an error issued and the test set will reject the change. See "CALL:OPERating" to select operating modes.
- When the 2.2k DCCH or 3.4k DCCH configuration is used, the downlink DPCH channelization code to be used during Radio Bearer Setup portions of BS origination procedure can be specified with the "CALL[:CELL]:SRBearer:CCHannel:DEDicated:BPS3400[:CCODe]" . When the 13.6 DCCH configuration is used, the channelization code is the same as that for the 12.2k RMC. See "CALL:DPCHannel:RMC12:CCODe" .

Related Topics

"How do I Change Call Parameters" on page 805

"CALL:SRBearer" on page 472

Setting Cell Power and AWGN Power Levels

The test set's base station emulator provides control over the following RF power levels:

- Cell Power: $\hat{I}_{or}$ is defined in 3GPP TS 25.101 V3.5.0 as the received power spectral density of the downlink as measured at the UE (mobile station) antenna connector. The downlink contains one or more downlink physical channels. The `Cell Power` setting sets the absolute level (in dBm) of the physical channels. The individual physical channel levels account for fractions of this setting, and are set in dB relative to the cell power (see "Setting Downlink Channel Codes and Levels"). If you have accounted for path loss (see "Amplitude Offset") between the test set output port and the UE antenna connector, then cell power is equivalent to $\hat{I}_{or}$.
- AWGN (Additive White Gaussian Noise) Power: I_{oc} is defined in 3GPP TS 25.101 V3.5.0 as the power spectral density of a band-limited white noise source (simulating interference from other cells) as measured at the UE antenna connector. If you have accounted for path loss, then AWGN power is equivalent to I_{oc}.
- Total RF Power: I_o is defined in 3GPP TS 25.101 V3.5.0 as the total received power spectral density, including signal and interference, as measured at the UE antenna connector. The total RF power is the sum of cell power and AWGN power. If you have accounted for path loss, then total RF power is equivalent to I_o.

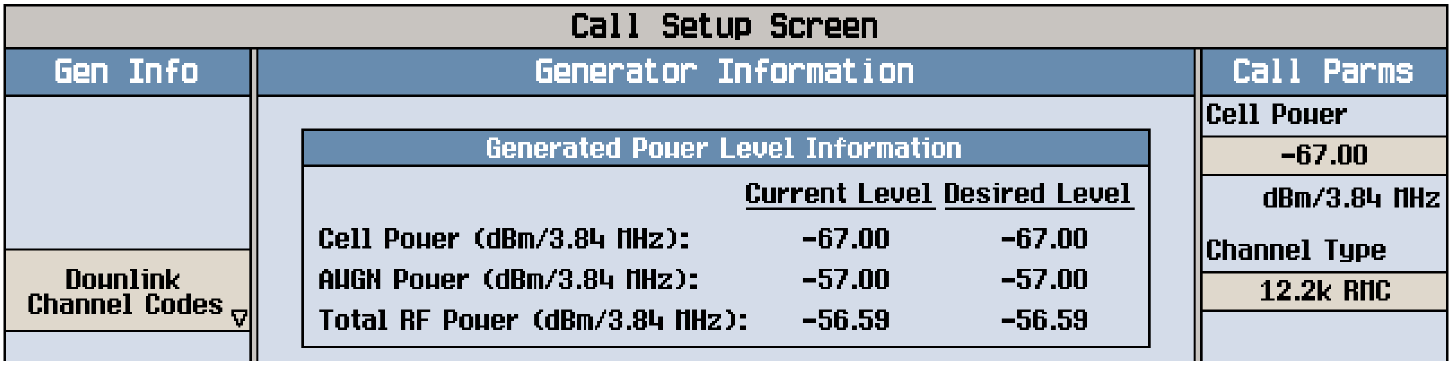
NOTE No signal is generated by the test set during Cell Off operation, regardless of the Cell Power setting. All settings are deferred until the Active Cell operating mode or FDD Test operating mode is used.

To access the cell power parameter using the test set's front panel, see "How do I Change Call Parameters" on page 805.

To access the AWGN power parameter using the test set's the front panel,"How Do I Change Generator Information?"

These power parameters are displayed in the Generated Power Level Information table (see Figure 12. "Generated Power Level Information").

Figure 12. Generated Power Level Information



Generated Power Level Information

	Current Level	Desired Level
Cell Power (dBm/3.84 MHz):	-67.00	-67.00
AWGN Power (dBm/3.84 MHz):	-57.00	-57.00
Total RF Power (dBm/3.84 MHz):	-56.59	-56.59

Cell Power
-67.00
dBm/3.84 MHz

Channel Type
12.2k RMC

Cell Power, AWGN Power and Total RF Power Ranges

The range of values that you can set these power levels to differs from the actual hardware range of the source. This is due to compensation for path loss between the test set RF output port and the UE antenna connector (see "Amplitude Offset").

For example, if you enter a value of -30 dBm for desired CW cell power, this indicates that you want -30 dBm of power at the UE antenna connector. So, if you have indicated an amplitude offset of -3.5 dB exists between the test set's RF In/Out port and the UE antenna connector, the source will actually have to output -26.5 dB in order to deliver -30 dB to the UE's antenna connector. Thus, with an amplitude offset of -3.5 dB, the settable range of CW cell power is -130.5 dB to -13.5 dB. The actual power range at a given time is defined by adding the value of the associated amplitude offset to the actual hardware range. If you select an invalid combination of power levels and amplitude offsets, an error message will appear at the bottom of the screen to alert you to this condition.

Table 6. Range of Power Levels

Parameter	**Actual Hardware Range with Amplitude Offset = 0 (RF In/Out Port)**	**Actual Hardware Range with Amplitude Offset = 0 (RF Out Only Port)**	**Setting (or Query) Range**
Cell Power (CW)	-127 dBm to -10 dBm	-119 dBm to -2 dBm	-177 dBm to +40 dBm
Cell Power (FDD)	-120 dBm/3.84 MHz to -13 dBm/3.84 MHz	-115 dBm/3.84 MHz to -5 dBm/3.84 MHz	-170 dBm/3.84 MHz to +37 dBm/3.84 MHz
AWGN Power (FDD)	-120 dBm/3.84 MHz to -15 dBm/3.84 MHz	-115 dBm/3.84 MHz to -7 dBm/3.84 MHz	-170 dBm/3.84 MHz to +35 dBm/3.84 MHz
Total RF Power	-120 dBm/3.84 MHz to -10.88 dBm/3.84 MHz	-115 dBm/3.84 MHz to -2.88 dBm/3.84 MHz	-170 dBm/3.84 MHz to +42 dBm/3.84 MHz

GPIB Commands for Setting the RF Power Levels

The test set includes commands to set the desired cell power and AWGN power levels. You may also query what you've set these desired power levels to, as well as query what the total RF power will be based on your desired cell power and AWGN power levels. See Table 7. "RF Power Levels".

The test set also includes commands to query the current level of cell power, AWGN power, and total RF power. See Table 7. "RF Power Levels". These CALL:STATus commands are query only. They return values that indicate the test set's actual hardware settings and hardware status. Actual hardware settings can differ from the desired level you've set. When no error conditions exist, the commands used to set the desired level will return the same results as the commands used to query current level. For example, "CALL:AWGNoise:POWer?" will return the same value as "CALL:STATus:AWGNoise:POWer?" when no error conditions exist.

Table 7. RF Power Levels

Parameter	**Current Level**	**Desired Level**
Cell Power	"CALL:STATus:CELL:POWer[:AMPLitude]?"	"CALL:POWer"
AWGN Power	"CALL:STATus:AWGNoise:POWer[:AMPLitude]?"	"CALL:AWGNoise"

Table 7. RF Power Levels

Parameter	Current Level	Desired Level
Total RF Power	"CALL:STATus:TOTal:POWer[:AMPLitude]?"	"CALL:TOTal:POWer[:AMPLitude]?" (query only)

Considerations When Setting Power Levels

- The difference between cell power and AWGN power must not be more than 10 dB when both power states are set to ON.
- The total RF power and amplitude offset must not set the source outside its valid hardware range.

Related Topics

"How Do I Change Generator Information?"

"How do I Change Call Parameters" on page 805

"Active Cell Operating Mode"

"FDD Test Operating Mode"

"Setting Downlink Channel Codes and Levels"

Setting Downlink Channel Codes and Levels

During Active Cell operation, downlink scrambling and channelization codes are used by the UE (mobile station) to synchronize to the base station emulator's frame clock and to specify message formats for call processing operations.

The relative level of all channels can be individually set or turned off except that the P-CCPCH and the SCH are controlled together. The level of each active channel is a fraction of the `Cell Power` setting, expressed in dB. If the summed level of all channels is less than one, the orthogonal coded noise source (OCNS) is turned on to account for the difference (see "Orthogonal Channel Noise Simulator (OCNS)").

How to Set Channel Codes and Levels

Active Cell operating mode emulates a base station in operation, and is used for call processing operations. During call processing, the downlink channel levels for establishing the call may be different than the levels used after the call has been connected. This is why there are two different level settings for the downlink codes: `Downlink Channel Levels` and `Connected DL Channel Levels`.

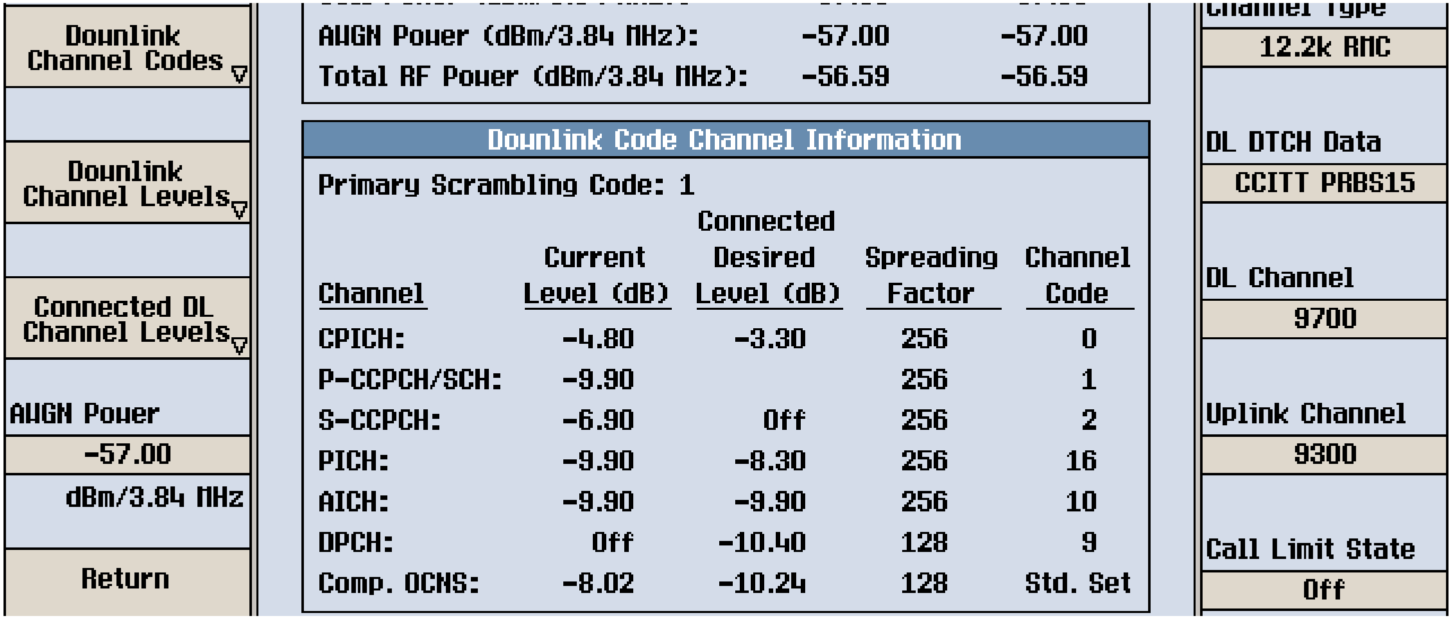
The `Downlink Channel Levels` settings are used during the initial call processing operation to establish the call. These levels can only be *changed* in the Cell Off operating mode. You can query these settings via GPIB and view them on the front panel during Active Cell mode operation, but attempting to change the levels during Active Cell mode operation results in an error message. Use "CALL:OPERating" to select operating modes.

The `Connected DL Channel Levels` are used when the UE is successfully connected on a call. These levels can be changed while using either the Active Cell or Cell Off operating modes. This allows you to vary the relative channel levels while a call is connected in order to test the UE's response.

`Downlink Channel Codes` can only be changed during Cell Off operation.

To change these settings from the front panel, see "How Do I Change Generator Information?" on page 809. After then, all your changes will be displayed in the Downlink Code Channel Information table as shown in Figure 13. "The Downlink Code Channel Information on the Generator Information Screen".

Figure 13. The Downlink Code Channel Information on the Generator Information Screen



AWGN Power (dBm/3.84 MHz): -57.00 -57.00
Total RF Power (dBm/3.84 MHz): -56.59 -56.59

AWGN Power
-57.00
dBm/3.84 MHz

Channel Type
12.2k RMC

DL DTCH Data
CCITT PRBS15

DL Channel
9700

Uplink Channel
9300

Call Limit State
Off

Downlink Code Channel Information

Primary Scrambling Code: 1

Channel	Current Level (dB)	Connected Desired Level (dB)	Spreading Factor	Channel Code
CPICH:	-4.80	-3.30	256	0
P-CCPCH/SCH:	-9.90		256	1
S-CCPCH:	-6.90	Off	256	2
PICH:	-9.90	-8.30	256	16
AICH:	-9.90	-9.90	256	10
DPCH:	Off	-10.40	128	9
Comp. OCNS:	-8.02	-10.24	128	Std. Set

Orthogonal Channel Noise Simulator (OCNS)

OCNS is used to simulate additional users on the downlink. OCNS is automatically enabled when the sum of the levels of all the enabled downlink physical channels is less than the cell power setting. OCNS is made up of the following 16 separate code channels: 2, 11, 17, 23, 31, 38, 47, 55, 62, 69, 78, 85, 94, 113, 119, and 125. All channels use a spreading factor of 128. The current setting is displayed in the Downlink Code Channel Information window on the test set.

As individual downlink channel levels are adjusted, the composite OCNS level is automatically set to a value equal to the difference between the summed downlink channel levels and the cell power setting. The fraction of the composite OCNS power that is allocated to each of the code channels making up the composite OCNS varies for each channel, and cannot be changed. See "CALL:OCNSource" .

GPIB Commands for Setting Downlink Channel Codes

- Primary Scrambling Code - "CALL:SCODe"
- 3.4k Signaling Radio Bearer Channelization Code - "CALL[:CELL]:SRBearer:CCHannel:DEDicated:BPS3400[:CCODe]"

  This parameter setting applies to a signaling radio bearer configuration using a 3.4k DCCH. See "Setting Signalling Radio Bearer (SRB)" .
- Secondary Common Control Physical Channel (S-CCPCH) Channelization Code - "CALL:CCPChannel:SECondary:CCODe"
- Page Indicator Channel (PICH) Channelization Code - "CALL:PICHannel:CCODe"
- Acquisition Indicator Channel (AICH) - "CALL:AICHannel:CCODe"
- Dedicated Physical Channel (DPCH) 12.2k RMC Channelization Code - "CALL:DPCHannel:RMC12:CCODe"
- Dedicated Physical Channel (DPCH) 64 k RMC Channelization Code -

"CALL:DPCHannel:RMC64:CCODe"

GPIB Commands for Setting Downlink Channel Levels in Cell Off Mode

- Common Pilot Channel (CPICH) Level - "CALL:CPIChannel"
- The Primary Common Control Physical Channel (P-CCPCH) and the Synchronization Channel (SCH) are time multiplexed, and use the same level for both channels - "CALL:CCPChannel:PRIMary[:SLEVel]"
- Secondary Common Control Physical Channel (S-CCPCH) Level - "CALL:CCPChannel:SECondary[:SLEVel]"
- Page Indicator Channel (PICH) Level - "CALL:PICHannel[:SLEVel]"
- Acquisition Indicator Channel (AICH) Level - "CALL:AICHannel"
- Dedicated Physical Channel (DPCH) Level - "CALL:DPCHannel"

GPIB Commands for Changing Connected Downlink Channel Levels

- Connected Common Pilot Channel (CPICH) Level - "CALL:CONNected:CPIChannel[:SLEVel]"
- The Connected Primary Common Control Physical Channel (P-CCPCH) and the Synchronization Channel (SCH) are time multiplexed, and use the same level for both channels - "CALL:CONNected:CCPChannel:PRIMary[:SLEVel]"
- Connected Secondary Common Control Physical Channel (S-CCPCH) Level - "CALL:CONNected:CCPChannel:SECondary[:SLEVel]"
- Connected Page Indicator Channel (PICH) Level - "CALL:CONNected:PICHannel[:SLEVel]"
- Dedicated Physical Channel (DPCH) Level - "CALL:CONNected:DPCHannel[:SLEVel]"

Considerations When Setting Code Channel States and levels

- Except the relative power level of DPCH channel ranges from 0 to -30 dB, all other code channels have the range of 0 to -20 dB.
- Any code channel powers that are ON must not be greater than 30 dB below the Total RF Power.

Related Topics

"How Do I Change Generator Information?" on page 809

"Setting Cell Power and AWGN Power Levels"

"Active Cell Operating Mode"

"Cell Off Operating Mode"

Setting Other Downlink Parameters

The following parameters are provided to define the contents of the downlink signal to the UE (mobile station) while the call is connected, and to control the call connection behavior. To access these parameters from the front panel, see "How do I Change Call Parameters" on page 805.

DTCH Data

The data pattern of the DTCH Data (user data) sent on the DPCH can be set to either: a 9 bit pseudo-random bit sequence (CCITT PRBS9), a CCITT PRBS15, all zeroes, or all ones. You can use the test set's loopback bit error ratio measurement or use your UE built in bit error reporting (if available) to determine if the UE has correctly decoded the data stream.

Paging Indicator Channel (PICH) Data

The paging indicator channel can be set to transmit either all zeroes or all ones. While in Active Cell operating mode, the PICH contents will initially be set to all zeroes in all paging indicators ("no page"). Once call origination is initiated, all of the page indicators in each valid access frame will be set to all ones indicating a page. The valid access frames occur at times specified by the DRX cycle length. Once the UE has responded to the page the paging indicators will return to "no page".

RLC Reestablish

The RLC re-establishment procedure automatically occurs during the radio bearer setup portion of call establishment as the DPCH is reconfigured from the signalling radio bearer (3.4K or 13.6K DCCH) to the actual service configuration. For the early UEs (mobile stations) that do not support the RLC reestablishment, the test set allows you to turn off the RLC re-establishment procedure and select an Agilent proprietary SRB configuration (2.2k DCCH). See also "Setting Signalling Radio Bearer (SRB)" .

Call Drop Timer State

The call drop timer can be turned off or on. When turned on, anytime the uplink signal is not detected, the test set only waits the length of the timer before assuming the call has been dropped by the UE. This timer is optimized for the manufacturing test environment. The timers defined in the 3GPP standards for determining that a call has been dropped are much longer. Turning on the call drop timer allows you to quickly identify UEs that can not maintain a call and remove them from your test area.

Call Limit State

When the call limit state is on, the test set does not respond to any PRACH preambles from the UE. Call Limit must be OFF for any random access procedure, such as Location Update or BS Origination to be successful (see "Establishing a Connection with the UE").

Once the random access procedure has been initiated with Call Limit set to "ON", the Test Set will appear to be "hung" indefinitely. You must end the call to terminate the procedure and return the Call Status to "IDLE". (See "End a Connection" on page 820 or "CALL:END" on page 431.)

GPIB Commands for Setting DTCH Parameters

- Downlink DTCH Data - "CALL:DTCHannel:DATA" on page 429
- Downlink Paging Indicator Channel Data - "CALL:PICHannel" on page 456
- Downlink Paging Indicator Channel Data - "CALL[:CELL]:RLC:RE_Establish" on page 462
- Call Drop Timer State - "CALL:CONNected:DROP:TIMer[:STATe][:SELected]" on page 411
- Call Limit State - "CALL:CONNected:LIMit[:STATe][:SELected]" on page 418

Related Topics

"How do I Change Call Parameters" on page 805

"Active Cell Operating Mode" on page 117

Setting Uplink Channel Number (UARFCN)

When the test set is using automatic receiver control (the default), the `Uplink Channel` setting automatically sets the test set's receivers to the expected UE's transmit frequency. The relationship between uplink channel number (UL UARFCN) and actual UE's transmit frequency is:

- For UL UARFCNs in the range of 12 to 287, use the equation: UARFCN = 5 * ((frequency in MHz-0.1)-1850)
- For all other UL UARFCNs, use the equation: UARFCN = 5 * (frequency in MHz)

If manual receiver control is selected, the test set's receivers frequency is set manually in MHz. See "Receiver Control" for more information.

To set the uplink channel number (UARFCN) from the front panel, see "How do I Change Call Parameters" on page 805.

To set the uplink channel number (UARFCN) with GPIB commands, see "CALL:UPLink:CHANnel" on page 490.

Operating Considerations

- This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in an error issued and the test set will reject the change. Use the Cell Off operating mode when changing these settings. See "CALL:OPERating" to select operating modes.
- If the UL UARFCN setting results in a UL/DL offset of less than 30 MHz when compared with the DL UARFCN setting (see "Setting Downlink Channel Number (UARFCN)"), the warning message "Performance not specified for UL/DL frequency offset <30 MHz" will be issued.
- A hard handoff can be performed to change the uplink channels (UL UARFCN) while a call is connected. After successful completion of a handoff between different UL UARFCNs, this setting is overwritten with the value of Handoff Uplink UARFCN. See "CALL:SETup:CHANnel[:SELected]:UPLink" on page 471.

Related Topics

"How do I Change Call Parameters" on page 805

"CALL:UPLink:CHANnel" on page 490

Setting Uplink Parameters

Uplink parameters define configuration of the Physical Random Access Channel (PRACH) and the uplink Dedicated Physical Channel (DPCH) used to set up a call. To set the uplink parameters using the test set's front panel, see "How Do I Change Uplink Parameters?" on page 813.

PRACH Parameters

The uplink Physical Random Access Channel (PRACH) carries the Random Access Channel (RACH) information which is transmitted by the mobile station during registrations or BS originated calls. A PRACH is composed of two parts: a number of preambles and a message portion. The preambles are a series of RF power "steps" which increase in power according to the power step setting until the maximum number of preambles is reached or the base station acknowledges receiving the preamble on the acquisition indication channel (AICH). Once the UE receives a positive indication on the AICH, it transmits the message portion of the PRACH which consists of message data and control data (pilot bit and TFCI) with independent power gain control.

Changing some of the following PRACH settings while in active cell operating mode will result in the execution of the BCCH Update procedure (see "Broadcast Channel (BCCH) Update Procedure").

- PRACH Power Step - power step size used to increase the transmit power of the PRACH preamble when no response is received from the test set
- PRACH Signature - part of the PRACH preamble, indicates what spreading factor the test set should use to spread the message portion of a PRACH
- PRACH Scrambling Codeword - scrambling code used to spread the Signature when creating a PRACH preamble
- PRACH Bc/Bd Control - used to select whether manually or automatically to adjust the gain settings for the message portion of the PRACH. When `Manual` is selected, then:
  - — Manual PRACH Bc: used to specify the gain setting for the control data of the message portion of the PRACH
  - — Manual PRACH Bd: used to specify the gain setting for the message data of the message portion of the PRACH
- Uplink Timing Offset - The Uplink Timing Offset allows you to specify which range the test set uses when searching for the PRACH transmission.
  - — Early: -32 to -8 chips
  - — Normal: -12 to +12 chips
  - — Late: +8 to +32 chips
- PRACH Preambles - specifies the maximum number of preambles to be sent during one PRACH Ramping Cycle when no response is received from the test set.
- PRACH Ramping Cycles - specifies the maximum number of preamble sequences to be repeated when no response is received from the test set.
- Available Subchannels (Bit Mask) - specifies which of the twelve PRACH Access Subchannels are available

for UE PRACH access. A setting of “1” indicates the corresponding subchannel is available, while a setting of “0” means the subchannel is unavailable. For example, a setting of “111111111111” means all twelve subchannels are available.

DPCH Parameters

The uplink Dedicated Physical Channel (DPCH) consists of the Dedicated Physical Data Channel (DPDCH) which carries the user data, and the Dedicated Physical Control Channel (DPCCH) which carries the physical layer control information (pilot data, TFCI and TPC).

- Uplink DPCH Scrambling Code - scrambling code used to provide a unique channelization required for each UE
- Uplink DPCH Bc/Bd Control - used to select whether manually or automatically to adjust the gain settings for DPCH. When `Manual` is selected, the following two settings are available:

— Manual Uplink DPCH Bc: used to specify the gain setting for the DPCCH

— Manual Uplink DPCH Bd: used to specify the gain setting for the DPDCH

GPIB Commands for Setting Uplink Parameters

- PRACH Power Step - “CALL:UPLink:PRAChannel:POWer:STEP[:LEVel]” on page 495
- PRACH Signature - “CALL:UPLink:PRAChannel:SIGNature” on page 496
- PRACH Scrambling Code - “CALL:UPLink:PRAChannel:SCODe” on page 496
- PRACH Bc/Bd Control - “CALL:UPLink:PRAChannel:BETA:AUTO” on page 493
- Manual PRACH Bc - “CALL:UPLink:PRAChannel:MANual:CBETa” on page 494
- Manual PRACH Bd - “CALL:UPLink:PRAChannel:MANual:DBETa” on page 494
- Uplink Timing Offset - “CALL:UPLink:PRAChannel:TIMing[:OFFSet]” on page 497
- PRACH Preambles - “CALL:UPLink:PRAChannel:PREamble:NUMBer” on page 495
- PRACH Ramping Cycles - “CALL:UPLink:PRAChannel:PREamble:RCYCle” on page 495
- Available Subchannels (Bit Mask) - “CALL:UPLink:PRAChannel:ASUBchannels” on page 493
- Uplink DPCH Scrambling Code - “CALL:UPLink:DPCHannel:SCODe” on page 492
- Uplink DPCH Bc/Bd Control - “CALL:UPLink:DPCHannel:BETA:AUTO” on page 491
- Manual Uplink DPCH Bc - “CALL:UPLink:DPCHannel:MANual:CBETa” on page 491
- Manual Uplink DPCH Bd - “CALL:UPLink:DPCHannel:MANual:DBETa” on page 492

Operation Considerations

Uplink parameters are *used* during Active Cell operation to set up a call, but can only be *changed* during Cell Off mode operation, or while the call status is Idle in Active Cell mode. See “CALL:OPERating” on page 450 to select operating modes.

To prevent the test set from responding to the PRACH request before reaching the maximum number of preambles as specified, you can turn the Call Limit State on. See “Call Limit State” on page 138.

Related Topics

"How Do I Change Uplink Parameters?" on page 813

"Downlink and Uplink Channels Overview"

"Broadcast Channel (BCCH) Update Procedure"

Setting Closed Loop Power Control

The test set transmits the power control information on the DPCCH which is used in conjunction with open loop power control to control power levels from the UE (mobile station). See also "UE (Mobile Station) Transmit Power Control" . When the closed loop power control bit pattern is set to "Active Bits" the test set automatically determines the correct pattern of TPC (Transmit Power Control) bits required to adjust the UE transmit power to the "MS Target Power". Otherwise the test set continuously transmits the specified bit pattern. To access these parameters from the front panel, see "How Do I Change UE TX Power Levels" on page 811.

Closed Loop Power Control Data Patterns

The uplink closed loop power control (`UL CL Power Ctrl`) can be set to the following data patterns:

- `Active bits` - activates "Closed Loop Power Control" . Closed loop power control maintains the UE's average power at the value entered for the `MS Target Power`. See "MS Target Power" on page 144.
- `Alternating bits` - sends alternating power up and power down bits to the UE. Using this setting should cause the UE to continuously transmit at a specified power level. You can also send individual transmit power control (TPC) commands to change the UE's power up or down one step at a time when uplink closed loop power control is set to the Alternating bits. See "Stepping Power Up and Down" on page 145.
- `All Up bits` - sends a continuous pattern of power-up bits. This is often used to drive the UE to transmit at its maximum power level.
- `All Down bits` - sends a continuous pattern of power-down bits. This is often used to drive the UE to transmit at its minimum power level.
- `10 Up/Down bits` - sends a repeating pattern of 10 power-up bits and 10 power-down bits.

MS Target Power

The `MS Target Power` specifies the expected power level from the UE (mobile station). It is also used to set the expected power level into the test set's receiver (see "Expected Power").

When operating in Active Cell mode, if the uplink closed loop power control is in the active bits mode (see "CALL[:CELL]:CLPControl:UPLink:MODE"), the test set will measure the mobile's transmit power and it will send the required transmit power control bit patterns to the UE. This setting does not directly set the transmit power of the UE, but it will drive the mobile power to the setting if closed loop power is active.

When operating in FDD test mode, this setting sets the UE expected power into the test set's receiver when using automatic receiver control. This setting is not used during manual receiver control. See "Receiver Control" .

Power Control Algorithm

Closed loop power control can operate using either Algorithm 1 or Algorithm 2 while it is active. Algorithm 2 is required to achieve the specified accuracy of the Test Sets measurements.

Stepping Power Up and Down

`Send Step Up TPC Bit Pattern` and `Send Step Down TPC Bit Pattern` can send individual transmit power control (TPC) commands to change the UE's power up or down by one step. These functions can only be used when the uplink closed loop power control is set to use `alternating bits`.

GPIB Commands for Setting These Parameters

- MS target power - "CALL:MS:POWer"
- Uplink closed loop power control mode - "CALL[:CELL]:CLPControl:UPLink:MODE"
- Power Control Algorithm - "CALL[:CELL]:CLPControl:UPLink:ALGorithm"
- Send step up TPC bit pattern - "CALL[:CELL]:CLPControl:UPLink[:IMMediate]:UP"
- Send step down TPC bit pattern - "CALL[:CELL]:CLPControl:UPLink[:IMMediate]:DOWN"

Related Topics

"How Do I Change UE TX Power Levels" on page 811

"UE (Mobile Station) Transmit Power Control"

"Receiver Control"

"Active Cell Operating Mode"

Setting Security Parameters

You can specify whether or not to perform the security procedure during UE (mobile station) registration (see "Performing a Registration"). The security settings are available by pressing `Security Setup` (**F6**) under Call Control (1 of 3). See "How do I Change Security Setup Parameters" on page 816. When `Security Operations` field is set to a value other than `None`, the authentication procedure will be performed during the UE registration. You can also specify to perform the Integrity Check for all downlink RRC (radio resource control) messages by selecting `Auth. & Int.` in the `Security Operations` field.

The Authentication Sequence Number (SQN) is set to zero each time the test set is powered on. It then increments each time an authentication procedure is performed. The SQN can be reset to zero by using `Reset Authen. SQN` key or with"CALL:SECurity:AUTHenticate:SQN:RESet[:IMMediate]" .

When the test set receives an Authentication Response message from the UE, the following authentication results are displayed in the `Security Results` window (see "How do I Change Security Setup Parameters" on page 816).

- MM Authentication Result is for non-GPRS service, either successful or a reject cause due to authentication failure. It can also be obtained with"CALL:SECurity:AUTHenticate:RESult[:MM]?" .
- GMM Authentication Result is for GPRS service, either successful or a reject cause due to authentication failure. It can also be obtained with "CALL:SECurity:AUTHenticate:RESult:GMM?" .
- MS Reported Failure Cause is the value of reject cause included in the Authentication Failure message. It can also be obtained with"CALL:MS:REPorted:AUTHenticate:FAILcause?" .

Table 8. MS Reported Failure Cause

MS Reported Failure Cause	Description
2	IMSI unknown in HLR
3	Illegal MS
4	IMSI unknown in VLR
5	IMEI not accepted
6	Illegal ME
7	GPRS service not allowed
8	GPRS services and non-GPRS services not allowed
9	MS identity cannot be derived by the network
10	Implicitly detached
11	PLMN not allowed
12	Location Area not allowed
13	Roaming not allowed in this location area
14	GPRS services not allowed in this PLMN
15	No Suitable Cells In Location Area

Table 8. MS Reported Failure Cause

MS Reported Failure Cause	Description
16	MSC temporarily not reachable
17	Network failure
20	MAC failure
21	Synch failure
22	Congestion
23	GSM authentication unacceptable
32	Service option not supported
33	Requested service option not subscribed
34	Service option temporarily out of order
38	Call cannot be identified
40	No PDP context activated
48 to 63	Retry upon entry into a new cell
95	Semantically incorrect message
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message type not compatible with the protocol state
99	Information element non-existent or not implemented
100	Conditional IE error
101	Message not compatible with the protocol state
111	Protocol error, unspecified

Note:

- Any other value received by the UE (mobile station) shall be treated as the value of 32, 'Service option temporarily out of order'.
- Any other value received by the network shall be treated as the value of 111, 'Protocol error, unspecified'.

GPIB Commands for These Settings

- Security Operations - “CALL:SECurity:OPERation”
- Authentication Algorithm - “CALL:SECurity:AUTHenticate:ALGorithm”
- Authentication Key, Upper (Hex) - “CALL:SECurity:AUTHenticate[:KEY]”
- Authentication Key, Upper Middle (Hex) - “CALL:SECurity:AUTHenticate[:KEY]”
- Authentication Key, Lower Middle (Hex) - “CALL:SECurity:AUTHenticate[:KEY]”
- Authentication Key, Lower (Hex) - “CALL:SECurity:AUTHenticate[:KEY]”
- Operator Variant Parm Type - “CALL:SECurity:AUTHenticate:OPVariant:PTYPe”
- Operator Variant Auth. Alg., Upper (Hex) - “CALL:SECurity:AUTHenticate:OPVariant:PVALue”
- Operator Variant Auth. Alg., Upper Middle (Hex) - “CALL:SECurity:AUTHenticate:OPVariant:PVALue”
- Operator Variant Auth. Alg., Lower Middle (Hex) - “CALL:SECurity:AUTHenticate:OPVariant:PVALue”
- Operator Variant Auth. Alg., Lower (Hex) - “CALL:SECurity:AUTHenticate:OPVariant:PVALue”
- Random (RAND) Value, Upper (Hex) - “CALL:SECurity:AUTHenticate:RANDom”
- Random (RAND) Value, Upper Middle (Hex) - “CALL:SECurity:AUTHenticate:RANDom”
- Random (RAND) Value, Lower Middle (Hex) - “CALL:SECurity:AUTHenticate:RANDom”
- Random (RAND) Value, Lower (Hex) - “CALL:SECurity:AUTHenticate:RANDom”
- AMF Value - “CALL:SECurity:AUTHenticate:AMF”

Related Topics

“How do I Change Security Setup Parameters”

“Active Cell Operating Mode”

“Performing a Registration”

Performing a Registration

See “Setting Cell Parameters” on page 127

See “Establishing a Connection with the UE” on page 150

You can also specify whether or not to perform the security operation during UE registration. See “Setting Security Parameters” on page 146.

When a registration has completed, the Mobile Station Information window will display the registration data received from the UE., such as its power class, Tx/Rx frequency separation, etc.

NOTE Call Limit must be OFF for any random access procedure, such as Location Update or BS Origination (paging) to be successful. See “Call Limit State” on page 138.

Related Topics

“CALL:PAGing” on page 453

“Active Cell Operating Mode”

Establishing a Connection with the UE

When the UE (mobile station) is powered on, the first task for it is to find and synchronizes to the test set base station's emulator before it can receive pages. You need to properly .

UE's International Mobile Subscriber Identity (IMSI)and proceed directly to originate a call"Performing a Registration" on page 149.

After a UE has registered, the Mobile Station Information table will display information reported from the UE, such as international mobile subscriber identity (IMSI) assigned to the UE, power class, etc.

When an active link (call) originates, the status display at the bottom of the screen will indicate the current call processing state. If the call is successful, it will display `Connected`. If the call is unsuccessful, an error message will be displayed and the call processing state will return to `Idle`.

When the UE has established an active link with the test set, you can also instruct the UE to report the measurement results for CPICH Ec/No, CPICH RSCP, Pathloss, and DTCH BLER Report. See "Mobile Station (UE) Reported Measurements" .

NOTE Call Limit must be OFF for any random access procedure, such as Location Update or BS Origination (paging) to be successful. See "Call Limit State" on page 138.

Making a Base Station Originated Call

See "Originating a Connection from the Test Set" on page 191.

Related Topics

"How Do I Set Up a Call?" on page 817

"Call Processing Event Synchronization" on page 308

"Active Cell Operating Mode" on page 117

Performing a Handoff

The handoff feature in the test set allows you to perform hard handoffs between different downlink and uplink channels (UARFCNs), or between different systems. All these handoff parameters are accessed from the Handoff Setup menu when the test set is in Active Cell operating mode. When the Handoff Setup menu is selected, a softkey labeled Execute Handoff is displayed. This allows several parameters to be changed without a handoff attempt until the Execute Handoff key is selected.

Handoffs between different downlink and uplink UARFCNs can be made while the current call status is `Connected`. You can change the downlink and uplink UARFCNs while maintaining a connection between the test set and the UE. The test set sends a physical channel reconfiguration message to the UE when you request a handoff by pressing the `Execute Handoff` key. After receiving a physical reconfiguration complete message from the UE, the handoff is complete.

The W-CDMA to GSM hard handoff is available only when both the E1963A and E1968A GSM/GPRS test applications (TA) are present in the test set and licensed for operation. The handoff is performed by sending the intersystem handoff message to the UE then executing a fast switch between E1963A and E1968A applications. In order to perform a handoff to GSM, the E1968A GSM/GPRS TA must first be set to Active Cell operating mode. The W-CDMA to GSM hard handoff will terminate in a GSM voice call. The needed GSM settings are accessible via the GPIB commands while the E1963A TA is active. If manual operation is desired, a TA switch to the E1968A GSM/GPRS TA must be done first in order to access its settings via its MUI. The user may then switch back to the E1963A TA for W-CDMA operations including the intersystem handoff.

Non-typical Behavior of W-CDMA to GSM Handoff with E1963A Test Application

When a call is originated the E1963A always places the link in Radio Bearer Test Mode. In this mode the higher layer control connection is to the Test Control (TC) protocol entity, rather than the Call Control (CC) protocol entity normally used. When connected in this mode, the UE’s CC entity remains in its IDLE state. From the UE’s (mobile station) perspective this means that there really is no call in progress. Unfortunately, the GSM protocol stack has no equivalent TC entity; a connection to CC is required in order to bring the GSM MS (mobile station) to a testable state. To perform the W-CDMA to GSM handoff with these restrictions, the E1963A and E1968A first execute the handoff in "RR CONNECTED" state; then, once the switch to GSM is complete, the E1968A automatically continues on to establish a normal GSM CC connection for voice service. The result of this is that once the test set and the mobile station have transitioned to GSM the mobile station will ring. The user must answer the ring for the connection to be completed and testing to progress.

Related Topics

“How Do I Perform a Handoff?” on page 819

“Step 6: Reconfigure Test Set and UE Connection Parameters” on page 195

“CALL:SETup” on page 470

“CALL:HANDoff”

Mobile Station (UE) Reported Measurements

When there is an active link between the UE and test set, the UE performs measurements on the downlink signal and can report the following results to the test set:

- CPICH Ec/No: CPICH Ec/No is the ratio of the received energy per PN chip for the CPICH to the total received power spectral density at the UE antenna connector. The reporting range for CPICH Ec/No is -24 dB to 0 dB (0 to 49)

Table 9. CPICH Ec/No Reported Value Mapping to Measured Quantity

CPICH Ec/No Reported Value	Measured Quantity Value	Unit
0	CPICH Ec/No < -24	dB
1	-24 </= CPICH Ec/No < -23.5	dB
...	...	...
48	-0.5 </= CPICH Ec/No < 0	dB
49	0 </= CPICH Ec/No	dB

- CPICH RSCP (Received Signal Code Power): This is the absolute power level of the CPICH as received by the UE. The reporting range for CPICH RSCP is -115 dBm to -25 dBm (0 to 91).

Table 10. CPICH RSCP Reported Value Mapping to Measured Quantity

CPICH RSCP Reported Value	Measured Quantity Value	Unit
0	CPICH RSCP < -115	dBm
1	-115 </= CPICH RSCP < -114	dBm
...	...	...
90	-26 </= CPICH RSCP < -25	dBm
91	-25 </= CPICH RSCP	dBm

- Pathloss: This is the pathloss between the cell and UE. It is calculated by comparing the UE's measurement of CPICH RSCP and the Primary CPICH Tx Power (the power level of the CPICH at the cell, as reported by the cell).
  Pathloss (dB) = Primary CPICH Tx Power (dBm) - CPICH RSCP (dBm)
  (See "UE (Mobile Station) Transmit Power Control" on page 164 for more information about `Primary CPICH Tx Power`).
  Range is 46 dB to 158 dB.
- DTCH BLER (Block Error Ratio) Report: This is a measure of the UE's ability to receive the DTCH without errors. The reporting range for BLER is 0 to 1 (0 to 63).

Table 11. DTCH BLER Reported Value Mapping to Measured Quantity

DTCH BLER Reported Value	Measured Quantity Value	Unit
0	BLER = 0	-
1	-infinity < Log10(BLER) < -4.03	-
2	-4.03 </= Log10(BLER) < -3.965	-
...	...	...
61	-0.195 </= Log10(BLER) < -0.13	
62	-0.13 </= Log10(BLER) < -0.065	-
63	-0.065 </= Log10(BLER) < -0	-

The measurement results are displayed in the `Mobile Station Reported Measurements` window on the `Call Setup Screen`, or obtained using the "CALL[:CELL[1]]:MS:REPorted:ALL?" command.

Requesting Mobile Station Reported Measurements

When an active link is present, an additional field labeled `Send Meas Request` (**F5**) is displayed on the `Call Control (2 of 2)` menu. You can instruct the UE to report measurement results by either selecting `Send Meas Request` (**F5**) or by sending the "CALL:MS:REPorted:MEASurement:REQuest" command.

You can also specify the observation period for the measurements either by selecting `BLER Rep Intrvl` (**F6**) or by sending the "CALL:DTCHannel:BLER:REPorting:INTerval" command.

Related Topics

"Establishing a Connection with the UE"

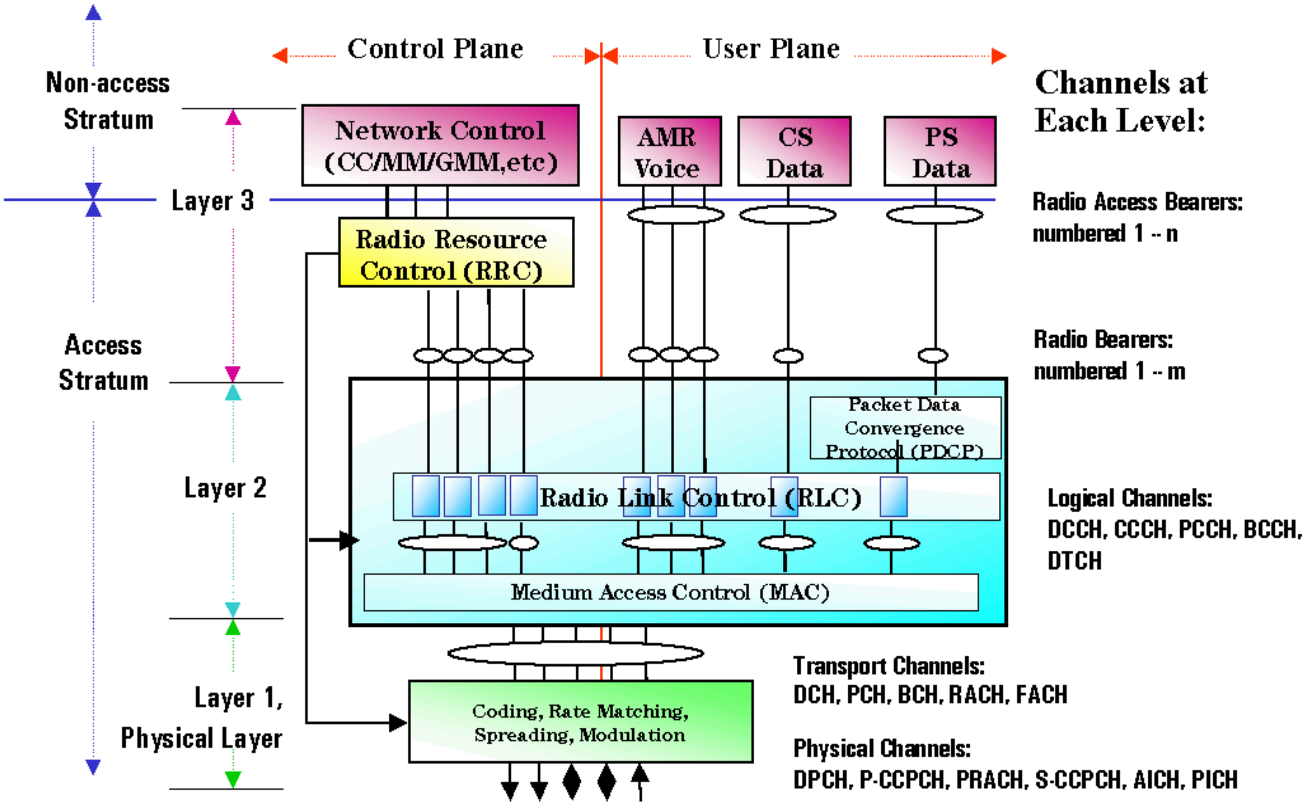
"Active Cell Operating Mode" on page 117

W-CDMA Concepts

W-CDMA Protocol Structure

The W-CDMA protocol has a layered structure designed to give the system a great deal of flexibility. The two major parts are the Core Network (CN) and Radio Access Network (RAN). The structure of the RAN and the relationship of several key terms to it are illustrated in Figure 14. It is important to recognize that this figure is only an illustration. The exact structure, including the number and type of channels, number and type of user services, and the configuration of blocks in the structure will vary over time to meet the current needs of the system. The structures of the uplink and downlink are very similar; however, some types of channels exist in only one direction; while others exist in both.

Figure 14. W-CDMA Protocol Structure

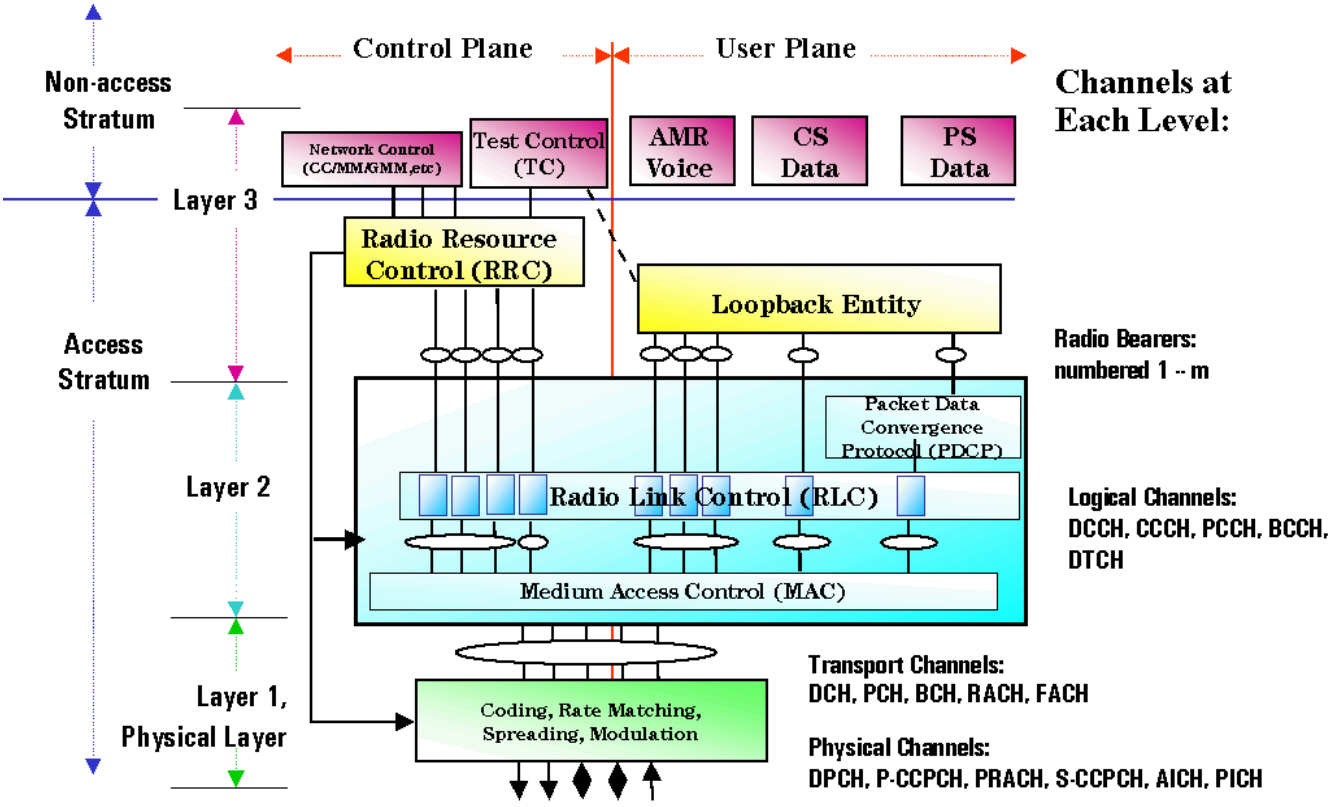


The WCDMA structure is divided vertically into an “Access Stratum (AS)” and a “Non Access Stratum (NAS)”, and horizontally into a “Control Plane” and a “User Plane”. Protocol Layers 1 and 2 are in the Access Stratum. Protocol Layer three is divided between the Access and Non-Access strata. In layers 2 and 3 control plane and user plane information is carried on separate channels. Within layer 1 some channels carry only control plane information, while others carry both user and control plane data.

Radio Bearer Test Mode, TC, and Reference Measurement Channels

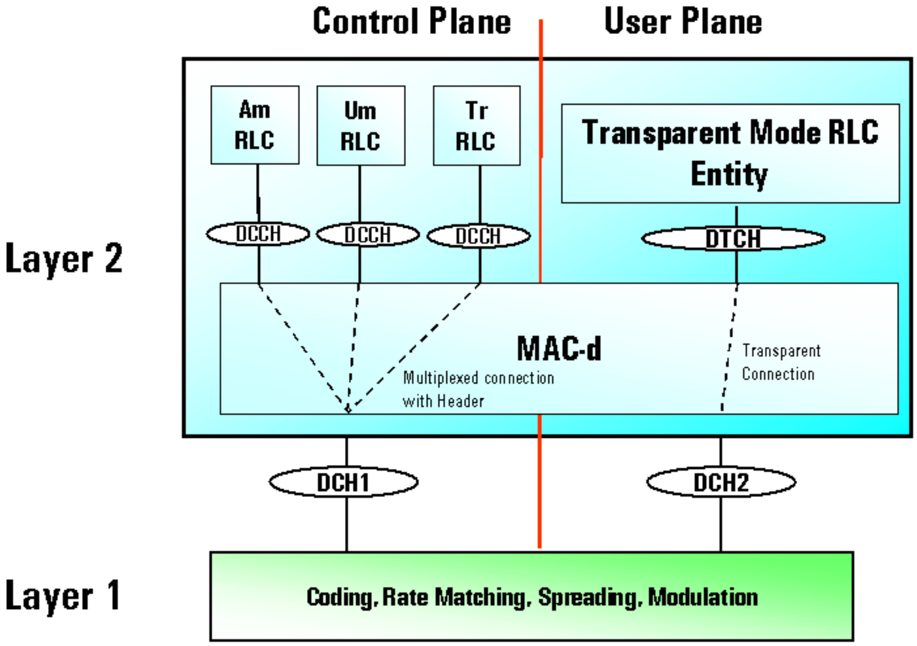
Radio Bearer Test Mode is a special mode of operation defined by the W-CDMA specifications. Its purpose is to provide for efficient manufacturing testing of a W-CDMA UE by offering a simplified mode of operation wherein the Test Set has complete control of the necessary UE functions. In Radio Bearer Test Mode connection to the UE is done via a special Test Control (TC) protocol entity and any User Plane radio bearers are terminated in a layer 3 loopback entity, rather than being connected through to a real service. In radio Bearer Test Mode the protocol structure appears as shown in Figure 15.

Figure 15. W-CDMA Protocol Structure in Radio Bearer Test Mode



While it is still possible to configure layers 1 and 2 in any valid configuration in Radio Bearer Test Mode, the typical use of this mode is to set up the special test configurations known as “Reference Measurement Channels”. The reference measurement channels are a defined set of configurations of layers 1 and 2 that provide stable, predictable behavior for radio testing. All aspects of these layers are explicitly defined by the definition of the Reference Measurement Channels given in the W-CDMA system specifications. The protocol structure of the Reference Measurement Channels is shown in Figure 16.

Figure 16. W-CDMA Reference Measurement Channel Protocol Structure



W-CDMA Channels

“Channel” has several meanings in the W-CDMA system.

Table 12. W-CDMA System Channels

Channel Name	Channel Type	Exists in Uplink	Exists in Downlink
CPICH	Physical Channel		*
P-CCPCH/SCH	Physical Channel		*
S-CCPCH	Physical Channel		*
PICH	Physical Channel		*
AICH	Physical Channel		*
DPCH	Physical Channel	*	*
PRACH	Physical Channel	*	
DCH	Transport Channel	*	*
RACH	Transport Channel	*	
PCH	Transport Channel		*
BCH	Transport Channel		*
FACH	Transport Channel		*

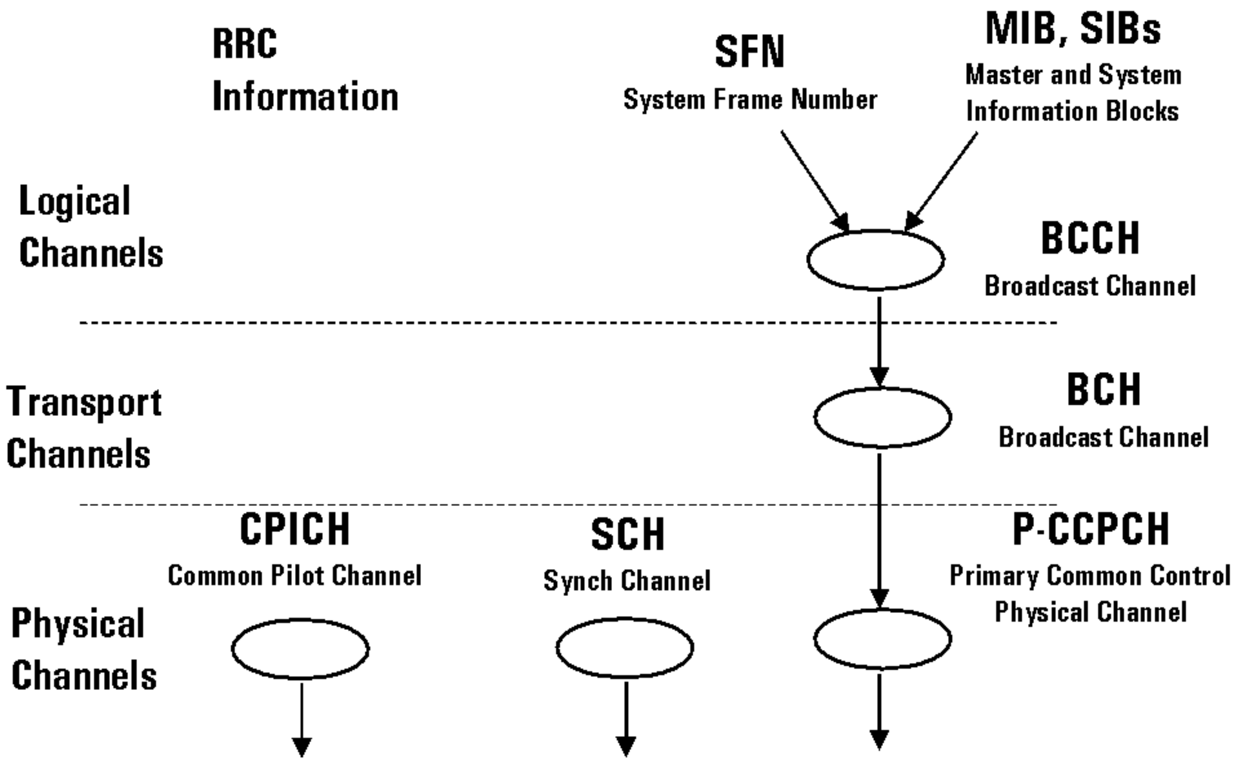
Table 12. W-CDMA System Channels

Channel Name	Channel Type	Exists in Uplink	Exists in Downlink
DTCH	Logical Channel	*	*
DCCH	Logical Channel	*	*
CCCH	Logical Channel	*	*
PCCH	Logical Channel		*
BCCH	Logical Channel		*

Downlink Overhead Channels

The overhead channels are transmitted continuously in each cell. They are used by the UE to synchronize to the cell, to identify the cell and the network, and to obtain information about how to access the cell.

Figure 17. W-CDMA Downlink Overhead Channels



- Common Pilot Channel (CPICH) - used to transmit timing and frequency reference information to UEs (mobile stations) which are used by the UE (mobile station) to find the primary scrambling code and to help determine its transmit power during open loop power control.
- Synchronization channel (SCH): includes the primary and secondary synchronization channels (PSC and SSC) that contain timing information to allow the UE to synchronize to the test set (or base station). It is time multiplexed with P-CCPCH.

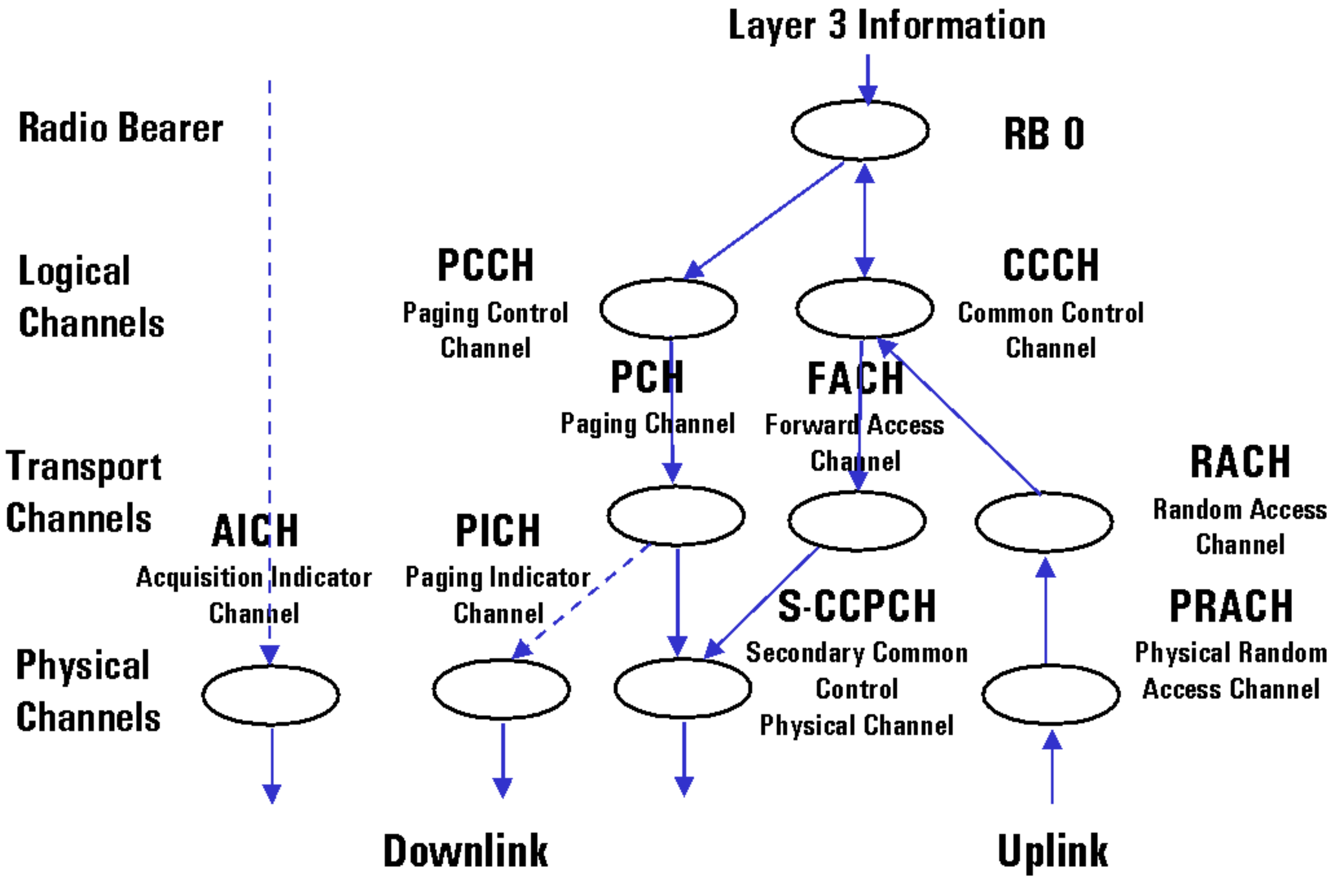
- Primary Common Control Physical Channel (P-CCPCH) - used to transmit Broadcast transport channel (BCH) which provides system information to the UE. It is time multiplexed with Synchronization Channel (SCH) which is used to aid the UE synchronization to the network. In FDD Test operating mode, this channel consists of pseudo-random bit sequence (PRBS) data and a valid system frame number (SFN).

Channels Used for Call Setup

After the UE has identified a cell that it wants to access and has read the access information from the Broadcast Channel, it must register. Registration informs the network of the presence of the UE and is performed using the Location Update Procedure.

In order for there to be any communication between the mobile and the network a control connection must be established between the RRC entities in the network and the UE. This step is the same whether the purpose is registration, mobile initiated call setup, or network originated call setup. These channels are shown in Figure 18.

Figure 18. W-CDMA Connection Setup Channels



- Acquisition Indication Channel (AICH) - used to acknowledge UE access request.
- Paging Indication Channel (PICH) - used to alert the UE of a forthcoming page message. In FDD test mode, the test set only provides a user specified bit pattern to allow the operator to verify that the UE is correctly decoding this channel.

- Secondary Common Control Physical Channel (S-CCPCH) - used to transmit pages and signalling to idling UEs.
- Physical Random Access Channel - used by the UE to make its initial transmissions to the network.

Downlink and Uplink Channels Overview

The “Downlink” refers to a radio link for the transmission of signals from the test set to a UE (mobile station) while the “Uplink” refers to a radio link for the transmission of signals from a UE (mobile station) to the test set. Table below summarizes the downlink and uplink channels supported by the test set in Active Cell operating mode and the FDD Test operating mode, and the following figures shows the channel structures respectively.

Table 13. Physical Channels in Active Cell and FDD Test Operating Modes

Active Cell Operating Mode		**FDD Test Operating Mode**	
Downlink Channels	Uplink Channels	Downlink Channels	Uplink Channels
CPICH	PRACH	CPICH	
P-CCPCH/SCH	DPCH	P-CCPCH/SCH	DPCH
S-CCPCH			
PICH		PICH	
AICH			
DPCH		DPCH	
Comp. OCNS		Comp. OCNS	

Figure 19. Active Cell Mode Downlink Channel Structure

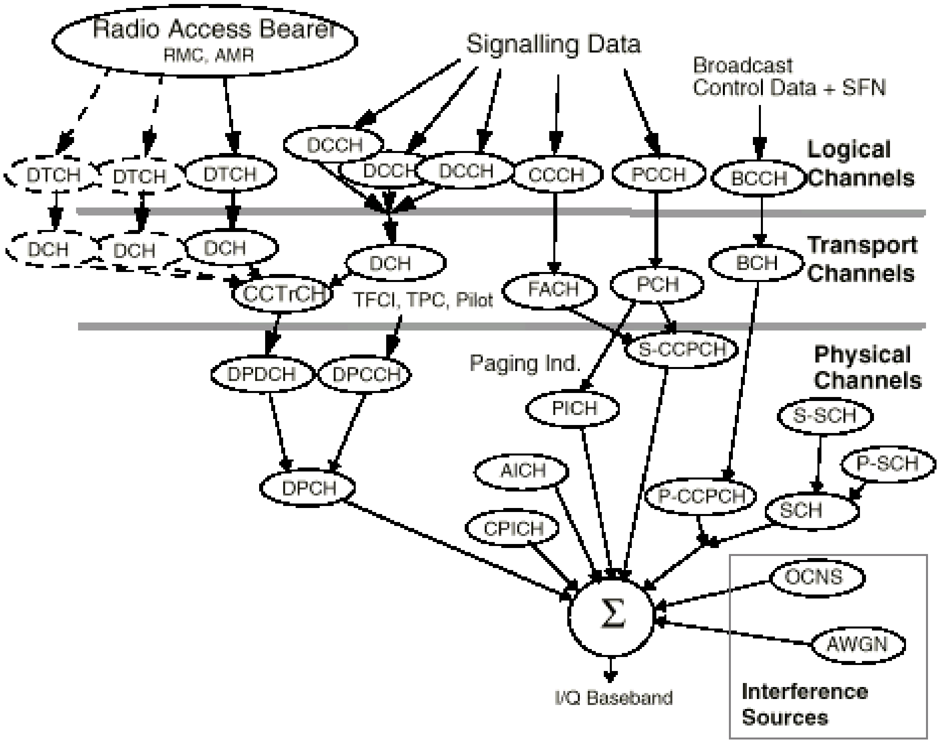


Figure 20. FDD Test Mode Downlink Channel Structure

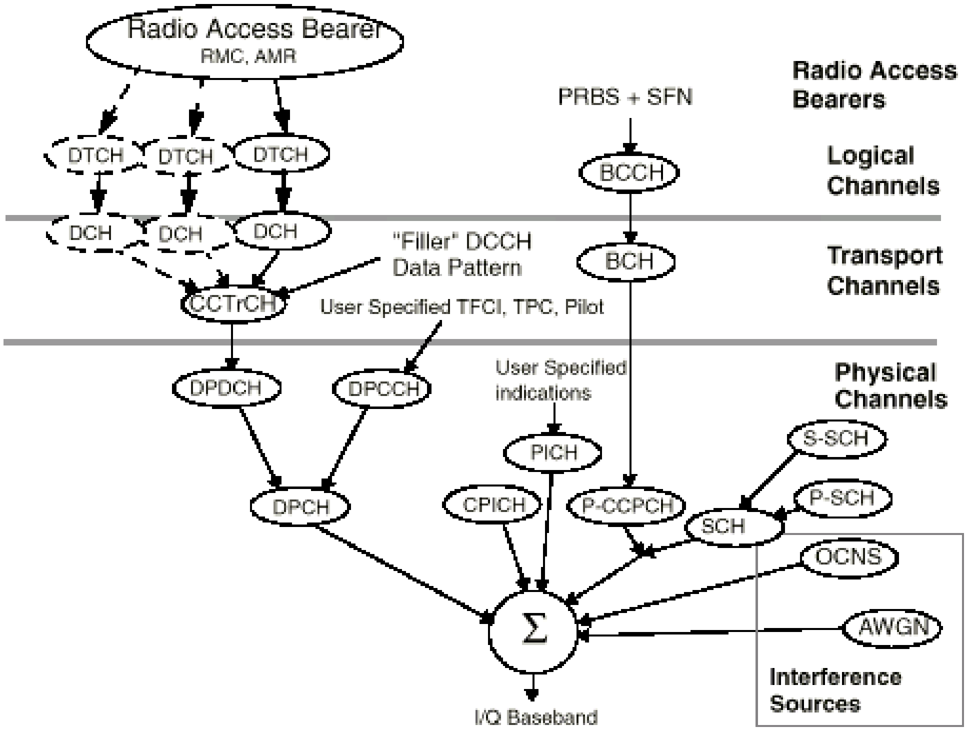


Figure 21. Active Cell Mode W-CDMA Uplink Channel Structure

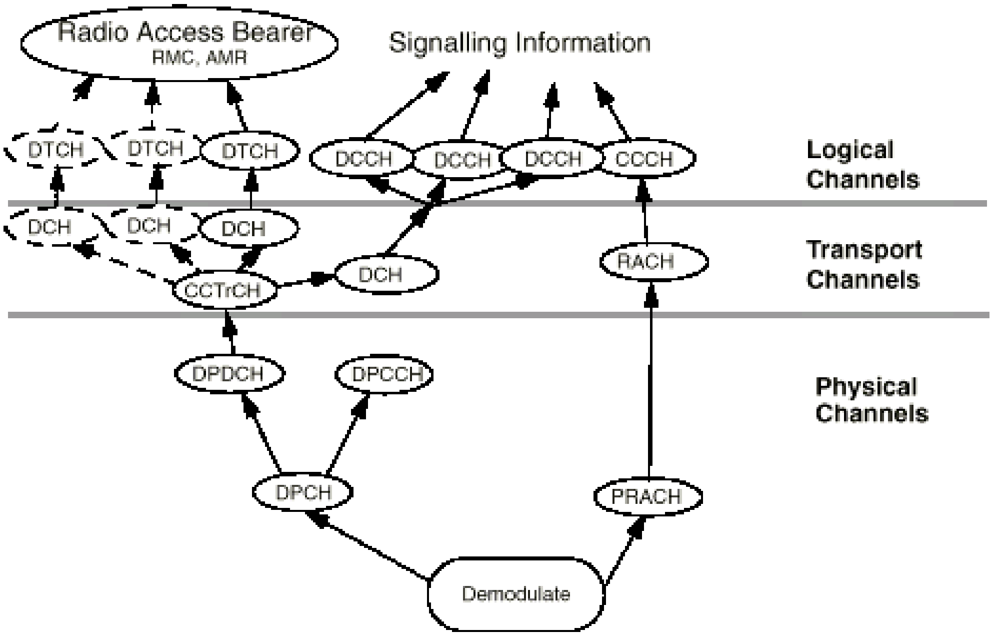
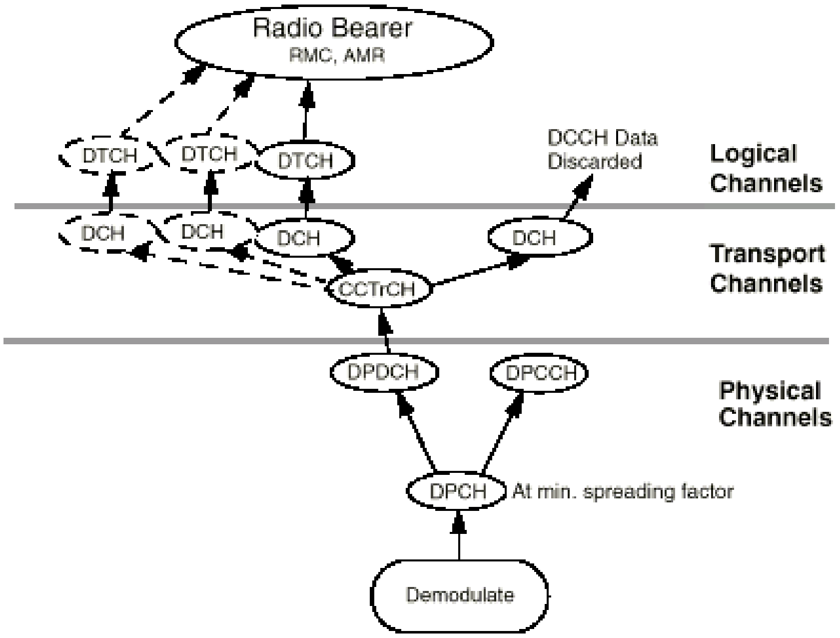


Figure 22. FDD Test Mode W-CDMA Uplink Channel Structure



Downlink Channels

The downlink channels transmitted by the test set in Active Cell operating mode (see "Active Cell Mode Downlink Channel Structure") are different from the downlink channels in FDD Test operating mode (see "FDD Test Mode Downlink Channel Structure"). To configure the downlink channel codes and levels, see

- Common pilot channel (CPICH): Used by the UE (mobile station) to find the primary scrambling code and to help determine its transmit power during open loop power control.
- Primary common control physical channel (P-CCPCH): Contains the broadcast channel (BCH) that normally provides system information to the UE. In FDD Test operating mode, this channel consists of pseudo-random bit sequence (PRBS) data and a valid system frame number (SFN).
- Secondary common control physical channel (S-CCPCH): Carries the signalling information used to set up the connection with the UE. This channel is not used in FDD Test Mode.
- Synchronization channel (SCH): Includes the primary and secondary synchronization channels (PSC and SSC) that contain timing information to allow the UE to synchronize to the test set (or base station).
- Page indicator channel (PICH): Used to alert the UE that it is being paged. In FDD test mode, the test set only provides a user specified bit pattern to allow the operator to verify that the UE is correctly decoding this channel.
- Acquisition Indicator Channel (AICH): Used in response to a UE's PRACH Preambles to indicate to the UE that it may continue with call setup. This channel is not used in FDD Test Mode.
- Dedicated physical channel (DPCH): Contains the dedicated physical control channel (DPCCH) which includes the transmit power control (TPC) and transmit format combination indicator (TFCI), and the dedicated physical data channel (DPDCH) which contains the user data.

Interference Sources on the Downlink

- Additive White Gaussian Noise (AWGN) - can be summed into the downlink signal to simulate interference from other cells when enabled. See "Setting Cell Power and AWGN Power Levels" on page 132.
- Orthogonal Channel Noise Simulator (OCNS) - used to simulate additional users on the downlink. OCNS is automatically enabled when the sum of the levels of all the enabled downlink physical channels is less than the cell power setting. See "Orthogonal Channel Noise Simulator (OCNS)" on page 136.

Uplink Channels

The test set recognizes two types of uplink physical channels, the Physical Random Access Channel (PRACH) and the Dedicated Physical Channel (DPCH). However, the "Active Cell Mode W-CDMA Uplink Channel Structure" is different from the "FDD Test Mode W-CDMA Uplink Channel Structure" .

- Physical Random Access Channel (PRACH) - used by the UE to request registration on the network. The test set only responds to the PRACH in Active Cell Mode.
- Dedicated Physical Channel (DPCH) - is the combination of the Dedicated Physical Data Channel (DPDCH) which carries the user data/signalling, and the Dedicated Physical Control Channel (DPCCH) which contains physical channel control information. In Active Cell Mode the test set will configure the Uplink DPCH by sending signalling information to the UE during Call Setup (see "Channels Used for Call Setup"). In FDD Test Mode the Test Set assumes that the UE's uplink has been properly configured to match the expected configuration. The expected configuration is determined by the FDD Channel Type setting (see "Setting Channel Type").

Related Topics

"W-CDMA Concepts"

UE (Mobile Station) Transmit Power Control

The UE (mobile station) uses open loop power control to determine the initial transmit power of the first PRACH preamble and of the DPCH as it is first turned on. Once the DPCH is established its power is controlled by the closed loop power control.

Open Loop Power Control

The test set calculated the expected initial transmit power of the first PRACH preamble and of the DPCH (at turn-on the DPCH consists only of the DPCCH) and displays in the Mobile Expected Open Loop Transmit Power window on the Call Setup Screen.

Initial PRACH Tx Power

The expected initial transmit power of the first PRACH preamble is calculated using the following formula:

Initial PRACH Tx Power = Primary CPICH TX power - CPICH_RSCP + UL Interference + Constant value

Three parameters are user settable: Primary CPICH TX Power, Uplink (UL) Interference, and Constant Value. See “Setting Cell Parameters” on page 127.

Primary CPICH Tx Power is a parameter transmitted to the UE on the BCCH by the test set. It is not the actual transmit power level of the test set’s CPICH.

The CPICH_RSCP is the result of the UE reported measurement of the CPICH code channel power (see “UE (Mobile Station) Transmit Power Control”).

Initial DPCCH Tx Power

In a W-CDMA system, the UE must determine at what transmit power to initially use for the DPCCH. After that, the power level is adjusted by the UE using closed loop power control. The test set calculates the expected initial DPCCH Tx power in the formula of:

Initial DPCCH Tx Power = DPCCH Power Offset - CPICH_RSCP

The CPICH_RSCP is the result of the UE reported measurement of the CPICH code channel power. The DPCCH Power Offset is signalled to the UE in the RRC Connection Setup, Radio Bearer Setup, and Physical Channel Reconfiguration messages.

Closed Loop Power Control

Once the DPCH is established, the closed loop power control is used to control the UE transmit power. You can activate the closed loop power control by setting the `UL CL Power Ctrl Mode` (**F8**, under Call Parms, 3 of 3) to Active bits. Then the closed loop power control maintains the UE’s average power at the value entered for the `MS Target Power`. You can also set which power control algorithm is to be used during closed loop power control.

The UE’s output transmit power can also be controlled manually by setting the `UL CL Power Ctrl Mode` (**F8**, under Call Parms, 3 of 3) to the value other than Active bits. Various data patterns are available for you to control the power manually and test the UE’s response. You can also send Transmit Power Control (TPC) bit patterns to step the power up or down one step at a time to verify the accuracy of the UE’s power amplifier. See “Setting Closed Loop Power Control” on page 144 for details.

Related Topics

"How Do I Change UE TX Power Levels" on page 811

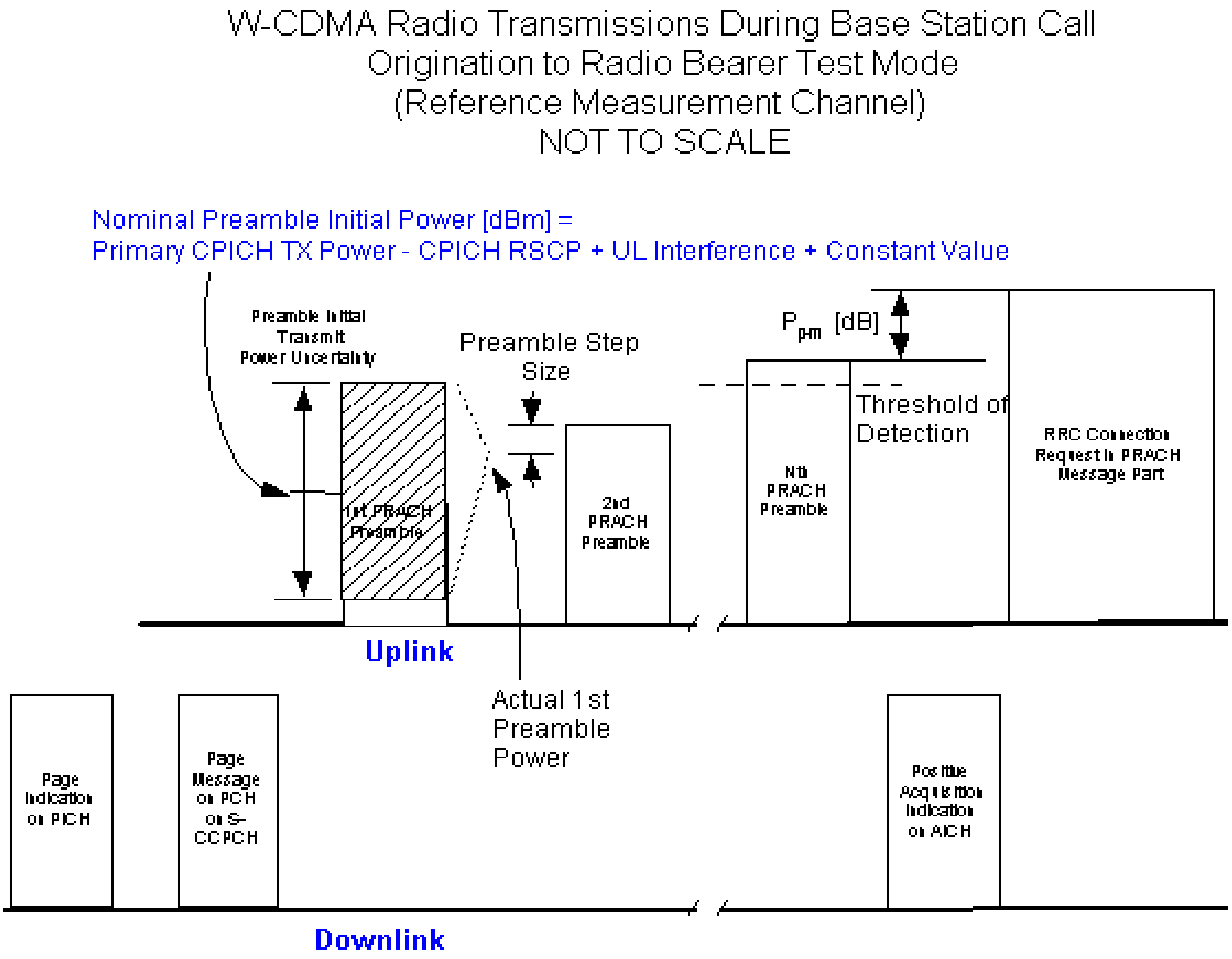
"How do I Change Cell Parameters" on page 807

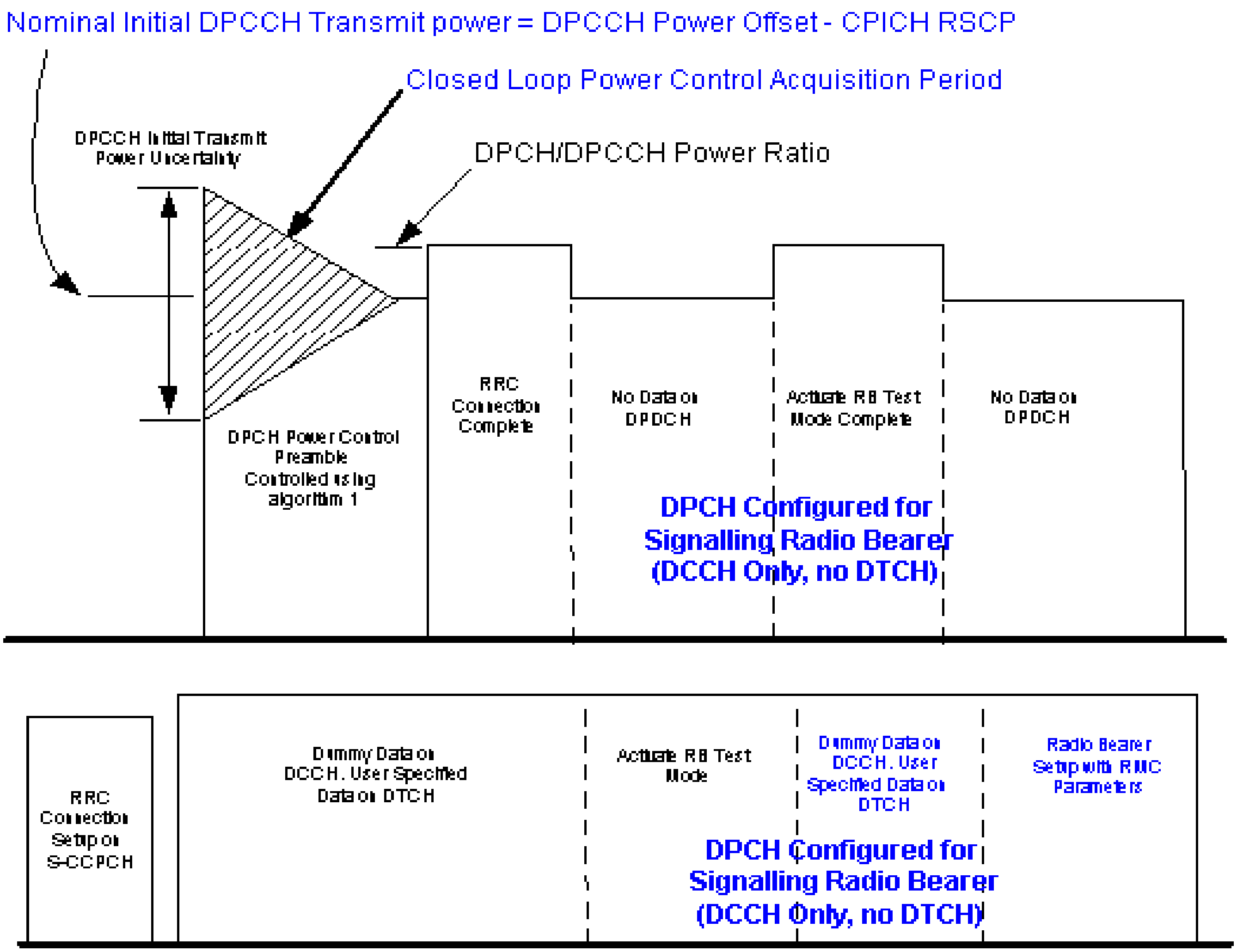
"Setting Closed Loop Power Control" on page 144

Base Station Originated Call Setup Flowchart

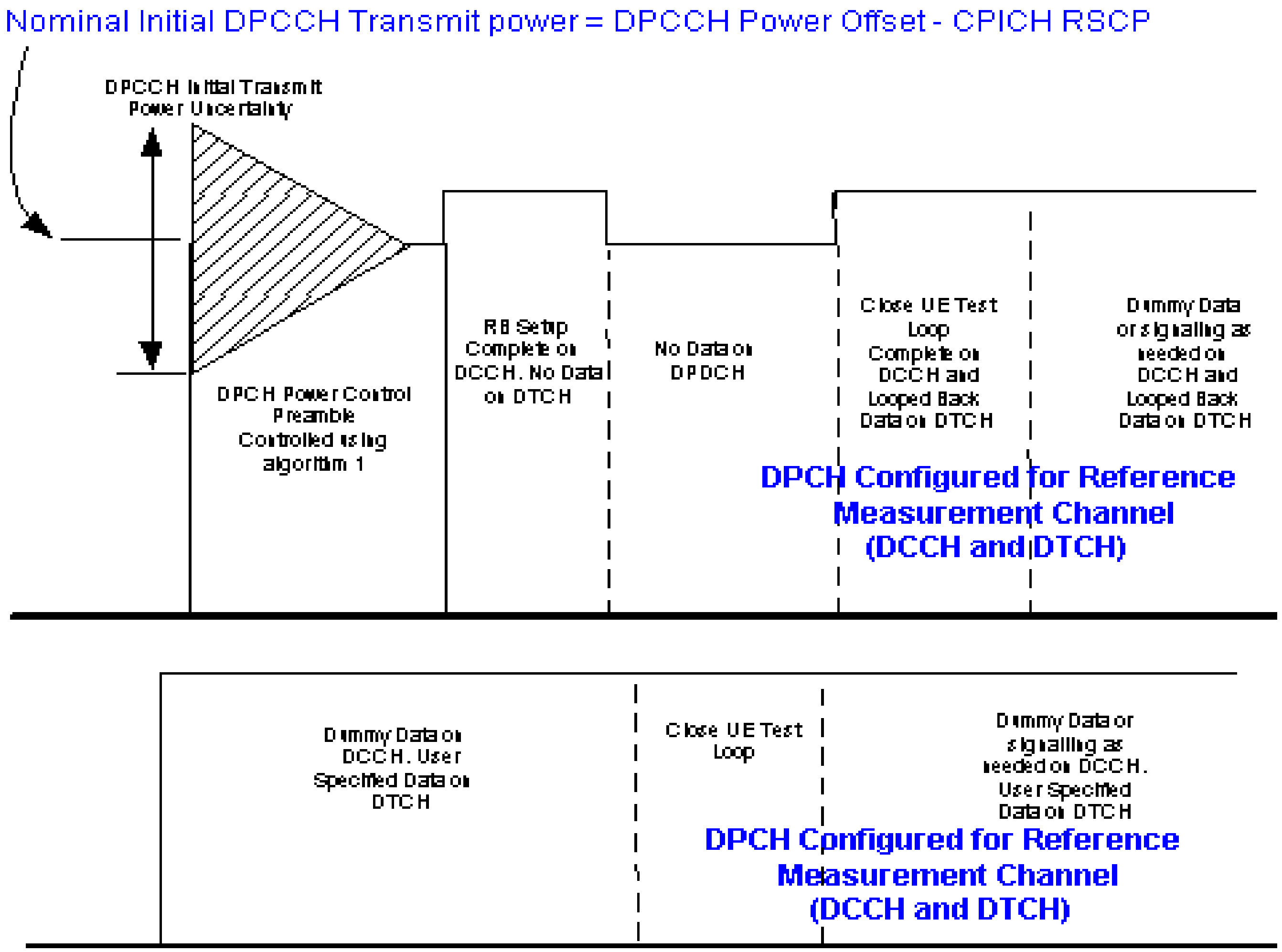
The following diagrams illustrate the key steps and messaging to establish a base station initiated call (BS Origination) to the UE (mobile station).

Click on the blue text for more information on that topic.





Note: Power steps due to RLC acknowlegements not shown for simplicity



Related Topics

"W-CDMA Concepts"

"Procedures Used for Call Processing Operation"

Procedures Used for Call Processing Operation

The following diagrams illustrates the primary procedures used for call processing operation.

- "RRC Connection Setup Procedure"
- "Location Update (Registration) Procedure"
- "Paging Procedure"
- "Radio Bear Setup Procedure"
- "BS Release from RB Test Mode Procedure"
- "Inter-frequency Hard Handoff Procedure (UARFCNs)"
- "Inter-system Hard Handoff Procedure (from WCDMA to GSM)"

The definitions below apply for the terms used in the diagrams.

- UE (User Equipment) - mobile station that is under test.
- 8960 - Wireless Communications Test Set (SS (System Simulator) specified in the 3GPP standard).
- User - test user, who handles the test and measurement process via the logical test interface (test set front panel or GPIB interface).
- RB (Radio Bearer) - the service provided by Layer 2 (RLC and MAC) for transfer of user data between UE and UTRAN (RF interface).
- TC (Test Control): UE protocol entity used by the SS to control the UE specific testing functions, such as UE test loop function and UE radio bearer test mode function.
  - The UE test loop function provides access to isolated functions of the UE via the radio interface without introducing new physical interfaces just for the reason of conformance testing.
  - The RB test mode is specified to be used together with the UE test loop function. The purpose of the RB test mode is to put the UE into a mode where: SS can set up radio bearers to be terminated in the UE test loop function without having to involve CC or SM; and to disable any control mechanisms in NAS protocols or in any UE applications that otherwise could cause the RRC connection to be released.

Figure 23. RRC Connection Setup Procedure

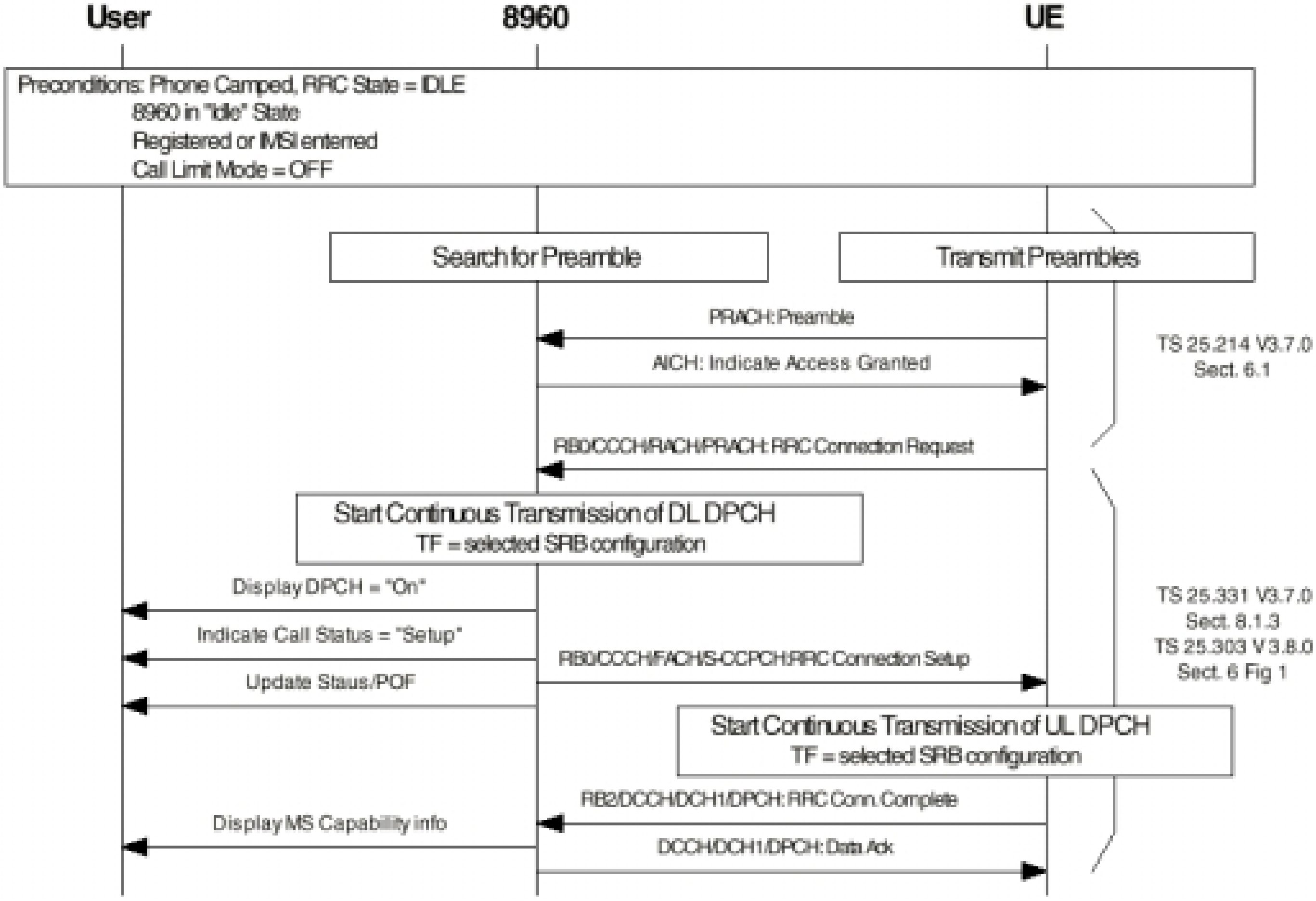


Figure 24. Location Update (Registration) Procedure

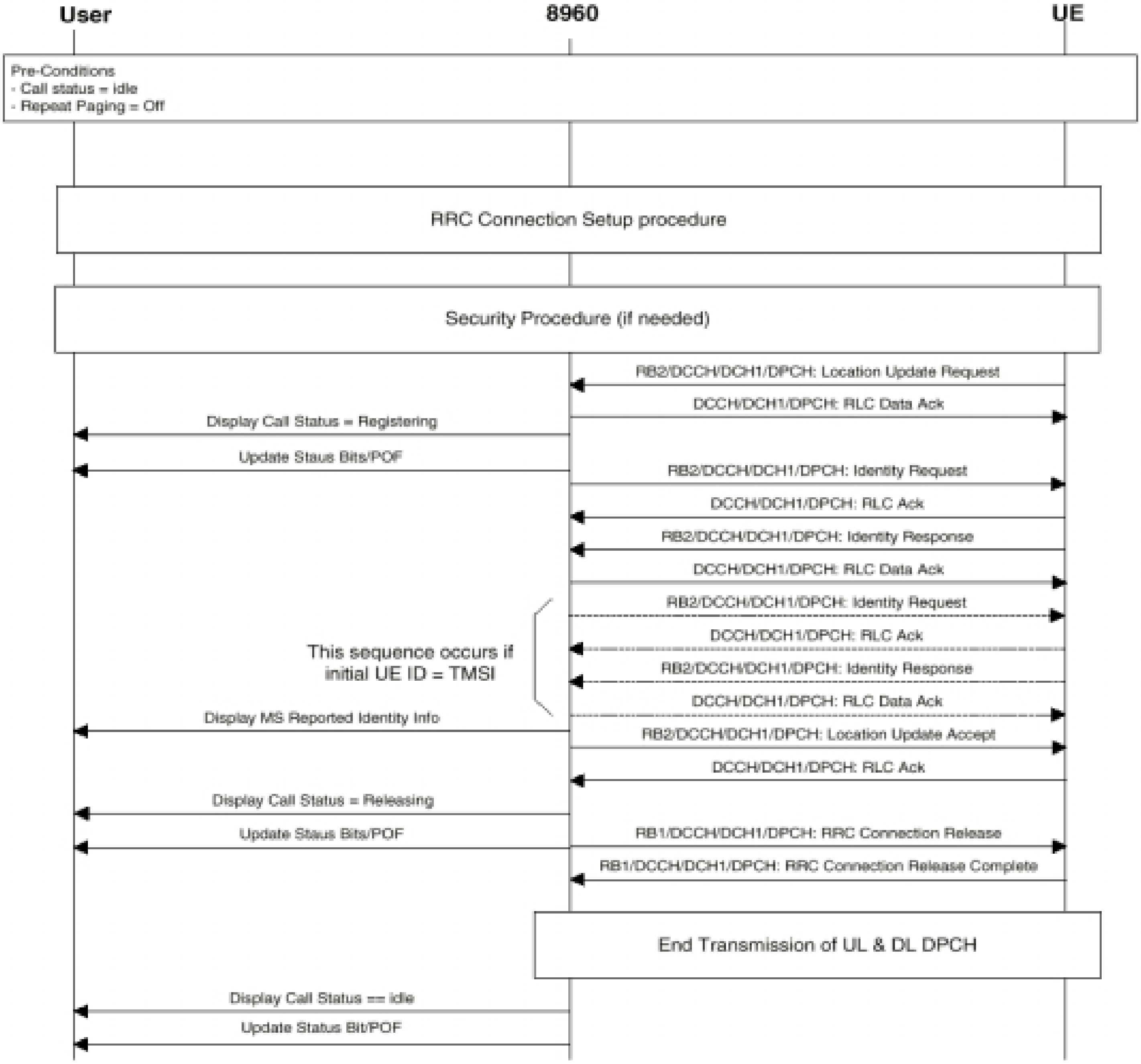


Figure 25. Paging Procedure

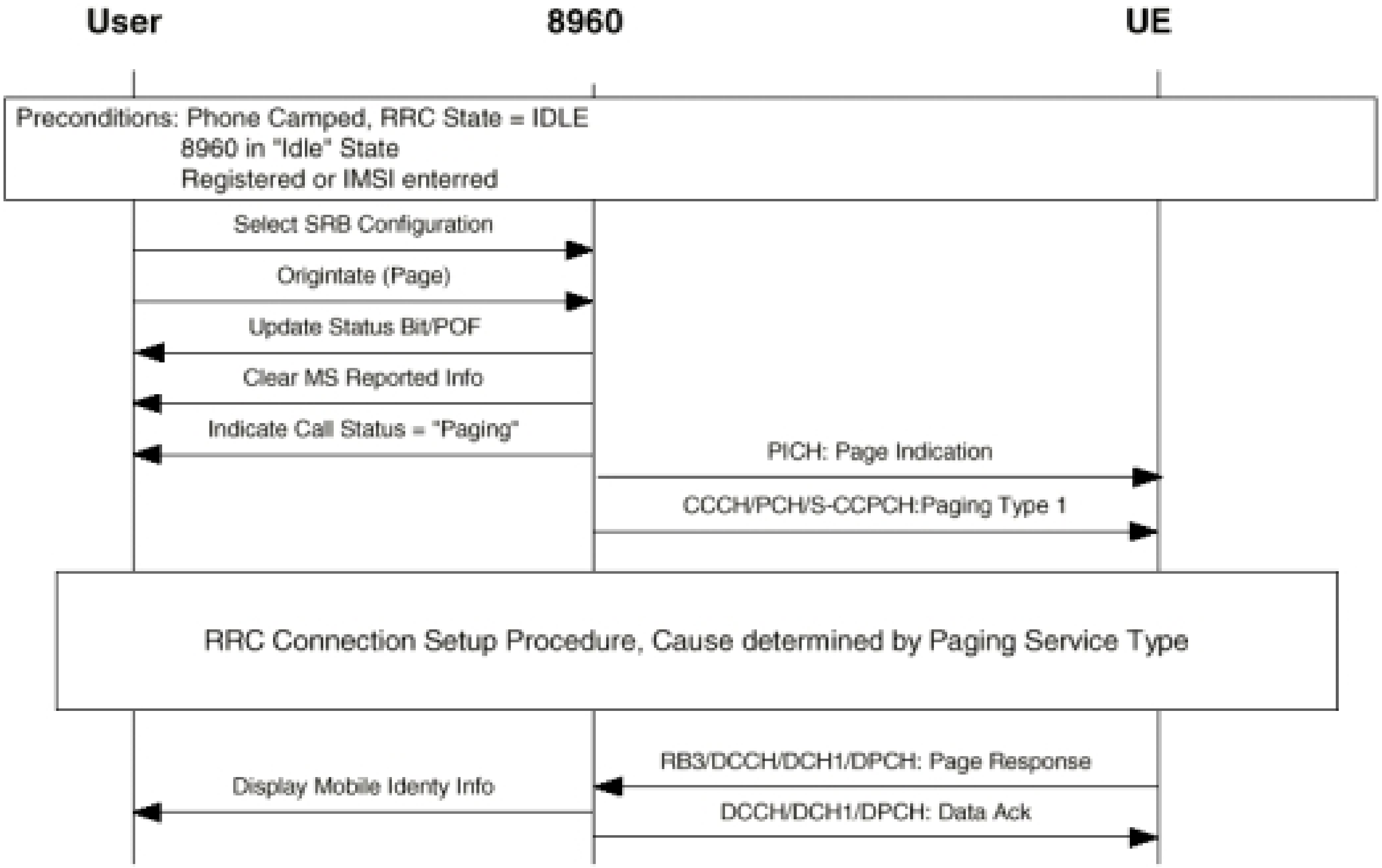


Figure 26. Radio Bear Setup Procedure

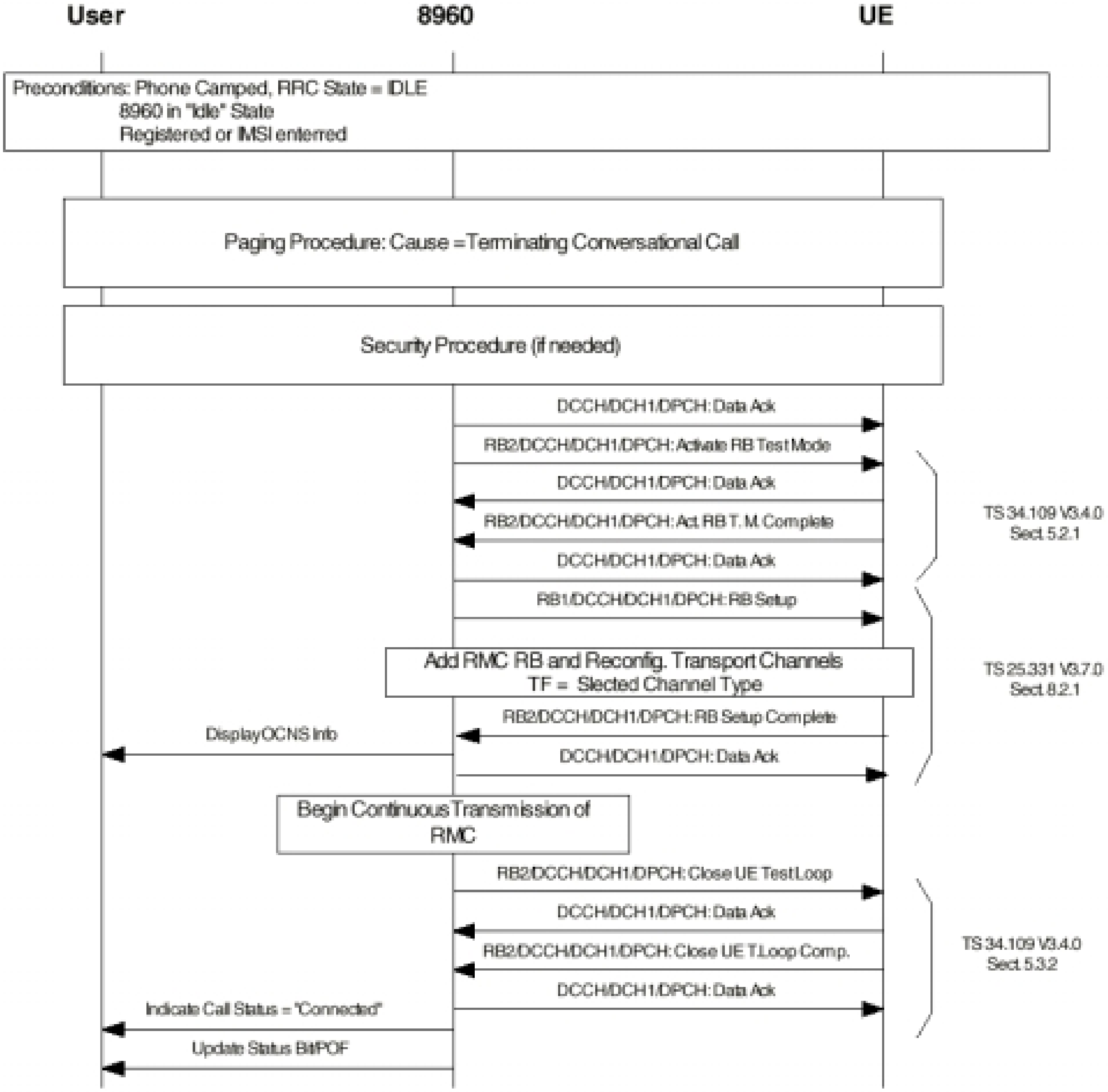


Figure 27. BS Release from RB Test Mode Procedure

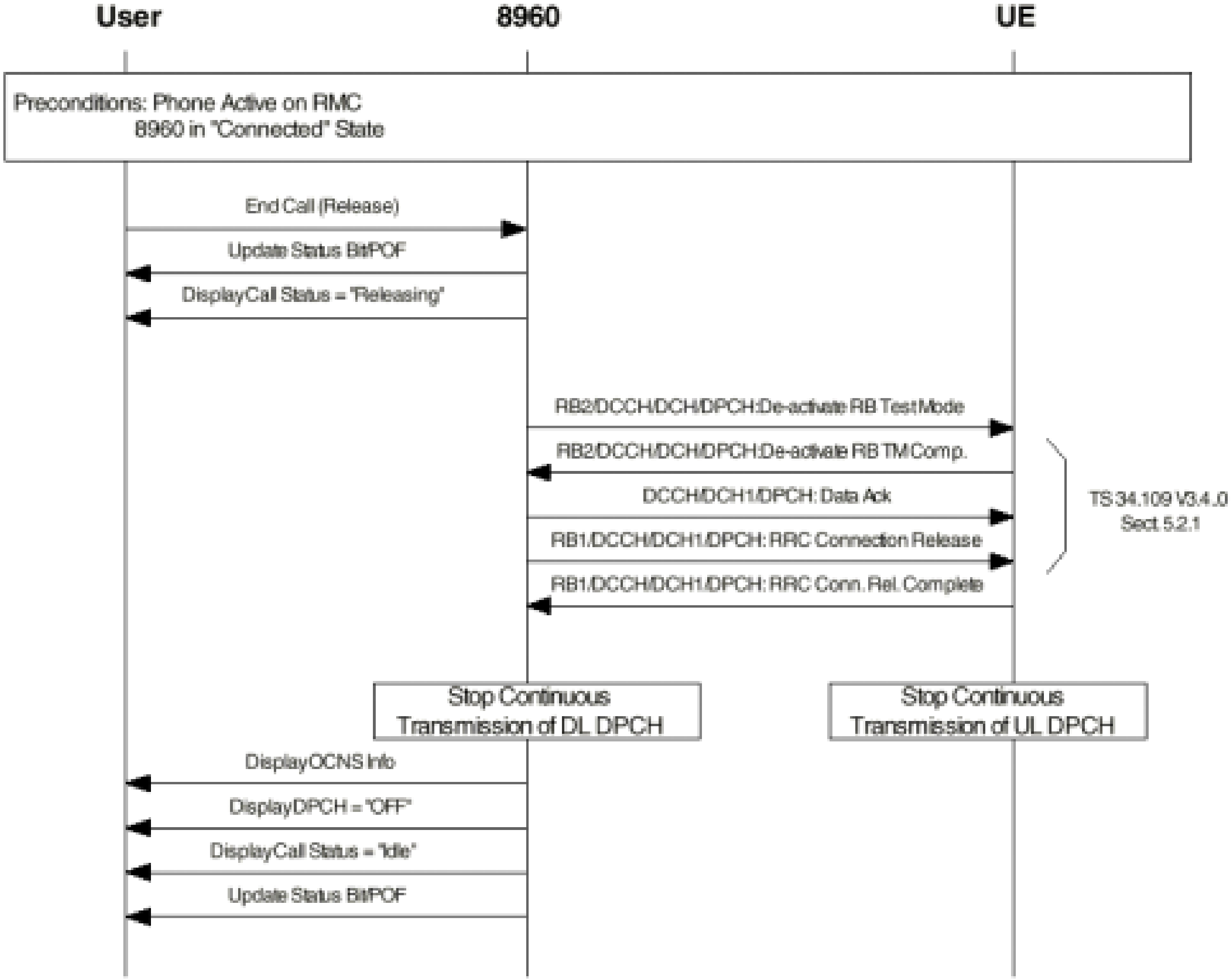


Figure 28. Inter-frequency Hard Handoff Procedure (UARFCNs)

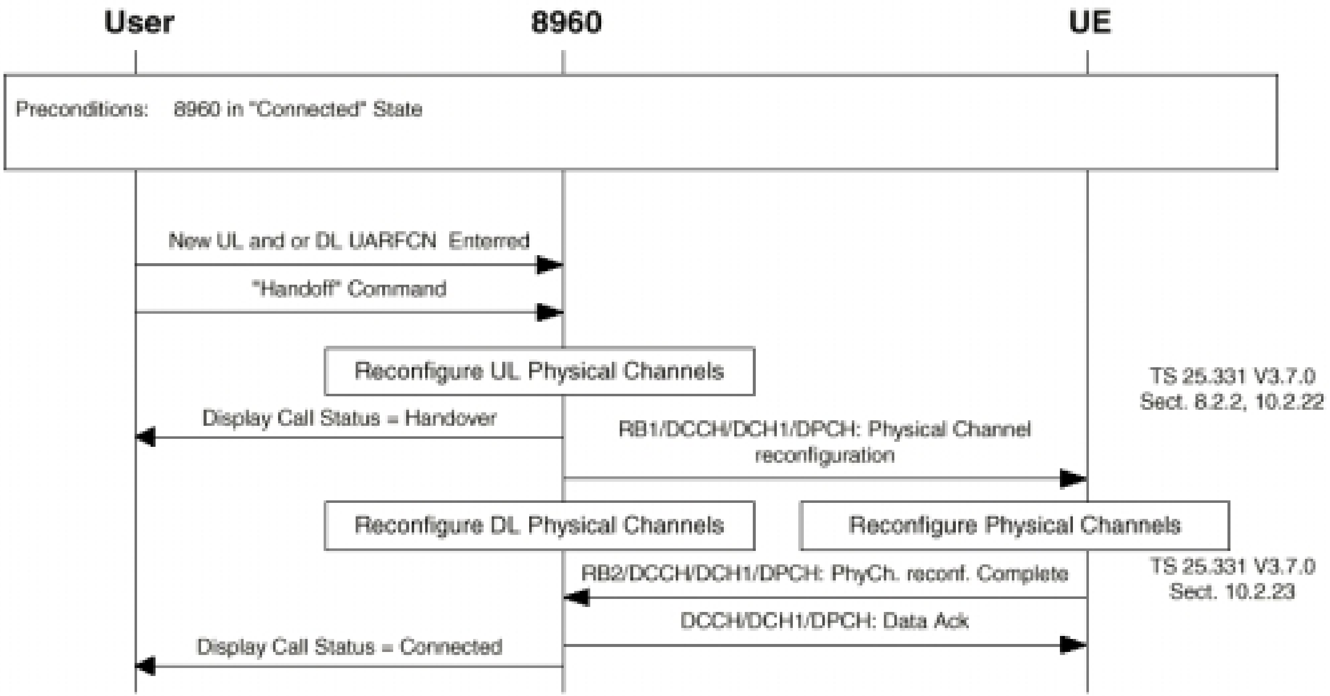
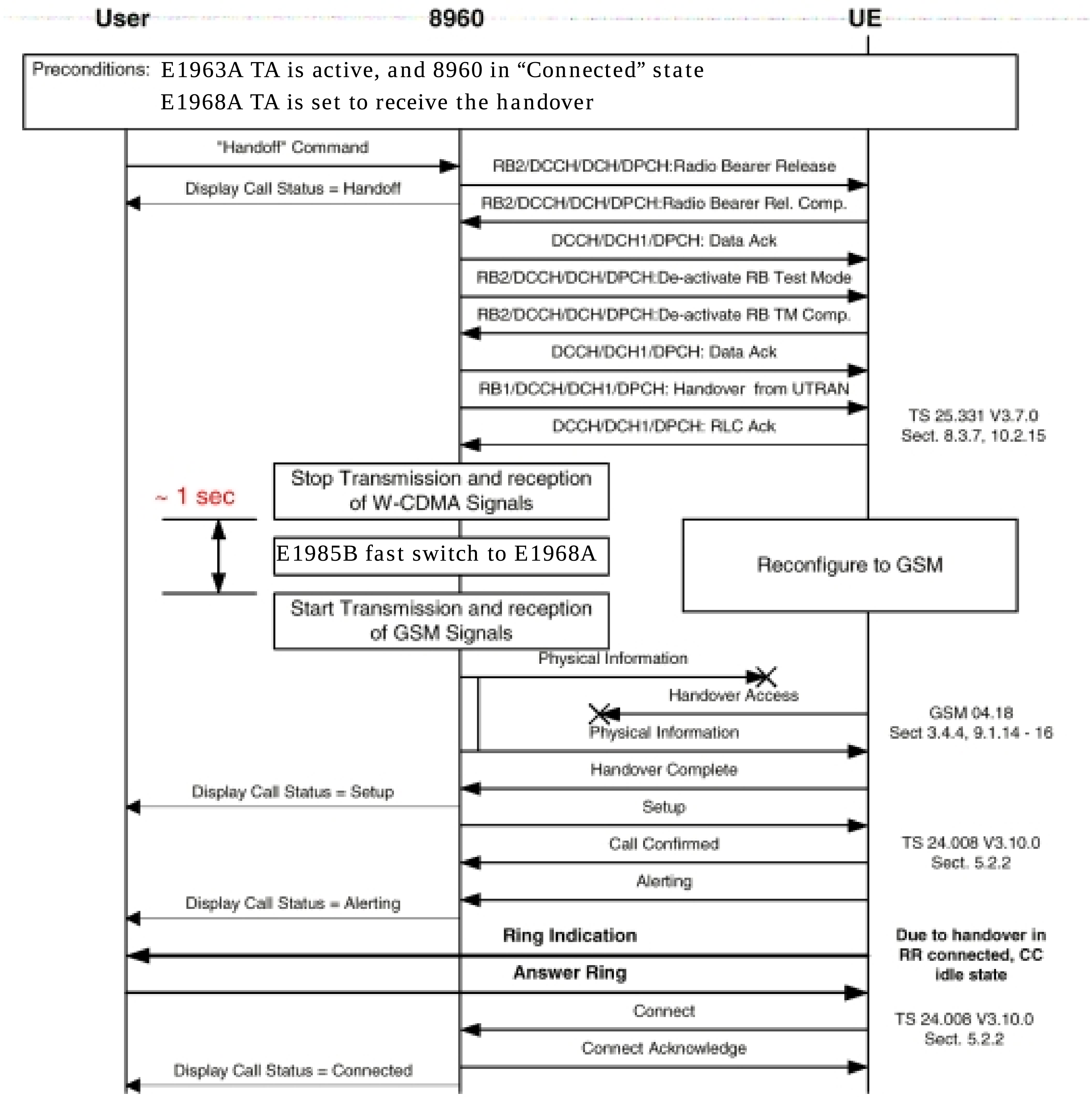


Figure 29. Inter-system Hard Handoff Procedure (from WCDMA to GSM)



Related Topics

“W-CDMA Concepts”

“Base Station Originated Call Setup Flowchart”

Broadcast Channel (BCCH) Update Procedure

The test set broadcasts the system information message on the BCCH which consists of a Master Information Block (MIB) and several System Information Blocks (SIBs 1, 2, 3, 5, 7 and 11) while in active cell operating mode. They are needed by the UE (mobile station) to successfully communicate with the network. Changing any of the settings listed in the table while in active cell operating mode will result in the execution of the BCCH Update procedure.

Table 14. Settings That Trigger BCCH Update Procedure

To access the following settings, see “Setting Cell Parameters” .
• Mobile Country Code (MCC) • Mobile Network Code (MNC) • Local Area Code (LAC) • ATT (IMSI Attach) Flag • Primary CPICH TX Power • Uplink Interference • Constant Value
To access the following settings, see “Setting SIB11 Cell Info List Parameters” on page 128.
• Cell Info List in SIB11 • Intra Freq 2nd Cell Scrambling Code • Intra Freq 3rd Cell Scrambling Code • Inter Freq 1st Cell Scrambling Code • Inter Freq 1st Cell UL Channel • Inter Freq 1st Cell DL Channel
To access the following settings, see “Setting Uplink Parameters” .
• PRACH Power Step • PRACH Bc/Bd Control • Manual PRACH Bc • Manual PRACH Bd • PRACH Preambles • PRACH Ramping Cycles • Available Subchannels (Bit Mask)

Related Topics

“How do I Change Cell Parameters” on page 807

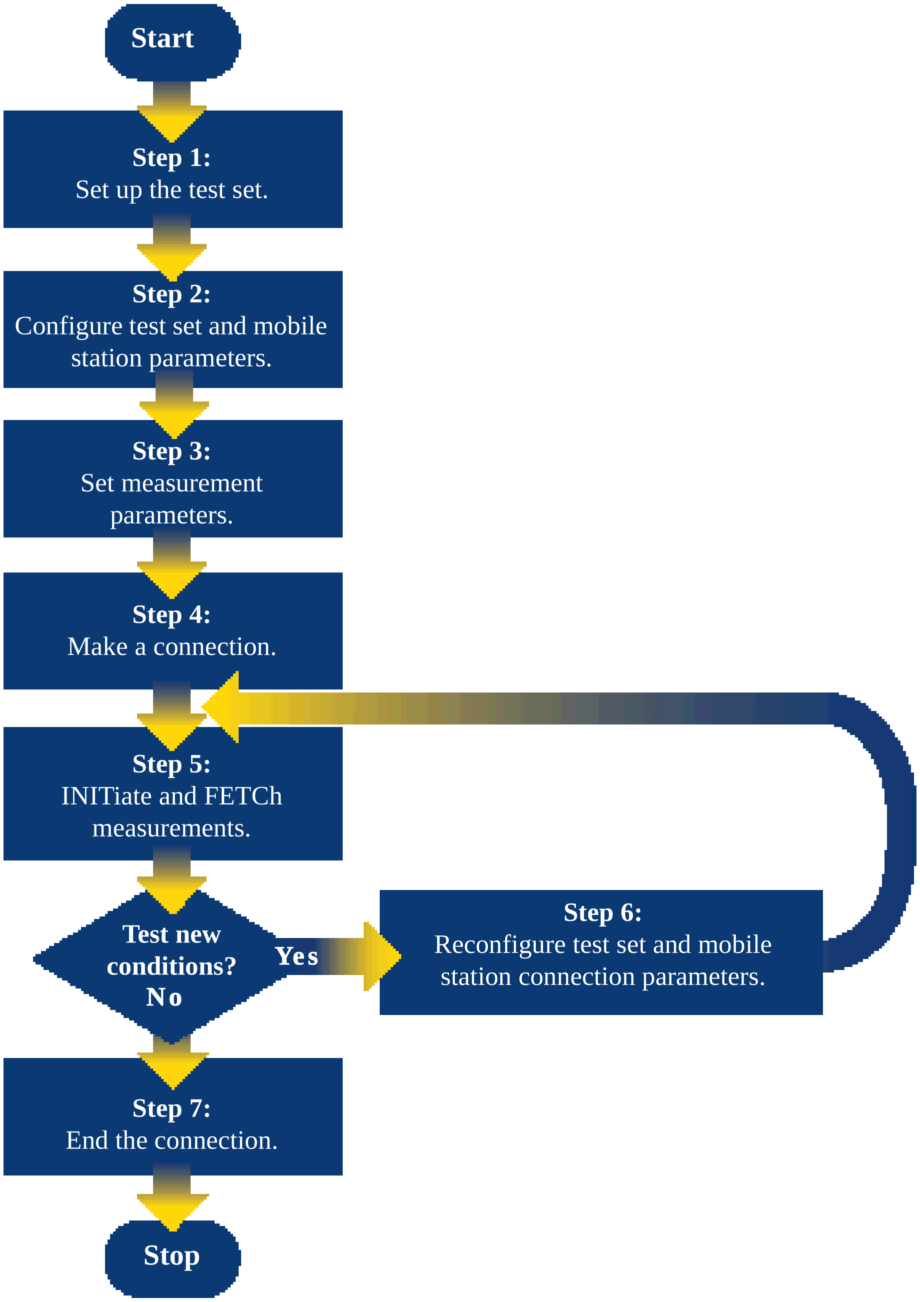
Programming

Programming: Getting Started Guide for W-CDMA Mobile Test

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



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 the E1963A W-CDMA mobile test application installed.

UE refers to W-CDMA user equipment like a mobile station, for example.

The variable `Testset` 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 included in the front inside pocket of this guide 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 8960 Family Support 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:

http://www.agilent.com/find/8960support/

Navigate to the Programming page for this test application. The illustrations on the back of the Programming Flowchart show you how to navigate to this page.

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

In this step you initialize the test set and set up general operating conditions.

- "Initialize the Test Set"
- "Set Up General Operating Conditions"

Initialize the Test Set

Fully Preset the Test Set

It is important to start each production session with the test set in a known state. Sending the `*RST` command resets all parameters to their default values, ends all measurement processes, and sets all measurement triggers to single.

Clear the Error Queue

At the start of each production session it is useful to clear the error queue so that you know any messages logged are relevant to the current production session.

Programming Example

```
210   OUTPUT Testset;"*RST"
220   OUTPUT Testset;"*CLS"
```

Set Up General Operating Conditions

Turn Debugger On

The debugger is useful while you are developing code. When it is on, the test set alerts you when you send an incorrect command. You should turn it off once your code is complete.

Set Operating Mode

There are four operating modes available: Active Cell, FDD Test Mode, CW Mode, or Cell Off Mode.

NOTE Some cell and connection parameters can not be set unless the operating mode is set to Cell Off.

Set Amplitude Offsets

You can account for path loss in your system by setting amplitude offsets. You can specify up to 20 frequency/amplitude pairs.

Programming Example

```
230   OUTPUT Testset;”SYST:COMM:GPIB:DEB ON”
240   OUTPUT Testset;”CALL:OPER:MODE OFF”
250   OUTPUT Testset;”SYST:CORR:FREQ 2000MHZ”
260   OUTPUT Testset;”SYST:CORR -1”
```

Step 2: Configure Test Set and UE Parameters

In this step you configure the parameters that allow a connection to be made between the test set and UE.

- "Set up the Cell Parameters"
- "Set Generator Info Parameters"
- "Set Uplink Parameters"
- "Set up Call Parameters"
- "Set Uplink Channel Levels"
- "Set up Call Control"

Set up the Cell Parameters

The example below illustrates how to set up the cell parameters. You can set cell parameters like the MCC, MNC, and LAC as well as specify whether single or repeat paging shoud be used when paging the UE.

The operating mode must be Cell Off to set up the cell parameters. See "Set Operating Mode" on page 185. If you do not set the operating mode to Cell Off, the test set generates the following error:

`Command Rejected. Change Not Allowed in Active Cell Mode.`

```
320   ! Cell Parameters
330   OUTPUT Testset;"CALL:LAC 30865" !Correct LAC avoids Location Update
340   OUTPUT Testset;"CALL:MCC 234"
350   OUTPUT Testset;"CALL:MNC 56"
360   OUTPUT Testset;"CALL:PAG:REP:STAT:WCDMA ON
```

Set Generator Info Parameters

There are several downlink physical channels and an AWGN (Additive White Gaussian Noise) source which you can configure. You can set the power level of each physical channel (relative to cell power) and the absolute power level of the AWGN source. You can also specify that these channels use different power levels once an Active Cell connection has been established. For some of the physical channels you can also specify the channelization code. The downlink channel codes and levels required the operating mode be set to Cell Off for configuring.

```
370   ! Generator Info
380   !   -Downlink Channel Codes
390   OUTPUT Testset;"CALL:SCOD:PRIM 0"
400   OUTPUT Testset;"CALL:SRB:CCH:DED:BPS3400:CCOD CODE12"
410   OUTPUT Testset;"CALL:CCPC:SEC:CCOD CODE7"
420   OUTPUT Testset;"CALL:PICH:CCOD CODE16"
430   OUTPUT Testset;"CALL:AICH:CCOD CODE10"
440   OUTPUT Testset;"CALL:DPCH:RMC12:CCOD CODE9"
450   !   -Downlink Channel Levels
460   OUTPUT Testset;"CALL:CPIC -4.8"
470   OUTPUT Testset;"CALL:CCPC:PRIM -7.1"
480   OUTPUT Testset;"CALL:CCPC:SEC -6.9"
490   OUTPUT Testset;"CALL:PICH -9.9"
```

```
500   OUTPUT Testset;”CALL:AICH -9.9”
510   OUTPUT Testset;”CALL:DPCH -12”
520   !   -Connected DL Channel Levels
530   OUTPUT Testset;”CALL:CONN:CPIC -3.3”
540   OUTPUT Testset;”CALL:CONN:CCPC:PRIM -5.35”
550   OUTPUT Testset;”CALL:CONN:PICH -20” !Change PICH to give OCNS
560   OUTPUT Testset;”CALL:CONN:DPCH -10.3”
570   !   -AWGN Power
580   OUTPUT Testset;”CALL:AWGN:POW:STAT OFF”
```

Set Uplink Parameters

The example below illustrates how to configure the PRACH and how to indicate what primary scrambling code the UE is using. The operating mode must be Cell Off to set these parameters.

```
590   ! Uplink Parameters
600   OUTPUT Testset;”CALL:UPL:PRAC:POW:STEP 3”
610   OUTPUT Testset;”CALL:UPL:PRAC:SIGN 0”
620   OUTPUT Testset;”CALL:UPL:PRAC:SCOD 0”
630   OUTPUT Testset;”CALL:UPL:DPCH:SCOD 0”
```

Set up Call Parameters

You must set the frequency at which the downlink will transmit, by specifying either the UARFCN or the frequency.

You must indicate to the 8960 at what frequency the UE will transmit. (Unlike other technologies, in W-CDMA the uplink channel is not automatically determined based on the downlink channel. The offset between the uplink and downlink may vary based upon which band class you are operating in. So, you must specify the uplink frequency.) You can specify the expected uplink frequency by UARFCN or by frequency.

You can specify the downlink DPCH type (12.2k or 64k RMC) and data type (such as PRBS15).

```
650   ! Call Parameters
660   OUTPUT Testset;”CALL:POW “;Rf_level
670   OUTPUT Testset;”CALL:DPCH:TYP RMC12”
680   OUTPUT Testset;”CALL:CHAN 10563”
690   OUTPUT Testset;”CALL:UPL:CHAN 9613”
700   OUTPUT Testset;”CALL:DTCH:DATA PRBS15”
710   OUTPUT Testset;”CALL:SRB:CCH:DED:DRAT BPS3400”
```

Set Uplink Channel Levels

As the example below illustrates, you can specify which closed loop power control bit sequence is sent on the downlink DPCCH.

It is important for you to specify what uplink power level the test set should expect by setting the MS Target Power. (In Active Cell mode, this command forces the UE to the specified output power. In FDD Test Mode, since the 8960 is not performing active closed loop power control of the uplink, this command does not change the UE’s output power.) Setting the MS Target Power automatically sets the receiver’s expected power accordingly.

```
720   ! Uplink Channel Levels
730   OUTPUT Testset;”CALL:CLPC:UPL:MODE ACT”
```

```
740   OUTPUT Testset;”CALL:MS:POW:TARG 0 DBM”

750   ! Call Control
760   OUTPUT Testset;”CALL:PAG:IMSI ‘1234567890’”
770   OUTPUT Testset;”CALL:OPER:MODE CALL”
```

Step 3: Set Measurement Parameters

In this step you set up measurement parameters. This configures the measurements so that they are ready to execute in“Step 5: INITiate and FETCh Measurements” on page 193.

Many of the measurements have only generic measurement parameters available, such as measurement count, timeout, trigger arm and trigger source.

There is a command available to set all measurement triggers to single (`SET:CONT:OFF`), which is the recommended trigger arm configuration for remote use of the test set. However, if you sent the `*RST` command in “Step 1: Set Up the Test Set” on page 185, all measurement triggers will already be set to single.

Some measurements have measurement-specific parameters available. Consult the programming reference material available on the Internet to find out more about measurement-specific parameters.

Programming Example

```
830   ! Set all measurement triggers to single
840   OUTPUT Testset;”SET:CONT:OFF”
850   ! Set up the Thermal Power measurement
860   OUTPUT Testset;”SET:WTP:TIM 7;COUN 1”
870   ! Set up the Channel Power measurement
880   OUTPUT Testset;”SET:WCP:TIM 7;COUN 1”
890   OUTPUT Testset;”SET:WCP:INT:TIME .667 MS”
900   OUTPUT Testset;”SET:WCP:FILT ON” ! Turn the RRC filter on
910   ! Set up the Waveform Quality measurement
920   OUTPUT Testset;”SET:WWQ:TIM 7;COUN 1;TSL 1”
930   ! Set up the ACLR measurement
940   OUTPUT Testset;”SET:WACL:TIM 7;COUN 1”
950   ! Set up the Loopback BER measurement
960   OUTPUT Testset;”SET:WBER:TIM 7;COUN 10000”
970   ! Set up the Occupied Bandwidth measurement
980   OUTPUT Testset;”SET:WOBW:TIM 7;COUN 1”
990   ! Set up the Spectrum Emission Mask measurement
1000  OUTPUT Testset;”SET:WSEM:TIM 7;COUN 1”
```

Step 4: Make a Connection

In this step you establish communication between the test set and user equipment such that measurements can be made. There are two possible ways to make a connection with the UE.

- "Originating a Connection from the Test Set"
- "Make a Connection using Test Mode Commands"

Originating a Connection from the Test Set

The code below illustrates how to make a connection by orginating a call from the test set and taking advantage of the repeat paging feature to decrease connection speed.

Origination is performed in a subroutine to allow the use of a timeout separate from the control program's GPIB timeout. This is necessary because the use of repeat paging prevents the use of the state change detector and it's associated timeout (activated by the `CALL:CONN?` hanging query). Therefore, to prevent GPIB bus from hanging indefinitely, which could occur if the UE is not turned on or badly broken, a timeout is implemented in the subroutine on line 2790. The `:SEQ` sequential command is appended to the `CALL:ORIG` command to prevent subsequent commands from being accepted by the test set before repeated pages can be used to originate a connection.

```
1060  PRINT "Turn the UE on now."
1070  Originate ! Subroutine to originate a connection

2810  SUB Originate
2820    COM /Address/ INTEGER Testset
2830    ON TIMEOUT 7,10 CALL Orig_failed
2840    OUTPUT Testset;"CALL:ORIG:SEQ"
2850    OUTPUT Testset;"CALL:CONN?"
2860    ENTER Testset;Connected
2870    IF NOT Connected THEN
2880      PRINT "Call origination not successful."
2890      STOP
2900    END IF
2910  SUBEND
```

If the origination fails

By using repeat paging, a situation has been introduced in which the test set will not respond to subsequent GPIB commands until the origination is successful. Once the origination attempt has timed out, it becomes necessary to send the test set a Device Clear remote command (IEEE 488.2 Section 6.1.4.2.6) to free up the remote user interface. In HP BASIC this is the `CLEAR` command, see line 1900. Subsequently, you can send the `CALL:END` command to stop paging the UE and proceed with the control program.

```
1920  SUB Orig_failed
1930    COM /Address/ INTEGER Testset
1940    CLEAR Testset
1950    OUTPUT Testset;"CALL:END"
1960    PRINT "Origination failed. Check conditions and run again."
1970    STOP
1980  SUBEND
```

Make a Connection using Test Mode Commands

When the test set is operating in FDD Test Mode, you do not send any commands to the test set for this step. The test set should already be properly configured and transmitting its downlink signal so that the UE can detect and synchronize to it. In this step you either implement a pause in your program and wait for the UE to be manually configured and begin transmitting, or send appropriate test mode commands to configure the UE and begin its transmission.

NOTE The method used to synchronize the UE with the test set is proprietary to the UE manufacturer. The test set has no direct control of synchronization when the UE is operating in test mode.

Step 5: INITiate and FETCh Measurements

In this step you INITiate measurements, FETCh the results, and verify the results are valid.

- “INITiate a Set of Concurrent Measurements”
- “FETCh Measurement Results”

INITiate a Set of Concurrent Measurements

The test set is capable of performing concurrent measurements. To start the measurement process you INITiate a set of concurrent measurements.

```
1190    OUTPUT Testset;”INIT:WBER;WTP;WWQ;WACL;WOBW;WSEM”
1200    Fetch_results! Go to a subroutine to handle the results
```

FETCh Measurement Results

To retrieve measurement results as they complete, you must set up a loop using the `INIT:DONE?` query. Depending upon the output of the query, the program will either wait for a measurement to complete, FETCh the result of a completed measurement, or continue the program once all measurements are complete. Once a measurement result is FETChed, you should check its integrity indicator to verify that the result is valid.

```
1990  SUB Fetch_results
2000    COM /Address/ INTEGER Testset
2010    REPEAT
2020      OUTPUT Testset;”INIT:DONE?”
2030      ENTER Testset;Measdone$
2040      SELECT Measdone$
2050      CASE “WTP”
2060        OUTPUT Testset;”FETC:WTP:INT?;POW?”
2070        ENTER Testset;Integrity,Power
2080        IF Integrity=0 THEN
2090          Print_results(Measdone$,Power)
2100        ELSE
2110          Meas_error(Measdone$,Integrity)
2120        END IF
2130      CASE “WCP”
2140        OUTPUT Testset;”FETC:WCP:INT?;POW?”
2150        ENTER Testset;Integrity,Power
2160        IF Integrity=0 THEN
2170          Print_results(Measdone$,Power)
2180        ELSE
2190          Meas_error(Measdone$,Integrity)
2200        END IF
2210      CASE “WWQ”
2220        OUTPUT Testset;”FETC:WWQ?”
2230        ENTER Testset;Integrity,Evm,Ferr,Ooff,Perr,Merr
2240        IF Integrity=0 THEN
2250          Print_results(Measdone$,Evm,Ferr,Ooff,Perr,Merr)
2260        ELSE
2270          Meas_error(Measdone$,Integrity)
```

```
2280        END IF
2290      CASE “WACL”
2300        OUTPUT Testset;”FETC:WACL:INT?;AVER?”
2310        ENTER Testset;Integrity,Negfive,Posfive,Negten,Posten
2320        IF Integrity=0 THEN
2330          Print_results(Measdone$,Negfive,Posfive,Negten,Posten)
2340        ELSE
2350          Meas_error(Measdone$,Integrity)
2360        END IF
2370      CASE “WBER”
2380        OUTPUT Testset;”FETC:WBER?”
2390        ENTER Testset;Integrity,Ber
2400        IF Integrity=0 THEN
2410          Print_results(Measdone$,Ber)
2420        ELSE
2430          Meas_error(Measdone$,Integrity)
2440        END IF
2450      CASE “WOBW”
2460        OUTPUT Testset;”FETC:WOBW?”
2470        ENTER Testset;Integrity,Obw
2480        IF Integrity=0 THEN
2490          Print_results(Measdone$,Obw)
2500        ELSE
2510          Meas_error(Measdone$,Integrity)
2520        END IF
2530      CASE “WSEM”
2540        OUTPUT Testset;”FETC:WSEM?”
2550        ENTER Testset;Integrity,Overall,Pow,Range1,Range2,Range3,Range4
2560        IF Integrity=0 THEN
2570          Print_results(Measdone$,Overall)
2580        ELSE
2590          Meas_error(Measdone$,Integrity)
2600        END IF
2610      END SELECT
2620    UNTIL Measdone$=”NONE”
2630  SUBEND
```

Step 6: Reconfigure Test Set and UE Connection Parameters

In this step you change characteristics of the link between the test set and UE differently depending on your test set operating mode.

- "Reconfigure the Connection when using Active Cell"
- "Reconfigure the Connection when using Test Mode"

Reconfigure the Connection when using Active Cell

The example below illustrates how to change the downlink and uplink channels. The process used to reconfigure the connection is to first change the parameter settings with `CALL:SET` commands. These new parameters are activated when the `CALL:HAND` command is sent. The `CALL:STAT?` query is used to ensure the call is still connected. If the connection is compromised, the subroutine `Dropped_call` is called.

```
1260  !Use deferred commands to set up new channels
1270    OUTPUT Testset;"CALL:SET:CHAN:DOWN 10526"
1280    OUTPUT Testset;"CALL:SET:CHAN:UPL 9626"
1290    OUTPUT Testset;"CALL:HAND" ! Executes the handoff
1300    OUTPUT Testset;"CALL:STAT?" ! Verify the handoff success
1310    ENTER Testset;Call_state$
1320    IF Call_stat$<>"CONN" THEN Dropped_call
```

Reconfigure the Connection when using Test Mode

If you change the test set configuration, such as downlink frequency or primary scrambling code, you must configure the test set and then allow the user equipment to find the new configuration and synchronize to it before proceeding with measurements. It is not necessary to use the CALL:HAND command used when the UE is on an active call.

Step 7: End the Connection

You can end the connection in one of two ways:

- "Ending the Connection from the Test Set"
- "Ending the Connection from the UE"

Ending the Connection from the Test Set

```
1390  OUTPUT Testset;"CALL:END"
1400  OUTPUT Testset;"CALL:CONN?"
1410  ENTER Testset;Callstate
1420  IF Callstate=1 THEN
1430    PRINT "Make sure the phone has released the call."
1440    OUTPUT Testset;"SYST:PRES3"
1450  END IF
```

Ending the Connection from the UE

Because the connection is being ended from the UE, 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 the additional details about this step available on the Internet.

```
OUTPUT Testset;"CALL:CONN:TIM 5" !Set timeout time to 5 seconds.
OUTPUT Testset;"CALL:CONN:ARM"   !Arm the change detector.
DISP "Terminate the call from the mobile station."
OUTPUT Testset;"CALL:CONN?" !Initiate call connect state query.
ENTER Testset;Call_connected     !Program will hang here until state
                                  !change or timer expires.
!Check if disconnect successful.
IF Call_connected THEN OUTPUT Testset;"SYST:PRES3"
```

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"
- "Set Up General Operating Conditions"

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.

Step 1: Set Up the Test Set

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 CELL

- 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.

Step 2: Configure Test Set and Mobile Station Parameters

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.

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

Step 3: Set Measurement Parameters

- 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 1. 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 2. 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.

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 3. Programming Example:

```
OUTPUT Test_set;"SET:CONT:OFF"
```

sets the trigger arm to single for all measurements.

Example 4. Programming Example:

```
OUTPUT Test_set;"SET:DTXP:TRIG:SOUR AUTO"
```

sets the trigger source to AUTO for the digital transmit power measurement.

Example 5. 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 6. Programming Example:

```
OUTPUT Test_set;"SET:CPOW:MSP FAST"
```

sets the IS-2000 channel power measurement speed to fast.

Example 7. Programming Example:

```
OUTPUT Test_set;"SET:ORFS:SWIT:FREQ 400 KHZ"
```

sets the first ORFS offset to 400 kHz.

Example 8. Programming Example:

```
OUTPUT Test_set;"SET:FBER:COUN 10000"
```

sets the number of fast BER bits to test to 10,000 bits.

Example 9. 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:
```

```
!
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"
- "Make a Test Mode Connection"

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

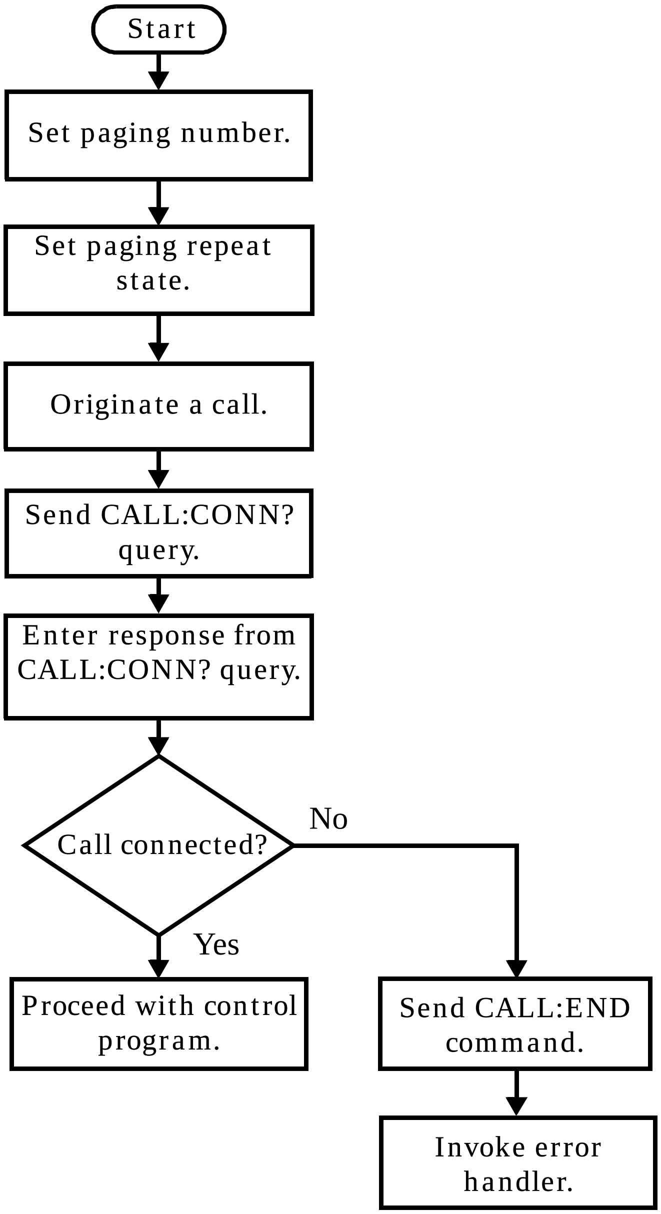
  If the call-state-change detector is armed and a call connection is attempted but the call state never changes from the idle state, the CALL:CONN? query hangs the bus. This easily happens if the mobile is badly broken, the mobile is not connected to the test set, or no one pushes the send button on the 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.

Step 4: Make Connection

Process for Making a Base Station Originated Call **Figure 30. Process for Making a Base Station Originated Call**



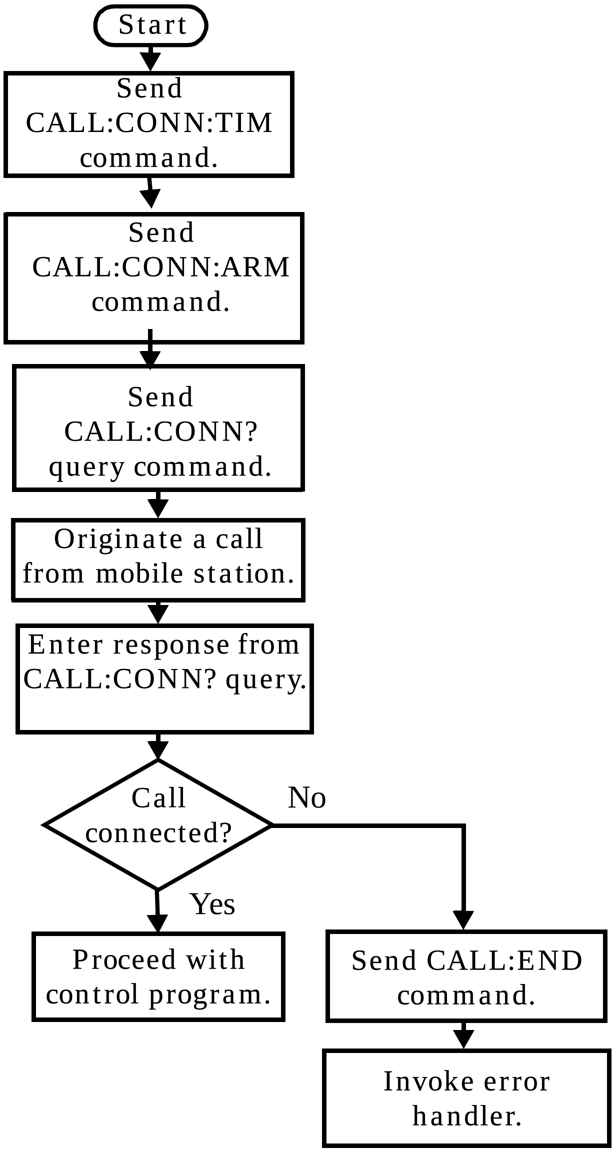
NOTE It is not necessary for you to send the CALL:CONN:TIM and CALL:CONN:ARM commands as they are automatically sent by the test set during a base station originated call or base station release.

Example 10. 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 31. 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 11. 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

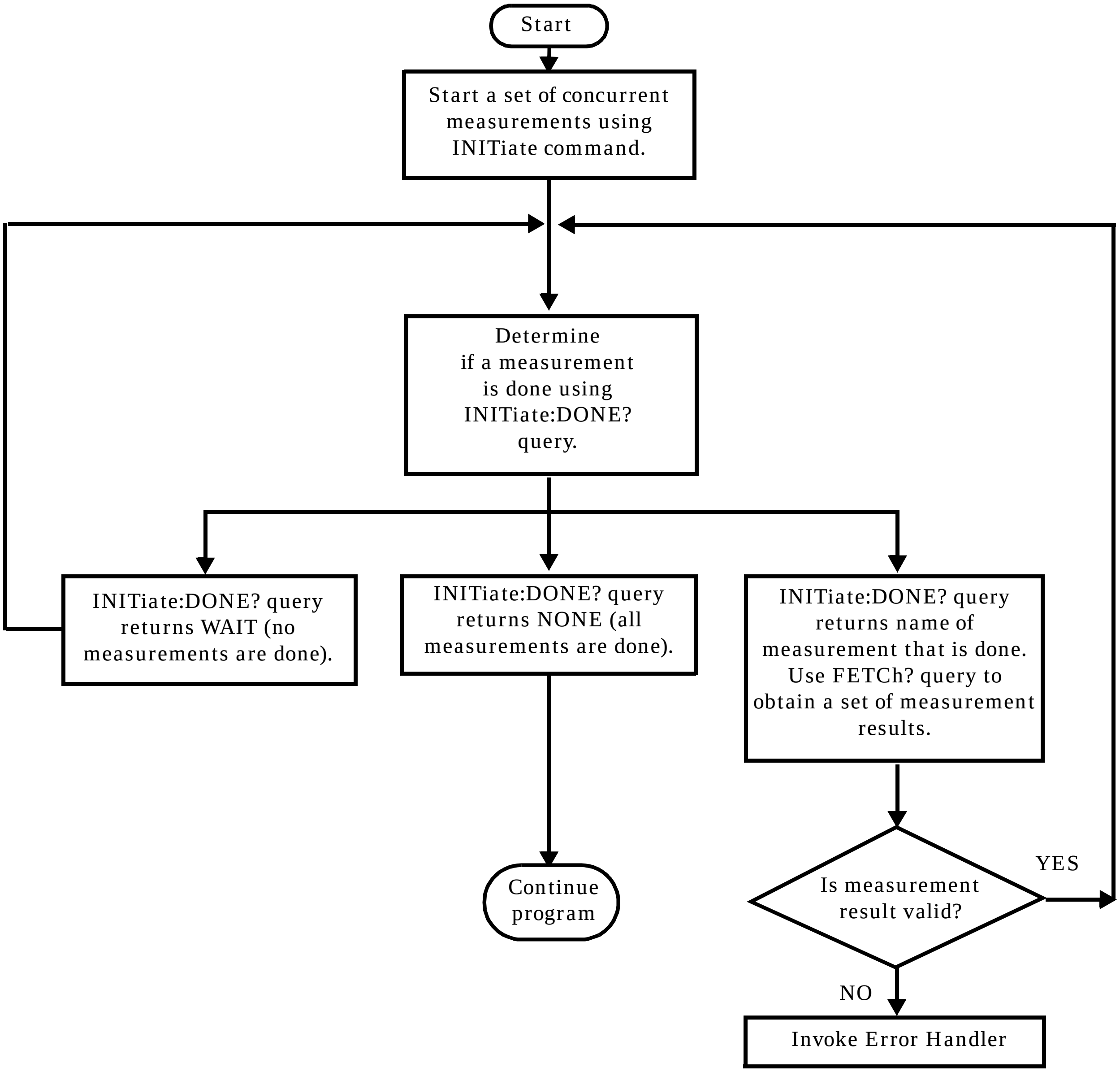
This step involves making measurements on the mobile station.

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 32. 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 15. 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>?
```

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

Step 5: INITiate and FETCh Measurements

Example FETCh? Result Formats

Command	Results Returned
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 12. 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

Example Integrity Indicators

Value Returned	Description (message also appears on test set)
2	Measurement Timeout
5	Over Range
6	Under Range

Example 13. 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 14. 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.

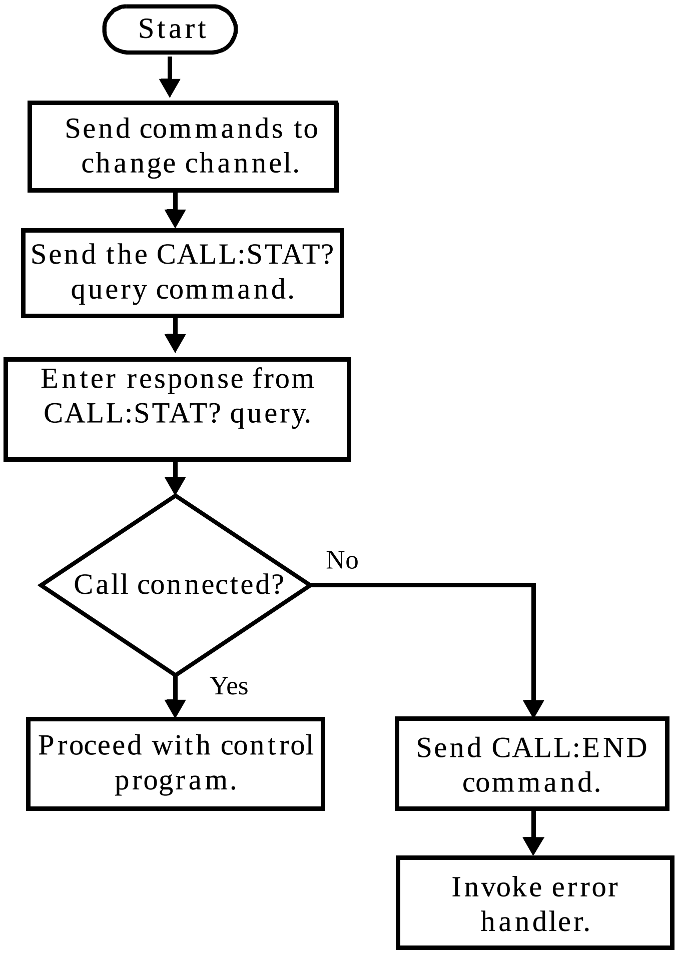
The CALL:STATus? query immediately returns the state of the call at the time the query is received.

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 33. 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

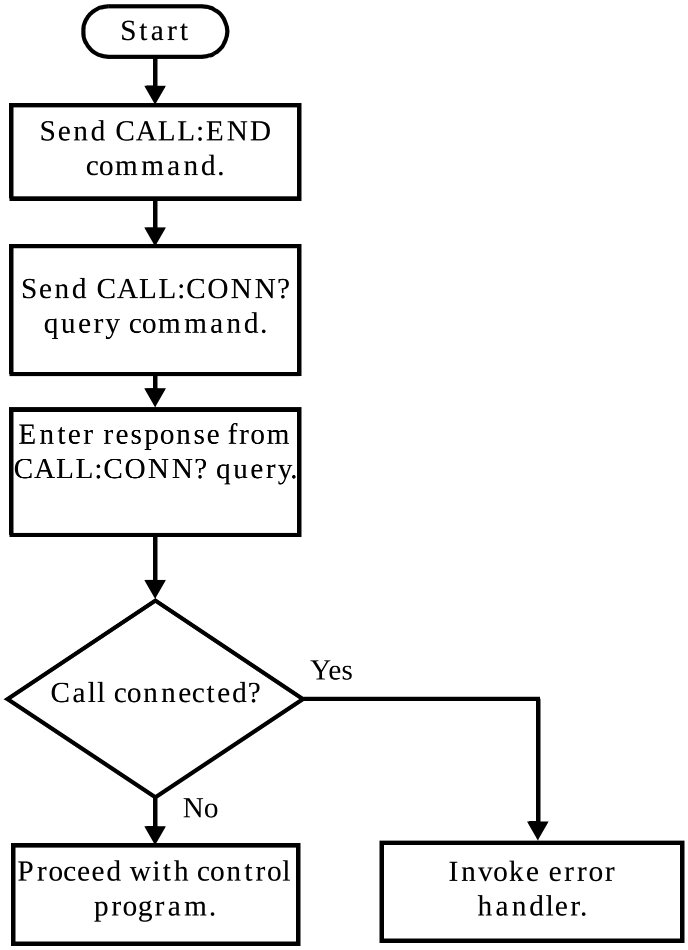
Release the Call in Active Cell Mode

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 34. Process for Releasing an Active Call from the Base Station

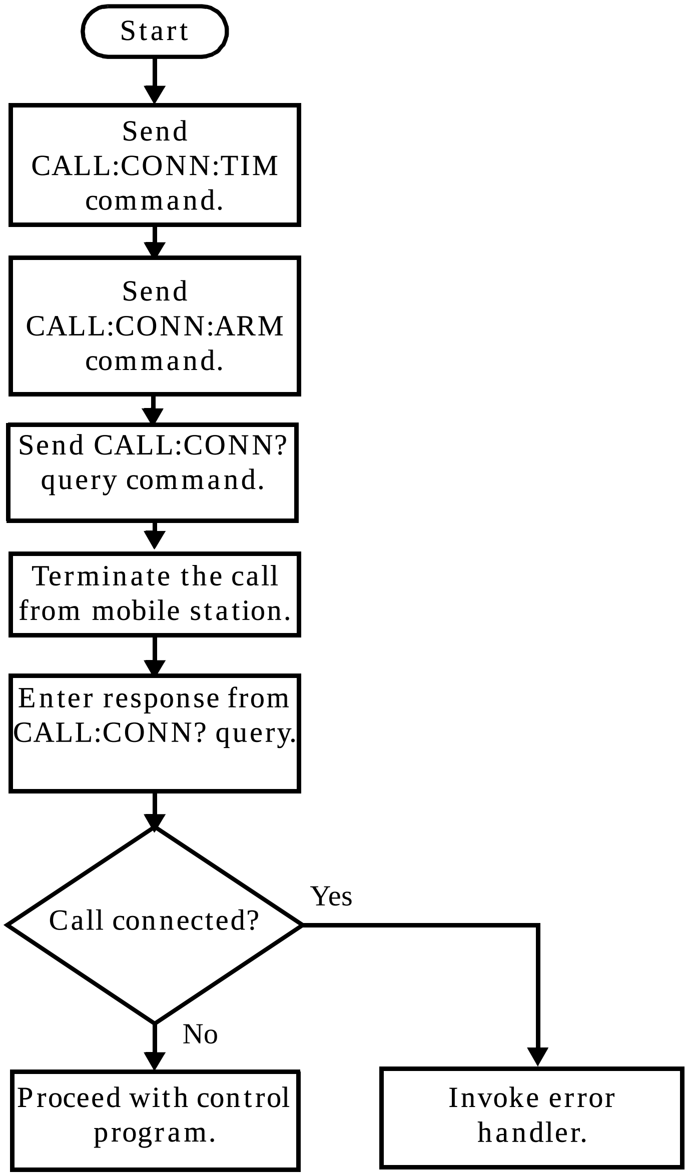


Example 15. Programming Example

```
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 35. 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 16. 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.

Programming an Audio Frequency Measurement

This section provides an example of how to make an audio frequency measurement with the Audio Analyzer (AFANalyzer) via GPIB.

The following procedure assumes that an audio source is connected to the AUDIO IN connectors. See “Audio Analyzer Measurement Description” .

1. Configure audio analyzer 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 for measurement (see the Programming Example below).
2. Start the audio analyzer measurement using the INITiate subsystem.
3. Use the FETCh? subsystem to obtain audio analyzer measurement results.

Programming Example

```
10  OUTPUT 714;”SETup:AFANalyzer:CONTinuous OFF” !Set the audio analyzer
20                                           !measurements to single trigger mode.
30 ! OUTPUT 714;”SETup:AFANalyzer:PEAK:VOLTage 3V” !Set the Expected peak voltage
40                                                !for the audio input level in Vpeak.
50  OUTPUT 714;”SETup:AFANalyzer:FREQuency:STATe ON” !Enable audio frequency meausurement.
60  OUTPUT 714;”SETup:AFANalyzer:FILTer TBPass” !Select the 100 Hz bandpass filter.
70  OUTPUT 714;”SETup:AFANalyzer:FILTer:TBPass 6000 Hz” !Set the 100 Hz bandpass
80     !filter’s center frequency to 6 kHz (example; to measure SAT frequency).
90  OUTPUT 714;”SETup:AFANalyzer:TIMeout 3S” !Set a timeout value of 3 seconds
100                                     !in case the measurement cannot be made.
110 OUTPUT 714;”INITiate:AFANalyzer” !Start the AF Analyzer measurement.
120 OUTPUT 714;”FETCh:AFANalyzer:FREQuency?” !Fetch the Audio Frequency  result.
130 ENTER 714;Audio_frequency !Enter the returned value into a variable.
140 END
```

Related Topics

“Audio Frequency Measurement Description” on page 61

“AFANalyzer Troubleshooting” on page 861

“Audio Analyzer Measurement Description” on page 58

“INITiate” on page 587

“SETup:AFANalyzer” on page 621

“FETCh:AFANalyzer” on page 503

“Control Program Example” on page 1

Programming an Audio Level Measurement

This section provides an example of how to make an audio level measurement with the Audio Analyzer (AFANalyzer) via GPIB.

The following procedure assumes that an audio source is connected to the AUDIO IN connectors. See “Audio Analyzer Measurement Description” .

1. Configure audio analyzer measurement parameters using the SETup subsystem. Even though default settings exist for each parameter, it is a good idea to deliberately set each parameter to make sure the setting is correct for the specific audio analyzer measurement you are making.
2. Start the audio analyzer measurement using the INITiate subsystem.
3. Use the FETCh? subsystem to obtain audio analyzer measurement results.

Programming Example

```
10  OUTPUT 714;”SETup:AFANalyzer:CONTinuous OFF” !Set the audio analyzer
20                                           !measurements to single trigger mode.
30  OUTPUT 714;”SETup:AFANalyzer:PEAK:VOLTage 3V” !Set the Expected Amplitude level for
40                                                !audio input voltage in Vpeak.
50  OUTPUT 714;”SETup:AFANalyzer:SDIStortion:STATe OFF” !Turn off the SINAD and
60                                                  !distortion measurements since
70                                                  !they are not being used.
80  OUTPUT 714;”SETup:AFANalyzer:FILTer NONE” !Bypass all audio filters.
90  OUTPUT 714;”SETup:AFANalyzer:DEMPhasis:STATe OFF” !Turn off de-emphasis.
100 OUTPUT 714;”SETup:AFANalyzer:EXPandor:STATe OFF” !Turn off the expandor.
110 OUTPUT 714;”SETup:AFANalyzer:DETector RMS” !Specify the RMS detector for the
120                                            !audio measurement.
130 OUTPUT 714;”SETup:AFANalyzer:TIMeout 3S” !Set a timeout value of 3 seconds
140                                      !in case the measurement cannot be made.
150 OUTPUT 714;”INITiate:AFANalyzer” !Start the AF Analyzer measurement.
160 OUTPUT 714;”FETCh:AFANalyzer:VOLTage?” !Fetch the Audio Level result.
170 ENTER 714;Audio_level  !Enter the returned value into a variable.
180 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 295.
- `Audio_level` returns the analog audio level in volts rms.

Related Topics

"Audio Analyzer Measurement Description" on page 58

"AFANalyzer Troubleshooting" on page 861

"INITiate" on page 587

"SETup:AFANalyzer" on page 621

"FETCh:AFANalyzer" on page 503

"Control Program Example" on page 1

Programming a Distortion Measurement

This section provides an example of how to make distortion measurements via GPIB. Distortion measurements are not typically made when testing W-CDMA mobiles, but are more common when testing AMPS or other analog mobiles. The programming example below is typical for an AMPS 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 "Audio Analyzer Measurement Description" on page 58.

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 SAT at ± 2 kHz peak deviation. It is also assumed that the Cell Power from the test set is set to -50 dBm (IS-137 standard).

1. Configure audio analyzer measurement parameters using the SETup subsystem.
2. Start the audio analyzer measurement using the INITiate subsystem.
3. Use the FETCh? subsystem to obtain audio analyzer measurement results.

Programming Example

```
10  OUTPUT 714;"SETup:AFANalyzer:CONTinuous OFF" !Set the audio analyzer
20                                            !measurements to single trigger mode.
30  OUTPUT 714;"SETup:AFANalyzer:PEAK:VOLTage 3V" !Set the Expected Amplitude level for
40                                                 !audio input voltage in Vpeak.
50  OUTPUT 714;"SETup:AFANalyzer:SDIStortion:STATe ON" !Turn on the SINAD and
60                                                   !distortion measurements.
70  OUTPUT 714;"SETup:AFANalyzer:SDIStortion:FREQuency 1004 HZ" !Specify the audio
80                                       !frequency to use for the measurements.
90  OUTPUT 714;"SETup:AFANalyzer:FILTer CMessage" !Select the c-message filter.
100 OUTPUT 714;"SETup:AFANalyzer:DEMPhasis:STATe OFF" !Turn off de-emphasis.
110 OUTPUT 714;"SETup:AFANalyzer:EXPandor:STATe OFF" !Turn off the expandor.
120 OUTPUT 714;"SETup:AFANalyzer:TIMeout 3S" !Set a timeout value of 3 seconds
130                                         !in case the measurement cannot be made.
140 OUTPUT 714;"INITiate:AFANalyzer" !Start the AF Analyzer measurement.
150 OUTPUT 714;"FETCh:AFANalyzer: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:AFANalyzer: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 295.
- `Distortion` returns the Distortion measurement value in percent (%).

Related Topics

“Audio Analyzer Measurement Description” on page 58

“AFANalyzer Troubleshooting” on page 861

“Distortion Measurement Description” on page 63

“INITiate” on page 587

“SETup:AFANalyzer” on page 621

“FETCh:AFANalyzer” on page 503

“Control Program Example” on page 1

Programming a SINAD Measurement

This section provides an example of how to make SINAD measurement via GPIB. SINAD measurements are not typically made when testing W-CDMA mobiles but, are more common when testing AMPS or other analog mobiles. The programming example below is typical for an AMPS 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 “Audio Analyzer Measurement Description” on page 58.

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 audio analyzer measurement parameters using the SETup subsystem.
2. Start the audio analyzer measurement using the INITiate subsystem.
3. Use the FETCh? subsystem to obtain audio analyzer measurement results.

Programming Example

```
10  OUTPUT 714;”SETup:AFANalyzer:CONTinuous OFF” !Set the audio analyzer
20                                           !measurements to single trigger mode.
30  OUTPUT 714;”SETup:AFANalyzer:PEAK:VOLTage 3V” !Set the Expected Amplitude level for
40                                                !audio input voltage in Vpeak.
50  OUTPUT 714;”SETup:AFANalyzer:SDIStortion:STATe ON” !Turn on the SINAD and
60                                                  !distortion measurements.
70  OUTPUT 714;”SETup:AFANalyzer:SDIStortion:FREQuency 1004 HZ” !Specify the audio
80                                      !frequency to use for the measurements.
90  OUTPUT 714;”SETup:AFANalyzer:FILTer CMESsage” !Select the c-message filter.
100 OUTPUT 714;”SETup:AFANalyzer:DEMPhasis:STATe OFF” !Turn off de-emphasis.
110 OUTPUT 714;”SETup:AFANalyzer:EXPandor:STATe OFF” !Turn off the expandor.
120 OUTPUT 714;”SETup:AFANalyzer:TIMeout 3S” !Set a timeout value of 3 seconds
130                                      !in case the measurement cannot be made.
140 OUTPUT 714;”INITiate:AFANalyzer” !Start the AF Analyzer measurement.
150 OUTPUT 714;”FETCh:AFANalyzer: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:AFANalyzer: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 295.
- `SINAD` returns the SINAD value in dB.

Related Topics

"Audio Analyzer Measurement Description" on page 58

"AFANalyzer Troubleshooting" on page 861

"INITiate" on page 587

"SETup:AFANalyzer" on page 621

"FETCh:AFANalyzer" on page 503

"Control Program Example" on page 1

Programming an Adjacent Channel Leakage Ratio Measurement

This section provides an example of how to make an adjacent channel leakage ratio measurement via GPIB. The following program example assumes that the mobile station's (UE's) antenna output is connected to the RF IN/OUT connector, and that the mobile station is transmitting an uplink signal.

The program example demonstrates how individual offsets, such as the ± 10 MHz measurements, can be turned off to increase measurement speed, but would normally be left on when making the 3GPP TS 34.121, 5.10 measurement.

The basic procedure to test adjacent channel leakage ratio is as follows:

1. Set the adjacent channel leakage ratio setup parameters as desired using the SETup:WACLeakage commands.
2. Use the INITiate:WACLeakage command to start the measurement.
3. Use the FETCh:WACLeakage? query to obtain the measurement results.

Programming Example

```
10    OUTPUT 714;”SETup:WACLeakage:CONTinuous OFF”   !Set the adjacent
20                !channel leakage ratio measurement to single trigger mode.
30    OUTPUT 714;”SETup:WACLeakage:TIMeout 1S”!Set a timeout value of 1 second
40                                 !in case the measurement cannot be made.
50    OUTPUT 714;”SETup:WACLeakage:COUNt 5”!Set multi-measurements to 5 and
60                                    !enable multi-measurements.
70    OUTPUT 714;”SETup:WACLeakage:TRIGger:SOURce AUTO” !Set the trigger source
80                                                  !to use automatic triggering.
90    OUTPUT 714;”SETup:WACLeakage:LOWer2:STATe OFF”  !Turn off the lower
100                                !second alternate (-10 MHz) measurement.
110   OUTPUT 714;”SETup:WACLeakage:UPPer2:STATe OFF”  !Turn off the upper
120                                !second alternate (+10 MHz) measurement.
130   OUTPUT 714;”INITiate:WACLeakage”!Start the adjacent channel leakage
140                                     !ratio measurement.
150   OUTPUT 714;”FETCh:WACLeakage?”!Query the returned integrity indicator, and the
160                                              !measurement values for each offset.
170   ENTER 714;Integrity,Low_1st_alt,Hi_1st_alt,Low_2nd_alt,Hi_2nd_alt  !Enter the
180                                              !returned values into variables.
190   IF Integrity<>0 THEN !Integrity <> 0 indicates  an invalid measurement.
200     PRINT “Measurement problem; check for signal level over/under range condition.”
210   ELSE
220   END IF
230   END
```

Returned Values

- `Integrity` stores the returned integrity indicator value (see "Integrity Indicator"); 0 means a successful measurement with no errors.
- Because multi-measurements are being used, `Low_1st_alt` and `Hi_1st_alt` (± 5 MHz) measurements return the *average* adjacent channel leakage ratio measurement values for those offsets, in dB. If multi-measurements were not being used, the returned values would be a single measurement value for each frequency offset.
- Because the `Low_2nd_alt` and `Hi_2nd_alt` (± 10 MHz) measurements are turned off in this example, the returned values are always 9.91E+37 (NAN).

Related Topics

- "Adjacent Channel Leakage Ratio Troubleshooting"
- "Adjacent Channel Leakage Ratio Measurement Description"
- "SETup:WACLeakage"
- "INITiate"
- "FETCh:WACLeakage"
- "Amplitude Offset"
- "Integrity Indicator"

Programming a Channel Power Measurement

This section provides an example of how to make channel power measurements via GPIB. The following program example assumes that the mobile station’s (UE’s) antenna output is connected to the RF IN/OUT connector, and that the mobile station is transmitting an uplink signal.

The basic procedure to test channel power is as follows:

1. Set the channel power Setup parameters as desired using the SETup:WCPower commands.
2. Use the INITiate:WCPower command to start the measurement.
3. Use the FETCh:WCPower? query to obtain the measurement results.

Programming Example

```
10    OUTPUT 714;”SETup:WCPower:CONTinuous OFF”!Set the channel power
20                                       !measurement to single trigger mode.
30    OUTPUT 714;”SETup:WCPower:TIMeout 1S”!Set a timeout value of 1 second
40                                    !in case the measurement cannot be made.
50    OUTPUT 714;”SETup:WCPower:COUNt 5”!Set multi-measurements to 5 and
60                                       !enable multi-measurements.
70    OUTPUT 714;”SETup:WCPower:INTerval:TIME 666.7US”!Set the measurement interval
80                                                     !for 1 timeslot (666.7 us).
90    OUTPUT 714;”SETup:WCPower:TRIGger:SOURce AUTO” !Set the trigger source
100                                                    !to use automatic triggering.
110   OUTPUT 714;”INITiate:WCPower”!Start the channel power measurement.
120   OUTPUT 714;”FETCh:WCPower?”!Query the returned integrity indicator and the
130                                 !average channel power measurement.
140   ENTER 714;Integrity,Wcpower!Enter the returned values into variables.
150   IF Integrity<>0 THEN !Integrity <> 0 indicates an invalid measurement.
170     PRINT “Measurement problem; check for signal level over/under range condition.”
171   ELSE
180   END IF
190   END
```

Returned Values

- `Integrity` stores the returned integrity indicator value (see “Integrity Indicator”); 0 means a successful measurement with no errors.
- `Wcpower` returns the *average* channel power measurement value in dBm.

Related Topics

- "Channel Power Troubleshooting"
- "Channel Power Measurement Description"
- "SETup:WCPower"
- "INITiate"
- "FETCh:WCPower"
- "Amplitude Offset"
- "Integrity Indicator"

Programming a Code Domain Measurement

Programming Example

```
10    ! Set trigger mode to single for the Code Domain measurement
20    OUTPUT 714;”SETup:WCDomain:CONTinuous OFF”
30    ! Set a timout value of 5 seconds and enable the timeout state
40    OUTPUT 714;”SETup:WCDomain:TIMeout 5”
50    ! Set the trigger source to automatically select the appropriate
60    !  trigger
70    OUTPUT 714;”SETup:WCDomain:TRIGger:SOURce AUTO”
80    ! Set the timeslot to be measured
90    OUTPUT 714;”SETup:WCDomain:TSLot 7”
100   ! Initiate the Code Domain measurement
110   OUTPUT 714;”INITiate:WCDomain”
120   ! Fetch the integrity indicator and the results of the measurement
130   OUTPUT 714;”FETCh:WCDomain:INTegrity?;BETas?”
140   ENTER 714;Integrity,Bc1,Bd1,Bd2,Bd3,Bd4,Bd4,Bd5
150   ! Check the integrity indicator to ensure the results are valid
160   IF Integrity<>0 THEN
170     PRINT “Measurement failed.”
180   ELSE
190   ! Process the measurement results.
200   END IF
210   END
```

Returned Values

- `Integrity` stores the returned integrity indicator value (see “Integrity Indicator”); 0 means a successful measurement with no errors.
- `Bc1` returns the relative amplitude level for the DPCCH (β_c).
- `Bd1` returns the relative amplitude level for the DPDCH (β_{d1}).
- `Bd2 - Bd6` returns “NAN” (Not A Number). These are reserved for use in the future.

Related Topics

- “Code Domain Troubleshooting”
- “Code Domain Measurement Description”
- “SETup:WCDomain”
- “INITiate”
- “FETCh:WCDomain”
- “Amplitude Offset”
- “Integrity Indicator”

Programming an Inner Loop Power Measurement

This section provides an example of how to make inner loop power measurements via GPIB. The following program example assumes that the mobile station's (UE's) antenna output is connected to the RF IN/OUT connector, and that the mobile station is transmitting an uplink signal.

The basic procedure to test inner loop power is as follows:

1. Set up the inner loop power measurement parameters as desired using the SETup:WILPower commands.
2. Use the INITiate:WILPower command to start the measurement.
3. Use the FETCh:WILPower? query to obtain the measurement results.

Programming Example

```
10     RE-SAVE "c:\temp\programs\ilp_example"
20     CLEAR SCREEN
30     !Select which test segment to test (or Manual mode)
40     OUTPUT 714;"SETup:WILPower:SEGMent A"
50     !Select the number of timeslots to test
60     OUTPUT 714;"SETup:WILPower:NSLots S15"
70     !Initiate Inner Loop Power control test
80     OUTPUT 714;"INITiate:WILPower"
90     !Query all Inner Loop Power control test results
100    OUTPUT 714;"FETCh:WILPower?"
110    !Read back all Inner Loop Power control test results
120    ENTER 714;Integrity,Pf,Wcslot1,Abspow1,Relpow1,Wcslot2,Abspow2,Relpow2
130    PRINT "Integrity Indicator = ";Integrity
140    PRINT "Pass/Fail results = ";Pf
150    PRINT "Worst case slot number for adjacent timeslot measurements = ";Wcslot1
160    PRINT "Absolute power level for adjacent timeslot measurements = ";Abspow1
170    PRINT "Relative power level for adjacent timeslot measurements = ";Relpow1
180    PRINT "Worst case slot number for 10 TPC measurements = ";Wcslot2
190    PRINT "Absolute power level for 10 TPC measurements = ";Abspow2
200    PRINT "Relative power level for 10 TPC measurements = ";Relpow2
210    END
```

Returned Values

See "FETCh:WILPower"

Related Topics

- "Inner Loop Power Troubleshooting"
- "Inner Loop Power Measurement Description"
- "SETup:WILPower"
- "INITiate"
- "FETCh:WILPower"
- "Amplitude Offset"
- "Integrity Indicator"

Programming an IQ Tuning Measurement

This section provides an example of how to make IQ tuning measurements via GPIB. The following program example assumes that the mobile station's (UE's) antenna output is connected to the RF IN/OUT connector, and that the mobile station is transmitting an uplink signal.

The basic procedure to test IQ tuning is as follows:

1. Set up the IQ tuning measurement parameters as desired using the SETup:WIQTuning commands.
2. Use the INITiate:WIQTuning command to start the measurement.
3. Use the FETCh:WIQTuning? query to obtain the measurement results.

Programming Example

```
10     RE-SAVE "c:\temp\programs\iqt_example"
20     CLEAR SCREEN
30     !Select which timeslot will be measured
40     OUTPUT 714;"SETup:WIQTuning:TSLot 14"
50     !Initiate the IQ tuning measurement
60     OUTPUT 714;"INITiate:WIQTuning"
70     !Query all IQ tuning measurement results.
80     OUTPUT 714;"FETCh:WIQTuning?"
90     !Read back all IQ tuning measurement results.
100    ENTER 714;Int,Rms_evm,Pk_evm,F_err,O_ofs,P_err,M_err,T_err,Pk_cd_err,Iq_gn_im,Iq_ph_im
110    PRINT "Integrity indicator = ";Int
120    PRINT "RMS error vector magnitude = ";Rms_evm
130    PRINT "Peak error vector magnitude = ";Pk_evm
140    PRINT "Frequency error = ";F_err
150    PRINT "Origin offset = ";O_ofs
160    PRINT "Phase error = ";P_err
170    PRINT "Magnitude error = ";M_err
180    PRINT "Timing error = ";T_err
190    PRINT "Peak code domain error = ";Pk_cd_err
200    PRINT "IQ gain imbalance = ";Iq_gn_im
210    PRINT "IQ phase imbalance = ";Iq_ph_im
220    END
```

Returned Values

See "FETCh:WIQTuning" .

Related Topics

- "IQ Tuning Measurement Troubleshooting"
- "IQ Tuning Measurement Description"
- "SETup:WIQTuning"
- "INITiate"
- "FETCh:WIQTuning"
- "Amplitude Offset"
- "Integrity Indicator"

Programming a Loopback Bit Error Ratio Measurement

This section provides an example of how to make loopback bit error ratio (BER) measurements via GPIB. The following program example assumes that the mobile station’s (UE) antenna output is connected to the RF IN/OUT connector, and that the mobile station is in loopback mode 1 and is re-transmitting the downlink data on an uplink signal.

The basic procedure to measure loopback BER is as follows:

1. Set the loopback BER setup parameters as desired for number of bits to test, measurement timeout, and single triggering, using the SETup:WBERror commands.
2. Use the INITiate:WBERror command to start the measurement.
3. Use the FETCh:WBERror? query to obtain the measurement results.

Programming Example

```
10    OUTPUT 714;”SETup:WBERror:CONTinuous Off”!Set the loopback BER
20                                     !measurement to single trigger mode.
30    OUTPUT 714;”SETup:WBERror:TIMeout 10S”!Set a timeout value of 10 secondS
40                    !and enable timeouts in case the measurement cannot be made.
50    OUTPUT 714;”SETup:WBERror:COUNt 12200”!Set the bits to test to 12200.
60    OUTPUT 714;”INITiate:WBERror”!Start the measurement.
70    OUTPUT 714;”FETCh:WBERror?”!Query the returned integrity indicator and the
80                               !average thermal power measurement.
90    ENTER 714;Integrity,Ber_percent,Bit_errors,Bits_tested !Enter the returned
100                                                          !values into variables.
110   IF Integrity<>0 THEN !Integrity <> 0 indicates an  invalid measurement.
120     PRINT “Measurement problem; check for signal level over/under range condition.”
130   ELSE
140   END IF
150   END
```

Returned Values

- `Integrity` stores the returned integrity indicator value (see “Integrity Indicator”); 0 means a successful measurement with no errors.
- `Ber_percent`, `Bit_errors`, and `Bits_tested` store the returned values for the bit error ratio (in %), the number of bit errors measured, and the number of bits tested, respectively.

Related Topics

"Loopback Bit Error Ratio Measurement Description"

"Loopback Bit Error Ratio Troubleshooting"

"SETup:WBERror"

"INITiate"

"FETCh:WBERror"

"Integrity Indicator"

Programming an Occupied Bandwidth Measurement

Programming Example

```
10    ! Set trigger mode to single for the Occupied Bandwidth meas
20    OUTPUT 714;”SETup:WOBWidth:CONTinuous OFF”
30    ! Set a timout value of 5 seconds and enable the timeout state
40    OUTPUT 714;”SETup:WOBWidth:TIMeout 5”
50    ! Set the trigger source to automatically select the appropriate
60    !  trigger
70    OUTPUT 714;”SETup:WOBWidth:TRIGger:SOURce AUTO”
80    ! Turn on multi-measurements and set the count number
90    OUTPUT 714;”SETup:WOBWidth:COUNt 5”
100   ! Initiate the Occupied Bandwidth measurement
110   OUTPUT 714;”INITiate:WOBWidth”
120   ! Fetch the integrity indicator and the statistical results of
130   !  the measurement
140   OUTPUT 714;”FETCh:WOBWidth:INTegrity?;BANDwidth:ALL?”
150   ENTER 714;Integrity,Min,Max,Avg,Sdev
160   ! Check the integrity indicator to ensure the results are valid
170   IF Integrity<>0 THEN
180     PRINT “Measurement failed.”
190   ELSE
200   ! Process the measurement results.
210   END IF
220   END
```

Returned Values

- `Integrity` stores the returned integrity indicator value (see “Integrity Indicator”); 0 means a successful measurement with no errors.
- `Min` returns the minimum occupied bandwidth result in MHz.
- `Max` returns the maximum occupied bandwidth result in MHz.
- `Avg` returns the average occupied bandwidth result in MHz.
- `Sdev` returns the standard deviation of the occupied bandwidth results in MHz.

Related Topics

- “Occupied Bandwidth Troubleshooting”
- “Occupied Bandwidth Measurement Description”
- “SETup:WOBWidth”
- “INITiate”
- “FETCh:WOBWidth”
- “Amplitude Offset”
- “Integrity Indicator”

Programming a PRACH Transmit On/Off Power Measurement

This section provides an example of how to make PRACH transmit on/off power measurements via GPIB. The following program example assumes that the mobile station’s (UE’s) antenna output is connected to the RF IN/OUT connector.

The basic procedure to test PRACH transmit on/off power is as follows:

1. Set the PRACH transmit on/off power setup parameters as desired using the SETup:WOOPower commands.
2. Use the INITiate:WOOPower commands to start the measurement.
3. Use the FETCh:WOOPower? query to obtain the measurement results.

Programming Example

```
1 ! PRACH Transmit On/Off Power Measurement Programming Example
2 ! This programming example assumes that the test set is
3 ! configured to allow the UE to camp to the test set
4 ! (sufficient cell power level, proper cell parameters etc.)
5 !
6       Testset=714
7 !
8 !***Set up test parameters***
9 !
10       OUTPUT Testset;”CALL:OPERating:MODE OFF”
11           ! Set operating mode to cell off
12       OUTPUT Testset;”CALL:UPLink:ASUBchannels ‘000000000001’”
13           ! Set available subchannels to 1
14       OUTPUT Testset;”CALL:OPERating:MODE CALL”
15           ! Set operating mode to active cell
16 !
17 !***Set up measurement parameters***
18 !
19       OUTPUT Testset;”SETup:WOOPower:TIMeout 5”
20           ! Set timeout to 5 seconds
21       OUTPUT Testset;”SETup:WOOPower:OFF:POWer:LIMit -55”
22           ! Set the Off Power Limit to -55 dBm
23       OUTPUT Testset;”SETup:WOOPower:OPEN:LOOP:POWer:LIMit 9”
24           ! Set the Open Loop Power Error Limit to 9 dB
25 !
26 !***INITiate and FETCh measurements***
27 !
28       OUTPUT Testset;”INITiate:WOOPower”
29           ! Initiate a PRACH transmit on/off power measurement
30       OUTPUT Testset;”FETCh:WOOPower?”
31           ! Fetch PRACH transmit power measurement results
32       ENTER
Testset;Integ,Pre_off_pow,Pre_off_pf,On_pow,Ol_pow_err,Ol_pf,Post_off_pow,Post_off_pf
33           ! Read results
34 !
```

```
35 !***Print measurement results***
36 !
37       CLEAR SCREEN
38       PRINT “PRACH Transmit On/Off Power Measurement Results:”
39       PRINT
40       PRINT “Integrity Indicator                     = “,Integrity
41       PRINT “Pre Burst Off Power (dBm)               = “,Pre_off_pow
42       PRINT “Pre Burst Off Power Pass (0)/Fail (1)   = “,Pre_off_pf
43       PRINT “Burst On Power (dBm)                    = “,On_pow
44       PRINT “Open Loop Power Error (dB)              = “,Ol_pow_err
45       PRINT “Open Loop Power Error Pass (0)/Fail (1) = “,Ol_pf
46       PRINT “Post Burst Off Power (dBm)              = “,Post_off_pow
47       PRINT “Post Burst Off Power Pass (0)/Fail (1)  = “,Post_off_pf
48 !
49       END
```

Related Topics

- “PRACH Transmit On/Off Power Troubleshooting”
- “PRACH Transmit On/Off Power Measurement Description”
- “SETup:WOOPower” on page 678
- “INITiate”
- “FETCh:WOOPower” on page 553
- “Amplitude Offset”
- “Integrity Indicator”

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 a forward channel 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" (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 86

"SETup:SMONitor" on page 638

"INITiate" on page 587

"FETCh:SMONitor" on page 517

"CALCulate:SMONitor" on page 380

Programming a Swept Audio Measurement

This section provides an example of how to make swept audio measurements via the GPIB.

The following example assumes that some device under test is connected between the test set’s AUDIO OUT and AUDIO IN ports. The default audio level measurement, and the optional SINAD and distortion measurements, are performed at each frequency point in the sweep.

1. Configure the swept audio measurement using the SETup subsystem.
2. Start the measurement using the INITiate subsystem.
3. Use the FETCh subsystem to obtain the audio analyzer’s results for all points in the sweep.

Programming Example

```
10    OUTPUT 714;”SETup:SAUDio:FREQuency:STARt 300 Hz” !Start the frequency
20                                         !sweep at 300 Hz.
30    OUTPUT 714;”SETup:SAUDio:FREQuency:STOP 4 kHz” !Stop the frequency
40                                         !sweep at 4 kHz.
50    OUTPUT 714;”SETup:SAUDio:FREQuency:POINts 5”  !Make measurements at 5 frequencies
60                       !spaced evenly between the start and stop frequencies.
70    OUTPUT 714;”SETup:SAUDio:SETTling 1.5 ms” !Set a settling time of
80                                          !1.5 milliseconds.
90    OUTPUT 714;”SETup:SAUDio:VOLTage:AMPLitude 1 V” !SET the audio generator
100                                         !voltage to 1 volt peak.
110   OUTPUT 714;”SETup:SAUDio:DETector PEAK” !Select the peak detector for
120                                         !the audio analyzer.
130   OUTPUT 714;”SETup:SAUDio:FILTer TBPass” !Select the AF analyzer’s 100 Hz bandwidth
140    !band pass filter for making the measurements. The center frequency for the filter
150                                !automatically tracks the AF generator’s frequency.
160   OUTPUT 714;”SETup:SAUDio:PEAK:VOLTage 1 V” !Set the expected peak voltage
170                                         !at the AUDIO IN port.
180   OUTPUT 714;”SETup:SAUDio:SDIStortion:STATe ON” !Turn on the SINAD
190                                         !and distortion measurements.
200   OUTPUT 714;”SETup:SAUDio:CONTinuous OFF” !Set the swept audio
210                                         !measurement to single trigger mode.
220   OUTPUT 714;”SETup:SAUDio:TIMeout 5 S” !Set a measurement timeout of
230                                      !5 seconds in case the measurement cannot be made.
240   OUTPUT 714;”INITiate:SAUDio”          !Start the swept audio measurements.
250   OUTPUT 714;”FETCh:SAUDio?”            !Query the audio level and distortion results.
260   ENTER 714;Integrity,Lev1,Dist1,Lev2,Dist2,Lev3,Dist3,Lev4,Dist4,Lev5,Dist5 !Enter the
270                         !returned integrity value, and the level and distortion values
280                         !for each of the five measurement points, into variables.
290   OUTPUT 714;”FETCh:SAUDio:SINAD?”       !Query the SINAD results.
300   ENTER 714;Sinad1,Sinad2,Sinad3,Sinad4,Sinad5 !Enter the 5 returned SINAD values
310                                          !into variables.
320   END
```

Returned Values

The results returned by this program are:

- `Integrity` returns the measurement integrity indicator (see "Integrity Indicator" on page 295); 0 means a successful measurement with no errors.
- `Lev1` through `Lev5` return the audio level (voltage) at each of the five measurement points. In this example, the value is returned in volts peak because the peak detector was specified.
- `Dist1` through `Dist5` return the distortion value at each of the five measurement points.
- `Sinad1` through `Sinad5` return the SINAD value at each of the five measurement points.

Related Topics

"Swept Audio Measurement Description" on page 88

"Swept Audio Measurement Troubleshooting" on page 871

"INITiate" on page 587

"SETup:SAUDio" on page 629

"FETCh:SAUDio" on page 512

Programming a Spectrum Emission Mask Measurement

Programming Example

```
10    ! Set trigger mode to single for the Spectrum Emission Mask meas.
20    OUTPUT 714;”SETup:WSEMask:CONTiuous OFF”
30    ! Set the multi-measurement count to 10
40    OUTPUT 714;”SETup:WSEMask:COUNt 10”
50    ! Set a timout value of 5 seconds and enable the timeout state
60    OUTPUT 714;”SETup:WSEMask:TIMeout 5”
70    ! Set the trigger source to automatically select the appropriate
80    !  trigger
90    OUTPUT 714;”SETup:WSEMask:TRIGger:SOURce AUTO”
100   ! Initiate the Spectrum Emission Mask measurement
110   OUTPUT 714;”INITiate:WSEMask”
120   ! Fetch the integrity indicator and the results of the measurement
130   OUTPUT 714;”FETCh:WSEMask?”
140   ENTER 714;Integrity,Wsemask,Chan_power,R1,R2,R3,R4
150   ! Check the integrity indicator to ensure the results are valid
160   IF Integrity<>0 THEN
170     PRINT “Measurement failed.”
180   ELSE
190   ! Process the measurement results.
200   END IF
210   END
```

Returned Values

- `Integrity` stores the returned integrity indicator value (see “Integrity Indicator”); 0 means a successful measurement with no errors.
- Because multi-measurements are being used, `R1, R2, R3, and R4` indicate a mask pass or fail for each frequency range based on the *average* of the power levels associated with the largest mask error for each measurement. Mask pass or fail for each frequency range is determined from the average of the measurement results. The average of the relative power level results for the number of measurements specified is taken. This average is used to determine if that frequency range passed or failed the mask. If multi-measurements were not being used, the mask result would be based on a single measurement value for each frequency range.

Related Topics

- "Spectrum Emission Mask Troubleshooting"
- "Spectrum Emission Mask Measurement Description"
- "SETup:WSEMask"
- "INITiate"
- "FETCh:WSEMask"
- "Amplitude Offset"
- "Integrity Indicator"

Programming a Thermal Power Measurement

This section provides an example of how to make thermal power measurements via GPIB. The following program example assumes that the mobile station's (UE's) antenna output is connected to the RF IN/OUT connector, and that the mobile station is transmitting an uplink signal.

The basic procedure to test thermal power is as follows:

1. Set the thermal power setup parameters as desired for triggering, measurement timeout, and multi-measurements using the SETup:WTPower commands.
2. Use the INITiate:WTPower command to start the measurement.
3. Use the FETCh:WTPower? query to obtain the measurement results.

Programming Example

```
10    OUTPUT 714;"SETup:WTPower:CONTinuous Off"!Set the thermal power
20                                   !measurement to single trigger mode.
30    OUTPUT 714;"SETup:WTPower:TIMeout 2S"!Set a timeout value of 2 secondS
40                  !and enable timeouts in case the measurement cannot be made.
50    OUTPUT 714;"SETup:WTPower:COUNt 5"!Set multi-measurements to 5 and
60                                   !enable multi-measurements.
70    OUTPUT 714;"INITiate:WTPower"!Start the measurement.
80    OUTPUT 714;"FETCh:WTPower?"!Query the returned integrity indicator and the
90                             !average thermal power measurement.
100   ENTER 714;Integrity,Wtpower!Enter the returned values into variables.
110   IF Integrity<>0 THEN !Integrity <> 0 indicates an  invalid measurement.
120     PRINT "Measurement problem; check for signal level over/under range condition."
130   ELSE
140   END IF
150   END
```

Returned Values

- `Integrity` stores the returned integrity indicator value (see "Integrity Indicator"); 0 means a successful measurement with no errors.
- Because multi-measurements are being used in this example, `Wtpower` stores the returned *average* thermal power measurement value in dBm. If multi-measurements were not being used, the returned value would be a single thermal power measurement value.

Related Topics

- “Thermal Power Troubleshooting”
- “Thermal Power Measurement Description”
- “SETup:WTPower”
- “INITiate”
- “FETCh:WTPower”
- “Amplitude Offset”
- “Integrity Indicator”

Programming a Waveform Quality Measurement

This section provides an example of how to make waveform quality measurements via GPIB. The following program example assumes that the mobile station’s (UE’s) antenna output is connected to the RF IN/OUT connector, and that the mobile station is synchronized to the test set and is transmitting an uplink signal.

The basic procedure to test waveform quality is as follows:

1. Set the waveform quality setup parameters as desired using the SETup:WWQuality commands.
2. Use the INITiate:WWQuality command to start the measurement.
3. Use the FETCh:WWQuality? query to obtain the measurement results.

Programming Example

```
10    OUTPUT 714;”SETup:WWQuality:CONTinuous Off”   !Set the waveform quality
20                                   !measurement to single trigger mode.
30    OUTPUT 714;”SETup:WWQuality:TIMeout 1S”!Set a timeout value of 1 second
40                              !in case the measurement cannot be made.
50    OUTPUT 714;”SETup:WWQuality:COUNt 5”  !Set multi-measurements to 5 and
60                                      !enable multi-measurements.
70    OUTPUT 714;”SETup:WWQuality:TSLot 11” !Set the measurement to
80                                !measure waveform quality during timeslot 11.
90    OUTPUT 714;”INITiate:WWQuality” !Start the waveform quality measurement.
100   OUTPUT 714;”FETCh:WWQuality?”  !Query the integrity indicator and all
110                               !results for the waveform quality measurement.
120   ENTER 714;Integrity,Evm,Ferr,Ooff,Perr,Merr,Terr,Pcde !Enter the
130          !returned integrity indicator and measurement values into variables.
140   IF Integrity<>0 THEN !Check the integrity value.
150   PRINT “Measurement problem; check for signal level over/under range condition.”
160   ELSE
170   ! Process measurement results
180   END IF
190   END
```

Returned Values

- `Integrity` stores the returned integrity indicator value (see “Integrity Indicator”); 0 means a successful measurement with no errors.
- `Evm` returns the maximum error vector magnitude result.
- `Ferr` returns the worst case frequency error result.
- `Ooff` returns the maximum origin offset result.
- `Perr` returns the maximum phase error result.
- `Merr` returns the maximum magnitude error result.
- `Terr` returns the worst case timing error in chips.
- `Pcde` returns the maximum peak code domain error.

Related Topics

- "Waveform Quality Troubleshooting"
- "Waveform Quality Measurement Description"
- "SETup:WWQuality"
- "INITiate"
- "FETCh:WWQuality"
- "Amplitude Offset"
- "Integrity Indicator"

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 16. 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 16. 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 17. 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 17. 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 778

Receiver Control

The test set's receiver includes two frequency downconverters:

- Measurement downconverter
- Demodulation downconverter

The Demodulation downconverter is used to establish and maintain the call (RF link) between the mobile station and test set, while the Measurement downconverter is optimized for measurements.

Refer to the "Block Diagram" for a description of the Signal Downconversion paths.

Automatic Receiver Control

Automatic receiver control is the default for all operating modes except CW (see "CW Operating Mode"). With automatic receiver control, the test set automatically tunes to the correct frequencies for making measurements and maintaining a call. Also, the test set adjusts attenuation settings according to the power level that should be present at the RF IN/OUT port given the current settings. This power level is referred to as the expected power, and the current value for expected power is displayed on many of the transmitter power measurement screens.

When operating in active cell operating mode with automatic receiver control, expected power is derived essentially from the Cell Power setting according to closed loop power control behavior, but expected power is also offset by other settings (see "Expected Power"). Tune frequencies are derived from Uplink Channel field settings (see "Setting Uplink Channel Number (UARFCN)").

Manual Receiver Control

In some instances, you may want to control the test set's receiver settings manually rather than allowing the test set to automatically control them. This ability is referred to as manual receiver control. Manual receiver settings can be used to override some or all of the automatic receiver settings. You can manually set the receiver's expected power, the measurement downconverter's tune frequency (Measurement Frequency), and the demodualtion downconverter's tune frequency (Uplink Frequency).

In CW operating mode, you must always specify what frequencies and power the receiver should tune to, there is no automatic receiver control.

For front panel operation, see "How Do I Change Receiver Control Parameters?" on page 814.

GPIB Equivalent Commands for Receiver Control

The following settings control the test set's receivers:

Power Control (Except for CW Mode)

The expected power from the mobile station (UE) is set manually by enabling manual power control using the"RFANalyzer:CONTrol:POWer:AUTO" command, and by using the "RFANalyzer:MANual:POWer[:SELected]" command to set the level.

CW receiver power

When using the CW operating mode, the expected power from the mobile station is set manually using the "RFANalyzer:CW:EXPected:POWer" command.

Measurement receiver frequency

Measurement receiver frequency commands are used to manually tune the test set's measurement downconverter input signal path (see "Block Diagram"). This path is used by the channel power, waveform quality, and adjacent channel leakage ratio measurements.

The commands are:

- "RFANalyzer:MANual:MEASurement[:MFRequency]" (to specify a frequency and turn manual mode on)
- "RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO" (to turn manual mode on/off)
- "RFANalyzer:MANual:MEASurement:FREQuency" (to specify a frequency)

Demodulation (uplink) receiver frequency

Demodulation receiver frequency commands are used to manually tune the test set's demodulation downconverter input signal path (see "Block Diagram"). The demodulation downconverter signal path is part of the function that demodulates information from the mobile station's (UE) uplink channel transmission. This path is used by the loopback bit error ratio measurement.

The commands are:

- "RFANalyzer:MANual:UPLink[:MFRequency]" (to specify a frequency and turn manual mode on)
- "RFANalyzer:CONTrol:UPLink:FREQuency:AUTO" (to turn manual mode on/off)
- "RFANalyzer:MANual:UPLink:FREQuency" (to specify a frequency)

Expected Power

To make accurate measurements, the test set needs to know how much power to expect at its RF IN/OUT port; this is referred to as the Expected Power. If a measurement uses autoranging (such as the thermal power, ACLR measurement, etc.), the expected power level is calibrated by the test set before making the measurement and does not need to be set by the user. For measurements that do not use autoranging, it gets the expected power value from the MS Target Power setting (see "MS Target Power" on page 144) during "Automatic Receiver Control" , or by the user specifying the Manual Power value with the receiver Power Control set to Manual. Refer to "Manual Receiver Control" on page 260.

The test set uses the expected power level to establish a range of acceptable input levels into its receivers. If the received signal is above or below the acceptable range, an Over Range or an Under Range message is displayed and the integrity value for the measurement is set to 5 or 6 (respectively). Refer to "Integrity Indicator" for details about the integrity values.

You can set the expected power level beyond the actual capability of the test set's hardware. This is because expected power is intended to reflect the potential range of RF power at the UE (mobile station). This range of RF power is meant to accommodate the use of a gain or loss network between the mobile station and the test set. See "Amplitude Offset" on page 107 for details about amplitude offsets.

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 dBm, the lower limit of the hardware, the test set shall be set to –25 dBm.

Effects on Receiver Control When Changing Operating Mode

After selecting the operating mode 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 some or all receiver parameters to return to automatic control.

Related Topics

“How Do I Change Receiver Control Parameters?” on page 814

“RFANalyzer”

“Setting Closed Loop Power Control”

“Active Cell Operating Mode”

“CW Operating Mode”

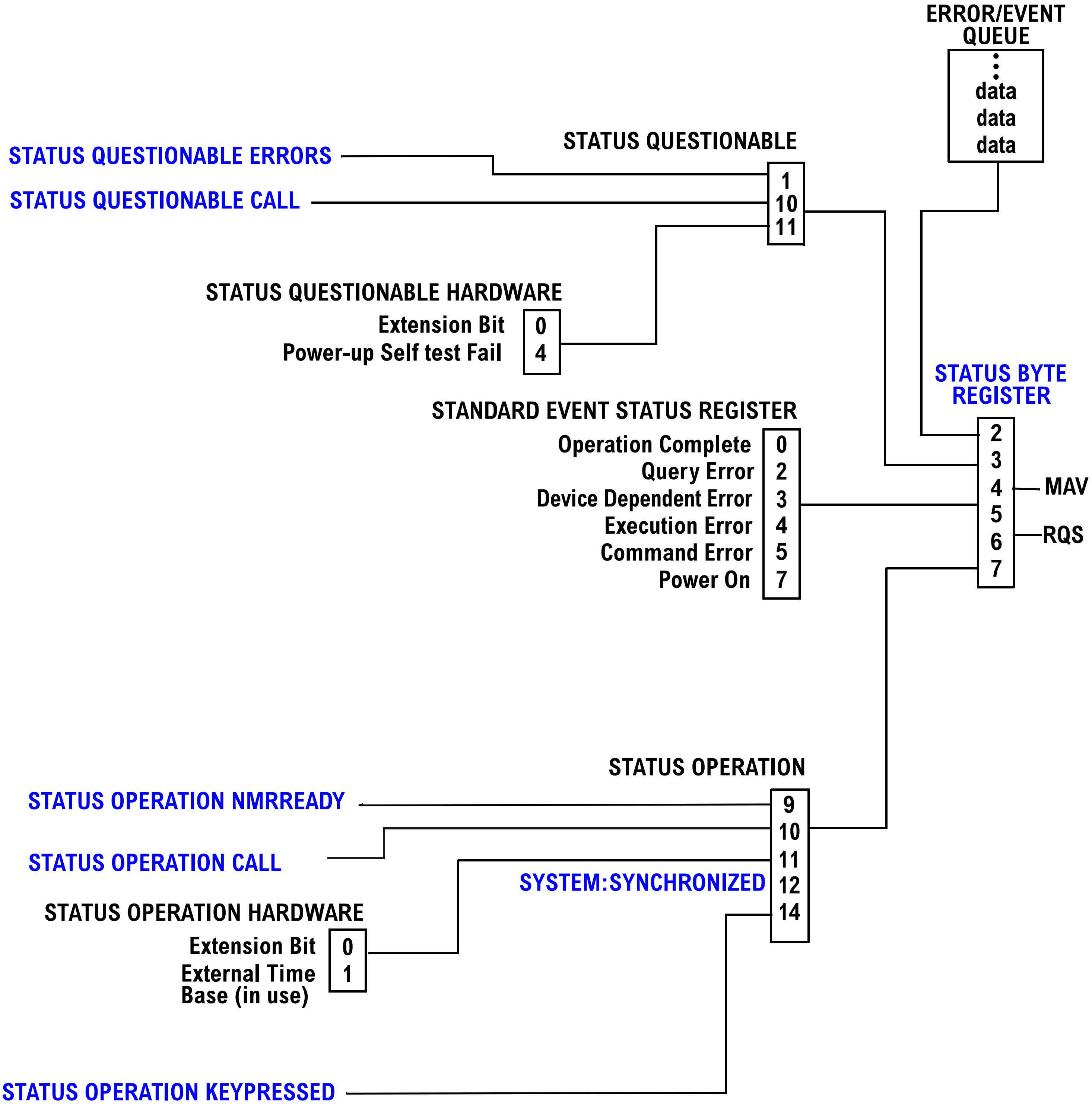
“FDD Test Operating Mode”

Status Subsystem Overview

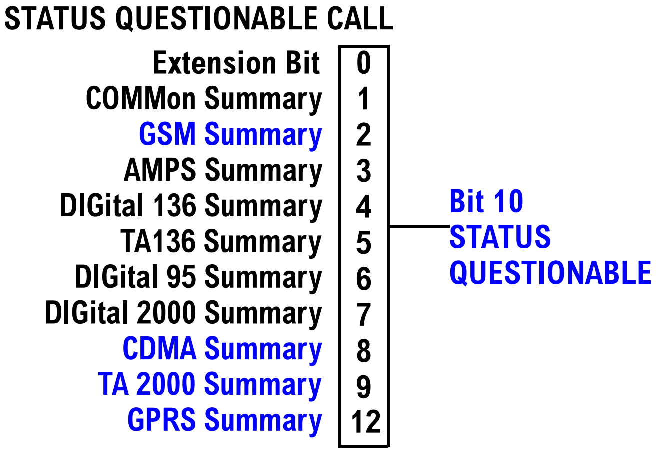
The following pages present an overview of the entire status subsystem, including applications which may or may not be loaded in your test set.

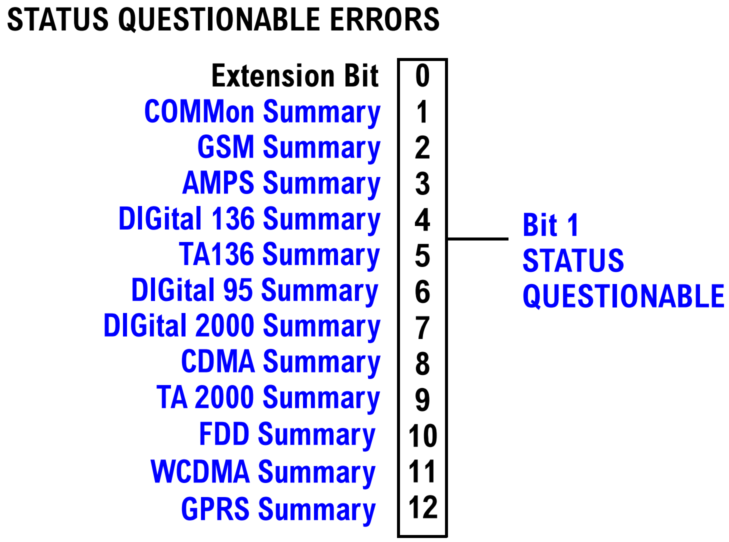
Description

Overview of STATus Reporting Structure

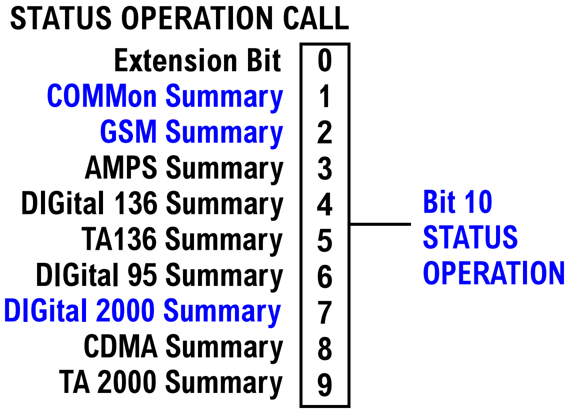


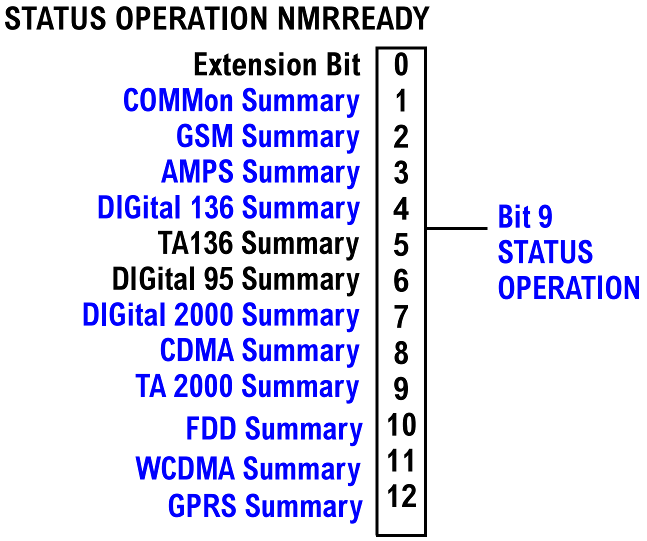
Status Reporting Structure For STATus QUEStionable and STATus OPERation



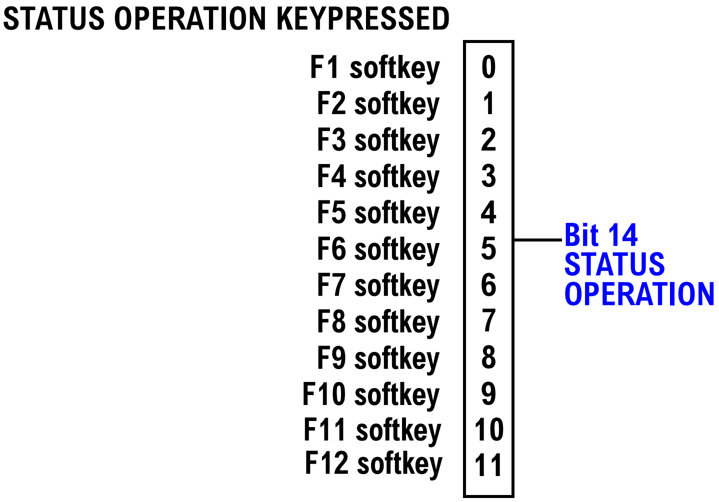


Some status registers are not functional at this time.

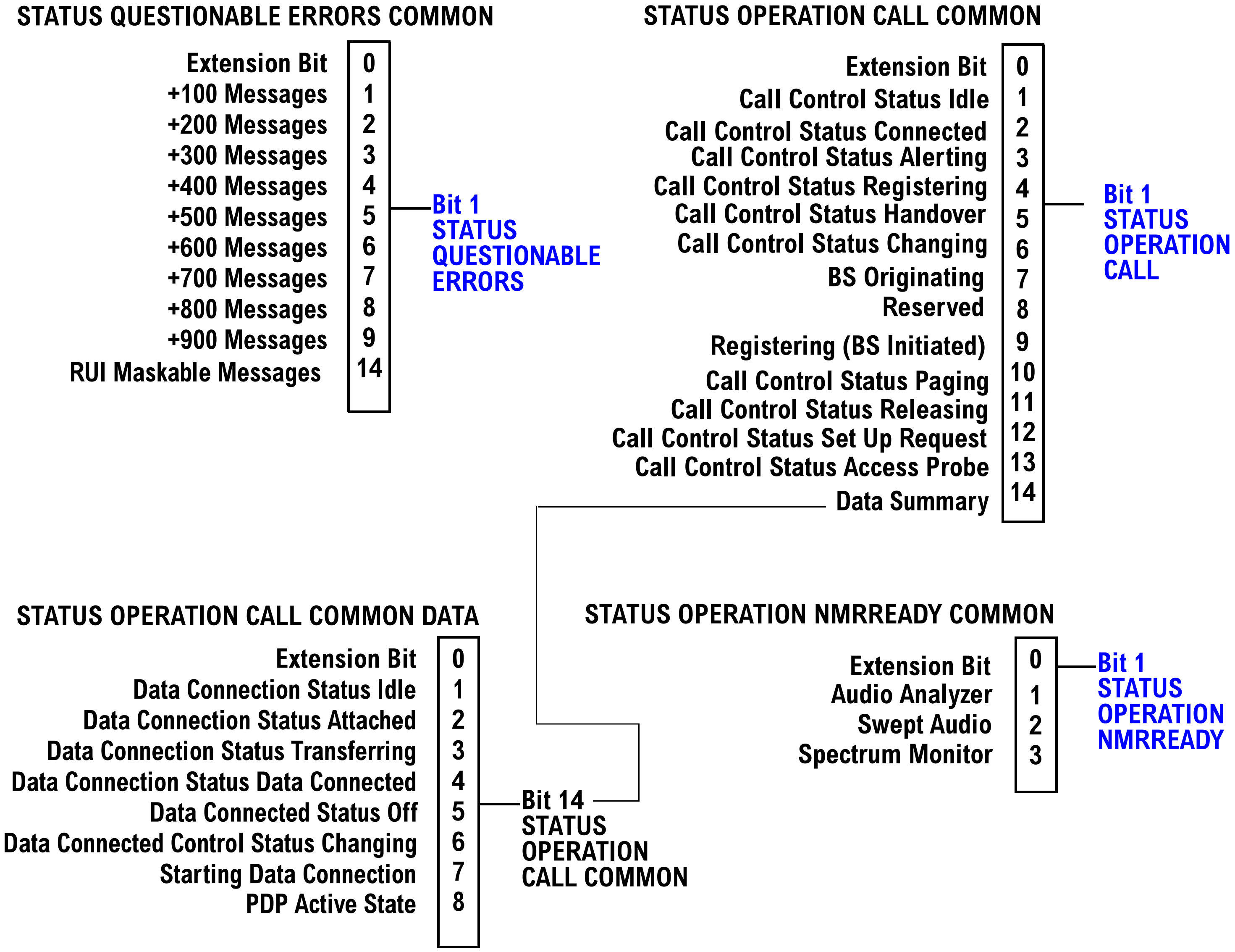




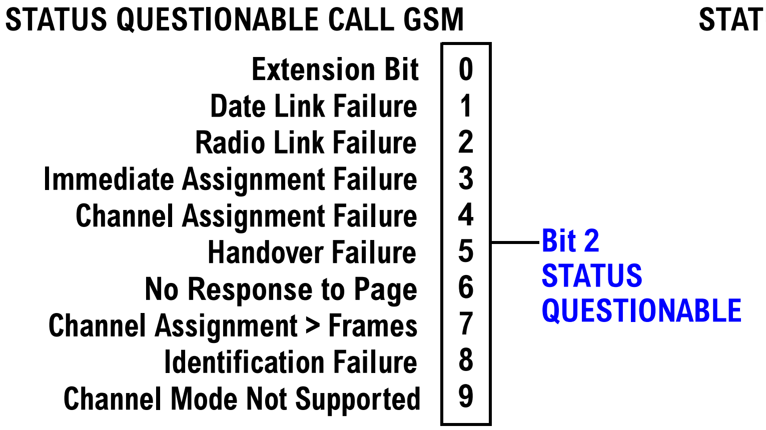
Status Reporting Structure For STATus OPERation KEYPressed Register

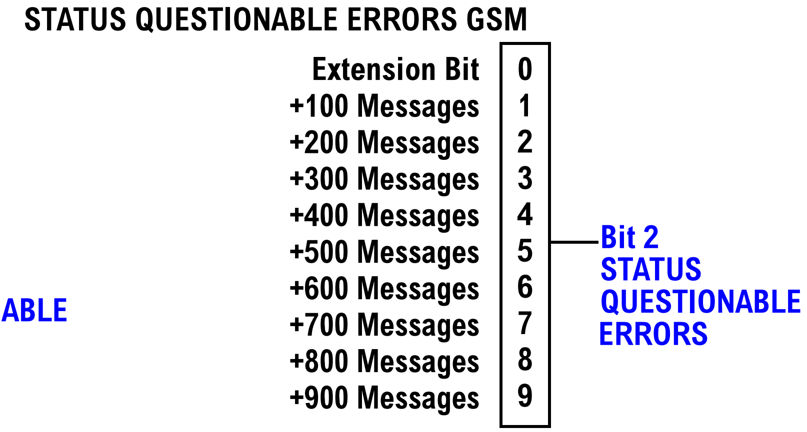


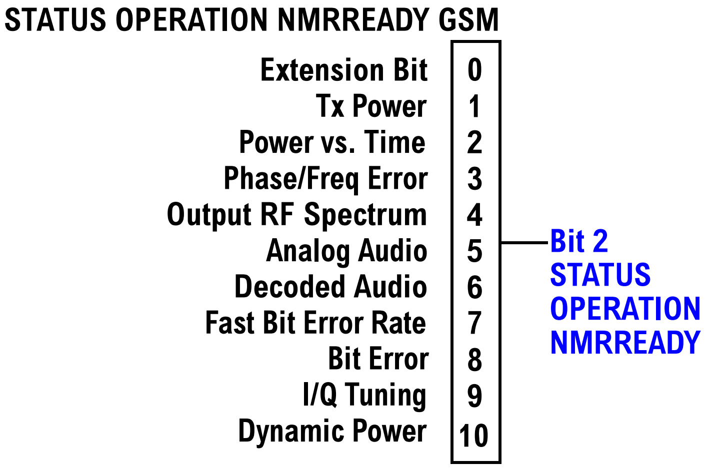
Status Reporting Structures for the COMMon Registers

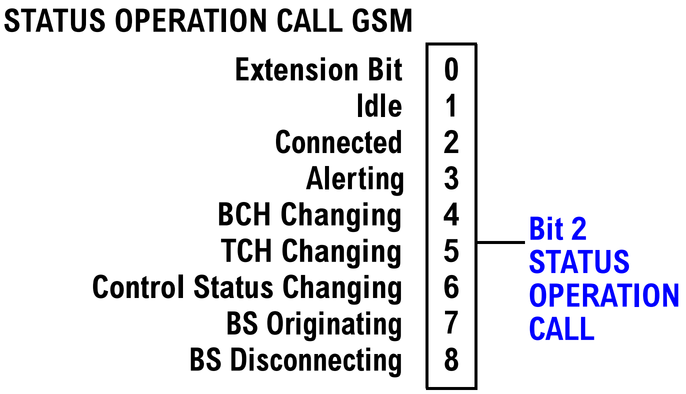


Status Reporting Structure for the GSM Registers

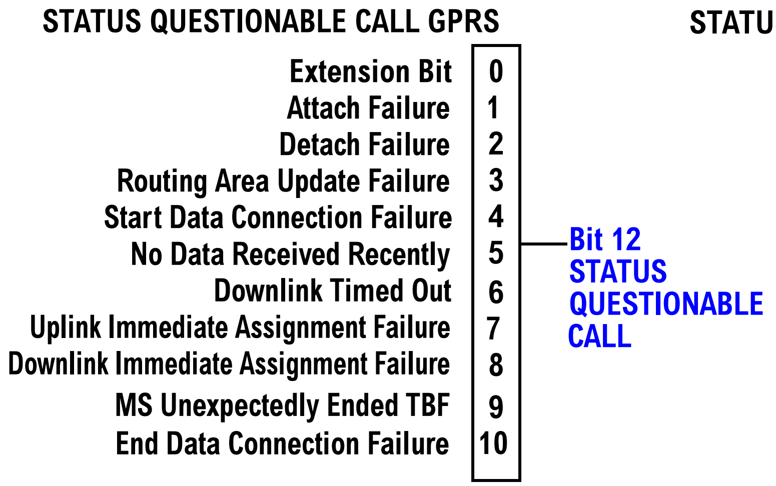


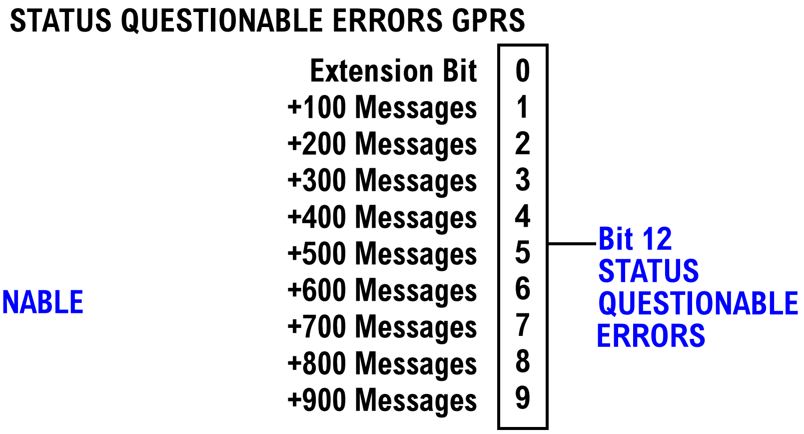


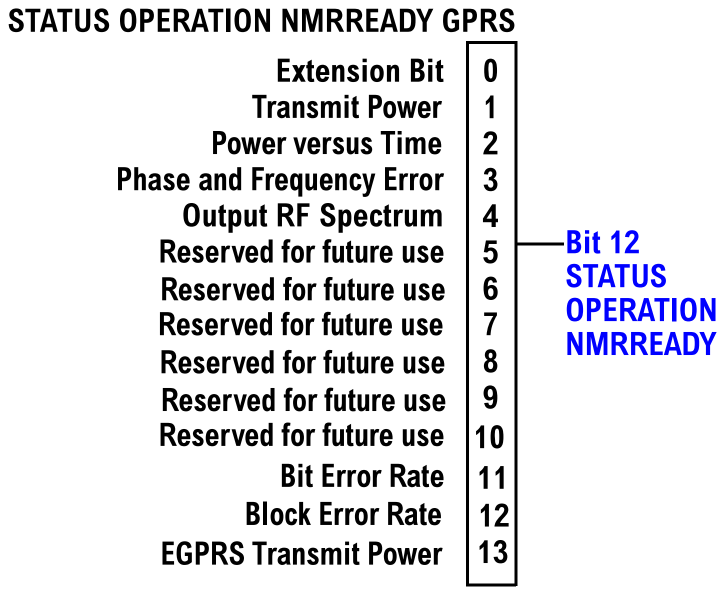




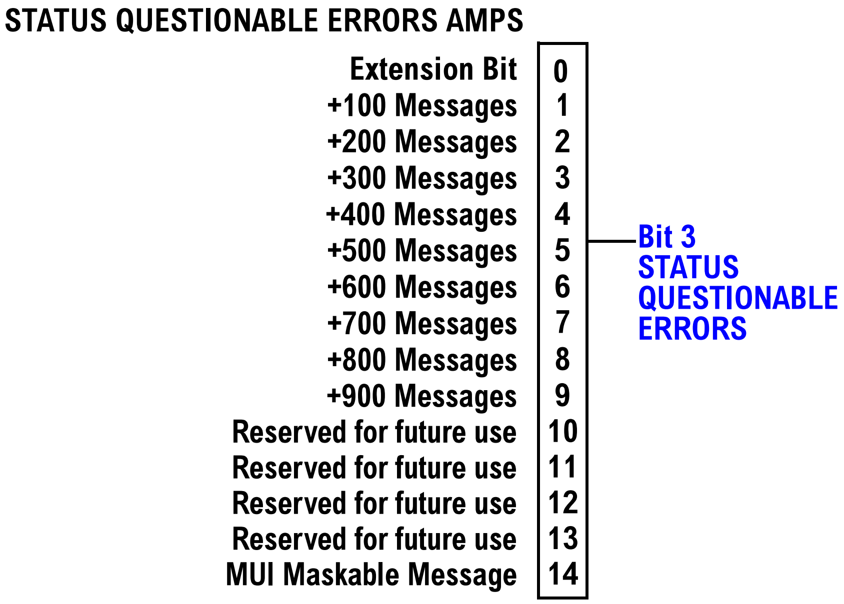
Status Reporting Structure For the GPRS Registers

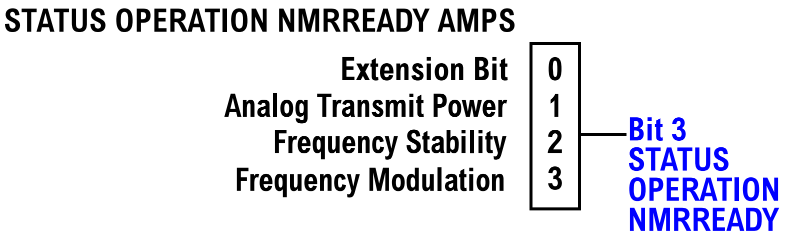




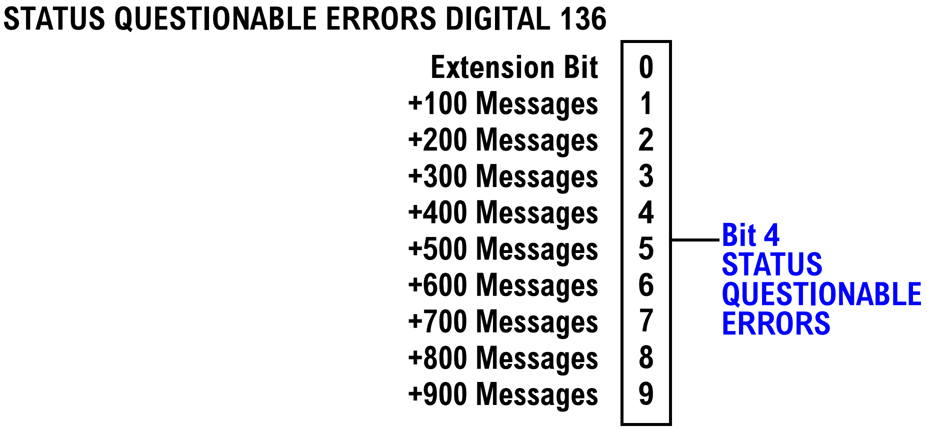


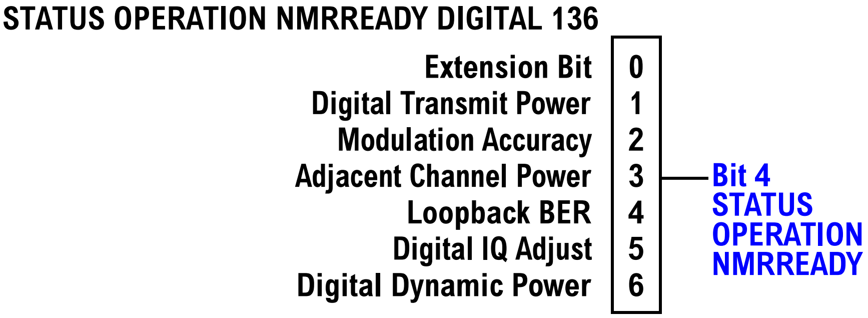
Status Reporting Structure for the AMPS Registers



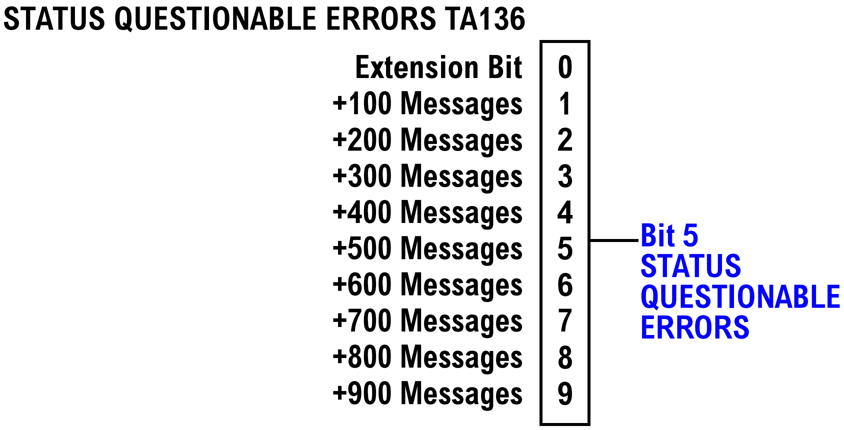


Status Reporting Structure for the DIGital136 Registers

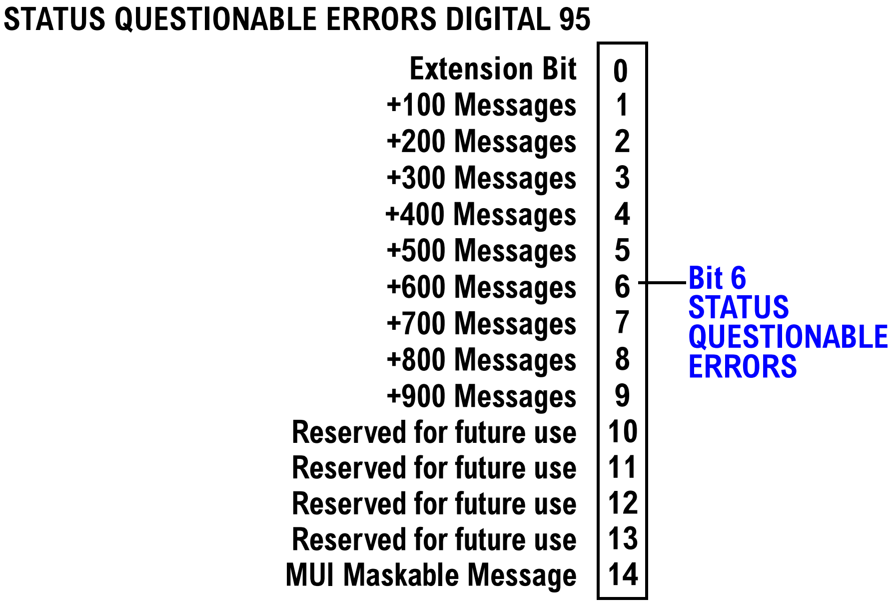




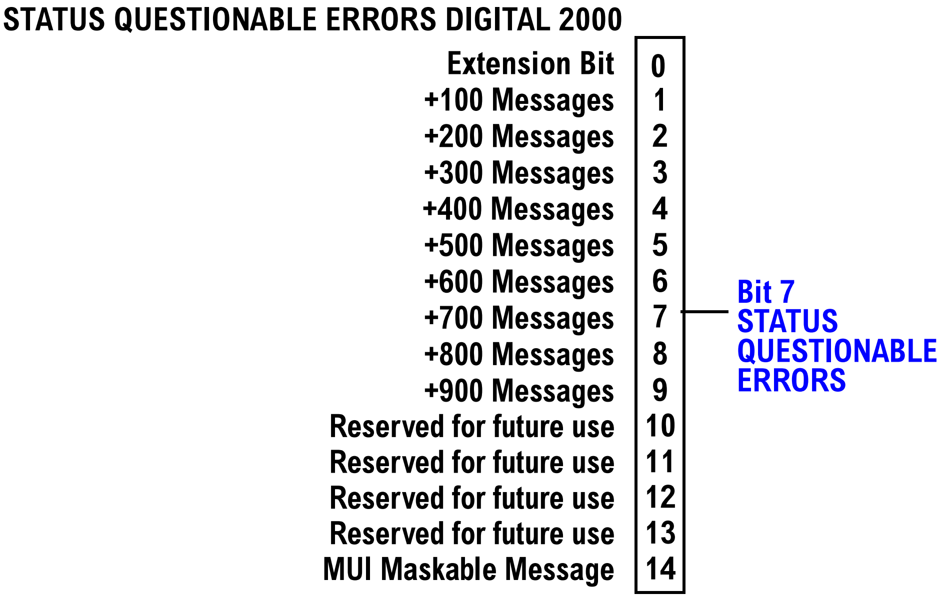
Status Reporting Structures for the TA136 Registers

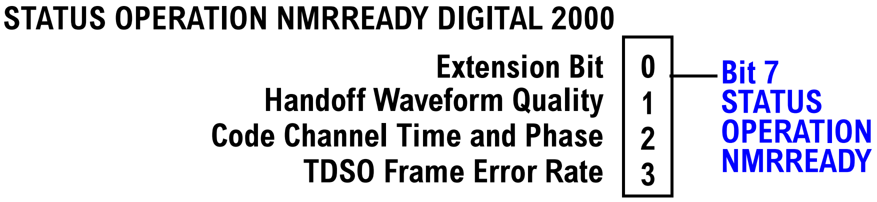


Status Reporting Structure for the DIGital95 Registers

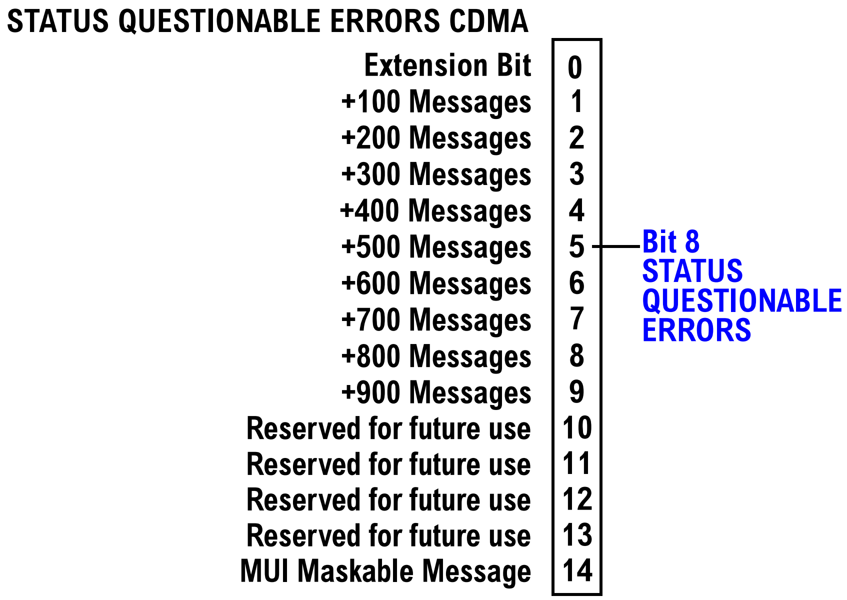


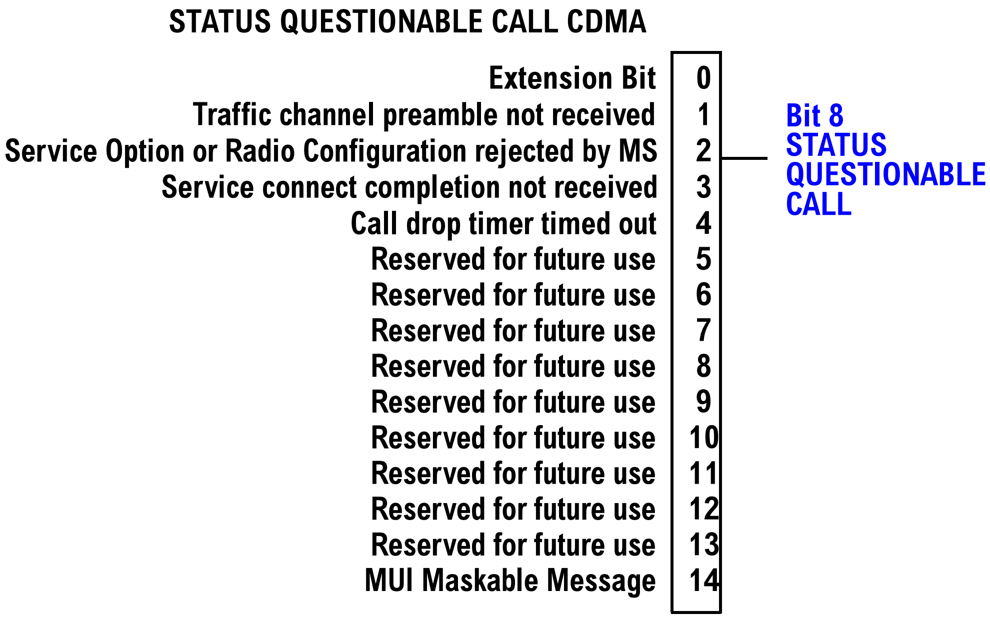
Status Reporting Structure for the DIGital 2000 Registers

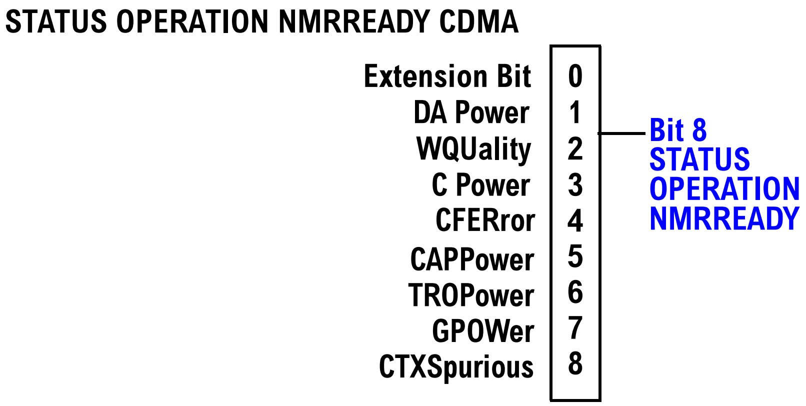




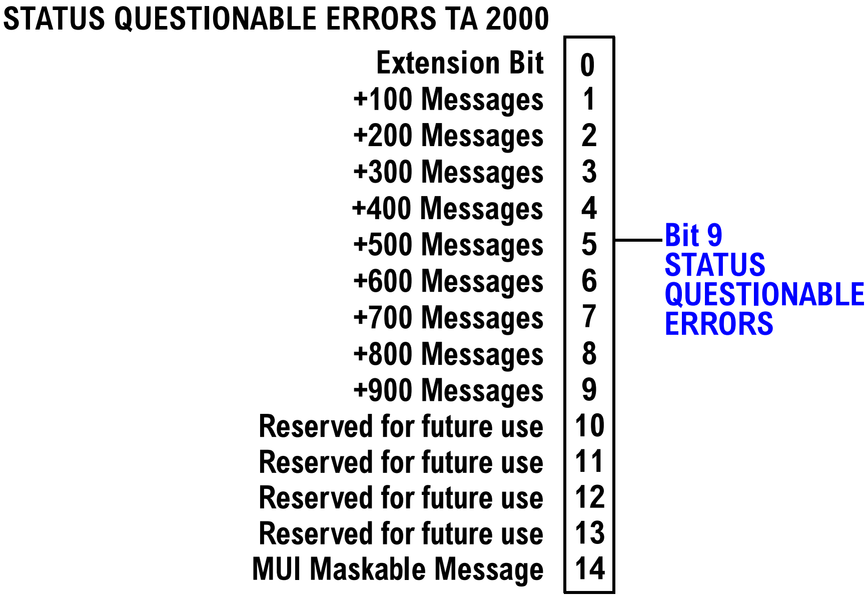
Status Reporting Structure for the CDMA Registers





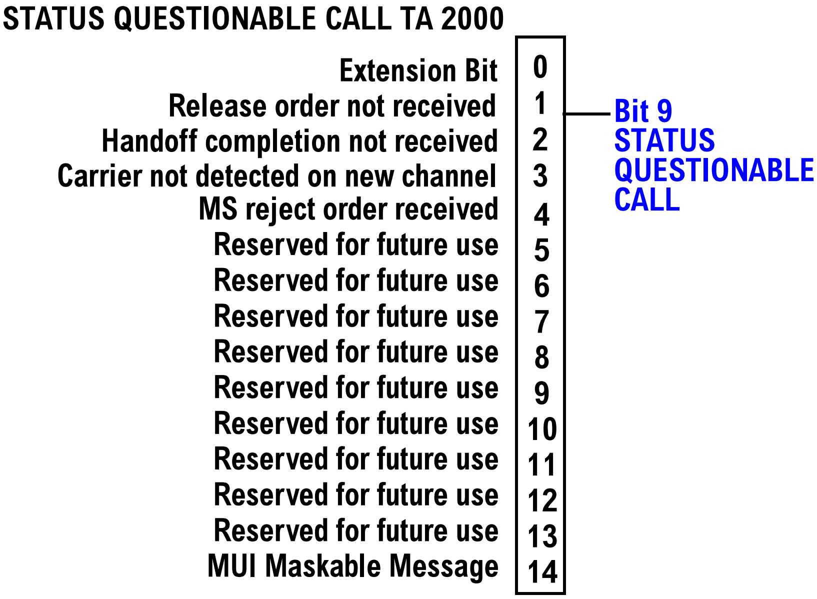

STATUS OPERATION NMRREADY CDMA
Extension Bit 0
DA Power 1
WQUality 2
C Power 3
CFERror 4
CAPPower 5
TROPower 6
GPOWer 7
CTXSpurious 8
Bit 8
STATUS
OPERATION
NMRREADY

Status Reporting Structure for the TA 2000 Registers



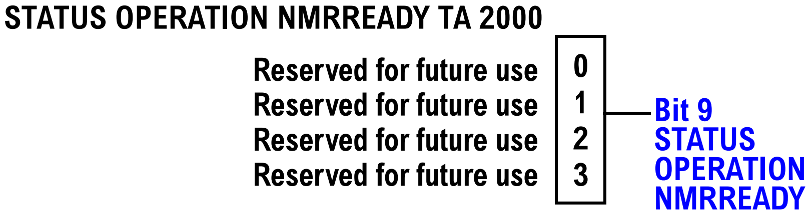
STATUS QUESTIONABLE ERRORS TA 2000

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

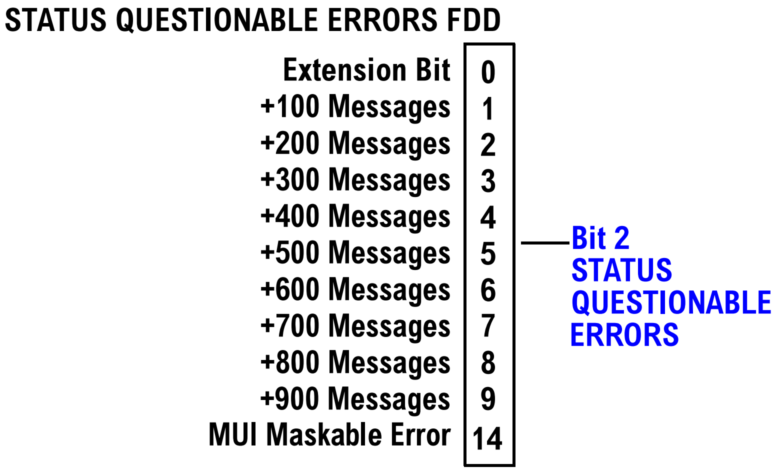


STATUS QUESTIONABLE CALL TA 2000

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

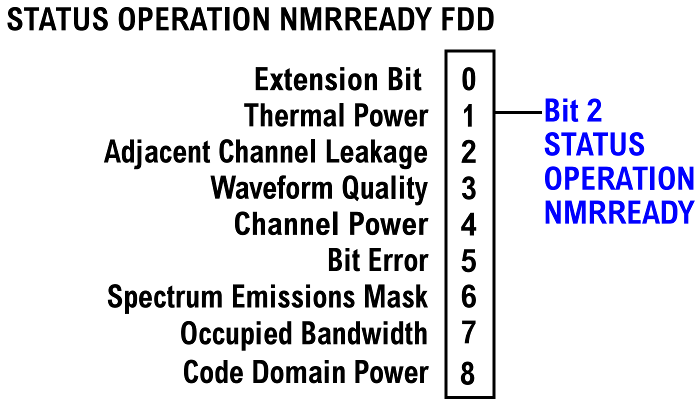

STATUS OPERATION NMRREADY TA 2000
Reserved for future use
Reserved for future use
Reserved for future use
Reserved for future use
0
1
2
3
Bit 9
STATUS
OPERATION
NMRREADY

Status Reporting Structure for the FDD Registers



STATUS QUESTIONABLE ERRORS FDD

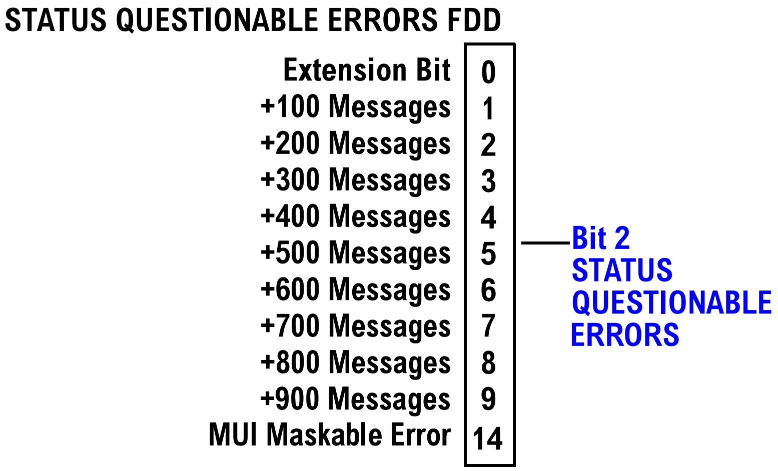
Extension Bit	0
+100 Messages	1
+200 Messages	2
+300 Messages	3
+400 Messages	4
+500 Messages	5
+600 Messages	6
+700 Messages	7
+800 Messages	8
+900 Messages	9
MUI Maskable Error	14

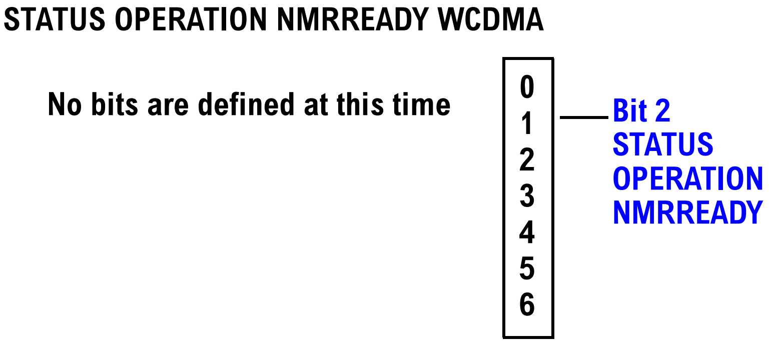


STATUS OPERATION NMRREADY FDD

Extension Bit	0
Thermal Power	1
Adjacent Channel Leakage	2
Waveform Quality	3
Channel Power	4
Bit Error	5
Spectrum Emissions Mask	6
Occupied Bandwidth	7
Code Domain Power	8

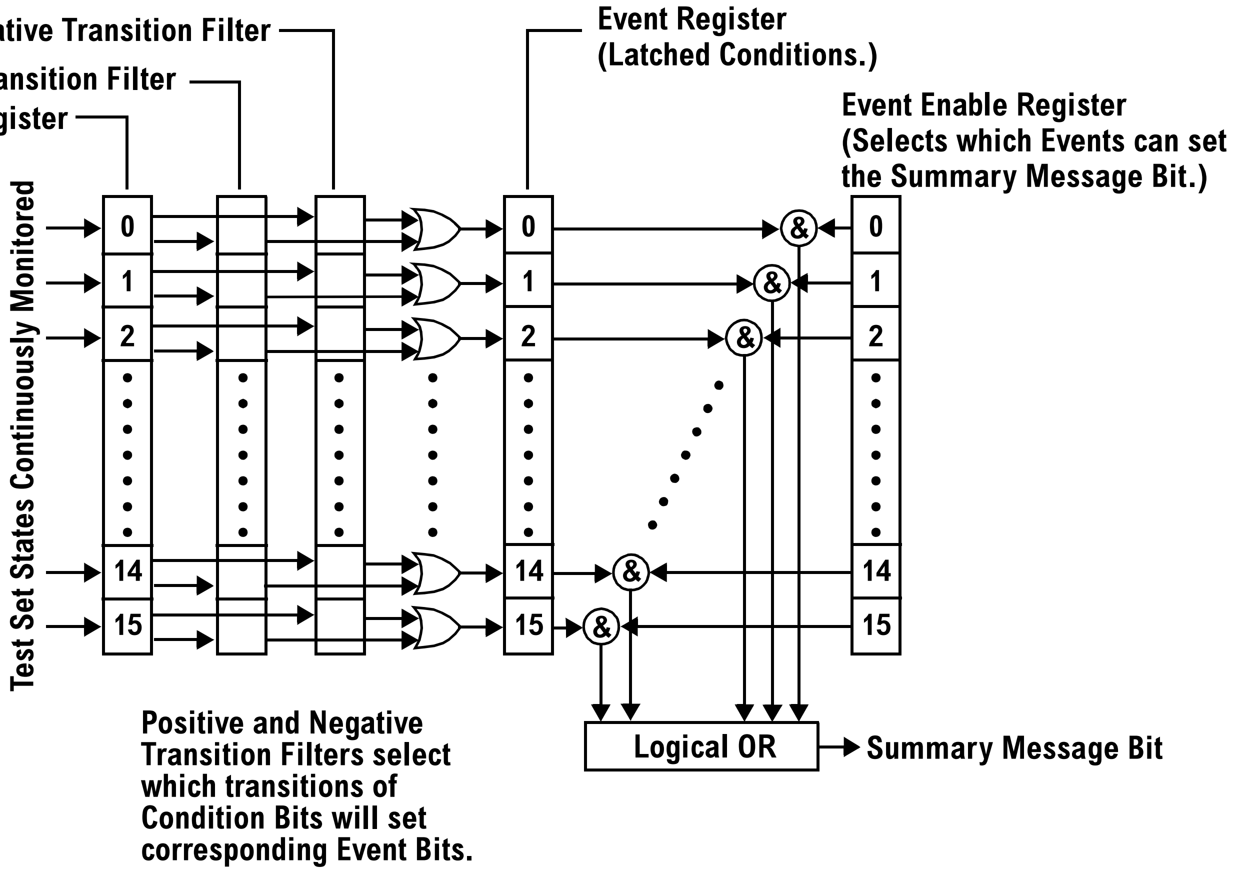
Status Reporting Structure for the WCDMA Registers





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.

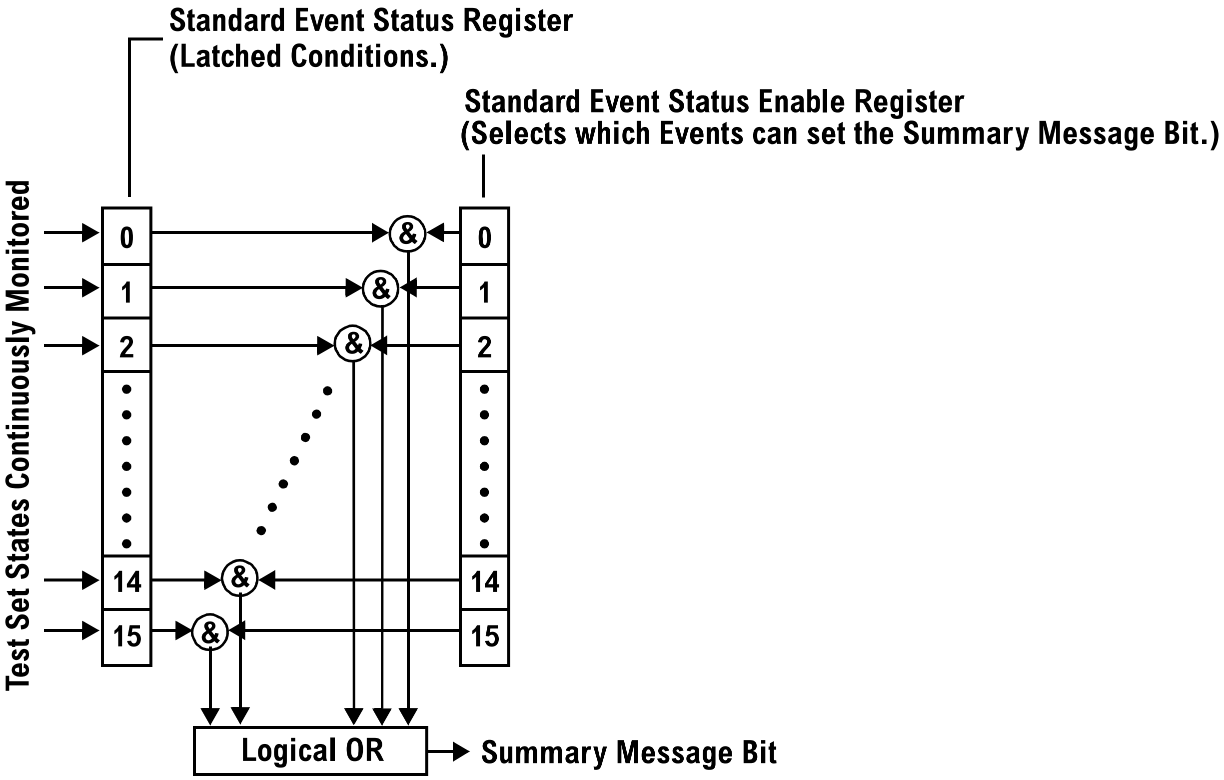
Transition Filters are unaffected by a *CLS (clear status) command.

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

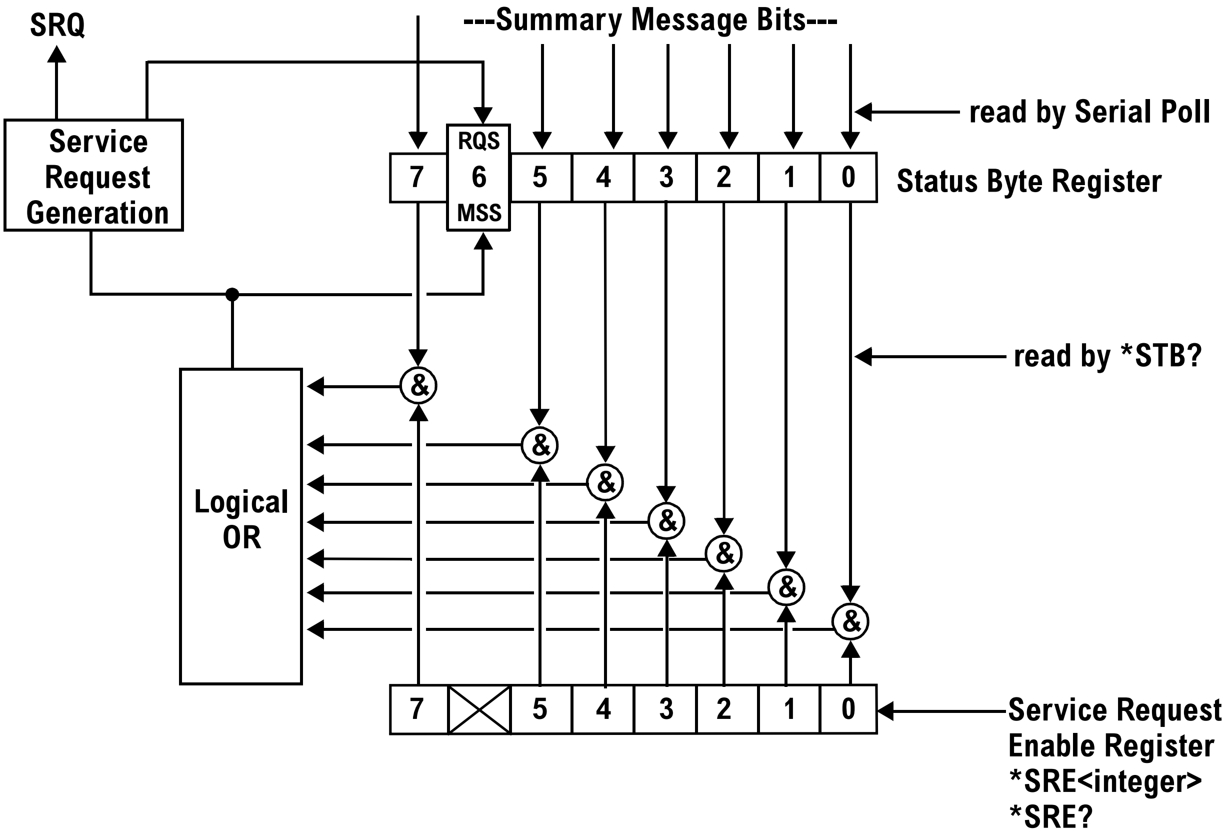


Summary Message Bit The Summary Message is a single-bit message which indicates whether or not one or more of the enabled events have occurred since the last reading or clearing of the Event Register. The test set logically ANDs corresponding bits in the Event and Enable registers and then performs an 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 694

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 E1963A Test Application

This table shows the concurrency considerations for the E1963A W-CDMA Mobile Test Application.

Table 1. W-CDMA Concurrency Considerations

	Waveform Quality	Thermal Power	Swept Audio	Spectrum Emission Mask	SINAD	Occupied Bandwidth	Loopback BER	Distortion	Code Domain	Channel Power	Audio Signal Generation	Audio Frequency	Audio Level
Adjacent Channel Leakage Ratio	B		B	B	B	B		B	B	B		B	B
Audio Level	B		A	B	B	B		B	B	B		B	
Audio Frequency	B		A	B	B	B		B	B	B			
Audio Signal Generation			E										
Channel Power	B		B	B	B	B		B	B				
Code Domain	B		B	B	B	B		B					
Distortion	B		A	B	B	B							
Loopback BER													
Occupied Bandwidth	B		B	B	B								
SINAD	B		A	B									
Spectrum Emission Mask	B		B										
Swept Audio	B												
Thermal 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: Swept audio automatically adjusts the audio generator, therefore adjusting the audio generator’s frequency while using swept audio will generate an error message. Also, once the swept audio measurement has completed, it does not reset the audio generator values back to what they were before it adjusted them.

Related Topics

“Block Diagram”

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 Values

All measurements in the W-CDMA Mobile Test application default to a timeout value of 10 seconds, except Loopback BER. The Loopback BER measurement timeout default is 20 seconds.

Related Topics

"Integrity Indicator"

"SETup Subsystem"

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:WACLeakage:ICOunt?” !Returns the approximate number of
!Adjacent Leakage Ratio (ACLR) measurements completed while using
!multi-measurements.
```

Related Topics

“Statistical Measurement Results”

Triggering of Measurements

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.

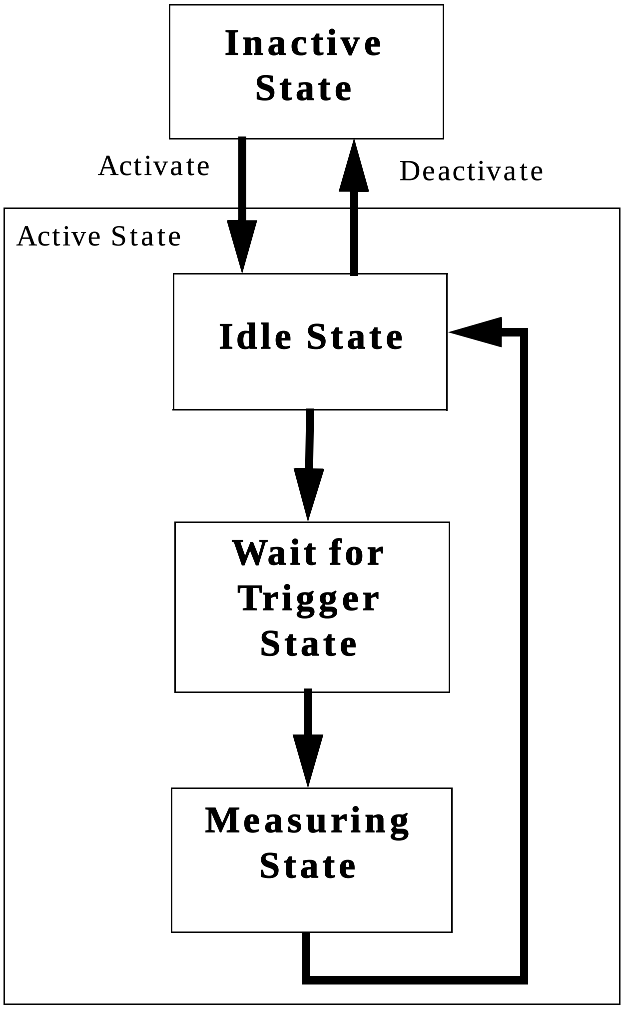
Auto Trigger Source: When auto triggering is selected, the test set automatically chooses the best trigger source for that measurement. This trigger source setting is convenient because the measurement trigger doesn't need to be changed when switching parameters. Auto trigger source is the best choice 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 291.

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 2. Trigger Arm Default Settings

Action	**Trigger Arm Default Setting**
Power up of test set	Continuous
Manual Full Preset	Continuous

Table 2. Trigger Arm Default Settings

Action	Trigger Arm Default Setting
*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"

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:WACLeakage:COUNt 10” !Enters an Adjacent Channel
!Leakage Ratio (ACLR) count of 10, and turns the multi-measurement
!count state on.
```

Related Topics

“Measurement Progress Report”

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 3.

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.

Integrity Indicator

Table 3.

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 3.

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.

Table 3.

Integrity Indicator Number	Integrity Indicator Message
29	Meas. Unspecified in Alg 1: Measurement behavior not specified while power control algorithm 1 is in use. This integrity indicator is used in the W-CDMA applications to indicate that when using power control algorithm 1 for control of the UE's (uplink) power, the thermal power, spectrum emission mask, occupied bandwidth and adjacent channel leakage power ratio measurements are not specified. To perform these measurements with specified behavior and accuracy, you must set the uplink power control algorithm to algorithm 2.

Example Program

```
10  OUTPUT 714;”INITiate:DAPower” !Start Digital Average measurement
20  OUTPUT 714;”FETCH:DAPower?” !Request measurement results.
30  ENTER 714;Integrity,Tx_power !Read measurement results.
40  IF Integrity = 0 THEN !Permits measurement to be printed if integrity indicator
50                      !indicates a successful measurement
60  PRINT “Analog TX Power =”;Tx_power!if 0 then measurement was successful
70  ELSE
80  PRINT “Measurement integrity questionable, integrity value = “;Integrity !If
90                                                                          !integrity
100                                                                         !not zero
110                                                                         !then print
120                                                                         !integrity
130                                                                         !value.
140 END IF
150 END
```

Related Topics

“Error Messages”

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.

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
```

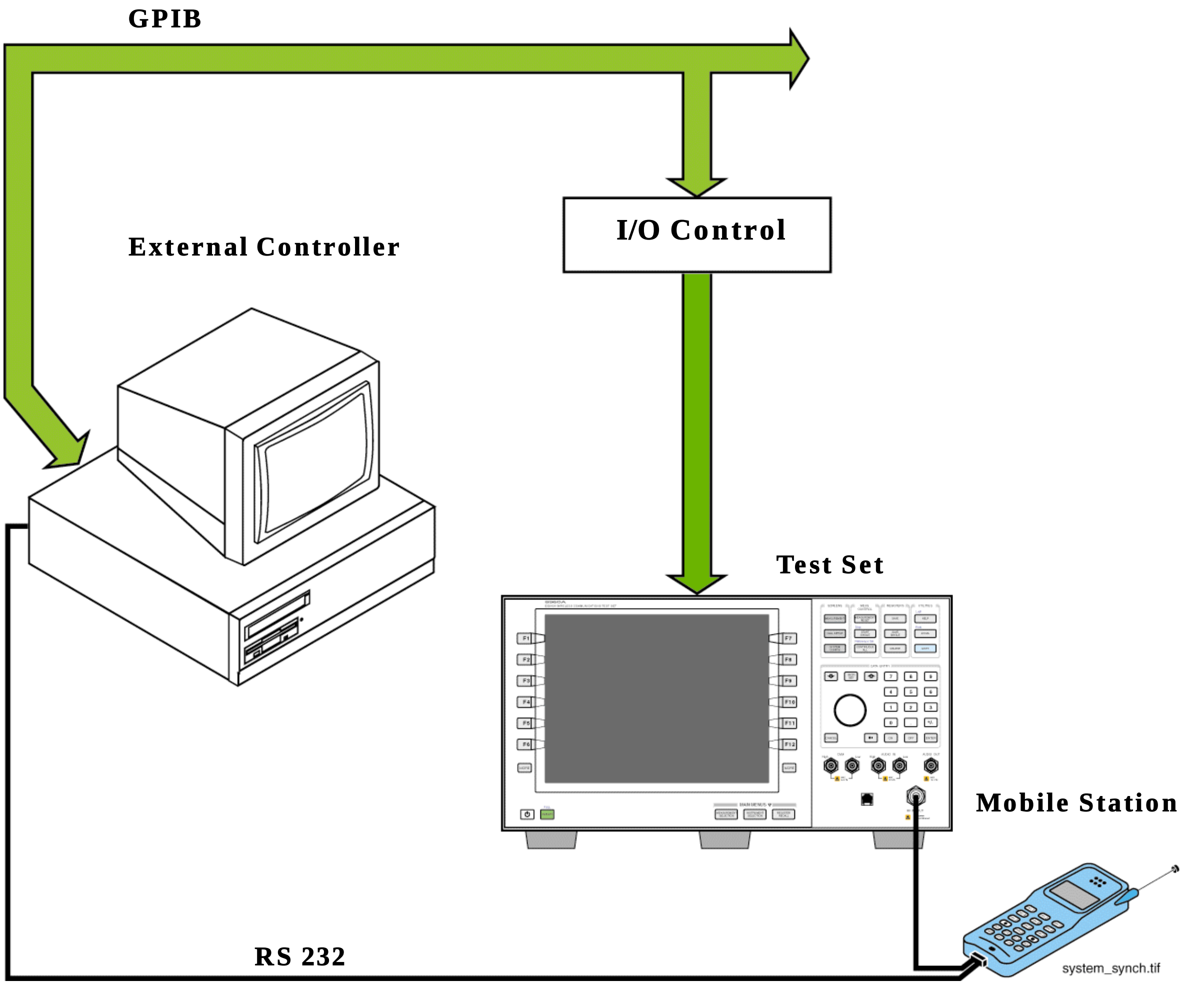
Test System Synchronization Overview

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" on page 474
  This command queries the test set's current call processing state. This command supports synchronization method five. See "Call Processing State Synchronization" on page 311.
- "CALL:STATus" on page 474
  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 312. 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 309.
- :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 309.
- :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 309.

- “INITiate:DONE?” on page 591
  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 591.
- STATUS:<register>
  Status bits in the 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 Register Bit Assignments” on page 708 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 694.
- “SYSTem:SYNChronized” on page 782
  This specialized command puts a 1 in the test set’s output queue, the test set responds to the query by sending a 1 to the external controller indicating that all prior sequential commands have completed, and all prior overlapped commands have at least begun execution. The condition bit is set then cleared. See “STATus:OPERation Register Bit Assignments” on page 701. This command supports synchronization four and six.
- “*OPC” and “*OPC?” on page 787, and “*WAI” on page 788 (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 311

“Measurement Event Synchronization” on page 305

“Call Processing Event Synchronization” on page 308

“SYSTem:SYNChronized” on page 782

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” on page 587 for more details about this query.

The INITiate:DONE? query returns at least one of the following indicators for each pass through the loop:

- "AFAN" - The audio frequency analyzer measurement results are available.
- "SMON" - The spectrum monitor measurement results are available.
- “WACL” - The adjacent channel leakage measurement results are available.
- “WBER” - The loopback bit error ratio measurement results are available.
- “WCD” - The code domain measurement results are available
- "WCP" - The channel power measurement results are available.
- "WILP" - The inner loop power measurement results are available.
- "WIQT" - The IQ tuning measurement results are available.
- “WOBW” - The occupied bandwidth measurement results are available.
- "WOOP" - The PRACH transmit On/Off power measurement results are available.
- "WSEM” - The spectrum emission mask measurement results are available.
- “WTP” - The thermal power measurement results are available.
- "WWQ" - The waveform quality 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 592. 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 592. This would indicate that all measurements results are available or none have been initiated.

Programming Example

The following example assumes that the UE is transmitting and no measurements other than channel power (WCP) and waveform quality (WWQ) are being triggered. See "Transition Filters" on page 280.

```
10  OUTPUT 714;"SETup:WCPower:CONTinuous OFF" !Sets channel power
20                                            !trigger mode to single.
30  OUTPUT 714;"SETUP:WWQuality:CONTinuous OFF" !Sets waveform quality
40                                         !trigger mode to single.
50  OUTPUT 714;"INITiate:WCPower;WWQuality" !Begin channel power and
60                                        !waveform quality measurements.
70  REPEAT
80    OUTPUT 714;"INITiate:DONE?" !Queries the test set for
90                                  !measurements that have completed
100   ENTER 714;Meas_done$ !String value representing DONE measurements,
110                       ! NONE if no measurements are done.
120   SELECT Meas_done$ !This variable will have a value of  WAIT until
130                    !a measurement is DONE.
140   CASE "WCP" !Characters must be upper case.
150     OUTPUT 714;"FETCH:WCPower?" !If this case is selected,
160             !channel power results are FETCHed.
170     ENTER 714;Integrity,Wcpower_meas
180     PRINT "Average Channel Power is ";Wcpower_meas
190   CASE "WWQ" !Characters must be uppercase.
200     OUTPUT 714;"FETCH:WWQuality:EVM?" !If this case is selected,
210             !the Max EVM measurement is FETCHed.
220     ENTER 714;Evm_meas
230     PRINT "Maximum Error Vector Magnitude is ";Evm_meas
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:FDD

The STATus:OPERation:NMRReady:FDD 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:<WCDMA | FDD> Register Bit Assignments" on page 713 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 280.
- STATus:OPERation:NMRReady:FDD bit for the measurement desired.
- STATus:OPERation:NMRReady bit (1024 for FDD) for the required system. See "STATus Subsystem Description" on page 694 or "Description" .
- STATus:OPERation bit (512 for NMRReady).
- Service Request Enabling (*SRE 128 for NMRReady).

The "STATus:OPERation:NMRReady:<WCDMA | FDD> Register Bit Assignments" on page 713 status register provides status reporting on the following measurement completions:

- Adjacent Channel Leakage Ratio
- Channel Power
- Code Domain
- Loopback Bit Error Ratio
- Occupied Bandwidth
- Spectrum Emission Mask
- Thermal Power
- Waveform Quality

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 Command Functions” on page 585

“What Happens When a Measurement is INITiated?” on page 585

“Concurrent Measurements” on page 285

“STATus:OPERation:NMRReady:<WCDMA | FDD> Register Bit Assignments” on page 713

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 4. 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 4. 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

Table 5. Overlapped Commands

Call Processing Command	Purpose Of Command	Pending Operation Flag (POF) is false when
CALL:ORIGinate See “CALL:ORIGinate” .	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:CONNected:ARM[:IMMediate] See “CALL:CONNected:ARM[:IMMediate]” .	Arms the call control status change detector.	The call control status change detector has been disarmed. See “Connected/Idle Query” .

Related Topics

“Call Processing State Synchronization” on page 311

“Test System Synchronization Overview” on page 302

“Measurement Event Synchronization” on page 305

Call Processing State Synchronization

Call Processing State Query

The CALL:STATUS[:STATE][:VOICE]? query returns the current call processing state.

This is a list of all possible values for this test application.

- “IDLE”

  Idle is returned when the test set is not on a call.

- “PAG”

  Paging is returned when the test set is in the process of paging the UE (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.

- “CONN”

  Connected is returned when the test set and the UES are connected on a call.

- “REL”

  Releasing is returned when the test set is in the process of releasing the UE from a call using over the air signalling as part of a MS or BS originated release procedure.

- “HAND”

  Handoff is returned when the test set is in the process of handing off the UE.

- “REG”

  Registering is returned when the test set is in the process of performing a registration with the UE.

The following command returns the current state of a call:

```
OUTPUT 714;”CALL:STATUS:STATE?”
```

See the “Instrument Status Area” on page 856 for call processing state information.

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 5. 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 6. 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.

Related Topics

"CALL:CONNected:TIMeout" on page 411

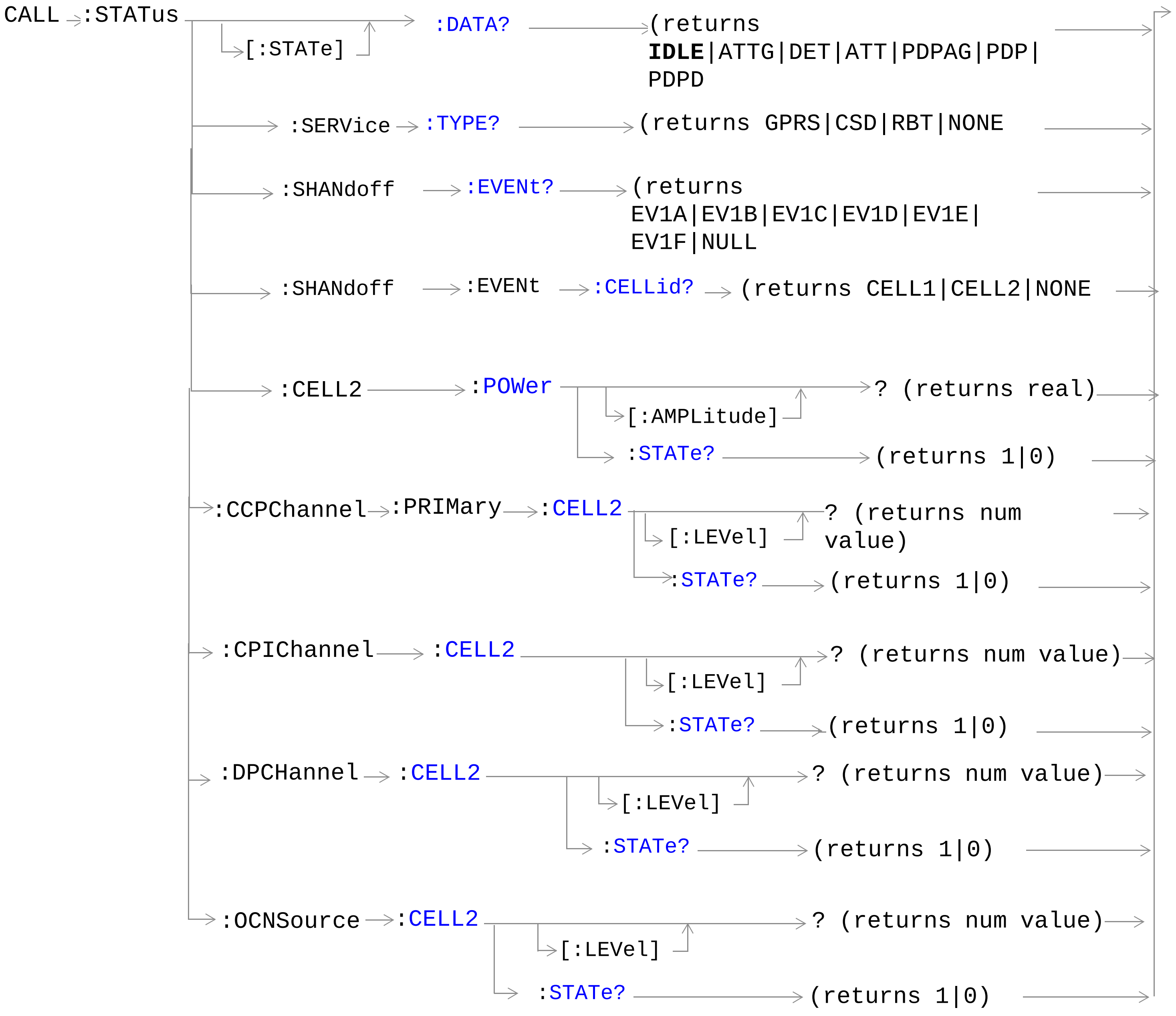
"CALL:CONNected:ARM[:IMMediate]" on page 410

"CALL:STATus[:STATe][:VOICe]?" on page 476

"Instrument Status Area" on page 856

GPIB Commands

CALL:STATus



"Diagram Conventions"

CALL:STATus[:STATe]:DATA?

Function	Queries the status of the data connection. Status can be: • Idle • Attaching • Detaching • Attached • PDP Activating • PDP Active • PDP Deactivating
Query	Range: IDLE | ATTG | DET | ATT | PDPAG | PDP | PDPD
*RST Setting	IDLE
Requirements	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATus:DATA?" !Returns the current data connection state.
```

CALL:STATus:SERVice:TYPe?

Function	Queries the type of service that is currently active. Service type can be: • UMTS/GPRS Packet Data • CS Data • RB Test Mode • None The current service type will be set to NONE when an event occurs that causes the service to be stopped. These events include: • End Call • A call processing error that results in a dropped call • UE initiated end of service • Full or Partial Preset
Query	Range: GPRS | CSData | RBTest | NONE
*RST Setting	NONE
Requirements	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATus:SERVice:TYPe?" !Returns the current service type.
```

CALL:STATus:SHANdoff:EVENt?

Function	Queries the most recent Intra Frequency Event identifier. Events can be: • 1a • 1b • 1c • 1d • 1e • 1f • None (See “Event Triggering” on page 115).
Query	Range: 1A | 1B | 1C | 1D | 1E | 1F | NONE
*RST Setting	NONE
Requirements	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATus:SHANdoff:EVENt?" !Returns the most recent event.
```

CALL:STATus:SHANdoff:EVENt:CELLid?

Function	Queries the cell that triggered the most recent event. (See “Event Triggering” on page 115).
Query	Range: CELL1 | CELL2 | NONE
*RST Setting	NONE
Requirements	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATus:SHANdoff:EVENt:CELLid?"
```

CALL:STATus:CELL2:POWer[:AMPLitude]?

Function	Queries the current cell 2 power level. (See “Cell 2 Overview” on page 112).
Query	Range: • -170dBm/3.84 MHz to +37dBm/3.84 MHz, 9.91 E+37 (-120 dBm/3.84 MHz to -13 dBm/3.84 MHz actual hardware range with amplitude offset = 0) The actual power range is defined by adding the value of the associated amplitude offset to the range above. For example, if amplitude offset is -3.5 dB, then the power range will be -123.5 dBm/3.84 MHz to -16.5 dBm/3.84 MHz. Resolution: 0.01 dBm/3.84 MHz
*RST Setting	9.91E+37
Requirements	Lab Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CELL2:POWER:AMPLITUDE?"`	

CALL:STATus:CELL2:POWer:STATe?

Function	Queries the current state of the cell 2 power setting. (See “Cell 2 Overview” on page 112).
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Lab Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CELL2:POWER:STATE?"`	

CALL:STATus:CCPChannel:PRIMary:CELL2[:LEVel]?

Function	Queries the current level of the cell 2 primary common control physical channel. (See “Cell 2 Overview” on page 112).
Query	Range: -20.00 to 0 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91E+37
Requirements	Lab Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CCPCHANNEL:PRIMARY:CELL2:LEVEL?"`	

CALL:STATus:CCPChannel:PRIMary:CELL2:STATe?

Function	Queries the current state of the cell 2 primary common control physical channel. (See “Cell 2 Overview” on page 112).
Query	Range: 0 | 1
*RST Setting	0 (off)
Requirements	Lab Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CCPCHANNEL:PRIMARY:CELL2:STATE?"`	

CALL:STATus:CPIChannel:CELL2[:LEVel]?

Function	Queries the current cell 2 common pilot channel’s power. (See “Cell 2 Overview” on page 112).
Query	Range: -20.00 to 0 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91E+37
Requirements	Lab Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CPICHANNEL:CELL2:LEVEL?"`	

CALL:STATus:CPIChannel:CELL2:STATe?

Function	Queries the current state of the cell 2 common pilot channel. (See “Cell 2 Overview” on page 112).
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Lab Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CPICHANNEL:CELL2:STATE?"`	

CALL:STATus:DPCHannel:CELL2[:LEVel]?

Function	Queries the current cell 2 dedicated physical channel's power. (See "Cell 2 Overview" on page 112).
Query	Range: -20.00 to 0 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Requirements	Lab Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:DPCHANNEL:CELL2:LEVEL?"`	

CALL:STATus:DPCHannel:CELL2:STATe?

Function	Queries the current state of the cell 2 dedicated physical channel.
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Lab Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:DPCHANNEL:CELL2:STATE?"`	

CALL:STATus:OCNSource:CELL2[:LEVel]?

Function	Queries the cell 2 orthogonal channel noise source (OCNS) level for the selected system type. The OCNS level is set using the "CALL:CELL2:OCNSource" commands. The optional [:SELected] keyword in this command specifies that the OCNS channel level being queried applies to the current system type. (See "Cell 2 Overview" on page 112).
Query	Range: 0 to -20 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91E+37
Requirements	Lab Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:OCNSOURCE:CELL2:LEVEL?"`	

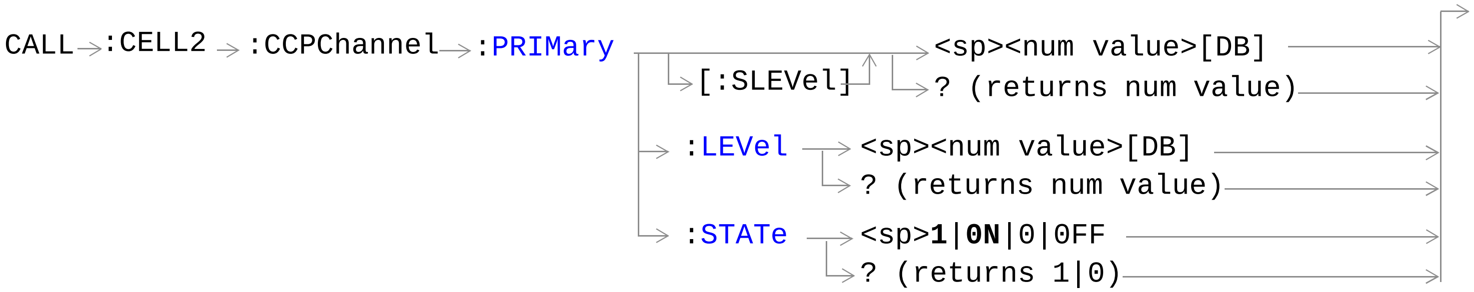
CALL:STATus:OCNSource:CELL2:STATe?

Function	Queries the current cell 2 on/off state of the orthogonal channel noise simulator channel (OCNS). The OCNS channel on/off state is set using the “CALL:OCNSource” commands. The optional [:SELected] keyword in this command specifies that the OCNS channel state being queried applies to the current system type. (See “Cell 2 Overview” on page 112).
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATUS:OCNS:CELL2:STATE?"
```

CALL:CELL2:CCPChannel



“Diagram Conventions”

CALL:CELL2:CCPChannel:PRIMary[:SLEVel]

Function	Sets/queries the initial power offset of the cell 2 primary common control physical channel. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value. See "Cell 2 Overview" on page 112.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-9.9 dB
Requirements	Lab Application Revision: A.01 and above.

Programming Example

```
OUTPUT 714;"CALL:CELL2:CCPCHANNEL:PRIMARY:SLEVEL -15DB" !Enables and sets the initial P-CCPCH
power offset to -15 dB.
```

CALL:CELL2:CCPChannel:PRIMary:LEVel

Function	Sets/queries the cell 2 primary common control physical channel's initial power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this setting. See "Cell 2 Overview" on page 112.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-9.9 dB
Requirements	Lab Application Revision: A.01 and above.

Programming Example

```
OUTPUT 714;"CALL:CELL2:CCPCHANNEL:PRIMARY:LEVEL -15DB" !Sets the initial P-CCPCH power offset to
-15 dB.
```

CALL:CELL2:CCPChannel:PRIMary:STATe

Function	Sets/queries the cell 2 primary common control physical channel's state. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this setting. See "Cell 2 Overview" on page 112.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Lab Application Revision: A.01 and above.

Programming Example

```
OUTPUT 714;"CALL:CELL2:CCPCHANNEL:PRIMARY:STATE ON"
```

CALL:CELL2:CLPControl

```
CALL → :CELL2 → :CLPControl → :UPLink → :MODE → <sp>ACTive|UDOWn|UP|DOWN|UDOWn10 →
                                              → ? (returns ACT|UDOW|UP|DOWN|
                                                   UDOW10)
```

"Diagram Conventions"

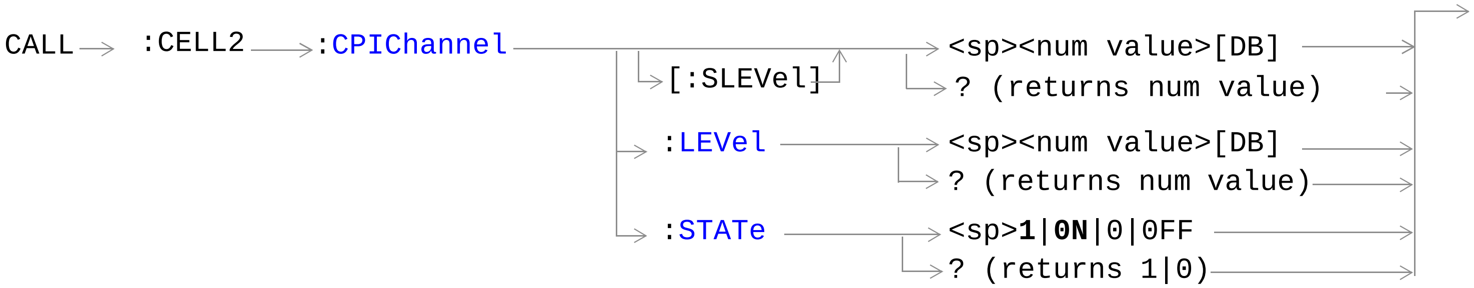
CALL:CELL2:CLPControl:UPLink:MODE

Function	Sets/queries the cell 2 uplink power control setting when using the Active Cell operating mode. See "Cell 2 Overview" on page 112.
Setting	Range: • ACTive (activates closed loop power control) • UDOWn (alternating bits) • UP (all up bits) • DOWN (all down bits) • UDOWn10 (ten up/ten down bits)
Query	Range: Same as setting range.
*RST Setting	ACTive
Requirements	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:CELL2:CLPControl:UPLink:MODE ACTive"
!Sets the uplink closed loop power control to active.
```

CALL:CELL2:CPIChannel



“Diagram Conventions”

CALL:CELL2:CPIChannel[:SLEVel]

Function	Sets/queries the cell 2 common pilot channel’s initial power offset. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value. (See “Cell 2 Overview” on page 112).
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-4.8 dB
Requirements	Lab Application Revision: A.01 and above.
Programming Example `OUTPUT 714;"CALL:CELL2:CPICHANNEL:SLEVEL -10"`	

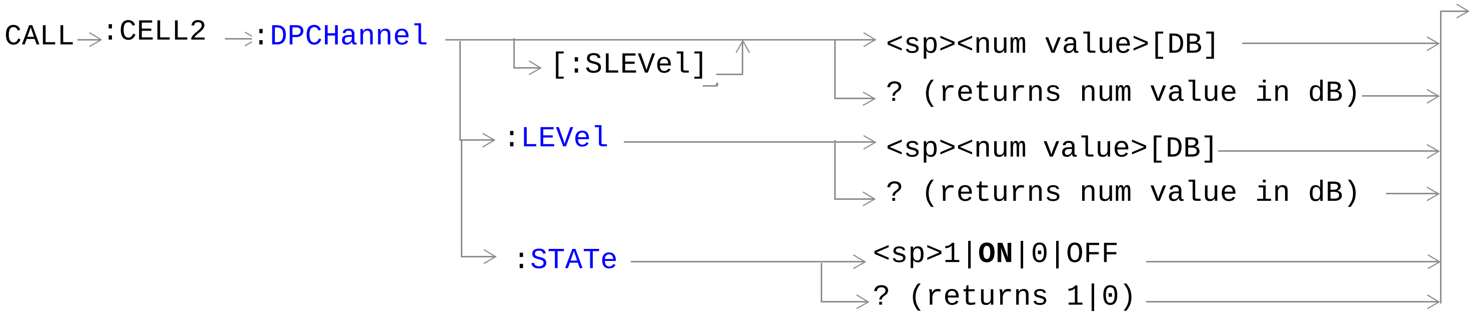
CALL:CPIChannel:LEVel

Function	Sets/queries the common pilot channel's initial power offset. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value. (See "Cell 2 Overview" on page 112).
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-4.8 dB
Requirements	Lab Application Revision: A.01 and above.
Programming Example `OUTPUT 714;"CALL:CPICHANNEL:LEVEL -5"`	

CALL:CPIChannel:STATe

Function	Sets/queries the common pilot channel's state. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value. (See "Cell 2 Overview" on page 112).
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Lab Application Revision: A.01 and above.
Programming Example `OUTPUT 714;"CALL:CPICHANNEL:STATE ON"`	

CALL:CELL2:DPCHannel



"Diagram Conventions"

CALL:CELL2:DPCHannel[:SLEVel]

Function	Sets/queries the cell 2 dedicated physical channel's (DPCH) initial downlink offset, and sets its state to ON. (See "Cell 2 Overview" on page 112).
Setting	Range: -30.00 dB to 0 dB Resolution: 0.01
Query	Range: -30.00 dB to 0 dB Resolution: 0.01
*RST Setting	-12.00 dB
Requirements	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:CELL2:DPCHANNEL:SLEVEL -12"
```

CALL:CELL2:DPCHannel:LEVel

Function	Sets/queries the cell 2 dedicated physical channel's (DPCH) initial downlink offset. (See "Cell 2 Overview" on page 112).
Setting	Range: -30.00 dB to 0 dB Resolution: 0.01
Query	Range: -30.00 dB to 0 dB Resolution: 0.01
*RST Setting	-12.00 dB
Requirements	Lab Application Revision: A.01 and above

Programming Example

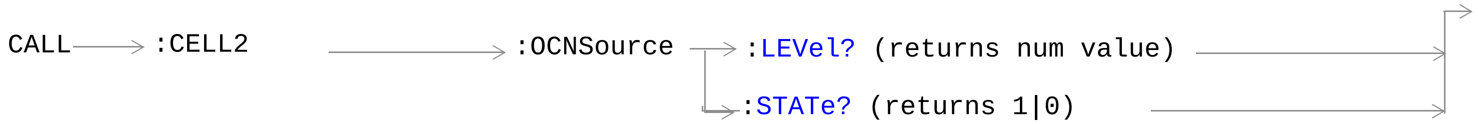
```
OUTPUT 714;"CALL:CELL2:DPCHANNEL:LEVEL -12"
```

CALL:DPCHannel:STATe

Function	Sets/queries the dedicated physical control channel’s state. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value. (See “Cell 2 Overview” on page 112).
Setting	Range: 1|ON | 0|OFF
Query	Range: 1| 0
*RST Setting	1
Requirements	Lab Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;"CALL:DPCHANNEL:STAT 1"
```

CALL:CELL2:OCNSource



“Diagram Conventions” on page 368

CALL:CELL2:OCNSource:LEVel?

Function	Queries the cell 2 calculated level of the UTRA FDD composite orthogonal channel noise simulator (OCNS). The OCNS level is a calculated value used to balance the relative power levels of the following channels to sum to 100%: • OCNS • Common Pilot Channel (CPICH) • Primary Common Control Physical Channel (P-CCPCH) • Synchronization Channel (SCH) • Dedicated Physical Channel (DPCH) If the contribution of OCNS is calculated to be -30 dB or less, the OCNS state is turned off. (See “Cell 2 Overview” on page 112).
Query	Range: 0 to -29 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Requirements	Lab Application Revision: A.01 and above
Programming Example	

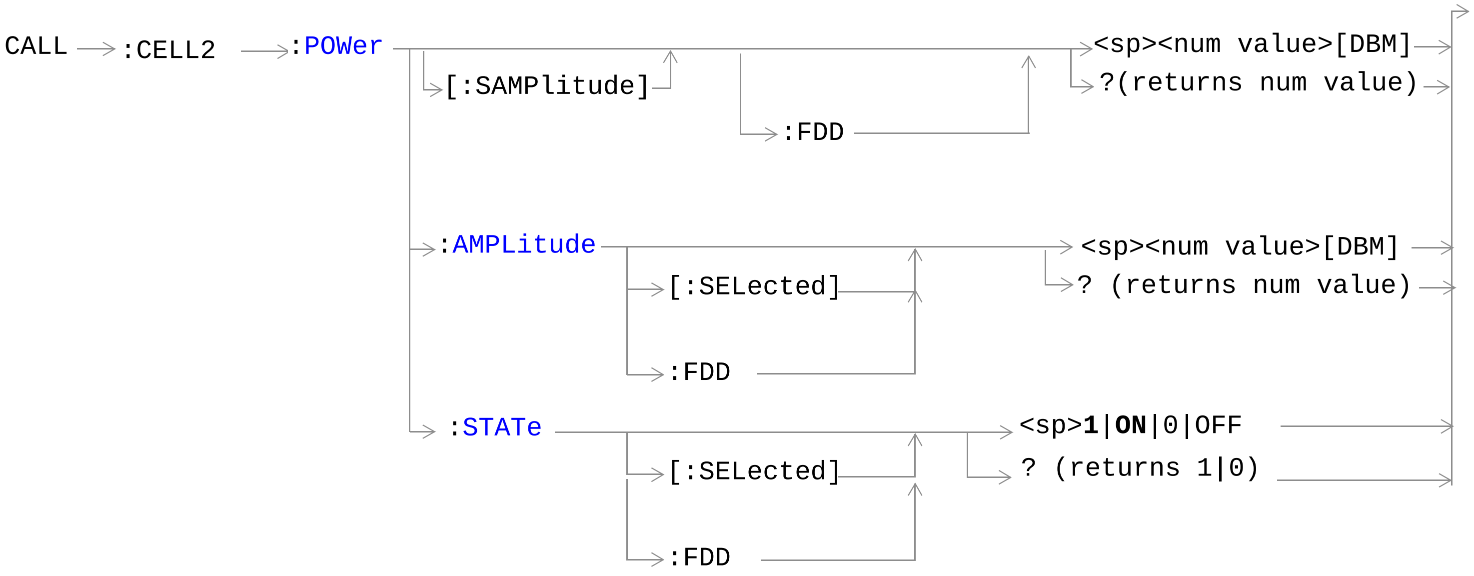
```
OUTPUT 714;"CALL:CELL2:OCNSOURCE:LEVEL?" !Queries the cell 2 calculated OCNS level.
```

CALL:CELL2:OCNSource:STATe?

Function	Queries the cell 2 on/off state of the calculated UTRA FDD composite orthogonal channel noise simulator (OCNS). The OCNS level is a calculated value used to balance the relative power levels of the following channels to sum to 100%: • OCNS • Common Pilot Channel (CPICH) • Primary Common Control Physical Channel (P-CCPCH) • Synchronization Channel (SCH) • Dedicated Physical Channel (DPCH) If the contribution of OCNS is calculated to be -30 dB or less, the OCNS state is turned off. (See "Cell 2 Overview" on page 112).
Setting	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Lab Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;"CALL:CELL2:OCNSOURCE:STATE?"
```

CALL:CELL2:POWer



"Diagram Conventions"

CALL:CELL2:POWer[:SAMPLitude]

Function	Sets/queries the cell 2 power level (including compensation for amplitude offset), and sets its state to ON. (See "Cell 2 Overview" on page 112).
Setting	Range: • -170dBm/3.84MHz to +37dBm/3.84MHz, 9.91 E+37 (-120 dBm/3.84MHz to -13 dBm/3.84MHz actual hardware range with amplitude offset = 0) The actual power range is defined by adding the value of the associated Amplitude Offset to the range in the table. For example, if amplitude offset is -3.5 dB, then the power range will be -123.5 dBm/3.84 MHz to -16.5 dBm/3.84MHz. Resolution: 0.01 dBm/3.84 MHz
Query	Range: Same as setting range. Resolution: Same as setting range.
*RST Setting	9.91 E+37
Requirements	Lab Application Revision: A.01 and above
Programming Example	`OUTPUT 714;"CALL:CELL2:POWER:SAMPLITUDE -30" !Sets the cell 2 power level -30 dBm and turns it on.`

CALL:CELL2:POWer:AMPLitude[:SELected]

Function	Sets/queries the cell 2 power level (including compensation for amplitude offset). The optional [:SELected] keyword in this command specifies that the cell power level being set or queried applies to the current system type. The current system type can be changed using the "CALL[:CELL]:SYSTem[:TYPE]?" command. (See "Cell 2 Overview" on page 112).
Setting	Range: • -170dBm/3.84MHz to +37dBm/3.84MHz, 9.91 E+37 (-120 dBm/3.84MHz to -13 dBm/3.84MHz actual hardware range with amplitude offset = 0) The actual power range is defined by adding the value of the associated Amplitude Offset to the range in the table. For example, if amplitude offset is -3.5 dB, then the power range will be -123.5 dBm/3.84 MHz to -16.5 dBm/3.84MHz. Resolution: 0.01 dBm/3.84 MHz
Query	Range: Same as setting range. Resolution: Same as setting range.
*RST Setting	9.91 E+37
Requirements	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:CELL2:POWER:AMPLITUDE -30"
!Sets the cell 2 power level -30 dBm.
```

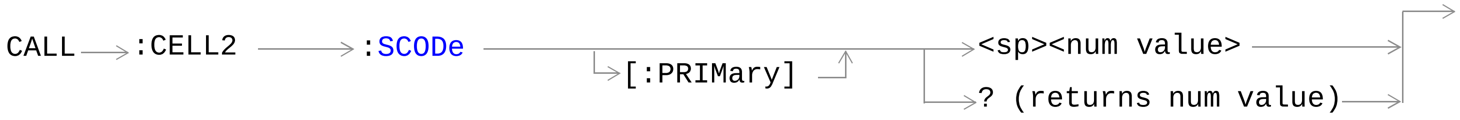
CALL:CELL2:POWer:STATe[:SELected]

Function	Sets/queries the cell 2 power state. The optional [:SELected] keyword in this command specifies that the cell 2 power state being set or queried applies to the current system type. The current system type can be changed using the "CALL[:CELL]:SYSTem[:TYPE]?" command. (See "Cell 2 Overview" on page 112).
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	ON
Requirements	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:CELL2:POWER:STATE OFF" !Turns off cell 2 power.
```

CALL:CELL2:SCODe



“Diagram Conventions” on page 368

CALL:CELL2:SCODe[:PRIMary]

Function	Sets/queries the cell 2 primary scrambling code. The actual code number for the primary scrambling code is 16 times the value of this setting. See 3GPP TS 25.213, "Spreading and Modulation (FDD)" for a complete description of the relationship between this index and the actual spreading code number. This setting cannot be changed while in the active cell operating mode. Attempting to change this setting while in this mode will result in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this setting. (See “Cell 2 Overview” on page 112).
Setting	Range: 0 to 511
Query	Range: 0 to 511
*RST Setting	1
Requirements	Lab Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;"CALL:CELL2:SCODe 10" !Sets the cell 2 primary scrambling code to 10.
```

CALL:CELL2:TOFFset

“Diagram Conventions”

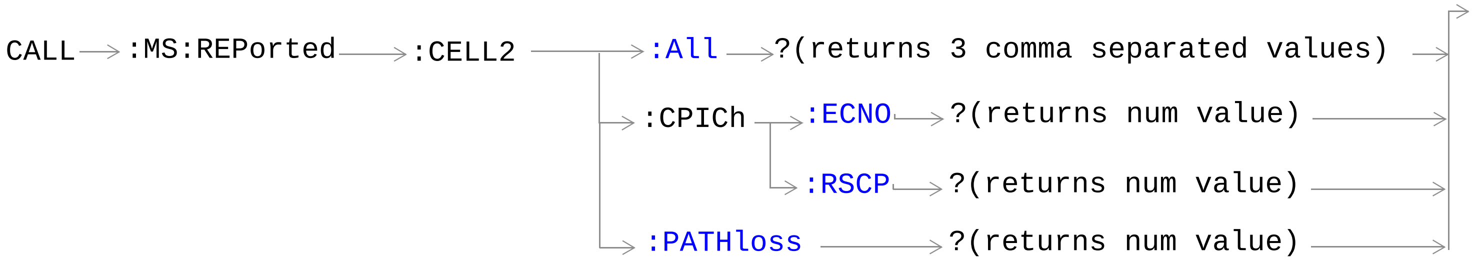
CALL:CELL2:TOFFset

Function	Sets/queries the cell 2 time offset. (See “Cell 2 Overview” on page 112).
Setting	Range: -16 to +16 chips
Query	Range: -16 to +16 chips
*RST Setting	0 chips
Requirements	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:CELL2:TOFFset 10" !Sets the cell 2 time offset to 10.
```

CALL:MS:REPorted:CELL2



"Diagram Conventions"

CALL:MS:REPorted:CELL2:ALL?

Function	Queries the cell 2 UE (mobile station) reported measurement results after a successful Measurement Request (see "CALL:MS:REPorted:MEASurement:REQuest" on page 445). The supported measurements include CPICH Ec/No, CPICH RSCP, and Pathloss (see "Mobile Station (UE) Reported Measurements" on page 152 for more information). After a successful Measurement Request, three comma separated results are returned in the order of CPICH Ec/No, CPICH RSCP, and Pathloss. See "CALL:MS:REPorted:CELL2:CPICh:ECNO?" , "CALL:MS:REPorted:CELL2:CPICh:RSCP?" , and "CALL:MS:REPorted:CELL2:PATHloss?" , and for more information.
Query	CPICH Ec/No: • Range: 0 to 49 CPICH RSCP: • Range: 0 to 91 Pathloss: • Range: 46 to 158 dB • Resolution: 1 dB
*RST Setting	"" (null string)
Requirements	Lab Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:MS:REPorted:CELL2:ALL?"`	

CALL:MS:REPorted:CELL2:CPICh:ECNO?

Function	Queries the cell 2 UE (mobile station) reported CPICH Ec/No measurement result which is an index to a range of Ec/No values. See "Mobile Station (UE) Reported Measurements" on page 152 for the mapping of this report value to actual Ec/No range.
Query	Range: 0 to 49

CALL:MS:REPorted:CELL2

*RST Setting	NULL
Requirements	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”CALL:MS:REPorted:CELL2:CPICh:ECNO?”
```

CALL:MS:REPorted:CELL2:CPICh:RSCP?

Function	Queries the cell 2 UE (mobile station) reported CPICH RSCP measurement result which is an index to a range of RSCP values. See "Mobile Station (UE) Reported Measurements" on page 152 for the mapping of this report value to actual RSCP range.
Query	Range: 0 to 91
*RST Setting	NULL
Requirements	Lab Application Revision: A.01 and above
Programming Example	

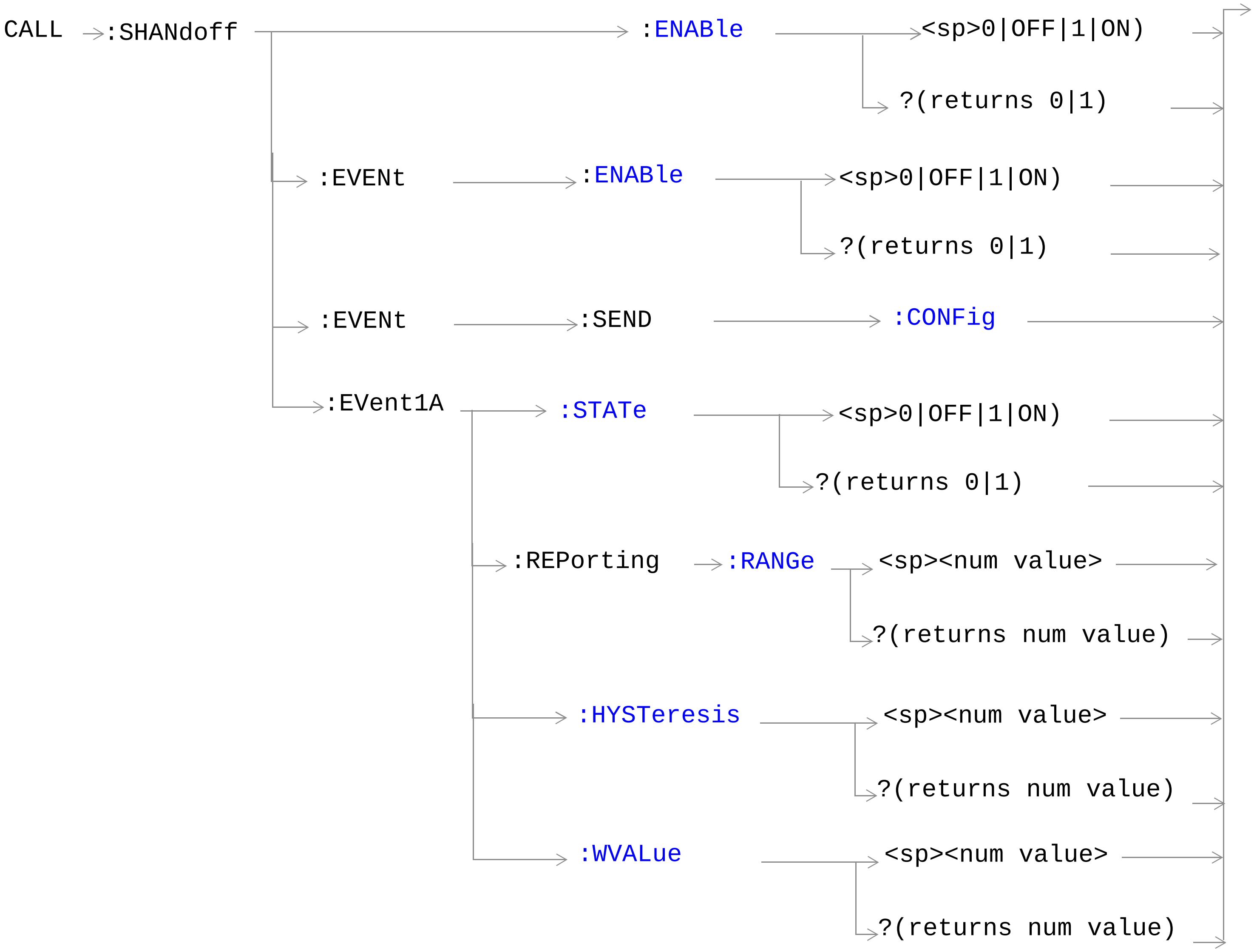
```
OUTPUT 714;"CALL:MS:REPorted:CELL2:CPICh:RSCP?"
```

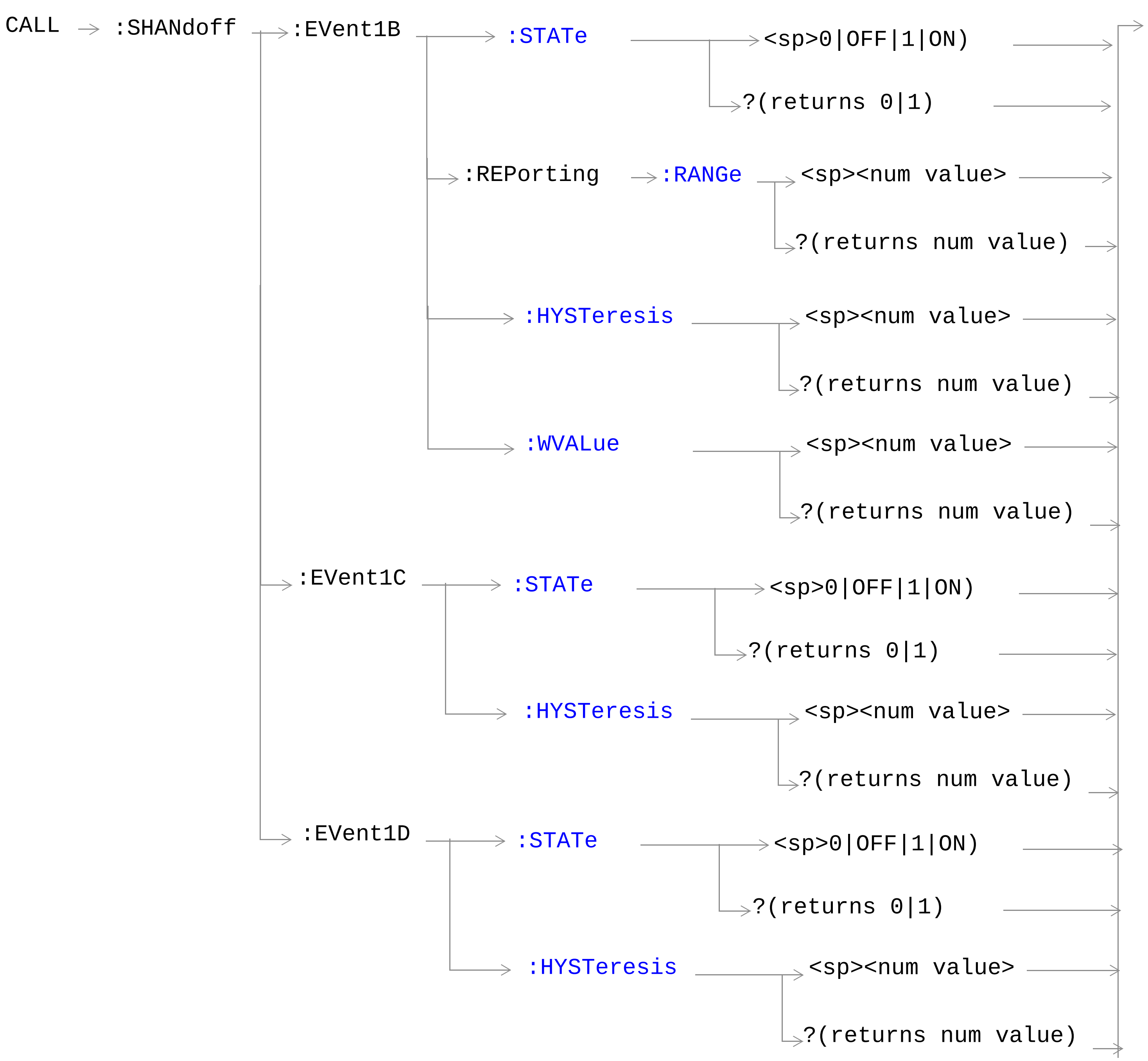
CALL:MS:REPorted:CELL2:PATHloss?

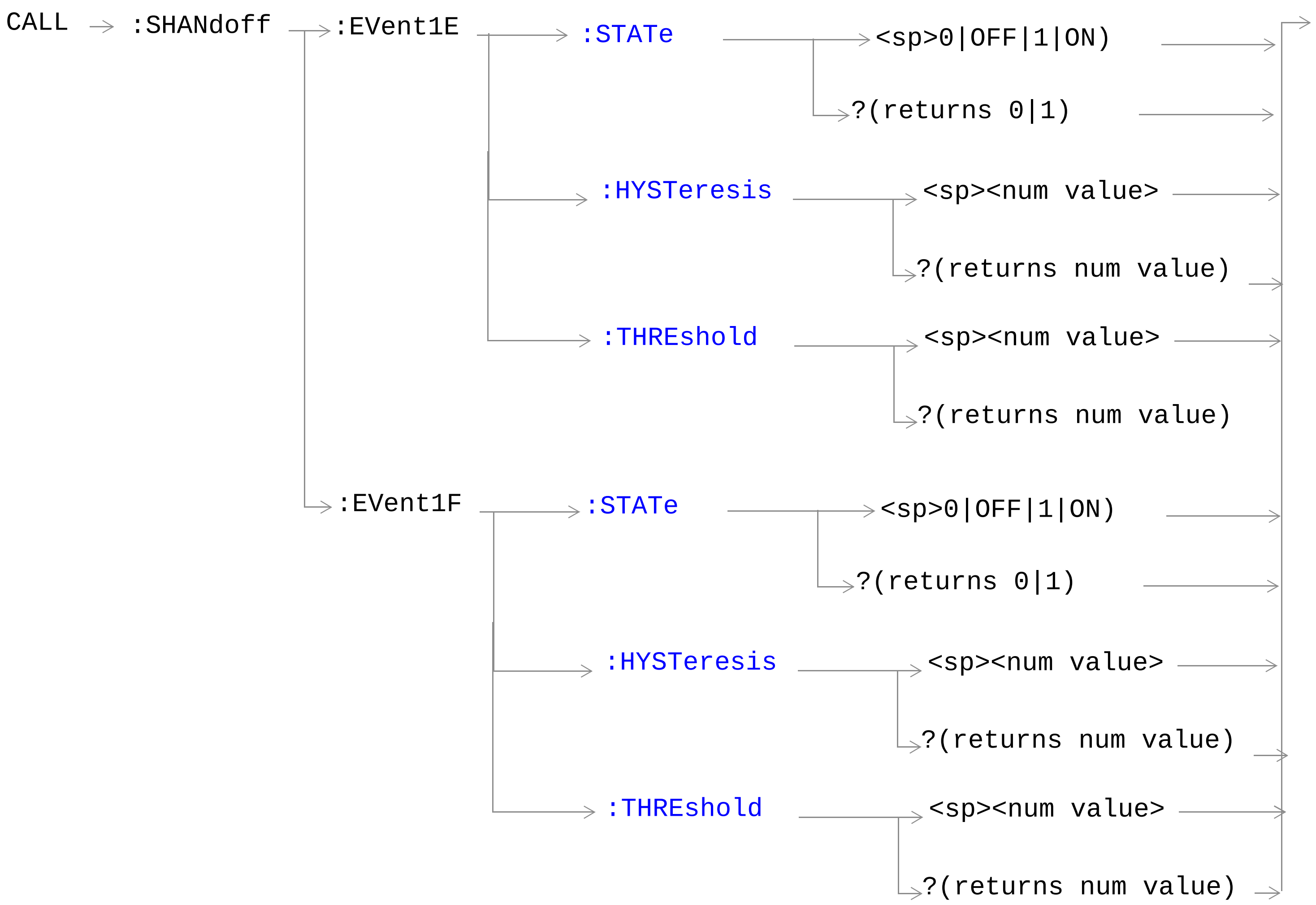
Function	Queries the cell 2 UE (mobile station) reported Pathloss measurement result in the unit of dB. See "Mobile Station (UE) Reported Measurements" on page 152 for more details.
Query	Range: 46 to 158 dB Resolution: 1 dB
*RST Setting	NULL
Requirements	Lab Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;"CALL:MS:REPorted:CELL2:PATHloss?"
```

CALL:SHANdoff




CALL
:SHANdoff
:EVent1B
:STATe
<sp>0|OFF|1|ON)
?(returns 0|1)
:REPorting
:RANGe
<sp><num value>
?(returns num value)
:HYSTeresis
<sp><num value>
?(returns num value)
:WVALue
<sp><num value>
?(returns num value)
:EVent1C
:STATe
<sp>0|OFF|1|ON)
?(returns 0|1)
:HYSTeresis
<sp><num value>
?(returns num value)
:EVent1D
:STATe
<sp>0|OFF|1|ON)
?(returns 0|1)
:HYSTeresis
<sp><num value>
?(returns num value)



"Diagram Conventions"

CALL:SHANdoff:ENABle

Function	Turns Soft Handoff On or Off. (See “Enabling Soft Handoff” on page 115)
Setting	Range: 0 | OFF | 1 | ON
Query	Range: 0 | 1
*RST Setting	OFF

Programming Example

```
OUTPUT 714;”CALL:SHANdoff:ENABle ON”
!Turns Soft Handoff ON.
```

CALL:SHANdoff:EVENt:ENABle

Function	Turns Event State On or Off (enables/disables event reporting). (See “Event Triggering” on page 115)
Setting	Range: 0 | OFF | 1 | ON
Query	Range: 0 | 1
*RST Setting	OFF

Programming Example

```
OUTPUT 714;”CALL:SHANdoff:EVENt:ENABle ON”
!Turns Event State ON.
```

CALL:SHANdoff:EVENt:SEND:CONFig

Function	Sends a Measurement Control message. You must send this command after configuring an event parameter (CALL:SHANdoff:EVent1A - 1F commands) for the new event parameter value to be implemented by the UE. (See “Event Triggering” on page 115).

Programming Example

```
OUTPUT 714;”CALL:SHANdoff:EVENt:SEND:CONFig”
!Sends a Measurement Control message.
```

CALL:SHANdoff:EVent1A:STATe

Function	Controls the UTRA FDD Event 1a ON/OFF State. In order for changes to this event parameter to be seen by the UE, you must send the “CALL:SHANdoff:EVENt:SEND:CONFig” command. (See “Event Triggering” on page 115).
Setting	Range: 0 | OFF | 1 | ON
Query	Range: 0 | 1
*RST Setting	ON

Programming Example

```
OUTPUT 714;”CALL:SHANdoff:EV1A:STATe ON”
!Turns the Event 1a State ON.
```

CALL:SHANdoff:EVent1A:REPorting:RANGe

Function	Controls the UTRA FDD Event 1a Reporting Range Constant. In order for changes to this event parameter to be seen by the UE, you must send the "CALL:SHANdoff:EVENt:SEND:CONFig" command. (See "Event Triggering" on page 115).
Setting	Range: 0.0 to 14.5 dB Resolution: 0.5 dB
Query	Range: 0.0 to 14.5
*RST Setting	0.0 dB
Programming Example	

```
OUTPUT 714;"CALL:SHANdoff:EV1A:REPorting:RANGe 1.5"
!Sets the UTRA FDD Event 1a Reporting Range Constant to 1.5 dB.
```

CALL:SHANdoff:EVent1A:HYSTeresis

Function	Controls the UTRA FDD Event 1a Hysteresis. In order for changes to this event parameter to be seen by the UE, you must send the "CALL:SHANdoff:EVENt:SEND:CONFig" command. (See "Event Triggering" on page 115).
Setting	Range: 0.0 to 7.5 dB Resolution: 0.5 dB
Query	Range: 0.0 to 7.5
*RST Setting	3.0 dB
Programming Example	

```
OUTPUT 714;"CALL:SHANdoff:EV1A:HYSTeresis 2.0"
!Sets the UTRA FDD Event 1a Hysteresis to 2.0 dB.
```

CALL:SHANdoff:EVent1A:WVALue

Function	Controls the UTRA FDD Event 1a "W" Value. In order for changes to this event parameter to be seen by the UE, you must send the "CALL:SHANdoff:EVENt:SEND:CONFig" command. (See "Event Triggering" on page 115).
Setting	Range: 0.0 to 2.0 dB Resolution: 0.1 dB
Query	Range: 0.0 to 2.0
*RST Setting	0 dB
Programming Example	

```
OUTPUT 714;"CALL:SHANdoff:EV1A:WVALue 0.5"
!Sets the UTRA FDD Event 1a "W" Value to 0.5 dB.
```

CALL:SHANdoff:EVent1B:STATe

Function	Controls the UTRA FDD Event 1b ON/OFF State. In order for changes to this event parameter to be seen by the UE, you must send the "CALL:SHANdoff:EVENt:SEND:CONFig" command. (See "Event Triggering" on page 115).
Setting	Range: 0 | OFF | 1 | ON
Query	Range: 0 | 1
*RST Setting	ON

Programming Example

```
OUTPUT 714;"CALL:SHANdoff:EV1B:STATe ON"
!Turns the Event 1b State ON.
```

CALL:SHANdoff:EVent1B:REPorting:RANGe

Function	Controls the UTRA FDD Event 1b Reporting Range Constant. In order for changes to this event parameter to be seen by the UE, you must send the "CALL:SHANdoff:EVENt:SEND:CONFig" command. (See "Event Triggering" on page 115).
Setting	Range: 0.0 to 14.5 dB Resolution: 0.5 dB
Query	Range: 0.0 to 14.5
*RST Setting	0.0 dB

Programming Example

```
OUTPUT 714;"CALL:SHANdoff:EV1B:REPorting:RANGe 1.5"
!Sets the UTRA FDD Event 1b Reporting Range Constant to 1.5 dB.
```

CALL:SHANdoff:EVent1B:HYSTeresis

Function	Controls the UTRA FDD Event 1b Hysteresis. In order for changes to this event parameter to be seen by the UE, you must send the "CALL:SHANdoff:EVENt:SEND:CONFig" command. (See "Event Triggering" on page 115).
Setting	Range: 0.0 to 7.5 dB Resolution: 0.5 dB
Query	Range: 0.0 to 7.5
*RST Setting	3.0 dB

Programming Example

```
OUTPUT 714;"CALL:SHANdoff:EV1B:HYSTeresis 2.0"
!Sets the UTRA FDD Event 1b Hysteresis to 2.0 dB.
```

CALL:SHANdoff:EVent1B:WVALue

Function	Controls the UTRA FDD Event 1b “W” Value. In order for changes to this event parameter to be seen by the UE, you must send the “CALL:SHANdoff:EVENt:SEND:CONFig” command. (See “Event Triggering” on page 115).
Setting	Range: 0.0 to 2.0 dB Resolution: 0.1 dB
Query	Range: 0.0 to 2.0
*RST Setting	0 dB
Programming Example	

```
OUTPUT 714;"CALL:SHANdoff:EV1B:WVALue 0.5"
!Sets the  UTRA FDD Event 1b “W” Value to 0.5 dB.
```

CALL:SHANdoff:EVent1C:STATe

Function	Controls the UTRA FDD Event 1c ON/OFF State. In order for changes to this event parameter to be seen by the UE, you must send the “CALL:SHANdoff:EVENt:SEND:CONFig” command. (See “Event Triggering” on page 115).
Setting	Range: 0 | OFF | 1 | ON
Query	Range: 0 | 1
*RST Setting	ON
Programming Example	

```
OUTPUT 714;"CALL:SHANdoff:EV1C:STATe ON"
!Turns the Event 1c State ON.
```

CALL:SHANdoff:EVent1C:HYSTeresis

Function	Controls the UTRA FDD Event 1c Hysteresis. In order for changes to this event parameter to be seen by the UE, you must send the “CALL:SHANdoff:EVENt:SEND:CONFig” command. (See “Event Triggering” on page 115).
Setting	Range: 0.0 to 7.5 dB Resolution: 0.5 dB
Query	Range: 0.0 to 7.5
*RST Setting	3.0 dB
Programming Example	

```
OUTPUT 714;"CALL:SHANdoff:EV1C:HYSTeresis 2.0"
!Sets the  UTRA FDD Event 1c Hysteresis to 2.0 dB.
```

CALL:SHANdoff:EVent1D:STATe

Function	Controls the UTRA FDD Event 1d ON/OFF State. In order for changes to this event parameter to be seen by the UE, you must send the "CALL:SHANdoff:EVENt:SEND:CONFig" command. (See "Event Triggering" on page 115).
Setting	Range: 0 | OFF | 1 | ON
Query	Range: 0 | 1
*RST Setting	ON

Programming Example

```
OUTPUT 714;"CALL:SHANdoff:EV1D:STATe ON"
!Turns the Event 1d State ON.
```

CALL:SHANdoff:EVent1D:HYSTeresis

Function	Controls the UTRA FDD Event 1c Hysteresis. In order for changes to this event parameter to be seen by the UE, you must send the "CALL:SHANdoff:EVENt:SEND:CONFig" command. (See "Event Triggering" on page 115).
Setting	Range: 0.0 to 7.5 dB Resolution: 0.5 dB
Query	Range: 0.0 to 7.5
*RST Setting	3.0 dB

Programming Example

```
OUTPUT 714;"CALL:SHANdoff:EV1D:HYSTeresis 2.0"
!Sets the UTRA FDD Event 1d Hysteresis to 2.0 dB.
```

CALL:SHANdoff:EVent1E:STATe

Function	Controls the UTRA FDD Event 1e ON/OFF State. In order for changes to this event parameter to be seen by the UE, you must send the "CALL:SHANdoff:EVENt:SEND:CONFig" command. (See "Event Triggering" on page 115).
Setting	Range: 0 | OFF | 1 | ON
Query	Range: 0 | 1
*RST Setting	ON

Programming Example

```
OUTPUT 714;"CALL:SHANdoff:EV1E:STATe ON"
!Turns the Event 1e State ON.
```

CALL:SHANdoff:EVent1E:HYSTeresis

Function	Controls the UTRA FDD Event 1e Hysteresis. In order for changes to this event parameter to be seen by the UE, you must send the “CALL:SHANdoff:EVENt:SEND:CONFig” command. (See “Event Triggering” on page 115).
Setting	Range: 0.0 to 7.5 dB Resolution: 0.5 dB
Query	Range: 0.0 to 7.5
*RST Setting	3.0 dB
Programming Example `OUTPUT 714;”CALL:SHANdoff:EV1E:HYSTeresis 2.0”` `!Sets the` UTRA FDD Event 1e Hysteresis to 2.0 dB.	

CALL:SHANdoff:EVent1E:THREshold

Function	Controls the UTRA FDD Event 1e Threshold. In order for changes to this event parameter to be seen by the UE, you must send the “CALL:SHANdoff:EVENt:SEND:CONFig” command. (See “Event Triggering” on page 115).
Setting	Range: -115 to 165 dB Resolution: Integer
Query	Range: -115 to 165
*RST Setting	-60 dB
Programming Example `OUTPUT 714;”CALL:SHANdoff:EV1E:THREshold -70”` `!Sets the` UTRA FDD Event 1e Threshold to -70 dB.	

CALL:SHANdoff:EVent1F:STATe

Function	Controls the UTRA FDD Event 1f ON/OFF State. In order for changes to this event parameter to be seen by the UE, you must send the “CALL:SHANdoff:EVENt:SEND:CONFig” command. (See “Event Triggering” on page 115).
Setting	Range: 0|OFF|1|ON
Query	Range: 0|1
*RST Setting	ON

Programming Example
`OUTPUT 714;”CALL:SHANdoff:EV1F:STATe ON”`
`!Turns the Event 1f State ON.`	

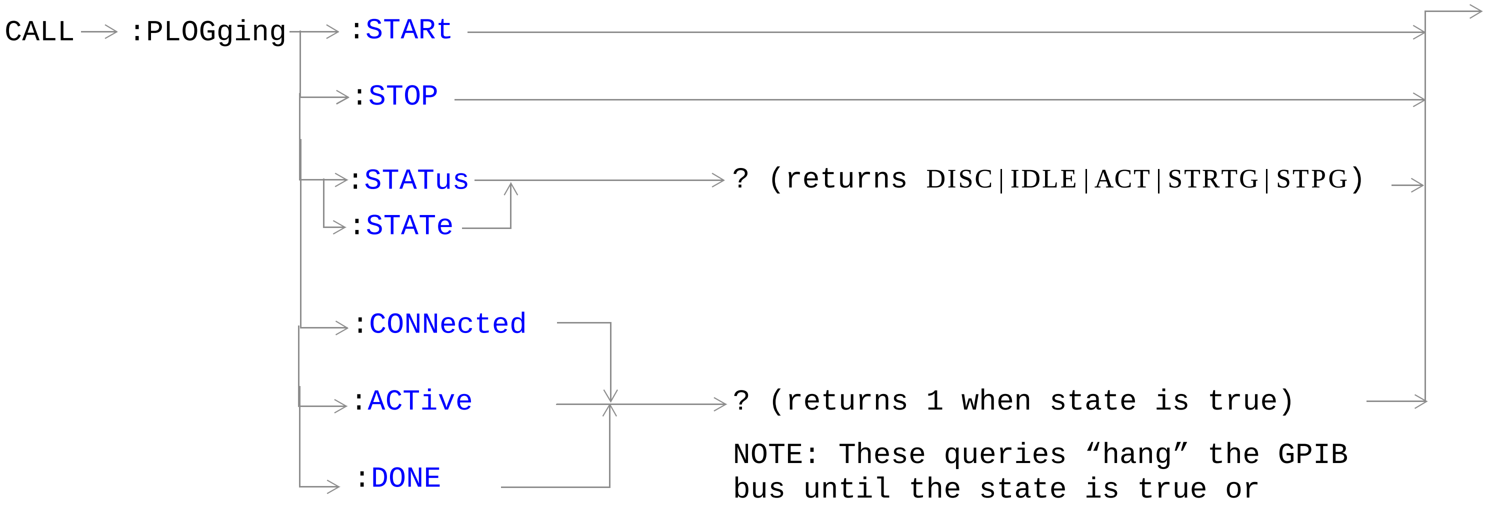
CALL:SHANdoff:EVent1F:HYSTeresis

Function	Controls the UTRA FDD Event 1f Hysteresis. In order for changes to this event parameter to be seen by the UE, you must send the "CALL:SHANdoff:EVENt:SEND:CONFig" command. (See "Event Triggering" on page 115).
Setting	Range: 0.0 to 7.5 dB Resolution: 0.5 dB
Query	Range: 0.0 to 7.5
*RST Setting	3.0 dB
Programming Example `OUTPUT 714;"CALL:SHANdoff:EV1F:HYSTeresis 2.0"` `!Sets the` UTRA FDD Event 1f Hysteresis to 2.0 dB.	

CALL:SHANdoff:EVent1F:THREshold

Function	Controls the UTRA FDD Event 1f Threshold. In order for changes to this event parameter to be seen by the UE, you must send the "CALL:SHANdoff:EVENt:SEND:CONFig" command. (See "Event Triggering" on page 115).
Setting	Range: -115 to 165 dB Resolution: Integer
Query	Range: -115 to 165
*RST Setting	-80 dB
Programming Example `OUTPUT 714;"CALL:SHANdoff:EV1F:THREshold -70"` `!Sets the` UTRA FDD Event 1f Threshold to -70 dB.	

CALL:PLOGging



NOTE: These queries “hang” the GPIB bus until the state is true or interface clear or bus timeout occurs.

“Diagram Conventions” on page 368

CALL:PLOGging:STARt

Function	This command will cause the test set to transition to the Active logging state. Once in the Active Logging state the test set can begin forwarding messages to the protocol logging software. The protocol logging software must be in real-time mode (not post-capture mode) and a real-time logging session must be connected before transition to the Active logging state is possible. A real-time logging session is connected by entering the IP Address of the test set in the Tools, Configuration window found in the protocol logging software. When a real-time logging session is connected, the test set's front panel logging annunciator will display Logging:Idle (see the Idle description in "CALL:PLOGging<:STATus|:STATe>?" .) After the transition from the Idle to Active logging state has occurred, the test set's front paned logging annunciator will appear as follows: **Logging:Active** **NOTE** The test set can also be transitioned to the Active logging state by clicking on the REC (record) button located in the protocol logging software
Requirements	Lab Application Revision: A.01.20 and above
Programming Example	`OUTPUT 714;"CALL:PLOGGING:START" !Starts protocol logging.`

CALL:PLOGging:STOP

Function	This command will cause the test set to transition to the Idle logging state. The test set must be in the Active state before transition to the Idle logging state is possible. After the transition from the Active to the Idle logging state, the test set's front panel logging annunciator will appear as follows `Logging:Idle` **NOTE** The test set can also be transitioned to the Idle logging state by clicking on the STOP button located in the protocol logging software
Requirements	Lab Application Revision: A.01.20 and above
Programming Example	`OUTPUT 714;"CALL:PLOGGING:STOP"!Stops protocol logging.`

CALL:PLOGging<:STATus|:STATe>?

Function	This command queries the status of the test set's protocol logging data source. The logging status can be viewed on the test set front panel's logging annunciator. Possible query results are: • DISC (Disconnected) - There is no real-time protocol logging session established between the test set and the protocol logging software. • IDLE - A real-time protocol logging session has been established between the test set and the protocol logging software, but protocol logging is not currently taking place. • ACT (Active) - Both a real-time session and a logging session have been established and data is being captured by the protocol logging software. • STRTG (Starting) - This is a transitional state while the protocol logging software attempts to start logging test set protocol messages. • STPG (Stopping) - This is a transitional state while the protocol logging software attempts to stop logging test set protocol messages.
Requirements	Lab Application Revision: A.01.20 and above
Query	Range: DISC | IDLE | ACT | STRTG | STPG
Programming Example	`OUTPUT 714;"CALL:PLOGGING:STATe?"!Queries the protocol logging state.`

CALL:PLOGging:CONNected?

Function	This query returns an integer value of 1 if the status of the test set's protocol logging data source is either: • IDLE - A real-time protocol logging session has been established between the test set and the protocol logging software, but protocol logging is not currently taking place. • ACT (Active) - Both a real-time session and a logging session have been established and data is being captured by the protocol logging software. See "CALL:PLOGging<:STATus|:STATe>?" . If the state of the test set's protocol logging data source is not one of the above, this query will "hang" until a transition to one of these states occurs, or a bus timeout or device clear terminates the query attempt.
Requirements	Lab Application Revision: A.01.20 and above
Query	Range: 1
Programming Example	`OUTPUT 714;"CALL:PLOGGING:CONN?"!Queries the connected state.`

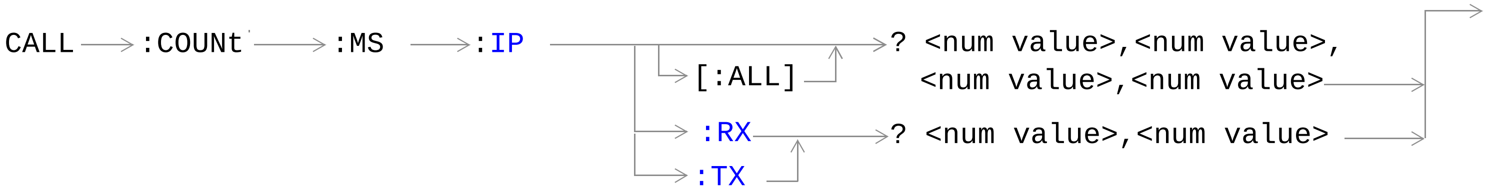
CALL:PLOGging:ACTive?

Function	This query returns an integer value of 1 if the status of the test set’s protocol logging data source is: • ACT (Active) - Both a real-time session and a logging session have been established and data is being captured by the protocol logging software. See “CALL:PLOGging<:STATus|:STATe>?” . If the state of the test set’s protocol logging data source is not Active, this query will “hang” until a transition to the Active state occurs, or a bus timeout or device clear terminates the query attempt.
Requirements	Lab Application Revision: A.01.20 and above
Query	Range: 1
Programming Example	`OUTPUT 714;”CALL:PLOGGING:ACT?”!Queries the Active state.`

CALL:PLOGging:DONE?

Function	This query returns an integer value of 1 if the status of the test set’s protocol logging data source is either: • DISC (Disconnected) - There is no real-time protocol logging session established between the test set and the protocol logging software. • IDLE - A real-time protocol logging session has been established between the test set and the protocol logging software, but protocol logging is not currently taking place. See “CALL:PLOGging<:STATus|:STATe>?” . If the state of the test set’s protocol logging data source is not one of the above, this query will “hang” until a transition to one of these states occurs, or a bus timeout or device clear terminates the query attempt.
Requirements	Lab Application Revision: A.01.20 and above
Query	Range: 1
Programming Example	`OUTPUT 714;”CALL:PLOGGING:DONE?”!Queries the done (logging) state.`

CALL:COUNt



"Diagram Conventions" on page 368

CALL:COUNt:MS:IP[:ALL]?

Function	Queries the number of IP (Internet Protocol) packets and bytes transferred between the test set and the wireless device on both the uplink and downlink. Results are returned in the following order: 1. Downlink packets 2. Downlink bytes 3. Uplink packets 4. Uplink bytes Power up, full preset, or the clear counters command will clear the counters. When IP counters reach their maximum value, they remain at that value until cleared.
Query	Range: 0 to 9999999999, 9.91 E+37 Resolution: 1

Programming Example

```
OUTPUT 714;"CALL:COUNt:MS:IP:ALL?" !Queries the packet and byte count on the
downlink and uplink.
```

CALL:COUNt:MS:IP:RX?

Function	Queries the number of IP (Internet Protocol) packets and bytes transferred between the wireless device and the test set on the uplink channel. Results are returned in the following order: 1. Packets 2. Bytes Power up, full preset, or the clear counters command will clear the counters. When IP counters reach their maximum value, they remain at that value until cleared.

CALL:COUNt

Query	Range: 0 to 9999999999, 9.91 E+37 Resolution: 1
Programming Example `OUTPUT 714;"CALL:COUNt:MS:IP:RX?" !Queries the packet and byte count on the downlink.`	

CALL:COUNt:MS:IP:TX?

Function	Queries the number of IP (Internet Protocol) packets and bytes transferred between the wireless device and the test set on the downlink channel. Results are returned in the following order: 1. Packets 2. Bytes Power up, full preset, or the clear counters command will clear the counters. When IP counters reach their maximum value, they remain at that value until cleared.
Query	Range: 0 to 9,999,999,999, 9.91 E+37 Resolution: 1

Programming Example

```
OUTPUT 714;"CALL:COUNt:MS:IP:TX?" !Queries the packet and byte count on the
downlink.
```

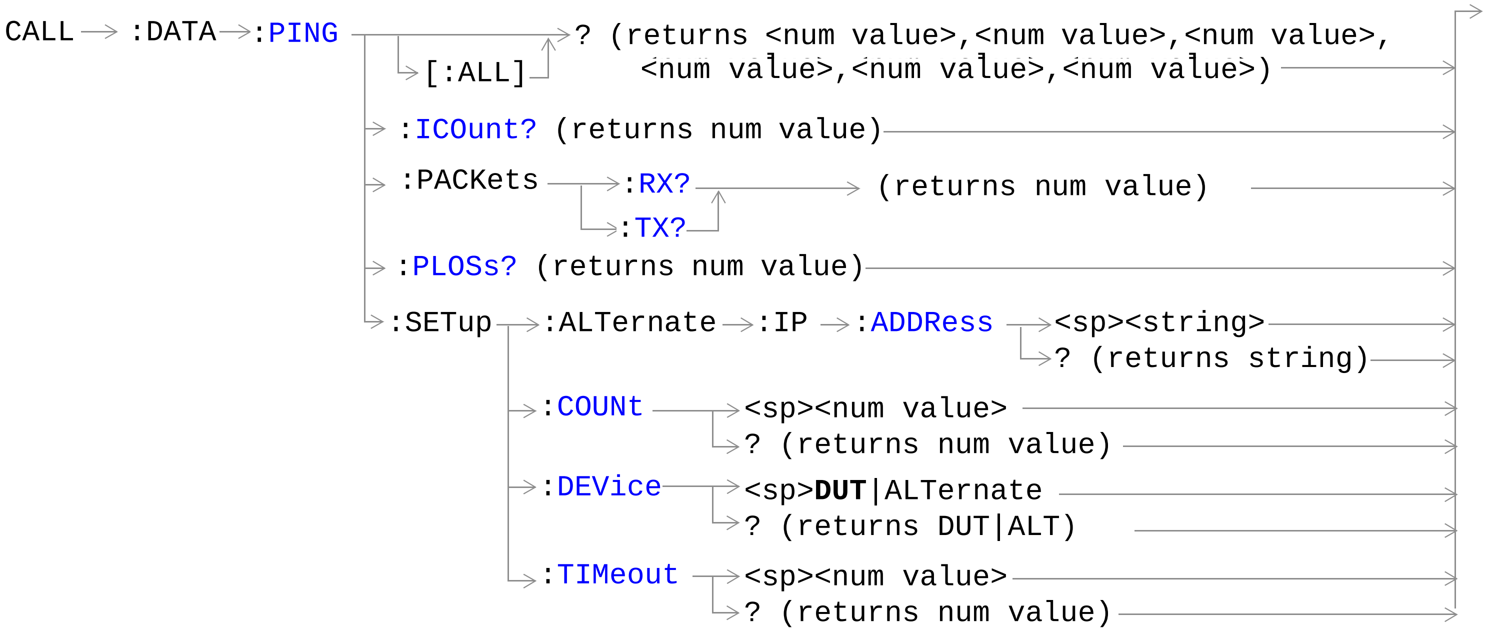
CALL:COUNt:CLEar:MS:IP

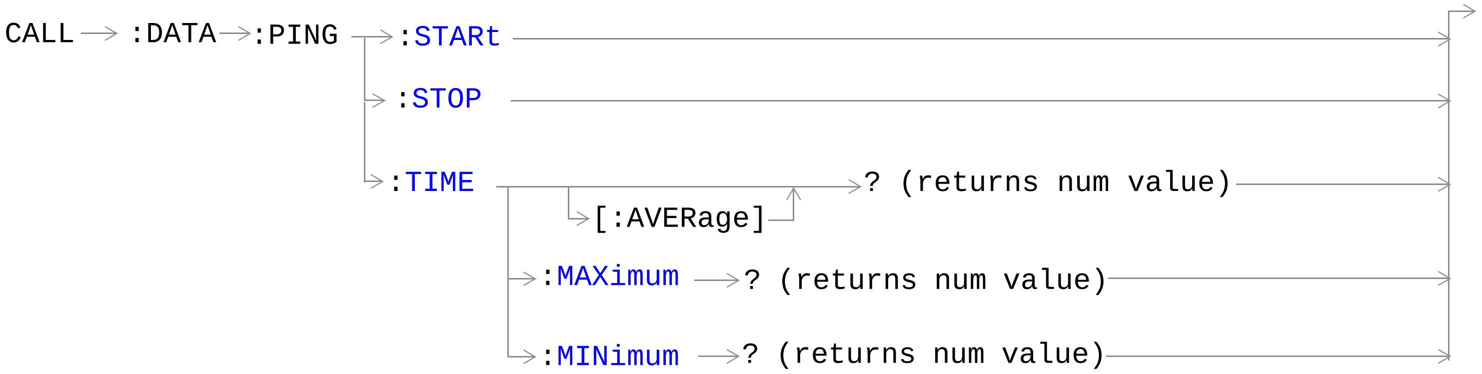
Function	Clears the data counters.

Programming Example

```
OUTPUT 714;"CALL:COUNt:CLEar:MS:IP" !Clears the IP counters.
```

CALL:DATA:PING





“Diagram Conventions”

CALL:DATA:PING[:ALL]?

Function	This command returns the following results: packets transmitted, packets received, percent 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 if the CALL:FUNCtion:DATA:TYPE command is not set to IPData, or if ping results are not available.
Requirements	Lab Application Revision: A.01 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	This command queries the value that is available when the query is received.
Requirements	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”CALL:DATA:PING:ICOUNT?”
ENTER 714;variable_name
```

CALL:DATA:PING:PACKets:RX?

Function	This command queries the number of packets received from the device being tested or from the alternate device if “CALL:DATA:PING:SETup:DEVice” is set to ALTernate. This command will return 9.91 E+37 if the CALL:FUNCtion:DATA:TYPE command is not set to IPData, or if ping results are not available.
Requirements	Lab Application Revision: A.01 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	This queries the number of packets transmitted from the test set. This command will return 9.91 E+37 if the CALL:FUNCtion:DATA:TYPE command is not set to IPData, or if ping results are not available.
Requirements	Lab Application Revision: A.01 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	This command queries the percentage of packets lost during the ping session. This command will return 9.91 E+37 if the CALL:FUNCtion:DATA:TYPE command is not set to IPData, or if ping results are not available.
Requirements	Lab Application Revision: A.01 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	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	Lab Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:DATA:PING:SETUP:ALTERNATE:IP:ADDRESS '192.168.16.57'"
```

CALL:DATA:PING:SETup:COUNt

Function	This command set/queries the number of ping IP messages sent for each uninterrupted invocation of the “CALL:DATA:PING:STARt” command.
Setting	Range: 1 to 1000
Query	Range: 1 to 1000
Requirements	Lab Application Revision: A.01 and above
*RST Setting	10
Programming Example `OUTPUT 714;”CALL:DATA:PING:SETUP:COUNT 20”`	

CALL:DATA:PING:SETup:DEVice

Function	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.
Setting	Range: DUT | ALTernate
Query	Range: DUT | ALT
Requirements	Lab Application Revision: A.01 and above
*RST Setting	DUT
Programming Example `OUTPUT 714;”CALL:DATA:PING:SETUP:DEVice ALT”`	

CALL:DATA:PING:SETup:TIMeout

Function	This command sets or queries how long the test set will wait before ending a ping session. This command will return 9.91 E+37 if the CALL:FUNCtion:DATA:TYPE command is not set to IPData, or if ping results are not available.
Setting	Range: 1 to 100 seconds
Query	Range: 1 to 100 seconds
Requirements	Lab Application Revision: A.01 and above
*RST Setting	5 seconds
Programming Example `OUTPUT 714;”CALL:DATA:PING:SETUP:TIMEOUT 10”`	

CALL:DATA:PING:STARt

Function	This command starts a ping session.
Requirements	Lab Application Revision: A.01 and above
Programming Example `OUTPUT 714;”CALL:DATA:PING:START”`	

CALL:DATA:PING:STOP

Function	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.
Requirements	Lab Application Revision: A.01 and above
Programming Example `OUTPUT 714;”CALL:DATA:PING:STOP”`	

CALL:DATA:PING:TIME[:AVERage]?

Function	This command queries the average round trip time (in seconds) for a series of pings. This command will return 9.91 E+37 if the CALL:FUNCtion:DATA:TYPE command is not set to IPData, or if ping results are not available.
Requirements	Lab Application Revision: A.01 and above

Programming Example
`OUTPUT 714;”CALL:DATA:PING:TIME:AVERAGE?”`
`ENTER 714;variable_name`	

CALL:DATA:PING:TIME:MAXimum?

Function	This command queries the maximum round trip time (in seconds) for a series of pings. This command will return 9.91 E+37 if the CALL:FUNCtion:DATA:TYPE command is not set to IPData, or if ping results are not available.
Requirements	Lab Application Revision: A.01 and above

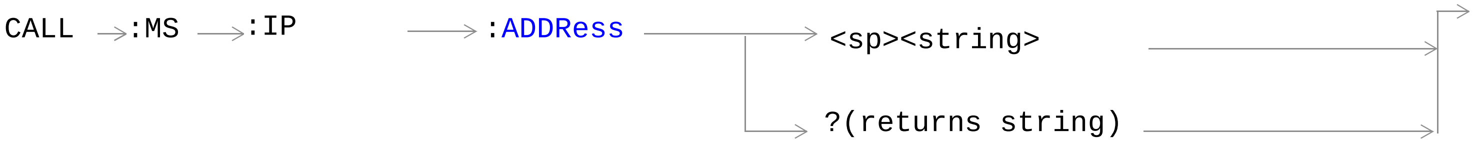
Programming Example
`OUTPUT 714;”CALL:DATA:PING:TIME:MAXIMUM?”`
`ENTER 714;variable_name`	

CALL:DATA:PING:TIME:MINimum?

Function	This command queries the minimum round trip time (in seconds). This command will return 9.91 E+37 if the CALL:FUNCtion:DATA:TYPE command is not set to IPData, or if ping results are not available.
Requirements	Lab Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;"CALL:DATA:PING:TIME:MINIMUM?"
ENTER 714;variable_name
```

CALL:MS:IP:ADDRess



"Diagram Conventions"

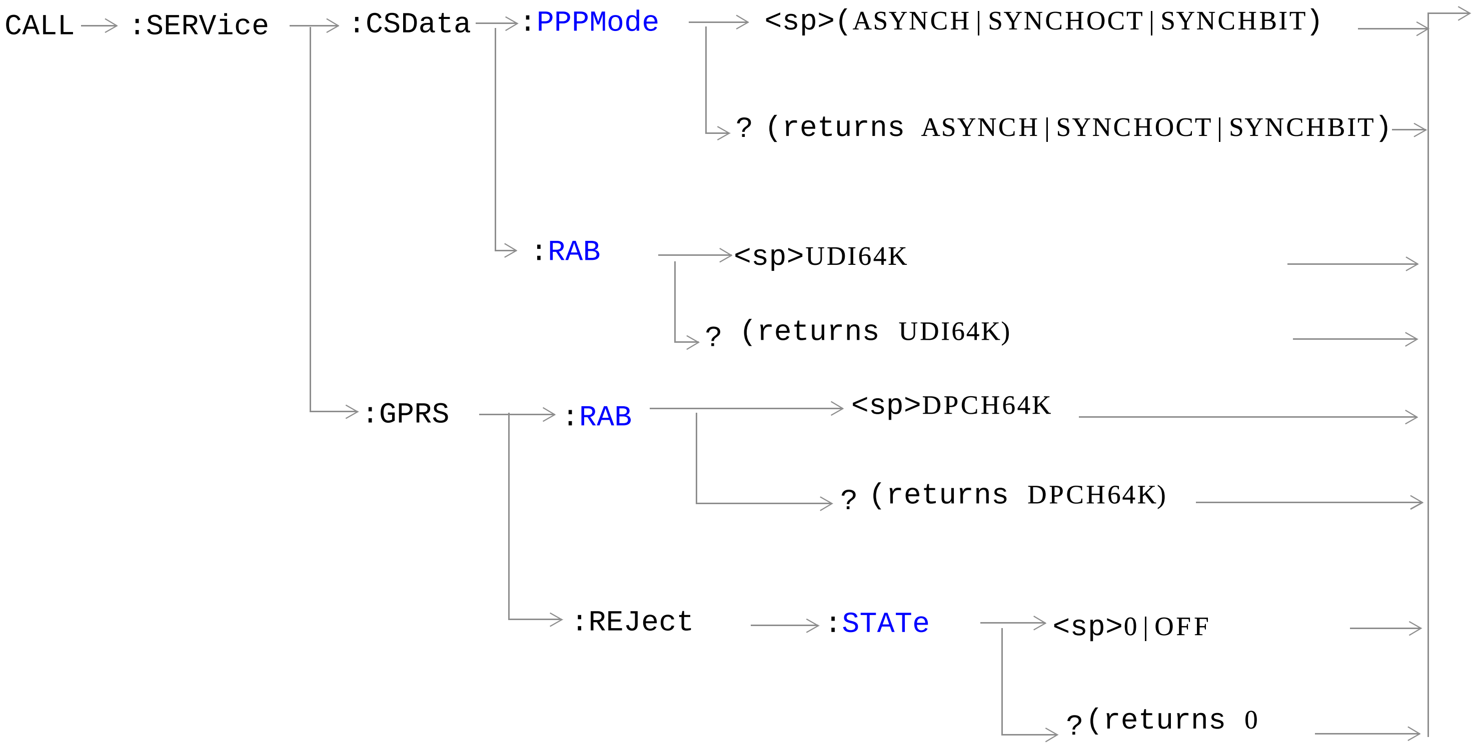
CALL:MS:IP:ADDRess

Function	Sets/queries the DUT (Device Under Test) IP address. This command is used to set up a wireless device's IP address.
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)
*RST Setting	Non-volatile

Programming Example

```
OUTPUT 714;"CALL:MS:IP:ADDRess '130.29.179.219'"
!Sets the DUT IP Address to 130.29.179.219.
```

CALL:SERVice



“Diagram Conventions” on page 368

CALL:SERVice:CSData:PPPMode

Function	This command configures the PPP layer for CS (circuit switched) data operation. PPP mode must be set to match the service configuration that will be requested by the UE. That bearer must be transparent. PPP mode can be set to: • Asynchronous • Synchronous with octet stuffing • Synchronous with bit stuffing
Setting	Range: ASYNCH | SYNCHOCT | SYNCHBIT
Query	Range: ASYNCH | SYNCHOCT | SYNCHBIT
Requirements	Lab Application Revision:??? and above
Programming Example	`OUTPUT 714;”CALL:SERVice:CSData:PPPMode SYNCHOCT” !Sets the CS Data PPP Mode to synchronous with octet stuffing.`

CALL:SERVice:CSData:RAB

Function	This command configures the RAB (Radio Access Bearer Type). Currently, the only choice for RAB is commonly referred to as UDI 64k or UDI-1B.
Setting	Range: UDI64K
Query	Range: UDI64K
Requirements	Lab Application Revision:??? and above
Programming Example	`OUTPUT 714;”CALL:SERVice:CSData:RAB UDI64K” !Sets the CS Data Radio Access Bearer Type to UDI 64k.`

CALL:SERVice:GPRS:RAB

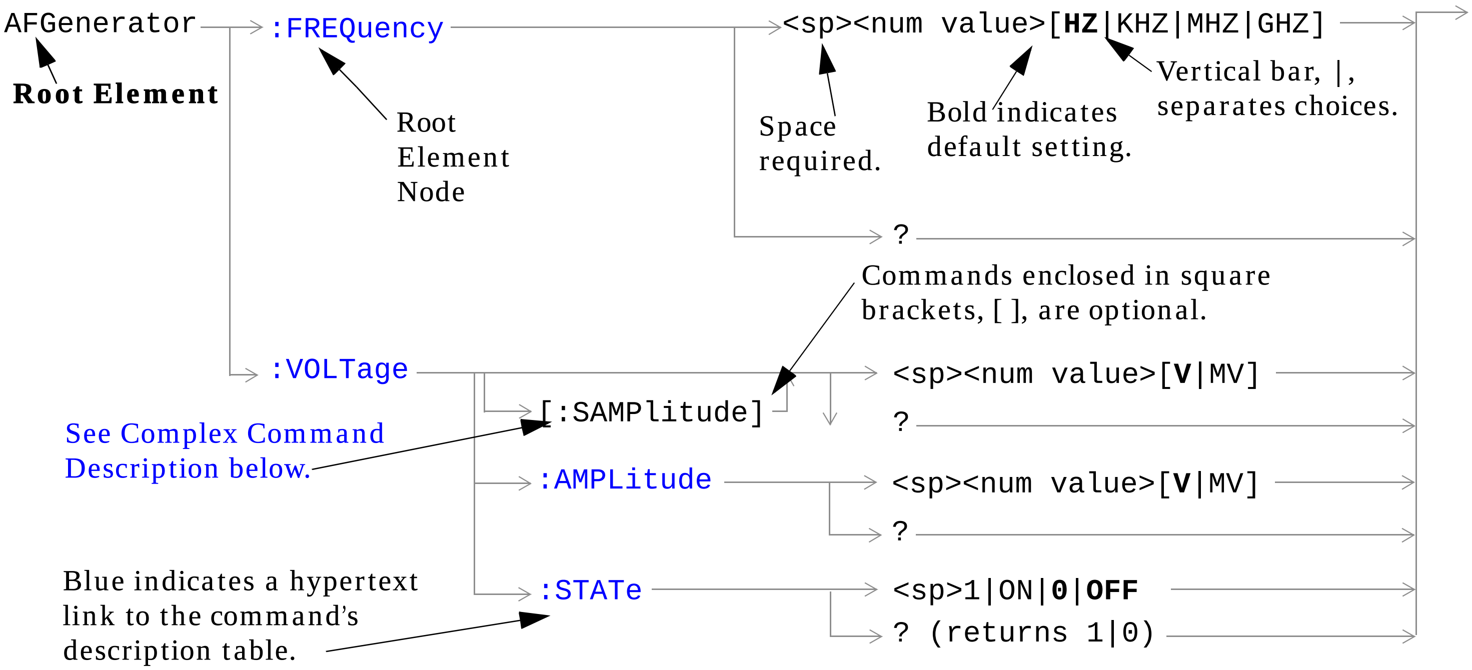
Function	This command configures the UTRA FDD GPRS Service Radio Access Bearer. Currently, the only choice for GPRS RAB is 64k UL/DL on DPCH.
Setting	Range: DPCH64K
Query	Range: DPCH64K
Requirements	Lab Application Revision:??? and above
Programming Example	`OUTPUT 714;”CALL:SERVice:GPRS:RAB DPCH64K” !Sets the GPRS Radio Access Bearer to 64k UL/DL on DPCH.`

CALL:SERVice:GPRS:REJect:STATe

Function	This command sets the GPRS service forced reject state. Currently, the only choice for GPRS service forced reject state is OFF.
Setting	Range: 0|OFF
Query	Range: 0
Requirements	Lab Application Revision:??? and above
Programming Example	`OUTPUT 714;”CALL:SERVice:GPRS:REJect:STATe?” !Queries the GPRS service forced reject state.`

Diagram Conventions

Description



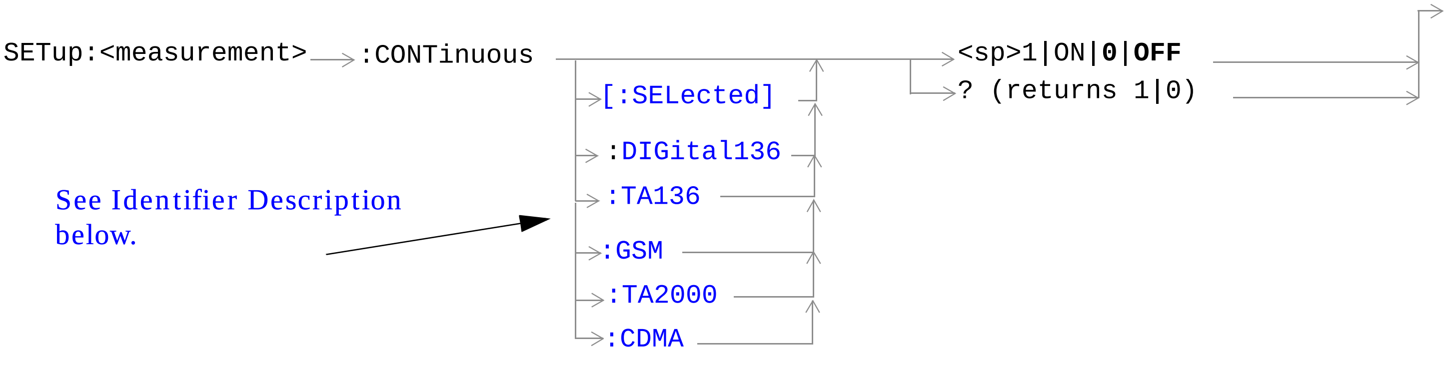


Diagram Description

Statement elements are connected by lines. Each line can be followed in only one direction, as indicated by the arrow at the end of the line. Any combination of statement elements that can be generated by starting at the **Root Element** and following the line the **direction of the arrow** is syntactically correct. The drawings show the proper use of spaces. Where spaces are required they are indicated by **<sp>**, otherwise no spaces are allowed between statement elements.

Complex Command Description

A complex command sets the state of the parameter to ON, and is used to set a value for that parameter. These parameters; amplitude, frequency, gain, number, time, and value can be used as a complex command. Refer to the specific command for the parameter that applies.

Identifier Description

Some test applications are able to test more than one radio format. There may be commands/queries that are shared by more than one radio format in the some of these test applications. Identifiers are used to specify the radio format for the command/query. The command/query is sent to the active radio format if you don’t use an identifier. An identifier must be used when sending commands to the inactive radio format.

Developing Code

It is recommended that you set the Test Set’s operating environment to debug. To set the Test Set debug mode to "ON" use the following syntax:

```
SYSTem:COMMunicate:GPIB:DEBug ON
```

Units-of-Measure

Amplitude (linear)	V
Frequency	Hz
Power (logarithmic)	dBm
Time	s

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

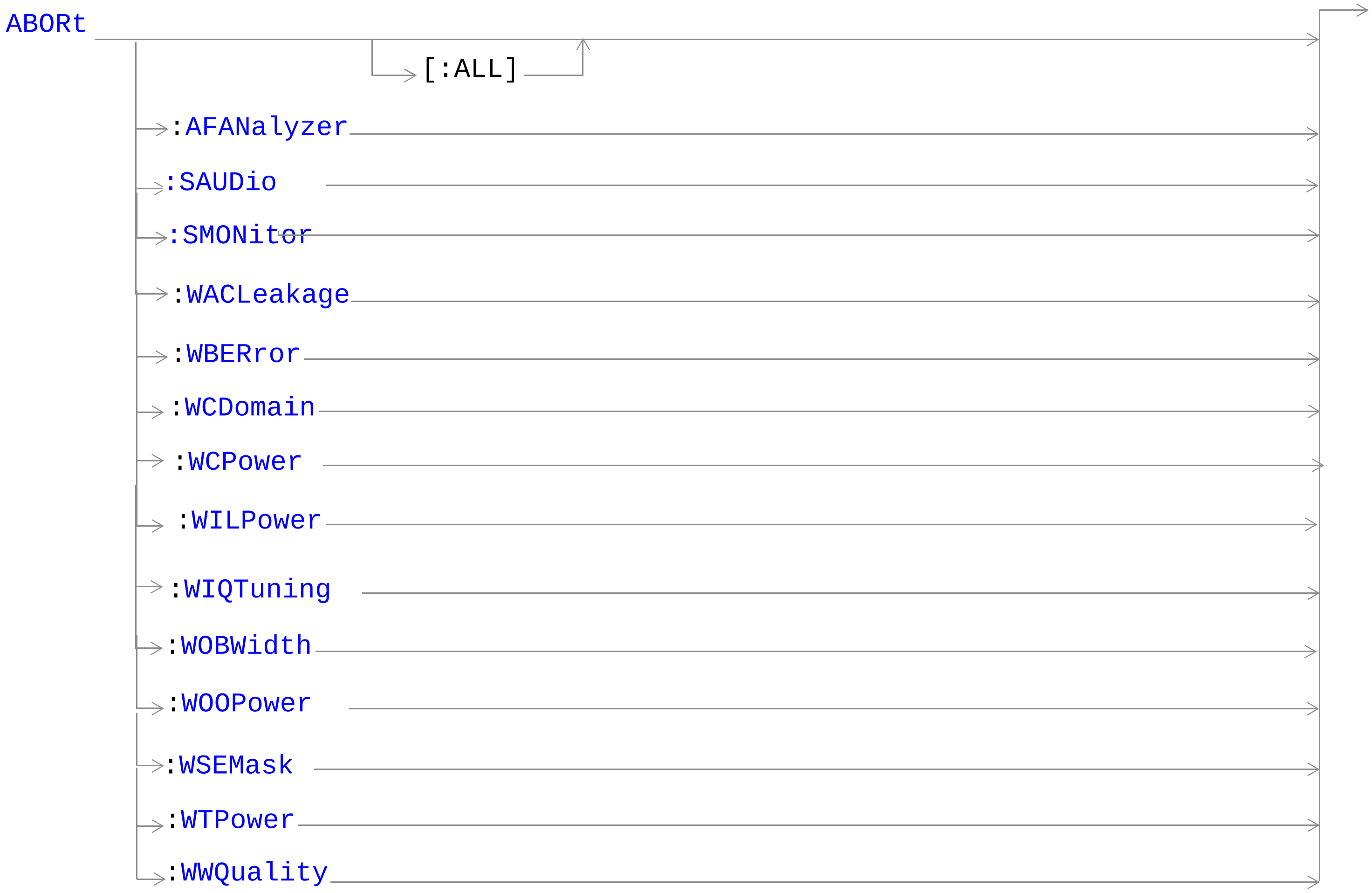
INITiate:<meas> will execute an ABORt:<meas> as part of the INITiate:<meas> command.

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



"Diagram Conventions" on page 368

ABORt[:ALL]

Function	Stops all measurements that are active. If the trigger arm is set to single, the measurements will go to the idle state. If the trigger arm is set to continuous, the measurements will re-arm and initiate again.

ABORt

Setting	Range
	- AFANalyzer - Audio Frequency measurements - SAUDio - Swept Audio measurement - SMONitor - Spectrum Monitor measurement - WACLeakage - Adjacent Channel leakage - WBERror - Loopback Bit Error Ratio measurement - WCDomain - Code Domain measurements - WCPower - Channel Power measurement - WILPower - Inner Loop Power measurement - WIQTuning - IQ Tuning measurement - WOBWidth - Occupied Bandwidth measurement - WOOPower - PRACH Transmit On/Off Power measurement - WSEMask - Spectrum Emission Mask measurement - WTPower - Thermal Power measurement - WWQuality - Waveform Quality measurement
Requirements	Test Application Revision: A.02 and above, added WCDomain, WSEMask, and WOBWidth. Test Application Revision: A.03 and above, added WIQTuning, WILPower, WOOPower and SMONitor.

Programming Example

```
OUTPUT 714;"ABORT:ALL" !Aborts all active measurements in progress.
```

ABORt:<meas-mnemonic>

Function	Stops the selected measurement if it is active. If the trigger arm is set to single, the measurements will go to the idle state. If the trigger arm is set to continuous the measurements will re-arm and initiate again.
Setting	Range • AFANalyzer - Audio Frequency measurement • SAUDio - Swept Audio measurement • SMONitor - Spectrum Monitor measurement • WACLeakage - Adjacent Channel leakage measurement • WBERror - Loopback Bit Error Ratio measurement • WCDomain - Code Domain measurements • WCPower - Channel Power measurement • WILPower - Inner Loop Power measurement • WIQTuning - IQ Tuning measurement • WOBWidth - Occupied Bandwidth measurement • WOOPower - PRACH Transmit On/Off Power measurement • WSEMask - Spectrum Emission Mask measurement • WTPower - Thermal Power measurement • WWQuality - Waveform Quality measurements
Requirements	Test Application Revision: A.02 added WCDomain, WSEMask, and WOBWidth. Test Application Revision: A.03 and above, added WIQTuning, WILPower, WOOPower and SMONitor.

Programming Example

```
OUTPUT 714;"ABORT:WWQUALITY" !Aborts the waveform quality measurements.
```

AFGenerator Subsystem

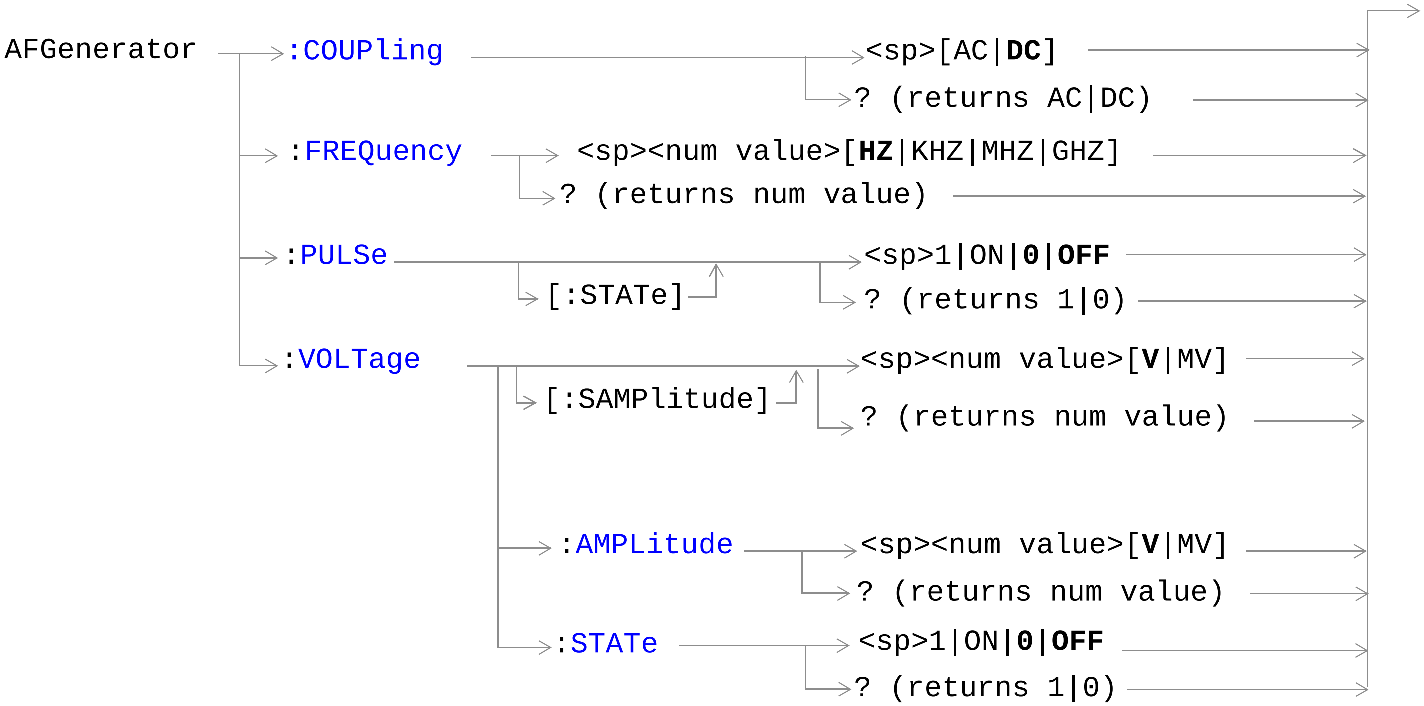
Description

The AFGenerator subsystem is used to control an audio source that can be routed to the AUDIO OUT port on the test set's front panel (see also "SYSTem:AUDio:OUTPut:SOURce").

Syntax Diagram and Command Descriptions

"AFGenerator" on page 375

AFGenerator



“Diagram Conventions” on page 368

AFGenerator:COUPling

Function	Sets the output of the audio generator to be ac or dc coupled to the front-panel AUDIO OUT port.
Setting	Range: AC or DC
Query	Range: AC|DC
*RST setting	DC
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;”AFGENERATOR:COUPling AC” !Sets the audio generator coupling to AC.`	

AFGenerator:FREQuency

Function	Sets/queries the frequency of the audio generator. The units (HZ|KHZ|MHZ|GHZ) are optional. If no units are specified, then units default to HZ.
Setting	Range: 1 Hz to 20 kHz Resolution:0 .1 HZ
Query	Range: 1 Hz to 20 kHz Resolution: 0.1 Hz
*RST setting	1 kHz
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"AFGENERATOR:FREQUENCY 1000" !Sets the audio generator frequency to 1000 Hz.`	

AFGenerator:PULSe[:STATe]

Function	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.
Setting	Range: 0 | OFF | 1 |ON
Query	Range: 0|1
*RST setting	0 (off)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"AFGENERATOR:PULSE ON" !Sets the audio generator pulse to ON.`	

AFGenerator:VOLTage[:SAMPlitude]

Function	Sets /queries the amplitude of the audio generator in volts and turns the state to on. The units (V|mV) are optional. If no units are specified, then units default to V.
Setting	Range: 0 to 9 V pk. Resolution: • 0.5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
Query	Range: 0 to 9 V pk. Resolution: • 0.5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
*RST setting	0 V
Requirements	Test Application Revision: A.01 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	Sets/queries the amplitude for the audio generator when the audio generator state is on. The units (V|mV) are optional. If no units are specified, then units default to V.
Setting	Range: 0 to 9 V pk. Resolution: • 0.5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
Query	Range: 0 to 9 V pk. Resolution: • 0.5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
*RST setting	0 V
Requirements	Test Application Revision: A.01 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	Sets/queries the audio generator state
Setting	0 | OFF | 1 |ON
Query	0|1
*RST setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"AFGENERATOR:VOLTAGE:STATE ON" !Set the audio generator state to ON.
```

CALCulate Subsystem

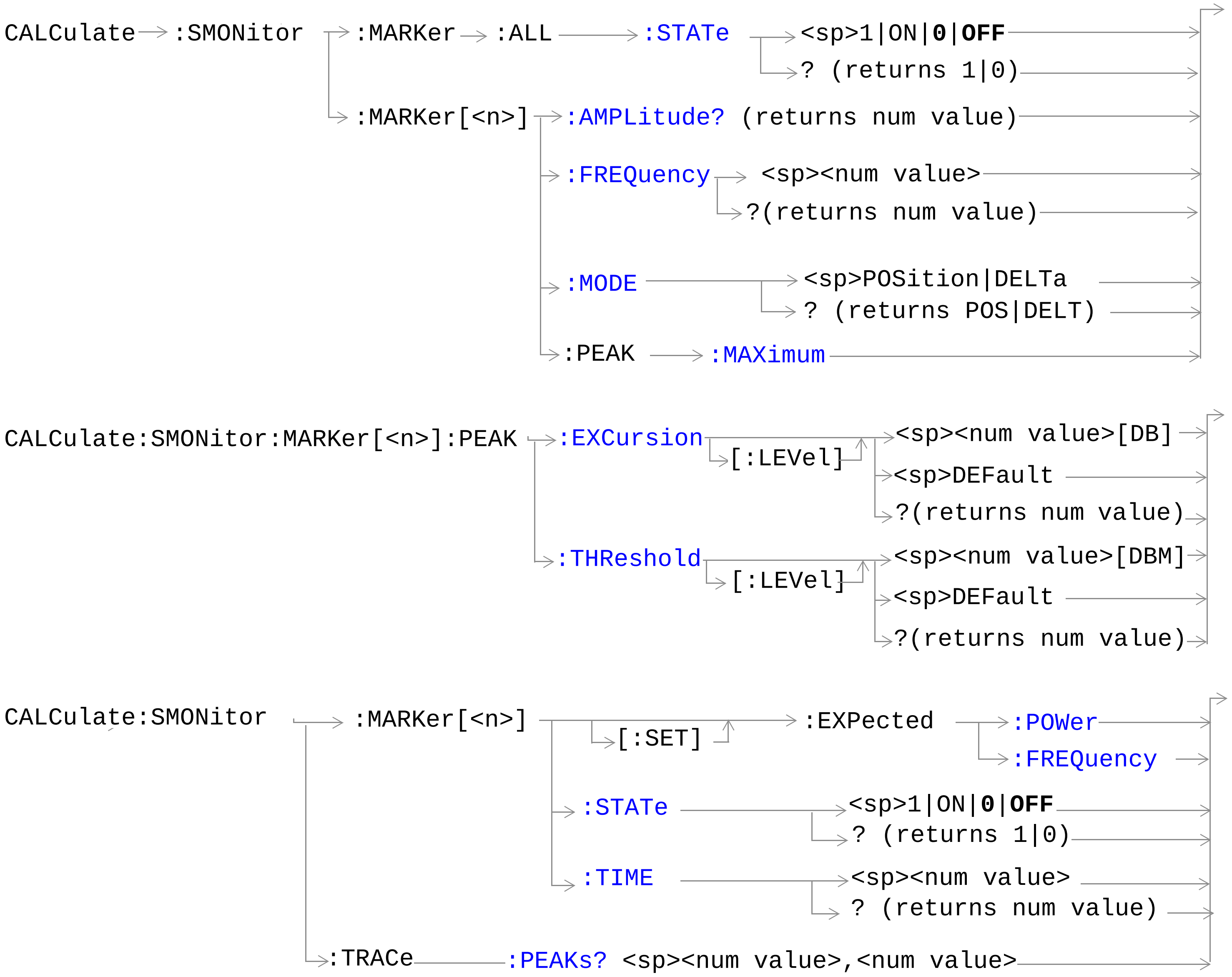
Description

The CALCulate subsystem is used to perform data processing on the measurement results. For example in the Spectrum Monitor the CALCulate subsystem uses the markers to find the peaks and read back their values.

Syntax Diagram and Command Descriptions

"CALCulate:SMONitor" on page 380

CALCulate:SMONitor



"Diagram Conventions" on page 368

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	OFF

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
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

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

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

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.

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

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.
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.
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	OFF
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
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

Programming Example

```
OUTPUT 714;"CALCulate:SMONitor:TRACe:PEAKs?"
```

CALibration Subsystem

Calibration Strategy

Various calibration routines must be run to ensure measurement accuracy. The type of calibration and appropriate intervals for performing calibrations vary with each application. See “CALibrating the Test Set” on page 105 for more information.

Syntax Diagram and Command Descriptions

“CALibration”

CALibration

`CALibration` → `:MEASurements?` → `(returns value indicating success or failure)`

“Diagram Conventions” on page 368

CALibration:MEASurements?

Function	Starts the measurement calibration routine. This calibration is used for all transmitter measurements except thermal power. It is important that no power is applied to the RF IN/OUT connector during calibration. Returns a value indicating success or failure of the measurement calibration. Zero indicates the calibration completed successfully. See “Measurement Calibration Indicator values” on page 105 for information about non-zero results.
Query	Range: 0 through 6, -340
Requirements	Test Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;"CALIBRATION:MEASUREMENTS?" !Starts the measurement calibration.
```

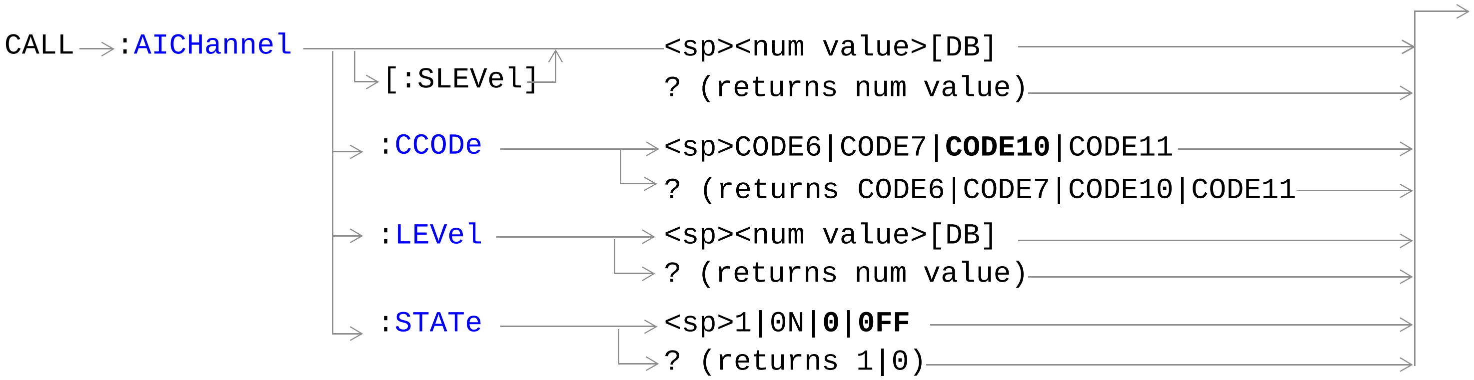
CALL Subsystem

Description

The CALL subsystem handles all setup, control, and query functions for call processing. This includes UE and Base Station (cell) functions.

Syntax Diagrams and Command Descriptions

CALL:AICHannel



"Diagram Conventions" on page 368

CALL:AICHannel[:SLEVel]

Function	Sets/queries the acquisition indicator channel's initial power offset. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected . Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-9.9 dB
Requirements	Test Application Revision: A.02 and above.
Programming Example	

`OUTPUT 714;"CALL:AICHANNEL:SLEVEL -13DB" !Sets the` acquisition indicator channel's power offset to -13 dB.

CALL:AICHannel:CCODe

Function	Sets/queries the acquisition indicator channel's channelization code. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected While in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: CODE6 | CODE7 | CODE10 | CODE11
Query	Range: CODE6 | CODE7 | CODE10 | CODE11

*RST Setting	CODE10
Requirements	Test Application Revision: A.02 and above.
Programming Example `OUTPUT 714;"CALL:AICHANNEL:CCODE CODE6”`	

CALL:AICHannel:LEVel

Function	Sets/queries the acquisition indicator channel's initial power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected . Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-9.9 dB
Requirements	Test Application Revision: A.02 and above.
Programming Example	

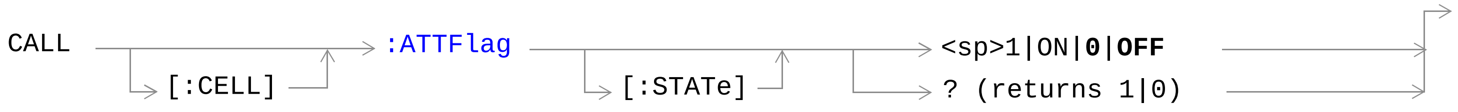
```
OUTPUT 714;"CALL:AICHANNEL:LEVEL -5"
```

CALL:AICHannel:STATe

Function	Sets/queries the acquisition indicator channel's state. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected . Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.02 and above.
Programming Example	

```
OUTPUT 714;"CALL:AICHANNEL:STATE ON"
```

CALL:ATTFlag

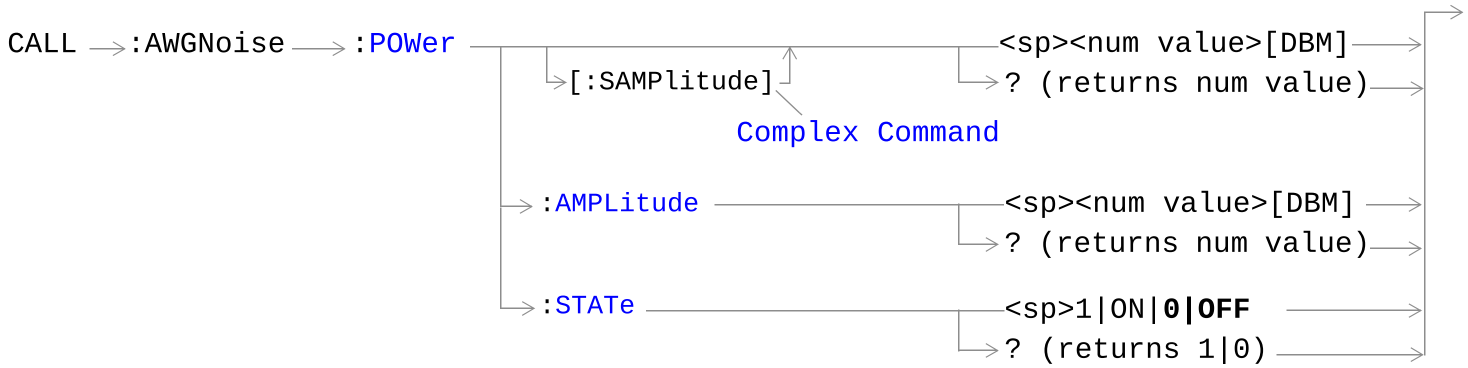


“Diagram Conventions” on page 368

CALL[:CELL]:ATTFlag[:STATe]

Function	Sets/queries the state of the IMSI Attach flag on the BCCH. When IMSI Attach flag is set to on, the test set will signal the UE (mobile station) to perform location update (registration) every time it camps. When the IMSI Attach flag is set to off, the UE See “Performing a Registration” on page 149. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in an error issued and the test set will reject the change. Use the cell off operating mode when changing this value. See “CALL:OPERating” to select operating modes.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 0 | 1
*RST Setting	0 (OFF)
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"CALL:ATTFlag ON" !Set the IMSI Attach flag state to on.`	

CALL:AWGNoise



“Diagram Conventions” on page 368

CALL:AWGNoise:POWer[:SAMPlitude]

Function	The setting form of this command performs two functions: (1) sets the additive white gaussian noise (AWGN) level and (2) turns the AWGN on/off state to on. The query form returns the desired AWGN power level. (See "Setting Cell Power and AWGN Power Levels" for more information about desired versus current power levels.)
Setting	Range: -170 dBm/3.84 MHz to +35 dBm/3.84 MHz (this is the range of settings accepted, see "Cell Power, AWGN Power and Total RF Power Ranges" for the actual hardware range of the source). Resolution: 0.01 dB
Query	Same as setting
*RST Setting	See "CALL:AWGNoise:POWer:AMPLitude" and "CALL:AWGNoise:POWer:STATe" .
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:AWGNOISE:POWER:SAMPLITUDE -30"
!Sets the AWGN power level to -30 dBM/3.84 MHz and turns the state on.
```

CALL:AWGNoise:POWer:AMPLitude

Function	Sets/queries the desired additive white gaussian noise (AWGN) level. (See "Setting Cell Power and AWGN Power Levels" for more information about desired versus current power levels.)
Setting	Range: -170 dBm/3.84 MHz to +35 dBm/3.84 MHz, NAN (this is the range of settings accepted, see "Cell Power, AWGN Power and Total RF Power Ranges" for the actual hardware range of the source). Resolution: 0.01 dB
Query	Same as setting
*RST Setting	-115 dBm/3.84 MHz
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:AWGNOISE:POWER:AMPLITUDE -30" !Set the AWGN level to -30 dBM/3.84 MHz.
```

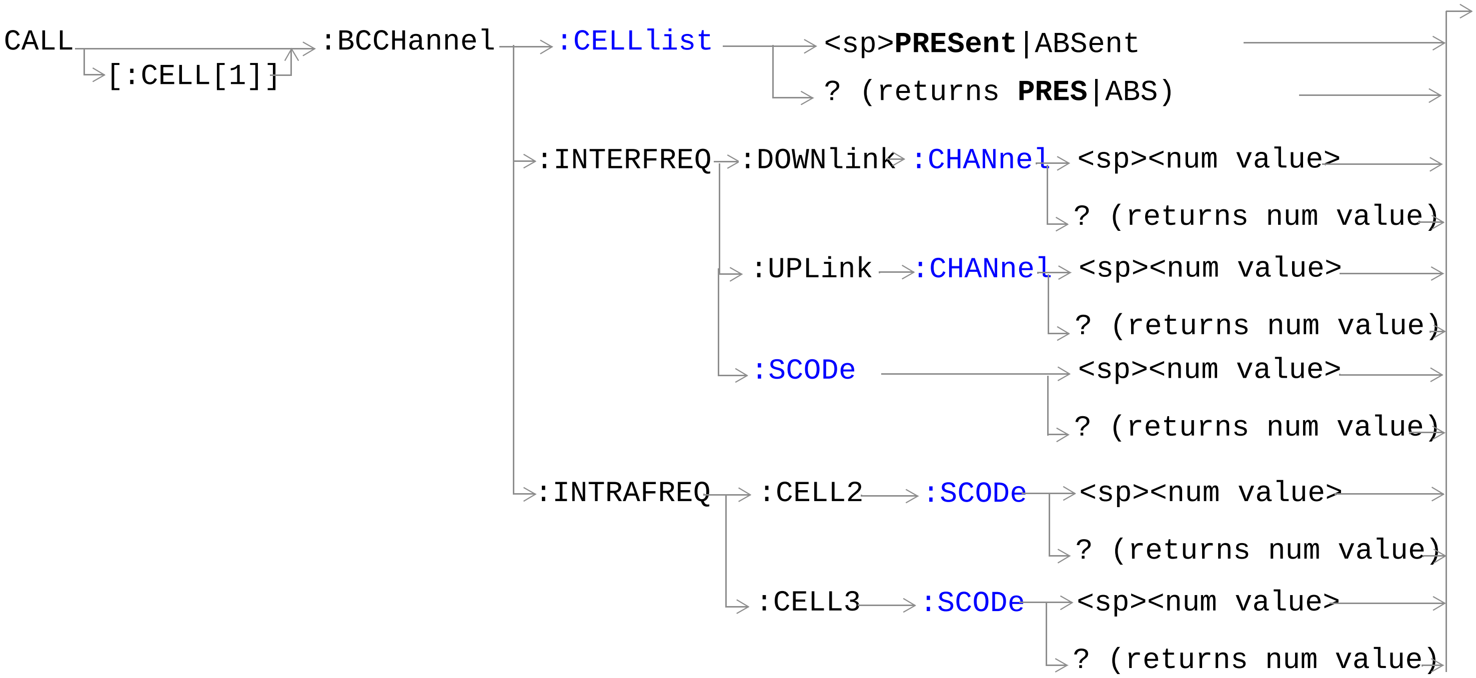
CALL:AWGNoise:POWer:STATe

Function	Sets/queries the additive white gaussian noise (AWGN) state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (OFF)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:AWGNOISE:POWER:STATE:SELECTED ON" !Turns on AWGN.
```

CALL:BCCHannel



"Diagram Conventions" on page 368

CALL[:CELL[1]]:BCCHannel:CELLlist

Function	Sets/queries whether or not to broadcast the neighbor cells information (Cell Info List) on the BCCH. When this setting is set to "Present", the Intra-frequency cell info and Inter-frequency cell info lists will be included in System Information Block (SIB) 11 on the BCCH. **NOTE** The test set does not actually generate any neighbor cells. These settings affect only the information broadcast on the BCCH, not the test set's call processing behavior. See "Setting SIB11 Cell Info List Parameters" on page 128. If this setting is changed while the Operating Mode is "Active Cell.", the test set will perform the BCCH Update procedure.
Setting	Range: PRESent|ABSent
Query	Range: PRES|ABS
*RST Setting	PRES
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"CALL:BCCHannel:CELLlist PRESent" !Selects BCCH Cell Info List to preset on the BCCH.`	

CALL[:CELL[1]]:BCCHannel:INTERFREQ:DOWNlink:CHANnel

Function	Sets/queries the downlink channel number (DL UARFCN) of the Inter-frequency cell info list which is included in the System Information Block (SIB) 11 on the BCCH. The Inter-frequency cell info list contains only one cell. This setting is available only when the BCCH SIB 11 Cell Info List is set to “Present” (see “CALL[:CELL[1]]:BCCHannel:CELLlist” on page 395). If this setting is changed while the Operating Mode is “Active Cell.”, the test set will perform the BCCH Update procedure.
Setting	Range: • 412 - 687 • 4320 - 4495 • 4600 - 4825 • 9000 - 9425 • 9625 - 9975 • 10,525 - 10,875
Query	Range: Same as settings
*RST Setting	10730
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:BCCHannel:INTERFREQ:DOWNlink:CHANnel 10735"
!Sets the BCCH Inter-frequency Cell DL UARFCN to 10735.
```

CALL[:CELL[1]]:BCCHannel:INTERFREQ:UPLnk:CHANnel

Function	Sets/queries the uplink channel number (UL UARFCN) of the Inter-frequency cell info list which is included in the System Information Block (SIB) 11 on the BCCH. The Inter-frequency cell info list contains only one cell. This setting is available only when the BCCH SIB 11 Cell Info List is set to “Present” (see “CALL[:CELL[1]]:BCCHannel:CELLlist” on page 395). If this setting is changed while the Operating Mode is “Active Cell.”, the test set will perform the BCCH Update procedure.
Setting	Range: • 12 - 287 • 4095 - 4270 • 4375 - 4600 • 8525 - 8950 • 9225 - 9925
Query	Range: same as settings
*RST Setting	9780
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:BCCHannel:INTERFREQ:UPLink:CHANnel 9785"
!Sets the BCCH Inter-frequency Cell UL UARFCN to 9785.
```

CALL[:CELL[1]]:BCCHannel:INTERFREQ:SCODe

Function	Sets/queries the primary scrambling code of the Inter-frequency cell info list which is included in the System Information Block (SIB) 11 on the BCCH. The Inter-frequency cell info list contains only one cell. This setting is available only when the BCCH SIB 11 Cell Info List is set to “Present” (see “CALL[:CELL[1]]:BCCHannel:CELLlist” on page 395). If this setting is changed while the Operating Mode is “Active Cell.”, the test set will perform the BCCH Update procedure.
Setting	Range: 0 - 511 Resolution: 1
Query	Range: same as settings
*RST Setting	63
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:BCCHannel:INTERFREQ:SCODe 63"
!Sets the BCCH Inter-frequency Cell Scrambling Code to 63.
```

CALL[:CELL[1]]:BCCHannel:INTRAFREQ:CELL2:SCODe

Function	Sets/queries the primary scrambling code of the 2nd cell in the Intra-frequency cell info list which is included in the System Information Block (SIB) 11 on the BCCH. This setting is available only when the BCCH SIB 11 Cell Info List is set to “Present” (see “CALL[:CELL[1]]:BCCHannel:CELLlist” on page 395). The Intra-frequency cell info list contains three cells. As required by the W-CDMA specifications, Cell 1 in this list is always the serving cell so the cell information is automatically set to match the test set’s cell. If this setting is changed while the Operating Mode is “Active Cell.”, the test set will perform the BCCH Update procedure.
Setting	Range: 0 - 511 Resolution: 1
Query	Range: same as settings
*RST Setting	127
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:BCCHannel:INTRAFREQ:CELL2:SCODe 130"
!Sets the BCCH Intra-frequency Cell 2 Scrambling Code to 130.
```

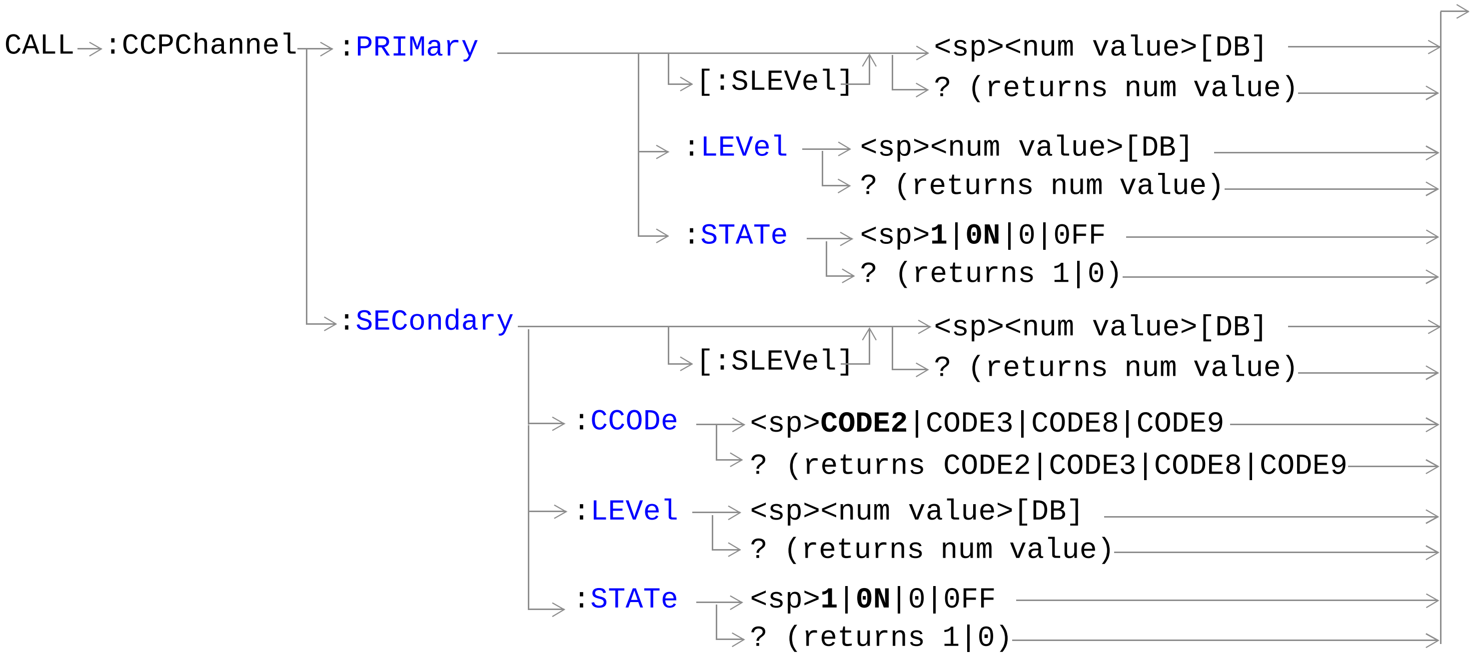
CALL[:CELL[1]]:BCCHannel:INTRAFREQ:CELL3:SCODe

Function	Sets/queries the primary scrambling code of the 3rd cell in the Intra-frequency cell info list which is included in the System Information Block (SIB) 11 on the BCCH. This setting is available only when the BCCH SIB 11 Cell Info List is set to “Present” (see “CALL[:CELL[1]]:BCCHannel:CELLlist” on page 395). The Intra-frequency cell info list contains three cells. As required by the W-CDMA specifications, Cell 1 in this list is always the serving cell so the cell information is automatically set to match the test set’s cell. If this setting is changed while the Operating Mode is “Active Cell.”, the test set will perform the BCCH Update procedure.
Setting	Range: 0 - 511 Resolution: 1
Query	Range: same as settings
*RST Setting	511
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:BCCHannel:INTRAFREQ:CELL3:SCODe 500"
!Sets the BCCH Intra-frequency Cell 3 Scrambling Code to 500.
```

CALL:CCPChannel



“Diagram Conventions” on page 368

CALL:CCPChannel:PRIMary[:SLEVel]

Function	Sets/queries the initial power offset of the primary common control physical channel . This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-9.9 dB
Requirements	Test Application Revision: A.02 and above.
Programming Example	`OUTPUT 714;"CALL:CCPCHANNEL:PRIMARY:SLEVEL -15DB" !Enables and sets the initial P-CCPCH power offset to -15 dB.`

CALL:CCPChannel:PRIMary:LEVel

Function	Sets/queries the primary common control physical channel’s initial power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this setting.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-9.9 dB
Requirements	Test Application Revision: A.02 and above.
Programming Example	`OUTPUT 714;"CALL:CCPCHANNEL:PRIMARY:LEVEL -15DB" !Sets the initial P-CCPCH power offset to -15 dB.`

CALL:CCPChannel:PRIMary:STATe

Function	Sets/queries the primary common control physical channel’s state. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this setting.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.02 and above.
Programming Example `OUTPUT 714;"CALL:CCPCHANNEL:PRIMARY:STATE ON"`	

CALL:CCPChannel:SECondary[:SLEVel]

Function	Sets/queries the initial power offset of the secondary common control physical channel . This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this setting.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-6.9 dB
Requirements	Test Application Revision: A.02 and above.
Programming Example `OUTPUT 714;"CALL:CCPCHANNEL:SECONDARY:SLEVEL -10DB" !Sets P-CCPCH initial power offset to -10 dB.`	

CALL:CCPChannel:SECondary:CCODe

Function	Sets/queries the secondary common control physical channel's channelization code. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this setting.
Setting	Range: CODE2 | CODE3 | CODE8 | CODE9
Query	Range: CODE2 | CODE3 | CODE8 | CODE9
*RST Setting	CODE2
Requirements	Test Application Revision: A.02 and above.
Programming Example	

```
OUTPUT 714;"CALL:CCPCHANNEL:SECONDARY:CCODE CODE3" !Sets the S-CCPCH channelization code.
```

CALL:CCPChannel:SECondary[:SLEVel]

Function	Sets/queries the initial power offset of the secondary common control physical channel . This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this setting.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-6.9 dB
Requirements	Test Application Revision: A.02 and above.
Programming Example	

```
OUTPUT 714;"CALL:CCPCHANNEL:SECONDARY:SLEVEL -10DB" !Enables and sets S-CCPCH initial power
offset.
```

CALL:CCPChannel:SECondary:LEVel

Function	Sets/queries the secondary common control physical channel's initial power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this setting.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-6.9 dB
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CCPCHANNEL:SECONDARY:LEVEL -5" !Sets the intial common control physical channel
level to -5 dB.
```

CALL:CCPChannel:SECondary:STATe

Function	Sets/queries the secondary common control physical channel's state. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this setting.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CCPCHANNEL:SECONDARY:STATE ON" !Enables the secondary common control physical
channel.
```

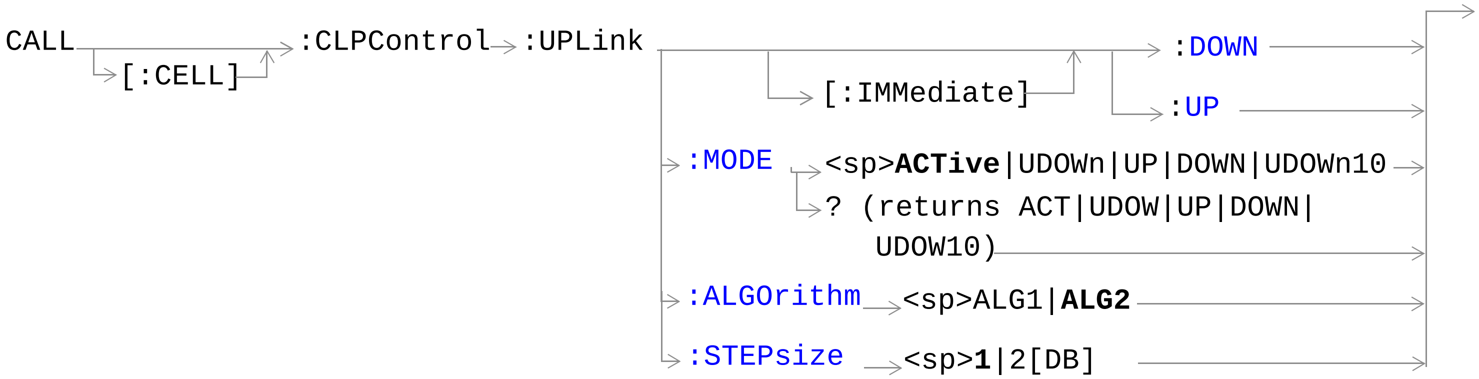
CALL:CHANNel

"Diagram Conventions" on page 368

CALL:CHANNel

Function	Sets/queries the downlink channel number (FDD DL UARFCN).
Setting	Range: • 412 - 687 • 4320 - 4495 • 4600 - 4825 • 9000 - 9425 • 9625 - 9975 • 10,525 - 10,875
Query	Range: • 412 - 687 • 4320 - 4495 • 4600 - 4825 • 9000 - 9425 • 9625 - 9975 • 10,525 - 10,875
*RST Setting	10700
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:CHANNEL?" !Queries the downlink channel number.`	

CALL:CLPControl



"Diagram Conventions" on page 368

CALL[:CELL]:CLPControl:UPLink[:IMMediate]:DOWN

Function	Sets the uplink inner loop power control to decrease power in one step (see "CALL[:CELL]:CLPControl:UPLink:STEPsize"). This function is only used when the UL CL power control is set to use alternating bits (see "CALL[:CELL]:CLPControl:UPLink:MODE").
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:CELL:CLPCONTROL:UPLINK:IMMEDIATE:DOWN"`	

CALL[:CELL]:CLPControl:UPLink[:IMMediate]:UP

Function	Sets the uplink inner loop power control to increase power in one step (see "CALL[:CELL]:CLPControl:UPLink:STEPsize"). This function is only used when the UL CL power control is set to use alternating bits (see "CALL[:CELL]:CLPControl:UPLink:MODE").
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:CELL:CLPCONTROL:UPLINK:IMMEDIATE:UP"`	

CALL[:CELL]:CLPControl:UPLink:MODE

Function	Sets/queries the uplink closed loop power control mode while in the Active Cell operating mode. See "Setting Closed Loop Power Control" for more information.
Setting	Range: • ACTive (activates closed loop power control) • UDOWn (alternating bits) • UP (all up bits) • DOWN (all down bits) • UDOWn10 (ten up/ten down bits)
Query	Range: Same as setting range.
*RST Setting	ACTive
Requirements	Test Application Revision: A.01 and above

Programming Example
`OUTPUT 714;"CALL:CELL:CLPControl:UPLink:MODE ACTive"`
`!Sets the uplink closed loop power control to active.`	

CALL[:CELL]:CLPControl:UPLink:ALGorithm

Function	Sets/queries the uplink power control algorithm to be used when closed loop power control is ACTive (see "CALL[:CELL]:CLPControl:UPLink:MODE" on page 406). This setting can only be changed while the Cell Operating Mode is "Cell Off", or while the cell operating mode is "Active Cell" and the call status is IDLE. Attempting to change this setting while in any other mode will result in an error. If you set the power control algorithm to Algorithm 1, an error message +228, "Measurement Accuracy Degraded While Power Control Algorithm 1 in use" is displayed to alert you to this condition.
Setting	Range: • ALG1 • ALG2
Query	Same as setting
*RST Setting	ALG2
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:CLPControl:UPLink:ALGOrithm ALG1" !Sets the uplink closed loop power control
algorithm to 1.
```

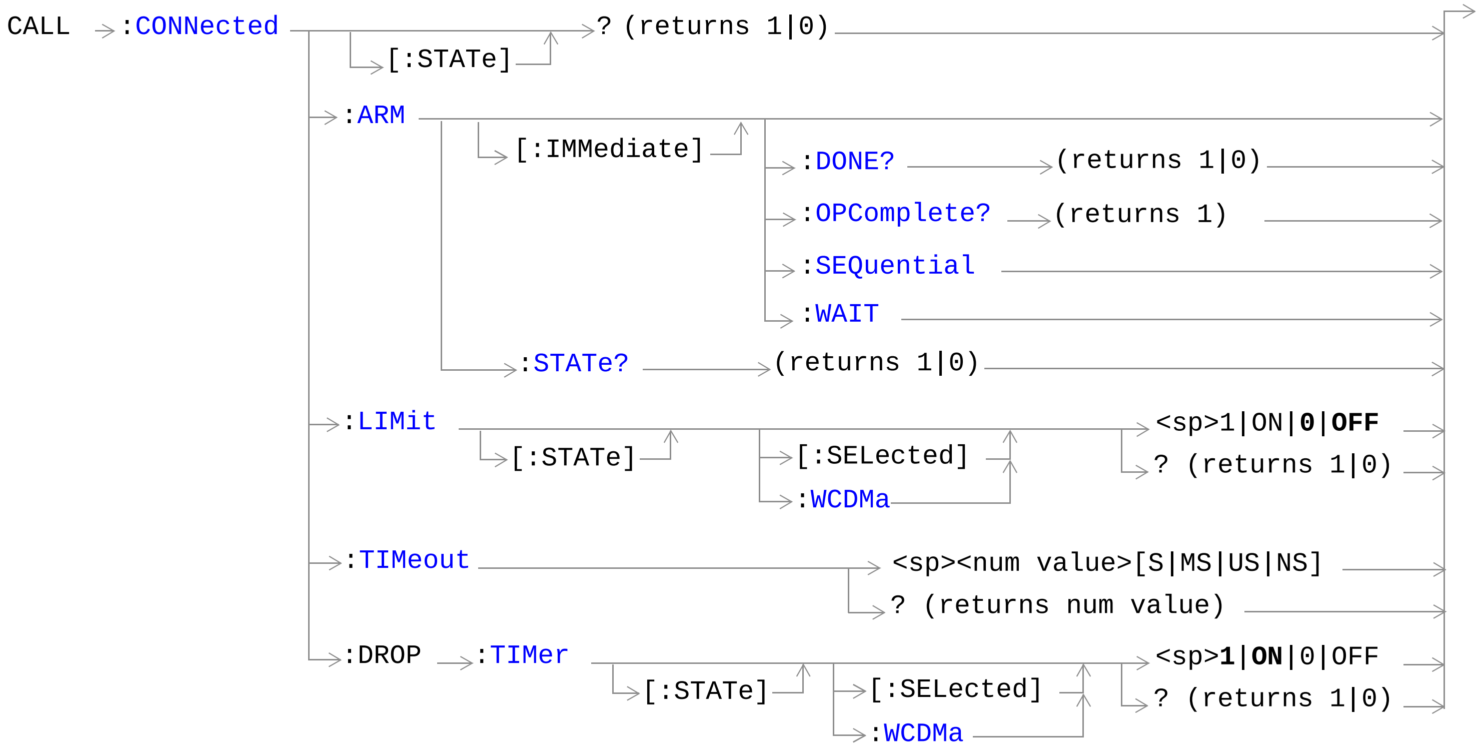
CALL[:CELL]:CLPControl:UPLink:STEPsize

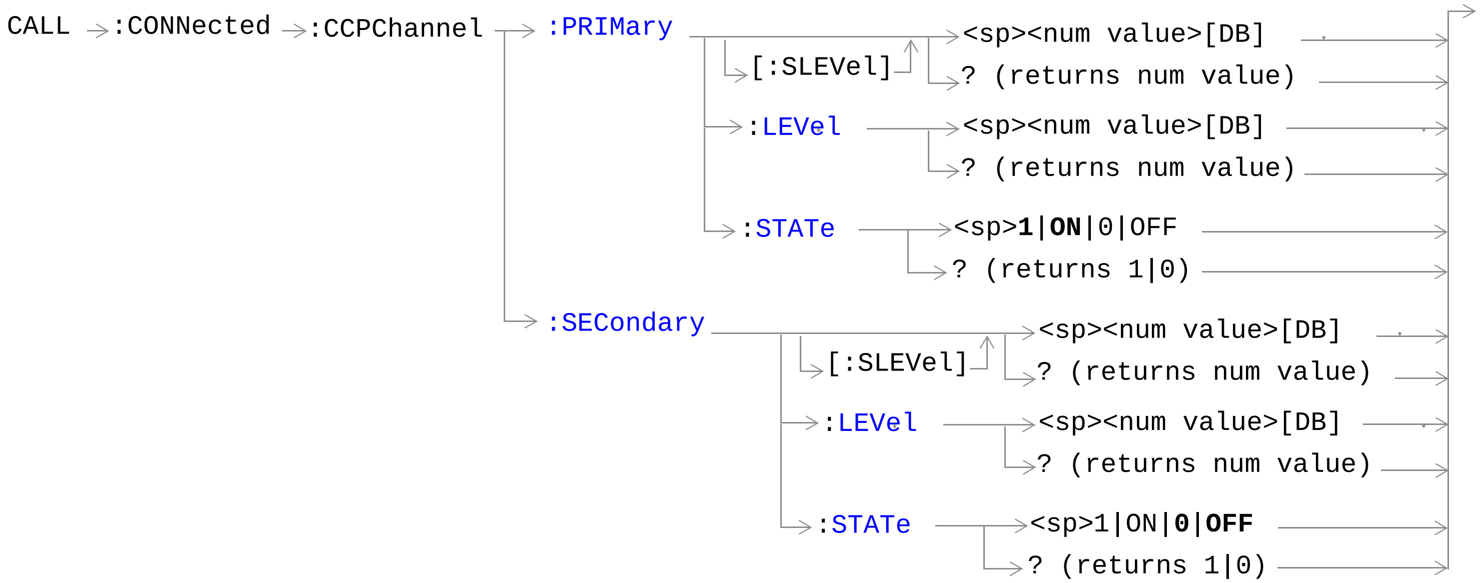
Function	Sets/queries the uplink power control step size when power control algorithm 1 is selected (see "CALL[:CELL]:CLPControl:UPLink:ALGorithm" on page 407). This setting can only be changed while the Cell Operating Mode is "Cell Off", or while the cell operating mode is "Active Cell" and the call status is IDLE. Attempting to change this setting while in any other mode will result in an error.
Setting	Range: 1, 2 Resolution: 1 dB
Query	Same as setting
*RST Setting	1 dB
Requirements	Test Application Revision: A.03 and above

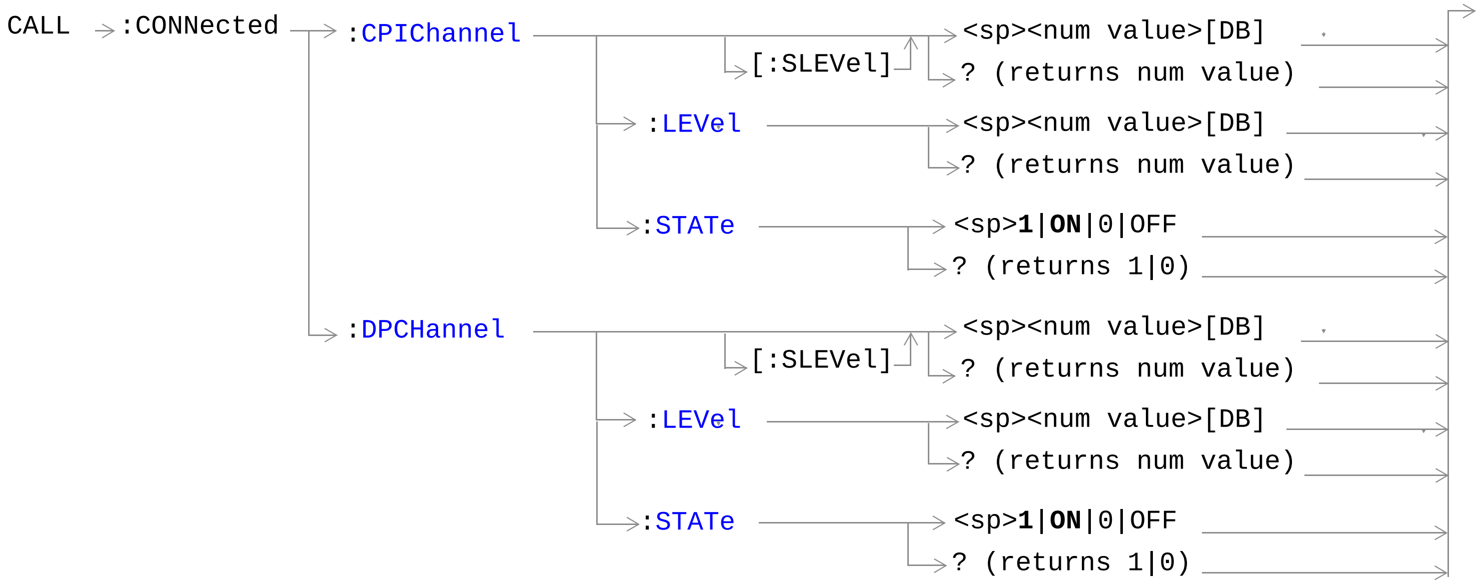
Programming Example

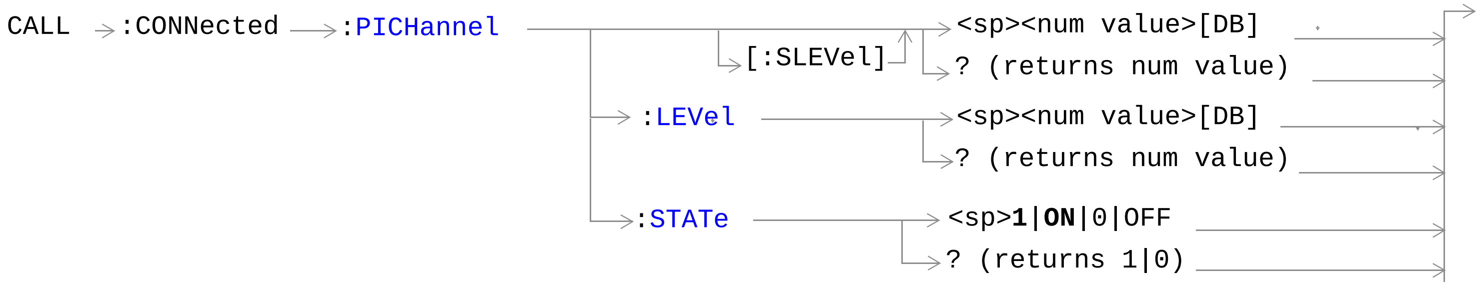
```
OUTPUT 714;"CALL:CLPControl:UPLink:STEPsize 2"
!Sets the uplink closed loop power control step size to 2 dB.
```

CALL:CONNected









“Diagram Conventions” on page 368

CALL:CONNected[:STATe]

Function	Queries the connected/disconnected state of the call. A one is returned if the call is in the connected state. A zero is returned if the call is in the idle (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 “Connected/Idle Query” and “Call State Change Detector” .
Query	Range: 0|1
*RST Setting	0
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:STATE?" !returns 1 if call is connected, 0 if call is idle.
```

CALL:CONNected:ARM[:IMMediate]

Function	Sets (arms) the call-state-change detector. Arming this detector allows the control program to tell the test set that it is expecting a change in 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, 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 with call processing state changes. See “Call State Change Detector” . For an explanation of the :DONE?, :OPComplete?, :SEQuential, and :WAIT commands, see “Call Processing Event Synchronization” .
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:ARM:IMMEDIATE" !Arms the call-state-change detector.
```

CALL:CONNected:ARM:STATe?

Function	Queries the arm state of the call-state-change detector. This command never hangs and immediately returns a one if the detector is armed, or a zero if the detector is not armed. See “Call State Change Detector”
Query	Range: 1|0
*RST Setting	0
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CONN:ARM:STATE?" !Returns arm state of the call-state-change detector.
```

CALL:CONNected:TIMeout

Function	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 an optional unit specifier in the 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 set using the CALL:CONNected:TIMeout command and should be greater than the maximum amount of time the control program needs 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 to one of the transitory states, the W-CDMA defined protocol timers take over and prevent the call state from staying in a transitory state forever. See “Call Processing State Synchronization” .
Setting	Range: 0 to 100 seconds Resolution: 0.1 seconds
Query	Range: 0 to 100 seconds Resolution: 0.1 seconds
*RST Setting	10 seconds
Requirements	Test Application Revision: A.02 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 Sets the CALL:CONNected:STATe? query
                                           timeout time to 500 milliseconds.
```

CALL:CONNected:DROP:TIMer[:STATe][:SELected]

Function	Sets/queries the call drop timer. The call drop timer indicates loss of uplink. This timer also determines when the demodulation of the uplink has been unsuccessful for a fixed period.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:DROP:TIMER:STATE 0"
```

CALL:CONNected:DROP:TIMer[:STATe]:WCDMa

Function	Sets/queries the call drop timer for the WCDMA format, whether or not that format is active. The call drop timer indicates loss of uplink. This timer also determines when the demodulation of the uplink has been unsuccessful for a fixed period.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:DROP:TIMER:STATE:WCDMA 0"
```

CALL:CONNected:CCPChannel:PRIMary[:SLEVel]

Function	Sets/queries the power offset of the primary common control physical channel to use while a call is connected. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-5.35 dB
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:CCPCHANNEL:PRIMARY:SLEVEL -7" !Sets P-CCPCH connected power offset.
```

CALL:CONNected:CCPChannel:PRIMary:LEVel

Function	Sets/queries the primary common control physical channel’s power offset to use while a call is connected. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-5.35 dB
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:CCPCHANNEL:PRIMARY:LEVEL -7"
```

CALL:CONNected:CCPChannel:PRIMary:STATe

Function	Sets/queries the primary common control physical channel’s state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:CCPCHANNEL:PRIMARY:STATE ON"
```

CALL:CONNected:CCPChannel:SECondary[:SLEVel]

Function	Sets/queries the connected power offset of the secondary common control physical channel to use while a call is connected. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-20.00 dB
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:CCPCHANNEL:SECONDARY:SLEVEL -10" !Sets P-CCPCH connected power offset
to -10 dB.
```

CALL:CONNected:CCPChannel:SECondary:LEVel

Function	Sets/queries the secondary common control physical channel's power offset to use while a call is connected. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-20.00 dB
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:CCPCHANNEL:SECONDARY:LEVEL -5"
```

CALL:CONNected:CCPChannel:SECondary:STATe

Function	Sets/queries the secondary common control physical channel's state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.02 and above.
Programming Example `OUTPUT 714;"CALL:CONNECTED:CCPCHANNEL:SECONDARY:STATE OFF"`	

CALL:CONNected:CPIChannel[:SLEVel]

Function	Sets/queries the power offset of the common pilot channel to use while a call is connected. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-3.30 dB
Requirements	Test Application Revision: A.02 and above.
Programming Example `OUTPUT 714;"CALL:CONNECTED:CPICHANNEL:SLEVEL -7" !Sets CPIC connected power offset.`	

CALL:CONNected:CPIChannel:LEVel

Function	Sets/queries the common pilot channel's power offset to use while a call is connected. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-3.30 dB
Requirements	Test Application Revision: A.02 and above.
Programming Example	

```
OUTPUT 714;"CALL:CONNECTED:CPICHANNEL:LEVEL -7"
```

CALL:CONNected:CPIChannel:STATe

Function	Sets/queries the common pilot channel's state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (ON)
Requirements	Test Application Revision: A.02 and above.
Programming Example	

```
OUTPUT 714;"CALL:CONNECTED:CPICHANNEL:STATE ON"
```

CALL:CONNected:DPCHannel[:SLEVel]

Function	Sets/queries the power offset of the dedicated physical channel to use while a call is connected. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-3.30 dB
Requirements	Test Application Revision: A.02 and above.
Programming Example `OUTPUT 714;"CALL:CONNECTED:DPCHANNEL:SLEVEL -7" !Sets DPCH connected power offset.`	

CALL:CONNected:DPCHannel:LEVel

Function	Sets/queries the dedicated physical channel’s power offset to use while a call is connected. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-3.30 dB
Requirements	Test Application Revision: A.02 and above.
Programming Example `OUTPUT 714;"CALL:CONNECTED:DPCHANNEL:LEVEL -7"`	

CALL:CONNected:DPCHannel:STATe

Function	Sets/queries the dedicated physical channel's state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.02 and above.
Programming Example `OUTPUT 714;"CALL:CONNECTED:DPCHANNEL:STATE ON"`	

CALL:CONNected:LIMit[:STATe][:SELected]

Function	Sets/queries the call limit state for current selected format (only WCDMA format is available now). When the call limit state is on, the test set does not respond to PRACH preambles for paging responses from the UE. It forces the UE to repeatedly send PRACH preambles.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (OFF)
Requirements	Test Application Revision: A.03 and above.
Programming Example `OUTPUT 714;"CALL:CONNECTED:LIMIT:STATE 1"`	

CALL:CONNected:LIMit[:STATe]:WCDMa

Function	Sets/queries the call limit state for the WCDMA format, whether or not that format is active. When the call limit state is on, the test set does not respond to PRACH preambles from the UE. This allows you to make power measurements on the PRACH preambles.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (OFF)
Requirements	Test Application Revision: A.03 and above.
Programming Example `OUTPUT 714;"CALL:CONNECTED:LIMIT:STATE:WCDMA 1"`	

CALL:CONNected:PICHannel[:SLEVel]

Function	Sets/queries the power offset of the page indicator channel to use while a call is connected. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-8.30 dB
Requirements	Test Application Revision: A.02 and above.

Programming Example

```
OUTPUT 714;"CALL:CONNECTED:PICHANNEL:SLEVEL -7" !Sets PICH connected power offset.
```

CALL:CONNected:PICHannel:LEVel

Function	Sets/queries the page indicator channel’s power offset to use while a call is connected. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-8.30 dB
Requirements	Test Application Revision: A.02 and above.

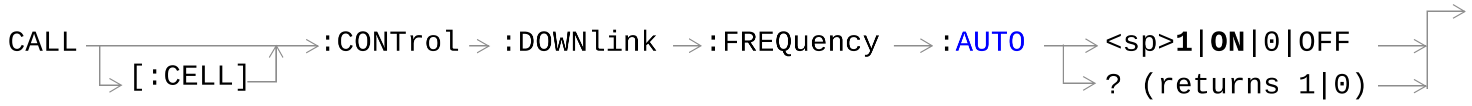
Programming Example

```
OUTPUT 714;"CALL:CONNECTED:PICHANNEL:LEVEL -7"
```

CALL:CONNected:PICHannel:STATe

Function	Sets/queries the page indicator channel's state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (ON)
Requirements	Test Application Revision: A.02 and above.
Programming Example `OUTPUT 714;"CALL:CONNECTED:PICHANNEL:STATE OFF"`	

CALL:CONTrol



“Diagram Conventions” on page 368

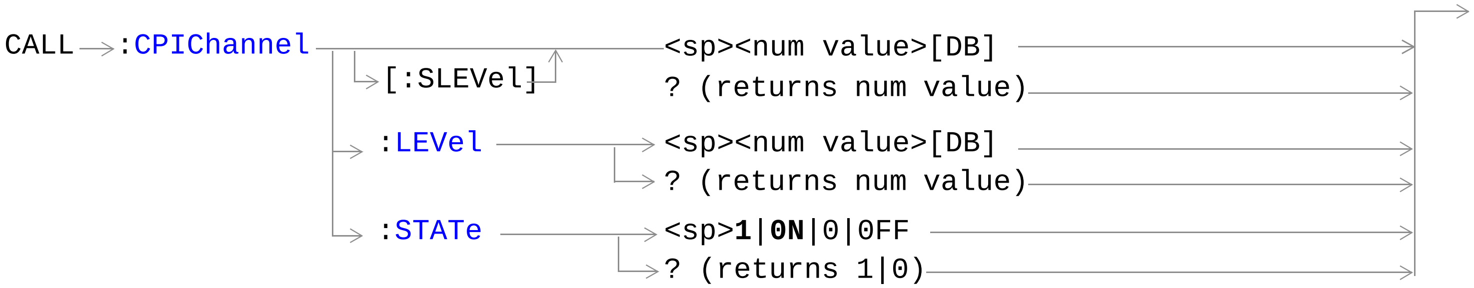
CALL[:CELL]:CONTrol:DOWNlink:FREQuency:AUTO

Function	Sets/queries whether the user or the base station emulator is in control of the RF generator’s downlink channel frequency setting. If set to on (1), the base station emulator is in control and the frequency will automatically be set by the test set. If set to off (0), the downlink channel frequency is directly settable. Refer to “CALL:RFGenerator” to set the downlink channel frequency.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (auto)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:CONTROL:DOWNLINK:FREQUENCY:AUTO OFF"
!Enables manual frequency setting.
```

CALL:CPIChannel



“Diagram Conventions” on page 368

CALL:CPIChannel[:SLEVel]

Function	Sets/queries the common pilot channel’s initial power offset. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-4.8 dB
Requirements	Test Application Revision: A.02 and above.
Programming Example `OUTPUT 714;"CALL:CPICHANNEL:SLEVEL -10"`	

CALL:CPIChannel:LEVel

Function	Sets/queries the common pilot channel's initial power offset. This command sets the power offset level and turns on the power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-4.8 dB
Requirements	Test Application Revision: A.02 and above.
Programming Example	

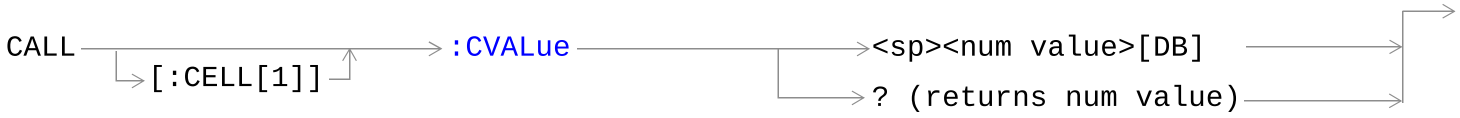
```
OUTPUT 714;"CALL:CPICHANNEL:LEVEL -5"
```

CALL:CPIChannel:STATe

Function	Sets/queries the common pilot channel's state. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.02 and above.
Programming Example	

```
OUTPUT 714;"CALL:CPICHANNEL:STATE ON"
```

CALL:CVALue

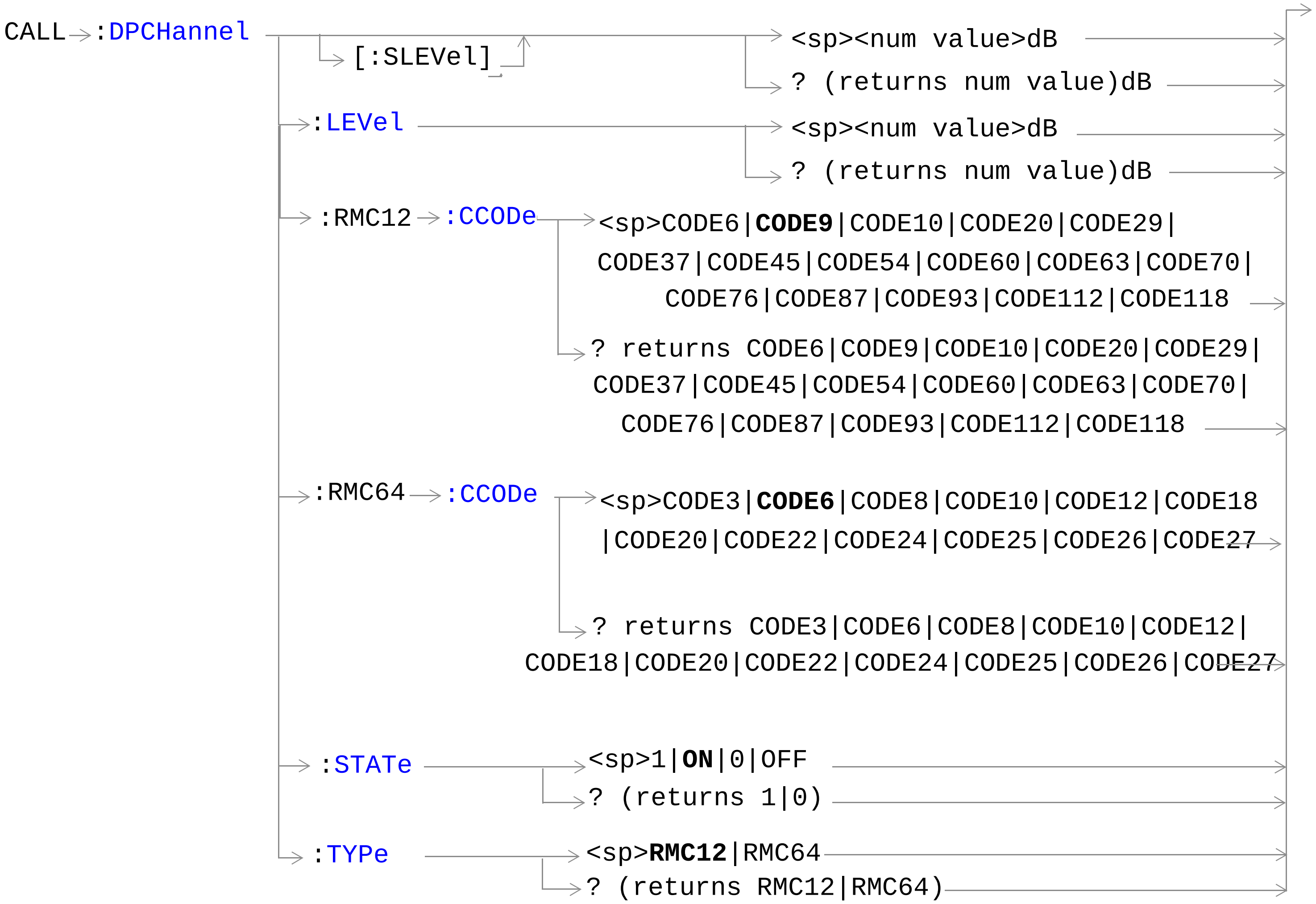


“Diagram Conventions” on page 368

CALL[:CELL[1]]:CVALue

Function	Sets/queries the BCCH Constant Value which are used by the UE to determine the initial transmit power of the first PRACH preamble. See “Initial PRACH Tx Power” . Changing this setting while in active cell operating mode and the Call Status is other than IDLE will result in the execution of the BCCH Update procedure (see “Setting Cell Parameters” on page 127).
Setting	Range: -35 dB to -10 dB Resolution: 1 dB
Query	Range: -35 dB to -10 dB Resolution: 1 dB
*RST Setting	-10 dB
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"CALL:CVALue -20" !Sets the constant value to -20 dB.`	

CALL:DPCHannel



“Diagram Conventions” on page 368

CALL:DPCHannel[:SLEVel]

Function	Sets/queries the dedicated physical channel's (DPCH) initial downlink offset, and sets its state to ON.
Setting	Range: -30.00 dB to 0 dB (Prior to A.03, the range is -20.00 dB to 0 dB) Resolution: 0.01
Query	Range: -30.00 dB to 0 dB (Prior to A.03, the range is -20.00 dB to 0 dB) Resolution: 0.01
*RST Setting	-12.00 dB
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"CALL:DPCHANNEL:SLEVEL -12"
```

CALL:DPCHannel:LEVel

Function	Sets/queries the dedicated physical channel's (DPCH) initial downlink offset.
Setting	Range: -30.00 dB to 0 dB (Prior to A.03, the range is -20.00 dB to 0 dB) Resolution: 0.01
Query	Range: -30.00 dB to 0 dB (Prior to A.03, the range is -20.00 dB to 0 dB) Resolution: 0.01
*RST Setting	-12.00 dB
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"CALL:DPCHANNEL:LEVEL -12"
```

CALL:DPCHannel:RMC12:CCODe

Function	Sets/queries the dedicated physical control channel's 12.2 kbps reference measurement channel's channelization code. The type of bearer service being carried by the WCDMA link drives the configuration of the DTCH and DCCH logical channels, the DCH Transport channel, and the DPCH physical channel. The test set supports only symmetrical channels, and only one type of bearer service at a time. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: CODE6 | CODE9 | CODE10 | CODE20 | CODE29 | CODE37 | CODE45 | CODE54 | CODE60 | CODE63 | CODE70 | CODE76 | CODE87 | CODE93 | CODE112 | CODE118
Query	Range: CODE6 | CODE9 | CODE10 | CODE20 | CODE29 | CODE37 | CODE45 | CODE54 | CODE60 | CODE63 | CODE70 | CODE76 | CODE87 | CODE93 | CODE112 | CODE118
*RST Setting	CODE9
Requirements	Test Application Revision: A.01 and above
Programming Example	
`OUTPUT 714;"CALL:DPCHANNEL:RMC12:CCODE CODE3" !Sets the 12.2 RMC's channelization code.`	

CALL:DPCHannel:RMC64:CCODe

Function	Sets/queries the dedicated physical control channel's 64 kbps reference measurement channel's channelization code. The type of bearer service being carried by the WCDMA link drives the configuration of the DTCH and DCCH logical channels, the DCH Transport channel, and the DPCH physical channel. The test set supports only symmetrical channels, and only one type of bearer service at a time. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: CODE3 | CODE6 | CODE8 | CODE10 | CODE12 | CODE18 | CODE20 | CODE22 | CODE24 | CODE25 | CODE26 | CODE27
Query	Range: CODE3 | CODE6 | CODE8 | CODE10 | CODE12 | CODE18 | CODE20 | CODE22 | CODE24 | CODE25 | CODE26 | CODE27
*RST Setting	CODE6
Requirements	Test Application Revision: A.02 and above
Programming Example	
`OUTPUT 714;"CALL:DPCHANNEL:RMC64:CCODE CODE3" !Sets the 64 RMC's channelization code.`	

CALL:DPCHannel:STATe

Function	Sets/queries the dedicated physical control channel’s state. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: 1|ON | 0|OFF
Query	Range: 1|ON | 0|OFF
*RST Setting	1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:DPCHANNEL:STAT 1"
```

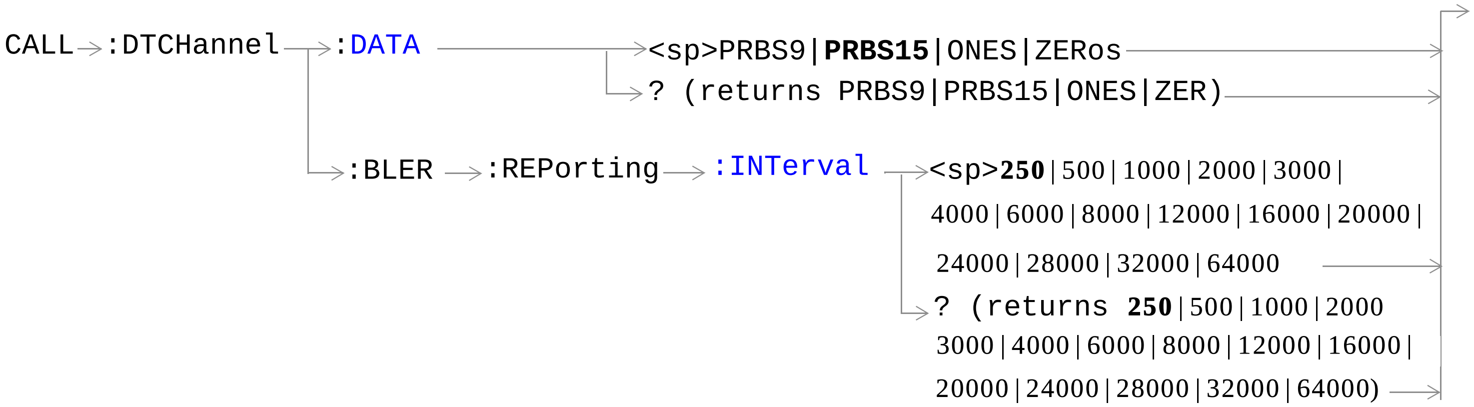
CALL:DPCHannel:TYPe

Function	Sets/queries the dedicated physical control channel’s channel type. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: RMC12|RMC64
Query	Range: RMC12|RMC64
*RST Setting	RMC12
Requirements	Test Application Revision: A.01 and above Test Application A.02 added RMC64

Programming Example

```
OUTPUT 714;"CALL:DPCHANNEL:TYPE RMC12" !Selects the 12.2 RMC for the DPCH.
```

CALL:DTCHannel



"Diagram Conventions" on page 368

CALL:DTCHannel:DATA

Function	Sets/queries the downlink dedicated traffic channel's data type. While the DTCH Data is set to ZERos a continuous series of 0's is transmitted on the DTCH. While the DTCH Data is set to ONES a continuous series of 1's is transmitted on the DTCH. While the DTCH Data is set to either CCITT PRBS9 or CCITT PRBS15 the appropriate pseudo-random bit sequence is transmitted continuously on the DTCH.
Setting	Range: PRBS9 | PRBS15 | ONES | ZERos
Query	Range: PRBS9 | PRBS15 | ONES | ZER
*RST Setting	PRBS15
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:DTCHANNEL:DATA ZER” !Sets the DTCH data pattern to continuous zeroes.
```

CALL:DTCHannel:BLER:REPorting:INTerval

Function	Sets/queries the observation period for UE reported DTCH BLER measurements (see "Mobile Station (UE) Reported Measurements" for details). It is in the unit of millisecond. This setting is only useful after a Measurement Request (see "CALL:MS:REPorted:MEASurement:REQuest" on page 445).
Setting	Range: 250 | 500 | 1000 | 2000 | 3000 | 4000 | 6000 | 8000 | 12000 | 16000 | 20000 | 24000 | 28000 | 32000 | 64000 ms Resolution: 1 ms
Query	Range: same as settings
*RST Setting	250 ms
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"CALL:DTCHannel:BLER:REPorting:INTerval 1000”
!Sets the DTCH BLER observation period to 1000 miliseconds.
```

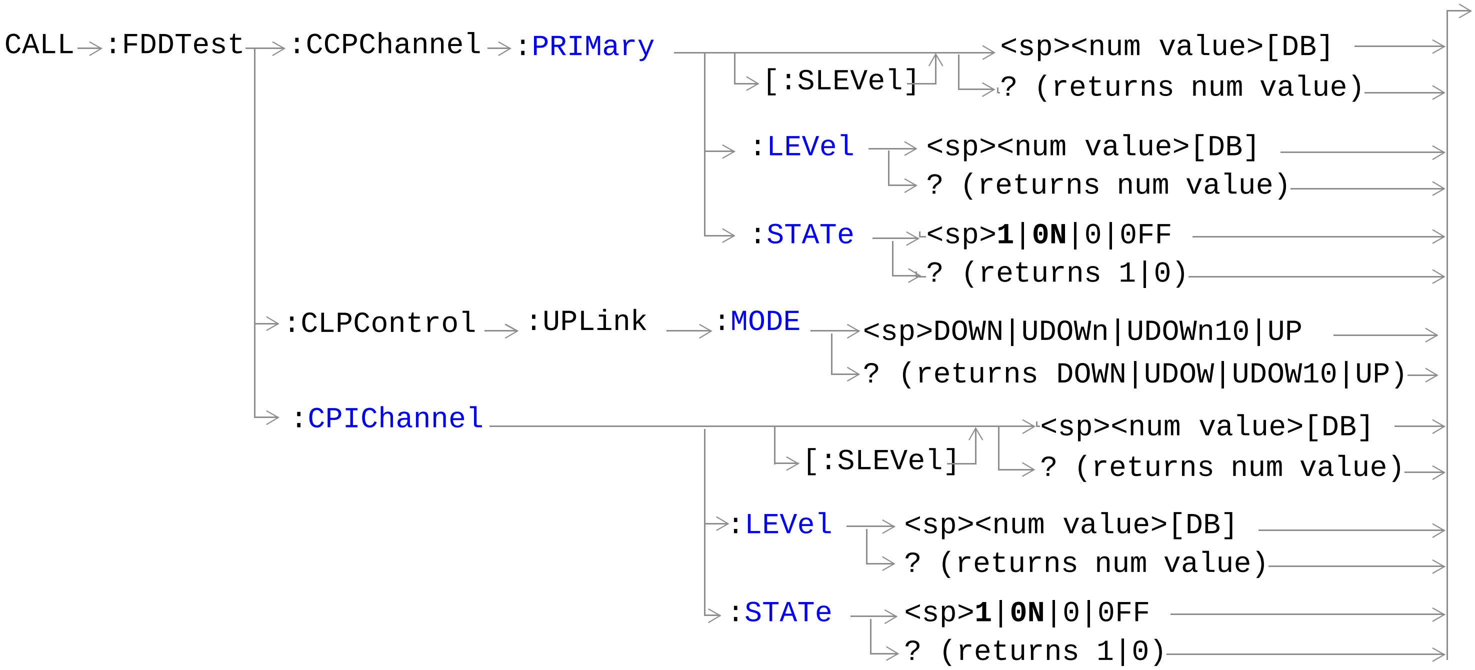
CALL:END

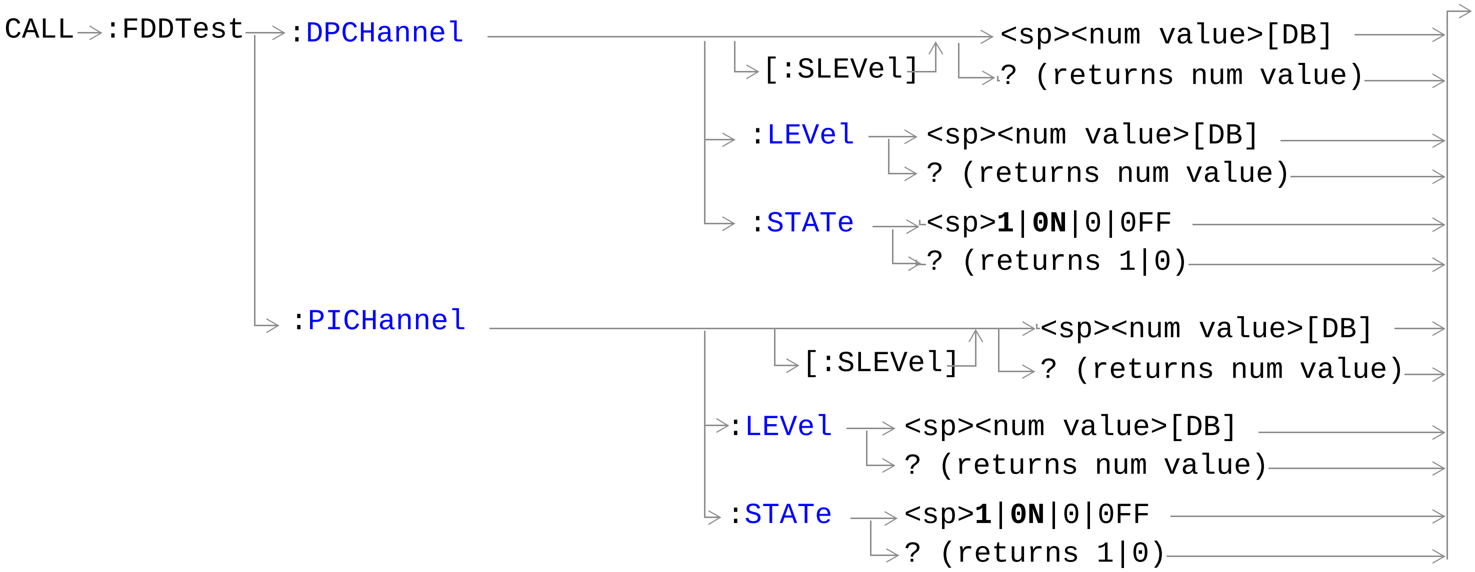
“Diagram Conventions” on page 368

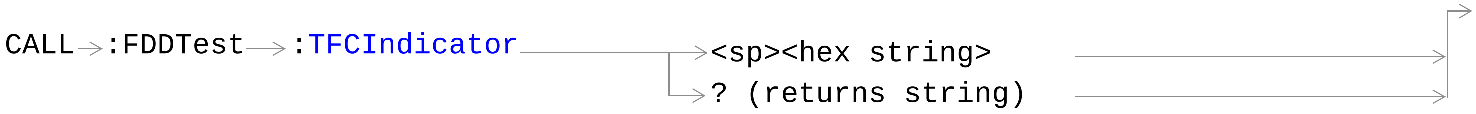
CALL:END

Function	Disconnects any calls or connections in progress. Aborts any outstanding registrations or base station pages in progress as well as mobile station originations.
Requirements	Test Application Revision: A.02 and above.
Programming Example `OUTPUT 714;"CALL:END"`	

CALL:FDDTest







“Diagram Conventions” on page 368

CALL:FDDTest:CCPChannel:PRIMary[:SLEVel]

Function	Sets/queries the test mode power offset of the primary common control physical channel during FDD test mode operation. This command sets the power offset level and turns on the power offset.
Setting	Range: -20.00 dB to 0 dB, 9.91 E+37 Resolution: 0.01
Query	Range: -20.00 dB to 0 dB, 9.91 E+37 Resolution: 0.01
*RST Setting	9.91 E+37
Requirements	Test Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;"CALL:FDDTEST:CCPCHANNEL:PRIMARY:SLEVEL" !Sets P-CCPCH test mode power offset.
```

CALL:FDDTest:CCPChannel:PRIMary:LEVel

Function	Sets/queries the primary common control physical channel’s test mode power offset during FDD test mode operation. This command sets the power offset level and turns on the power offset.
Setting	Range: -20.00 dB to 0 dB, 9.91 E+37 Resolution: 0.01
Query	Range: -20.00 dB to 0 dB, 9.91 E+37 Resolution: 0.01
*RST Setting	9.91 E+37
Requirements	Test Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;"CALL:FDDTEST:CCPCHANNEL:PRIMARY:LEVEL -5"
```

CALL:FDDTest:CLPControl:UPLink:MODE

Function	Sets/queries the uplink inner loop power control mode during FDD test mode operation. When UP is selected, the test set sends all 0 (up) power control bits. When DOWN is selected, the test set sends all 1 (down) power control bits. When UDOWn is selected, the test set sends alternating up/down power control bits. When UDOWn10 is selected, the test set sends alternating 10 up/down power control bits.
Setting	Range: UP | DOWN | UDOWn | UDOWn10
Query	Range:UP | DOWN | UDOW | UDOW10
*RST Setting	UDOW
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:CLPCONTROL:REVERSE:MODE UDOWN"
!Sets the closed loop power control mode to alternating up, down bits.
```

CALL:FDDTest:CCPChannel:PRIMary:STATe

Function	Sets/queries the primary common control physical channel’s state during FDD test mode operation.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:FDDTEST:CCPCHANNEL:PRIMARY:STATE ON"
```

CALL:FDDTest:CPIChannel[:SLEVel]

Function	Sets/queries the test mode power offset of the common pilot channel during FDD test mode operation. This command sets the power offset level and turns on the power offset.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-3.3 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:FDDTEST:CPICHANNEL:SLEVEL -10"
```

CALL:FDDTest:CPIChannel:LEVel

Function	Sets/queries the common pilot channel’s test mode power offset during FDD test mode operation. This command sets the power offset level and turns on the power offset.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-3.3 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:FDDTEST:CPICHANNEL:LEVEL -5"
```

CALL:FDDTest:CPIChannel:STATe

Function	Sets/queries the common pilot channel’s state during FDD test mode operation.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:FDDTEST:CPICHANNEL:STATE OFF"
```

CALL:FDDTest:DPCHannel[:SLEVel]

Function	Sets/queries the test mode power offset of the dedicated physical channel during FDD test mode operation. This command sets the power offset level and turns on the power offset.
Setting	Range: -30.00 dB to 0 dB (Prior to A.03, the range is -20.00 dB to 0 dB) Resolution: 0.01
Query	Range: -30.00 dB to 0 dB (Prior to A.03, the range is -20.00 dB to 0 dB) Resolution: 0.01
*RST Setting	-10.3 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:FDDTEST:DPCHANNEL:SLEVEL -7"
```

CALL:FDDTest:DPCHannel:LEVel

Function	Sets/queries the dedicated physical channel's test mode power offset during FDD test mode operation. This command sets the power offset level and turns on the power offset.
Setting	Range: -30.00 dB to 0 dB (Prior to A.03, the range is -20.00 dB to 0 dB) Resolution: 0.01
Query	Range: -30.00 to 0 dB (Prior to A.03, the range is -20.00 dB to 0 dB) Resolution: 0.01
*RST Setting	-10.3 dB
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:FDDTEST:DPCHANNEL:LEVEL -7"
```

CALL:FDDTest:DPCHannel:STATe

Function	Sets/queries the dedicated physical channel's state during FDD test mode operation.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:FDDTEST:DPCHANNEL:STATE OFF"
```

CALL:FDDTest:PICHannel[:SLEVel]

Function	Sets/queries the test mode power offset of the page indicator channel during FDD test mode operation. This command sets the power offset level and turns on the power offset.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-8.3 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:FDDTEST:CPICHANNEL:SLEVEL -10"
```

CALL:FDDTest:PICHannel:LEVel

Function	Sets/queries the page indicator channel's test mode power offset during FDD test mode operation. This command sets the power offset level and turns on the power offset.
Setting	Range: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -20.00 dB to 0 dB Resolution: 0.01
*RST Setting	-8.3 dB
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:FDDTEST:CPICHANNEL:LEVEL -5"`	

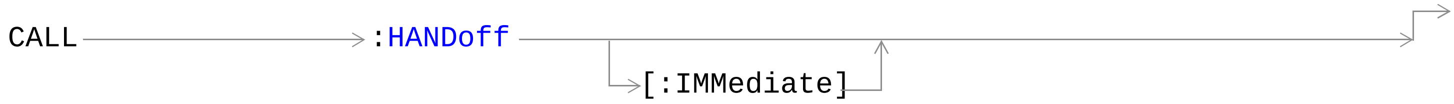
CALL:FDDTest:PICHannel:STATe

Function	Sets/queries the page indicator channel's state during FDD test mode operation.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:FDDTEST:CPICHANNEL:STATE OFF"`	

CALL:FDDTest:TFCIndicator

Function	Sets/queries the transport format combination indicator (TFCI) during FDD test mode operation. The TFCI is a hexadecimal string of up to 12 characters. An error message is displayed if the user attempts to enter more characters than fit into the string.
Setting	Range: 0x000 to 0x3FF
Query	Range: 0x000 to 0x3FF
*RST Setting	0x000
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:FDDTEST:TFCINDICATOR 0x2DE"`	

CALL:HANDoff



"Diagram Conventions" on page 368

CALL:HANDoff[:IMMediate]

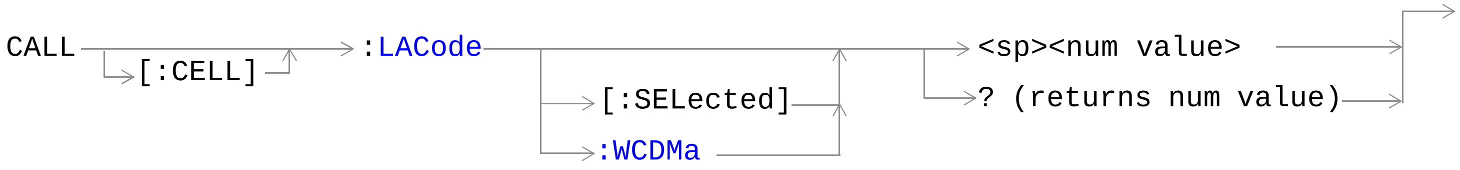
Function	Initiates a handoff while on a call (and in Active Cell mode). Any measurements that have been initiated are aborted when a handoff is initiated. See "Performing a Handoff" on page 151. A handoff can initiate a change of downlink UARFCN ("CALL:SETup:CHANnel[:SELected]:DOWNlink"), a change of uplink UARFCN("CALL:SETup:CHANnel[:SELected]:UPLink"), or a change from W-CDMA system to GSM system ("CALL:SETup:SYSTem[:TYPE]") while maintaining the connection. The W-CDMA to GSM handoff is only available when both the E1963A and E1968A test applications (TAs) are present in the test set and licensed for operation.
Requirements	Test Application Revision: A.03 and above: add handoff from W-CDMA to GSM
Programming Example `OUTPUT 714;"CALL:HANDoff"`	

Related Topics

"Performing a Handoff"

"CALL:SETup"

CALL:LACode



"Diagram Conventions" on page 368

CALL[:CELL]:LACode[:SELected]

Function	Sets/queries the local area code (LAC), for the currently selected test application. If this setting is changed while the Operating Mode is "Active Cell.", the test set will perform the BCCH Update procedure.
Setting	Range: 0 to 65535
Query	Range: 0 to 65535
*RST Setting	1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:LACODE 310" !Sets the local area code to 310.
```

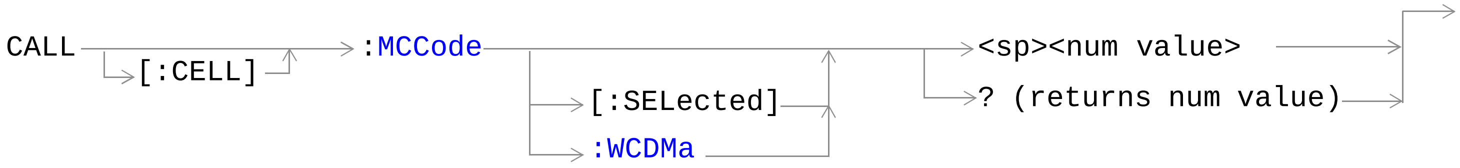
CALL[:CELL]:LACode:WCDMa

Function	Sets/queries the local area code (LAC), when using the W-CDMA test application. This setting cannot be changed whil the Operating Mode is set to "Active Cell." This setting can only be changed when the Operating Mode is set to Cell Off.
Setting	WCDMa Range: 0 to 65535
Query	Range: 0 to 65535
*RST Setting	1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:LACODE:WCDMA 310" !Sets the WCDMA local area code to 310.
```

CALL:MCCode



“Diagram Conventions” on page 368

CALL[:CELL]:MCCode[:SELected]

Function	Sets/queries the mobile country code (MCC) for the currently selected test application. If this setting is changed while the Operating Mode is “Active Cell.”, the test set will perform the BCCH Update procedure.
Setting	Range: 0 to 999
Query	Range: 0 to 999
*RST Setting	1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:MCCODE 310" !Sets the mobile country code to 310.
```

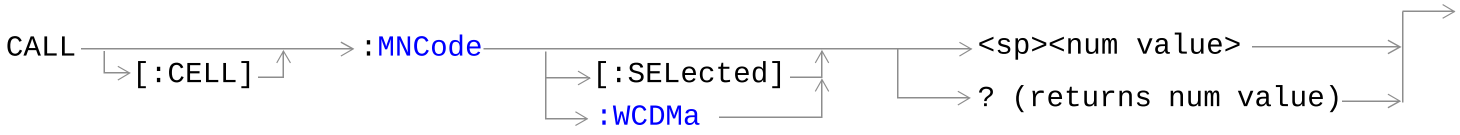
CALL[:CELL]:MCCode:WCDMa

Function	Sets/queries the mobile country code (MCC) when using the W-CDMA test application. If this setting is changed while the Operating Mode is “Active Cell.”, the test set will perform the BCCH Update procedure.
Setting	Range: 0 to 999
Query	Range: 0 to 999
*RST Setting	1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:MCCODE:WCDMa 310" !Sets the W-CDMA mobile country code to 310.
```

CALL:MNCode



“Diagram Conventions” on page 368

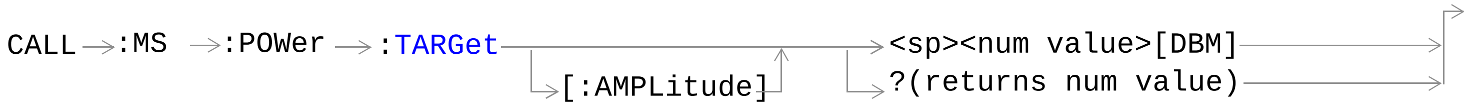
CALL[:CELL]:MNCode

Function	Sets/queries the mobile network code (MNC) for the currently selected test application. If this setting is changed while the Operating Mode is “Active Cell.”, the test set will perform the BCCH Update procedure.
Setting	Range: 0 to 99
Query	Range: 0 to 99
*RST Setting	1
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:CELL:MNCODE 10" !Sets the current MNC setting to 10.`	

CALL[:CELL]:MNCode:WCDMa

Function	Sets/queries the mobile network code (MNC), when using the W-CDMA test application. This setting cannot be changed while Operating Mode is set to “Active Cell.” This setting can only be changed when the Operating Mode is set to Cell Off (CALL:OPERating:MODE OFF).
Setting	Range: 0 to 99
Query	Range: 0 to 99
*RST Setting	1
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:CELL:MNCODE:WCDMA 10" !Sets the WCDMA mobile network code to 10.`	

CALL:MS:POWer

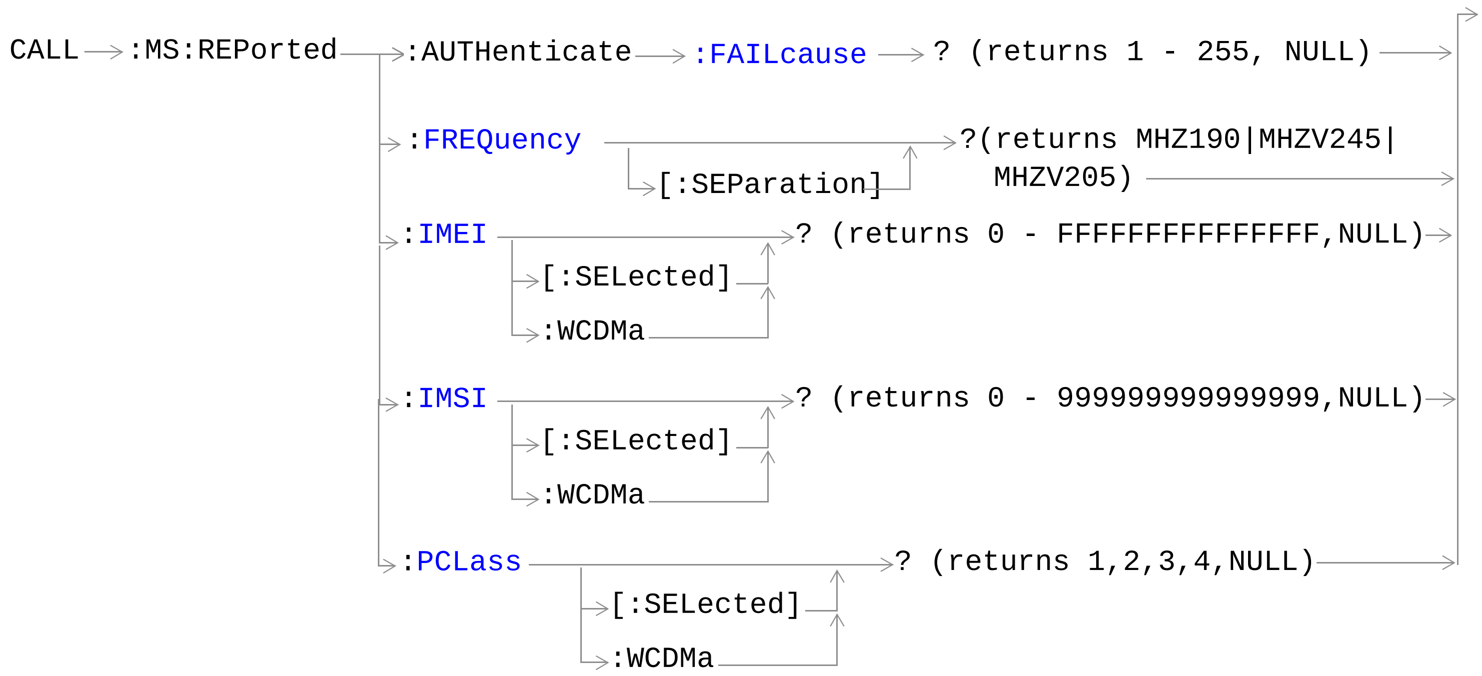


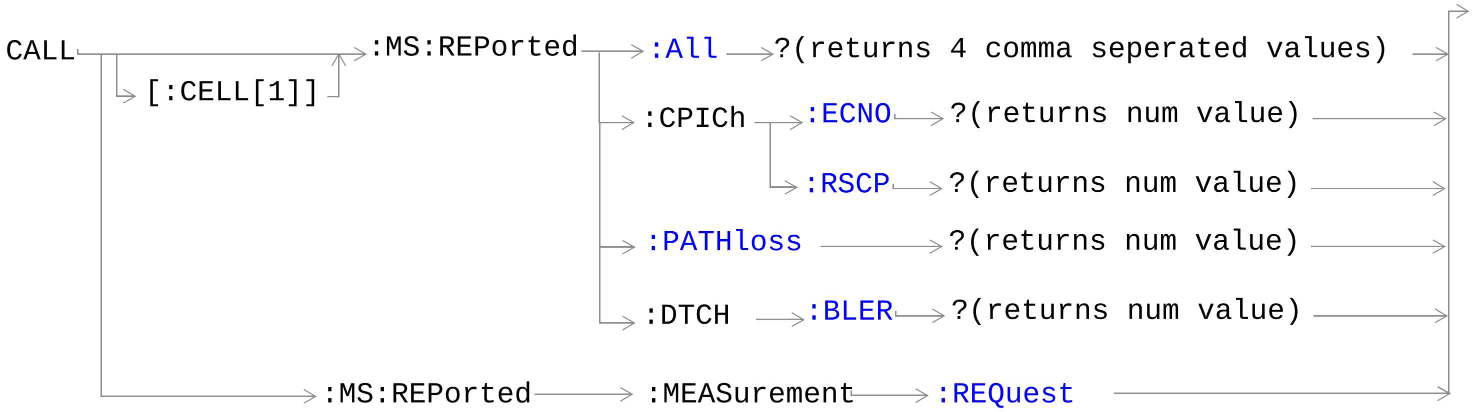
"Diagram Conventions" on page 368

CALL:MS:POWer:TARGet[:AMPLitude]?

Function	Sets/queries the expected power level from the UE (mobile station). See "MS Target Power" on page 144.
Query	Range: -50 dBm to +24 dBm Resolution: 1 dB
*RST Setting	-5 dBm
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:MS:POWER:TARGET:AMPLITUDE -20"`	

CALL:MS:REPorted





"Diagram Conventions" on page 368

CALL:MS:REPorted:AUTHenticate:FAILcause?

Function	Queries the UE (mobile station) reported authentication fail cause. See “Setting Security Parameters” for more description on the fail causes.
Query	Range: 1 to 255 or NULL
*RST Setting	NULL
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:MS:REPorted:AUTHenticate:FAILcause?"
!Queries the authentication fail cause.
```

CALL:MS:REPorted:FREQuency[:SEParation]?

Function	Queries the “Band A” transmit/receive frequency separation. The specified frequencies are as follows: 190 MHz (MHZ190, fixed frequency separation), 174.8 to 205.2 MHz (MHZV205, variable frequency separation within this range), 134 to 245.2 MHz (MHZV245, variable frequency separation within this range).
Query	Range: MHZ190 | MHZV245 | MHZV205 or ““
*RST Setting	““ (null string)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;”CALL:MS:REPORTED:FREQUENCY:SEPARATION?”
```

CALL:MS:REPorted:IMEI[:SELected]?

Function	Queries the mobile reported international mobile equipment identity (IMEI).
Query	Range: up to 15 digits: 0 through FFFFFFFFFFFFFFF, or ““ (null string)
*RST Setting	““ (null string)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;”CALL:MS:REPORTED:IMEI:SELECTED?”
```

CALL:MS:REPorted:IMSI[:SELected]?

Function	Queries the mobile reported international mobile subscriber identity (IMSI):
Query	Range: up to 15 digits: 0 through 999999999999999, or ““ (null string)
*RST Setting	““ (null string)
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;”CALL:MS:REPORTED:IMSI:SELECTED?”`	

CALL:MS:REPorted:PCLass[:SELected]?

Function	Queries the mobile reported power class:
Query	Range: 1,2,3,4, or ““ (null string)
*RST Setting	““ (null string)
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;”CALL:MS:REPORTED:PCLASS:SELECTED?”`	

CALL:MS:REPorted:MEASurement:REQuest

Function	Sends the Measurement Request message to instruct the UE (mobile station) to make the following measurements: CPICH Ec/No, CPICH RSCP, Pathloss and DTCH BLER. See “Mobile Station (UE) Reported Measurements” for more descriptions. This function is only available while the Call Status is "CONNected". The reported measurement results can be queried with “CALL[:CELL[1]]:MS:REPorted:ALL?” on page 446. You can specify the observation period for DTCH BLER measurements. See “CALL:DTCHannel:BLER:REPorting:INTerval” on page 430
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;”CALL:MS:REPorted:MEASurement:REQuest”`	

CALL[:CELL[1]]:MS:REPorted:ALL?

Function	Queries the UE (mobile station) reported measurement results after a successful Measurement Request (see “CALL:MS:REPorted:MEASurement:REQuest” on page 445) . The supported measurements include CPICH Ec/No, CPICH RSCP, Pathloss and DTCH BLER (see “Mobile Station (UE) Reported Measurements” for more descriptions). After a successful Measurement Request, four comma separated results are returned in the order of CPICH Ec/No, CPICH RSCP, Pathloss and DTCH BLER. See “CALL[:CELL[1]]:MS:REPorted:CPICh:ECNO?” , “CALL[:CELL[1]]:MS:REPorted:CPICh:RSCP?” , “CALL[:CELL[1]]:MS:REPorted:PATHloss?” , and “CALL[:CELL[1]]:MS:REPorted:DTCH:BLER?” for more information.
Query	CPICH Ec/No: • Range: 0 to 49 CPICH RSCP: • Range: 0 to 91 Pathloss: • Range: 46 to 158 dB • Resolution: 1 dB DTCH BLER: • Range: 0 to 63
*RST Setting	““ (null string)
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;”CALL:MS:REPorted:ALL?”`	

CALL[:CELL[1]]:MS:REPorted:CPICh:ECNO?

Function	Queries the UE (mobile station) reported CPICH Ec/No measurement result which is an index to a range of Ec/No values. See “Mobile Station (UE) Reported Measurements” for the mapping of this report value to actual Ec/No range.
Query	Range: 0 to 49, or 9.91 E+37
*RST Setting	NULL
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;”CALL:MS:REPorted:CPICh:ECNO?”`	

CALL[:CELL[1]]:MS:REPorted:CPICh:RSCP?

Function	Queries the UE (mobile station) reported CPICH RSCP measurement result which is an index to a range of RSCP values. See "Mobile Station (UE) Reported Measurements" for the mapping of this report value to actual RSCP range.
Query	Range: 0 to 91, or 9.91 E+37
*RST Setting	NULL
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"CALL:MS:REPorted:CPICh:RSCP?"`	

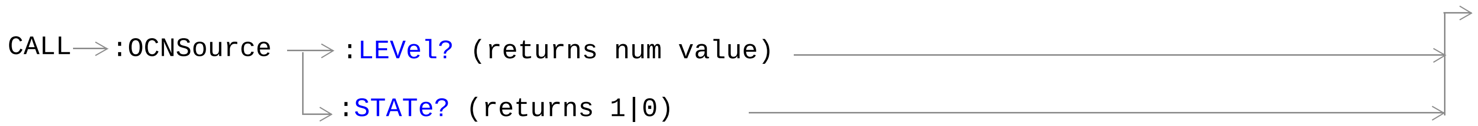
CALL[:CELL[1]]:MS:REPorted:DTCH:BLER?

Function	Queries the UE (mobile station) reported DTCH BLER measurement result which is an index to a range of BLER values. See "Mobile Station (UE) Reported Measurements" for the mapping of this report value to actual BLER range.
Query	Range: 0 to 63, or 9.91 E+37
*RST Setting	NULL
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"CALL:MS:REPorted:DTCH:BLER?"`	

CALL[:CELL[1]]:MS:REPorted:PATHloss?

Function	Queries the UE (mobile station) reported Pathloss measurement result in the unit of dB. See "Mobile Station (UE) Reported Measurements" for more details.
Query	Range: 46 to 158 dB, or 9.91 E+37 Resolution: 1 dB
*RST Setting	NULL
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"CALL:MS:REPorted:PATHloss?"`	

CALL:OCNSource



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CALL:OCNSource:LEVel?

Function	Queries the calculated level of the UTRA FDD composite orthogonal channel noise simulator (OCNS). The OCNS level is a calculated value used to balance the relative power levels of the following channels to sum to 100%: • OCNS • Common Pilot Channel (CPICH) • Primary Common Control Physical Channel (P-CCPCH • Syncronisation Channel (SCH) • Page Indicator Channel (PICH) • Dedicated Physical Channel (DPCH) If the contribution of OCNS is calculated to be -30 dB or less, the OCNS state is turned off.
Query	Range: 0 to -29 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:OCNSOURCE:LEVEL?" !Queries the calculated OCNS level.`	

CALL:OCNSource:STATe?

Function	Queries the on/off state of the calculated UTRA FDD composite orthogonal channel noise simulator (OCNS). The OCNS level is a calculated value used to balance the relative power levels of the following channels to sum to 100%: • OCNS • Common Pilot Channel (CPICH) • Primary Common Control Physical Channel (P-CCPCH • Syncronisation Channel (SCH) • Page Indicator Channel (PICH) • Dedicated Physical Channel (DPCH) If the contribution of OCNS is calculated to be -30 dB or less, the OCNS state is turned off.
Setting	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:OCNSOURCE:STATE?"
```

CALL:OPERating

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CALL[:CELL]:OPERating:MODE

Function	Sets/queries the operating mode of the base station emulator. If a call is in progress during a change in operating mode it will be dropped.
Setting	Range: Active Cell Mode = CALL UTRA FDD Test Mode = FDDTest CW Mode = CW Cell Off Mode = OFF
Query	Range: CALL|CW|FDDT|OFF
*RST Setting	CALL
Requirements	Test Application Revision: A.01 and above
Programming Example	`OUTPUT 714;"CALL:CELL:OPERATING:MODE FDDTEST" !Selects UTRA FDD test mode.`

CALL:ORIGinate

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CALL:ORIGinate

Function	Generates a page attempt to the mobile station. If the call attempt fails, the test set will return to the idle call processing state.
Requirements	Test Application Revision: A.02 and above
Programming Example	
`OUTPUT 714;"CALL:ORIGINATE" !pages the mobile station`	

CALL:ORIGinate:DONE?

Function	See “Call Processing Event Synchronization”
Query	Range: 1 | 0
Requirements	Test Application Revision: A.02 and above
Programming Example	
`OUTPUT 714;"CALL:ORIGINATE:DONE?"`	

CALL:ORIGinate:OPComplete?

Function	See “Call Processing Event Synchronization”
Query	Range: 1
Requirements	Test Application Revision: A.02 and above
Programming Example	
`OUTPUT 714;"CALL:ORIGINATE:OPCOMPLETE?"`	

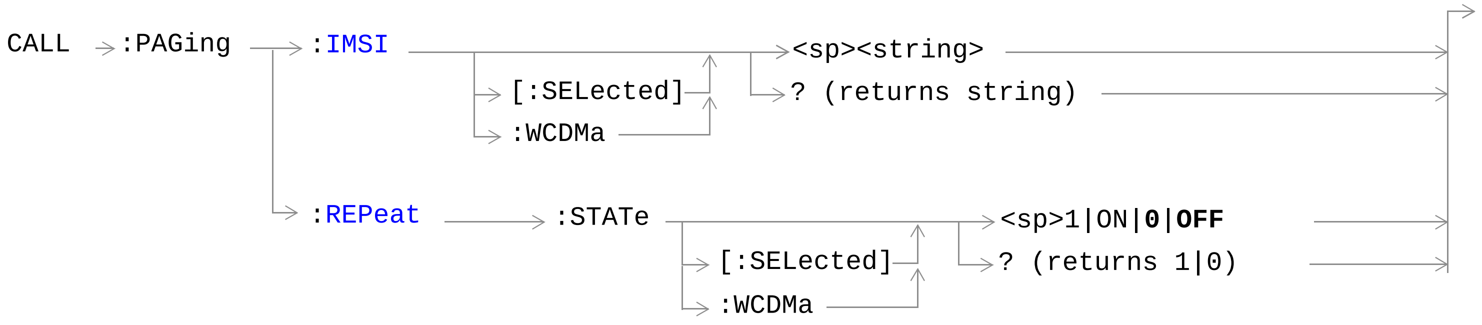
CALL:ORIGinate:SEQuential

Function	See “Call Processing Event Synchronization”
Requirements	Test Application Revision: A.02 and above
Programming Example	
`OUTPUT 714;"CALL:ORIGINATE:SEQUENTIAL"`	

CALL:ORIGinate:WAIT

Function	See “Call Processing Event Synchronization”
Setting	Range:
Requirements	Test Application Revision: A.02 and above
Programming Example	
`OUTPUT 714;"CALL:ORIGINATE:WAIT"`	

CALL:PAGing



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CALL:PAGing:iMSI[:SELected]

Function	Sets/queries the paging international mobile subscriber identity (IMSI). Paging IMSI will be overwritten by the mobile station’s reported IMSI during a location update or call setup.
Setting	Range: '000000000000000' - '999999999999999' (15 digits string enclosed with quotes, each digit from the set of 0-9 digits)
Query	Range: same as settings
*RST Setting	'001012345678901'
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:PAGing:IMSI ’023389832394287’"`	

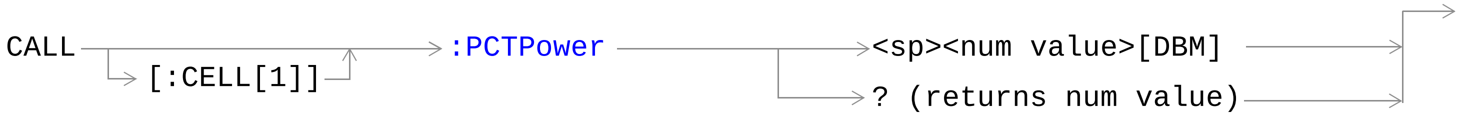
CALL:PAGing:REPeat:STATe[:SELected]

Function	Sets/queries the repeat paging state. When repeat paging is off, the test set sends a single Paging Type 1 message in response to the user's page command. When repeat paging is on, the test set will begin sending Paging Type 1 messages in response to the user's page command and will repeat the message every discontinuous reception (DRX) cycle until either: 1) the UE (mobile station) responds with PRACH preambles and a valid RRC connection request or, 2) if it is enabled, the call drop timer expires or, 3) the user issues a "CALL:END" command to the test set. Changing the repeat paging state to "Off" during a paging attempt has the same effect as "CALL:END" .
Setting	Range: 0 | ON | 1 | OFF
Query	Range: 0 | 1
*RST Setting	0 (off)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"CALL:PAGING:REPEAT:STATE ON"
```

CALL:PCTPower



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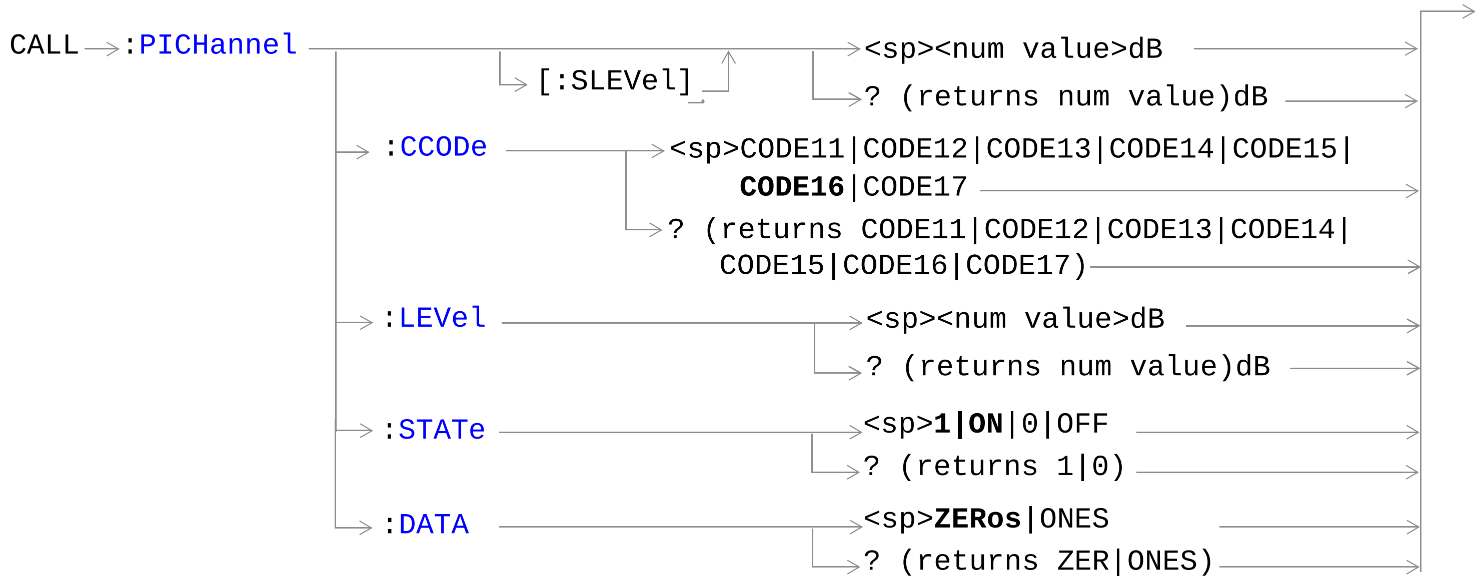
CALL[:CELL[1]]:PCTPower

Function	Sets/queries the BCCH Primary CPICH TX Power in the unit of dBm. This setting is used by the UE to determine the initial transmit power of the first PRACH preamble. See “Initial PRACH Tx Power” . Changing this setting while in active cell operating mode and the Call Status is other than IDLE will result in the execution of the BCCH Update procedure (see “Setting Cell Parameters” on page 127).
Setting	Range: -10 dBm to +50 dBm Resolution: 1 dB
Query	Range: -10 dBm to +50 dBm Resolution: 1 dB
*RST Setting	+19 dBm
Requirements	Test Application Revision: A.03 and above
Programming Example	`OUTPUT 714;"CALL:PCTPower 20" !Sets the Primary CPICH TX Power to 20 dBm.`

CALL:PICHannel



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CALL:PICHannel[:SLEVel]

Function	Sets/queries the page indicator channel’s initial power offset, and turns its state to ON. This setting cannot be changed while in active cell operating mode (when available). Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: - 20 to 0 dB Resolution: 0.01
Query	Range: -20 to 0 dB Resolution: 0.01
*RST Setting	-9.9 dB
Requirements	Test Application Revision: A.02 and above
Programming Example	
`OUTPUT 714;"CALL:PICHANNEL -12DB”`	

CALL:PICHannel:CCODe

Function	Sets/queries the page indicator channel’s channelization code. This setting cannot be changed while in active cell operating mode (when available). Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: CODE11 | CODE12 | CODE13 | CODE14 | CODE15 | CODE16 | CODE17
Query	Range: CODE11 | CODE12 | CODE13 | CODE14 | CODE15 | CODE16 | CODE17
*RST Setting	CODE16
Requirements	Test Application Revision: A.01 (codes 14--17) Test Application Revision: A.02 and above (added codes 11--13)
Programming Example	
`OUTPUT 714;"CALL:PICHANNEL:CCODE CODE17”`	

CALL:PICHannel:LEVel

Function	Sets/queries the page indicator channel’s initial power offset. This setting cannot be changed while in active cell operating mode (when available). Attempting to change this setting while in this mode results in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this value.
Setting	Range: - 20 to 0 dB Resolution: 0.01
Query	Range: -20 to 0 dB Resolution: 0.01
*RST Setting	-9.9 dB
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:PICHANNEL:LEVEL -10DB”`	

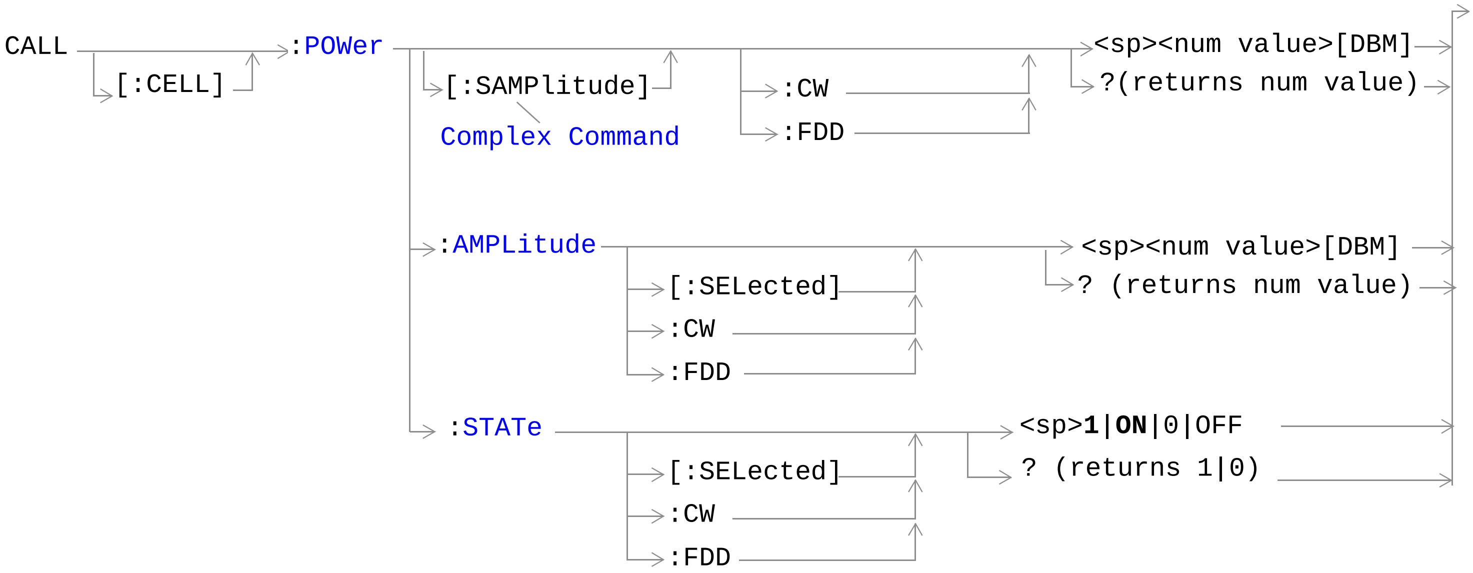
CALL:PICHannel:STATe

Function	Sets/queries the state of the page indicator channel’s initial power offset.
Setting	Range: 1|ON | 0|OFF
Query	Range: 1|0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:DPCHANNEL:STAT OFF"`	

CALL:PICHannel:DATA

Function	Sets/queries the page indicator channel’s data pattern. The pattern can be set to either all ones or all zeros.
Setting	Range: ZERos|ONES
Query	Range: ZER|ONES
*RST Setting	All Zeros
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:PICHANNEL:DATA ZEROS” !Sets the paging indicator channel data to all zeroes.`	

CALL:POWer



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CALL[:CELL]:POWer[:SAMPLitude]

Function	The setting form of this command performs two functions: (1) sets the desired cell power level and (2) turns the cell power on/off state to on. The query form returns the desired cell power level or NAN. (See "Setting Cell Power and AWGN Power Levels" for more information about desired versus current power levels.) The optional [:SELected] keyword in this command specifies that the cell power level being set or queried applies to the current system type (see "CALL[:CELL]:SYSTem[:TYPE]?"). The cell power settings for the CW operating mode are independent of the cell power settings for the other operating modes.
Setting	Range: (This is the range of settings accepted, see "Cell Power, AWGN Power and Total RF Power Ranges" for the actual hardware range of the source • FDD: -170 dBm/3.84MHz to +37 dBm/3.84MHz • CW: -177 dBm to +40 dBm Resolution: 0.01 dBm/3.84 MHz
Query	Same as setting
*RST Setting	See "CALL[:CELL]:POWer:AMPLitude[:SELected]" and "CALL[:CELL]:POWer:STATe[:SELected]" .
Requirements	Test Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;"CALL:CELL:POWER:SAMPLITUDE -30" !Sets the cell power level -30 dBm and turns it on.
```

CALL[:CELL]:POWer:AMPLitude[:SELected]

Function	Sets/queries the desired cell power level. (See "Setting Cell Power and AWGN Power Levels" for more information about desired versus current power levels.) The optional [:SELected] keyword in this command specifies that the cell power level being set or queried applies to the current system type (see "CALL[:CELL]:SYSTem[:TYPE]?"). The cell power settings for the CW operating mode are independent of the cell power settings for the other operating modes.
Setting	Range: (This is the range of settings accepted, see "Cell Power, AWGN Power and Total RF Power Ranges" for the actual hardware range of the source • FDD: -170 dBm/3.84MHz to +37 dBm/3.84MHz • CW: -177 dBm to +40 dBm Resolution: 0.01 dBm/3.84 MHz
Query	Same as setting
*RST Setting	• FDD: -115 dBm/3.84MHz • CW: -50 dBm
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -30"
!Sets the cell power level -30 dBm.
```

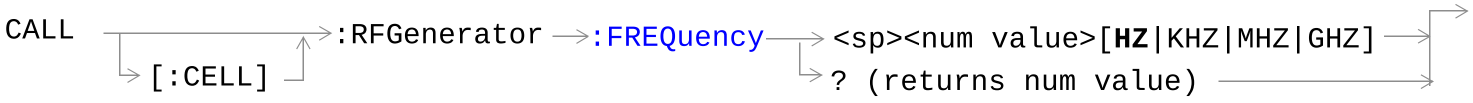
CALL[:CELL]:POWer:STATe[:SELected]

Function	Sets/queries the cell power state. The optional [:SELected] keyword in this command specifies that the cell power state being set or queried applies to the current system type (see "CALL[:CELL]:SYSTem[:TYPE]?"). The cell power settings for the CW operating mode are independent of the cell power settings for the other operating modes.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	ON
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:POWER:STATE OFF" !Turns off cell power.
```

CALL:RFGenerator



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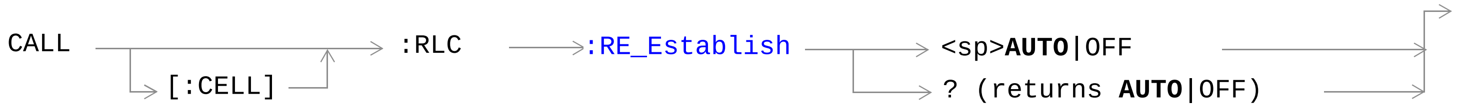
CALL[:CELL]:RFGenerator:FREQuency

Function	Sets/queries the RF generator downlink channel frequency. If no units are specified the setting defaults to Hz. The test set will tune to the frequency entered using this command when the "CALL:CONTrol" command is set to manual.
Setting	Range: 292 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292 MHz to 2700 MHz Resolution: 0.1 Hz
*RST Setting	851 MHz
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:RFGENERATOR:FREQUENCY 450 MHZ" !Set downlink channel frequency to 450 MHz.
```

CALL:RLC



“Diagram Conventions” on page 368

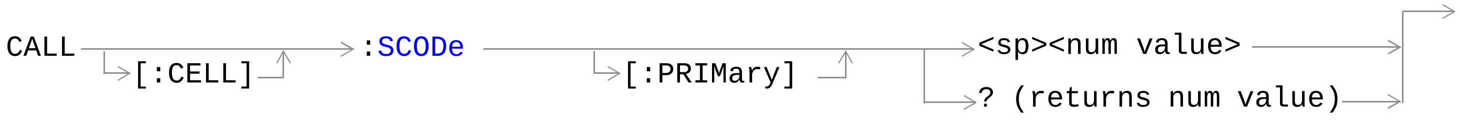
CALL[:CELL]:RLC:RE_Establish

Function	Sets/queries the RLC re-establishment state. RLC re-establishment procedure typically occurs during the radio bearer setup portion of call establishment as the DPCH is reconfigured from the signalling radio bearer to the actual service configuration. Attempting to change this setting to OFF results in the following error message: “+257, RLC behavior not compliant to 3GPP specifications for 3.4k or 13.6k SRB”. When this setting is off, the test set will not perform the RLC re-establishment procedure even if the conditions would otherwise require it. This may result in unspecified behavior including loss of data.
Setting	Range: `AUTO|OFF`
Query	Range: `AUTO|OFF`
*RST Setting	`AUTO`
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:RLC:RE_Establish OFF"
!Inhibit to perform the RLC re-establishement procedure.
```

CALL:SCODe



“Diagram Conventions” on page 368

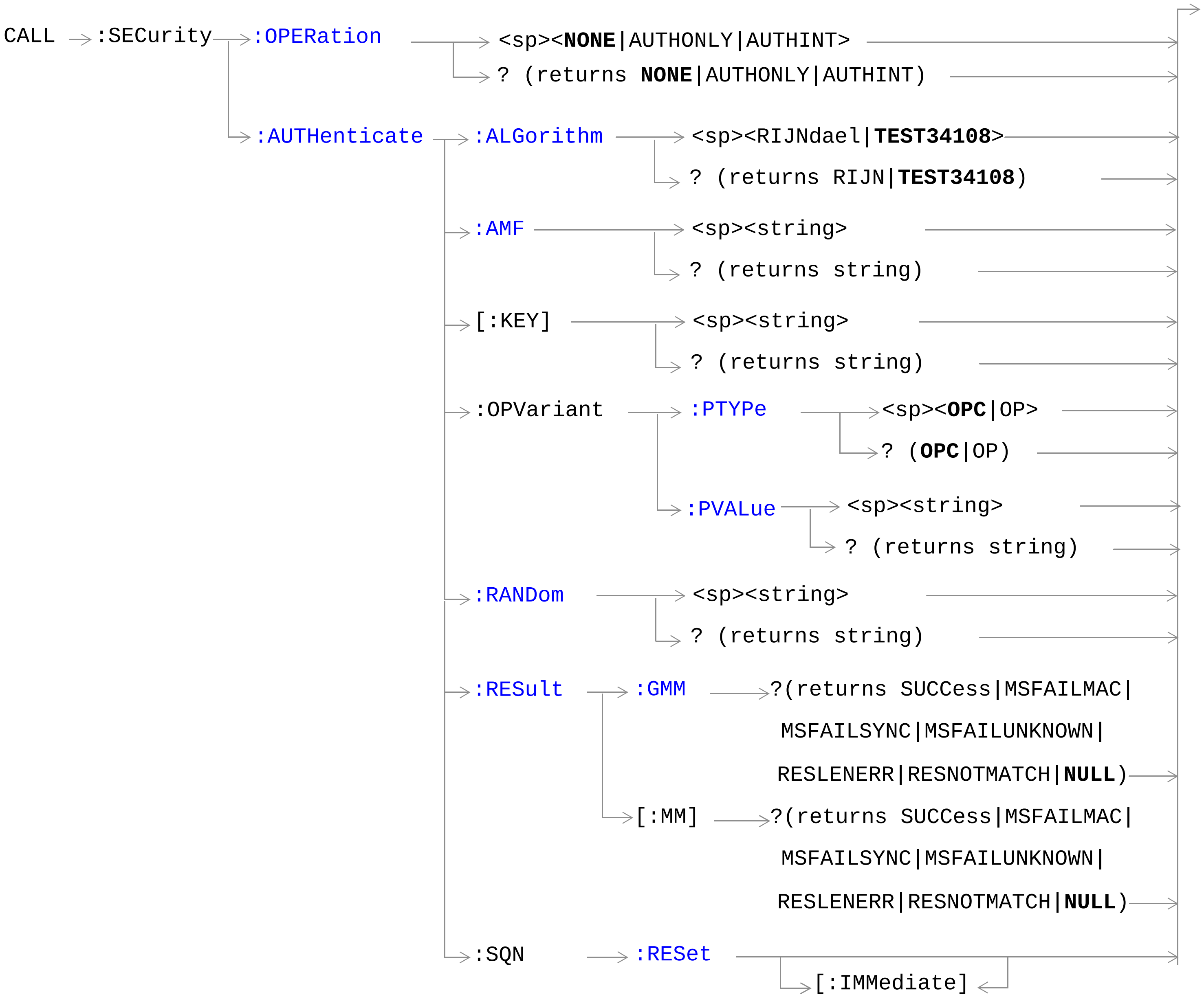
CALL[:CELL]:SCODe[:PRIMary]

Function	Sets/queries the primary scrambling code. The actual code number for the primary scrambling code is 16 times the value of this setting. See 3GPP TS 25.213, "Spreading and Modulation (FDD)" for a complete description of the relationship between this index and the actual spreading code number. This setting cannot be changed while the active cell operating mode. Attempting to change this setting while in this mode will result in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode when changing this setting.
Setting	Range: 0 to 511
Query	Range: 0 to 511
*RST Setting	0
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:SCODe 10" !Sets the primary scrambling code to 10.
```

CALL:SECurity



"Diagram Conventions" on page 368

CALL:SECurity:AUTHenticate:ALGorithm

Function	Sets/queries the authentication algorithm to be used for security operation. Rijndael is the normal operation authentication algorithm, and the TEST34108 is the conformance test algorithm described in TS 34.108. This setting is not useful until the security operation mode is set to other than “NONE”. See “CALL:SECurity:OPERation” on page 469.
Setting	Range: RIJNdael | TEST34108
Query	Range: RIJN | TEST34108
*RST Setting	TEST34108
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"CALL:SECurity:AUTHenticate:ALGorithm RIJN"
!Sets the authentication algorithm to Rigndel.
```

CALL:SECurity:AUTHenticate:AMF

Function	Sets/queries the value of the AMF parameter. This setting is not useful until the security operation mode is set to other than “NONE”. See “CALL:SECurity:OPERation” on page 469.
Setting	Range: '0’ to 'FFFF' (1 to 4 characters from the set: 0123456789aAbBcCdDeEfF, enclosed by quotes)
Query	Range: '0000’ to 'FFFF' (The returned string is always 4 characters enclosed by quotes)
*RST Setting	'0000' (4 characters)
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"CALL:SECurity:AUTHenticate:AMF ’FFFF’"
!Sets the AMF value to FFFF.
```

CALL:SECurity:AUTHenticate[:KEY]

Function	Sets/queries the authentication key. This setting is not useful until the security operation mode is set to other than “NONE”. See “CALL:SECurity:OPERation” on page 469.
Setting	Range: '0' to 'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF' (1 to 32 characters from the set: 0123456789aAbBcCdDeEfF, enclosed by quotes)
Query	Range: '00000000:00000000:00000000:00000000' to 'FFFFFFFF:FFFFFFFF:FFFFFFFF:FFFFFFFF' (The returned string is always four colon separated groups in the order of upper, upper middle, lower middle and lower, each group with 8 characters)
*RST Setting	'4147494C:454E5420:54454348:4E4F0000'
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:SECurity:AUTHenticate ’4147494C454E5420544543484E4F0000’"
!Sets the authentication key to 4147494C:454E5420:54454348:4E4F0000.
```

CALL:SECurity:AUTHenticate:OPVariant:PTYPe

Function	Sets/queries the Operator Variant Authentication Parameter type. This setting is not useful until the security operation mode is set to other than “NONE”. See “CALL:SECurity:OPERation” on page 469.
Setting	Range: OP | OPC
Query	Range: OP | OPC
*RST Setting	OPC
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:SECurity:AUTHenticate:OPVariant:PTYPe OP"
!Sets the Operator Variant Authentication Parameter type to OP.
```

CALL:SECurity:AUTHenticate:OPVariant:PVALue

Function	Sets/queries the value of the Operator Variant Authentication Parameter. This setting is not useful until the security operation mode is set to other than “NONE”. See “CALL:SECurity:OPERation” on page 469.
Setting	Range: '0' to 'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF' (1 to 32 characters from the set: 0123456789aAbBcCdDeEfF, enclosed by quotes)
Query	Range: '00000000:00000000:00000000:00000000' to 'FFFFFFFF:FFFFFFFF:FFFFFFFF:FFFFFFFF' (The returned string is always four colon separated groups in the order of upper, upper middle, lower middle and lower, each group with 8 characters.)
*RST Setting	'00000000:00000000:00000000:00000000'
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:SECurity:AUTHenticate:OPVariant:PVALue ’10F’"
!Sets the value of Operator Variant Authentication Parameter to
00000000:00000000:00000000:0000010F.
```

CALL:SECurity:AUTHenticate:RANDom

Function	Sets/queries the value of the random (RAND) parameter. This setting is not useful until the security operation mode is set to other than “NONE”. See “CALL:SECurity:OPERation” on page 469.
Setting	Range: '0' to 'FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF' (1 to 32 characters from the set: 0123456789aAbBcCdDeEfF, enclosed by quotes)
Query	Range: '00000000:00000000:00000000:00000000' to 'FFFFFFFF:FFFFFFFF:FFFFFFFF:FFFFFFFF' (The returned string is always four colon separated groups in the order of upper, upper middle, lower middle and lower, each group with 8 characters.)
*RST Setting	'00000000:00000000:00000000:00000000'
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:SECurity:AUTHenticate:RANDom ’A’"
!Sets the random value of the Authentication Parameter to 00000000:00000000:00000000:0000000A.
```

CALL:SECurity:AUTHenticate:RESult:GMM?

Function	Queries the GMM (for GPRS service) authentication result.
Query	Range: SUCCess | MSFAILMAC | MSFAILSYNC | MSFAILUNKNOWN | RESLENERR | RESNOTMATCH | NULL • SUCCess - MS Authentication Success • MSFAILMAC - MS Authentication Failure, with a reject cause of MAC Does not Match • MSFAILSYNC - MS Authentication Failure, with a reject cause of Synch Failure • MSFAILUNKNOWN - MS Authentication Failure, with a reject cause of Unknown • RESLENERR - MS Authentication Failure, with a reject cause of Incorrect RES Length • RESNOTMATCH - MS Authentication Failure, with a reject cause of RES does not Match
*RST Setting	NULL
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"CALL:SECurity:AUTHenticate:RESult:GMM?"
!Queries the GMM authentication result.
```

CALL:SECurity:AUTHenticate:RESult[:MM]?

Function	Queries the MM (for non-GPRS service) authentication result.
Query	Range: SUCCess | MSFAILMAC | MSFAILSYNC | MSFAILUNKNOWN | RESLENERR | RESNOTMATCH | NULL • SUCCess - MS Authentication Success • MSFAILMAC - MS Authentication Failure, with a reject cause of MAC Does not Match • MSFAILSYNC - MS Authentication Failure, with a reject cause of Synch Failure • MSFAILUNKNOWN - MS Authentication Failure, with a reject cause of Unknown • RESLENERR - MS Authentication Failure, with a reject cause of Incorrect RES Length • RESNOTMATCH - MS Authentication Failure, with a reject cause of RES does not Match
*RST Setting	NULL
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"CALL:SECurity:AUTHenticate:RESult?"
!Queries the MM authentication result.
```

CALL:SECurity:AUTHenticate:SQN:RESet[:IMMediate]

Function	Resets the authentication sequence number (SQN) to zero.The SQN is set to zero each time the test set is powered on. It then increments each time an authentication procedure is performed.
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:SECurity:AUTHenticate:SQN:RESet"
!Resets the authentication SQN.
```

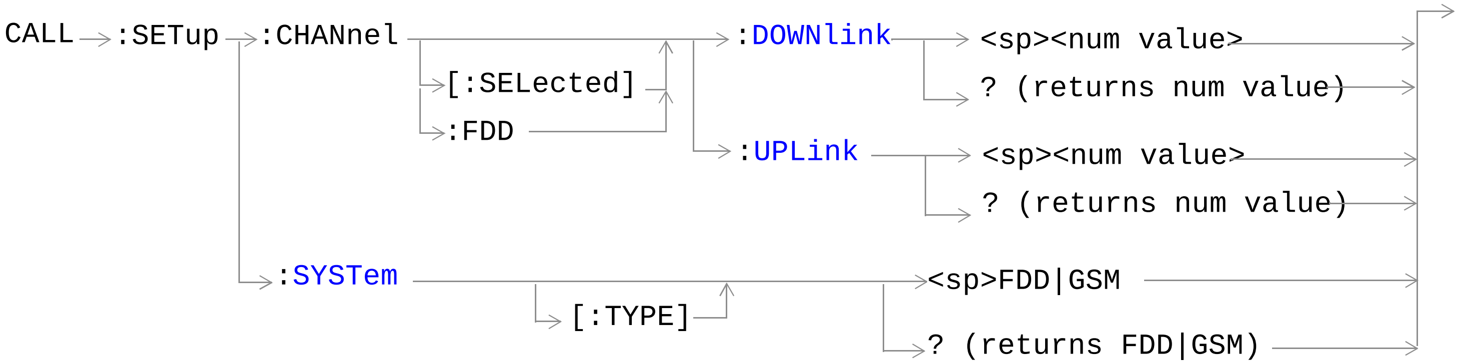
CALL:SECurity:OPERation

Function	Sets/queries whether or not to perform the security procedure during UE registration. The security procedure is performed only if this setting is set to other than NONE, either with authentication only or with authentication and integrity protection.
Setting	Range: NONE|AUTHONLY|AUTHINT • AUTHONLY - Authentication Only • AUTHINT - Authentication and Integrity Protection
Query	Range: NONE|AUTHONLY|AUTHINT
*RST Setting	NONE
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:SECurity:OPERation AUTHONLY"
!Sets the security procedure with authentication only.
```

CALL:SETup



“Diagram Conventions” on page 368

CALL:SETup:CHANnel[:SELected]:DOWNlink

Function	Sets/queries the handoff downlink channel (handoff FDD DL UARFCN). If the entered handoff FDD DL UARFCN has an uplink/downlink offset of less than 30 MHz when compared with the FDD UL UARFCN (“CALL:UPLink:CHANnel”) the warning message "+217, Performance not specified for UL/DL frequency offset < 30 MHz" will be issued. The setting will be used as entered if not changed by the user.
Setting	Range: • 4320 - 4495 • 4600 - 4825 • 9000 - 9425 • 9625 - 9975 • 10,525 - 10,875
Query	Range: • 4320 - 4495 • 4600 - 4825 • 9000 - 9425 • 9625 - 9975 • 10,525 - 10,875
*RST Setting	9700
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:SETUP:CHANNEL:DOWNLINK 4600"`	

CALL:SETup:CHANnel[:SELected]:UPLink

Function	Sets/queries the handoff uplink channel (handoff FDD UL UARFCN). If the entered handoff FDD UL UARFCN has an uplink/downlink offset of less than 30 MHz when compared with the FDD DL UARFCN ("CALL:CHANnel") the warning message "+217, Performance not specified for UL/DL frequency offset < 30 MHz" will be issued. The setting will be used as entered if not changed by the user.
Setting	Range: • 4095 - 4270 • 4375 - 4600 • 8525 - 8950 • 9225 - 9925
Query	Range: • 4095 - 4270 • 4375 - 4600 • 8525 - 8950 • 9225 - 9925
*RST Setting	9300
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"CALL:SETUP:CHANNEL:UPLINK 4375"
```

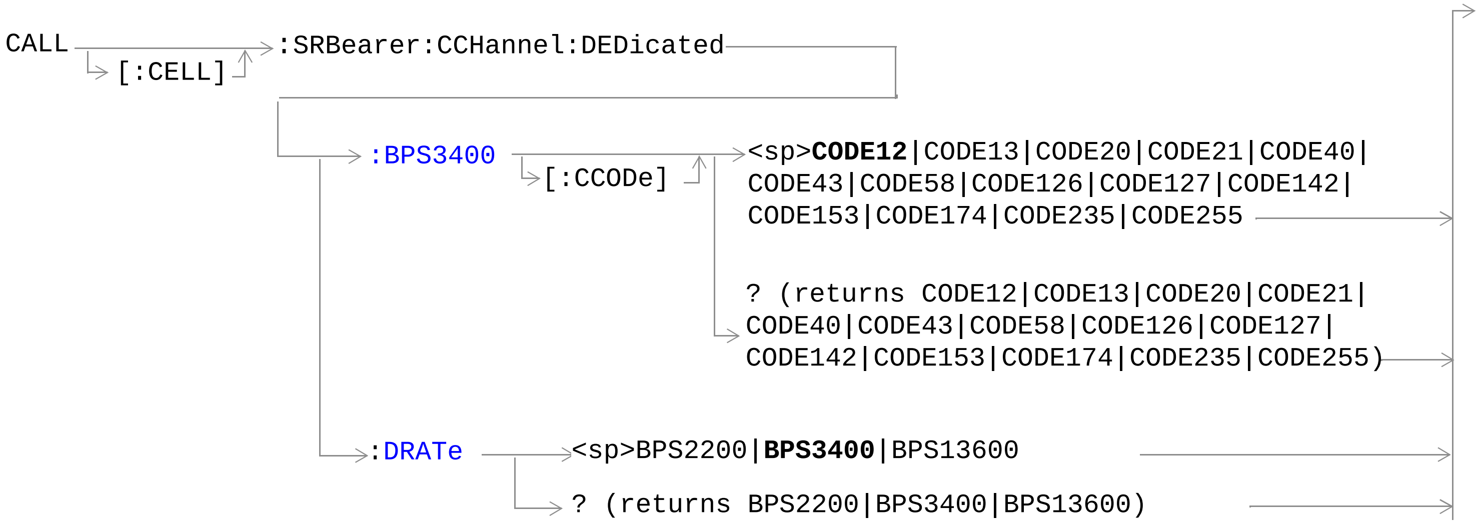
CALL:SETup:SYSTem[:TYPE]

Function	Sets/queries the system type that the mobile station will be handed off to when the "CALL:HANDoff" command is used. The intersystem handoff can be performed only from W-CDMA to GSM. This setting cannot be changed to GSM while the E1968A test applications (TA) are not present in the test set and licensed for operation. Attempting to change this setting while the E1968A TA is not available will result in an error message to alert you this condition.
Setting	Range: FDD | GSM
Query	Range: FDD | GSM
*RST Setting	FDD
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:SETup:SYSTem GSM" !Selects GSM as the handoff system type.
```

CALL:SRBearer



“Diagram Conventions” on page 368

CALL[:CELL]:SRBearer:CCHannel:DEDicated:BPS3400[:CCODe]

Function	Sets/queries the downlink dedicated physical channel's (DPCH) channelization code during the "setup" phase of connection setup when "CALL[:CELL]:SRBearer:CCHannel:DEDicated:DRATe" is set to BPS3400. When "CALL[:CELL]:SRBearer:CCHannel:DEDicated:DRATe" is set to BPS13600, the DPCH channelization code will be determined by the UTRA FDD DL DPCH 12.2 RMC channelization code ("CALL:DPCHannel:RMC12:CCODe"). This setting cannot be changed while the active cell operating mode. Attempting to change this setting while in this mode will result in the following error message: "Command Rejected. Change Not Allowed in Active Cell Mode." Use the cell off operating mode to change this setting.
Setting	Range: CODE12 | CODE13CODE20 | CODE21 | CODE40 | CODE43 | CODE58 | CODE126 | CODE127 | CODE142 | CODE153 | CODE174 | CODE235 | CODE255
Query	Range: CODE12 | CODE13CODE20 | CODE21 | CODE40 | CODE43 | CODE58 | CODE126 | CODE127 | CODE142 | CODE153 | CODE174 | CODE235 | CODE255
*RST Setting	CODE12
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"CALL:CELL:SRBearer:CCHannel:DEDicated:BPS3400:CCODE CODE58"
```

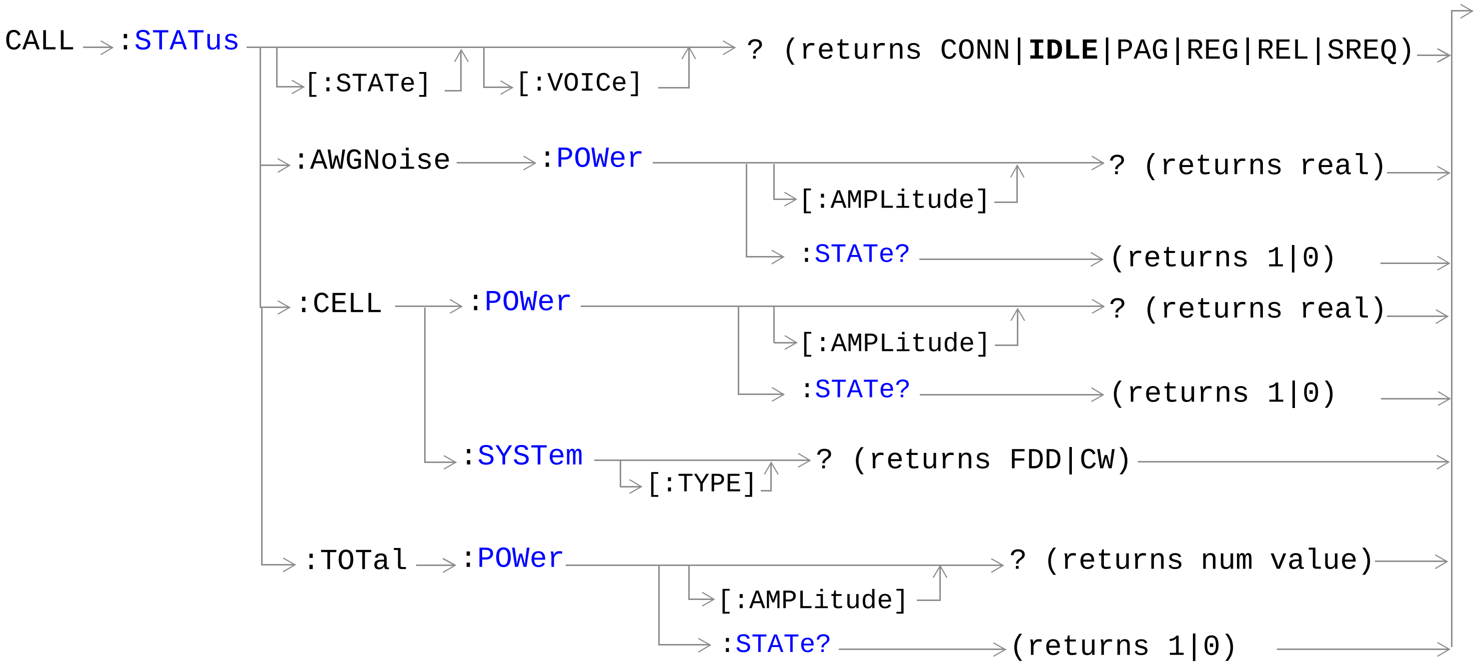
CALL[:CELL]:SRBearer:CCHannel:DEDicated:DRATe

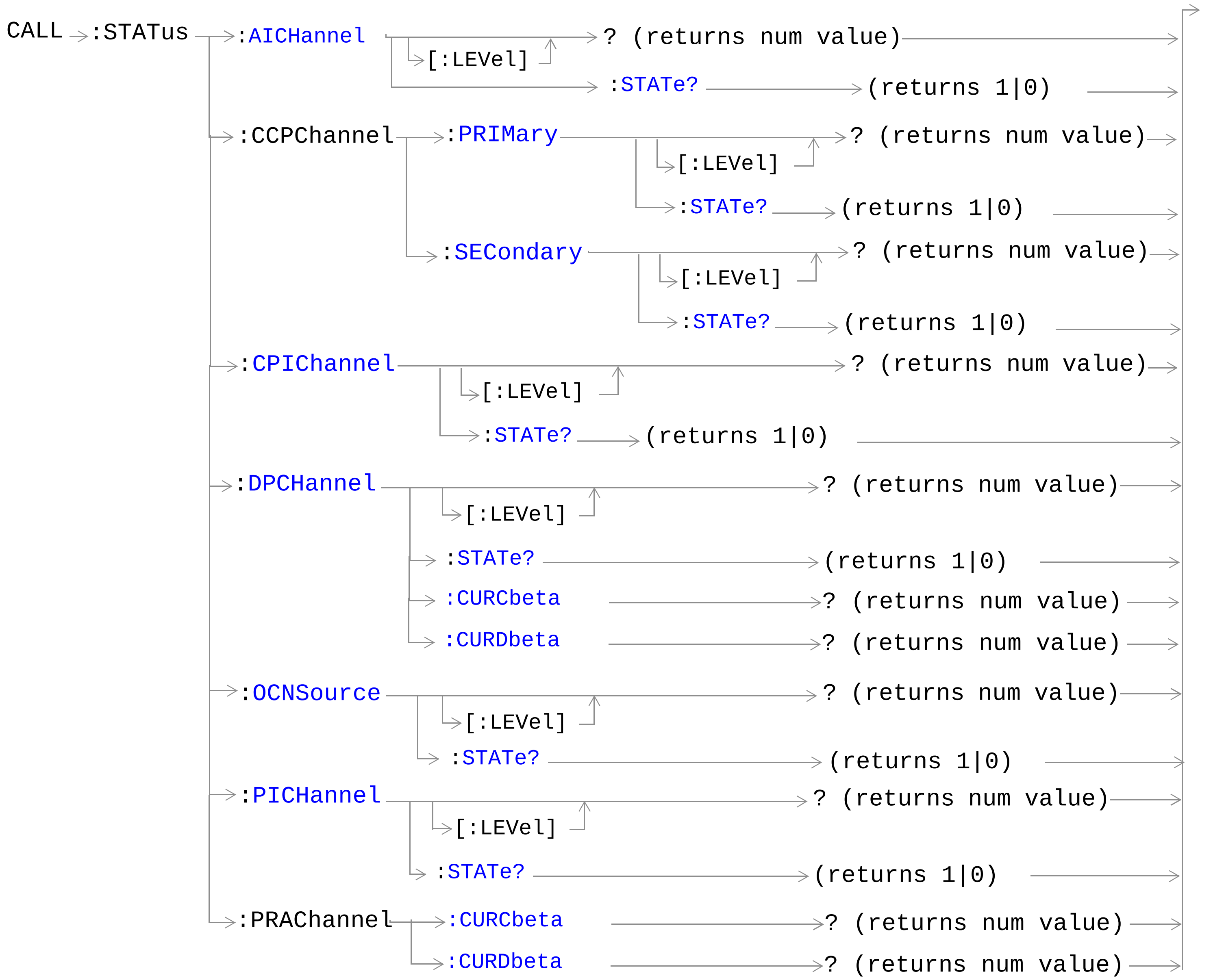
Function	Sets/queries the initial signaling radio bearer (SRB) configuration: 2.2 kbps (BPS2200), 3.4 kbps (BPS3400) or 13.4 kbps (BPS 13400).
Setting	Range: BPS2200 | BPS3400 | BPS13600
Query	Range: BPS2200 | BPS3400 | BPS13600
*RST Setting	BPS3400
Requirements	Test Application Revision: A.03 and above: added BPS2200 setting.

Programming Example

```
OUTPUT 714;"CALL:CELL:SRBEARER:CCHANNEL:DEDICATED:DRATE BPS13600"
```

CALL:STATus


CALL
:STATus
[:STATe]
[:VOICe]
? (returns CONN|IDLE|PAG|REG|REL|SREQ)
:AWGNoise
:POWer
[:AMPLitude]
? (returns real)
:STATe?
(returns 1|0)
:CELL
:POWer
[:AMPLitude]
? (returns real)
:STATe?
(returns 1|0)
:SYSTem
[:TYPE]
? (returns FDD|CW)
:TOTal
:POWer
[:AMPLitude]
? (returns num value)
:STATe?
(returns 1|0)



“Diagram Conventions” on page 368

CALL:STATus[:STATe][:VOICe]?

Function	Queries the status of the call. Status can be connected, idle, paging, registering, releasing, or setting up service.
Query	Range: CONN | IDLE | PAG | REG | REL | SREQ Only IDLE is returned in FDD Test operating mode.
*RST Setting	IDLE
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATUS?" !Returns the current call processing state.
```

CALL:STATus:AICHannel[:LEVel]?

Function	Queries the current level of the acquisition indicator channel. This setting is not used in FDD Test operating mode.
Query	Range: -20.00 to 0 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	-9.9 dB
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"CALL:STATUS:AICHANNEL:LEVEL?"
```

CALL:STATus:AICHannel:STATe?

Function	Queries the current state of the acquisition indicator channel. This setting is not used in FDD Test operating mode.
Query	Range: 0 | 1
*RST Setting	1 (on)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"CALL:STATUS:AICHANNEL:STATE?"
```

CALL:STATus:AWGNoise:POWer[:AMPLitude]?

Function	Queries the current power level of the additive white Gaussian noise (AWGN) source. AWGN power level is set using the "CALL:AWGNoise" commands. See "Setting Cell Power and AWGN Power Levels" for more information about desired versus current power levels.
Query	Range: • -170 dBm/3.84 MHz to +35 dBm/3.84 MHz, NAN (this is the range of settings accepted, see "Cell Power, AWGN Power and Total RF Power Ranges" for the actual hardware range of the source) • 9.91 E+37 (NAN) is returned if "CALL:STATus:AWGNoise:POWer:STATe?" is OFF Resolution: 0.01 dB
*RST Setting	9.91 E+37 (NAN)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATUS:AWGNOISE:POWER:AMPLITUDE?"
!Queries the current AWGN power.
```

CALL:STATus:AWGNoise:POWer:STATe?

Function	Queries the current on/off state of the additive white Gaussian noise (AWGN) source. AWGN power level on/off state is set using the "CALL:AWGNoise" commands. See "Setting Cell Power and AWGN Power Levels" for more information about desired versus current power levels.
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATUS:AWGNOISE:POWER:STATE?"
```

CALL:STATus:CCPChannel:PRIMary[:LEVel]?

Function	Queries the current level of the primary common control physical channel.
Query	Range: -20.00 to 0 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	-9.9 dB
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CCPCHANNEL:PRIMARY:LEVEL?"`	

CALL:STATus:CCPChannel:PRIMary:STATe?

Function	Queries the current state of the primary common control physical channel.
Query	Range: 0 | 1
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CCPCHANNEL:PRIMARY:STATE?"`	

CALL:STATus:CCPChannel:SECondary[:LEVel]?

Function	Queries the current level of the secondary common control physical channel.
Query	Range: -20.00 to 0 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	-6.9 dB
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CCPCHANNEL:SECONDARY:LEVEL?"`	

CALL:STATus:CCPChannel:SECondary:STATe?

Function	Queries the current state of the secondary common control physical channel.
Query	Range: 0 | 1
*RST Setting	1 (on)
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CCPCHANNEL:SECONDARY:STATE?"`	

CALL:STATus:CELL:POWer[:AMPLitude]?

Function	Queries the current cell power level. Cell power is set using the "CALL:POWer" commands. See "Setting Cell Power and AWGN Power Levels" for more information about desired versus current power levels.
Query	Range: • -170 dBm/3.84 MHz to +37 dBm/3.84 MHz, NAN (this is the range of settings accepted, see "Cell Power, AWGN Power and Total RF Power Ranges" for the actual hardware range of the source) • 9.91 E+37 (NAN) is returned if "CALL:STATus:CELL:POWer:STATe?" is OFF Resolution: 0.01 dB
*RST Setting	-115.00 dBm
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATUS:CELL:POWER:AMPLITUDE?"
```

CALL:STATus:CELL:POWer:STATe?

Function	Queries the current state of the cell power setting. Cell power state is set using the "CALL:POWer" commands. See "Setting Cell Power and AWGN Power Levels" for more information about desired versus current power levels.
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATUS:CELL:POWER:STATE?"
```

CALL:STATus:CELL:SYSTem[:TYPE]?

Function	Queries the current system type that the test set is currently emulating. When the test set is in active cell operating mode (see "CALL:OPERating") the current system type is selected by the "CALL:SYSTem" command. (Active cell operating mode is not available in the initial W-CDMA test application release.) When the test set is in any test mode operating mode (see "CALL:OPERating") or CW operating mode, this command will return the corresponding system type.
Query	Range: FDD|CW
*RST Setting	FDD
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CELL:SYSTEM:TYPE?"`	

CALL:STATus:CPIChannel[:LEVel]?

Function	Queries the current common pilot channel's power.
Query	Range: -20.00 to 0 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	-4.8 dB
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CPICHANNEL:LEVEL?"`	

CALL:STATus:CPIChannel:STATe?

Function	Queries the current state of the common pilot channel.
Query	Range: 1|0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:CPICHANNEL:STATE?"`	

CALL:STATus:DPCHannel:CURCbeta?

Function	Queries the current power gain of the dedicated physical control channel (DPCCH).
Query	Range: 2 to 15 Resolution: 1
*RST Setting	8
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"CALL:STATus:DPCHannel:CURCbeta?"`	

CALL:STATus:DPCHannel:CURDbeta?

Function	Queries the current power gain of the dedicated physical data channel (DPDCH).
Query	Range: 0 to 15 Resolution: 1
*RST Setting	15
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"CALL:STATus:DPCHannel:CURDbeta?"`	

CALL:STATus:DPCHannel[:LEVel]?

Function	Queries the current dedicated physical channel’s power.
Query	Range: -20.00 to 0 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:DPCHANNEL:LEVEL?"`	

CALL:STATus:DPCHannel:STATe?

Function	Queries the current state of the dedicated physical channel.
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:DPCHANNEL:STATE?"`	

CALL:STATus:OCNSource[:LEVel]?

Function	Queries the orthogonal channel noise source (OCNS) level for the selected system type. The OCNS level is set using the "CALL:OCNSource" commands. The optional [:SELected] keyword in this command specifies that the OCNS channel level being queried applies to the current system type.
Query	Range: 0 to -20 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	-8.02 dB
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:OCNSOURCE:LEVEL?"`	

CALL:STATus:OCNSource:STATe?

Function	Queries the current on/off state of the orthogonal channel noise simulator channel (OCNS). The OCNS channel on/off state is set using the "CALL:OCNSource" commands. The optional [:SELected] keyword in this command specifies that the OCNS channel state being queried applies to the current system type.
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:OCNS:STATE?"`	

CALL:STATus:PICHannel[:LEVel]?

Function	Queries the current downlink page indicator channel’s power.
Query	Range: -20.00 to 0 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:PICHANNEL:LEVEL?"`	

CALL:STATus:PICHannel:STATe?

Function	Queries the current state of the downlink page indicator channel.
Query	Range: 1|0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:PICHANNEL:STATE?"`	

CALL:STATus:PRAChannel:CURCbeta?

Function	Queries the current power gain for the control data of the message portion of the uplink physical random access channel (PRACH).
Query	Range: 2 to 15 Resolution: 1
*RST Setting	15
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"CALL:STATus:PRAChannel:CURCbeta?"`	

CALL:STATus:PRAChannel:CURDbeta?

Function	Queries the current power gain for the message data of the message portion of the uplink physical random access channel (PRACH).
Query	Range: 0 to 15 Resolution: 1
*RST Setting	15
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:STATus:PRAChannel:CURDbeta?"
```

CALL:STATus:TOTal:POWer[:AMPLitude]?

Function	Queries the current total RF power for the specified system type. The total RF power is equal to the sum of the cell power setting (see "CALL:POWer") and the AWGN setting (see "CALL:AWGNoise"). See "Setting Cell Power and AWGN Power Levels" for more information about desired versus current power levels.
Query	Range: • -170 dBm/3.84 MHz to +42 dBm/3.84 MHz, NAN (this is the range of settings accepted, see "Cell Power, AWGN Power and Total RF Power Ranges" for the actual hardware range of the source) • 9.91 E+37 (NAN) is returned if "CALL:STATus:TOTal:POWer:STATe?" is OFF Resolution: 0.01 dB
*RST Setting	-115.00 dBm
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATUS:TOTAL:POWER?"
```

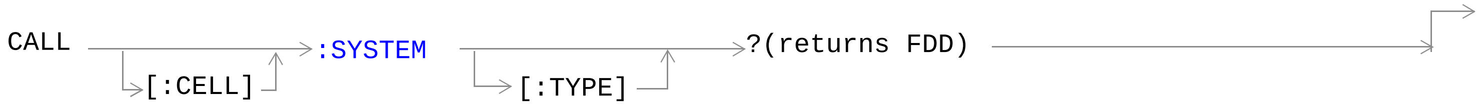
CALL:STATus:TOTal:POWer:STATe?

Function	Queries the current total RF power measurement's state for the currently selected system type. This query will return a 1 (on) if the current cell power ("CALL:POWer") power state is on.
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:STATUS:TOTAL:POWER:STATE?"
```

CALL:SYSTem

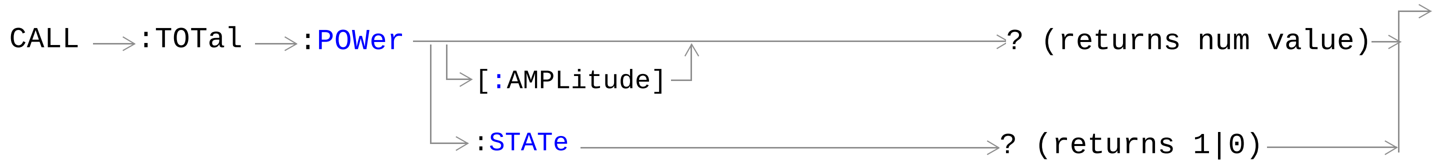


"Diagram Conventions" on page 368

CALL[:CELL]:SYSTem[:TYPE]?

Function	Queries the type of cell the system is emulating when in active cell mode. This command is query only because only one active cell system type (UTRA FDD) is supported at this time.
Query	Range: FDD
*RST Setting	FDD
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:CELL:SYSTEM:TYPE?”`	

CALL:TOTal:POWer



"Diagram Conventions" on page 368

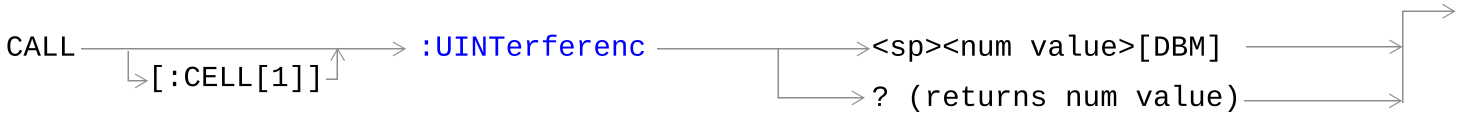
CALL:TOTal:POWer[:AMPLitude]?

Function	Queries the desired total RF power for the current system type. Total RF Power is a calculated vaule, that is the sum of cell power and AWGN power settings. (See "Cell Power, AWGN Power and Total RF Power Ranges" for more information about desired versus current power levels.)
Query	Range: • -170 dBm/3.84 MHz to +42 dBm/3.84 MHz • 9.91 E+37 (NAN) is returned if both Cell Power and AWGN poer are set to OFF Resolution: 0.01 dBm/3.84 MHz
*RST Setting	-115 dBm/3.84 MHz
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:TOTAL:POWER:AMPLITUDE?"`	

CALL:TOTal:POWer:STATe?

Function	Queries the total RF power state for the current system type. The total RF power state is 1 (on) if either cell power or AWGN power is on. The return value for this query is not necessarily the total power state at the moment this command is processed by the test set. To query the power state of the test set at the moment, use the "CALL:STATus:TOTal:POWer:STATe?" command.
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:TOTAL:POWER:STATE?"`	

CALL:UINTerferenc



"Diagram Conventions" on page 368

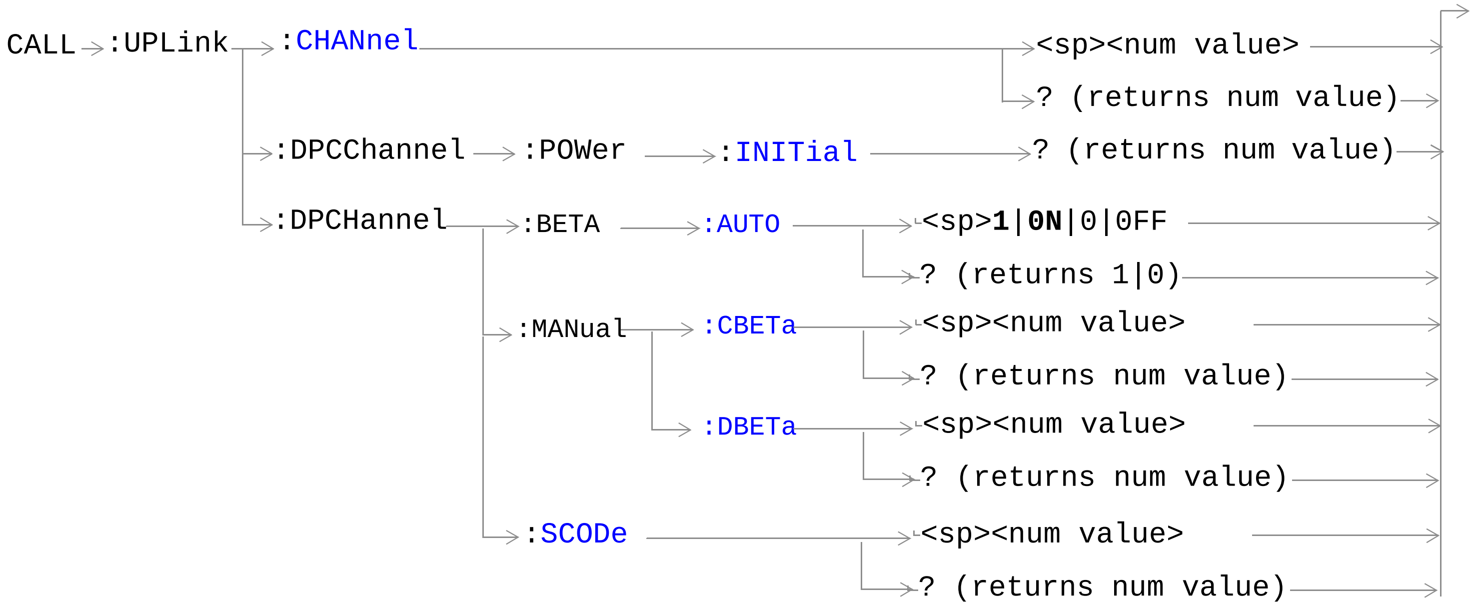
CALL[:CELL[1]]:UINTerferenc

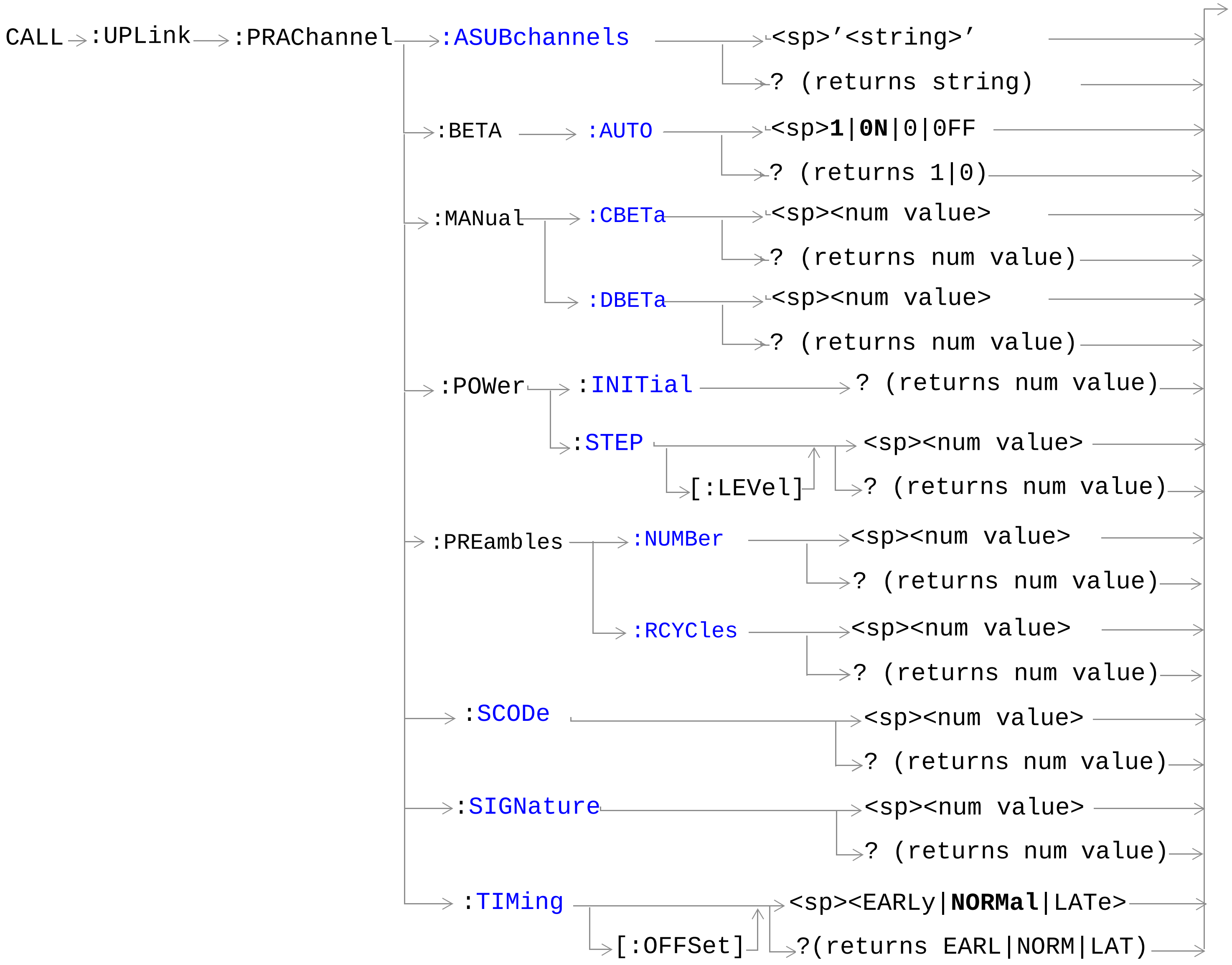
Function	Sets/queries the BCCH uplink interference power level in the unit of dBm. This setting is used by the UE to determine the initial transmit power of the first PRACH preamble. See "Initial PRACH Tx Power" on page 164. Changing this setting while in active cell operating mode and the Call Status is other than IDLE will result in the execution of the BCCH Update procedure (see "Setting Cell Parameters" on page 127).
Setting	Range: -110 dBm to -70 dBm Resolution: 1 dBm
Query	Range: -110 dBm to -70 dBm Resolution: 1 dBm
*RST Setting	-75 dBm
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:UINTerferenc -70" !Sets the uplink interference power level to -70 dBm.
```

CALL:UPLink


CALL
:UPLink
:CHANnel
<sp><num value>
? (returns num value)
:DPCChannel
:POWer
:INITial
? (returns num value)
:DPCHannel
:BETA
:AUTO
<sp>**1**|**ON**|0|OFF
? (returns 1|0)
:MANual
:CBETa
<sp><num value>
? (returns num value)
:DBETa
<sp><num value>
? (returns num value)
:SCODe
<sp><num value>
? (returns num value)



"Diagram Conventions" on page 368

CALL:UPLink:CHANnel

Function	Sets/queries the uplink channel number (FDD UL UARFCN). See "Setting Uplink Channel Number (UARFCN)" . This setting cannot be changed while in the active cell operating mode. Attempting to change this setting while in this mode results in an error issued and the test set will reject the change. Use the cell off operating mode when changing this value. See "CALL:OPERating" to select operating modes.
Setting	Range: • 12-287 • 4095 - 4270 • 4375 - 4600 • 8525 - 8950 • 9225 - 9925
Query	Range: • 12-287 • 4095 - 4270 • 4375 - 4600 • 8525 - 8950 • 9225 - 9925
*RST Setting	9300
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"CALL:UPLINK:CHANNEL?" !Queries the FDD UL UARFCN.
```

CALL:UPLink:DPCChannel:POWer:INITial?

Function	Queries the expected initial power level for the uplink dedicated physical control channel.
Query	Range: -50 to 24 dBm and 9.91E+37 (NAN)
Requirements	Test Application Revision: A.02.25 and above

Programming Example

```
OUTPUT 714;"CALL:UPLINK:DPCC:POWER:INITIAL?"
```

CALL:UPLink:DPCHannel:BETA:AUTO

Function	Sets/queries the power gain control mode for the uplink dedicated physical channel (DPCH) which consists of the dedicated physical data channel (DPDCH) and the dedicated physical control channel (DPCCH). See "Setting Uplink Parameters" for details. ON = automatic OFF = manual This setting cannot be changed while in the active cell operating mode. Attempting to change this setting while in this mode results in an error issued and the test set will reject the change. Use the cell off operating mode when changing this value. See "CALL:OPERating" to select operating modes.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST setting	1 (on)
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:UPLink:DPCHannel:BETA:AUTO OFF"!Enables manual control of the DPCH power gain.
```

CALL:UPLink:DPCHannel:MANual:CBETa

Function	Sets/queries the power gain of the dedicated physical control channel (DPCCH) when the DPCH power gain control mode is MANual (see "CALL:UPLink:DPCHannel:BETA:AUTO" on page 491). This setting cannot be changed while in the active cell operating mode. Attempting to change this setting while in this mode results in an error issued and the test set will reject the change. Use the cell off operating mode when changing this value. See "CALL:OPERating" to select operating modes.
Setting	Range: 2 to 15 Resolution: 1
Query	Range: 2 to 15
*RST setting	8
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:UPLink:DPCHannel:MANual:CBETa 10"
!Sets manual control of power gain for the DPCCH to 10.
```

CALL:UPLink:DPCHannel:MANual:DBETa

Function	Sets/queries the power gain of the dedicated physical data channel (DPDCH) when the DPCH power gain control mode is MANual (see "CALL:UPLink:DPCHannel:BETA:AUTO" on page 491). This setting cannot be changed while in the active cell operating mode. Attempting to change this setting while in this mode results in an error issued and the test set will reject the change. Use the cell off operating mode when changing this value. See "CALL:OPERating" to select operating modes.
Setting	
Query	Range: 0 to 15
*RST setting	15
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"CALL:UPLink:DPCHannel:MANual:DBETa 5"
!Sets manual control of power gain for the DPDCH to 5.
```

CALL:UPLink:DPCHannel:SCODe

Function	Sets/queries the uplink dedicated physical channel's scrambling code. See "Setting Uplink Parameters" for details. This setting cannot be changed while in the active cell operating mode. Attempting to change this setting while in this mode results in an error issued and the test set will reject the change. Use the cell off operating mode when changing this value. See "CALL:OPERating" to select operating modes.
Setting	Range: 0 to 38399
Query	Range: 0 to 38399
*RST Setting	1
Requirements	Test Application Revision: A.02 and above
Programming Example	

```
OUTPUT 714;"CALL:UPLINK:DPCH:SCODE 10" !Sets the uplink DPCH scrambling code to 10.
```

CALL:UPLink:PRAChannel:ASUBchannels

Function	Sets/queries the available subchannels for the uplink random access request. The bits with 1 settings indicate that the corresponding subchannels are available for use, while the bits with 0 settings indicate that the corresponding subchannels can not be used. See "Setting Uplink Parameters" for details.
Setting	Range: '0' to '111111111111' (1 to 12 characters from the set of 0 and 1, enclosed by quotes).
Query	Range: '000000000000' to '111111111111' (The returned string is always 12 characters, enclosed by quotes).
*RST Setting	'111111111111'
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"CALL:UPLink:PRAChannel:ASUBchannels '111111111111'"
!Sets all twelve PRACH access subchannels avai1able for use.
```

CALL:UPLink:PRAChannel:BETA:AUTO

Function	Sets/queries the power gain control mode for the message portion of the uplink physical random access channel (PRACH). See "Setting Uplink Parameters" for details. ON = automatic OFF = manual
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST setting	1 (automatic)
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"CALL:UPLink:PRAChannel:BETA:AUTO OFF"
!Enables manual control of the PRACH power level.
```

CALL:UPLink:PRAChannel:MANual:CBETa

Function	Sets/queries the power gain setting for the control data of the message portion of the uplink physical random access channel (PRACH) when the PRACH power gain control mode is MANual (see "CALL:UPLink:PRAChannel:BETA:AUTO" on page 493).
Setting	Range: 2 to 15 Resolution: 1
Query	Range: 2 to 15
*RST setting	15
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:UPLink:PRAChannel:MANual:CBETa 10"
!Sets manual control of power gain for the control data of the message portion of the PRACH to 10.
```

CALL:UPLink:PRAChannel:MANual:DBETa

Function	Sets/queries the power gain setting for the message data of the message portion of the uplink physical random access channel (PRACH) when the PRACH power gain control mode is MANual (see "CALL:UPLink:PRAChannel:BETA:AUTO" on page 493).
Setting	Range: 0 to 15 Resolution: 1
Query	Range: 0 to 15
*RST setting	15
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"CALL:UPLink:PRAChannel:MANual:DBETa 5"
!Sets manual control of power gain for message data of the message portion of the PRACH to 5.
```

CALL:UPLink:PRAChannel:POWer:INITial?

Function	Queries the expected initial power level for the uplink physical random access channel.
Query	Range: -50 to 24 dBm and 9.91E+37 (NAN)
Requirements	Test Application Revision: A.02.25 and above

Programming Example

```
OUTPUT 714;"CALL:UPLINK:PRAC:POWER:INITIAL?"
```

CALL:UPLink:PRAChannel:POWer:STEP[:LEVel]

Function	Sets/queries the uplink physical random access channel’s preamble power step size in dB. See “Setting Uplink Parameters” for details.
Setting	Range: 1 to 8 Resolution: 1
Query	Range: 1 to 8
*RST Setting	3
Requirements	Test Application Revision: A.02 and above
Programming Example	

```
OUTPUT 714;"CALL:UPLink:PRAChannel:POWer:STEP:LEVel 5”
```

CALL:UPLink:PRAChannel:PREamble:NUMBer

Function	Sets/queries the PRACH Preambles, which is the maximum number of preambles in a single PRACH Ramping Cycle (see “CALL:UPLink:PRAChannel:PREamble:RCYCle” on page 495) per PRACH access channel request. See “Setting Uplink Parameters” for details.
Setting	Range: 1 to 64 Resolution: 1
Query	Range: 1 to 64
*RST Setting	64
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"CALL:UPLink:PRAChannel:PREamble:NUMBer 15”
!Sets the maximum number of preambles per PRACH Ramping Cycle to 15.
```

CALL:UPLink:PRAChannel:PREamble:RCYCle

Function	Sets/queries the PRACH Ramping Cycles, which is the number of PRACH preamble sequences the UE (mobile station) will transmit per PRACH access channel request. See “Setting Uplink Parameters” for details.
Setting	Range: 1 to 32 Resolution: 1
Query	Range: 1 to 32
*RST Setting	2
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"CALL:UPLink:PRAChannel:PREamble:RCYCle 5”
!Sets the PRACH ramping cycles per PRACH access request to 5.
```

CALL:UPLink:PRAChannel:SCODe

Function	Sets/queries the uplink physical random access channel's scrambling code. See "Setting Uplink Parameters" for details. This setting cannot be changed while in the active cell operating mode. Attempting to change this setting while in this mode results in an error issued and the test set will reject the change. Use the cell off operating mode when changing this value. See "CALL:OPERating" to select operating modes.
Setting	Range: 0 to 8191 Resolution: 1
Query	Range: 0 to 8191
*RST Setting	0
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"CALL:UPLink:PRAChannel:SCODe 5”
```

CALL:UPLink:PRAChannel:SIGNature

Function	Sets/queries the uplink physical random access channel's signature value. See "Setting Uplink Parameters" for details. This setting cannot be changed while in the active cell operating mode. Attempting to change this setting while in this mode results in an error issued and the test set will reject the change. Use the cell off operating mode when changing this value. See "CALL:OPERating" to select operating modes.
Setting	Range: 0 to15 Resolution: 1
Query	Range: 0 to 15
*RST Setting	0
Requirements	Test Application Revision:A.02 and above

Programming Example

```
OUTPUT 714;"CALL:UPLink:PRAChannel:SIGNature 11” !Set the PRACH signature to 11.
```

CALL:UPLink:PRAChannel:TIMing[:OFFSet]

Function	Sets/queries the uplink physical random access channel's timing offset. See "Setting Uplink Parameters" for details. This setting cannot be changed while in the active cell operating mode. Attempting to change this setting while in this mode results in an error issued and the test set will reject the change. Use the cell off operating mode when changing this value. See "CALL:OPERating" to select operating modes.
Setting	Range: EARLy | NORMal | LATe
Query	Range: EARL | NORM | LAT
*RST Setting	NORM
Requirements	Test Application Revision:A.02.25 and above

Programming Example

```
OUTPUT 714;"CALL:UPLink:TIMing EARLy” !Set the PRACH timing offset to early.
```

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.

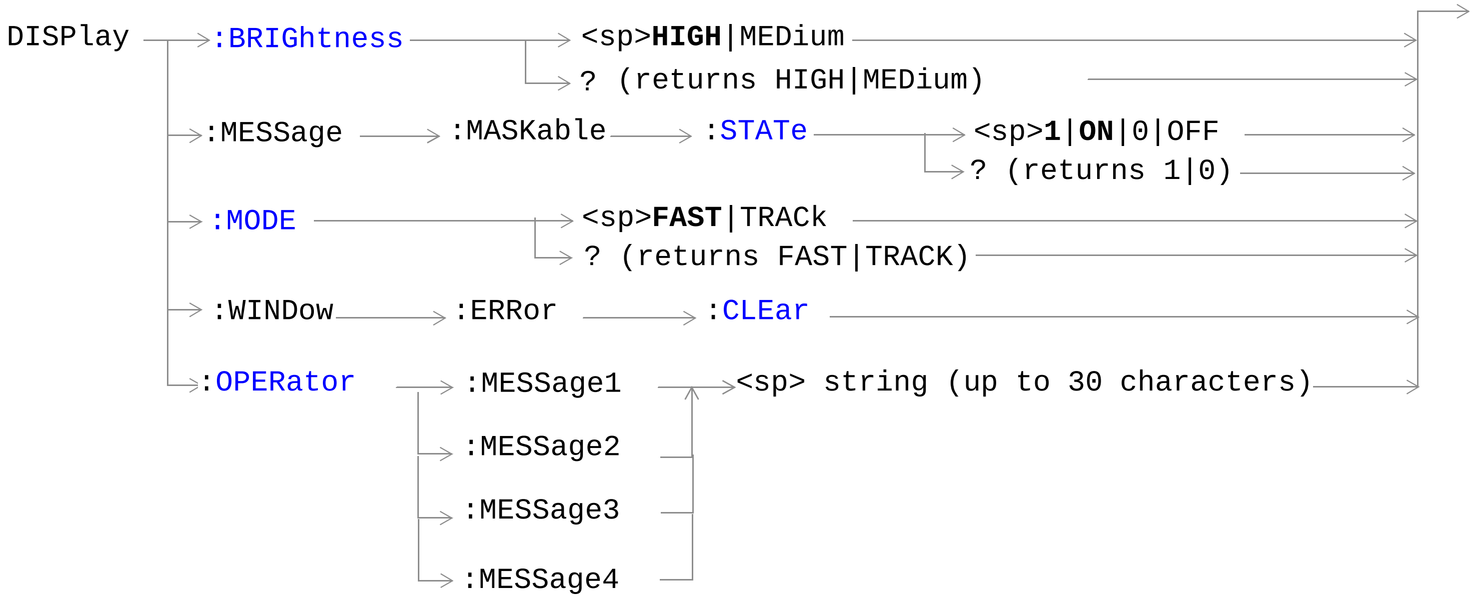
Display Backlight Dimming

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 368

DISPlay:BRIGhtness

Function	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 498.
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	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"DISPLAY:BRIGHTNESS MEDIUM" !Sets display brightness to medium.
```

DISPlay:MESSage:MASKable:STATe

Function	Blocks maskable messages from appearing on the test set display display screen but not from the Message Log. Maskable messages are reported to the Message Log in either state. See "Error Messages" on page 875.
Setting	Range: On | Off
Query	Range: On | Off
Factory setting	On
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"DISPLAY:MESSAGE:MASKABLE:STATE OFF"
!Prevents certain messages from appearing on the display.
```

DISPlay:MODE

Function	Sets/queries the test set's display mode. See "Display Mode (Track/Fast)" for a description of fast and track display modes.
Setting	Range: FAST | TRACK
Query	Range: FAST | TRAC
*RST setting	TRACK
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"DISPLAY:MODE FAST" !Sets display mode to fast.
```

DISPlay:WINDow:ERRor:CLEar

Function	Clears the error message from the display screen but not from the Message Log.
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"DISPLAY:WINDOW:ERROR:CLEAR" !Clears an error message from the display.
```

DISPlay:OPERator:MESSage

Function	Allows the operator to enter up to four messages, each up to 30 characters in length. These messages will be printed to the display when the command is sent and "DISPlay:MODE" is set to FAST.
Setting	1|2 |3|4 1=uppermost field, 4=lowermost field
Factory setting	Each message is initialized to a null string. Nothing will be displayed until one or more of the four GPIB messages is sent to the test set.
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"DISP:OPER:MESS1‘Press F6 to stop test’"
!Writes the message “Press F6 to stop test" to the uppermost display field.
```

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

"FETCh:AFANalyzer" on page 503 (AF Analyzer measurements)

"FETCh:SAUDio" on page 512 (Swept Audio measurement)

"FETCh:SMONitor" on page 517 (Spectrum Monitor measurements)

"FETCh:WACLeakage" on page 518 (Adjacent Channel Leakage measurements)

"FETCh:WBERror" on page 521 (Loopback Bit Error Ratio measurements)

"FETCh:WCDomain" on page 524 (Code Domain measurements)

"FETCh:WCPower" on page 530 (Channel Power measurements)

"FETCh:WILPower" on page 534 (Inner Loop Power measurements)

"FETCh:WIQTuning" on page 540 (IQ Tuning measurements)

"FETCh:WOBWidth" on page 549 (Occupied Bandwidth measurements)

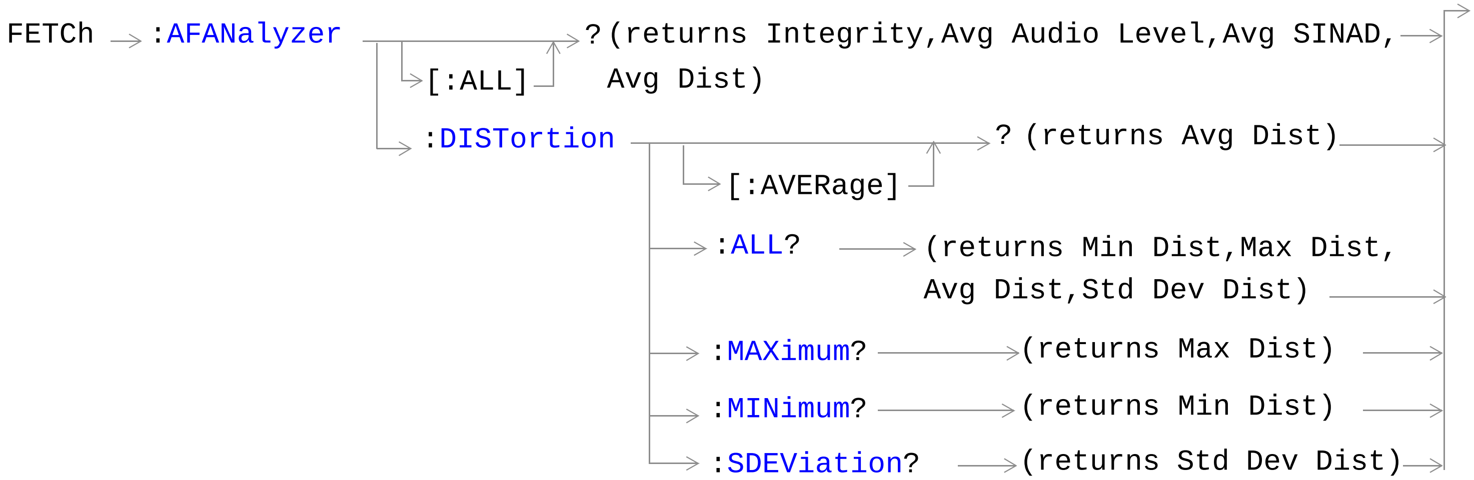
"FETCh:WOOPower" on page 553 (PRACH Transmit On/Off Power measurements)

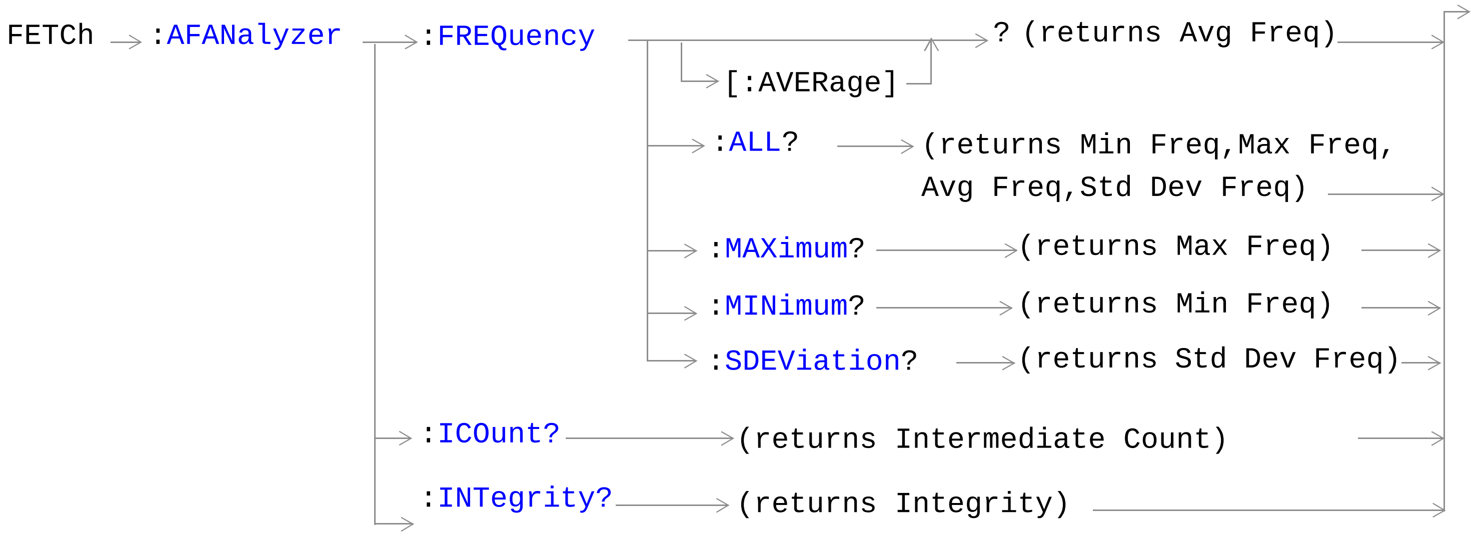
"FETCh:WSEMask" on page 556 (Spectrum Emission Mask measurements)

"FETCh:WTPower" on page 562 (Thermal Power measurements)

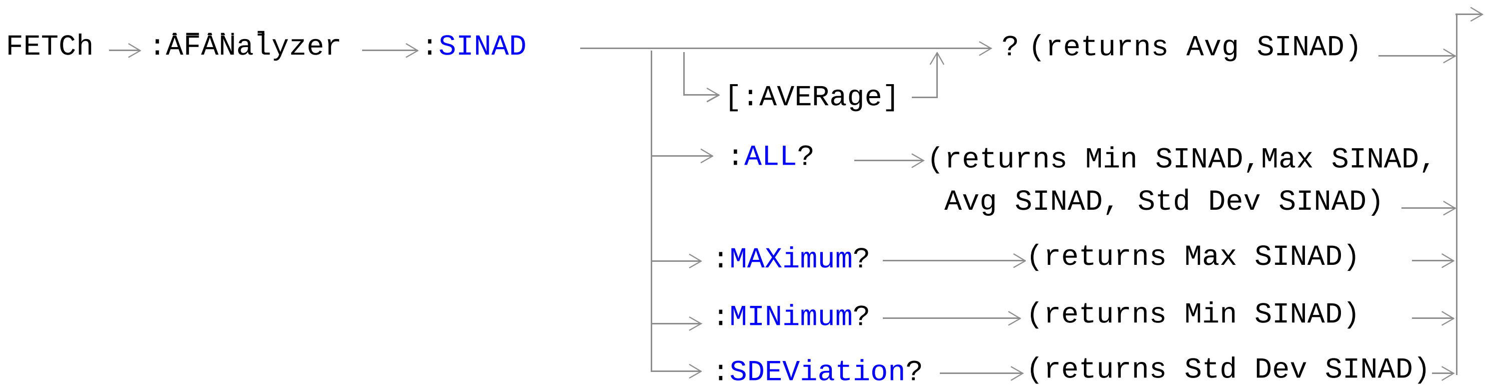
"FETCh:WWQuality" on page 566 (Waveform Quality measurements)

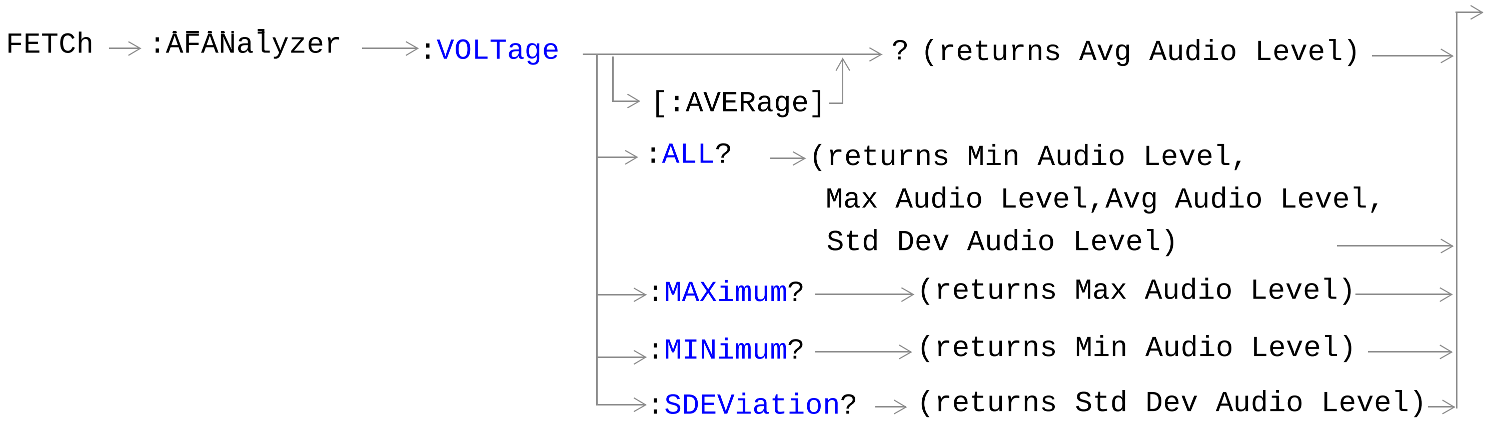
FETCh:AFANalyzer





FETCh:AFANalyzer





“Diagram Conventions” on page 368

FETCh:AFANalyzer[:ALL]?

Function	Queries the AF analyzer measurements. Measurement results are returned in the following order: integrity, average audio level, average SINAD, average distortion.
Query	Average analog audio level • Range: 0 to 20 volts, 9.91 E+37 • Resolution: The lesser of 4 significant digits or 10 uV Average SINAD • Range:-99 to 99 dB, 9.91 E+37 • Resolution: 0.01 dB Average audio distortion • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.01%
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:ALL?”
!Returns integrity, average audio level, average SINAD,and average audio distortion.
```

FETCh:AFANalyzer:DISTortion[:AVERage]?

Function	Queries the average audio distortion measurement.
Query	Average audio distortion • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.01%
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:DISTORTION:AVERAGE?”
```

FETCh:AFANalyzer:DISTortion:ALL?

Function	Queries the audio distortion measurements. The measurement results are returned in the following order: minimum distortion, maximum distortion, average distortion, standard deviation distortion.
Query	Miniumum, 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	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:DISTORTION:ALL?”
!Returns mininum, maximum, average, and standard deviation audio distortion.
```

FETCh:AFANalyzer:DISTortion:MAXimum?

Function	Queries the maximum audio distortion.
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.01%
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:DISTORTION:MAXIMUM?”
```

FETCh:AFANalyzer:DISTortion:MINimum?

Function	Queries the minimum audio distortion.
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.01%
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:DISTORTION:MINIMUM?”
```

FETCh:AFANalyzer:DISTortion:SDEViation?

Function	Queries the standard deviation audio distortion.
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.001%
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:AFANALYZER:DISTORTION:SDEVIATION?"
```

FETCh:AFANalyzer:FREQuency[:AVERage]?

Function	Queries the average audio frequency measurement.
Query	Average audio frequency • Range: 0 to 99999 Hz, 9.91 E+37 • Resolution: 0.1 Hz
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:AFANALYZER:FREQUENCY:AVERAGE?"
```

FETCh:AFANalyzer:FREQuency:ALL?

Function	Queries the audio frequency measurements. The measurement results are returned in the following order: minimum frequency, maximum frequency, average frequency, standard deviation frequency.
Query	Miniumum, maximum, and average audio frequency: • Range: 0 to 99999 Hz, 9.91 E+37 • Resolution: 0.1 Hz Standard deviation audio frequency: • Range: 0 to 99999 Hz, 9.91 E+37 • Resolution: 0.01 Hz
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:AFANALYZER:FREQUENCY:ALL?"
!Returns mininum, maximum, average, and standard deviation audio frequency.
```

FETCh:AFANalyzer:FREQuency:MAXimum?

Function	Queries the maximum audio frequency.
Query	Range: 0 to 99999 Hz, 9.91 E+37 Resolution: 0.1 Hz
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:FREQUENCY:MAXIMUM?”
```

FETCh:AFANalyzer:FREQuency:MINimum?

Function	Queries the minimum audio frequency.
Query	Range: 0 to 99999 Hz, 9.91 E+37 Resolution: 0.1 Hz
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:FREQUENCY:MINIMUM?”
```

FETCh:AFANalyzer:FREQuency:SDEViation?

Function	Queries the standard deviation audio frequency.
Query	Range: 0 to 99999 Hz, 9.91 E+37 Resolution: 0.01 Hz
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:FREQUENCY:SDEVIATION?”
```

FETCh:AFANalyzer:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement.
Query	Range: 0 to 999
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:ICOUNT?”
```

FETCh:AFANalyzer:INTegrity?

Function	Queries the measurement integrity indicator for the last AF analyzer measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 295 for information about non-zero integrity results.
Query	Range: 1 through 16
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:AFANalyzer:INTegrity?"
!Query the inegrity indicator for the AF analyzer results.
```

FETCh:AFANalyzer:SINAD[:AVERage]?

Function	Queries the average SINAD measurement.
Query	Average SINAD • Range:-99 to 99 dB, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:AFANALYZER:SINAD:AVERAGE?"
```

FETCh:AFANalyzer:SINAD:ALL?

Function	Queries the SINAD measurements. Measurement results are returned in the following order: minimim SINAD, maximum SINAD, average SINAD, and standard deviation SINAD.
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	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:AFANALYZER:SINAD:ALL?"
!Returns mininum, maximum, average, and standard deviation SINAD.
```

FETCh:AFANalyzer:SINAD:MAXimum?

Function	Queries the maximum SINAD measurements.
Query	Range: -99 to 99 dB, 9.91 E+37 Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:SINAD:MAXIMUM?”
```

FETCh:AFANalyzer:SINAD:MINimum?

Function	Queries the minimum SINAD measurements.
Query	Range: -99 to 99 dB, 9.91 E+37 Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:SINAD:MINIMUM?”
```

FETCh:AFANalyzer:SINAD:SDEViation?

Function	Queries the standard deviation SINAD measurements.
Query	Range: 0 to 99 dB, 9.91 E+37 Resolution: 0.001 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:SINAD:SDEVIATION?”
```

FETCh:AFANalyzer:VOLTage[:AVERage]?

Function	Queries the average audio level measurement.
Query	Range: 0 to 20 volts, 9.91 E+37 Resolution: the lesser of 4 significant digits or 10 uV
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:VOLTAGE:AVERAGE?”
```

FETCh:AFANalyzer:VOLTage:ALL?

Function	Queries the audio level measurements. Measurement results are returned in the following order: minimum audio level, maximum audio level, average audio level, standard deviation audio level.
Query	Range: 0 to 20 V, 9.91 E+37 Resolution: 4 significant digits
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:VOLTAGE:ALL?”
!Returns minimum, maximum, average, and standard deviation audio level.
```

FETCh:AFANalyzer:VOLTage:MAXimum?

Function	Queries the maximum audio level measurement.
Query	Range: 0 to 20 V, 9.91 E+37 Resolution: 4 significant digits
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:VOLTAGE:MAXIMUM?”
```

FETCh:AFANalyzer:VOLTage:MINimum?

Function	Queries the minimum audio level measurement.
Query	Range: 0 to 20 V, 9.91 E+37 Resolution: 4 significant digits
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:VOLTAGE:MINIMUM?”
```

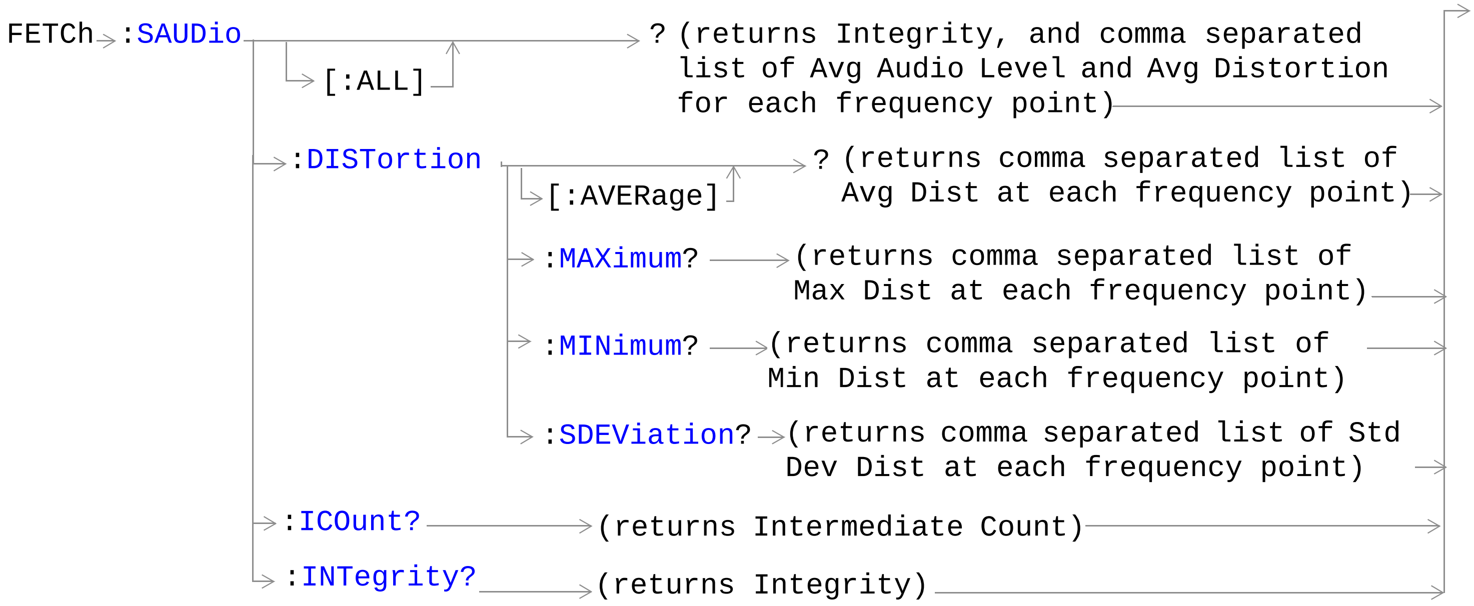
FETCh:AFANalyzer:VOLTage:SDEViation?

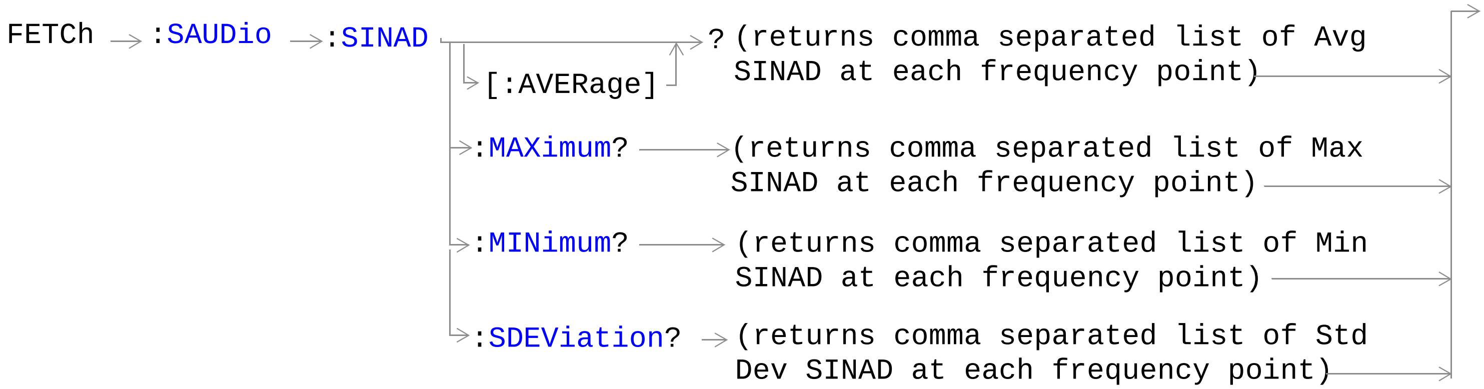
Function	Queries the standard deviation audio level measurement.
Query	Range: 0 to 20 V, 9.91 E+37 Resolution: 4 significant digits
Requirements	Test Application Revision: A.01 and above

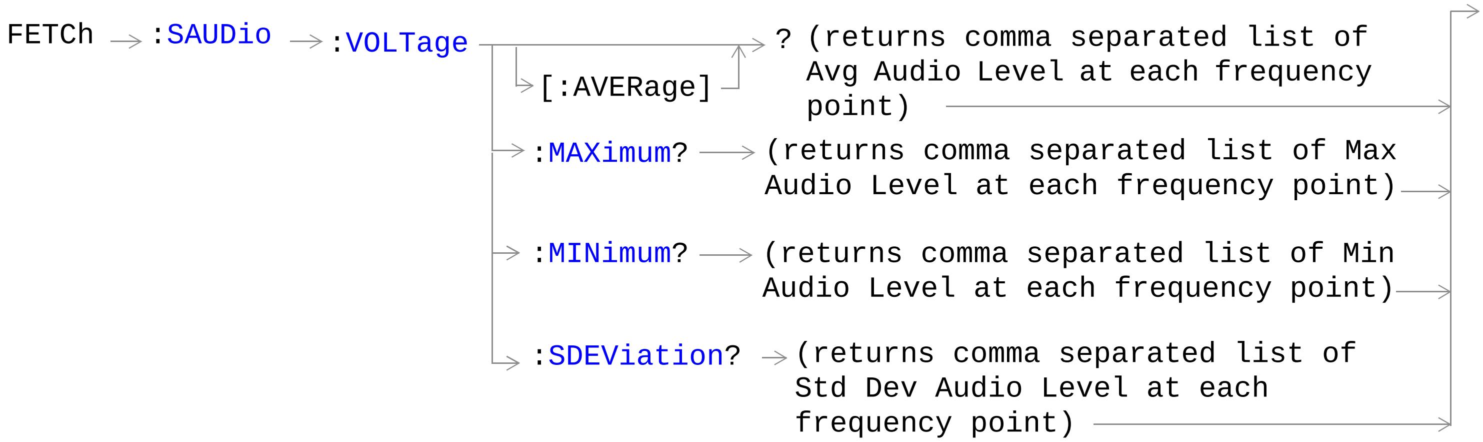
Programming Example

```
OUTPUT 714;”FETCH:AFANALYZER:VOLTAGE:SDEVIATION?”
```

FETCh:SAUDio







“Diagram Conventions” on page 368

FETCh:SAUDio[:ALL]?

Function	This query returns the swept audio measurement results. This query returns results in the following order: integrity indicator, average swept audio level and average distortion for the first frequency point, average swept audio level and average distortion for the second frequency point, and so on. The number of frequency points is determined with the “SETup:SAUDio:FREQuency:POINts” on page 633 command. For frequencies above 10 kHz, this measurement returns 9.91 E+37.
Query	Integrity indicator • Range: See “Integrity Indicator” on page 295. • Resolution: 1 Average audio level • Range: 1 mV to 20 V, 9.91 E+37 • Resolution: the lesser of 4 significant digits or 10 uV Average distortion • Range: 0 to 99.9%, 9.91 E+37 • Resolution: 0.01%

FETCh:SAUDio:DISTortion[:AVERage]?

Function	This query returns a comma separated list of the audio distortion measured at each frequency point in the sweep. The number of frequency points is determined with the “SETup:SAUDio:FREQuency:POINts” on page 633 command. For frequencies above 10 kHz, this measurement returns 9.91 E+37.
Query	Average audio distortion • Range: 0 to 99.9%, 9.91 E+37 • Resolution: 0.01%

FETCh:SAUDio:DISTortion:MAXimum?

Function	This query returns a comma separated list of the maximum audio distortion measured at each frequency point in the sweep. The number of frequency points is determined with the “SETup:SAUDio:FREQuency:POINts” on page 633 command. For frequencies above 10 kHz, this measurement returns 9.91 E+37.
Query	Range: 0 to 99.9%, 9.91 E+37 Resolution: 0.01%

FETCh:SAUDio:DISTortion:MINimum?

Function	This query returns a comma separated list of the minimum audio distortion measured at each frequency point in the sweep. For frequencies above 10 kHz, this measurement returns 9.91 E+37.
Query	Range: 0 to 99.9%, 9.91 E+37 Resolution: 0.01%

FETCh:SAUDio:DISTortion:SDEViation?

Function	This query returns a comma separated list of the standard deviation audio distortion measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" on page 633 command. For frequencies above 10 kHz, this measurement returns 9.91 E+37.
Query	Range: 0 to 99.9%, 9.91 E+37 Resolution: 0.001%

FETCh:SAUDio:ICOunt?

Function	This query returns the intermediate count of swept audio multi-measurements completed. The total measurement count is the number of measurements specified in with the multi-measurement count command, "SETup:SAUDio:COUNt[:SNUMber]" on page 631, times the number of frequency points specified with the "SETup:SAUDio:FREQuency:POINts" on page 633. Therefore, when completing a 5 point sweep with multi-measurements turned off, the measurement will return 5 not 1. See also "SETup:SAUDio:ICOunt:MAXimum?" on page 634.
Query	Range: 1 to 999 x 60 Resolution: 1

FETCh:SAUDio:INTegrity?

Function	This query returns the integrity indicator for the last swept audio measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 295 for descriptions of non-zero integrity indicators.
Query	Range: See "Integrity Indicator" on page 295. Resolution: 1

FETCh:SAUDio:SINAD[:AVERage]?

Function	This query returns a comma separated list of the average SINAD measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" on page 633 command.
Query	Average SINAD • Range: -99.99 to 99.99 dB, 9.91 E+37 • Resolution: 0.01 dB

FETCh:SAUDio:SINAD:MAXimum?

Function	This query returns a comma separated list of the maximum SINAD measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" on page 633 command.
Query	Range: -99.99 to 99.99 dB, 9.91 E+37 Resolution: 0.01 dB

FETCh:SAUDio:SINAD:MINimum?

Function	This query returns a comma separated list of the minimum SINAD measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" on page 633 command.
Query	Range: -99.99 to 99.99 dB, 9.91 E+37 Resolution: 0.01 dB

FETCh:SAUDio:SINAD:SDEViation?

Function	This query returns a comma separated list of the standard deviation of SINAD measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" on page 633 command.
Query	Range: 0 to 99.99 dB, 9.91 E+37 Resolution: 0.001 dB

FETCh:SAUDio:VOLTage[:AVERage]?

Function	This query returns a comma separated list of the average swept audio level measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" on page 633 command. Value is returned in units of V.
Query	Range: 1 mV to 20, 9.91 E+37 Resolution: 4 significant digits

FETCh:SAUDio:VOLTage:MAXimum?

Function	This query returns a comma separated list of the maximum audio voltage measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" on page 633 command.
Query	Range: 1 mV to 20 V, 9.91 E+37 Resolution: 4 significant digits

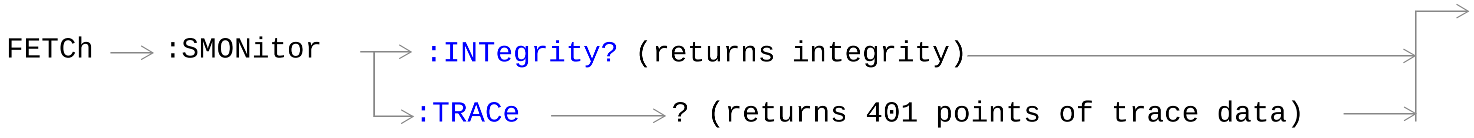
FETCh:SAUDio:VOLTage:MINimum?

Function	This query returns a comma separated list of minimum audio voltage measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" on page 633 command.
Query	Range: 1 mV to 20 V, 9.91 E+37 Resolution: 4 significant digits

FETCh:SAUDio:VOLTage:SDEViation?

Function	This query returns a comma separated list of the standard deviation of audio voltage measured at each point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" on page 633 command.
Query	Range: 1 mV to 20 V, 9.91 E+37 Resolution: 4 significant digits

FETCh:SMONitor



“Diagram Conventions” on page 368

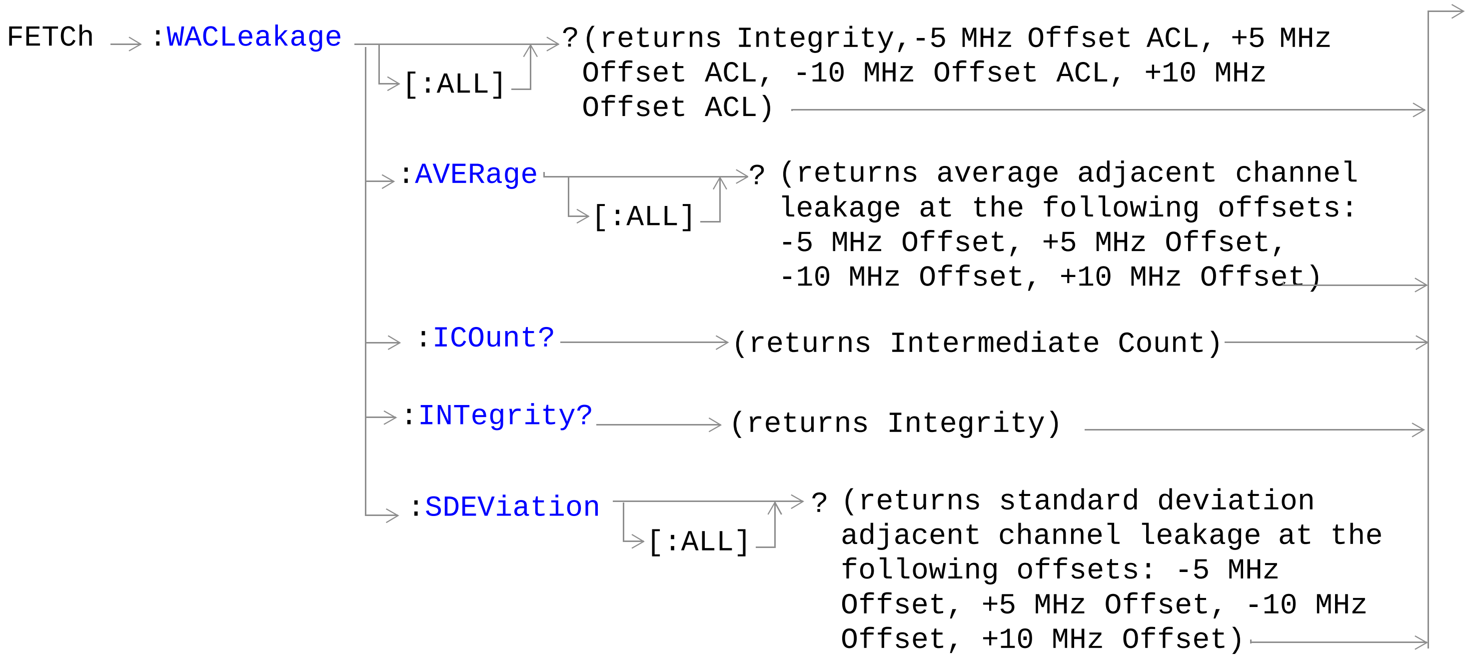
FETCh:SMONitor:INTegrity?

Function	Returns the integrity indicator value for the last spectrum monitor measurement performed. Zero indicates a normal result. See “Integrity Indicator” on page 295 for descriptions of non-zero integrity indicators.
Query	Range: See “Integrity Indicator” on page 295. Resolution: 1

FETCh:SMONitor:TRACe?

Function	Queries the spectrum monitor and returns 401 points representing the amplitude results (in dBm) 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

FETCh:WACLeakage



"Diagram Conventions" on page 368

FETCh:WACLeakage[:ALL]?

Function	Queries a adjacent channel leakage ratio (ACLR) measurement result. This query returns an integrity indicator followed by -5 MHz offset power ratio maximum, +5 MHz offset power ratio maximum, -10 MHz offset power ratio maximum, +10 MHz offset power ratio maximum. If the multi-measurement state is on, the result represents the *average* of a number of adjacent channel leakage measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:WACLeakage:COUNt[:SNUMber]" .
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dBm
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WACLEAKAGE:ALL?" !Returns integrity, ACLR measurements.
```

FETCh:WACLeakage:AVERage[:ALL]?

Function	Queries the average adjacent channel leakage ratio at the following offsets: -5 MHz, +5 MHz, -10 MHz, +10 MHz. To set the number of measurement to average, use the command "SETup:WACLeakage:COUNt[:SNUMber]" on page 648.
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WACLEAKAGE:AVERAGE:ALL?"
!Queries the average adjacent channel leakage ratio.
```

FETCh:WACLeakage:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement. To set up multi-measurements, see "SETup:WACLeakage:COUNt[:SNUMber]" .
Query	Range: 0 to 999
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WACLEAKAGE:ICOUNT?"
!Returns the intermediate count of adjacent channel leakage ratio multi-measurements.
```

FETCh:WACLeakage:INTegrity?

Function	Queries the measurement integrity indicator for the last adjacent channel leakage measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 295 for information about non-zero integrity results.
Query	Range: 0 through 23
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WACLEAKAGE:INTegrity?"
!Queries the integrity indicator for the adjacent channel leakage ratio results.
```

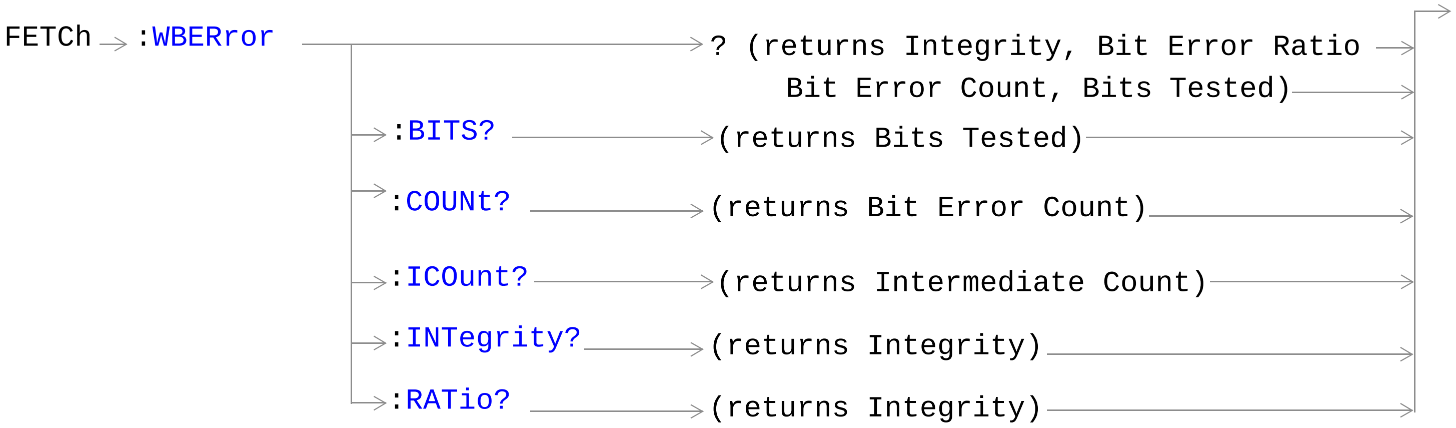
FETCh:WACLeakage:SDEViation[:ALL]?

Function	Queries the standard deviation of several adjacent channel leakage ratio measurements at the following offsets: -5 MHz, +5 MHz, -10 MHz, +10 MHz. To set the number of measurement to compare, use the command "SETup:WACLeakage:COUNt[:SNUMber]" .
Query	• Range: 0 to 99 dB, 9.91 E+37 • Resolution: 0.001 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WACLEAKAGE:SDEVIATION:ALL?"
!Queries the standard deviation of power for the adjacent channel leakage ratio
!measurements.
```

FETCh:WBERror



"Diagram Conventions" on page 368

FETCh:WBERror[:ALL]?

Function	Queries a loopback bit error measurement result. Measurement results are returned in the following order: integrity, bit error ratio, bit error count, bits tested.
Query	Range • Integrity: 1 to 23 • Bit Error Ratio: 0 to 99%, 9.91 E+37 • Bit Error Count: 0 to 999999, 9.91 E+37 • Bits Tested: 0 to 999999, 9.91 E+37 Resolution • Integrity: 1 • Bit Error Ratio: 0.0001 dB • Bit Error Count: 1 • Bits Tested: 1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WBERROR:ALL?"
```

FETCh:WBERror:BITS?

Function	Queries the number of bits tested.
Query	Range: 0 to 999999
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WBERROR:BITS?"
```

FETCh:WBERror:COUNt?

Function	Queries the bit error count.
Query	Range: 0 to 999999
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WBERROR:COUNT?"
```

FETCh:WBERror:ICOunt?

Function	Queries the intermediate count of bits tested. To set up the total number of bits to test, see “SETup:WBERror:COUNt” .
Query	Range: 0 to 999999
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WBERROR:ICOUNT?"
```

FETCh:WBERror:INTegrity?

Function	Queries the measurement integrity indicator for the last loopback bit error measurement completed. Zero indicates a normal measurement. See “Integrity Indicator” on page 295 for information about non-zero integrity results.
Query	Range: 0 through 23
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WBERROR:INTegrity?"
```

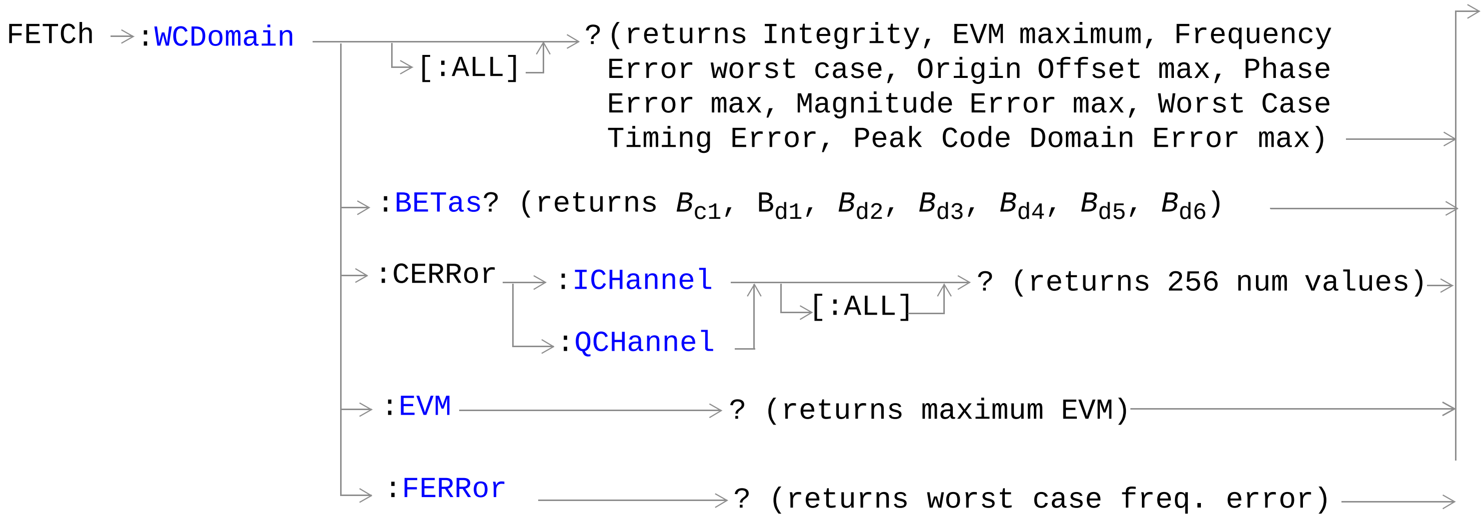
FETCh:WBERror:RATio?

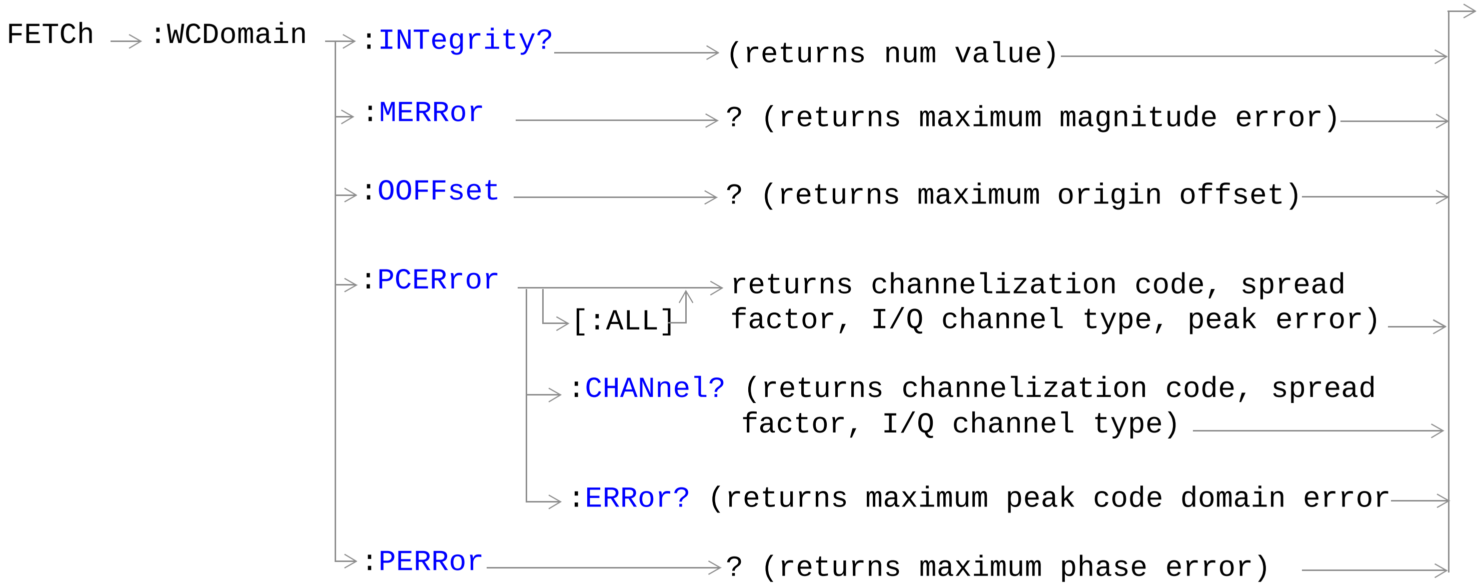
Function	Queries the loopback bit error ratio measurement.
Query	Range: 0 to 99%, 9.91 E+37
Requirements	Test Application Revision: A.01 and above

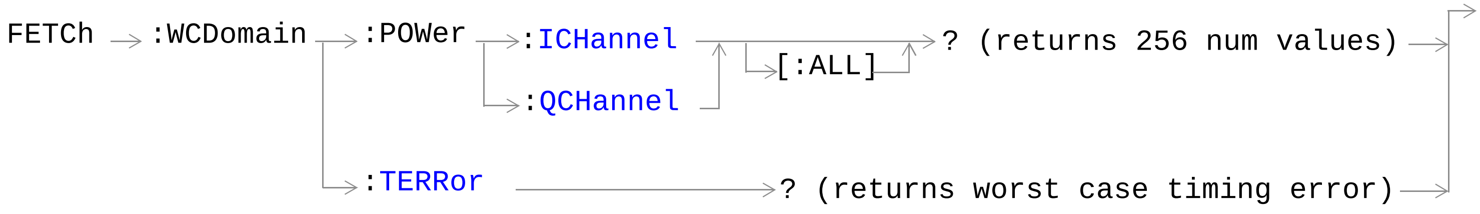
Programming Example

```
OUTPUT 714;"FETCH:WBERROR:RATio?"
```

FETCh:WCDomain







"Diagram Conventions" on page 368

FETCh:WCDomain[:ALL]?

Function	Queries the code domain measurements. Measurement results are returned in the following order: integrity, EVM maximum, frequency error worst case, origin offset maximum, phase error maximum, worst case timing error, peak code domain error maximum.
Query	Integrity • Range: 0 to 23 • Resolution: 1 EVM Maximum • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.1 Frequency Error worst case • Range: -99.99 to 99.99 kHz, 9.91 E+37 • Resolution: 0.1 Origin Offset Maximum • Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.1 Phase Error Maximum • Range: 0 to 180 degrees, 9.91 E+37 • Resolution: 0.1 Timing Error Maximum • Range: -99.99 to 99.99 chips, 9.91 E+37 • Resolution: 0.01 chips Peak Code Domain Error Maximum • Range: -99.0 to 0.0 dB, 9.91 E+37 • Resolution: 0.1
Requirements	Test Application Revision: A.02 and above Test Application Revision: A.03, timing error is returned in chips instead of seconds

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:ALL?"
```

FETCh:WCDomain:BETas?

Function	Queries the code domain betas B_{c1}, B_{d1}, B_{d2}, B_{d3}, B_{d4}, B_{d5}, B_{d6}. Only the control channel (B_{c1}) and 1 data channel (B_{d1}) are active. The other betas are reserved for future use. There are no units for the betas relative amplitude levels.
Query	Range: 0 to 1 Resolution: 0.001
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:BETAS?"
```

FETCh:WCDomain:CERRor:ICHannel[:ALL]?

Function	Queries the code domain error in each of the 256 “I” code channels (0 through 255).
Query	Range: -99 to 0 dB Resolution: 0.01
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:CERROR:ICHANNEL:ALL?"
```

FETCh:WCDomain:CERRor:QCHannel[:ALL]?

Function	Queries the code domain error in each of the 256 “Q” code channels (0 through 255).
Query	Range: -99 to 0 dB Resolution: 0.01
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:CERROR:QCHANNEL:ALL?"
```

FETCh:WCDomain:EVM?

Function	Queries the maximum error vector magnitude (EVM).
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:EVM?" !Returns maximum EVM.
```

FETCh:WCDomain:FERRor?

Function	Queries the worst case frequency error.
Query	Range: -99 to 99 kHz, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:FERROR?" !Returns worst case frequency error.
```

FETCh:WCDomain:INTegrity?

Function	Queries the measurement integrity indicator for the last code domain measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 295 for information about non-zero integrity results.
Query	Range: 0 through 23
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:INTEGRITY?"
!Queries the integrity indicator for the code domain measurement results.
```

FETCh:WCDomain:MERRor?

Function	Queries the maximum magnitude error.
Query	Range: 0.0 to 99.0% Resolution: 0.1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:MERRor?" !Returns maximum magnitude error.
```

FETCh:WCDomain:OOFFset?

Function	Queries the maximum origin offset.
Query	Range: -99 to 0 dB, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:OOFFSET?" !Returns maximum origin offset.
```

FETCh:WCDomain:PCERror[:ALL]?

Function	Queries the peak code domain error measurement. There are four numbers returned for each measurement. The first three numbers describe channel at which the peak error result was measured (channelization code, spread factor, I/Q channel type), and the last number is the peak error. Results are returned in the following order: channelization code, spread factor, I/Q channel type, and peak code domain error.
Query	Channelization Code • Range: 0 to 255, 9.91 E+37 Spread Factor • Range: 4 to 256, 9.91 E+37 I/Q Channel Type • Range: 0 = I, 1= Q, 9.91 E+37 Peak Code Domain Error • Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:PCERROR:ALL?"
!Returns Channelization code, spread factor, I/Q channel type, and peak error.
```

FETCh:WCDomain:PCERror:CHANnel?

Function	Returns the orthogonal variable spreading factor (OVSF) code number (channelization code) at which the peak code domain error was detected.
Query	Range: 0 to 255
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:PCERROR:CHANNEL?" !Returns channel at which peak error was detected.
```

FETCh:WCDomain:PCERror:ERRor?

Function	Queries the maximum peak code domain error.
Query	Range: -99 to 0 dB, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:PCERROR:ERRor?" !Returns maximum peak code domain error.
```

FETCh:WCDomainPERRor?

Function	Queries the maximum peak code domain error.
Query	Range: 0 to 180 degrees, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:PERROR?" !Returns maximum phase error.
```

FETCh:WCDomain:POWer:ICHannel[:ALL]?

Function	Queries the code domain power in each of the 256 “I” code channels (0 through 255).
Query	Range: -99 to 0 dB Resolution: 0.01
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:POWER:ICHANNEL:ALL?"
```

FETCh:WCDomain:POWer:QCHannel[:ALL]?

Function	Queries the code domain power in each of the 256 “Q” code channels (0 through 255).
Query	Range: -99 to 0 dB Resolution: 0.01
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:POWER:QCHANNEL:ALL?"
```

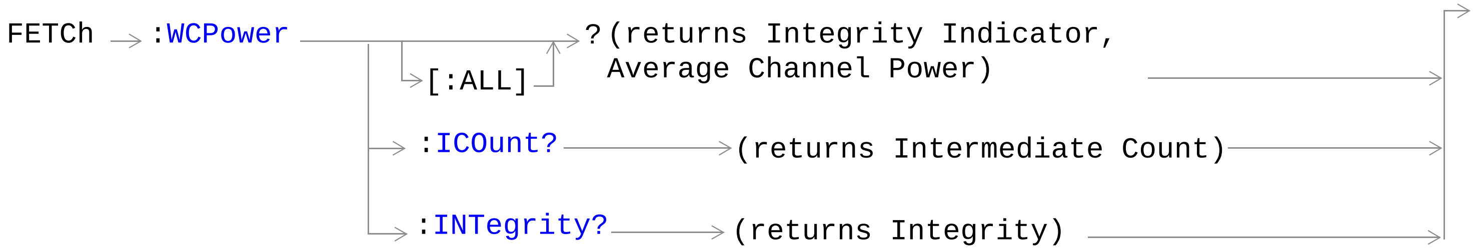
FETCh:WCDomain:TERRor?

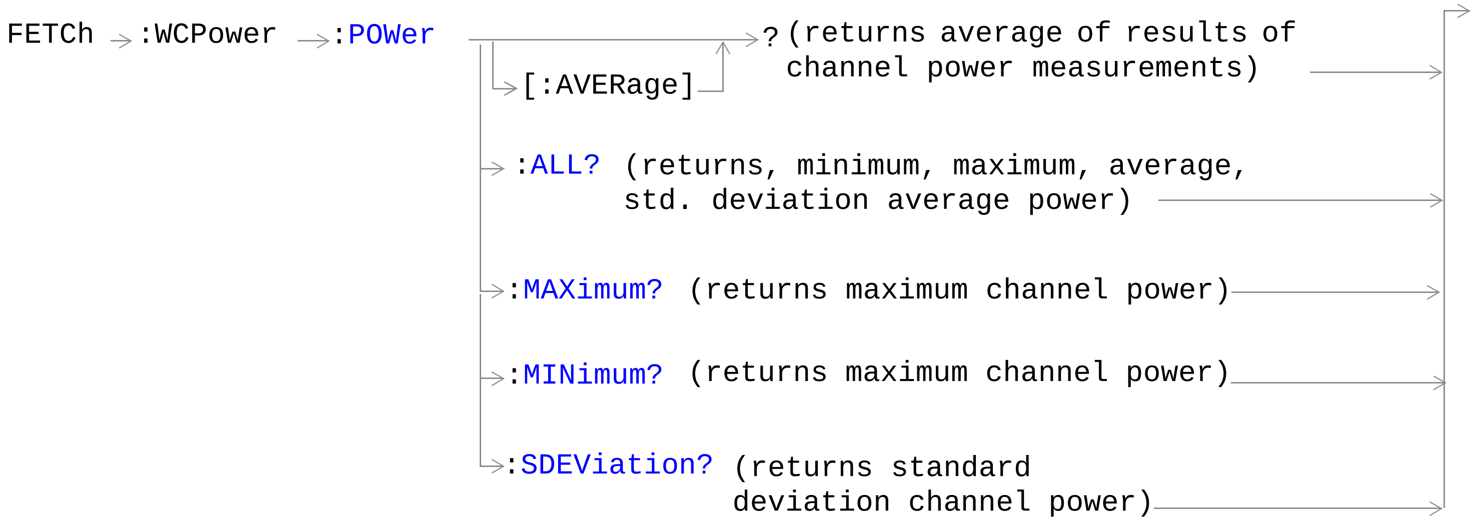
Function	Queries the worst case timing error.
Query	Range: -99.99 to 99.99 chips, 9.91 E+37 Resolution: 0.01 chips
Requirements	Test Application Revision: A.02 and above Test Application Revision: A.03, timing error is returned in chips instead of seconds

Programming Example

```
OUTPUT 714;"FETCH:WCDOMAIN:TERROR?" !Returns worst case timing error.
```

FETCh:WCPower





“Diagram Conventions” on page 368

FETCh:WCPower[:ALL]?

Function	Queries a channel power measurement result. This query returns an integrity indicator followed by the average channel power measurement result. If the multi-measurement state is on, the result represents the *average* of a number of channel power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:WCPower:COUNt[:SNUMber]" .
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dBm
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WCPOWER:ALL?" !Returns integrity, channel power measurement.
```

FETCh:WCPower:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement. To set up multi-measurements, see "SETup:WCPower:COUNt[:SNUMber]" .
Query	Range: 0 to 999
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WCPOWER:ICOUNT?"
!Returns the intermediate count of channel power multi-measurements.
```

FETCh:WCPower:INTegrity?

Function	Queries the measurement integrity indicator for the last channel power measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 295 for information about non-zero integrity results.
Query	Range: 0 through 23
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WCPOWER:INTegrity?"
!Queries the integrity indicator for the channel channel power results.
```

FETCh:WCPower:POWer[:AVERage]?

Function	Queries the average of the results of several channel power measurements. To set the number of measurement to average, use the command "SETup:WCPower:COUNt[:SNUMber]" on page 660.
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WCPOWER:POWER:AVERAGE?"
!Queries the average power for the channel power results.
```

FETCh:WCPower:POWer:ALL?

Function	Queries the statistical measurement results for several channel power measurements. To set the number of measurements to gather statistics for, use the command "SETup:WCPower:COUNt[:SNUMber]" on page 660. Results are returned in the following order: minimum, maximum, average, and standard deviation channel power.
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WCPOWER:POWER:ALL?"
!Queries the statistical measurement results for channel power measurement.
```

FETCh:WCPower:POWer:MAXimum?

Function	Queries the maximum power of several channel power measurements. To set the number of measurement to average, use the command "SETup:WCPower:COUNt[:SNUMber]" on page 660.
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WCPOWER:POWER:MAXIMUM?"
!Queries the inegrity indicator for the channel power results.
```

FETCh:WCPower:POWer:MINimum?

Function	Queries the minimum power of several channel power measurements. To set the number of measurement to compare, use the command “SETup:WCPower:COUNt[:SNUMber]” on page 660.
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WCPOWER:POWER:MINIMUM?"
!Queries the minimum channel power.
```

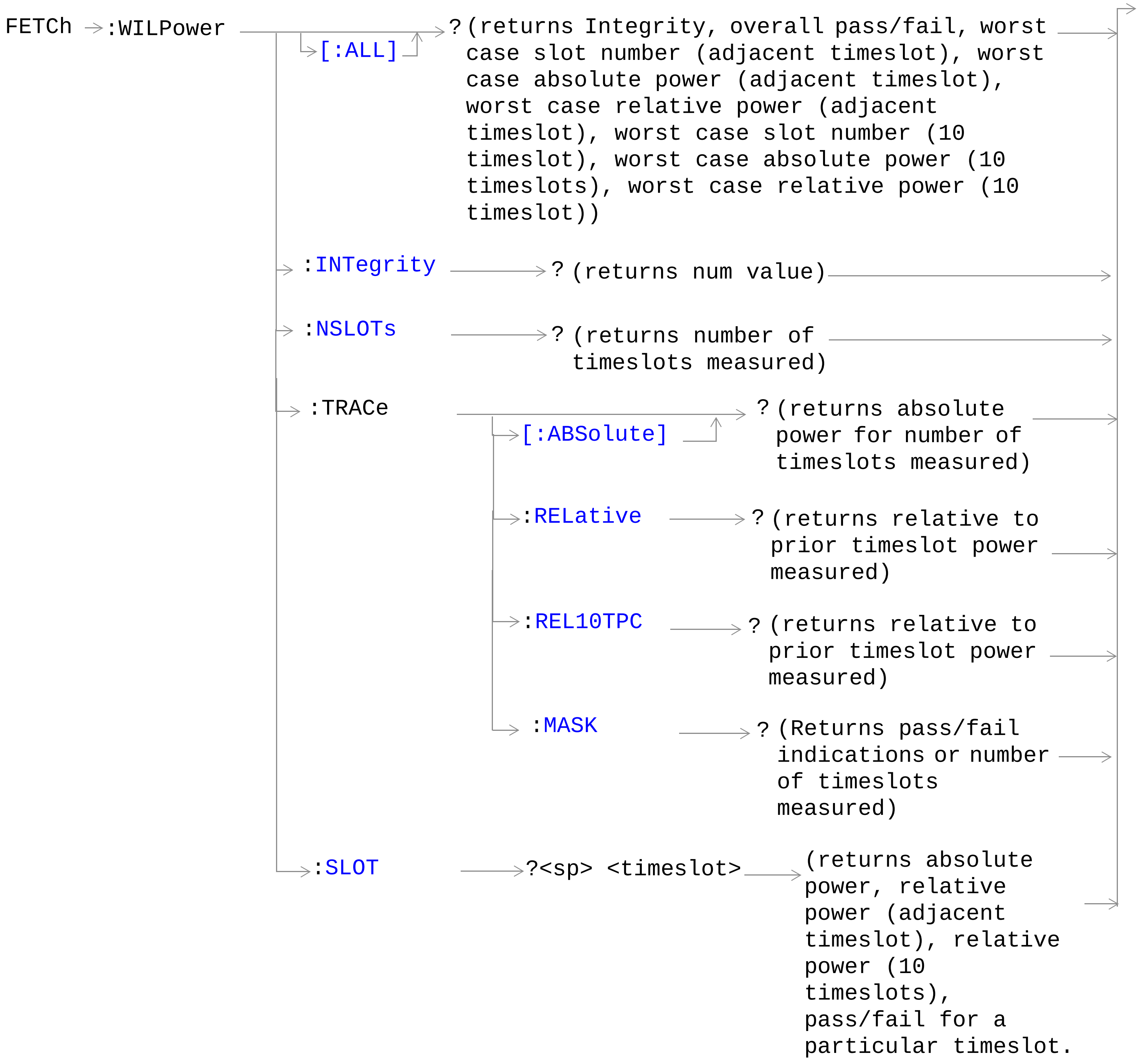
FETCh:WCPower:POWer:SDEViation?

Function	Queries the standard deviation of several channel power measurements. To set the number of measurement to compare, use the command “SETup:WCPower:COUNt[:SNUMber]” on page 660.
Query	• Range: 0 to 99 dB, 9.91 E+37 • Resolution: 0.001 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WCPOWER:POWER:SDEVIATION?"
!Queries the standard deviation of power for the channel power measurements.
```

FETCh:WILPower



"Diagram Conventions" on page 368

FETCh:WILPower[:ALL]?

Function	Queries the Inner Loop Power measurements. Inner Loop Power Control consists of TPC (Transmit Power Control) commands that are sent to the UE on the downlink to control UE transmitter power on the uplink. This measurement verifies that the UE derives the transmitter power control command (TPC_cmd) correctly and that the inner loop power control drives the UE to the correct level relative to the adjacent timelot. Inner Loop Power measurements are made over the period of time between 25 microsecond transient durations, which begin and end at the timeslot boundaries. The test set returns absolute and relative-to-previous values for each timeslot and performs aggregate power control measurements over 10 TPC_cmd groups. See "FETCh:WILPower:TRACe:REL10TPC?" Measurement results are returned in the following order:
Query	Integrity • Range: 0 to 23 • Resolution: 1 Overall pass/fail • Range: 0 to 1 • Resolution: 1 Worst case slot number (based on each adjacent timeslot measurements) • Range: 1 to 150, 9.91 E+37 • Resolution: 1 Absolute power (based on worst case adjacent timeslot measurements) • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01 Relative power (based on worst case adjacent timeslot measurements) • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01 Worst case slot number (based on worst case Rel Pwr 10 TPC (dB) measurements) • Range: 1 to 150, 9.91 E+37 • Resolution: 1 Absolute power (based on worst case Rel Pwr 10 TPC (dB) measurements) • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01 Relative power (based on worst case Rel Pwr 10 TPC (dB) measurements) • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01
Requirements	Test Application Revision: A.03 and above

FETCh:WILPower

Programming Example

```
OUTPUT 714;"FETCh:WILPower?" !Returns all Inner Loop Power control measurement results.
```

FETCh:WILPower:INTegrity?

Function	Queries the measurement integrity indicator for the last IQ tuning measurement completed. Zero indicates a normal measurement. See “Integrity Indicator” on page 295 for information about non-zero integrity results.
Query	• 0 to 23
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"FETCh:WILPower:INT?" !Returns the Inner Loop Power control integrity indicator`	

FETCh:WILPower:NSLOTs?

Function	Returns the number of timeslots tested during the last Inner Loop Power control measurement
Query	• Resolution: 1 • Range: 1 to 150, 9.91 E+37
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"FETCh:WILPower:NSLOTs?" !Returns the number of slots tested.`	

FETCh:WILPower:TRACe[:ABSolute]?

Function	Returns the absolute power levels of each timeslot measured during the last Inner Loop Power measurement.
Query	Absolute power (for up to 150 timeslots, see “FETCh:WILPower:NSLOTs?”) • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"FETCh:WILPower:TRACe?" !Returns the absolute power levels of all timeslots.`	

FETCh:WILPower:TRACe:RELative?

Function	Returns the power levels of each timeslot measured during the last Inner Loop Power measurement relative to the adjacent, previous timeslot.
Query	Relative power for up to 150 timeslots. See “FETCh:WILPower:NSLOTs?” . • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WILPower:TRACe:RELative?" !Returns the relative power levels of all timeslots.
```

FETCh:WILPower:TRACe:REL10TPC?

Function	For each timeslot measured during the last Inner Loop Power measurement, returns the aggregate power level of the previous 10 TPC_cmd groups, relative to the first timeslot in a set of 10 TPC_cmd groups. TPC_cmd groups can occur at a rate of one group per timeslot (Algorithm One) or one group per five-timeslots (Algorithm Two). The first timeslot that has a 10 TPC measurement result will either be slot 10 (Algorithm One) or slot 50 (Algorithm Two). Timeslots are numbered beginning with zero. Depending on which algorithm is used and the number of timeslots tested, the number of results returned by this command will vary.
Query	Relative power (for up to 150 timeslots). See “FETCh:WILPower:NSLOTs?” . • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WILPower:TRACe:REL10TPC?" !returns the aggregate power level of 10 TPC_cmd
groups for each timeslot relative to the first timeslot in a set of 10 TPC_cmd groups.
```

FETCh:WILPower:TRACe:MASK?

Function	Returns relative power measurement pass/fail indications for each timeslot based on previous, adjacent timeslot power. Each pass/fail indication includes a result for both the adjacent and 10 TPC measurements. They are coded as follows: • 0 = Both measurements passed • 1 = Adjacent timeslot measurement failed • 2 = 10 TPC measurement failed • 3 = Both measurements failed
Query	Pass/Fail (for up to 150 timeslots). See "FETCh:WILPower:NSLOTs?" . • Range: 0 to 3, 9.91 E+37 • Resolution: 1
Requirements	Test Application Revision: A.03 and above
Programming Example	

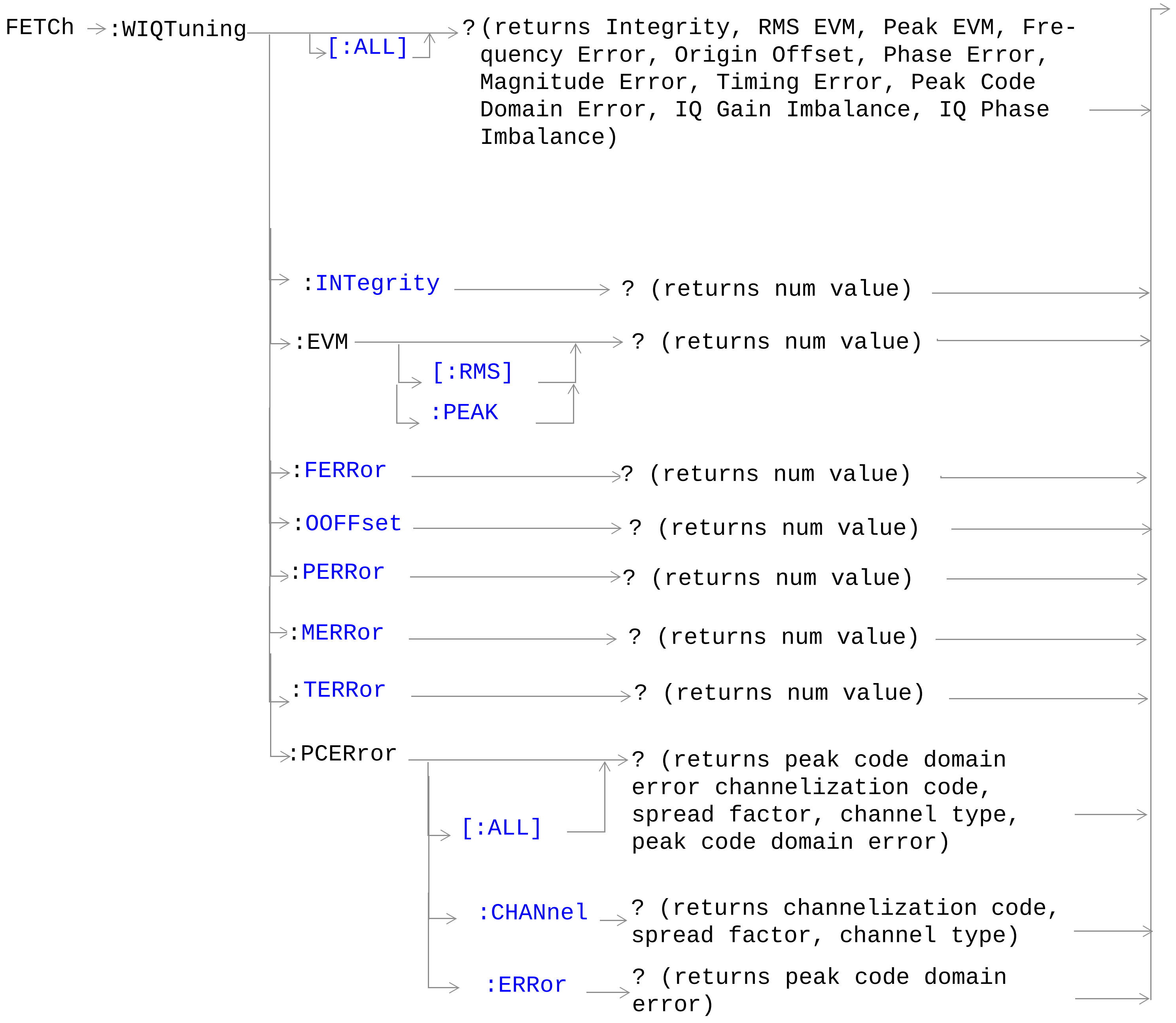
```
OUTPUT 714;"FETCh:WILPower:TRACe:MASK?" !returns pass/fail indications for relative power
measurements.
```

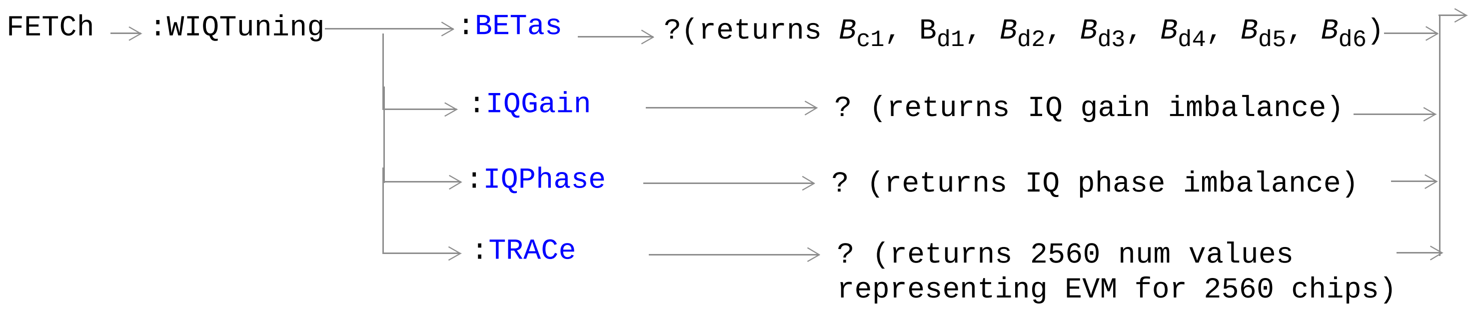
FETCh:WILPower:SLOT?<sp><timeslot number>

Function	Returns the following measurement results in the following order for the timeslot number (timeslots are numbered beginning with 0) specified in the command:
Query	Absolute power • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01 Relative power (based on the adjacent timeslot measurement) • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01 Relative power (based on Rel Pwr 10 TPC (dB) measurements) • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01 Pass/Fail • Range: 0 to 3 (see "FETCh:WILPower:TRACe:MASK?" for the return value definitions. • Resolution: 1
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"FETCh:WILPower:SLOT? 10" !returns measurement results for timeslot 10.
```

FETCh:WIQTuning





"Diagram Conventions" on page 368

FETCh:WIQTuning[:ALL]?

Function	Queries the IQ tuning measurement. Measurement results are returned in the following order: Integrity, EVM (RMS), EVM (peak), Frequency Error, Origin Offset, Phase Error, Magnitude Error, Time Error, Peak Code Domain Error, IQ Gain Imbalance, IQ Phase Imbalance.
Query	Integrity • Range: 0 to 23 • Resolution: 1 EVM (RMS) • Range: 0.0 to 99.0%, 9.91 E+37 • Resolution: 0.01 EVM (Peak) • Range: 0.0 to 99.0%, 9.91 E+37 • Resolution: 0.01 Frequency Error • Range: -99.0 to 99.0 kHz, 9.91 E+37 • Resolution: 0.1 Origin Offset • Range: -99.0 to 0.0 dB, 9.91 E+37 • Resolution: 0.1 Phase Error • Range: 0 to 180 degrees, 9.91 E+37 • Resolution: 0.1 Magnitude Error • Range: 0.0 to 99.0%, 9.91 E+37 • Resolution: 0.01 Timing Error • Range: -99.99 to 99.99 chips, 9.91 E+37 • Resolution: 0.01 chips Peak Code Domain Error • Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.01 IQ Gain Imbalance • Range: -99 to 99, 9.91 E+37 • Resolution: 0.001 dB IQ Phase Imbalance • Range: 0 to 180, 9.91 E+37 • Resolution: 0.001 deg

Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"FETCh:WIQTuning:ALL?" !Queries the IQ tuning measurement results.
```

FETCh:WIQTuning:INTegrity?

Function	Queries the measurement integrity indicator for the last IQ tuning measurement completed. Zero indicates a normal measurement. See “Integrity Indicator” on page 295 for information about non-zero integrity results.
Query	Range: 0 through 23
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WIQTuning:INTegrity?"
!Queries the integrity indicator for the IQ tuning measurement results.
```

FETCh:WIQTuning:EVM:PEAK?

Function	Queries the peak IQ tuning measurement EVM.
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.01
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCH:WIQTuning:EVM:RMS?" !Returns rms EVM.
```

FETCh:WIQTuning:EVM[:RMS]?

Function	Queries the rms IQ tuning measurement EVM.
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.01
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCH:WIQTuning:EVM?" !Returns peak EVM.
```

FETCh:WIQTuning:FERRor?

Function	Queries the IQ tuning measurement frequency error.
Query	Range: -99 to 99 kHz, 9.91 E+37 Resolution: 0.01
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WIQTuning:FERRor?" !Returns frequency error.
```

FETCh:WIQT:OOFFset?

Function	Queries the IQ tuning measurement origin offset.
Query	Range:-99 to 0 dB, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WIQTuning:OOFFset?" !Returns origin offset.
```

FETCh:WIQTuning:PERRor?

Function	Queries the IQ tuning measurement phase error.
Query	• Range: 0 to 180 degrees, 9.91 E+37 • Resolution: 0.1
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WIQTuning:PERRor?"
!Returns IQ tuning measurement phase error.
```

FETCh:WIQTuning:MERRor?

Function	Queries the IQ tuning measurement magnitude error.
Query	Range: 0 to 99% Resolution: 0.01
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WIQTuning:MERRor?" !Queries magnitude error.
```

FETCh:WIQTuning:TERRor?

Function	Queries the IQ tuning measurement timing error.
Query	Range: -99.99 to 99.99 chips, 9.91 E+37 Resolution: 0.01 chips
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WIQTuning:TERRor?" !Returns IQ tuning measurement timing error.
```

FETCh:WIQTuning:PCERror[:ALL]?

Function	Queries the IQ tuning measurement peak code domain error. There are four numbers returned for each measurement. The first three numbers describe the channel where the peak error result was measured (OVSF channelization code, spreading factor, I/Q channel type), and the last number is the peak error. Results are returned in the following order: OVFS channelization code, spreading factor, I/Q channel type, and peak code domain error.
Query	Channelization Code • Range: 0 to 255, 9.91 E+37 Spread Factor • Range: 4 to 256, 9.91 E+37 I/Q Channel Type • Range: 0 = I, 1= Q, 9.91 E+37 Peak Code Domain Error • Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCh:WIQTuning:PCERror?"
!Returns Channelization code, spread factor, I/Q channel type, and peak error.
```

FETCh:WIQTuning:PCERror:CHANnel?

Function	Returns the orthogonal variable spreading factor (OVSF) code number (channelization code) where the peak code domain error was detected.
Query	Range: 0 to 255, 9.91 E+37
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WIQTuning:PCERror:CHANnel?" !Returns channel where peak error was detected.
```

FETCh:WIQTuning:PCERror:ERRor?

Function	Queries the IQ tuning measurement peak code domain error.
Query	• Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.1
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WIQTuning:PCERror:ERRor?"
!Returns peak code domain error.
```

FETCh:WIQTuning:BETas?

Function	Queries the IQ tuning measurement betas B_{c1}, B_{d1}, B_{d2}, B_{d3}, B_{d4}, B_{d5}, B_{d6}. Only the control channel (B_{c1})and one data channel (B_{d1}) are active. The other betas are reserved for future use. There are no units for the betas relative amplitude levels.
Query	Range: 0 to 1 Resolution: 0.001
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCH:WIQTuning:BETas?"
```

FETCh:WIQTuning:IQGain?

Function	Queries the IQ tuning measurement IQ modulator gain imbalance.
Query	Range: -99.0 to +99.0 dB Resolution: 0.001
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WIQTuning:IQGain?" !Queries the IQ tuning measurment IQ gain imbalance.
```

FETCh:WIQTuning:IQPhase?

Function	Queries the IQ tuning measurement IQ modulator phase imbalance.
Query	Range: 0 to +180.0 deg Resolution: 0.001
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WIQTuning:IQGain?" !Queries the IQ tuning measurment IQ gain imbalance.
```

FETCh:WIQTuning

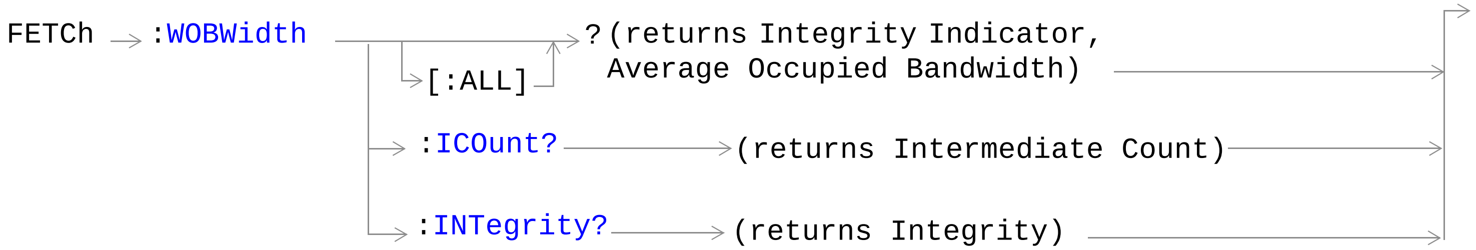
FETCh:WIQTuning:TRACe?

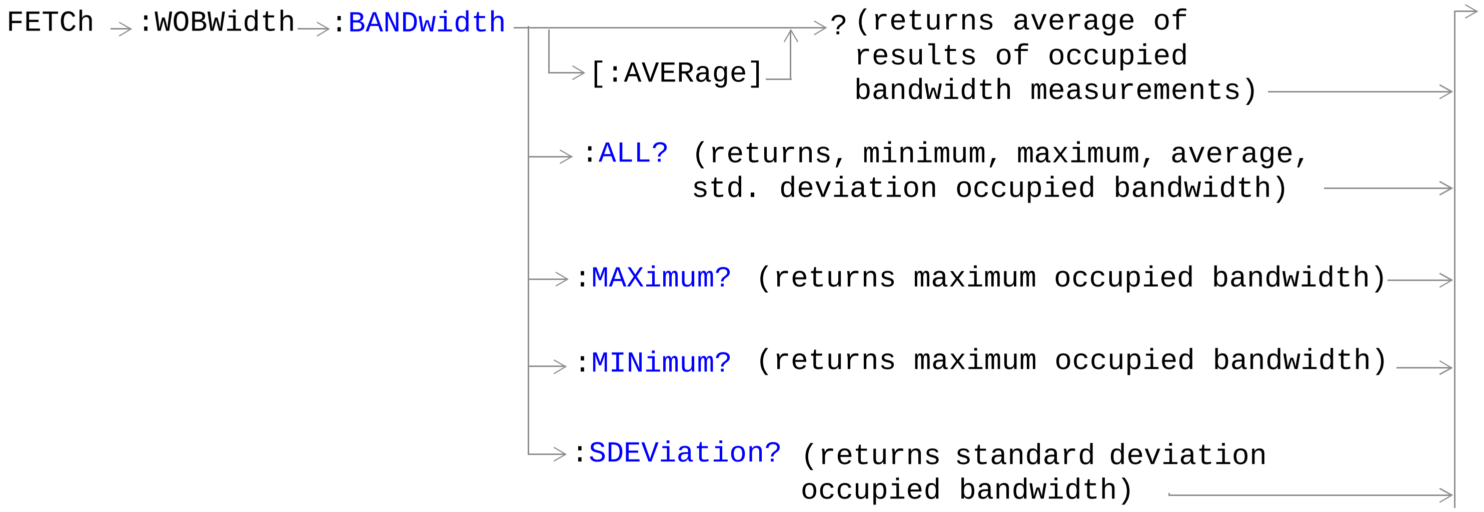
Function	Queries the IQ tuning measurement EVM for each chip up to 2560 chips. IQ constellation data can be derived from this measurement result.
Query	Range: 0 to 99% Resolution: 0.1
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"FETCh:WIQTuning:TRACe?" !Queries the IQ tuning measurment EVM for 2560 chips.
```

FETCh:WOBWidth





"Diagram Conventions" on page 368

FETCh:WOBWidth[:ALL]?

Function	Queries an occupied bandwidth measurement result. This query returns an integrity indicator followed by the average occupied bandwidth measurement result. If the multi-measurement state is on, the result represents the *average* of a number of occupied bandwidth measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see “SETup:WOBWidth:COUNt[:SNUMber]” .
Query	• Range: 0.0 to 10.0 MHz, 9.91 E+37 • Resolution: 0.0001
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WOBWIDTH:ALL?" !Returns integrity, occupied bandwidth measurement.
```

FETCh:WOBWidth:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement. To set up multi-measurements, see “SETup:WOBWidth:COUNt[:SNUMber]” .
Query	Range: 0 to 999
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WOBWIDTH:ICOUNT?"
!Returns the intermediate count of occupied bandwidth multi-measurements.
```

FETCh:WOBWidth:INTegrity?

Function	Queries the measurement integrity indicator for the last occupied bandwidth measurement completed. Zero indicates a normal measurement. See “Integrity Indicator” on page 295 for information about non-zero integrity results.
Query	Range: 0 through 23
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WOBWIDTH:INTegrity?"
!Queries the integrity indicator for the channel occupied bandwidth results.
```

FETCh:WOBWidth:BANDwidth[:AVERage]?

Function	Queries the average of the results of several occupied bandwidth measurements. To set the number of measurement to average, use the command "SETup:WOBWidth:COUNt[:SNUMber]" on page 674.
Query	• Range: 0.0 to 10.0 MHz, 9.91 E+37 • Resolution: 0.0001
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WOBWIDTH:BANDWIDTH:AVERAGE?"
!Queries the average power for the occupied bandwidth results.
```

FETCh:WOBWidth:BANDwidth:ALL?

Function	Queries the statistical measurement results for several occupied bandwidth measurements. To set the number of measurements to gather statistics for, use the command "SETup:WOBWidth:COUNt[:SNUMber]" on page 674. Results are returned in the following order: minimum, maximum, average, and standard deviation occupied bandwidth.
Query	• Range: 0.0 to 10.0 MHz, 9.91 E+37 • Resolution: 0.0001
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WOBWIDTH:BANDWIDTH:ALL?"
!Queries the statistical measurement results for occupied bandwidth measurement.
```

FETCh:WOBWidth:BANDwidth:MAXimum?

Function	Queries the maximum bandwidth of several occupied bandwidth measurements. To set the number of measurement to average, use the command "SETup:WOBWidth:COUNt[:SNUMber]" on page 674.
Query	• Range: 0.0 to 10.0 MHz, 9.91 E+37 • Resolution: 0.0001
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WOBWIDTH:BANDWIDTH:MAXIMUM?"
!Queries the maximum occupied bandwidth result for statistical measurements.
```

FETCh:WOBWidth:BANDwidth:MINimum?

Function	Queries the minimum bandwidth of several occupied bandwidth measurements. To set the number of measurement to compare, use the command "SETup:WOBWidth:COUNt[:SNUMber]" on page 674.
Query	• Range: 0.0 to 10.0 MHz, 9.91 E+37 • Resolution: 0.0 to 10.0 MHz
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WOBWIDTH:BANDWIDTH:MINIMUM?"
!Queries the minimum occupied bandwidth result for statistical measurements.
```

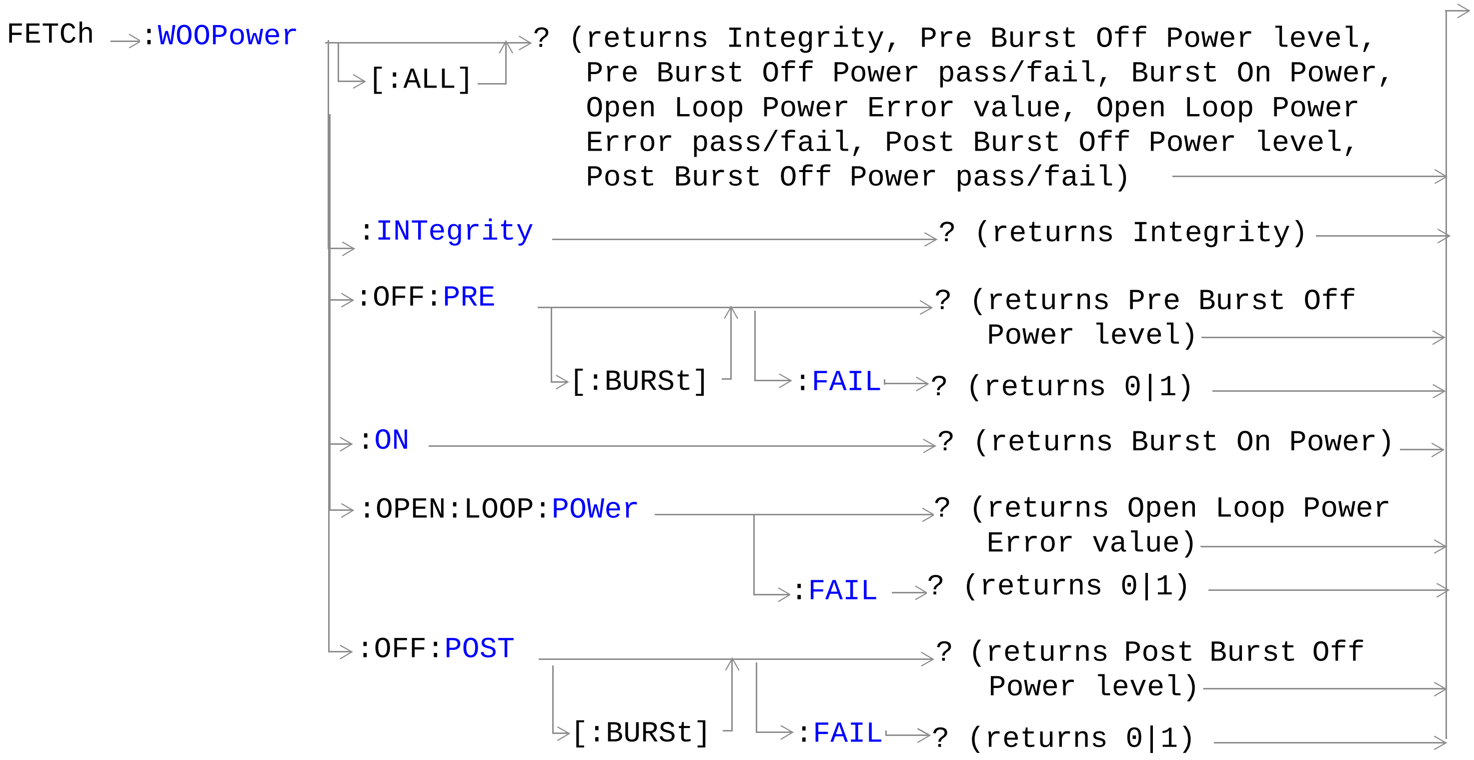
FETCh:WOBWidth:BANDwidth:SDEViation?

Function	Queries the standard deviation of several occupied bandwidth measurements. To set the number of measurement to compare, use the command "SETup:WOBWidth:COUNt[:SNUMber]" on page 674.
Query	• Range: 0.0 to 10.0 MHz, 9.91 E+37 • Resolution: 0.0001
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WOBWIDTH:BANDWIDTH:SDEVIATION?"
!Queries the standard deviation of power for the occupied bandwidth measurements.
```

FETCh:WOOPower



“Diagram Conventions” on page 368

FETCh:WOOPower[:ALL]?

Function	Queries the PRACH transmit on/off power measurement results. See "PRACH Transmit On/Off Power Measurement Results" on page 84. [:ALL] returns measurement results in the following order: Integrity, Pre Burst Off Power level, Pre Burst Off Power pass/fail, Burst On Power, Open Loop Power Error value, Open Loop Power Error pass/fail, Post Burst Off Power level, Post Burst Off Power pass/fail. Instead of returning [:ALL] results, you may query the result for any particular measurement result individually using the appropriate keywords (for example, FETCh:WOOPower:OFF:PRE[:BURSt]?).
Requirements	Test Application Revision: A.03 and above
Query	Integrity • Range: 0 to 23, 9.91E+37 • Resolution: 1 Pre Burst Off Power level • Range: -99.99 to 00.00 dBm, 9.91 E+37 • Resolution: 0.01 dBm Pre Burst Off Power pass/fail • Range: 0 (pass), 1 (fail), 9.91 E+37 Burst On Power • Range: -99.99 to 99.99 dBm, 9.91 E+37 • Resolution: 0.01 dBm Open Loop Power Error value • Range: -99.99 to +99.99 dB, 9.91E+37 • Resolution: 0.01 dB Open Loop Power Error pass/fail • Range: 0 (pass), 1 (fail), 9.91 E+37 Post Burst Off Power level • Range: -99.99 to 00.00 dBm, 9.91 E+37 • Resolution: 0.01 dBm Post Burst Off Power pass/fail • Range: 0 (pass), 1 (fail), 9.91 E+37

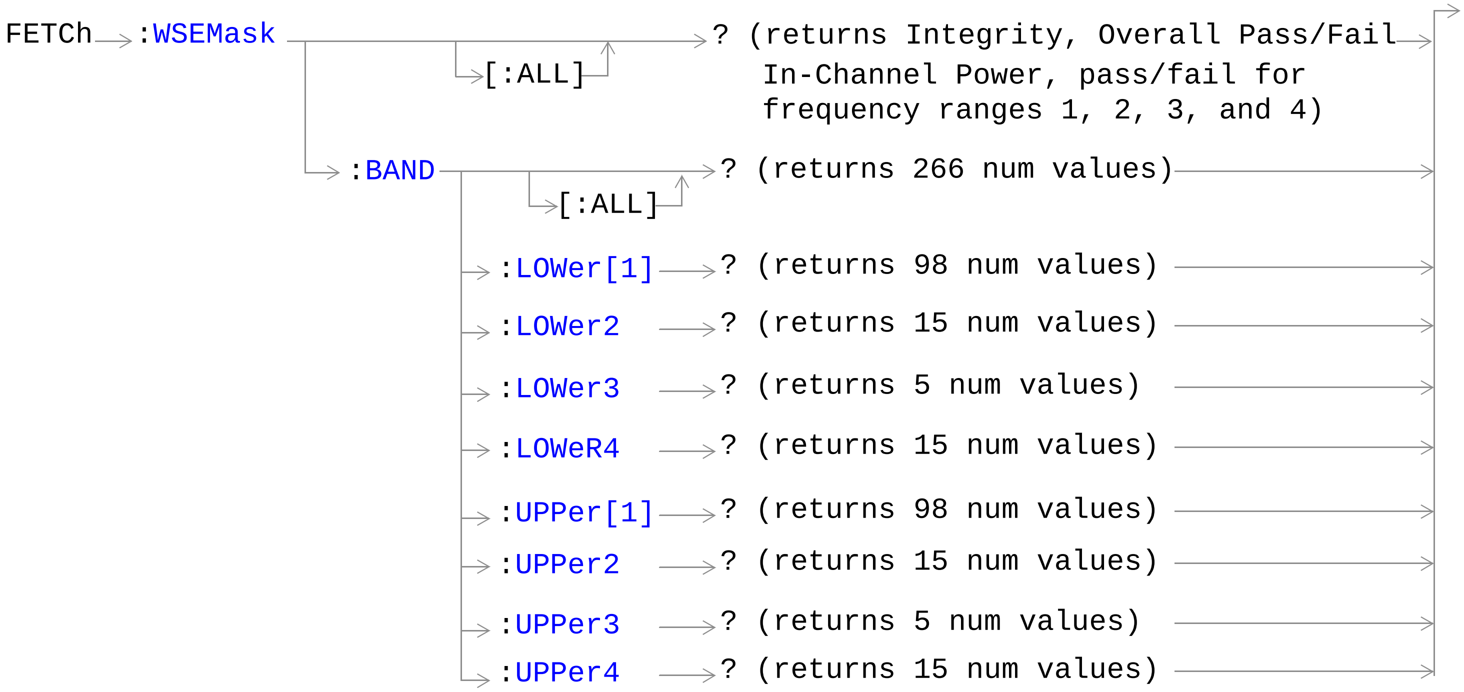
Programming Example

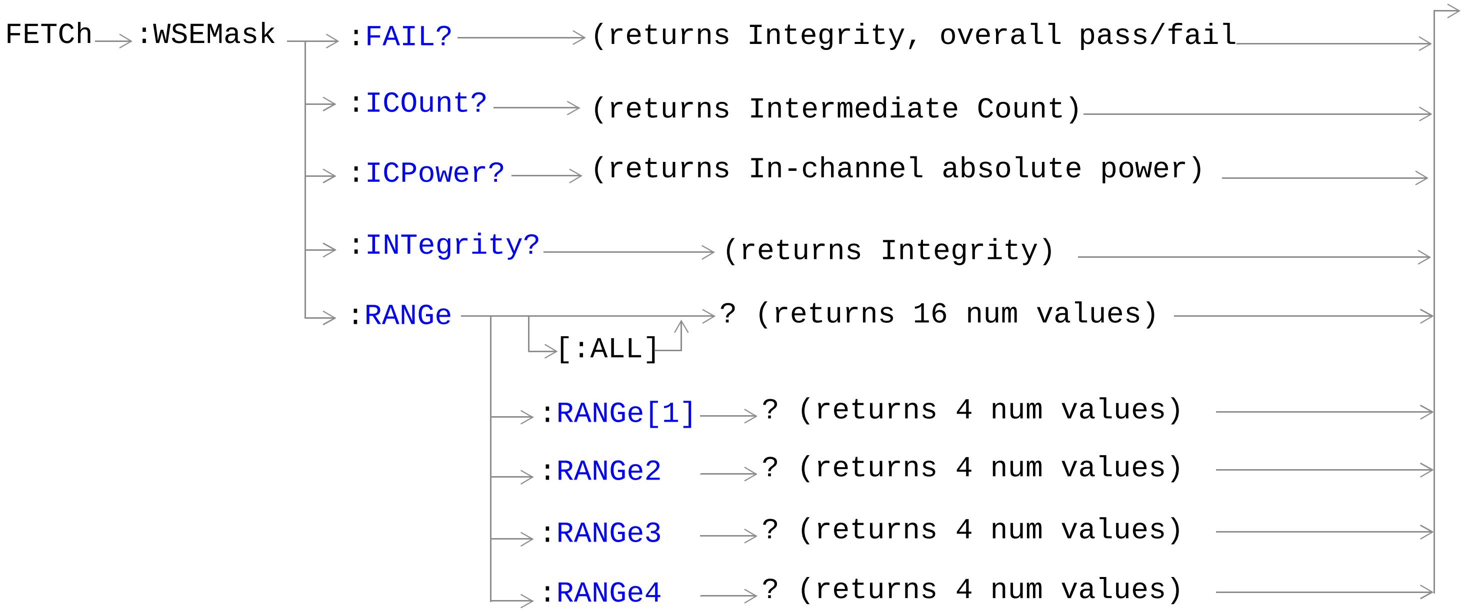
```
OUTPUT 714;"FETCh:WOOPower?"
! returns Integrity, Pre Burst Off Power level, Pre Burst Off Power pass/fail,
! Burst On Power, Open Loop Power Error value, Open Loop Power Error pass/fail,
! Post Burst Off Power level, Post Burst Off Power pass/fail

OUTPUT 714;"FETCh:WOOPower:INTegrity?"
! returns Integrity

OUTPUT 714;"FETCh:WOOPower:OFF:PRE?"
! returns Pre Burst Off Power level
```

FETCh:WSEMask





“Diagram Conventions” on page 368

FETCh:WSEMask:[:ALL]?

Function	Returns the spectrum emissions mask measurement results. Measurement results are returned in the following order: integrity, overall pass/fail (0 = pass, 1 = fail, 9.91 E+37 = no result available), in-channel power (in dBm/3.84 MHz), and pass/fail results for frequency ranges 1, 2, 3, and 4. In-channel power is returned in dBm/3.84 MHz. The four frequency ranges for this measurement are as follows: • Range 1: +/- 2.5 to 3.5 MHz • Range 2: +/- 3.5 to 7.5 MHz • Range 3: +/- 7.5 to 8.5 MHz • Range 4: +/- 8.5 to 12.5 MHz If the multi-measurement state is on, the result represents the *average* of a number of spectrum emission measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:WSEMask:COUNt[:SNUMber]" .
Query	Range: -99.00 to +99.00 dBc Resolution: 0.01
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WSEMASK:ALL?"
```

FETCh:WSEMask:BAND[:ALL]?

Function	Returns the power level vectors relative to in-channel power for all of the bands. Results are in dBc. The total number of results returned is 266.
Query	Range: -99.00 to +99.00 dBc Resolution: 0.01
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WSEMASK:BAND:ALL?"
```

FETCh:WSEMask:BAND:LOWer[1]?

Function	Returns the power level vectors relative to in-channel power for the specified band. Results are in dBc. Result vector size is as follows: • LOWer 4: -12.000 to -8.500 MHz (step size 250 kHz, BW 1 MHz) 1:15 • LOWer 3: -8.500 to -7.500 MHz (step size 250 kHz, BW 1 MHz) 1:5 • LOWer 2: -7.500 to -4.000 MHz (step size 250 kHz, BW 1 MHz) 1:15 • LOWer[1]: -3.485 to -2.515 MHz (step size 10 kHz, BW 30 kHz) 1:98
Query	Range: -99.00 to +99.00 dBc Resolution: 0.01
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WSEMASK:BAND:LOW2?"
```

FETCh:WSEMask:BAND:UPPer[1]?

Function	Returns the power level vectors relative to in-channel power for the specified band. Results are in dBc. Result vector size is as follows: • UPPer[1]: 2.515 to 3.485 MHz (step size 10 kHz, BW 30 kHz) 1:98 • UPPer 2: 4.000 to 7.500 MHz (step size 250 kHz, BW 1 MHz) 1:15 • UPPer 3: 7.500 to 8.500 MHz (step size 250 kHz, BW 1 MHz) 1:5 • UPPer 4: 8.500 to 12.000 MHz (step size 250 kHz, BW 1 MHz) 1:15
Query	Range: -99.00 to +99.00 dBc Resolution: 0.01
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WSEMASK:BAND:UPP?" !Returns power level in the UPPer1 band.
```

FETCh:WSEMask:FAIL?

Function	Queries the measurement integrity and the overall pass/fail result for the spectrum emissions mask measurement. Measurement results are returned in the following order: integrity, overall pass/fail (0 = Pass, 1 = Fail)
Query	Range: 0 | 1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WSEMASK:FAIL?"
```

FETCh:WSEMask:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement. To set up multi-measurements, see "SETup:WSEMask:COUNt[:SNUMber]" .
Query	Range: 0 to 999
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WSEMASK:ICOUNT?"
!Returns the intermediate count of spectrum emissions mask multi-measurements.
```

FETCh:WSEMask:ICPower?

Function	Queries the in-channel absolute power. To set the number of measurement to average, use the command "SETup:WSEMask:COUNt[:SNUMber]" on page 682.
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WSEMASK:ICPOWER?"
!Queries the in-channel power for the spectrum emissions mask results.
```

FETCh:WSEMask:INTegrity?

Function	Queries the measurement integrity indicator for the last spectrum emissions mask measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 295 for information about non-zero integrity results.
Query	Range: 0 through 23
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WSEMASK:INTegrity?"
!Queries the integrity indicator for the channel spectrum emissions mask results.
```

FETCh:WSEMask:RANGe[:ALL]?

Function	Returns the following for each of the four measurement ranges: level (in dBc), frequency offset (in MHz), mask margin (in dB), pass fail result. The level results are the relative power that is associated with the largest mask error in the range. Fail is indicated anytime the mask offset is negative.
Query	Level • Range: -99.00 to +99.00 dBc, 9.91 E+37 • Resolution: 0.01 Frequency Offset • Range 1: +/- 2.515 to 3.485 MHz • Range 2: +/- 4.000 to 7.500 MHz • Range 3: +/- 7.500 to 8.500 MHz • Range 4: +/- 8.500 to 12.500 MHz • Resolution, all ranges: 0.001 Mask Margin • Range: -99.00 to +99.00 dB, 9.91 E+37 • Resolution: 0.01 dB Pass/Fail Result • Range: 0 = pass, 1 =f fail, 9.91 E+37 = undetermined
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WSEMASK:RANGE:ALL?"
```

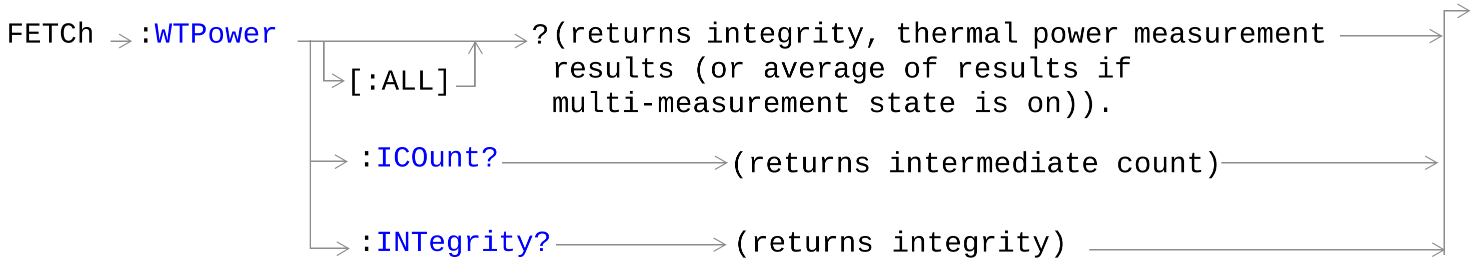
FETCh:WSEMask:RANGe:RANGe[1]?

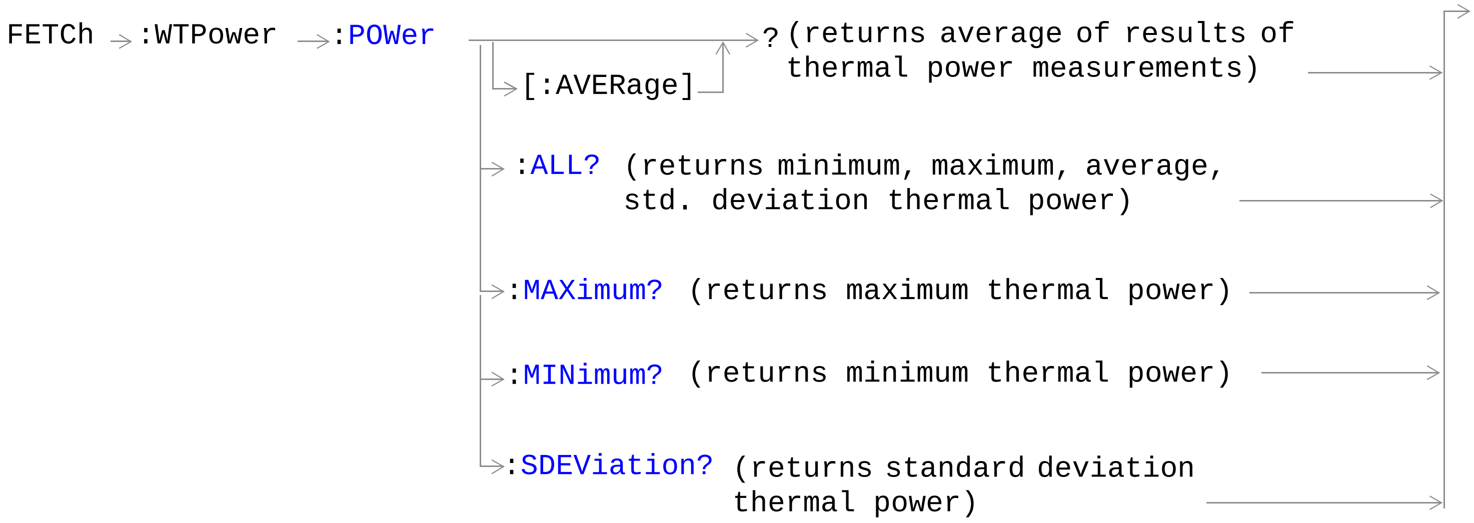
Function	Returns the following results for the specified range: level (in dBc), frequency offset (in MHz), mask margin (in dB), pass/fail result.
Query	Level • Range: -99.00 to +99.00 dBc, 9.91 E+37 • Resolution: 0.01 Frequency Offset • Range 1: +/- 2.515 to 3.485 MHz • Range 2: +/- 4.000 to 7.500 MHz • Range 3: +/- 7.500 to 8.500 MHz • Range 4: +/- 8.500 to 12.500 MHz • Resolution, all ranges: 0.001 Mask Margin • Range: -99.00 to +99.00 dB, 9.91 E+37 • Resolution: 0.01 dB Pass/Fail Result • Range: 0 = pass, 1 =fail, 9.91 E+37 = undetermined
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WSEMASK:RANGE:RANG3?" !Returns power level in the range 3.
```

FETCh:WTPower





“Diagram Conventions” on page 368

FETCh:WTPower[:ALL]?

Function	Queries a thermal power measurement result. This query returns an integrity indicator followed by a thermal power measurement result (if results are available). If the multi-measurement state is on, the result represents the *average* of a number of thermal power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:WTPower:COUNt[:SNUMber]" .
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WTPOWER:ALL?" !Returns integrity, thermal power.
```

FETCh:WTPower:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement. The multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:WTPower:COUNt[:SNUMber]"
Query	Range: 0 to 999
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WTPOWER:ICOUNT?"
```

FETCh:WTPower:INTegrity?

Function	Queries the measurement integrity indicator for the last thermal power measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 295 for information about non-zero integrity results.
Query	Range: 1 through 16
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WTPOWER:INTegrity?"
!Queries the inegrity indicator for the thermal power results.
```

FETCh:WTPower:POWer[:AVERage]?

Function	Queries the average of the results of several thermal power measurements. To set the number of measurement to average, use the command “SETup:WTPower:COUNt[:SNUMber]” on page 687.
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WTPOWER:POWER:AVERAGE?"
!Queries the thermal power for the thermal power results.
```

FETCh:WTPower:POWer:ALL?

Function	Queries the statistical measurement results for several thermal power measurements. To set the number of measurements to gather statistics for, use the command “SETup:WTPower:COUNt[:SNUMber]” on page 687. Results are returned in the following order: minimum, maximum, average, and standard deviation thermal power.
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WTPOWER:POWER:ALL?"
!Queries the statistical measurement results for thermal power measurement.
```

FETCh:WTPower:POWer:MAXimum?

Function	Queries the maximum power of several thermal power measurements. To set the number of measurement to average, use the command “SETup:WTPower:COUNt[:SNUMber]” on page 687.
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WTPOWER:POWER:MAXIMUM?"
!Queries the inegrity indicator for the thermal power results.
```

FETCh:WTPower:POWer:MINimum?

Function	Queries the minimum power of several thermal power measurements. To set the number of measurement to compare, use the command "SETup:WTPower:COUNt[:SNUMber]" on page 687.
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WTPOWER:POWER:MINIMUM?"
!Queries the minimum thermal power.
```

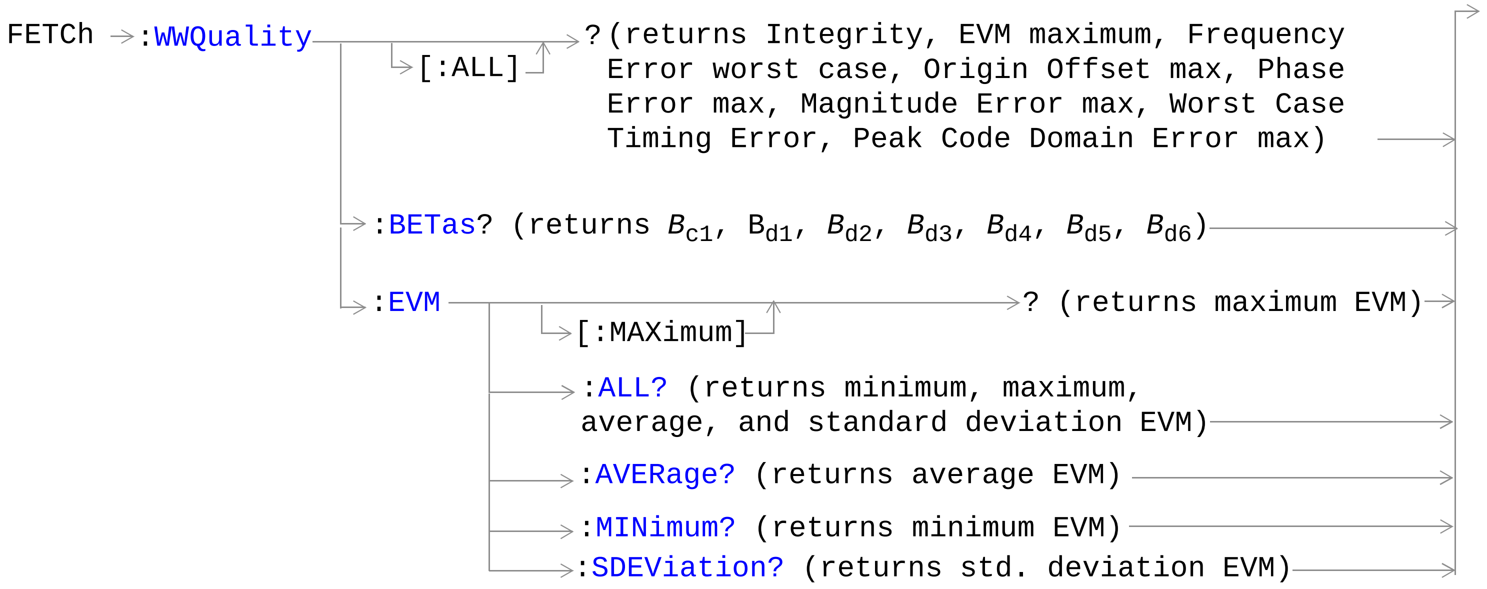
FETCh:WTPower:POWer:SDEViation?

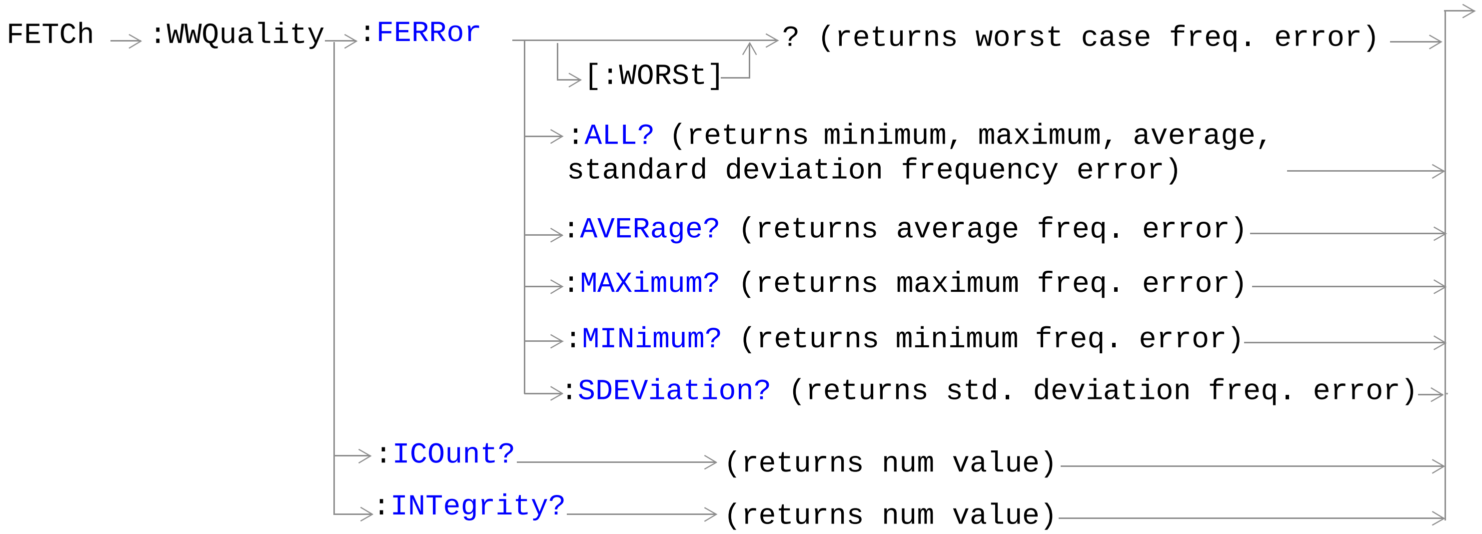
Function	Queries the standard deviation of several thermal power measurements. To set the number of measurement to compare, use the command "SETup:WTPower:COUNt[:SNUMber]" on page 687.
Query	• Range: 0 to 99 dB, 9.91 E+37 • Resolution: 0.001 dB
Requirements	Test Application Revision: A.01 and above

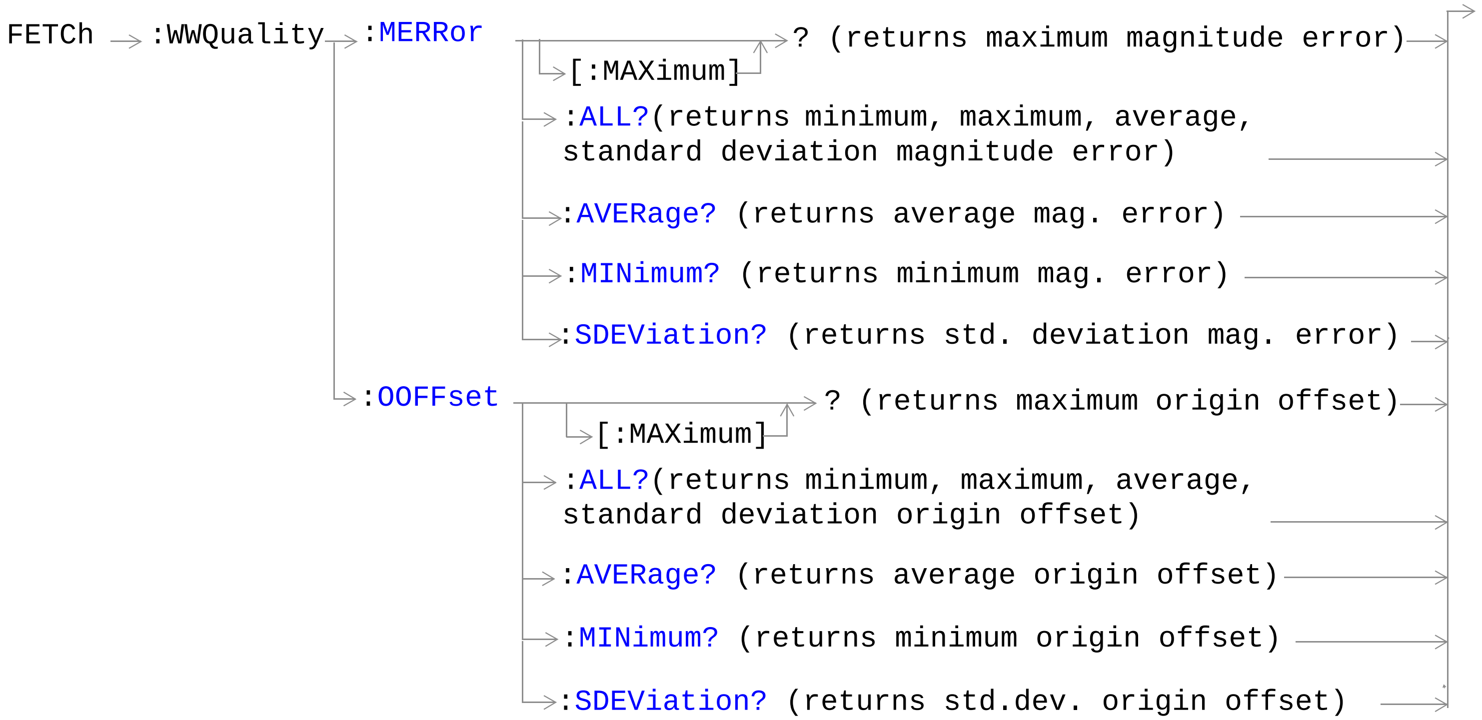
Programming Example

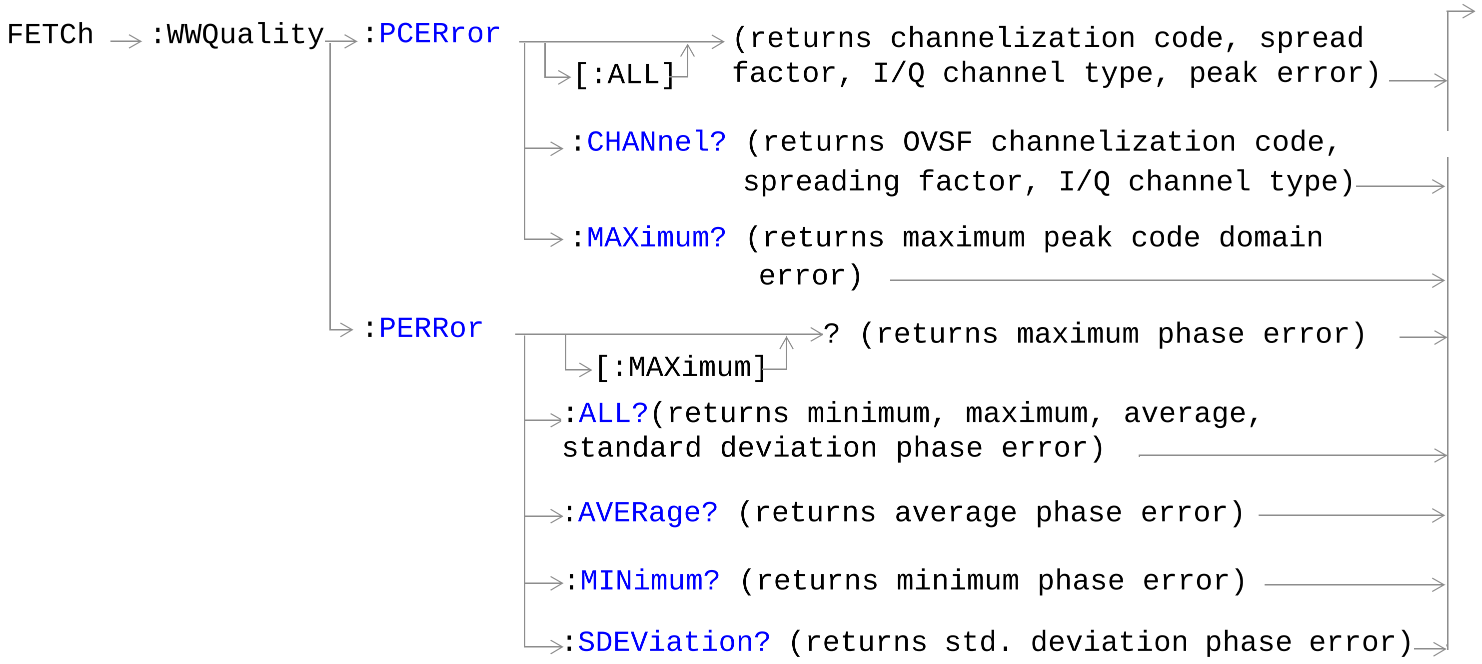
```
OUTPUT 714;"FETCH:WTPOWER:POWER:SDEVIATION?"
!Queries the standard deviation of power for the thermal power measurements.
```

FETCh:WWQuality

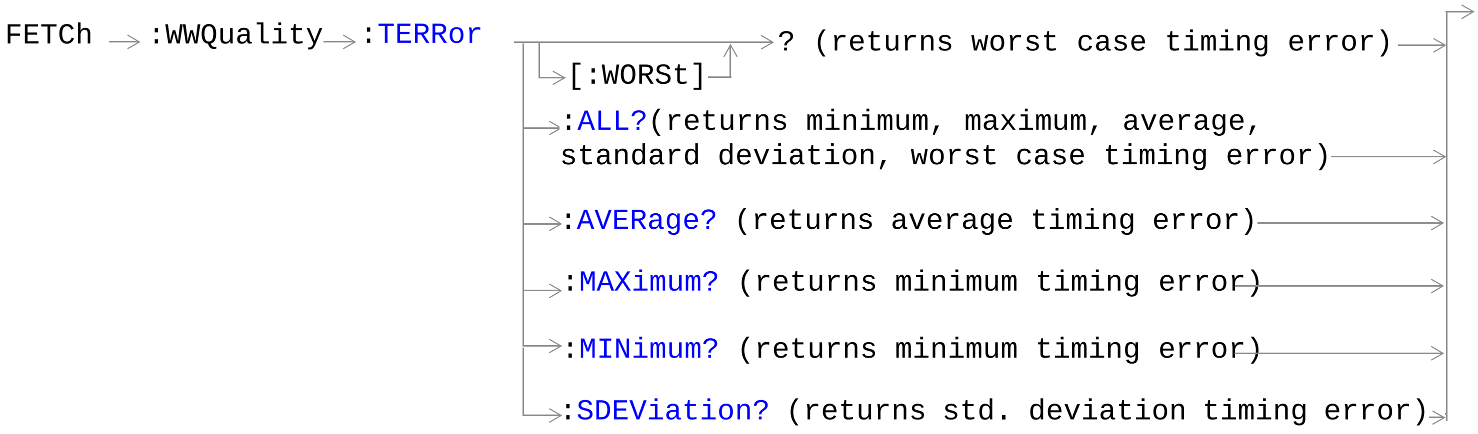





FETCh
:WWQuality
:MERRor
? (returns maximum magnitude error)
[:MAXimum]
:ALL?(returns minimum, maximum, average, standard deviation magnitude error)
:AVERage? (returns average mag. error)
:MINimum? (returns minimum mag. error)
:SDEViation? (returns std. deviation mag. error)
:OOFFset
? (returns maximum origin offset)
[:MAXimum]
:ALL?(returns minimum, maximum, average, standard deviation origin offset)
:AVERage? (returns average origin offset)
:MINimum? (returns minimum origin offset)
:SDEViation? (returns std.dev. origin offset)


FETCh
:WWQuality
:PCERror
(returns channelization code, spread factor, I/Q channel type, peak error)
[:ALL]
:CHANnel? (returns OVSF channelization code, spreading factor, I/Q channel type)
:MAXimum? (returns maximum peak code domain error)
:PERRor
? (returns maximum phase error)
[:MAXimum]
:ALL?(returns minimum, maximum, average, standard deviation phase error)
:AVERage? (returns average phase error)
:MINimum? (returns minimum phase error)
:SDEViation? (returns std. deviation phase error)

FETCh:WWQuality



“Diagram Conventions” on page 368

FETCh:WWQuality[:ALL]?

Function	Queries the waveform quality measurements. Measurement results are returned in the following order: integrity, EVM maximum, worst case frequency error, origin offset maximum, phase error maximum, magnitude error maximum, worst case timing error, and peak code domain error maximum. If the multi-measurement state is on, each result represents the *average* of a number of waveform quality measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:WWQuality:COUNt[:SNUMber]" .
Query	Integrity • Range: 0 to 23 • Resolution: 1 EVM Maximum • Range: 0.0 to 99.0%, 9.91 E+37 • Resolution: 0.1 Frequency Error worst case • Range: -99.0 to 99.0 kHz, 9.91 E+37 • Resolution: 0.1 Origin Offset Maximum • Range: -99.0 to 0.0 dB, 9.91 E+37 • Resolution: 0.1 Phase Error Maximum • Range: 0 to 180 degrees, 9.91 E+37 • Resolution: 0.1 Magnitude Error Maximum • Range: 0.0 to 99.0%, 9.91 E+37 • Resolution: 0.1 Timing Error Worst Case • Range: -99.99 to 99.99 chips, 9.91 E+37 • Resolution: 0.01 chips Peak Code Domain Error Maximum • Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.1
Requirements	Test Application Revision: A.01 and above Test Application Revision: A.02 added peak code domain error and timing error Test Application Revision: A.02.25, timing error is returned in chips instead of seconds.

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:ALL?"
```

FETCh:WWQuality:BETas?

Function	Queries the waveform quality betas B_{c1}, B_{d1}, B_{d2}, B_{d3}, B_{d4}, B_{d5}, B_{d6}. Only the control channel (B_{c1})and 1 data channel (B_{d1}) are active. The other betas are reserved for future use. There are no units for the betas relative amplitude levels.
Query	Range: 0 to 1 Resolution: 0.001
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:BETAS?"
```

FETCh:WWQuality:EVM[:MAXimum]?

Function	Queries the maximum EVM.
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:EVM:MAXIMUM?" !Returns maximum EVM.
```

FETCh:WWQuality:EVM:ALL?

Function	Queries the EVM measurements. Results are returned in the following order: minimum, maximum, average, standard deviation error vector magnitude.
Query	Minimum EVM • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.1 Maximum EVM • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.1 Average EVM • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.1 Standard Deviation EVM • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.01
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:EVM:ALL?" !Returns all EVM measurement results.
```

FETCh:WWQuality:EVM:AVERage?

Function	Queries the average EVM.
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:EVM:AVERAGE?" !Returns average EVM.
```

FETCh:WWQuality:EVM:MINimum?

Function	Queries the minimum EVM.
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:EVM:MINIMUM?" !Returns mininum EVM.
```

FETCh:WWQuality:EVM:SDEViation?

Function	Queries the standard deviation of results for EVM measurements.
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.01
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:EVM:SDEVIATION?" !Returns standard deviation EVM.
```

FETCh:WWQuality:FERRor[:WORSt]?

Function	Queries the worst case frequency error.
Query	Range: -99 to 99 kHz, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:FERROR:WORSt?" !Returns worst case frequency error.
```

FETCh:WWQuality:FERRor:ALL?

Function	Queries the frequency error measurements. Results are returned in the following order: minimum, maximum, average, standard deviation frequency error.
Query	Minimum Frequency Error • Range: -99 to 99 kHz, 9.91 E+37 • Resolution: 0.1 Maximum Frequency Error • Range: -99 to 99 kHz, 9.91 E+37 • Resolution: 0.1 Average Frequency Error • Range: -99 to 99 kHz, 9.91 E+37 • Resolution: 0.1 Standard Deviation Frequency Error • Range: -99 to 99 kHz, 9.91 E+37 • Resolution: 0.01
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:FERROR:ALL?"
!Returns mininum, maximum, average, and standard deviation frequency error.
```

FETCh:WWQuality:FERRor:AVERage?

Function	Queries the average frequency error.
Query	Range: -99 to 99 kHz, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:FERROR:AVERAGE?" !Returns average frequency error.
```

FETCh:WWQuality

FETCh:WWQuality:FERRor:MAXimum?

Function	Queries the average frequency error.
Query	Range: -99 to 99 kHz, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:FERROR:MAXIMUM?" !Returns maximum frequency error.
```

FETCh:WWQuality:FERRor:MINimum?

Function	Queries the minimum frequency error.
Query	Range: -99 to 99 kHz, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:FERROR:MINIMUM?" !Returns minimum frequency error.
```

FETCh:WWQuality:FERRor:SDEViation?

Function	Queries the standard deviation of frequency error measurements.
Query	Range: 0 to 99 kHz, 9.91 E+37 Resolution: 0.01
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:FERROR:SDEViation?" !Returns standard deviation frequency error.
```

FETCh:WWQuality:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement.
Query	Range: 0 to 999
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:ICOUNT?"
```

FETCh:WWQuality:INTegrity?

Function	Queries the measurement integrity indicator for the last waveform quality measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 295 for information about non-zero integrity results.
Query	Range: 0 through 23
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:INTEGRITY?"
!Queries the integrity indicator for the channel channel power results.
```

FETCh:WWQuality:MERRor[:MAXimum]?

Function	Queries the average magnitude error.
Query	Range: 0 to 99% Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:MERRor:MAXIMUM?" !Returns maximum magnitude error.
```

FETCh:WWQuality:MERRor:ALL?

Function	Queries the magnitude error measurements. Results are returned in the following order: minimum, maximum, average, standard deviation magnitude error.
Query	Minimum Magnitude Error • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.1 Maximum Magnitude Error • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.1 Average Magnitude Error • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.1 Standard Deviation Magnitude Error • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.01
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:MERRor:ALL?"
!Returns mininum, maximum, average, and standard deviation magnitude error.
```

FETCh:WWQuality:MERRor:AVERage?

Function	Queries the average magnitude error.
Query	Range: 0 to 99% Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:MERRor:AVERAGE?" !Returns average magnitude error.
```

FETCh:WWQuality:MERRor:MINimum?

Function	Queries the minimum magnitude error.
Query	Range: 0 to 99% Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:MERRor:MINIMUM?" !Returns minimum magnitude error.
```

FETCh:WWQuality:MERRor:SDEViation?

Function	Queries the standard deviation of magnitude error measurements.
Query	Range: 0 to 99% Resolution: 0.01
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:MERRor:SDEVIATION?" !Returns standard deviation magnitude error.
```

FETCh:WWQuality:OOFFset[:MAXimum]?

Function	Queries the average origin offset.
Query	Range:-99 to 0 dB, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:OOFFSET:MAXIMUM?" !Returns maximum origin offset.
```

FETCh:WWQuality:OOFFset:ALL?

Function	Queries the origin offset measurements. Results are returned in the following order: minimum, maximum, average, standard deviation origin offset.
Query	Minimum Origin Offset • Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.1 Maximum Origin Offset • Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.1 Average Origin Offset • Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.1 Standard Deviation Origin Offset • Range: 0 to 99 dB, 9.91 E+37 • Resolution: 0.01
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:OOFFSET:ALL?"
!Returns mininum, maximum, average, and standard deviation origin offset.
```

FETCh:WWQuality:OOFFset:AVERage?

Function	Queries the average origin offset.
Query	Range: -99 to 0 dB, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:OOFFSET:AVERAGE?" !Returns average origin offset.
```

FETCh:WWQuality:OOFFset:MINimum?

Function	Queries the minimum origin offset.
Query	Range:-99 to 0 dB, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:OOFFSET:MINIMUM?" !Returns minimum origin offset.
```

FETCh:WWQuality:OOFFset:SDEViation?

Function	Queries the standard deviation of results for origin offset measurements.
Query	Range: 0 to 99 dB, 9.91 E+37 Resolution: 0.01
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:OOFFSET:SDEVIATION?" !Returns standard deviation origin offset.
```

FETCh:WWQuality:PCERror[:ALL]?

Function	Queries the peak code domain error measurement. There are four number returned for each measurement. The first three numbers describe channel at which the peak error result was measured (OVFS channelization code, spreading factor, I/Q channel type), and the last number is the peak error. Results are returned in the following order: OVFS channelization code, spreading factor, I/Q channel type, and peak code domain error.
Query	Channelization Code • Range: 0 to 255, 9.91 E+37 Spread Factor • Range: 4 to 256, 9.91 E+37 I/Q Channel Type • Range: 0 = I, 1= Q, 9.91 E+37 Peak Code Domain Error • Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:PCERROR:ALL?"
!Returns Channelization code, spread factor, I/Q channel type, and peak error.
```

FETCh:WWQuality:PCERror:CHANnel?

Function	Returns the orthogonal variable spreading factor (OVSF) code number (channelization code) at which the peak code domain error was detected.
Query	Range: 0 to 255, 9.91 E+37
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:PCERROR:CHANNEL?" !Returns channel at which peak error was detected.
```

FETCh:WWQuality:PCERror:MAXimum?

Function	Queries the maximum peak code domain error.
Query	Range: -99 to 0 dB, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:PCERROR:MAXIMUM?" !Returns maximum peak code domain error.
```

FETCh:WWQuality:PERRor[:MAXimum]?

Function	Queries the maximum phase error measurement.
Query	Range: 0 to 180 degrees, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:PERROR:MAXIMUM?" !Returns maximum phase error.
```

FETCh:WWQuality:PERRor:ALL?

Function	Queries the phase error measurements. Results are returned in the following order: minimum, maximum, average, standard deviation phase error.
Query	Minimum Phase Error • Range: 0 to 180 degrees, 9.91 E+37 • Resolution: 0.1 Maximum Phase Error • Range: 0 to 180 degrees, 9.91 E+37 • Resolution: 0.1 Average Phase Error • Range: 0 to 180 degrees, 9.91 E+37 • Resolution: 0.1 Standard Deviation Phase Error • Range: 0 to 180 degrees, 9.91 E+37 • Resolution: 0.01
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:PERROR:ALL?"
!Returns mininum, maximum, average, and standard deviation phase error.
```

FETCh:WWQuality:PERRor:AVERage?

Function	Queries the average phase error.
Query	Range: 0 to 180 degrees, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:PERROR:AVERAGE?" !Returns average phase error.
```

FETCh:WWQuality:PERRor:MINimum?

Function	Queries the minimum phase error.
Query	Range: 0 to 180 degrees, 9.91 E+37 Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:PERROR:MINIMUM?" !Returns minimum phase error.
```

FETCh:WWQuality:PERRor:SDEViation?

Function	Queries the standard deviation of results for phase error measurements.
Query	Range: 0 to 180 degrees, 9.91 E+37 Resolution: 0.01
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:PERROR:SDEVIATION?" !Returns standard deviation phase error.
```

FETCh:WWQuality:TERRor[:WORSt]?

Function	Queries the worst case timing error.
Query	Range: -99.99 to 99.99 chips, 9.91 E+37 Resolution: 0.01 chips
Requirements	Test Application Revision: A.02 and above Test Application Revision: A.02.25, timing error is returned in chips instead of seconds

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:TERROR:WORSt?" !Returns worst case timing error.
```

FETCh:WWQuality:TERRor:ALL?

Function	Queries the timing error measurements. Results are returned in the following order: minimum, maximum, average, standard deviation timing error.
Query	Minimum Timing Error • Range: -99.99 to 99.99 chips, 9.91 E+37 • Resolution: 0.01 chips Maximum Timing Error • Range: -99.99 to 99.99 chips, 9.91 E+37 • Resolution: 0.01 chips Average Timing Error • Range: -99.99 to 99.99 chips, 9.91 E+37 • Resolution: 0.01 chips Standard Deviation Timing Error • Range: -99.99 to 99.99 chips, 9.91 E+37 • Resolution: 0.01 chips
Requirements	Test Application Revision: A.02 and above Test Application Revision: A.02.25, timing error is returned in chips instead of seconds

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:TERROR:ALL?"
!Returns mininum, maximum, average, and standard deviation timing error.
```

FETCh:WWQuality:TERRor:AVERage?

Function	Queries the average timing error.
Query	Range: -99.99 to 99.99 chips, 9.91 E+37 Resolution: 0.01 chips
Requirements	Test Application Revision: A.02 and above Test Application Revision: A.02.25, timing error is returned in chips instead of seconds

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:TERROR:AVERAGE?" !Returns average timing error.
```

FETCh:WWQuality:TERRor:MAXimum?

Function	Queries the average timing error.
Query	Range: -99.99 to 99.99 chips, 9.91 E+37 Resolution: 0.01 chips
Requirements	Test Application Revision: A.02 and above Test Application Revision: A.02.25, timing error is returned in chips instead of seconds

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:TERROR:MAXIMUM?" !Returns maximum timing error.
```

FETCh:WWQuality:TERRor:MINimum?

Function	Queries the minimum timing error.
Query	Range: -99.99 to 99.99 chips, 9.91 E+37 Resolution: 0.01 chips
Requirements	Test Application Revision: A.02 and above Test Application Revision: A.02.25, timing error is returned in chips instead of seconds

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:TERROR:MINIMUM?" !Returns minimum timing error.
```

FETCh:WWQualityTERRor:SDEViation?

Function	Queries the standard deviation of timing error measurements.
Query	Range: 0 to 99.99 chips, 9.91 E+37 Resolution: 0.01 chips
Requirements	Test Application Revision: A.02 and above Test Application Revision: A.02.25, timing error is returned in chips instead of seconds

Programming Example

```
OUTPUT 714;"FETCH:WWQUALITY:TERROR:SDEViation?" !Returns standard deviation time error.
```

INITiate Subsystem

Syntax Diagrams and Command Descriptions

"INITiate" on page 587

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)

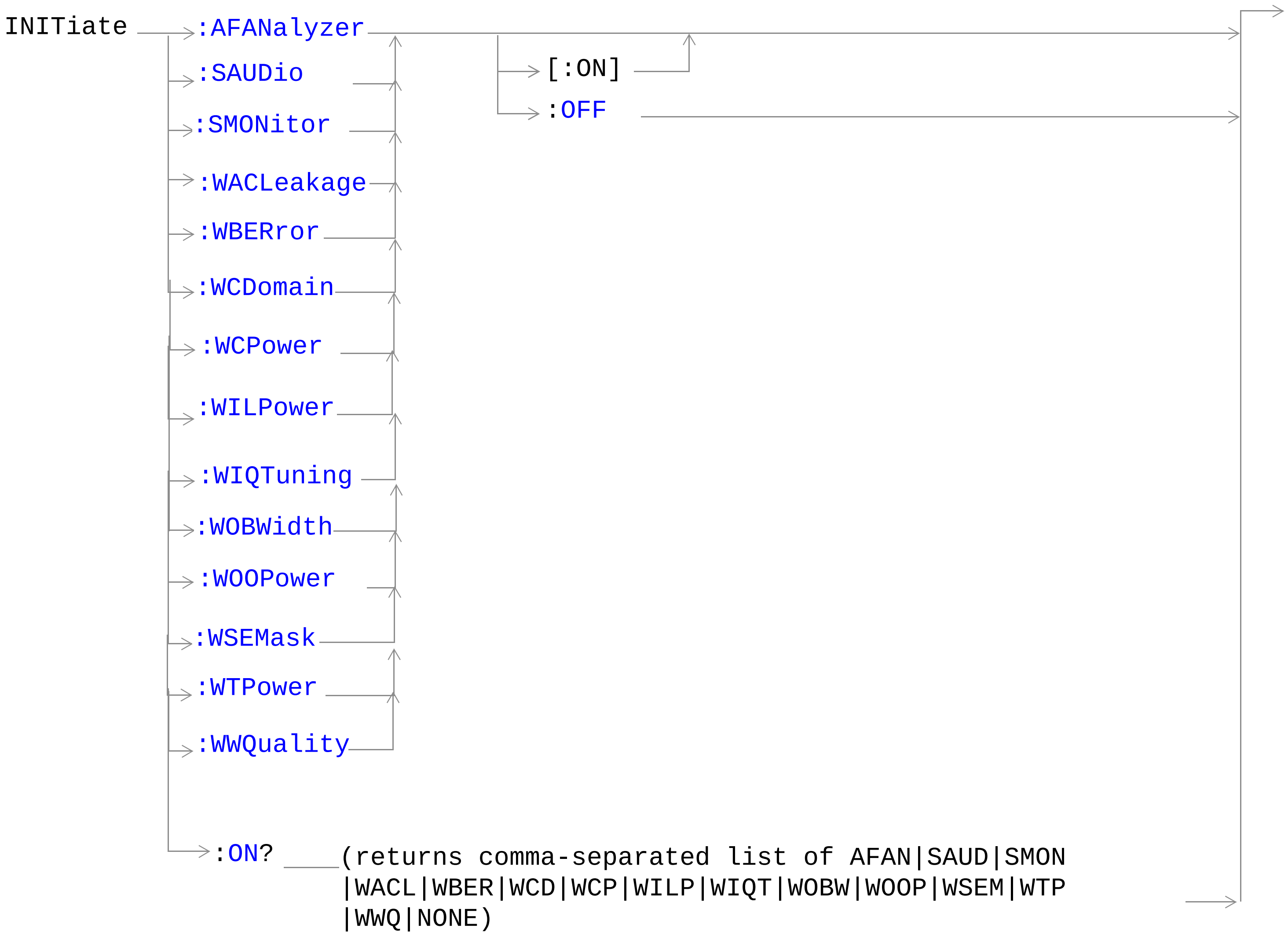
The INITiate command is used to start measurements. INITiate commands allow multiple measurements to be started without waiting for other measurement processes to complete. For example, the following code starts the Digital Average Power and Waveform Quality measurements, and then uses the INITiate:DONE? command in a loop to query the status of these measurements, see "Measurement Event Synchronization" on page 305.

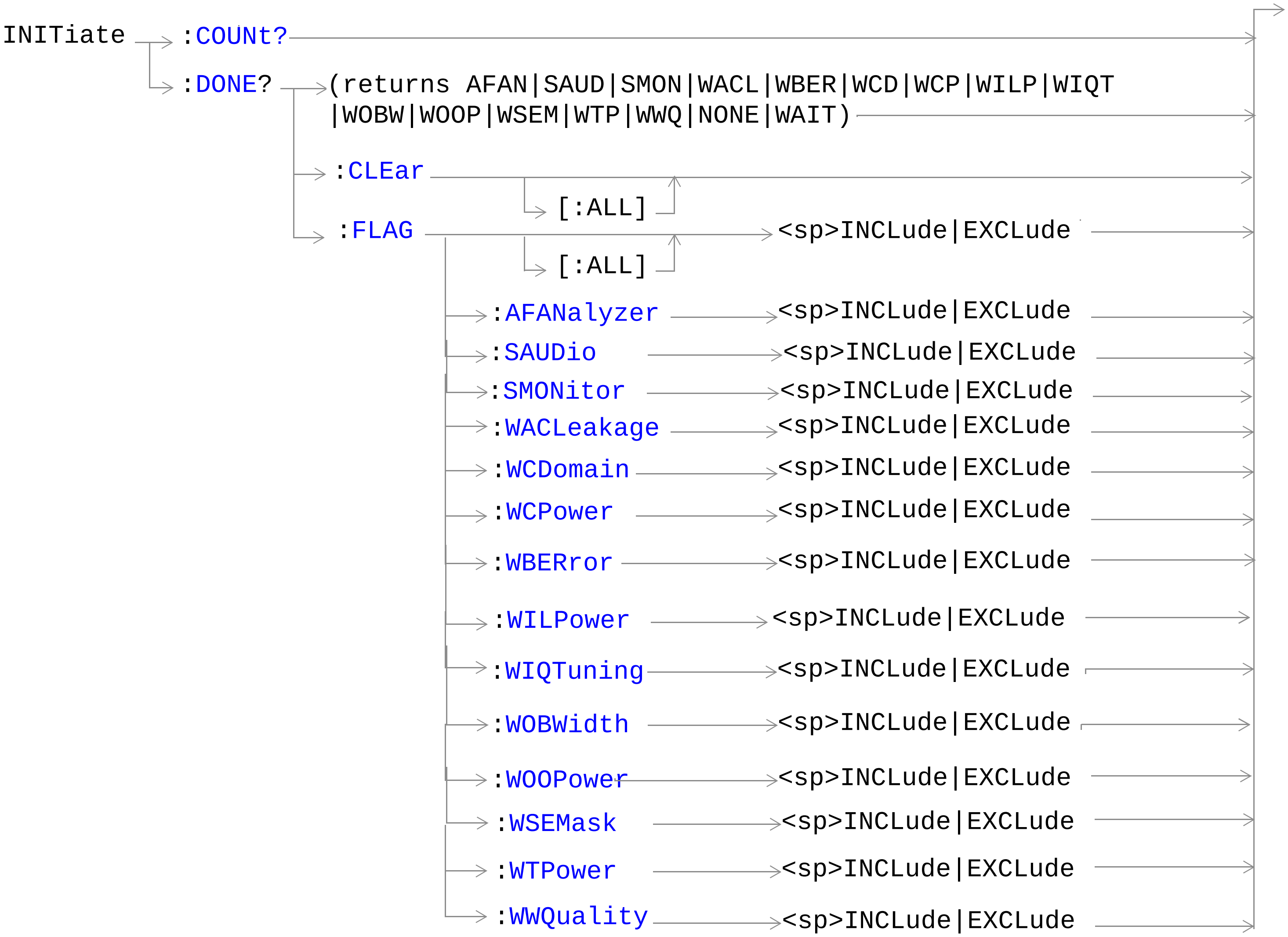
When the measurements are done, the FETCh command is used to acquire the results, and the results are entered into variables in the controlling application. The program ends when the INITiate:DONE? command returns the string "NONE" indicating that all initiated measurements have gone through the measuring state see "Measurement States" on page 291.

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 trigger  mode.
20 OUTPUT 714;”INITiate:WBERror;WCPower” ! starts loopback BER  and
30                                       !channel power  measurements.
40 LOOP
50 OUTPUT 714;”INITiate:DONE?” !query to find out if any measurements are done.
60 ENTER 714;Meas_complete$
70 SELECT Meas_complete$
80 CASE “WBER” !tests for the string “WBER”, indicating loopback BER measurement is done.
90 OUTPUT 714;”FETCh:WBERror?” !Queries loopback BER results.
100 ENTER 714;Integrity,Ber,Ber_count,Bits_tested
110 CASE “WCP” !tests for the string “WCP”, indicating channel power measuremenet is done.
120 OUTPUT 714;”FETCh:WCPow?” !Queries the channel power results.
130 ENTER 714;Integrity,Avg_chan_pow
140 END SELECT
150 EXIT IF Meas_complete$=”NONE”
160 END LOOP
170 END
```

INITiate


INITiate
:AFANalyzer
:SAUDio
:SMONitor
:WACLeakage
:WBERror
:WCDomain
:WCPower
:WILPower
:WIQTuning
:WOBWidth
:WOOPower
:WSEMask
:WTPower
:WWQuality
[:ON]
:OFF
:ON?
(returns comma-separated list of AFAN|SAUD|SMON
|WACL|WBER|WCD|WCP|WILP|WIQT|WOBW|WOOP|WSEM|WTP
|WWQ|NONE)



“Diagram Conventions” on page 368

INITiate:<measurement mnemonic>[:ON]

Function	These commands initiate (start) the following measurements: • AFANalyzer - Audio Frequency Analyzer measurements • SAUDio - Swept Audio measurement • SMONitor - Spectrum Monitor measurement • WACLeakage - Adjacent Channel Leakage • WBERror - Loopback Bit Error Ratio measurement • WCDomain - Code Domain measurements • WCPower - Channel Power measurement • WILPower - Inner Loop Power measurement • WIQTuning - IQ Tuning measurement • WOBWidth - Occupied Bandwidth measurement • WOOPower - PRACH Transmit On/Off Power measurement • WSEMask - Spectrum Emission Mask measurement • WTPower - Thermal Power measurement • WWQuality - Waveform Quality measurement This command also queries the active state using the ON? keyword in place of a measurement mnemonic. The INITiate command is associated with the SETup "SETup Subsystem" on page 618 and the "FETCh? Subsystem" on page 502. One or more measurements can be initiated with the same program line (see "Concurrent Measurements" on page 285 and the Programming Example below). This command is also used to activate a measurement. See "INITiate Programming Examples (how INIT commands are used)" on page 585.
Range	AFAN | SAUD | SMON | WACL | WBER | WCD | WCP | WIQT | WILP | WOBW | WOOP | WSEM | WTP | WWQ
Requirements	Test Application Revision: A.02 and above, added WCDomain, WSEMask, and WOBWidth. Test Application Revision: A.03 and above, added WIQTuning, WILPower, WOOPower, and SMONitor

Programming Example

```
OUTPUT 714;"INITIATE:WCPOWER;WQUALITY:ON"
!Initiates a channel power and a waveform quality measurement.
```

INITiate:ON?

Function	Queries the measurements that are on. Returns a comma separated list of measurement mnemonics.
Query	Range: AFAN | SAUD | SMON | WACL | WBER | WCD | WCP | WIQT | WILP | WOBW | WOOP | WSEM | WTP | WWQ | NONE
Requirements	Test Application Revision: A.02 and above, added WCDomain, WSEMask, and WOBWidth. Test Application Revision: A.03 and above, added WIQTuning, WILPower, WOOPower and SMONitor.
Programming Example `OUTPUT 714;"INITIATE:ON?"`	

INITiate:<measurement mnemonic>:OFF

Function	Deactivates the selected measurement. See "Measurement States" on page 291. Only one measurement can be deactivated at a time. To stop one or more measurements and leave them in the active state, use "ABORt" on page 371.
Requirements	Test Application Revision: A.02 and above, added WCDomain, WSEMask, and WOBWidth. Test Application Revision: A.03 and above, added WIQTuning, WILPower, WOOPower and SMONitor.
Programming Example `OUTPUT 714;"INITIATE:WCPOWER:OFF" !Deactivates the channel power measurement.`	

INITiate:COUNt?

Function	Queries the number of measurements that have been initiated (are active). See "Measurement States" on page 291.
Query	Range: 0 to 10
Requirements	Test Application Revision: A.02 and above, added WCDomain, WSEMask, and WOBWidth. Test Application Revision: A.03 and above, added WIQTuning, WILPower, WOOPower and SMONitor.
Programming Example `OUTPUT 714;"INITIATE:COUNT?"`	

INITiate:DONE?

Function	Queries (one at a time) which measurements, if any, are finished or have timed-out. See "Measurement Event Synchronization" on page 305 for how to use this command. See "Measurement States" on page 291 to understand the test set's measurement states. See "INITiate:DONE:FLAG:<measurement mnemonic>" on page 592 for include or exclude commands.
Requirements	Test Application Revision: A.02 and above, added WCDomain, WSEMask, and WOBWidth. Test Application Revision: A.03 and above, added WIQTuning, WILPower, WOOPower and SMONitor.
Query	Range: AFAN | SMON | WACL | WBER | WCD | WCP | WIQT | WILP | WOBW | WOOP | WSEM | WTP | WWQ | NONE | WAIT

INITiate:DONE:CLEar

Function	Clears the done flag from all measurements.
Requirements	Test Application Revision: A.02 and above, added WCDomain, WSEMask, and WOBWidth. Test Application Revision: A.03 and above, added WIQTuning, WILPower, WOOPower and SMONitor.
Programming Example `OUTPUT 714;"INITIATE:DONE:CLEAR" !Clears the done flag.`	

INITiate:DONE:FLAG[:ALL]

Function	Specifies that all measurements are either included or excluded when the INITitate:DONE? query is sent. If a measurement trigger arm is left in continuous mode, the done flag for that measurement will toggle between DONE and WAIT. 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's triggering must be continuously armed, you should exclude the measurement using "INITiate:DONE:FLAG:<measurement mnemonic>" . Use INITitate:DONE:FLAG:ALL EXCLude to exclude all measurements. Once 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 with any type of preset.
Setting	Range: INCLude | EXCLude
Requirements	Test Application Revision: A.02 and above, added WCDomain, WSEMask, and WOBWidth. Test Application Revision: A.03 and above, added WIQTuning, WILPower, WOOPower and SMONitor.

Programming Example

```
OUTPUT 714;"INITIATE:DONE:FLAG:ALL INCLUDE"
!Includes all measurements in the INITIATE:DONE? query.
```

INITiate:DONE:FLAG:<measurement mnemonic>

Function	Specifies if a measurement done flag is considered (using the INCLude or EXCLude settings) when the INITitate:DONE? query is sent. If more than one measurement is active, and one or more measurement trigger arm states is continuous, the INITiate:DONE? query may not be effective. The best solution is to change the arm state of all measurements to single using the "SETup:CONTinuous" command. However, if a measurement must be continuously triggered, you should exclude the measurement using the EXCLude setting provided by this command if you want to use INITiate:DONE? to query measurement done status. The test set will not reset any excluded measurement to included with any type of preset.
Setting	Range: INCLude | EXCLude
Requirements	Test Application Revision: A.02 and above, added WCDomain, WSEMask, and WOBWidth. Test Application Revision: A.03 and above, added WIQTuning, WILPower, WOOPower and SMONitor.

Programming Example

```
OUTPUT 714;"INITIATE:DONE:FLAG:WTP EXCLUDE"
!Excludes the thermal power measurement from responding to the INITIATE:DONE? query.
```

READ? Subsystem

Syntax Diagram and Command Descriptions

"READ" on page 595

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:

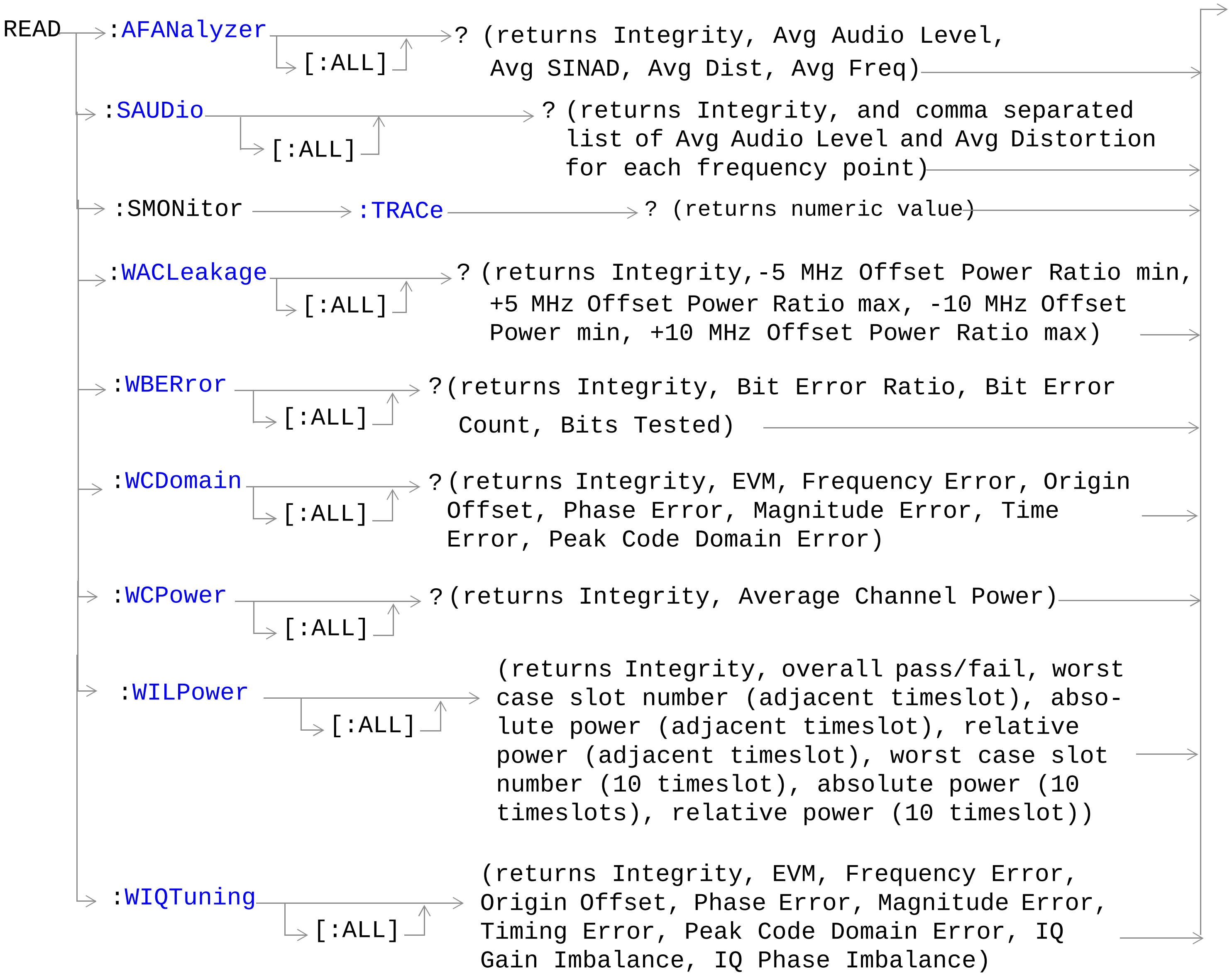
- The test set does not process any additional GPIB commands until the requested measurement results are available.
- The sequential nature of the READ? command does not allow the user to make concurrent measurements. Concurrent measurements require the overlapped commands INITiate, DONE? and FETCh? .
- 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).

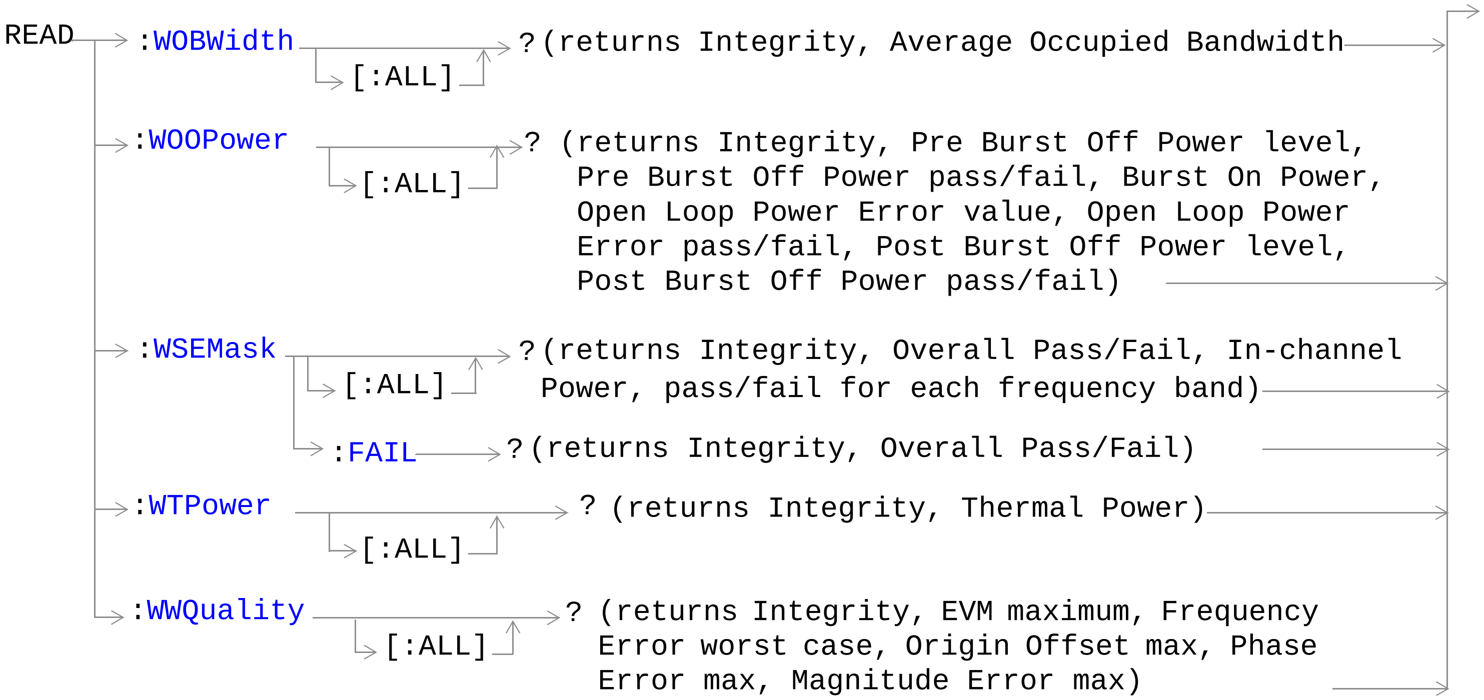
Program Example - READ:WTPower?

```
OUTPUT 714;”READ:WTPower?” !Starts a thermal power measurement. As soon as the
                           !measurement cycle has completed, the test set
                           !provides the thermal power measurement results to the
                           !controlling application.
ENTER 714;Integrity, Thermal_power !Enters the integity indicator and the
                                      !thermal power measurement values into
                                      !the controlling application.
```

READ


READ
:AFANalyzer
[:ALL]
? (returns Integrity, Avg Audio Level, Avg SINAD, Avg Dist, Avg Freq)
:SAUDio
[:ALL]
? (returns Integrity, and comma separated list of Avg Audio Level and Avg Distortion for each frequency point)
:SMONitor
:TRACe
? (returns numeric value)
:WACLeakage
[:ALL]
? (returns Integrity,-5 MHz Offset Power Ratio min, +5 MHz Offset Power Ratio max, -10 MHz Offset Power min, +10 MHz Offset Power Ratio max)
:WBERror
[:ALL]
?(returns Integrity, Bit Error Ratio, Bit Error Count, Bits Tested)
:WCDomain
[:ALL]
?(returns Integrity, EVM, Frequency Error, Origin Offset, Phase Error, Magnitude Error, Time Error, Peak Code Domain Error)
:WCPower
[:ALL]
?(returns Integrity, Average Channel Power)
:WILPower
[:ALL]
(returns Integrity, overall pass/fail, worst case slot number (adjacent timeslot), absolute power (adjacent timeslot), relative power (adjacent timeslot), worst case slot number (10 timeslot), absolute power (10 timeslots), relative power (10 timeslot))
:WIQTuning
[:ALL]
(returns Integrity, EVM, Frequency Error, Origin Offset, Phase Error, Magnitude Error, Timing Error, Peak Code Domain Error, IQ Gain Imbalance, IQ Phase Imbalance)

READ



“Diagram Conventions” on page 368

READ:AFANalyzer[:ALL]?

Function	Initiates and fetches an audio frequency analyzer measurement as a sequential operation. Measurement results are returned in the following order: integrity, average audio level, average SINAD, average audio distortion.
Query	Integrity • Range: 0 to 23 see "Integrity Indicator" • Resolution: 1 Average audio level • Range: 0 to 20 volts, 9.91 E+37 • Resolution: the lesser of 4 significant digits or 10 uV. Average SINAD • Range: -99.00 to 99.00 dB, 9.91 E+37 • Resolution: 0.01 dB Average audio distortion • Range: 0.00 to 99.00%, 9.91 E+37 • Resolution: 0.01%
Requirements	Test Application Revision: A.01 and above

READ:SAUDio[:ALL]?

Function	Initiates and fetches a swept audio measurement as a sequential operation. Measurement results are returned in the following order: integrity indicator, average swept audio level and average distortion for the first frequency point, average swept audio level and average distortion for the second frequency point, and so on. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" on page 633 command. For frequencies above 10 kHz, this measurement returns 9.91 E+37.
Query	Integrity indicator • Range: See "Integrity Indicator" on page 295. • Resolution: 1 Average audio level • Range: 1 mV to 20 V, 9.91 E+37 • Resolution: the lesser of 4 significant digits or 10 uV Average distortion • Range: 0 to 99.9%, 9.91 E+37 • Resolution: 0.01%

READ:SMONitor:TRACe?

Function	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	Test Application Revision: A.03 and above

READ:WACLeakage[:ALL]?

Function	Initiates and fetches an adjacent channel leakage ratio measurement as a sequential operation. Measurement results are returned in the following order: integrity, -5 MHz minimum offset power ratio, +5 MHz maximum offset power ratio, -10 MHz minimum offset power ratio, +10 MHz maximum offset power ratio. If the measurement state of any offset is set to OFF, the result for that offset will be 9.91 E+37.
Query	• Range: -100 to 100 dBm • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

READ:WBER?

Function	Initiates and fetches a loopback bit error ratio measurement as a sequential operation. Measurement results are returned in the following order: integrity, bit error ratio, bit error count, bits tested.
Query	Range • Integrity: 1 to 23 • Bit Error Ratio: 0 to 99%, 9.91 E+37 • Bit Error Count: 0 to 999999, 9.91 E+37 • Bits Tested: 0 to 999999, 9.91 E+37 Resolution • Integrity: 1 • Bit Error Ratio: 0.0001 dB • Bit Error Count: 1 • Bits Tested: 1
Requirements	Test Application Revision: A.01 and above

READ:WCDomain[:ALL]?

Function	Initiates and fetches a code domain measurement as a sequential operation. Measurement results are returned in the following order: integrity, EVM, frequency error, origin offset, phase error, magnitude error, time error, peak code domain error.
Query	Integrity • Range: 0 to 23 • Resolution: 1 EVM Maximum • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.1 Frequency Error worst case • Range: -99.99 to 99.99 kHz, 9.91 E+37 • Resolution: 0.1 Origin Offset Maximum • Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.1 Phase Error Maximum • Range: 0 to 180 degrees, 9.91 E+37 • Resolution: 0.1 Time Error Maximum • Range: -99 to 99 μ s, 9.91 E+37 • Resolution: 1 ns Peak Code Domain Error Maximum • Range: -99.0 to 0.0 dB, 9.91 E+37 • Resolution: 0.1
Requirements	Test Application Revision:

READ:WCPower[:ALL]?

Function	Initiates and fetches a channel power measurement as a sequential operation. Measurement results are returned in the following order: integrity, average channel power. If the multi-measurement state is on, the result represents the average of a number of channel power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see “SETup:WCPower:COUNt[:SNUMber]” .
Query	• Range: -99 to 99 dBm • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

READ:WILPower[:ALL]?

Function	Initiates and fetches an Inner Loop Power control measurement as a sequential operation. Measurement results are returned in the following order:
Query	Integrity • Range: 0 to 23 • Resolution: 1 Overall pass/fail • Range: 0 to 1 • Resolution: 1 Worst case slot number (based on each adjacent timeslot measurement) • Range: 1 to 150, 9.91 E+37 • Resolution: 1 Absolute power (based on each adjacent timeslot measurement) • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01 Relative power (based on each adjacent timeslot measurement) • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01 Worst case slot number (based on Rel Pwr 10 TPC (dB) measurements) • Range: 1 to 150, 9.91 E+37 • Resolution: 1 Absolute power (based on Rel Pwr 10 TPC (dB) measurements) • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01 Relative power (based on Rel Pwr 10 TPC (dB) measurements) • Range: -99.0 to +99.0 dB, 9.91 E+37 • Resolution: 0.01
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"FETCh:WILPower:ALL?"`	

READ:WIQTuning[:ALL]?

Function	Initiates and fetches an IQ tuning measurement as a sequential operation. Measurement results are returned in the following order: Integrity, EVM, Frequency Error, Origin Offset, Phase Error, Magnitude Error, Time Error, Peak Code Domain Error, IQ Gain Imbalance, IQ Phase Imbalance.
Query	Integrity • Range: 0 to 23 • Resolution: 1 EVM • Range: 0.0 to 99.0%, 9.91 E+37 • Resolution: 0.1 Frequency Error • Range: -99.0 to 99.0 kHz, 9.91 E+37 • Resolution: 0.1 Origin Offset • Range: -99.0 to 0.0 dB, 9.91 E+37 • Resolution: 0.1 Phase Error • Range: 0 to 180 degrees, 9.91 E+37 • Resolution: 0.1 Magnitude Error • Range: 0.0 to 99.0%, 9.91 E+37 • Resolution: 0.1 Timing Error • Range: -99.99 to 99.99 chips, 9.91 E+37 • Resolution: 0.01 chips Peak Code Domain Error • Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.1 IQ Gain Imbalance • Range: • Resolution: IQ Phase Imbalance • Range: • Resolution:
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"READ:WIQTuning:ALL?" !Queries the IQ tuning measurement results.`	

READ:WOBWidth[:ALL]?

Function	Initiates and fetches an occupied bandwidth measurement as a sequential operation. Measurement results are returned in the following order: integrity, average occupied bandwidth. If the multi-measurement state is on, the result represents the average of a number of channel power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:WOBWidth:COUNt[:SNUMber]" .
Query	• Range: 0.0 to 10.0 MHz • Resolution:.0001
Requirements	Test Application Revision: A.02 and above

READ:WOOPower[:ALL]?

Function	Initiates and fetches a PRACH transmit on/off power measurement as a sequential operation. Measurement results are returned in the following order: Integrity, Pre Burst Off Power level, Pre Burst Off Power pass/fail, Burst On Power, Open Loop Power Error value, Open Loop Power Error pass/fail, Post Burst Off Power level, Post Burst Off Power pass/fail (see "PRACH Transmit On/Off Power Measurement Results" on page 84).
Query	Integrity • Range: 0 to 23 • Resolution: 1 Pre Burst Off Power level • Range: -99.99 to 00.00 dBm, 9.91 E+37 • Resolution: 0.01 dBm Pre Burst Off Power pass/fail • Range: 0 (pass), 1 (fail), 9.91 E+37 Burst On Power • Range: -99.99 to 99.99 dBm, 9.91 E+37 • Resolution: 0.01 dBm Open Loop Power Error value • Range: -99.99 to +99.99 dB • Resolution: 0.01 dB Open Loop Power Error pass/fail • Range: 0 (pass), 1 (fail), 9.91 E+37 Post Burst Off Power level • Range: -99.99 to 00.00 dBm, 9.91 E+37 • Resolution: 0.01 dBm Post Burst Off Power pass/fail • Range: 0 (pass), 1 (fail), 9.91 E+37
Requirements	Test Application Revision: A.03 and above

READ:WSEMask[:ALL]?

Function	Initiates and fetches a spectrum emissions mask measurement as a sequential operation. Measurement results are returned in the following order: integrity, overall pass/fail, in-channel power, and pass/fail results for each of the four frequency ranges. In-channel power is returned in dBm/3.84 MHz. The four frequency ranges for this measurement are as follows: • Range 1: +/- 2.515 to 3.485 MHz • Range 2: +/- 4.000 to 7.500 MHz • Range 3: +/- 7.500 to 8.500 MHz • Range 4: +/- 8.500 to 12.500 MHz If the multi-measurement state is on, the result represents the *average* of a number of spectrum emissions measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see “SETup:WSEMask:COUNt[:SNUMber]” .
Query	Integrity • Range: 0 to 23 Overall Pass/Fail • Range: 0 | 1 In-Channel Power (dBm/3.84 MHz) • Range: -99.00 to +99.00 dBm, 9.91 E+37 • Resolution: 0.01 Range Pass/Fail • Range: 0 | 1
Requirements	Test Application Revision: A.02 and above

READ:WSEMask:FAIL?

Function	Initiates and fetches a spectrum emissions mask measurement as a sequential operation. Measurement results are returned in the following order: integrity, overall pass/fail (0 = Pass, 1 = Fail). If the multi-measurement state is on, the result represents the *average* of a number of thermal power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see “SETup:WSEMask:COUNt[:SNUMber]” .
Query	• Range: 0 | 1
Requirements	Test Application Revision: A.02 and above

READ:WTPower[:ALL]?

Function	Initiates and fetches a thermal power measurement as a sequential operation. Measurement results are returned in the following order: integrity, thermal transmit power. If the multi-measurement state is on, the result represents the *average* of a number of thermal power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see “SETup:WTPower:COUNt[:SNUMber]” .
Query	• Range: -99 to 99 dBm, 9.91 E+37 • Resolution: 0.01 dB
Requirements	Test Application Revision: A.01 and above

READ:WWQuality[:ALL]?

Function	Initiates and fetches the waveform quality measurements as a sequential operation. Measurement results are returned in the following order: integrity, EVM maximum, frequency error worst case, origin offset maximum, phase error maximum, magnitude error maximum. If the multi-measurement state is on, each result represents the *average* of a number of waveform quality measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:WWQuality:COUNt[:SNUMber]" .
Query	Integrity • Range: 0 to 16 • Resolution: 1 EVM Maximum • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.1 Frequency Error worst case • Range-99.99 to 99.99 kHz, 9.91 E+37 • Resolution: 0.1 Origin Offset Maximum • Range: -99 to 0 dB, 9.91 E+37 • Resolution: 0.1 Phase Error Maximum • Range: 0 to 180 degrees, 9.91 E+37 • Resolution: 0.1 Magnitude Error Maximum • Range: 0 to 99%, 9.91 E+37 • Resolution: 0.1
Requirements	Test Application Revision: A.01 and above

RFANalyzer Subsystem

Description

The RFANalyzer command subsystem performs “lower-level” functions that control the test set's measuring receiver. The measuring receiver includes three separate signal paths:

- Power detector
- Demodulation
- Measurement

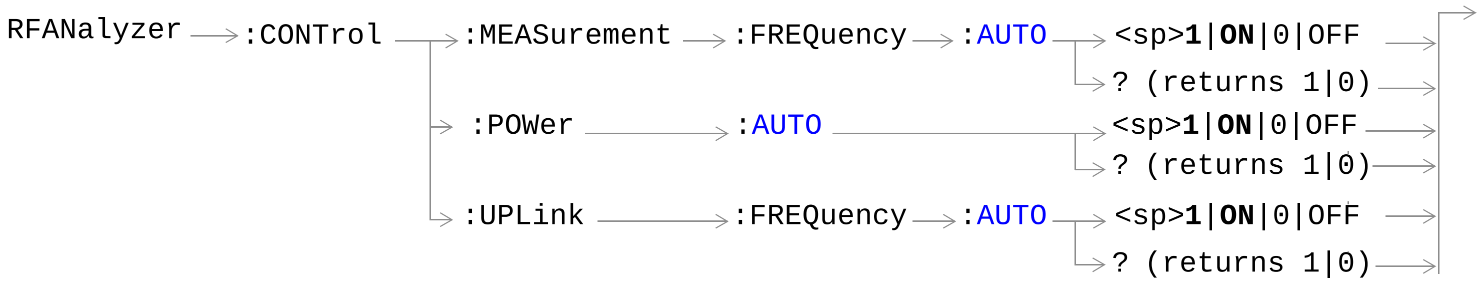
Refer to the “Block Diagram” on page 908 for a description of the signal paths.

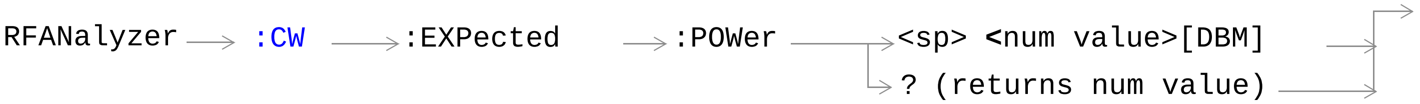
The RFANalyzer commands allow manual settings to the tune frequency or expected power level to each of these paths if it is necessary to override automatic settings.

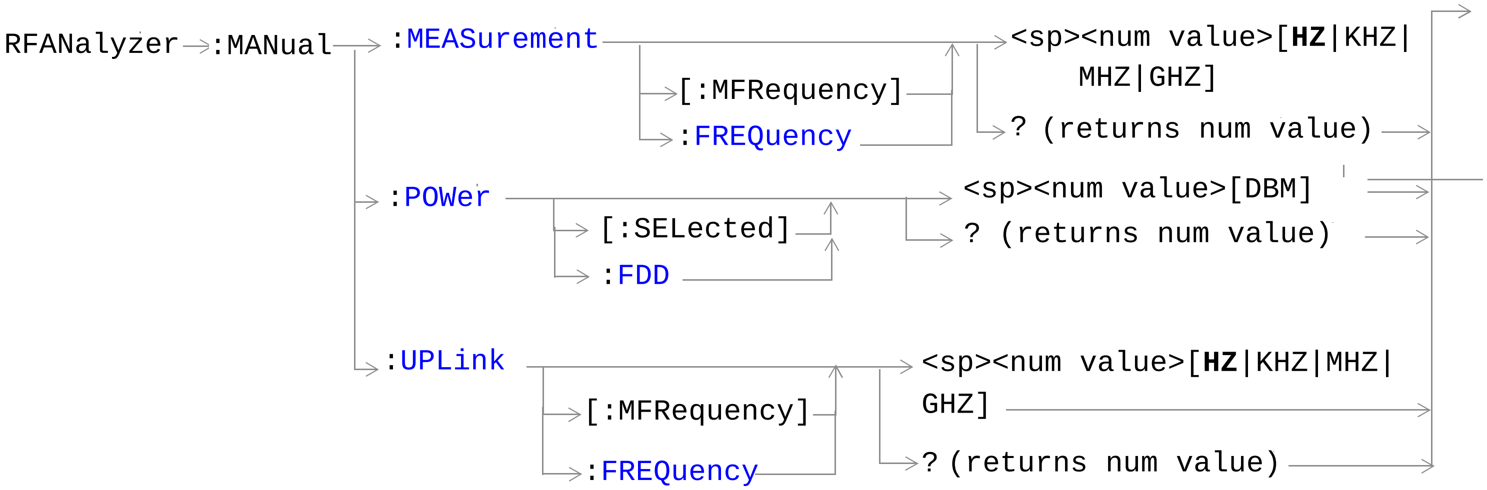
Syntax Diagrams and Command Descriptions

“RFANalyzer” on page 610

RFANalyzer







"Diagram Conventions" on page 368

RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO

Function	Turns on/off the auto Meas Frequency feature which determines the measurement downconverter signal path frequency control mode. (See “Block Diagram” .) ON = automatic OFF = manual
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST setting	1 (on)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO OFF"
!Enables manual control of the measurement signal path tune frequency.
```

RFANalyzer:CONTrol:POWer:AUTO

Function	Sets/queries the test set’s receiver input power control mode. ON = automatic OFF = manual
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST setting	1 (on)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"RFANALYZER:CONTROL:POWER:AUTO OFF"

!Enables manual control of the expected input power level.
```

RFANalyzer:CONTrol:UPLink:FREQuency:AUTO

Function	Sets/queries the test set's demodulation signal path tune frequency control mode. ON = automatic OFF = manual.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST setting	1 (on)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"RFANALYZER:CONTROL:UPLINK:FREQUENCY:AUTO OFF" !Enables manual control of the
demodulation signal path tune frequency.
```

RFANalyzer:CW:EXPected:POWer

Function	Sets/queries the expected CW receiver input power. This setting is only used when the Operating Mode is set to CW. (See "CALL:OPERating" .)
Setting	Range: -60 dBm to +53 dBm
Query	Range: -60 dBm to +53 dBm
*RST setting	+13 dBm
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"RFANALYZER:CW:EXPECTED:POWER -20"
```

RFANalyzer:MANual:POWer[:SELected]

Function	Sets/queries the receiver expected input power when the test set's receiver input power control mode is set to manual. See "Power Control (Except for CW Mode)" . The optional [:SELected] keyword in this command specifies that the expected input power setting being queried applies to the current system type. The test set's receiver power control mode is set by the "RFANalyzer:CONTrol:POWer:AUTO" command. The test set's measuring receiver will consider any amplitude offsets that are defined along with this setting to calculate input power range settings.
Setting	Range: Test application and system type dependent (approximately -25 to +43 dBm). Resolution: 0.01 dBm
Query	Range: Test application and system type dependent (approximately -25 to +43 dBm).
*RST setting	-75 dBm
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"RFANALYZER:MANUAL:POWER:SELECTED 24 DBM" !Sets the manual power control mode
expected input power level for the currently selected system type to 24 dBm.
```

RFANalyzer:MANual:POWer:FDD

Function	Sets/queries the sets the measurement and demod receivers expected input power when UTRA FDD is the current system type and the receiver input power control is set to Manual. See "Power Control (Except for CW Mode)" . The test set's receiver power control mode is set by the "RFANalyzer:CONTrol:POWer:AUTO" command. The test set's measuring receiver will consider any amplitude offsets that are defined along with this setting to calculate input power range settings.
Setting	Range: -129 to +80 dBm (-79 dBm to +30 dBm actual hardware range with amplitude offset = 0) Resolution: 0.01 dBm
Query	Range: -129 to +80 dBm (-79 dBm to +30 dBm actual hardware range with amplitude offset = 0)
*RST setting	0 dBm
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"RFANALYZER:MANUAL:POWER:FDD 24 DBM"
!Sets the manual power control mode expected input power level for the FDD system type to
!24 dBm.
```

RFANalyzer:MANual:MEASurement[:MFRequency]

Function	The setting form of this command performs two functions: (1) sets the Meas Frequency of the test set's measurement signal path, and (2) selects manual (auto off) tune mode for the test set's measurement signal path. (See "Block Diagram" .) The query form of this command returns the tune frequency of the test set's measurement signal path. The tune mode for the test set's measurement signal path can be returned to auto using the "RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO" command.
Setting	Range: 292.5 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"RFANALYZER:MANUAL:MEASUREMENT:MFREQUENCY 942.6 MHZ"
!Enables manual control of the measurement signal path tune frequency and sets the tune frequency
to 942.6 MHz.
```

RFANalyzer:MANual:MEASurement:FREQuency

Function	Sets/queries Meas Frequency, the measurement downconverter signal path frequency control mode. (See "Block Diagram" .) This setting is applied when manual mode is selected (see "RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO").
Setting	Range: 292.5 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"RFANALYZER:MANUAL:MEASUREMENT:FREQUENCY 942.6 MHZ"
!Sets the measurement signal path tune frequency to 942.6 MHz when manual control mode is used.
```

RFANalyzer:MANual:UPLink[:MFRequency]

Function	The setting form of this command performs two functions: (1) sets the tune frequency of the test set’s demodulation signal path, and (2) selects manual tune mode for the test set’s demodulation signal path. The query form of this command returns the tune frequency of the test set’s demodulation signal path. The tune mode for the test set’s demodulation path can be returned to auto using the “RFANalyzer:CONTrol:UPLink:FREQuency:AUTO” command.
Setting	Range: 292.5 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"RFANALYZER:MANUAL:UPLINK:MFREQUENCY 1955.030 MHZ"
```

```
!Enables manual control of the demodulation signal path tune frequency and sets the tune frequency
!to 1955.030 MHz.
```

RFANalyzer:MANual:UPLink:FREQuency

Function	Sets/queries the tune frequency of the test set’s demodulation signal path. This setting is applied when manual mode is selected (see “RFANalyzer:CONTrol:UPLink:FREQuency:AUTO”).
Setting	Range: 292.5 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"RFANALYZER:MANUAL:UPLINK:FREQUENCY 942.6 MHZ"
!Sets the test set’s demodulation signal path tune frequency to 942.6 MHz.
```

RFGenerator Subsystem

Description

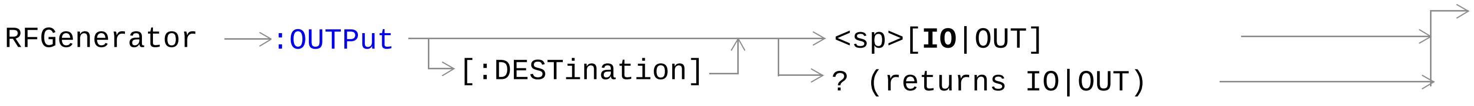
The RFGenerator subsystem selects the RF generator output port on test sets equipped with both the RF IN/OUT port and the RF OUT ONLY port. If the test set does not have the RF OUT ONLY port, an error message is generated when attempting to switch output ports.

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 617

RFGenerator:OUTPut



"Diagram Conventions" on page 368

RFGenerator:OUTPut[:DESTination]

Function	Sets/queries the RF output port destination: RF IN/OUT (IO) or RF OUT ONLY (OUT). If the correct hardware is not installed when trying to change to the RF OUT ONLY port, the test set displays the following error: `Hardware error; RFIO version does not support RF out only selection.` The query form will always return a value, regardless of the hardware version.
Setting	Range: IO | OUT
Query	Range: IO |OUT
*RST Setting	IO
Requirements	Test Application Revision: A.01 and above Hardware: RF Input/Output module with second RF output connector, modified front panel.

Programming Example

```
OUTPUT 714;"RFGenerator:OUTPut OUT"
!Sets the RF generator's output destination to the RF Out Only port.
```

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

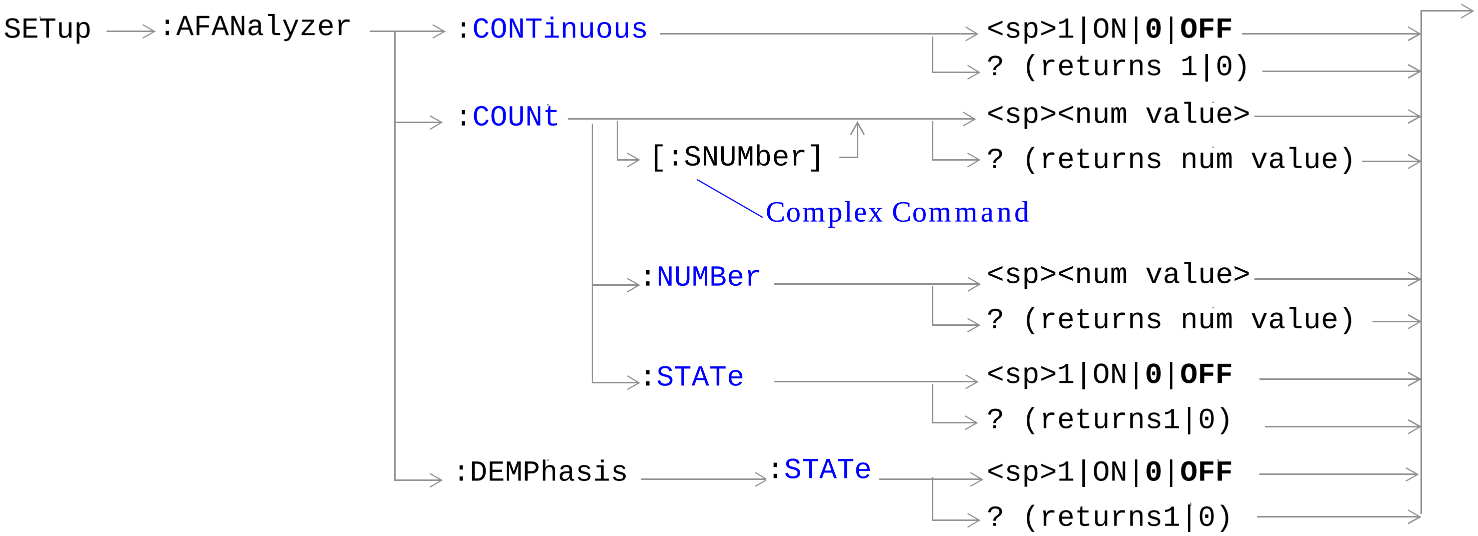
SETup:CONTinuous

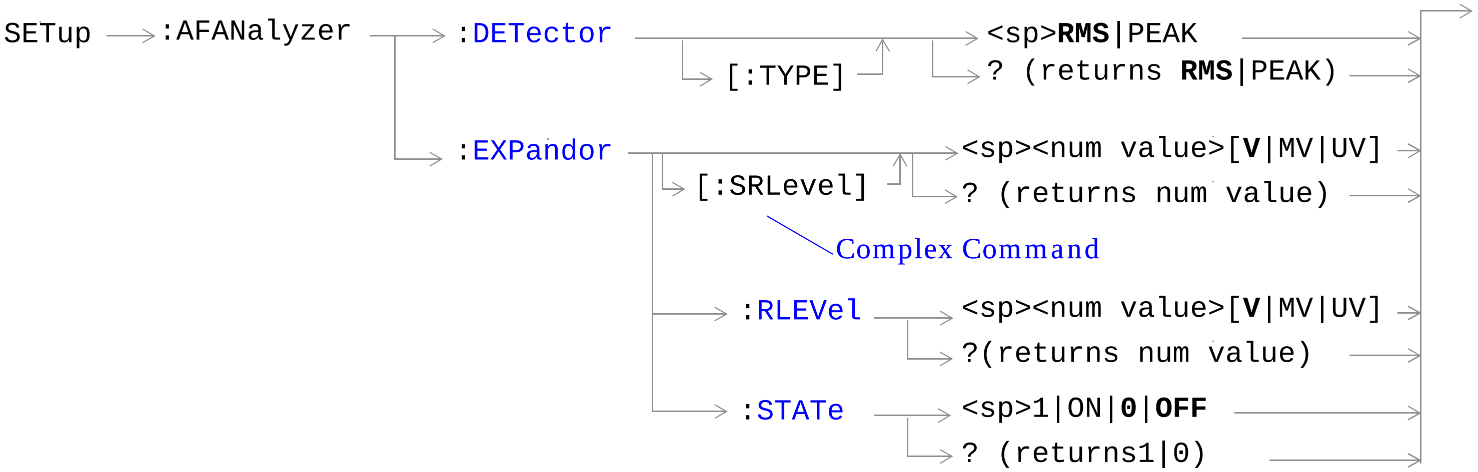
"Diagram Conventions" on page 368

SETup[:ALL]:CONTinuous

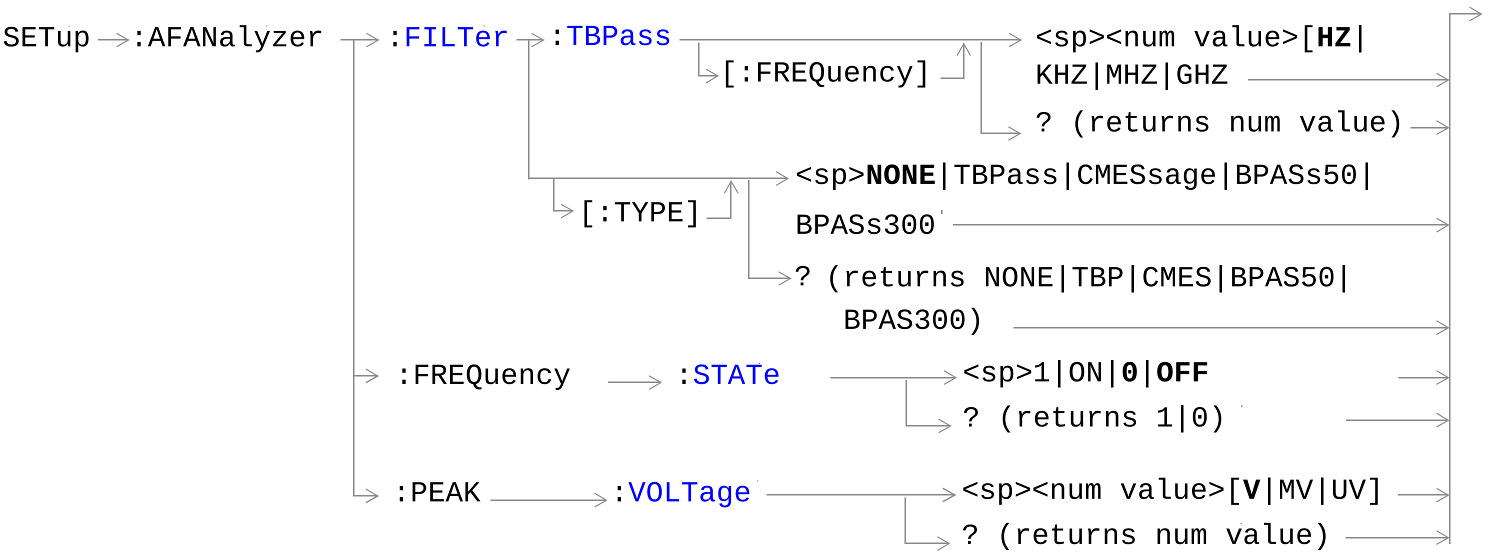
Function	Sets/queries the trigger arm state for all measurements. Determines whether all measurements will make one measurement then stop (OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (ON (continuous)). This setting overrides previously set trigger arm settings for idividual measurements.
Setting	Range: ON, OFF
Programming Example `OUTPUT 714;"SETup:ALL:CONTinuous:OFF” !Sets all measurements to single trigger mode.`	

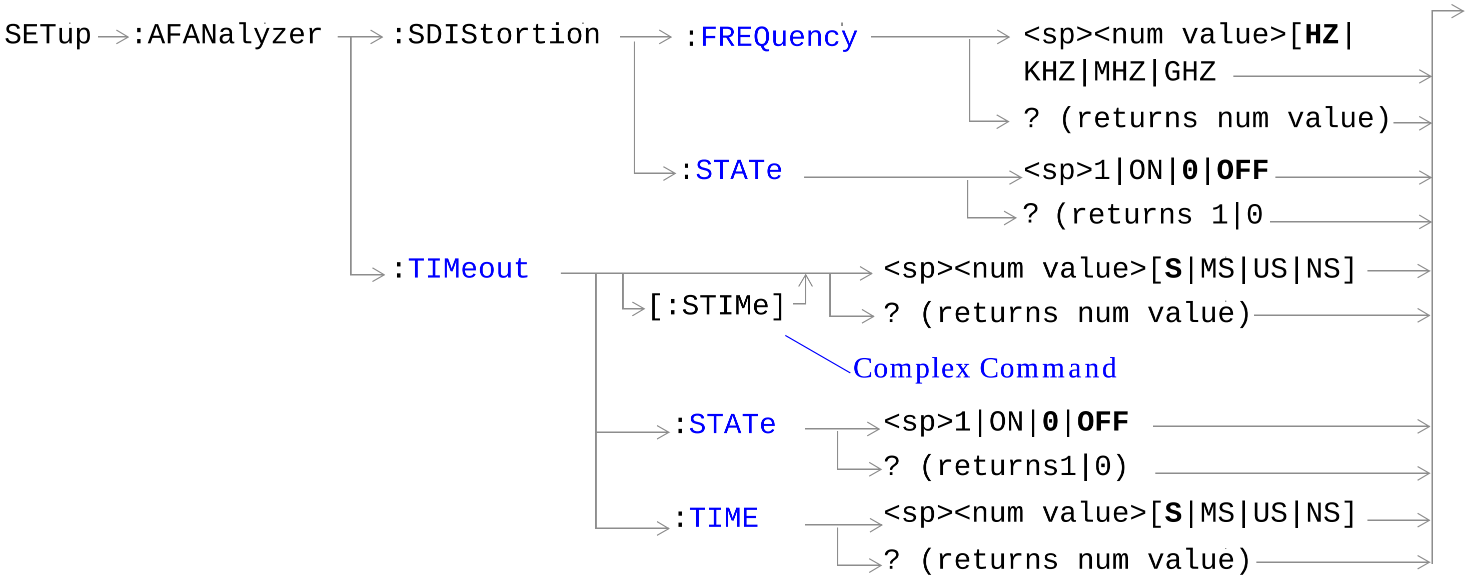
SETup:AFANalyzer





SETup:AFANalyzer





“SETup Subsystem” on page 618

SETup:AFANalyzer:CONTinuous

Function	Sets/queries the trigger arm state for the AF analyzer measurement. 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)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:AFANALYZER:CONTINUOUS OFF”
!Sets measurement to single trigger mode.
```

SETup:AFANalyzer:COUNt[:SNUMber]

Function	Sets/queries the number of AF analyzer measurements to be made in a mulit-measurement setup. This command sets the count, and automatically sets the multi-measurement STATe command to 1 (on).
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:AFANALYZER:COUNT:SNUMBER 5”
!Turns on multi-measurements and sets the number of measurements to 5.
```

SETup:AFANalyzer:COUNt:NUMBer

Function	Sets/queries the number of AF analyzer measurements to be made when mulit-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:AFANALYZER:COUNT:NUMBER 5”
!Sets the number of measurements to 5 when the multi-measurement state is set to ON.
```

SETup:AFANalyzer:COUNt:STATe

<table>
<tr><td>Function</td><td>Sets/queries the multi-measurement state of the AF analyzer measurement.</td></tr>
<tr><td>Setting</td><td>Range: 1|ON|0|OFF</td></tr>
<tr><td>Query</td><td>Range: 1|0</td></tr>
<tr><td>*RST Setting</td><td>0 (off)</td></tr>
<tr><td>Requirements</td><td>Test Application Revision: A.01 and above</td></tr>
<tr><td colspan="2">Programming Example
<code>OUTPUT 714;"SETUP:AFANALYZER:COUNT:STATE ON” !Turns on multi-measurements.</code></td></tr>
</table>

SETup:AFANalyzer:DEMPhasis:STATe

<table>
<tr><td>Function</td><td>Sets/queries whether 750 us de-emphasis is enabled.</td></tr>
<tr><td>Setting</td><td>Range: 1|ON|0|OFF</td></tr>
<tr><td>Query</td><td>Range: 1|0</td></tr>
<tr><td>*RST Setting</td><td>0 (off)</td></tr>
<tr><td>Requirements</td><td>Test Application Revision: A.01 and above</td></tr>
<tr><td colspan="2">Programming Example
<code>OUTPUT 714;”SETUP:AFANALYZER:DEMPHASIS:STATE ON”</code></td></tr>
</table>

SETup:AFANalyzer:DETector[:TYPE]

<table>
<tr><td>Function</td><td>Sets/queries the detector type for audio level measurements.</td></tr>
<tr><td>Setting</td><td>Range: RMS|PEAK</td></tr>
<tr><td>Query</td><td>Range: RMS|PEAK</td></tr>
<tr><td>*RST setting</td><td>RMS</td></tr>
<tr><td>Requirements</td><td>Test Application Revision: A.01 and above</td></tr>
<tr><td colspan="2">Programming Example
<code>OUTPUT 714;”SETUP:AFANALYZER:DETECTOR:TYPE PEAK”</code></td></tr>
</table>

SETup:AFANalyzer:EXPandor[:SRLevel]

Function	Sets/queries the expandor’s reference level and automatically sets the expandor’s state to ON.
Setting	Range: 10 mV to 10 V Resolution: 1 mV
Query	Range: 10 mV to 10 V
*RST setting	1 V
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”SETUP:AFANALYZER:EXPANDOR:SRLEVEL 5V”
!Sets expandor state to on and level to 5 V.
```

SETup:AFANalyzer:EXPandor:RLEVel

Function	Sets/queries the expandor’s reference level to be used when the expandor’s state is set to ON.
Setting	Range: 10 mV to 10 V Resolution: 1 mV
Query	Range: 10 mV to 10 V
*RST setting	1 V
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”SETUP:AFANALYZER:EXPANDOR:RLEVEL 5V” !Sets expandor reference level to 5 V.
```

SETup:AFANalyzer:EXPandor:STATe

Function	Sets/queries whether the expandor is enabled.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”SETUP:AFANALYZER:EXPANDOR:STATE ON”
```

SETup:AFANalyzer:FILTer[:TYPE]

Function	Sets/queries the filter type for audio measurements. Filter choices are as follows: 100 Hz tunable bandpass filter (TBP), C-message filter (CMES), 50 Hz to 15 kHz bandpass filter (BPAS50), 300 Hz to 15 kHz bandpass filter (BPAS300).
Setting	Range: NONE | TBPass | CMESsage | BPASs50 | BPASs300
Query	Range: NONE | TBP | CMES | BPAS50 | BPAS300
*RST setting	NONE
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”SETUP:AFANALYZER:FILTER:TYPE BPASS50”
!Selects the 50 Hz to 15 kHz bandpass filter.
```

SETup:AFANalyzer:FILTer:TBPass[:FREQuency]

Function	Sets/queries the center frequency for the 100 Hz tunable bandpass filter (TBPass).
Setting	Range: 300.0 to 20000 Hz Resolution: 0.1
Query	Range: 300.0 to 20000 Hz
*RST setting	1000
Requirements	Test Application Revision: A.01 and above

Programming Example

```
10 OUTPUT 714;”SETUP:AFANALYZER:FILTER:TBPASS:FREQUENCY 300HZ”
```

SETup:AFANalyzer:FREQuency:STATe

Function	Sets/queries whether the audio frequency measurement is enabled.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;”SETUP:AFANALYZER:FREQUENCY:STATE ON”
```

SETup:AFANalyzer:PEAK:VOLTage

Function	Sets/queries the expected peak voltage for audio measurements.
Setting	Range: 0.001 to 20 Vpk Resolution: 0.001
Query	Range: 0.001 to 20 Vpk
*RST setting	20
Requirements	Test Application Revision: A.01 and above
Programming Example `10 OUTPUT 714;SETUP:AFANALYZER:PEAK:VOLTAGE 10V”`	

SETup:AFANalyzer:SDIStortion:FREQuency

Function	Sets/queries the fundamental frequency setting for the SINAD/distortion measurement.
Setting	Range: 100.0 to 10000 Hz Resolution: 0.1
Query	Range: 100.0 to 10000 Hz
*RST setting	1000
Requirements	Test Application Revision: A.01 and above
Programming Example `10 OUTPUT 714;SETUP:AFANALYZER:SDISTORTION:FREQUENCY 300HZ”`	

SETup:AFANalyzer:SDIStortion:STATe

Function	Sets/queris whether the SINAD/distortion measurement is enabled.
Setting	Range: 1|0N|0|OFF
Query	Range: 1|0
*RST setting	0 (off)
Requirements	Test Application Revision: A.01 and above
Programming Example `10 OUTPUT 714;SETUP:AFANALYZER:SDISTORTION:STATE ON”`	

SETup:AFANalyzer:TIMeout[:STIMe]

Function	Sets/queries the AF analyzer measurement’s timeout setting and automatically sets the timeout state to ON.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds, on
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:AFANALYZER:TIMEOUT:STIME 5S”
!Sets timeout state to ON and sets the timeout time to 5 seconds.
```

SETup:AFANalyzer:TIMeout:STATe

Function	Sets/queries the AF analyzer measurement’s timeout state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:AFANALYZER:TIMEOUT:STATE ON”
```

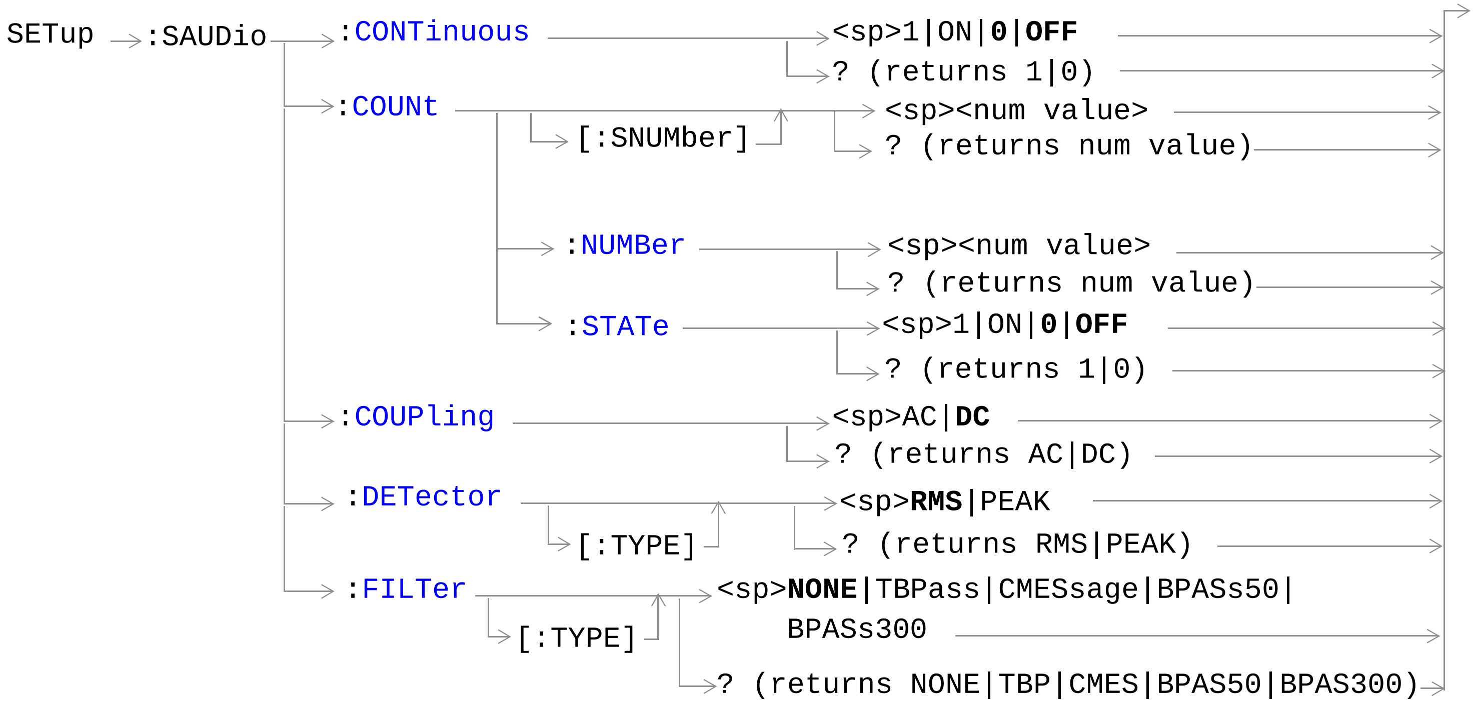
SETup:AFANalyzer:TIMeout:TIME

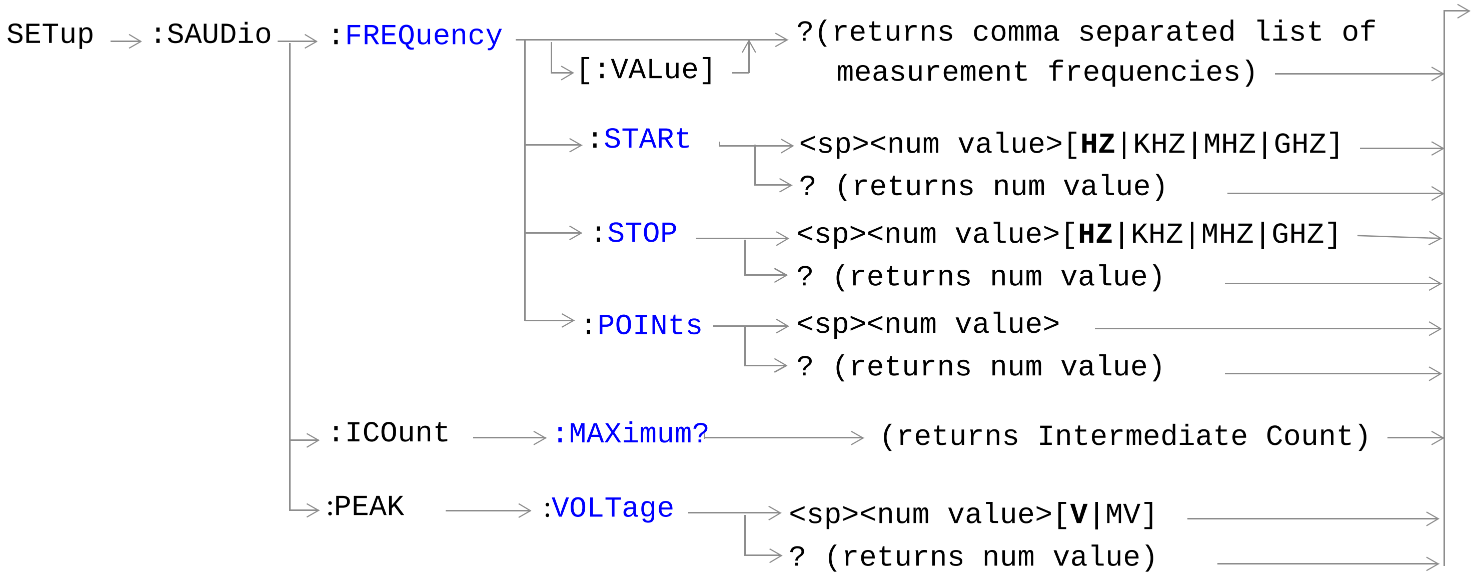
Function	Sets/queries the AF analyzer measurement’s timeout setting to be used when the timeout state is set to ON.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds
Requirements	Test Application Revision: A.01 and above

Programming Example

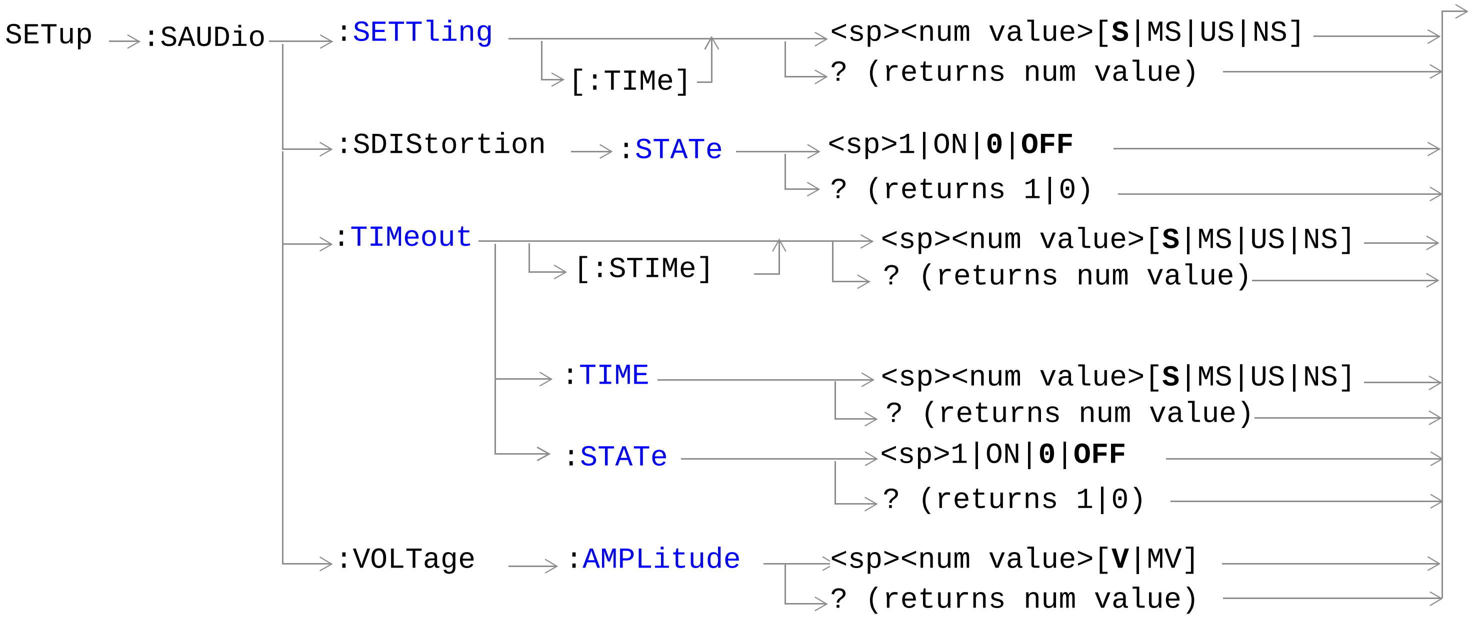
```
OUTPUT 714;"SETUP:AFANALYZER:TIMEOUT:TIME 5S”
```

SETup:SAUDio





SETup:SAUDio



"Diagram Conventions" on page 368

SETup:SAUDio:CONTinuous

Function	Sets/queries the trigger arm state for the swept audio measurement. 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)).
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:SAUDIO:CONTINUOUS ON” !Turns on continuous triggering.`	

SETup:SAUDio:COUNt[:SNUMber]

Function	Sets/queries the number of audio measurements to perform at each measurement point in a single multi-measurement sweep. This command sets the count, and automatically sets the multi-measurement STATe command to 1 (on).
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
Programming Example `OUTPUT 714;"SETUP:SAUDIO:COUNT:SNUMBER 5” !Turns on multi-measurements and makes 5 measurements at each frequency point in the sweep.`	

SETup:SAUDio:COUNt:NUMBer

Function	Sets/queries the number of audio measurements to perform at each measurement point in a single multi-measurement sweep when the “SETup:SAUDio:COUNt:STATe” is set to 1 (on).
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
Programming Example `OUTPUT 714;"SETUP:SAUDIO:COUNT:NUMBER 5” !Makes 5 measurements at each frequency point in the sweep.`	

SETup:SAUDio:COUNt:STATe

Function	Selects/queries the swept audio measurement’s multi-measurement count state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)

Programming Example

```
OUTPUT 714;"SETUP:SAUDIO:COUNT:STATE ON” !Turns on multi-measurement for the swept audio
measurement.
```

SETup:SAUDio:COUPling

Function	Sets/queries the audio generator’s coupling to the AUDIO OUT port.
Setting	Range: AC | DC
Query	Range: AC | DC
*RST Setting	DC

Programming Example

```
OUTPUT 714;"SETUP:SAUDIO:COUPLING AC” !Select AC coupling to the AUDIO OUT port.
```

SETup:SAUDio:DETector[:TYPE]

Function	Sets/queries the type of level detector used in swept audio measurements.
Setting	Range: RMS | PEAK
Query	Range: RMS | PEAK
*RST Setting	RMS

Programming Example

```
OUTPUT 714;"SETUP:SAUDIO:DETECTOR:TYPE PEAK” !Select the peak detector for the AF
analzyer.
```

SETup:SAUDio:FILTer[:TYPE]

Function	Sets/queries the type of filter on the sampled data, before any measurements are performed. The filter choices are: none, TBPass (100 Hz bandwidth bandpass), CMESsage (C-Message), BPASs50 (50 Hz to 15 kHz bandpass), BPASs300 (300 Hz to 15 kHz bandpass)
Setting	Range: NONE | TBPass | CMESsage | BPASs50 | BPASs300
Query	Range: NONE | TBP | CMES | BPAS50 | BPAS300
*RST Setting	None
Programming Example	

```
OUTPUT 714;"SETUP:SAUDIO:FILTER:TYPE TBPASS” !Selects the 100 Hz bandpass filter.
```

SETup:SAUDio:FREQuency[:VALue]?

Function	Returns a comma-separated list of the generated frequency for each frequency point (see “SETup:SAUDio:FREQuency:POINts”). When you specify the start frequency, stop frequency, and the number of measurement points, the test set calculates the intermediate frequencies that are generated. You cannot directly set the intermediate frequencies using this command, you can only query them.
Query	Range: up to 60 comma separated values
Programming Example	

```
OUTPUT 714;"SETUP:SAUDIO:FREQUENCY:VALUE?” !Queries the list of generated frequencies.
```

SETup:SAUDio:FREQuency:POINts

Function	Sets/queries the number of evenly-spaced frequency points in the sweep. If this value is set to 1, only the start frequency is used in the sweep.
Setting	Range: 1 to 60
Query	Range: 1 to 60
*RST Setting	5
Programming Example	

```
OUTPUT 714;"SETUP:SAUDIO:FREQUENCY:POINTS 20” !Make audio measurements at 20 frequency
points in the sweep.
```

SETup:SAUDio:FREQuency:STARt

Function	Sets/queries the frequency at which to begin the sweep. The default units are Hz. It is possible to set the start frequency higher than the stop frequency. If this is done, the sweep starts at the higher frequency and stops at the lower frequency.
Setting	Range: 300.0 to 15000.0 Hz
Query	Range: 300.0 to 15000.0 Hz
*RST Setting	300 Hz
Programming Example	`OUTPUT 714;"SETUP:SAUDIO:FREQUENCY:START 450HZ” !Start the frequency sweep at 450 Hz.`

SETup:SAUDio:FREQuency:STOP

Function	Sets/queries the frequency at which to end the sweep. The default units are Hz. It is possible to set the stop frequency lower than the start frequency. If this is done, the sweep starts at the higher frequency and stops at the lower frequency.
Setting	Range: 300.0 to 15000.0 Hz
Query	Range: 300.0 to 15000.0 Hz
*RST Setting	3000 Hz
Programming Example	`OUTPUT 714;"SETUP:SAUDIO:FREQUENCY:STOP 1500HZ” !Stop the frequency sweep at 1500 Hz.`

SETup:SAUDio:ICOunt:MAXimum?

Function	Queries the total multi-measurement count. This is equal to the number of frequency points in the sweep multiplied by the multi-measurement count set for the swept audio measurement.
Query	Range: 1 to 59940 (60 measurement points multiplied by 999 multi-measurements)
*RST Setting	5
Programming Example	`OUTPUT 714;"SETUP:SAUDIO:ICOUNT:MAXIMUM?” !Queries the total number of measurements made.`

SETup:SAUDio:PEAK:VOLTage

Function	Sets/queries the expected peak voltage of the swept audio measurement. This determines the range and resolution of the sampled votage values.
Setting	Range: 1 mV to 20 V Resolution: 1 mV
Query	Range: 1 mV to 20 V
*RST Setting	20 V peak
Programming Example `OUTPUT 714;"SETUP:SAUDIO:PEAK:VOLTAGE 5V”`	

SETup:SAUDio:SETTling[:TIMe]

Function	Sets/queries how long swept audio measurements wait to start an audio measurement after setting the audio source’s frequency. A setting of 0.0 seconds let’s swept audio measurements run at maximum speed. Settling time may be needed when testing a device that has a time delay through the audio path. Path delays can cause the audio generator’s signal to change frequencies before the output signal can be analyzed at that frequency. Specifying a settling time ensures that the audio generator stays at each frequency point long enough for the audio analyzer to correctly measure the device’s audio output.
Setting	Range: 0.0 to 999 ms Resolution: 1 ms
Query	Range: 0.0 to 999 ms
*RST Setting	0 ms
Programming Example `OUTPUT 714;"SETUP:SAUDIO:SETTLING:TIME 20MS”`	

SETup:SAUDio:SDIStortion:STATe

Function	Sets/queries whether SINAD and distortion measurments are enabled. Turning on SINAD/Distortion measurements will cause the swept audio measurement to run significantly slower because of added sampling and calculation times.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:SAUDIO:SDISTORTION:STATE ON”`	

SETup:SAUDio:TIMeout[:STIMe]

Function	Selects/queries the timeout value in seconds that is used for swept audio measurements and sets the timeout state to ON. Units (S|MS) are optional, if no units are specified then units default to S (seconds).
Setting	Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query	Range: 0.1 to 999 seconds
*RST Setting	10 seconds

Programming Example

```
OUTPUT 714;"SETUP:SAUDIO:TIMEOUT:STIME 10” !Enables timeouts and sets the value to 10
seconds.
```

SETup:SAUDio:TIMeout:TIME

Function	Selects/queries the timeout value in seconds that is used for swept audio measurements when the timeout state is set to ON. Units (S|MS) are optional, if no units are specified then units default to S (seconds).
Setting	Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query	Range: 0.1 to 999 seconds
*RST Setting	10 seconds

Programming Example

```
OUTPUT 714;"SETUP:SAUDIO:TIMEout:TIME 10” !Sets the timeout value to 10 seconds.
```

SETup:SAUDio:TIMeout:STATe

Function	Selects/queries the swept audio measurement timeout state. Timeout is set using the “SETup:SAUDio:TIMeout:TIME” command.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)

Programming Example

```
OUTPUT 714;"SETUP:SAUDIO:TIMEOUT:STATE ON” !Enables timeouts for swept audio
measurements.
```

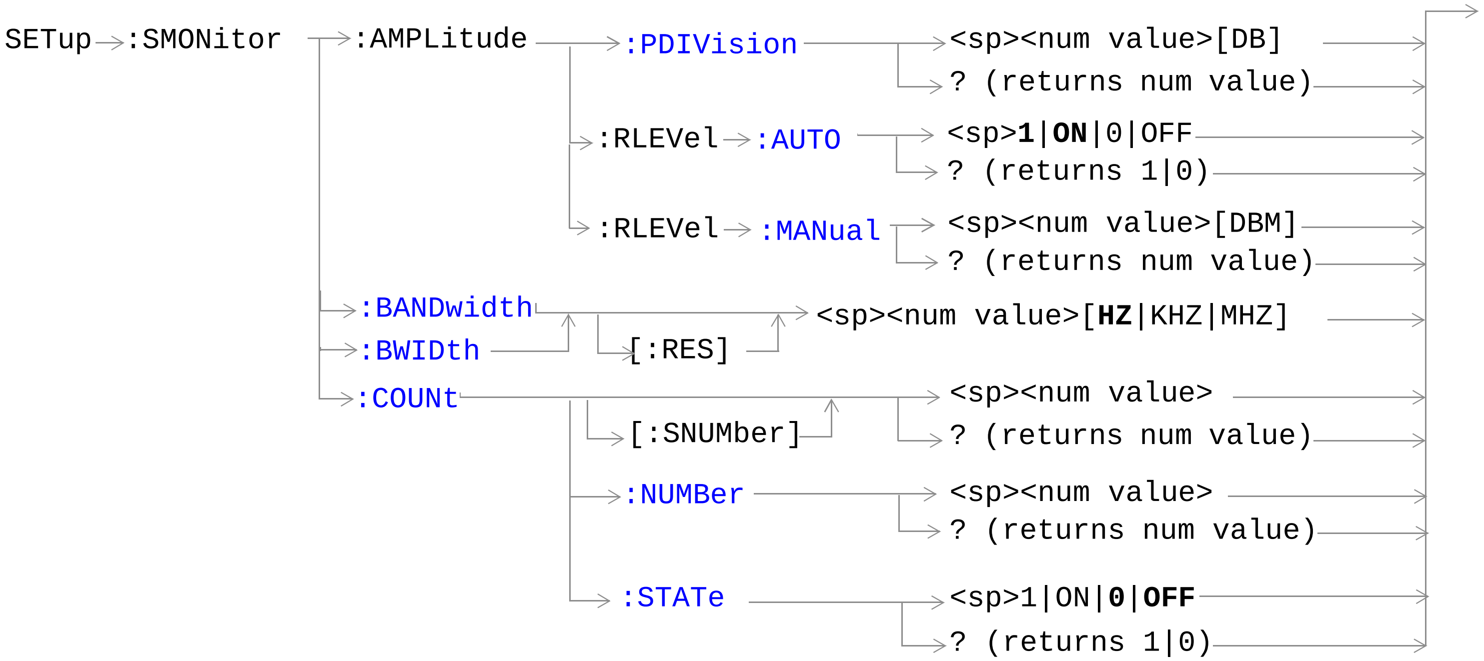
SETup:SAUDio:VOLTage:AMPLitude

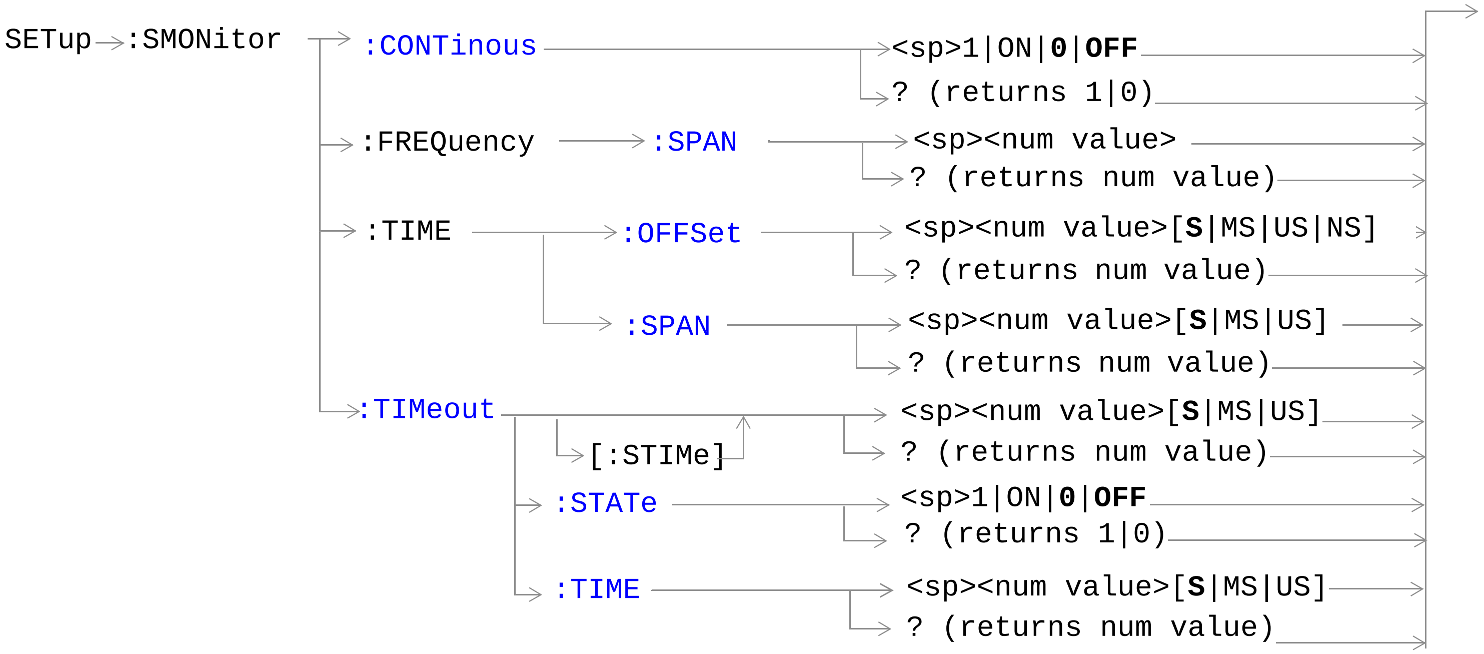
Function	Sets/queries the output level (peak voltage) of the audio generator when it is turned on. This command does not turn on the audio generator.
Setting	Range: 0.0 to 9.0 V peak (R_L > 600 ohms) Resolution: • < 0.5 mV peak (less than or equal to 1 V peak output) • < 5 mV peak (greater than 1 V peak output)
Query	Range: 0.0 to 9.0 V peak (R_L > 600 ohms)
*RST Setting	0.0 V peak

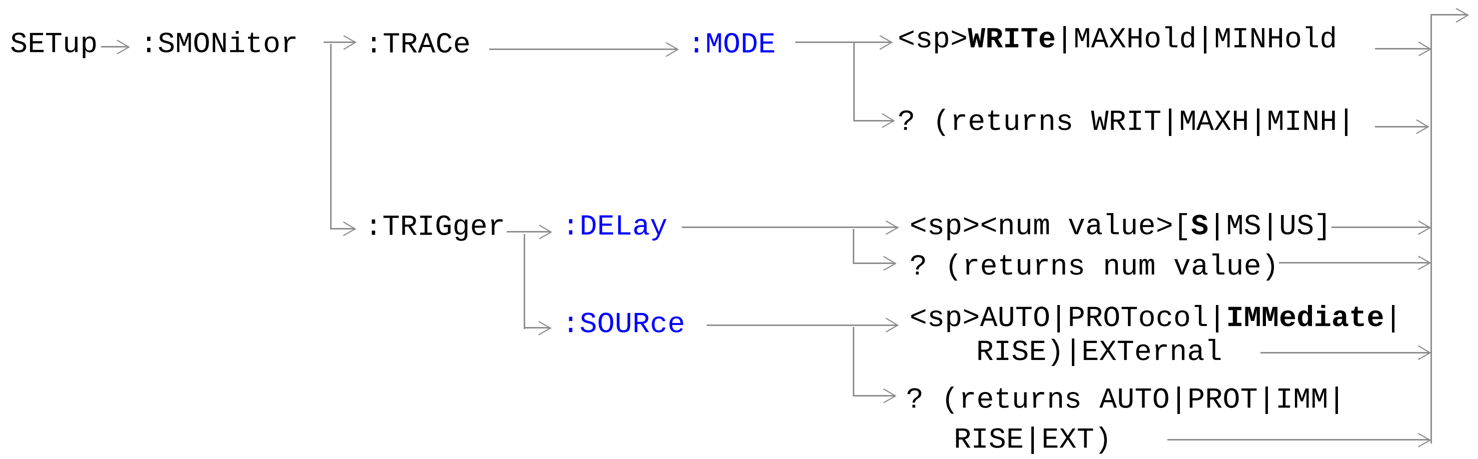
Programming Example

```
OUTPUT 714;"SETUP:SAUDIO:VOLTAGE:AMPLITUDE 1V” !Set the audio generator’s output to
1Vpeak.
```

SETup:SMONitor







“Diagram Conventions” on page 368

SETup:SMONitor:AMPLitude:PDIVision

Function	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

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	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

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	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 769). 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

Programming Example
`OUTPUT 714;"SETup:SMONitor:AMPLitude:RLEVel:MANual -20DBM"`
`!Sets spectrum monitor’s reference level to -20 dBm.`	

SETup:SMONitor:BWIDth[:RES]

Function	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 642, 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

Programming Example

```
OUTPUT 714;"SETup:SMONitor:BAND 100 KHZ"
!Sets spectrum monitor's resolution bandwidth to 100 kHz.
```

SETup:SMONitor:COUNt[:SNUMber]

Function	This command sets/queries the averaging count and turns on averaging.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	100

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	This command sets/queries the averaging count used when the averaging is turned on.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	100

Programming Example

```
OUTPUT 714;"SETup:SMONitor:COUNt:NUMber 200" !Sets the averaging count to 200.
```

SETup:SMONitor:COUNt:STATe

Function	This command sets/queries the averaging state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	OFF
Programming Example `OUTPUT 714;"SETup:SMONitor:COUNt:STATe 1" !Turns on averaging.`	

SETup:SMONitor:CONTinous

Function	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
Programming Example `OUTPUT 714;"SETup:SMONitor:CONTinuous ON" ! Sets the trigger mode to continuous.`	

SETup:SMONitor:FREQuency:SPAN

Function	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
Programming Example `OUTPUT 714;"SETup:SMONitor:FREQuency:SPAN 10MHZ" ! Sets the frequency span to 10 MHz.`	

SETup:SMONitor:TIME:OFFSet

Function	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 643. 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

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	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

Programming Example

```
OUTPUT 714;"SETup:SMONitor:TIME:SPAN 30MS"
! Sets the spectrum monitor’s time span to 30 millisecond.
```

SETup:SMONitor:TIMeout[:STIMe]

Function	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

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	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

Programming Example

```
OUTPUT 714;"SETup:SMONitor:TIMeout:STATe 1" ! Turns on the timeout timer.
```

SETup:SMONitor:TIMeout:TIME

Function	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.
Setting	Range: 1 to 999 seconds Resolution: 0.1 seconds
Query	Range: 1 to 999 seconds Resolution: 0.1 seconds
*RST Setting	10 seconds

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

Function	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.
Setting	Range: WRITe | MAXHold | MINHold
Query	Range: WRIT | MAXH | MINH
*RST Setting	WRITe
Programming Example	

```
OUTPUT 714;"SETup:SMONitor:TRACe:MODE MAXH"
! Sets the update method to maximim hold.
```

SETup:SMONitor:TRiGger:DELay

Function	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
Programming Example	

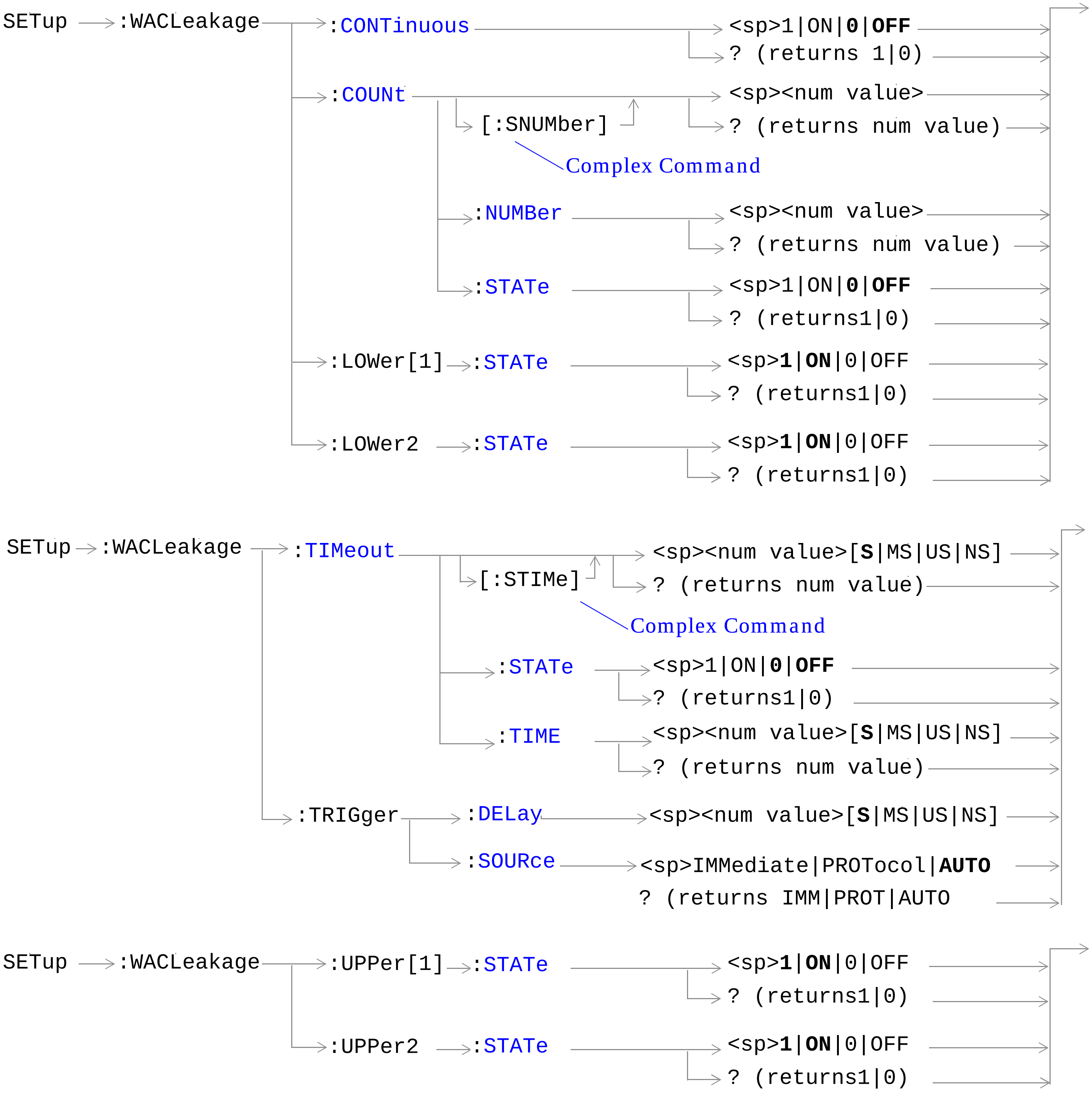
```
OUTPUT 714;"SETup:SMONitor:TRIGger:DELay 1MS" ! Sets the trigger delay to 1 millisecond.
```

SETup:SMONitor:TRiGger:SOURce

Function	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
Programming Example	

```
OUTPUT 714;"SETup:SMONitor:TRIGger:SOURce RISE"
! Sets the measurement to trigger on the rising edge of an RF burst.
```

SETup:WACLeakage



"Diagram Conventions" on page 368

SETup:WACLeakage:CONTinuous

Function	Sets/queries the trigger arm state for the adjacent channel leakage measurement. The trigger arm state determines whether the adjacent channel leakage measurement will be made once then stop (0|OFF (single)), or automatically re-arm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WACLEAKAGE:CONTINUOUS OFF"
!Sets measurement to single trigger mode.
```

SETup:WACLeakage:COUNt[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of adjacent channel leakage measurements to be made in a multi-measurement, and (2) sets the multi-measurement STATe command to 1 (on). The query form returns the number of adjacent channel leakage multi-measurements to be made when multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WACLEAKAGE:COUNT:SNUMBER 5"
!Turns on multi-measurements and sets the number of measurements to 5.
```

SETup:WACLeakage:COUNt:NUMBer

Function	Sets/queries the number of adjacent channel leakage measurements to be made when the multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WACLEAKAGE:COUNT:NUMBER 5"
!Sets the number of adjacent channel leakage multi-measurements to 5.
```

SETup:WACLeakage:COUNt:STATe

Function	Sets/queries the adjacent channel leakage multi-measurement state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WACLEAKAGE:COUNT:STATE ON" !Turns on adjacent channel leakage
multi-measurements.
```

SETup:WACLeakage:LOWer[1]:STATe

Function	Sets/queries the 1st lower adjacent channel’s state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WACLEAKAGE:LOW1:STATE 0" !Turns off the lower 1st adjacent channel.
```

SETup:WACLeakage:LOWer2:STATe

Function	Sets/queries the 2nd lower adjacent channel’s state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WACLEAKAGE:LOW2:STATE 0" !Turns off the lower 2nd adjacent channel.
```

SETup:WACLeakage:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the adjacent channel leakage measurement's timeout (see "Measurement Timeouts") value, and (2) sets the adjacent channel leakage measurement's timeout STATe to 1 (on). The query form returns the adjacent channel leakage measurement's timeout value.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds, on
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WACLEAKAGE:TIMEOUT:STIME 5 S"
!Sets timeout state to ON and sets the timeout time to 5 seconds.
```

SETup:WACLeakage:TIMeout:STATe

Function	Sets/queries the adjacent channel leakage measurement's timeout (see "Measurement Timeouts") state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WACLEAKAGE:TIMEOUT:STATE ON"
```

SETup:WACLeakage:TIMeout:TIME

Function	Sets/queries the adjacent channel leakage measurement's timeout (see "Measurement Timeouts") setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WACLEAKAGE:TIMEOUT:TIME 5 S"
```

SETup:WACLeakage:TRIGger:DELay

Function	Sets/queries the adjacent channel leakage measurement's trigger delay setting. This setting can be used to delay the measurement trigger in order to to start a measurement during a specific timeslot in the frame. For example, a 1.333 ms delay would cause the trigger to wait until after the first two timeslots have elapsed.
Setting	Range: -10 to 10 milliseconds Resolution: 0.0001 millisecond
Query	Range: -10 to 10 milliseconds
*RST Setting	0 seconds
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SETUP:WACLEAKAGE:TRIGGER:DELAY 1MS"`	

SETup:WACLeakage:TRIGger:SOURce

Function	Sets/queries the adjacent channel leakage measurement's trigger source.
Setting	Range: IMMediate | PROTocol | AUTO
Query	Range: IMM | PROT | AUTO
*RST Setting	AUTO
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SETUP:WACLEAKAGE:TRIGGER:SOURCE IMMEDIATE"`	

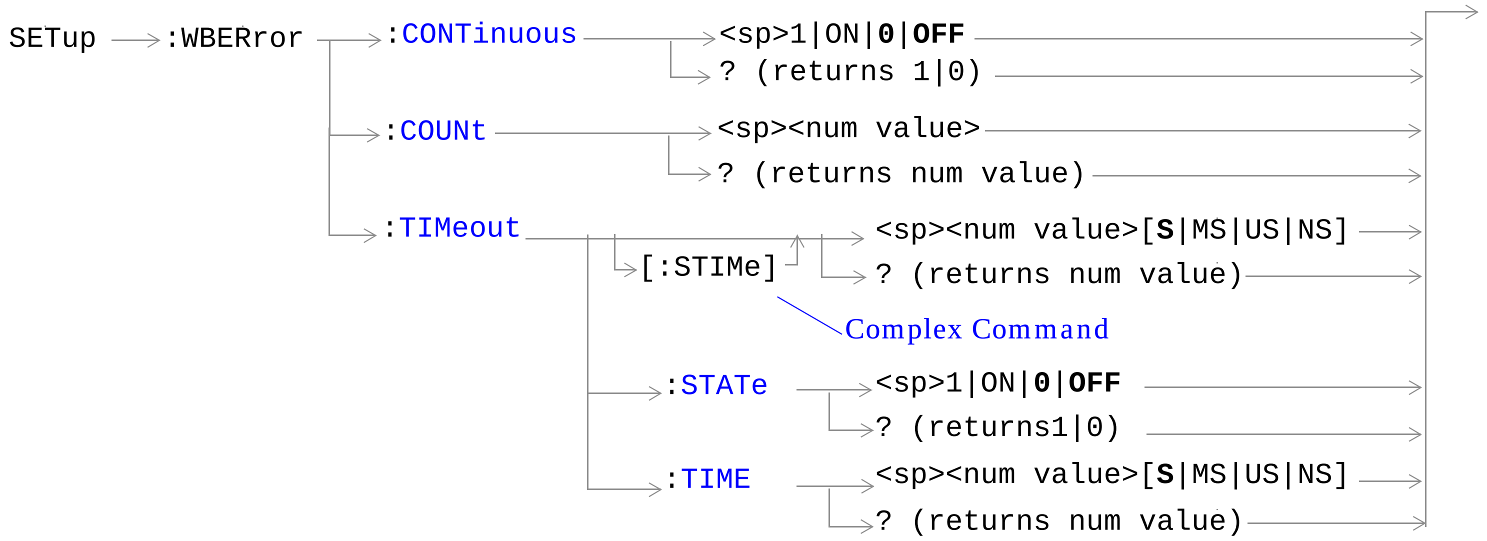
SETup:WACLeakage:UPPer[1]:STATe

Function	Sets/queries the 1st upper adjacent channel's state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SETUP:WACLEAKAGE:UPP1:STATE 0" !Turns off the upper 1st adjacent channel.`	

SETup:WACLeakage:UPPer2:STATe

Function	Sets/queries the 2nd upper adjacent channel's state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SETUP:WACLEAKAGE:UPP2:STATE 0" !Turns off the upper 2nd adjacent channel.`	

SETup:WBERror



"Diagram Conventions" on page 368

SETup:WBERror:CONTinuous

Function	Sets/queries the trigger arm state for the loopback bit error ratio measurement. The trigger arm state determines whether the bit error measurement will be made once then stop (0 | OFF (single)), or automatically re-arm upon completion of one measurement and repeat the process (1 | ON (continuous)).
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WBERROR:CONTINUOUS ON"
!Sets measurement to continuous trigger mode.
```

SETup:WBERror:COUNt

Function	Sets/queries the number of bits to test in the loopback bit error ratio test.
Setting	Range: 1000 to 999000
Query	Range: 1000 to 999000
*RST Setting	10000
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WBERROR:COUNT 5000"
```

SETup:WBERror:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the loopback bit error ratio measurement's timeout (see "Measurement Timeouts") value, and (2) sets the adjacent channel leakage measurement's timeout STATe to 1 (on). The query form returns the loopback bit error rate measurement's timeout value.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	20 seconds, on
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WBERROR:TIMEOUT:STIME 5 S"
!Sets timeout state to ON and sets the timeout time to 5 seconds.
```

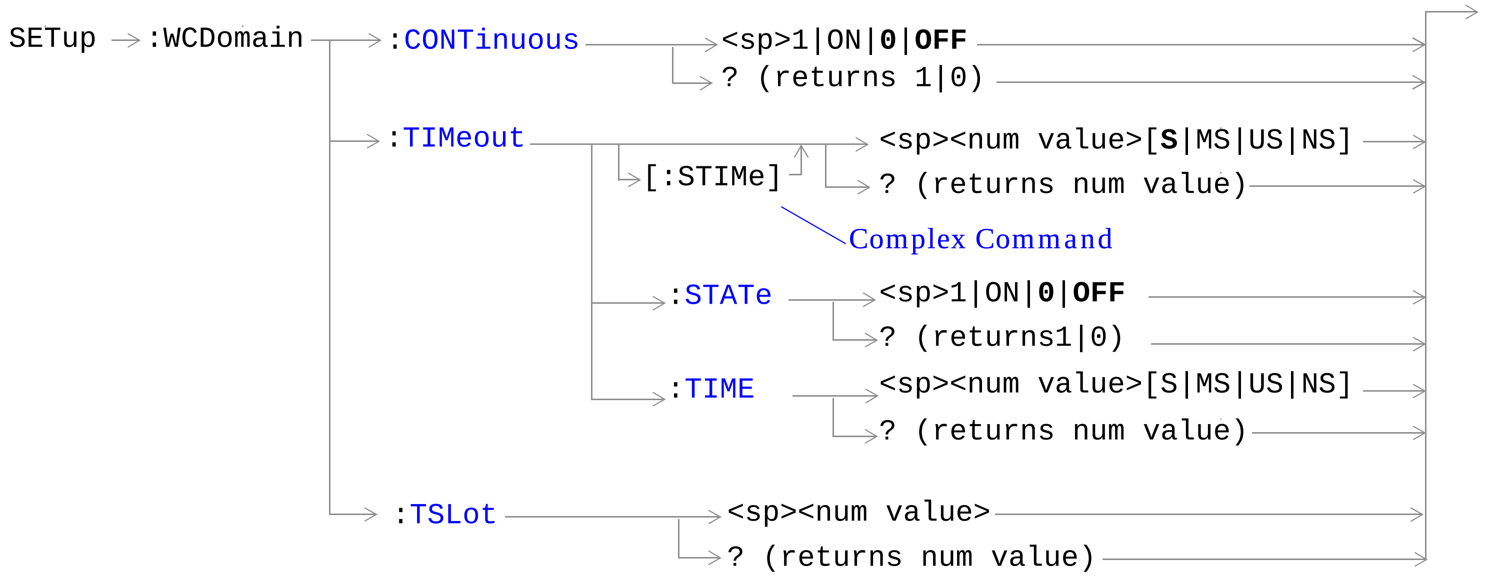
SETup:WBERror:TIMeout:STATe

Function	Sets/queries the loopback bit error ratio measurement’s timeout state (see “Measurement Timeouts”).
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SETUP:WBERROR:TIMEOUT:STATE ON"`	

SETup:WBERror:TIMeout:TIME

Function	Sets/queries loopback bit error ratio measurement’s timeout setting to be used when the timeout state is set to ON (see “Measurement Timeouts”) .
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	20 seconds
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SETUP:WBERROR:TIMEOUT:TIME 5 S"`	

SETup:WCDomain



"Diagram Conventions" on page 368

SETup:WCDomain:CONTinuous

Function	Sets/queries the trigger arm state for the code domain measurement. The trigger arm state determines whether the bit error measurement will be made once then stop (0|OFF (single)), or automatically re-arm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WCDOMAIN:CONTINUOUS ON"
!Sets measurement to continuous trigger mode.
```

SETup:WCDomain:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the code domain measurement's timeout (see "Measurement Timeouts") value, and (2) sets the adjacent channel leakage measurement's timeout STATe to 1 (on). The query form returns the loopback bit error rate measurement's timeout value.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	20 seconds, on
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WCDOMAIN:TIMEOUT:STIME 5 S"
!Sets timeout state to ON and sets the timeout time to 5 seconds.
```

SETup:WCDomain:TIMeout:STATe

Function	Sets/queries the code domain measurement's timeout state (see "Measurement Timeouts").
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WCDOMAIN:TIMEOUT:STATE ON"
```

SETup:WCDomain:TIMeout:TIME

Function	Sets/queries code domain measurement’s timeout setting to be used when the timeout state is set to ON (see “Measurement Timeouts”) .
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	20 seconds
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WCDOMAIN:TIMEOUT:TIME 5 S"
```

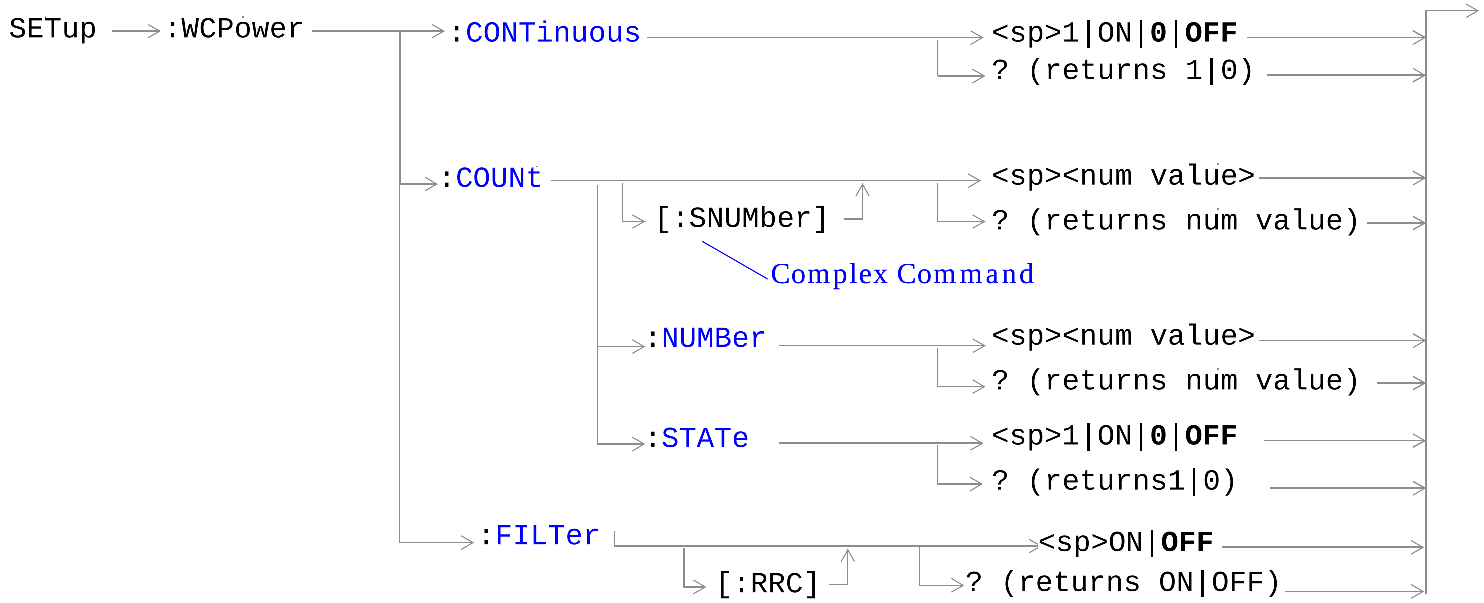
SETup:WCDomain:TSLot

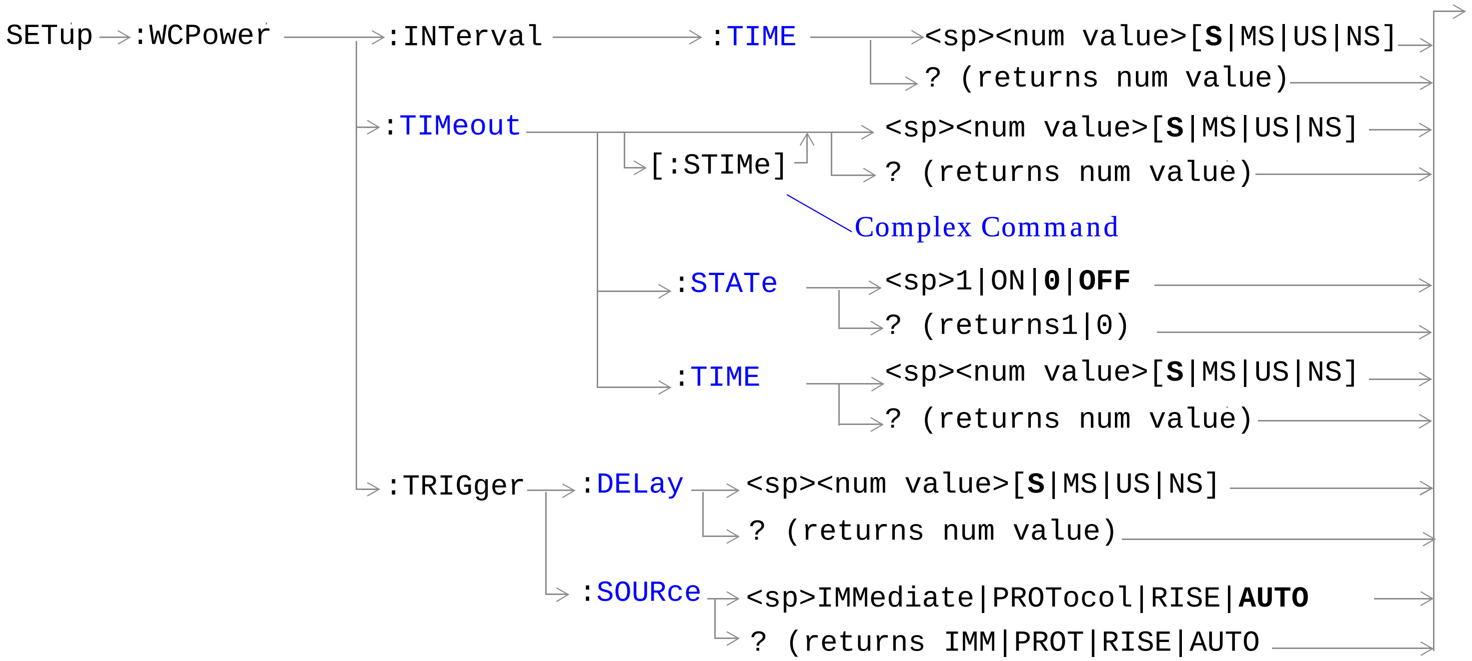
Function	Sets/queries the timeslot to test in the code domain test.
Setting	Range: 0 to 14
Query	Range: 0 to 14
*RST Setting	0
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WCDOMAIN:TSLot"
```

SETup:WCPower





“Diagram Conventions” on page 368

SETup:WCPower:CONTinuous

Function	Sets/queries the trigger arm state for the channel power measurement. The trigger arm state determines whether the channel power measurement will be made once then stop (0|OFF (single)), or automatically re-arm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WCPOWER:CONTINUOUS OFF"
!Sets measurement to single trigger mode.
```

SETup:WCPower:COUNt[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of channel power measurements to be made in a multi-measurement, and (2) sets the multi-measurement STATe command to 1 (on). The query form returns the number of channel power multi-measurements to be made when multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WCPOWER:COUNT:SNUMBER 5"
!Turns on multi-measurements and sets the number of measurements to 5.
```

SETup:WCPower:COUNt:NUMBer

Function	Sets/queries the number of channel power measurements to be made when the multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WCPOWER:COUNT:NUMBER 5"
!Sets the number of channel power multi-measurements to 5.
```

SETup:WCPower:COUNt:STATe

Function	Sets/queries the channel power multi-measurement state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WCPOWER:COUNT:STATE ON" !Turns on channel power multi-measurements.
```

SETup:WCPower:FILTer[:RRC]

Function	Sets/queries the state of the root-raised cosine (RRC) filter.
Setting	Range: ON | OFF
Query	Range: ON | OFF
*RST Setting	OFF
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WCPOWER:FILTER:RRC ON" !Turns on the RRC filter.
```

SETup:WCPower:INTerval:TIME

Function	Sets/queries the channel power measurement interval. 10 milliseconds represents a full frame.
Setting	Range: 0.1 to 10 milliseconds Resolution: 100 nanoseconds (minimum)
Query	Range: 0.01 to 10 milliseconds
*RST Setting	0.6667 ms (one slot interval)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WCPOWER:INTERVAL:TIME 10MS"
!Sets interval time to 10 milliseconds.
```

SETup:WCPower:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the channel power measurement's timeout (see "Measurement Timeouts") value, and (2) sets the channel power measurement's timeout STATe to 1 (on). The query form returns the channel power measurement's timeout value.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds, on
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WCPOWER:TIMEOUT:STIME 5 S"
!Sets timeout state to ON and sets the timeout time to 5 seconds.
```

SETup:WCPower:TIMeout:STATe

Function	Sets/queries the channel power measurement's timeout (see "Measurement Timeouts") state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WCPOWER:TIMEOUT:STATE ON"
```

SETup:WCPower:TIMeout:TIME

Function	Sets/queries the channel power measurement's timeout (see "Measurement Timeouts") setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WCPOWER:TIMEOUT:TIME 5 S"
```

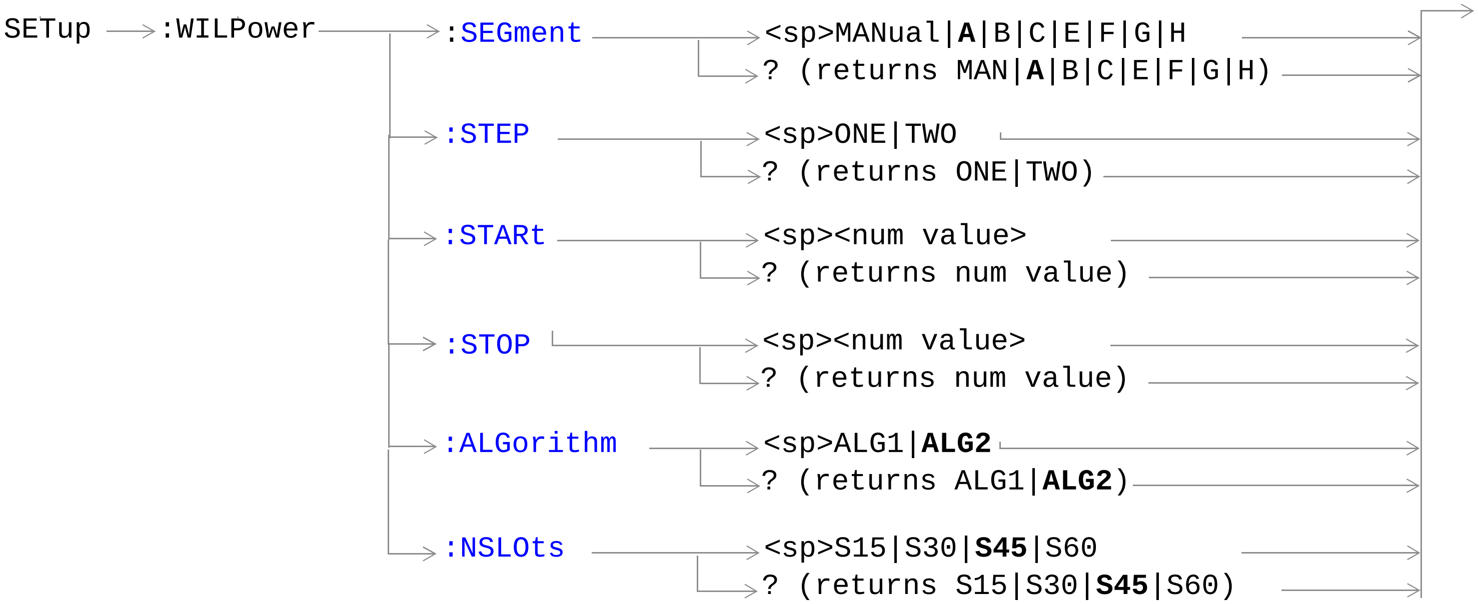
SETup:WCPower:TRIGger:DELay

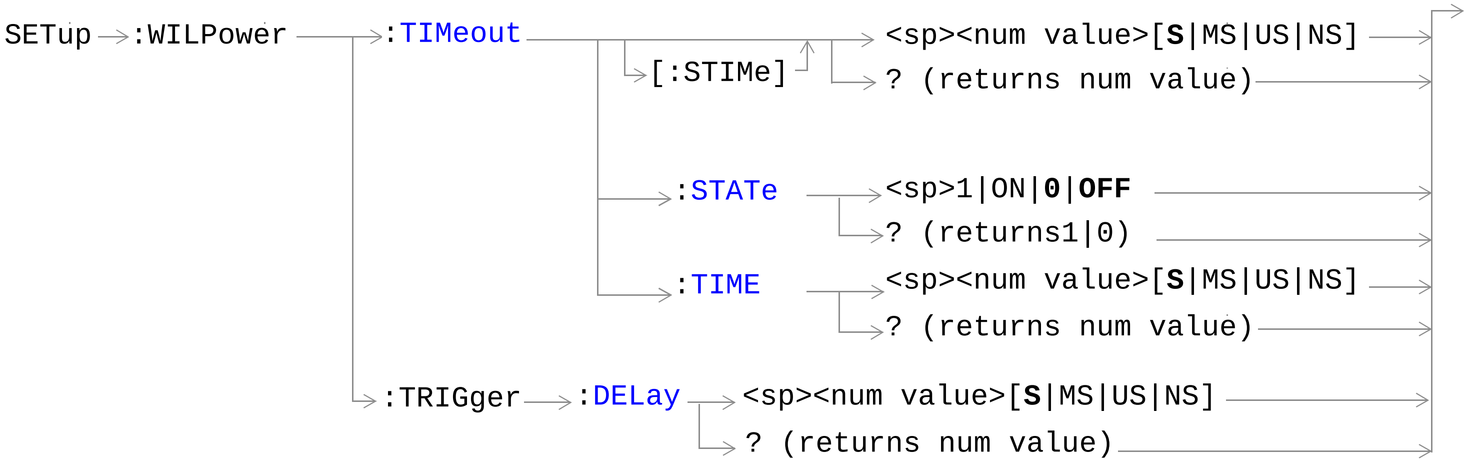
Function	Sets/queries the channel power measurement's trigger delay setting. This setting can be used to delay the measurement trigger in order to start a measurement during a specific timeslot in the frame. For example, a 1.333 ms delay would cause the trigger to wait until after the first two timeslots have elapsed.
Setting	Range: -10 to 10 milliseconds Resolution: 0.0001 millisecond
Query	Range: -10 to 10 milliseconds
*RST Setting	0 seconds
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SETUP:WCPOWER:TRIGGER:DELAY 1MS"`	

SETup:WCPower:TRIGger:SOURce

Function	Sets/queries the channel power measurement's trigger source.
Setting	Range: IMMediate | PROTocol | RISE | AUTO
Query	Range: IMM | PROT | RISE | AUTO
*RST Setting	AUTO
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SETUP:WCPOWER:TRIGGER:SOURCE IMMEDIATE"`	

SETup:WILPower





“Diagram Conventions” on page 368

SETup:WILPower:ALGorithm

Function	Sets/queries the power control algorithm for uplink channels. This setting is useful only when the test segment is set to Manual (see "SETup:WILPower:SEGment") and the start power is different from the stop power. See "Inner Loop Power Measurement Description" on page 72 for more information.
Setting	Range: ALG1 | ALG2
Query	Range: ALG1 | ALG2
*RST Setting	ALG2
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"SETup:WILPower:ALGorithm ALG1"
!Sets Power control algorithm to use algorithm 1.
```

SETup:WILPower:NSLOts

Function	Sets/queries the number of timeslots to be measured which equals to the total number of TPC commands sent for the chosen test segments. This setting is used only during two test configurations: when Test Segment A is selected and when Test Segment Manual is selected with Start Power and Stop Power set to the same values. See "Inner Loop Power Measurement Description" on page 72 for more information. The following sequence of TPC commands are sent in accordance with the selected number of timeslots: • 100000101010101 (Number of Slots = 15) • 100000101010101111101000001010 (Number of Slots = 30) • 100000101010101111101000001010101011111010000 (Number of Slots = 45) • 100000101010101111101000001010101011111010000010101010111110 (Num of Slots = 60)
Setting	Range: S15 | S30 | S45 | S60
Query	Range: S15 | S30 | S45 | S60
*RST Setting	S45
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"SETup:WILPower:NSLOts S60"
!Sets the number of timeslots to be measured to 60.
```

SETup:WILPower:SEGment

Function	Sets/queries the Inner Loop Power control measurement configuration. With Manual selected, you can build a custom test segment to run. If you select a test segment other than Manual, the test set will run a single test segment as specified in the standard (referred to as Test Steps in the standard). See "Inner Loop Power Measurement Description" on page 72 for more information.
Setting	Range: MANual | A | B | C | E | F | G | H
Query	Range: MANual | A | B | C | E | F | G | H
*RST Setting	A
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"SETup:WILPower:SEGment MAN"
!Sets the segment to be measured to manual.
```

SETup:WILPower:STEP

Function	Sets/queries the power control step size for the UE transmitter which is the change in the UE transmitter output power in response to a single TPC_cmd derived at UE. ONE is the change of 1 dB and TWO is the change of 2 dB. This setting is useful only when the test segment is set to Manual (see "SETup:WILPower:SEGment") and the power control algorithm is set to ALG1 (see "SETup:WILPower:ALGorithm" . See "Inner Loop Power Measurement Description" on page 72 for more information.
Setting	Range: ONE | TWO
Query	Range: ONE | TWO
*RST Setting	TWO
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"SETup:WILPower:STEP ONE"
!Sets Power control step size to 1 dB.
```

SETup:WILPower:STARt

Function	Sets/queries the start power for the measurement in manual mode (see "SETup:WILPower:SEGment"). The UE will be instructed to the start power and make the measurements while ramping up/down the power to the specified stop power. See "Inner Loop Power Measurement Description" on page 72 for more information.
Setting	Range: -61 dBm to +30 dBm (-50 dBm to +24 dBm for Class 1 UE) Resolution: 1 dBm
Query	Range: -61 dBm to +30 dBm (-50 dBm to +24 dBm for Class 1 UE)
*RST Setting	+24 dBm
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"SETup:WILPower:STARt 10"
!Sets Power control algorithm to use algorithm 1.
```

SETup:WILPower:STOP

Function	Sets/queries the stop power for the measurement in manual mode (see "SETup:WILPower:SEGment"). The UE will be instructed to the start power and make the measurements while ramping up/down the power to the specified stop power. See "Inner Loop Power Measurement Description" on page 72 for more information.
Setting	Range: -61 dBm to +30 dBm (-50 dBm to +24 dBm for Class 1 UE) Resolution: 1 dBm
Query	Range: -61 dBm to +30 dBm (-50 dBm to +24 dBm for Class 1 UE)
*RST Setting	+24 dBm
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"SETup:WILPower:STOP 0"
```

SETup:WILPower:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the Inner Loop Power control measurement's timeout (see "Measurement Timeouts") value, and (2) sets the Inner Loop Power control measurement's timeout STATe to 1 (on). The query form returns the Inner Loop Power control measurement's timeout value.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds, on
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"SETUP:WILPOWER:TIMEOUT:STIME 5 S"
!Sets timeout state to ON and sets the timeout time to 5 seconds.
```

SETup:WILPower:TIMeout:STATe

Function	Sets/queries the Inner Loop Power control measurement's timeout (see "Measurement Timeouts") state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"SETUP:WILPOWER:TIMEOUT:STATE ON"
```

SETup:WILPower:TIMeout:TIME

Function	Sets/queries the Inner Loop Power control measurement's timeout (see "Measurement Timeouts") setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds
Requirements	Test Application Revision: A.03 and above

Programming Example

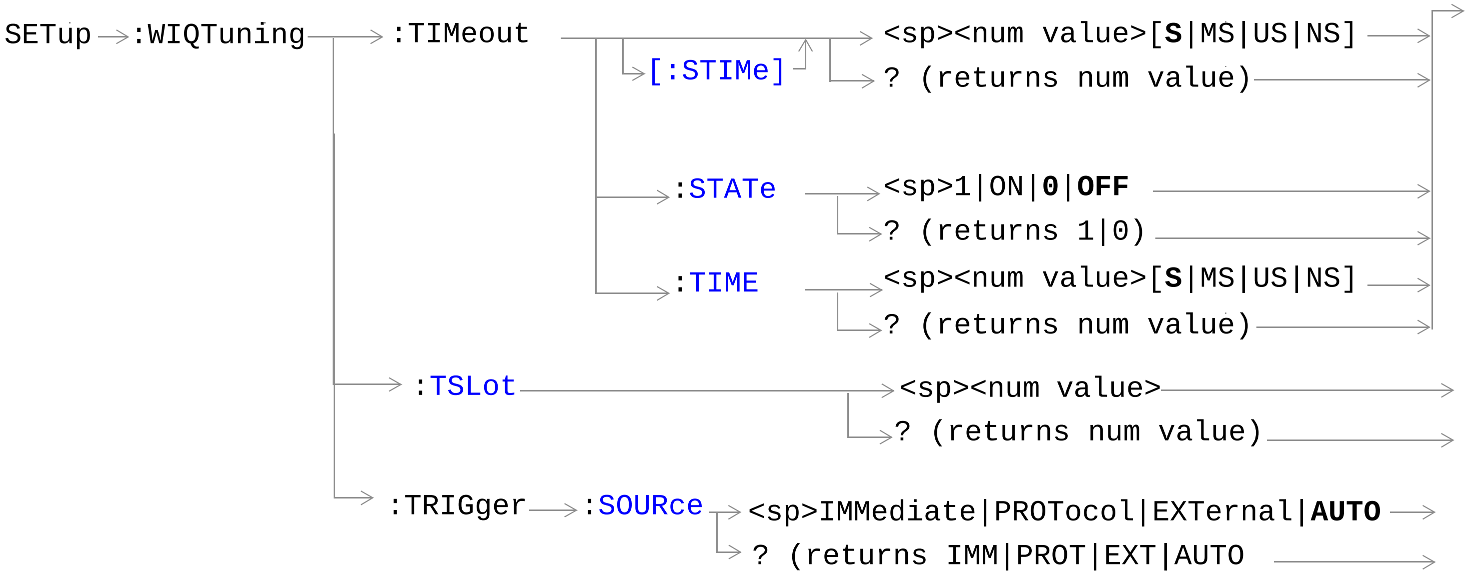
```
OUTPUT 714;"SETUP:WILPOWER:TIMEOUT:TIME 5 S"
```

SETup:WILPower:TRIGger:DELay

Function	Sets/queries the Inner Loop Power control measurement's trigger delay setting. This setting can be used to delay the measurement trigger in order to start a measurement during a specific timeslot in the frame. For example, a 1.333 ms delay would cause the trigger to wait until after the first two timeslots have elapsed.
Setting	Range: -10 to 10 milliseconds Resolution: 0.0001 millisecond
Query	Range: -10 to 10 milliseconds
*RST Setting	0 seconds
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"SETUP:WILPOWER:TRIGGER:DELAY 1MS"
```

SETup:WIQTuning



"Diagram Conventions" on page 368

SETup:WIQTuning:CONTinuous

Function	Sets/queries the trigger arm state for the IQ tuning measurement. The trigger arm state determines whether the IQ tuning measurement will be made once then stop (0|OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"SETup:WIQTuning:CONTINUOUS OFF"
!Sets measurement to single trigger mode.
```

SETup:WIQTuning:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the IQ tuning measurement's timeout value, and (2) sets the IQ tuning measurement's timeout STATe to 1 (on). The query form returns the waveform quality measurement's timeout value.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds, on
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"SETup:WIQTuning:TIMEout:STIMe 5S"
!Sets timeout state to ON and sets the timeout time to 5 seconds.
```

SETup:WIQTuning:TIMeout:STATe

Function	Sets/queries the IQ tuning measurement's timeout state.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"SETup:WIQTuning:TIMeout:STATe ON"
```

SETup:WIQTuning:TIMeout:TIME

Function	Sets/queries the IQ tuning measurement’s timeout setting to be used when the timeout state is set to ON.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"SETup:WIQTuning:TIMeout:TIME 5S"`	

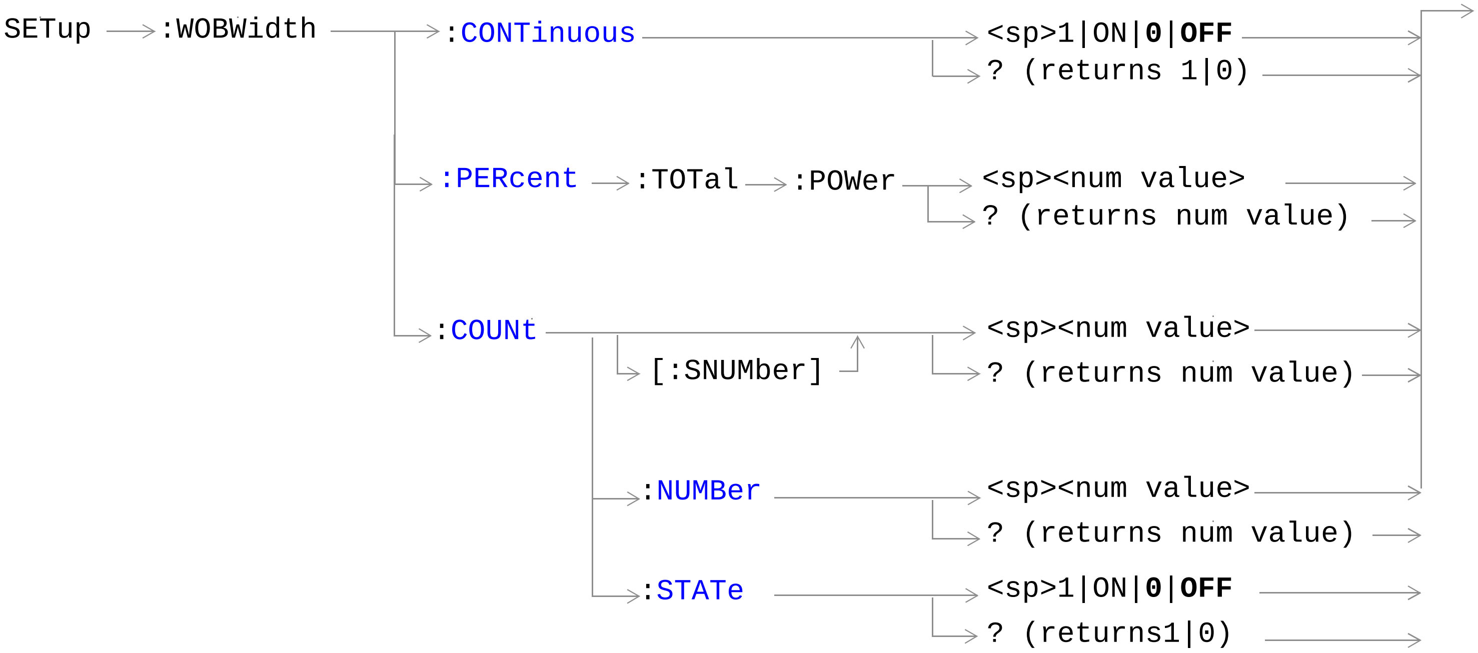
SETup:WIQTuning:TSLot

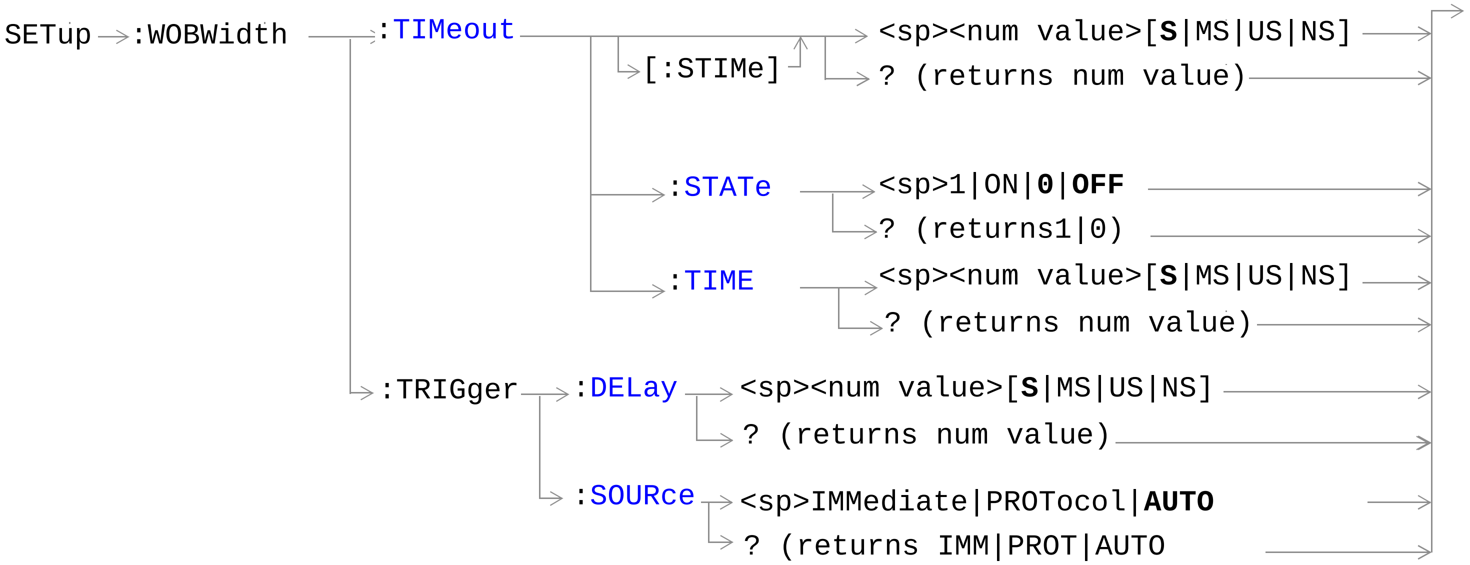
Function	Selects which one of the 15 timeslots found in the frame to make measurements on. The measurement interval is defined to be 1 timeslot long.
Setting	Range: 0 to 14 Resolution: 1
Query	Range: 0 to 14
*RST Setting	1
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"SETup:WIQTuning:TSLot 10"`	

SETup:WIQTuning:TRIGger:SOURce

Function	Sets/queries the waveform quality measurement’s trigger source.
Setting	Range: IMMediate | PROTocol | EXTernal | AUTO
Query	Range: IMM | PROT | EXT | AUTO
*RST Setting	AUTO
Requirements	Test Application Revision: A.03 and above
Programming Example `OUTPUT 714;"SETup:WIQTuning:TRIGger:SOURce AUTO" !selects auto triggering`	

SETup:WOBWidth





“Diagram Conventions” on page 368

SETup:WOBWidth:CONTinuous

Function	Sets/queries the trigger arm state for the occupied bandwidth measurement. The trigger arm state determines whether the occupied bandwidth measurement will be made once then stop (0|OFF (single)), or automatically re-arm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WOBWIDTH:CONTINUOUS OFF"
!Sets measurement to single trigger mode.
```

SETup:WOBWidth:PERcent:TOTal:POWer

Function	Sets/queries the percentage of total power parameter used in the occupied bandwidth measurement.
Setting	Range: 70.0 to 99.0 percent
Query	Range: 70.0 to 99.0 percent
*RST Setting	99 percent
Requirements	Test Application Revision: A.03 and above

Programming Example

```
OUTPUT 714;"SETup:WOBWidth:PERcent:TOTal:POWer 99"
!Sets percentage of total power to 99%.
```

SETup:WOBWidth:COUNt[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of occupied bandwidth measurements to be made in a multi-measurement, and (2) sets the multi-measurement STATe command to 1 (on). The query form returns the number of occupied bandwidth multi-measurements to be made when multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WOBWIDTH:COUNT:SNUMBER 5"
!Turns on multi-measurements and sets the number of measurements to 5.
```

SETup:WOBWidth:COUNt:NUMBer

Function	Sets/queries the number of occupied bandwidth measurements to be made when the multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WOBWIDTH:COUNT:NUMBER 5"
!Sets the number of occupied bandwidth multi-measurements to 5.
```

SETup:WOBWidth:COUNt:STATe

Function	Sets/queries the occupied bandwidth multi-measurement state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WOBWIDTH:COUNT:STATE ON" !Turns on occupied bandwidth
multi-measurements.
```

SETup:WOBWidth:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the occupied bandwidth measurement’s timeout (see “Measurement Timeouts”) value, and (2) sets the occupied bandwidth measurement’s timeout STATe to 1 (on). The query form returns the occupied bandwidth measurement’s timeout value.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds, on
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WOBWIDTH:TIMEOUT:STIME 5 S"
!Sets timeout state to ON and sets the timeout time to 5 seconds.
```

SETup:WOBWidth:TIMeout:STATe

Function	Sets/queries the occupied bandwidth measurement’s timeout (see “Measurement Timeouts”) state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"SETUP:WOBWIDTH:TIMEOUT:STATE ON"`	

SETup:WOBWidth:TIMeout:TIME

Function	Sets/queries the occupied bandwidth measurement’s timeout (see “Measurement Timeouts”) setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"SETUP:WOBWIDTH:TIMEOUT:TIME 5 S"`	

SETup:WOBWidth:TRIGger:DELay

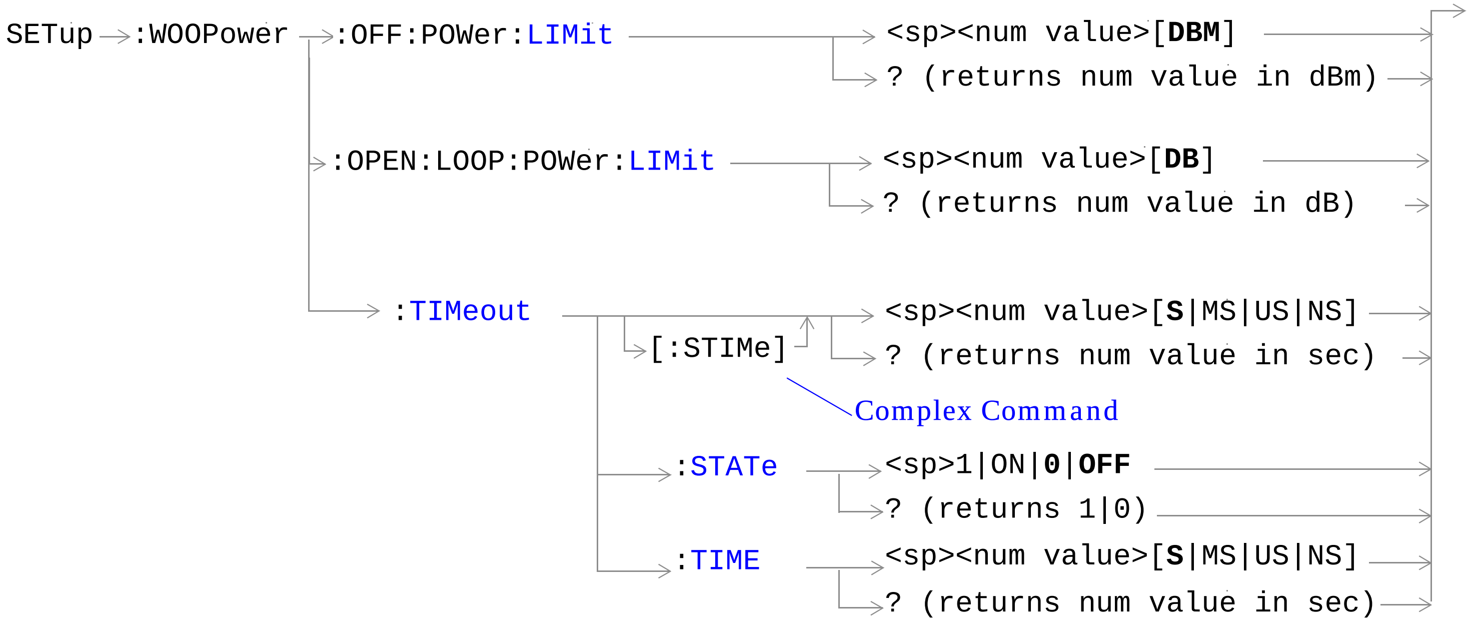
Function	Sets/queries the occupied bandwidth measurement’s trigger delay setting. This setting can be used to delay the measurement trigger in order to start a measurement during a specific timeslot in the frame. For example, a 1.333 ms delay would cause the trigger to wait until after the first two timeslots have elapsed.
Setting	Range: -10 to 10 milliseconds Resolution: 1 nanosecond
Query	Range: -10 to 10 milliseconds
*RST Setting	0 seconds
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"SETUP:WOBWIDTH:TRIGGER:DELAY 1MS"`	

SETup:WOBWidth:TRIGger:SOURce

Function	Sets/queries the occupied bandwidth measurement’s trigger source.
Setting	Range: IMMediate | PROTocol | AUTO
Query	Range: IMM | PROT | AUTO
*RST Setting	AUTO
Requirements	Test Application Revision: A.02 and above
Programming Example	

```
OUTPUT 714;"SETUP:WOBWIDTH:TRIGGER:SOURCE IMMEDIATE"
```

SETup:WOOPower



"Diagram Conventions" on page 368

SETup:WOOPower:OFF:POWer:LIMit

Function	Sets/queries the Off Power Limit (see "PRACH Transmit On/Off Power Measurement Parameters" on page 84).
Requirements	Test Application Revision: A.03 and above
Setting	Range: -99.99 to 99.0 Resolution: 0.1
Query	Same as setting.
*RST Setting	-55 dBm

Programming Example

```
OUTPUT 714;"SETup:WOOPower:OFF:POWer:LIMit -54"
! Sets the Off Power Limit to -54 dBm.
```

SETup:WOOPower:OPEN:LOOP:POWer:LIMit

Function	Sets/queries the Open Loop Power Error Limit (see "PRACH Transmit On/Off Power Measurement Parameters" on page 84).
Requirements	Test Application Revision: A.03 and above
Setting	Range: 0.0 to 99.9 Resolution: 0.1
Query	Same as setting.
*RST Setting	9.0 dB

Programming Example

```
OUTPUT 714;"SETup:WOOPower:OPEN:LOOP:POWer:LIMit 10"
! Sets the Open Loop Power Error Limit to 10 dB.
```

SETup:WOOPower:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the PRACH transmit on/off power measurement's timeout value (see "Measurement Timeouts" on page 288), and (2) sets the timeout STATe to 1 (on). The query form returns the PRACH transmit on/off power measurement's timeout value.
Requirements	Test Application Revision: A.03 and above
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Same as setting
*RST Setting	10 seconds, 0 (off)

Programming Example

```
OUTPUT 714;"SETup:WOOPower:TIMeout 5"
!Sets timeout state to ON and sets the timeout time to 5 seconds.
```

SETup:WOOPower:TIMeout:STATe

Function	Sets/queries the PRACH transmit on/off power measurement's timeout state (see "Measurement Timeouts" on page 288).
Requirements	Test Application Revision: A.03 and above
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)

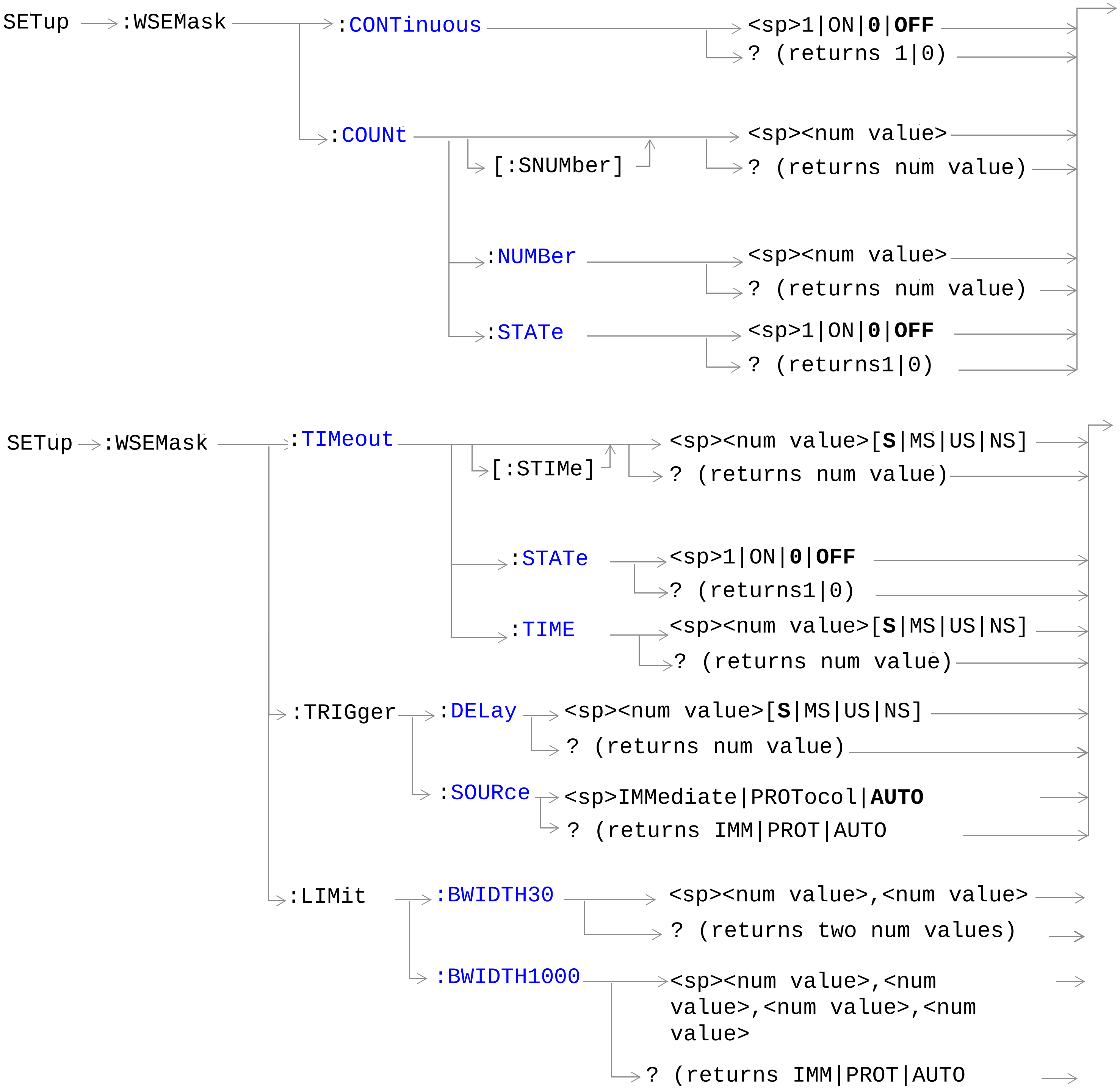
Programming Example

```
OUTPUT 714;"SETup:WOOPower:TIMeout:STATe ON"
```

SETup:WOOPower:TIMeout:TIME

Function	Sets/queries the PRACH transmit on/off power measurement’s timeout setting (see “Measurement Timeouts” on page 288) to be used when the timeout state is set to ON.
Requirements	Test Application Revision: A.03 and above
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds
Programming Example `OUTPUT 714;"SETup:WOOPower:TIMeout:TIME 5"`	

SETup:WSEMask



“Diagram Conventions” on page 368

SETup:WSEMask:CONTinuous

Function	Sets/queries the trigger arm state for the spectrum emission mask measurement. The trigger arm state determines whether the spectrum emission mask measurement will be made once then stop (0|OFF (single)), or automatically re-arm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WSEMASK:CONTINUOUS OFF"
!Sets measurement to single trigger mode.
```

SETup:WSEMask:COUNt[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of spectrum emission mask measurements to be made in a multi-measurement, and (2) sets the multi-measurement STATe command to 1 (on). The query form returns the number of spectrum emission mask multi-measurements to be made when multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WSEMASK:COUNT:SNUMBER 5"
!Turns on multi-measurements and sets the number of measurements to 5.
```

SETup:WSEMask:COUNt:NUMBer

Function	Sets/queries the number of spectrum emission mask measurements to be made when the multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WSEMASK:COUNT:NUMBER 5"
!Sets the number of spectrum emission mask multi-measurements to 5.
```

SETup:WSEMask:COUNt:STATe

Function	Sets/queries the spectrum emission mask multi-measurement state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WSEMASK:COUNT:STATE ON" !Turns on spectrum emission mask
multi-measurements.
```

SETup:WSEMask:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the spectrum emission mask measurement's timeout (see "Measurement Timeouts") value, and (2) sets the spectrum emission mask measurement's timeout STATe to 1 (on). The query form returns the spectrum emission mask measurement's timeout value.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds, on
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WSEMASK:TIMEOUT:STIME 5 S"
!Sets timeout state to ON and sets the timeout time to 5 seconds.
```

SETup:WSEMask:TIMeout:STATe

Function	Sets/queries the spectrum emission mask measurement's timeout (see "Measurement Timeouts") state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"SETUP:WSEMASK:TIMEOUT:STATE ON"
```

SETup:WSEMask:TIMeout:TIME

Function	Sets/queries the spectrum emission mask measurement's timeout (see "Measurement Timeouts") setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"SETUP:WSEMASK:TIMEOUT:TIME 5 S"`	

SETup:WSEMask:TRIGger:DELay

Function	Sets/queries the spectrum emission mask measurement's trigger delay setting. This setting can be used to delay the measurement trigger in order to to start a measurement during a specific timeslot in the frame. For example, a 1.333 ms delay would cause the trigger to wait until after the first two timeslots have elapsed.
Setting	Range: -10 to 10 milliseconds Resolution: 1 nanosecond
Query	Range: -10 to 10 milliseconds
*RST Setting	0 seconds
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"SETUP:WSEMASK:TRIGGER:DELAY 1MS"`	

SETup:WSEMask:TRIGger:SOURce

Function	Sets/queries the spectrum emission mask measurement's trigger source.
Setting	Range: IMMediate | PROTocol | AUTO
Query	Range: IMM | PROT | AUTO
*RST Setting	AUTO
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"SETUP:WSEMASK:TRIGGER:SOURCE IMMEDIATE"`	

SETup:WSEMask:LIMit:BWIDTH30

Function	Sets/queries the spectrum emission mask measurement's pass/fail limits for the 30 kHz bandwidth filter frequency offsets. There are two 30 kHz bandwidth filter pass/fail settings, one for the +/-2.5 MHz offset and one for the +/-3.5 MHz offset.
Setting	Range: -90 to 0 dBc Resolution: 0.01 dBc
Query	Range: -90 to 0
*RST Setting	-35 dBc (+/-2.5 MHz offset), -50 dBc(+/-3.5 MHz offset)
Requirements	Test Application Revision: A.03 and above
Programming Example	

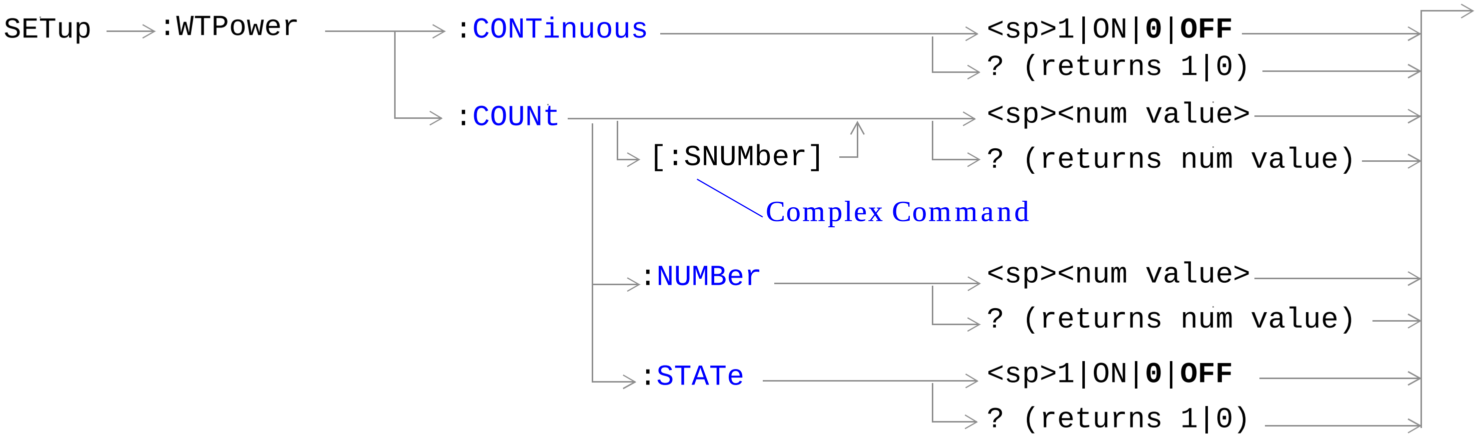
```
OUTPUT 714;"SETUP:WSEMASK:LIMit:BWIDTH30 -35,-34"!Sets the +/-2.5 MHz frequency offset
pass/fail limit to -35 and sets the +/-3.5 MHz frequency offset to -34
```

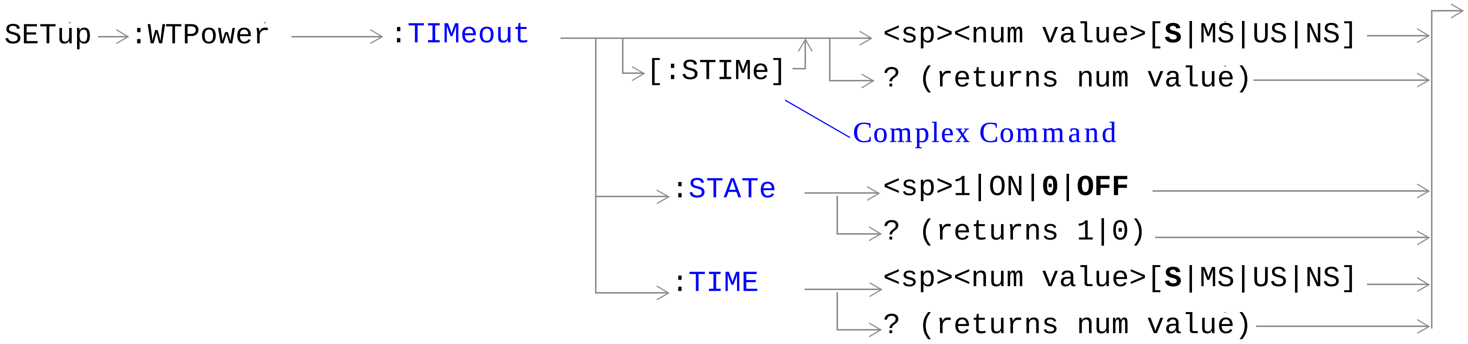
SETup:WSEMask:LIMit:BWIDTH1000

Function	Sets/queries the spectrum emission mask measurement's pass/fail limits for the 1 MHz bandwidth filter frequency offsets. There are four 1 MHz bandwidth filter pass/fail settings • +/-3.5 MHz offset • +/-7.5 MHz offset • +/-8.5 MHz offset • +/-12.5 MHz offset
Setting	Range: -90 to 0 dBc Resolution: 0.01 dBc
Query	Range: -90 to 0
*RST Setting	-35 dBc (+/-3.5 MHz offset), -39 dBc (+/-7.5 MHz offset), -49 dBc (+/-8.5 MHz offset), -49 dBc(+/-12.5 MHz offset)
Requirements	Test Application Revision: A.03 and above
Programming Example	

```
OUTPUT 714;"SETUP:WSEMASK:LIMit:BWIDTH1000 -35,-34,-45,-45"!Sets the pass/fail limits
for the four Spectrum Emissions Measurement 1 MHz filter frequency offsets.
```

SETup:WTPower





“Diagram Conventions” on page 368

SETup:WTPower:CONTinuous

Function	Sets/queries the trigger arm state for the thermal power measurement. The trigger arm state determines whether the thermal power measurement will be made once then stop (0|OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WTPOWER:CONTINUOUS ON"
!Sets measurement to single trigger mode.
```

SETup:WTPower:COUNt[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of thermal power measurements to be made in a multi-measurement, and (2) sets the multi-measurement STATe command to 1 (on). The query form returns the number of thermal power multi-measurements to be made when mulit-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WTPOWER:COUNT:SNUMBER 5"
!Turns on multi-measurements and sets the number of measurements to 5.
```

SETup:WTPower:COUNt:NUMBer

Function	Sets/queries the number of thermal power measurements to be made when the multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WTPOWER:COUNT:NUMBER 5"
!Sets the number of measurements to 5 when the multi-measurement state is set to ON.
```

SETup:WTPower:COUNt:STATe

Function	Sets/queries the multi-measurement state of the thermal power measurement.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WTPOWER:COUNT:STATE ON" !Turns on multi-measurements.
```

SETup:WTPower:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the thermal power measurement’s timeout value, and (2) sets the thermal power measurement’s timeout STATe to 1 (on). The query form returns the channel power measurement’s timeout value.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds, on
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WTPOWER:TIMEOUT:STIME 5S"
!Sets timeout state to ON and sets the timeout time to 5 seconds.
```

SETup:WTPower:TIMeout:STATe

Function	Sets/queries the thermal power measurement’s timeout state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

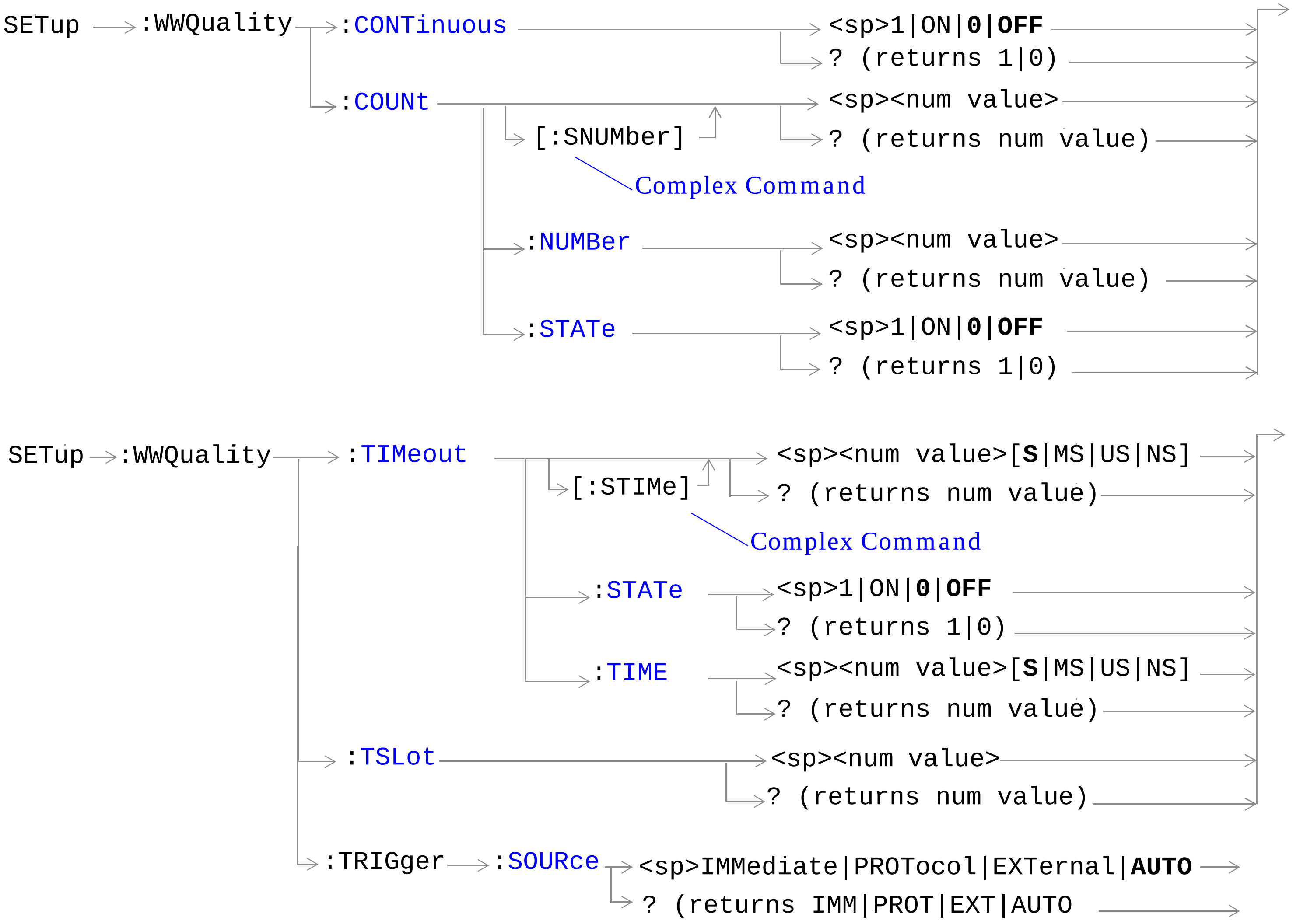
Programming Example

```
OUTPUT 714;"SETUP:WTPOWER:TIMEOUT:STATE ON"
```

SETup:WTPower:TIMeout:TIME

Function	Sets/queries the thermal power measurement’s timeout setting to be used when the timeout state is set to ON.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SETUP:WTPOWER:TIMEOUT:TIME 5S"`	

SETup:WWQuality



"Diagram Conventions" on page 368

SETup:WWQuality:CONTinuous

Function	Sets/queries the trigger arm state for the waveform quality measurement. The trigger arm state determines whether the waveform quality measurement will be made once then stop (0|OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WWQUALITY:CONTINUOUS OFF"
!Sets measurement to single trigger mode.
```

SETup:WWQuality:COUNt[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of waveform quality measurements to be made in a multi-measurement, and (2) sets the multi-measurement STATe command to 1 (on). The query form returns the number of waveform quality multi-measurements to be made when multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WWQUALITY:COUNT:SNUMBER 5"
!Turns on multi-measurements and sets the number of measurements to 5.
```

SETup:WWQuality:COUNt:NUMBer

Function	Sets/queries the number of waveform quality measurements to be made when the multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SETUP:WWQUALITY:COUNT:NUMBER 5"
!Sets the number of measurements to 5 when the multi-measurement state is set to ON.
```

SETup:WWQuality:COUNt:STATe

Function	Sets/queries the multi-measurement state of the waveform quality measurement.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SETUP:WWQUALITY:COUNT:STATE ON" !Turns on multi-measurements.`	

SETup:WWQuality:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the waveform quality measurement's timeout value, and (2) sets the waveform quality measurement's timeout STATe to 1 (on). The query form returns the waveform quality measurement's timeout value.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds, on
Requirements	Test Application Revision: A.01 and above

Programming Example
`OUTPUT 714;"SETUP:WWQUALITY:TIMEOUT:STIME 5S"`
`!Sets timeout state to ON and sets the timeout time to 5 seconds.`	

SETup:WWQuality:TIMeout:STATe

Function	Sets/queries the waveform quality measurement's timeout state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SETUP:WWQUALITY:TIMEOUT:STATE ON"`	

SETup:WWQuality:TIMeout:TIME

Function	Sets/queries the waveform quality measurement's timeout setting to be used when the timeout state is set to ON.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds
Requirements	Test Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;"SETUP:WWQUALITY:TIMEOUT:TIME 5S"
```

SETup:WWQuality:TSLot

Function	Selects which one of the 15 timeslots found in the frame to make measurements on. The measurement interval is defined to be 1 timeslot long.
Setting	Range: 0 to 16 Resolution: 1
Query	Range: 0 to 14
*RST Setting	1
Requirements	Test Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;"SETUP:WWQUALITY:TSLOT 10"
```

SETup:WWQuality:TRIGger:SOURce

Function	Sets/queries the waveform quality measurement's trigger source.
Setting	Range: IMMediate | PROTocol | EXTernal | AUTO
Query	Range: IMM | PROT | EXT | AUTO
*RST Setting	AUTO
Requirements	Test Application Revision: A.02 and above
Programming Example	

```
OUTPUT 714;"SETUP:WWQUALITY:TRIGGER:SOURCE AUTO"
```

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

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“STATus:PRESet” on page 716

“STATus:QUEStionable” on page 717

“Status Byte Register” on page 747

“Standard Event Status Register” on page 748

Status Register Bit Definitions

- “Status Byte Register Bit Assignments” on page 747
- “Standard Event Status Register Bit Assignment” on page 749
- “STATus:QUEStionable Condition Register Bit Assignment” on page 724
  - — “STATus:QUEStionable:CALL Condition Register Bit Assignment” on page 725
  - — “STATus:QUEStionable:CALL:CDMA Condition Register Bit Assignment” on page 726
  - — “STATus:QUEStionable:ERRors:COMMon Register Bit Assignments” on page 733
  - — “STATus:QUEStionable:ERRors Condition Register Bit Assignment” on page 728
  - — “STATus:QUEStionable:ERRors:AMPS Condition Register Bit Assignment” on page 729
  - — “STATus:QUEStionable:ERRors:CDMA Register Bit Assignments” on page 731
  - — “STATus:QUEStionable:ERRors:COMMon Register Bit Assignments” on page 733
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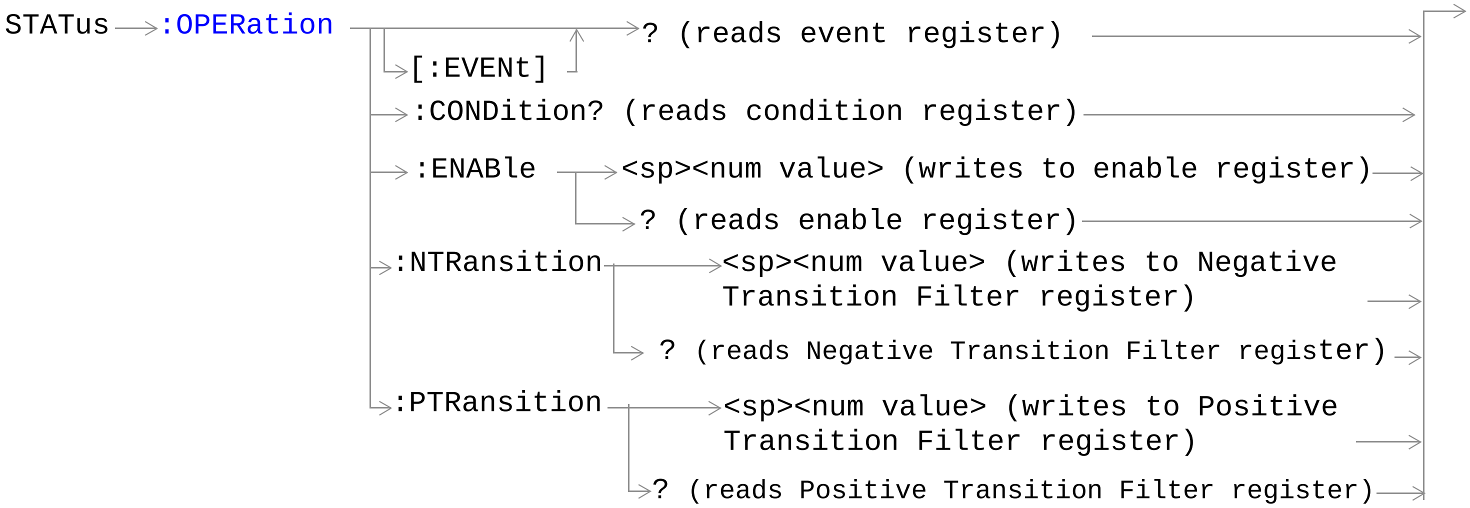
  - — “STATus:QUEStionable:ERRors:WCDMa Register Bit Assignments” on page 743
  - — “STATus:QUEStionable:ERRors:FDD Register Bit Assignments” on page 739
  - — “STATus:QUEStionable:CALL:TA2000 Condition Register Bit Assignment” on page 727
  - — “STATus:QUEStionable:HARDware Condition Register Bit Assignment” on page 745
- “STATus:OPERation Register Bit Assignments” on page 701
  - — “STATus:OPERation:CALL Condition Register Bit Assignment” on page 702
  - — “STATus:OPERation:CALL:COMMon Condition Register Bit Assignment” on page 703
  - — “STATus:OPERation:CALL:DIGital2000 Register Bit Assignment” on page 706

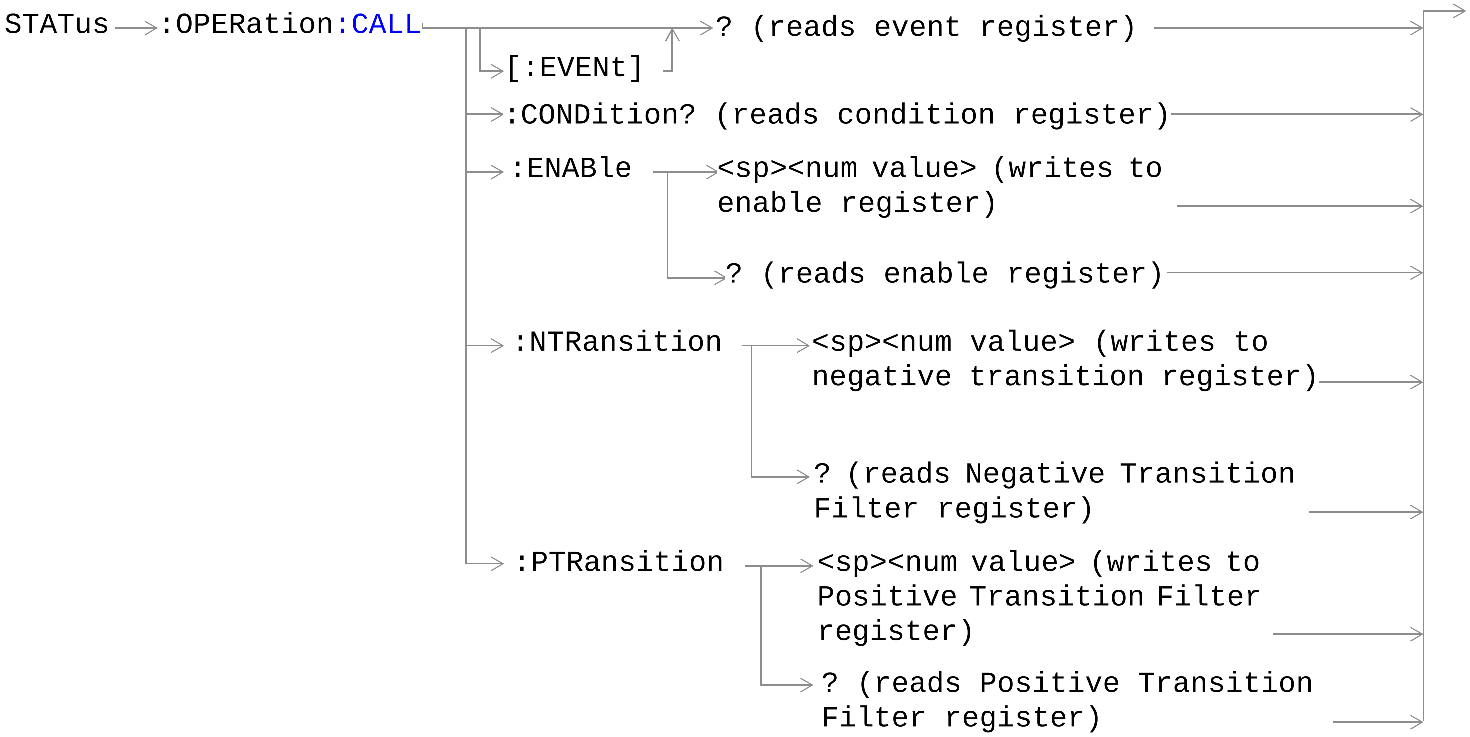
- — “STATus:OPERation:KEYPressed Register Bit Assignments” on page 707
- — “STATus:OPERation:NMRReady Register Bit Assignments” on page 708
- — “STATus:OPERation:NMRReady:AMPS Condition Register Bit Assignment” on page 709
- — “STATus:OPERation:NMRReady:CDMA Register Bit Assignments” on page 710
- — “STATus:OPERation:NMRReady:COMMon Register Bit Assignments” on page 712
- — “STATus:OPERation:NMRReady:<WCDMA | FDD> Register Bit Assignments” on page 713

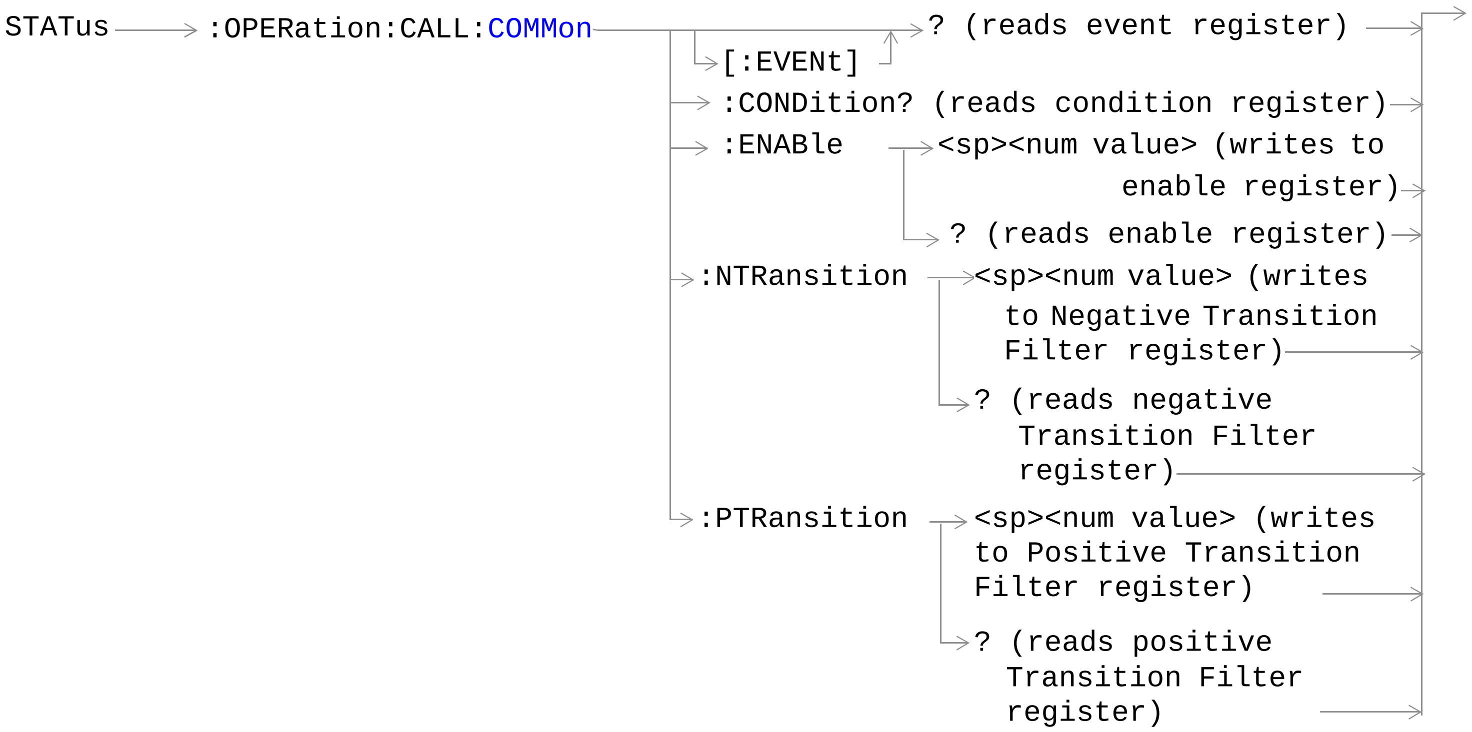
Related Topics

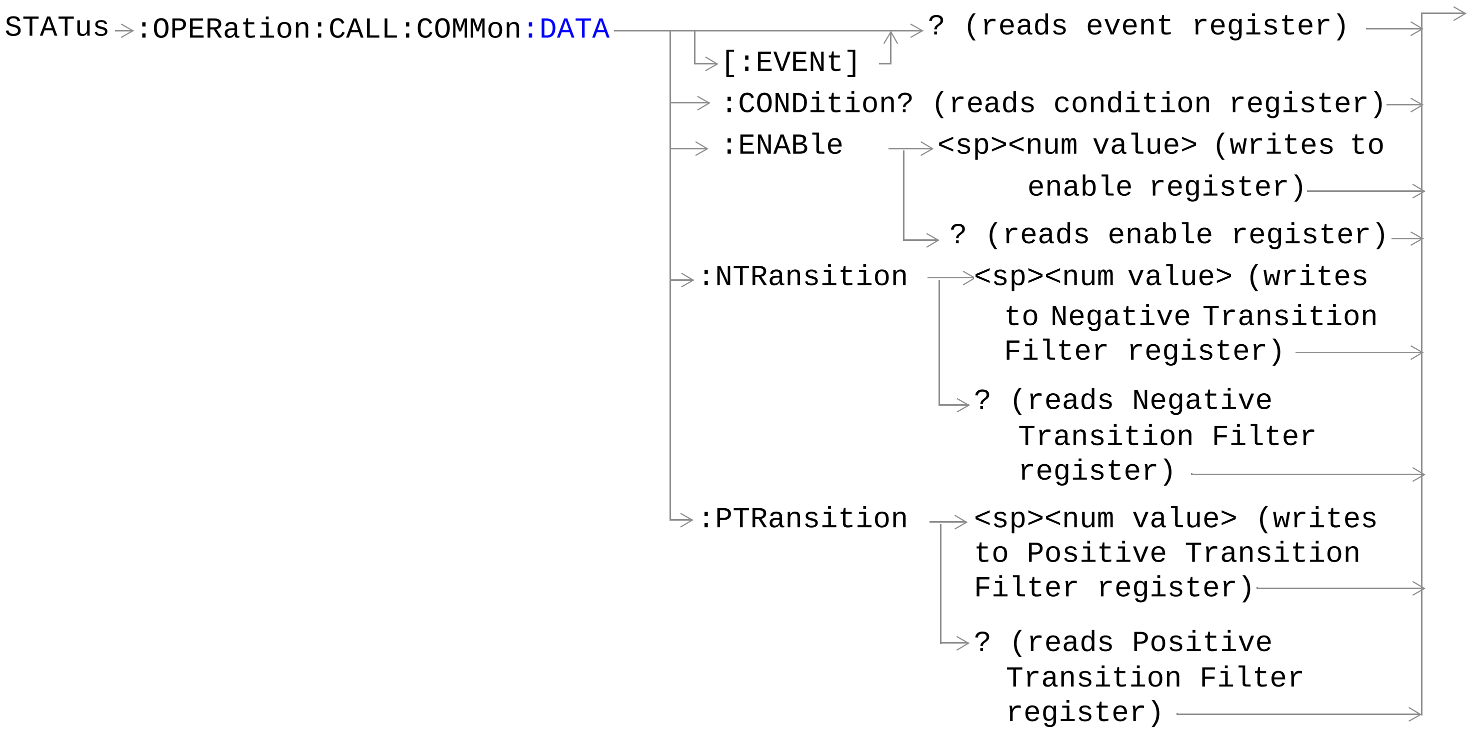
“Description” on page 264

STATus:OPERation:

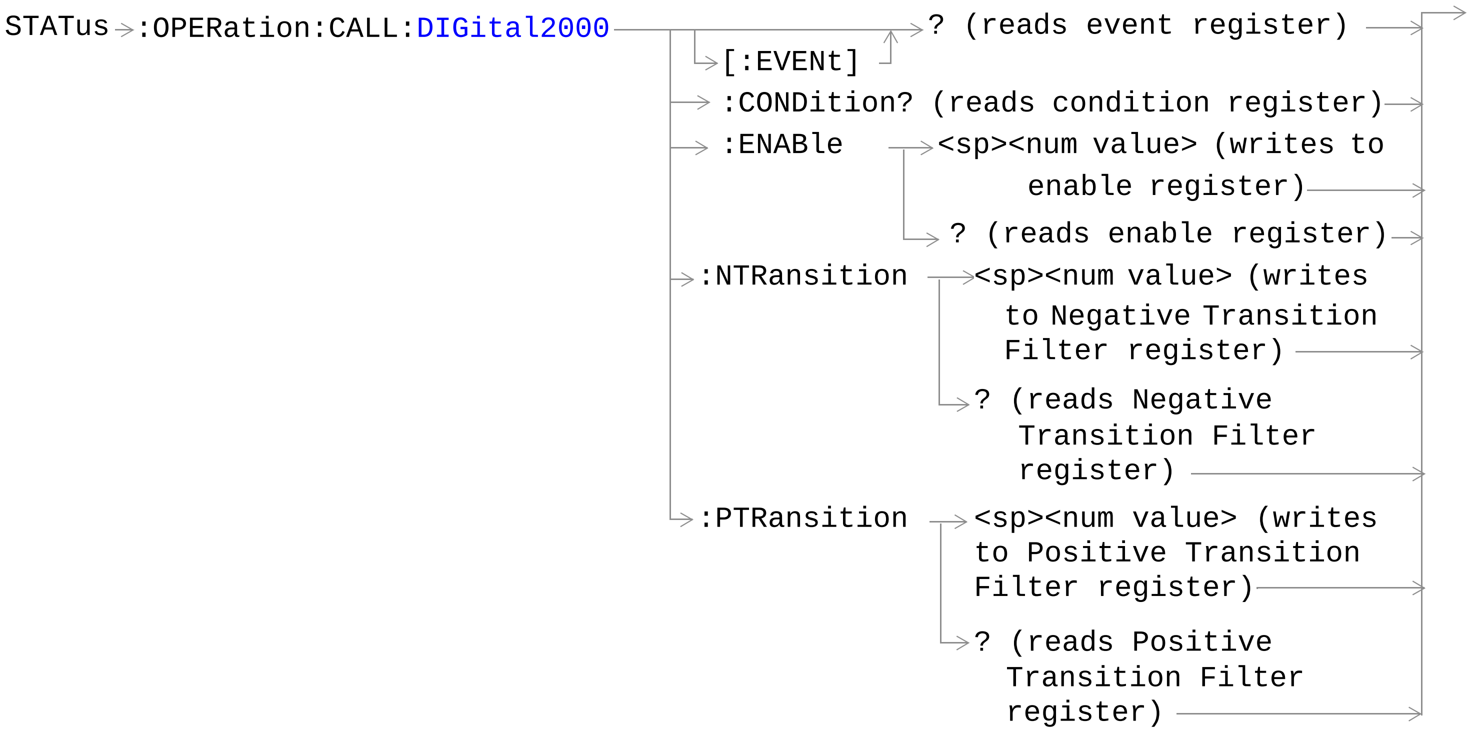


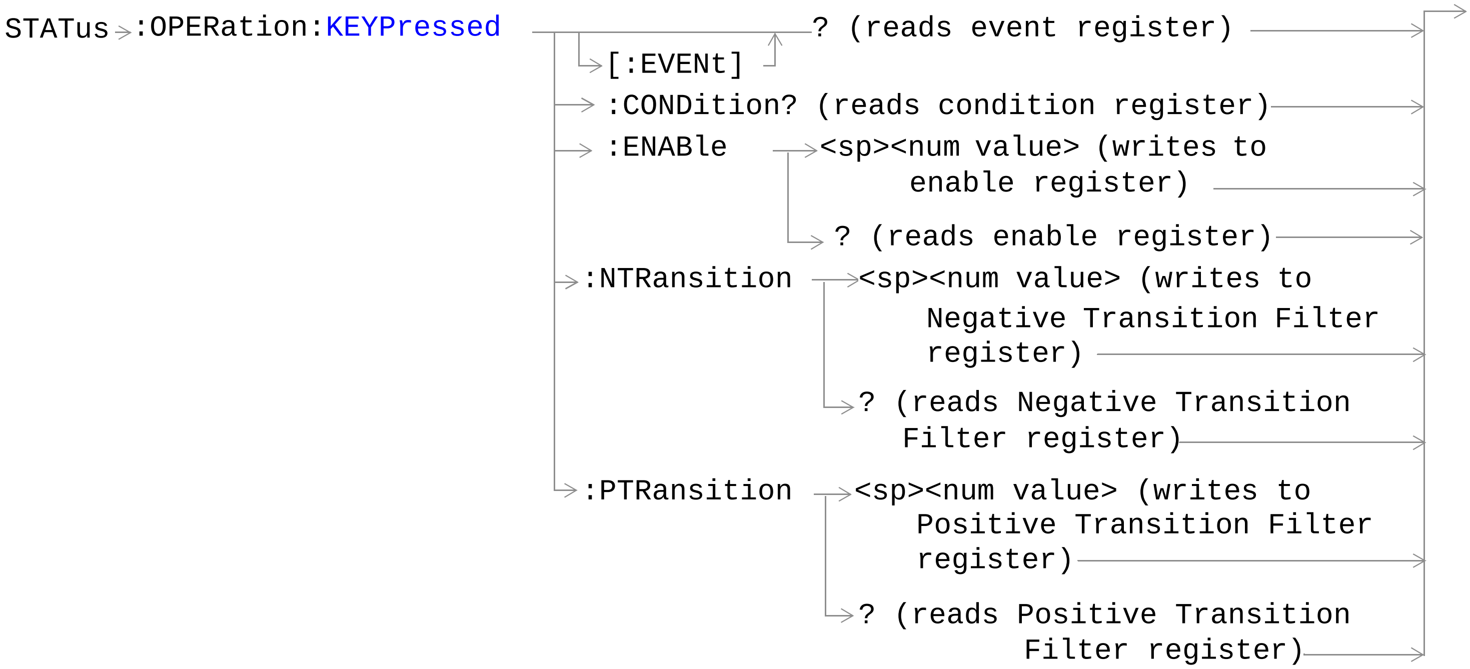


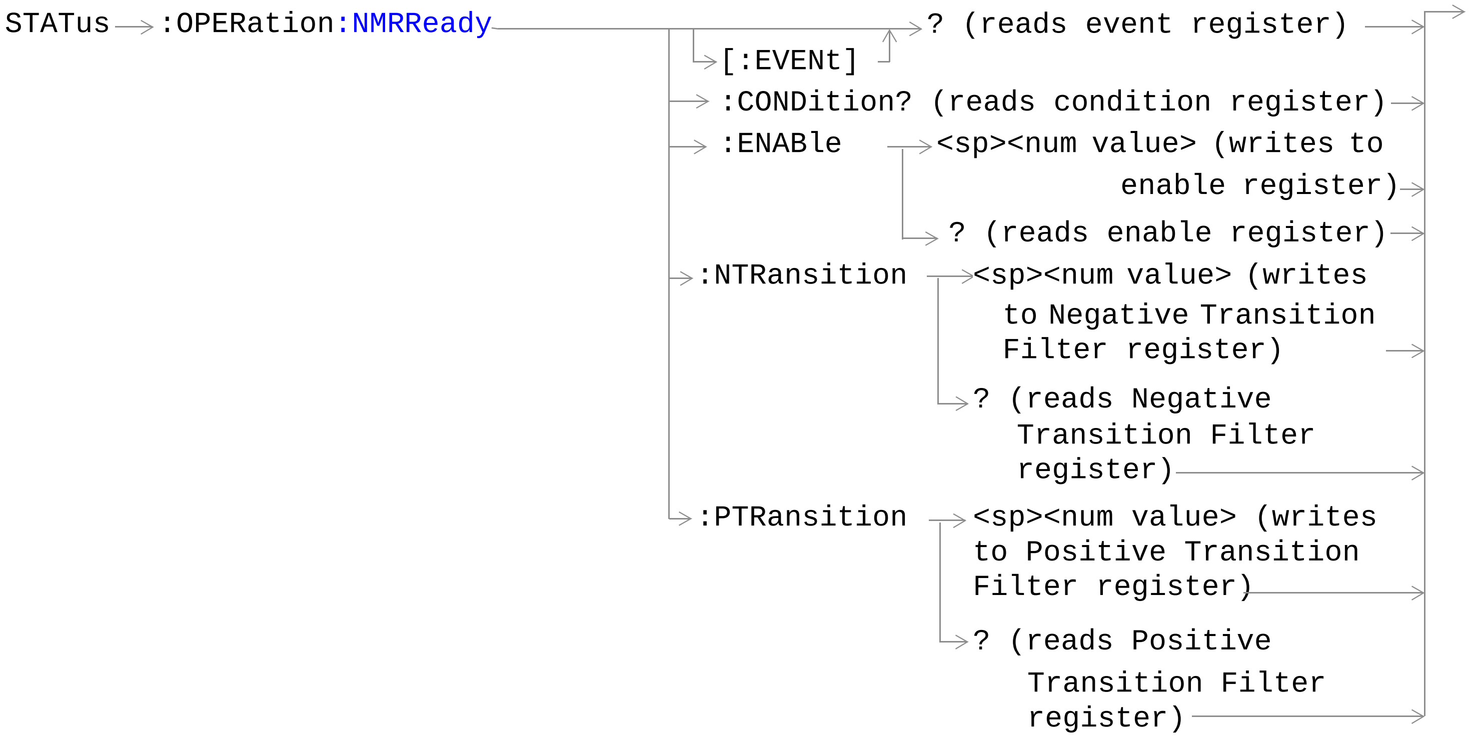

STATus
:OPERation:CALL:COMMon
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads positive Transition Filter register)

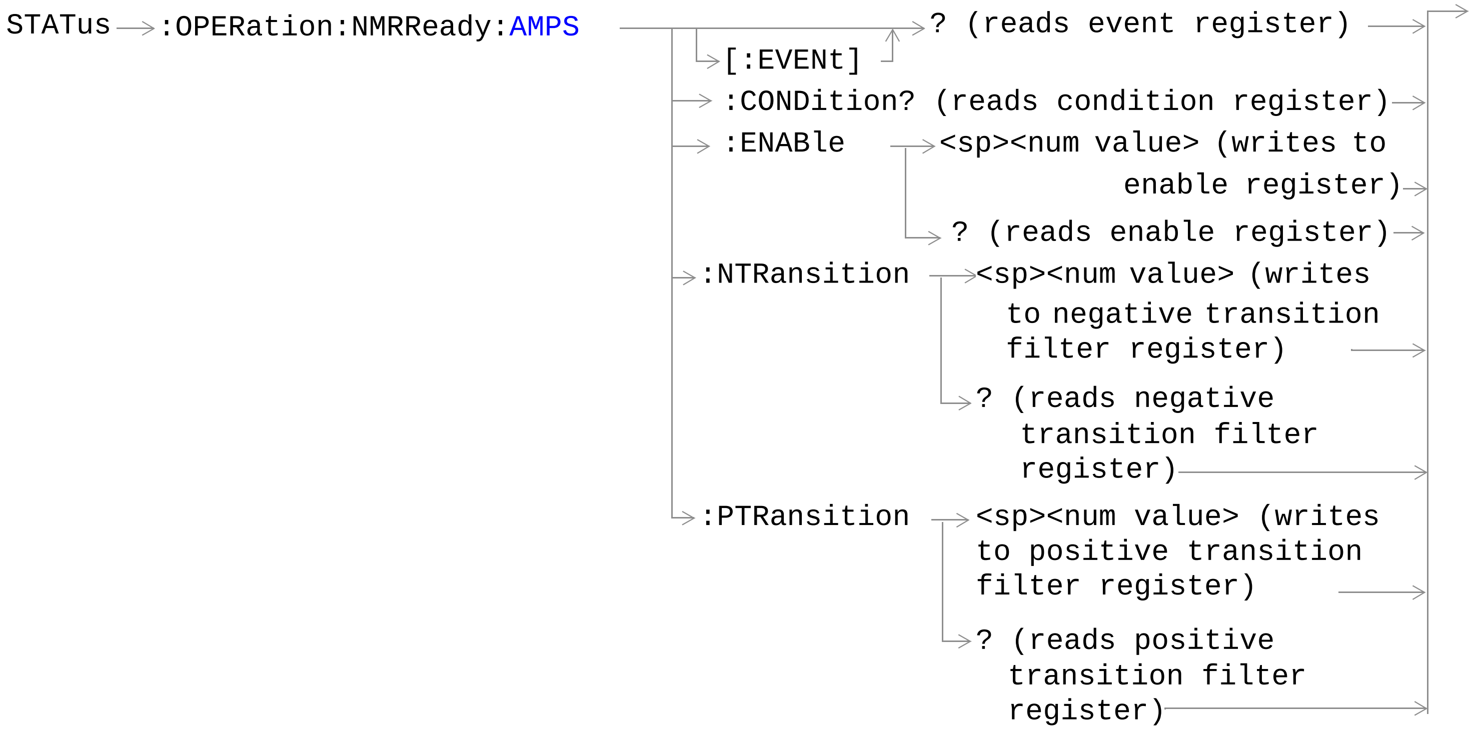

STATus
:OPERation:CALL:COMMon:DATA
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)

STATus:OPERation:

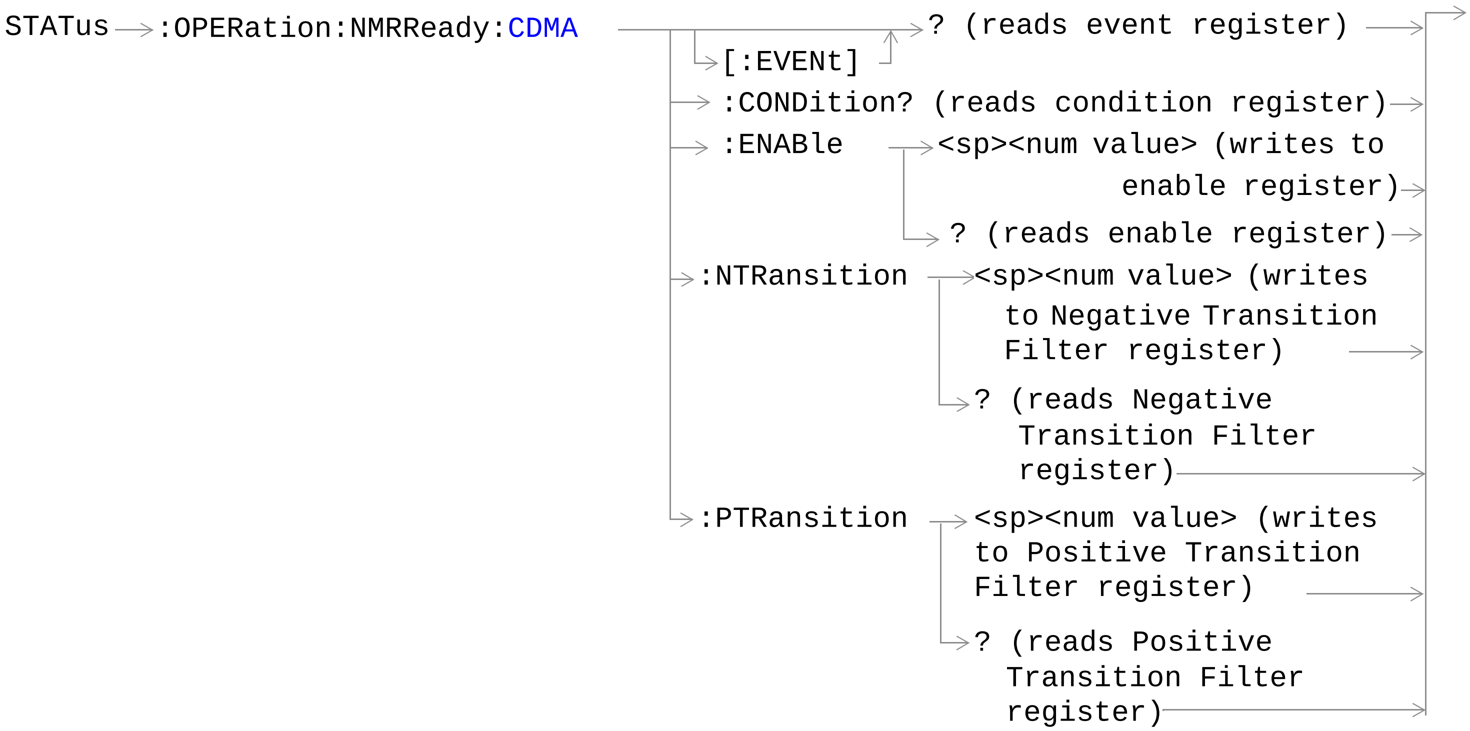


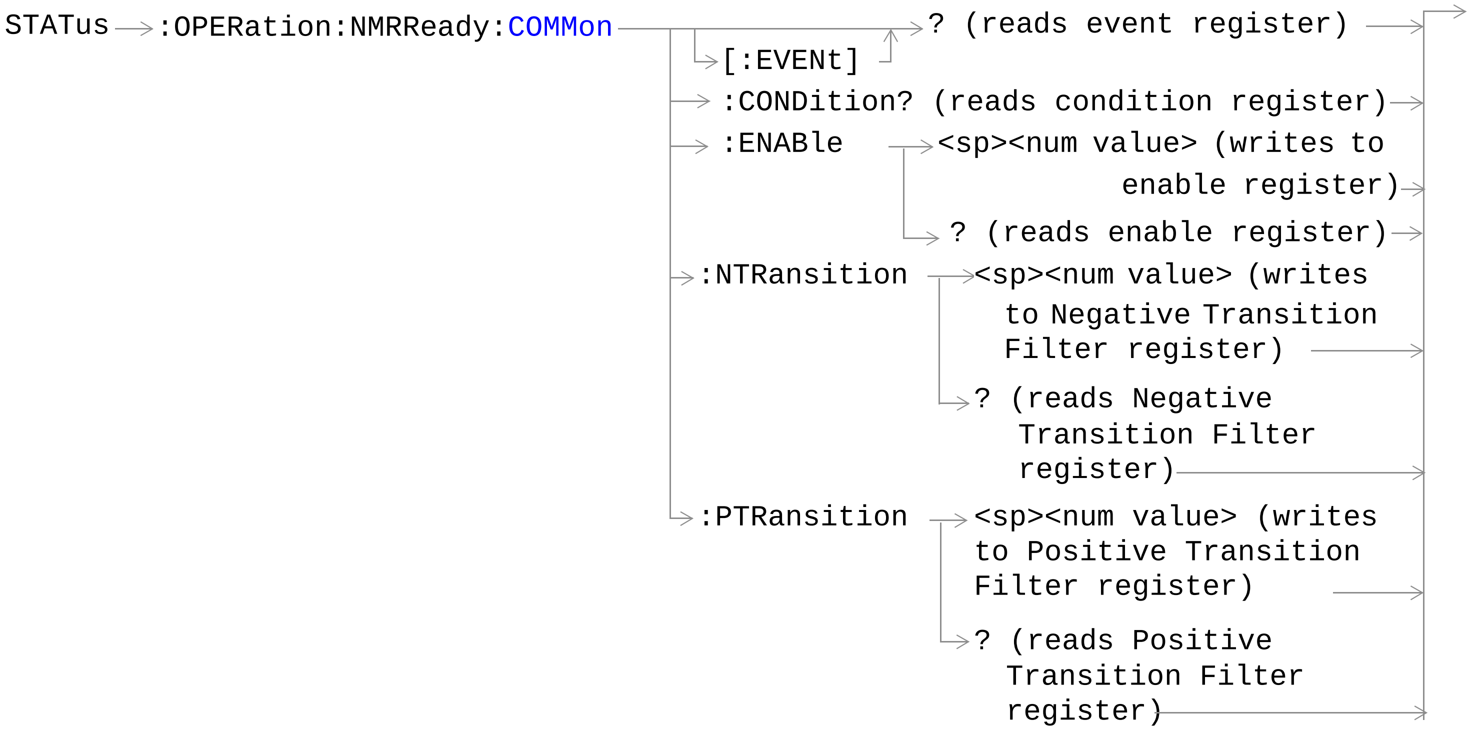


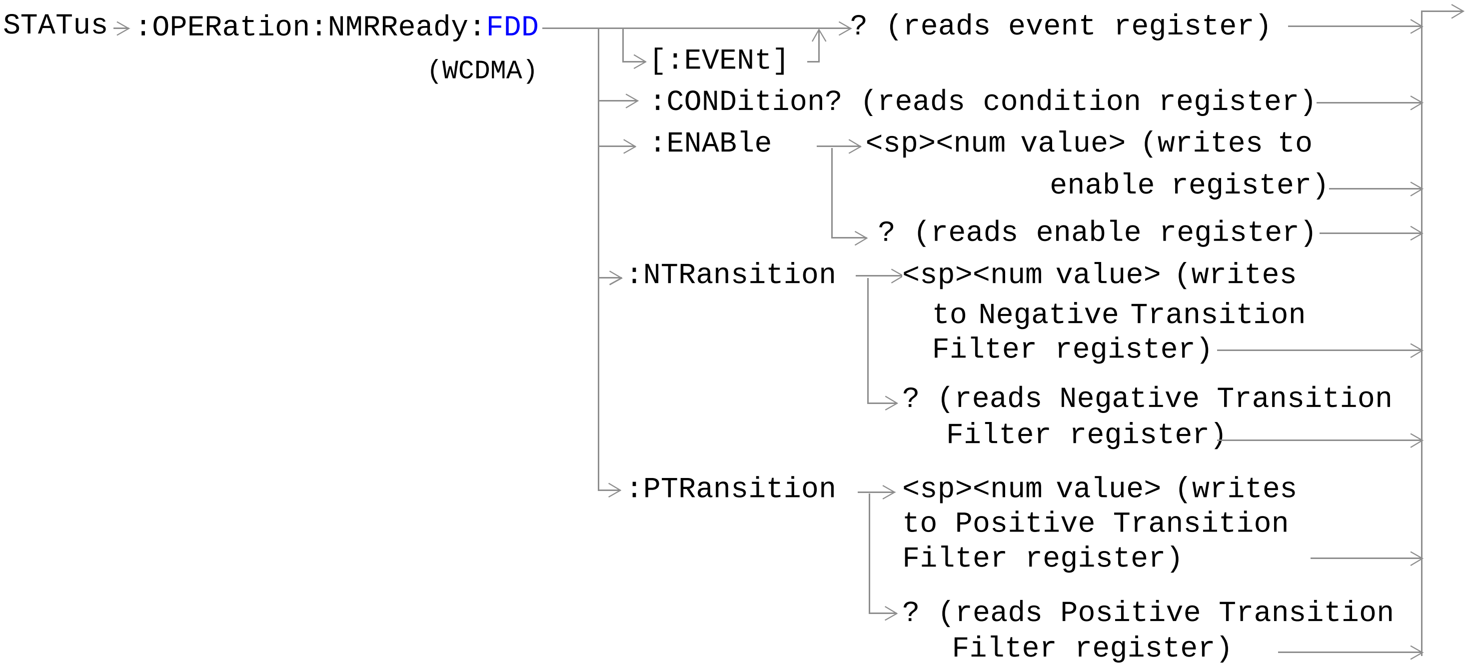

STATus
:OPERation:NMRReady
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)


STATus
:OPERation:NMRReady:AMPS
? (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:







“Diagram Conventions” on page 368

STATus:OPERation Register Bit Assignments

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	SYSTem:SYNChronized	This condition bit is “pulsed" by the SYSTem:SYNChronized command. This will allow 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 message bit for the STATus:OPERation:CALL register.
9	512	NMRReady (New Measurement Result Ready) Summary	This bit is the summary message bit for the STATus:OPERation:NMRReady register.

STATus:OPERation:

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	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 the Operation Event Register.
OUTPUT 714;"STATUS:OPERATION:CONDITION?" !Queries the Operation Condition Register.
OUTPUT 714;"STATUS:OPERATION:ENABLE 1024" !Sets the Operation Enable Register for bit 10.
OUTPUT 714;"STATUS:OPERATION:NTR 1024" !Sets the Operation Negative Transition
                                       !Register for bit 10.
OUTPUT 714;"STATUS:OPERATION:PTR 512" !Sets the Operation Event Positive Transition
                                      !Register for bit 9.
```

STATus:OPERation:CALL Condition Register Bit Assignment

The STATus:OPERation:CALL register bits will be 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	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	TA2000 Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:CDMA register.

Bit Number	Binary Weighting	Condition	Description
7	128	DIGital2000 Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:DIGital95 register.
5	32	TA136 Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:TA136 register.
4	16	DIGital136 Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:DIGITAL136 register.
3	8	AMPS Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:AMPS register.
2	4	GSM Summary bit	This bit is the summary message bit for the STATus:OPERation:CALL:GSM register.
1	2	COMMon Summary bit	This bit is the summary message 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 the Operation Call Event !Register.
OUTPUT 714;”STATUS:OPERATION:CALL:CONDITION?” !Queries 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 Register for bit 2.
OUTPUT 714;”STATUS:OPERATION:CALL:PTR 256” !Sets the Positive Transition Register for bit 8.
```

STATus:OPERation:CALL:COMMon Condition Register Bit Assignment

The STATus:OPERation:CALL:COMMon register bits will be 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 message 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.

STATus:OPERation:

Bit Number	Binary Weighting	Condition	Description
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 a 1 when the test set is in the call control status changing state.
5	32	Call Control Status Handover/Handoff	This bit is a 1 when the test set is in the call control handover or handoff state.
4	16	Call Control Status Registering	This bit will be a 1 when the test set is in the call control status registering state.
3	8	Call Control Status is “Alerting”	This bit is a 1 when the test set is in the call alerting state (ringing).
2	4	Call Control Status is “Connected”	This bit is a 1 when the test set is in the call connected state.
1	2	Call Control Status is “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 the Operation Call Common Event
                                         !Register.
OUTPUT 714;”STATUS:OPERATION:CALL:COMMON:CONDITION?” !Queries the Operation Call Common
                                             !Condition Register.
OUTPUT 714;”STATUS:OPERATION:CALL:COMMON:ENABLE 8” !Sets the Operation Call Common Enable
                                           !Register for bit 3.
OUTPUT 714;”STATUS:OPERATION:CALL:COMMON:NTR 8” !Sets the Negative Transition
                                        !Register for bit 3.
OUTPUT 714;”STATUS:OPERATION:CALL:COMMON:PTR 256” !Sets the Positive Transition
                                          !Register for bit 8.
```

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	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	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.
3	8	Data Connection Status Transferring	This bit is set to 1 when the data connection status is Transferring.
2	4	Data Connection Status Attached	This bit is set to 1 when the data connection status is Attached.
1	2	Data Connection Status Idle	This bit is set to 1 when the data connection status is Idle.
0	1	Extension Bit	This bit will always be 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:DIGital2000 Register Bit Assignment

The STATus:OPERation:CALL:DIGital2000 register bits will be used to indicate status of processes that occur during DIGital2000 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	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	F-SCH Synchronized.	1 indicates that a 10.24 second sync frame boundary has been encountered and a valid TDSO FER measurement can now be initiated.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:CALL

```
OUTPUT 714;"STATUS:OPERATION:CALL:DIGITAL2000:EVENT?"
   !Queries the Operation Call DIGital2000 Event Register.
OUTPUT 714;"STATUS:OPERATION:CALL:DIGITAL2000:CONDITION?"
   !Queries the Operation Call DIGital2000Condition Register.
OUTPUT 714;"STATUS:OPERATION:CALL:DIGITAL2000:ENABLE 2"
   !Sets the Operation Call DIGital2000Enable Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:CALL:DIGITAL2000:NTR 4"
   !Sets the DIGital2000 Negative Transition Register for bit 2.
```

```
OUTPUT 714;”STATUS:OPERATION:CALL:DIGITAL2000:PTR 256”
   !Sets the DIGital2000 Positive Transition Register for bit 8.
```

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 test set’s F12 softkey has been pressed.
10	1024	F11 softkey	This bit is a 1 when the test set’s F11 softkey has been pressed.
9	512	F10 softkey	This bit is a 1 when the test set’s F10 softkey has been pressed.
8	256	F9 softkey	This bit is a 1 when the test set’s F9 softkey has been pressed.
7	128	F8 softkey	This bit is a 1 when the test set’s F8 softkey has been pressed.
6	64	F7 softkey	This bit is a 1 when the test set’s F7 softkey has been pressed.
5	32	F6 softkey	This bit is a 1 when the test set’s F6 softkey has been pressed.
4	16	F5 softkey	This bit is a 1 when the test set’s F5 softkey has been pressed.
3	8	F4 softkey	This bit is a 1 when the test set’s F4 softkey has been pressed.
2	4	F3 softkey	This bit is a 1 when the test set’s F3 softkey has been pressed.
1	2	F2 softkey	This bit is a 1 when the test set’s F2 softkey has been pressed.
0	1	F1 softkey	This bit is a 1 when the test set’s F1 softkey has been pressed.

Program Examples - STATus:OPERation:KEYPressed

```
OUTPUT 714;"STATUS:OPERATION:KEYPRESSED:EVENT?"
   !Queries the Keypressed Event Register.
```

```
OUTPUT 714;"STATUS:OPERATION:KEYPRESSED:CONDITION?"
   !Queries the Keypressed Condition Register.
OUTPUT 714;"STATUS:OPERATION:KEYPRESSED:ENABLE 16"
   !Sets Keypressed Enable register for bit 4.
OUTPUT 714;"STATUS:OPERATION:KEYPRESSED:NTR 2"
   !Sets the Keypressed Negative Transition Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:KEYPRESSED:PTR 4"
   !Sets the Keypressed Positive Transition Register for bit 2
```

STATus:OPERation:NMRReady Register Bit Assignments

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	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	TA2000 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:CDMA register.
7	128	DIGital2000 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:DIGital95 register.
5	32	TA136 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:TA136 register.
4	16	DIGITAL136 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:DIGITAL136 register.
3	8	AMPS Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:AMPS register.
2	4	GSM Summary bit	STATus:This bit is the summary message bit for the OPERation:NMRReady:GSM register.
1	2	COMMON Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:COMMon register.

Bit Number	Binary Weighting	Condition	Description
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:EVENT?" !Queries the New Measurement
                                              !Results Ready Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CONDITION?" !Queries 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
                                             !Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:PTR 4" !Sets the New Measurement
                                             !Results Ready Positive
                                             !Transition Register
                                             !for bit 2
```

STATus:OPERation:NMRReady:AMPS Condition Register Bit Assignment

The STATus:OPERation:NMRReady:AMPS 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.

Bit Number	Binary Weighting	Condition	Description
3	8	FM New Measurement Result Ready	This is a 1 if the measurement has been completed and has produced new results.
2	4	FSTABility New Measurement Result Ready	This is a 1 if the measurement has been completed and has produced new results.
1	2	ATXPower New Measurement Result Ready	This is a 1 if the measurement has been completed and has produced new results.
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady:AMPS

```
OUTPUT 714;”STATUS:OPERATION:NMRREADY:AMPS:EVENT?” !Queries the New Measurement
                                              !Results Ready AMPS Event Register.
OUTPUT 714;”STATUS:OPERATION:NMRREADY:AMPS:CONDITION?” !Queries the New Measurement
                                                  !Results Ready AMPS Condition Register.
OUTPUT 714;”STATUS:OPERATION:NMRREADY:AMPS:ENABLE 8” !Sets New Measurement Results
                                                 !Ready AMPS Enable Regigter for bit 3.
OUTPUT 714;”STATUS:OPERATION:NMRREADY:AMPS:NTR 2” !Sets the New Measurement Results
                                             !Ready AMPS Negative Transition
                                             !Register for bit 1.
OUTPUT 714;”STATUS:OPERATION:NMRREADY:AMPS:PTR 4” !Sets the New Measurement
                                             !Results Ready AMPS Positive
                                             !Transition Register for bit 2
```

STATus:OPERation:NMRReady:CDMA Register Bit Assignments

The STATus:OPERation:NMRReady:CDMA 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.

Bit Number	Binary Weighting	Condition	Description
8	256	CTXSpurious 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 290.
7	128	GPOWer 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 290.
6	64	TROPower 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 290.
5	32	CAPPower 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 290.
4	16	CFERror 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 290.
3	8	CPOWer 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 290.
2	4	WQUality 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 290.
1	2	DAPower 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 290.

STATus:OPERation:

Bit Number	Binary Weighting	Condition	Description
0	1	Extension Bit	This bit is always 0.

Program Examples - STATus:OPERation:NMRReady:CDMA

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:EVENT?" !Queries the New Measurement
                                              !Results Ready CDMA Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:CONDITION?" !Queries the New Measurement
                                                  !Results Ready CDMA
                                                  !Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:ENABLE 8" !Sets New Measurement Results
                                                 !Ready CDMA Enable Regigter
                                                 !for bit 3.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:NTR 2" !Sets the New Measurement Results
                                             !Ready CDMA Negative Transition
                                             !Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:PTR 4" !Sets the New Measurement
                                             !Results Ready CDMA Positive
                                             !Transition Register
                                             !for bit 2
```

STATus:OPERation:NMRReady:COMMon Register Bit Assignments

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	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
2	4	Reserved for future use.	This bit is always 0.
1	2	Audio Analyzer	This is the summary message 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 the New Measurement
                                              !Results Ready Common Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:CONDITION?" !Queries the New Measurement
                                                  !Results Ready Common
                                                  !Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:ENABLE 2" !Sets New Measurement Results
                                                 !Ready Common Enable Register
                                                 !for bit 1.

OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:NTR 2" !Sets the New Measurement Results
                                             !Ready Common Negative Transition
                                             !Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:PTR 2" !Sets the New Measurement
                                             !Results Ready Common Positive
                                             !Transition Register
                                             !for bit 1
```

STATus:OPERation:NMRReady:<WCDMA | FDD> Register Bit Assignments

The STATus:OPERation:NMRReady:FDD 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.

STATus:OPERation:

Bit Number	Binary Weighting	Condition	Description
8	256	WCDomain 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 290.
7	128	WOBWidth 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 290.
6	64	WSEMask 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 290.
5	32	WBERror 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 290.
4	16	WCPower 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 290.
3	8	WWQuality 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 290.
2	4	WACLeakage 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 290.

Bit Number	Binary Weighting	Condition	Description
1	2	WTPower 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 290.
0	1	Extension Bit	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 290.

Program Examples - STATus:OPERation:NMRReady:FDD

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:FDD:EVENT?" !Queries the New Measurement
                                              !Results Ready FDD Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:FDD:CONDITION?" !Queries the New
                                                  !Measurement Results Ready FDD
                                                  !Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:FDD:ENABLE 8" !Sets New Measurement Results
                                                 !Ready FDD Enable Register
                                                 !for bit 3.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:FDD:NTR 2" !Sets the New Measurement Results
                                             !Ready FDD Negative Transition
                                             !Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:FDD:PTR 4" !Sets the New Measurement
                                             !Results Ready FDD Positive
                                             !Transition Register
                                             !for bit 2
```

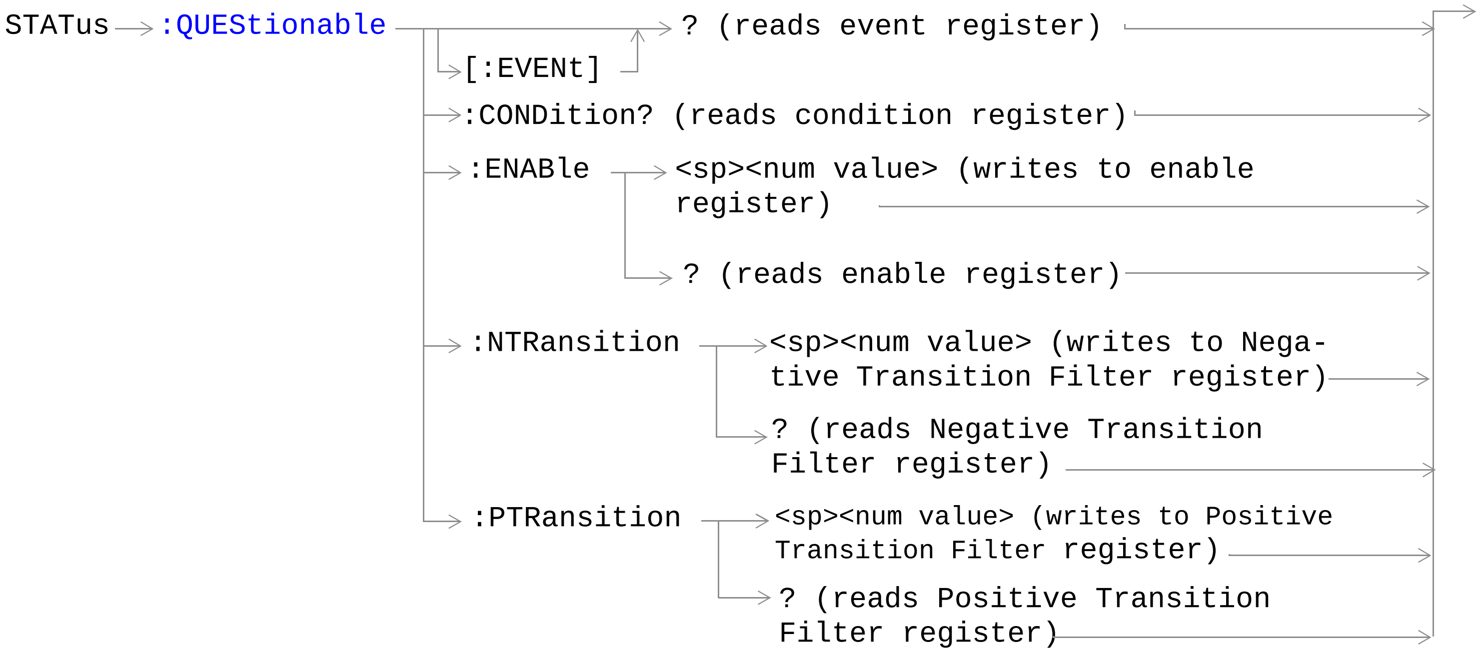
STATus:PRESet

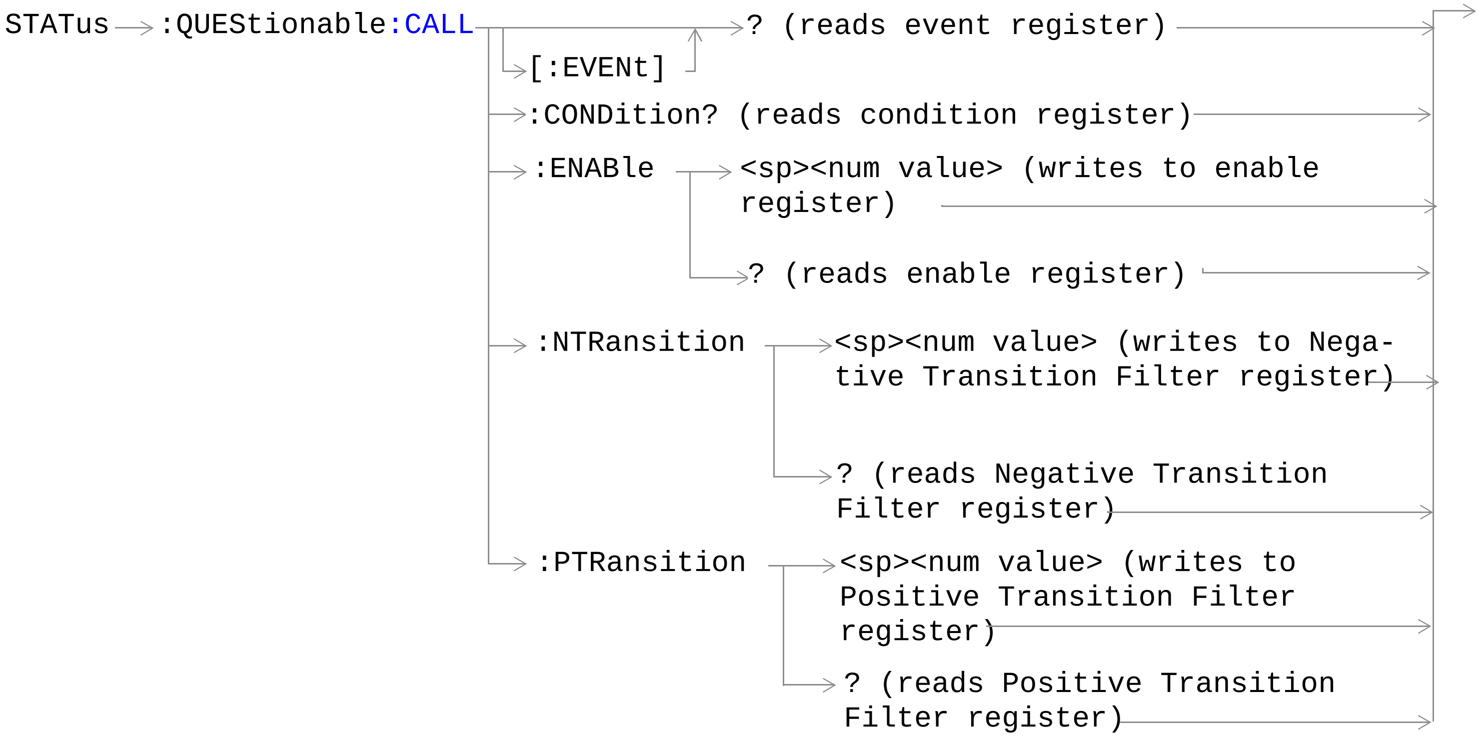
“Diagram Conventions” on page 368

STATus:PRESet

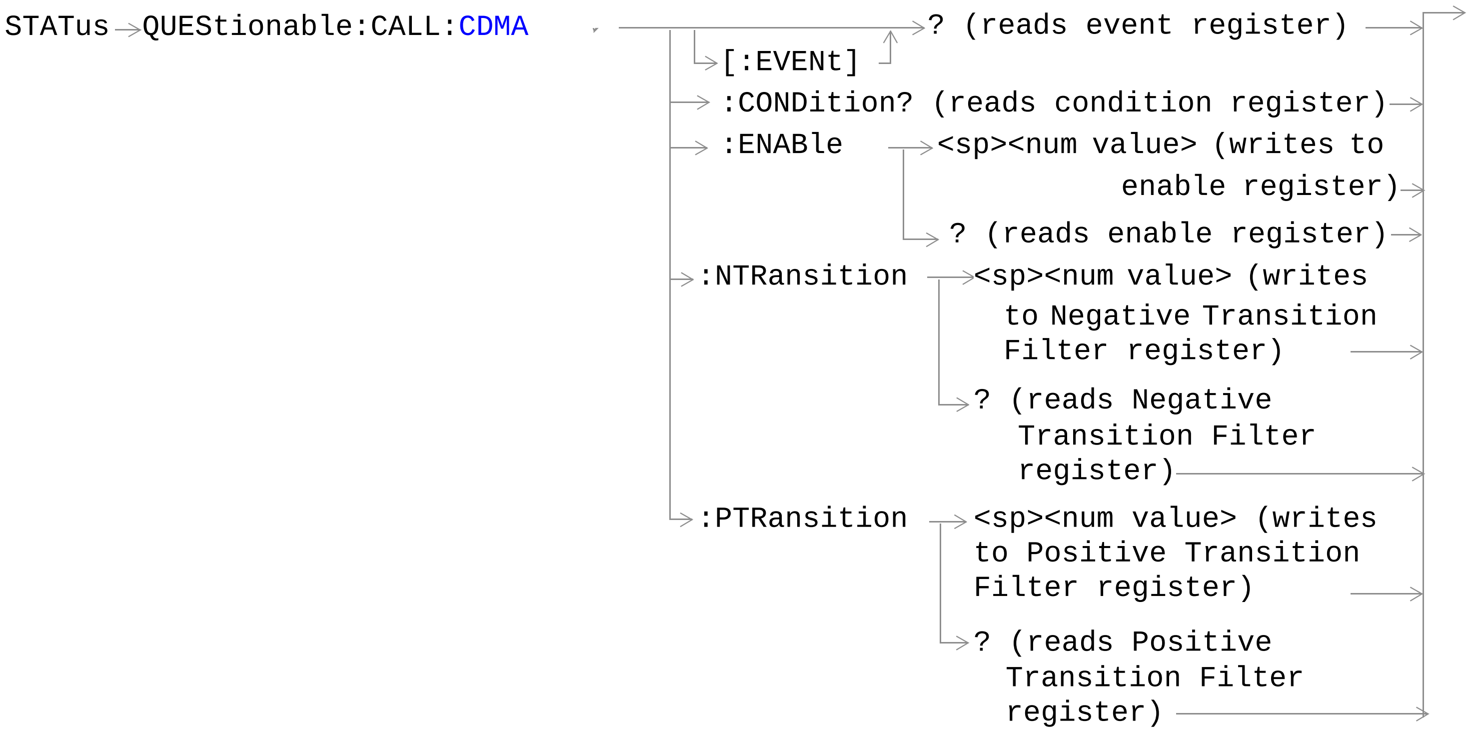
Function	Presets the status subsystem. Presetting the status subsystem performs the following functions: • All enable registers are set to 0 (not enabled) • All Positive Transition Registers (PTR’s) are set to 1 (positive transitions enabled). • All Negative Transition Registers (NTR’s) are set to 0 (negative transitions disabled).
Requirements	Test Application Revision: A.01 and above

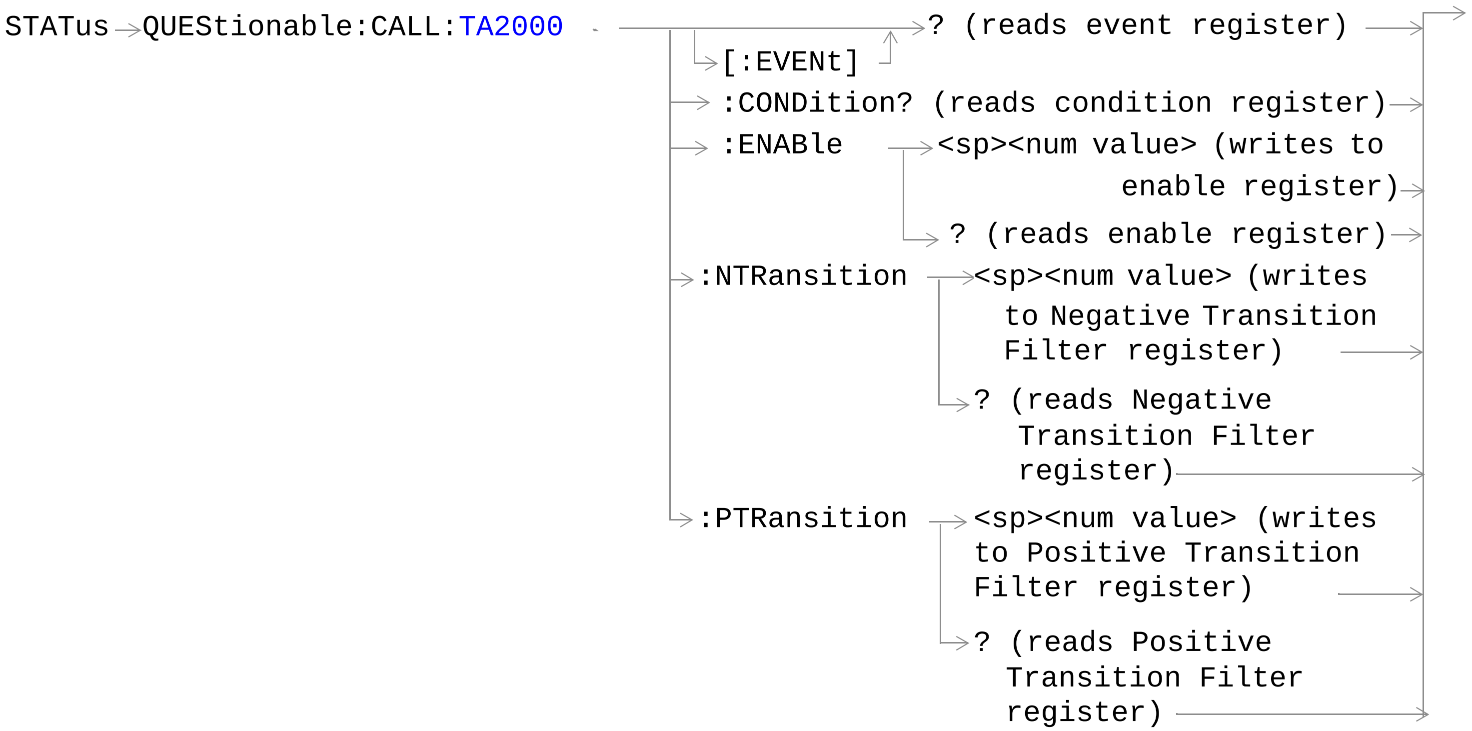
STATus:QUEStionable

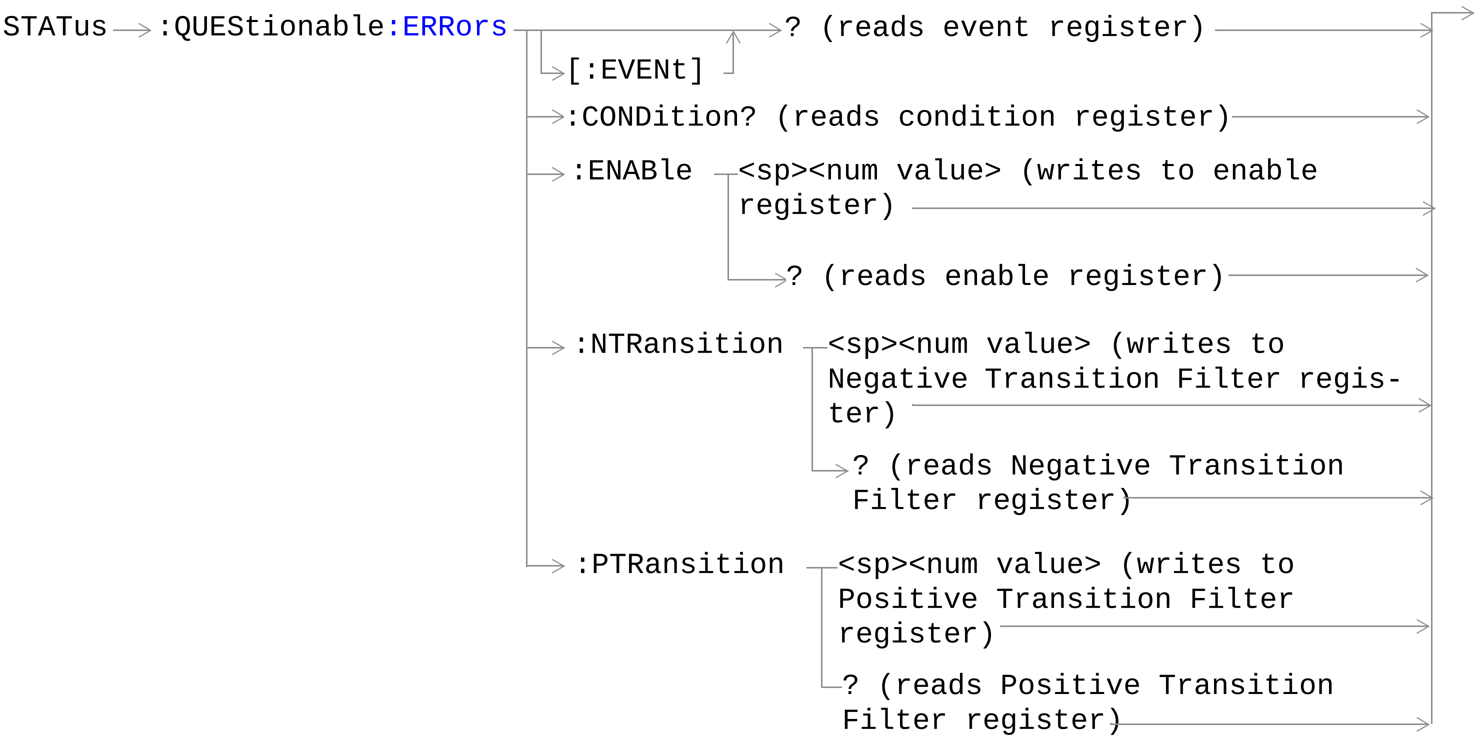


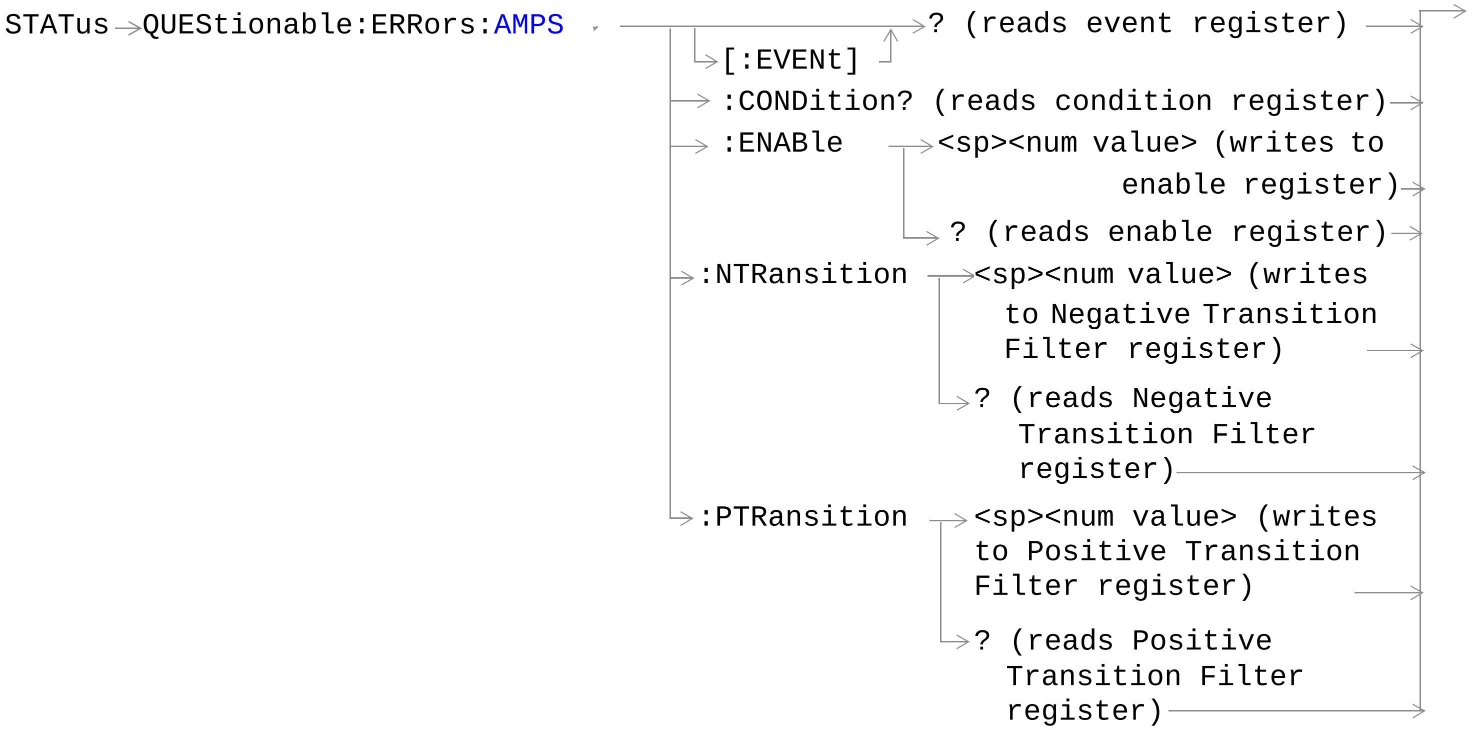


STATus:QUEStionable

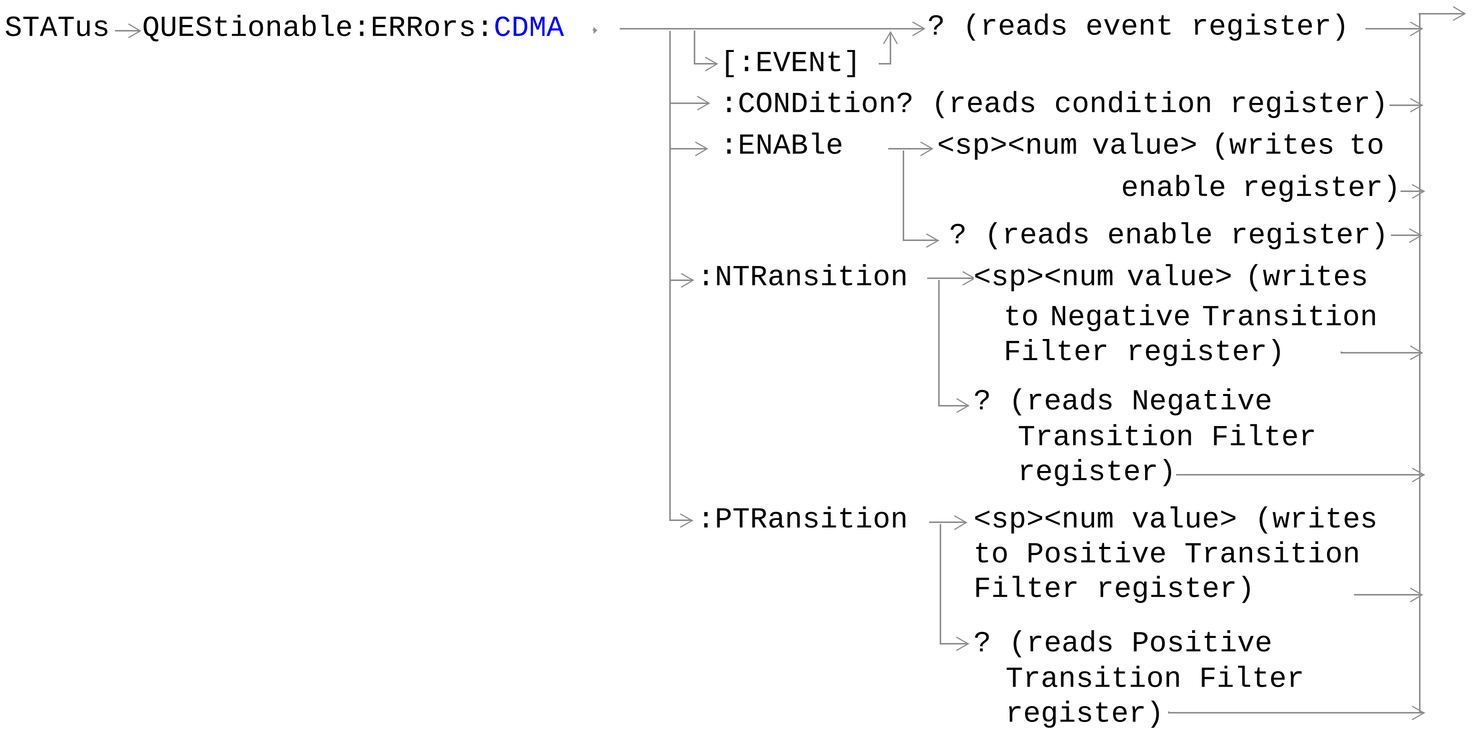


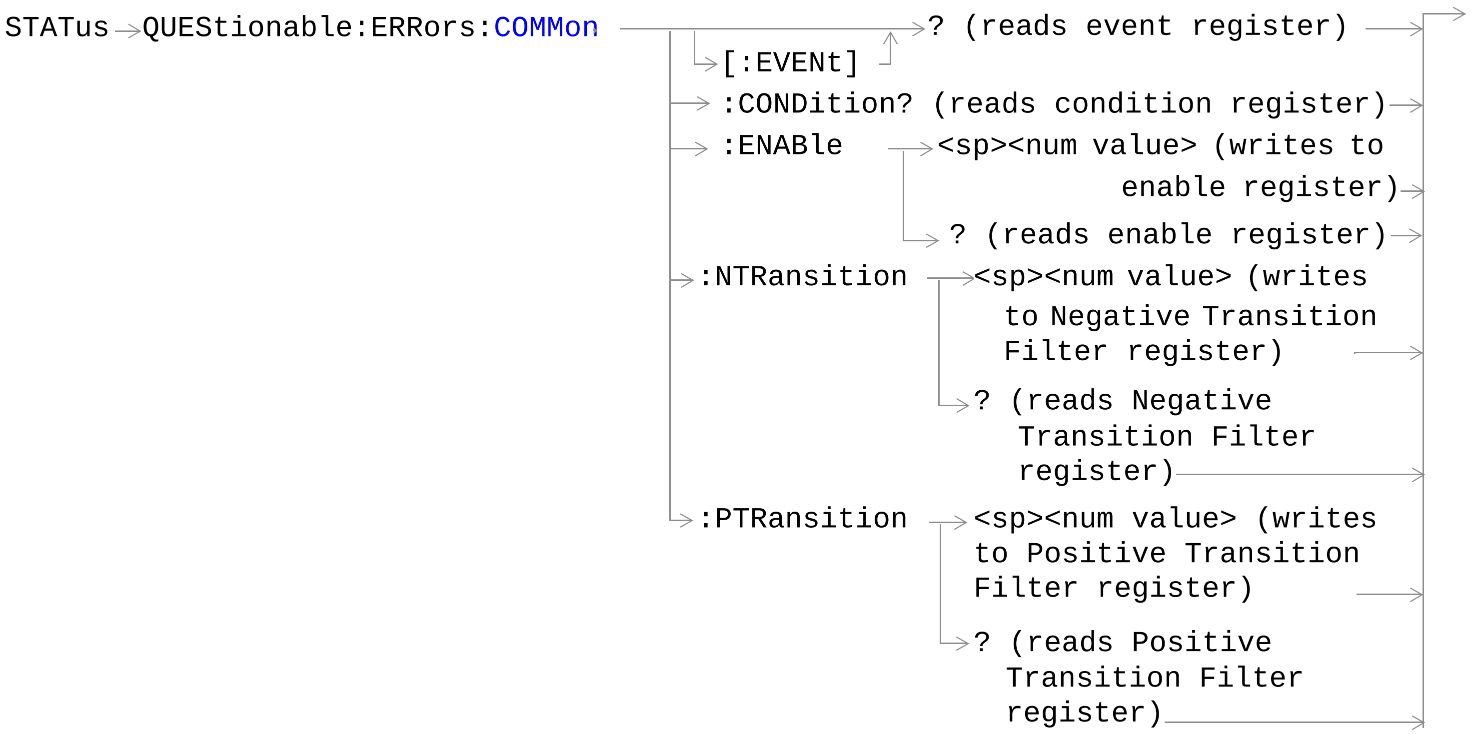


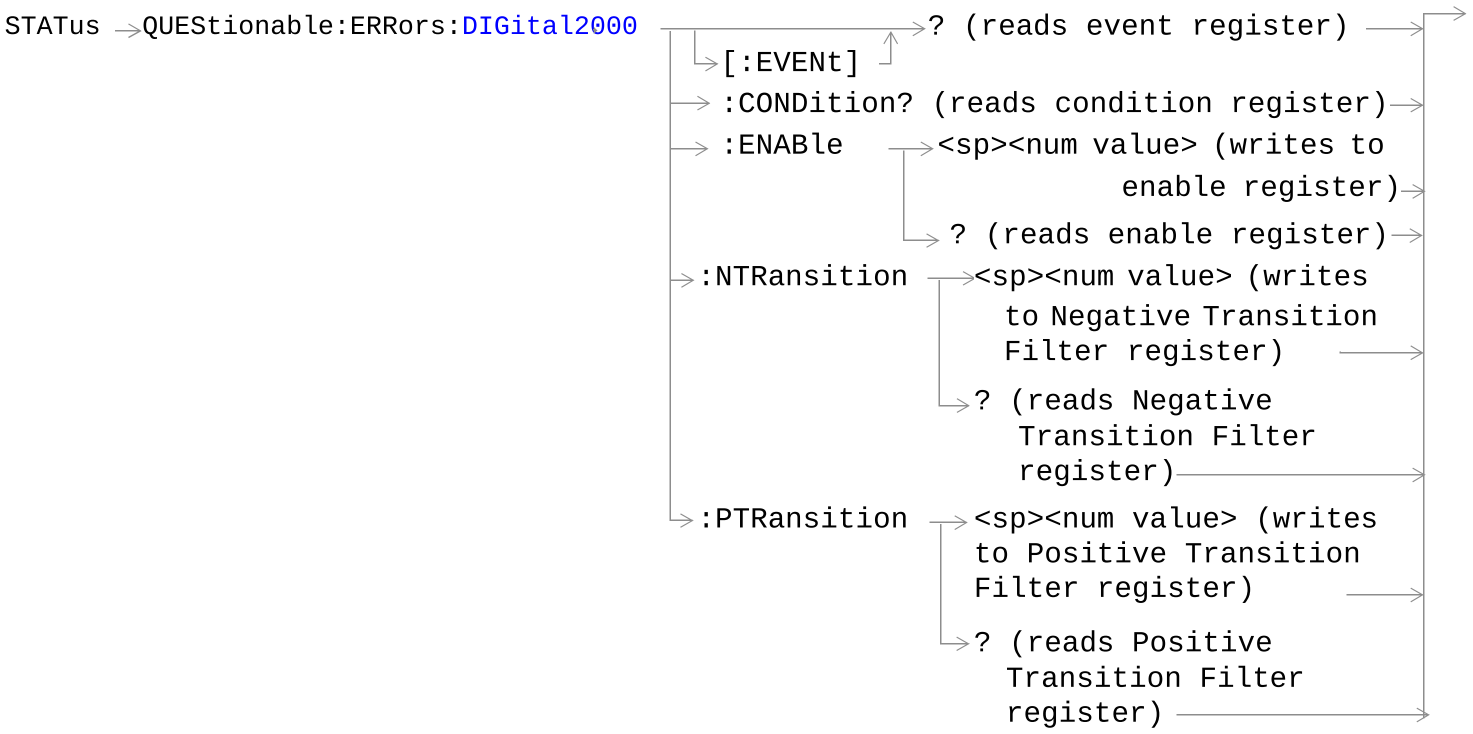

STATus
:QUEStionable:ERRors
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)

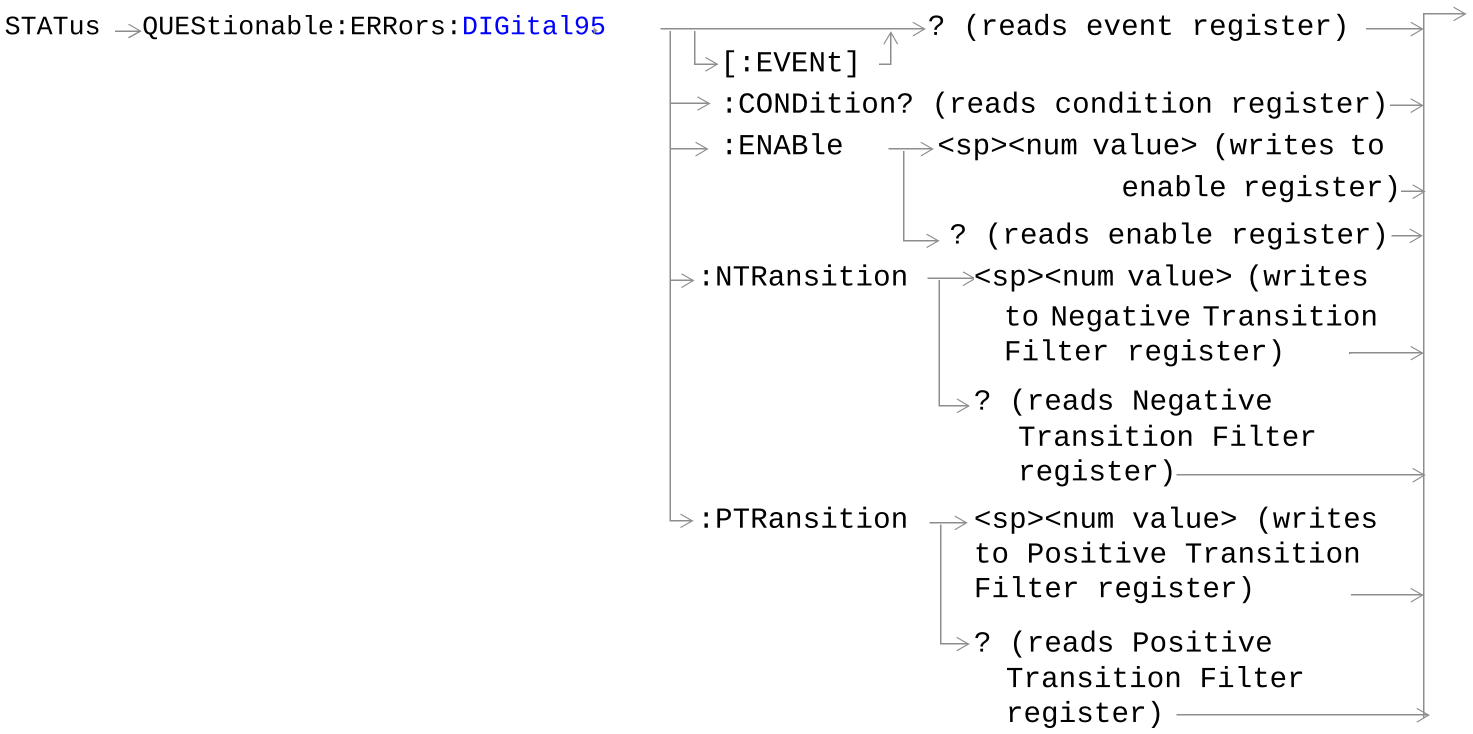

STATus
QUEStionable:ERRors:AMPS
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)

STATus:QUEStionable

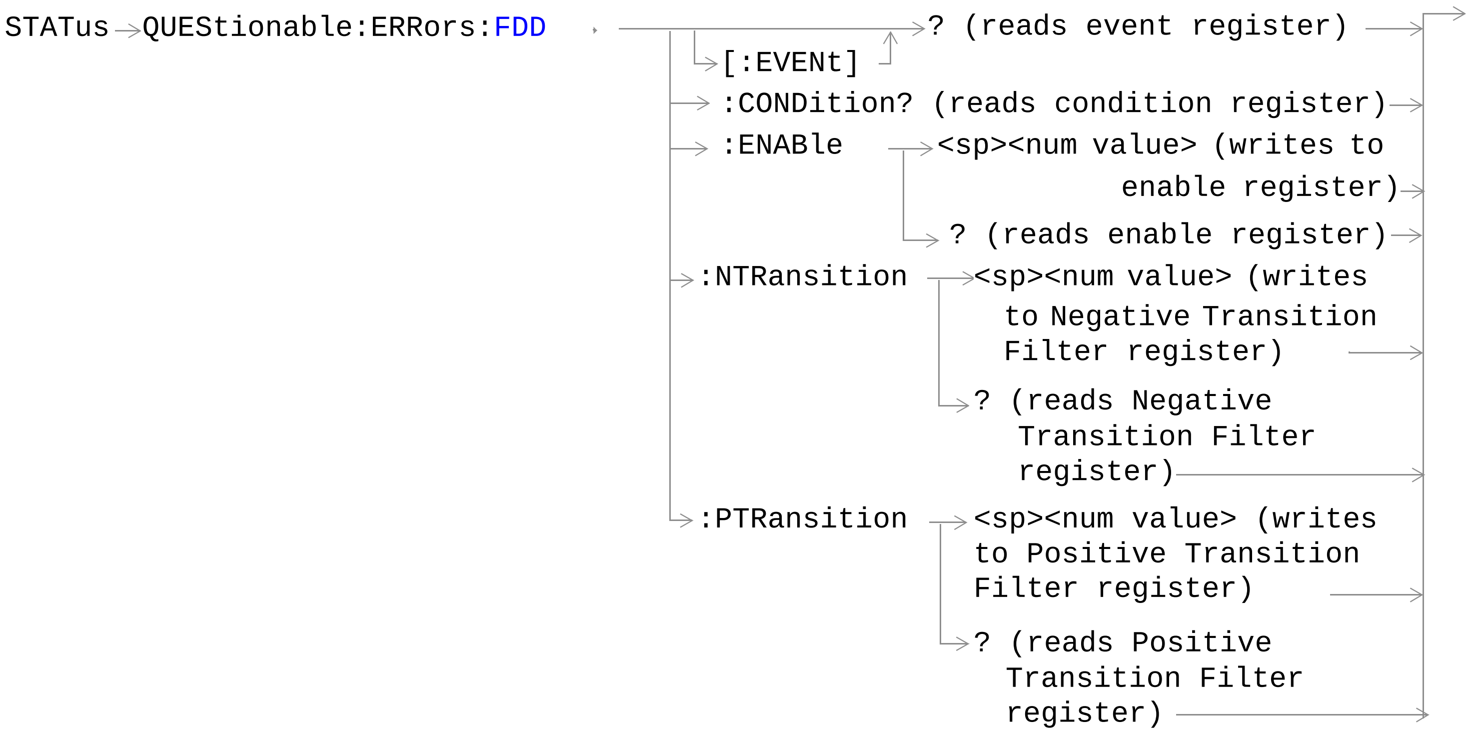


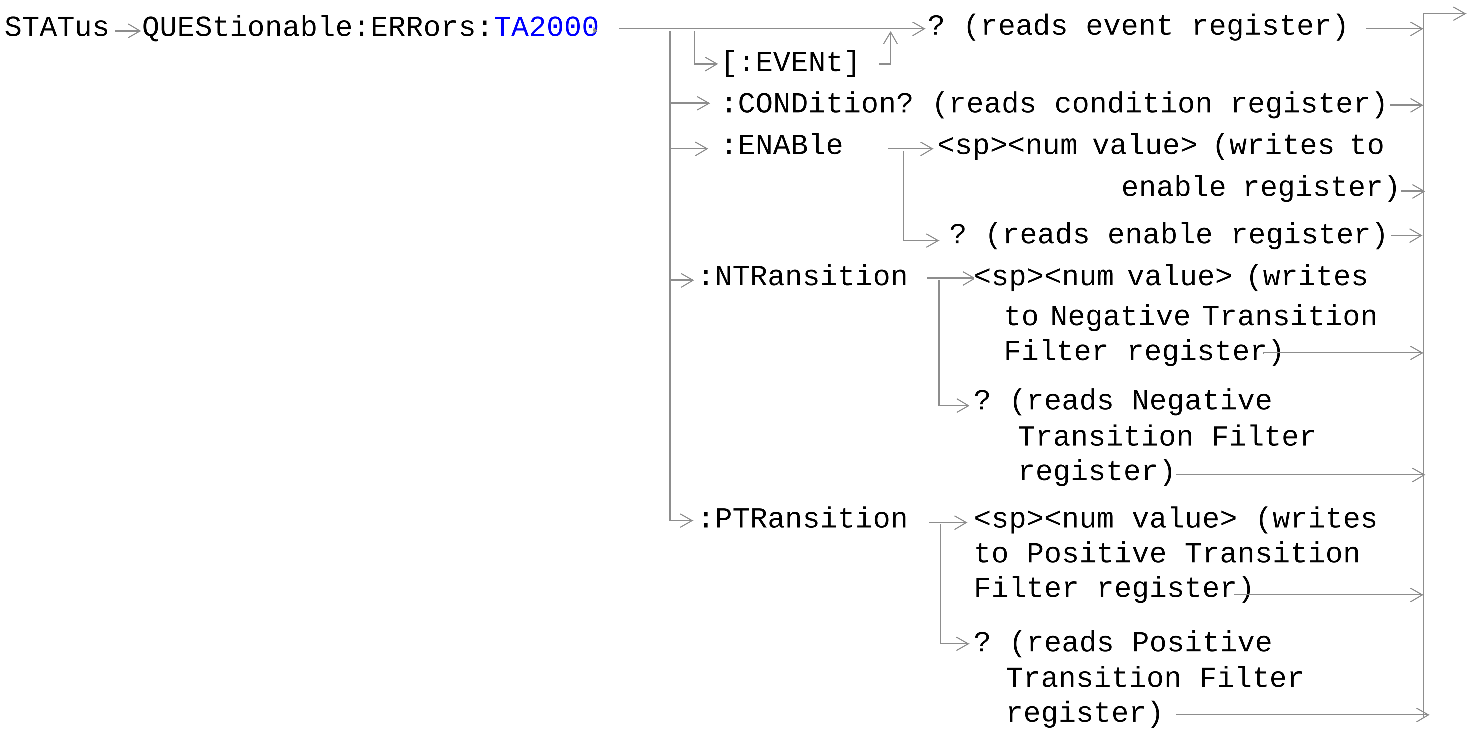


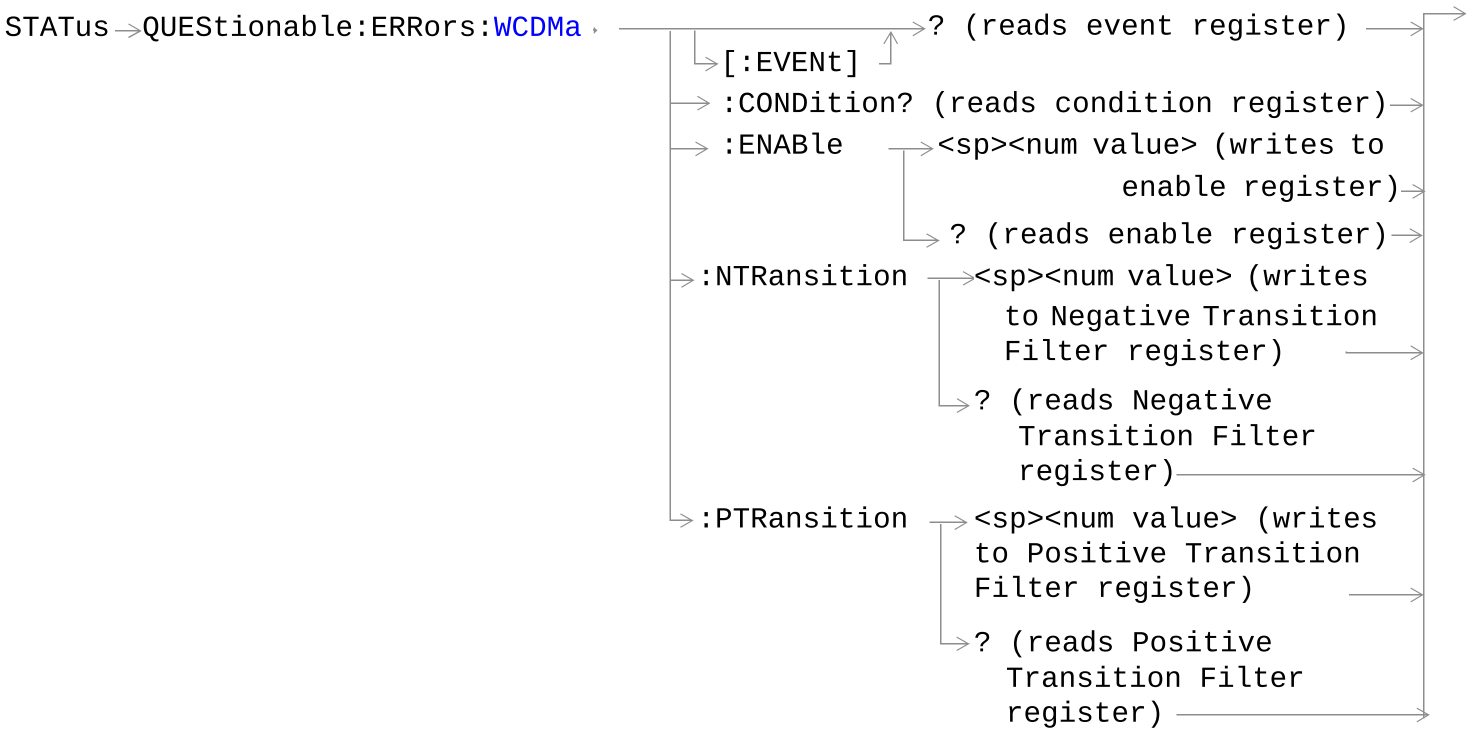

STATus
QUEStionable:ERRors:DIGital2000
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)

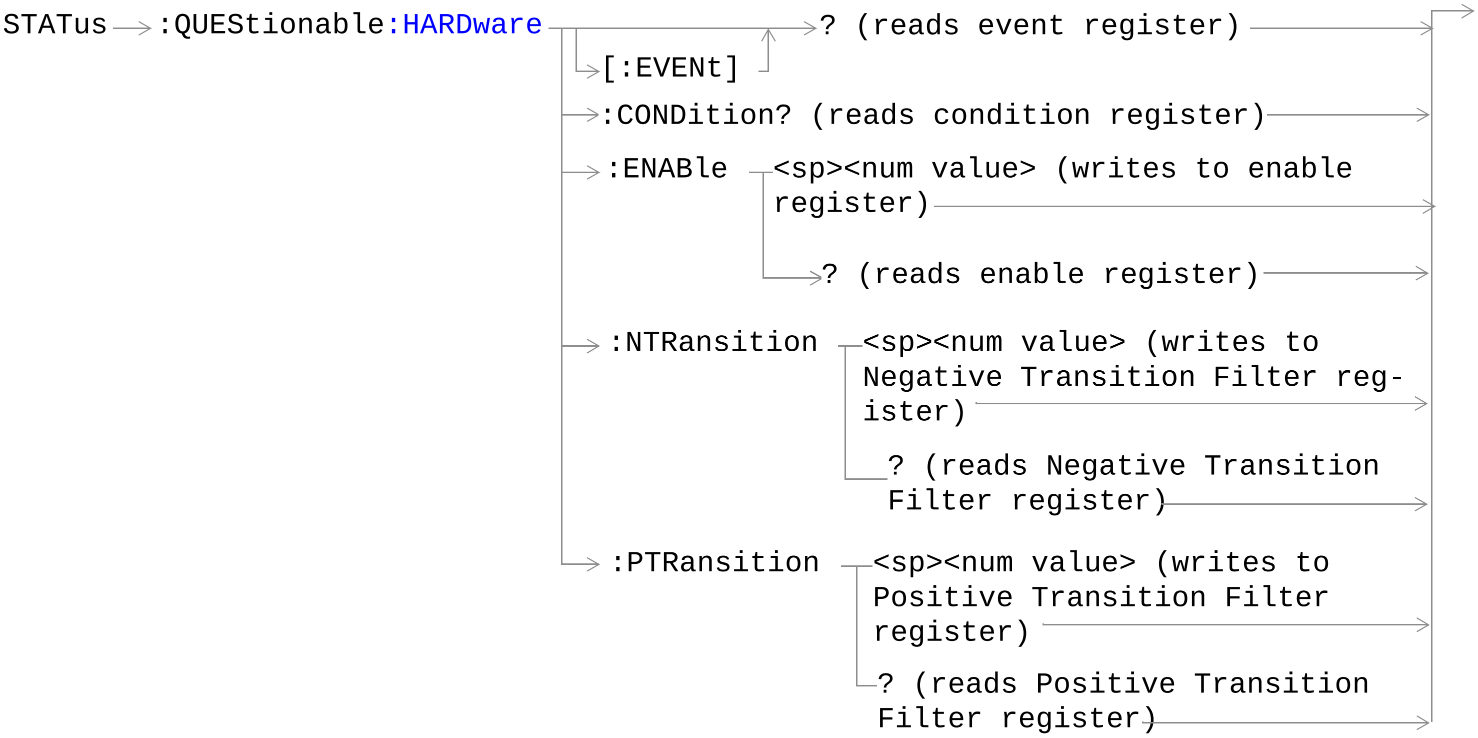

STATus
QUEStionable:ERRors:DIGital95
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)

STATus:QUEStionable









“Diagram Conventions” on page 368

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 message bit for the STATus:QUEStionable:HARDware register.
10	1024	QUEStionable:CALL summary	This bit is the summary message bit for the STATus:QUEStionable:CALL register.
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	QUEStionable:ERRors summary	This bit is the summary message bit for the STATus:QUEStionable:ERRors register.
0	1	Reserved for future use.	This bit is always 0.

Program Example - STATus:QUEStionable Register Bit Assignments

```
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 will 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	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	TA2000 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:CDMA register.
7	128	DIGital2000 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:CALL:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:CALL:DIGital95 register.
5	32	TA136 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:TA136 register.
4	16	DIGital136 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:DIGital136 register.
3	8	AMPS Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:AMPS register.
2	4	GSM Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:GSM register.
1	2	COMMon Summary bit	This bit is the summary message 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 Register
                                                       !for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:PTRANSITION 2" !Sets the Questionable Call
                                                       !Positive Transition Filter Register
                                                       !for bit 1
```

STATus:QUEStionable:CALL:CDMA Condition Register Bit Assignment

The STATus:QUEStionable:CALL:CDMA registers will 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	MUI Maskable Message.	
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	Call drop timer timed out.	This bit is a 1 after 250 consecutive bad frames are counted indicating that the reverse link is lost
3	8	Service connect completion not received.	This bit is a 1 when the test set has not received a message from the MS that it has completed the change to a new Service Option or Radio Configuration.
2	4	Service Option or Radio Configuration rejected by MS.	This bit is a 1 when the MS receives a Service Option or a Radio Configuration that it does not support.
1	2	Traffic channel preamble not received.	This bit is a 1 if no preamble was received from the MS.
0	1	Extension Bit.	This bit is always 0.

Program Example - STATus:QUEStionable:CALL:CDMA Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:CALL:CDMA:EVENT?"
```

```
    !Queries and clears the Questionable Call CDMA Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:CALL:CDMA:CONDITION?”
    !Queries and clears the Questionable Call CDMA Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:CALL:CDMA:ENABLE 1024”
    !Sets the Questionable Call CDMA Enable Register for bit 10
OUTPUT 714;”STATUS:QUESTIONABLE:CALL:CDMA:NTRANSITION 2”
    !Sets the Questionable Call CDMA Negative Transition Filter Register !for bit 1
OUTPUT 714;”STATUS:QUESTIONABLE:CALL:CDMA:PTRANSITION 2”
    !Sets the Questionable Call CDMA Positive Transition Filter Registerfor bit 1
```

STATus:QUEStionable:CALL:TA2000 Condition Register Bit Assignment

The STATus:QUEStionable:CALL:TA2000 registers will 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	MUI Maskable Message.	
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	MS reject order received	This bit is a 1 if the Service Option or Radio Configuration change was rejected by the MS while connected.
3	8	Carrier not detected on new channel	This bit is a 1 when no power is detected by the test set after a handoff or when making a call.
2	4	Handoff completion not received	This bit is a 1 if the test set does not receive a handoff completion message from the MS.
1	2	Release order not received	This bit is a 1 if the MS does not send the call release to the test set.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:CALL:TA2000 Register Bit Assignment

```
OUTPUT 714;”STATUS:QUESTIONABLE:CALL:TA2000:EVENT?”
```

```
!Queries and clears the Questionable Call Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:CALL:TA2000:CONDITION?”
!Queries and clears the Questionable Call Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:CALL:TA2000:ENABLE 1024”
!Sets the Questionable Call Enable Register for bit 10
OUTPUT 714;”STATUS:QUESTIONABLE:CALL:TA2000:NTRANSITION 2”
!Sets the Questionable Call Negative Transition Filter Register for bit 1
OUTPUT 714;”STATUS:QUESTIONABLE:CALL:TA2000:PTRANSITION 2”
!Sets the Questionable Call Positive Transition Filter Register for bit 1
```

STATus:QUEStionable:ERRors Condition Register Bit Assignment

The STATus:QUEStionable:ERRors register bits will be 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	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	TA2000 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:CDMA register.
7	128	DIGital2000 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:DIGital95 register.
5	32	TA136 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:TA136 register.
4	16	DIGital136 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:DIGital136 register.
3	8	AMPS Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:AMPS register.
2	4	GSM Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:GSM register.
1	2	COMMon Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:ERRors register.

Bit Number	Binary Weighting	Condition	Description
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:ERRors Register Bit Assignments

```
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:AMPS Condition Register Bit Assignment

The STATus:QUEStionable:ERRors:AMPS register bits will be used to indicate information about AMPS related 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	MUI Maskable Messages	This bit is a 1 when a Maskable Message has occured. Maskable Messages are not displayed on the test set display.
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.

Bit Number	Binary Weighting	Condition	Description
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.
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.

Bit Number	Binary Weighting	Condition	Description
1	2	+100 Errors	The condition is be 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:AMPS Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:AMPS:EVENT?" !Queries and clears the Questionable
                                                    !Errors AMPS Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:AMPS:CONDITION?" !Queries and clears the Questionable
                                                        !Errors AMPS Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:AMPS:ENABLE 1024" !Sets the Questionable
                                                         !Errors AMPS Enable
                                                         !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:AMPS:NTRANSITION 2" !Sets the Questionable Errors
                                                           !AMPS Negative Transition
                                                           !Filter Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:AMPS:PTRANSITION 2" !Sets the Questionable Errors
                                                           !AMPS Positive Tranasition
                                                           !Filter Register for bit 1
```

STATus:QUEStionable:ERRors:CDMA Register Bit Assignments

The STATus:QUEStionable:ERRors:CDMA register bits will be used to indicate information about CDMA related 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	MUI Maskable Message.	
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.

Bit Number	Binary Weighting	Condition	Description
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 will be 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 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.
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.

Bit Number	Binary Weighting	Condition	Description
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:CDMA Condition Register Bit Assignment

```
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:CDMA:EVENT?” !Queries and clears the Questionable
                                                    !Errors CDMA Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:CDMA:CONDITION?” !Queries and clears the Questionable
                                                        !Errors CDMA Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:CDMA:ENABLE 1024” !Sets the Questionable
                                                         !Errors CDMA Enable
                                                         !Register for bit 10
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:CDMA:NTRANSITION 2” !Sets the Questionable Errors
                                                           !CDMA Negative Transition
                                                           !Filter Register for bit 1
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:CDMA:PTRANSITION 2” !Sets the Questionable Errors
                                                           !CDMA Positive Tranasition
                                                           !Filter Register for bit 1
```

STATus:QUEStionable:ERRors:COMMon Register Bit Assignments

The STATus:QUEStionable:ERRors:COMMon register bits will be 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	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 can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
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.
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.

Bit Number	Binary Weighting	Condition	Description
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 Register Bit Assignments

```
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:DIGital2000Condition Register Bit Assignment

The STATus:QUEStionable:ERRors:DIGital2000 register bits will be used to indicate information about DIGital2000 related 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	MUI Maskable Message.	
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.

Bit Number	Binary Weighting	Condition	Description
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.
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.

Bit Number	Binary Weighting	Condition	Description
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 will always be 0.

Program Example - STATus:QUEStionable:ERRors:DIGital2000 Condition Register Bit Assignment

```
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:EVENT?” !Queries and clears the
                                                     !Questionable Errors
                                                     !DIGITAL2000 Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:CONDITION?” !Queries and clears the
                                                         !Qestionable Errors
                                                         !DIGITAL2000 Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:ENABLE 1024” !Sets the Questionable
                                                          !Errors DIGITAL2000 Enable
                                                          !Register for bit 10
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:NTRANSITION 2” !Sets the Questionable
                                                            !Errors DIGITAL2000 Negative
                                                            !Transition Filter
                                                            !Register for bit 1
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:PTRANSITION 2” !Sets the Questionable
                                                            !Errors DIGITAL2000 Positive
                                                            !Transition Filter
                                                            !Register for bit 1
```

STATus:QUEStionable:ERRors:DIGital95 Condition Register Bit Assignment

The STATus:QUEStionable:ERRors:DIGital95 register bits will be used to indicate information about DIGital95 related 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	MUI Maskable Message.	
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	+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.
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.

Bit Number	Binary Weighting	Condition	Description
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 will always be 0.

Program Example - STATus:QUEStionable:ERRors:DIGital95 Condition Register Bit Assignment

```
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:DIGITAL95:EVENT?” !Queries and clears the
                                                     !Questionable Errors
                                                     !DIGITAL95 Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:DIGITAL95:CONDITION?” !Queries and clears the
                                                         !Qestionable Errors
                                                         !DIGITAL95 Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:DIGITAL95:ENABLE 1024” !Sets the Questionable
                                                          !Errors DIGITAL95 Enable
                                                          !Register for bit 10
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:DIGITAL95:NTRANSITION 2” !Sets the Questionable
                                                            !Errors DIGITAL95 Negative
                                                            !Transition Filter
                                                            !Register for bit 1
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:DIGITAL95:PTRANSITION 2” !Sets the Questionable
                                                            !Errors DIGITAL95 Positive
                                                            !Transition Filter
                                                            !Register for bit 1
```

STATus:QUEStionable:ERRors:FDD Register Bit Assignments

The STATus:QUEStionable:ERRors:FDD register bits will be used to indicate information about FDD related 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	MUI Maskable Message.	
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
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.
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. Query the Event Register to find out if one 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.

Bit Number	Binary Weighting	Condition	Description
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:FDD Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:FDD:EVENT?" !Queries and clears the
                                                          !Questionable Errors
                                                          !FDD Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:FDD:CONDITION?" !Queries and clears the
                                                              !Qestionable Errors
                                                              !FDD Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:FDD:ENABLE 1024" !Sets the Questionable
                                                               !Errors FDD Enable
                                                               !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:FDD:NTRANSITION 2" !Sets the Questionable
                                                                 !Errors FDD Negative
                                                                 !Transition Filter
                                                                 !Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:FDD:PTRANSITION 2" !Sets the Questionable
                                                                 !Errors FDD Positive
                                                                 !Transition Filter
                                                                 !Register for bit 1
```

STATus:QUEStionable:ERRors:TA2000 Register Bit Assignments

The STATus:QUEStionable:ERRors:TA2000 register bits will be used to indicate information about TA2000 related 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	MUI Maskable Message.	
13	8192	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
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.
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. Query the Event Register to find out if one 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.

Bit Number	Binary Weighting	Condition	Description
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:TA2000 Condition Register Bit Assignment

```
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:TA2000:EVENT?” !Queries and clears the
                                                          !Questionable Errors
                                                          !TA2000 Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:TA2000:CONDITION?” !Queries and clears the
                                                              !Qestionable Errors
                                                              !TA2000 Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:TA2000:ENABLE 1024” !Sets the Questionable
                                                               !Errors TA2000 Enable
                                                               !Register for bit 10
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:TA2000:NTRANSITION 2” !Sets the Questionable
                                                                 !Errors TA2000 Negative
                                                                 !Transition Filter
                                                                 !Register for bit 1
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:TA2000:PTRANSITION 2” !Sets the Questionable
                                                                 !Errors TA2000 Positive
                                                                 !Transition Filter
                                                                 !Register for bit 1
```

STATus:QUEStionable:ERRors:WCDMa Register Bit Assignments

The STATus:QUEStionable:ERRors:WCDMa register bits will be used to indicate information about WCDMA related 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	MUI Maskable Message.	
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
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.
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. Query the Event Register to find out if one 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.

Bit Number	Binary Weighting	Condition	Description
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:WCDMA Condition Register Bit Assignment

```
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:WCDMA:EVENT?” !Queries and clears the
                                                          !Questionable Errors
                                                          !WCDMA Event Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:WCDMA:CONDITION?” !Queries and clears the
                                                              !Qestionable Errors
                                                              !WCDMA Condition Register
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:WCDMA:ENABLE 1024” !Sets the Questionable
                                                               !Errors WCDMA Enable
                                                               !Register for bit 10
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:WCDMA:NTRANSITION 2” !Sets the Questionable
                                                                 !Errors WCDMA Negative
                                                                 !Transition Filter
                                                                 !Register for bit 1
OUTPUT 714;”STATUS:QUESTIONABLE:ERRORS:WCDMA:PTRANSITION 2” !Sets the Questionable
                                                                 !Errors WCDMA 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.

Bit Number	Binary Weighting	Condition	Description
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	Reserved for future use.	This bit will always be 0.
8	256	Reserved for future use.	This bit will always be 0.
7	128	Reserved for future use.	This bit will always be 0.
6	64	Reserved for future use.	This bit will always be 0.
5	32	Reserved for future use.	This bit will always be 0.
4	16	Power-up Self Test(s) Failed	This bit will be a 1 if the power-up self tests failed.
3	8	Reserved for future use.	This bit will always be 0.
2	4	Reserved for future use.	This bit will always be 0.
1	2	Reserved for future use.	This bit will always be 0.
0	1	Extension Bit.	This bit will always be 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?

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

Bit Number	Binary Weighting	Label	Description
7	128	STATus: OPERation	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	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 368

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.
```

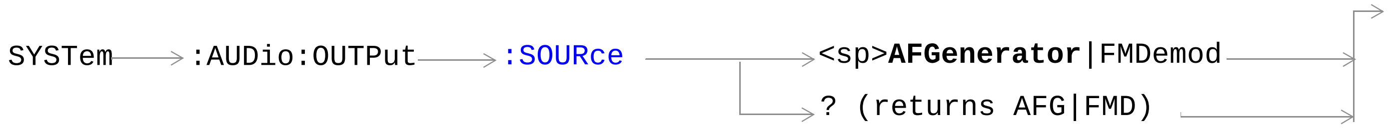
SYSTem Subsystem

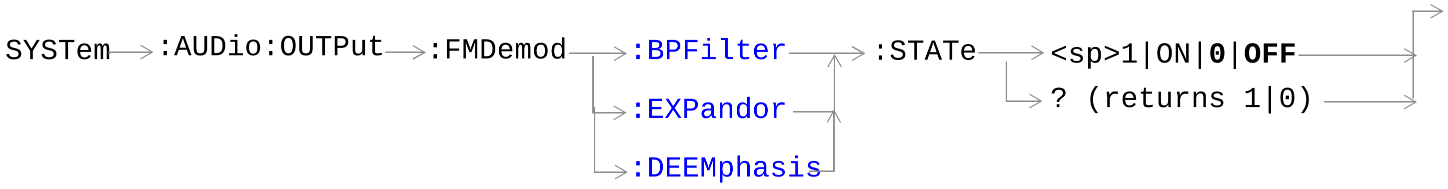
Description

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:AUDio





“Diagram Conventions” on page 368

SYSTem:AUDio:OUTPut:SOURce

Function	Set/queries whether the audio generator signal or the FM demodulation signal is selected to be routed to the AUDIO OUT port of the test set's front panel. When audio generator is selected for output at the front-panel AUDIO OUT port, use "AFGenerator Subsystem" to control the audio generator. **NOTE** The selection of FM Demod signal is useful only in AMPS system. A bandpass filter, expander circuit, and deemphasis circuit can be individually inserted or bypassed in the FM Demod signal path. Use the command "SYSTem:AUDio:OUTPut:FMDemod:BPFilter:STATe" to insert the bandpass filter. Use the command "SYSTem:AUDio:OUTPut:FMDemod:EXPandor:STATe" to insert the expandor circuit. Use the command "SYSTem:AUDio:OUTPut:FMDemod:DEEMphasis:STATe" to insert the deemphasis filter. **NOTE** There will be no guaranteed performance for the signal present at the Audio Out port when FM Demod is selected for output.
Requirements	Test Application Revision: A.03 or above
Setting	AFGenerator | FMDemod
Query	AFG | FMD
*RST Setting	AFG

Programming Example

```
OUTPUT 714;"SYSTem:AUDio:OUTPut:SOURce FMDemod"
!Selects FM Demod signal for output at the front panel AUDIO OUT port.
```

SYSTem:AUDio:OUTPut:FMDemod:BPFilter:STATe

Function	Sets/queries whether the fixed bandpass filter is inserted or bypassed in the FM Demod signal path. It is useful only when FM Demod signal is selected for output at the front-panel AUDIO OUT port (see "SYSTem:AUDio:OUTPut:SOURce" on page 753). When the state is ON, a 300 Hz to 3 KHz bandpass filter is inserted in the audio signal path. When the state is OFF, the bandpass filter is bypassed in the audio signal path
Requirements	Test Application Revision: A.03 or above
Setting	Range: 0 | OFF | 1 | ON
Query	Range: 0 | 1
*RST setting	0 (OFF)

Programming Example

```
OUTPUT 714;"SYSTem:AUDio:OUTPut:FMDemod:BPFilter:STATe ON"
!Sets the bandpass filter state to ON.
```

SYSTem:AUDio:OUTPut:FMDemod:EXPandor:STATe

Function	Sets/queries whether the expandor filter is inserted or bypassed in the FM Demod signal path. It is useful only when FM Demod signal is selected for output at the front-panel AUDIO OUT port (see "SYSTem:AUDio:OUTPut:SOURce" on page 753). When the state is ON, the expandor filter is inserted in the audio signal path. When the state is OFF, the expandor filter is bypassed in the audio signal path.
Requirements	Test Application Revision: A.03 or above
Setting	Range: 0 | OFF | 1 | ON
Query	Range: 0 | 1
*RST setting	0 (OFF)

Programming Example

```
OUTPUT 714;"SYSTem:AUDio:OUTPut:FMDemod:EXPandor:STATe ON" !Sets the expandor filter state to ON.
```

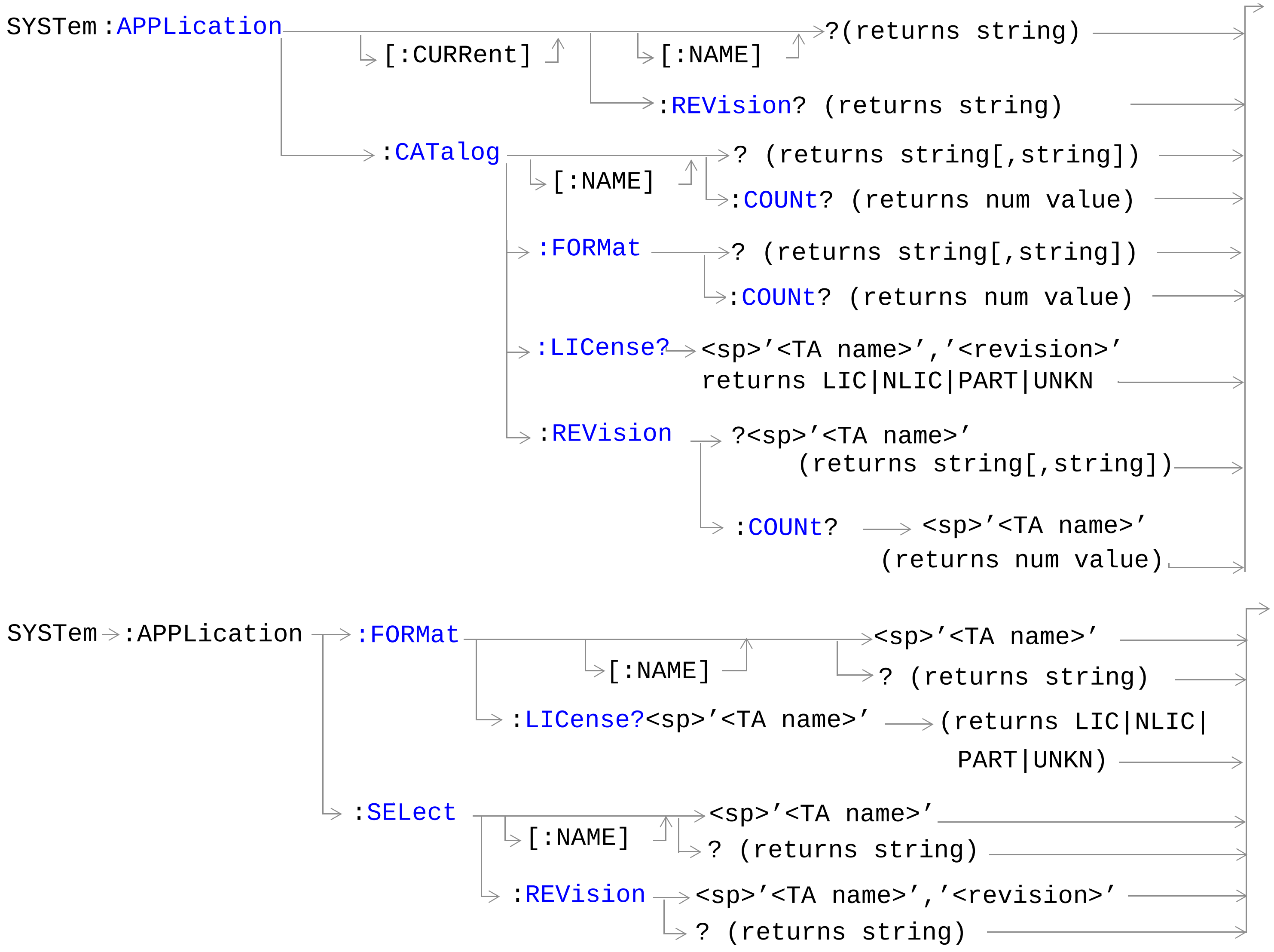
SYSTem:AUDio:OUTPut:FMDemod:DEEMphasis:STATe

Function	Sets/queries whether the deemphasis filter is inserted or bypassed in the FM Demod signal path. It is useful only when FM Demod signal is selected for output at the front-panel AUDIO OUT port (see "SYSTem:AUDio:OUTPut:SOURce" on page 753). When the state is ON, the deemphasis filter is inserted in the audio signal path. When the state is OFF, the deemphasis filter is bypassed in the audio signal path.
Requirements	Test Application Revision: A.03 or above
Setting	Range: 0 | OFF | 1 | ON
Query	Range: 0 | 1
*RST setting	0 (OFF)

Programming Example

```
OUTPUT 714;"SYSTem:AUDio:OUTPut:FMDemod:DEEMphasis:STATe ON"
!Sets the deemphasis filter state to ON.
```

SYSTem:APPLication



"Diagram Conventions" on page 368

SYSTem:APPLication[:CURRent][:NAME]?

Function	Query the test set for the name of the currently running test application.
Query	Range: See "SYSTem:APPLication:CATalog[:NAME]?" and null string.
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:NAME?"`	

SYSTem:APPLication[:CURRent]:REVision?

Function	Query the test set for the currently running test application revision number.
Query	Range: Any string up to 20 characters including null. A typical example would be A.01.01 for a licensed version.
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:REVISION?"`	

SYSTem:APPLication:CATalog[:NAME]?

Function	Query 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.
Query	Range: AMPS/136 Mobile Test CDMA 2000 Mobile Test GSM Mobile Test GSM/GPRS Mobile Test GSM_AMPS/136_GPRS Mobile Test GSM_AMPS/136_GPRS_WCDMA WCDMA Mobile Test
Requirements	Test Application Revision: A.01 and above Test Application Revision A.02 added GSM_AMPS/136_GPRS_WCDMA
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME?"`	

SYSTem:APPLication:CATalog[:NAME]:COUNt?

Function	Query the test set for the total number test application names stored on the hard drive. Up to 30 test applications can be stored.
Query	Range: 0 through 30
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:NAME:COUNT?”`	

SYSTem:APPLication:CATalog:FORMat?

Function	Queries the test set for the names of all formats that are available in a fast switching test application. A licensed fast switching test application must be selected to use this command. This query returns one or more strings, each string is separated by a comma.
Query	Range: A string up to 25 characters, or the null string. • “GSM” • “AMPS/136” • “GPRS” • “IS-2000/IS-95/AMPS” • “WCDMA”
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:FORMAT?”`	

SYSTem:APPLication:CATalog:FORMat:COUNt?

Function	Queries the test set for the total number of formats available in a fast switching test application. A licensed fast switching test application must be selected to use this command.
Query	Range: 0 to 3
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:FORMAT:COUNT?”`	

SYSTem:APPLication:CATalog:LICense? Ô<test application name>Õ,Õ<revision>Õ

Function	Query 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" not all test applications that correspond to the fast switching test application radio formats are licensed. • "UNKN" indicates that license status is unknown.
Query	Range: LIC | NLIC | PART | UNKN
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:LICENSE? 'GSM mobile test','A.04.00'"`	

SYSTem:APPLication:CATalog:REVision? Ô<test application name>Õ

Function	Query the test set for all revision numbers stored on the test set's hard drive for a specific test application. 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.
Query	Range: One or more comma separated strings or a null string
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION? 'AMPS/136 MOBILE TEST'"`	

SYSTem:APPLication:CATalog:REVision:COUNt? Ô<test application name>Õ

Function	Query 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	Test Application Revision: A.01 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. A licensed fast switching 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’ • ‘AMPS/136’ • ‘GPRS’ • ‘IS-2000/IS-95/AMPS’ • ‘WCDMA’
Query	Range: A string up to 25 characters, or the null string. • “GSM” • “AMPS/136” • “GPRS” • “IS-2000/IS-95/AMPS” • “WCDMA”
Requirements	Test Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;”SYSTEM:APPLICATION:FORMAT:NAME ‘AMPS/136’”
OUTPUT 714;”SYSTEM:APPLICATION:FORMAT:NAME?”
```

SYSTem:APPLication:FORMat:LICense? Ô<format name>Õ

Function	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.
Query	Range: LIC | NLIC | PART | UNKN
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;”SYSTEM:APPLICATION:FORMAT:LICENSE? ‘AMPS/136’”`	

SYSTem:APPLication:SELect[:NAME] Ô<test application name>Õ

Function	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.
Setting	Range: See “SYSTem:APPLication:CATalog[:NAME]?” .
Query	Range: See “SYSTem:APPLication:CATalog[:NAME]?” and null string.
Requirements	Test Application Revision: A.01 and above

Programming Example
`OUTPUT 714;”SYSTEM:APPLICATION:SELECT:NAME ‘AMPS/136 MOBILE TEST’”`
`OUTPUT 714;”SYSTEM:APPLICATION:SELECT:NAME?”`	

SYSTem:APPLication:SELect:REVision Ô<test application name>Õ,Õ<revision>Õ

Function	Selects a revision for particular 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. Users will need to reload a revision that has test application switching following the download process for upgrading firmware.
Setting	Range: A valid test application name and revision number for any licensed test application.
Query	Range: A string up to 20 characters, or the null string.
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION ‘GSM MOBILE TEST’,’A.04.00’"
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION? ‘GSM MOBILE TEST’"
```

Related Topics

“Test Application Switching” on page 924

“Test Application Revisions and Licenses” on page 926

“Test Application Name” on page 928

“SYSTem:CURRent:TA” on page 774

SYSTem:BEEPer

“Diagram Conventions” on page 368

SYSTem:BEEPer:STATe

Function	Sets/queries the beeper state of the test set.
Setting	0|OFF | 1|ON
Query	0|1
*RST Setting	1 (on)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SYSTEM:BEEPER:STATE OFF" !Sets beeper state to off.
```

SYSTem:CONFigure

SYSTem ——:CONFigure → :INFormation → :HARDware → :VERBose? →

“Diagram Conventions” on page 368

SYSTem:CONFigure:INFormation:HARDware:VERBose?

Function	Query 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.
*RST Setting	Resets have no effect on this information. The information is gathered during the power up cycle.
Requirements	Test Application Revision: A.01 and above
Programming Example	

```
OUTPUT 714;"SYSTEM:CONFIGURE:INFORMATION:HARDWARE:VERBOSE?" !Queries system hardware.
```

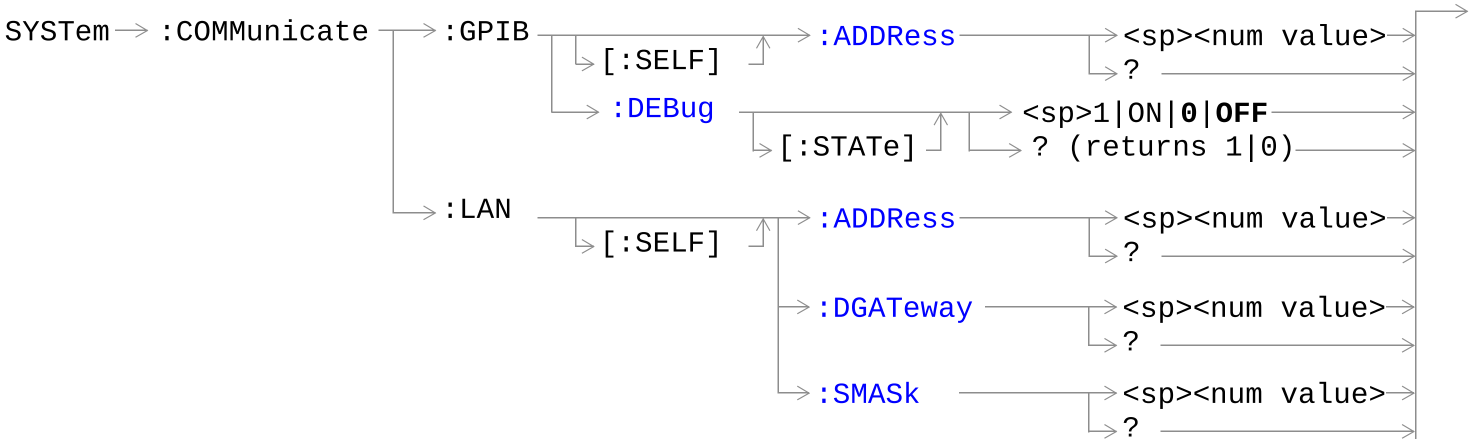
Related Topics

“Hardware Configuration Report” on page 1145

“SYSTem:CURRent:TA” on page 774

“Obtaining Identification Information (*IDN)” on page 1143

SYSTem:COMMunicate



"Diagram Conventions" on page 368

SYSTem:COMMunicate:GPIB:[:SELF]:ADDRess

Function	Sets/queries the test set's GPIB address.
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)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SYSTEM:COMMUNICATE:GPIB:SELF:ADDRESS 14" !Sets the GPIB address to 14.
```

SYSTem:COMMunicate:GPIB:DEBug[:STATe]

Function	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 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 875 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	0|1
*RST setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SYSTEM:COMMUNICATE:GPIB:DEBUG:STATE ON" !Sets debugger to on.
```

SYSTem:COMMunicate:LAN[:SELF]:ADDRess

Function	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 767. 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.
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)
Requirements	Test Application Revision: A.01 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	Sets/queries the LAN IP router/gateway address for the test set.
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	Test Application Revision: A.01 and above

Programming Example

```
OUTPUT 714;"SYSTEM:COMMUNICATE:LAN:SELF:DGATEWAY '130.2.6.200'"
```

SYSTem:COMMunicate:LAN[:SELF]:SMASk

Function	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.
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	Test Application Revision: A.01 and above
Programming Example	

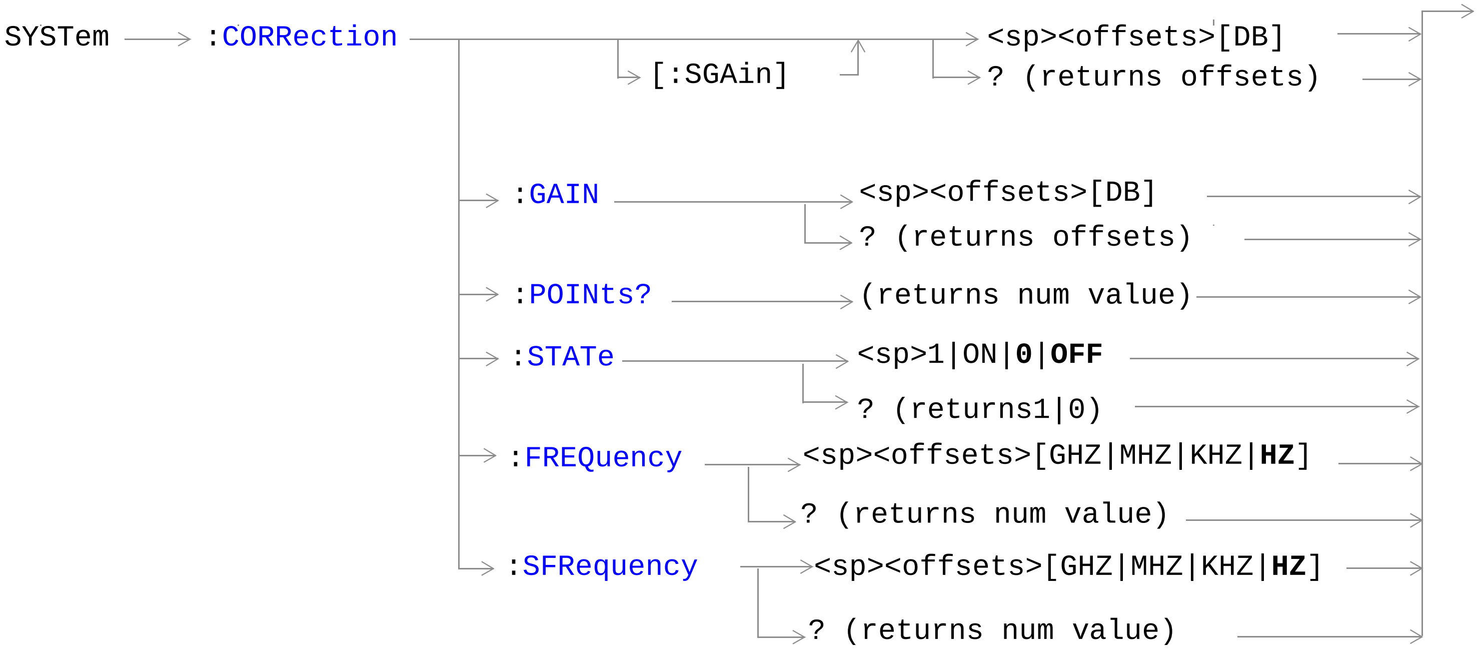
```
OUTPUT 714;”SYSTEM:COMMUNICATE:LAN:SELF:SMASK '255.2.6.200'”
```

Related Topics

“Configuring the Test Set’s GPIB” on page 922

“Configuring the Test Set’s LAN” on page 920

SYSTem:CORRection



“Diagram Conventions” on page 368

SYSTem:CORRection:[:SGAin]

Function	Sets/queries up to 20 comma-separated amplitude offset values in dB. This command sets the state to On. See “Amplitude Offset” on page 107. 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.
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	Test Application Revision: A.01 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	Sets/queries up to 20 comma-separated frequency values in MHz. Each frequency value corresponds with a gain setting. See “SYSTem:CORRection:GAIN” . The units, (GHz, MHz, kHz, Hz) are optional. If no units are specified, units default to Hz. See “Amplitude Offset” on page 107. 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
Requirements	Test Application Revision: A.01 and above

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	Sets/queries the up to 20 comma separated offset gain values in units of dB. Each gain value corresponds with a frequency setting. See "SYSTem:CORRection:FREQuency" . See "Amplitude Offset" on page 107. 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	Test Application Revision: A.01 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	Query returns 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 107.
Query	Range: 1 to 20, and NAN (9.91E+37) Resolution: 1
Requirements	Test Application Revision: A.01 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	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 107. 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	Test Application Revision: A.01 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
```

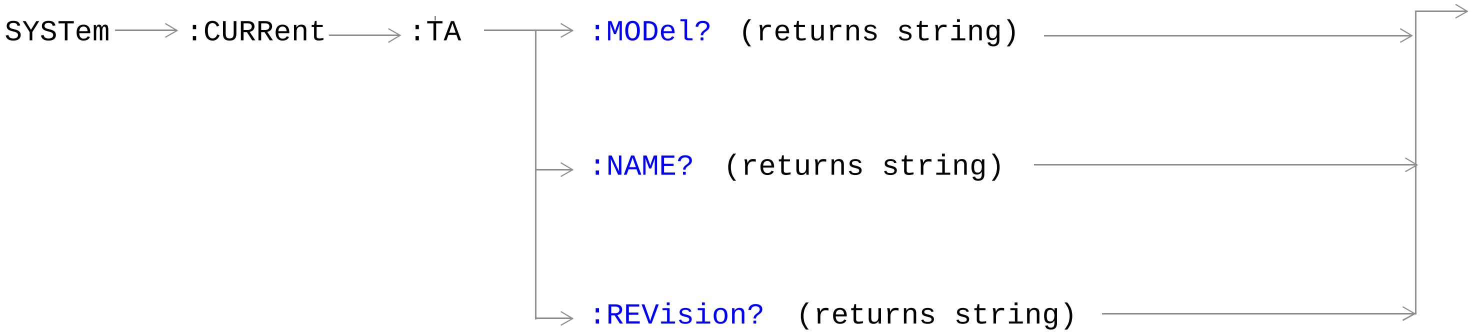
SYSTem:CORRection:STATe

Function	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 107.
Setting	0|OFF | 1|ON
Query	0|1
Factory Setting	0 (off)
Requirements	Test Application Revision: A.01 and above

Programming Example

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

SYSTem:CURRent:TA



“Diagram Conventions” on page 368

SYSTem:CURRent:TA:MODel?

Function	Query the model number of the test application running. Printable ASCII characters up to a 15 character string.
Query	Range: ASCII codes 32 - 126 decimal excluding comma and semicolon
*RST Setting	non volatile, read from the test set’s hard disk
Requirements	Test Application Revision: A.01 and above

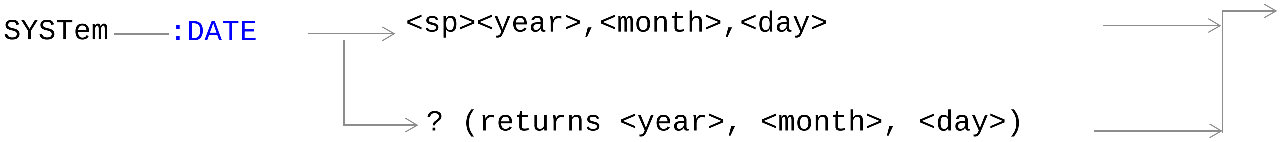
SYSTem:CURRent:TA:NAME?

Function	Query the name of the test application running. Printable ASCII characters up to a 25 character string. This command is not recommended see “SYSTem:APPLication” on page 755.
Query	Range: ASCII codes 32 - 126 decimal excluding comma and semicolon
*RST Setting	non volatile, read from the test set’s hard disk
Requirements	Test Application Revision: A.01 and above

SYSTem:CURRent:TA:REVision?

Function	Query the coordinated codeware revision for the test application running. Printable ASCII characters up to a 20 character string. This command is not recommended see “SYSTem:APPLication” on page 755.
Query	Range: ASCII codes 32 - 126 decimal excluding comma and semicolon
*RST Setting	non volatile, read from the test set’s hard disk.
Requirements	Test Application Revision: A.01 and above

SYSTem:DATE



“Diagram Conventions” on page 368

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	Test Application Revision: A.01 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?

“Diagram Conventions” on page 368

SYSTem:ERRor?

Function	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 875.
Query	Error/Event Queue • Range: 0 to 100 messages up to 255 characters in length
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SYSTEM:ERROR?”` !Queries the contents of the Error/Event Queue	

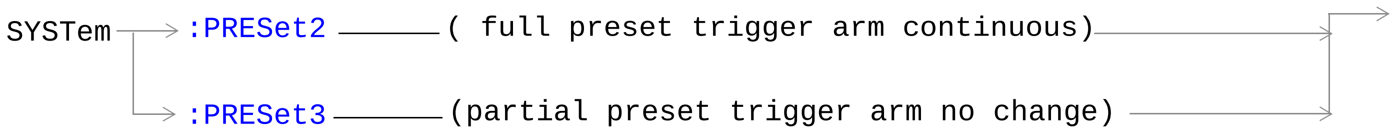
SYSTem:MEASurement:RESet

“Diagram Conventions” on page 368

SYSTem:MEASurement:RESet

Function	Sets all measurements to abort. If continous triggering is enabled, measurements will begin a new measurement cycle.
Setting	These results are set to their default values when measurement reset occurs.
Requirements	Test Application Revision: A.01 and above

SYSTem:PRESet



"Diagram Conventions" on page 368

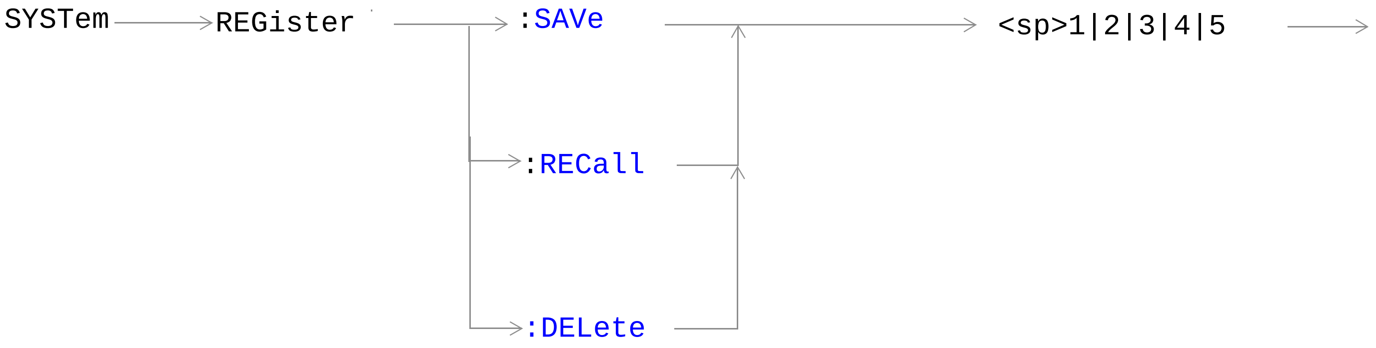
SYSTem:PRESet2

Function	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 292. The *RST command will set the trigger arm to single.
Related Topics	See "Full Preset" on page 258 for details about the *RST full preset.
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SYSTEM:PRESET2" !Full preset, trigger arm set to continuous.`	

SYSTem:PRESet3

Function	Performs a partial preset. This is the recommended command for users 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.
Related Topics	See "Partial Preset" for more details.
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SYSTEM:PRESET3" !Partial preset when in remote operation.`	

SYSTem:REGister



"Diagram Conventions" on page 368

SYSTem:REGister:SAVe

Function	Saves the current test set settings to one of five available registers. If this command is used to save to a register that is already full, the old contents of the register will be overwritten.
Setting	1|2|3|4|5
Query	No query
*RST Setting	Not applicable
Requirements	Test Application Revision: A.03 or above
Programming Example `OUTPUT 714;"SYSTem:REGister:SAVe 1" !Saves the current test set configuration to save register 1.`	

SYSTem:REGister:RECall

Function	Recalls a saved register from one of five registers. If this command is used to recall a register that is empty, an error message will be displayed.
Setting	1|2|3|4|5
Query	No query
*RST Setting	Not applicable
Requirements	Test Application Revision: A.03 or above
Programming Example `OUTPUT 714;"SYSTem:REGister:RECall 1" !Recalls register 1.`	

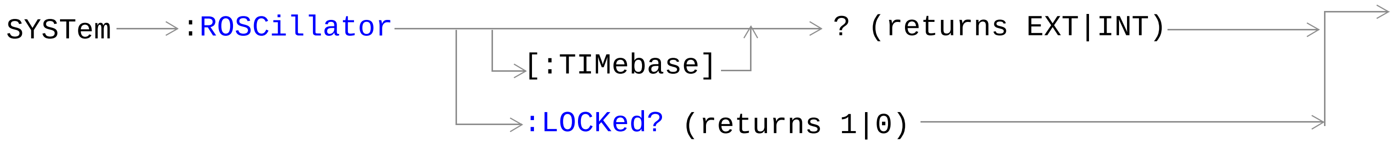
SYSTem:REGister:DELete

Function	Deletes any contents saved in the selected register.
Setting	1|2|3|4|5
Query	No query
*RST Setting	Not applicable
Requirements	Test Application Revision: A.03 or above
Programming Example `OUTPUT 714;"SYSTem:REGister:DELete 1" !Deletes register 1.`	

Related Topics

"Save and Recall Registers" on page 853

SYSTem:ROSCillator



“Diagram Conventions” on page 368

SYSTem:ROSCillator[:TIMebase]?

Function	Queries the timebase source. If an external timebase is used, it must have these characteritics: • an output level of 0 to +13 dBm • frequency of 10 MHz
Query	Range: INT = internal source EXT = external source
Requirements	Test Application Revision: A.01 and above

SYSTem:ROSCillator:LOCKed?

Function	Queries the timebase to find out if it is locked or unlocked. Returns 0 or 1.
Query	Range: 0 = unlocked 1 = locked
Requirements	Test Application Revision: A.01 and above

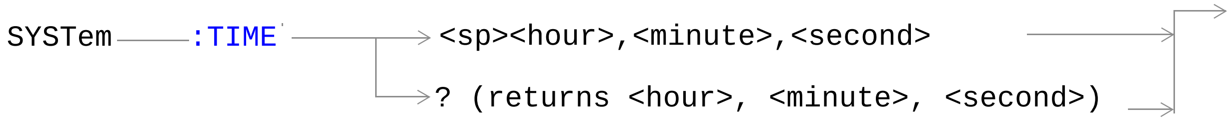
SYSTem:SYNChronized

“Diagram Conventions” on page 368

SYSTem:SYNChronized

Function	Sets/queries the test set to see that all prior sequential commands have completed or that all prior overlapped commands have started, indicating that the input buffer is synchronized.
Setting	Bit 12 of the status operation condition register is pulsed.
Query	Range: 1
Requirements	Test Application Revision: A.01 and above

SYSTem:TIME



“Diagram Conventions” on page 368

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	Test Application Revision: A.01 and above

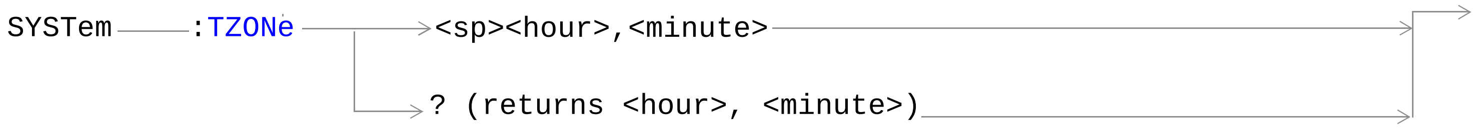
Programming Example
`OUTPUT 714;"SYSTEM:TIME 7,30,0" !Sets local time to 7:30`
`OUTPUT 714;"SYSTEM:TIME?” !Returns “+7,+30,+0" if local time has been set to 7:30.`	

Related Topics

“SYSTem:UTC[:TIME]”

“SYSTem:TZONe”

SYSTem:TZONe



“Diagram Conventions” on page 368

SYSTem:TZONe

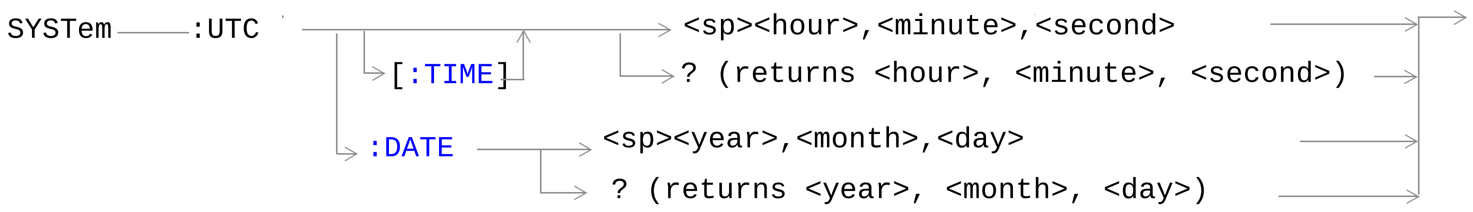
Function	Sets/queries the time zone. Changes to time zone will cause changes to local time, but will not directly affect UTC time.
Setting	Range: • <hour> -12 to +15 • <minute> 0 to 59
Query	Range: • <hour> -12 to +15 • <minute> 0 to 59
*RST Setting	This feature is not affected by instrument preset
Requirements	Test Application Revision: A.01 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 368

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	Test Application Revision: A.01 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

Function	Sets/queries the Universal Coordinated Time (UTC) date. (UTC is also known as UCT, Zulu, and Greenwich Mean Time.)
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	Test Application Revision: A.01 and above

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.
```

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.

See also

“Obtaining Identification Information (*IDN)”

“Preset Descriptions”

Manual Operation

How Do I Configure Cell 2?

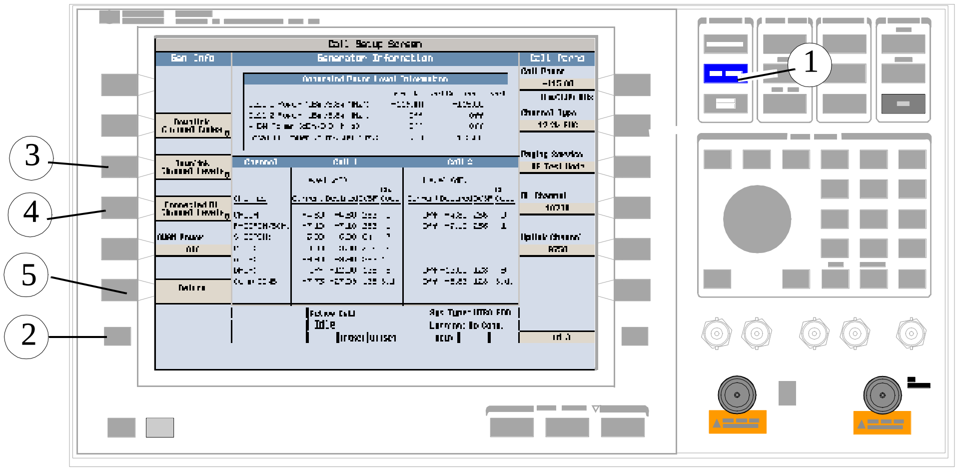
- “A. Set Cell 2 Power”
- “B. Set Cell 2 Downlink Channel Levels”
- “C. Set Cell 2 Primary Scrambling Code”
- “D. Set Cell 2 Time Offset from Cell 1”
- “E. Set Cell 2 Closed Loop Power Control Mode”

A. Set Cell 2 Power

1. “B. Go to the Soft Handoff Information Screen” on page 792.
2. Set `Cell2 Power` (**F1**) to the desired value.

B. Set Cell 2 Downlink Channel Levels

1. Press the **CALL SETUP** key.
2. Press the **More** key on the left to go to `Call Control` (`2 of 3`).
3. Press `Generator Info` (**F3**).



4. Press the `Connected DL Channel Levels` (**F4**) key, and change the power levels for the downlink channels, as needed.
5. Select `Close Menu` (**F6**).

C. Set Cell 2 Primary Scrambling Code

1. "B. Go to the Soft Handoff Information Screen" on page 792.
2. Select `SHO / Event Parameters` (**F2**).
3. Set `Cell2 Primary Scrambling Code` to the desired value.
4. Select `Close Menu` (**F6**).

D. Set Cell 2 Time Offset from Cell 1

1. "B. Go to the Soft Handoff Information Screen" on page 792.
2. Select `SHO / Event Parameters` (**F2**).
3. Set `Cell2 Time Offset` to the desired value.
4. Select `Close Menu` (**F6**).

E. Set Cell 2 Closed Loop Power Control Mode

1. Press the **CALL SETUP** key.
2. Press the **More** key on the right two times to go to `Call Parms (3 of 3)`.
3. Select `UL CL Power Ctrl Parameters` (**F8**).
4. Set `Cell2 Power Ctrl` to the desired setting.
5. Select `Close Menu` (**F6**).

Related Topics

"Soft Handoff" on page 112

"How Do I Perform a Soft Handoff?" on page 792

"How Do I Configure and Enable (Start) Event Reporting?" on page 794

Configuring Cell 1: "How Do I Change Generator Information?" on page 809

How Do I Perform a Soft Handoff?

A. Make a Call

See "How Do I Set Up a Call?" on page 817

B. Go to the Soft Handoff Information Screen

1. Press the **CALL SETUP** key.
2. Press the **More** key on the left to go to `Call Control` (`2 of 3`).
3. Select Soft Handoff Info (F1)

C. Configure Cell 2 and Turn Cell 2 Power On

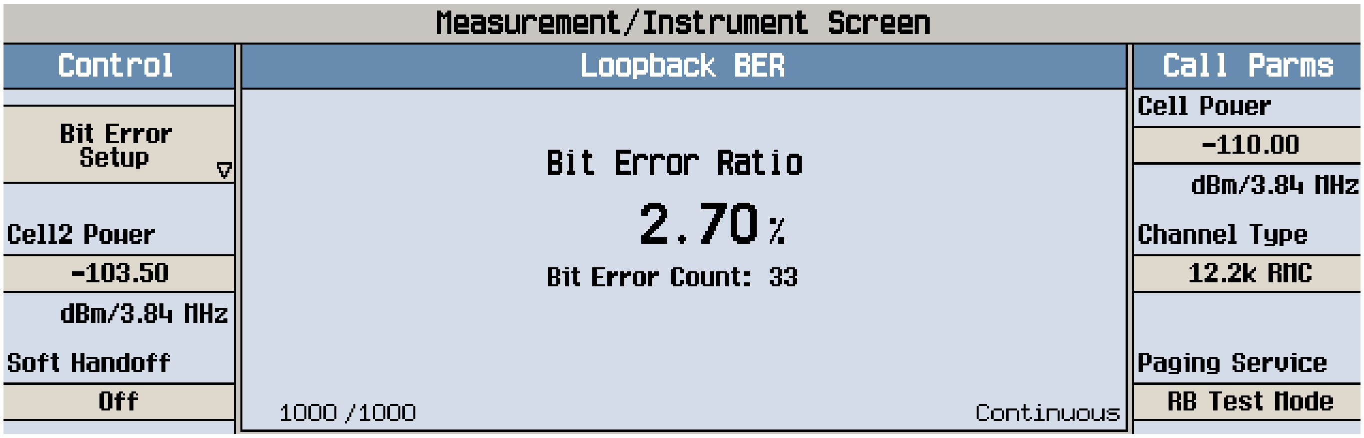
See "How Do I Configure Cell 2?" on page 790

D. Enable Soft Handoff

1. "B. Go to the Soft Handoff Information Screen"
2. Set `Soft Handoff` (**F3**) to `On`.

E. Perform Loopback BER Testing

1. Initialize the Loopback BER measurement (press the **Measurement selection** key, then select `Loopback BER`).
2. Select `Bit Error Setup` (**F1**) to configure the Loopback BER measurement (if you set `Trigger Arm` to `Single`, you will need to press **START SINGLE** to begin the measurement). Select `Close Menu` (**F6**).
3. Set `Soft Handoff` (**F3**) to `Off`.
4. Set `Cell Power` (**F7**) to `-110 dBm/3.84 MHz`.
5. Set `Cell2 Power` (**F2**) to `-103.5 dBm/3.84 MHz`. Note as you increase cell 2 power or decrease cell 1 power, BER increases.



Cell2 Power
-103.50
dBm/3.84 MHz

Soft Handoff
Off

Bit Error Ratio
2.70 %
Bit Error Count: 33

1000 /1000
Continuous

Cell Power
-110.00
dBm/3.84 MHz

Channel Type
12.2k RMC

Paging Service
RB Test Mode

6. Set `Soft Handoff` (**F3**) to `On`. BER should decrease significantly, as the cell 2 signal is now combined with the cell 1 signal, rather than acting as interference. (If cell 2 level is too high, the messaging to order a soft handoff may not be properly received by the UE and an error will be posted. If this is the case, simply decrease cell 2 power, enable soft handoff, then return cell 2 its previous level)

Related Topics

"Soft Handoff" on page 112

"How Do I Configure Cell 2?" on page 790

"How Do I Configure and Enable (Start) Event Reporting?" on page 794

"Measuring Loopback Bit Error Ratio" on page 827

How Do I Configure and Enable (Start) Event Reporting?

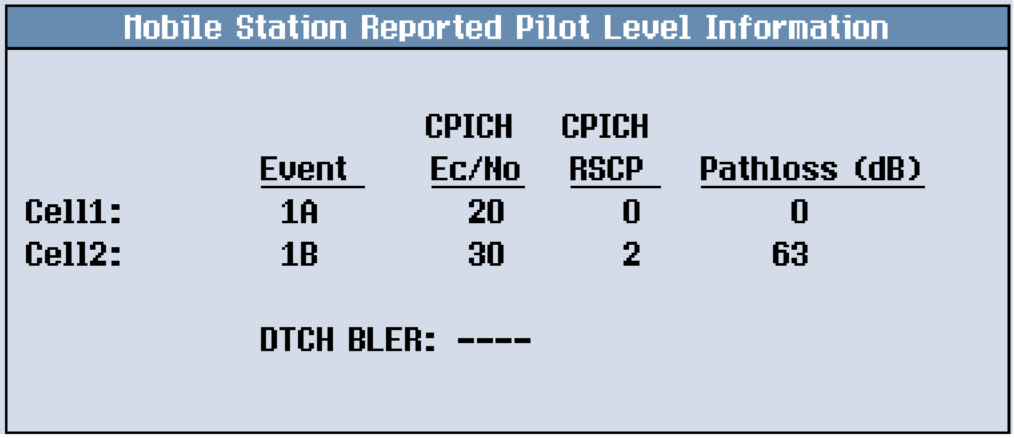
- "A. Configure Event Parameters"
- "B. Enable Event Reporting"
- "C. Change Event Parameters"

A. Configure Event Parameters

1. "B. Go to the Soft Handoff Information Screen" on page 792
2. Select `SHO / Event Parameters` (**F2**).
3. Set event parameters as needed.

B. Enable Event Reporting

1. "B. Go to the Soft Handoff Information Screen" on page 792
2. Set `Event State` (**F4**) to `On`. The test set sends a Measurement Control message to the UE with the event parameter configuration specified in step "A. Configure Event Parameters" on page 794.



Mobile Station Reported Pilot Level Information

	Event	CPICH Ec/No	CPICH RSCP	Pathloss (dB)
Cell1:	1A	20	0	0
Cell2:	1B	30	2	63

DTCH BLER: ----

The UE reports events for cell 1 and cell 2 as they occur, as well as MS reported measurement results for each cell.

C. Change Event Parameters

1. "A. Configure Event Parameters" on page 794.
2. Select `Send Event Config` (**F5** if `Event State` is `On`), to send a new Measurement Control message to the UE, specifying the changes to the event parameters.

NOTE You can also send a new Measurement Control message to the UE by toggling `Event State` off and on.

Related Topics

"Soft Handoff" on page 112

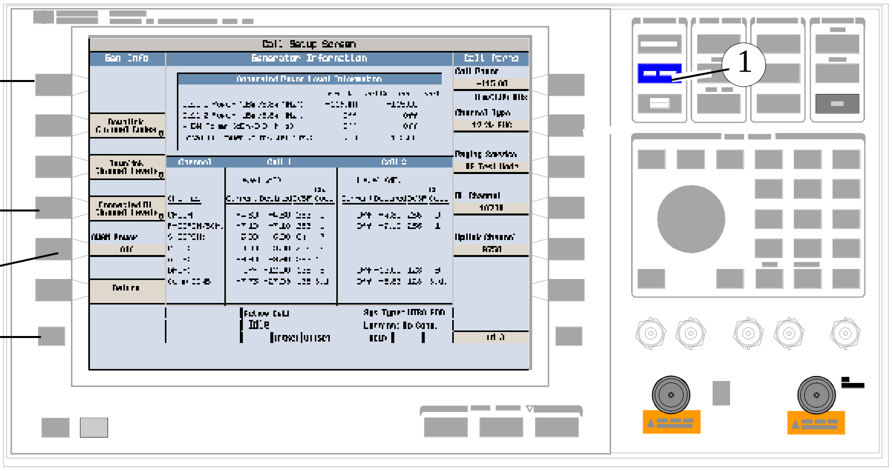
"How Do I Configure Cell 2?" on page 790

"How Do I Perform a Soft Handoff?" on page 792

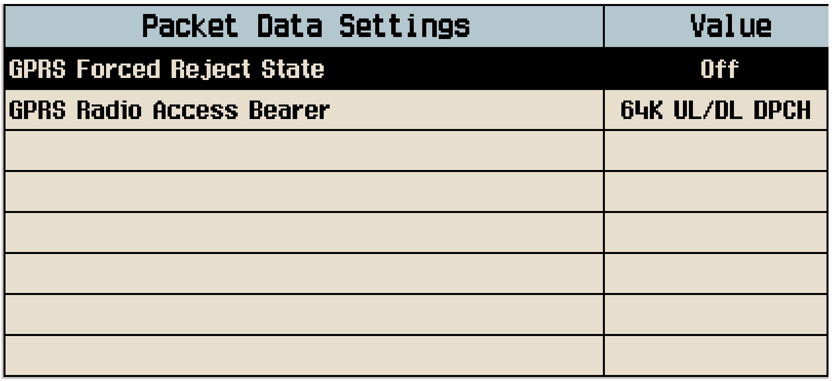
How Do I Set Up Data Channel Parameters?

A. Packet Data Setup

1. Press the **CALL SETUP** key.
2. Press the **More** key on the left two times to go to `Call Parms (3 of 3)`.
3. Press `Data Channels` (**F4**).
4. Press `Packet Data Setup` (**F1**).



5. Set Packet Data Parameters.



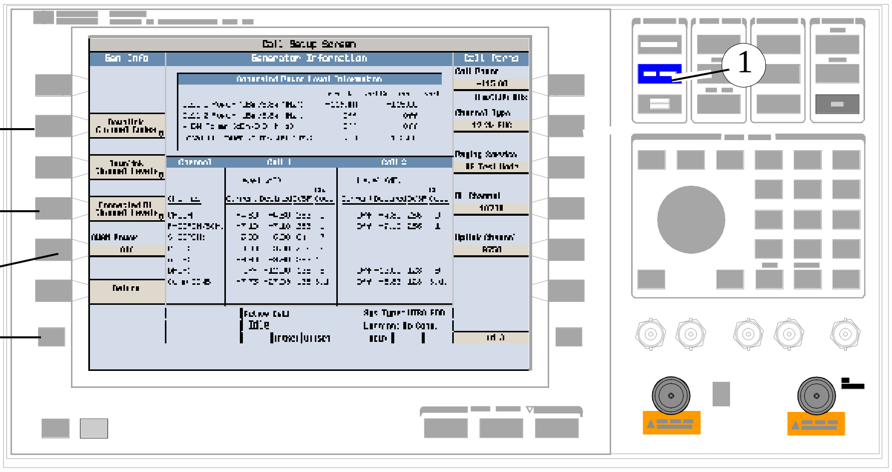
Packet Data Settings	Value
GPRS Forced Reject State	Off
GPRS Radio Access Bearer	64K UL/DL DPCH

6. Select `Close Menu` (**F6**).

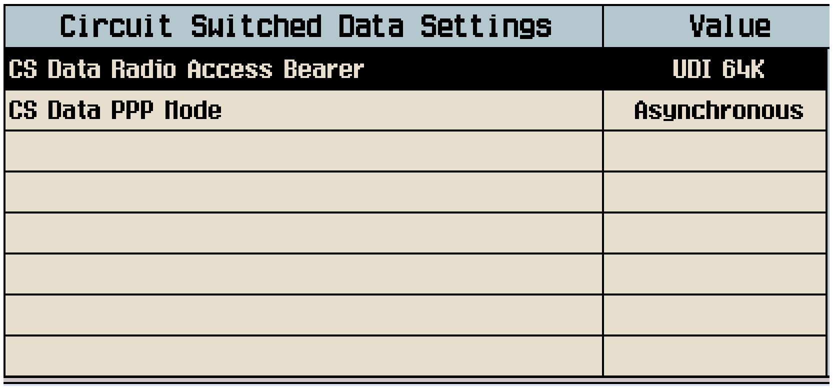
B. CS (Circuit Switched) Data Setup

1. Press the **CALL SETUP** key.
2. Press the **More** key on the left two times to go to `Call Parms (3 of 3)`.
3. Press `Data Channels` (**F4**).

4. Press `CS Data Setup` (**F2**).



5. Set CS Data Parameters.



Circuit Switched Data Settings	Value
CS Data Radio Access Bearer	UDI 64K
CS Data PPP Mode	Asynchronous

6. Select `Close Menu` (**F6**).

Related Topics

"GPRS Packet Data Service Example Procedure"

IP Address Requirements

The test set provides a field for entering the IP Address for a wireless device being tested using the packet and CS (circuit switched) data channels.

There are two requirements for the DUT IP Address field:

1. The network portion (see "IP Address Formatting") of the wireless device's DUT IP address must be the same as the network and subnet portion of the test set's LAN IP Address (see "Configuring the Test Set's LAN").
2. The host portion of the wireless device's DUT IP address must be unique. (It should not be the same as any other host on the network or subnet that the test set is connected to.)

How Network Addresses Are Assigned

Network IDs are assigned by the NIC (Network Information Center). The network portion (first two bytes) of the class B address in the example above would be acquired from the NIC by a network administrator to avoid conflicts with other networks. The network administrator is then free to allocate subnets as needed since subnetting is not visible outside the network.

If you do not know the IP address the test set and/or DUT should be set to, or which unique host IDs are available, you should contact your network administrator.

How to Interpret IP Addresses

The network portion of the LAN IP Address depends on the address classification as shown below:

LAN IP Address Classification

Class A = 1.0.0.0 to 127.255.255.255
Class B = 128.0.0.0 to 191.255.255.255
Class C = 192.0.0.0 to 223.255.255.255
Class D = 224.0.0.0 to 247.255.255.255

An IP Address consists of a 4-byte (32 bit) number. Each byte is in a decimal form separated from other bytes by a dot. This is referred to as a "dotted decimal" format.

The IP address class defines which bytes contain the network portion of the address. For Class A addresses, the first byte from the left identifies the network. For class B it is the first two bytes from the left, and for class C it is the first three bytes. Class D addresses are multicast, which are used when a datagram is directed to multiple hosts. See Table 6. "IP Address Formatting".

Table 6. IP Address Formatting

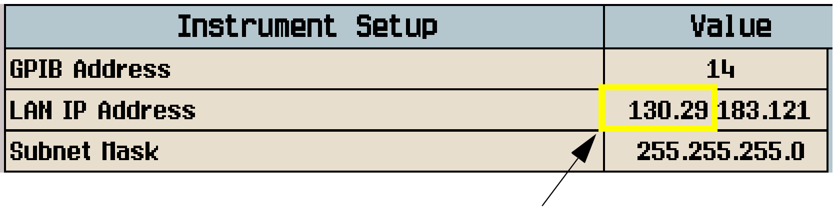
Class	Byte 1	Byte 2	Byte 3	Byte 4
A	Network	Host		
B	Network		Host	
C	Network			Host

Table 6. IP Address Formatting

Class	Byte 1	Byte 2	Byte 3	Byte 4
D	Multicast			

Example 7. Determining the Test Set's Network Address

If the test set's LAN IP Address is set to 130.29.183.121, as shown below, the first two bytes represent the network portion since this is a Class B address.



Instrument Setup	Value
GPIB Address	14
LAN IP Address	130.29.183.121
Subnet Mask	255.255.255.0

Network Portion

If the test set is on a subnet, the Subnet Mask must be applied to determine the subnet address. This is done by performing bit-wise AND logic between the binary values of the LAN IP Address and Subnet Mask. See "Applying the Subnet Address"

Table 7. Applying the Subnet Address

LAN IP Address	**130**								**29**								**183**								**121**							
Subnet Mask	**255**								**255**								**255**								**0**							
Subnet Mask (Binary)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
LAN IP Address (Binary)	1	0	0	0	0	0	1	0	0	0	0	1	1	1	0	1	1	0	1	1	0	1	1	1	0	1	1	1	1	0	0	1
Subnet Address (Binary)	1	0	0	0	0	0	1	0	0	0	0	1	1	1	0	1	1	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0

Table 7. Applying the Subnet Address

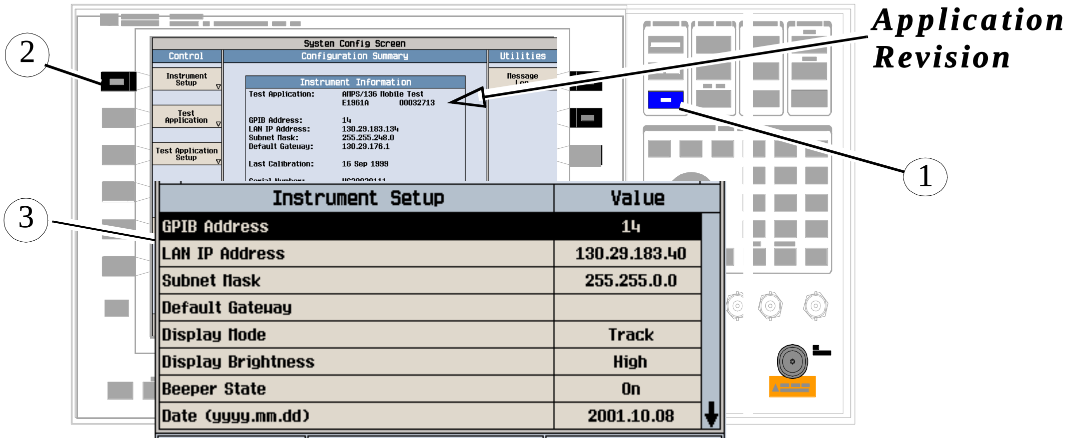
LAN IP Address	**130**	**29**	**183**	**121**
Subnet Mask	**255**	**255**	**255**	**0**
Subnet Address	Network 130	Network 29	Subnet 183	Host 0

As shown in the table above, the Subnet Mask splits the 16 bit host portion of the class B address into an 8-bit subnet ID and an 8-bit host ID.

In this example the DUT IP Address would need to be set to 130.29.183.XXX to match the test set's subnet ID. The host portion of the LAN IP Address is identified by the bits corresponding to the 0 bits in the Subnet Mask. Therefore, the last byte in the DUT IP Address must not be 121 or any address that corresponds with any other host on the subnet at 130.29.183.XXX

How Do I Configure the Test Set for My Test System?

A. Configure instrument information and setup.



Instrument Information

Test Application: AMPS/136 Mobile Test
E1961A 00032713

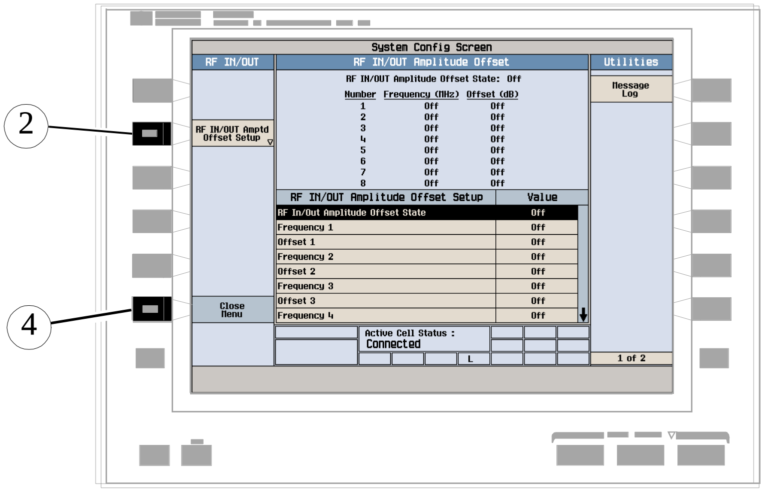
GPIB Address: 14
LAN IP Address: 130.29.183.134
Subnet Mask: 255.255.248.0
Default Gateway: 130.29.176.1

Last Calibration: 16 Sep 1999

Instrument Setup	Value
GPIB Address	14
LAN IP Address	130.29.183.40
Subnet Mask	255.255.0.0
Default Gateway	
Display Mode	Track
Display Brightness	High
Beeper State	On
Date (yyyy.mm.dd)	2001.10.08

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.



RF IN/OUT Amplitude Offset State: Off

Number	Frequency (MHz)	Offset (dB)
1	Off	Off
2	Off	Off
3	Off	Off
4	Off	Off
5	Off	Off
6	Off	Off
7	Off	Off
8	Off	Off

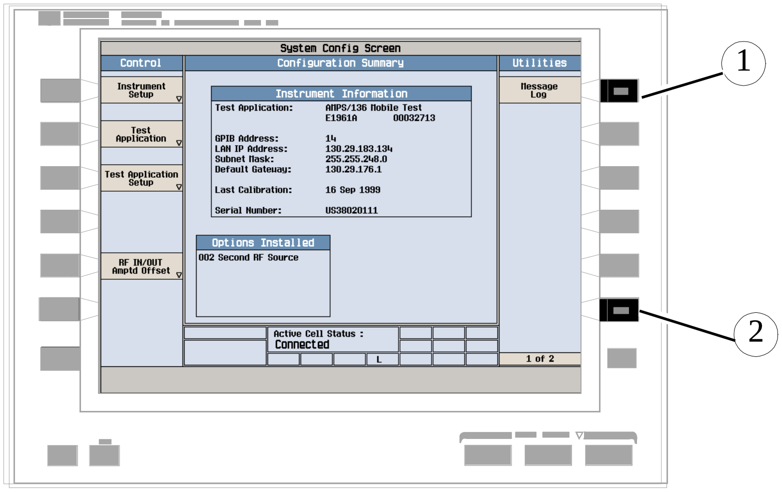
RF IN/OUT Amplitude Offset Setup	Value
RF In/Out Amplitude Offset State	Off
Frequency 1	Off
Offset 1	Off
Frequency 2	Off
Offset 2	Off
Frequency 3	Off
Offset 3	Off
Frequency 4	Off

Active Cell Status : Connected

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 offset for the test frequencies you use.
4. Press the `Close Menu` (**F6**) key.

5. Press the `Return` (**F6**) key.

C. Check the message log.



Instrument Information

Test Application: AMPS/136 Mobile Test
E1961A 00032713

GPIB Address: 14
LAN IP Address: 130.29.183.134
Subnet Mask: 255.255.248.0
Default Gateway: 130.29.176.1

Last Calibration: 16 Sep 1999

Serial Number: US38020111

Options Installed

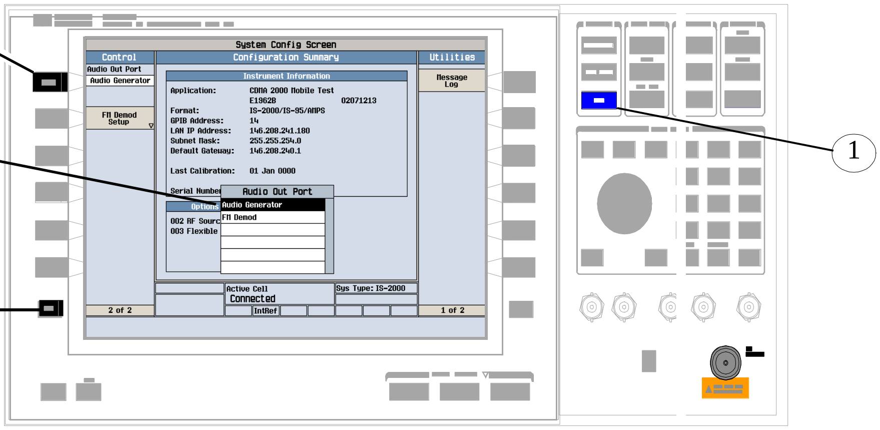
002 Second RF Source

Active Cell Status : Connected

1. Press the `Message Log` (**F7**) key and view the message log.
2. Press the `Return` (**F12**) key.

How Do I Configure the AUDIO OUT Port?

A. Select a signal to output at the AUDIO OUT port.



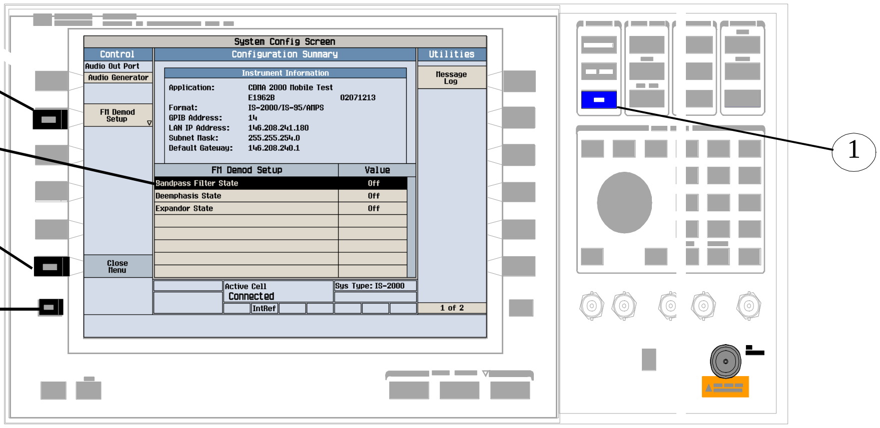
Application: CDMA 2000 Mobile Test
E1962B 02071213
Format: IS-2000/IS-95/AMPS
GPIB Address: 14
LAN IP Address: 146.208.241.180
Subnet Mask: 255.255.254.0
Default Gateway: 146.208.240.1
Last Calibration: 01 Jan 0000
Serial Number
002 RF Sourc
003 Flexible
Audio Generator
FM Demod
Active Cell Connected
Sys Type: IS-2000

1. Press the **SYSTEM CONFIG** key.
2. Press the **More** key on the left side of the display for additional system parameters.
3. Press the `Audio Out Port` (**F1**) key.
4. Turn the knob to highlight a selection and then press the knob.

NOTE Selection of FM Demod signal routed to the front-panel AUDIO OUT port is useful only in AMPS system. There will be no guaranteed performance for the signal present at the Audio Out Port when FM Demod is selected for output.

B. Set FM Demod signal.

When FM Demod signal is selected for output to the front-panel AUDIO OUT port, a bandpass filter, expander circuit, and de-emphasis circuit can be individually inserted or bypassed in the FM Demod signal path.



Application: CDMA 2000 Mobile Test
E1962B 02071213
Format: IS-2000/IS-95/AMPS
GPIB Address: 14
LAN IP Address: 146.208.241.180
Subnet Mask: 255.255.254.0
Default Gateway: 146.208.240.1

FM Demod Setup	Value
Bandpass Filter State	Off
Deemphasis State	Off
Expandor State	Off

Active Cell Connected
Sys Type: IS-2000

How Do I Configure the AUDIO OUT Port?

1. Press the **SYSTEM CONFIG** key.
2. Press the **More** key.
3. Press the `FM Demod Setup` (**F2**) key.
4. Turn the knob to highlight a selection and then press the knob.
5. Enter a value or selection and press the knob.
6. Press the `Close Menu` (**F6**) key.

NOTE If the FM Demod Setup settings are changed while the Audio Out Port selection is not FM Demod (see "A. Select a signal to output at the AUDIO OUT port."), the values will be stored for use when Audio Out Port is set to FM Demod.

Related Topics

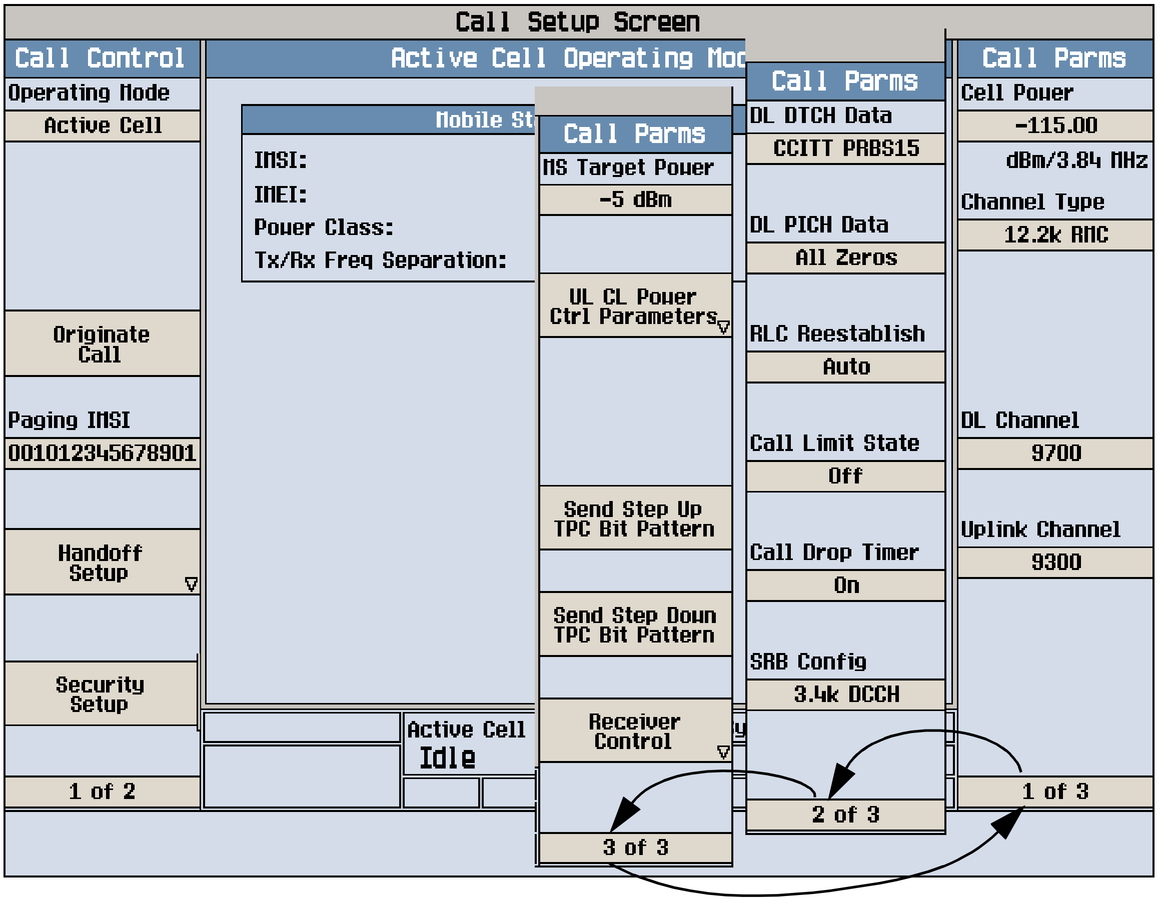
"Configuring the Test Set's AUDIO OUT port"

"SYSTem:AUDio" on page 752

"AFGenerator Subsystem" on page 374

How do I Change Call Parameters

A. Call Parameter Changes Allowed in Active Cell Mode



Operating Mode: Active Cell

IMSI:

IMEI:

Power Class:

Tx/Rx Freq Separation:

Paging IMSI: 001012345678901

Active Cell Idle

MS Target Power: -5 dBm

DL DTCH Data: CCITT PRBS15

DL PICH Data: All Zeros

RLC Reestablish: Auto

Call Limit State: Off

Call Drop Timer: On

SRB Config: 3.4k DCCH

Cell Power: -115.00 dBm/3.84 MHz

Channel Type: 12.2k RMC

DL Channel: 9700

Uplink Channel: 9300

1. Press **CALL SETUP**.
2. Press the `Cell Power` (**F7**) key, and set the desired level of the downlink signal.
3. Press **`More`** key on the right to go to Call Parms screen `2 of 3`.
4. Press `DL DTCH Data` (**F7**) key, and set the desired data pattern to be used on the downlink DTCH.
5. Press `DL PICH Data` (**F8**) key, and set the downlink paging indicators data to either `All Zeros` or `All Ones`.
6. Press `CAll Limit State` (**F10**) to turn the call limit mode on or off.

NOTE When the call limit state is on, the test set does not respond to any PRACH preambles from the UE. You must turn off the call limit for any random access procedure, such as Location Update or BS Origination to be successful. See "Call Limit State" on page 138.

---

7. Press `CAll Drop Timer` (**F11**) to turn the timer on or off.

8. Press the right **`More`** key again to go to Call Parms screen `3 of 3`. All parameters for controlling UE transmit power are provided here, see "How Do I Change UE TX Power Levels" on page 811 for detailed procedure.

B. Set Parameters Requiring Cell Off Operating Mode

1. Press CALL SETUP.
2. Press `Operating Mode` (**F1**) and select `Cell Off`.
3. Press the `Channel Type` (**F8**) key, and set the desired reference measurement channel (RMC) type.
4. Press the `DL Channel` (**F10**) key, and enter the downlink channel number.
5. Press the `Uplink Channel` (**F11**) key, and enter the uplink channel number.
6. Press **`More`** key on the right to go to Call Parms screen `2 of 3`.
7. Press `SRB Config` (**F12**) key, and set the desired data rate for the initial signaling radio bearer.

Related Topics

"Setting Channel Type" on page 129

"Setting Downlink Channel Number (UARFCN)"

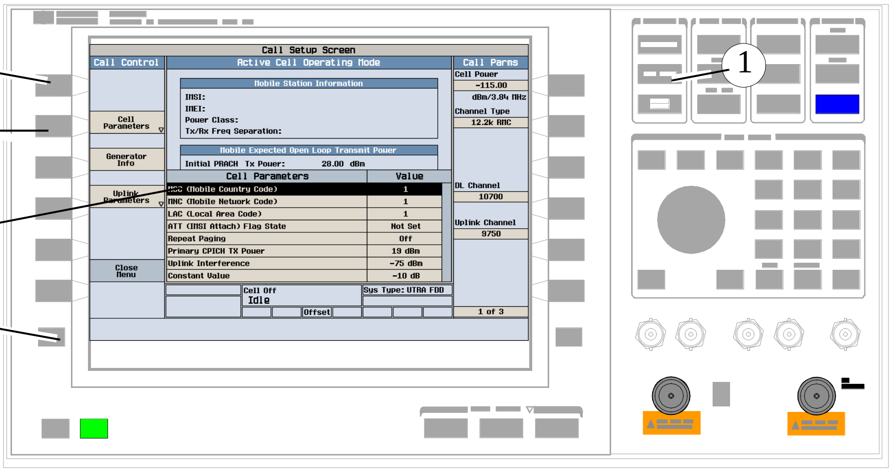
"Setting Uplink Channel Number (UARFCN)"

"Setting Signalling Radio Bearer (SRB)" on page 131

"Setting Other Downlink Parameters" on page 138

"Setting Closed Loop Power Control"

How do I Change Cell Parameters



Mobile Station Information

IMSI:
IMEI:
Power Class:
Tx/Rx Freq Separation:

Mobile Expected Open Loop Transmit Power

Initial PRACH Tx Power: 28.00 dBm

Cell Parameters	Value
MCC (Mobile Country Code)	1
MNC (Mobile Network Code)	1
LAC (Local Area Code)	1
ATT (IMSI Attach) Flag State	Not Set
Repeat Paging	Off
Primary CPICH TX Power	19 dBm
Uplink Interference	-75 dBm
Constant Value	-10 dB

Cell Power
-115.00
dBm/3.84 MHz
Channel Type
12.2k RMC
DL Channel
10700
Uplink Channel
9750
1 of 3

Cell Off
Idle
Sys Type: UTRA FDD
Offset

1. Press **CALL SETUP**.
2. If required (some cell parameters can be changed only in Cell Off operating mode), press `Operating Mode` (**F1**) and select `Cell Off`.
3. Press **More** on left side and go to `Call Control` screen `2 of 2`.
4. Press `Cell Parameters` (**F2**).
5. Turn the knob to highlight a parameter as desired, and then press the knob.
6. Enter a value or selection and press the knob.
7. Select `Close Menu` (**F6**).

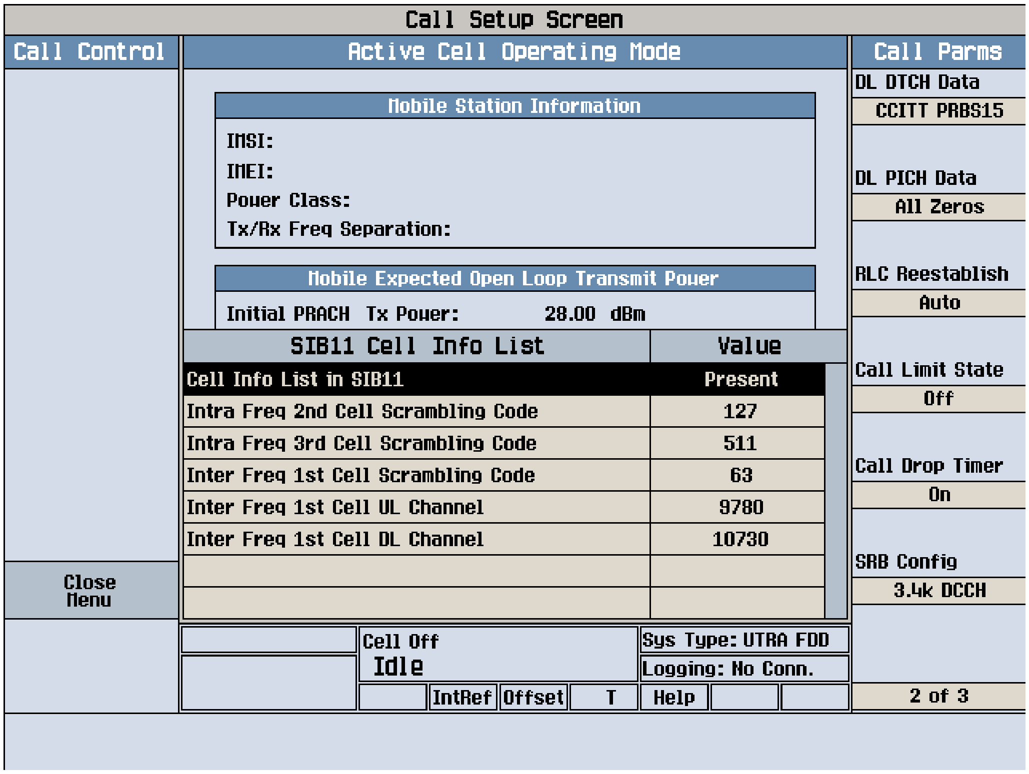
Related Topics

"Setting Cell Parameters"

"UE (Mobile Station) Transmit Power Control"

"Cell Off Operating Mode"

How Do I Change SIB11 Cell Info List?



Mobile Station Information

IMSI:
IMEI:
Power Class:
Tx/Rx Freq Separation:

Mobile Expected Open Loop Transmit Power

Initial PRACH Tx Power: 28.00 dBm

SIB11 Cell Info List	Value
Cell Info List in SIB11	Present
Intra Freq 2nd Cell Scrambling Code	127
Intra Freq 3rd Cell Scrambling Code	511
Inter Freq 1st Cell Scrambling Code	63
Inter Freq 1st Cell UL Channel	9780
Inter Freq 1st Cell DL Channel	10730

DL DTCH Data: CCITT PRBS15
DL PICH Data: All Zeros
RLC Reestablish: Auto
Call Limit State: Off
Call Drop Timer: On
SRB Config: 3.4k DCCH

Cell Off
Idle
Sys Type: UTRA FDD
Logging: No Conn.

1. Press **CALL SETUP**.
2. Press **More** on left side two times and go to `Call Control` screen `3 of 3`.
3. Press `SIB11 Cell Info List` (**F5**).
4. Highlight the `Cell Info List in SIB11` and press the knob, select `Present`.
5. Turn the knob to highlight other parameter as desired, and then press the knob.
6. Enter a value or selection and press the knob.
7. Press `Close Menu` (**F6**).

Related Topics

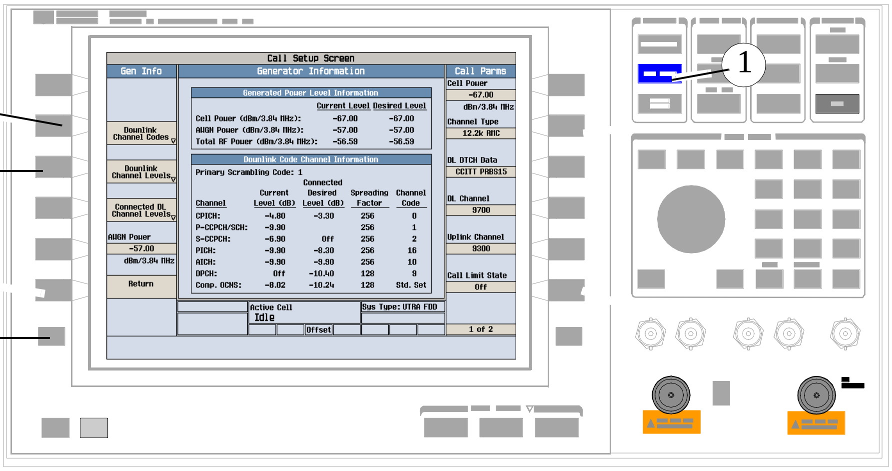
"Setting SIB11 Cell Info List Parameters"

"Cell Off Operating Mode"

How Do I Change Generator Information?

A. Set Parameters Requiring Cell Off Operating Mode: Downlink Channel Codes and Downlink Channel Levels.

1. Press the **CALL SETUP** key.
2. Press `Operating Mode` (**F1**) and select `Cell Off`.
3. Press **More** key on the left to go to `Call Control` (`2 of 2`).
4. Press `Generator Info` (**F3**).



Generator Information

Generated Power Level Information

	Current Level	Desired Level
Cell Power (dBm/3.84 MHz):	-67.00	-67.00
AWGN Power (dBm/3.84 MHz):	-57.00	-57.00
Total RF Power (dBm/3.84 MHz):	-56.59	-56.59

Downlink Code Channel Information

Primary Scrambling Code: 1

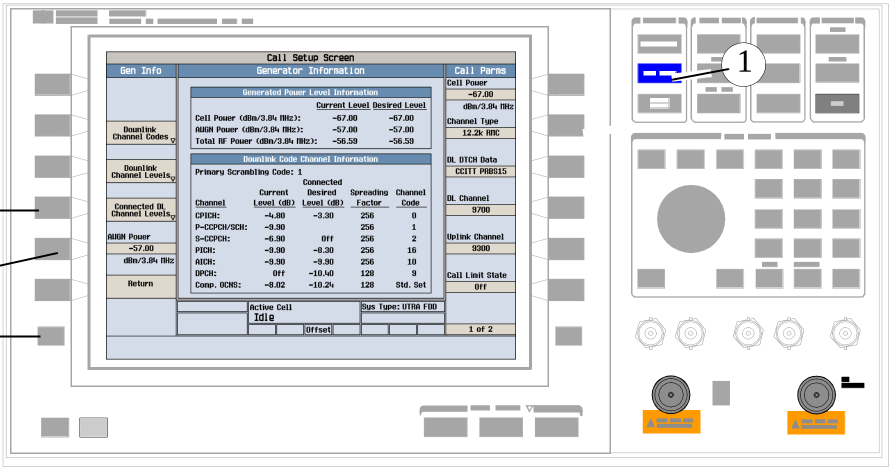
Channel	Current Level (dB)	Connected Desired Level (dB)	Spreading Factor	Channel Code
CPICH:	-4.80	-3.30	256	0
P-CCPCH/SCH:	-9.90		256	1
S-CCPCH:	-6.90	Off	256	2
PICH:	-9.90	-8.30	256	16
AICH:	-9.90	-9.90	256	10
DPCH:	Off	-10.40	128	9
Comp. OCNS:	-8.02	-10.24	128	Std. Set

5. Press the `Downlink Channel Codes` (**F2**) key, and set the channel codes.
6. Press the `Downlink Channel Levels` (**F3**) key, and set the power levels for the downlink channels.
7. Press `Close Menu` (**F6**) key. Your settings are displayed in the `Down Link Channel Information` table on the `Generator Information` window.
8. Press `Return` (**F6**) key.
9. Change the operating mode back to Active Cell if desired.

B. Change Parameters Allowed in Active Cell Mode: Connected Downlink Channel Levels and AWGN Power.

1. Press the **CALL SETUP** key.
2. Press **More** key on the left to go to `Call Control` (`2 of 2`).

3. Press `Generator Info` (**F3**).



Call Setup Screen

Generated Power Level Information

	Current Level	Desired Level
Cell Power (dBm/3.84 MHz):	-67.00	-67.00
AWGN Power (dBm/3.84 MHz):	-57.00	-57.00
Total RF Power (dBm/3.84 MHz):	-56.59	-56.59

Downlink Code Channel Information

Primary Scrambling Code: 1

Channel	Current Level (dB)	Connected Desired Level (dB)	Spreading Factor	Channel Code
CPICH:	-4.80	-3.30	256	0
P-CCPCH/SCH:	-9.90		256	1
S-CCPCH:	-6.90	Off	256	2
PICH:	-9.90	-8.30	256	16
AICH:	-9.90	-9.90	256	10
DPCH:	Off	-10.40	128	9
Comp. OCNS:	-8.02	-10.24	128	Std. Set

AWGN Power -57.00 dBm/3.84 MHz

Cell Power -67.00 dBm/3.84 MHz

Channel Type 12.2k RMC

DL DTCH Data CCITT PRBS15

DL Channel 9700

Uplink Channel 9300

Call Limit State Off

Active Cell Idle

Sys Type: UTRA FDD

4. Press the `Connected DL Channel Levels` (**F4**) key, and change the power levels for the downlink channels while a call is connected in order to test the UE’s response.

5. Press the `AWGN Powers` (**F5**) key, and set a value as needed using the knob and/or keypad. Your setting is displayed in the `Generated Power Level Information` table on the `Generator Information` window.

6. Press `Return` (**F6**).

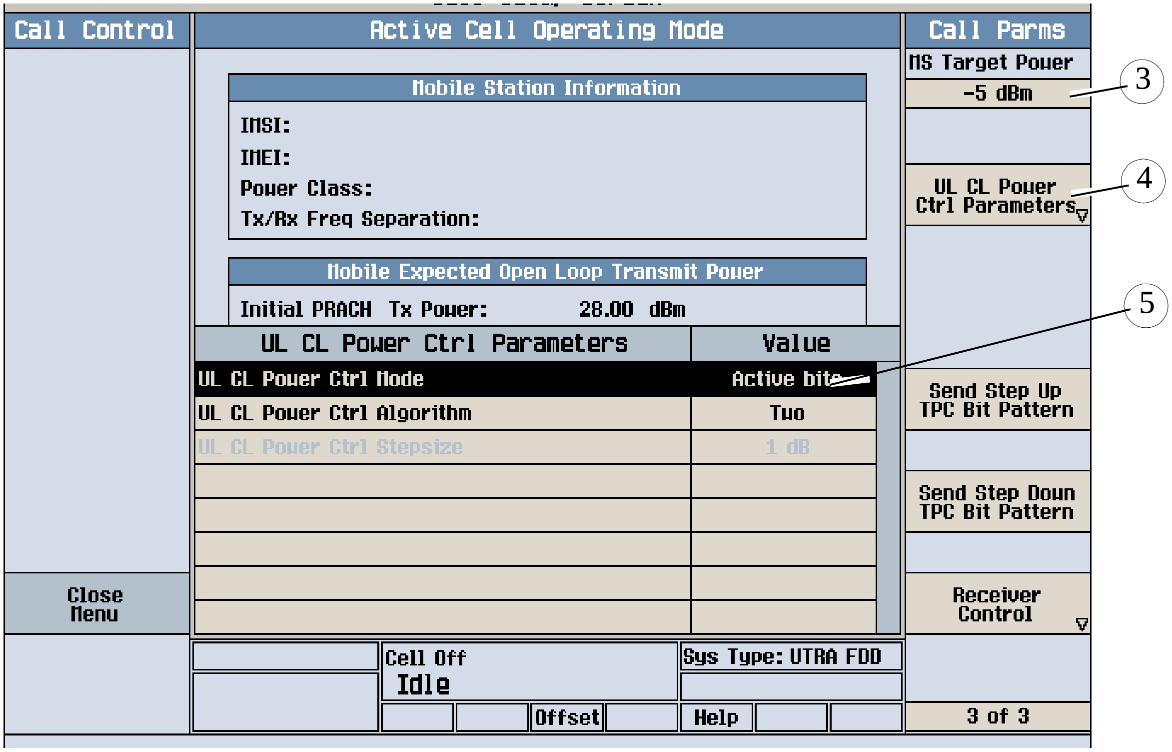
Related Topics

“Setting Cell Power and AWGN Power Levels” on page 132

“Setting Downlink Channel Codes and Levels” on page 135

How Do I Change UE TX Power Levels

A. Using Closed Loop Power Control



Mobile Station Information

IMSI:

IMEI:

Power Class:

Tx/Rx Freq Separation:

Mobile Expected Open Loop Transmit Power

Initial PRACH Tx Power: 28.00 dBm

UL CL Power Ctrl Parameters	Value
UL CL Power Ctrl Mode	Active bits
UL CL Power Ctrl Algorithm	Two
UL CL Power Ctrl Stepsize	1 dB

Cell Off

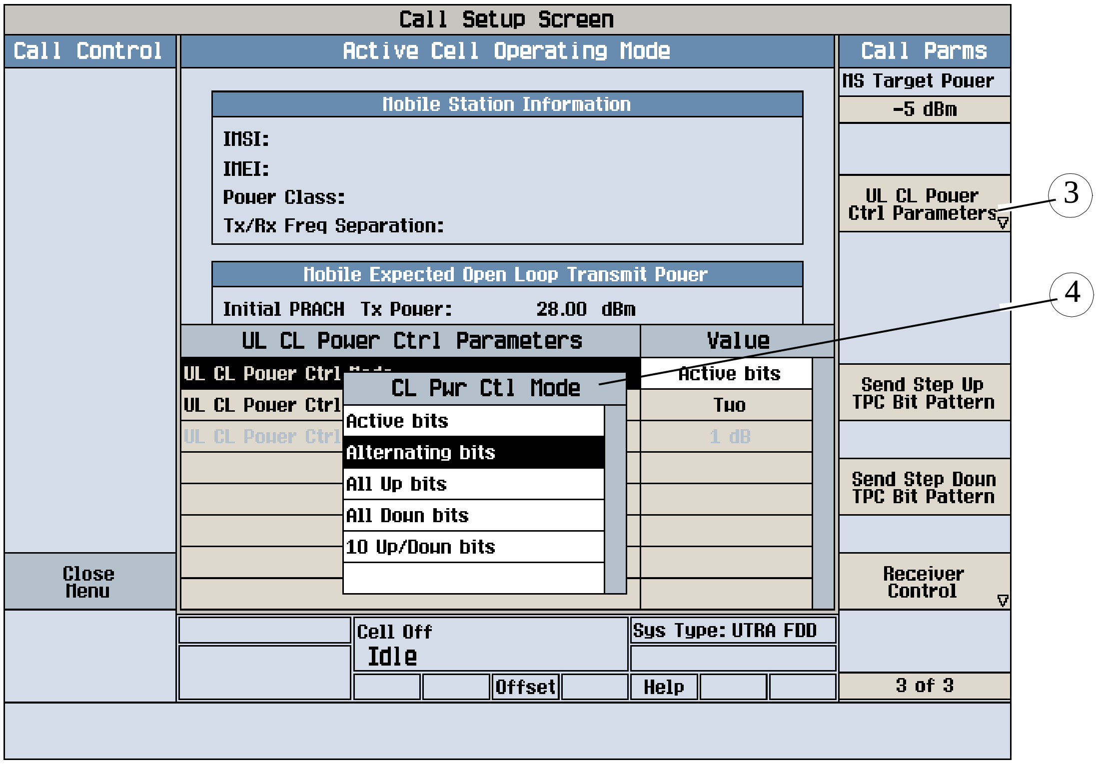
Idle

Sys Type: UTRA FDD

1. Press the **CALL SETUP** key.
2. Press the **More** key on the right side two times to go to Call Parms (`3 of 3`).
3. Press the `MS Target Power` (**F7**) key, and set the desired average transmit power of the UE (see “CALL:MS:POWer” on page 442 for more description).
4. Press the `UL CL Power Ctrl Parameters` (**F8**) key.
5. Highlight the `UL CL Power Ctrl Mode` and select `Active bits`. This activates the uplink closed loop power control.
6. Highlight the `UL CL Power Ctrl Algorithm` and select power control algorithm as desired. If algorithm `One` is selected for power control, you can also specify the `UL CL Power Ctrl Step Size` to either 1 dB or 2 dB.
7. Now, the UE’s transmit power will be controlled automatically by the closed loop power control to maintain the UE’s average power at the value entered for the `MS Target Power`.

NOTE If algorithm `One` is selected for power control, an error message will pop up to alert you that measurement accuracy is degraded while Power Control Algorithm 1 is in use.

B. Controlling the UE’s TX Power Manually



MS Target Power: -5 dBm

IMSI:

IMEI:

Power Class:

Tx/Rx Freq Separation:

Initial PRACH Tx Power: 28.00 dBm

UL CL Power Ctrl Parameters	Value
UL CL Power Ctrl Mode	Active bits
UL CL Power Ctrl	Two
UL CL Power Ctrl	1 dB

Cell Off

Idle

Sys Type: UTRA FDD

3 of 3

1. Press the **CALL SETUP** key.
2. Press the **More** key on the right side two times to go to screen `3 of 3`.
3. Press the `UL CL Power Ctrl Parameters` (**F8**) key.
4. Highlight the `UL CL Power Ctrl Mode` and select the power control mode *other than* `Active bits`. This allows you to controll the UE’s transmit power manually.
5. Highlight the `UL CL Power Ctrl Algorithm` and select power control algorithm as desired. If algorithm `One` is selected for power control, you can also specify the `UL CL Power Ctrl Step Size` to either 1 dB or 2 dB.

NOTE If algorithm `One` is selected for power control, you can also specify the `UL CL Power Ctrl Step Size` to either 1 dB or 2 dB. However, an error message will pop up to alert you that measurement accuracy degraded while Power Control Algorithm 1 is in use.

---

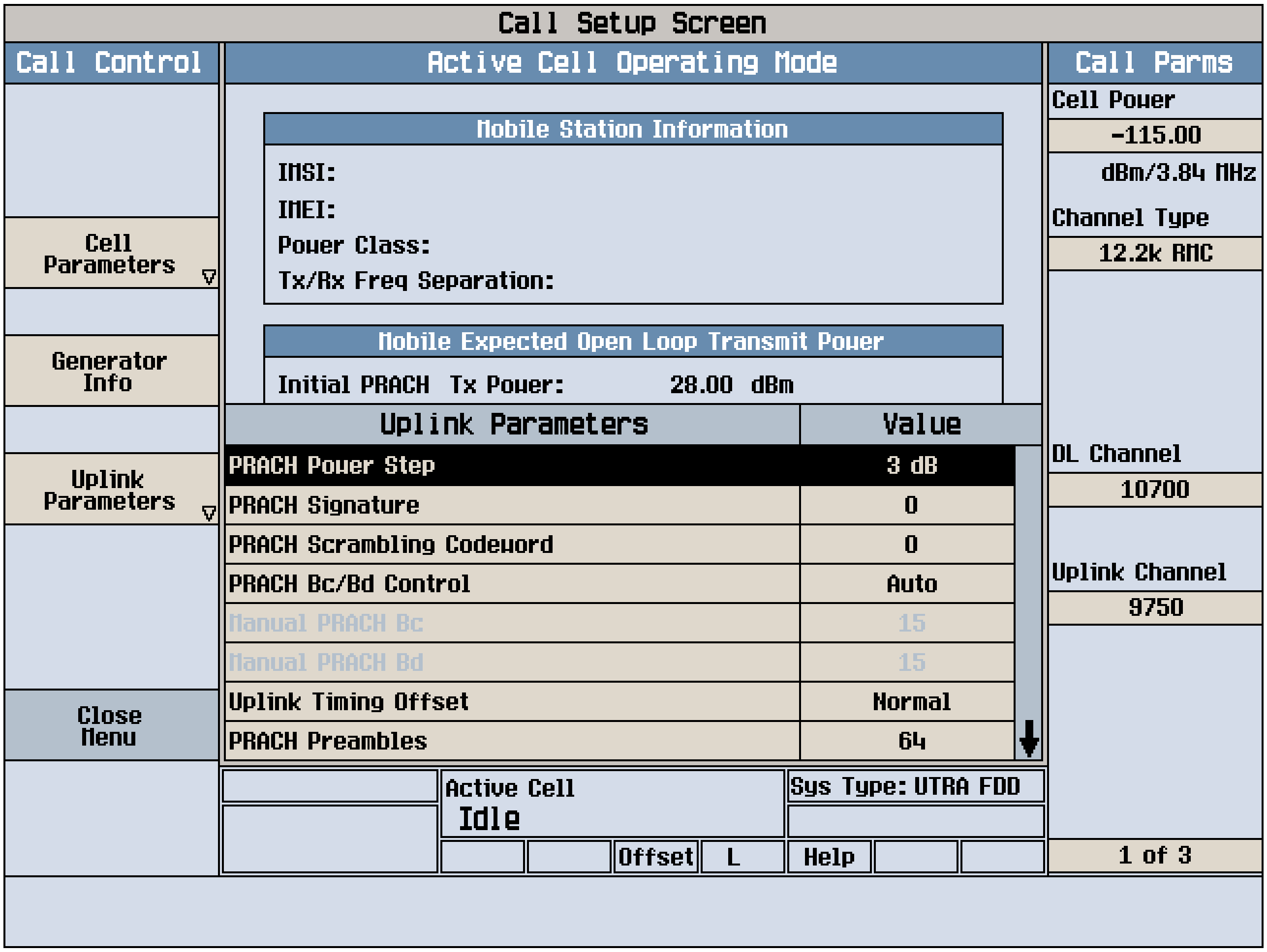
6. If you’ve chosen `Alternating bits` as the power control mode, you can use the `Send Step Up TPC Bit Pattern` (**F10**) key or the `Send Step Down TPC Bit Pattern` (**F11**) key to change the UE’s transmit power either up or down by one step.

Related Topics

“Setting Closed Loop Power Control”

“UE (Mobile Station) Transmit Power Control”

How Do I Change Uplink Parameters?



Mobile Station Information

IMSI:

IMEI:

Power Class:

Tx/Rx Freq Separation:

Mobile Expected Open Loop Transmit Power

Initial PRACH Tx Power: 28.00 dBm

Uplink Parameters	Value
PRACH Power Step	3 dB
PRACH Signature	0
PRACH Scrambling Codeword	0
PRACH Bc/Bd Control	Auto
Manual PRACH Bc	15
Manual PRACH Bd	15
Uplink Timing Offset	Normal
PRACH Preambles	64

Cell Power
-115.00
dBm/3.84 MHz

Channel Type
12.2k RMC

DL Channel
10700

Uplink Channel
9750

Active Cell
Idle

Sys Type: UTRA FDD

1. Press the **CALL SETUP** key.
2. Press `Operating Mode` (**F1**) and select `Cell Off`.
3. Press **More** key on the left to go to `Call Control` (`2 of 2`).
4. Press the `Uplink Parameters` (**F4**) to access the settings for uplink PRACH and DPCH channels.
5. Turn the knob to highlight a parameter and then press the knob.
6. Enter a value or selection as desired and press the knob.
7. Press `Close Menu` (**F6**).
8. Change the operating mode back to Active Cell if needed.

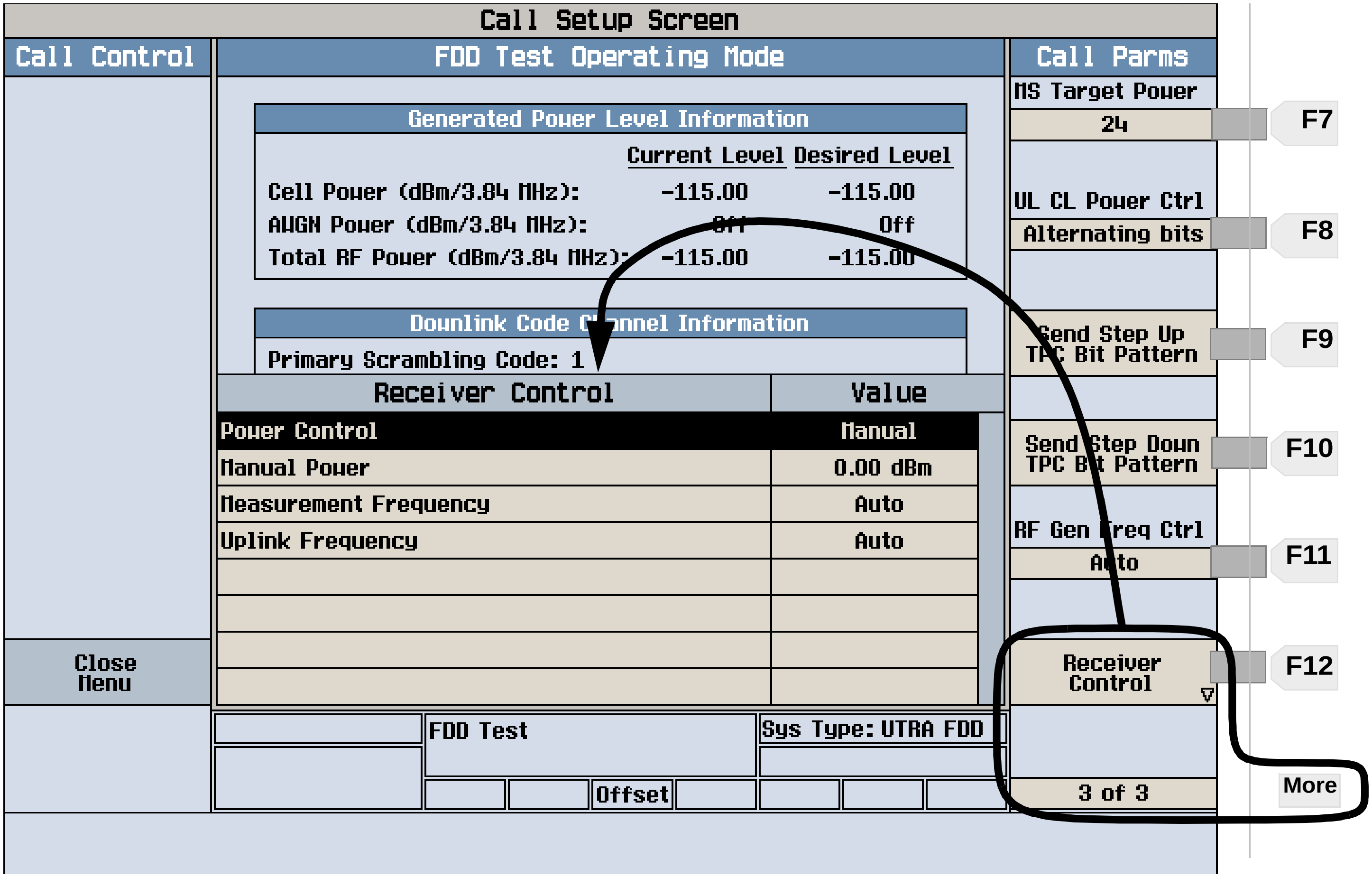
Related Topics

"Setting Uplink Parameters"

How Do I Change Receiver Control Parameters?

In some instances you may want to control the test set's receiver settings manually rather than allowing the test set to automatically control them. This ability is referred to as manual receiver control (see "Receiver Control" on page 260).

Manual Receiver Control in Active Cell, Cell Off or FDD Test Operating Mode



Generated Power Level Information

	Current Level	Desired Level
Cell Power (dBm/3.84 MHz):	-115.00	-115.00
AWGN Power (dBm/3.84 MHz):	Off	Off
Total RF Power (dBm/3.84 MHz):	-115.00	-115.00

Downlink Code Channel Information

Primary Scrambling Code: 1

Receiver Control	Value
Power Control	Manual
Manual Power	0.00 dBm
Measurement Frequency	Auto
Uplink Frequency	Auto

MS Target Power: 24

UL CL Power Ctrl: Alternating bits

Send Step Up TPC Bit Pattern

Send Step Down TPC Bit Pattern

RF Gen Freq Ctrl: Auto

Receiver Control

FDD Test

Offset

Sys Type: UTRA FDD

3 of 3

1. Press the **CALL SETUP** key.
2. Press `Operating Mode` (**F1**) and select `Active Cell`, or `Cell Off`, or `FDD Test`.
3. Press the **More** key two times until `3 of 3` is displayed.
4. Press the `Receiver Control` (**F12**) key.
5. To manually set the receiver's expected power, highlight the `Power Control` field and select `Manual`, then enter a a desired value in the `Manual Power` field by using the knob or numeric keys.
6. To manually set the receiver's measurement downconverter frequency, highlight the `Measurement Frequency` field and enter a desired value to replace the `Auto` with the knob or numeric keys.

7. (In FDD Test mode only) To manually set the receiver's demodulation downconverter tune frequency, turn the knob to highlight the `Uplink Frequency` field and enter a desired value to replace the `Auto` with the knob or numeric keys.

Manual Receiver Control in CW Operating Mode

1. Press the **CALL SETUP** key.
2. Press `Operating Mode` (**F1**) and select `CW`.
3. Press the `Receiver Control` (**F12**) key.
4. To set the receiver's expected power, turn the knob to highlight the `Expected CW Power` field and press the knob, then enter a desired value by using the knob or numeric keys and press the knob.
5. To set the measurement downconverter's tune frequency, turn the knob to highlight the `Measurement Frequency` field and press the knob, then enter a desired value by using the knob or numeric keys and press the knob.
6. To set the demodulation downconverter's tune frequency, turn the knob to highlight the `Uplink Frequency` field and press the knob, then enter a desired value by using the knob or numeric keys and press the knob.
7. Press `Close Menu` (**F6**).

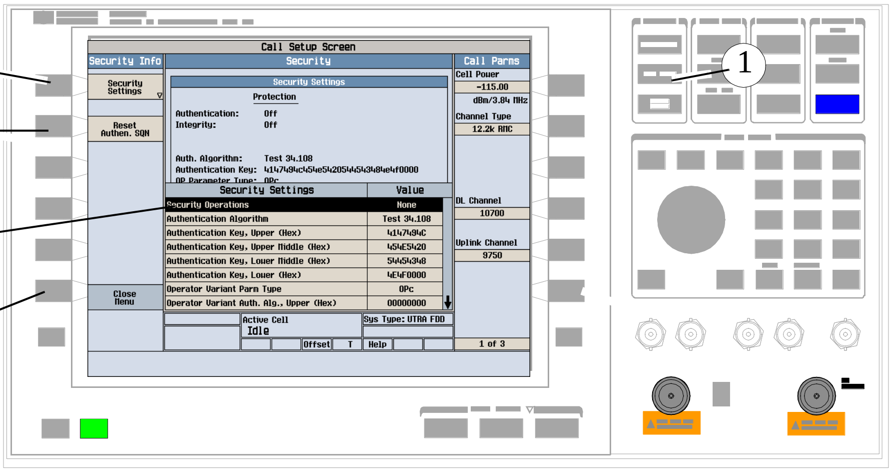
Related Topics

"Receiver Control"

"Active Cell Operating Mode"

"CW Operating Mode"

How do I Change Security Setup Parameters



Security Settings

Protection

Authentication: Off
Integrity: Off

Auth. Algorithm: Test 34.108
Authentication Key: 414749 4c454e542054454348 4e4f0000
OP Parameter Type: OPc

Security Settings	Value
Security Operations	None
Authentication Algorithm	Test 34.108
Authentication Key, Upper (Hex)	4147494C
Authentication Key, Upper Middle (Hex)	454E5420
Authentication Key, Lower Middle (Hex)	54454348
Authentication Key, Lower (Hex)	4E4F0000
Operator Variant Parm Type	OPc
Operator Variant Auth. Alg., Upper (Hex)	00000000

Cell Power: -115.00 dBm/3.84 MHz
Channel Type: 12.2k RMC
DL Channel: 10700
Uplink Channel: 9750
Active Cell: Idle
Sys Type: UTRA FDD

1. Press the **CALL SETUP** key.
2. Press `Operating Mode` (**F1**) and select `Active Cell` or `Cell Off`.
3. Press the `Security Setup` (**F6**).
4. Press the `Security Settings` (**F1**).
5. Select the desired parameter and change the parameter as needed using the knob and/or keypad.
6. Press `Close Menu` (**F6**).
7. Your settings are displayed in the `Security Settings` table on the `Security` window.
8. If desired, press `Reset Authen. SQN` (**F2**) key to reset the authentication sequence number (SQN) to zero.
9. Press `Return` (**F6**).

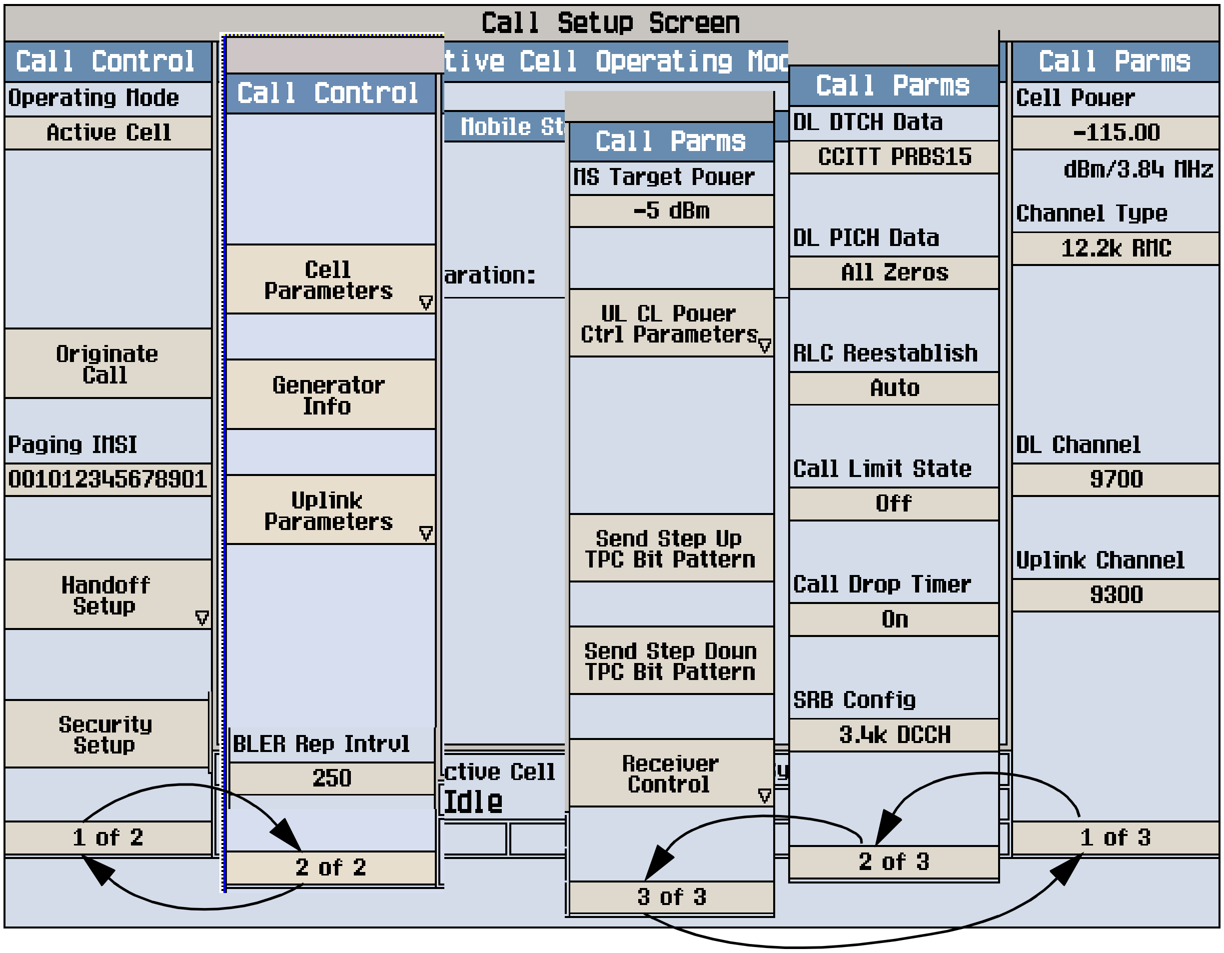
Related Topics

"Setting Security Parameters"

"Active Cell Operating Mode"

How Do I Set Up a Call?

The keys under Call Parms and Call Control menus provide access to the parameters needed to set up a call.



1. Connect the UE (mobile station) to the test set.
2. Press the blue **SHIFT** key.
3. Press the green **PRESET** key.
4. Press **CALL SETUP**.
5. Press `Operating Mode` (**F1**) and select `Cell Off`.
6. Press `Cell Power` (**F7**) and change the value to -50 dBm/3.84 MHz (or to your desired).
   You may need to change other Call Parms settings such as DL Channel and Uplink Channel to specify at which DL UARFCN the downlink will transmit and at which UL UARFCN the UE will transmit. See "How do I Change Call Parameters" on page 805.
7. You may need to change Cell Parameters settings such as LAC (Local Area Code) to allow the UE to find service. See "How do I Change Cell Parameters" on page 807.

8. If you know the UE's IMSI, press `Paging IMSI` (**F4**) and enter the UE's IMSI.
   If you did not know the UE's IMSI, you may need to change the `ATT (IMSI Attach) Flag State` *parameter to* `Set` *(see* "How do I Change Cell Parameters" on page 807*) which will force the UE to perform the location update (registration) when the UE first turns on.*
9. Press `Operating Mode` (**F1**) and select `Active Cell`.
10. Turn the UE on and allow it to camp to the test set.
11. Press the `Originate Call` (**F3**) key.
12. Check for `Connected` in the `Active Cell` status field.

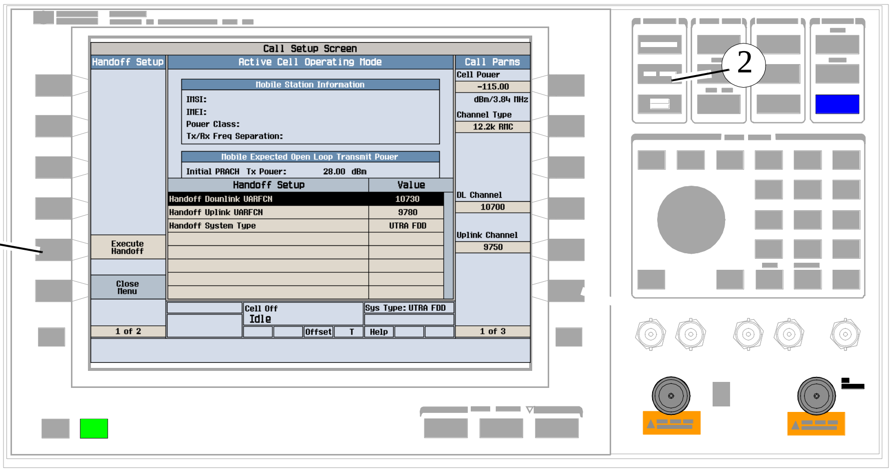
Related Topics

"Establishing a Connection with the UE"

"Active Cell Operating Mode" on page 117

"How Do I Make Measurements on a UE?"

How Do I Perform a Handoff?



Mobile Station Information
IMSI:
IMEI:
Power Class:
Tx/Rx Freq Separation:

Mobile Expected Open Loop Transmit Power
Initial PRACH Tx Power: 28.00 dBm

Handoff Setup	Value
Handoff Downlink UARFCN	10730
Handoff Uplink UARFCN	9780
Handoff System Type	UTRA FDD

Cell Power: -115.00 dBm/3.84 MHz
Channel Type: 12.2k RMC
DL Channel: 10700
Uplink Channel: 9750
Cell Off
Idle
Sys Type: UTRA FDD

1. Establish a call with the UE and verify that the `Connected` is shown in the `Active Cell` field (see “How Do I Set Up a Call?” on page 817).
2. Press the **CALL SETUP** key.
3. Press `Handoff Setup` (**F5**).
4. If you want to perform a handoff between different downlink and uplink UARFCNs, highlight `Handoff Downlink UARFCN` or `Handoff Uplink UARFCN` field and change to your desired channel numbers; or highlight `Handoff System Type` and select `GSM` if you want to perform an inter-system handoff.

NOTE Make sure the E1968A test application is present in the test set prior to changing the `Handoff System Type` setting from UTRA FDD to GSM system. Otherwise, it will cause an error message.

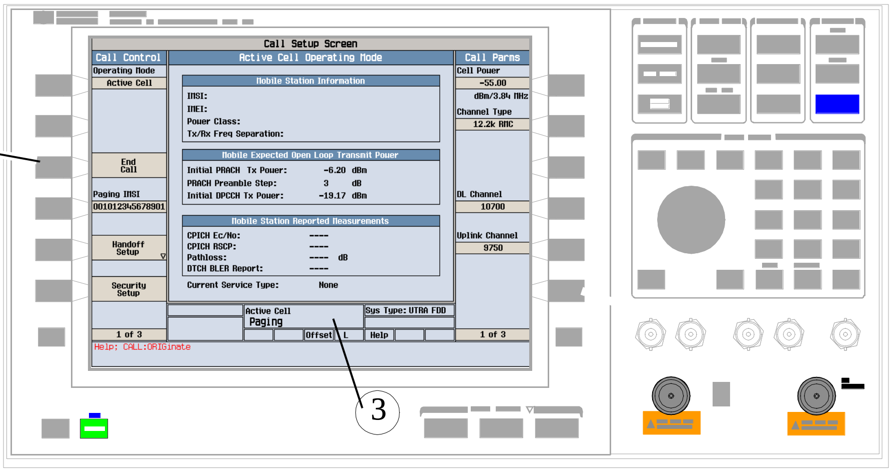
---

5. Select `Execute Handoff` (**F5**) to complete the handoff, or `Close Menu` (**F6**) to abort the handoff.
6. Check for `Connected` in the `Active Cell` field.

Related Topics

“Performing a Handoff” on page 151

End a Connection



Call Setup Screen

Call Control

Operating Mode: Active Cell

Paging IMSI: 001012345678901

1 of 3

Active Cell Operating Mode

Mobile Station Information

IMSI:

IMEI:

Power Class:

Tx/Rx Freq Separation:

Mobile Expected Open Loop Transmit Power

Initial PRACH Tx Power: -6.20 dBm

PRACH Preamble Step: 3 dB

Initial DPCCH Tx Power: -19.17 dBm

Mobile Station Reported Measurements

CPICH Ec/No: ----

CPICH RSCP: ----

Pathloss: ---- dB

DTCH BLER Report: ----

Current Service Type: None

Active Cell: Paging

Sys Type: UTRA FDD

Offset L

Call Parms

Cell Power: -55.00 dBm/3.84 MHz

Channel Type: 12.2k RMC

DL Channel: 10700

Uplink Channel: 9750

1 of 3

Help: CALL:ORIGinate

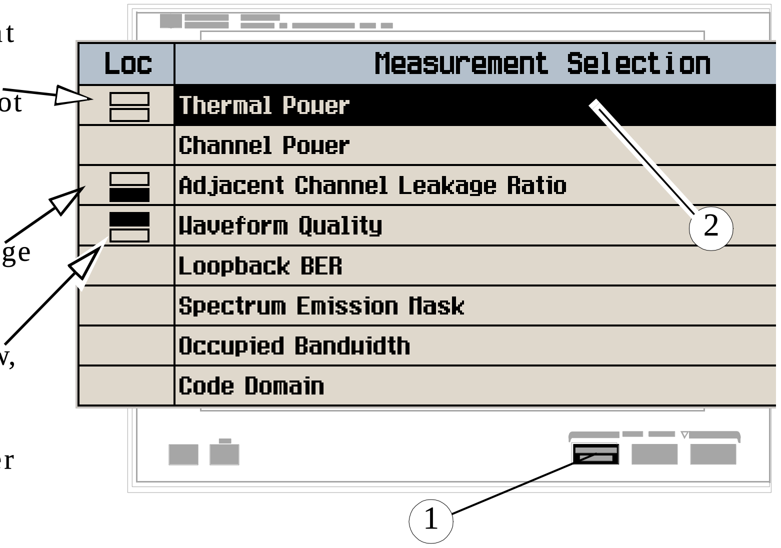
1. Press the **CALL SETUP** key.
2. Press the `End Call` (**F3**) key, or end the call from the UE.
3. Check for Idle in the `Active Cell` field.

How Do I Make Measurements on a UE?

A. Establish a Connection.

See "How Do I Set Up a Call?" .

B. Select measurements.



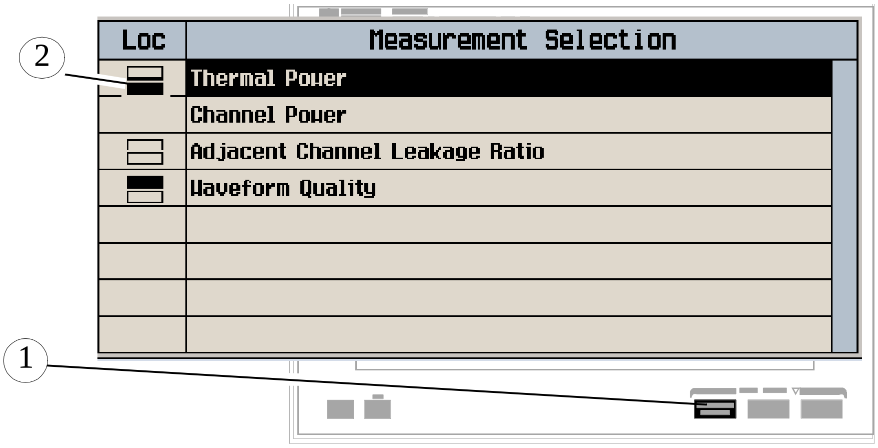
The gray boxes indicate that the measurement is being made, but the results are not being displayed.

These black boxes indicate that adjacent channel leakage ratio measurement results are being displayed in the lower measurement window, and that waveform quality 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.

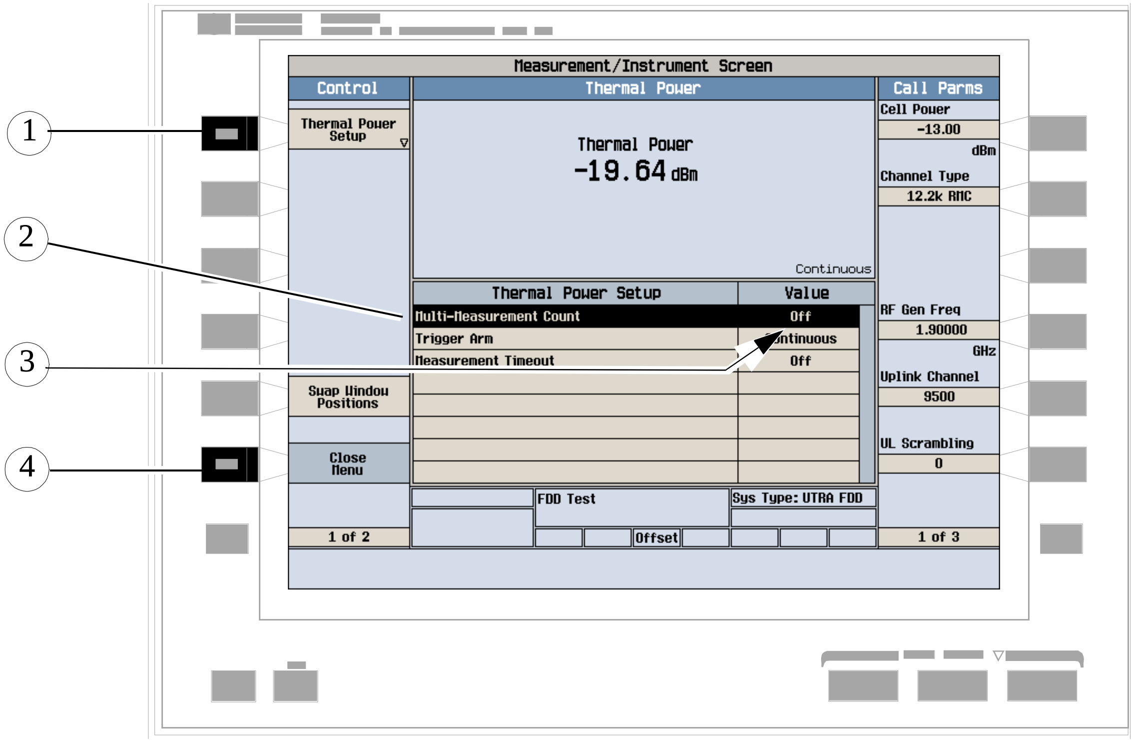
How Do I Change the Measurement Setup?

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.



Thermal Power -19.64 dBm

Multi-Measurement Count Off

Trigger Arm ontinuous

Measurement Timeout Off

Cell Power -13.00 dBm

Channel Type 12.2k RMC

RF Gen Freq 1.90000 GHz

Uplink Channel 9500

UL Scrambling 0

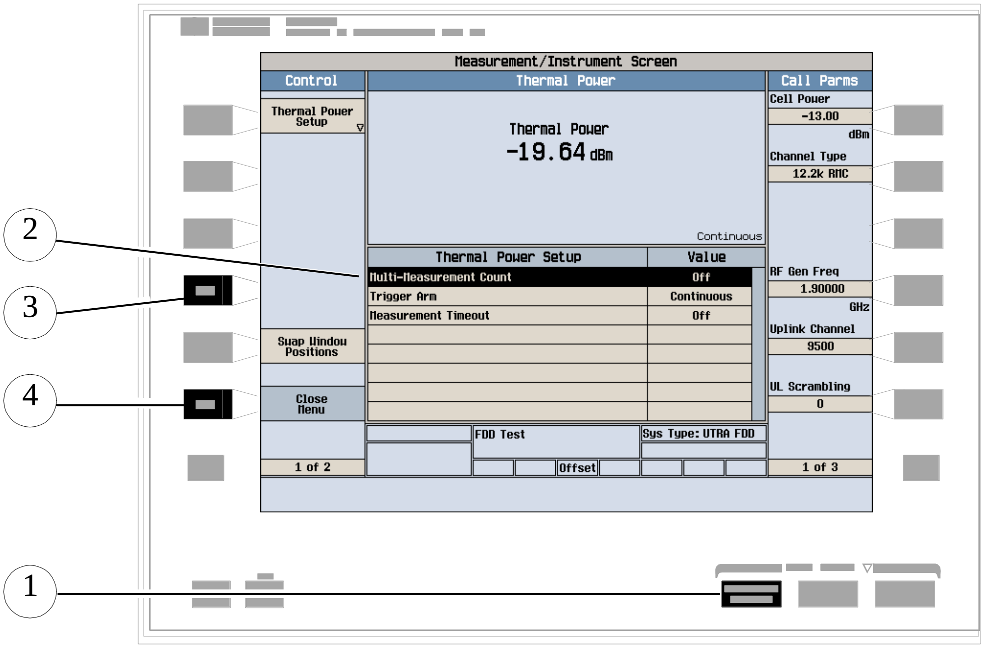
1. Press the measurement’s setup key (**F1**).
2. Highlight a parameter and press the knob.

3. Enter a value or 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?



Thermal Power Setup	Value
Multi-Measurement Count	Off
Trigger Arm	Continuous
Measurement Timeout	Off

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.

Performing Individual Measurements Manually

The following step-by-step procedures explain how to perform specific measurements available on the W-CDMA Test Application.

The test set and the UE must be synchronized before the UE can generate an uplink signal that can be measured in the following procedures. See "How Do I Make Measurements on a UE?" .

Detailed descriptions for each measurement and the FDD Test operating mode are provided in the *Reference* information on the documentation CD-ROM and at the Agilent 8960 support website (www.agilent.com/find/8960support).

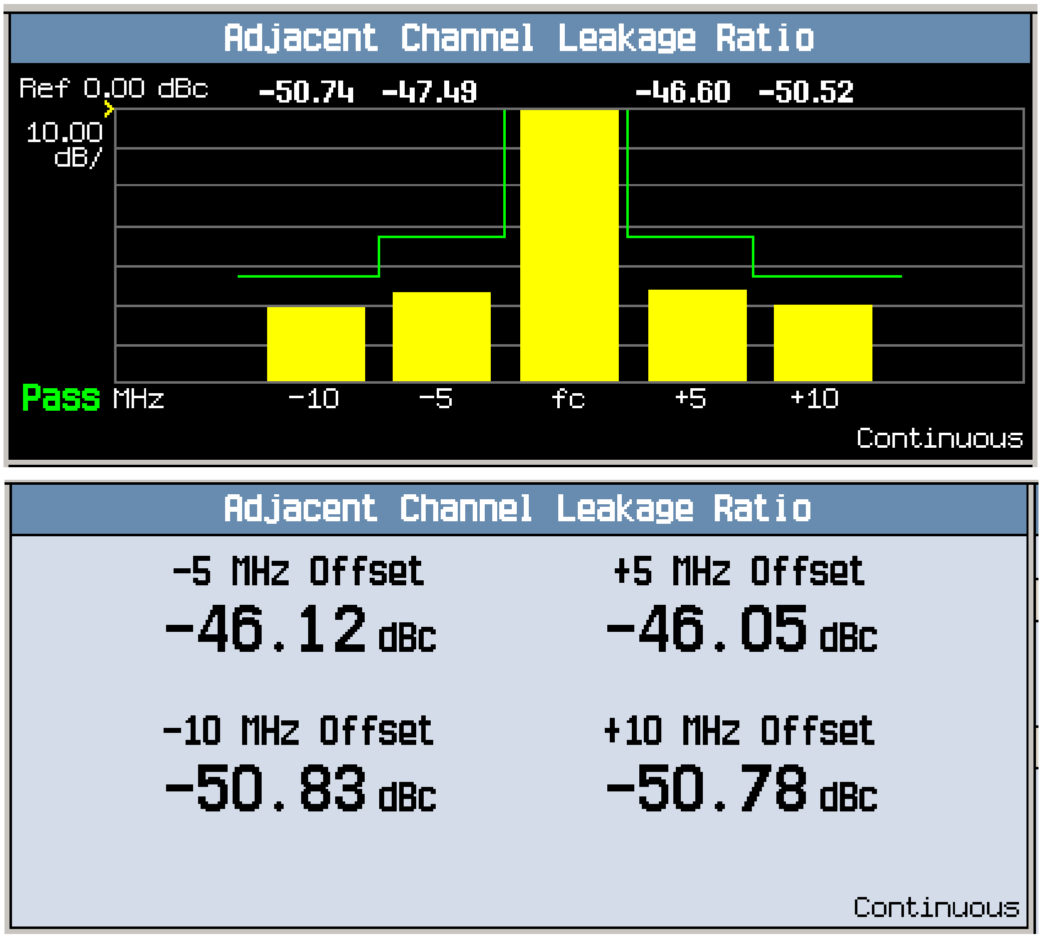
Setup parameters for each measurement are assumed to be set to their default (full preset) values unless otherwise stated.

The following measurement procedures are provided:

- "Measuring Adjacent Channel Leakage Ratio" on page 825
- "Measuring Channel Power" on page 826
- "Measuring Loopback Bit Error Ratio" on page 827
- "Measuring Thermal Power" on page 828
- "Measuring Waveform Quality" on page 828
- "Measuring Spectrum Emission" on page 830
- "Measuring Occupied Bandwidth" on page 831
- "Measuring Code Domain Power and Error" on page 831

Measuring Adjacent Channel Leakage Ratio

1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Adjacent Channel Leakage Ratio` measurement.
4. Press the `ACLR Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation, such as turning the measurements on or off for the different frequency offsets.
6. Press the `Change View` (**F2**) key to display the measurement results in either graphical or numeric format.
7. If using the graphical display, press `Graph Limits` (**F5**) to enter the pass/fail measurement limit for each of the four frequency offsets (shown in the graphical measurements example below as the thin lines above each measurement).



Adjacent Channel Leakage Ratio

-5 MHz Offset
-46.12 dBc

+5 MHz Offset
-46.05 dBc

-10 MHz Offset
-50.83 dBc

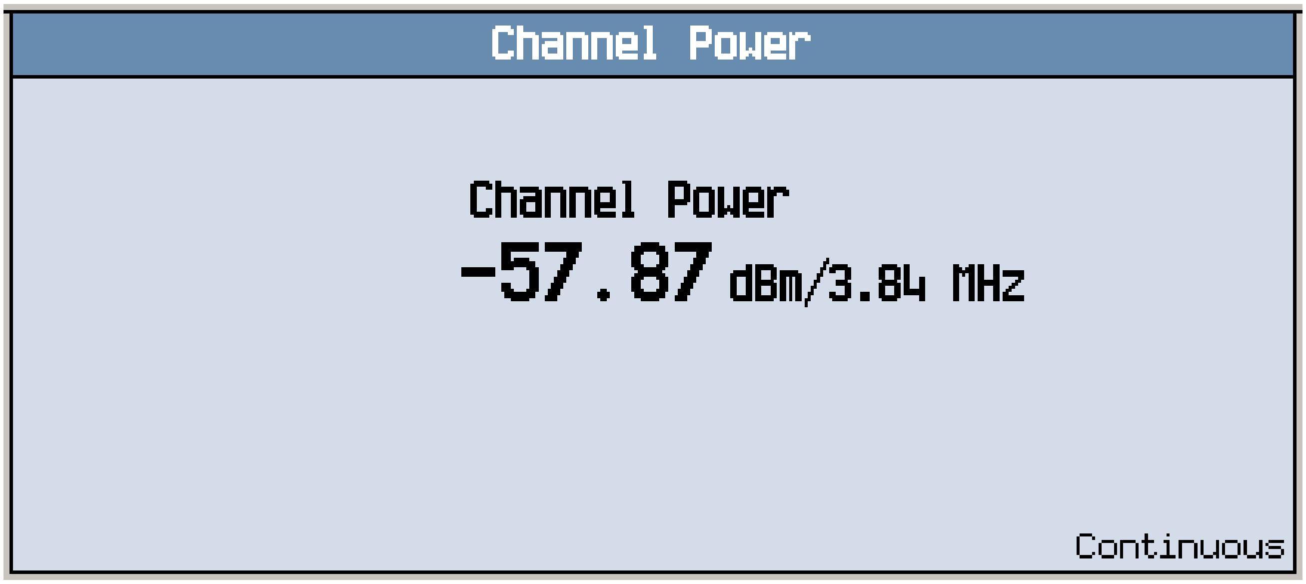
+10 MHz Offset
-50.78 dBc

Continuous

Typical adjacent channel leakage ratio results using graphical and numeric format.

Measuring Channel Power

1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Channel Power` measurement.
4. Press the `Channel Power Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.


Channel Power

Channel Power

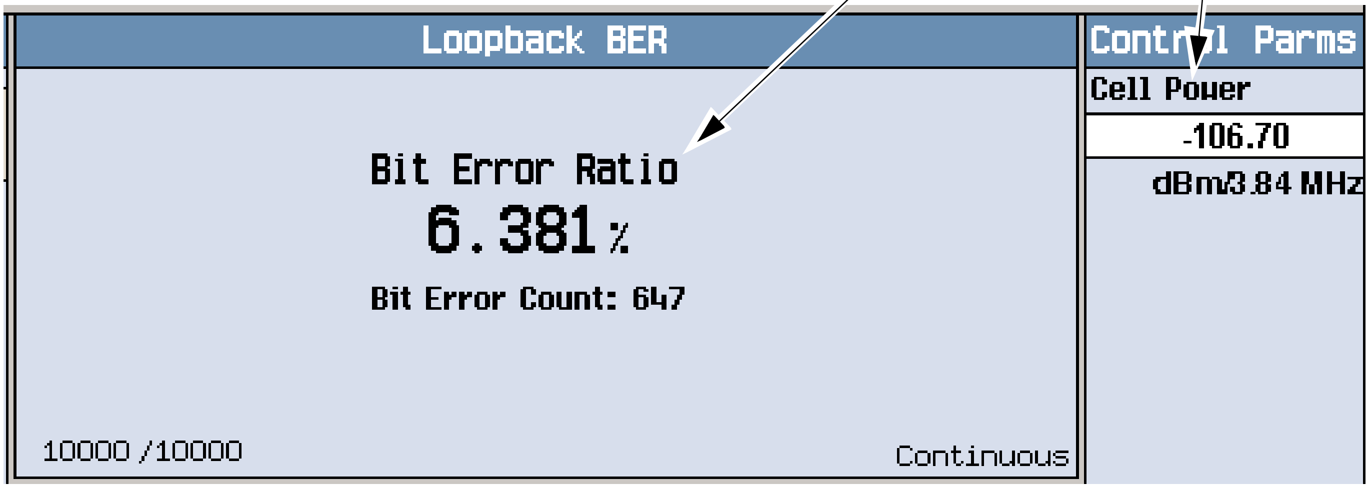
-57.87 dBm/3.84 MHz

A typical channel power measurement result is shown above.

Measuring Loopback Bit Error Ratio

1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the Loopback BER measurement.
4. Press the `Bit Error Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.

Observe how reducing the cell power to low levels causes the bit error ratio to increase.



Loopback BER

Bit Error Ratio

6.381 %

Bit Error Count: 647

10000 /10000

Continuous

Control Parms

Cell Power

-106.70

dBm/3.84 MHz

To see how low levels of cell power into the mobile affect the bit error ratio, press `Cell Power` (**F7**) and slowly reduce the level. With the level into the UE set to -106.70 dBm/3.84 MHz, the example above indicates a failed BER value (the 3GPP standard specifies a BER of no more than 0.1% at this input level).

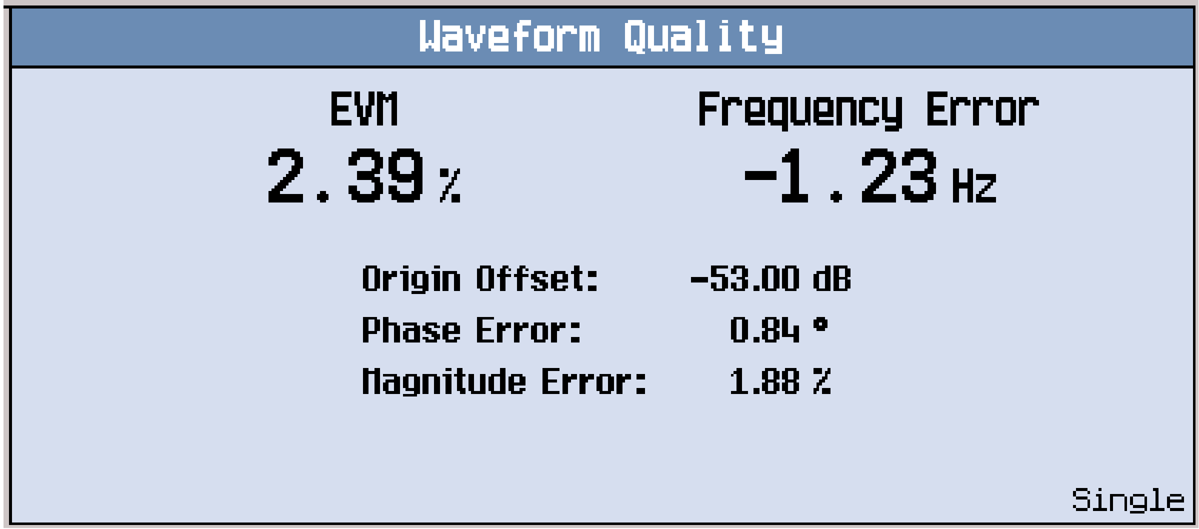
Measuring Thermal Power

1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Thermal Power` measurement.
4. Press the `Thermal Power Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.

A typical thermal power measurement result is shown above.

Measuring Waveform Quality

1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Waveform Quality` measurement.
4. Press the `WWQ Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.



Waveform Quality

EVM
2.39 %

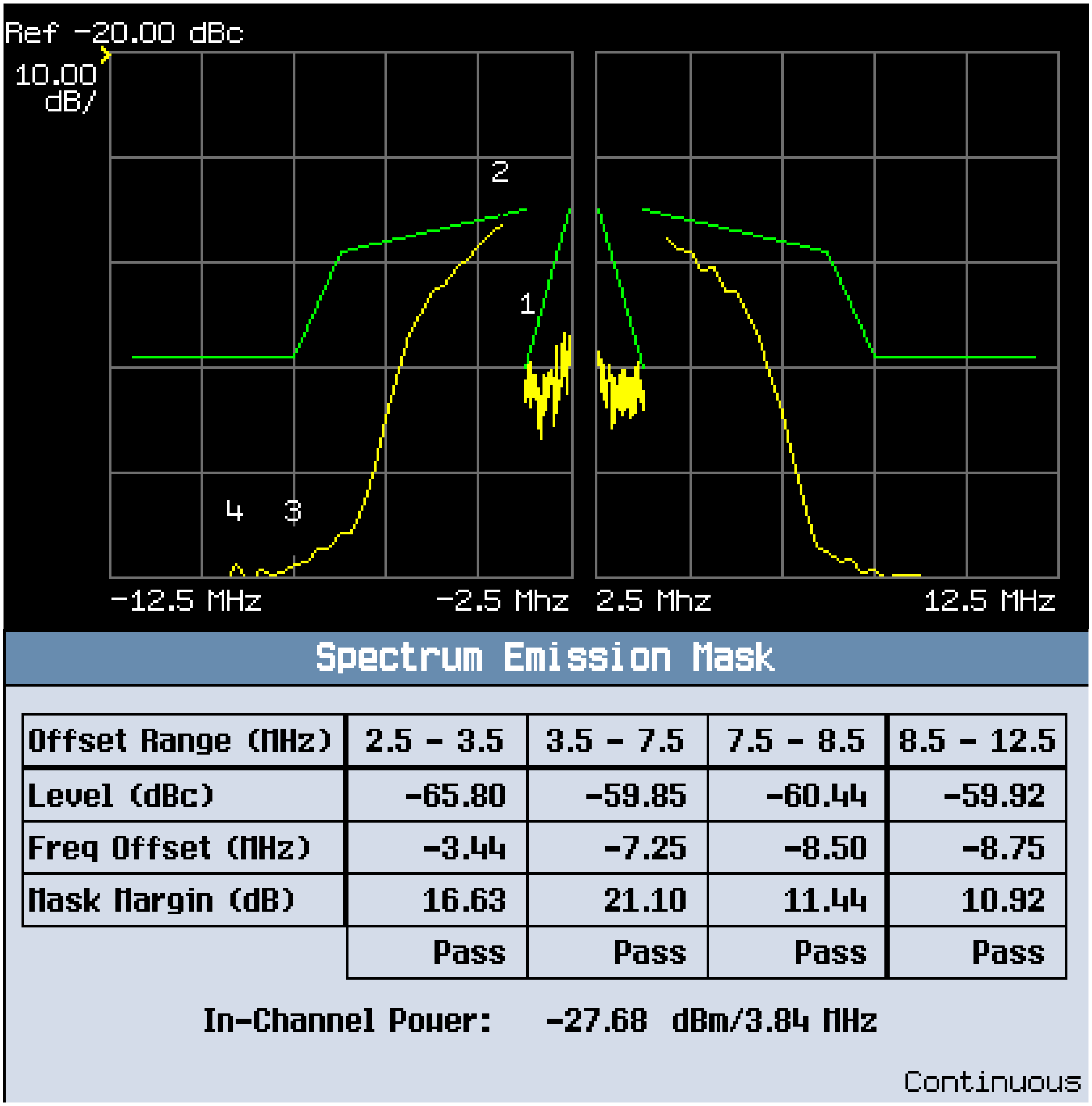
Frequency Error
-1.23 Hz

Origin Offset: -53.00 dB
Phase Error: 0.84 °
Magnitude Error: 1.88 %

Typical waveform quality results are shown above.

Measuring Spectrum Emission

1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Spectrum Emission Mask` measurement.
4. Press the `SEM Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.
6. Press the `Change View` (**F2**) key to display the measurement results in either graphical or numeric format.



Spectrum Emission Mask

Offset Range (MHz)	2.5 - 3.5	3.5 - 7.5	7.5 - 8.5	8.5 - 12.5
Level (dBc)	-65.80	-59.85	-60.44	-59.92
Freq Offset (MHz)	-3.44	-7.25	-8.50	-8.75
Mask Margin (dB)	16.63	21.10	11.44	10.92
	Pass	Pass	Pass	Pass

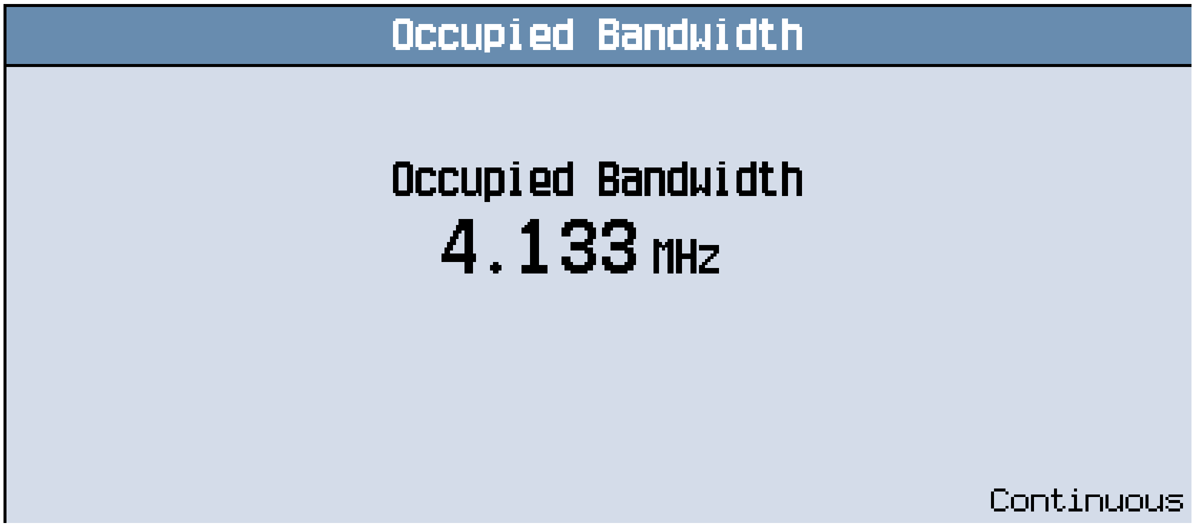
In-Channel Power: -27.68 dBm/3.84 MHz

Continuous

Typical adjacent channel leakage ratio results using graphical and numeric format.

Measuring Occupied Bandwidth

1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Occupied Bandwidth` measurement.
4. Press the `Occupied BW Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.

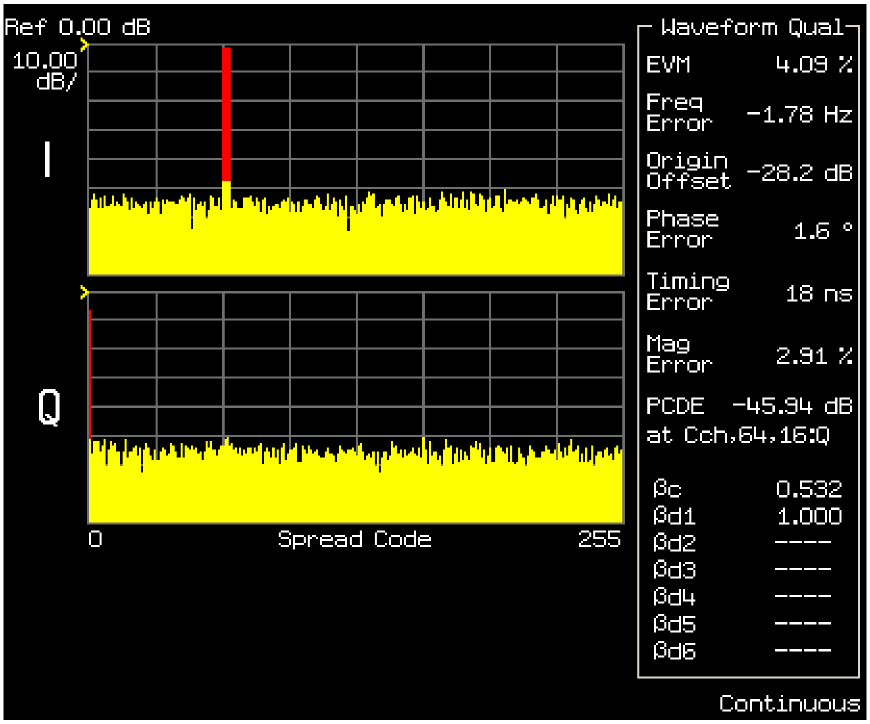


Occupied Bandwidth
4.133 MHz

Typical waveform quality results are shown above.

Measuring Code Domain Power and Error

1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Code Domain` measurement.
4. Press the `Code Domain Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.



Waveform Qual

EVM	4.09 %
Freq Error	-1.78 Hz
Origin Offset	-28.2 dB
Phase Error	1.6 °
Timing Error	18 ns
Mag Error	2.91 %
PCDE	-45.94 dB

at Cch,64,16:Q

βc	0.532
βd1	1.000
βd2	----
βd3	----
βd4	----
βd5	----
βd6	----

Continuous

Typical waveform quality results are shown above.

How Do I Use the Spectrum Monitor?

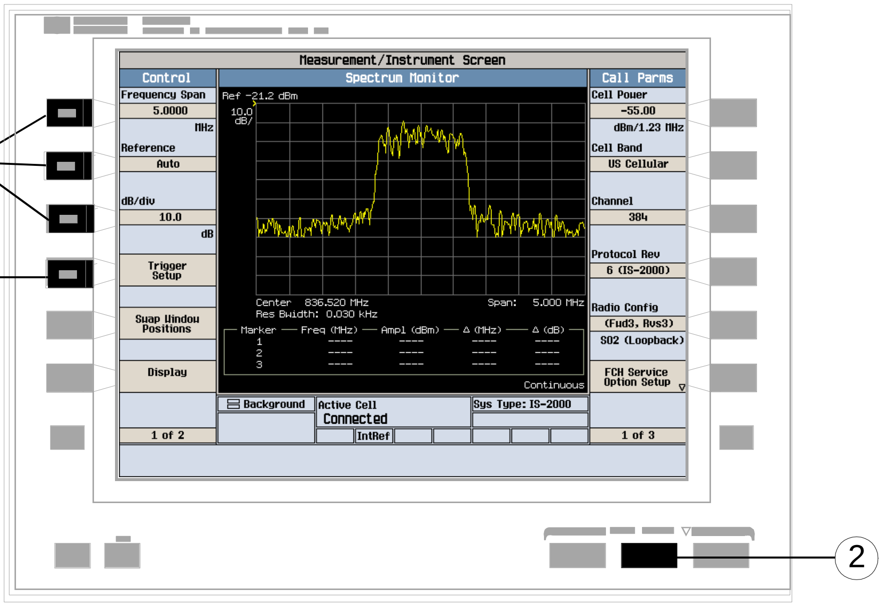
The following procedure shows a typical usage of the spectrum monitor in each of its two modes of operation; Swept Mode and Zero Span mode.

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`.



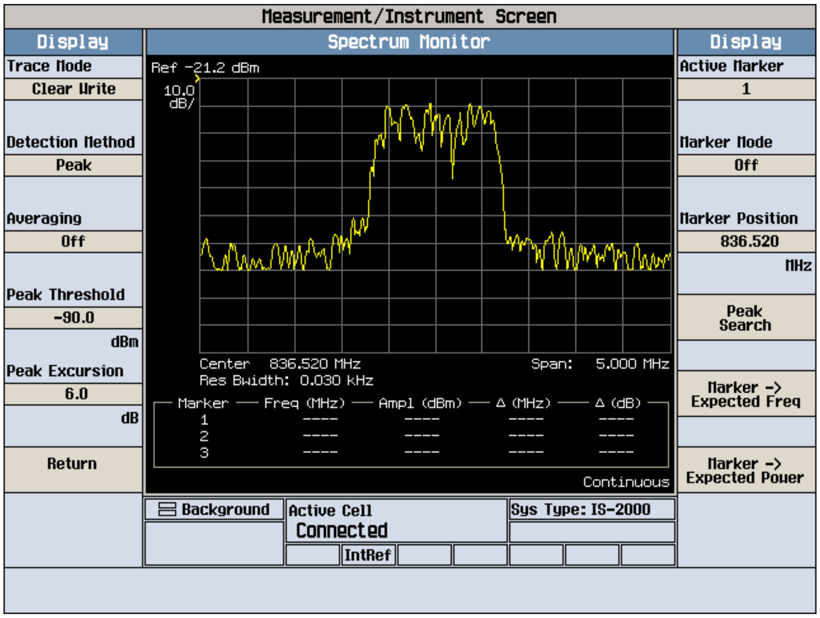
Frequency Span 5.0000 MHz
Reference Auto
dB/div 10.0 dB
Ref -21.2 dBm
10.0 dB/
Center 836.520 MHz
Span: 5.000 MHz
Res Bwidth: 0.030 kHz
Cell Power -55.00 dBm/1.23 MHz
Cell Band US Cellular
Channel 384
Protocol Rev 6 (IS-2000)
Radio Config (Fwd3, Rvs3)
SO2 (Loopback)
Active Cell Connected
Sys Type: IS-2000

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` (**F3**) 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.



Trace Mode: Clear Write
Detection Method: Peak
Averaging: Off
Peak Threshold: -90.0 dBm
Peak Excursion: 6.0 dB
Active Marker: 1
Marker Mode: Off
Marker Position: 836.520 MHz
Ref -21.2 dBm
10.0 dB/
Center 836.520 MHz
Span: 5.000 MHz
Res Bwidth: 0.030 kHz

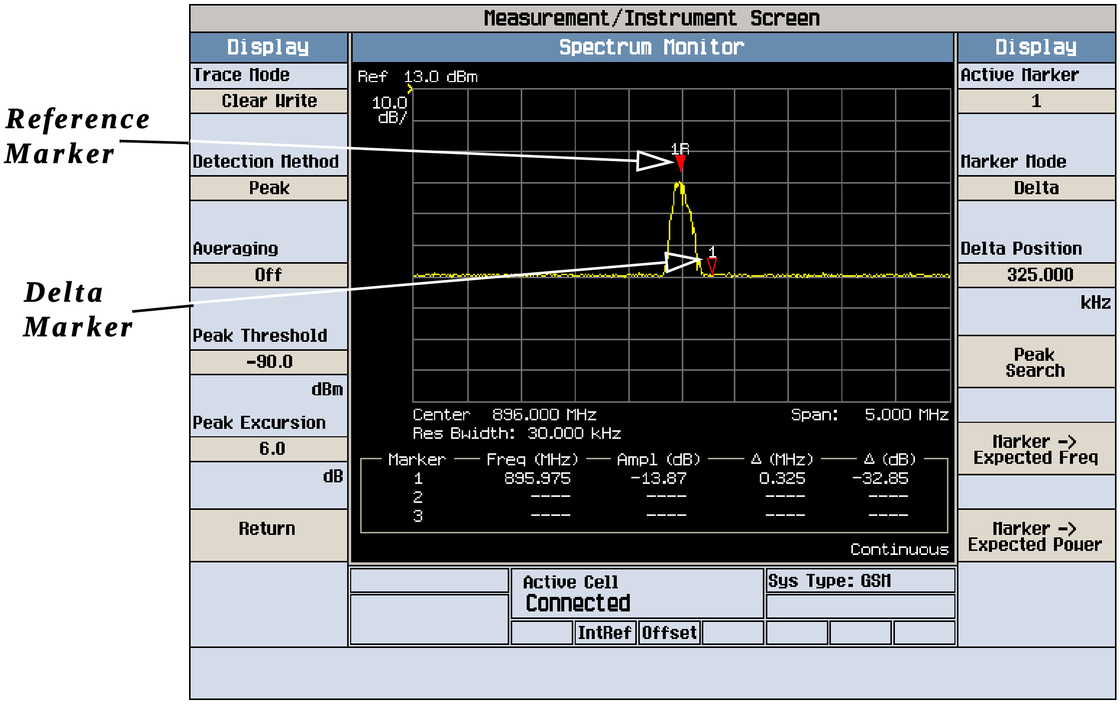
Marker	Freq (MHz)	Ampl (dBm)	Δ (MHz)	Δ (dB)
1	----	----	----	----
2	----	----	----	----
3	----	----	----	----

Continuous
Active Cell: Connected
Sys Type: IS-2000

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.



Trace Mode: Clear Write

Detection Method: Peak

Averaging: Off

Peak Threshold: -90.0 dBm

Peak Excursion: 6.0 dB

Active Marker: 1

Marker Mode: Delta

Delta Position: 325.000 kHz

Ref 13.0 dBm

10.0 dB/

Center 896.000 MHz

Span: 5.000 MHz

Res Bwidth: 30.000 kHz

Marker	Freq (MHz)	Ampl (dB)	Δ (MHz)	Δ (dB)
1	895.975	-13.87	0.325	-32.85
2	----	----	----	----
3	----	----	----	----

Continuous

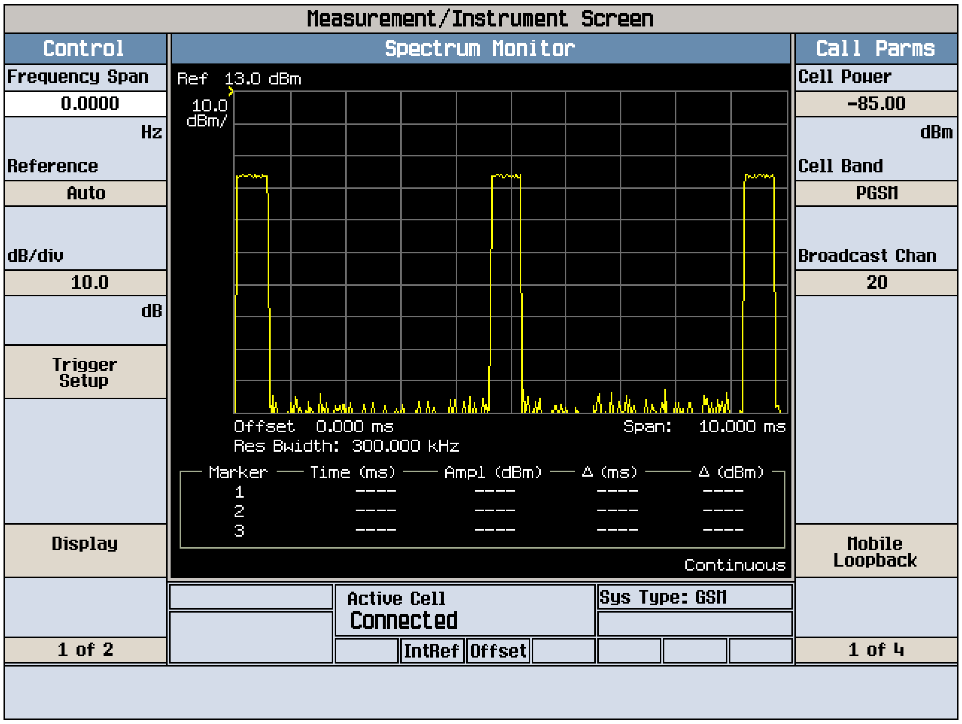
Active Cell Connected

Sys Type: GSM

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.



Frequency Span 0.0000 Hz

Reference Auto

dB/div 10.0 dB

Ref 13.0 dBm

10.0 dBm/

Offset 0.000 ms Span: 10.000 ms

Res Bwidth: 300.000 kHz

Marker	Time (ms)	Ampl (dBm)	Δ (ms)	Δ (dBm)
1	----	----	----	----
2	----	----	----	----
3	----	----	----	----

Cell Power -85.00 dBm

Cell Band PGSM

Broadcast Chan 20

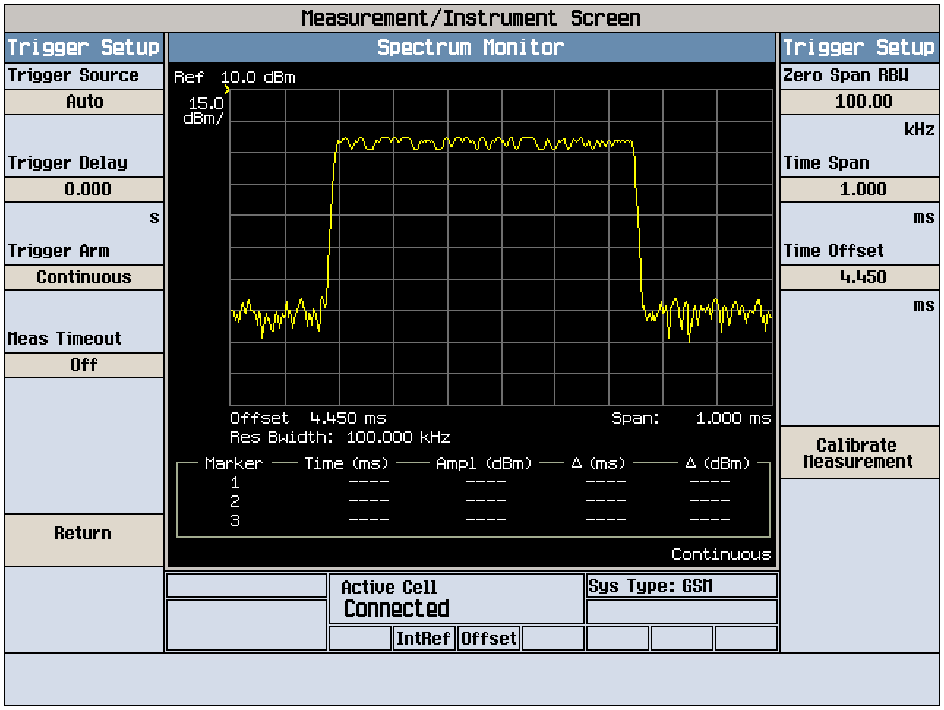
Active Cell Connected

Sys Type: GSM

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.



Trigger Source
Auto

Trigger Delay
0.000 s

Trigger Arm
Continuous

Meas Timeout
Off

Zero Span RBW
100.00 kHz

Time Span
1.000 ms

Time Offset
4.450 ms

Ref 10.0 dBm
15.0 dBm/

Offset 4.450 ms Span: 1.000 ms
Res Bwidth: 100.000 kHz

Marker	Time (ms)	Ampl (dBm)	Δ (ms)	Δ (dBm)
1	----	----	----	----
2	----	----	----	----
3	----	----	----	----

Active Cell
Connected

Sys Type: GSM

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 outside the calibrated temperature range of the spectrum monitor, a `Measurement Uncalibrated` message is displayed. To calibrate the spectrum monitor for the current temperature, press the `Calibrate Measurement` (**F11**) key on the `Trigger Setup` menu.

Related Topics

“Spectrum Monitor Description” on page 86

“Programming the Spectrum Monitor” on page 247

“Spectrum Monitor Troubleshooting” on page 870

Help Mode

Description

This section explains:

- "What is Help Mode?"
- "How do I use the help mode?"

What is Help Mode?

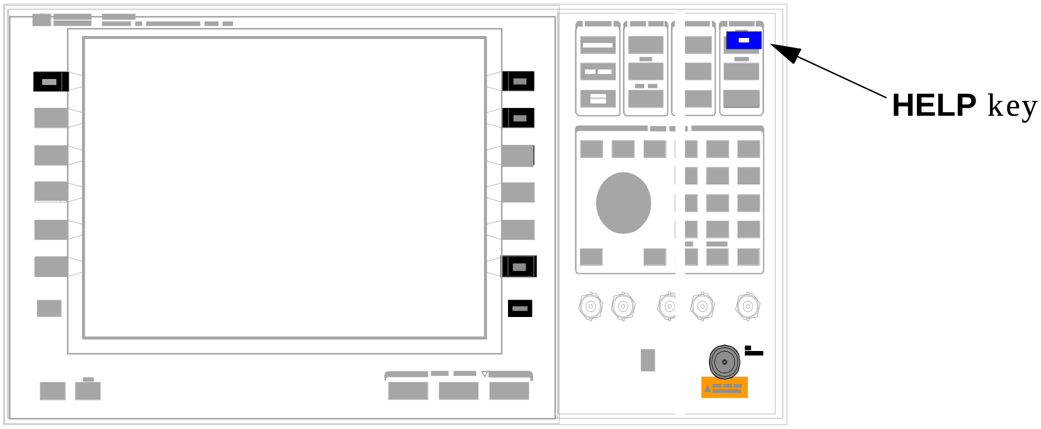
The help mode implemented in your test set provides context sensitive GPIB command syntax assistance. When you put the test set into help mode, the test set displays the GPIB command syntax necessary to perform an action remotely for each action you perform from the front panel.

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.



The Help annunciator should now be displayed in the bottom of the screen.

Active Cell Idle

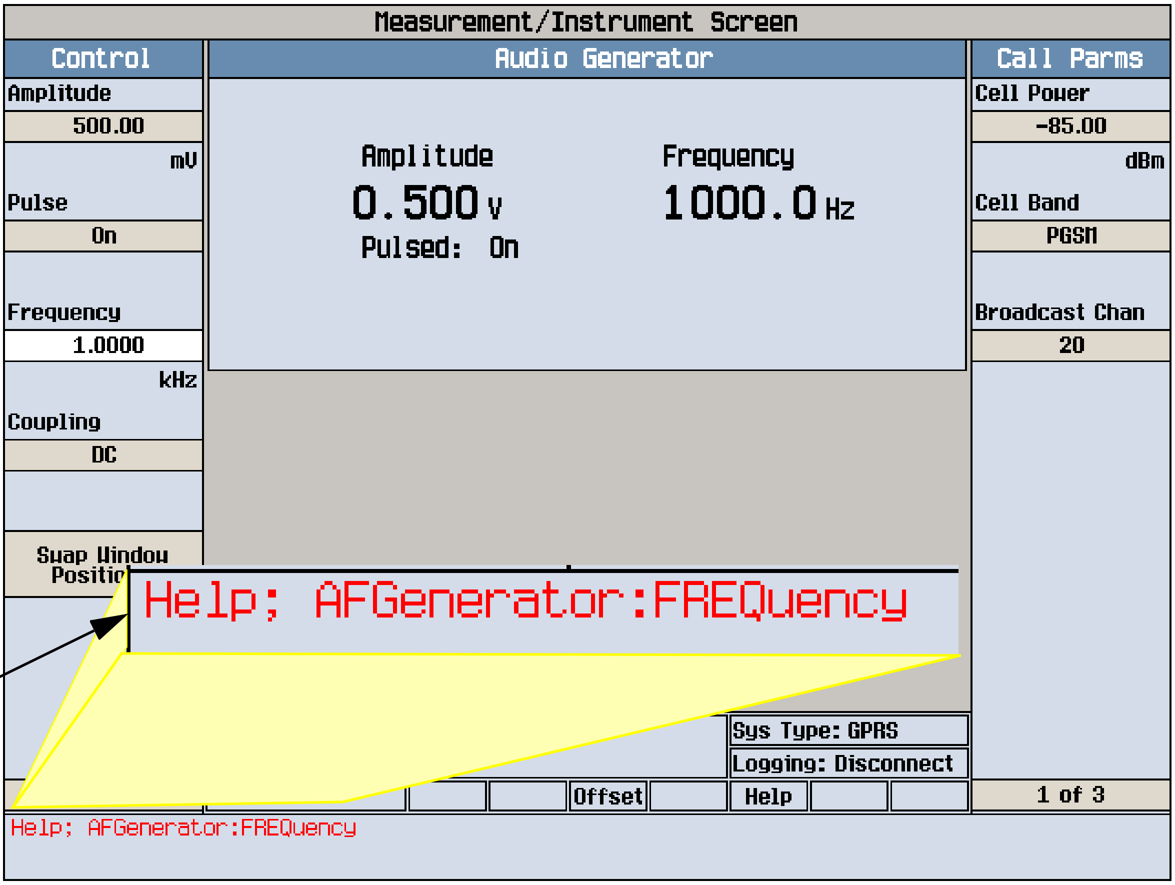
Sys Type: GPRS

Logging: Disconnect

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**)



Amplitude 500.00 mV

Pulse On

Frequency 1.0000 kHz

Coupling DC

Amplitude 0.500 V

Pulsed: On

Frequency 1000.0 Hz

Cell Power -85.00 dBm

Cell Band PGSM

Broadcast Chan 20

Sys Type: GPRS

Logging: Disconnect

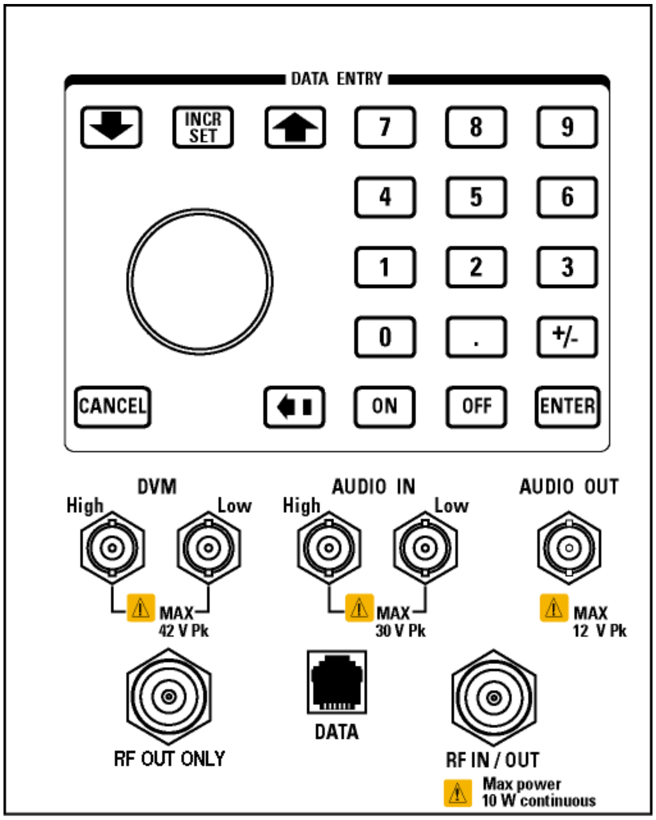
Help: AFGenerator:FREQuency

GPIB command syntax to set the frequency remotely.

Refer to the user documentation on each command for more information.

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.

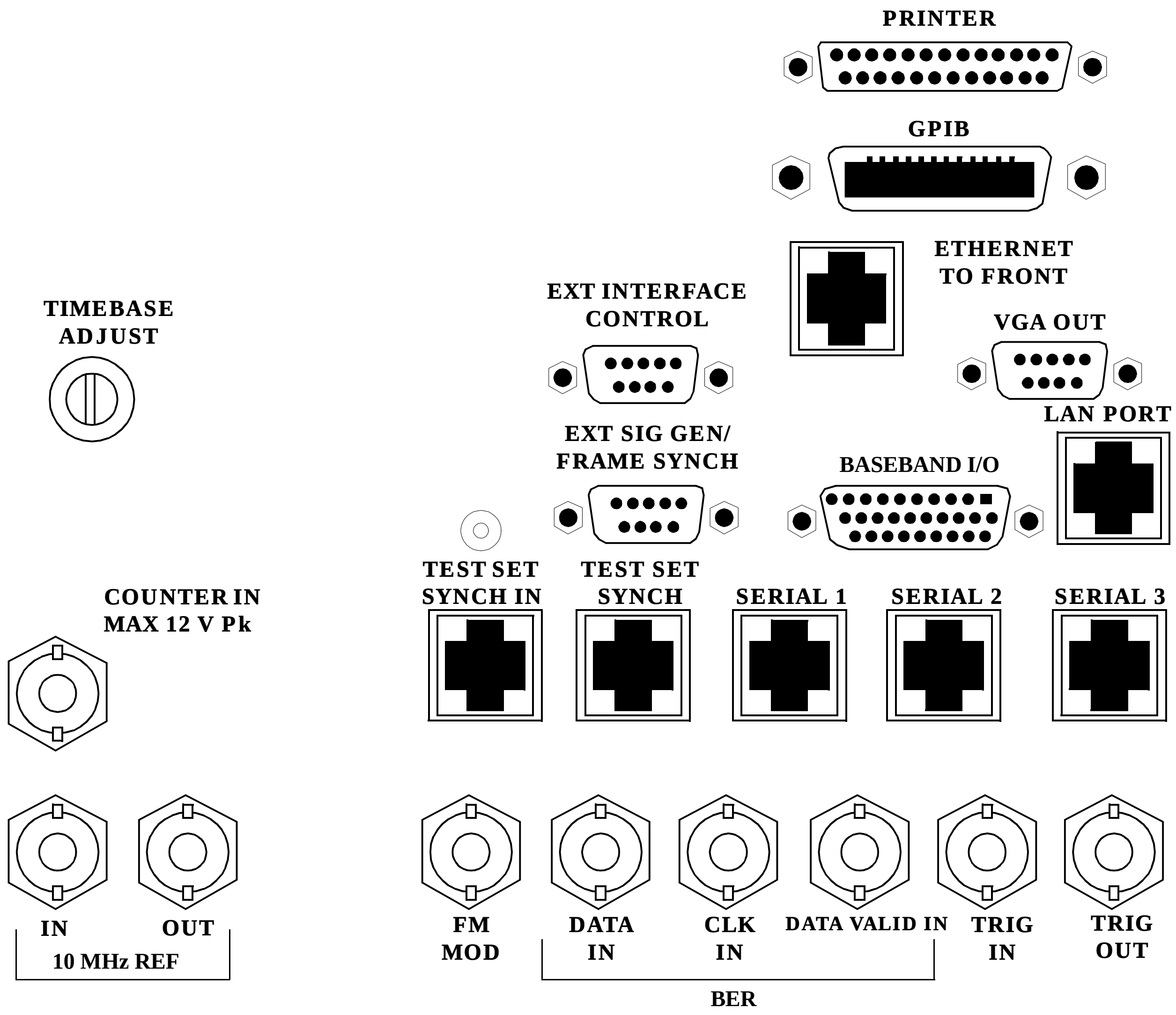
Related Topics

"RFGenerator Subsystem" (RF OUT ONLY control)

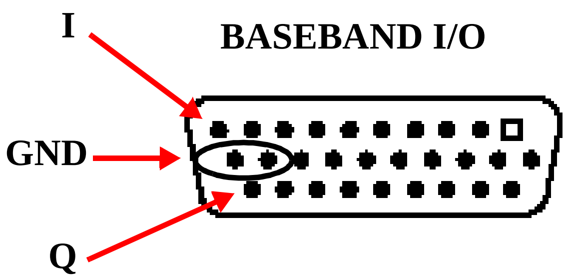
"Amplitude Offset" (RF amplitude offsets)

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.

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.

Printing Screens

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.

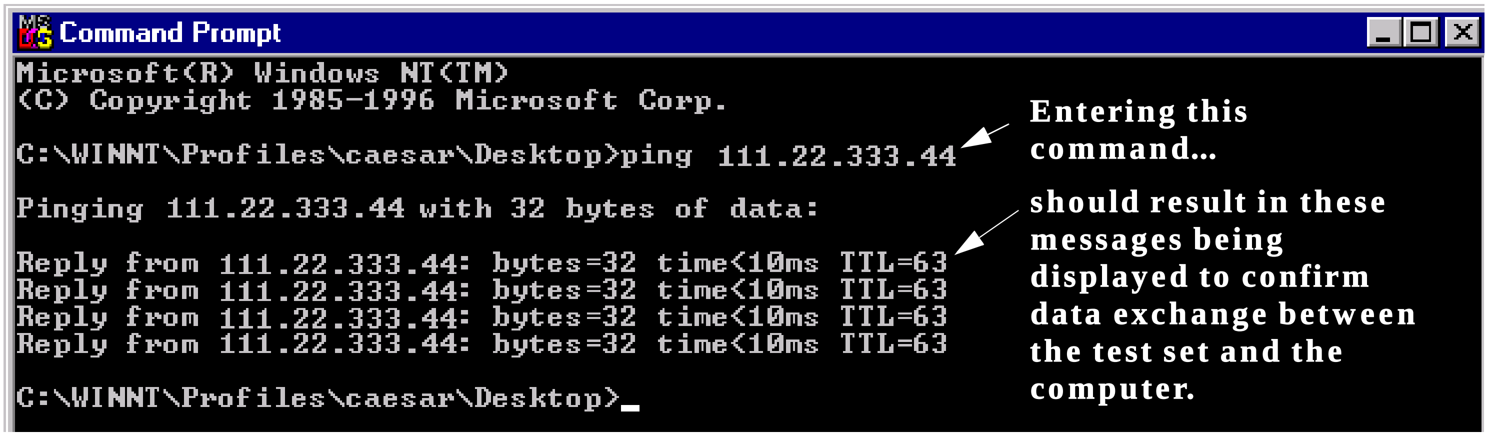
The image can now be retrieved from your directory and used as needed.

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.



```
Microsoft(R) Windows NT(TM)
(C) Copyright 1985-1996 Microsoft Corp.

C:\WINNT\Profiles\caesar\Desktop>ping 111.22.333.44

Pinging 111.22.333.44 with 32 bytes of data:

Reply from 111.22.333.44: bytes=32 time<10ms TTL=63
Reply from 111.22.333.44: bytes=32 time<10ms TTL=63
Reply from 111.22.333.44: bytes=32 time<10ms TTL=63
Reply from 111.22.333.44: bytes=32 time<10ms TTL=63

C:\WINNT\Profiles\caesar\Desktop>_
```

Entering this command...

should result in these messages being displayed to confirm data exchange between the test set and the computer.

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

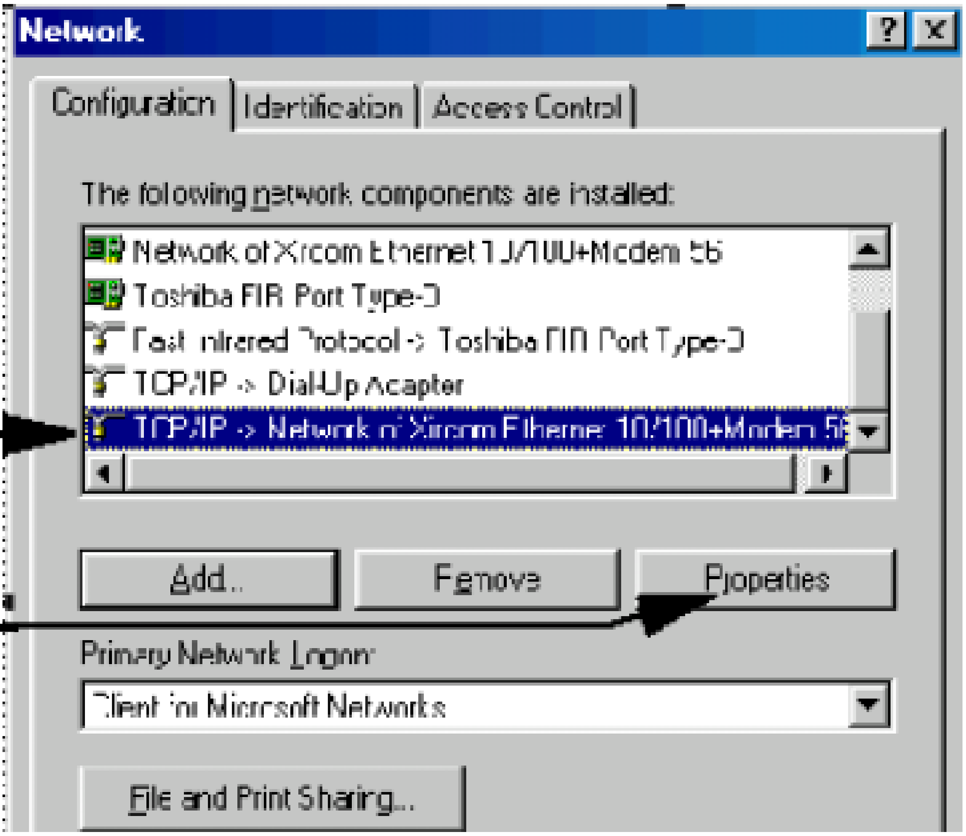
Network configuration procedures vary between operating systems. You may have to refer to your computer's help system, or your LAN adapter card's documentation, for assistance.

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 3. Accessing Your Computer’s LAN Settings



The following network components are installed:

- Network of Xircom Ethernet 10/100+Modem 56
- Toshiba FIR Port Type-O
- Fast Infrared Protocol -> Toshiba FIR Port Type-O
- TCP/IP -> Dial-Up Adapter
- TCP/IP -> Network of Xircom Ethernet 10/100+Modem 5

Primary Network Logon:
Client for Microsoft Networks

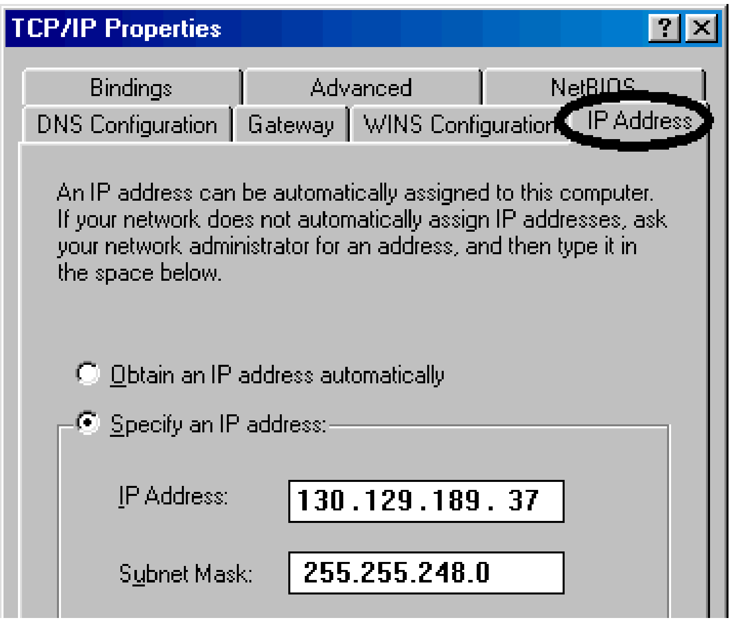
Select the entry for your Ethernet network adapter, then...

select Properties to list the TCP/IP settings for your adapter.

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 4. Specifying the Computer’s IP Address and Subnet Mask



An IP address can be automatically assigned to this computer. If your network does not automatically assign IP addresses, ask your network administrator for an address, and then type it in the space below.

○ Obtain an IP address automatically

● Specify an IP address:

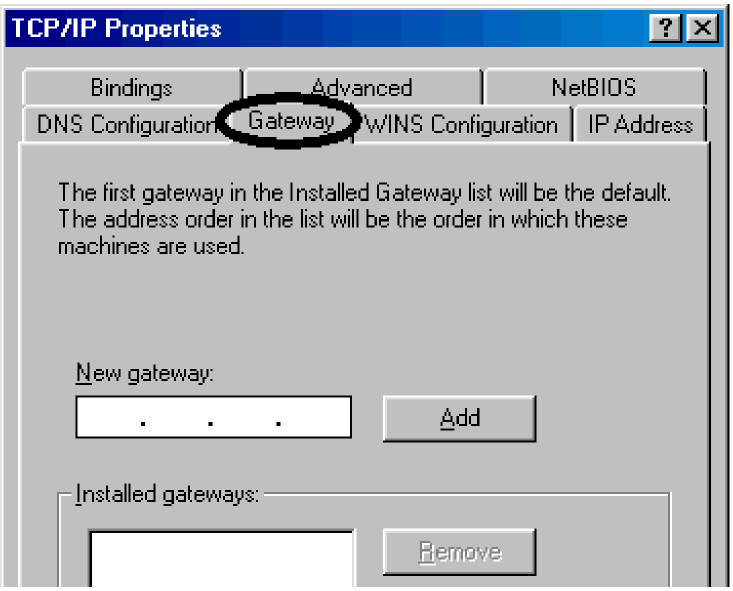
IP Address: 130 .129 .189 . 37

Subnet Mask: 255.255.248.0

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 5. Accessing the Gateway Setting



The first gateway in the Installed Gateway list will be the default. The address order in the list will be the order in which these machines are used.

New gateway: . . .

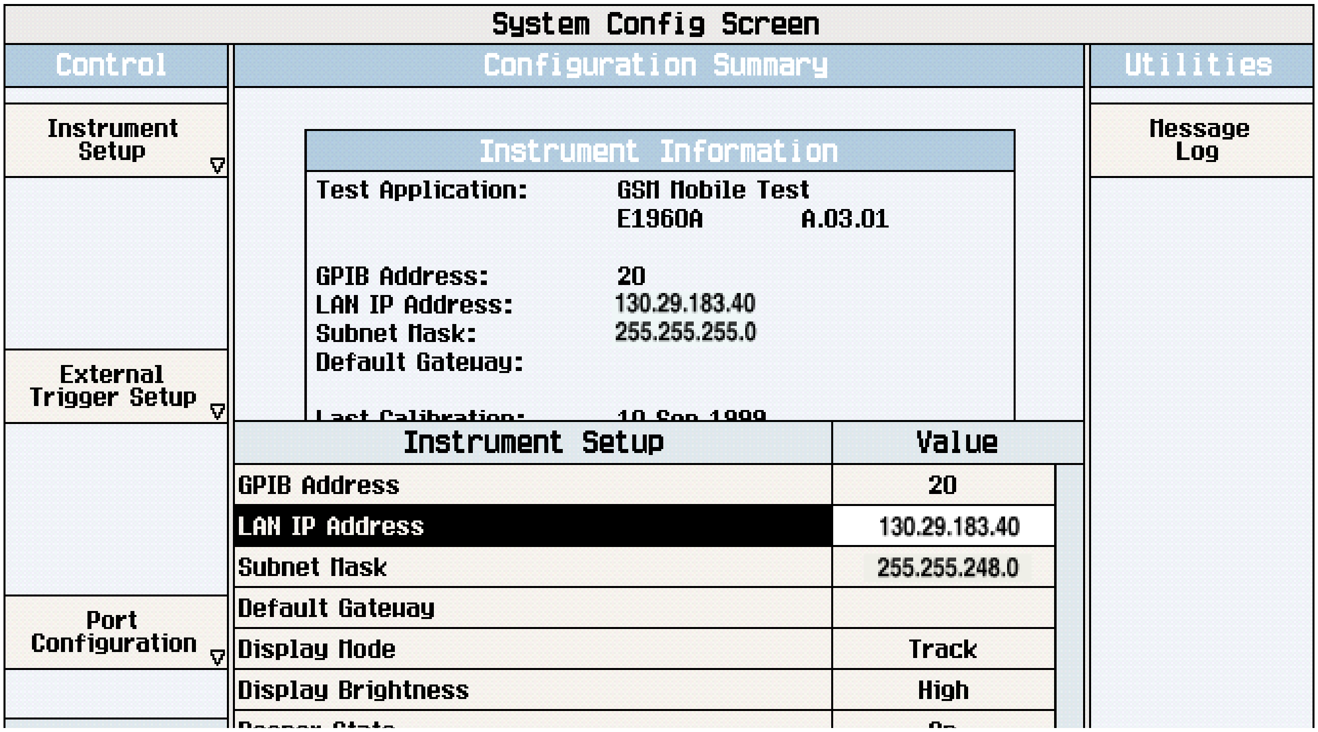
Installed gateways:

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.



Test Application: GSM Mobile Test
E1960A A.03.01

GPIB Address: 20
LAN IP Address: 130.29.183.40
Subnet Mask: 255.255.255.0
Default Gateway:

Last Calibration: 10 Sep 1999

Instrument Setup	Value
GPIB Address	20
LAN IP Address	130.29.183.40
Subnet Mask	255.255.248.0
Default Gateway	
Display Mode	Track
Display Brightness	High

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.

Related Topics

"Configuring the Test Set's LAN"

Save and Recall Registers

Description

The test set provides up to five save/recall registers . Each register is identified by a number (1-5).

Recalling Saved Registers

Press the **Register recall** hardkey.

Use the knob to scroll to a register that is labeled Full and press the knob.

When a register is recalled, the test set will clear all active measurements and display the Call Setup Screen.

CAUTION If the test set has had hardware options installed since the last time a registers were saved, delete the registers and re-save them. Failure to perform this step could result in a non-recoverable firmware “assert” when performing a register recall.

Deleting Saved Registers

Pressing the **DELETE** hardkey will display a menu indicating which registers have been saved (they are labeled “Full”).

Use the knob to scroll to a register and press the knob. Select Yes to confirm the selection.

Settings that are Saved

All functions and parameters that have an associated static state or settable value will be saved. For example:

- Cell parameters (System ID, Network ID, etc.)
- Call control parameters (System Type, Operating Mode, etc.)
- Measurement setup parameters (Trigger Arm state, Measurement Timeout, etc.)

- Call Parms (Cell Power, Cell Band, etc.)

Settings that are not Saved

Functions that trigger immediate actions, such as originating a call or calibrating a measurement are not saved.

Settings saved in non-volatile memory (settings that are unchanged when power is cycled or the test set is preset) are not saved. For example:

- LAN IP Address
- Date/Time
- RF IN/OUT Amplitude Offset
- All other settings on the Instrument Setup menu on the System Config screen.
- Measurement results
- Call status
- Active measurements

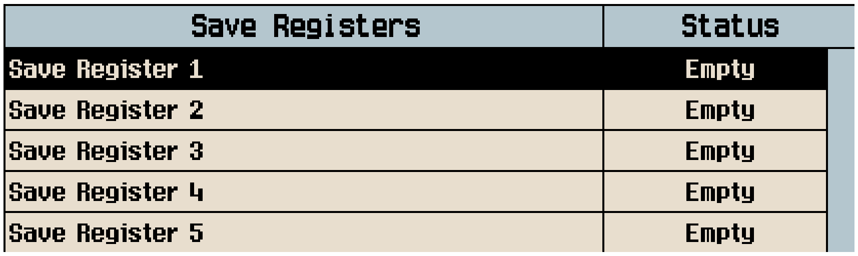
Read-only call processing results such as Mobile Station Information tables are not saved.

Saving Current Settings to a Register

To save the current state of the test set, press the **SAVE** hardkey.

A menu will be displayed that shows the status of all five registers. If the register status is “Full”, the register has had instrument settings saved to it. If the register status is “Empty”, it does not currently contain any instrument settings.

Use the knob to scroll to a register and press the knob. If the selected register is currently Full, select Yes in the Overwrite Save Reg? window and it will be overwritten.



Save Registers	Status
Save Register 1	Empty
Save Register 2	Empty
Save Register 3	Empty
Save Register 4	Empty
Save Register 5	Empty

CAUTION When a test set application is upgraded using the 8960 File Utility Program, the new revision of the application will not automatically retain save/recall registers from the old revision. Prior to the application upgrade, it is recommended that you record the critical settings (such as call setup information) from registers that you will want to re-save after the test application upgrade.

Related Topics

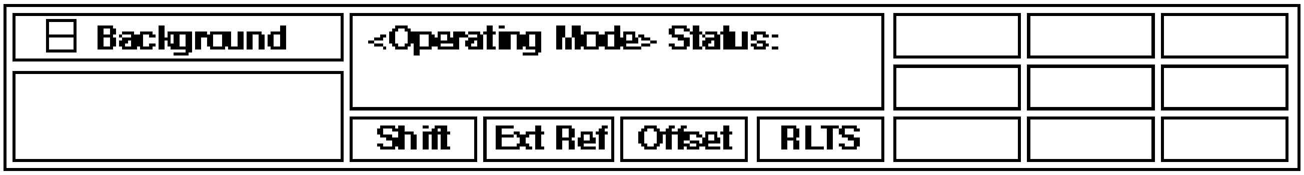
"SYSTem:REGister" on page 779

Instrument Status Area

Description

The Instrument status area is found on the bottom center of the test set’s display.

Figure 6. 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.
- 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.

Troubleshooting

Data Channel Troubleshooting

GPRS Attach

GPRS attach is a UE initiated procedure. There are three errors conditions during GPRS attach that will generate error messages. These error conditions will not stop the GPRS attach procedure:

- The test set does not receive the RRC Connection Complete message from the UE within 6 seconds from the time of sending the RRC Connection Setup message. This will generate error +201, No Response to RRC Connection Setup.
- The test set does not receive the Identity Response message from the UE within 6 seconds from the time of sending the Identity Request message. This will generate error +208, No Response to Identity Request.
- The test set does not receive the RRC Connection Release Complete message from the UE within 6 seconds from the time of sending the RRC Connection Release message. This will generate error +208, No Response to RRC Connection Release.

Ping

- 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 1 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 value of 0x821DB5CB. This is because the test set uses an internal address to originate IP data from the test set to the mobile station.
- Ping does not work although the mobile station is attached: The device must be PDP activated. 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`.

Frequently Asked Questions

- Can't find where to set the mobile station address: Switch the `Conn Type` to `Auto` first.
- BER measurements wrong when using the data channel: The BER measurement is 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.

AFANalyzer Troubleshooting

Possible Setup Issues

During remote operation of the Audio Analyzer, 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? query is used.

The Detector Type selected (peak or rms) also sets how 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 Audio Analyzer setup parameters to their proper settings for the measurement being made. The SINAD and Distortion measurements typically use different settings than the Audio Level measurement. See “Audio Analyzer Measurement Description” on page 58 and “Audio Analyzer Block Diagram” on page 60.

For very low level audio signals, use the 100 Hz BW BPF filter to reduce the affects of noise (see “Audio Level Measurement Description” on page 62).

For accurate 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 62).

Interpreting Integrity Indicator Values

See “Integrity Indicator” on page 295.

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.

Adjacent Channel Leakage Ratio Troubleshooting

Possible Setup Issues

During remote operation of the adjacent channel leakage ratio measurement, you should configure the trigger arm to single. See "SETup:WACLeakage" .

If the trigger arm is not set to single, you may not be able to retrieve measurement results during remote use if you are using the INIT:DONE? query. When the trigger arm is continuous, the measurement rearms itself and starts another measurement cycle, causing the INIT:DONE? query to always return "WAIT". See "Trigger Arm (Single or Continuous) Description" for more explanation.

The trigger source defaults to Auto for the adjacent channel leakage ratio measurement, and tries to use protocol triggering if the mobile station (UE) is synchronized to the test set. Immediate triggering is used if the mobile station is not synchronized.

The measurement results are the calculated ratios between the in-channel power and adjacent channels and are therefore not adjusted by any amplitude offsets that are entered.

Interpreting Integrity Indicator Values

This measurement uses auto-ranging to automatically set the expected level into the test set.

If `Over Range` (5) is returned, the measured signal exceeds the expected input level or exceeds the maximum allowed input power for the test set.

If `Under Range` (6) is returned, the measured signal is below the expected input level.

If `Uncalibrated Due to Temperature` (19) is returned, the temperature in the test set has changed by ± 10° C or more since the last calibration and should be calibrated again. See "Measurement Calibration Indicator values" on page 105.

See "Integrity Indicator" .

Related Topics

"Adjacent Channel Leakage Ratio Measurement Description" on page 65

Channel Power Troubleshooting

Possible Setup Issues

During remote operation of the channel power measurement you should configure the trigger arm to single. See "SETup:WCPower" .

If the trigger arm is not set to single, you may not be able to retrieve measurement results during remote use if you are using the INIT:DONE? query. When the trigger arm is continuous, the measurement rearms itself and starts another measurement cycle, causing the INIT:DONE? query to always return "WAIT". See "Trigger Arm (Single or Continuous) Description" for more explanation.

The trigger source defaults to Auto for the channel power measurement, and tries to use protocol triggering if the mobile station (UE) is synchronized to the test set. Immediate triggering is used if the mobile station is not synchronized.

RF Rise triggering should only be used when a burst is sent, such as a PRACH burst.

Autoranging is not available for this measurement. The expected input level is determined by either the MS Target Power setting, when automatic receiver control is used (default), or by the Manual Power setting when manual receiver control is selected. See "Receiver Control" .

Measurement results are affected by any amplitude offsets that are entered. See "Amplitude Offset" .

The channel power measurement value may be slightly lower than the thermal power measurement's value (typically about 0.25 dB). This is because the channel power measurement is band-limited, rejecting the additional power that may be in the uplink signal's sidebands.

Interpreting Integrity Indicator Values

If `Over Range` (5) is returned, the measured signal exceeds the expected input level or exceeds the maximum allowed input power for the test set.

If `Under Range` (6) is returned, the measured signal is below the expected input level.

If `Uncalibrated Due to Temperature` (19) is returned, the temperature in the test set has changed by ± 10° C or more since the last calibration and should be calibrated again. See "Measurement Calibration Indicator values" on page 105.

See "Integrity Indicator" .

Related Topics

"Channel Power Measurement Description" on page 67

Code Domain Troubleshooting

Possible Setup Issues

During remote operation of the code domain measurement, you should configure the trigger arm to single. See "SETup:WCDomain" .

If the trigger arm is not set to single, you may not be able to retrieve measurement results during remote use if you are using the INIT:DONE? query. When the trigger arm is continuous, the measurement rearms itself and starts another measurement cycle, causing the INIT:DONE? query to always return "WAIT". See "Trigger Arm (Single or Continuous) Description" for more explanation.

The mobile station (UE) must be synchronized to the test set for this measurement to operate correctly.

Interpreting Integrity Indicator Values

If `Over Range` (5) is returned, the measured signal exceeds the expected input level or exceeds the maximum allowed input power for the test set.

If `Under Range` (6) is returned, the measured signal is below the expected input level.

If `Cannot Correlate` (17) is returned, the test set cannot demodulate the signal from the mobile station (UE). Make sure the uplink scrambling code from the mobile station matches the UL Scrambling setting on the test set (see "CALL:UPLink").

If `Uncalibrated Due to Temperature` (19) is returned, the temperature in the test set has changed by ± 10° C or more since the last calibration and should be calibrated again. See "Measurement Calibration Indicator values" on page 105.

See "Integrity Indicator" .

Related Topics

"Code Domain Measurement Description" on page 69

Inner Loop Power Troubleshooting

Possible Setup Issues

No other measurements can be running when an inner loop power measurement is performed. If any measurements are running when an inner loop power measurement is initiated, they are closed and a message is displayed to indicate that they were closed.

To use this measurement in Active Cell mode, UE (mobile station) needs to be up on a call. To use the measurement in FDD Test Mode, UE should be capable of deriving TPC commands in FDD test mode. You needs to configure the UE to use the right power control algorithm and the step size before initiating a measurement.

Inner Loop Power measurement will try to reconfigure the UE to the desired algorithm mode and power step size (if it is required) before running the measurement. If the UE does not receive or acknowledge this request, the test set will issue an error “No Physical channel reconfig complete Received”.

The test set does not support testing the UE in compressed mode with this measurement, therefore 3 dB power control step size will not be allowed.

Absolute measurement results are affected by any amplitude offsets that are entered (relative measurement results are not). See “Amplitude Offset” .

Interpreting Integrity Indicator Values

If `Over Range` (5) is returned, the measured signal exceeds the expected input level or exceeds the maximum allowed input power for the test set.

If `Under Range` (6) is returned, the measured signal is below the expected input level.

If `Uncalibrated Due to Temperature` (19) is returned, the temperature in the test set has changed by ± 10° C or more since the last calibration and should be calibrated again. “Measurement Calibration Indicator values”

See “Integrity Indicator” .

Related Topics

- “Inner Loop Power Measurement Description”
- “Amplitude Offset”
- “Integrity Indicator”

IQ Tuning Measurement Troubleshooting

Possible Setup Issues

During remote operation of the IQ tuning measurement you should configure the trigger arm to single. See "SETup:WIQTuning" on page 670.

If the trigger arm is not set to single, you may not be able to retrieve measurement results during remote use if you are using the INIT:DONE? query. When the trigger arm is continuous, the measurement rearms itself and starts another measurement cycle, causing the INIT:DONE? query to always return "WAIT". See "Trigger Arm (Single or Continuous) Description" for more explanation.

The mobile station (UE) must be synchronized to the test set for this measurement to operate correctly.

RF In/Out Amplitude offsets entered do not affect these measurement results unless the received signal level becomes too low to accurately detect relative I/Q modulation vector transitions.

Interpreting Integrity Indicator Values

If `Over Range` (5) is returned, the measured signal exceeds the expected input level or exceeds the maximum allowed input power for the test set.

If `Under Range` (6) is returned, the measured signal is below the expected input level.

If `Cannot Correlate` (17) is returned, the test set cannot demodulate the signal from the mobile station (UE). Make sure the uplink scrambling code from the mobile station matches the UL Scrambling setting on the test set (see "CALL:UPLink").

If `Uncalibrated Due to Temperature` (19) is returned, the temperature in the test set has changed by ± 10° C or more since the last calibration and should be calibrated again. See "Measurement Calibration Indicator values" on page 105.

See "Integrity Indicator" .

Related Topics

- "IQ Tuning Measurement Description"
- "Integrity Indicator"

Loopback Bit Error Ratio Troubleshooting

Possible Setup Issues

During remote operation of the loopback bit error ratio measurement, you should configure the trigger arm to single. See "SETup:WBERror" and "Triggering of Measurements" .

The mobile station (UE) must be configured in loopback mode 1, described in 3GPP TS 34.109. This requires the mobile station to decode the dedicated traffic channel (DTCH) data from the downlink and resend it in the uplink DTCH. When using FDD Test operating mode, this requires the operator to manually configure the mobile station during testing; no overhead messaging or signaling is provided to set up the mobile station in this operating mode.

This measurement always uses protocol triggering. A measurement cannot be made unless the mobile station (UE) is synchronized to the test set's downlink signal and is transmitting a corresponding uplink signal.

Measurement results are affected by any amplitude offsets that are entered, since the level into the UE is altered.

Interpreting Integrity Indicator Values

If `Measurement Timeout` (2) is returned, the test set initiated the measurement and attempted to post the measurement results before the measurement had completed. This is typically occurs when either of the following conditions exist:

- The measurement timeout value you entered for the measurement is too small for the number of bits being used. In this case, either reduce the number of bits to test or increase the timeout value.
- The measurement did not start due because it could not align the received data with the transmitted data. This happens if any of the following conditions occur:

  — The test set is unable to synchronize to the uplink signal.

  — The UE is not configured for the proper loopback mode.

  — The UE is not configured for the proper uplink transport format.

If `Synch Not Found (11)` is returned, the test set lost synchronization with the uplink for some period of time during the measurement.

If `Over Range` (5) is returned, the signal exceeds the maximum allowable level for the test set or is above the level expected by the test set.

If `Under Range` (6) is returned, the signal is below the minimum allowable level for the test set or is below the level expected by the test set.

Related Topics

"Integrity Indicator"

"Loopback Bit Error Ratio Measurement Description"

Occupied Bandwidth Troubleshooting

Possible Setup Issues

For the Occupied Bandwidth measurement, Algorithm 2 should be selected in the UL CL (Closed Loop) Power Ctrl Parameters menu. This will ensure that during the test the UE will not change power levels due to closed loop power control commands. If Algorithm 1 is selected when the Occupied Bandwidth measurement is selected, an error message will be displayed.

During remote operation of the occupied bandwidth measurement, you should configure the trigger arm to single. See "SETup:WOBWidth" on page 673.

If the trigger arm is not set to single, you may not be able to retrieve measurement results during remote use if you are using the INIT:DONE? query. When the trigger arm is continuous, the measurement rearms itself and starts another measurement cycle, causing the INIT:DONE? query to always return "WAIT". See "Trigger Arm (Single or Continuous) Description" for more explanation.

The trigger source defaults to Auto for the occupied bandwidth measurement, and tries to use protocol triggering if the mobile station (UE) is synchronized to the test set. Immediate triggering is used if the mobile station is not synchronized.

Interpreting Integrity Indicator Values

This measurement uses auto-ranging to automatically set the expected level into the test set.

If `Over Range` (5) is returned, the measured signal exceeds the expected input level or exceeds the maximum allowed input power for the test set.

If `Under Range` (6) is returned, the measured signal is below the expected input level.

If `Uncalibrated Due to Temperature` (19) is returned, the temperature in the test set has changed by ± 10° C or more since the last calibration and should be calibrated again. See "CALibration Subsystem" on page 386.

See "Integrity Indicator" .

Related Topics

- "Occupied Bandwidth Measurement Description" on page 80

PRACH Transmit On/Off Power Troubleshooting

Possible Setup Issues

Before performing a PRACH transmit on/off measurement:

- Set Operating Mode to Cell Off.
- Set Available Subchannels (Bit Mask) to 1.
- Set Operating Mode to Active Cell.
- Turn the UE on and wait for it to camp to the test set's signal.

No other measurements can be running when a PRACH transmit on/off power measurement is performed. If any measurements are running when a PRACH transmit On/Off power measurement is initiated, they are closed and a message is displayed to indicate that they were closed.

If the PRACH transmit on/off power measurement timeout is not on, the PRACH transmit on/off measurement will hang until it is triggered by a PRACH burst. You can reset the measurement by pressing the **MEASUREMENT RESET** key.

An RF rise to a level within 9 dB of the expected `Initial PRACH Tx Power` is required to allow the measurement to then trigger based on protocol. If your UE is not transmitting at the expected level, you may need to set expected power manually.

Absolute measurement results are affected by any amplitude offsets that are entered (relative measurement results are not). See "Amplitude Offset" .

Interpreting Integrity Indicator Values

If `Over Range` (5) is returned, the measured signal exceeds the expected input level or exceeds the maximum allowed input power for the test set.

If `Under Range` (6) is returned, the measured signal is below the expected input level.

If `Uncalibrated Due to Temperature` (19) is returned, the temperature in the test set has changed by ± 10° C or more since the last calibration and should be calibrated again. See "CALibrating the Test Set" on page 105.

See "Integrity Indicator" .

Related Topics

- "PRACH Transmit On/Off Power Measurement Description"
- "Amplitude Offset"
- "Integrity Indicator"

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 638.

If the trigger arm is not set to single, the Spectrum Monitor may not return a result. When trigger arm is continuous the Spectrum Monitor 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 291.

If trigger source immediate is used for burst modulated signals the results returned will be unreliable. 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 295.

Related Topics

"Spectrum Monitor Description" on page 86

Swept Audio Measurement Troubleshooting

Possible Setup Issues

During remote operation of the Swept Audio measurement, you should always set the Trigger Arm setting 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? query is used.

If digital measurements are active, turn them off or set their trigger source to Immediate. See “Triggering of Measurements” on page 290.

The Detector Type selected (peak or rms) also sets how 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 the Detector Type, Filter Type, and other audio analyzer settings for the type of measurement being made. The SINAD and Distortion measurements typically use different settings than the Audio Level measurement. See “Audio Analyzer Measurement Description” on page 58 and “Audio Analyzer Block Diagram” on page 60.

For very low level audio signals, or for measurements made in a noisy environment, use the 100 Hz BW BPF filter to reduce the affects of noise (see “Audio Analyzer Measurement Description” on page 58).

Interpreting Integrity Indicator Values

See “Integrity Indicator” on page 295.

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.

Spectrum Emission Mask Troubleshooting

Possible Setup Issues

During remote operation of the spectrum emission mask measurement, you should configure the trigger arm to single. See "SETup:WSEMask" .

If the trigger arm is not set to single, you may not be able to retrieve measurement results during remote use if you are using the INIT:DONE? query. When the trigger arm is continuous, the measurement rearms itself and starts another measurement cycle, causing the INIT:DONE? query to always return "WAIT". See "Trigger Arm (Single or Continuous) Description" for more explanation.

The trigger source defaults to Auto for the spectrum emission mask measurement, and tries to use protocol triggering if the mobile station (UE) is synchronized to the test set. Immediate triggering is used if the mobile station is not synchronized.

Measurement results for the mask are not affected by any amplitude offsets that are entered because they are all relative to the in-channel power. The absolute in-channel power returned by the measurement will reflect any amplitude offset settings for the appropriate frequency range.

Interpreting Integrity Indicator Values

This measurement uses auto-ranging to automatically set the expected level into the test set.

If `Over Range` (5) is returned, the measured signal exceeds the expected input level or exceeds the maximum allowed input power for the test set.

If `Under Range` (6) is returned, the measured signal is below the expected input level.

If `Uncalibrated Due to Temperature` (19) is returned, the temperature in the test set has changed by ± 10° C or more since the last calibration and should be calibrated again. See "Calibration Strategy" on page 386.

See "Integrity Indicator" .

Related Topics

- "Spectrum Emission Mask Measurement Description"

Thermal Power Troubleshooting

Possible Setup Issues

During remote operation of the thermal power measurement you should configure the trigger arm to single. See "SETup:WTPower" .

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; possibly interrupting the FETCh operation during remote use. See "Measurement States" .

The trigger source is always immediate for the thermal power measurement. No synchronization or external signals are required.

Measurement results are affected by any RF In/Out amplitude offsets that are entered. See "Amplitude Offset" .

The thermal power measurement value may be slightly higher than the channel power measurement's value (typically about 0.25 dB). This is because the channel power measurement is band-limited, rejecting the additional power that may be in the uplink signal's sidebands.

This is a broadband, unfiltered power measurement. Therefore, virtually any signal present at the RF IN/OUT connector will affect this measurement. If the measured level exceeds the channel power measurement by more than 0.25 dBm, verify that the only signal present is the mobile station's (UE) uplink signal.

Interpreting Integrity Indicator Values

This measurement uses autoranging to automatically set the expected level into the test set.

If `Over Range` (5) is returned, the signal exceeds the maximum allowable level for the test set.

If `Under Range` (6) is returned, the measured signal is below -21 dBm. The thermal power measurement is specified to operate accurately down to -10 dBm, and will operate with degraded accuracy down to -20 dBm. Use the channel power measurement for measuring lower level signals.

See "Integrity Indicator" .

Related Topics

"Thermal Power Measurement Description"

Waveform Quality Troubleshooting

Possible Setup Issues

During remote operation of the waveform quality measurement you should configure the trigger arm to single. See "SETup:WWQuality" .

If the trigger arm is not set to single, you may not be able to retrieve measurement results during remote use if you are using the INIT:DONE? query. When the trigger arm is continuous, the measurement rearms itself and starts another measurement cycle, causing the INIT:DONE? query to always return "WAIT". See "Trigger Arm (Single or Continuous) Description" for more explanation.

The mobile station (UE) must be synchronized to the test set for this measurement to operate correctly.

RF In/Out Amplitude offsets entered do not affect these measurement results unless the received signal level becomes too low to accurately detect relative I/Q modulation vector transitions.

Interpreting Integrity Indicator Values

If `Over Range` (5) is returned, the measured signal exceeds the expected input level or exceeds the maximum allowed input power for the test set.

If `Under Range` (6) is returned, the measured signal is below the expected input level.

If `Cannot Correlate` (17) is returned, the test set cannot demodulate the signal from the mobile station (UE). Make sure the uplink scrambling code from the mobile station matches the UL Scrambling setting on the test set (see "CALL:UPLink").

If `Uncalibrated Due to Temperature` (19) is returned, the temperature in the test set has changed by ± 10° C or more since the last calibration and should be calibrated again. See "Measurement Calibration Indicator values" on page 105.

See "Integrity Indicator" .

Related Topics

"Waveform Quality Measurement Description"

Error Messages

Error Mesage 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.

Related Topics

“SYSTem:ERRor?” on page 776

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"

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.

WCDMA and FDD Manual User Messages

Table 8.

Error Message	Description
WCDMA common measurements calibration completed successfully.	The calibration procedure for WCDMA measurements completed without problems.
WCDMA common measurements calibration failed due to temperature drift. Wait for temperature to stabilize.	The temperature in the test set was changing during calibration, causing the calibration to fail.
WCDMA common measurements calibration failed due to oven out of range.	Indicates an internal problem during measurement calibration.
WCDMA common measurements calibration failed due to loopback switch problem.	Indicates an internal problem during measurement calibration.
WCDMA common measurements calibration failed due to under range condition.	Indicates an internal problem during measurement calibration.
WCDMA common measurements calibration failed due to over range condition.	Indicates an internal problem during measurement calibration.
WCDMA common measurements calibration failed due to correlation problem.	Indicates an internal problem during measurement calibration.
WCDMA common measurements calibration failed.	The measurement calibration procedure failed for an unspecified reason.
WCDMA common measurements calibration in progress. Do not apply RF power during calibration	Tells you to not apply power during measurement calibration.
WCDMA common measurements calibration <x>%.	Progress indicator for the measurement calibration routine.
FDD measurement warning; Thermal Power measurement has been closed.	Indicates that a measurement has been inactivated because of a resource conflict. This message is typically generated when thermal power measurements are initiated.
FDD measurement warning; Adjacent Channel Leakage Ratio measurement has been closed.	Indicates that a measurement has been inactivated because of a resource conflict. This message is typically generated when adjacent channel leakage ratio measurements are initiated.
FDD measurement warning; Waveform Quality measurement has been closed.	Indicates that a measurement has been inactivated because of a resource conflict. This message is typically generated when waveform quality measurements are initiated.
FDD measurement warning; Channel Power measurement has been closed.	Indicates that a measurement has been inactivated because of a resource conflict. This message is typically generated when channel power measurements are initiated.
FDD measurement warning; Loopback Bit Error Ratio measurement has been closed.	Indicates that a measurement has been inactivated because of a resource conflict. This message is typically generated when loopback bit error ratio measurements are initiated.

Table 8.

Error Message	Description
FDD measurement warning; Spectrum Emission Mask measurement has been closed.	Indicates that a measurement has been inactivated because of a resource conflict. This message is typically generated when spectrum emission mask measurements are initiated.
FDD measurement warning; Code Domain measurement has been closed.	Indicates that a measurement has been inactivated because of a resource conflict. This message is typically generated when code domain measurements are initiated.
FDD measurement warning; Occupied Bandwidth measurement has been closed.	Indicates that a measurement has been inactivated because of a resource conflict. This message is typically generated when occupied bandwidth measurements are initiated.

-400 through -499 Error Message Descriptions

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 through -399 Error Message Descriptions

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.

-300 through -399 Error Message Descriptions

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.

-200 through -299 Error Message Descriptions

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.

-200 through -299 Error Message Descriptions

Error Message	Description
-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.
-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.

Error Message	Description
-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.
-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 through -199 Error Message Descriptions

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.

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.

-100 through -199 Error Message Descriptions

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.

+100 through +199 Error Message Descriptions

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.

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).

+100 through +199 Error Message Descriptions

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 through +299 Error Message Descriptions

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 +200 errors bit in the questionable error status register is set.

Table 9.

Error Message	Description
+201 No Response to RRC Connection Setup	No "RRC Connection Complete" message was received from the UE. However, the BS Origination process is allowed to proceed.
+202 No Response to RRC Connection Release	No "RRC Connection Release Complete" message was received from the UE. However, the BS Release process is allowed to proceed.
+203 No Response to Activate RB Test Mode	No "Activate Radio Bearer Test Mode Complete" message was received from the UE. However, the BS Origination process is allowed to proceed.
+204 No Response to De-Activate RB Test Mode	No "De-Activate Radio Bearer Test Mode Complete" message was received from the UE. However, the BS Release process is allowed to proceed.
+205 No Response to Close UE Test Loop	No "Close UE Test Loop Complete" message was received from the UE. However, the BS Origination process is allowed to proceed.
+206 No Response to Radio Bearer Setup	No "Radio Bearer Setup Complete" message was received from the UE. However, the BS Origination process is allowed to proceed.
+208 No response to Identity Request	The test set did not receive an identity response message from the UE. However, the Location Update process is allowed to proceed.
+209 Call Disconnected. No Signal Found on Uplink DPCH	The test set could not find a valid DPCH signal within 2 seconds of sending the "RRC Connection Setup" layer 3 message during a BS Origination procedure or sending either the "Transport Channel Reconfiguration" or "Physical Channel Reconfiguration" layer 3 messages during a Handoff procedure.
+210 Call Disconnected. Signal Lost on Uplink DPCH	The test set determined that a link failure occurred due to loss of synchronization with the embedded pilot in the uplink DPCH.

+200 through +299 Error Message Descriptions

Table 9.

Error Message	Description
+211 Call Disconnected. No Response to registration request.	The call is dropped by the test set as a result of the UE not responding to a registration request message.
+212 Call Disconnected. Max No. RLC Retransmissions Exceeded	The single RLC retransmission attempted by the test set is not acknowledged by the UE.
+213 Call Disconnected. RLC Reset Received	The single RLC retransmission request from the test set resulted in a second incorrectly received PDU.
+214 Command Rejected. Change Not Allowed in Active Cell Mode	This setting can not be changed by the user while the Cell Operating Mode is “Active Cell”.
+215 Call Disconnected. No Response to Page	The test set did not receive either a valid PRACH preamble or the “RRC Connection Request” message within 2 seconds.
+222 No Physical Channel Reconfiguration Complete	The uplink DPCH is found but the appropriate “Reconfiguration Complete” message is not received from the UE after a sending a physical channel reconfiguration. However, the test set assumes the reconfiguration was successful and attempts to maintain the connection.

Table 10. FDD Call Processing Errors

Error Message	Description
+217 Performance not specified for UL/DL frequency offset < 30 MHz	Performance is not specified when the difference in the uplink and downlink frequencies is less than 30 MHz.
+218 FDD Settings Deferred: Cell power and AWGN power > 10 dB apart.	AWGN and Cell Power settings must be within 10 dB of each other.
+220 Command Rejected. UL Power Control is active	Step up or step down TPC bit patterns can not be sent when uplink closed loop power control is active.
+221 FDD Test Mode Settings Deferred: Sum of code channel power levels > 0 dB	The sum of the code channels cannot exceed 0 dB. Reduce one or more channel levels.
+223 Active Cell Mode Initial Settings Deferred: Sum of code channel power levels > 0 dB	The sum of the code channels cannot exceed 0 dB. Reduce one or more channel levels.
+224 FDD Test Mode Settings Deferred: One or more code channel power levels > 30 dB below total RF power	The power of at least one code channel is more than 30 dB below the total RF power, exceeding the test set’s limits.
+225 Active Cell Mode Initial Settings Deferred: One or more code channel power levels > 30 dB below total RF power	The power of at least one code channel is more than 30 dB below the total RF power, exceeding the test set’s limits.
+226 Active Cell Mode Connected Settings Deferred: Sum of code channel power levels > 0 dB	The sum of the code channels cannot exceed 0 dB. Reduce one or more channel levels.

Table 10. FDD Call Processing Errors

Error Message	Description
+227 Active Cell Mode Connected Settings Deferred: One or more code channel power levels > 30 dB below total RF power	The power of at least one code channel is more than 30 dB below the total RF power, exceeding the test set’s limits.

+300 through +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 748 for information on this register.

No link control errors are currently defined for this test application.

+400 through +499 Error Message Descriptions

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	

+400 through +499 Error Message Descriptions

Error Message	Description
+414 Hardware failure; Fixed external reference output is not responding	
+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	

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

+500 through +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.

No hardware specific errors are currently defined for this test application.

+600 through +699 Error Message Descriptions

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.

+700 through +799 Error Message Descriptions

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 +700 errors bit in the questionable error status register is set.

Table 11. FDD System Measurement Errors

Error Message	Description
+701 FDD measurement failure; Thermal Power hardware is not responding	A hardware failure associated with this measurement is suspected. Rerun the measurement to verify this error.
+702 FDD measurement failure; Adjacent Channel Leakage Ratio hardware is not responding	A hardware failure associated with this measurement is suspected. Rerun the measurement to verify this error.
+703 FDD measurement failure; Waveform Quality hardware is not responding	A hardware failure associated with this measurement is suspected. Rerun the measurement to verify this error.
+704 FDD measurement failure; Channel Power hardware is not responding	A hardware failure associated with this measurement is suspected. Rerun the measurement to verify this error.
+705 FDD measurement failure; Loopback Bit Error Ratio hardware is not responding	A hardware failure associated with this measurement is suspected. Rerun the measurement to verify this error.
+706 FDD measurement failure; Spectrum Emission Mask hardware is not responding	A hardware failure associated with this measurement is suspected. Rerun the measurement to verify this error.
+707 FDD measurement failure; Occupied Bandwidth hardware is not responding	A hardware failure associated with this measurement is suspected. Rerun the measurement to verify this error.
+707 FDD measurement failure; Code Domain hardware is not responding	A hardware failure associated with this measurement is suspected. Rerun the measurement to verify this error.

+800 through +899 Error Message Descriptions

Description

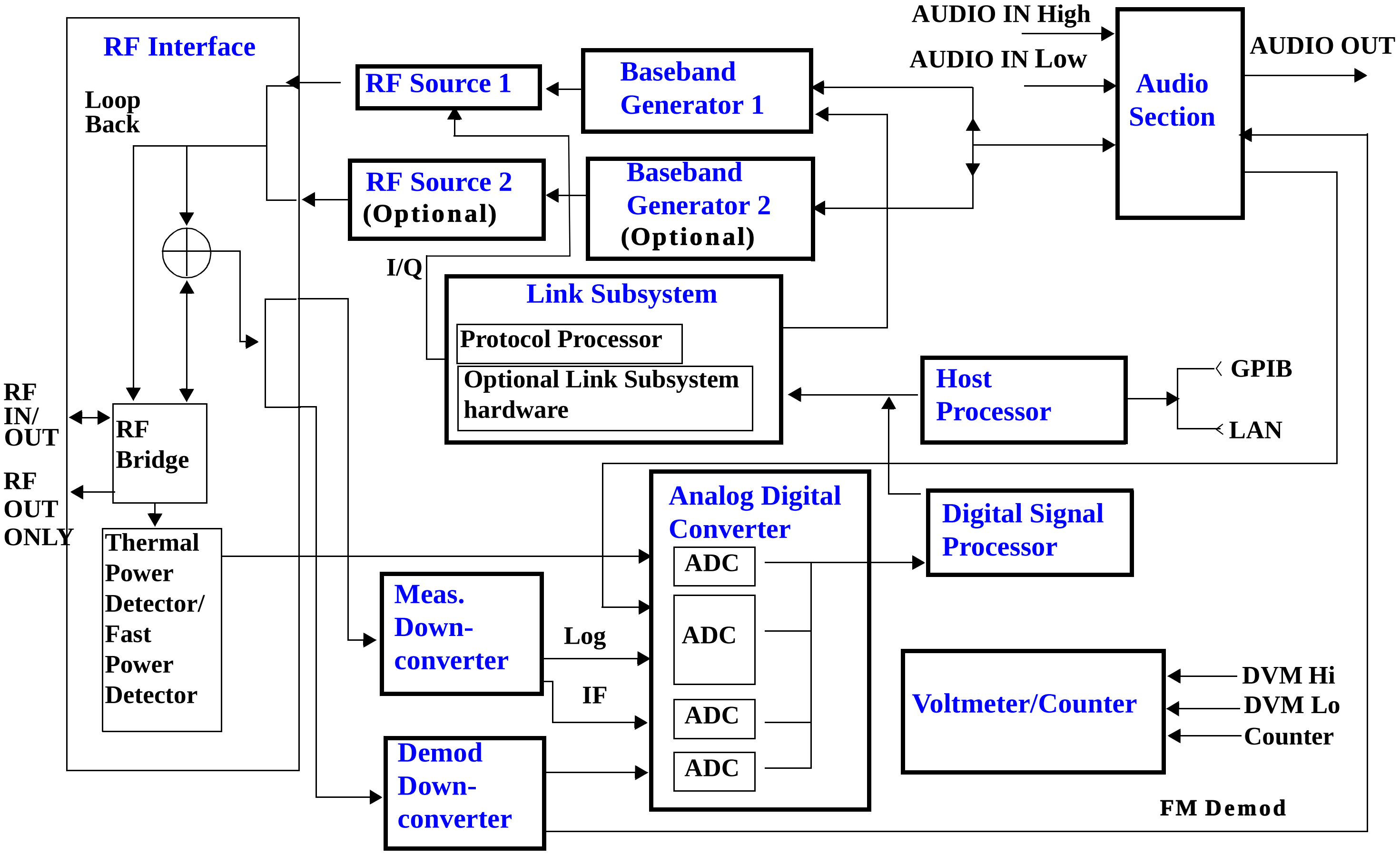
These errors are generated when a problem occurs that is specific to one of the test set’s core measurements (such as analog audio).

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.

Block Diagram

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

Configuring the Test Set’s AUDIO OUT port

Description

The AUDIO OUT connector on the test set’s front panel can be configured to carry one of two signals:

- Audio Generator
- FM Demod

By default, the AUDIO OUT connector is configured to carry the output from the built in audio generator. This signal is typically used to stimulate a system to measure its audio performance. When the audio generator’s signal is selected for output at the front panel AUDIO OUT connector, use the AFGenerator commands to control the signal.

When testing AMPS systems, it may be useful to configure the AUDIO OUT connector to carry the analog FM Demod signal. This provides the demodulated FM signal for external analysis and baseband processing. Fixed bandwidth bandpass, expandor, and de-emphasis filters can be selected to control the FM Demod signal. When the FM Demod signal is selected for output at the front panel AUDIO OUT connector, use the SYSTem:AUDio:OUTPut commands to control the signal.

For front panel operation, to select the signal source for output to the AUDIO OUT connector, press **System Config** hardkey, then select `Audio Out Port` (**F1**) on the System Config Screen (2 of 2).

Programmatically, to select the signal source for output to the AUDIO OUT connector, use the SYSTem:AUDio:OUTPut:SOURce commands.

Example

```
OUTPUT 714;”SYSTem:AUDio:OUTPut:SOURce AFGenerator” !Selects Audio Generator signal for output
                                                      !at the front panel AUDIO OUT port.
```

NOTE There will be no guaranteed performance for the signal present at the AUDIO OUT connector when FM Demod signal is selected for output.

Related Topics

“How Do I Configure the AUDIO OUT Port?” on page 803

“SYSTem:AUDio” on page 752

“AFGenerator Subsystem” on page 374

Adjusting the Brightness of the Test Set’s Display

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”

“Display Backlight Dimming”

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
```

Writing Messages to the Display

The capability to write up to four 30-character lines of text to the front panel display for operator messages is available when the display is in “Fast Mode” . This feature can be used to control the flow of software running on an external controller by pressing softkeys on the test set’s front panel.

For example, by displaying a message that prompts the operator to press a front panel softkey and then monitoring that softkey through status register bits, the programmer can design code that starts measurements, stops measurements, or branches to a selected routine or function without the need for access to the external computer’s keyboard.

The GPIB commands for writing messages to the display are found in the “DISPlay:OPERator:MESSage” table.

The status bit register GPIB commands and bit definitions for monitoring the test set's sofkeys are found in the "STATus:OPERation:KEYPressed Register Bit Assignments" table.

Related Topics

"DISPlay" on page 499

"STATus:OPERation:KEYPressed Register Bit Assignments" on page 707

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 762

“Error Messages” on page 875

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”

“Rear Panel Connectors”

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"

Configuring the Test Set’s GPIB

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” on page 764

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"

Test Application Switching

Description

Different radio formats (such as GSM, AMPS, CDMA 2000 or TIA/EIA 136) can be tested when the optional test applications are purchased from Agilent Technologies. The test set allows you to select a different test application and switch to it, a reboot makes the test application functional. The reboot will happen automatically when the you tell the test set to switch test applications. Switching to another test application takes about one minute.

Some radio formats are combined as fast switching test applications. Switching formats in a fast switching test application takes less than 2 seconds.

Test Application Switching GPIB Command

In order to switch to another test application use this GPIB command:

```
OUTPUT 714;”SYSTEM:APPLICATION:SELECT:NAME ‘GSM MOBILE TEST’”
```

Sending this command causes the test set to reboot.

Test Application Revision and Licensing

Each test application must have a valid license and revision to function. Licensed revisions of test applications are available from Agilent Technologies.

It may take several seconds before revision, model, and name information is returned.

Test Application Switching Programming Example

This program example shows you how to switch to the GSM test application.

1. Query the list of test application names to get exact spelling of the GSM 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 test applications and cause the test set to reboot.

```
10    OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:NAME?”
20    !Queries all of the test 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 test application to GSM MOBILE TEST
130   END
```

Related Topics

"Test Application Revisions and Licenses" on page 926

"SYSTem:APPLication" on page 755

"SYSTem:CURRent:TA" on page 774

"Test Application Name" on page 928

Test Application Revisions and Licenses

Description

Different revisions of the test applications in your test set provide different capabilities. The selected test application revision is loaded after the next test 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 test application. These queries are helpful when selecting revisions but are not usually necessary when switching test applications.

NOTE The Agilent E1960A GSM mobile test application revisions prior to A.04.00 do not support test 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.

Test Application Revision Queries and Commands

These are commands to query revision information or select a revision.

- To query a **selected** test 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 test application **currently running** use this GPIB command:

```
OUTPUT 714;”SYSTEM:APPLICATION:CURRENT:REVISION?”
```

- To query **all** of the revisions available for a test application use this GPIB command:

```
OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:REVISION? ‘AMPS/136 MOBILE TEST’”
```

- To **select** a revision of a test 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 test application:

```
OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:REVISION:COUNT? ‘GSM MOBILE TEST’”
```

Test Application License Status Query

The test application license status can be queried for a particular test 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 test application appears to have a LICense. The test application may have been developed before licensing and therefore needs no license.
- “NLIC” - This test application does not appear to have a license. Selecting a Not LICensed revision will result in an error +130.
- “PART” - Some PART of the test application does not appear to have a license.
- “UNKN” - This test 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 Test Application Setup menu to determine the licensed versions of test applications available.

Revision and license information can be viewed and selected from the SYSTEM CONFIG screen, by selecting the Test 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 test application appears to have a License. The test application may have been developed before licensing and therefore needs no license.
- “N” - This test application does not appear to have a license. Selecting a Not licensed revision will result in an error +130.
- “P” - Some Part of the test application does not appear to have a license.
- “U” - This test application has Unknown license status.

Related Topics

“Test Application Switching” on page 924

“SYSTem:APPLication” on page 755

Test Application Name

Description

The following queries give you details about the test application name. To query or switch test applications you must use the test application name as it appears in the catalog (without regard to case).

- To query the name of the all test applications installed in the test set use this GPIB query.

  ```
  OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:NAME?”
  ```

- To query the name of the selected test application (running or not) use this GPIB query.

  ```
  OUTPUT 714;”SYSTEM:APPLICATION:SELECT:NAME?”
  ```

- To query the name of the currently running test application use this GPIB query.

  ```
  OUTPUT 714;”SYSTEM:APPLICATION:CURRENT:NAME?”
  ```

- To query the number of test applications installed in the test set use this GPIB query.

  ```
  OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:NAME:COUNT?”
  ```

The test application names can also be displayed in the Test Application Setup menu on the test set’s display.

Related Topics

“SYSTem:APPLication” on page 755

“Test Application Switching” on page 924

Release Notes

E6703A W-CDMA Lab Application Revision Information

This document describes features and functionality that are part of the Agilent Technologies E6703A W-CDMA 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" on page 930

A.01 Release

These are the original features of the Agilent E6703A.

The E6703A Release A.01 includes all of the features and functionality present in the E1963A W-CDMA Test Application Release A.03 (see "A.03 Release - February 2003" on page 931). The unique features of the E6703A Lab Application are indicated below.

Call Processing

- Protocol Logging: (see "Protocol Logging" on page 1)

  The E6703A Lab Application enables the test set to capture the exchange of control and data information between the test set and a UE (user equipment). Captured information is forwarded to a software application that runs on a personal computer under the Windows operating system.

  The software application is referred to as the WPA (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 UE.

- Data Channel: (see "Data Channel" on page 123)

  The data channel feature allows you to use the test set as a router while you exchange data between the UE and remote servers.

- Soft Handoff: (see "Soft Handoff" on page 112)

  The E6703A Lab Application includes two sectors which allow you to perform a soft handoff. The lab application also supports event reporting.

W-CDMA Revision Information

This document describes the features that are in the Agilent Technologies E1963A WCDMA 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.03 Release - February 2003"
- "A.02.35 Release - August 2002"
- "A.02 Release - June 2002"
- "A.01 Release - November 2001 (Initial Test Application Release)"

A.03 Release - February 2003

This firmware release provides you with improved call processing from the previous release, three new measurements (Inner Loop Power, PRACH Transmit On/Off Power, and IQ Tuning), and enhancements to the Spectrum Emission Mask and Occupied Bandwidth measurements. The newly added Spectrum Monitor instrument provides additional transmitter measurement functionality. Also, save/recall function is available in this release. By working with the E1968A test application, this revision allows to make an inter-system handoff from W-CDMA to GSM.

This firmware release runs on the E5515C chassis with Option 003. If you have previously been using any revision of the E1963A W-CDMA test application on an upgraded E5515B or E5515T chassis then this revision will also run. However, if you wish to run this test application on an E5515B or E5515T chassis for the first time, contact your local sales representative.

Call Processing

- Support for inter-system hard handoff from W-CDMA to GSM. See "Performing a Handoff" for more information.
- Support for user selectable "Registration" or "IMSI Attach". See "Performing a Registration" on page 149.
- Support for security operation control (security procedure with authentication and integrity protection). See "Setting Security Parameters" on page 146.
- Support for UE (mobile station) reported measurement results for current cell: DPCH BLER, CPICH RSCP, CPICH Ec/No, and Pathloss. See "CALL:MS:REPorted:MEASurement:REQuest" .
- Support for user settable open loop power control parameters used to determine the initial transmit power of the first PRACH preamble. See "Initial PRACH Tx Power" for more information.
- Added 2.2k DCCH Signalling Radio Bear configuration for no RLC Reset during Radio Bear Setup. See "Setting Signalling Radio Bearer (SRB)" for more information.
- User settable power gain controls (beta-c and beta-d) for uplink channels (PRACH and DPCH). See "Setting Uplink Parameters" .

Transmitter Measurements

- Inner Loop Power

  For more information about this measurement, refer to "Inner Loop Power Measurement Description" .

- PRACH Transmit On/Off Power

  For more information about this measurement, refer to "PRACH Transmit On/Off Power Measurement Description" .

- IQ Tuning

  For more information about this measurement, refer to "IQ Tuning Measurement Description" .

- Spectrum Emission Mask

  Support for adjustable mask limits for each range. For more information, refer to "Spectrum Emission Mask Measurement Description" .

- Occupied Bandwidth

  Support for adjustable percentage of total integrated power from 70.0 to 99.0%. For more information, refer to "Occupied Bandwidth Measurement Description" .

- Spectrum Monitor Measurement

  The Spectrum Monitor measurement feature has been added. This allows you to find, identify and measure transmitted signals from your UE (mobile phone). It can also be used for spur measurements in the transmit band. See "Spectrum Monitor Description" .

Other Features

- Save/Recall

  This function allows you to store the test set's current settings to a register and retrieve them later, eliminating the task of reconfiguring the test set. See "Save and Recall Registers" on page 853.

A.02.35 Release - August 2002

This firmware release provides you with improved call processing from the previous release.

This firmware release runs on the E5515C chassis with Option 003. If you have previously been using any revision of the E1963A W-CDMA test application on an upgraded E5515B or E5515T chassis then this revision will also run. However, if you wish to run this test application on an E5515B or E5515T chassis for the first time, contact your local sales representative.

Call Processing

- 64k RMC capability has been improved in both active cell and test mode.
- Call limit state

  This allows you to make power measurements on PRACH preambles by not permitting the test set to respond. See "Call Limit State" for more information.

- Expected values for open loop power control are now available on the display and via GPIB. See:

  — "CALL:UPLink:DPCChannel:POWer:INITial?"

— "CALL:UPLink:PRAChannel:POWer:INITial?"

- PRACH signature capability has been improved.

Measurements

- Timing error is now returned in chips instead of seconds for the Waveform Quality and Code Domain measurements.

A.02 Release - June 2002

This firmware release provides you with call processing, including base station originate, base station release, and closed loop power control, an additional reference measurement channel, 64k RMC, three new measurements, Spectrum Emission Mask, Occupied Bandwidth, and Code Domain Power, and enhancements to the Waveform Quality and Channel Power measurements. Also, a GPIB help mode exists in this firmware. This revision works with the E1985A fast switching test application.

Call Processing

- Network initiated origination

  This allows you to originate a call from the test set. See "CALL:ORIGinate" .

- Network initiated release.

  This allows you to end a call from the test set. See "CALL:END" .

- Closed loop power control

  For more information, refer to "Setting Closed Loop Power Control" .

- Support for a 64k Reference Measurement Channel (RMC) has been added in this release. Refer to "CALL:DPCHannel:TYPe" for more information.
- Hard handoff capability is available in this release. Only handoffs to new downlink and uplink channels are supported. It is not possible to switch between the 12.2k and 64k RMC while on a call. A new command has been added to initiate the handoff. (See "CALL:HANDoff" .)
- UE reported information

  This command allows you to query the test set for information the UE has sent about its identification, power class, etc. For more information, refer to "CALL:MS:REPorted" .

- Cell parameters that can be configured include the following:

  — Local Area Code (See "CALL:LACode")

  — Mobile Country Code (See "CALL:MCCode")

  — Mobile Network Code (See "CALL:MNCode")

  — Repeat Paging (See "CALL:PAGing:REPeat:STATe[:SELected]")

- New downlink signal parameters that can be configured:

  — AICH Channelizaton Code, Initial Channel Level (See "CALL:AICHannel")

  — DPCH Initial Channel Level (See "CALL:DPCHannel:LEVel")

  — P-CCPCH Initial Channel Level (See "CALL:CCPChannel:PRIMary:LEVel")

 - — S-CCPCH Channelization Code, Initial Channel Level (See “CALL:CCPChannel”)
 - — CPICH Initial Channel Level (See “CALL:CPIChannel”)
 - — PICH Channelization Code, Initial Channel Level (See “CALL:PICHannel”)
 - — Connected Channel Level for P-CCPCH, S-CCPCH, CPICH, PICH, and DPCH (See “CALL:CONNected”)
 - — Signaling Radio Bearer Channelizaiton Code, Data Rate (See “CALL:SRBearer”)

- Uplink signal parameters that can be configured:
  - — Uplink Channel (See “CALL:UPLink:CHANnel”)
  - — Uplink DPCH Scrambling Code (See “CALL:UPLink:DPCHannel:SCODe”)
  - — PRACH Power Step (See “CALL:UPLink:PRAChannel:POWer:STEP[:LEVel]”
  - — PRACH Signature (See “CALL:UPLink:PRAChannel:SIGNature”)
  - — PRACH Scrambling Code (See “CALL:UPLink:PRAChannel:SCODe”)
  - — PRACH Timing Offset (See “CALL:UPLink:PRAChannel:TIMing[:OFFSet]”

Measurements

- Spectrum Emission Mask

  For more information about this measurement, refer to “Spectrum Emission Mask Measurement Description” .

- Occupied Bandwidth

  For more information about this measurement, refer to “Occupied Bandwidth Measurement Description” .

- Code Domain

  For more information about this measurement, refer to “Code Domain Measurement Description” .

- The Waveform Quality measurement now makes timing error and peak code domain error available as measurement results. Support for immediate triggering for making asynchronous EVM measurements has been added. For more information, refer to the “Waveform Quality Measurement Description” .
- The Channel Power measurement has been enhanced to allow you to turn the RRC filter on and off. For more information refer to “SETup:WCPower:FILTer[:RRC]” .

Other

- Help Mode

  This release enables the **HELP** key on the test set’s front panel. When in help mode, the test set provides GPIB syntax assistance. For more information, refer to “Help Mode” .

- This release gives you the first revision of the W-CDMA Test Application that can be used with the E1985A GSM_136/AMPS_GPRS fast switching test application. This release when used with the E1985A GSM_AMPS/136_GPRS_WCDMA fast switching test application allows you to switch quickly between GSM, AMPS/136, GPRS, and W-CDMA formats.

  When writing program code for use with the E1985A, there are several parameters which require the format identifier, :WCDMA, to be appended. For details on these commands, refer to the user documentation for the GSM_AMPS/136_GPRS_WCDMA fast switching test application.

- Measurements have to be recalibrated when you switch to the E1963A W-CDMA Test Application from the E1962B CDMA2000 Test Application of release revisions B.05 or lower.

A.01 Release - November 2001 (Initial Test Application Release)

Call Processing

This release of the W-CDMA test application does not provide call processing. Therefore, call processing operations, such as base station origination (paging) and registration, are not available to establish a connection between the test set and the user equipment (UE).

A frequency division duplex (FDD) test mode is available to provide a downlink signal that a properly configured UE can synchronize to in order to transmit a corresponding uplink signal. The test set can then demodulate the uplink signal and make waveform quality and loopback bit error ratio measurements. See "FDD Test Operating Mode" for a description of this feature.

Transmitter Measurements

- Thermal Power. This is an unfiltered, broad-banded power measurement that uses a thermal detector to measure the total power of all signals present at the test set's RF IN/OUT connector down to -10 dBm. Because of its high accuracy, this is the preferred power measurement for the *Maximum Output Power* test (3GPP TS 34.121, section 5.2, v3.2.0) to verify that the UE is transmitting at the correct level when transmitting at its highest output level. See "Thermal Power Measurement Description" .
- Channel Power. This is a filtered power measurement that can be used to measure high level and low level signals within a 3.84 MHz bandwidth. This measurement is used in the *Transmit Off Power* test (3GPP TS 34.121, section 5.5.1, v3.2.0). It can also be used for calibrating mobile TX power. These tests require specific power levels to be measured within the 3.84 MHz channel bandwidth. See "Channel Power Measurement Description" .
- Adjacent Channel Leakage Ratio. Power is measured within a 3.84 MHz bandwidth at +/-5 MHz and +/-10 MHz offsets from the center frequency. The measurement results can be displayed in either numeric and graphical formats. This measurement is defined in 3GPP TS 34.121, section 5.10, v3.2.0, *Adjacent Channel Leakage Power Ratio (ACLR)*, which verifies that the mobile station is not transmitting too much power outside of its 3.84 MHz channel bandwidth, which could interfere with other frequency channels. See "Adjacent Channel Leakage Ratio Measurement Description" .
- Waveform Quality. This measurement returns the composite error vector magnitude (EVM), frequency error, origin offset, phase error, and magnitude error of the received signal. This measurement is used for the *Error Vector Magnitude (EVM)* test in 3GPP TS 34.121, section 5.13.1, and for the *Frequency Error* test in 3GPP TS 34.121, section 5.3, v3.2.0. These measurements verify the accuracy of the transmitter's modulation circuitry and RF source. For this FDD test mode release, this measurement can only be performed on a 12.2 kbps reference measurement channel (RMC) that is synchronized to the downlink signal from the test set. See "Waveform Quality Measurement Description" .

Receiver Measurements

- Loopback bit error ratio (BER). This measurement uses the UE in loopback mode 1 to test the sensitivity of its receiver. The receiver sensitivity test is described in 3GPP TS 34.121, section 6.2, *v3.2.0, Reference Sensitivity Level*. When using the test set's FDD Test operating mode, the user must configure the UE in the loopback mode 1 to perform this measurement; no provision is made to send messages over the downlink signal to the UE to configure it. See "Loopback Bit Error Ratio Measurement Description" .

Other Features

Base Station Emulation in FDD Test Operating Mode Base station emulation for this release is limited to sending a configurable downlink signal that the UE can synchronize to in order to transmit a corresponding uplink signal. The downlink does not send any commands to the UE to configure it for testing. All control of the UE must be provided by the user.

Downlink signal parameters that can be configured include the following settings:

- Downlink channel codes:
  - Primary Scrambling Code
  - PICH Channelization Code
  - DPCH 12.2 RMC Channelization Code
- Downlink channel levels:
  - FDD Test CPICH Level
  - FDD Test P-CCPCH/SCH Level
  - FDD Test PICH Level
  - FDD Test DPCH Level
- Orthogonal Channel Noise Simulator - OCNS is automatically turned on and off, and the level set, as the downlink channel levels are changed. See "Noise Sources on the Downlink" .
- Additive White Gaussian Noise (AWGN)
- Downlink Transport Format Combination Indicator (TFCI)
- Downlink channel
- Downlink DTCH data type
- Downlink PICH data pattern

Power control bit patterns can also be configured on the downlink. This allows you to vary the value being sent for the uplink closed loop power control data, and to send step up and step down power control sequences.

CW Operating Mode CW operating mode provides an unmodulated RF generator signal with an adjustable level from -10 dBm to -127 dBm.