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

Reference Guide

E1963A W-CDMA Mobile Test Application Revision A.02

1000-1844 (not orderable)

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Safety/Regulatory Information

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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

Agilent Technologies Warranty Statement for Commercial Products

Duration of Warranty: Hardware - 1 year, Software - 90 days

1. Agilent Technologies warrants Agilent Technologies hardware, accessories and supplies against defects in materials and workmanship for the period specified above. If Agilent Technologies receives notice of such defects during the warranty period, Agilent Technologies will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.
2. Agilent Technologies warrants that Agilent Technologies software will not fail to execute its programming instructions, for the period specified above, due to defects in material and workmanship when properly installed and used. If Agilent Technologies receives notice of such defects during the warranty period, Agilent Technologies will replace software media which does not execute its programming instructions due to such defects.
3. Agilent Technologies does not warrant that the operation of Agilent Technologies products will be uninterrupted or error free. If Agilent Technologies is unable, within a reasonable time, to repair or replace any product to a condition as warranted, customer will be entitled to a refund of the purchase price upon prompt return of the product.
4. Agilent Technologies products may contain remanufactured parts equivalent to new in performance or may have been subject to incidental use.
5. The warranty period begins on the date of delivery or on the date of installation if installed by Agilent Technologies. If customer schedules or delays Agilent Technologies installation more than 30 days after delivery, warranty begins on the 31st day from delivery.
6. Warranty does not apply to defects resulting from (a) improper or inadequate maintenance or calibration, (b) software, interfacing, parts or supplies not supplied by Agilent Technologies, (c) unauthorized modification or misuse, (d) operation outside of the published environmental specifications for the product, or (e) improper site preparation or maintenance.
7. TO THE EXTENT ALLOWED BY LOCAL LAW, THE ABOVE WARRANTIES ARE EXCLUSIVE AND NO OTHER WARRANTYOR CONDITION, WHETHER WRITTEN OR ORAL IS EXPRESSED OR IMPLIED AND AGILENT TECHNOLOGIES SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTIES OR CONDITIONS OR MERCHANTABILITY, SATISFACTORY QUALITY, AND FITNESS FOR A PARTICULAR PURPOSE.
8. Agilent Technologies will be liable for damage to tangible property per incident up to the greater of $300,000 or the actual amount paid for the product that is the subject of the claim, and for damages for bodily injury or death, to the extent that all such damages are determined by a court of competent jurisdiction to have been directly caused by a defective Agilent Technologies product.
9. TO THE EXTENT ALLOWED BY LOCAL LAW, THE REMEDIES IN THIS WARRANTY STATEMENT ARE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES. EXCEPT AS INDICATED ABOVE, IN NO EVENT WILL AGILENT TECHNOLOGIES OR ITS SUPPLIERS BE LIABLE FOR LOSS OF DATA OR FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFIT OR DATA), OR OTHER DAMAGE, WHETHER BASED IN CONTRACT, TORT, OR OTHERWISE.

   FOR CONSUMER TRANSACTIONS IN AUSTRALIA AND NEW ZEALAND: THE WARRANTY TERMS CONTAINED IN THIS STATEMENT, EXCEPT TO THE EXTENT LAWFULLY PERMITTED, DO NOT

EXCLUDE RESTRICT OR MODIFY AND ARE IN ADDITION TO THE MANDATORY STATUTORY RIGHTS APPLICABLE TO THE SALE OF THIS PRODUCT TO YOU.

Should Agilent have a negotiated contract with the User and should any of the contract terms conflict with these terms, the contract terms shall control.

DECLARATION OF CONFORMITY

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

Manufacturers Name: **Agilent Technologies UK Ltd.**

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

Declares, that the product

Product Name: 8960 Series 10 Wireless Communications Test Set

Model Number: E5515B

Product Options: This declaration covers all options of the above product.

Conforms with the following European Directives:

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

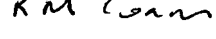
EMC	**Standard**	Limit
	IEC 61326-1:1997+A1:1998/EN 61326-1:1997+A1:1998	
	CISPR 11:1990 / EN 55011:1991	Group 1 Class A [1]
	IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995	4kV CD, 8kV AD
	IEC 61000-4-3:1995 / EN 61000-4-3:1995	3 V/m, 80-1000 MHz
	IEC 61000-4-4:1995 / EN 61000-4-4:1995	0.5V signal lines,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

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

Supplemental Information:

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

14 December 2000



R.M. Evans / Quality Manager

14 December 2000

W.V.Roland / Reliability & Regulatory Engineering Manager

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

DECLARATION OF CONFORMITY

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

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	
	CISPR 11:1990 / EN 55011:1991	Group 1 Class A [1]
	IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995	4kV CD, 8kV AD
	IEC 61000-4-3:1995 / EN 61000-4-3:1995	3 V/m, 80-1000 MHz
	IEC 61000-4-4:1995 / EN 61000-4-4:1995	0.5kV signal lines, 1kV power lines
	IEC 61000-4-5:1995 / EN 61000-4-5:1995	0.5 kV line-line, 1 kV line-ground
	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

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01 May 2001

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1 Measurements

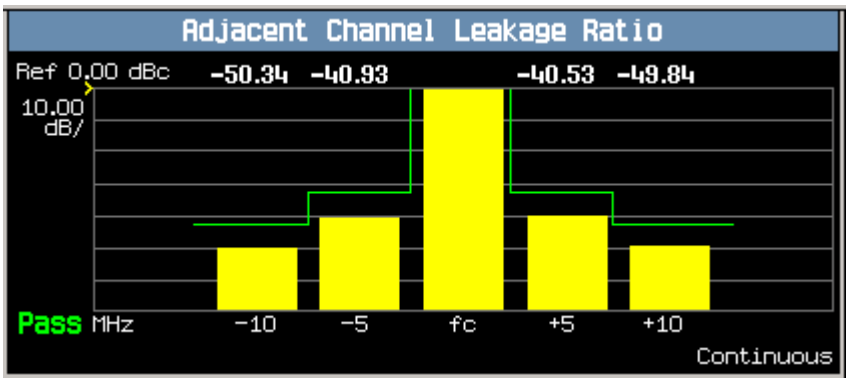
Adjacent Channel Leakage Ratio Measurement Description

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 223) 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 57
- “Triggering of Measurements”
- “Statistical Measurement Results”
- “Integrity Indicator”

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 137

"AFANalyzer Troubleshooting" on page 583

"Audio Analyzer Measurement Description" on page 33

"Audio Analyzer Block Diagram" on page 35

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 35

"AFANalyzer Troubleshooting" on page 583

"Audio Level Measurement Description" on page 32

"Audio Frequency Measurement Description" on page 36

"SINAD Measurement Description" on page 41

"Distortion Measurement Description" on page 39

"Programming an Audio Frequency Measurement" on page 139

"Programming an Audio Level Measurement" on page 137

"Programming a SINAD Measurement" on page 146

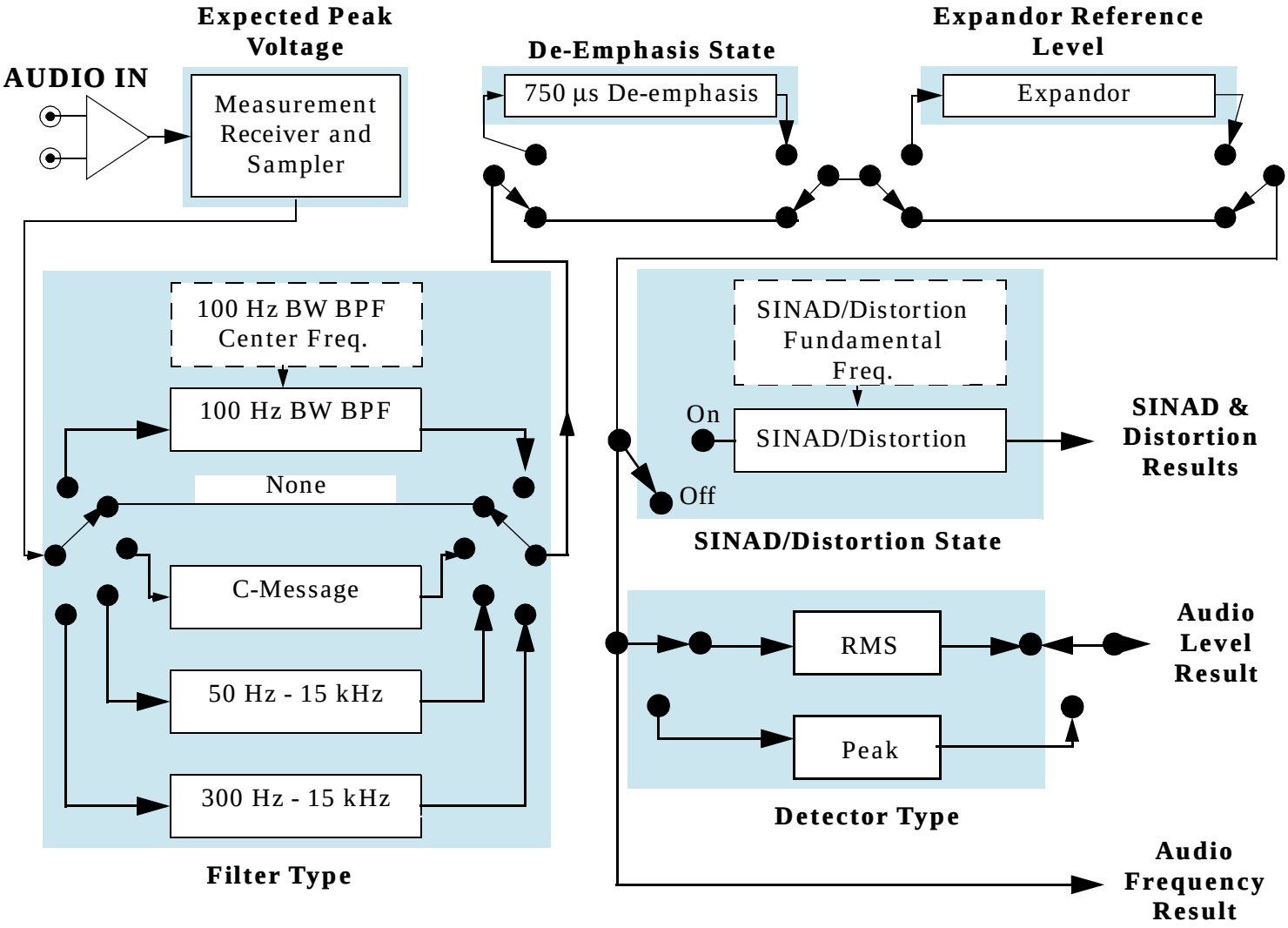
"Programming a Distortion Measurement" on page 142

"Statistical Measurement Results" on page 189 (Multi-measurements)

"Triggering of Measurements" on page 185

"Measurement Timeouts" on page 183

Audio Analyzer Block Diagram



Related Topics

"Audio Analyzer Measurement Description"

Audio Frequency Measurement Description

Related Topics

"Programming an Audio Frequency Measurement" on page 139

"Audio Analyzer Measurement Description" on page 33

"Audio Analyzer Block Diagram" on page 35

"AFANalyzer Troubleshooting" on page 583

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 621). 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 223) 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 57
- “Triggering of Measurements”
- “Statistical Measurement Results”
- “Integrity Indicator”

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 33.

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 33

"AFANalyzer Troubleshooting" on page 583

"Programming a Distortion Measurement" on page 142

"Test Adherence to Standards" on page 53

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"

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"

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 37.

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 57

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 54.

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.
- 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 223) 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".

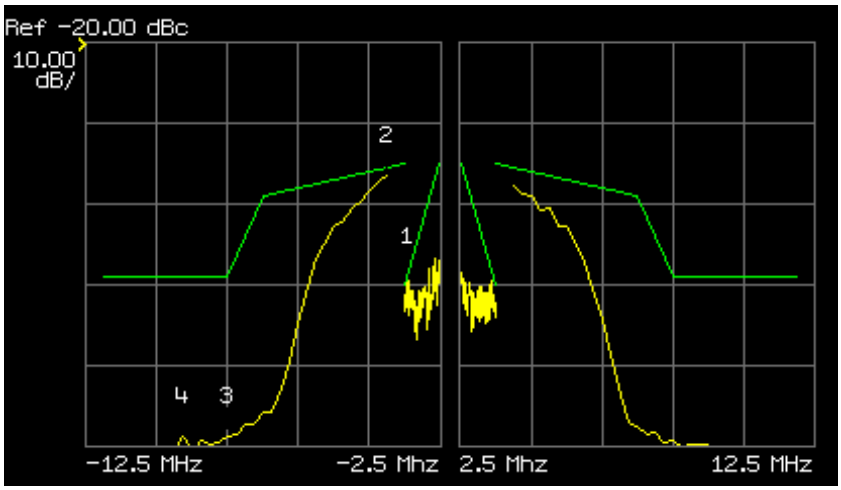
Related Topics

- “Programming a Waveform Quality Measurement”
- “Waveform Quality Troubleshooting”
- “Test Adherence to Standards”
- “What 3GPP W-CDMA Conformance Tests are supported?” on page 57
- “Triggering of Measurements”
- “Statistical Measurement Results”
- “Integrity Indicator”

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 α=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. 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
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 223) 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 53
- “What 3GPP W-CDMA Conformance Tests are supported?” on page 57
- “Triggering of Measurements” on page 185
- “Statistical Measurement Results” on page 189
- “Integrity Indicator” on page 190

Occupied Bandwidth Measurement Description

How is the occupied bandwidth measurement made?

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. The total power found in the measured frequency range is calculated. 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 is repeated from the upper frequency boundary downwards. The bandwidth between the 0.5% power frequency points is the occupied bandwidth. The occupied bandwidth contains 99% of the total power of the transmitted spectrum. This measurement conforms to 3GPP TS 34.121 section 5.8 *Occupied Bandwidth (OBW).*

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 223) 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 33
- “Occupied Bandwidth Troubleshooting” on page 35
- “Test Adherence to Standards” on page 53
- “What 3GPP W-CDMA Conformance Tests are supported?” on page 57
- “Triggering of Measurements” on page 185
- “Statistical Measurement Results” on page 189
- “Integrity Indicator” on page 190

Code Domain Measurement Description

How is the code domain measurement made?

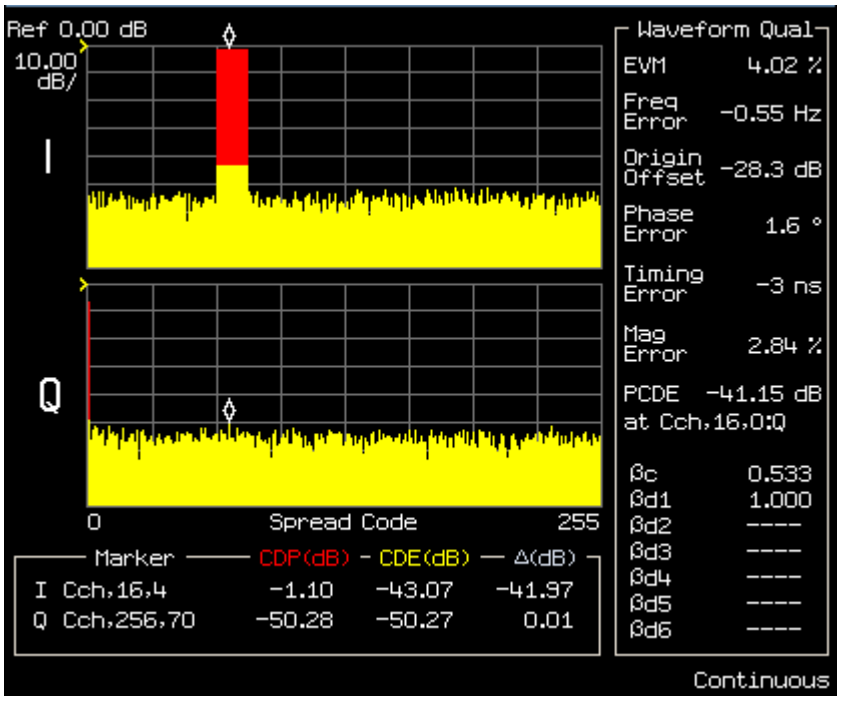
Code domain power (CDP) is an analysis of the distribution of signal power projected on a code-space of a particular dimension, normalized to the total signal power. To analyze the composite waveform, each channel is decoded using a code-correlation algorithm. This algorithm determines the correlation 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 DPDCHoccupies $C_{ch,16,4}$ as defined in the 3GPP standards. ($C_{ch,\text{Spreading Factor},\text{Code Number}}$)



- 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 44.

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 223) 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 57
- “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 57 for a list of 3GPP conformance tests supported in the W-CDMA Mobile Test Applicaiton.

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.

Related Topics

"Thermal Power Measurement Description" on page 42

"Programming a Thermal Power Measurement" on page 148

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 chiprate, 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 37

"Programming a Channel Power Measurement" on page 140

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 30

"Programming an Adjacent Channel Leakage Ratio Measurement" on page 135

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 $\beta_{d1\text{-}6}$. (β_c and $\beta_{d1\text{-}6}$ 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 44

"Programming a Waveform Quality Measurement" on page 150

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 conjuction 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)
- Spurious Emissions (3GPP TS 34.121, section 6.8)

Related Topics

"Loopback Bit Error Ratio Measurement Description" on page 40

"Programming a Loopback Bit Error Ratio Measurement" on page 144

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 46

"Programming a Spectrum Emission Mask Measurement" on page 39

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 54

"Code Domain Measurement Description" on page 50

"Programming a Code Domain Measurement" on page 27

"Waveform Quality Measurement Description" on page 44

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 49

"Programming an Occupied Bandwidth Measurement" on page 33

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 1. Transmitter Characteristics

3GPP TS 34.121	Test Description	As of June Ô02	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	Channel Power
5.4.2	Inner Loop Power Control in the Uplink		
5.4.3	Minimum Output Power	Yes	Channel Power with RRC filter OFF
5.4.4	Out-of-synchronisation handling of output power		
5.5.1	Transmit OFF Power	Yes	Channel Power with RRC filter ON
5.5.2	Transmit ON/OFF Time mask		
5.6	Change of TFC		
5.7	Power setting in uplink compressed mode		
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		
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 2. Receiver Characteristics

3GPP TS 34.121	Test Description	As of June Ô02	E1963A Measurement
6.2	Reference Sensitivity Level	Yes	Loopback Bit Error Ratio
6.3	Maximum Input Level	Yes	Loopback Bit Error Ratio
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	Yes**	Camp to E1963A. Use an external spectrum analyzer.

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 53

“Thermal Power Measurement Description” on page 42

“Waveform Quality Measurement Description” on page 44

“Code Domain Measurement Description” on page 50

“Channel Power Measurement Description” on page 37

“Occupied Bandwidth Measurement Description” on page 49

“Spectrum Emission Mask Measurement Description” on page 46

“Adjacent Channel Leakage Ratio Measurement Description” on page 30

“Loopback Bit Error Ratio Measurement Description” on page 40

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 key, F5.

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

Setting Up Amplitude Offsets and Frequency Points

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

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

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

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

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

Turning amplitude offsets on/off

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

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

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

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

Examples of Amplitude Offset Behavior

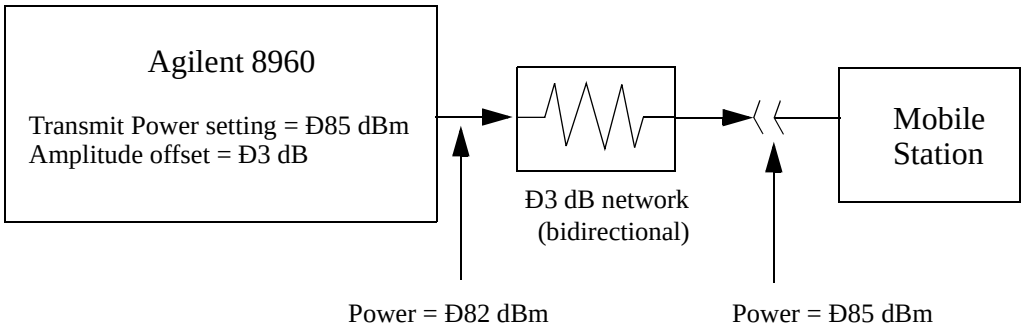
When the amplitude offset table entries accurately represent the loss in all components (cabling, connectors, and test fixturing) in the signal path between the test set and the mobile station, the test set will make the necessary adjustments in both receiver and transmitter measurements.

Mobile Station Receiver Example

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

For example, with the test set's transmit power set to –85 dBm and a –3 dB amplitude offset the actual power level transmitted from the test set will be automatically offset to –82 dBm. With a 3 dB loss in the signal path the mobile station will receive –85 dBm, the actual setting.

Figure 1. Amplitude Offset Mobile Station Receiver Example



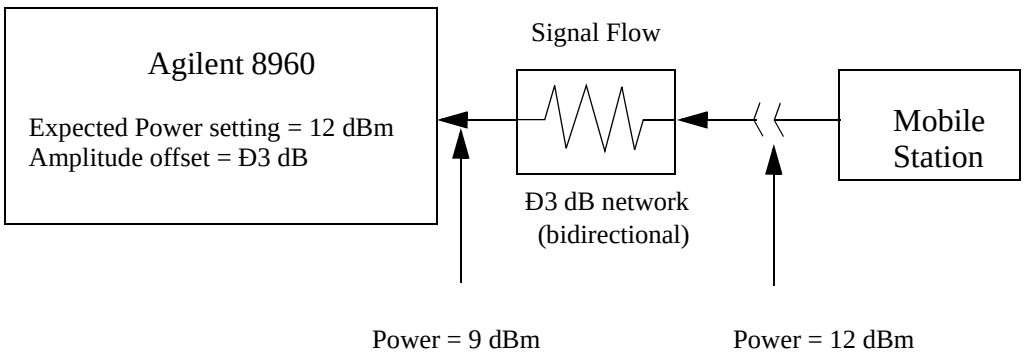
Mobile Station Transmitter Example

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

For example, with the mobile station transmitting 12 dBm and a –3 dB amplitude offset is entered, the measured power at the test set would be 9 dBm. The displayed power level is automatically adjusted to 12 dBm to show the level at the mobile station.

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

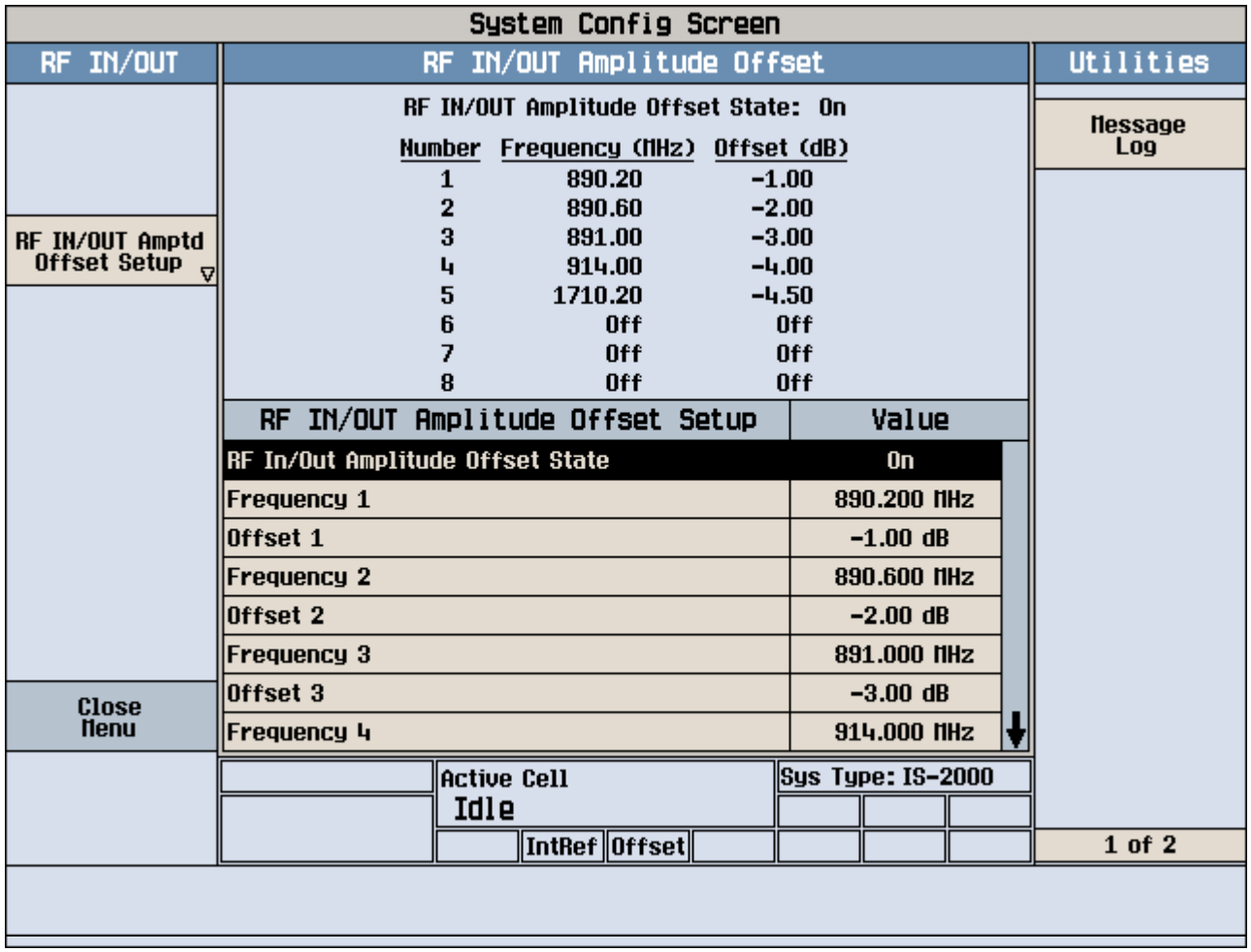
Figure 2. Amplitude Offset Mobile Station Transmitter Example



Amplitude Offsets Between Frequency Settings

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

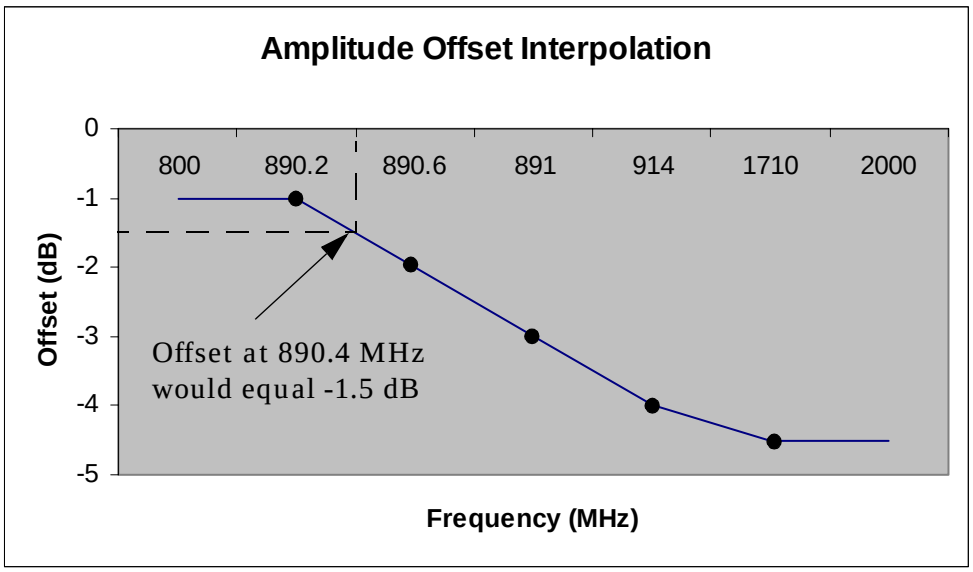
Figure 3. RF IN/OUT Amplitude Offset Setup



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

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

Figure 4. Amplitude Offset Interpolation



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

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

Related Topics

"SYSTem:CORRection"

2 Call Processing

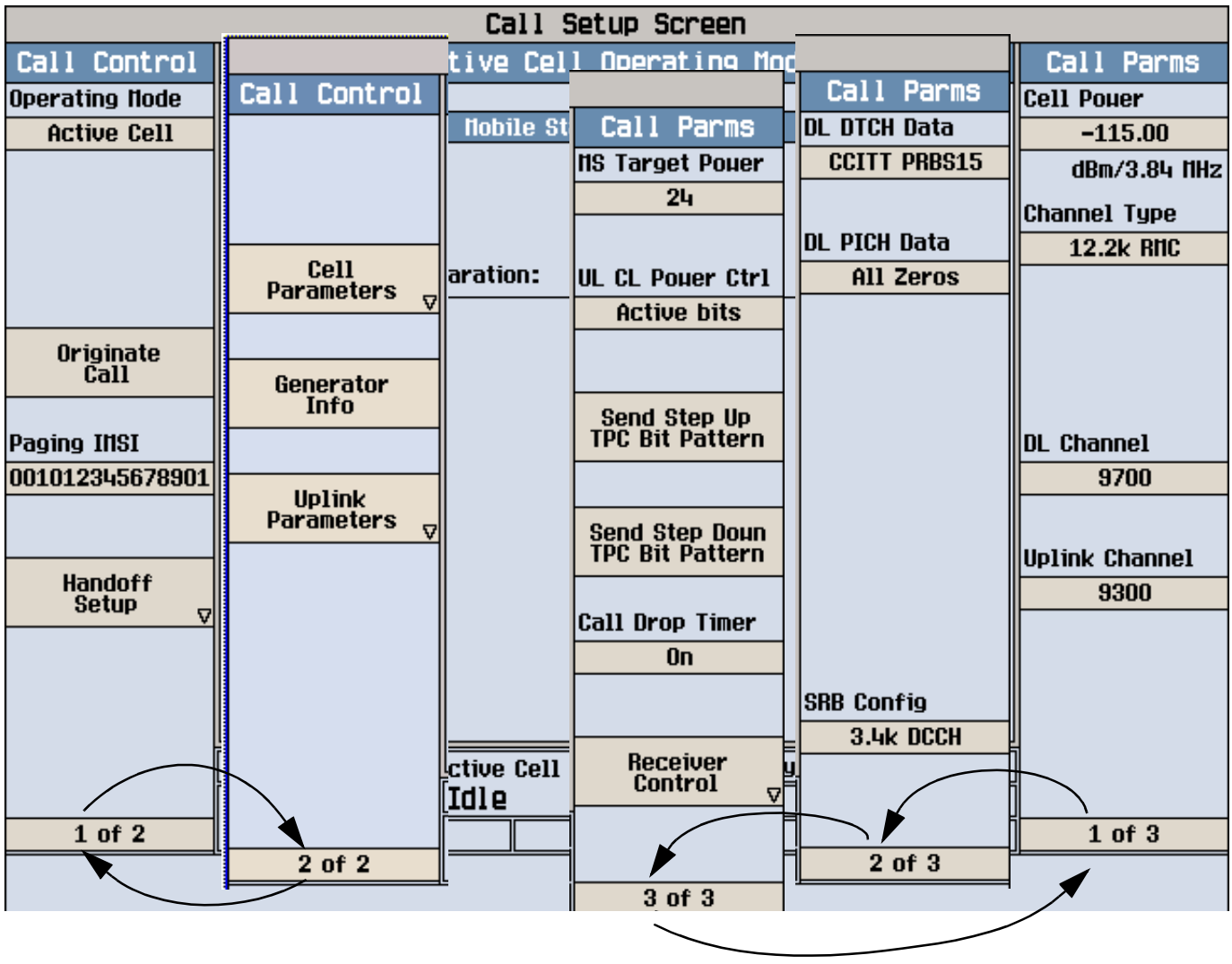
Active Cell Operating Mode

The Active Cell operating mode is used to emulate a base transceiver station (BTS) 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).

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 BTS operation in a network. Use the Cell Off operating mode to change these settings. See "Cell Off Operating Mode" on page 71.

Active Cell Operating Mode Screen Description

Controls for various aspects of call processing are grouped in menus on either side of the screen. See the references given below for details concerning the operation of each group of controls.



Control Descriptions

Click on the following links to access additional information for the individual controls.

- `Operating Mode` - selects the operating mode to use: Active Cell, FDD Test, Cell Off, CW. See "CALL[:CELL]:OPERating" on page 277.
- `Originate Call` - attempts to originate a call with a UE (mobile station). In order for the UE to respond, the Paging IMSI must be set to the UE's IMSI. In addition, the Cell Parameters, Generator Info, and Uplink Parameters may need to be set to work with the UE. See "CALL:ORIGinate" on page 278.
- `Paging IMSI` - specifies the international mobile subscriber identity assigned to the UE. This number must be provided before attempting to page the UE. "CALL:PAGing" on page 280.
- `Cell Parameters` - specify the mobile country code (MCC), mobile network code (MNC), local area code (LAC), and Repeat Paging setting used for base station emulation. See "Setting Cell Parameters" on page 74.
- `Generator Info` - specifies the downlink channel codes and levels for the CPICH, P-CCPCH/SCH, S-CCPCH, PICH, AICH, SRB, and DPCH. See "Setting Downlink Channel Codes and Levels" on page 75.
- `Uplink Parameters` - specify the PRACH settings and uplink DPCH scrambling code to use. See "Setting Uplink Parameters" on page 80.
- `Downlink parameters` include the downlink channel number (`DL Channel`), the reference measurement channel type (`Channel Type`) used for the dedicated traffic channel (DTCH) and the data pattern (`DL DTCH Data`), the paging indicator channel (PICH) data pattern (`DL PICH Data`) that is transmitted by the test set to the UE, the call drop timer, and the signaling radio bearer configuration (`SRB Config`). See "Setting Downlink Parameters" on page 82.
- Downlink power level settings include the `Cell Power`, additive white gaussian noise source (`AWGN Power`), and orthogonal channel noise source (`Comp. OCNS`). Any amplitude offsets also affect the downlink power level at the test set's front panel. See "Setting Downlink Power Levels" on page 78.
- Uplink channel assignment and power control settings include the `Uplink Channel`, `MS Target Power`, uplink closed loop power control (`UL CL Power Ctrl`) mode, and `Send Step Up TPC Bit Pattern` and `Send Step Down TPC Bit Pattern`. These settings tell the test set where to tune its receiver, and how to interact with the UE to control its transmit power level. See "Setting Uplink Channel and Power Control" on page 84.

Related Topics

"Cell Off Operating Mode" on page 71

FDD Test Operating Mode

During frequency division duplex (FDD) test mode operation, call processing operations, such as base station origination (paging) and location registration, are not available to establish a connection between the test set and the UE[1] (mobile station). Instead, when FDD test mode is selected, the test set immediately starts transmitting a downlink signal containing a dedicated physical channel (DPCH) that is configured as a 12.2 kbps reference measurement channel (RMC). The downlink signal also contains the overhead channels required to allow the UE to synchronize to the test set and decode transmitted data; the primary common pilot channel (CPICH), primary common control physical channel (P-CCPCH), and the synchronization channel (SCH). The paging indicator channel (PICH) is also included, and OCNS and AWGN are available if desired (see "Noise Sources on the Downlink").

To synchronize with the test set's downlink signal, the UE must be manually controlled by the operator to place it in the correct configuration for it to receive the downlink signal. After the UE has synchronized to the test set, the UE must be controlled by the operator to begin transmitting a corresponding uplink signal that also consists of a dedicated physical channel (DPCH) configured as a 12.2 kbps RMC (described in 3GPP TS 25.101, Annex A.2.1, *UL Reference Measurement Channel (12.2 kbps*).

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).

The test set ignores transport format combination indicator (TFCI) and transmit power control (TPC) bits sent on the uplink.

The following example selects FDD Test operating mode via GPIB:

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

UE (Mobile Station) Control During FDD Test Mode

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.

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

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. 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

1. UE stands for User Equipment, and is the term used in the 3GPP standards. This may be a mobile station (cellular phone) or any other transceiver device using the W-CDMA protocols.

receive and measure:

- "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
  - — DPCH 12.2 RMC Channelization Code
- "Transport Format Combination Indicator Pattern" (TFCI) - If the UE is configured to respond to TFCI, the appropriate TFCI value must be entered on the test set and 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 12.2k 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 Settings

The downlink signal consists of the following channels:

- 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).
- 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.
- 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 (which is always the 12.2 kbps RMC for this test mode).

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 test set.

Channel Codes

The following downlink channel codes can be specified:

- Primary scrambling code (“CALL[:CELL]: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 12.2 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)

AWGN can be summed into the downlink signal to simulate outside signal interference. When enabled, the AWGN level must be set within +/-10 dB of the cell power setting. See “CALL:AWGNoise:POWer” .

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” .

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[:CELL]:CLPControl:UPLink" 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" .

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: 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 Settings" 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 Settings" for more information on how manual and automatic receiver control are used.

Related Topics

- "CW Operating Mode"
- "CW Operating Mode"
- "Setting Downlink Power Levels"
- "Receiver Control Settings"
- "Programming: Getting Started Guide for E1963A W-CDMA Mobile Test Application Revision A.02"

Cell Off Operating Mode

Cell Off operating mode and Active Cell operating mode share the same settings. However, Cell Off mode lets you change cell parameters, downlink channel codes and levels, and uplink parameters that are used for call processing that cannot be changed during Active Cell operation.

Use Cell Off operating mode to set up the downlink signal parameters before establishing a connection to the UE (mobile station). After making the settings, switch to Active Cell operating to begin generating the downlink signal.

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 64

"Setting Cell Parameters" on page 74

"Setting Downlink Channel Codes and Levels" on page 75

"Setting Downlink Power Levels" on page 78

"Setting Downlink Parameters" on page 82

"Setting Uplink Parameters" on page 80

"Setting Uplink Channel and Power Control" on page 84

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"

Setting Cell Parameters

Cell parameters are used to send base station location information on the downlink by specifying the following values: mobile country code (MCC), mobile network code (MNC), and the local area code (LAC). They also specify whether to use single or repeat paging when attempting to page the UE.

Changing Cell Parameters

Cell parameters typically do not change during base station operation. Therefore, these settings cannot be changed during Active Cell operation. Instead, use the Cell Off operating mode when changing these settings. See "CALL[:CELL]:OPERating" to select operating modes.

GPIB Commands for These Settings

- Mobile Country Code - "CALL[:CELL]:MCCode"
- Mobile Network Code - "CALL[:CELL]:MNCode"
- Local Area Code - "CALL[:CELL]:LACode"
- Repeat Paging - "CALL:PAGing"

Changing Cell Parameters From the Front Panel

1. Press the **CALL SETUP** key.
2. Press the **F1** key to display the available operating modes.
3. Select `Cell Off` .
4. Press the **More** key (in the Call Control column), and then press `Cell Parameters` (**F2**).
5. Select the desired parameter and enter the new value.

Related Topics

- "Active Cell Operating Mode"
- "Cell Off Operating Mode"

Setting Downlink Channel Codes and Levels

During Active Cell operation, downlink scrambling and channelization codes are used by the UE 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 (although 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.

How to Set Channel Codes and Levels

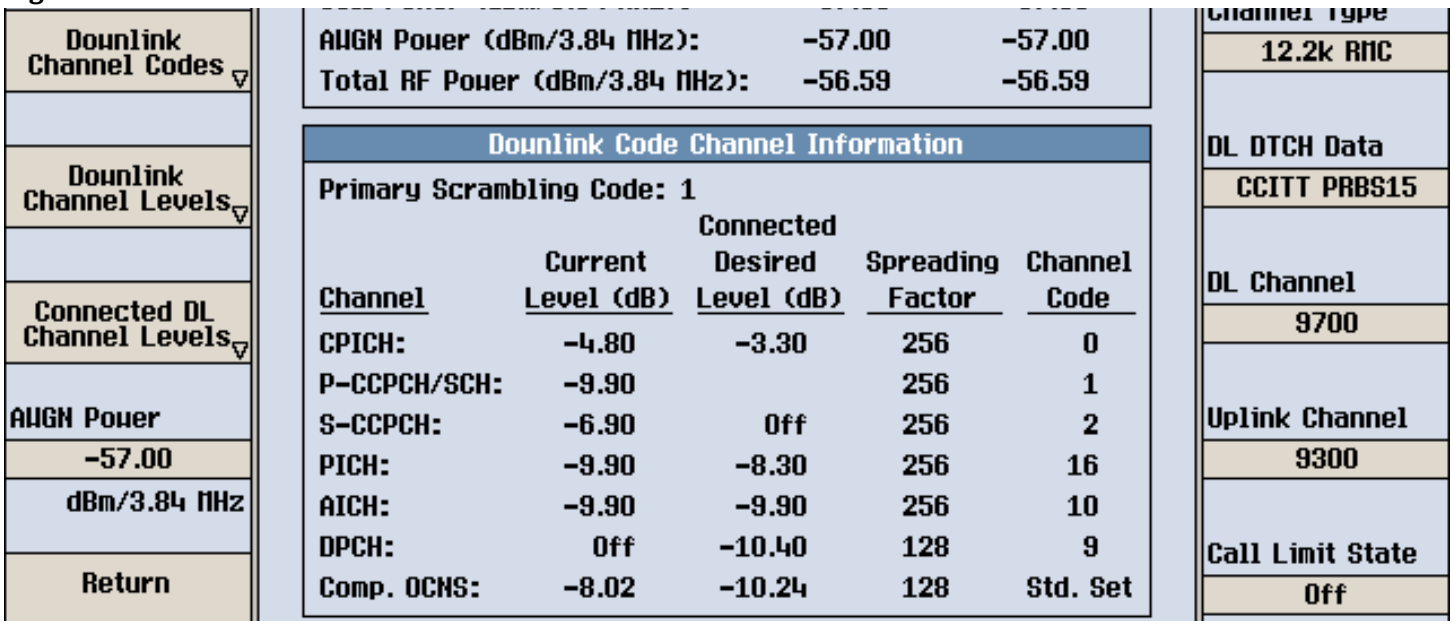
Active Cell operating mode emulates a base station in operation, and is used for call processing operations. During call processing, the downlink channel levels for establishing the call may be different than the levels used after the call has been connected. This is why there are two different level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

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.

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.

Figure 5. The Downlink Code Channel Information on the Generator Information Screen



GPIB Commands for Setting Downlink Channel Codes

- Primary Scrambling Code - "CALL[:CELL]: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 "Signaling Radio Bearer Configuration" .
- 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 - "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]"

Changing Downlink Channel Codes and Levels From the Front Panel

1. Press the **CALL SETUP** key.
2. Press the **F1** key to display the available operating modes.
3. Select `Cell Off` or `Active Cell`. During Active Cell operation you can only change the Connected DL Channel Levels.
4. Press the **More** key (in the Call Control column) to display menu 2 of 2.
5. Press the `Generator Info` (**F3**) key.
6. Select the type of setting you want to change (channel code, channel level, or connected channel level).
7. Select the setting to change and enter or select the new value.

Related Topics

- “Active Cell Operating Mode”
- “Cell Off Operating Mode”
- “Setting Downlink Power Levels”

Setting Downlink Power Levels

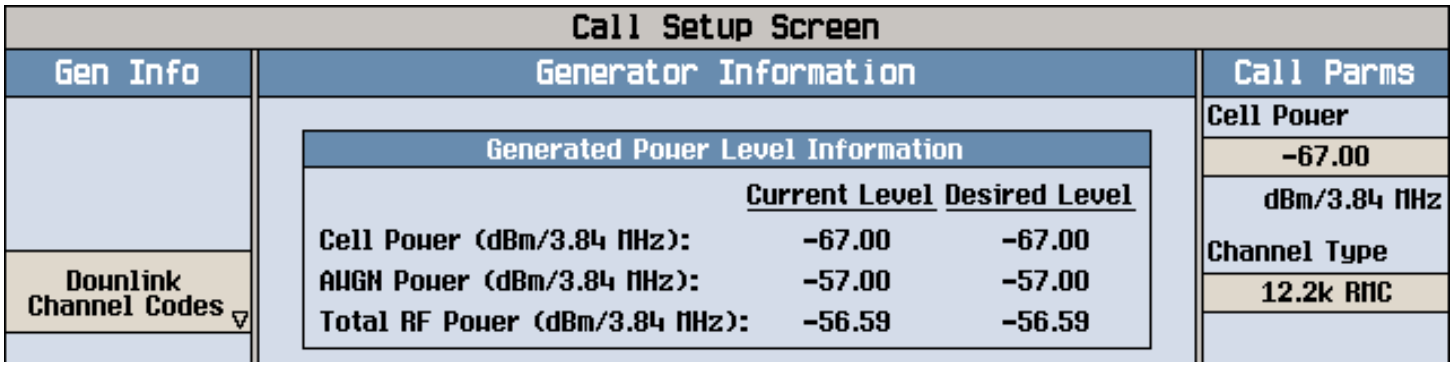
The total radio frequency (RF) downlink power at the test set's RF IN/OUT or RF OUT ONLY port is the sum of all signals being generated within the test set, along with any amplitude offsets that have been specified. This includes all of the downlink physical (code) channels and additive white gaussian noise (AWGN) if enabled. Orthogonal channel noise (OCNS) may also be present, depending on the sum of the code channel levels (see "Noise Sources on the Downlink").

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.

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" .

Amplitude offsets are any gains or losses between the test set and the UE (mobile station) at different frequencies, and are used by the test set to adjust its output level. See "Amplitude Offset" .

Figure 6. Generated Power Level Information



Follow these steps to display the generated power level information:

1. Press the **CALL SETUP** key.
2. Press the **F1** key to display the available operating modes.
3. Select the operating mode you are using (`Active Cell.`, `Cell Off`, or `FDD Test`).
4. Press the **More** key (in the Call Control column).
5. Press the `Generator Info` (**F3**) key.

Current Level and Desired Level

The combination of cell power, amplitude offset, and AWGN level settings can result in a value that the test set cannot actually create. For example, attempting to set the AWGN level to -13 dBm when the cell power level is set to -15 dBm would result in a combined level that is greater than the test set can generate (-10.88 dBm). In this case, -10.88 dBm is displayed as the `Desired Level`. The `Current Level` indicates the actual level at the UE that is being generated by the test set.

Whenever the `Desired Level` exceeds the `Current Level`, an error is displayed at the bottom of the screen to alert you to this condition. The error message is displayed until one or more levels are changed to reconfigure the test set's generator to operate within its limits.

GPIB Commands for Setting Downlink Power Levels

- Cell Power - "CALL[:CELL]:POWer"
- AWGN Power - "CALL:AWGNoise:POWer"
- Composite OCNS level and state query - "CALL:OCNSource"

Related Topics

- "FDD Test Operating Mode"
- "Active Cell Operating Mode"
- "Cell Off Operating Mode"

Setting Uplink Parameters

Uplink parameters define contents of the Physical Random Access Channel (PRACH) and the Dedicated Physical Channel (DPCH) used to set up a call.

PRACH Parameters

The Physical Random Access Channel (PRACH) contains the Random Access Channel (RACH) information used by the UE to request registration on the network.

- Power Step - power step size used to increase the transmit power of the PRACH preamble when no response is received from the test set
- Signature - part of the PRACH preamble, indicates what spreading factor the test set should use to spread the message portion of a PRACH
- Scrambling Code - scrambling code used to spread the Signature when creating a PRACH preamble
- 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

Changing Uplink Parameters

Uplink parameters are *used* during Active Cell operation to set up a call, but can only be *changed* during Cell Off mode operation. See “CALL[:CELL]:OPERating” on page 277to select operating modes.

GPIB Commands for Setting Uplink Parameters

- PRACH Power Step - “CALL:UPLink:PRAChannel:POWer:STEP[:LEVel]” on page 307
- PRACH Signature - “CALL:UPLink:PRAChannel:SIGNature” on page 308
- PRACH Scrambling Code - “CALL:UPLink:PRAChannel:SCODe” on page 308
- Uplink Timing Offset - “CALL:UPLink:TIMing[:OFFSet]” on page 309
- Uplink DPCH Scrambling Code - “CALL:UPLink:DPCHannel:SCODe” on page 307

Changing Uplink Parameters From the Front Panel

1. Press the **CALL SETUP** key.
2. Press the **F1** key to display the available operating modes.
3. Select `Cell Off`.
4. Press the **More** key (in the Call Control column) to display menu 2 of 2.
5. Press the `Uplink Parameters` (**F4**) key.
6. Select the setting you want to change and enter the new value.

Related Topics

"Active Cell Operating Mode" on page 64

Setting Downlink Parameters

Several parameters are used to define the channel number (UARFCN) and logical channel type and contents of the downlink signal to the UE while the call is connected.

- "Channel Type"
- "DTCH Data"
- "Downlink Channel Number"
- "Paging Indicator Channel (PICH) Data"
- "Call Drop Timer State"
- "Call Limit State"
- "Signaling Radio Bearer Configuration"
- "GPIB Commands for Setting DTCH Parameters"

Channel Type

The channel type can be set to either a 12.2 kbps or a 64 kbps reference measurement channel (RMC). No other channel type is supported at this time.

DTCH Data

The DTCH data can be set to a 9 bit or 15 bit pseudo-random bit sequence (CCITT PRBS9 or CCITT PRBS15) or set to all zeroes or all ones.

Downlink Channel Number

The downlink channel number can only be changed during Cell Off mode operation. See "CALL[:CELL]:OPERating" on page 277to select operating modes.

Paging Indicator Channel (PICH) Data

The paging indicator channel can be set to transmit either all zeroes or all ones.

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. This capability is provided to give you a way to making power measurements on PRACH preambles with the

Channel Power measurement. (See “How to make power measurements on PRACH preambles.” on page 23.)

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 553 or “CALL:END” on page 261.)

Call Limit must be OFF for any random access procedure, such as Location Update or BS Origination to be successful.

Signaling Radio Bearer Configuration

The signaling radio bearer (SRB) configuration can be set to either a 3.4k DCCH or a 13.6 DCCH. When the 3.4k DCCH configuration is used, the downlink DPCH channelization code to be used during the “Setup” phase of establishing a connection can be specified. See “CALL[:CELL]:SRBearer:CCHannel:DEDicated:BPS3400[:CCODe]” on page 291. 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” on page 257.

GPIB Commands for Setting DTCH Parameters

- Channel Type - “CALL:DPCHannel:TYPe” on page 259
- Downlink DTCH Data - “CALL:DTCHannel:DATA” on page 260
- Downlink Channel number - “CALL:CHANnel” on page 235
- Downlink Paging Indicator Channel Data - “CALL:PICHannel” on page 282
- Call Drop Timer State - “CALL:CONNected:DROP:TIMer[:STATe][:SELected]” on page 242
- Call Limit State - “CALL:CONNected:LIMit[:STATe][:SELected]” on page 249
- Signaling Radio Bearer Configuration - “CALL[:CELL]:SRBearer:CCHannel:DEDicated:DRATe” on page 292

Related Topics

“Active Cell Operating Mode” on page 64

Setting Uplink Channel and Power Control

The uplink channel setting sets the test set's receiver to the UE's (mobile station) transmit frequency.

The power control settings are used to control the UE transmit power during a call. You can set closed loop power control to be active or inactive. You can also set which power control algorithm is to be used during closed loop power control. When closed loop power control is inactive, various data patterns are availabe 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.

Changing Uplink Channel and Power Control Settings

Changing the Uplink Channel Number

The `Uplink Channel` setting cannot be changed directly while using Active Cell Operating mode. Use the Cell Off operating mode when changing the Uplink Channel number. See "CALL[:CELL]:OPERating" to select operating modes.

A hard handoff can be performed to change the uplink and downlink channels (UARFCN) while a call is connected. Use the Handoff Setup controls on the Active Cell Operating Mode screen to change these channel numbers.

Uplink Power Control Settings

Specifying the Type of Uplink Power Control to Use 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`. The MS target power setting is also used to set the expected power level into the test set's receiver (see "Expected Power").
- `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 set power level.
- `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.

Specifying the Power Control Algorithm When closed loop power control is active, the test set signals the UE to use either power control algroithm 1 or power control algorithm 2.

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 the Uplink Channel and Power Control

- Uplink channel number - "CALL:UPLink:CHANnel"
- 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

"Active Cell Operating Mode"

"Cell Off Operating Mode"

Establishing a Connection with the UE

For instructions on how to establish a connection with the UE refer to "Step 4: Make a Connection" on page 102.

Related Topics

"Call Processing Event Synchronization" on page 1

How the Test Set Performs a Handoff

The handoff feature in the test set allows you to change the downlink and uplink UARFCNs while maintaining a connection between the test set and the UE. The test set sends a physical reconfiguration message to the UE when you request a handoff. After receiving a physical reconfiguration complete message from the UE, the test set sends an acknowledgement message to the UE and the handoff is complete.

The handoff implemented in the test set is a hard handoff.

Related Topics

"Step 6: Reconfigure Test Set and UE Connection Parameters" on page 106

How the Test Set Performs a Handoff

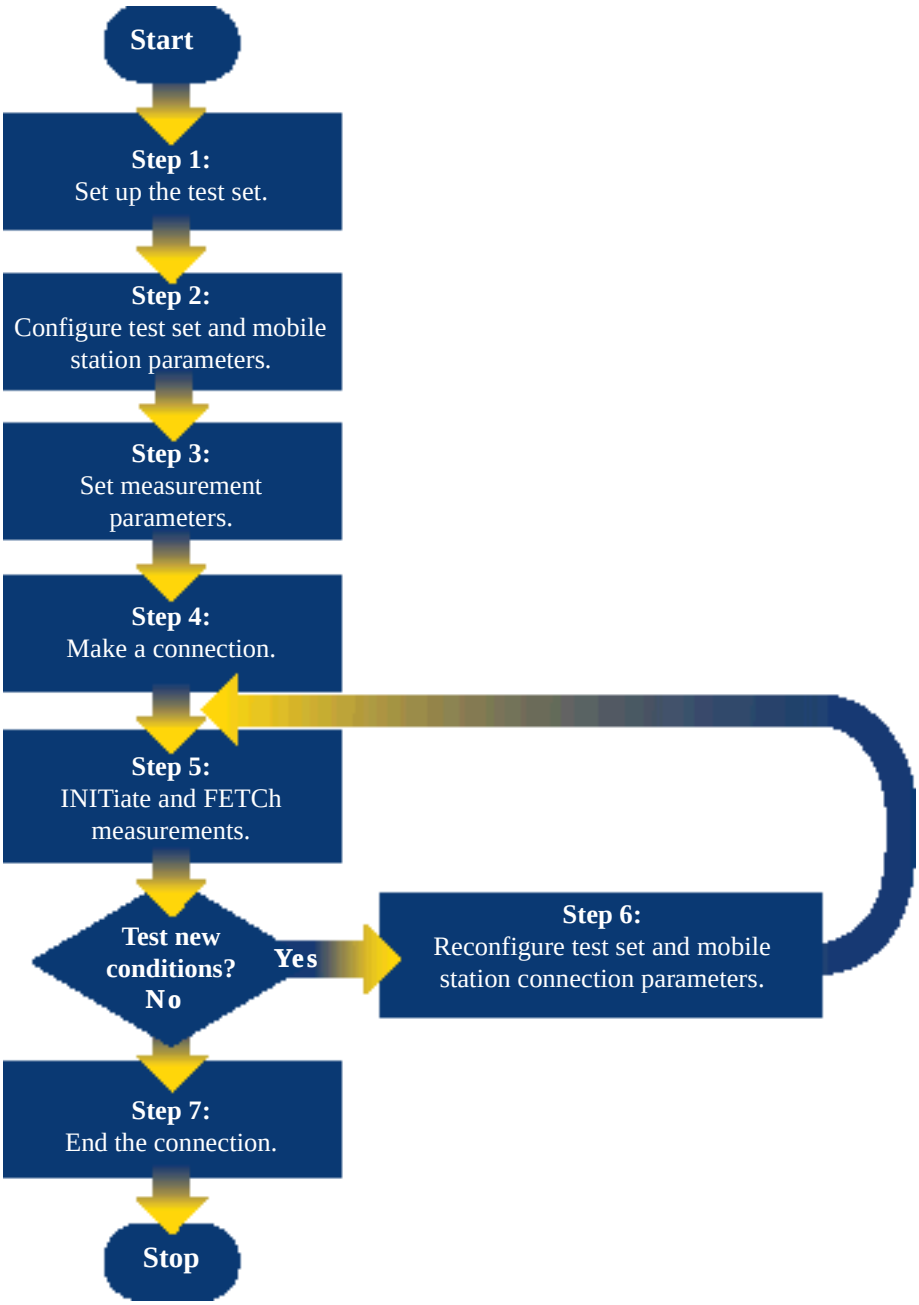
3 Programming

Programming: Getting Started Guide for E1963A W-CDMA Mobile Test Application Revision A.02

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 96. 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 104.

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 96, 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 three possible ways to make a connection with the UE.

- "Originating a Connection from the Test Set"
- "Originating a Connection from the UE"
- "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
```

Originating a Connection from the UE

The code below illustrates how to make a connection by originating a call from the UE. This code is not included in the control program available on-line for you to download. That example originates the connection from the test set.

Synchronization between the control program and the test set is maintained by querying the test set for the state of the connection between it and the UE. When a UE origination occurs, the CALL:CONN? hanging query is used. It will return a 1 when the call is connected and a 0 otherwise. A state change detector is also armed to ensure the query does not stop hanging before the state transition from "IDLE" to "CONNected" is able to begin. Finally, to prevent the query from hanging indefinitely, which could occur if the mobile station is not turned on, badly broken, or no one pushes the "send" button on the mobile, a timeout is set for this query. In this example, 15 seconds is the value assigned to the timeout. After 15 seconds, the change detector is disarmed and the query returns either a 1 or 0. For more information about call synchronization, refer to the Internet.

```
OUTPUT Test_set;"CALL:CONN:TIM 15"   ! Set timeout time to 15 seconds
OUTPUT Test_set;"CALL:CONN:ARM"      ! Arm the change detector
OUTPUT Test_set;"CALL:CONN:STAT?"    ! Initiate call connect state query
DISP "Originate call from mobile station."
ENTER Test_set;Call_connected        ! Program will hang here until
                                     ! origination passes or fails
IF NOT Call_connected THEN           ! Check if connection successful
  OUTPUT Test_set;"CALL:END"
  PRINT "Origination failed.  Program terminated."
  STOP
END IF
```

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.

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"
- "Set Cell Power"
- "Set Mobile Station Transmit Power"
- "Set Up Additional Connection Parameters"

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:K PCS 384

This practice also applies to test applications which test both analog and digital channel types. In this case you should specify the channel for the analog and digital channel types in advance. Then, switching between them requires only one command to initiate the change, and not an additional change to specify the channel of the new channel type.

If you specify channels in advance as described, the only time you need to specify a channel during testing is if you move to a new channel within the same band and channel type.

- Set Active Band and Mode

  Once you have specified the channel information for each band and channel type, you must set the active band using one of the following commands (depending upon which test application you are using):

Commands to Set the Active Band

Command	Example
CALL:<channel mnemonic>:BAND <band mnemonic>	CALL:TCH:BAND EGSM
CALL:SET:<channel type mnemonic>:BAND <band mnemonic>	CALL:SET:DTC:BAND PCS
CALL:BAND:<channel mnemonic> <band mnemonic>	CALL:BAND:DIG2000 KPCS

If the test application you are using supports testing of both analog and digital channel types, then you must also set the channel type using the following command:

Command to Set the Active Channel Type

Command	Example
CALL:<channel mnemonic>:TYPE <channel type mnemonic>	CALL:TCH:TYPE DTC

- Active Cell and Test Mode Considerations

  The function of the CALL commands differ depending upon whether you are in active cell or test mode.

  In active cell mode, when you use the CALL commands to set the channel numbers, the test set's output frequency and receiver frequency are set. A message is also sent to the mobile station to set its frequency.

  However, in test mode, since the BSE does not send call processing information to the mobile station, the CALL commands only configure the test set's output frequency and receiver frequency. You need to also send the appropriate test mode commands to the mobile station to set it to the correct frequency.

  In test mode, instead of using the CALL commands to configure the test set's frequencies, you may prefer to manually control the RF generator and RF analyzer using the CALL:RFG and RFAN commands, respectively. In either case, you must still send the appropriate test mode commands to the mobile station to move it to the proper frequency.

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"
- "Generic Measurement Parameters"
- "Measurement-Specific Measurement Parameters"

Measurement Parameters Overview

There are two different types of measurement parameters:

- Generic Measurement Parameters
- Measurement-Specific Measurement Parameters

The SETup subsystem is used to configure measurement parameters. Each individual measurement parameter can be set and queried using the associated SETup subsystem command. The general hierarchy of the SETup subsystem command structure is as follows:

```
SETup:<measurement mnemonic>:<measurement parameter> <parameter setting/value>
```

NOTE Not all measurements use all measurement parameters. Refer to the GPIB syntax listing for the detailed list of measurement parameters for individual measurements.

Generic Measurement Parameters

There are three types of generic measurement parameters:

- Measurement Count (used by most measurements)
  Measurement Count State
  Measurement Count Number
- Measurement Timeout (used by all measurements)
  Measurement Timeout State
  Measurement Timeout Time
- Measurement Trigger (used by most measurements)
  Trigger Arm (used by all measurements)

Trigger Source (not applicable to analog measurements)
Trigger Delay (not applicable to analog measurements)

Measurement Count Parameters

The measurement count parameters control measurement averaging. The STATe command turns averaging on or off, and the NUMBer command determines the number of averages. The SNUMber command is a complex command which allows you to turn averaging on and set the number of averages in one command.

Statistical Measurement Results Parameters

Parameter	Command Syntax
Measurement Count State	`SETup:<meas-mnemonic>:COUNt:STATe <ON|1|OFF|0>`
Measurement Count Number	`SETup:<meas-mnemonic>:COUNt:NUMBer <numeric value>`
Measurement Count Number and State	`SETup:<meas-mnemonic>:COUNt[:SNUMber] <numeric value>`

Example 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.

Step 3: Set Measurement Parameters

- 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:
```

Step 3: Set Measurement Parameters

```
!
OUTPUT Test_set;"SET:DTXP:COUN 5"
OUTPUT Test_set;"SET:DTXP:TRIG:SOUR AUTO"
OUTPUT Test_set;"SET:DTXP:TIM 5"
!
! ************************************************
! Configure Frequency Stability Measurement:
!
OUTPUT Test_set;"SET:FST:COUN 3"
OUTPUT Test_set;"SET:FST:TIM 10"
!
! ************************************************
! Configure Analog TX Power Measurement:
!
OUTPUT Test_set;"SET:ATXP:COUN 5"
OUTPUT Test_set;"SET:ATXP:TRIG:SOUR AUTO"
OUTPUT Test_set;"SET:ATXP:TIM 15"
```

Step 4: Make Connection

The following information provides additional details on Step 4 of the Programming Flowchart. This information is applicable to all test applications.

Description

In this step you make a connection between the mobile station and test set. How you do this depends upon whether you are in active cell or test mode. In active cell mode you establish a phone call between the test set and mobile station. In test mode, you command the mobile station to synchronize to the test set's signal and begin transmitting back an appropriate signal.

Contents

- "Establish a Call in Active Cell Mode"
- "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.

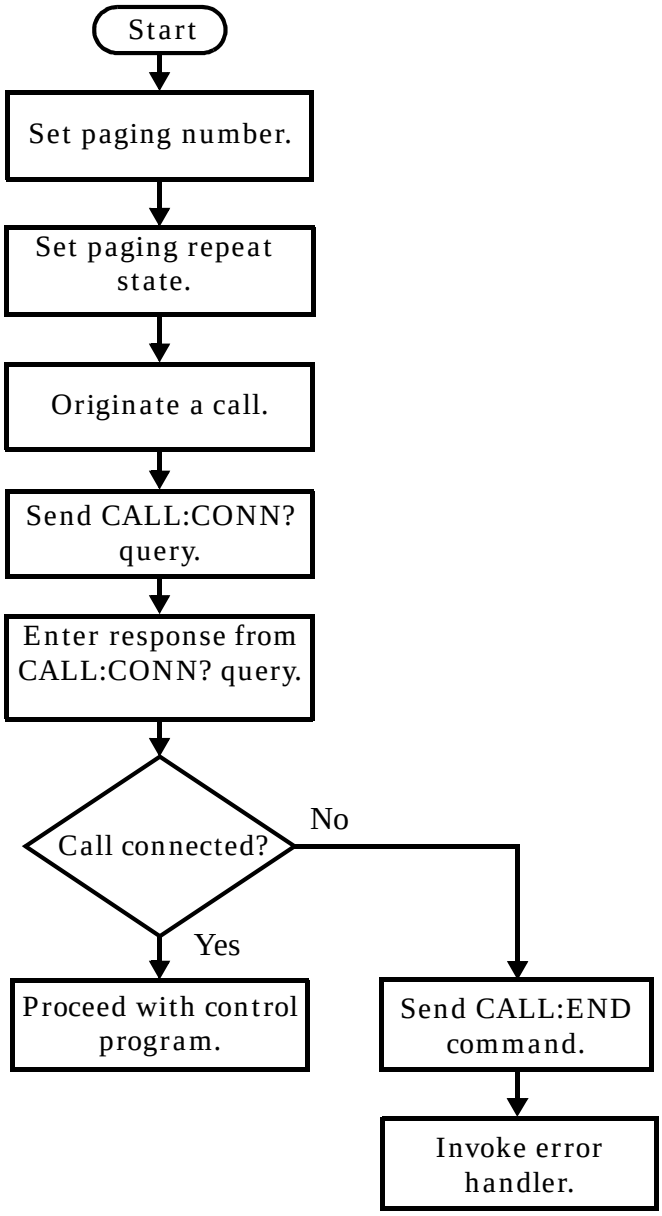
- Call-State-Change Detector Timeout Command

  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.

Process for Making a Base Station Originated Call **Figure 7. 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.

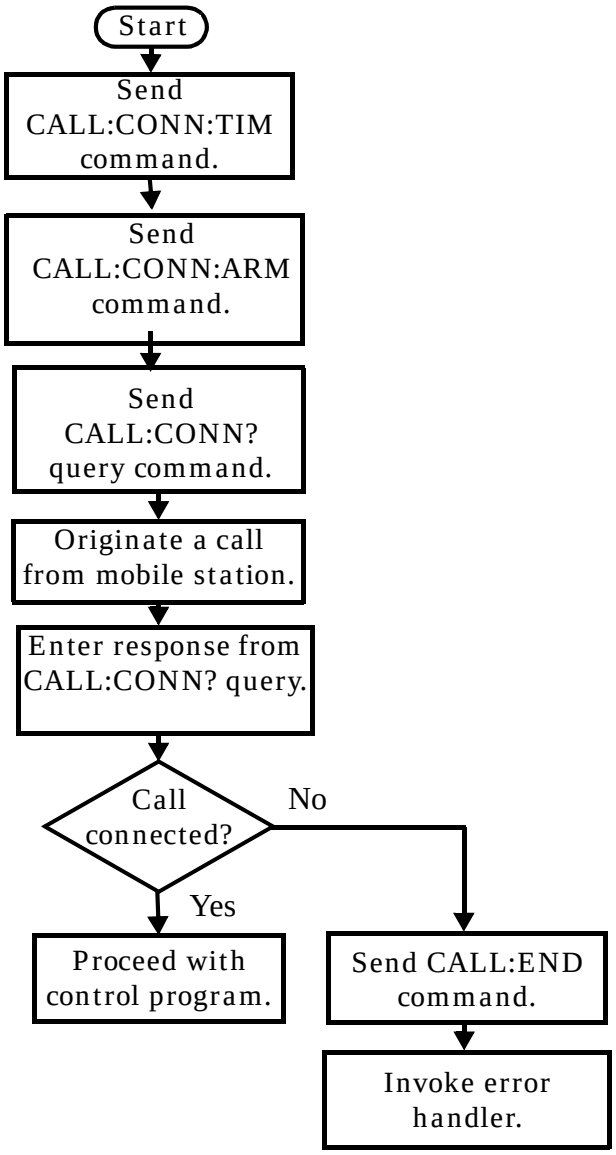
Example 10. Programming Example

```
OUTPUT Test_set;"CALL:PAG:PNUM '0000574016'"! Set paging number
OUTPUT Test_set;"CALL:PAG:REP ON" ! Set paging repeat state
```

Step 4: Make Connection

```
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 8. 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.

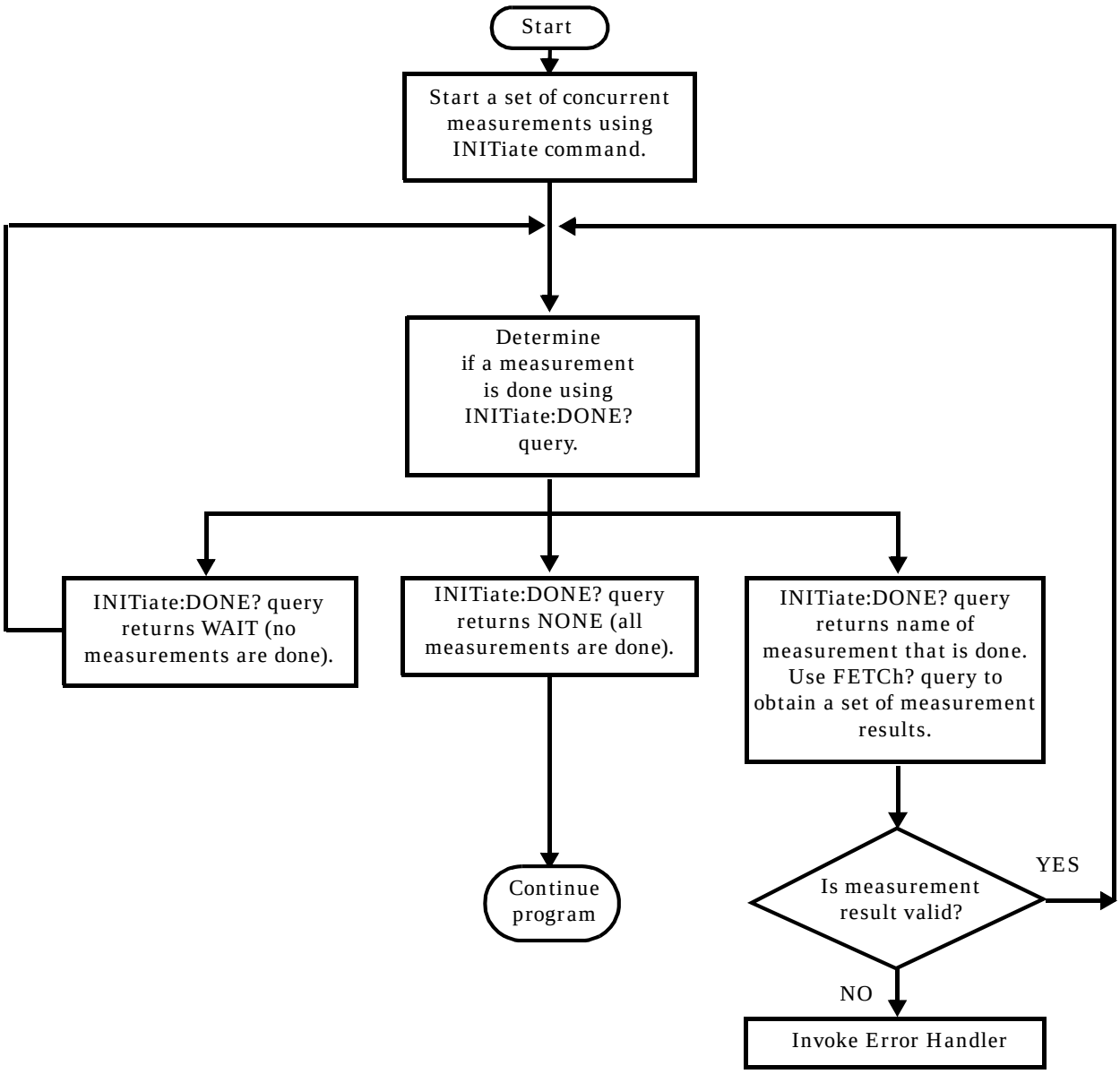
The test set has multiple signal paths and processors, which means you can make measurements concurrently and reduce test time. Making concurrent measurements involves starting a group of measurements, fetching the results of the measurements as they complete, and then verifying that the results are valid.

Contents

- "Concurrent Measurement Process"
- "Alternative Measurement Process"

Concurrent Measurement Process

Figure 9. 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 3. 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
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
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"
- "Change Other Connection Parameters"

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.

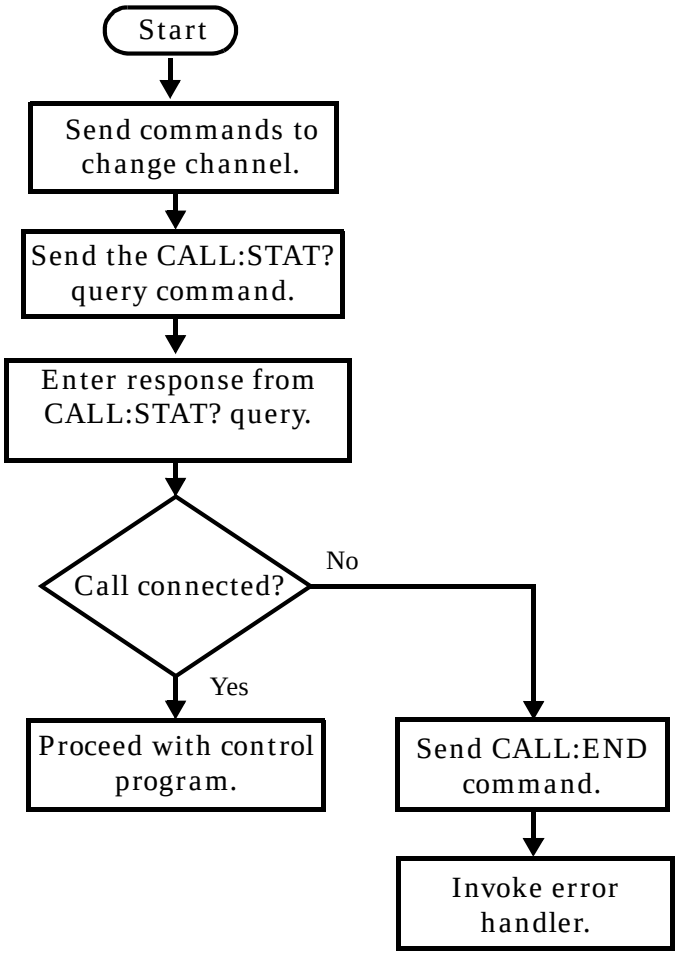
The CALL:STATus? query immediately returns the state of the call at the time the query is received.

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 10. 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"
- "End the Mobile Station Test Mode Transmission"
- "Partially Preset the Test Set"

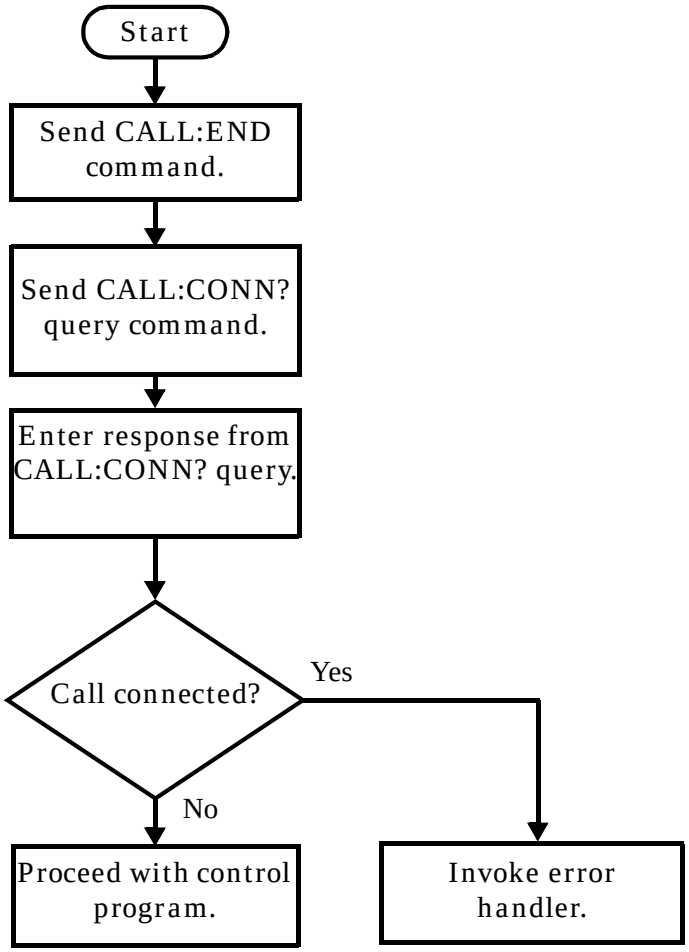
Release the Call in Active Cell Mode

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

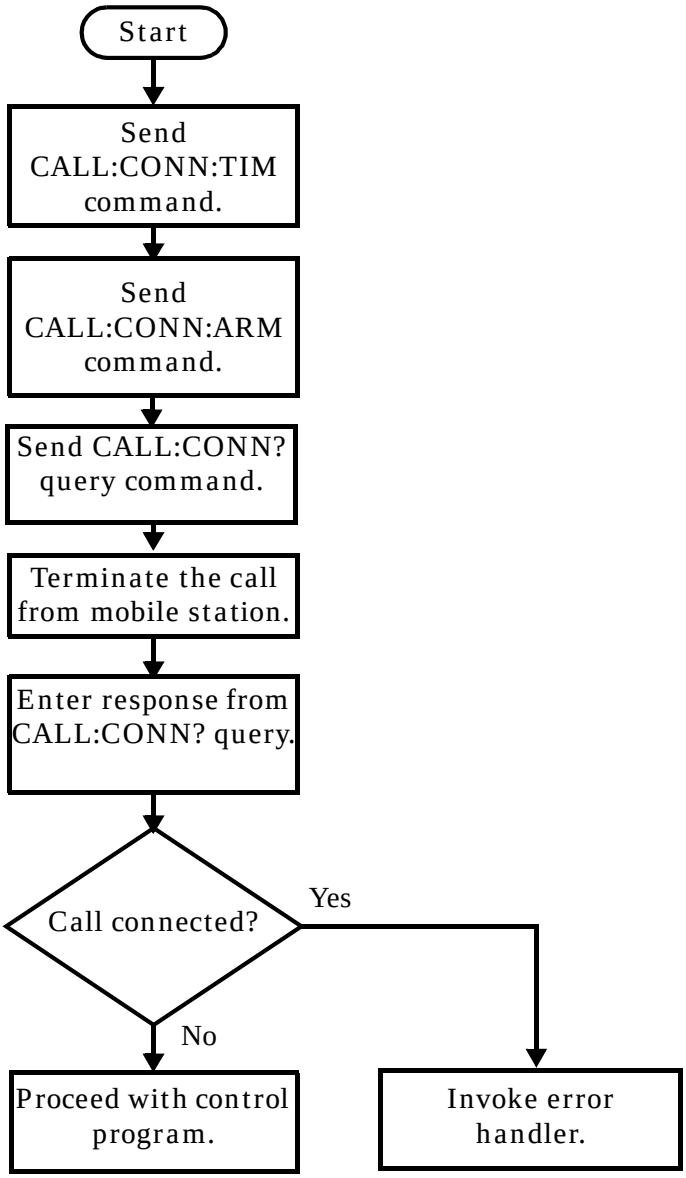


Example 15. Programming Example

```
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
```

Releasing an Active Call from the Mobile Station

Figure 12. 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.
```

Step 7: End Connection

```
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 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 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 190.
- `Audio_level` returns the analog audio level in volts rms.

Related Topics

“Audio Analyzer Measurement Description” on page 33

“AFANalyzer Troubleshooting” on page 583

“INITiate” on page 376

“SETup:AFANalyzer” on page 401

“FETCh:AFANalyzer” on page 315

“Control Program Example” on page 1

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 36

“AFANalyzer Troubleshooting” on page 583

“Audio Analyzer Measurement Description” on page 33

“INITiate” on page 376

“SETup:AFANalyzer” on page 401

“FETCh:AFANalyzer” on page 315

“Control Program Example” on page 1

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 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 33.

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 190.
- `Distortion` returns the Distortion measurement value in percent (%).

Related Topics

"Audio Analyzer Measurement Description" on page 33

"AFANalyzer Troubleshooting" on page 583

"Distortion Measurement Description" on page 39

"INITiate" on page 376

"SETup:AFANalyzer" on page 401

"FETCh:AFANalyzer" on page 315

"Control Program Example" on page 1

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 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 33.

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 190.
- `SINAD` returns the SINAD value in dB.

Related Topics

"Audio Analyzer Measurement Description" on page 33

"AFANalyzer Troubleshooting" on page 583

"INITiate" on page 376

"SETup:AFANalyzer" on page 401

"FETCh:AFANalyzer" on page 315

"Control Program Example" on page 1

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 4. 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

Table 4. Partial Preset Behavior

Function	Partial Preset Result
Maskable Message Display State	no change
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 5. Full Preset Behavior

Function	Full Preset Result
Trigger Arm	Continuous (manual operation full preset or SYSTEM:PRESET2 command)

Table 5. Full Preset Behavior

Function	Full Preset Result
Trigger Arm	Single (remote operation full preset, *RST command)
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”

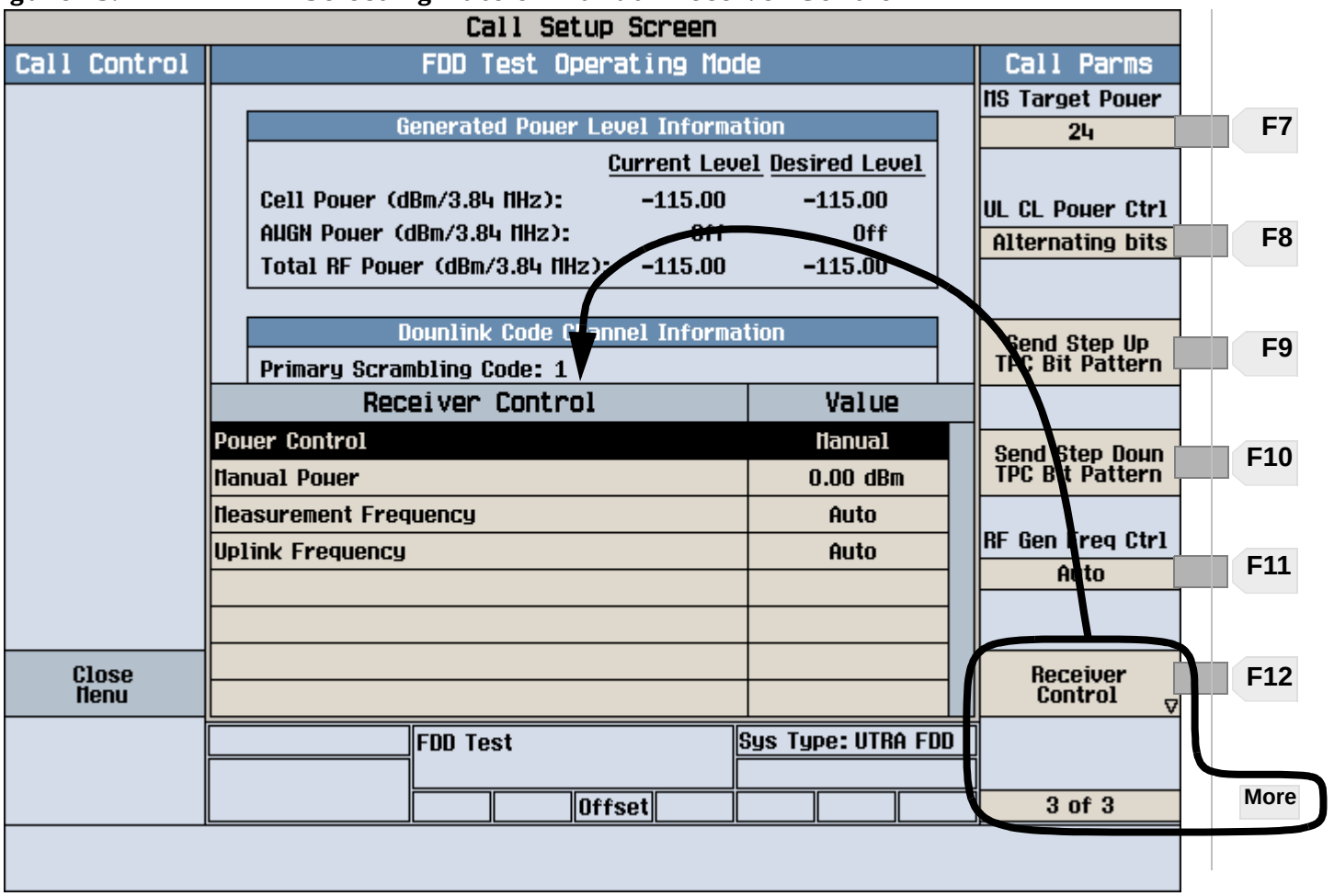
Receiver Control

The test set normally sets all receiver parameters automatically. You can also control the test set's receiver parameters manually rather than allowing the test set to control them. This ability is referred to as manual receiver control.

Manual Versus Automatic Receiver Control

- **Auto** mode receiver control is the default for all operating modes except CW (see "CW Operating Mode"). Using automatic receiver control, the receiver's expected power and frequency settings are set automatically according to the settings you enter on the Call Setup Screen.
- **Manual** mode 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) by highlighting the setting, pressing the knob, and entering or selecting the new value. A full or partial preset of the test set, including cycling power, returns the test set back to auto mode.

Figure 13. Selecting Auto or Manual Receiver Control



Front Panel Access to Receiver Controls

To access receiver control settings on the test set's front panel while using FDD Test operating mode, press the **CALL SETUP** key, press the **More** key until `3 of 3` is displayed, and select `Receiver Control` (**F12**). See Figure 13. "Selecting Auto or Manual Receiver Control".

In CW operating mode, receiver control is accessed by pressing **F12**.

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 and ACLR measurements), 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 during automatic receiver control, or by the user specifying the Manual Power value with the receiver Power Control set to Manual. Refer to Figure 13. "Selecting Auto or Manual Receiver Control".

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).

You can enter an expected power level setting that is 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 mobile station (UE)*. 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 59 for details about entering 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.

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)

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

"RFANalyzer"

"CW Operating Mode"

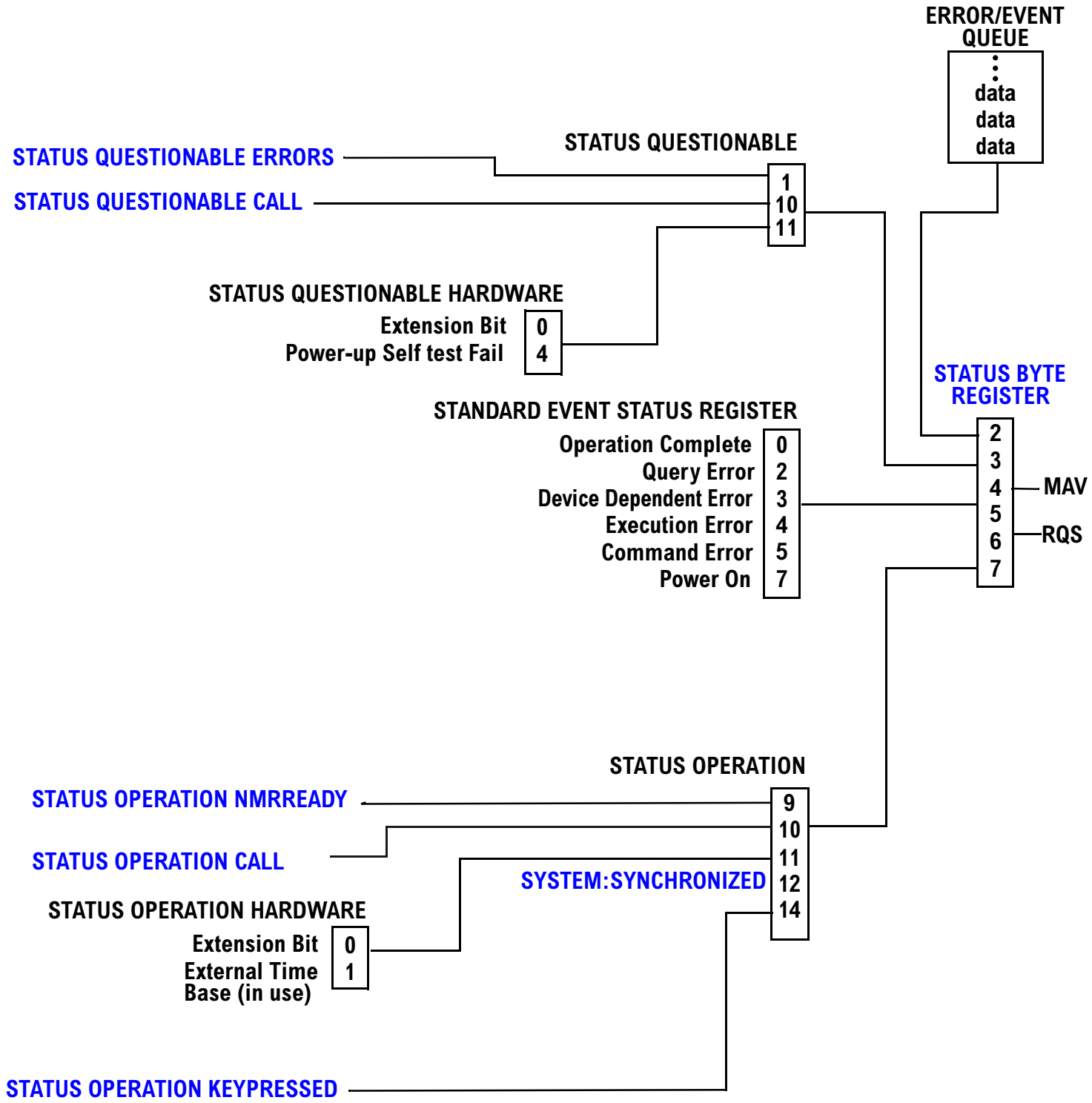
"FDD Test Operating Mode"

Status Subsystem Overview

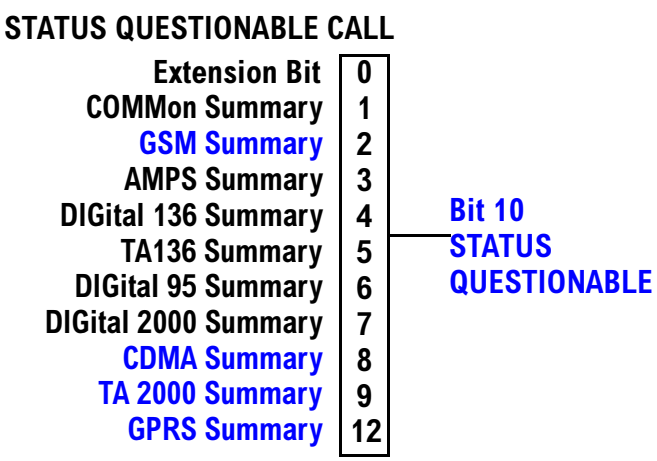
The following pages present an overview of the entire status subsystem, including test applications which may or may not be loaded in your test set.

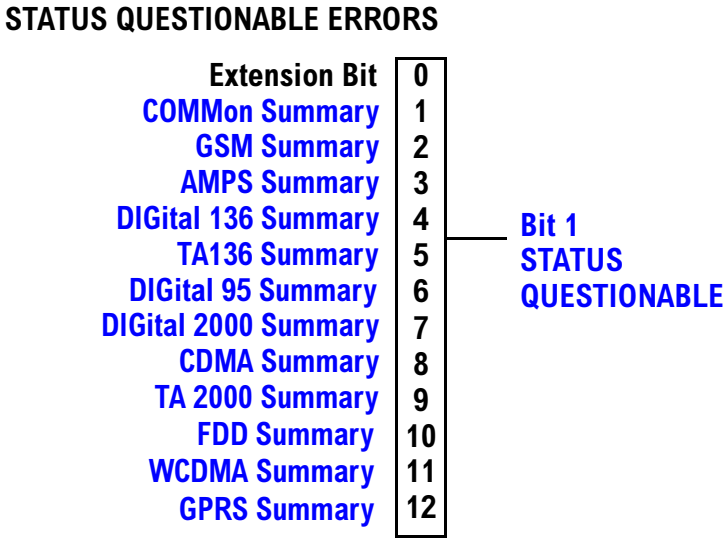
Description

Overview of STATus Reporting Structure

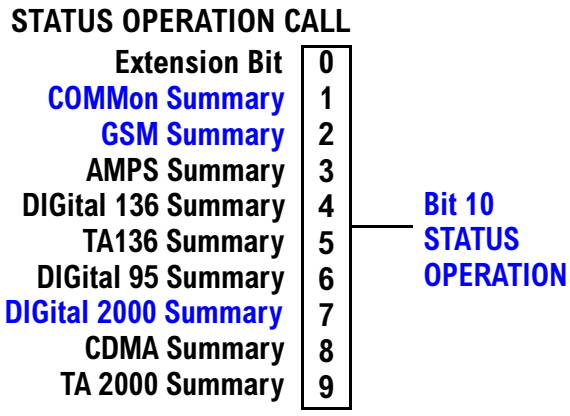


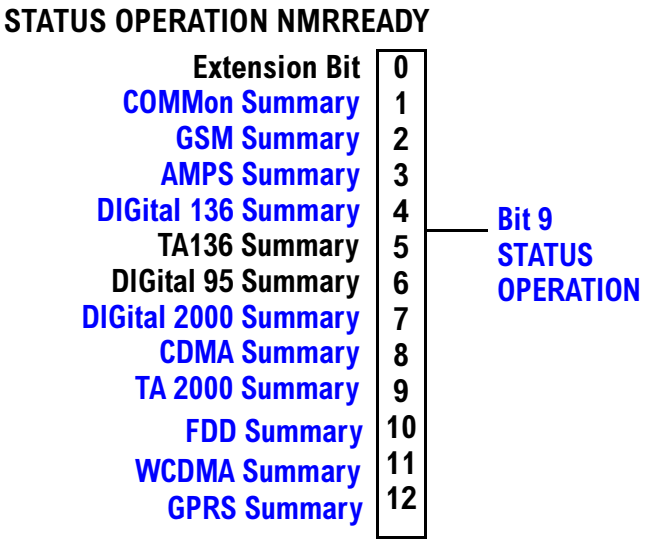
Status Reporting Structure For STATus QUEStionable and STATus OPERation



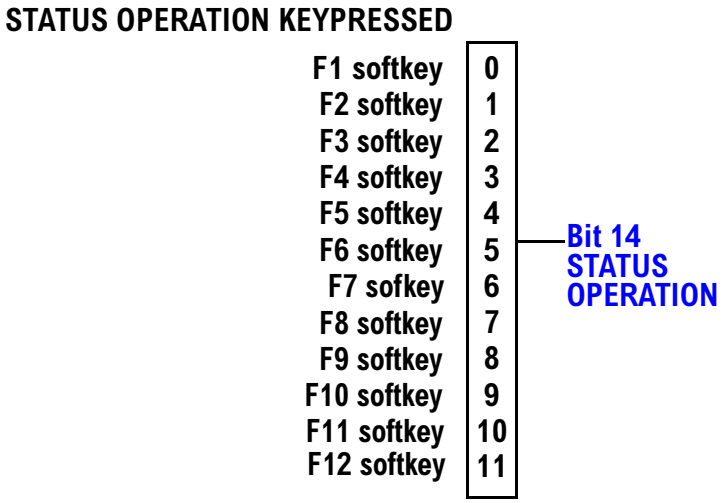


Some status registers are not functional at this time.

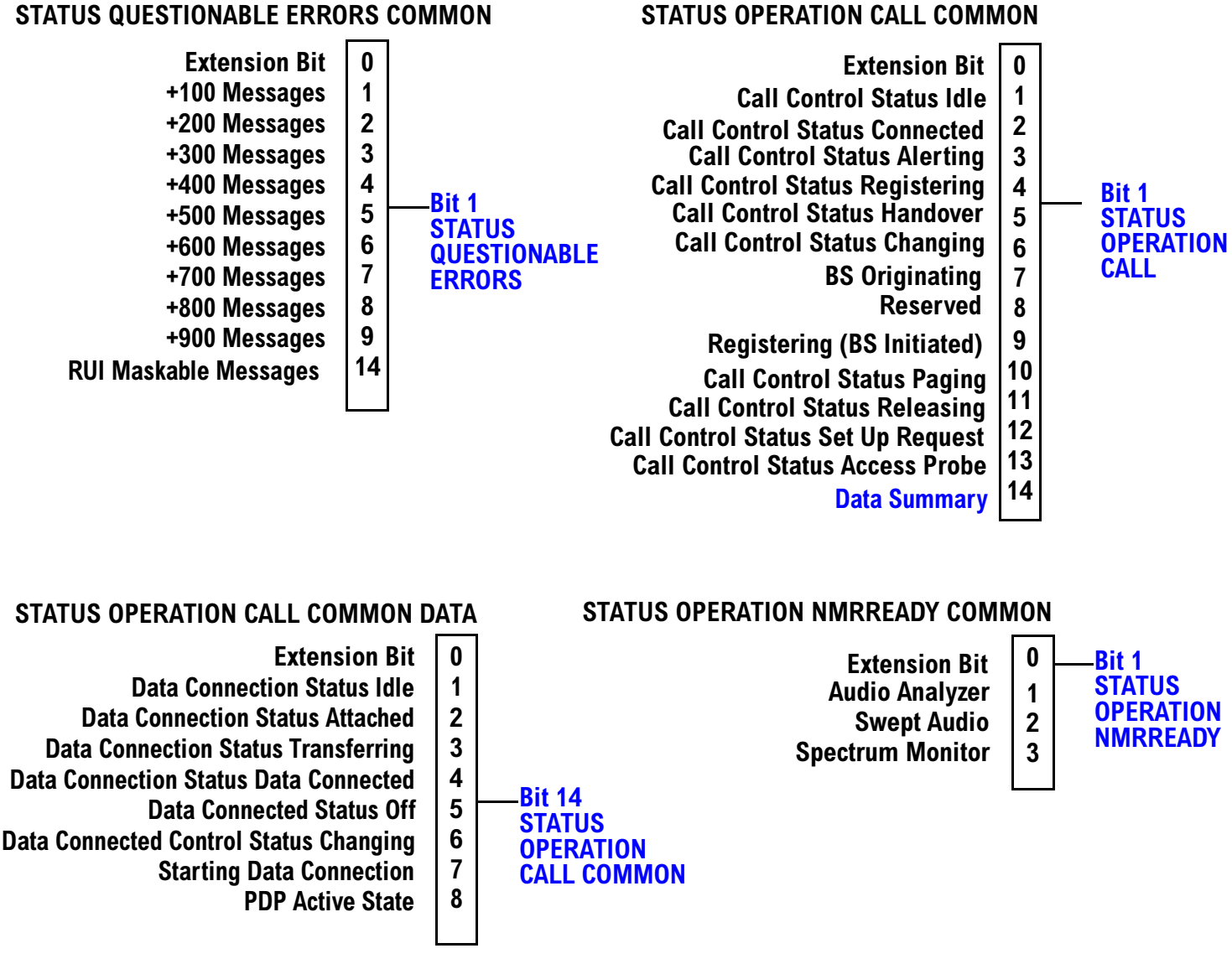




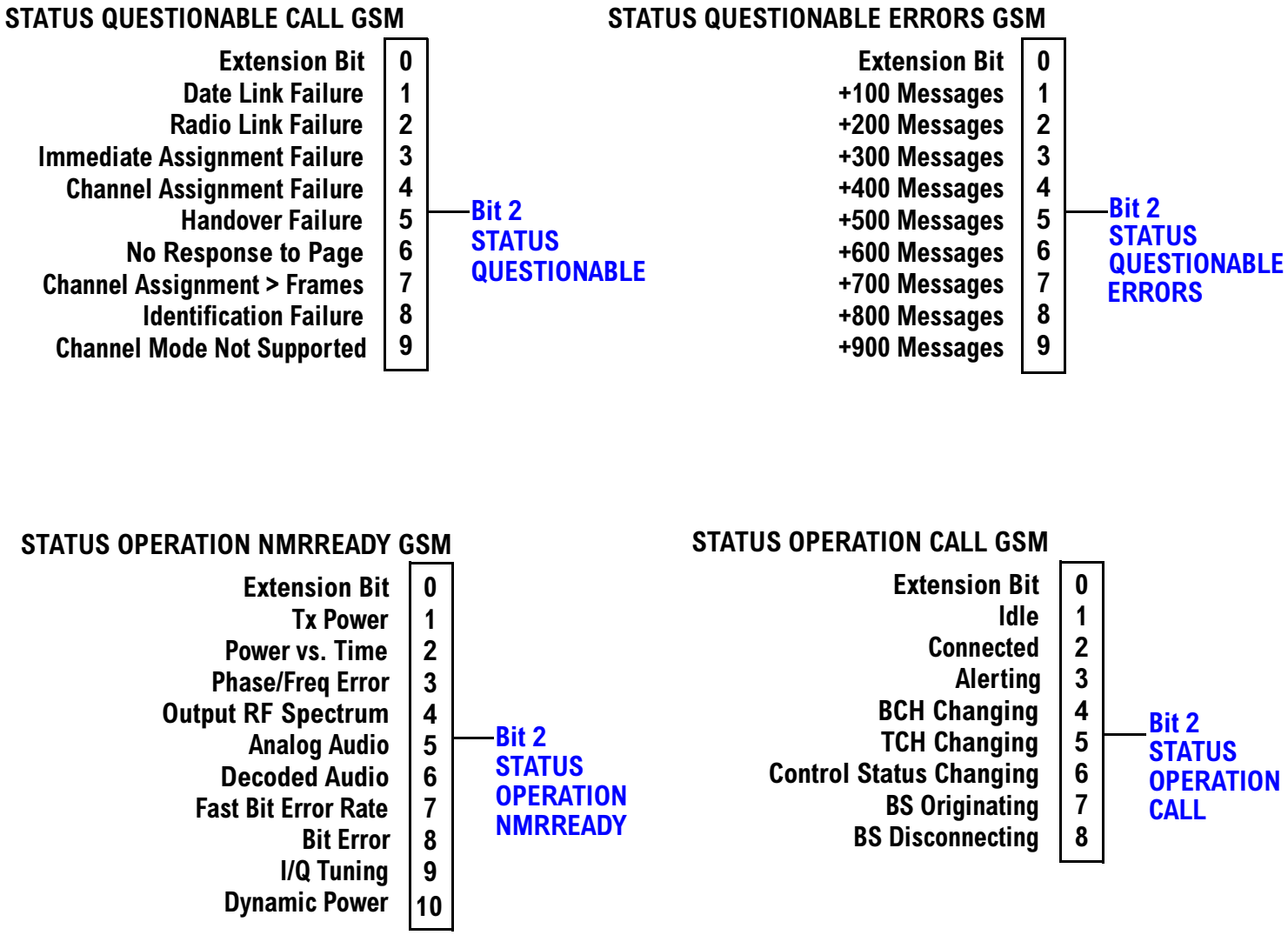
Status Reporting Structure For STATus OPERation KEYPressed Register



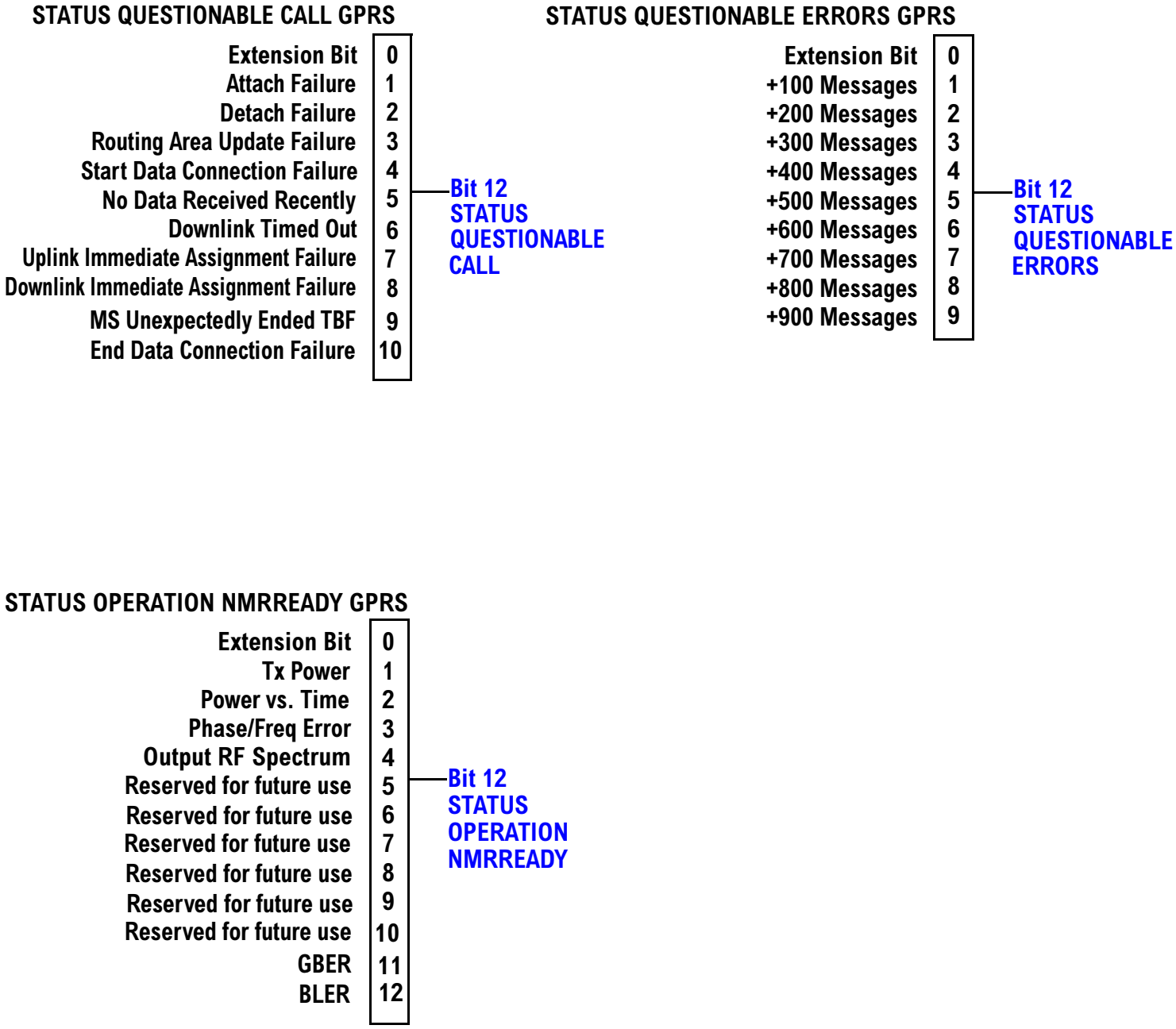
Status Reporting Structures for the COMMon Registers



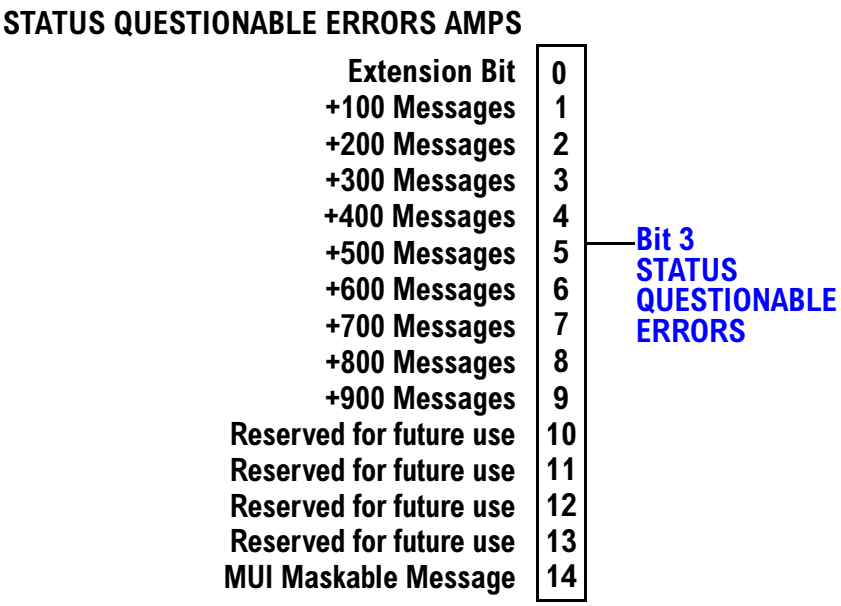
Status Reporting Structure for the GSM Registers

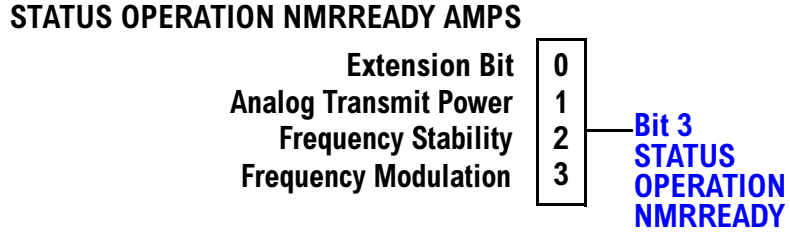


Status Reporting Structure For the GPRS Registers

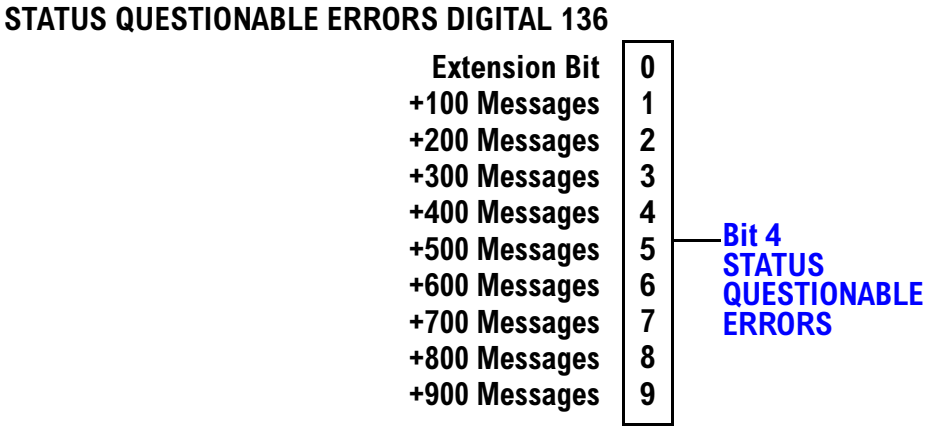


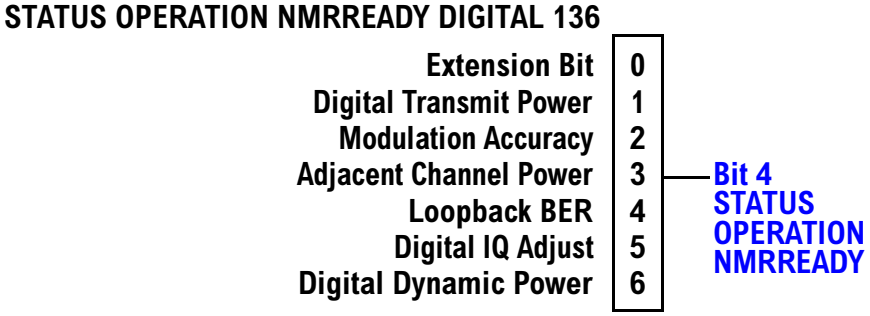
Status Reporting Structure for the AMPS Registers



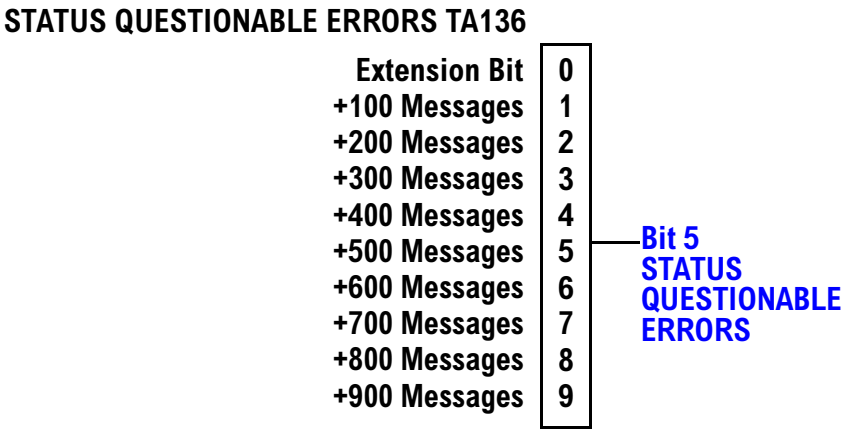


Status Reporting Structure for the DIGital136 Registers

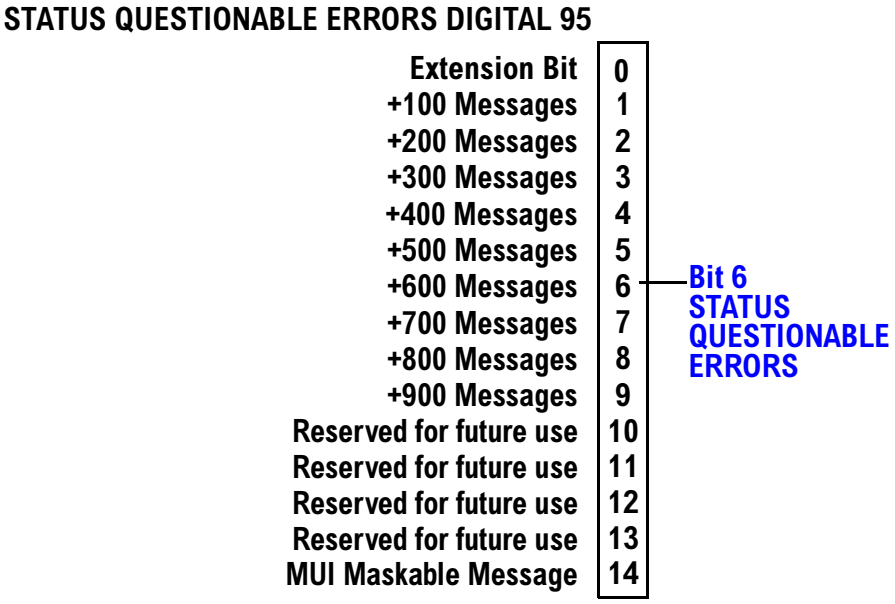




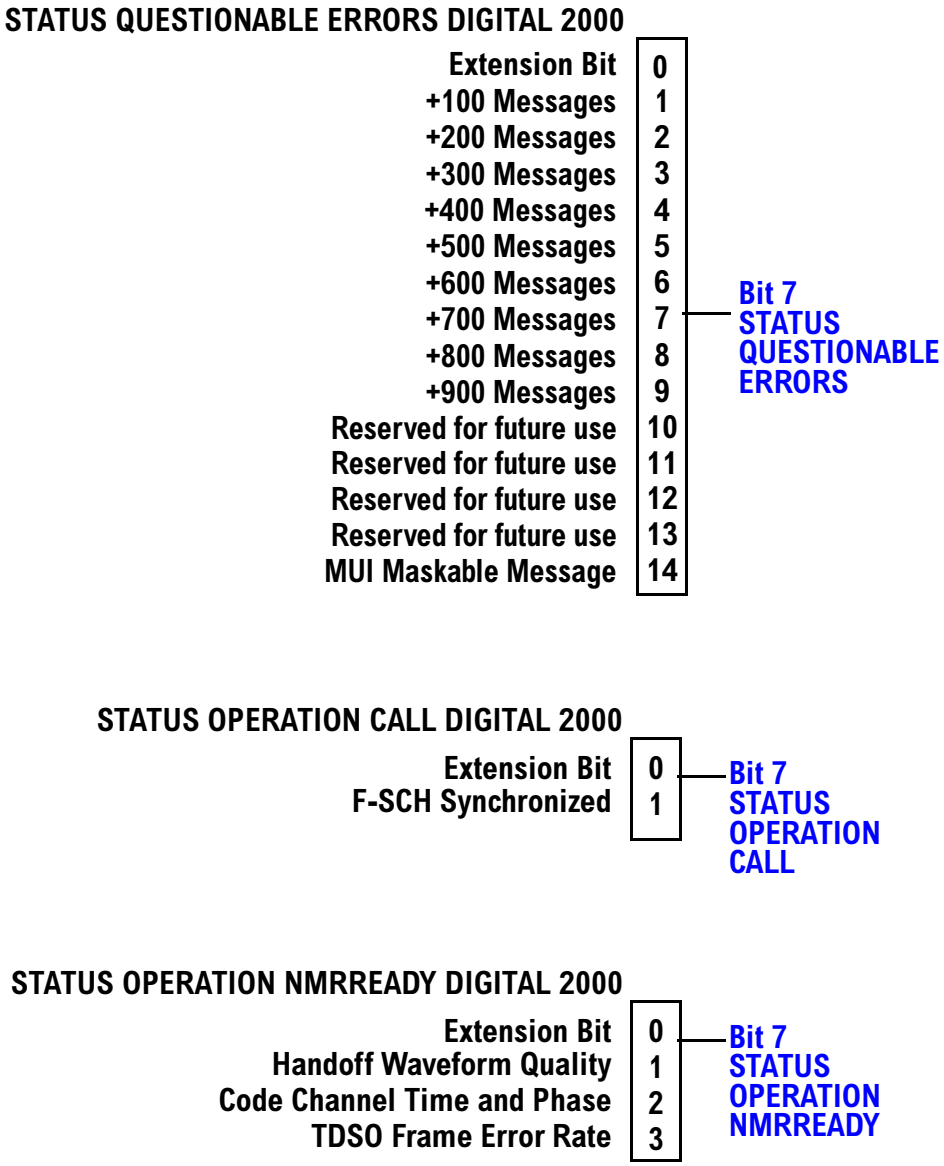
Status Reporting Structures for the TA136 Registers



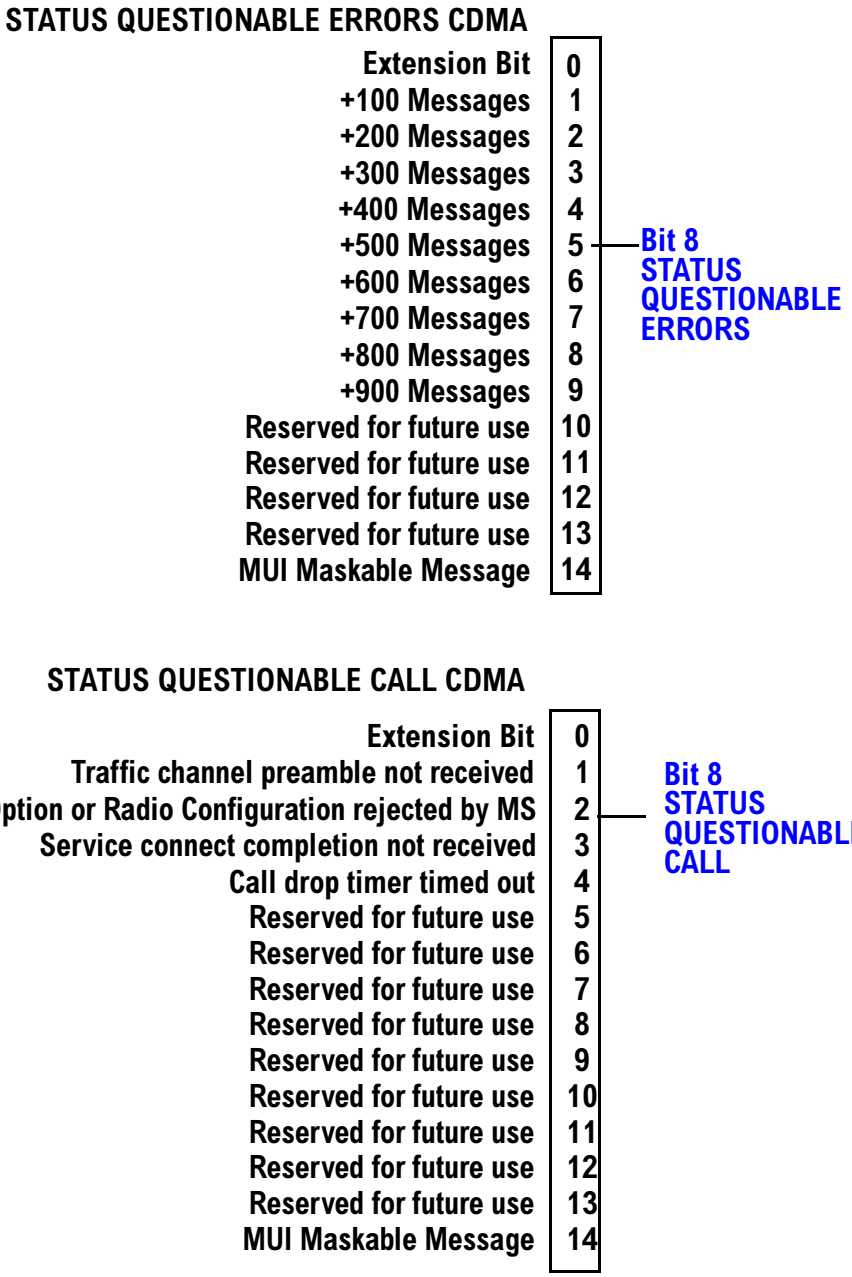
Status Reporting Structure for the DIGital95 Registers

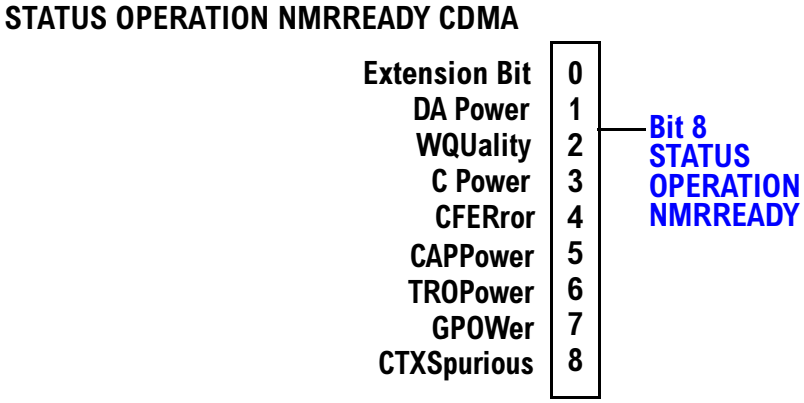


Status Reporting Structure for the DIGital 2000 Registers

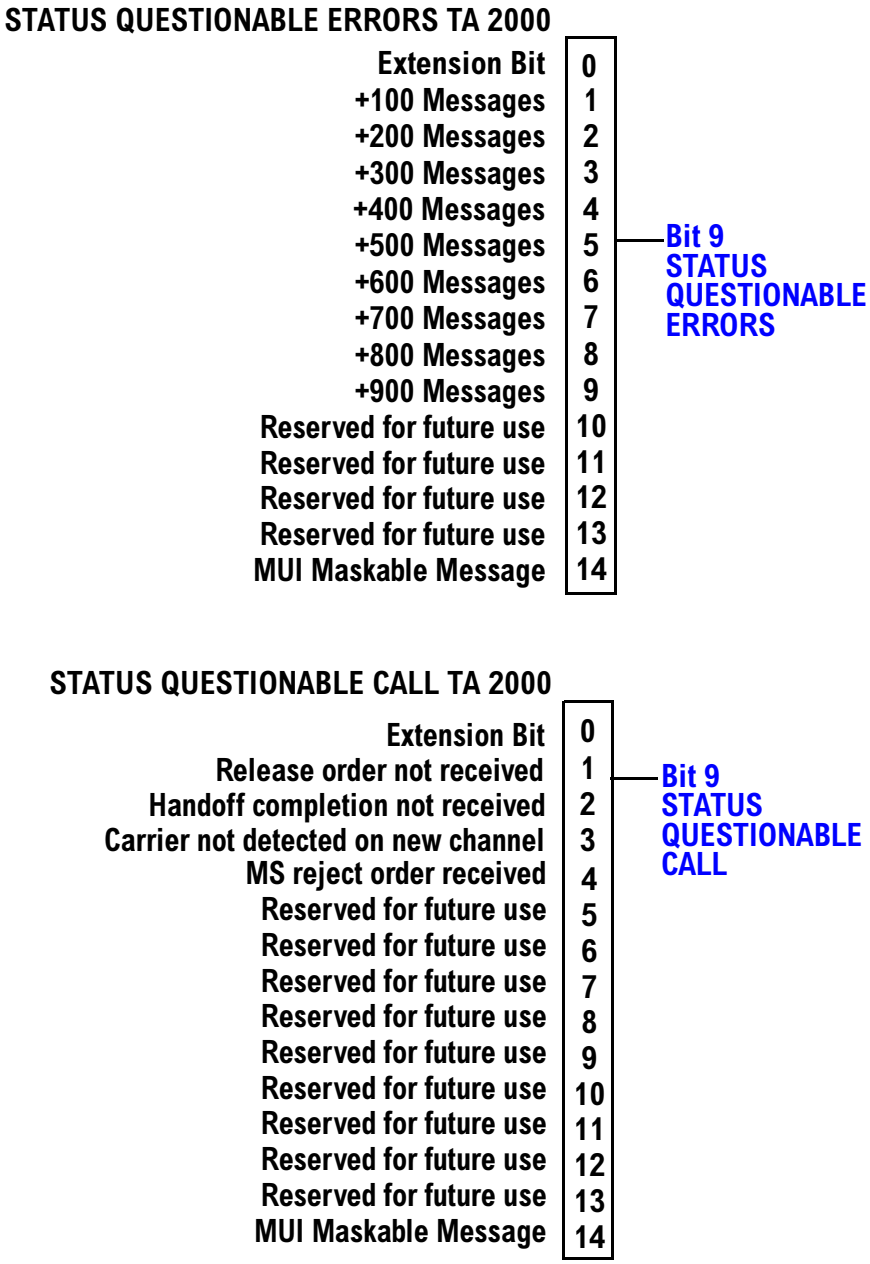


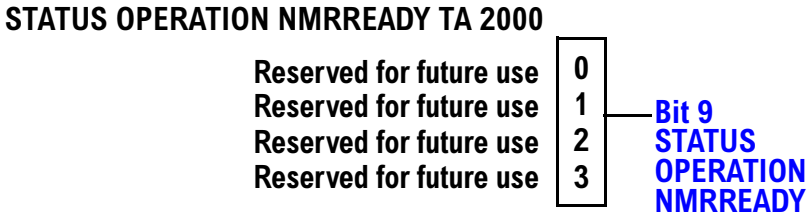
Status Reporting Structure for the CDMA Registers



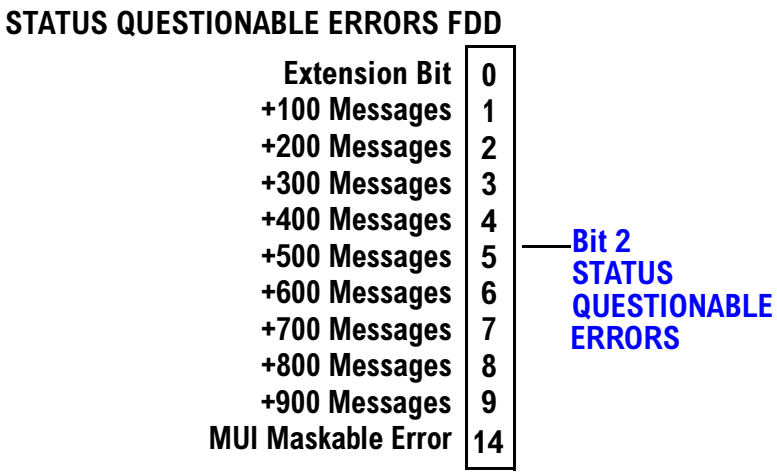

STATUS OPERATION NMRREADY CDMA
Extension Bit
DA Power
WQUality
C Power
CFERror
CAPPower
TROPower
GPOWer
CTXSpurious
0
1
2
3
4
5
6
7
8
Bit 8
STATUS
OPERATION
NMRREADY

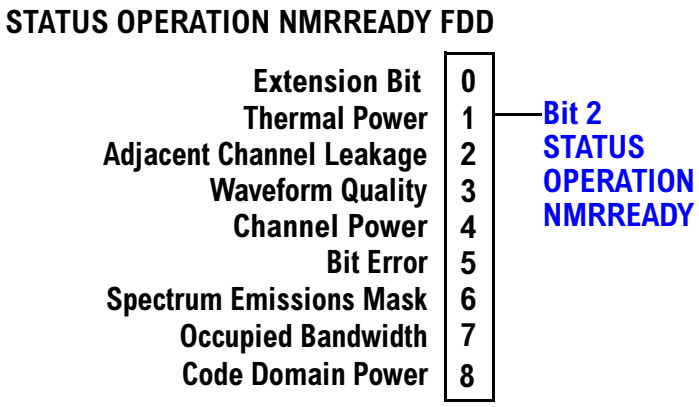
Status Reporting Structure for the TA 2000 Registers



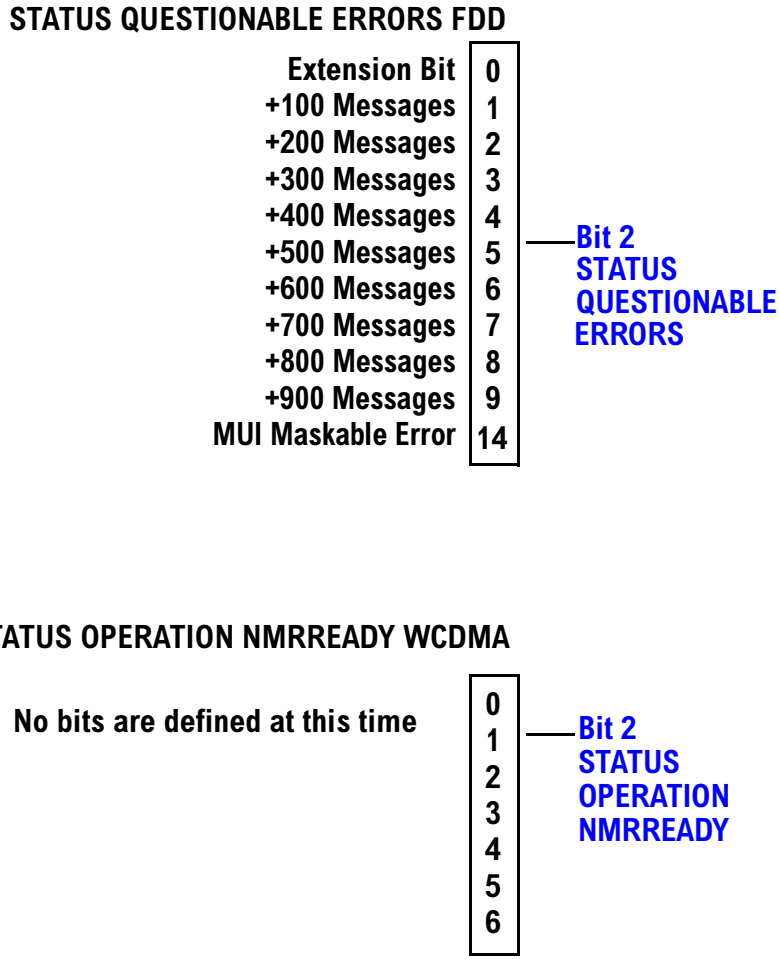

STATUS OPERATION NMRREADY TA 2000
Reserved for future use
Reserved for future use
Reserved for future use
Reserved for future use
0
1
2
3
Bit 9
STATUS
OPERATION
NMRREADY

Status Reporting Structure for the FDD Registers





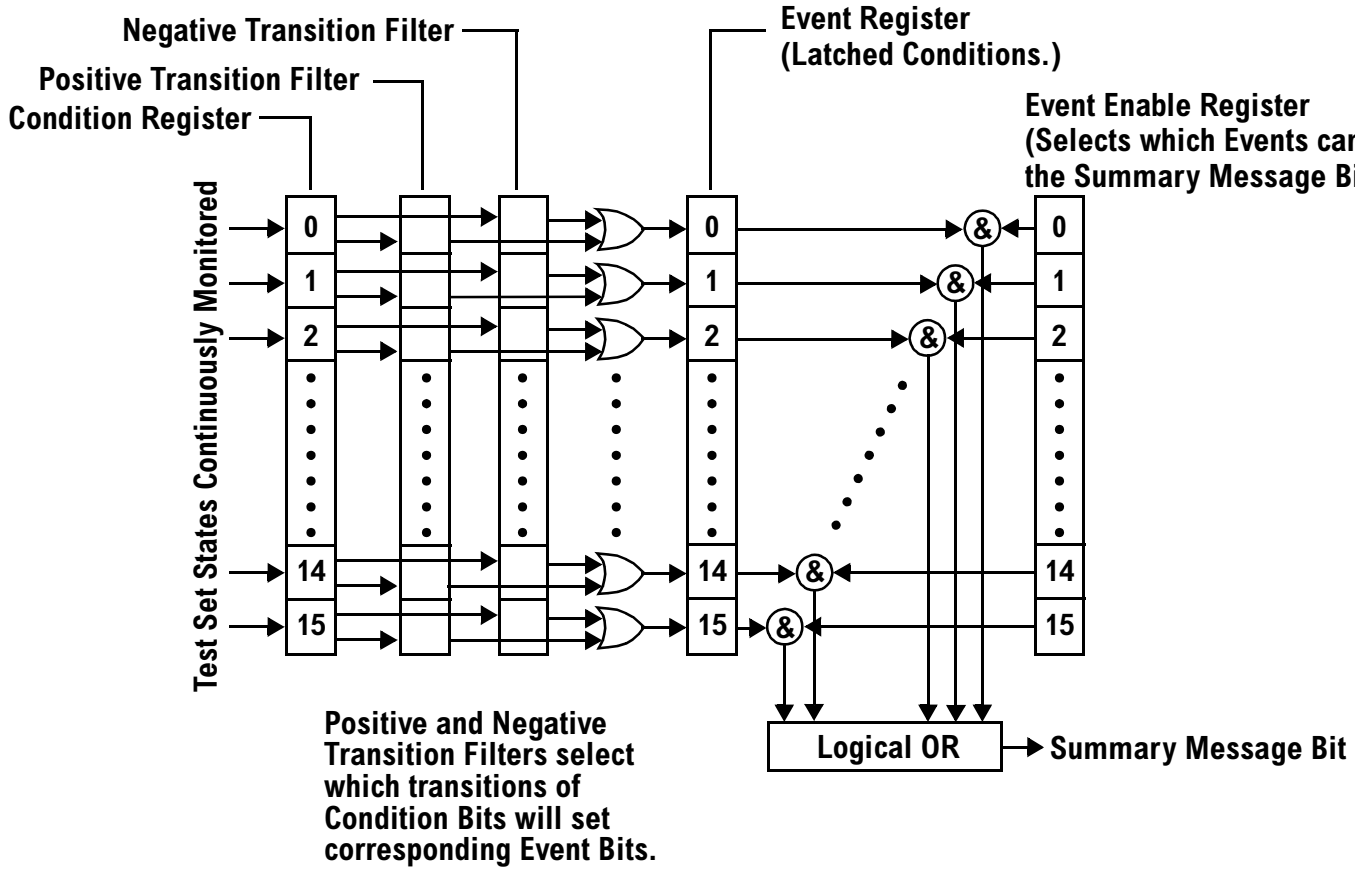
Status Reporting Structure for the WCDMA Registers



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.

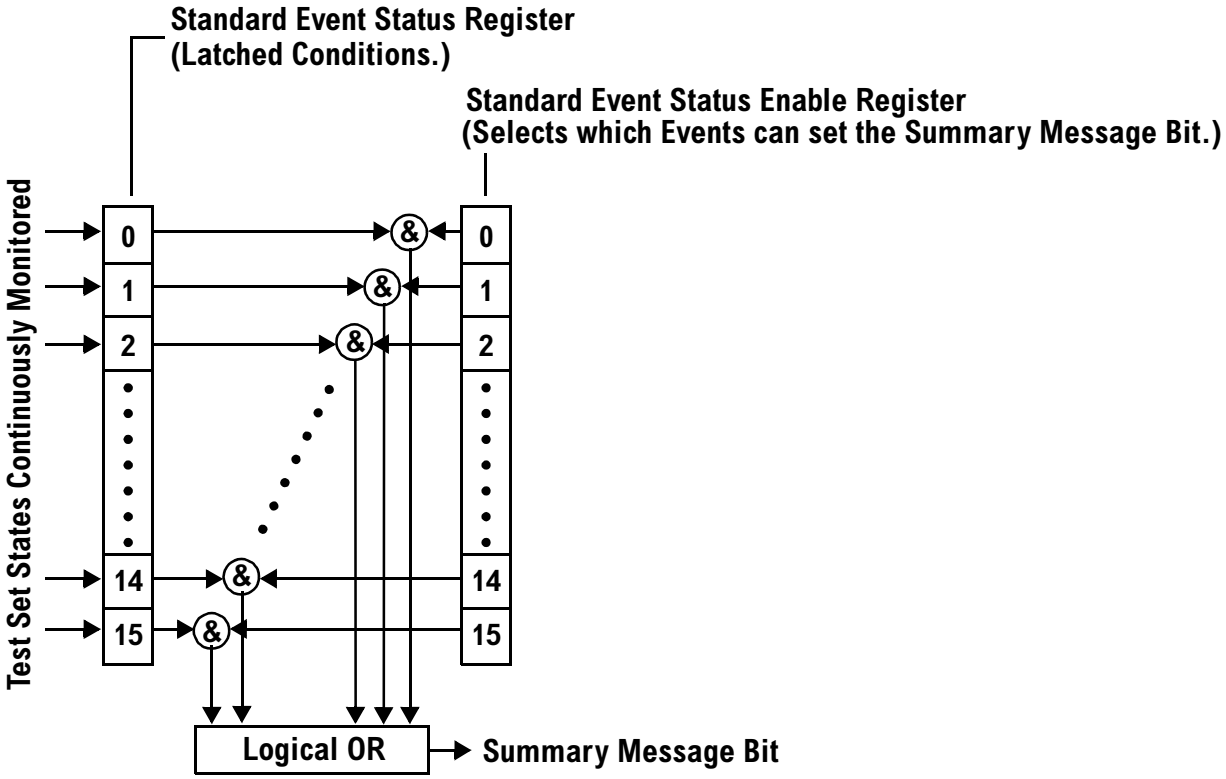
Transition Filters are unaffected by a *CLS (clear status) command.

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

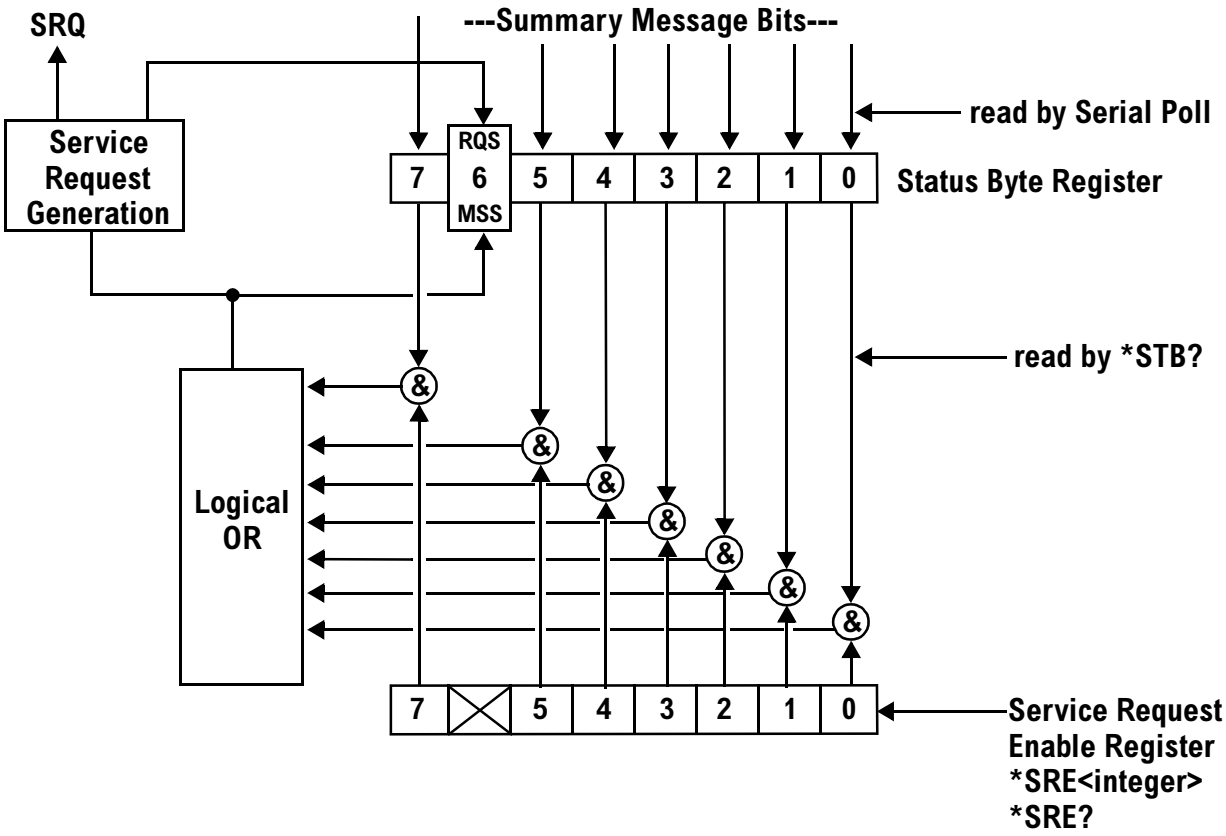


Summary Message Bit The Summary Message is a single-bit message which indicates whether or not one or more of the enabled events have occurred since the last reading or clearing of the Event Register. The test set logically ANDs corresponding bits in the Event and Enable registers and then performs an 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 Bye 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 Bute 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 442

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 CDMA 2000 Mobile Test application default to a timeout value of 10 seconds, except FER. The FER measurement timeout default is 200 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.

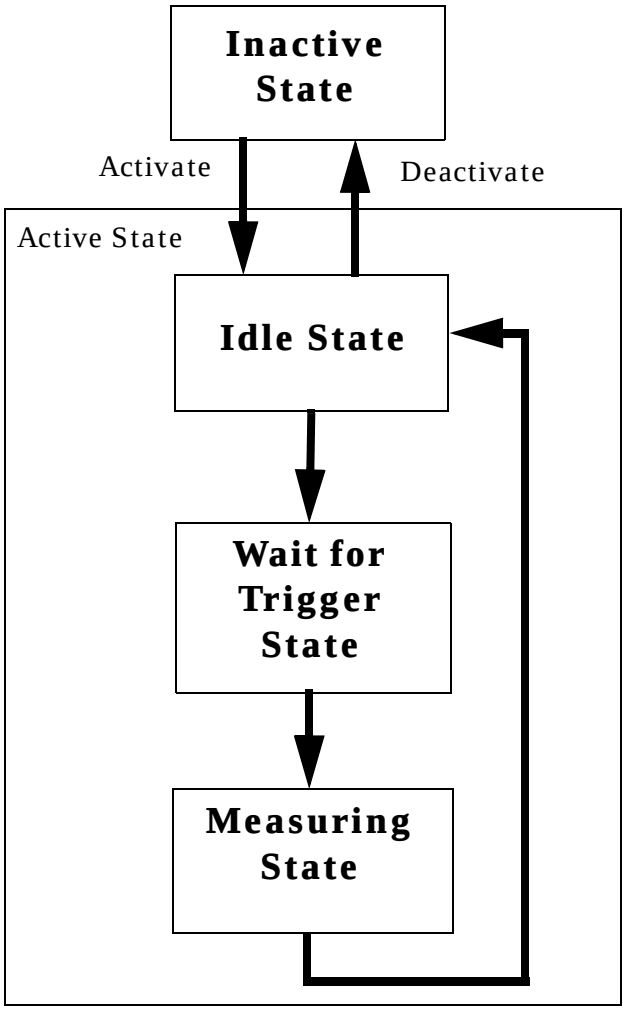
Auto Trigger Source: When auto triggering is selected, the test set automatically chooses the best trigger source for that measurement. This trigger source setting is convenient because the measurement trigger doesn't need to be changed when switching parameters. Auto trigger source is the best choice 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 186.

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
*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 and GPRS 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.

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.

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:

Dealing With Semicolon Separated Response Data Lists

```
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
```

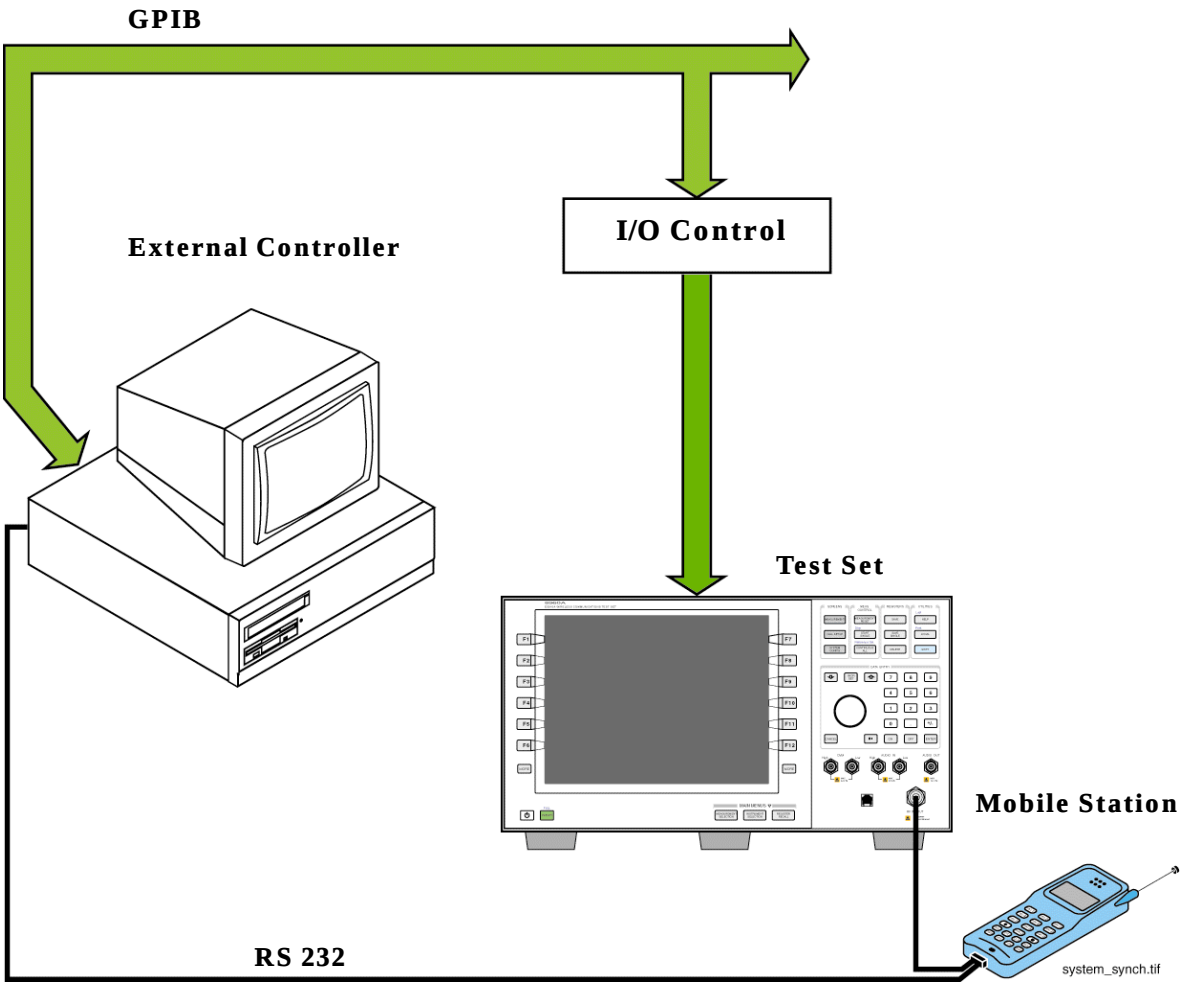
Test System Synchronization Overview

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 293
  This command queries the test set's current call processing state. This command supports synchronization method five. See "Call Processing State Synchronization" on page 1.
- "CALL:STATus" on page 293
  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 1. 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 2.
- :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 2.
- :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 2.
- "INITiate:DONE?" on page 378
  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 378.
- 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 460 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 442.

- "SYSTem:SYNChronized" on page 532
  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 451. This command supports synchronization four and six.
- "*OPC" and "*OPC?" on page 537, and "*WAI" on page 538 (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 1

"Measurement Event Synchronization" on page 201

"Call Processing Event Synchronization" on page 1

"SYSTem:SYNChronized" on page 532

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 376 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.
- "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.
- "WOBW" - The occupied bandwidth 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 379. 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 379. 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 175.

```
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 466 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 175.
- 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 442 or "Status Subsystem Overview" on page 158.
- STATus:OPERation bit (512 for NMRReady).
- Service Request Enabling (*SRE 128 for NMRReady).

The "STATus:OPERation:NMRReady:<WCDMA | FDD> Register Bit Assignments" on page 466 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 374

“What Happens When a Measurement is INITiated?” on page 374

“Concurrent Measurements” on page 180

“STATus:OPERation:NMRReady:<WCDMA | FDD> Register Bit Assignments” on page 466

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.

Related Topics

"Call Processing State Synchronization"

Call Processing State Synchronization

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.

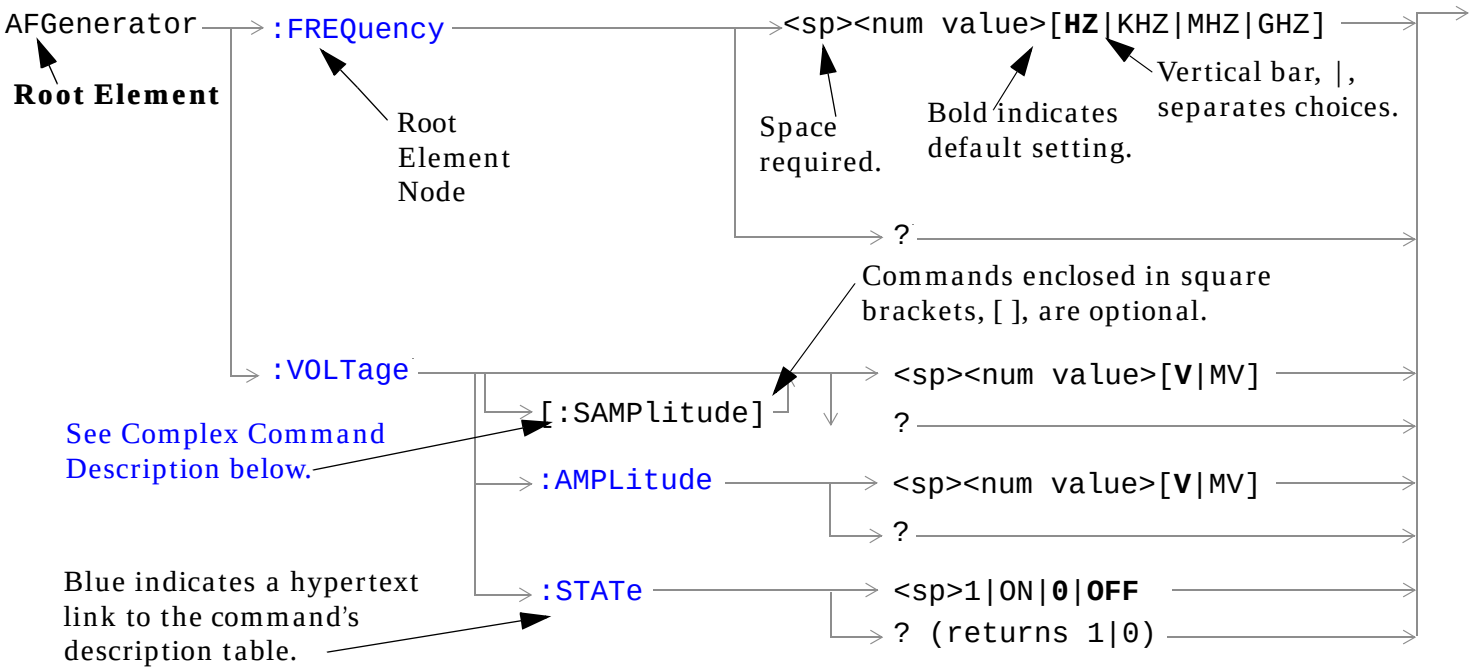
Related Topics

"Call Processing Event Synchronization"

4 GPIB Commands

Diagram Conventions

Description



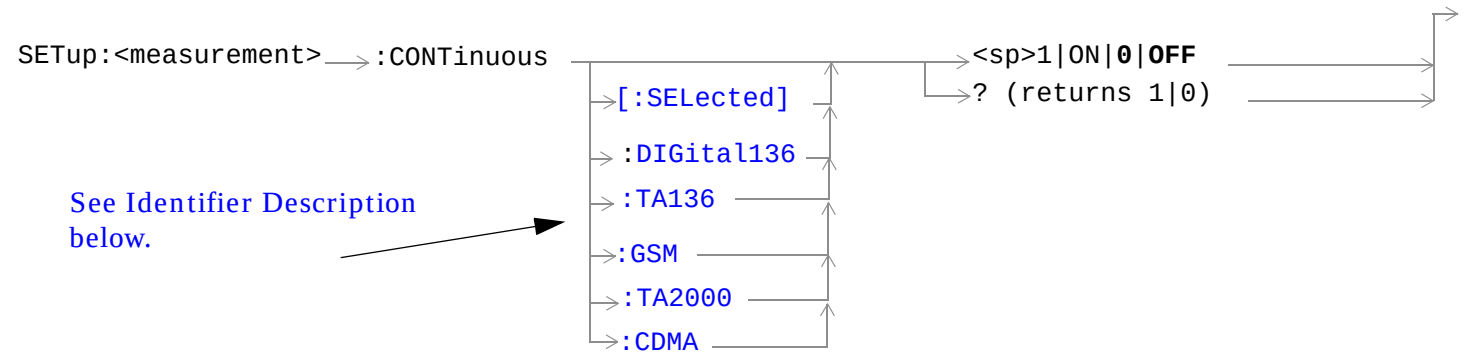


Diagram Description

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

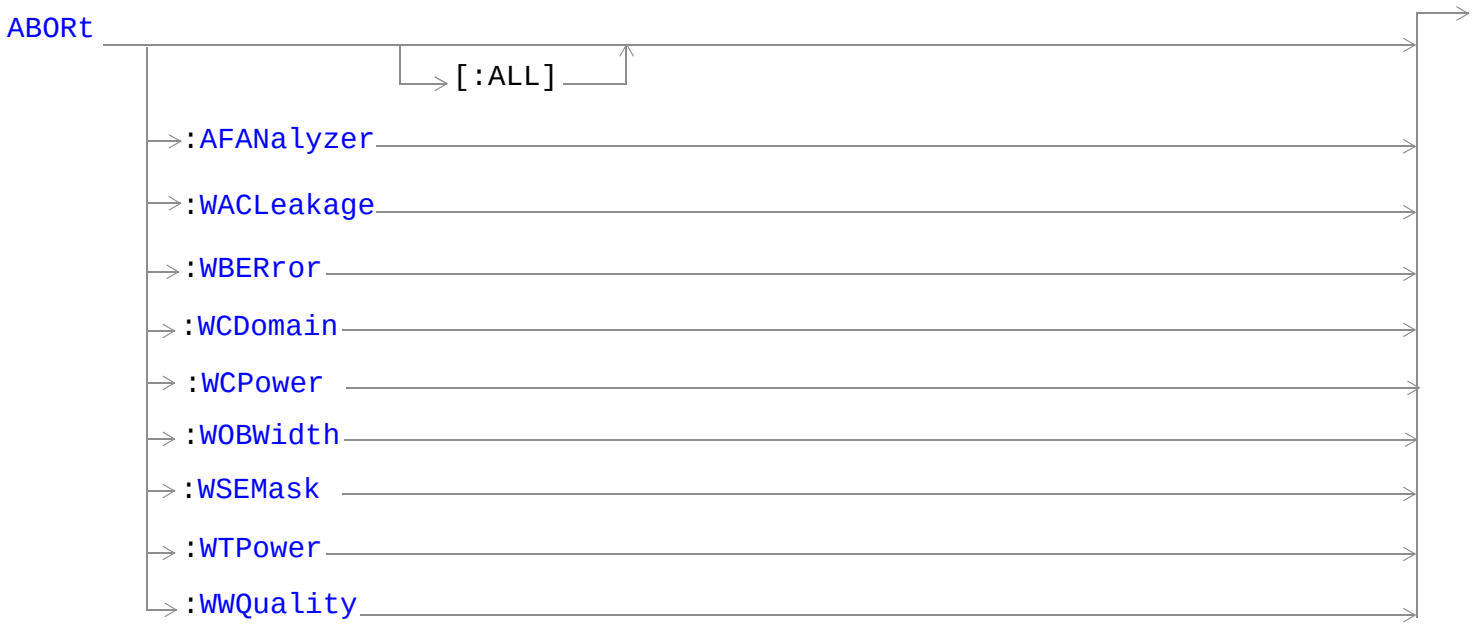
INITiate:<meas> will execute an ABORt:<meas> as part of the INITiate:<meas> command.

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 210

ABORt

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.
Setting	Range • AFANalyzer - Audio Frequency measurements • WACLeakage - Adjacent Channel leakage • WBERror - Loopback Bit Error Ratio measurement • WCDomain - Code Domain measurements • WCPower - Channel Power measurement • WOBWidth - Occupied Bandwidth measurement • WSEMask - Spectrum Emission Mask measurement • WTPower - Thermal Power measurement • WWQuality - Waveform Quality measurement
Requirements	Test Application Revision: A.01 and above Test Application Revision: A.02 added WCDomain, WSEMask, and WOBWidth.
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 measurements • WACLeakage - Adjacent Channel leakage • WBERror - Loopback Bit Error Ratio measurement • WCDomain - Code Domain measurements • WCPower - Channel Power measurement • WOBWidth - Occupied Bandwidth measurement • WSEMask - Spectrum Emission Mask measurement • WTPower - Thermal Power measurement • WWQuality - Waveform Quality measurements

Requirements	Test Application Revision: A.01 and above Test Application Revision: A.02 added WCDomain, WSEMask, and WOBWidth.
Programming Example `OUTPUT 714;"ABORT:WWQUALITY" !Aborts the waveform quality measurements.`	

AFGenerator Subsystem

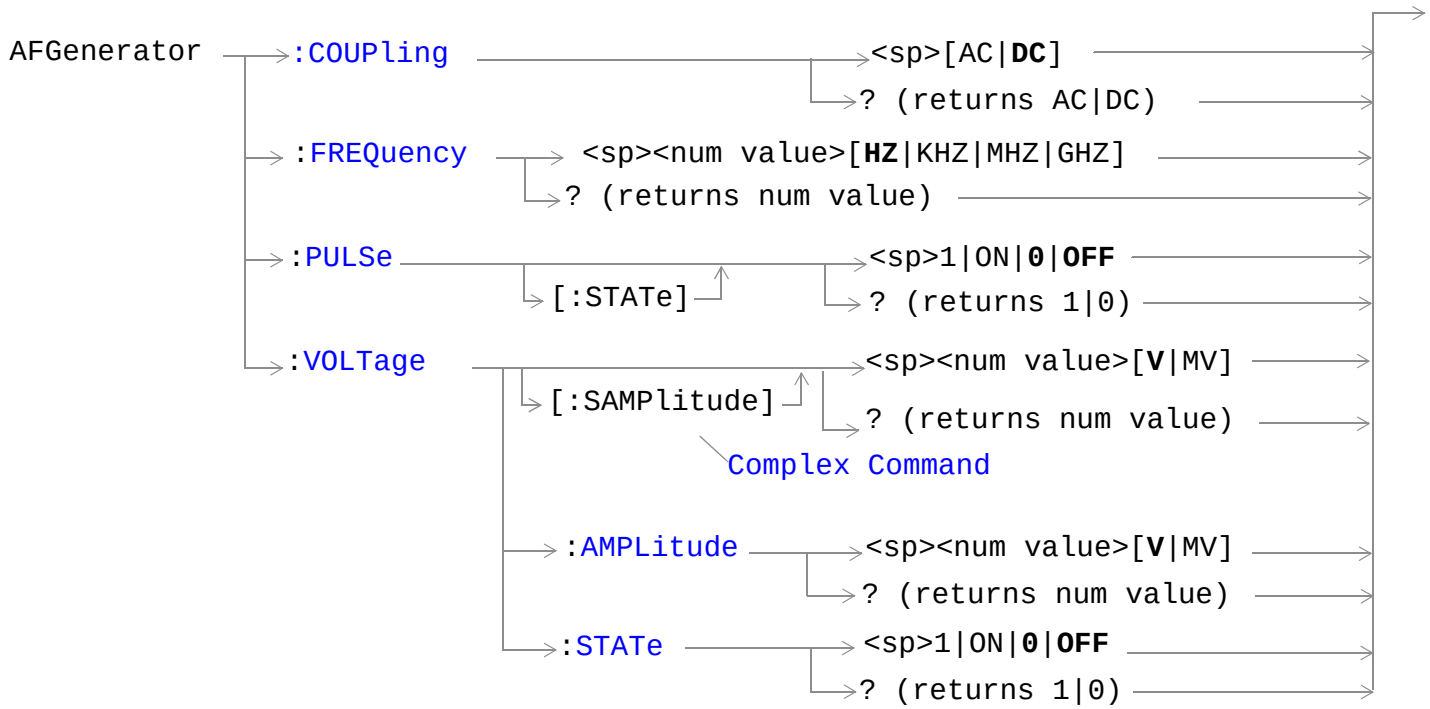
Description

The AFGenerator subsystem is used to control the audio source that is available at the Audio Output connector.

Syntax Diagram and Command Descriptions

"AFGenerator" on page 217

AFGenerator



"Diagram Conventions" on page 210

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.`	

CALibration Subsystem

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 223. The test set returns a numeric value indicating the outcome of the calibration attempt.

Table 5. 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.
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.

Syntax Diagram and Command Descriptions

"CALibration"

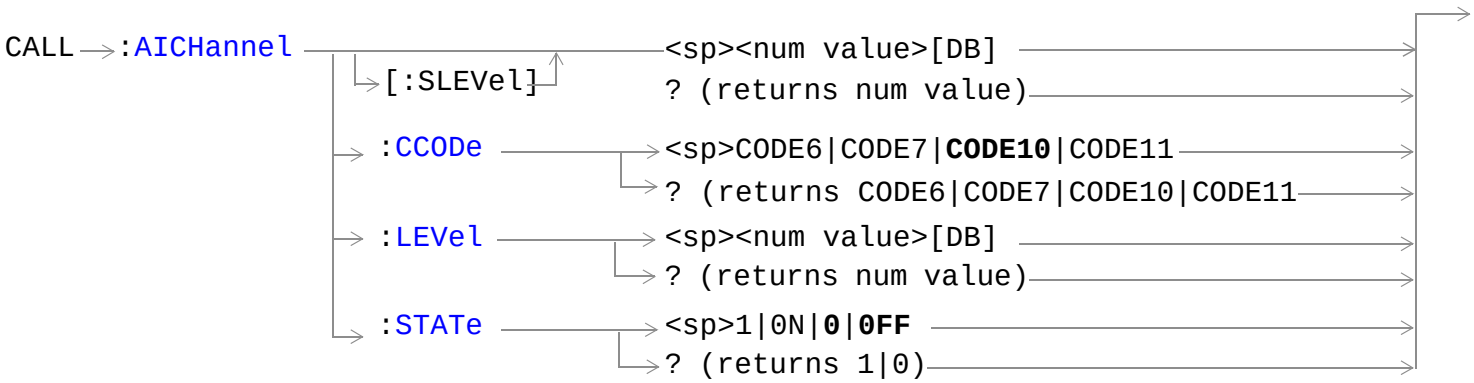
CALibration

"Diagram Conventions" on page 210

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" on page 221 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:AICHannel



"Diagram Conventions" on page 210

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

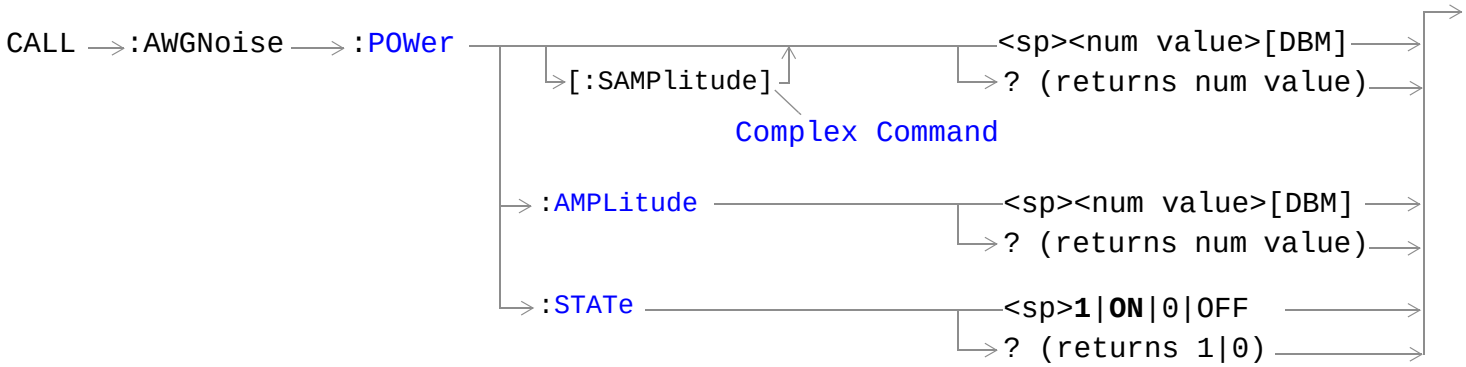
Function	Sets/queries the acquisition indicator channel's initial power offset. This setting cannot be changed while in active cell operating mode. Attempting to change this setting while in this mode results in the following error message: "Command Rejected . Change Not Allowed in Active Cell Mode." 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:AWGNoise:POWer



"Diagram Conventions" on page 210

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 AWGN power level or NAN. AWGN and cell power (see "CALL[:CELL]:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, an AWGN level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of AWGN and cell power causing total RF power limits to be exceeded (see "CALL:TOTal:POWer" for the allowable range of total RF power.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection" to set or query the amplitude offset value).
Setting	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
Query	Range: -170 dBm/3.84 MHz to +35 dBm/3.84 MHz, 9.91 E+37 Resolution: 0.01 dBm/3.84 MHz
*RST Setting	9.91 E+37
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.
```

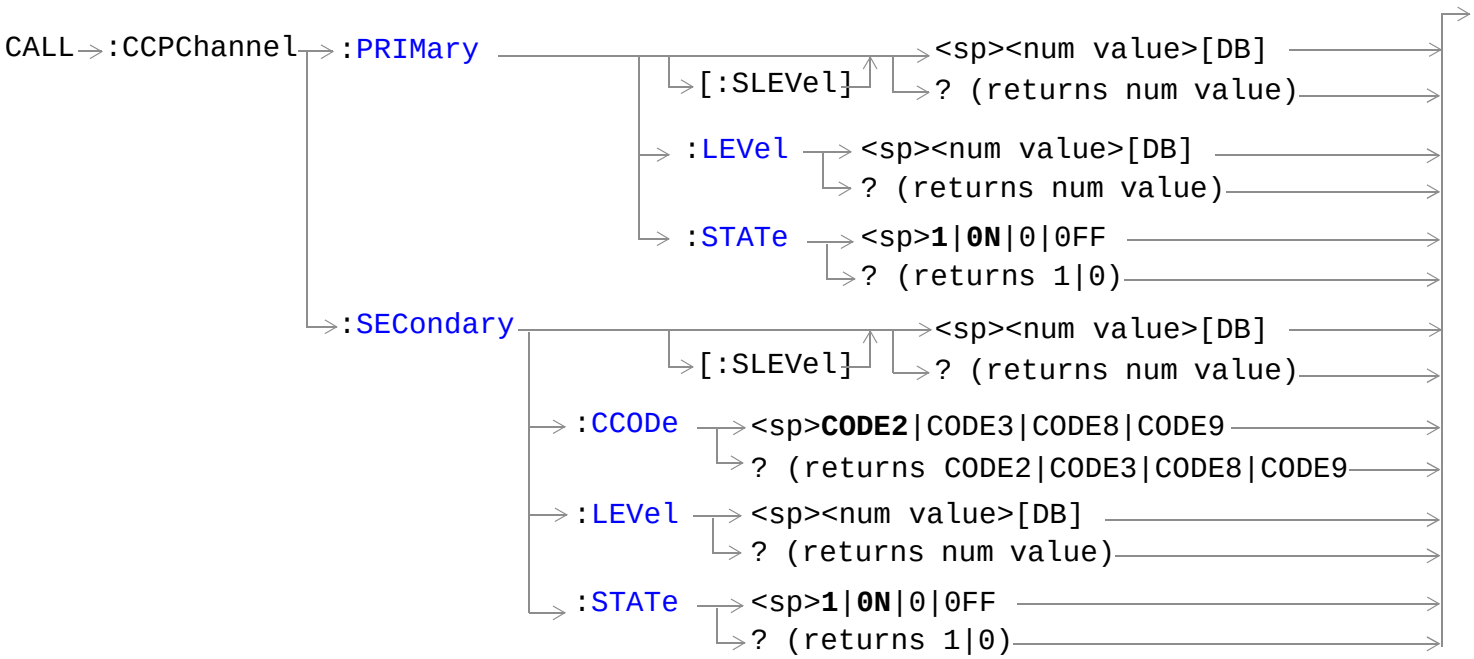
CALL:AWGNoise:POWer:AMPLitude

Function	Sets/queries the additive white gaussian noise (AWGN) level. AWGN and cell power (see "CALL[:CELL]:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, an AWGN level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of AWGN and cell power causing total RF power limits to be exceeded (see "CALL:TOTal:POWer" for range of total RF power.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection" to set or query the amplitude offset value).
Setting	Range: -120 dBm/3.84 MHz to -15 dBm/3.84 MHz, NAN Resolution: 0.01 dB
Query	Range: -120 dBm/3.84 MHz to -15 dBm/3.84 MHz, NAN Resolution: 0.01 dB
*RST Setting	NAN
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. AWGN and cell power (see "CALL[:CELL]:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, an AWGN level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of AWGN and cell power causing total RF power limits to be exceeded (see "CALL:TOTal:POWer" for range of total RF power.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection" to set or query the amplitude offset value).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	OFF
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:AWGNOISE:POWER:STATE:SELECTED ON" !Turns on AWGN.`	

CALL:CCPChannel



"Diagram Conventions" on page 210

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.`	

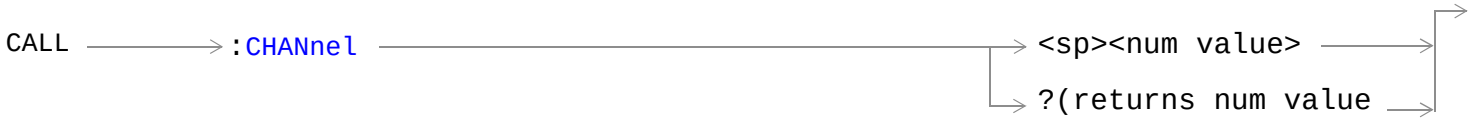
CALL:CCPChannel:SECondary:LEVel

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

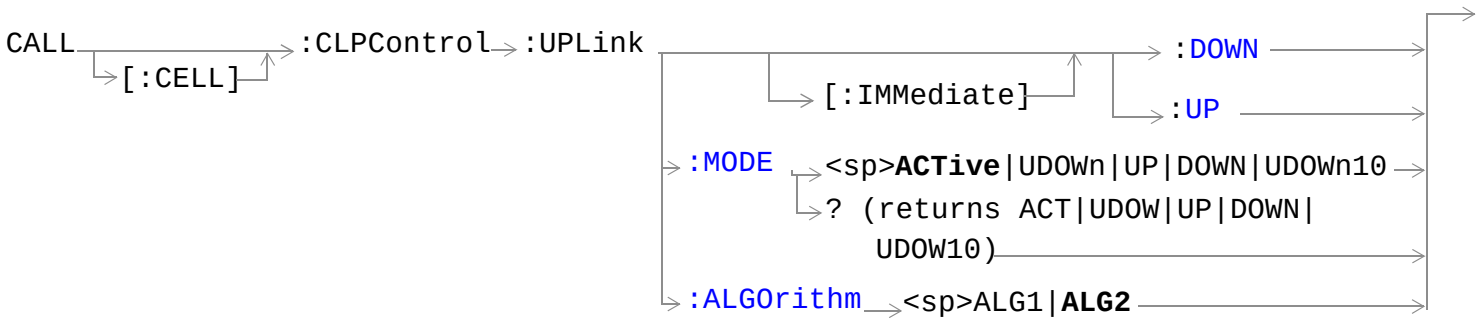


"Diagram Conventions" on page 210

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	9700
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:CHANNEL?" !Queries the downlink channel number.`	

CALL[:CELL]:CLPControl:UPLink



"Diagram Conventions" on page 210

CALL[:CELL]:CLPControl:UPLink[:IMMediate]:DOWN

Function	Sets the uplink inner loop power control to step down power. 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 step up power. 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"`	

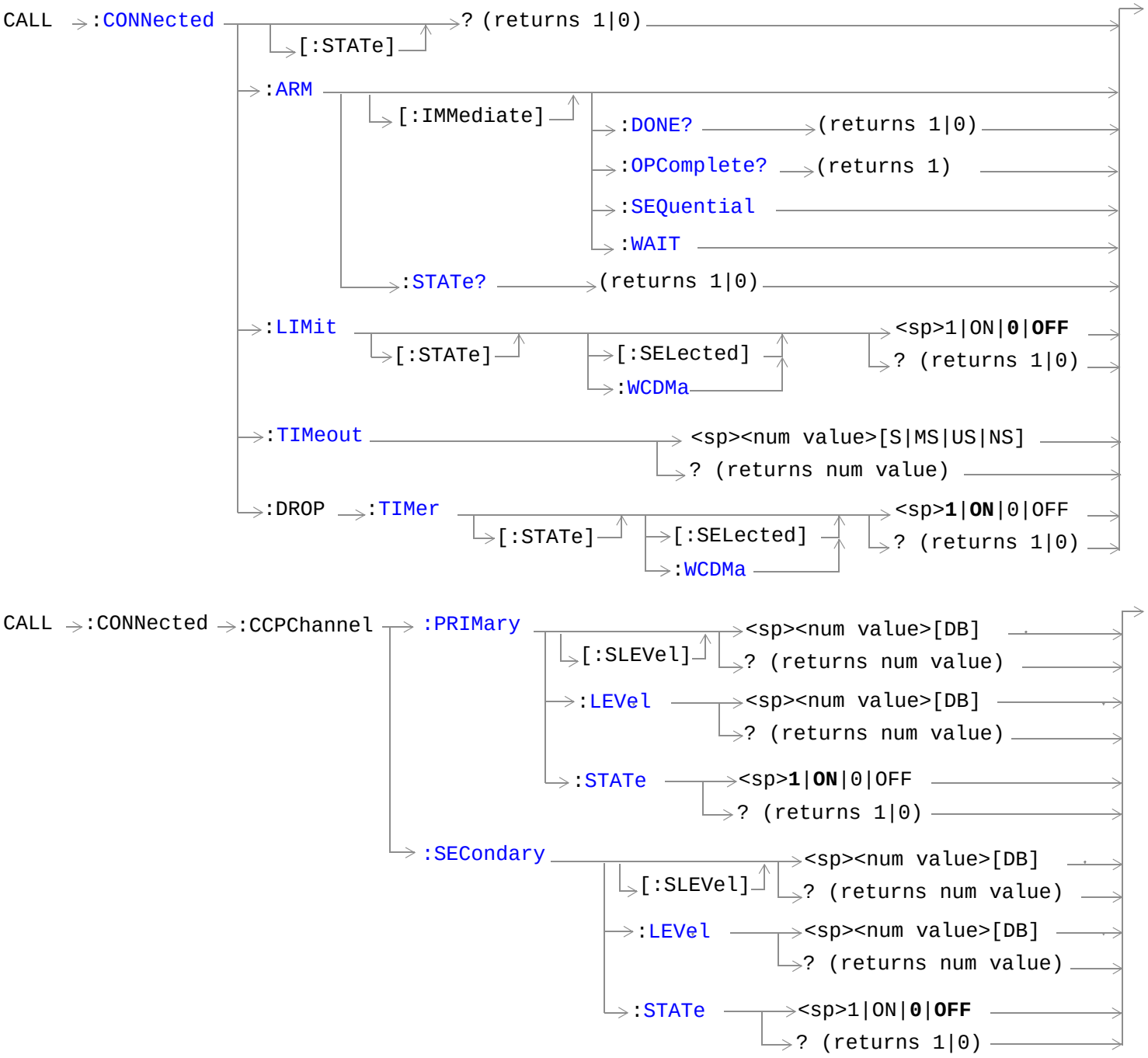
CALL[:CELL]:CLPControl:UPLink:MODE

Function	Sets/queries the uplink power control setting when using the Active Cell operating mode.
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.`	

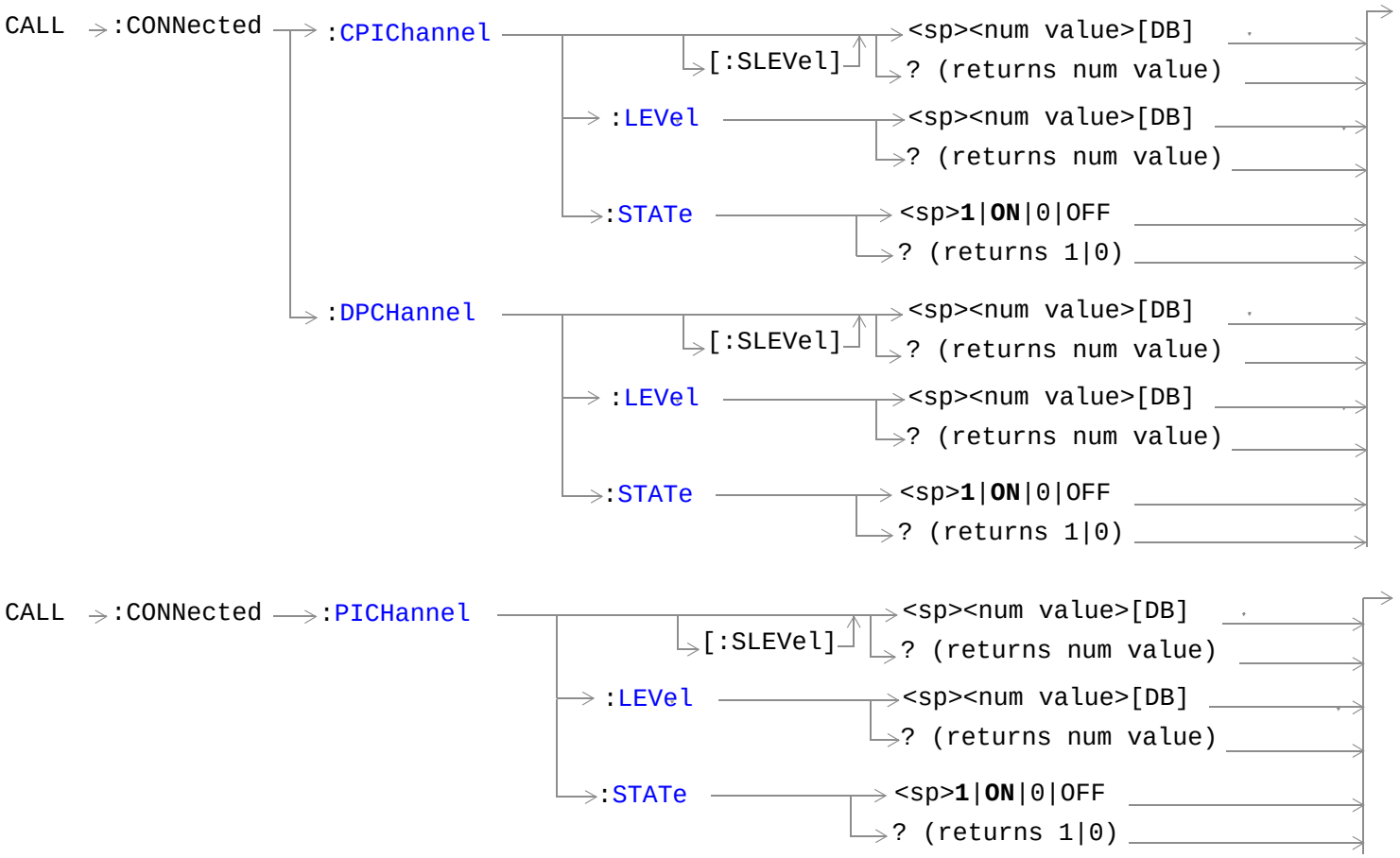
CALL[:CELL]:CLPControl:UPLink:ALGOrithm

Function	Sets/queries the power control algorithm setting when closed loop power control is active.
Setting	Range: • ALG1 • ALG2
Query	Range: Same as setting range.
*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:CONNected



CALL:CONNected



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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. 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 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.`	

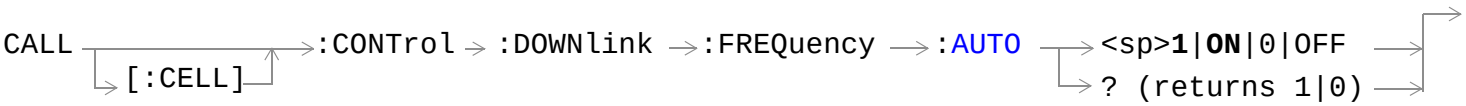
CALL:CONNected:PICHannel:LEVel

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[:CELL]:CONTrol:DOWNlink:FREQuency:AUTO



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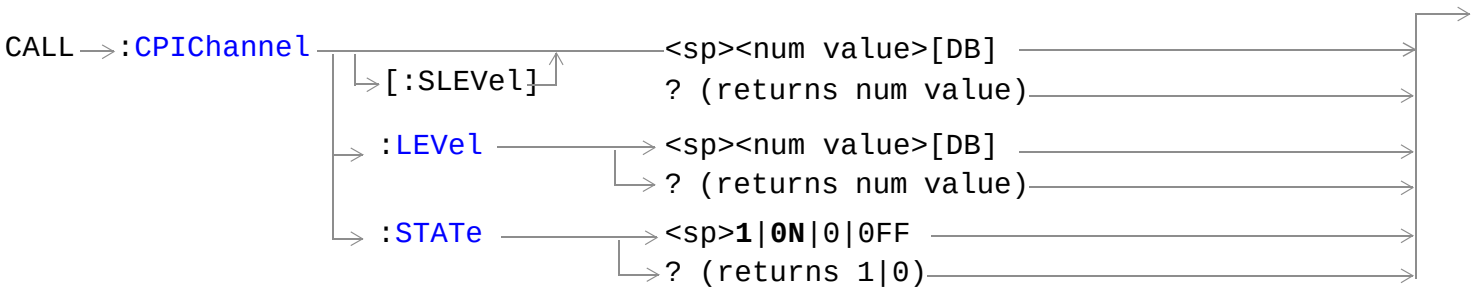
CALL[:CELL]:CONTrol:DOWNlink:FREQuency:AUTO

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[:CELL]: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 210

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"`	

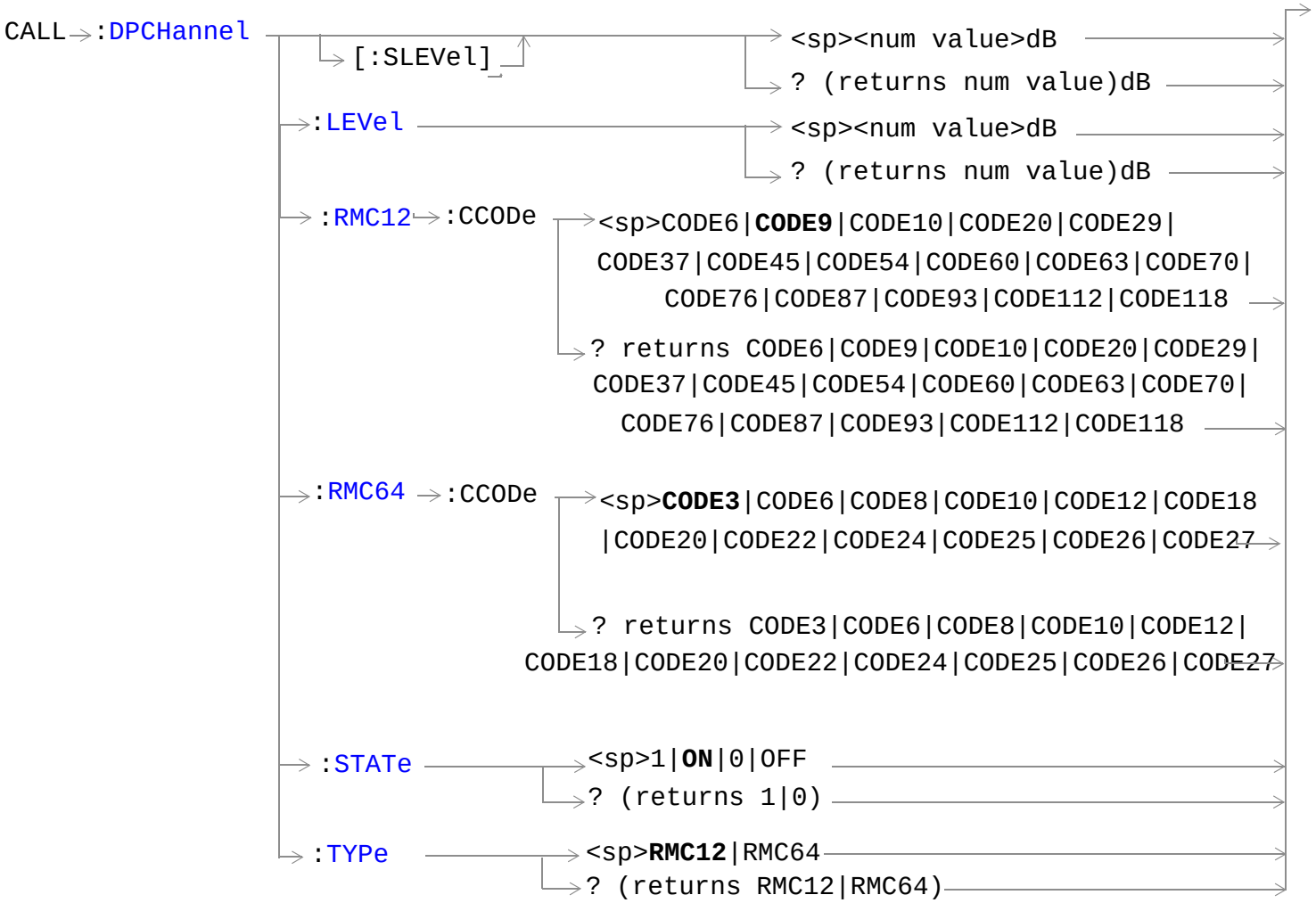
CALL:CPIChannel:LEVel

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:DPCHannel



"Diagram Conventions" on page 210

CALL:DPCHannel[:SLEVel]

Function	Sets/queries the dedicated physical channel's (DPCH) initial downlink offset, and sets its state to ON.
Setting	Range: -20.00 to 0 Resolution: 0.01
Query	Range: -20.00 to 0 Resolution: 0.01
*RST Setting	-12.00 dB
Requirements	Test Application Revision: A.02 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: -20.00 to 0 Resolution: 0.01
Query	Range: -20.00 to 0 Resolution: 0.01
*RST Setting	-12.00 dB
Requirements	Test Application Revision: A.02 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 8960 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 8960 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	CODE3
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:DPCHANNEL:RMC64:CCODE CODE3" !Sets the 64 RMC's channelization code.`	

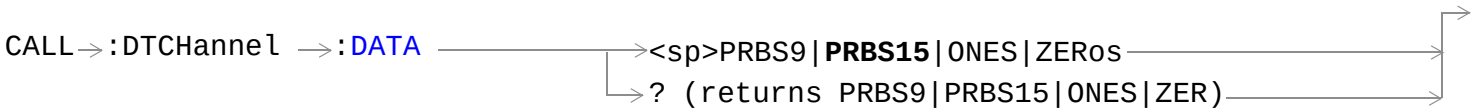
CALL:DPCHannel:STATe

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 | OFF
Query	Range: 1|ON | 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:DATA



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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:END

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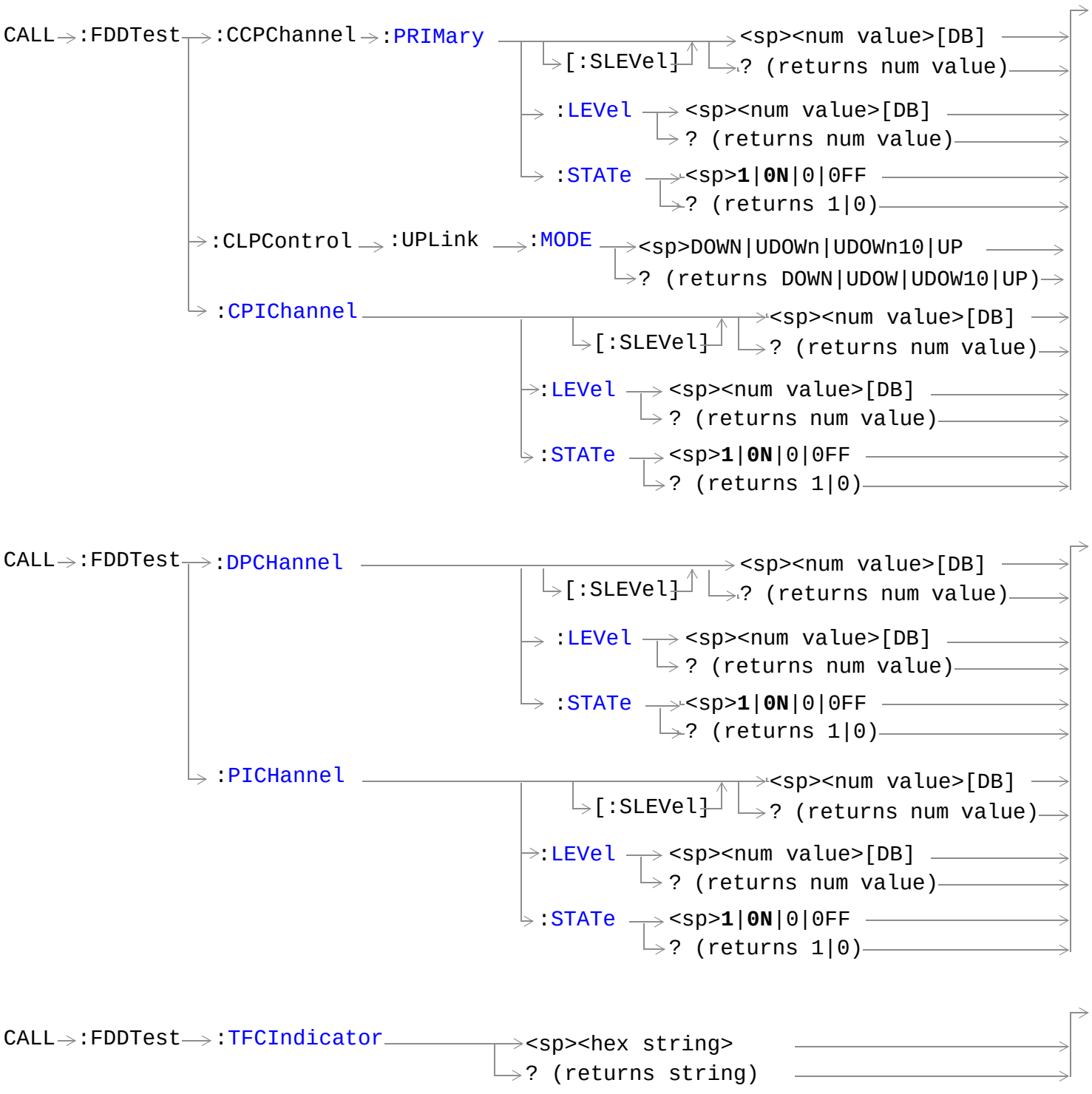
CALL:END

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



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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: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -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: -20.00 dB to 0 dB Resolution: 0.01
Query	Range: -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: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"`	

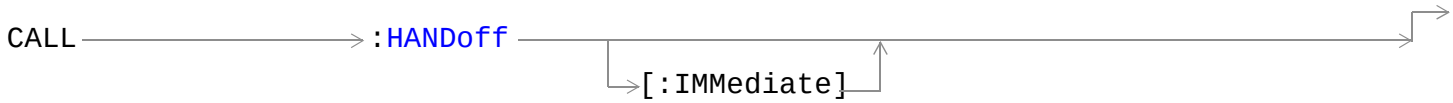
CALL:FDDTest:PICHannel:STATe

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[:IMMediate]



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CALL:HANDoff[:IMMediate]

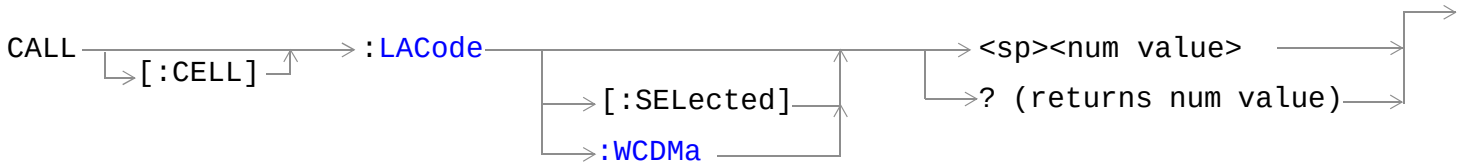
Function	Initiates a handoff while on a call (and in Active Cell mode). Any measurements that have been initiated are aborted when a handoff is initiated. A handoff can initiate a change of channel type, a change in downlink DPCH channelization code, a change in frequency (UARFCN), or both while maintaining the connection.
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:HANDOFF:IMMEDIATE"`	

Related Topics

"CALL:SETup:CHANnel[:SELected]:DOWNlink"

"CALL:SETup:CHANnel[:SELected]:UPLink"

CALL[:CELL]:LACode



"Diagram Conventions" on page 210

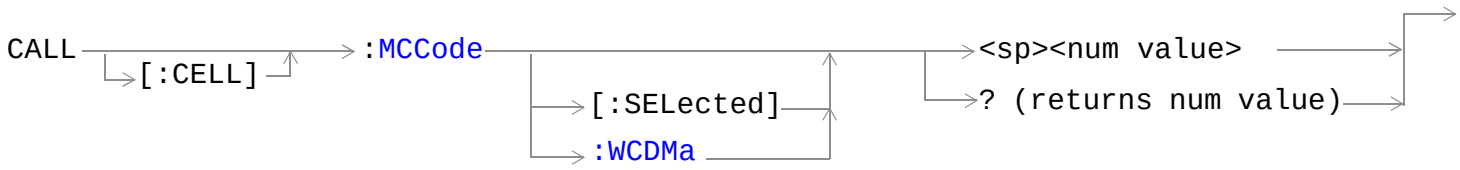
CALL[:CELL]:LACode[:SELected]

Function	Sets/queries the local area code (LAC), for the currently selected 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	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[:CELL]:MCCode



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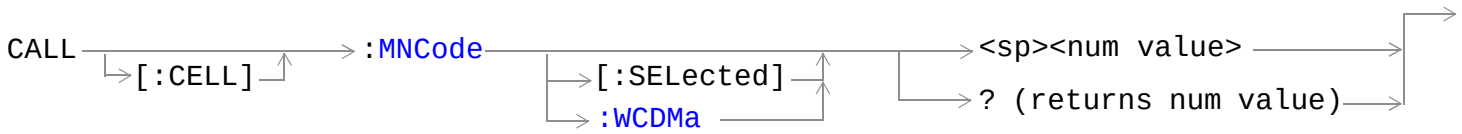
CALL[:CELL]:MCCode[:SELected]

Function	Sets/queries the mobile country code (MCC) for the currently selected 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 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. 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 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[:CELL]:MNCode



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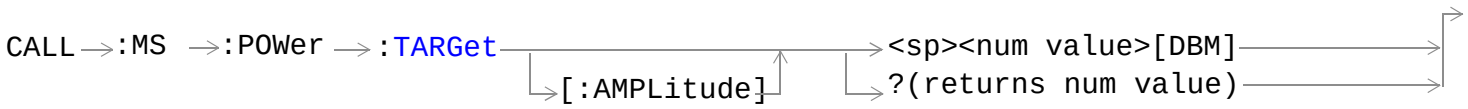
CALL[:CELL]:MNCode

Function	Sets/queries the mobile network code (MNC) for the currently selected 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 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

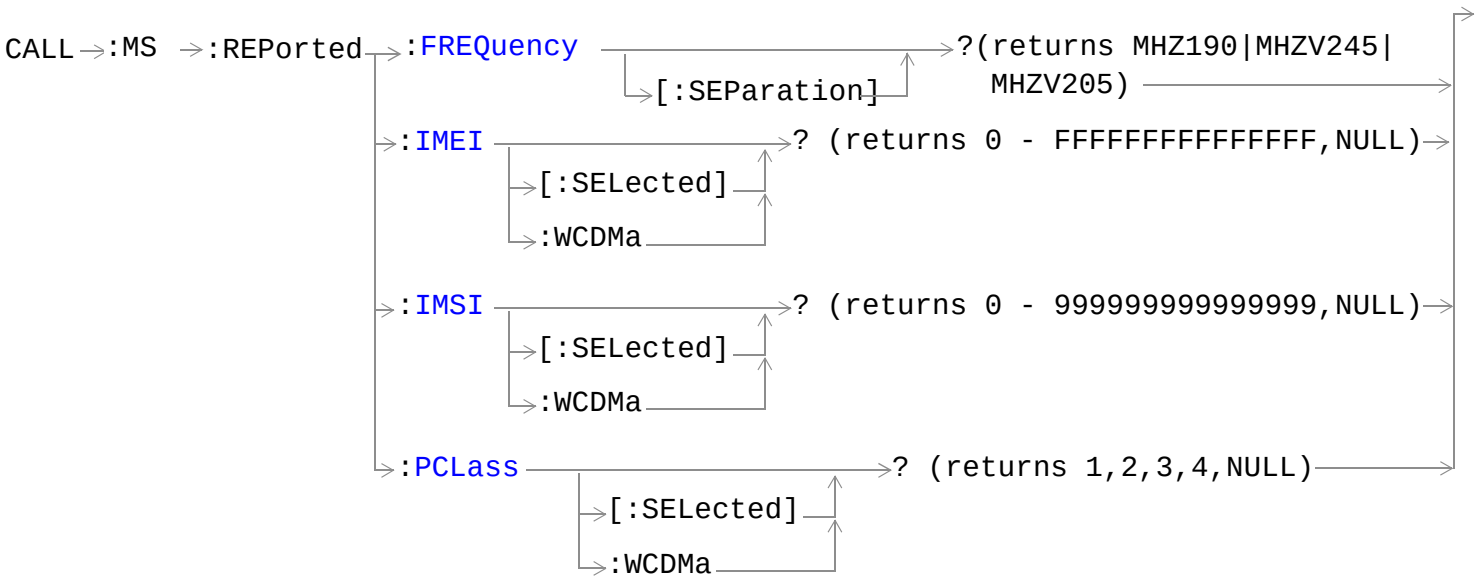


"Diagram Conventions" on page 210

CALL:MS:POWer:TARGet[:AMPLitude]?

Function	Sets/queries the UE (mobile station) target transmitter power. When operating in FDD test mode, this setting sets the UE expected power into the test set when using automatic receiver control. This setting does not control the UE output power in any way. The user must set this value when making measurements that do not provide autoranging to prevent an over range or an under range measurement situation. See "FDD Test Operating Mode" . When operating in Active Cell mode, if the uplink closed loop power control (`UL CL Power Ctrl`) is in the active bits mode, the instrument will measure the mobile's transmit power and it will send the required transmit power control bit patterns to the mobile. This setting does not directly set the transmit power of the mobile, but it will drive the mobile power to the setting if closed loop power is active. See "CALL[:CELL]:CLPControl:UPLink:MODE" . As in FDD Test operating mode, this setting has the secondary function of setting the test set receiver's expected power level when the receiver power control state is set to AUTO.
Query	Range: -50 dBm to +24 dBm Resolution: 1 dB
*RST Setting	24 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 210

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 FFFFFFFFFFFFFF, or "" (null string)
*RST Setting	DB1
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:MS:REPORTED:IMEI:SELECTED?"`	

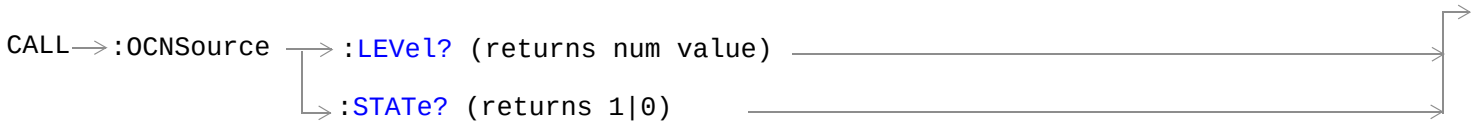
CALL:MS:REPorted:IMSI[:SELected]?

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:OCNSource



"Diagram Conventions" on page 210

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[:CELL]:OPERating

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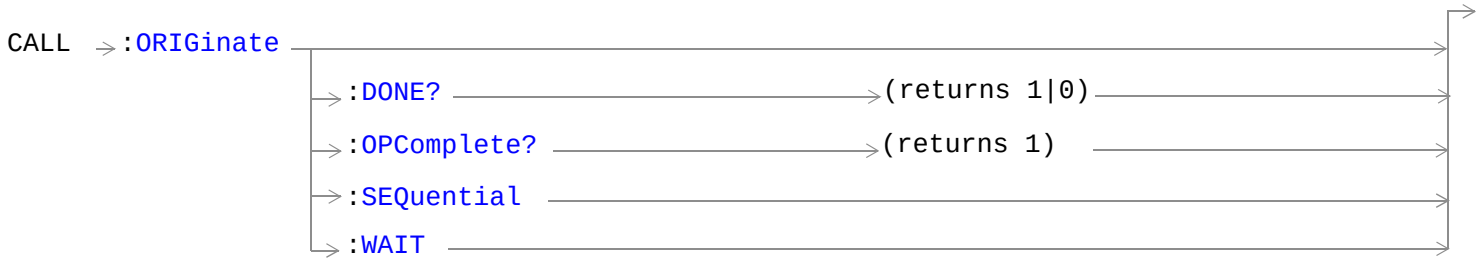
CALL[:CELL]:OPERating:MODE

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?"`	

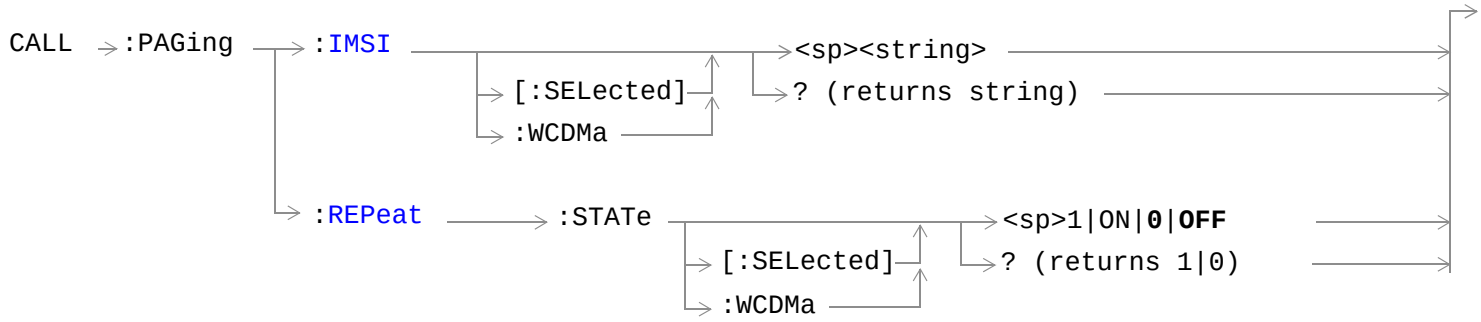
CALL:ORIGinate:SEQuential

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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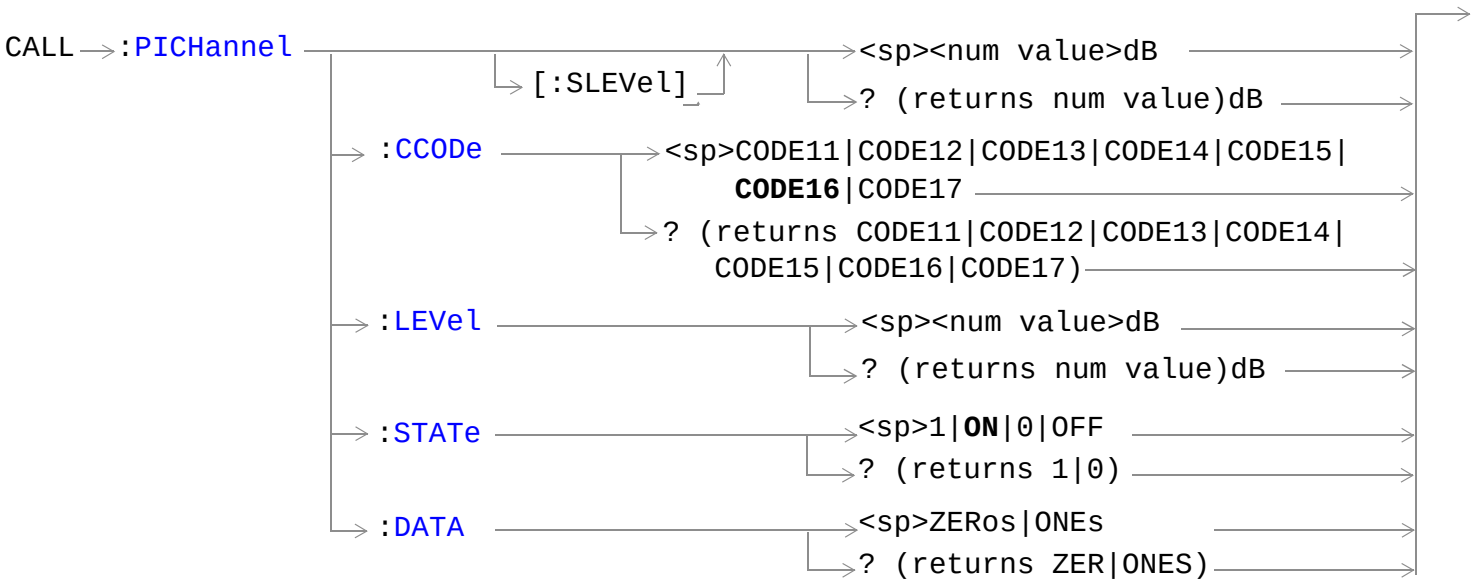
CALL:PAGing:iMSI[:SELected]

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: 0 - 999999999999999
Query	Range: 0 - 999999999999999
*RST Setting	001012345678901
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:PAGING:IMSI:WCDMA 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: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”`	

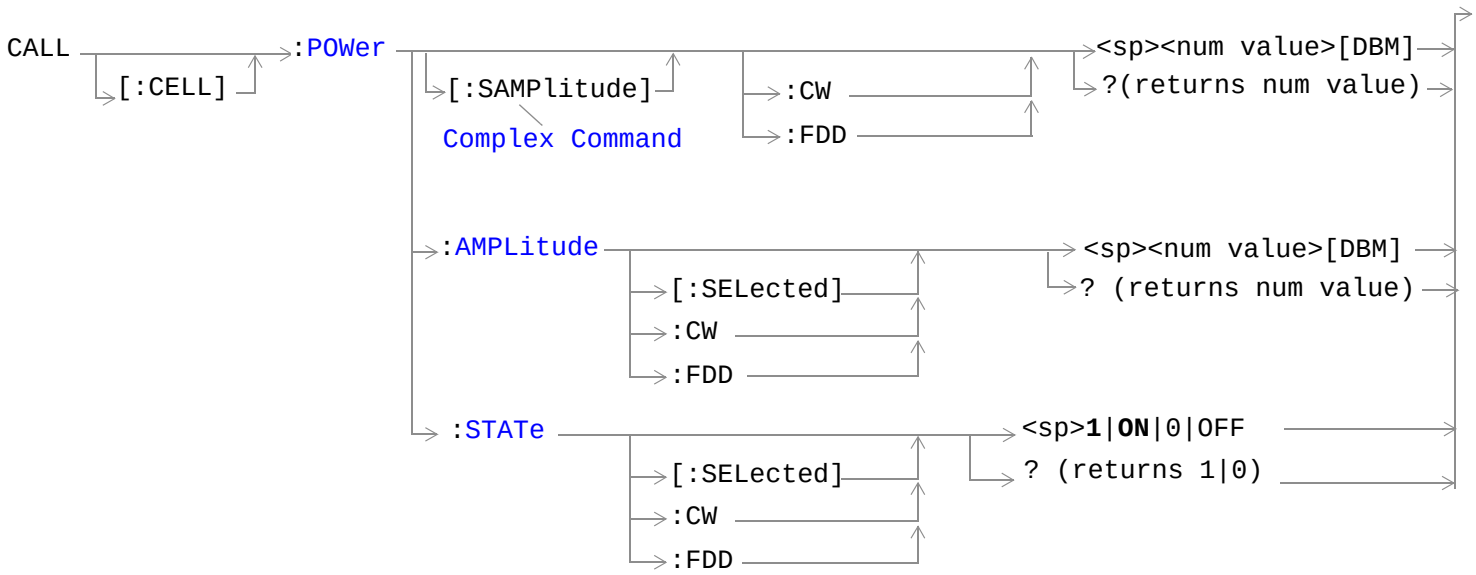
CALL:PICHannel:STATe

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[:CELL]:POWer



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CALL[:CELL]:POWer[:SAMPLitude]

Function	Sets/queries the cell power level (including compensation for amplitude offset), and sets its state to ON. The cell power settings for the CW operating mode are independant of the cell power settings for the other operating modes.
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	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]

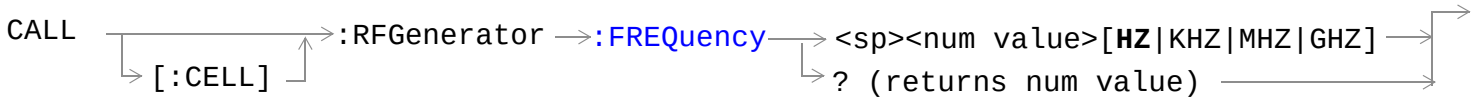
Function	Sets/queries the cell power level (including compensation for amplitude offset). The optional [:SELected] keyword in this command specifies that the cell power level being set or queried applies to the current system type. The current system type can be changed using the "CALL[:CELL]:SYSTem[:TYPE]?" command. The cell power settings for the CW operating mode are independant of the cell power settings for the other operating modes.
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	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. The current system type can be changed using the "CALL[:CELL]:SYSTem[:TYPE]?" command. The cell power settings for the CW operating mode are independant 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[:CELL]:RFGenerator

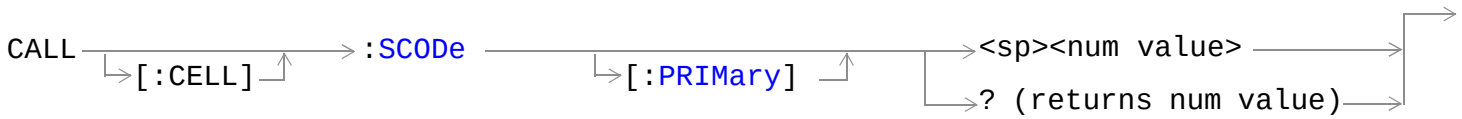


"Diagram Conventions" on page 210

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[:CELL]:CONTrol:DOWNlink:FREQuency:AUTO" 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[:CELL]:SCODe

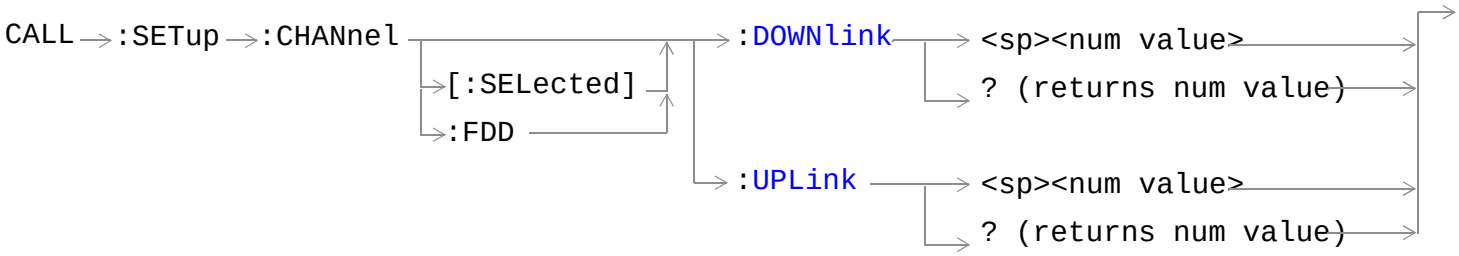


"Diagram Conventions" on page 210

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	1
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:CELL:SCODe 10" !Sets the primary scrambling code to 10.`	

CALL:SETup:CHANnel



"Diagram Conventions" on page 210

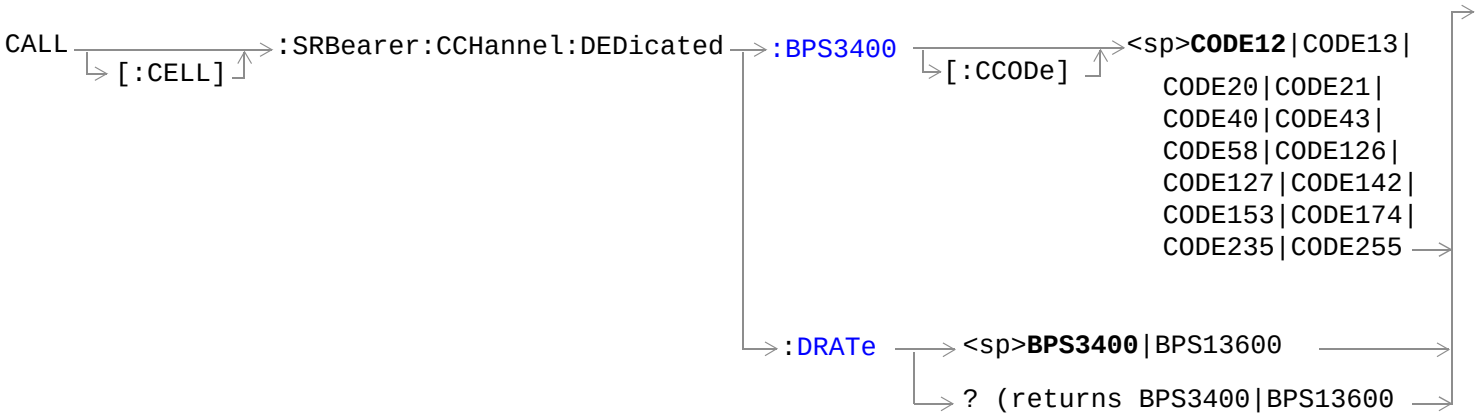
CALL:SETup:CHANnel[:SELected]:DOWNlink

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[:CELL]:SRBearer:CCHannel:DEDicated



"Diagram Conventions" on page 210

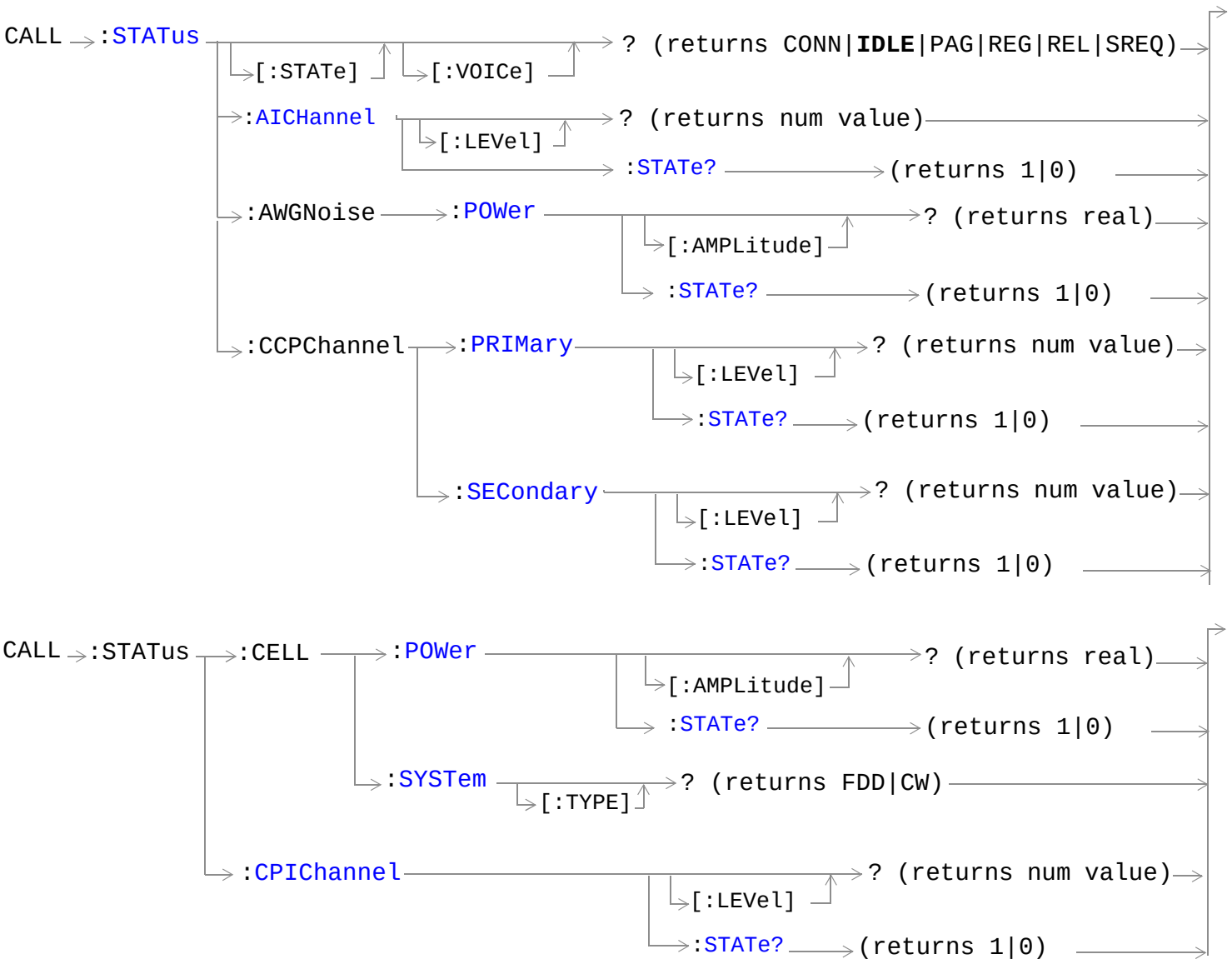
CALL[:CELL]:SRBearer:CCHannel:DEDicated:BPS3400[:CCODe]

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

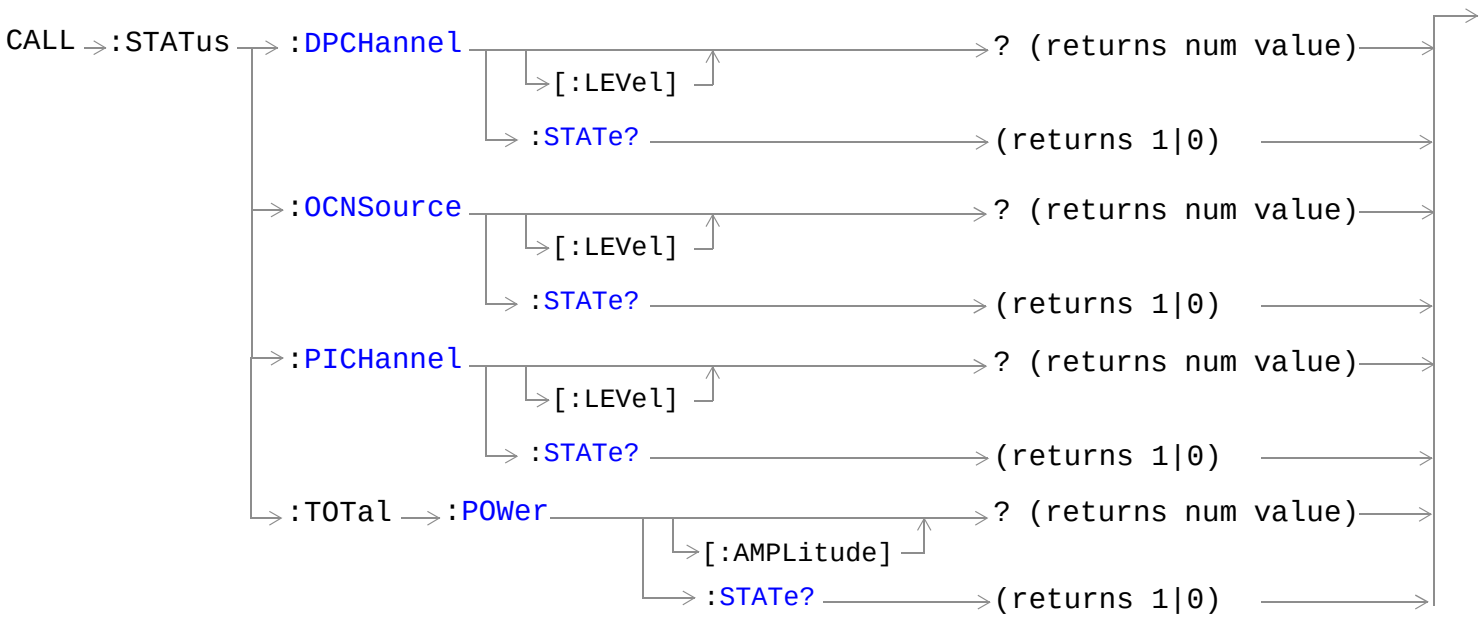
Function	Sets/queries the initial signaling radio bearer (SRB) configuration: 3.4 kbps (BPS3400) or 13.4 kbps (BPS 13400).
Setting	Range: BPS3400|BPS13600
Query	Range: BPS3400|BPS13600
*RST Setting	BPS3400
Requirements	Test Application Revision: A.02 and above
Programming Example `OUTPUT 714;"CALL:CELL:SRBEARER:CCHANNEL:DEDICATED:DRATE BPS13600”`	

CALL:STATus


CALL
:STATus
[:STATe]
[:VOICe]
? (returns CONN|IDLE|PAG|REG|REL|SREQ)
:AICHannel
[:LEVel]
? (returns num value)
:STATe?
(returns 1|0)
:AWGNoise
:POWer
[:AMPLitude]
? (returns real)
:STATe?
(returns 1|0)
:CCPChannel
:PRIMary
[:LEVel]
? (returns num value)
:STATe?
(returns 1|0)
:SECondary
[:LEVel]
? (returns num value)
:STATe?
(returns 1|0)

CALL
:STATus
:CELL
:POWer
[:AMPLitude]
? (returns real)
:STATe?
(returns 1|0)
:SYSTem
[:TYPE]
? (returns FDD|CW)
:CPIChannel
[:LEVel]
? (returns num value)
:STATe?
(returns 1|0)

CALL:STATus



"Diagram Conventions" on page 210

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:POWer" commands.
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	9.91 E+37
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:POWer" commands.
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[:CELL]:POWer" commands.
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	-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[:CELL]:POWer" commands.
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[:CELL]:OPERating") the current system type is selected by the "CALL[:CELL]: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[:CELL]: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[: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?"`	

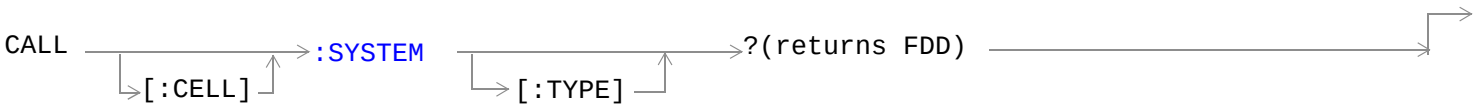
CALL:STATus:TOTal:POWer[:AMPLitude]?

Function	Queries the total RF power of the currently selected system type. The total RF power is equal to the sum of the cell power setting (see "CALL[:CELL]:POWer") and the AWGN setting (see "CALL:AWGNoise:POWer").
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	9.91 E+37
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:STATUS:TOTAL:POWER:AMPLITUDE?"`	

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[:CELL]: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[:CELL]:SYSTem

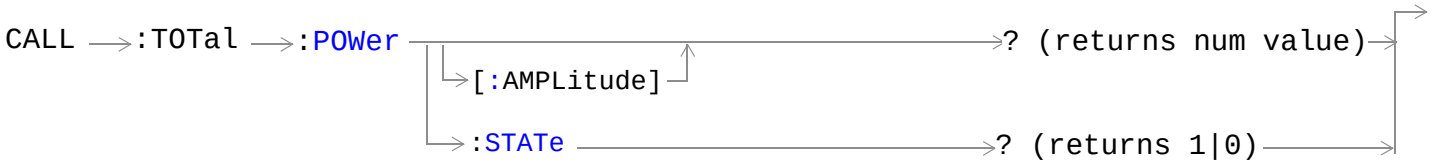


"Diagram Conventions" on page 210

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 210

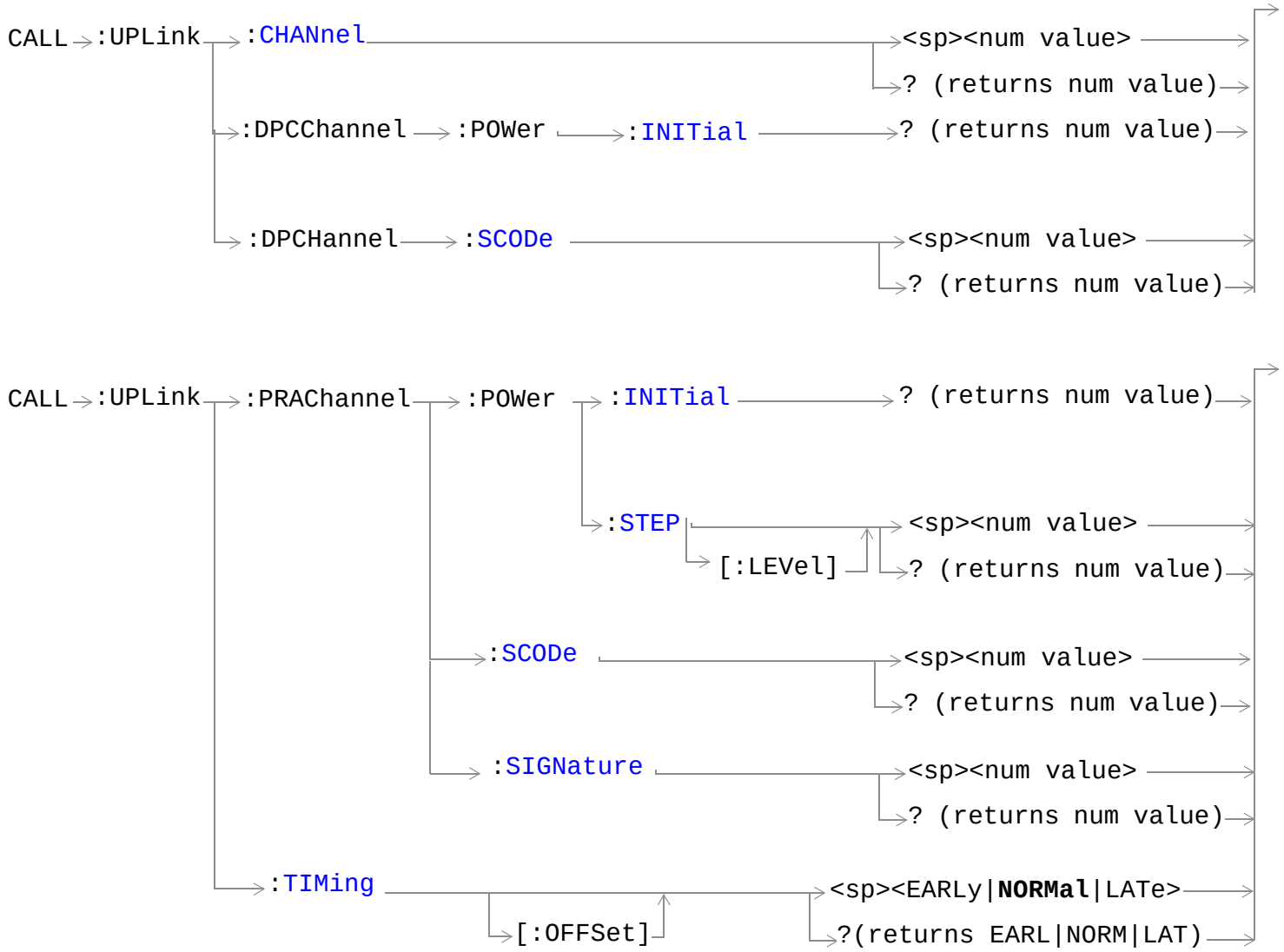
CALL:TOTal:POWer[:AMPLitude]?

Function	Queries the total RF power settings for the current system type. Total RF Power is the sum of cell power and AWGN power
Query	Range: • -170 dBm/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	9.91 E+37
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. This command may return a state that has been requested of the test set, but that has been pended or delayed for some reason. 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	0 (off)
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"CALL:TOTAL:POWER:STATE?"`	

CALL:UPLink



"Diagram Conventions" on page 210

CALL:UPLink:CHANnel

Function	Sets/queries the uplink channel number (FDD UL UARFCN). 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: • 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:SCODe

Function	Sets/queries the uplink dedicated physical channel's scrambling code. 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: 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: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. 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: 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:SCODe

Function	Sets/queries the uplink physical random access channel's scrambling code. 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: 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. 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: 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:TIMing[:OFFSet]

Function	Sets/queries the uplink physical random access channel's timing offset. 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: 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.

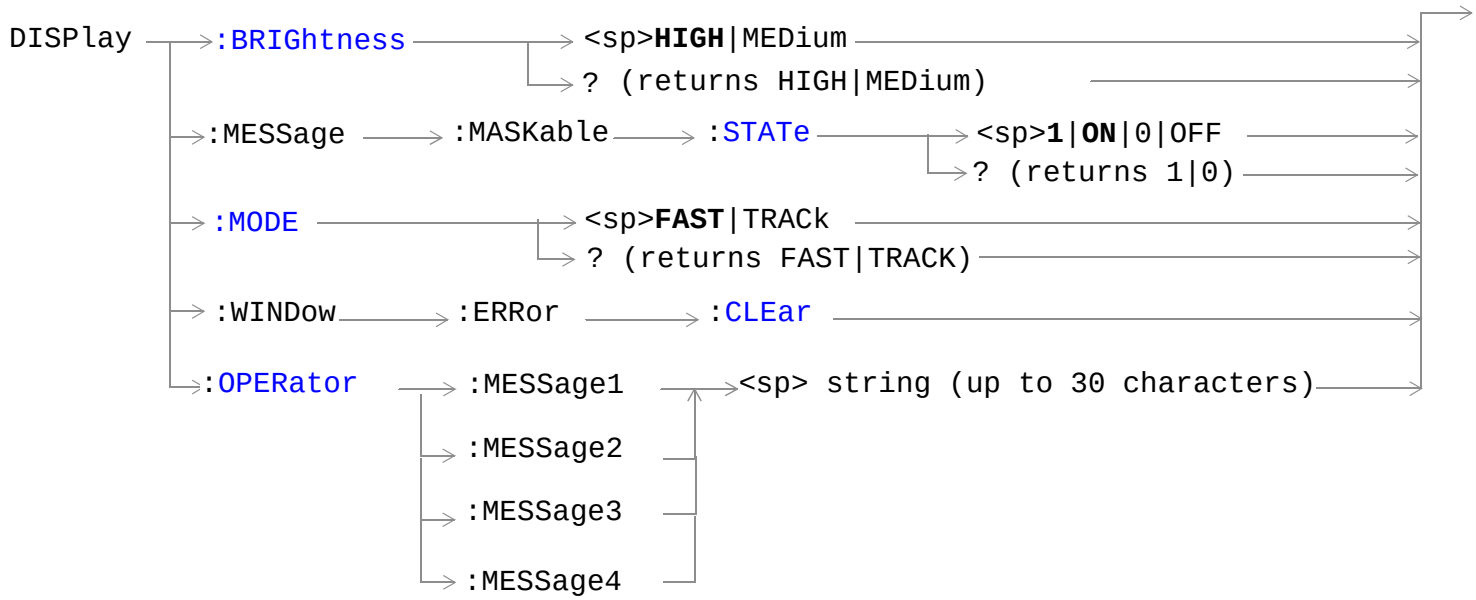
Display Backlight Dimming

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 210

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 310.
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 588.
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 315 (AF Analyzer measurements)

"FETCh:WACLeakage" on page 325 (Adjacent Channel Leakage measurements)

"FETCh:WBERror" on page 328 (Loopback Bit Error Ratio measurements)

"FETCh:WCDomain" on page 331 (Code Domain measurements)

"FETCh:WCPower" on page 337 (Channel Power measurements)

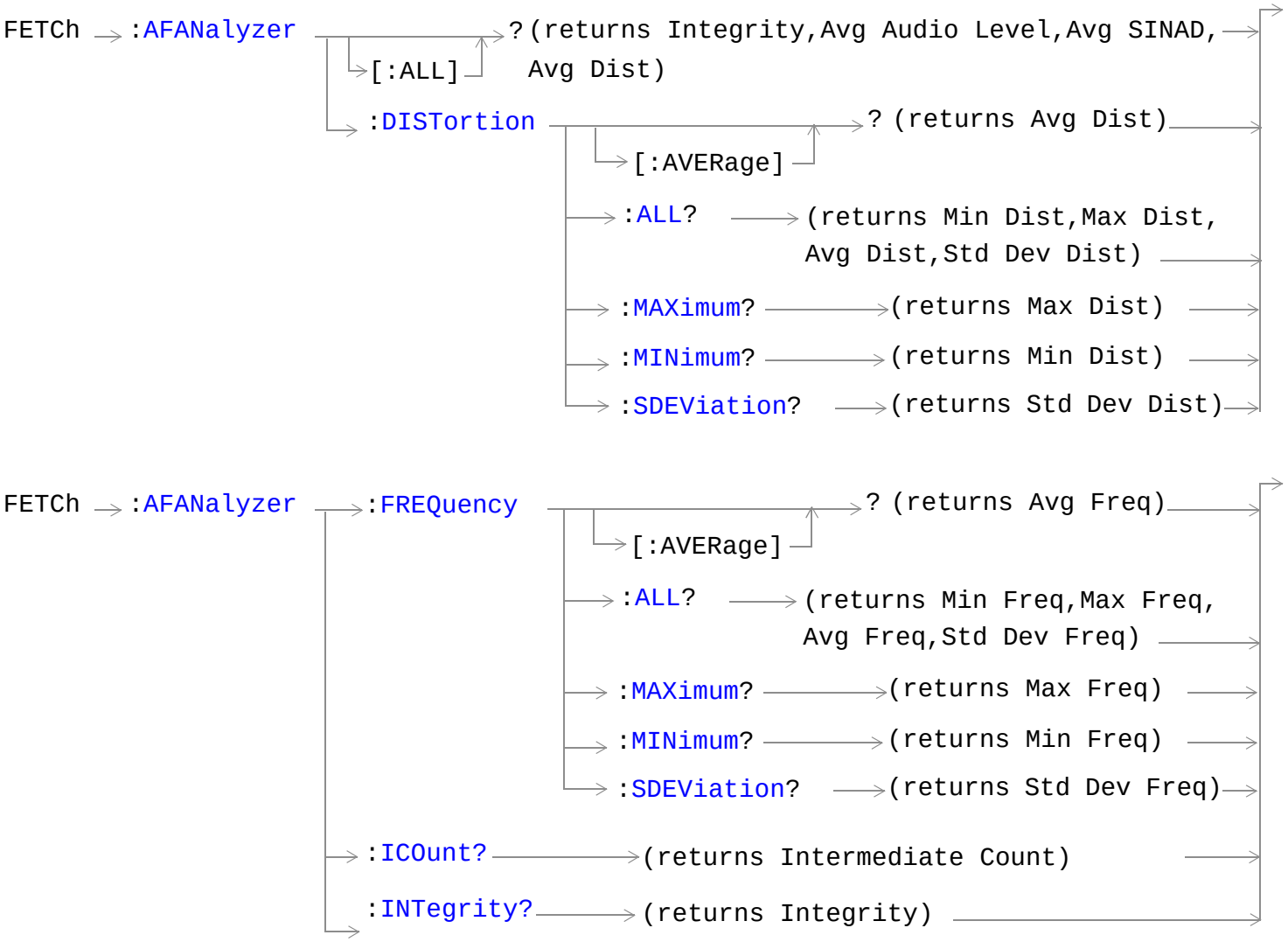
"FETCh:WOBWidth" on page 341 (Occupied Bandwidth measurements)

"FETCh:WSEMask" on page 345 (Spectrum Emission Mask measurements)

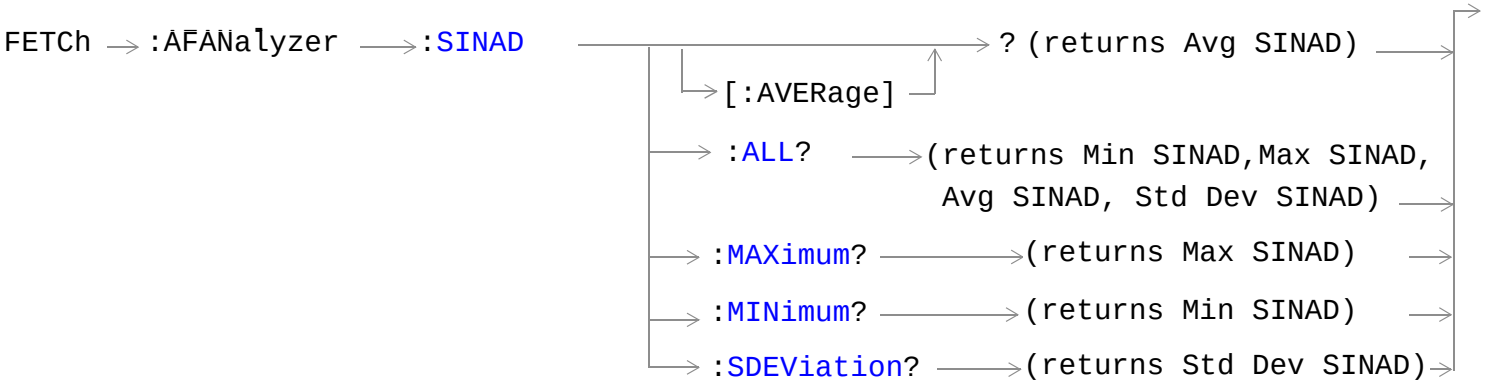
"FETCh:WTPower" on page 351 (Thermal Power measurements)

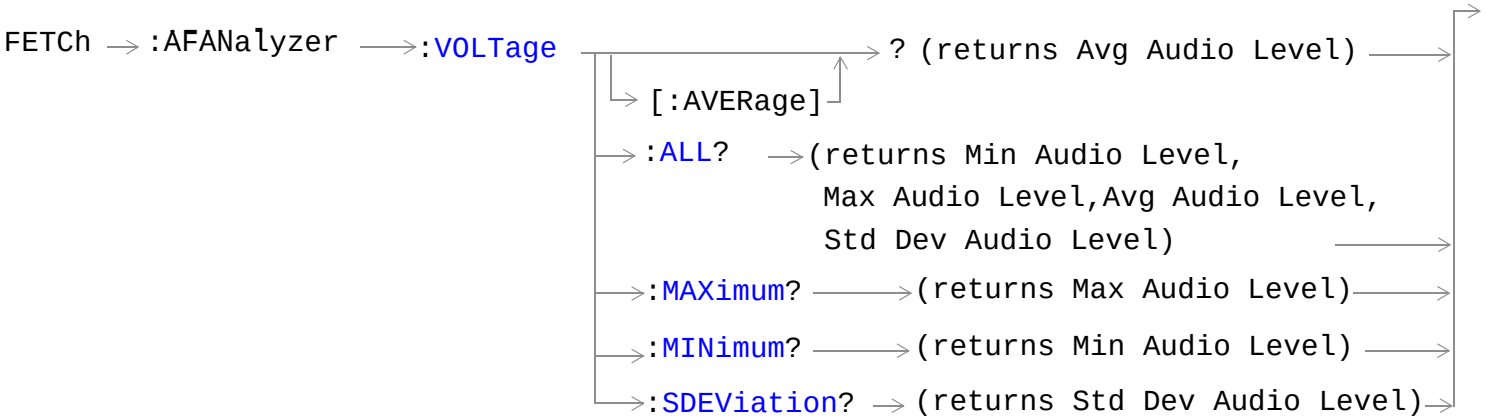
"FETCh:WWQuality" on page 355 (Waveform Quality measurements)

FETCh:AFANalyzer



FETCh:AFANalyzer





"Diagram Conventions" on page 210

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 190 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?"
```

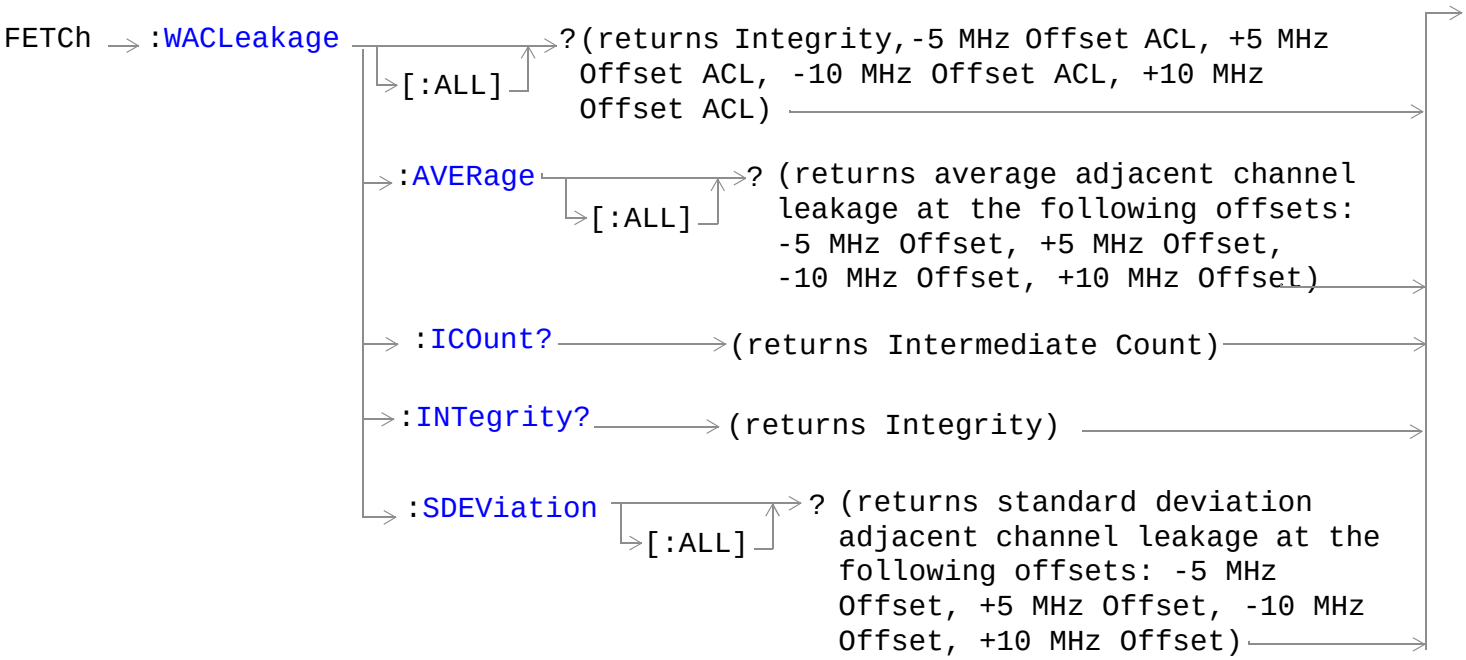
FETCh:AFANalyzer:VOLTage:SDEViation?

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:WACLeakage



"Diagram Conventions" on page 210

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 410.
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 190 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.
```

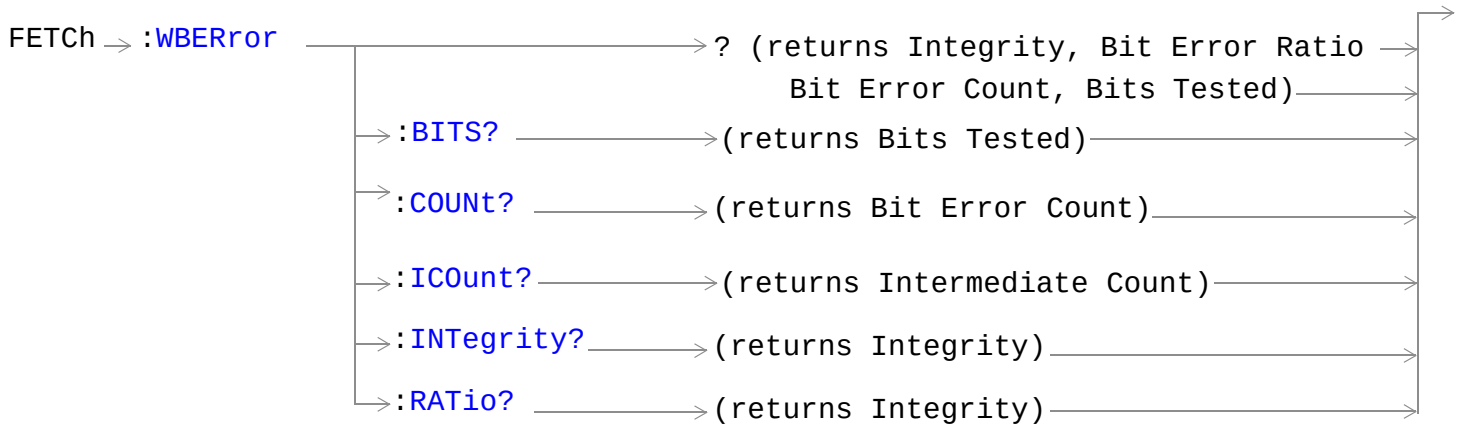
FETCh:WACLeakage:SDEViation[:ALL]?

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 210

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 190 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?"
```

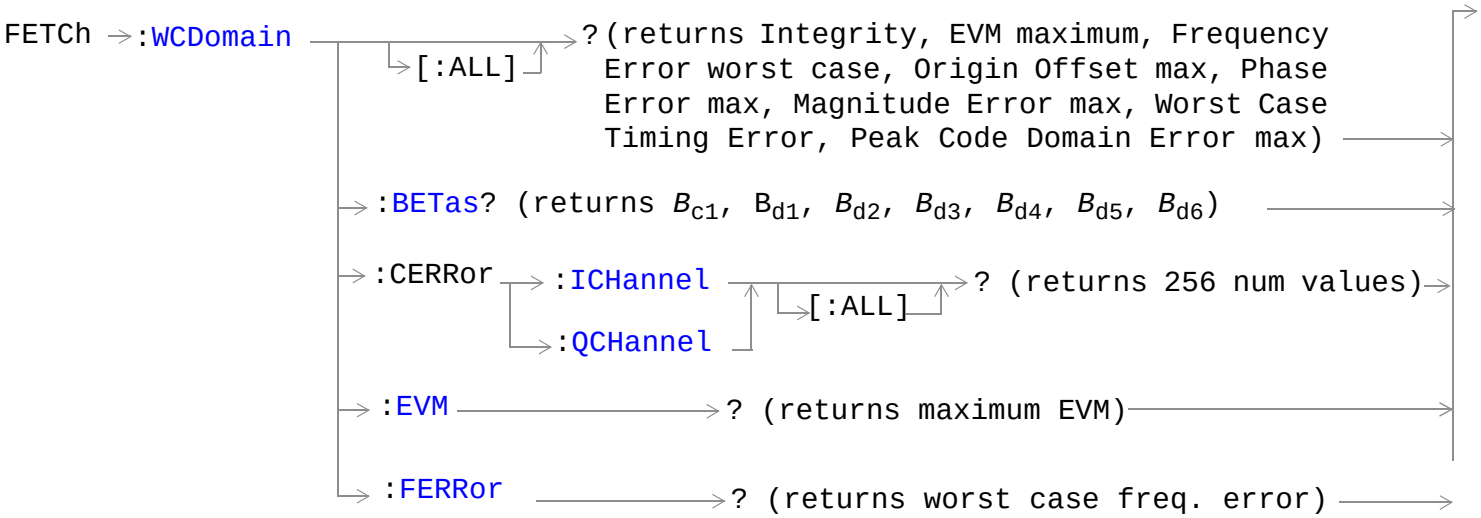
FETCh:WBERror:RATio?

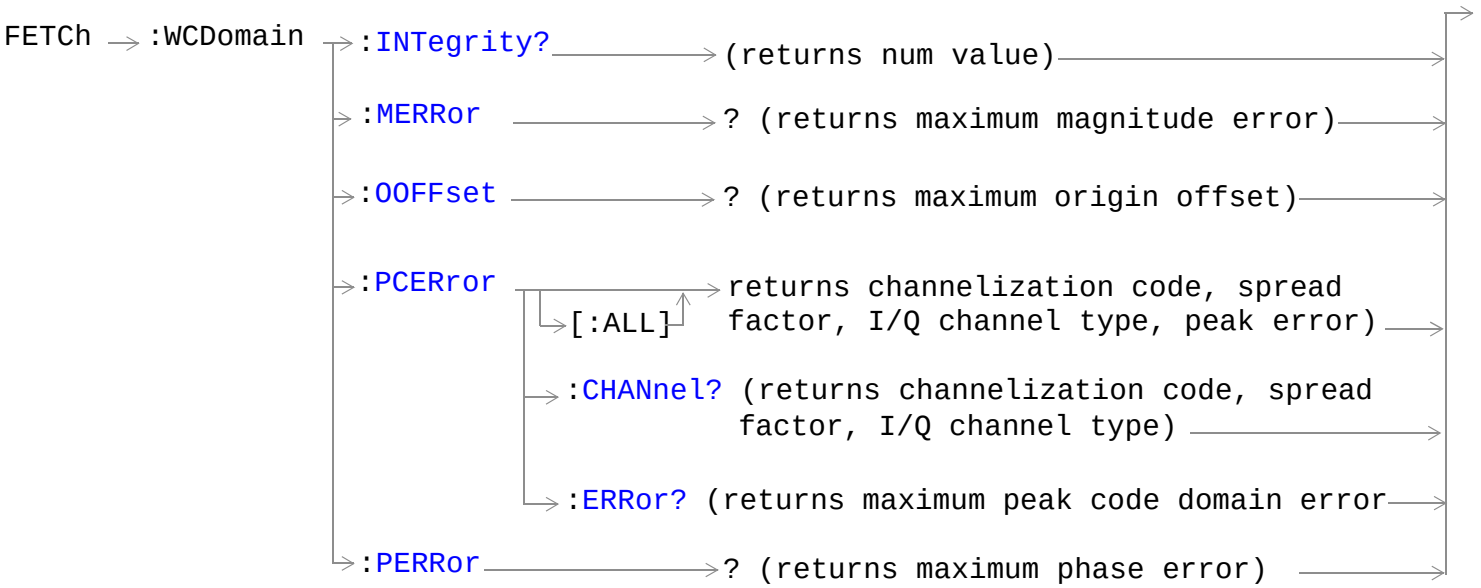
Function	Queries the loopback bit error ratio measurement.
Query	Range: 0 to 99%, 9.91 E+37
Requirements	Test Application Revision: A.01 and above

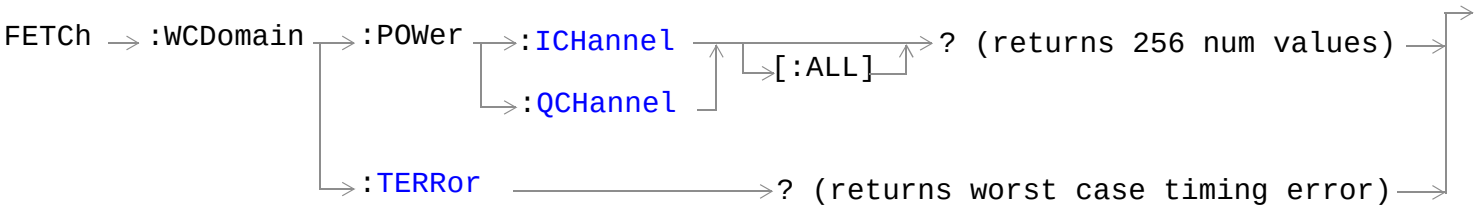
Programming Example

```
OUTPUT 714;"FETCH:WBERROR:RATio?"
```

FETCh:WCDomain







"Diagram Conventions" on page 210

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 190 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?"
```

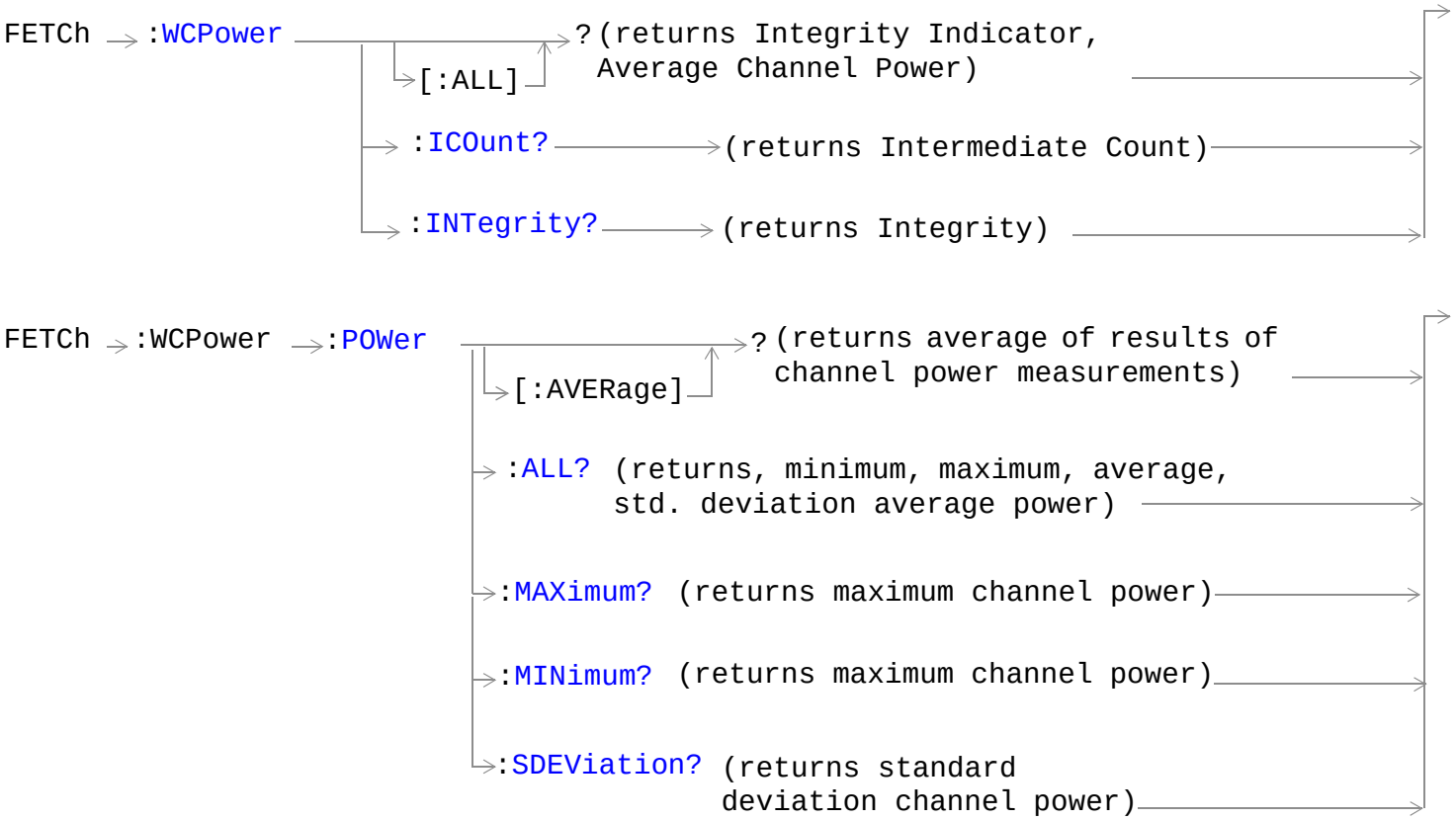
FETCh:WCDomain:TERRor?

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 210

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 190 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 422.
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 422. 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 422.
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 422.
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.
```

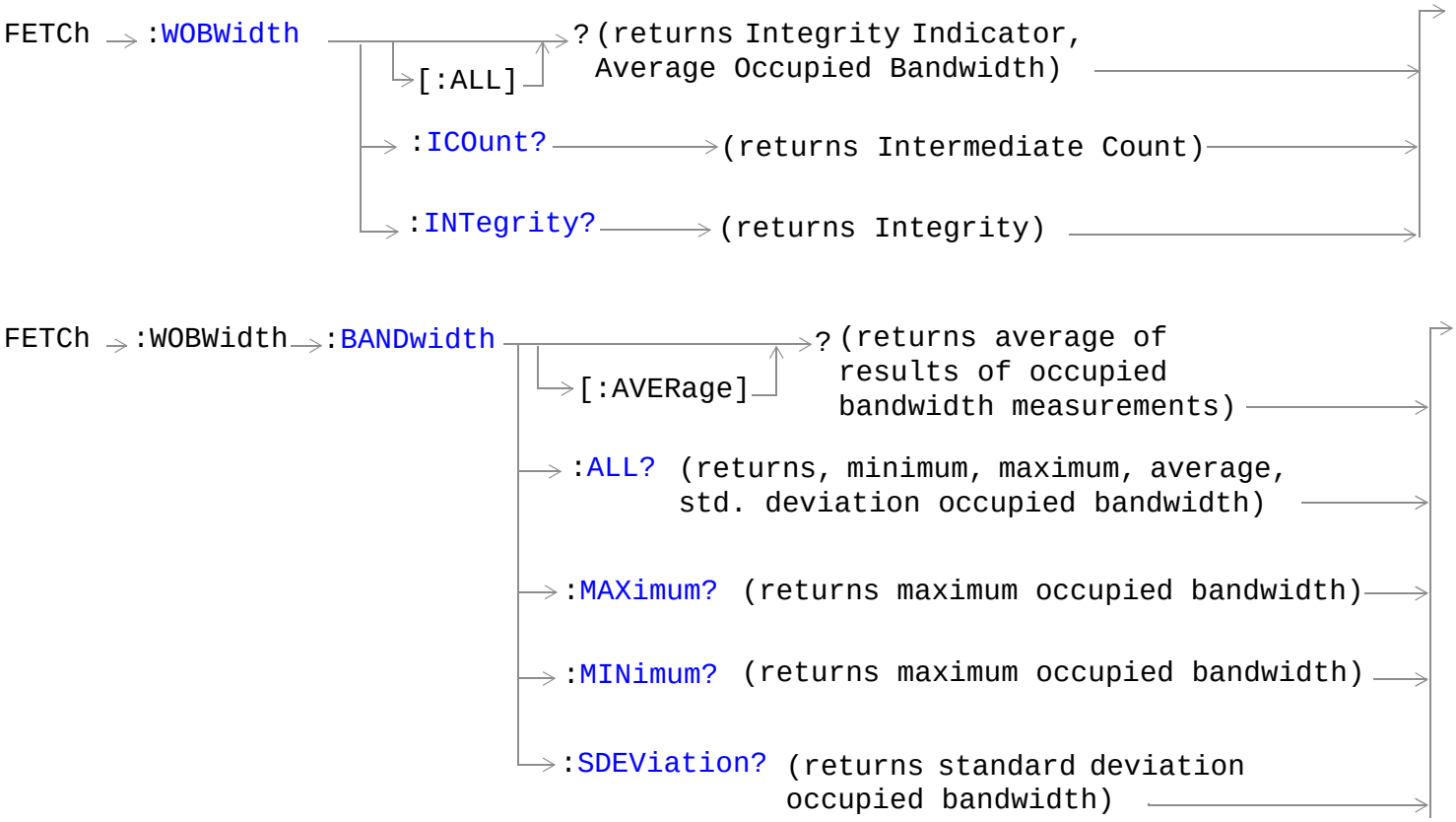
FETCh:WCPower:POWer:SDEViation?

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 422.
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:WOBWidth



"Diagram Conventions" on page 210

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 190 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 427.
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 427. 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 427.
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 427.
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.
```

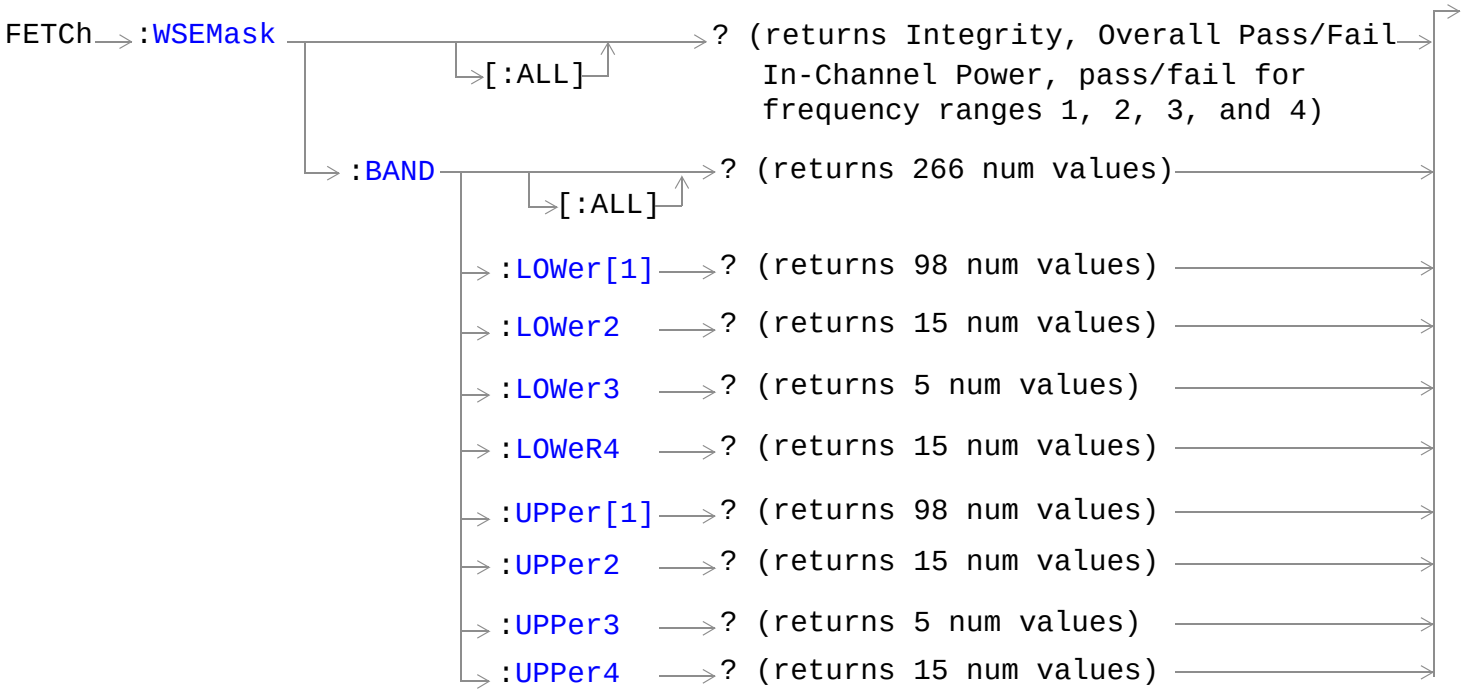
FETCh:WOBWidth:BANDwidth:SDEViation?

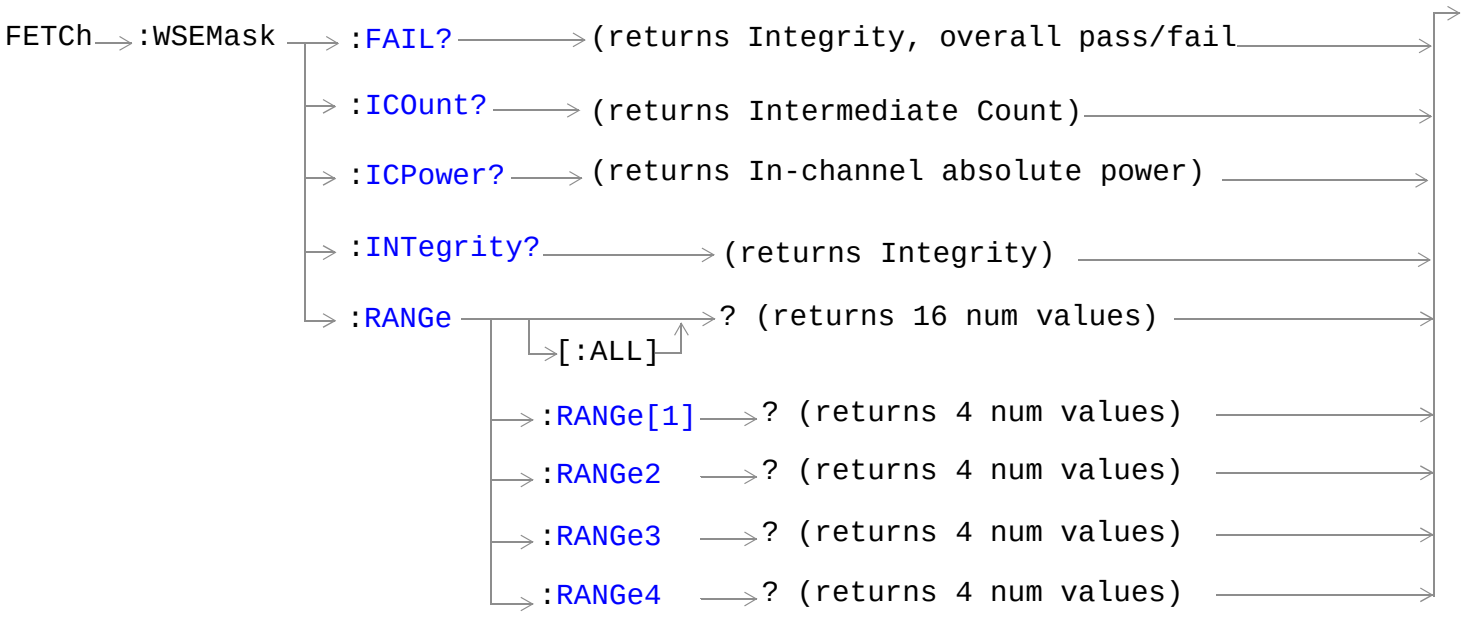
Function	Queries the standard deviation of several occupied bandwidth measurements. To set the number of measurement to compare, use the command "SETup:WOBWidth:COUNt[:SNUMber]" on page 427.
Query	• Range: 0.0 to 10.0 MHz, 9.91 E+37 • Resolution: 0.0001
Requirements	Test Application Revision: A.02 and above

Programming Example

```
OUTPUT 714;"FETCH:WOBWIDTH:BANDWIDTH:SDEVIATION?"
!Queries the standard deviation of power for the occupied bandwidth measurements.
```

FETCh:WSEMask





"Diagram Conventions" on page 210

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 431.
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 190 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?"
```

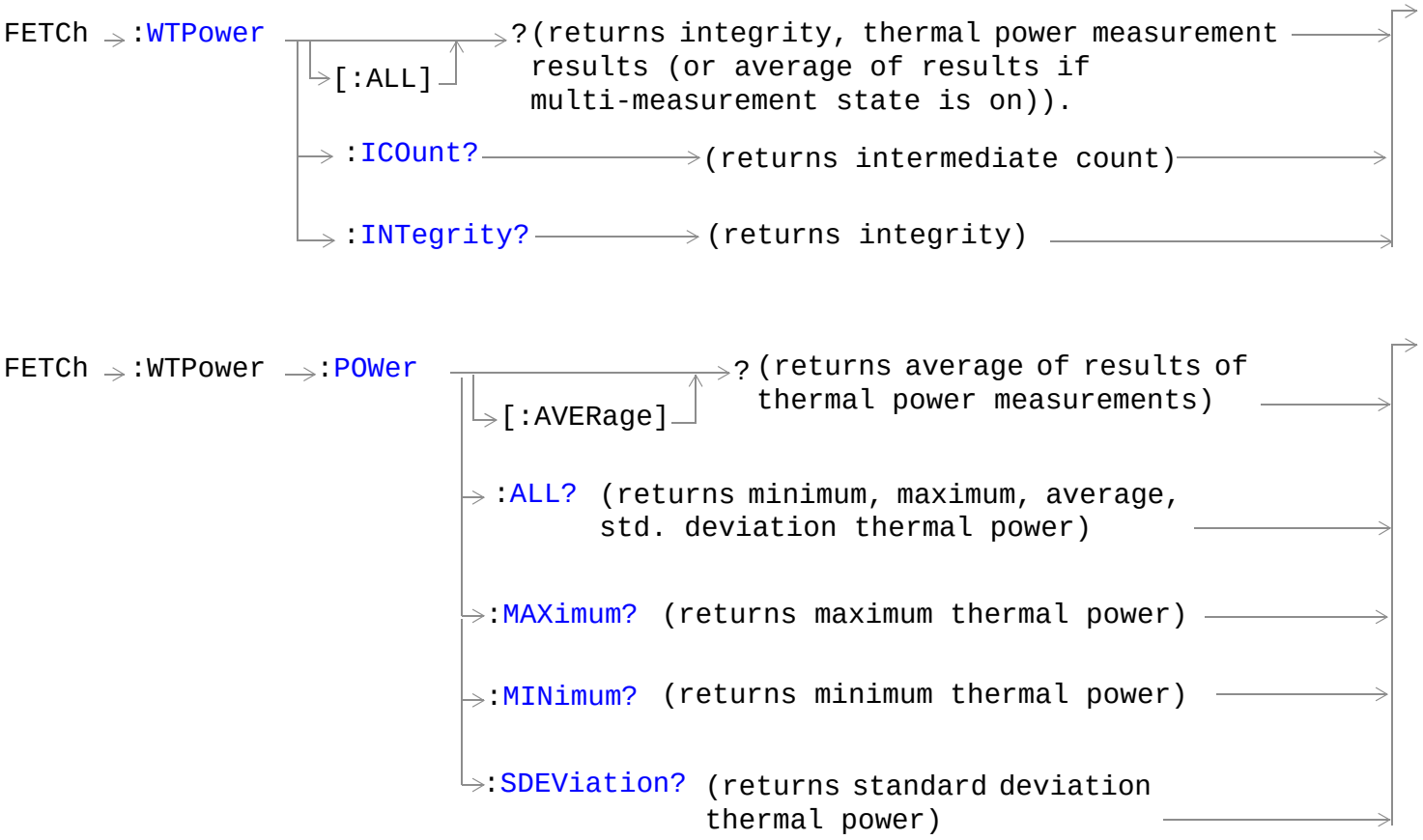
FETCh:WSEMask:RANGe:RANGe[1]?

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 210

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 190 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 435.
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 435. 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 435.
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 435.
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.
```

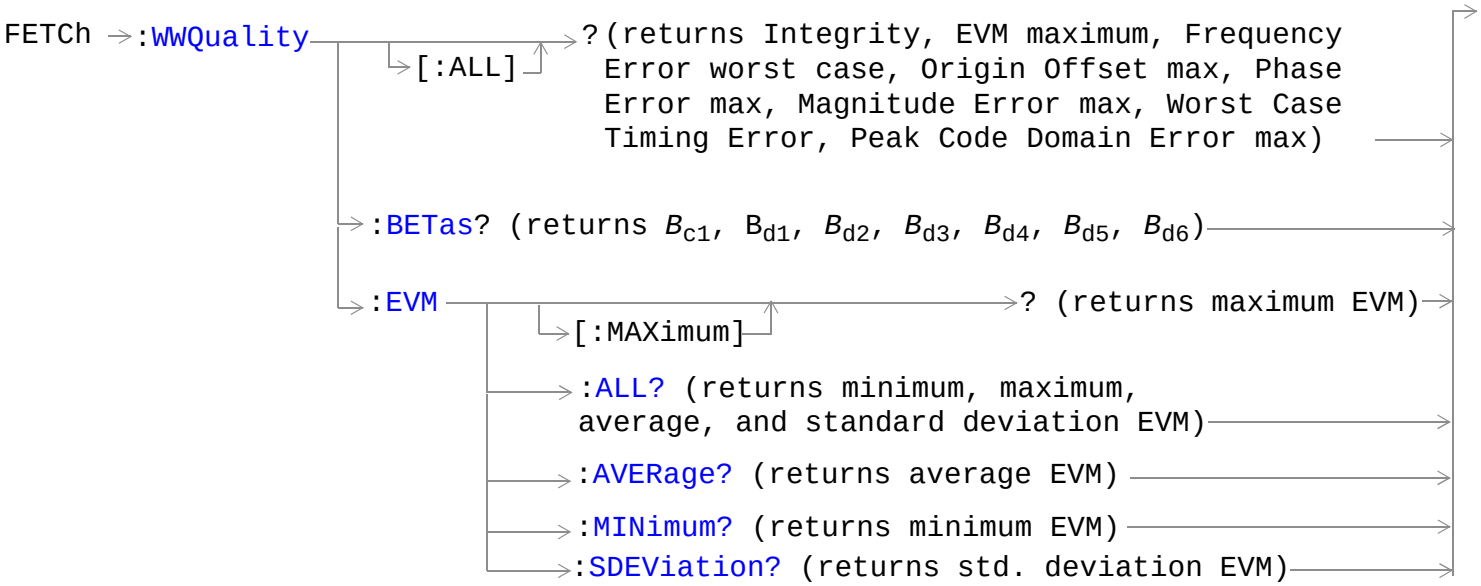
FETCh:WTPower:POWer:SDEViation?

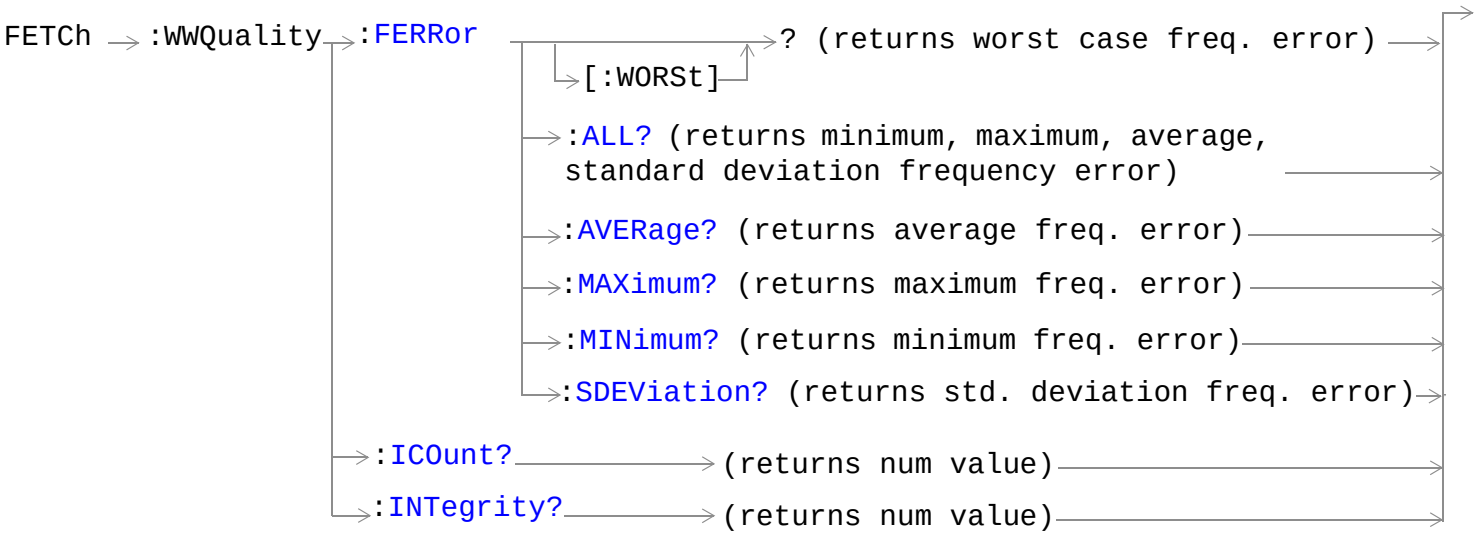
Function	Queries the standard deviation of several thermal power measurements. To set the number of measurement to compare, use the command "SETup:WTPower:COUNt[:SNUMber]" on page 435.
Query	• Range: 0 to 99 dB, 9.91 E+37 • Resolution: 0.001 dB
Requirements	Test Application Revision: A.01 and above

Programming Example

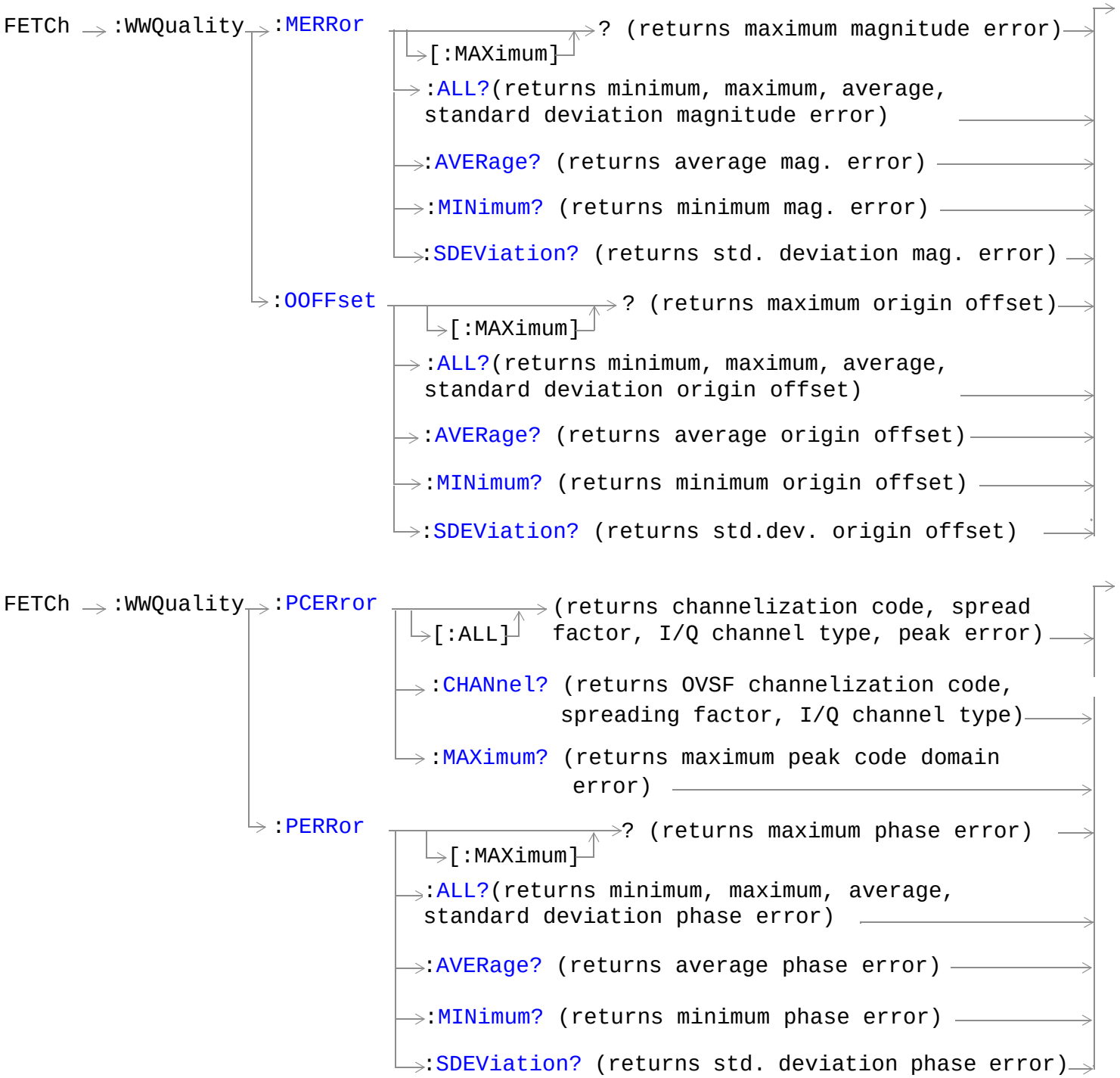
```
OUTPUT 714;"FETCH:WTPOWER:POWER:SDEVIATION?"
!Queries the standard deviation of power for the thermal power measurements.
```

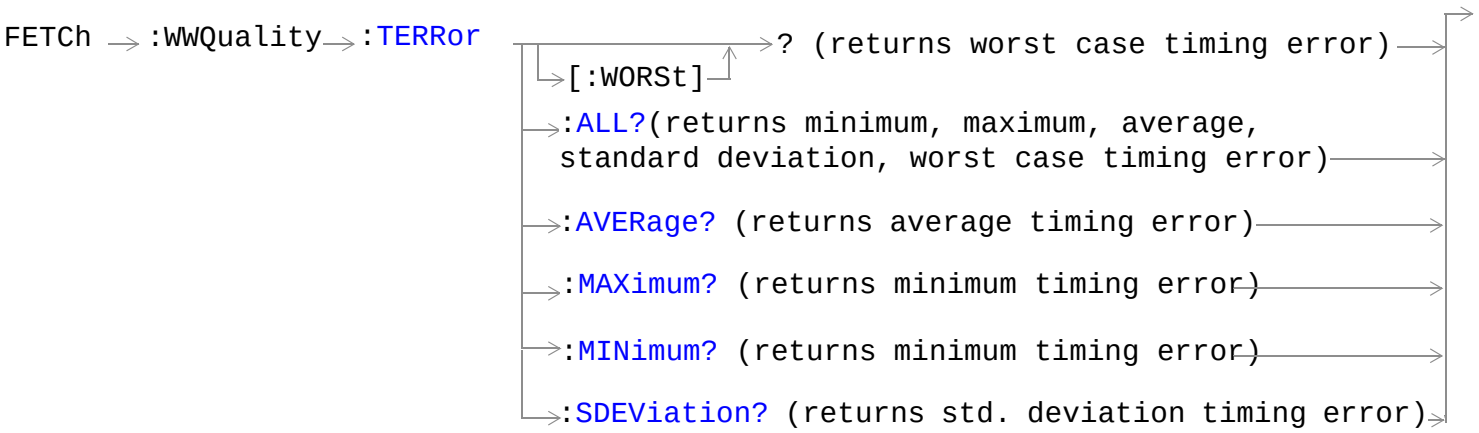
FETCh:WWQuality





FETCh:WWQuality





"Diagram Conventions" on page 210

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: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 190 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 376

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)

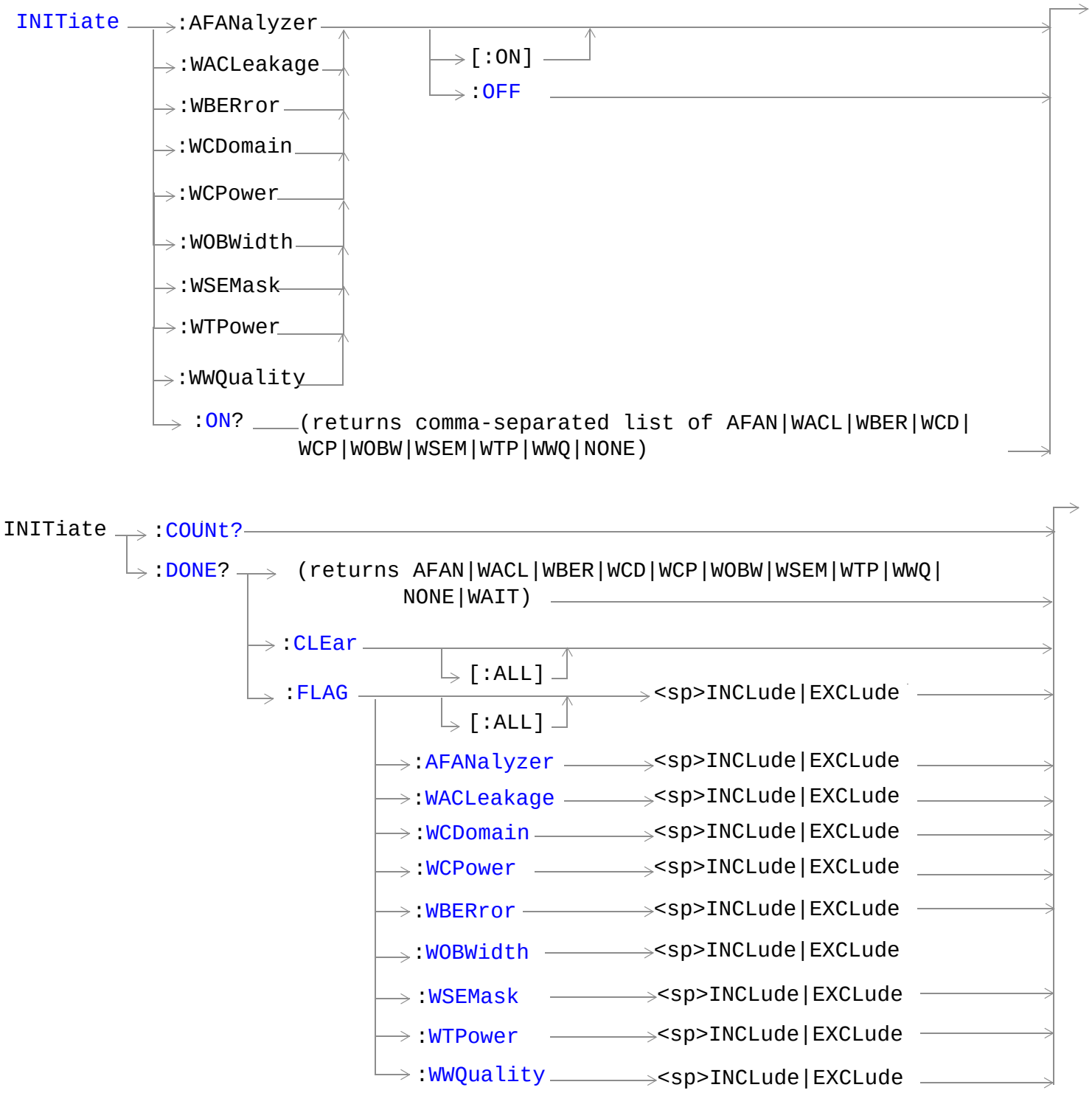
The INITiate command is used to start measurements. INITiate commands allow multiple measurements to be started without waiting for other measurement processes to complete. For example, the following code starts the Digital Average Power and Waveform Quality measurements, and then uses the INITiate:DONE? command in a loop to query the status of these measurements, see "Measurement Event Synchronization" on page 201.

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 187.

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



"Diagram Conventions" on page 210

INITiate:<measurement mnemonic>[:ON]

Function	These commands initiate (start) the following measurements: • AFANalyzer - Audio Frequency Analyzer measurements • WACLeakage - Adjacent Channel Leakage • WBERror - Loopback Bit Error Ratio measurement • WCDomain - Code Domain measurements • WCPower - Channel Power measurement • WOBWidth - Occupied Bandwidth 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 399 and the "FETCh? Subsystem" on page 314. One or more measurements can be initiated with the same program line (see "Concurrent Measurements" on page 180 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 374.
Range	AFAN | WACL | WBER | WCD | WCP | WOBW | WSEM | WTP | WWQ
Requirements	Test Application Revision: A.01 and above Test Application Revision: A.02 added WCDomain, WSEMask, and WOBWidth.

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 | WACL | WBER | WCD | WCP | WOBW | WSEM | WTP | WWQ | NONE
Requirements	Test Application Revision: A.01 and above Test Application Revision: A.02 added WCDomain, WSEMask, and WOBWidth.
Programming Example `OUTPUT 714;"INITIATE:ON?"`	

INITiate:<measurement mnemonic>:OFF

Function	Deactivates the selected measurement. See "Measurement States" on page 187. 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 213.
Requirements	Test Application Revision: A.01 and above Test Application Revision: A.02 added WCDomain, WSEMask, and WOBWidth.
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 187.
Query	Range: 0 to 10
Requirements	Test Application Revision: A.01 and above Test Application Revision: A.02 added WCDomain, WSEMask, and WOBWidth.
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 201 for how to use this command. See "Measurement States" on page 187 to understand the test set's measurement states. See "INITiate:DONE:FLAG:<measurement mnemonic>" on page 379 for include or exclude commands.
Requirements	Test Application Revision: A.01 and above Test Application Revision: A.02 added WCDomain, WSEMask, and WOBWidth.
Query	Range: AFAN | WACL | WBER | WCD | WCP | WOBW | WSEM | WTP | WWQ | NONE | WAIT

INITiate:DONE:CLEar

Function	Clears the done flag from all measurements.
Requirements	Test Application Revision: A.01 and above Test Application Revision: A.02 added WCDomain, WSEMask, and WOBWidth.
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.01 and above Test Application Revision: A.02 added WCDomain, WSEMask, and WOBWidth.

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[:ALL]: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.01 and above Test Application Revision: A.02 added WCDomain, WSEMask, and WOBWidth.

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 382

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:

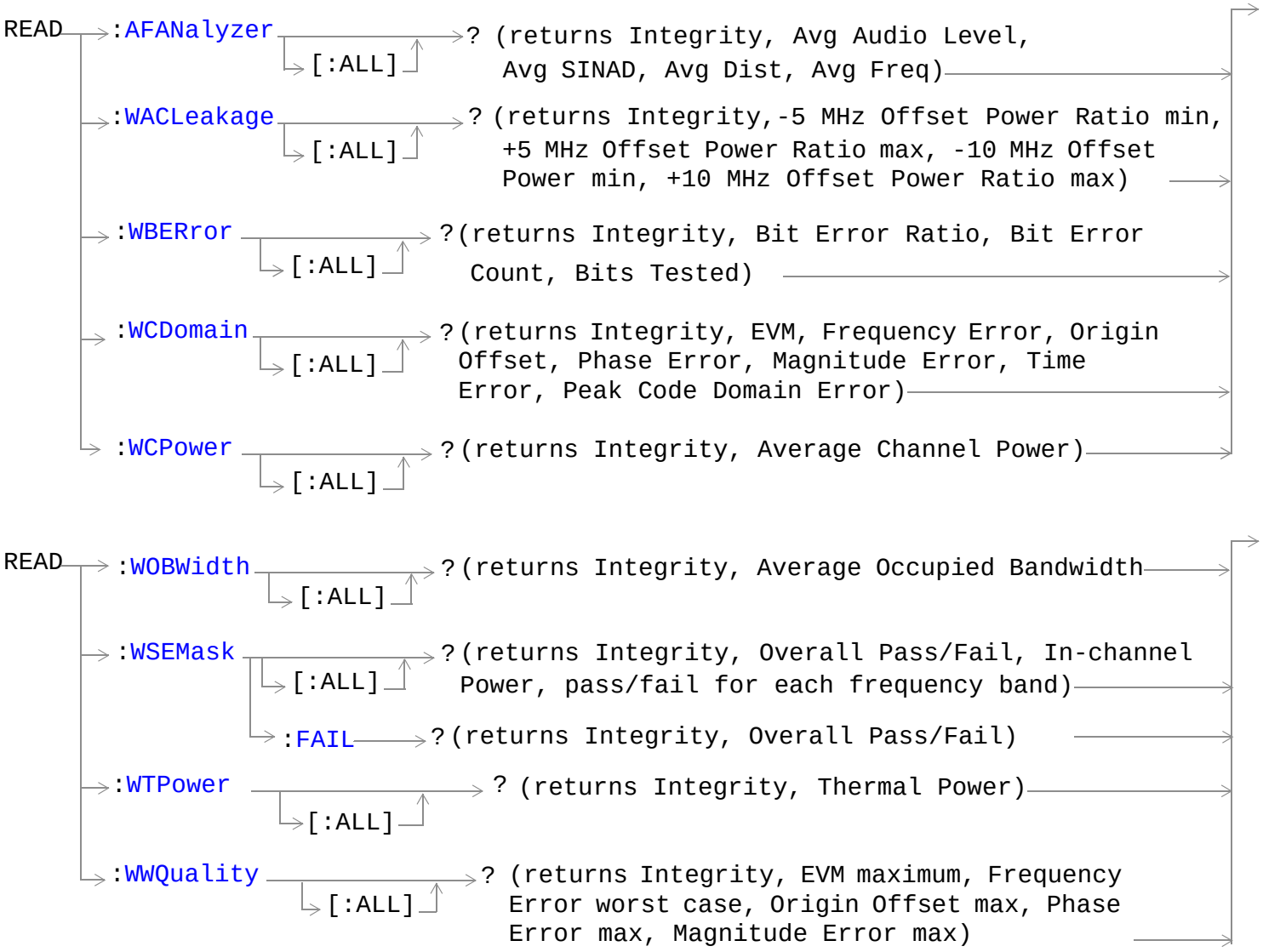
- The test set does not process any additional GPIB commands until the requested measurement results are available.
- The sequential nature of the READ? command does not allow the user to make concurrent measurements. Concurrent measurements require the overlapped commands INITiate, DONE? and FETCh? .
- 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



"Diagram Conventions" on page 210

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: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: A.02 and above

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: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: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

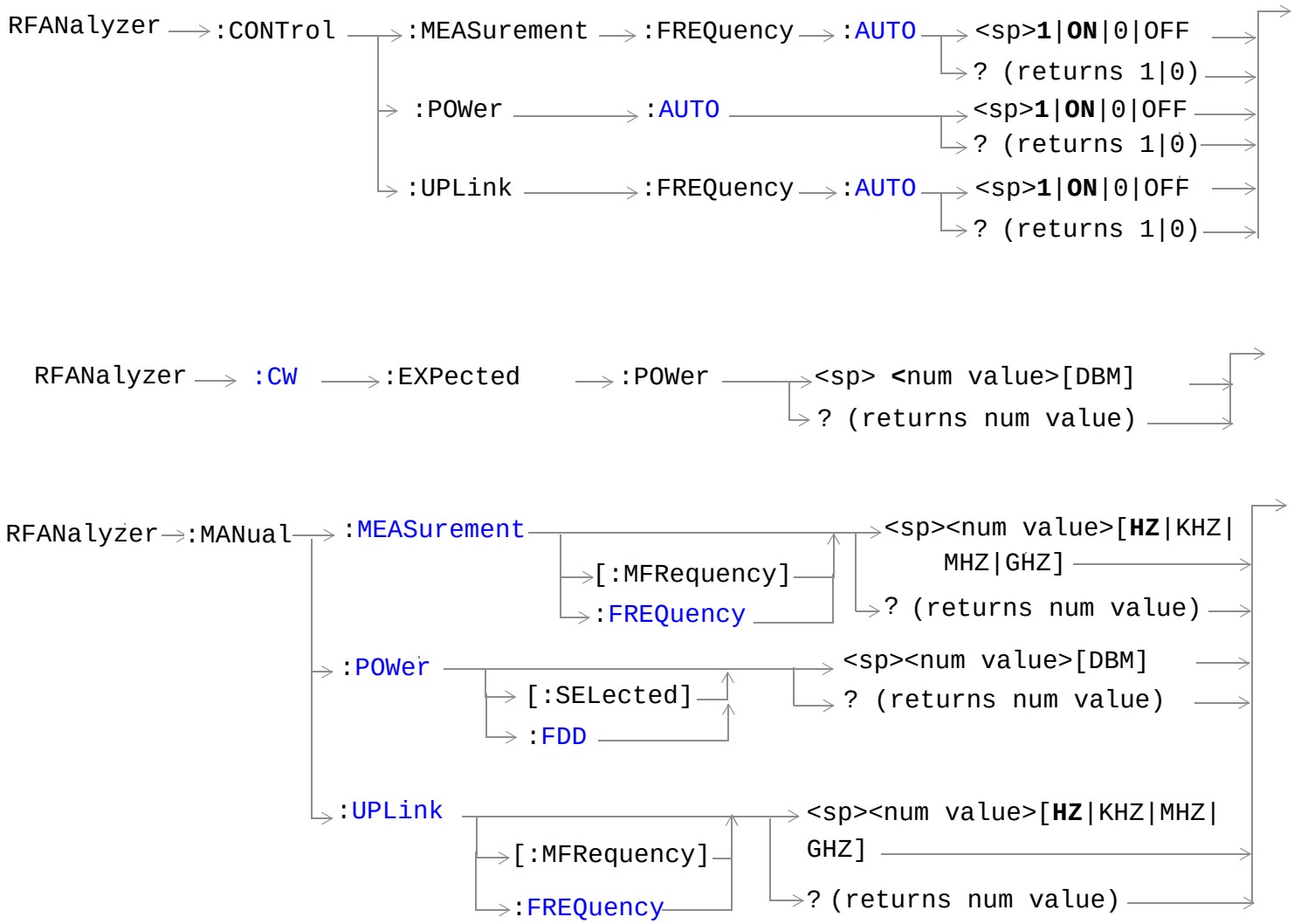
Refer to the “Block Diagram” on page 621 for a description of the signal paths.

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 391

RFANalyzer



"Diagram Conventions" on page 210

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[:CELL]: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

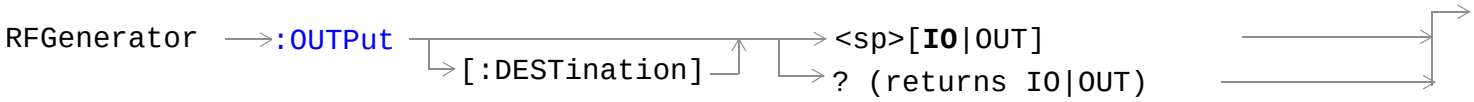
The RFGenerator subsystem selects the RF generator output port on test sets equipped with both the RF IN/OUT port and the RF OUT ONLY port. If the test set does not have the RF OUT ONLY port, an error message is generated when attempting to switch output ports.

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 398

RFGenerator:OUTPut



"Diagram Conventions" on page 210

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:AFANalyzer” on page 401

“SETup:WACLeakage” on page 409

“SETup:WBERror” on page 415

“SETup:WCDomain” on page 418

“SETup:WCPower” on page 421

“SETup:WOBWidth” on page 426

“SETup:WSEMask” on page 430

“SETup:WTPower” on page 434

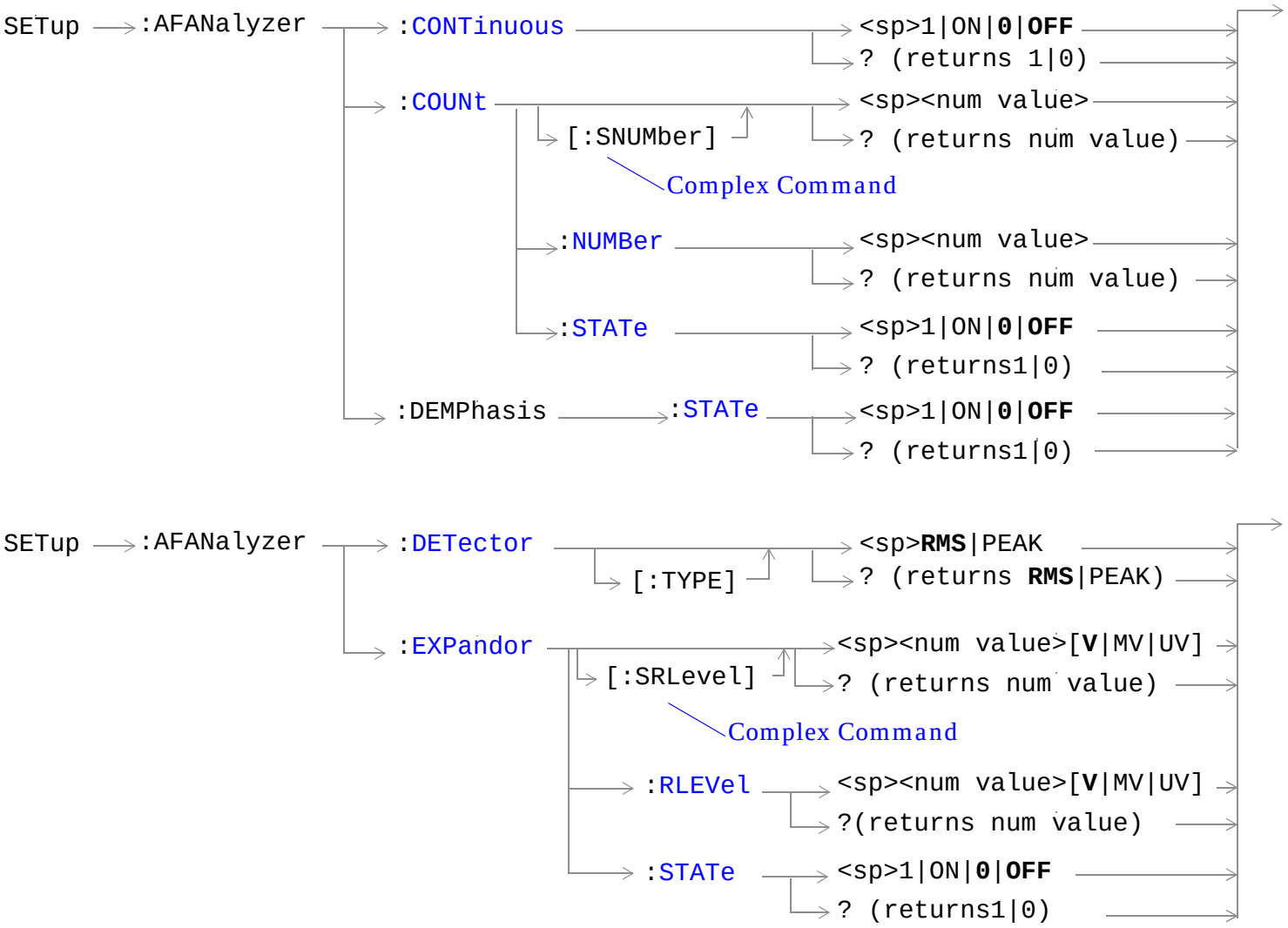
“SETup:WWQuality” on page 438

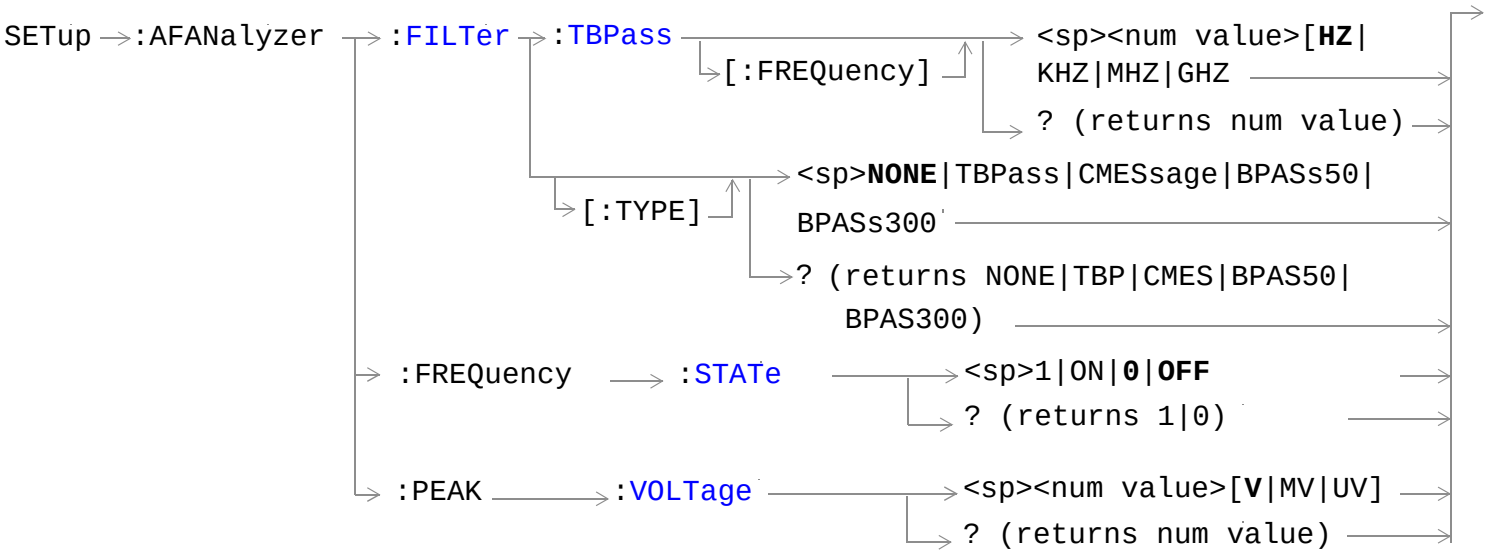
SETup[:ALL]:CONTinuous

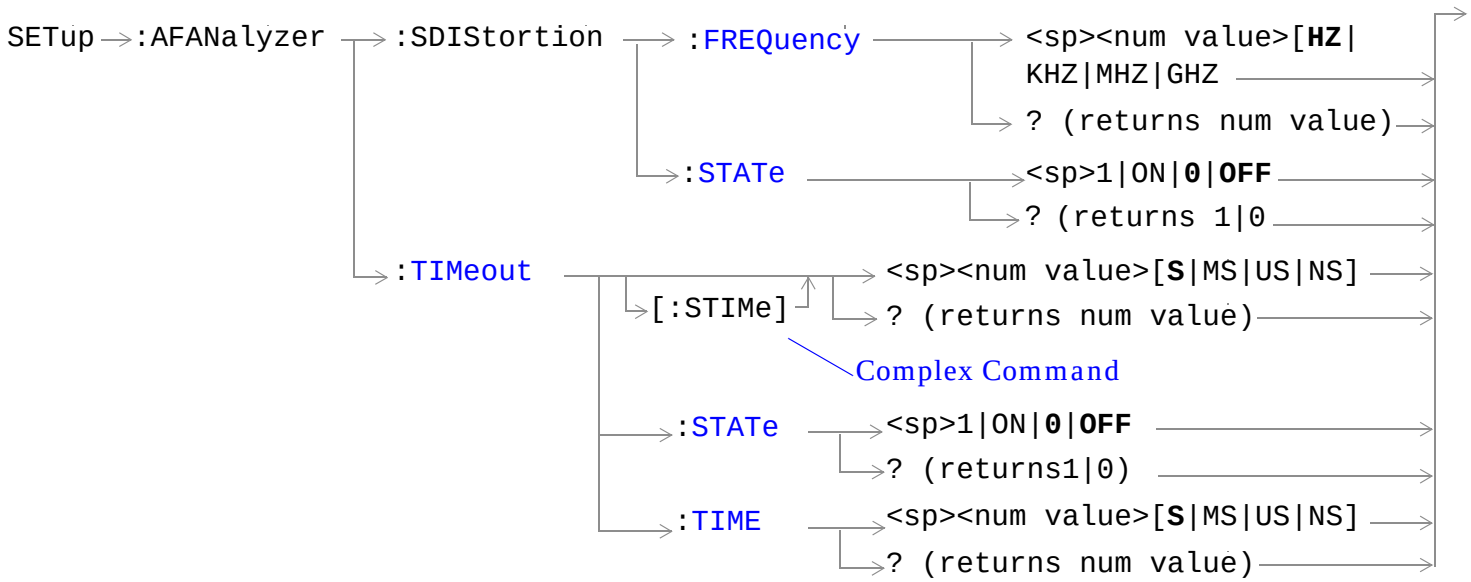
SETup[:ALL]:CONTinuous

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 Subsystem" on page 399

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

Function	Sets/queries the multi-measurement state of the AF analyzer 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:AFANALYZER:COUNT:STATE ON" !Turns on multi-measurements.`	

SETup:AFANalyzer:DEMPhasis:STATe

Function	Sets/queries whether 750 us de-emphasis 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:DEMPHASIS:STATE ON"`	

SETup:AFANalyzer:DETector[:TYPE]

Function	Sets/queries the detector type for audio level measurements.
Setting	Range: RMS|PEAK
Query	Range: RMS|PEAK
*RST setting	RMS
Requirements	Test Application Revision: A.01 and above
Programming Example `OUTPUT 714;"SETUP:AFANALYZER:DETECTOR:TYPE PEAK"`	

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.`	

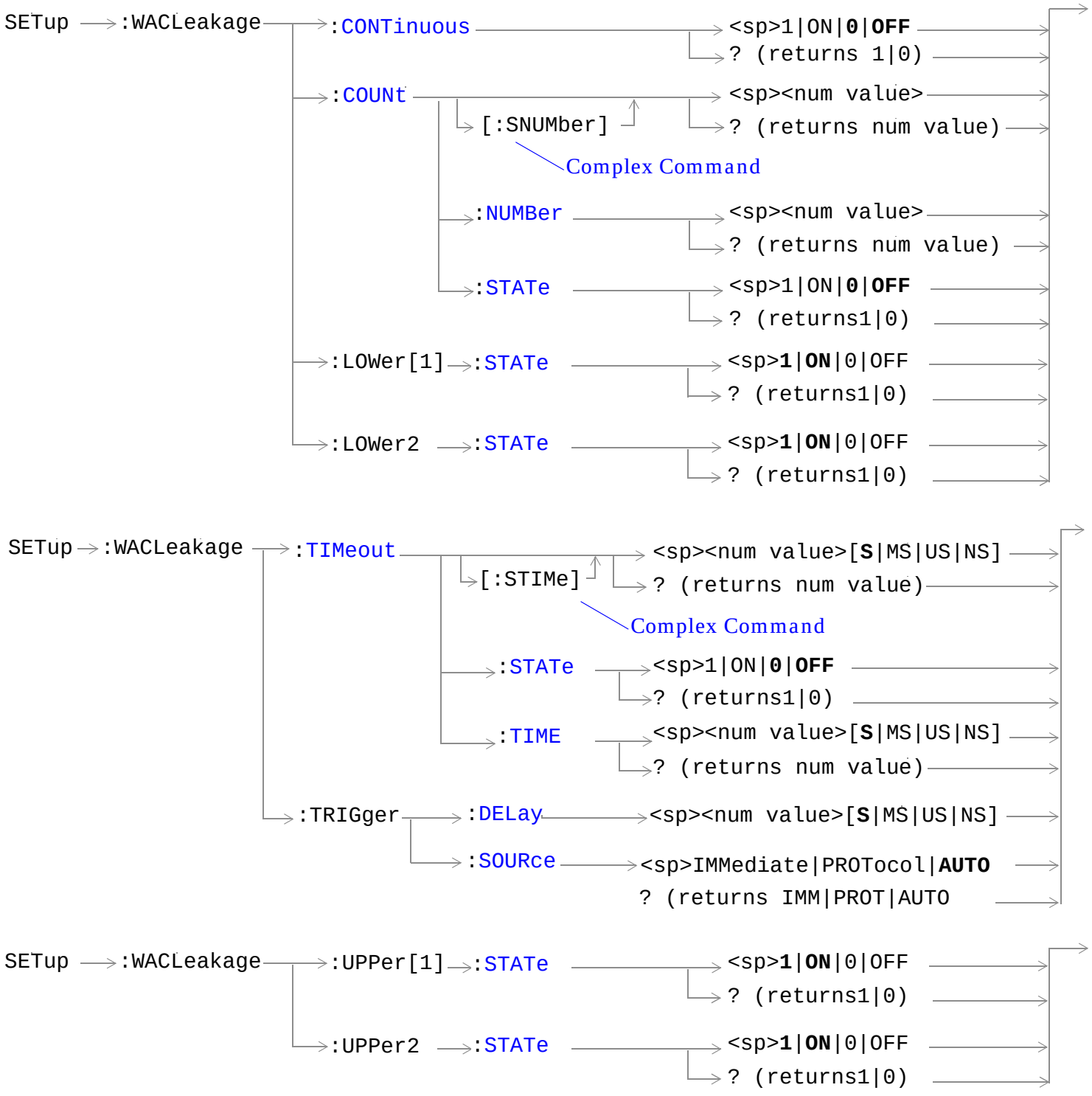
SETup:AFANalyzer:TIMeout:STATe

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:WACLeakage



"Diagram Conventions" on page 210

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"`	

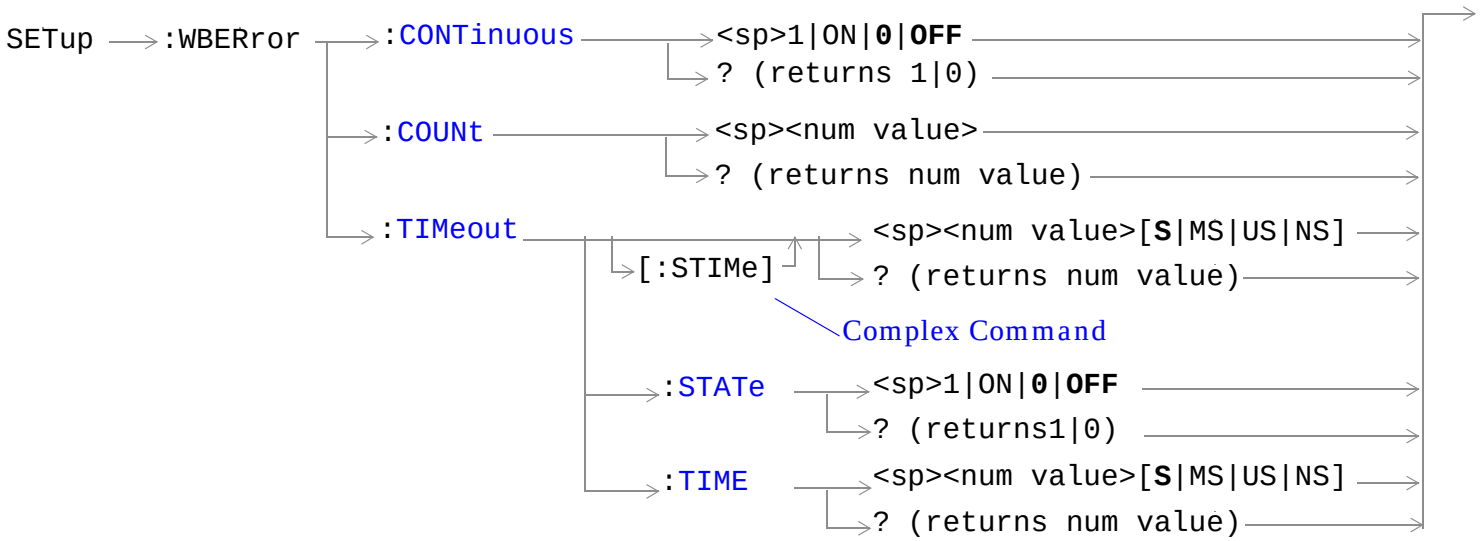
SETup:WACLeakage:UPPer[1]:STATe

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



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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.`	

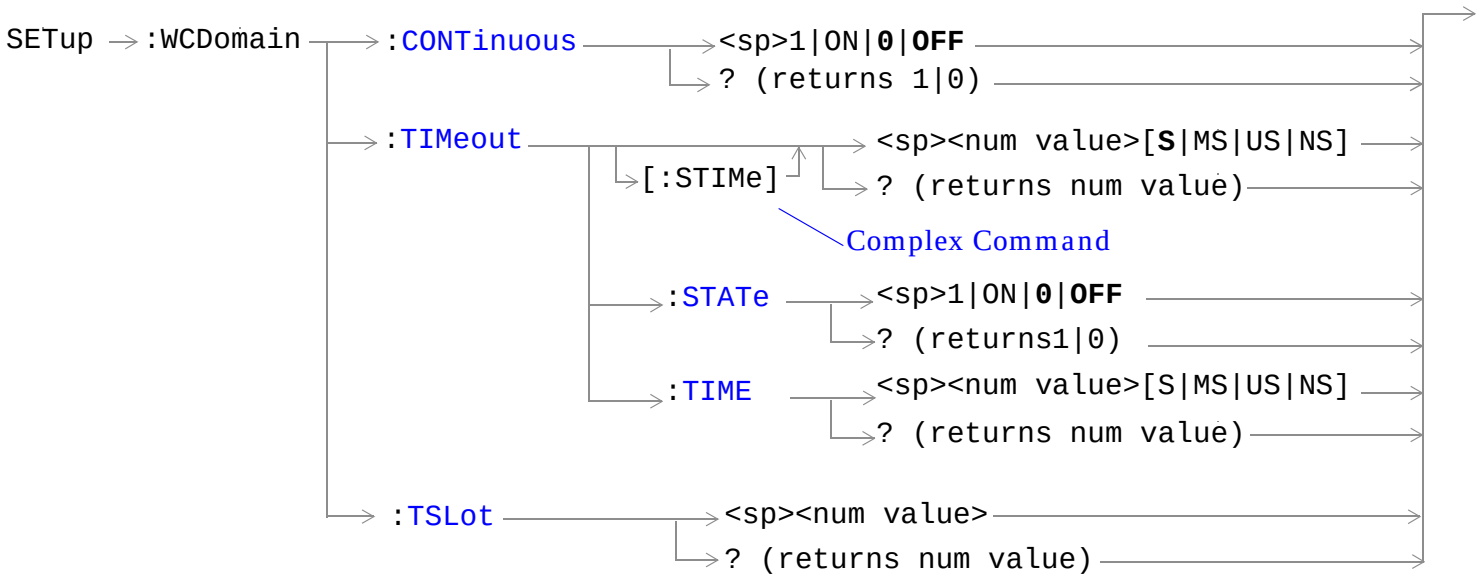
SETup:WBERror:TIMeout:STATe

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 210

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"`	

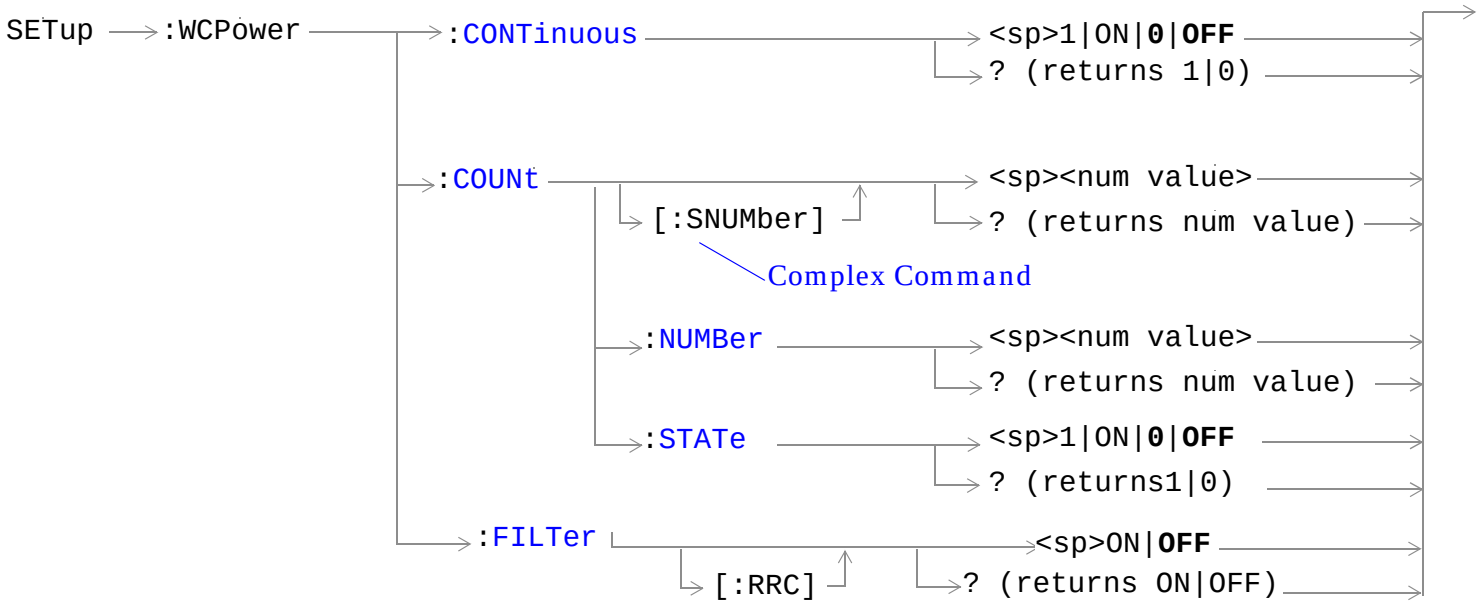
SETup:WCDomain:TIMeout:TIME

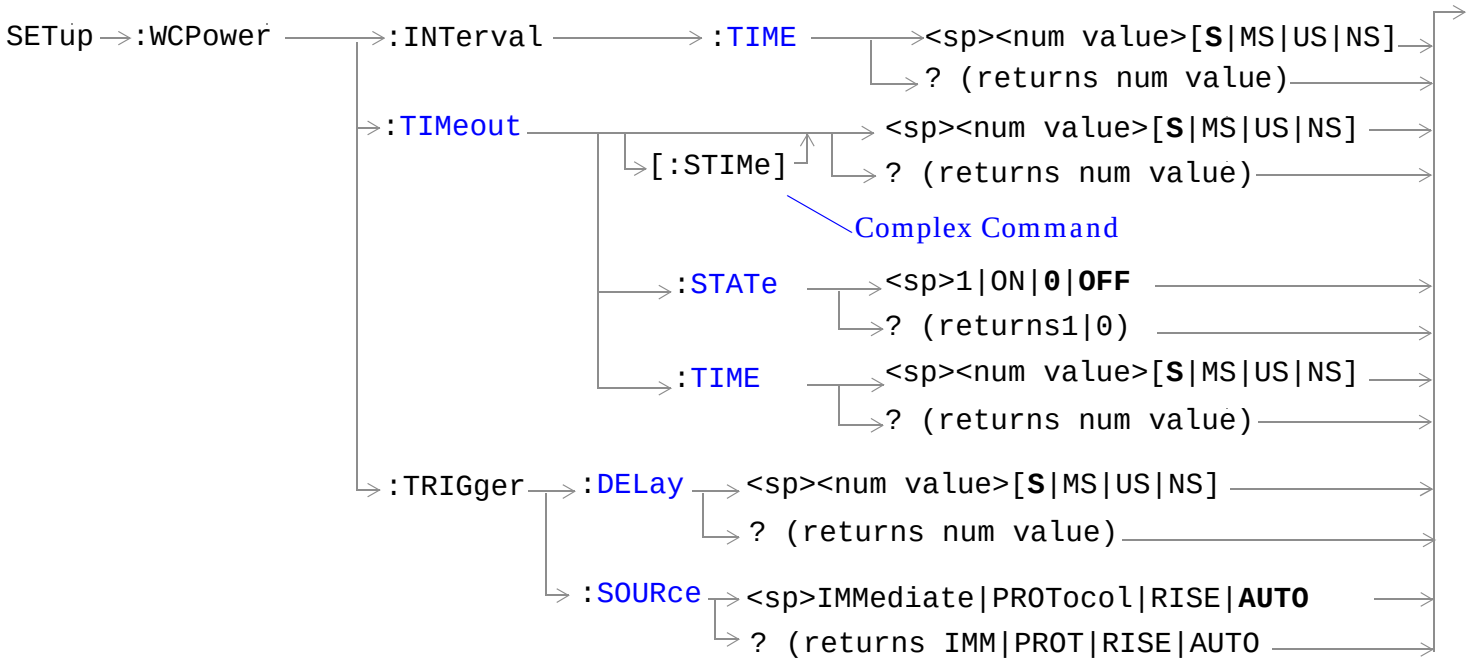
Function	Sets/queries code domain measurement's timeout setting to be used when the timeout state is set to ON (see "Measurement Timeouts") .
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	20 seconds
Requirements	Test Application Revision: A.02 and above
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 210

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"`	

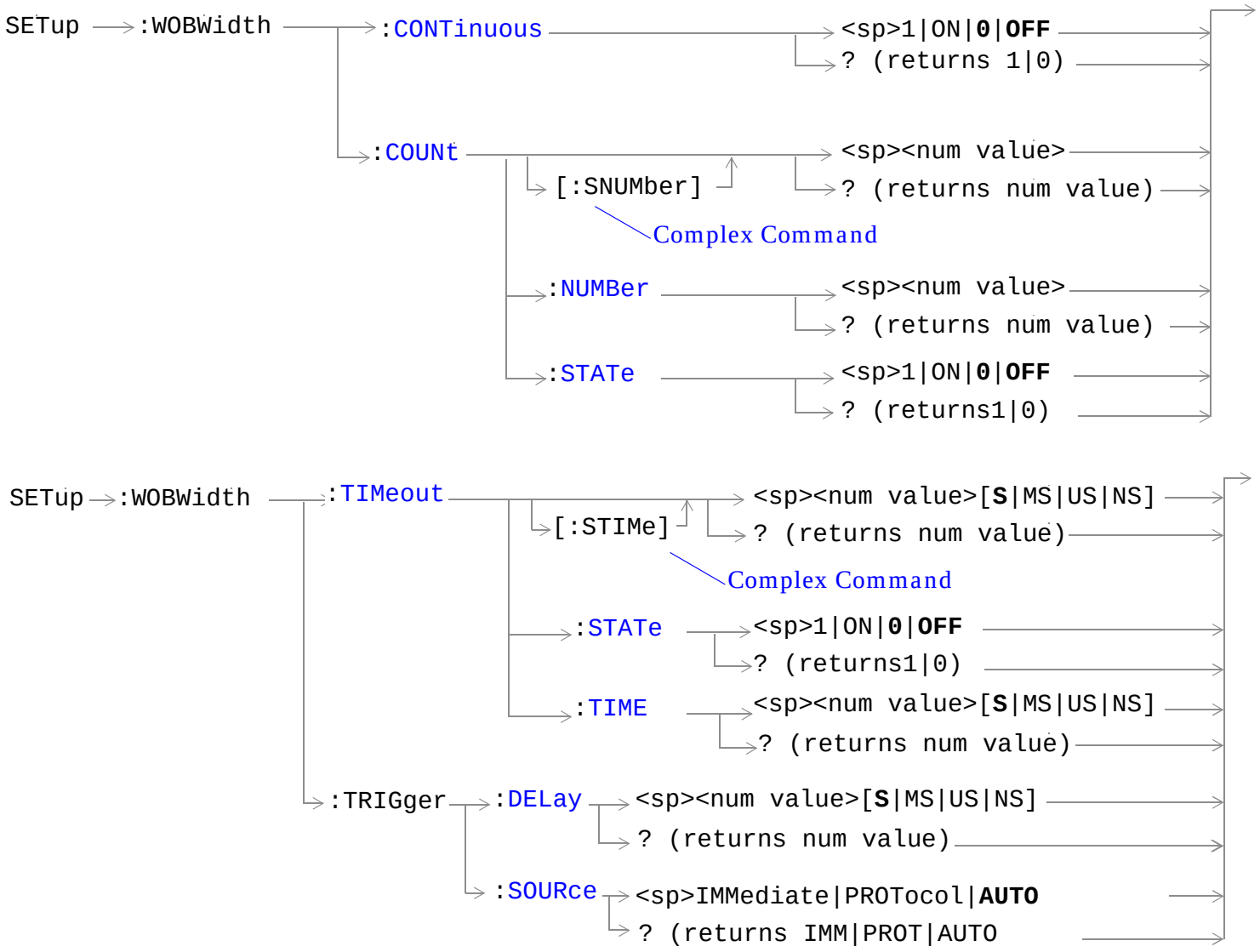
SETup:WCPower:TRIGger:DELay

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:WOBWidth



"Diagram Conventions" on page 210

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: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"`	

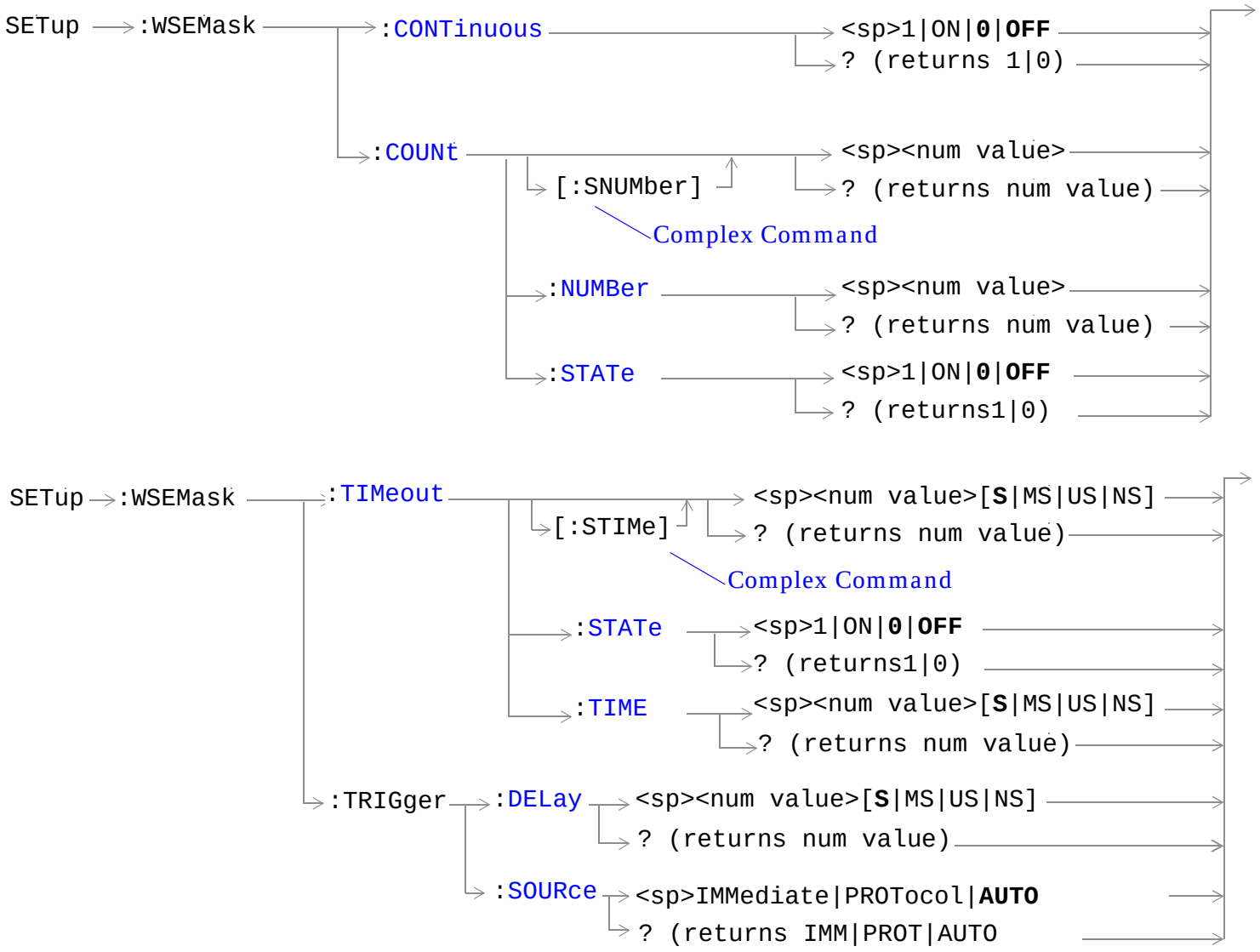
SETup:WOBWidth:TRIGger:DELay

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:WSEMask



"Diagram Conventions" on page 210

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"`	

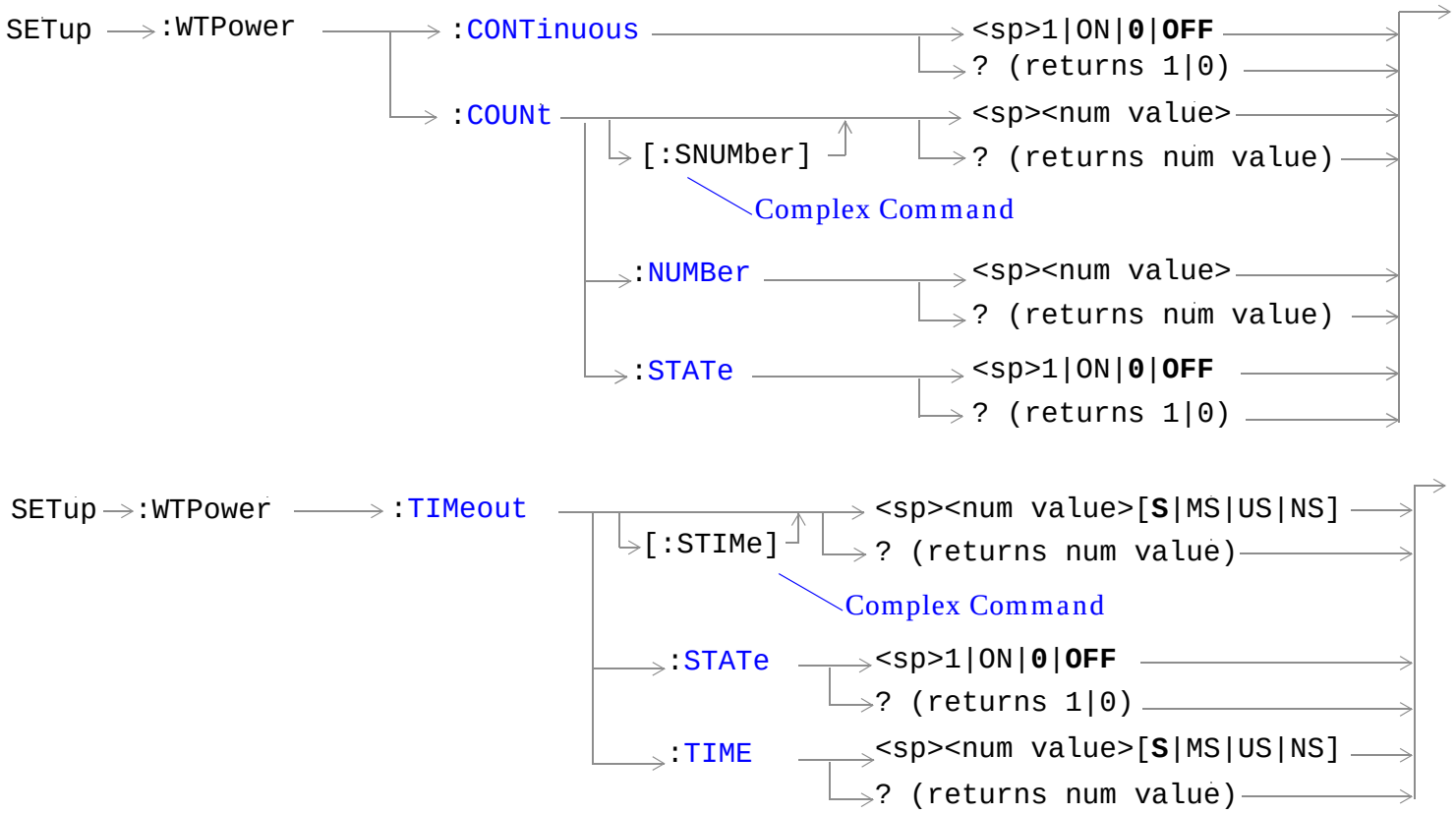
SETup:WSEMask:TRIGger:DELay

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:WTPower



"Diagram Conventions" on page 210

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.`	

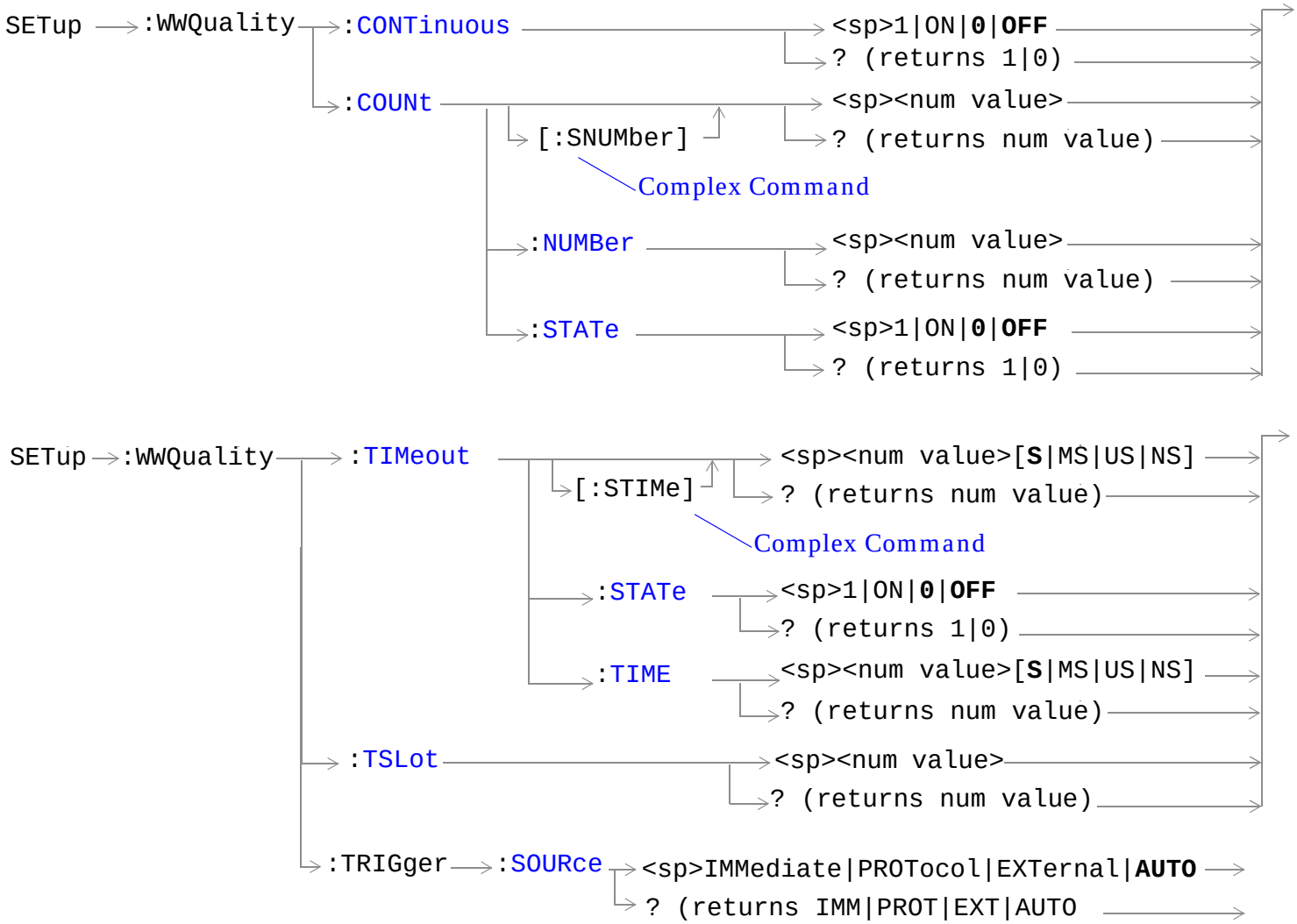
SETup:WTPower:TIMeout:STATe

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 210

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

"STATus:OPERation:" on page 444

"STATus:PRESet" on page 469

"STATus:QUEStionable" on page 470

"Status Byte Register" on page 502

"Standard Event Status Register" on page 503

Status Register Bit Definitions

- "Status Byte Register Bit Assignments" on page 502
- "Standard Event Status Register Bit Assignment" on page 504
- "STATus:QUEStionable Condition Register Bit Assignment" on page 477
  - — "STATus:QUEStionable:CALL Condition Register Bit Assignment" on page 478
  - — "STATus:QUEStionable:CALL:CDMA Condition Register Bit Assignment" on page 480
  - — "STATus:QUEStionable:ERRors:COMMon Register Bit Assignments" on page 489
  - — "STATus:QUEStionable:ERRors Condition Register Bit Assignment" on page 483
  - — "STATus:QUEStionable:ERRors:AMPS Condition Register Bit Assignment" on page 485
  - — "STATus:QUEStionable:ERRors:CDMA Register Bit Assignments" on page 487
  - — "STATus:QUEStionable:ERRors:COMMon Register Bit Assignments" on page 489
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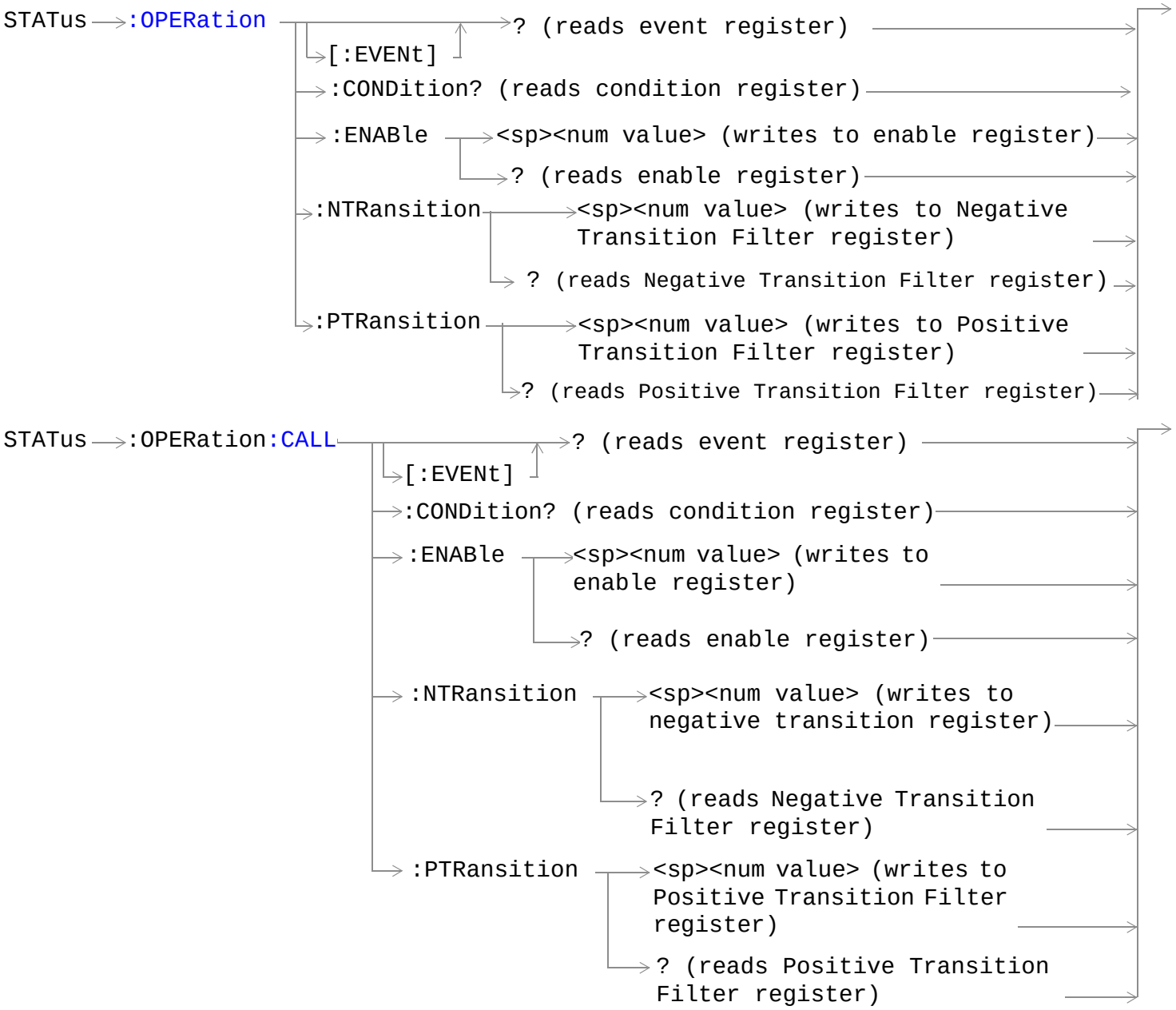
  - — "STATus:QUEStionable:ERRors:WCDMa Register Bit Assignments" on page 499
  - — "STATus:QUEStionable:ERRors:FDD Register Bit Assignments" on page 495
  - — "STATus:QUEStionable:CALL:TA2000 Condition Register Bit Assignment" on page 482
  - — "STATus:QUEStionable:HARDware Condition Register Bit Assignment" on page 501
- "STATus:OPERation Register Bit Assignments" on page 451
  - — "STATus:OPERation:CALL Condition Register Bit Assignment" on page 452
  - — "STATus:OPERation:CALL:COMMon Condition Register Bit Assignment" on page 453
  - — "STATus:OPERation:CALL:DIGital2000 Register Bit Assignment" on page 457
  - — "STATus:OPERation:KEYPressed Register Bit Assignments" on page 458

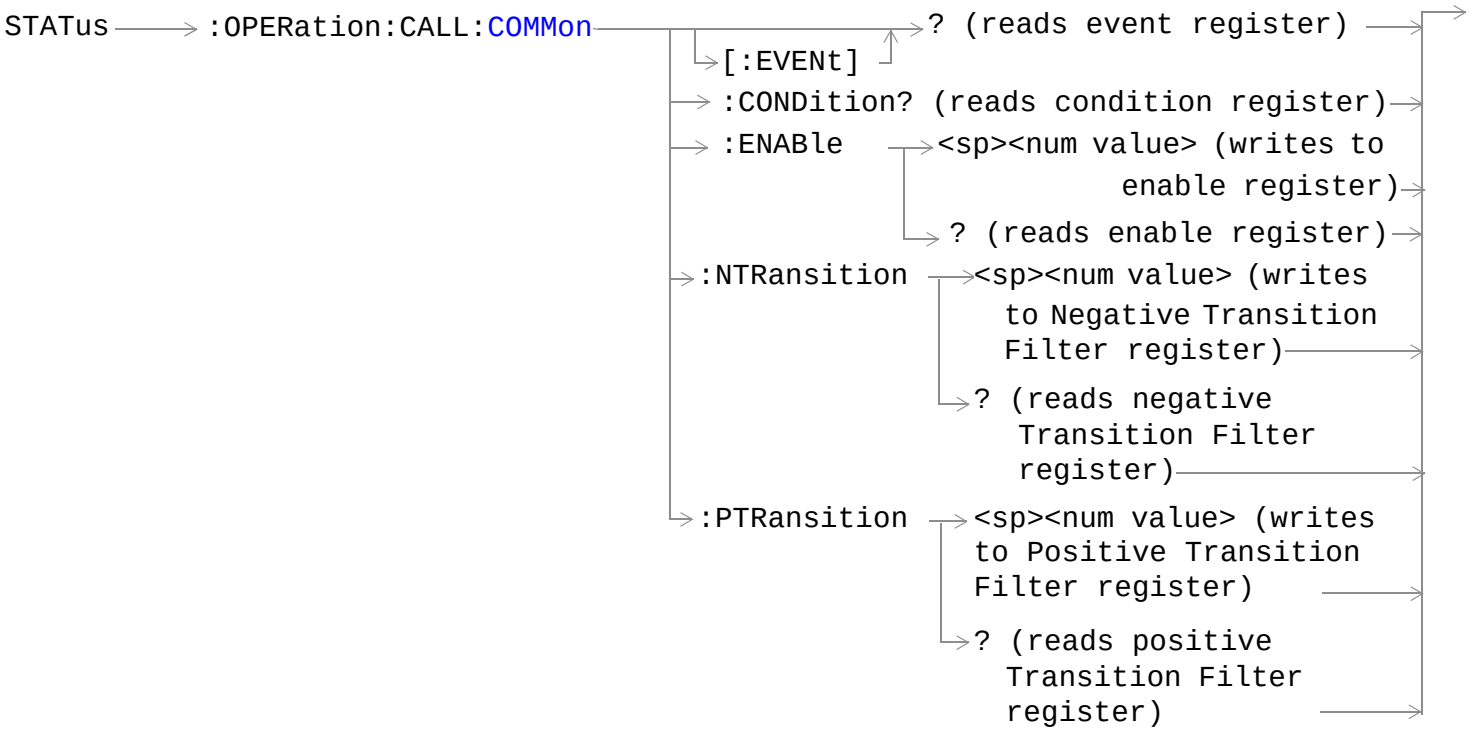
— “STATus:OPERation:NMRReady Register Bit Assignments” on page 460
— “STATus:OPERation:NMRReady:AMPS Condition Register Bit Assignment” on page 462
— “STATus:OPERation:NMRReady:CDMA Register Bit Assignments” on page 463
— “STATus:OPERation:NMRReady:COMMon Register Bit Assignments” on page 465
— “STATus:OPERation:NMRReady:<WCDMA | FDD> Register Bit Assignments” on page 466

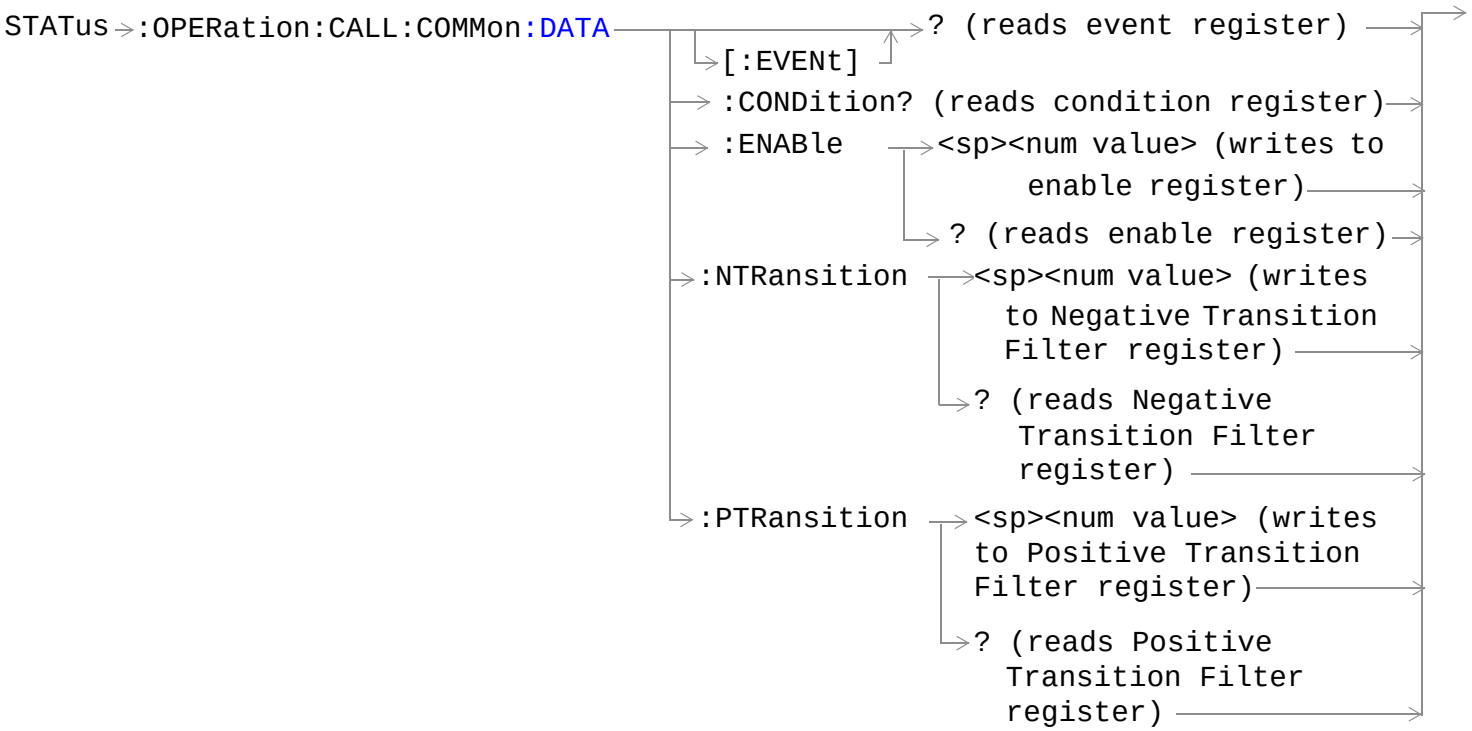
Related Topics

“Status Subsystem Overview” on page 158

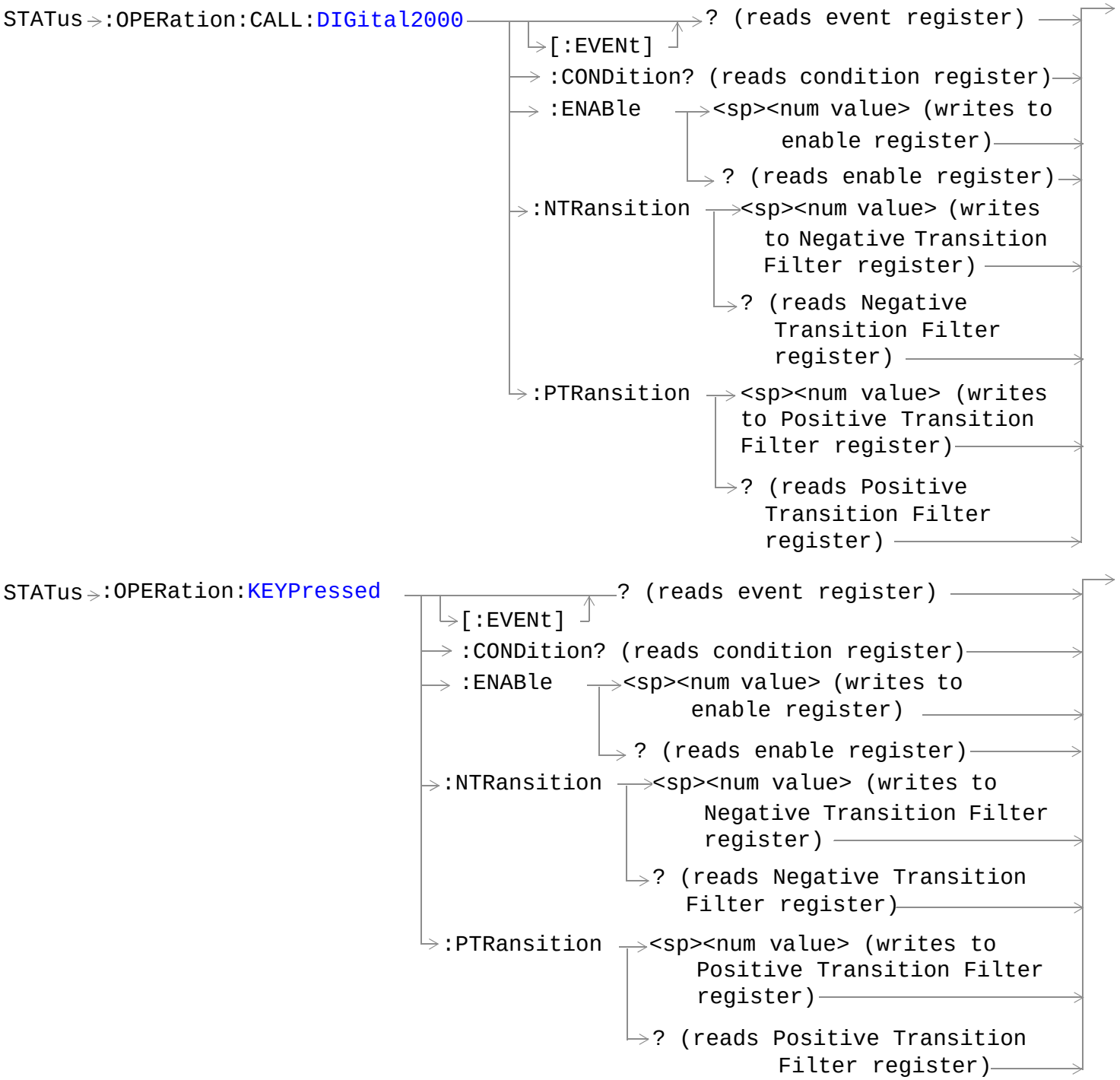
STATus:OPERation:

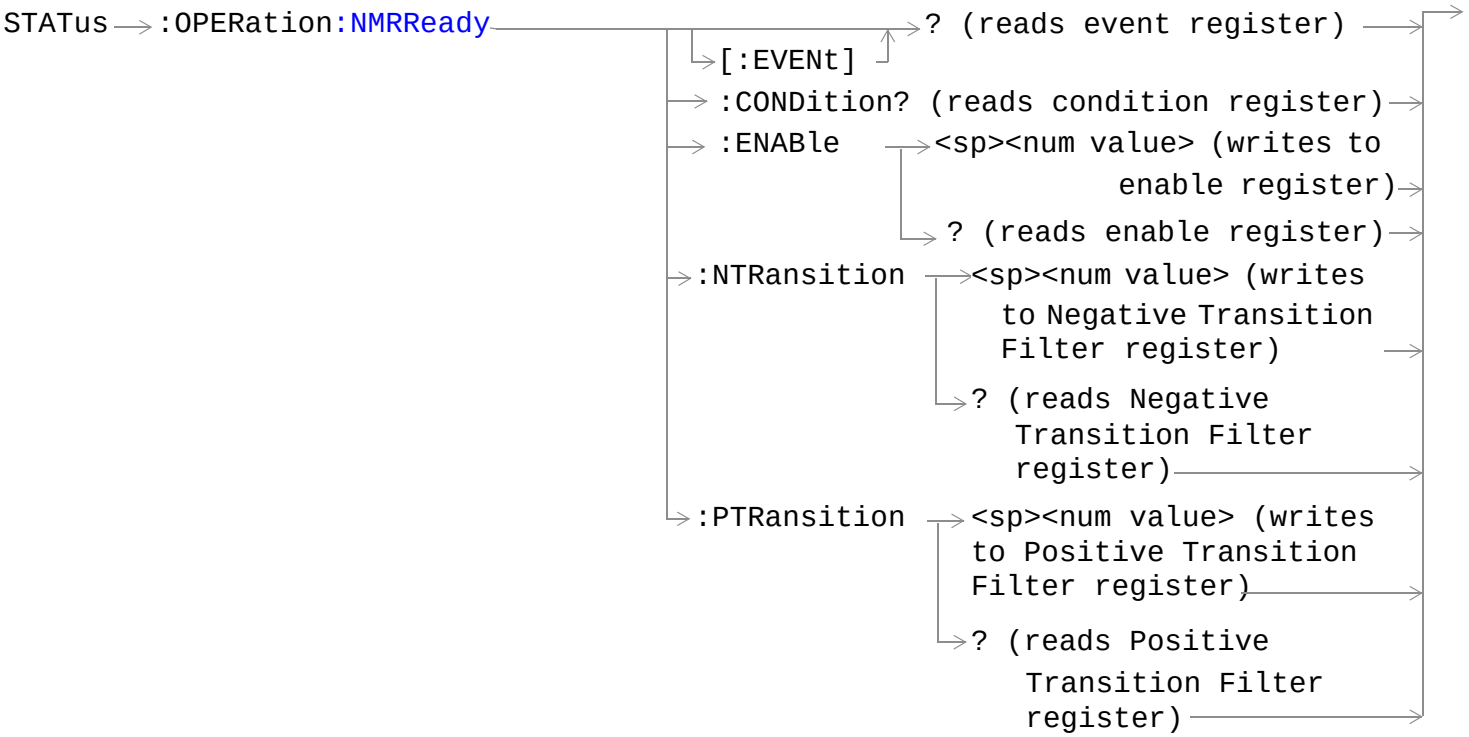


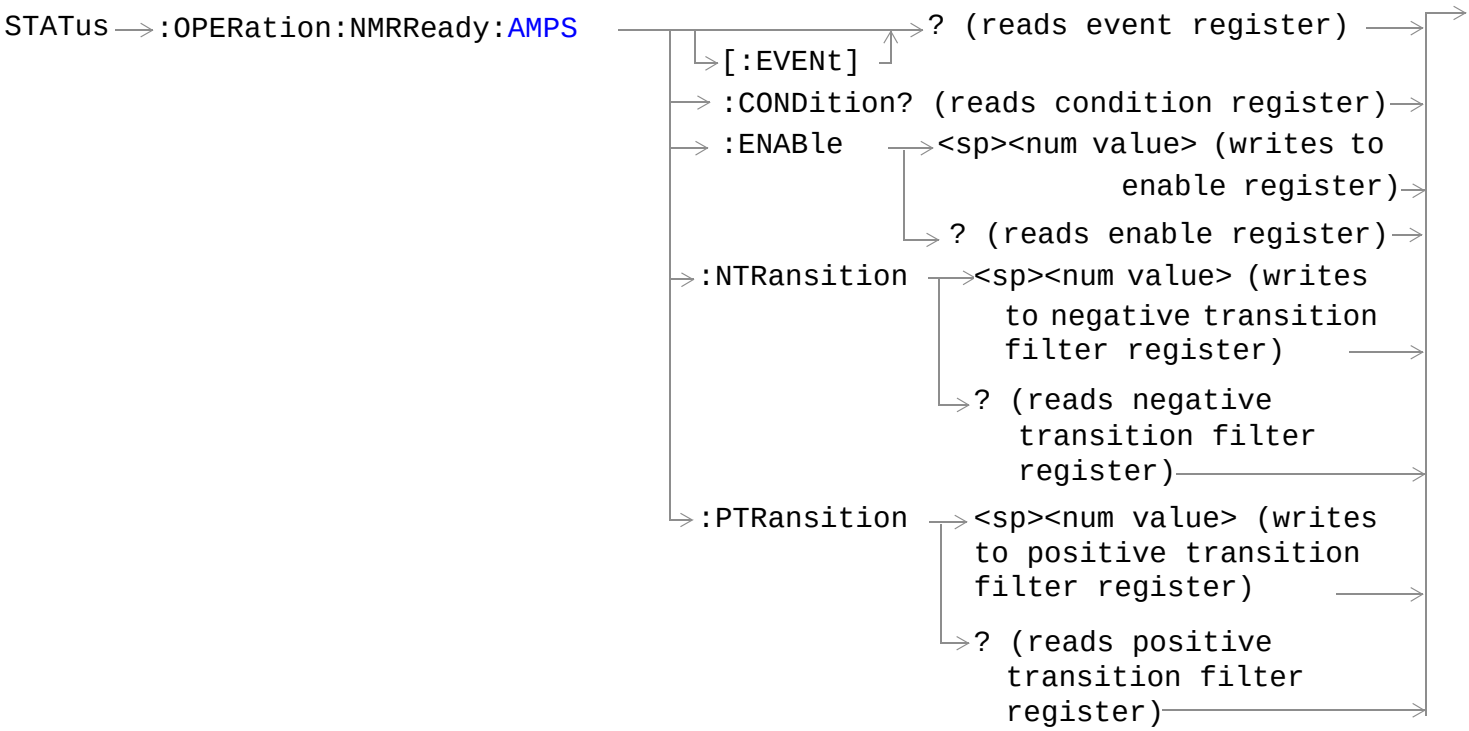

STATus
:OPERation:CALL:COMMon
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads positive Transition Filter register)


STATus
:OPERation:CALL:COMMon:DATA
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)

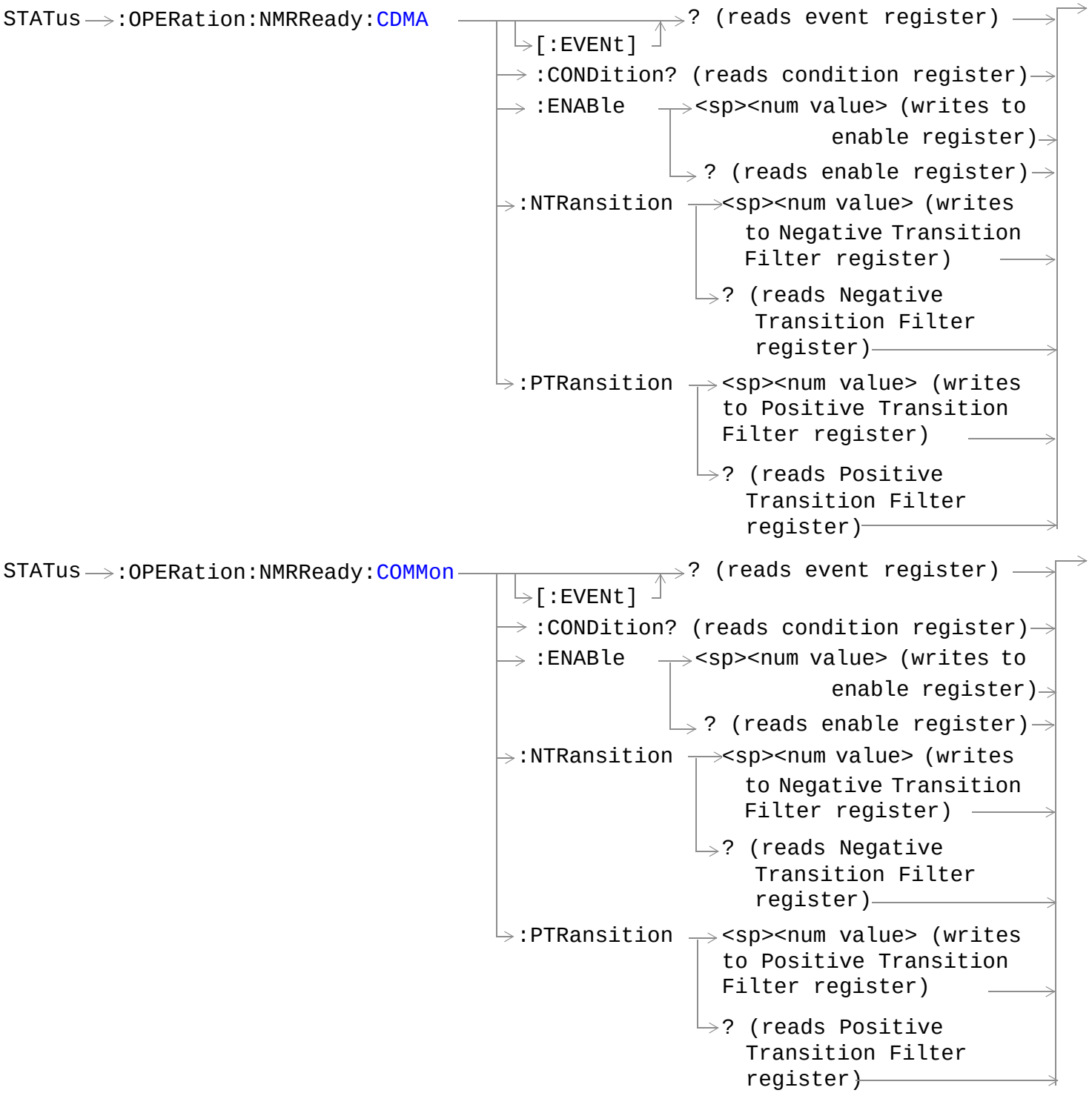
STATus:OPERation:

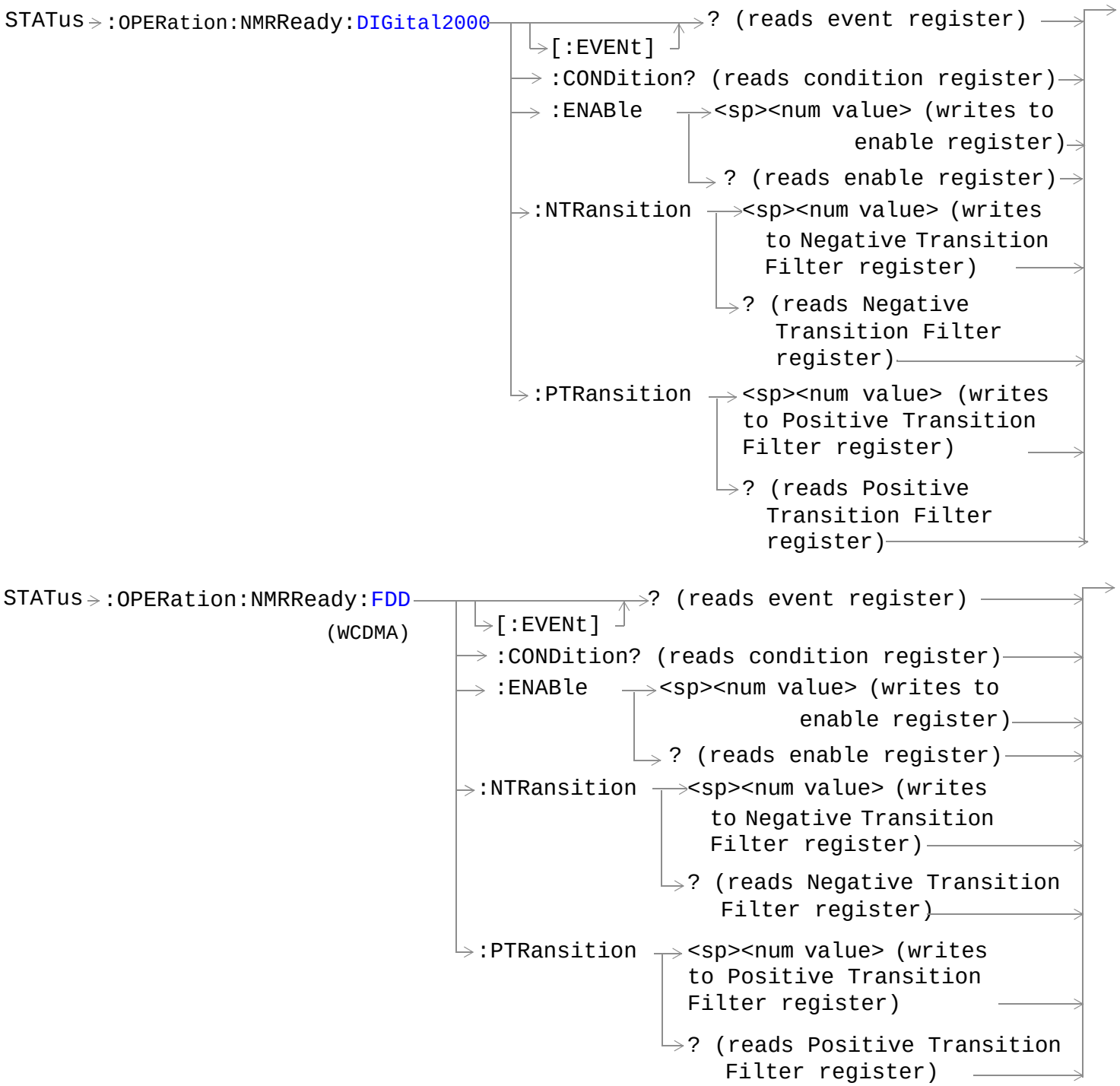



STATus
:OPERation:NMRReady
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)

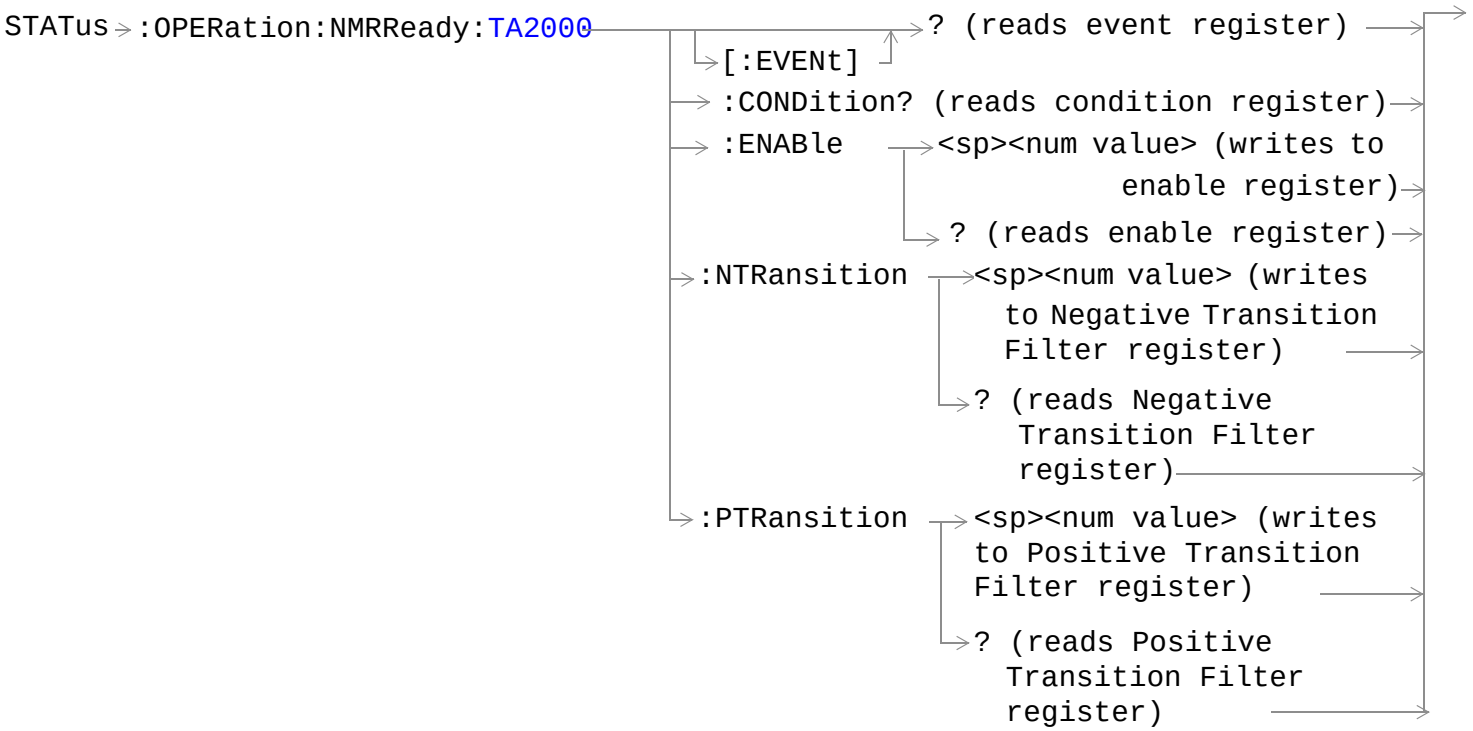

STATus
:OPERation:NMRReady:AMPS
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to negative transition filter register)
? (reads negative transition filter register)
:PTRansition
<sp><num value> (writes to positive transition filter register)
? (reads positive transition filter register)

STATus:OPERation:




STATus
:OPERation:NMRReady: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
:OPERation:NMRReady:FDD
(WCDMA)
? (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 210

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.
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.
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.
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
```

STATus:OPERation:

```
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.
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.
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.
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 185.
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 185.
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 185.
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 185.
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 185.

STATus:OPERation:

Bit Number	Binary Weighting	Condition	Description
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 185.
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 185.
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 185.
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.
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.
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 185.
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 185.
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 185.
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 185.

Bit Number	Binary Weighting	Condition	Description
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 185.
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 185.
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 185.
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 185.
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 185.

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.
```

STATus:OPERation:

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:FDD:PTR 4" !Sets the New Measurement
                                                 !Results Ready FDD Positive
                                                 !Transition Register
                                                 !for bit 2
```

STATus:PRESet

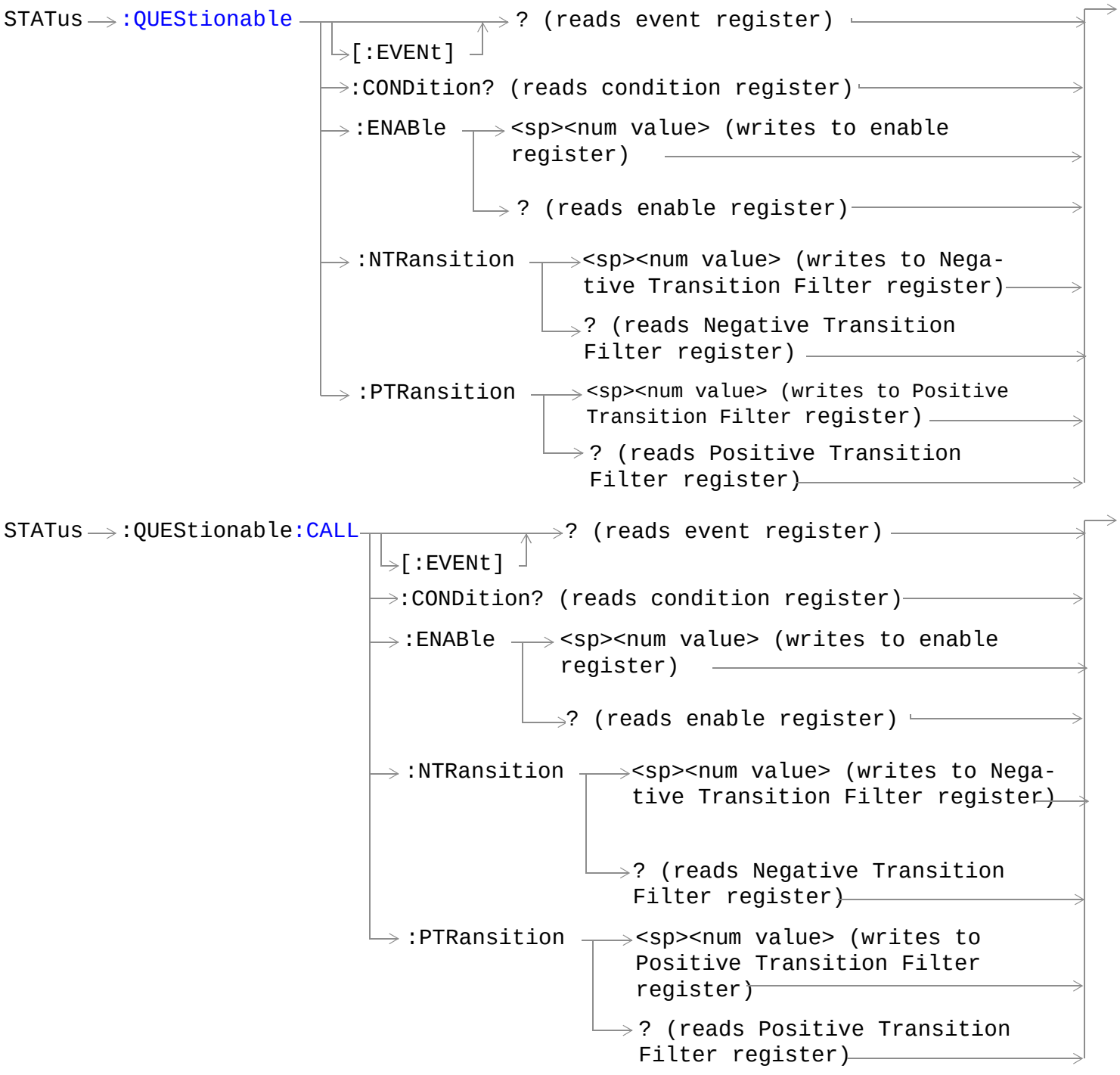
STATus → :PRESet

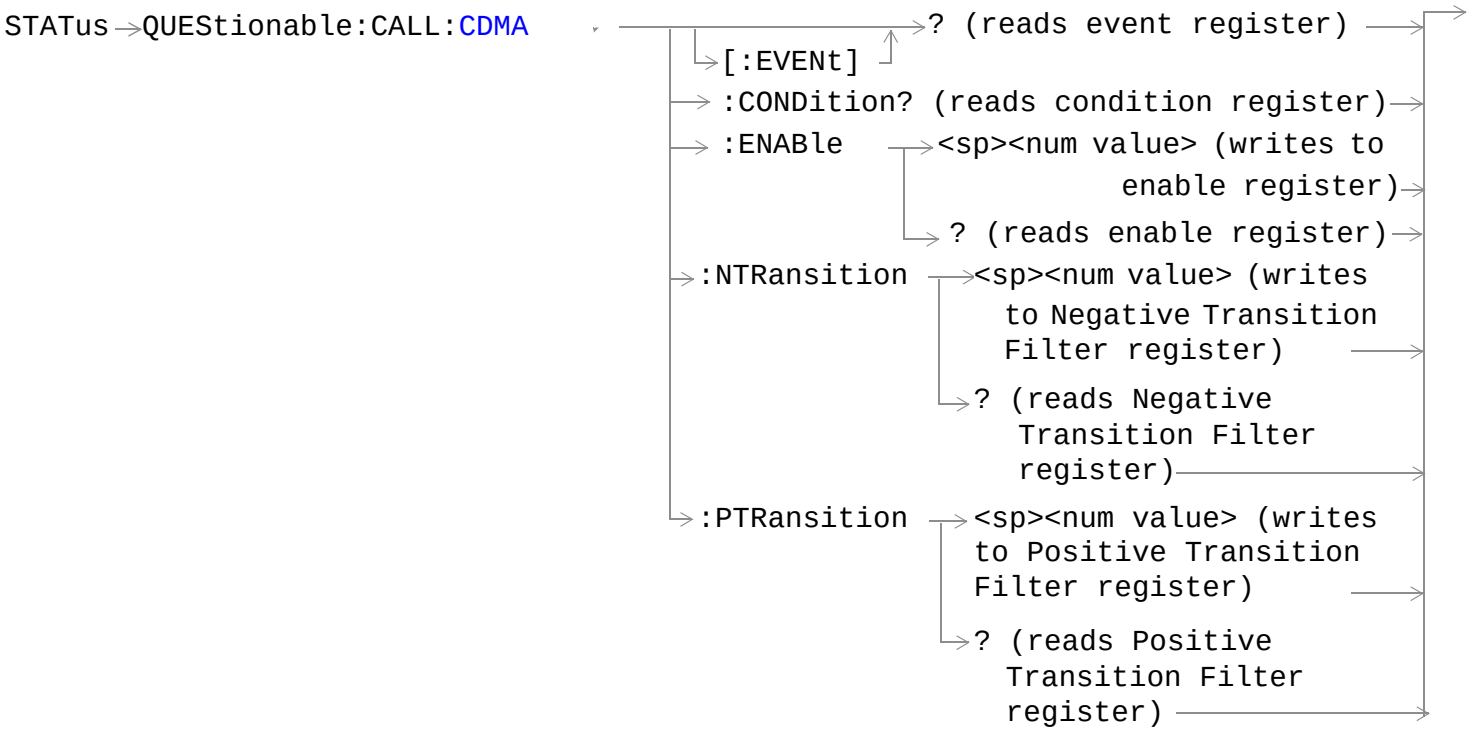
"Diagram Conventions" on page 210

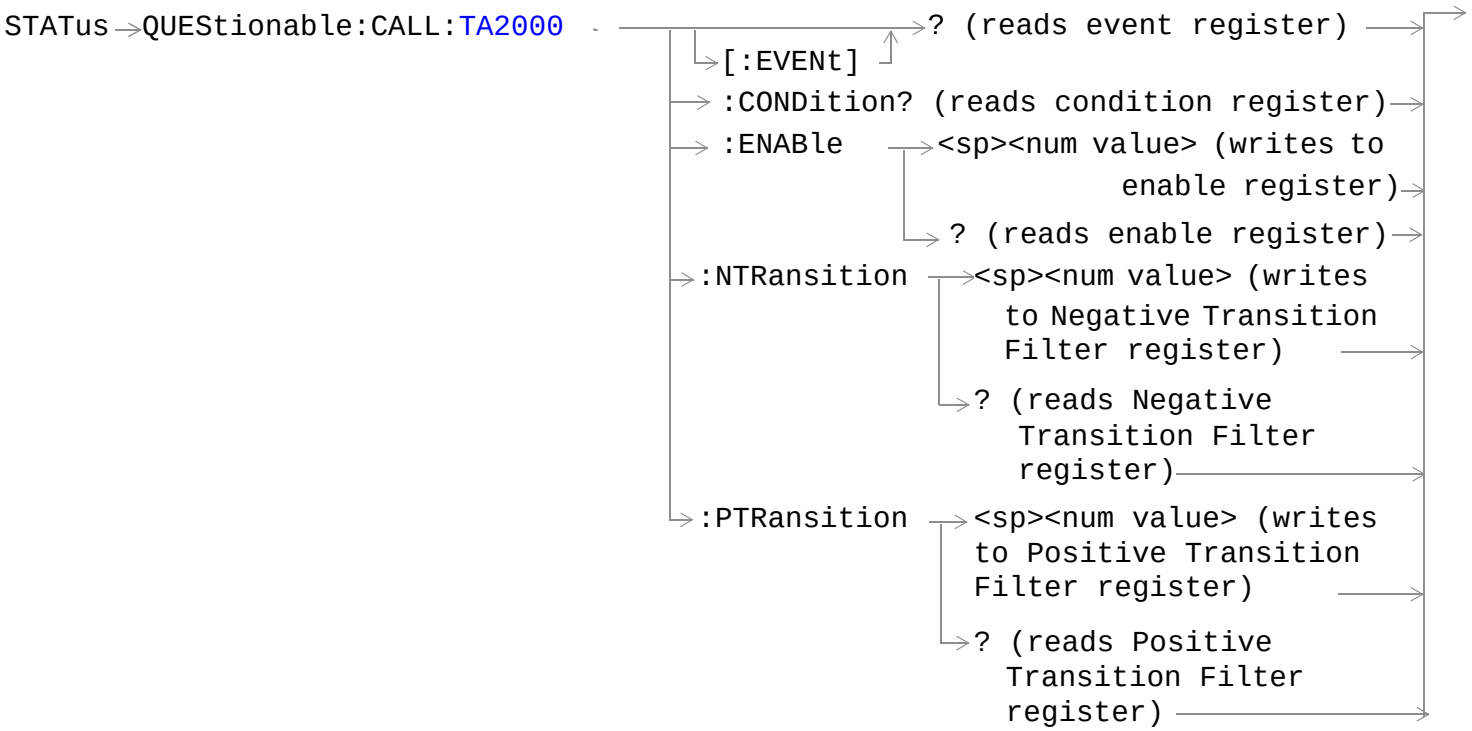
STATus:PRESet

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

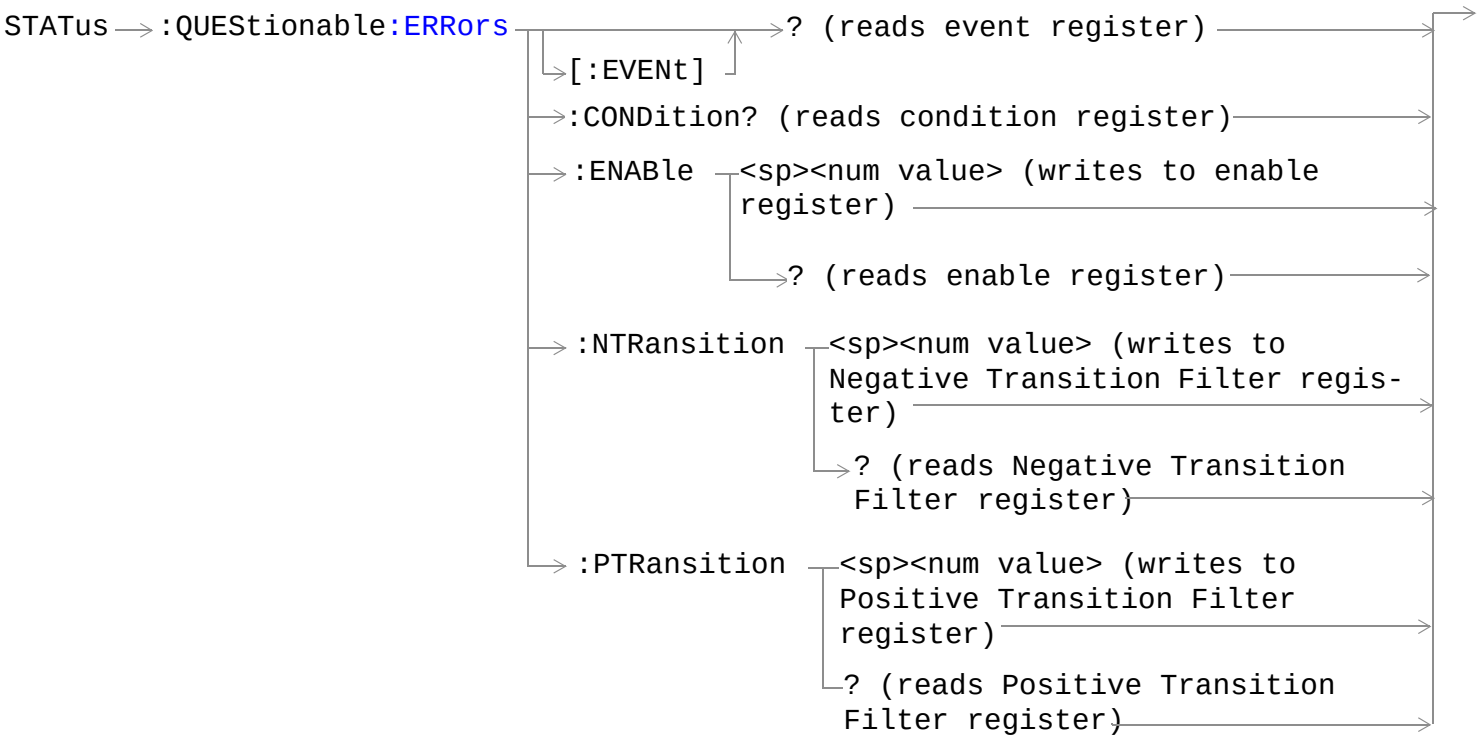
STATus:QUEStionable

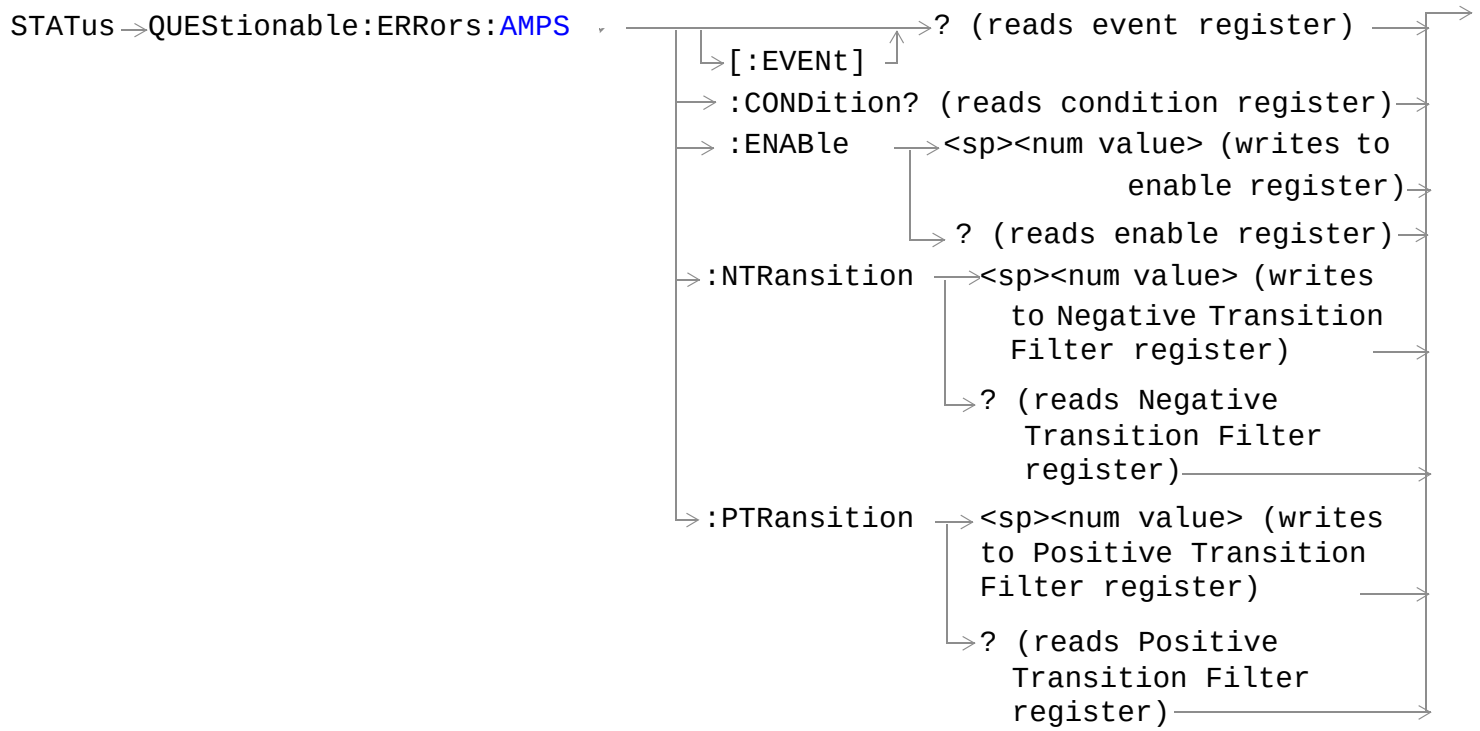


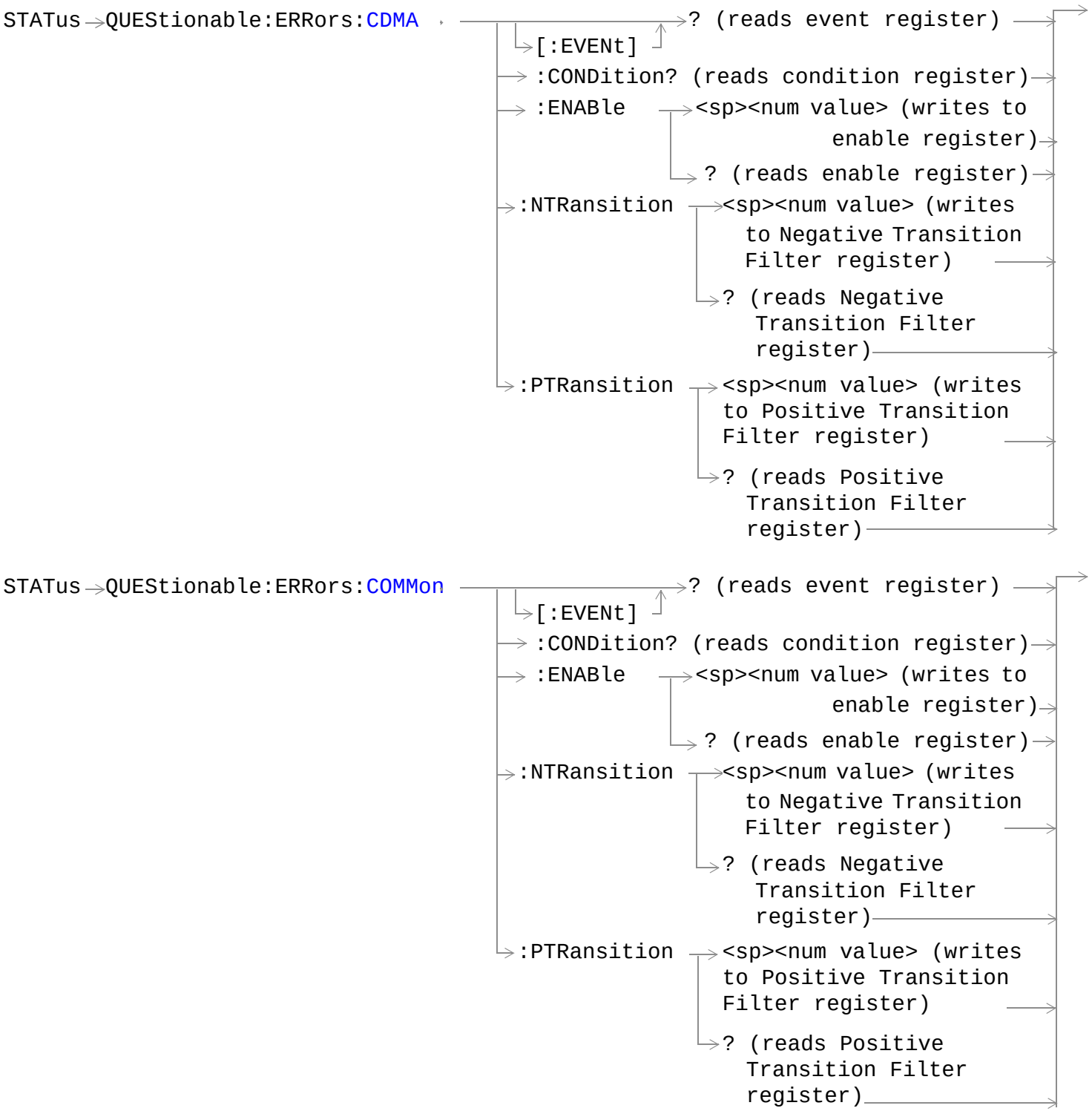

STATus:QUEStionable:CALL:CDMA
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)


STATus:QUEStionable:CALL:TA2000
[: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)

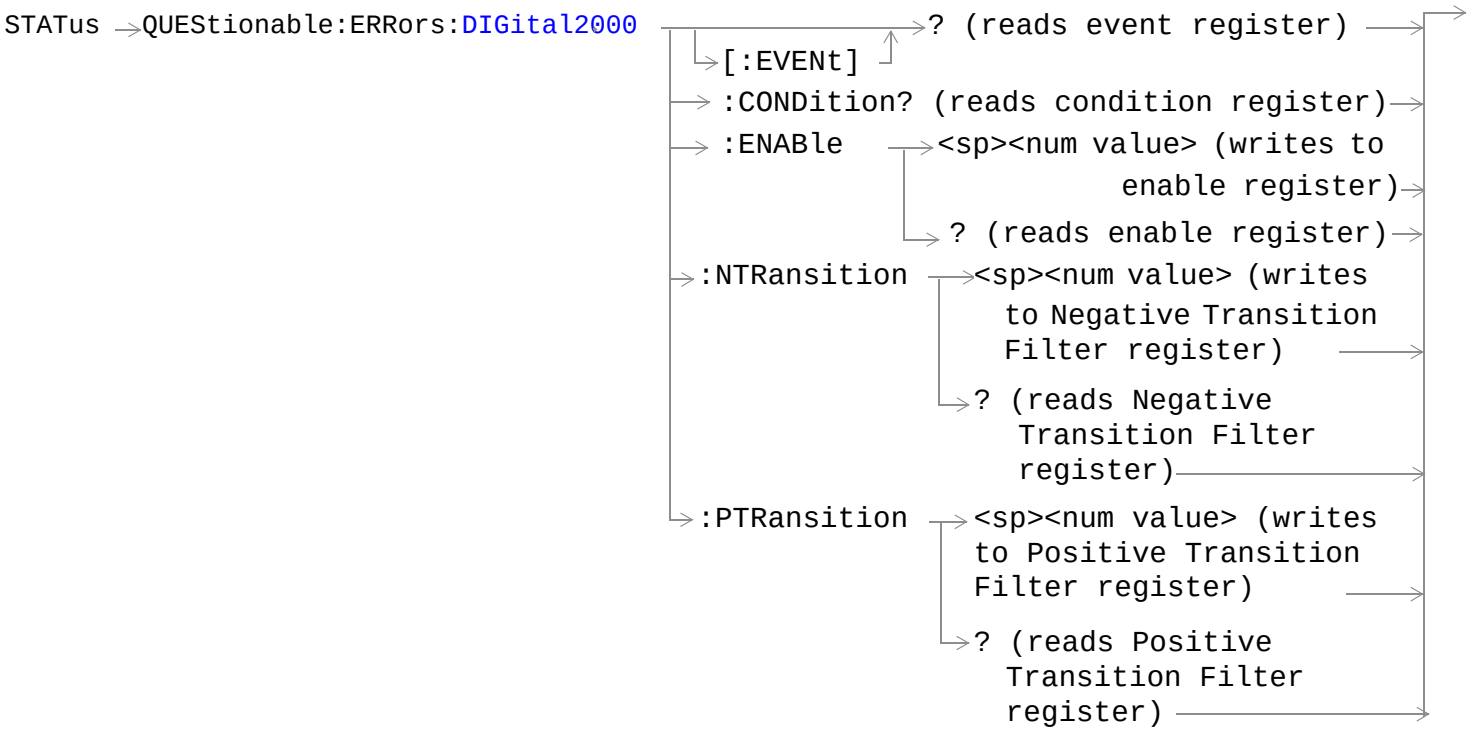
STATus:QUEStionable

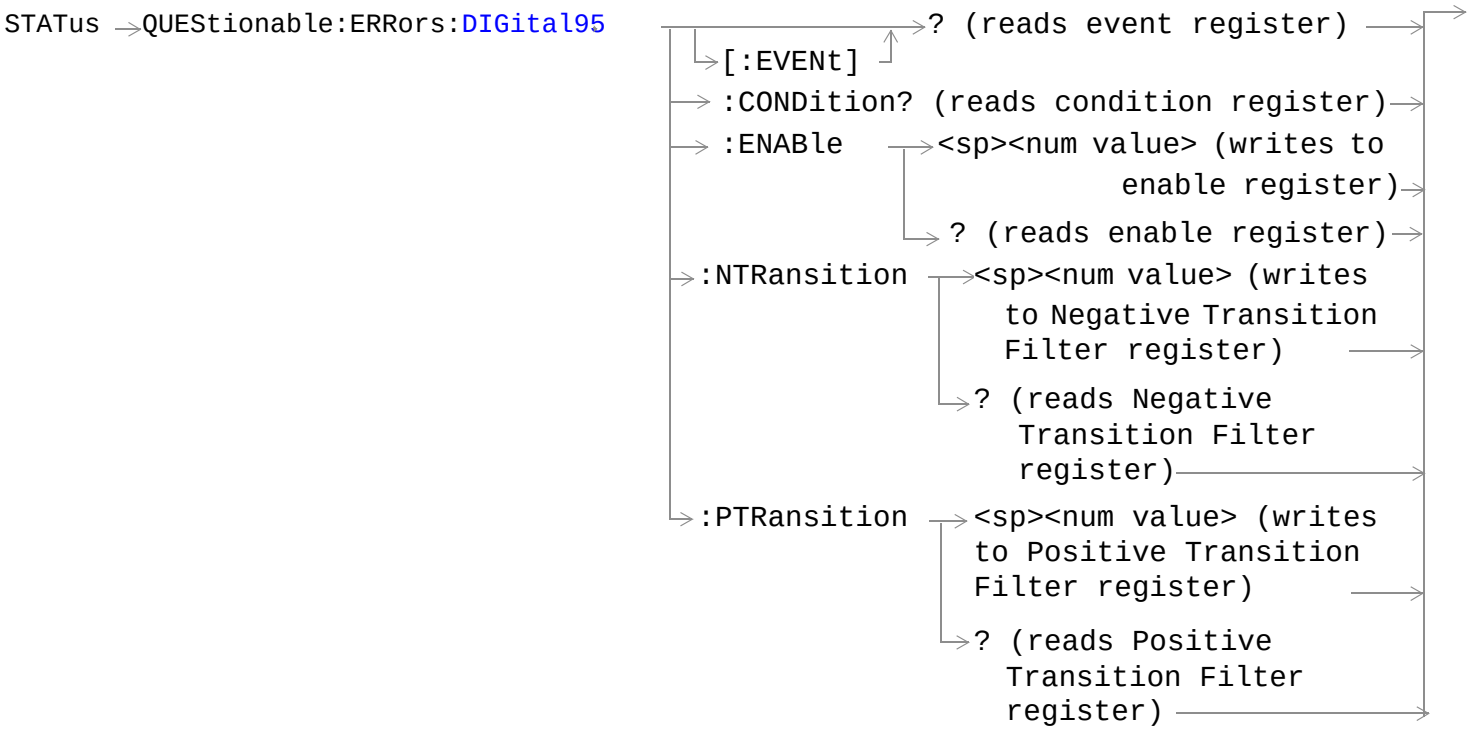


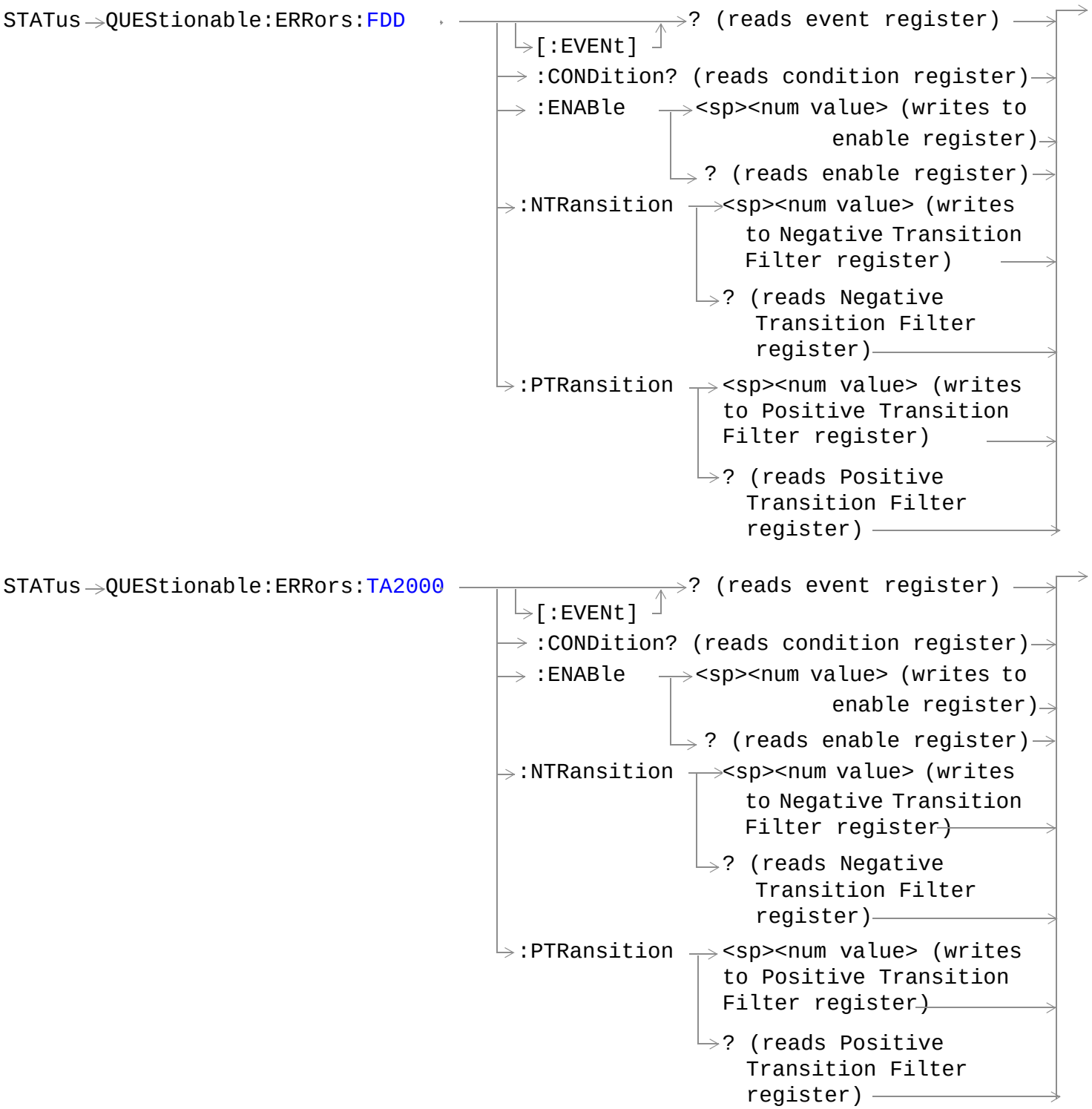



STATus
QUEStionable:ERRors:CDMA
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)
STATus
QUEStionable:ERRors:COMMon
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)

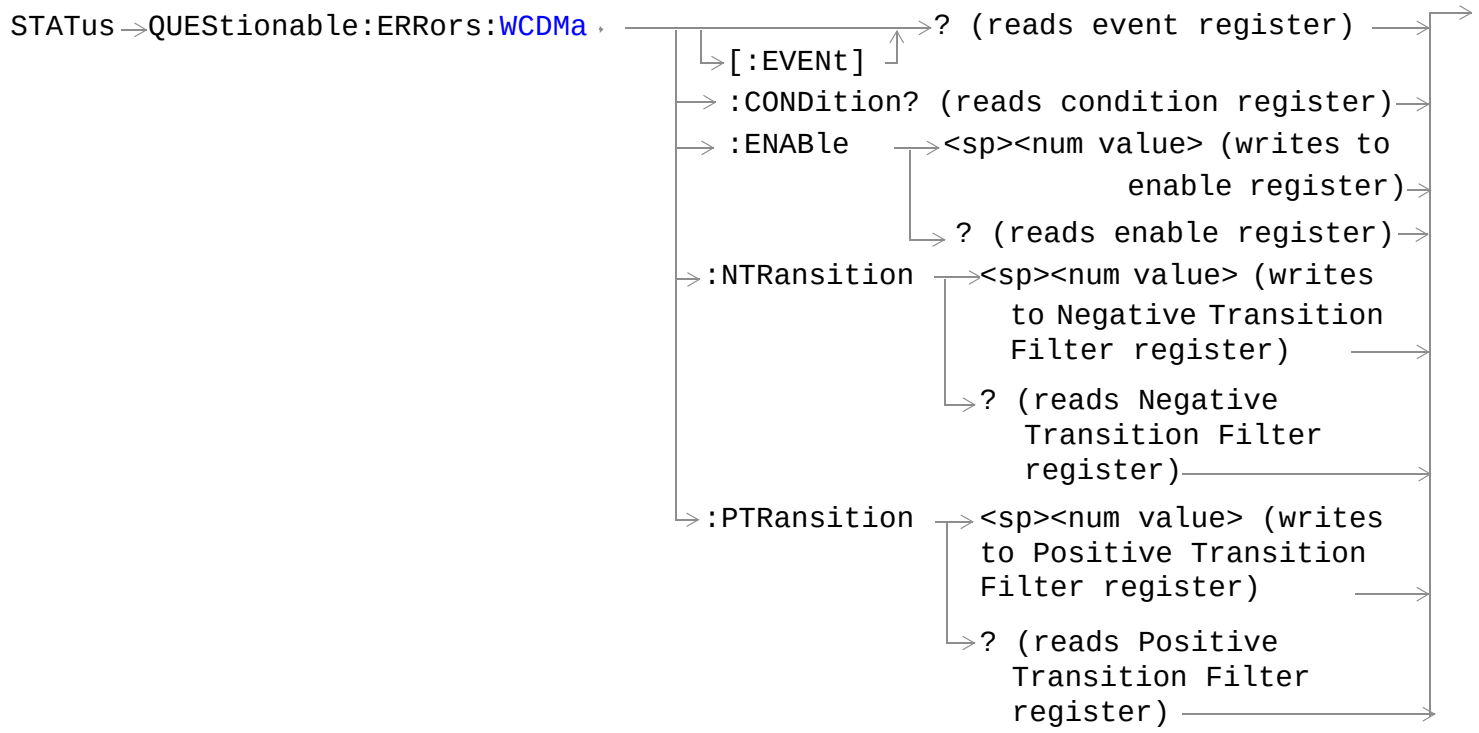
STATus:QUEStionable

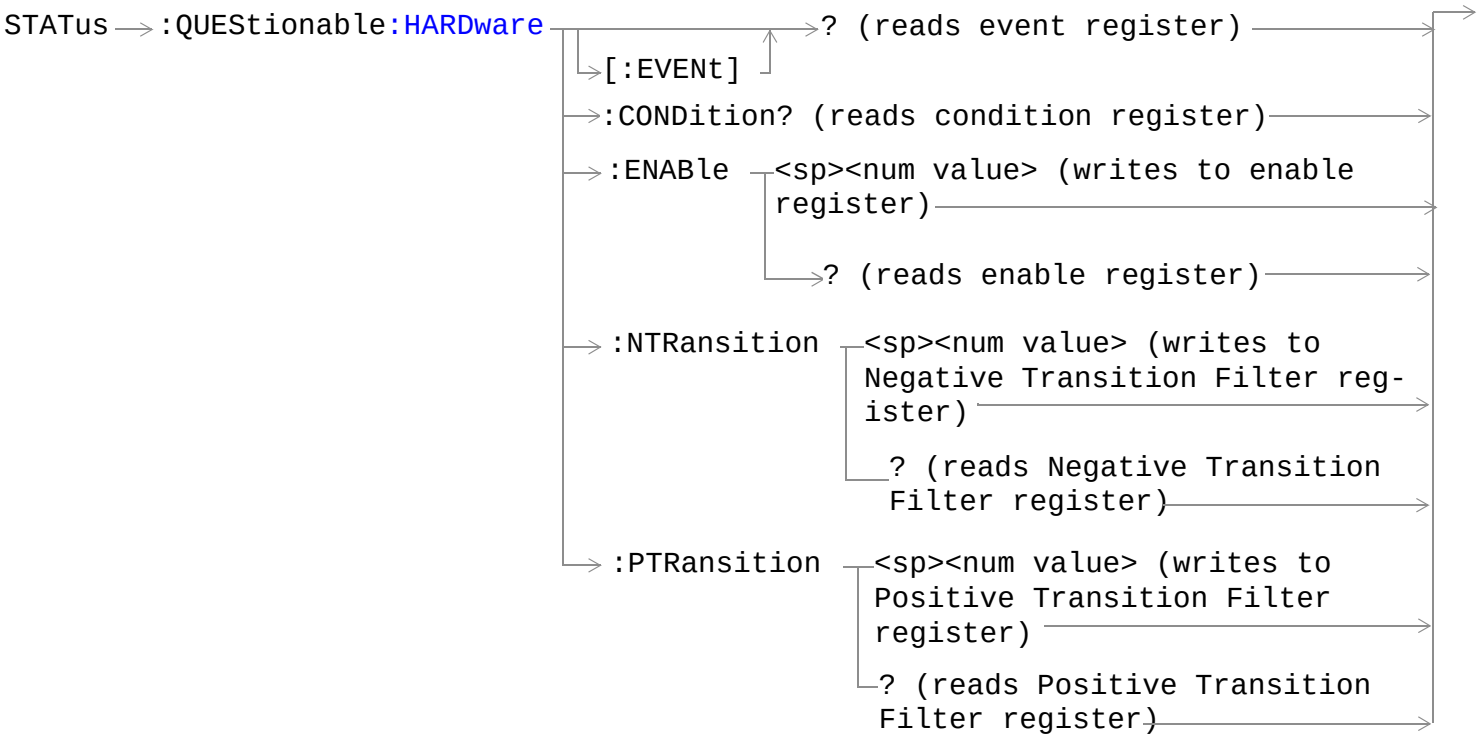





STATus
QUEStionable:ERRors:FDD
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)
STATus
QUEStionable:ERRors:TA2000
? (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 210

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.
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.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition 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.
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.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:ERRors: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.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit is always 0.

Program Example - STATus:QUEStionable:ERRors:COMMon 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.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit 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.
9	512	+900 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
2	4	+200 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit 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.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	+900 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. 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.
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.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	+900 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. 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.
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.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	+900 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you can query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit is pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. 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.
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.
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?

*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

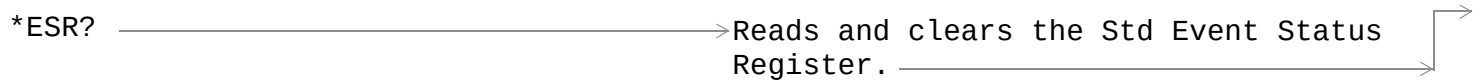
Bit Number	Binary Weighting	Label	Description
7	128	STATus: OPERation	Summarizes the STATus: OPERation Status Register, which fans out to the NMRReady and CALL Status Registers.
6	64	RQS (SRQ TRUE?)/Master Summary Status	RQS is read by a serial poll (SPOLL) Master Summary Status is read by a *STB? query - 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

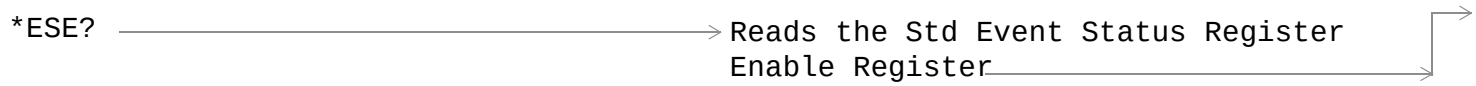
```
OUTPUT 714;"*STB?" !Queries the Status Byte.
```

Standard Event Status Register

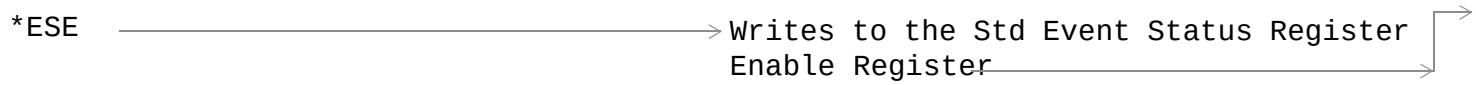
***ESR?**



***ESE?**



***ESE**



"Diagram Conventions" on page 210

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.

Bit Number	Binary Weighting	Condition	Description
2	4	Query Error	This bit is set to 1 if an error has occurred while trying to read the test set's output queue. The following events cause a query error: • An attempt is made to read data from the output queue when no data is present or is pending. • Data in the output queue has been lost. An example of this would be an output queue overflow.
1	2	Reserved for future use.	This bit will always be 0.
0	1	Operation Complete	This bit is set to 1 when the test set has completed all pending operations and is ready to accept new commands. This bit is only generated in response to the *OPC IEEE 488.2 common command.

Program Example - Standard Event Status Register

```
OUTPUT 714;"*ESR?" !Queries (reads) the Standard Event Status Register.
```

SYSTem Subsystem

Description

The SYSTem subsystem collects the functions that are not related to test set performance. Examples include functions for performing general housekeeping and functions related to setting global configurations, such as TIME or CORRection (amplitude offset).

Syntax Diagrams and Command Descriptions

"SYSTem:APPLication" on page 507

"SYSTem:BEEPer" on page 514

"SYSTem:COMMunicate" on page 516

"SYSTem:CONFigure:INFormation:HARDware:VERBose?" on page 515

"SYSTem:CORRection" on page 520

"SYSTem:CURRent:TA" on page 526

"SYSTem:DATE" on page 527

"SYSTem:ERRor?" on page 528

"SYSTem:MEASurement:RESet" on page 529

"SYSTem:PRESet" on page 530

"SYSTem:ROSCillator" on page 531

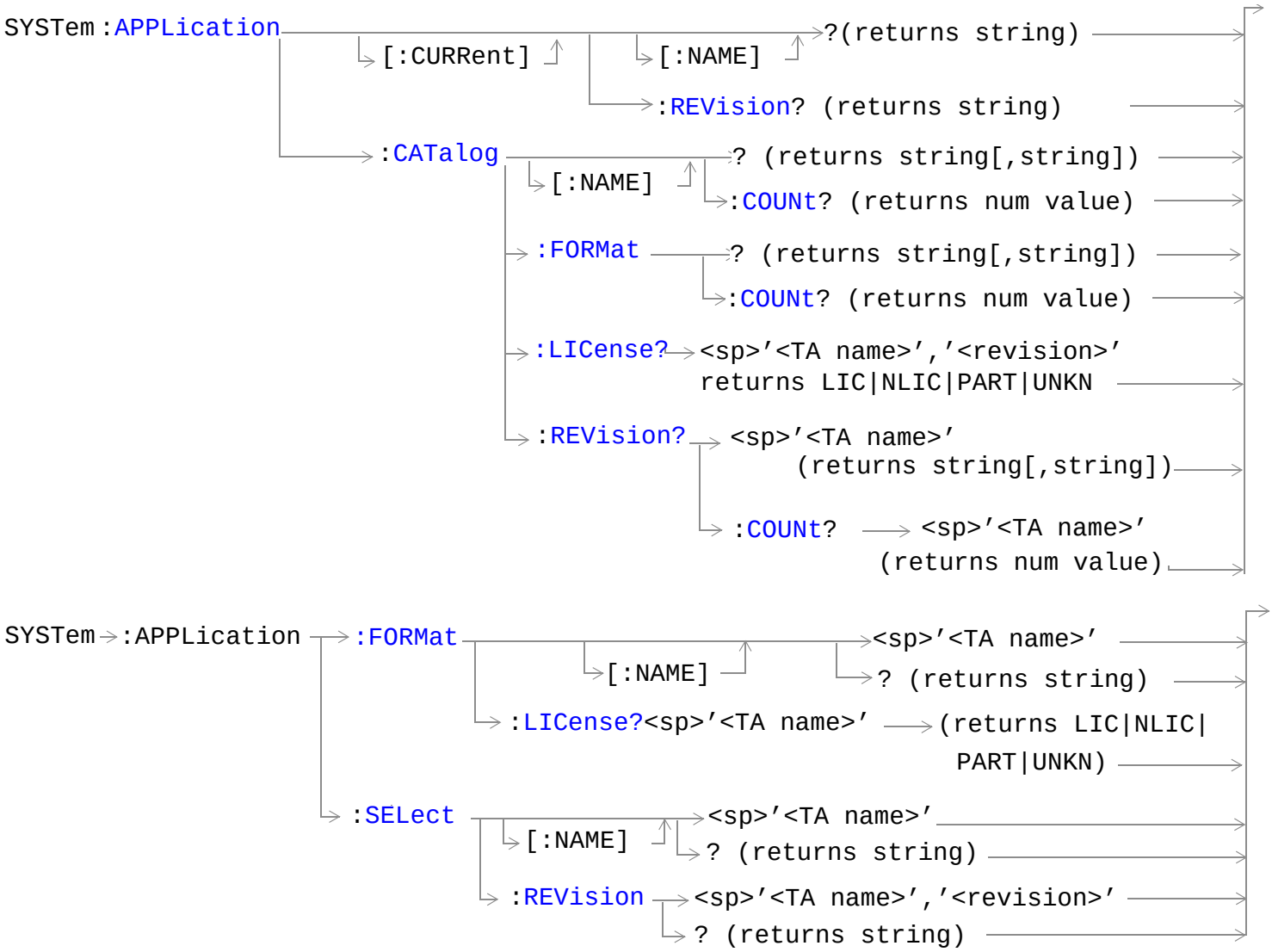
"SYSTem:SYNChronized" on page 532

"SYSTem:TIME" on page 533

"SYSTem:TZONe" on page 534

"SYSTem:UTC" on page 535

SYSTem:APPLication



"Diagram Conventions" on page 210

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? <test application name>,<revision>

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?<test application name>

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? <test application name>

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? <format name>

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] <test application name>

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 <test application name>,<revision>

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 640

"Test Application Revisions and Licenses" on page 642

"Test Application Name" on page 644

"SYSTem:CURRent:TA" on page 526

SYSTem:BEEPer

"Diagram Conventions" on page 210

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:INFormation:HARDware:VERBose?

"Diagram Conventions" on page 210

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.`	

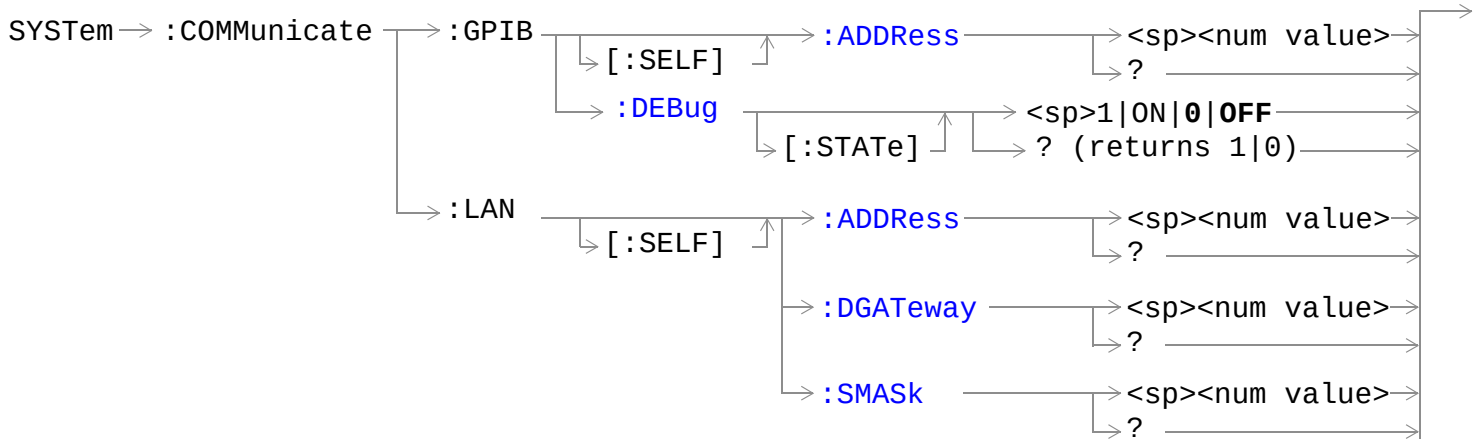
Related Topics

"Hardware Configuration Report" on page 629

"SYSTem:CURRent:TA" on page 526

"Obtaining Identification Information (*IDN)" on page 628

SYSTem:COMMunicate



"Diagram Conventions" on page 210

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 588 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 519. 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

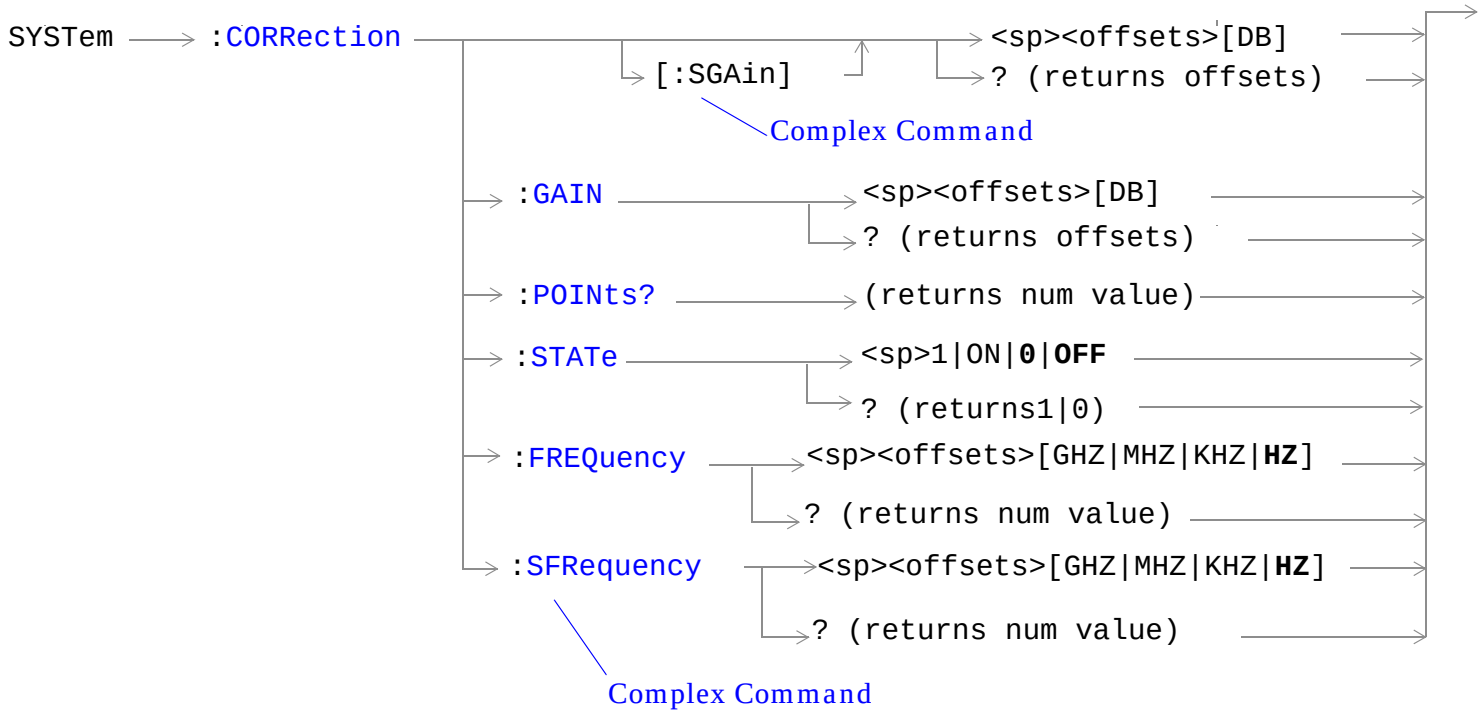
Function	Sets/queries the subnet mask of the test set based on the LAN IP address selected. The subnet mask changes according to the value of A used for the LAN IP address. If A is less than or equal to 127, the subnet mask is 255.0.0.0. If A is greater than 127 and less or equal to 191, the subnet mask 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 638

"Configuring the Test Set's LAN" on page 636

SYSTem:CORRection



"Diagram Conventions" on page 210

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 59. 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 59. 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 59. 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 59.
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 59. 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
```

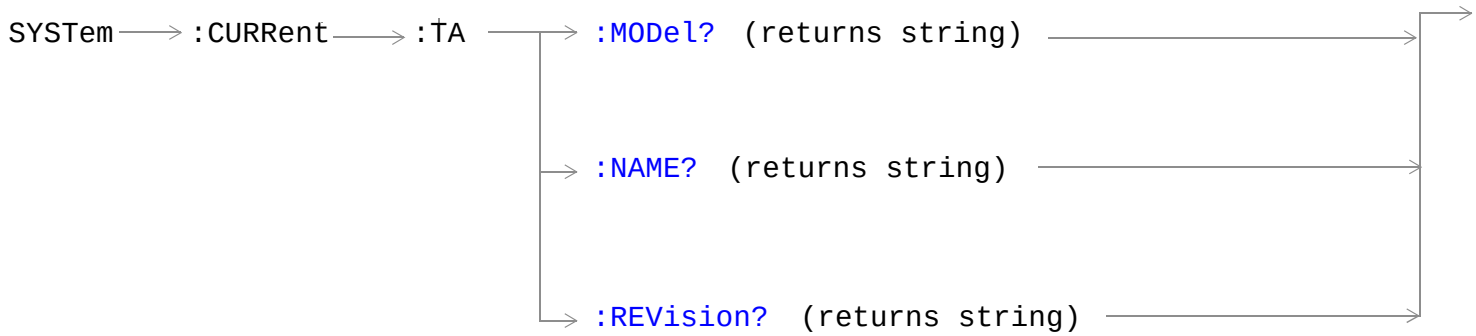
SYSTem:CORRection:STATe

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 59.
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 210

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

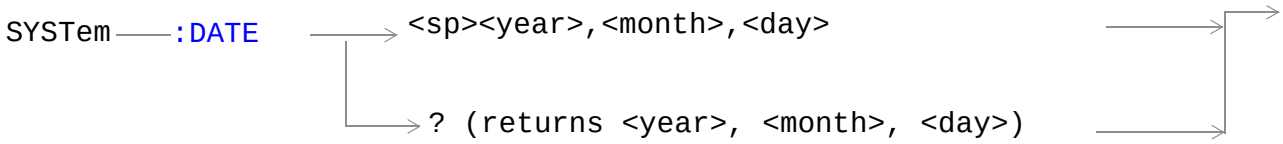
SYSTem:CURRent:TA:NAME?

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 507.
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 507.
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 210

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 210

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 588.
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`	

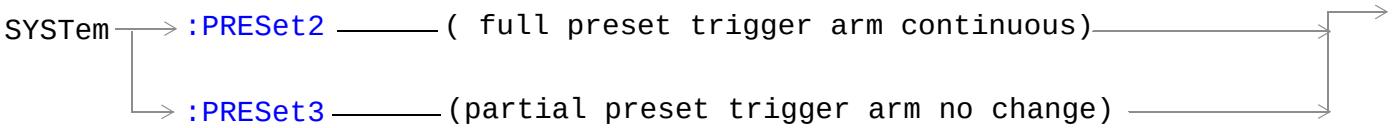
SYSTem:MEASurement:RESet

"Diagram Conventions" on page 210

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 210

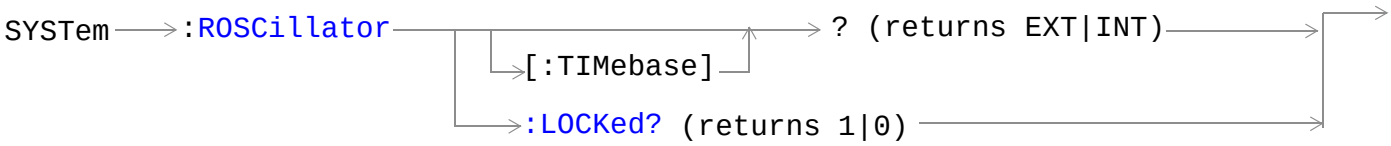
SYSTem:PRESet2

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 187. The *RST command will set the trigger arm to single.
Related Topics	See "Full Preset" on page 153 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:ROSCillator



"Diagram Conventions" on page 210

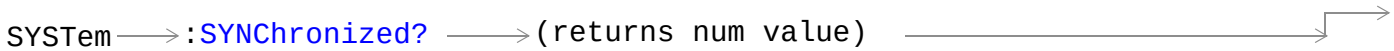
SYSTem:ROSCillator[:TIMebase]?

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

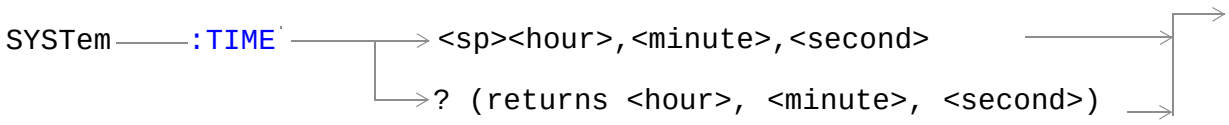


"Diagram Conventions" on page 210

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 210

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

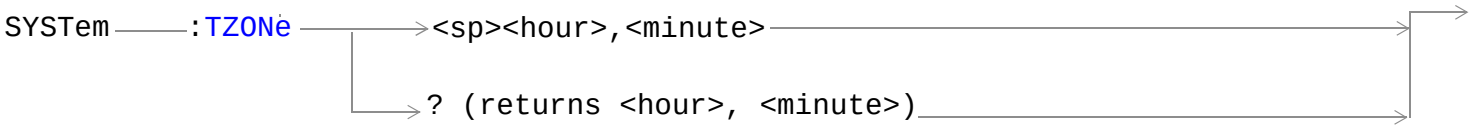
Programming Example
`OUTPUT 714;"SYSTEM:TIME 7,30,0" !Sets local time to 7:30`
`OUTPUT 714;"SYSTEM:TIME?" !Returns "+7,+30,+0" if local time has been set to 7:30.`	

Related Topics

"SYSTem:UTC[:TIME]"

"SYSTem:TZONe"

SYSTem:TZONe



"Diagram Conventions" on page 210

SYSTem:TZONe

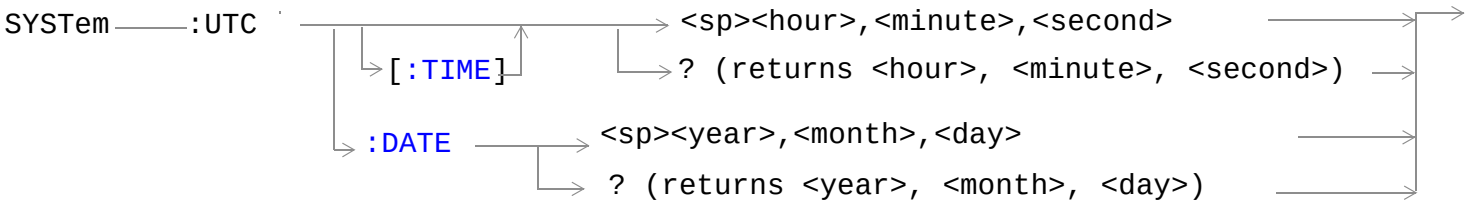
Function	Sets/queries the time zone. Changes to time zone will cause changes to local time, but will not directly affect UTC time.
Setting	Range: • <hour> -12 to +15 • <minute> 0 to 59
Query	Range: • <hour> -12 to +15 • <minute> 0 to 59
*RST Setting	This feature is not affected by instrument preset
Requirements	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 210

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

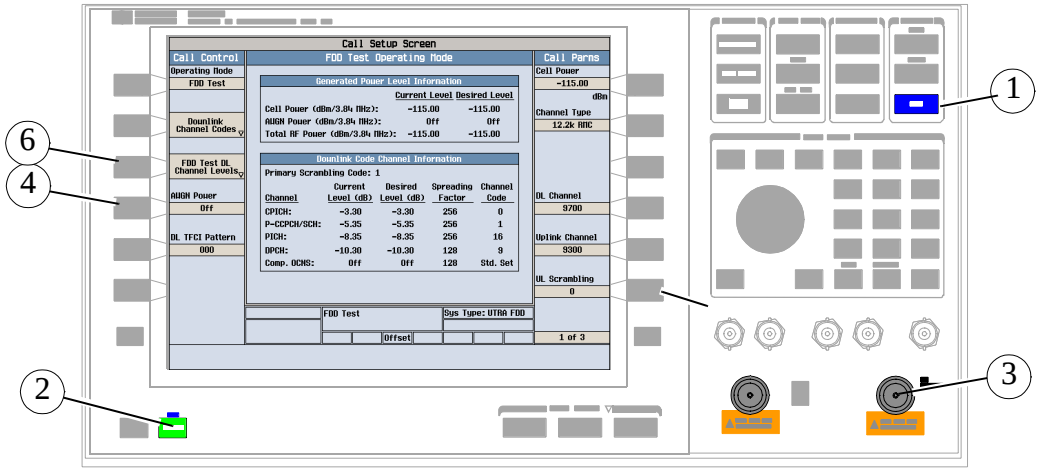
“Obtaining Identification Information (*IDN)”

“Preset Descriptions”

5 Manual Operation

Making Measurements on a UE

A. Establish a Connection.

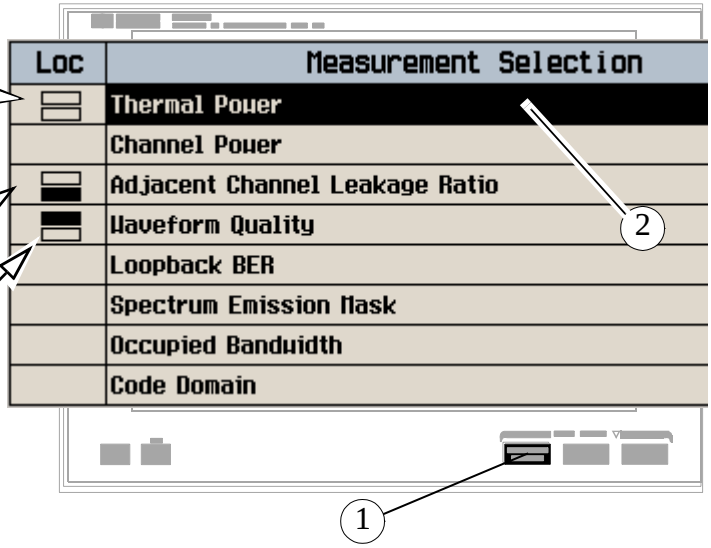


1. Press the blue **SHIFT** key.
2. Press the green **PRESET** key.
3. Connect the UE to the test set.
4. Press `Paging IMSI` (**F4**) and enter the UE's IMSI.
5. Turn the UE on and allow it to camp to the test set.
6. Press `Originate Call` (**F3**).

B. Select measurements.

The gray boxes indicate that the measurement is being made, but the results are not being displayed.

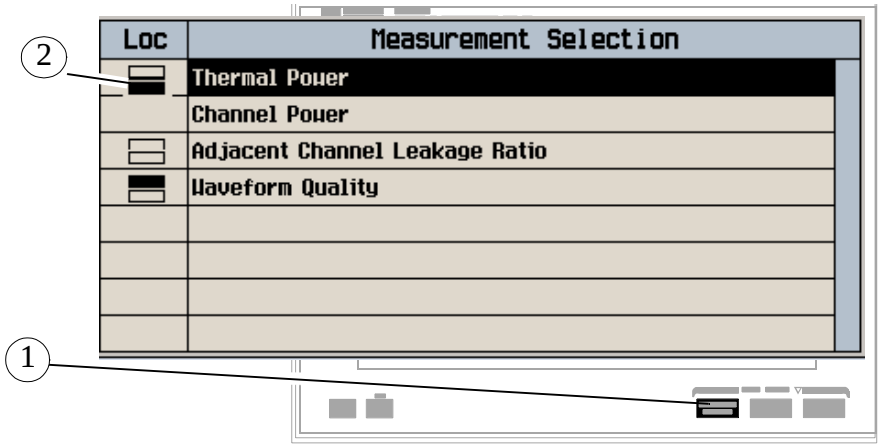
These black boxes indicate that adjacent channel leakage ratio measurement results are being displayed in the lower measurement window, and that waveform quality measurement results are being displayed in the upper measurement window.



1. Press the **Measurement selection** key.
2. Highlight a measurement and press the knob.
3. Repeat steps 1 and 2 to add measurements.

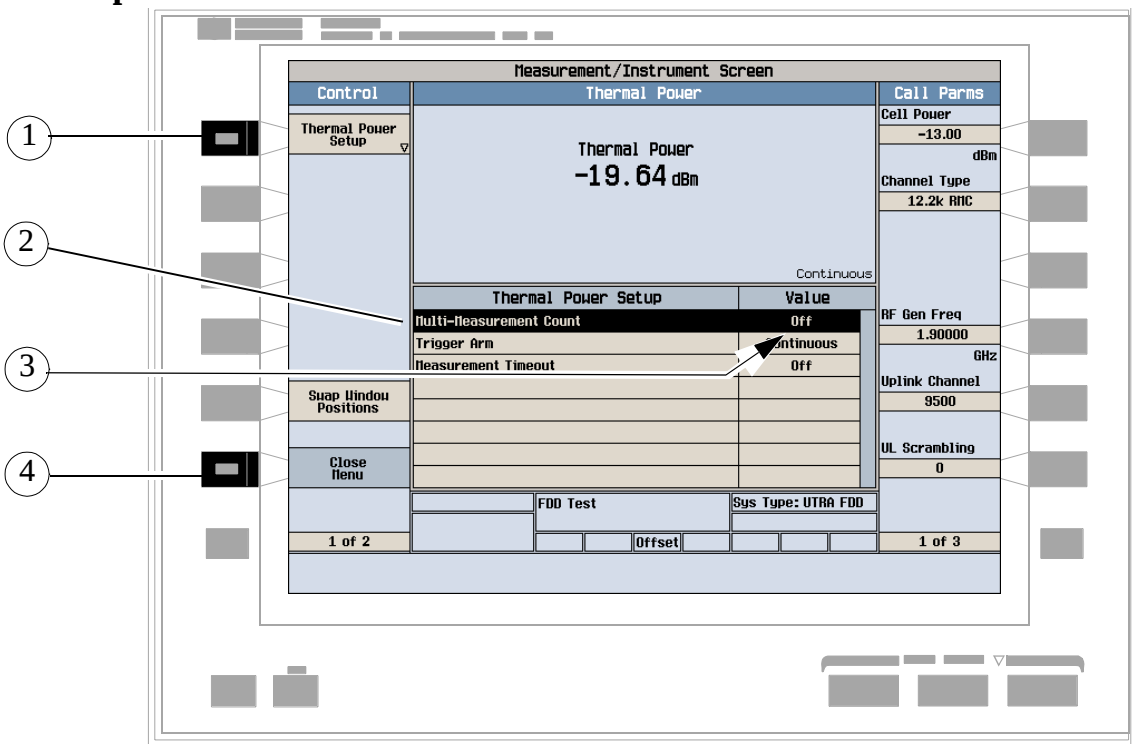
How Do I Change the Measurement Setup?

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.



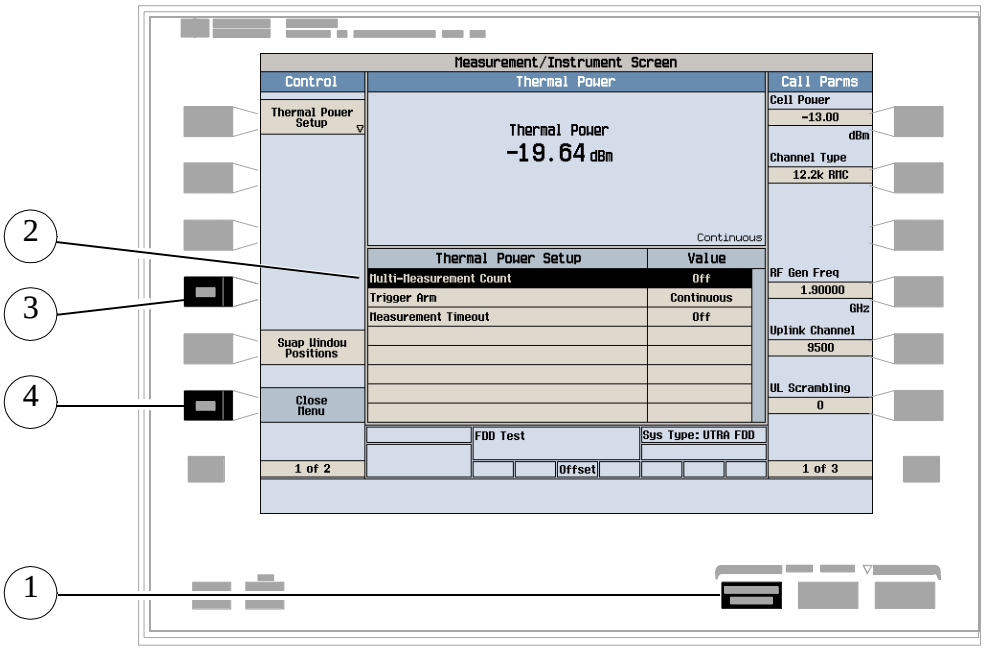
1. Press the measurement's setup key (**F1**).
2. Highlight a parameter and press the knob.

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.

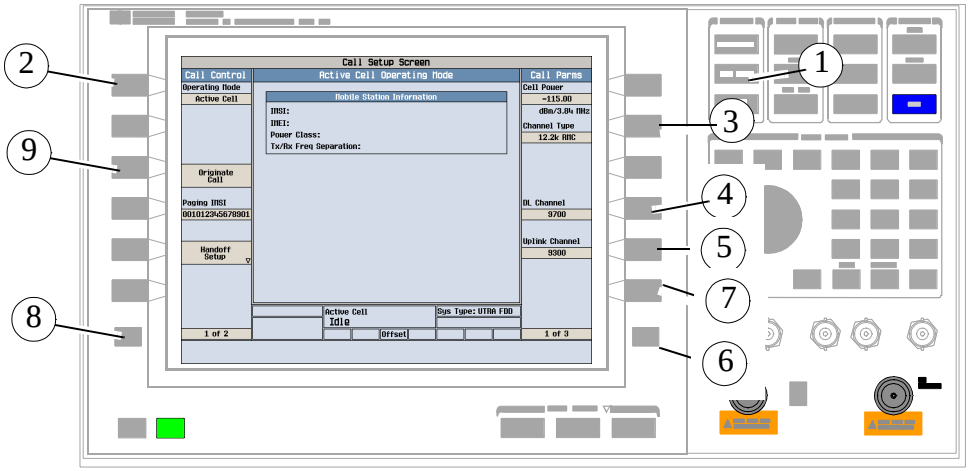
How Do I Turn Off a Measurement?



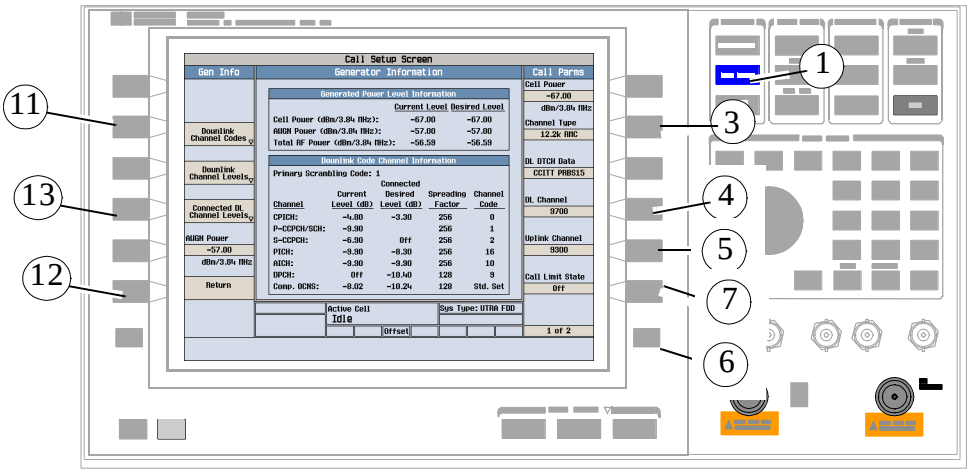
1. Press the **Measurement selection** key.
2. Highlight the measurement you want to turn off.
3. Press the `Close Measurement` (**F4**) key.
4. Press the `Close Menu` (**F6**) key.

Changing Call Parameters

A. 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 to go to screen `2 of 3`.
7. Press `SRB Config` (**F12**) key, and set the desired data rate for the initial signaling radio bearer.
8. Press **More** key on the left to go to `Call Control` (`2 of 2`).
9. Press `Generator Info` (**F3**).



10. Press the `Downlink Channel Codes` (**F2**) key, and set the channel codes.
11. Press the `Downlink Channel Levels` (**F3**) key, and set the power levels for the downlink channels.

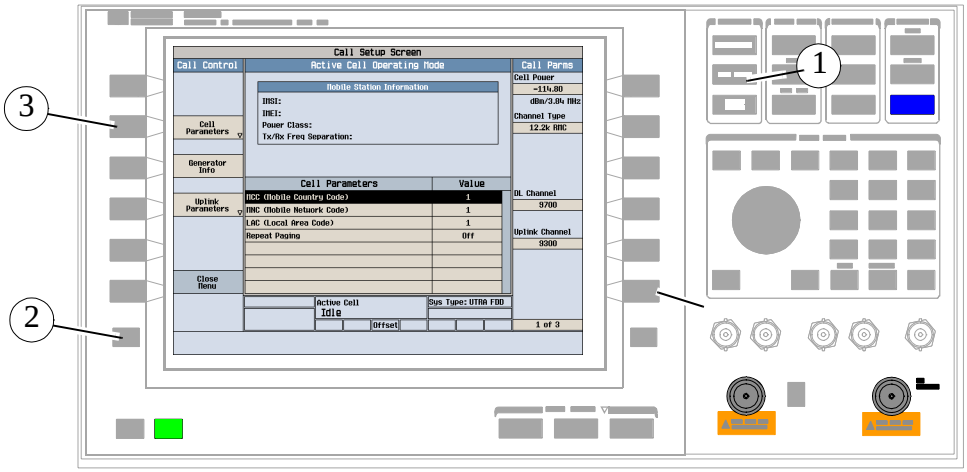
12.Press Return (**F6**).

13.Press Uplink Parameters (**F4**) and set the PRACH settings and the uplink scrambling code.

B. Call Parameter Changes Allowed in Active Cell Mode

1. Press **CALL SETUP**.
2. Press the Cell Power (**F7**) key, and set the desired level of the downlink signal.
3. Press **More** key to go to 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 DL PICH data to either All Zeros or All Ones.
6. Press CAll Drop Timer (**F11**) to turn the timer on or off.

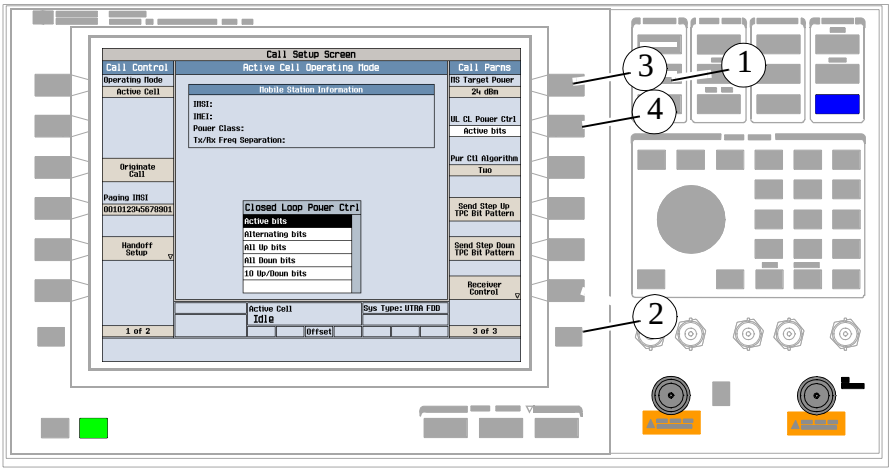
Changing Cell Parameters



1. Press CALL SETUP.
2. Press **More** on left side and go to `Call Control` screen `2 of 2`.
3. Press Cell Parameters (F2).
4. Modify the MCC, MNC, LAC, and Repeat Paging parameters as desired.

Changing UE TX Power Levels

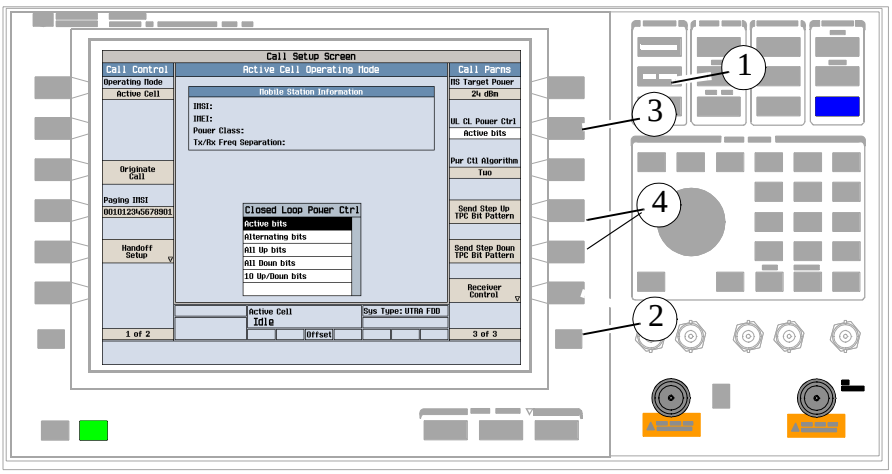
A. Using Closed Loop Power Control



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 `MS Target Power` (**F7**) key, and set the desired average transmit power of the UE.
4. Press the `UL CL Power Ctrl` (**F8**) key, and select `Active bits`. This sets the uplink closed loop power control to active.

NOTE Closed loop power control uses the power control algorithm set with the `Pwr Ctl Algorithm` (**F9**) key. However, the operating mode must be `Cell Off` to set this parameter. See "A. Set Parameters Requiring Cell Off Operating Mode" on page 545 for instructions.

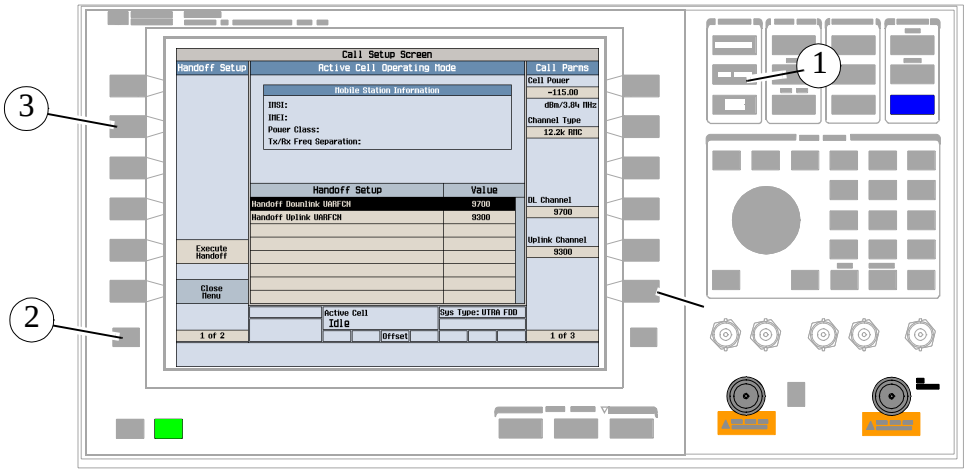
B. Controlling the UE's TX Power Manually



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` (**F8**) key, and select your desired method of controlling the UE's transmit power manually. Select from
   - `Alternating bits`
   - `All Up bits`
   - `All Down bits`
   - `10 Up/Down bits`
4. If you've chosen `Alternating bits`, 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.

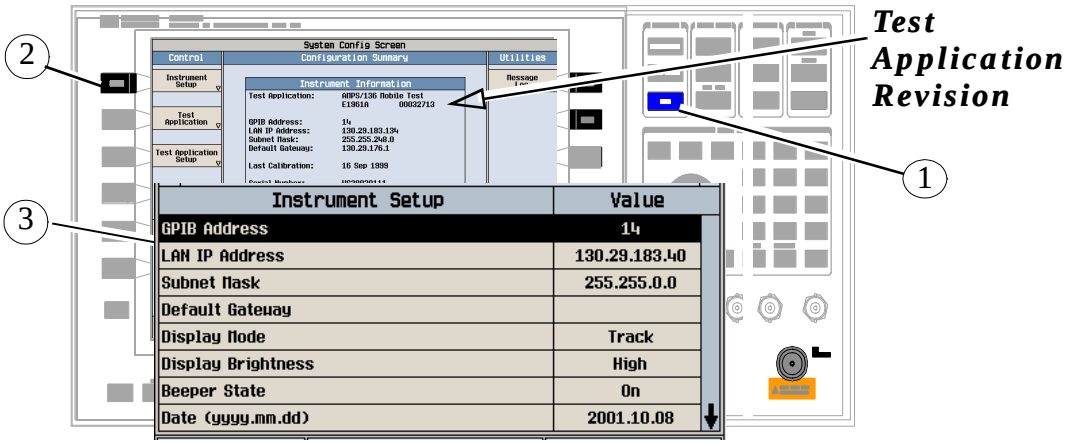
Perform a Handoff



1. Press the **CALL SETUP** key.
2. Press `Handoff Setup` (**F5**). Change the downlink and uplink UARFCNs to new values.
3. Press `Execute Handoff` (**F5**).
4. Check for `Connected` in the `Active Cell` field.

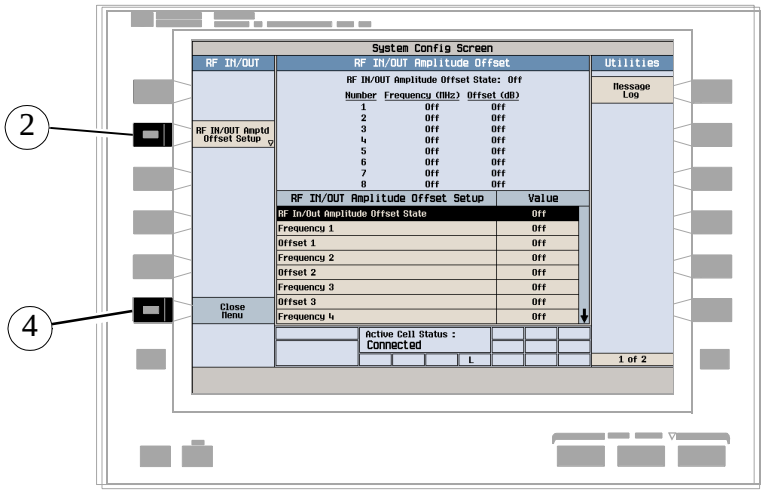
How Do I Configure the Test Set for My Test System?

A. Configure instrument information and setup.



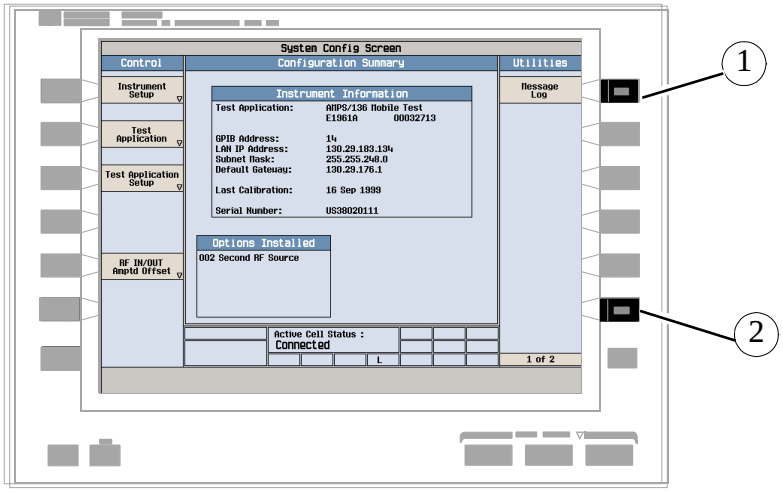
1. Press the **SYSTEM CONFIG** key.
2. Press the `Instrument Setup` (**F1**) key.
3. Adjust an instrument setting and then press the `Close Menu` (**F6**) key.

B. Set amplitude offsets.



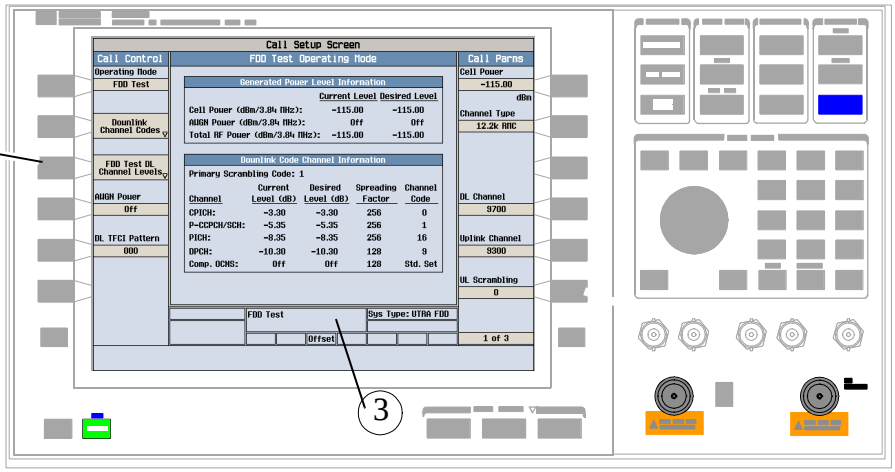
1. On the Configuration Summary Screen, press the `RF IN/OUT Amptd Offset` (**F5**) key.
2. On the RF IN/OUT Amplitude Offset screen, press the `RF IN/OUT Amptd Offset Setup` (**F2**) key.
3. Enter the amplitude offset for the test frequencies you use.
4. Press the `Close Menu` (**F6**) key.
5. Press the `Return` (**F6**) key.

C. Check the message log.



1. Press the Message Log (**F7**) key and view the message log.
2. Press the Return (**F12**) key.

End a Connection



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.

W-CDMA Measurements

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 sychronized before the UE can generate an uplink signal that can be measured in the following procedures. See "Making 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).

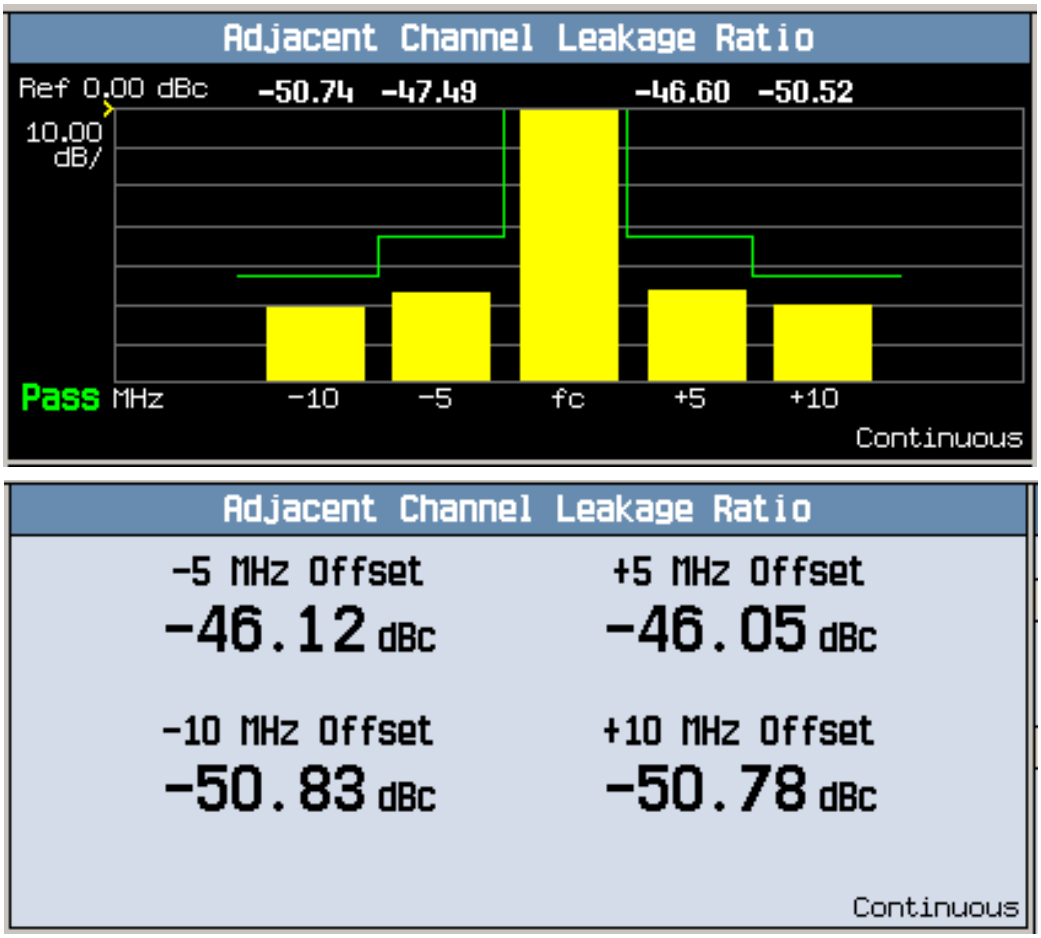
Setup parameters for each measurement are assumed to be set to their default (full preset) values unless otherwise stated.

The following measurement procedures are provided:

- "Measuring Adjacent Channel Leakage Ratio" on page 555
- "Measuring Channel Power" on page 556
- "Measuring Loopback Bit Error Ratio" on page 557
- "Measuring Thermal Power" on page 558
- "Measuring Waveform Quality" on page 559
- "Measuring Spectrum Emission" on page 560
- "Measuring Occupied Bandwidth" on page 561
- "Measuring Code Domain Power and Error" on page 562

Measuring Adjacent Channel Leakage Ratio

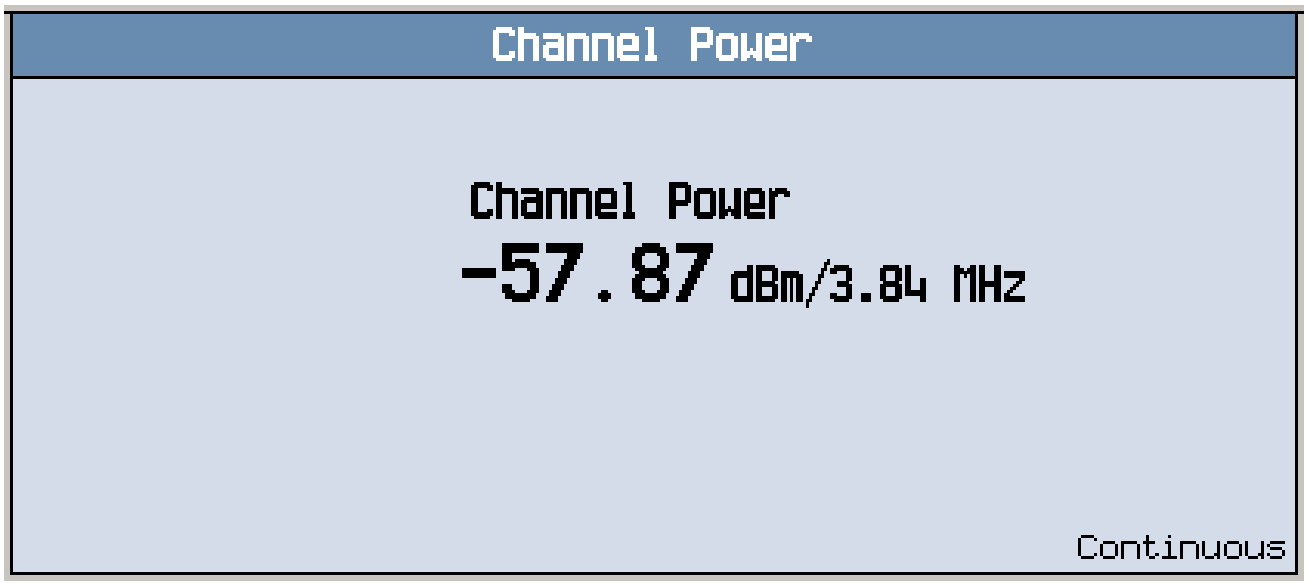
1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Adjacent Channel Leakage Ratio` measurement.
4. Press the `ACLR Setup` (**F1**) key.
5. Set the measurement parameters as needed for your 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).



Typical adjacent channel leakage ratio results using graphical and numeric format.

Measuring Channel Power

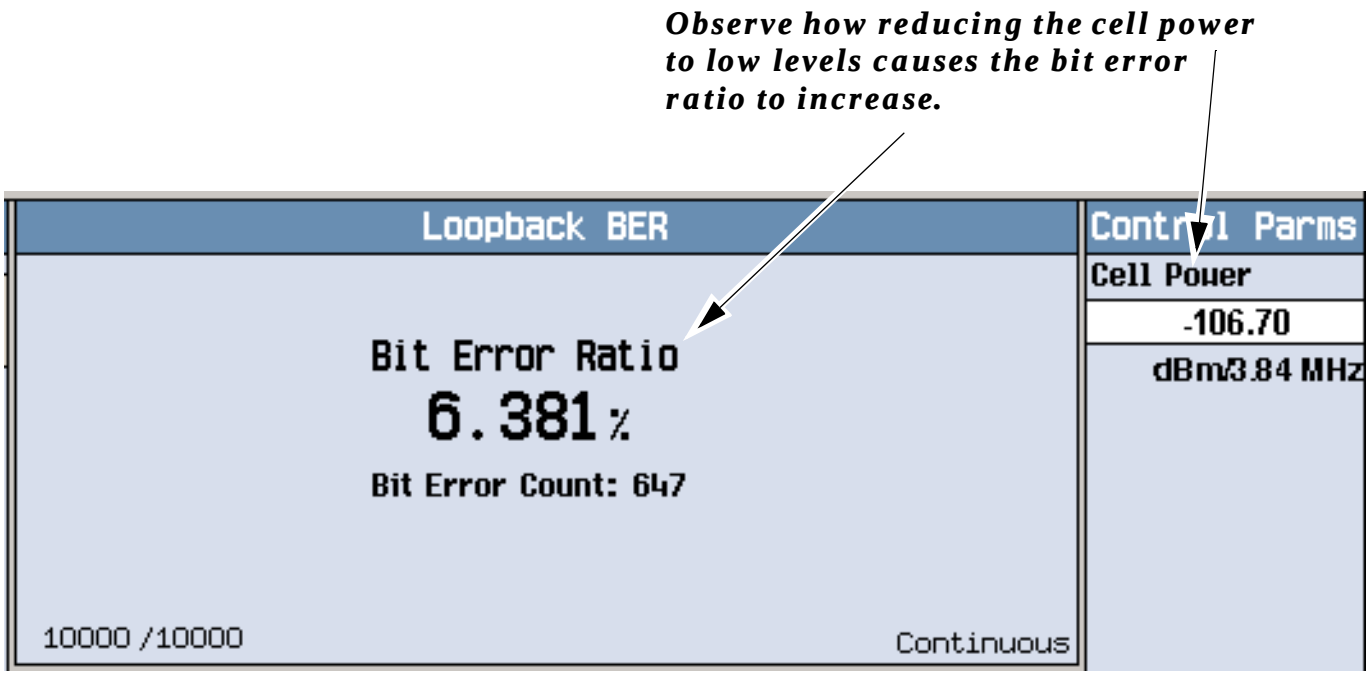
1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Channel Power` measurement.
4. Press the `Channel Power Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.



A typical channel power measurement result is shown above.

Measuring Loopback Bit Error Ratio

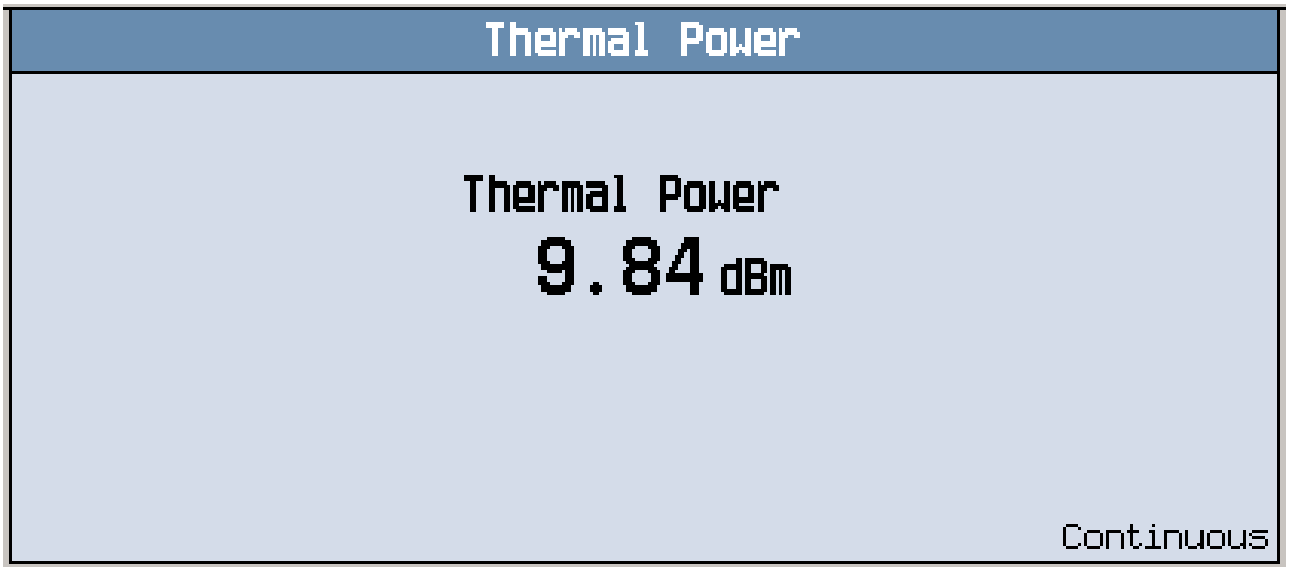
1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the Loopback BER measurement.
4. Press the Bit Error Setup (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.



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

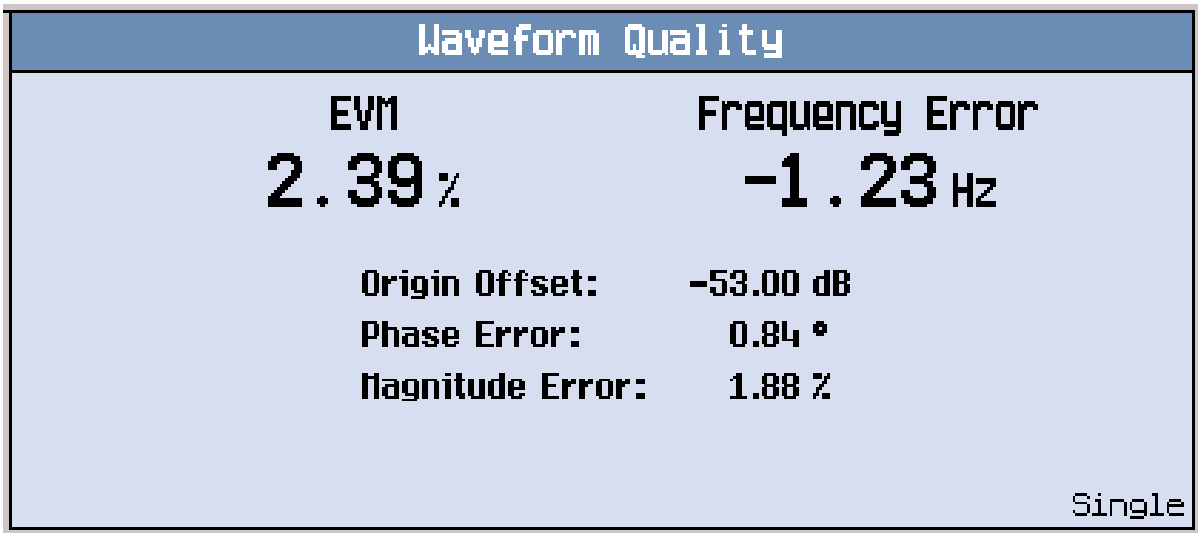
1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Thermal Power` measurement.
4. Press the `Thermal Power Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.



A typical thermal power measurement result is shown above.

Measuring Waveform Quality

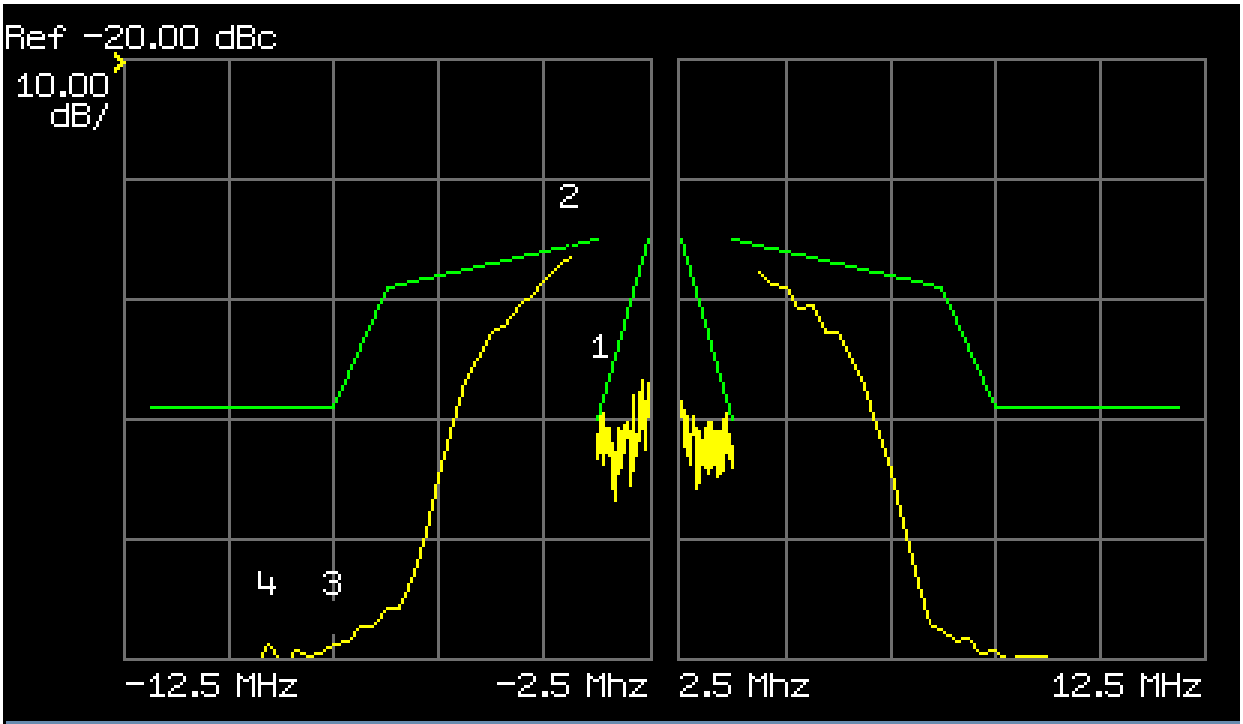
1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Waveform Quality` measurement.
4. Press the `WWQ Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.



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

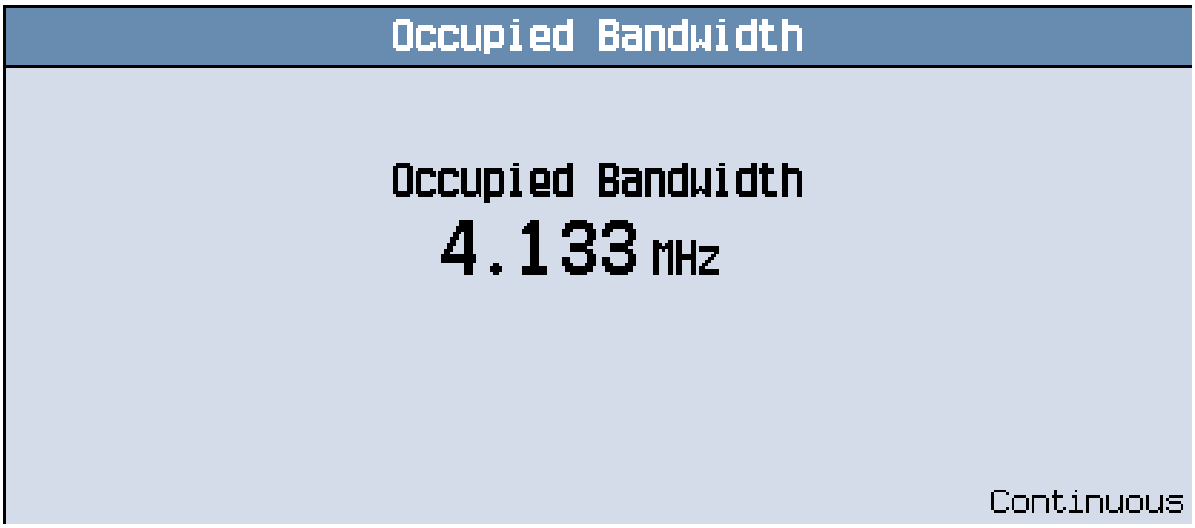
In-Channel Power: -27.68 dBm/3.84 MHz

Continuous

Typical adjacent channel leakage ratio results using graphical and numeric format.

Measuring Occupied Bandwidth

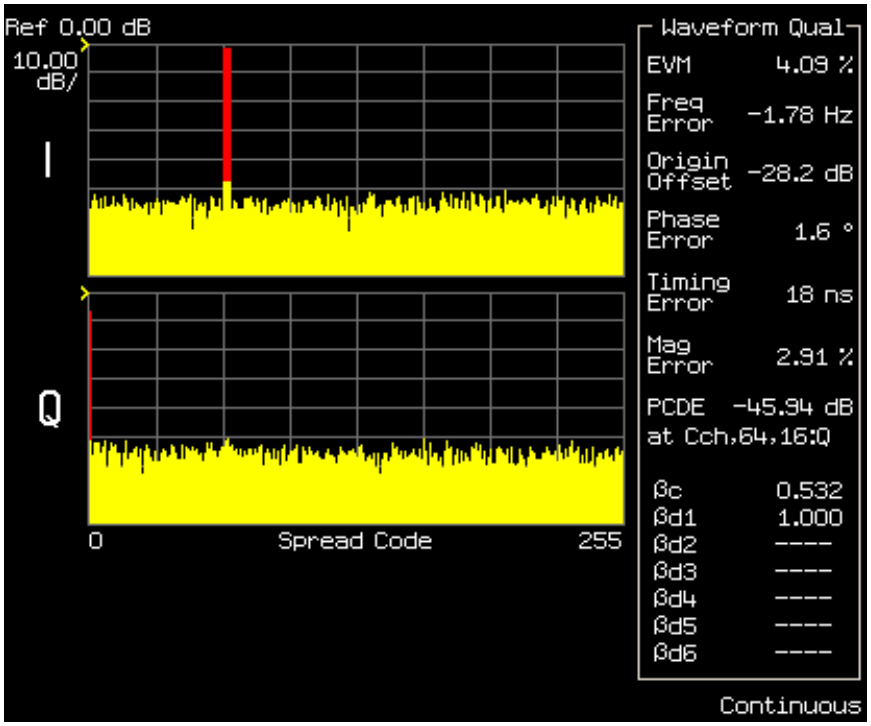
1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Occupied Bandwidth` measurement.
4. Press the `Occupied BW Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.



Typical waveform quality results are shown above.

Measuring Code Domain Power and Error

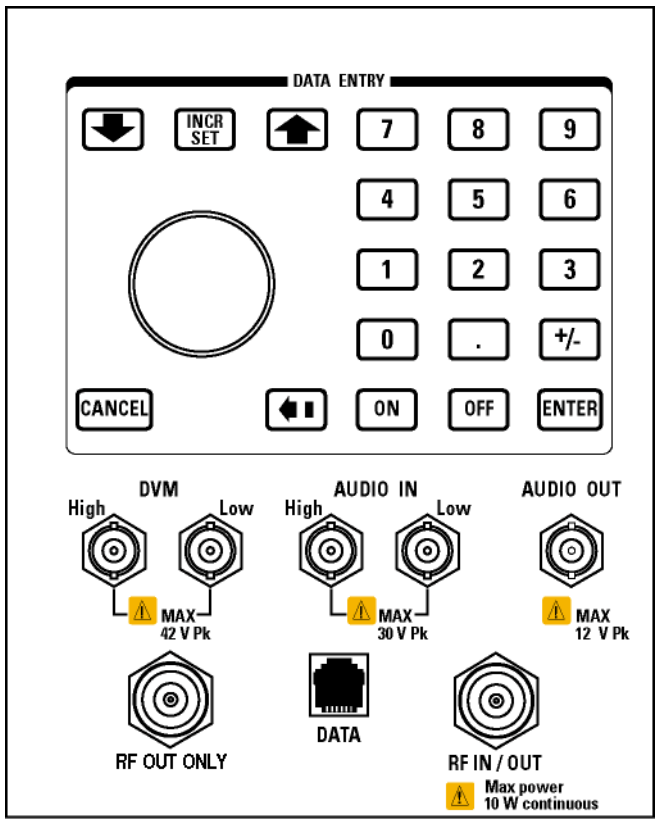
1. Configure the mobile station to generate a 12.2 kbps or 64 kbps reference measurement channel (RMC).
2. Press the **Measurement selection** key.
3. Select the `Code Domain` measurement.
4. Press the `Code Domain Setup` (**F1**) key.
5. Set the measurement parameters as needed for your measurement situation.



Typical waveform quality results are shown above.

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 to the test set's audio generator. Refer to the technical specifications for more information.

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.

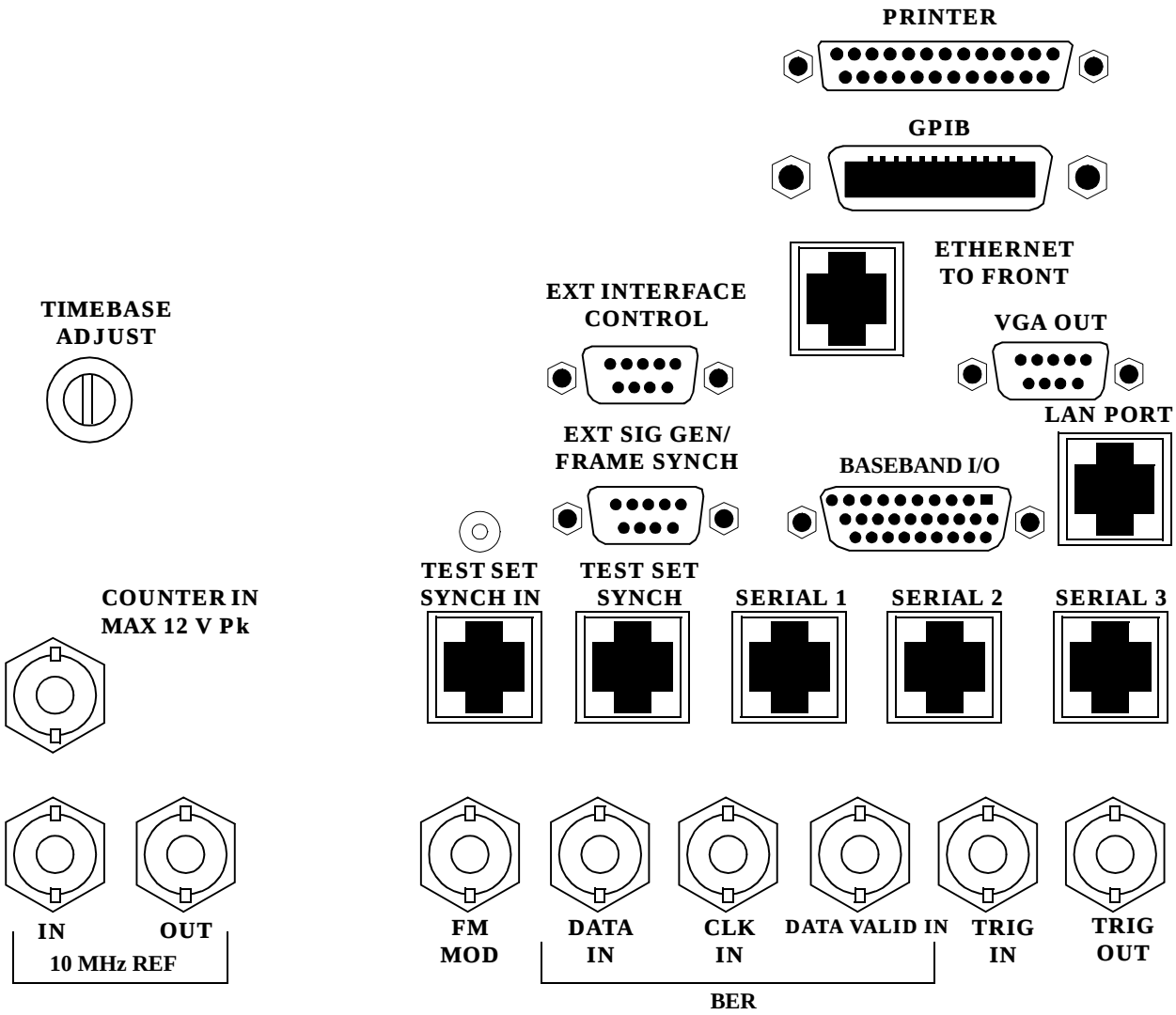
Related Topics

"RFGenerator Subsystem" (RF OUT ONLY control)

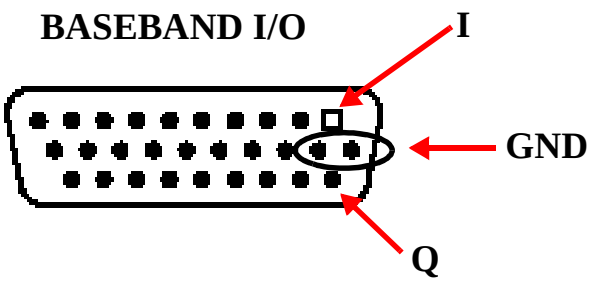
"Amplitude Offset" (RF amplitude offsets)

Rear Panel Connectors

Description



BASEBAND I/O



Four pins are functional on this connector:

- I channel
- Q channel
- 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.

Help Mode

Description

This section explains:

- "What is Help Mode?"
- "How do I use the help mode?"

What is Help Mode?

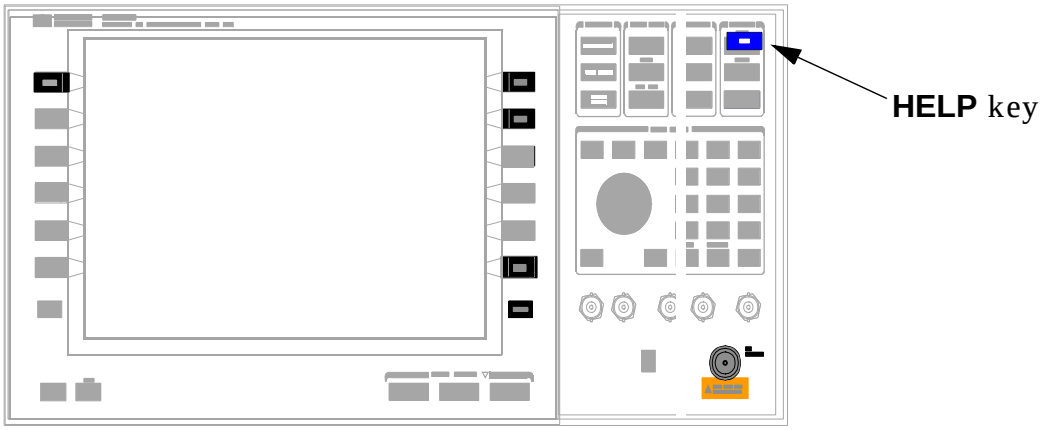
The help mode implemented in your test set provides context sensitive GPIB command syntax assistance. When you put the test set into help mode, the test set displays the GPIB command syntax necessary to perform an action remotely for each action you perform from the front panel.

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.

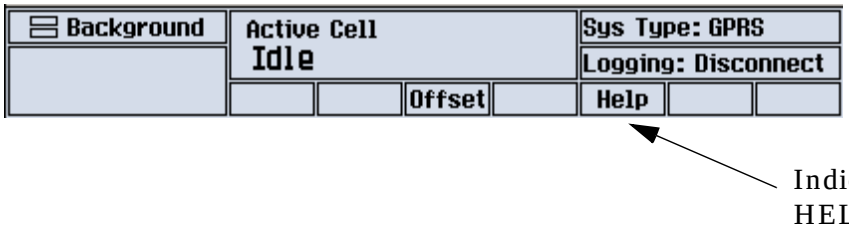
NOTE Operating the test set in Help Mode does not prevent you from changing parameters from the front panel. The parameters you change while in Help Mode are applied just as they would be normally.

How do I use the help mode?

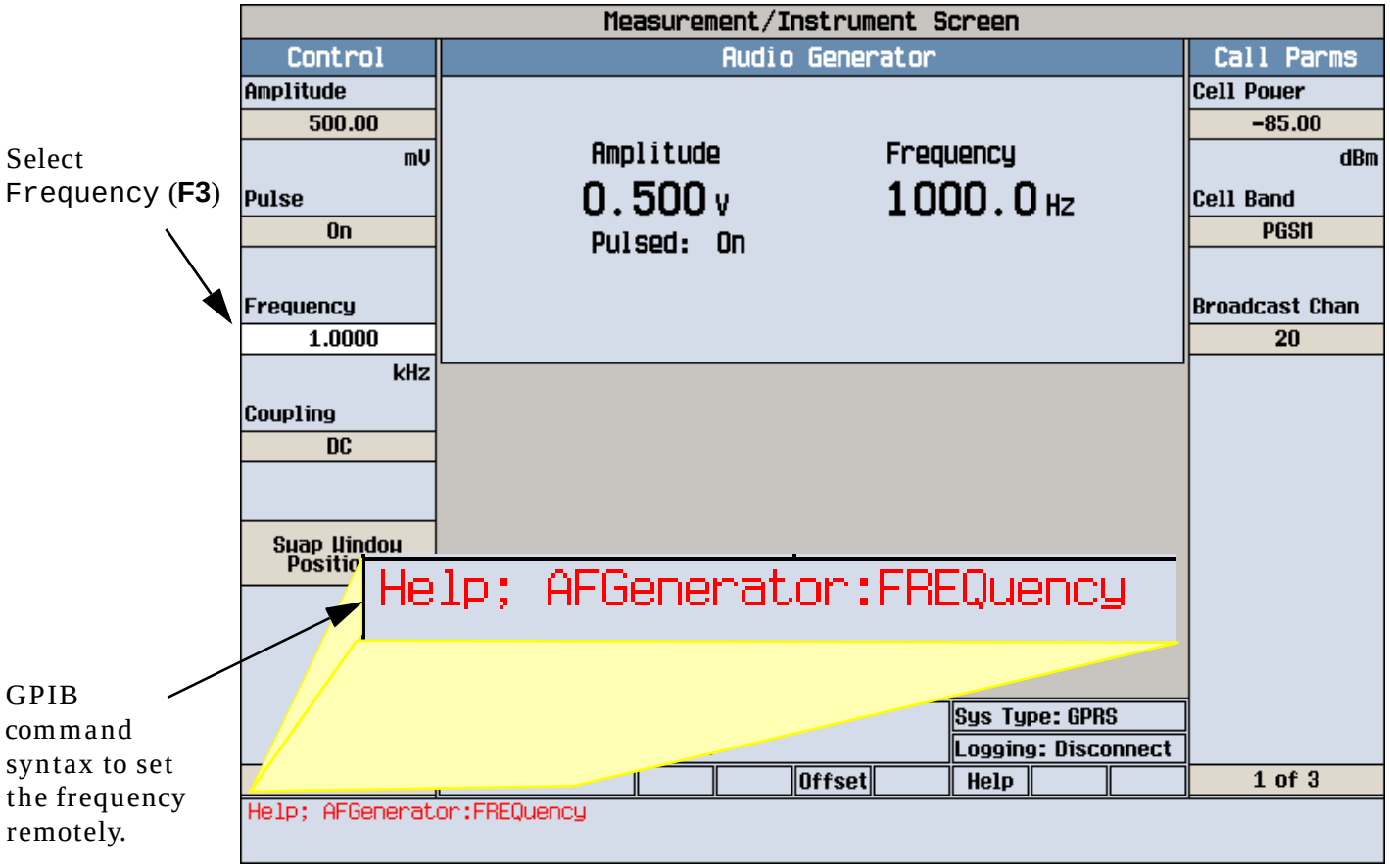
1. Put the test set into help mode by pressing the **HELP** key on the front panel.



The Help annunciator should now be displayed in the bottom of the screen.



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.



Refer to the user documentation on each command for more information.

—

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.

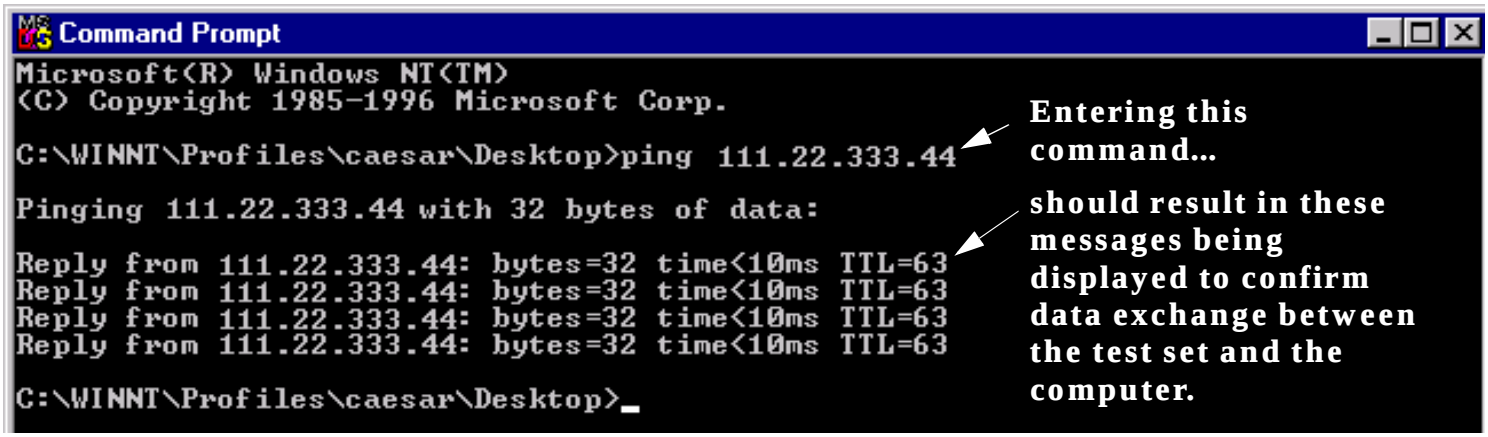
The image can now be retrieved from your directory and used as needed.

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.



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.

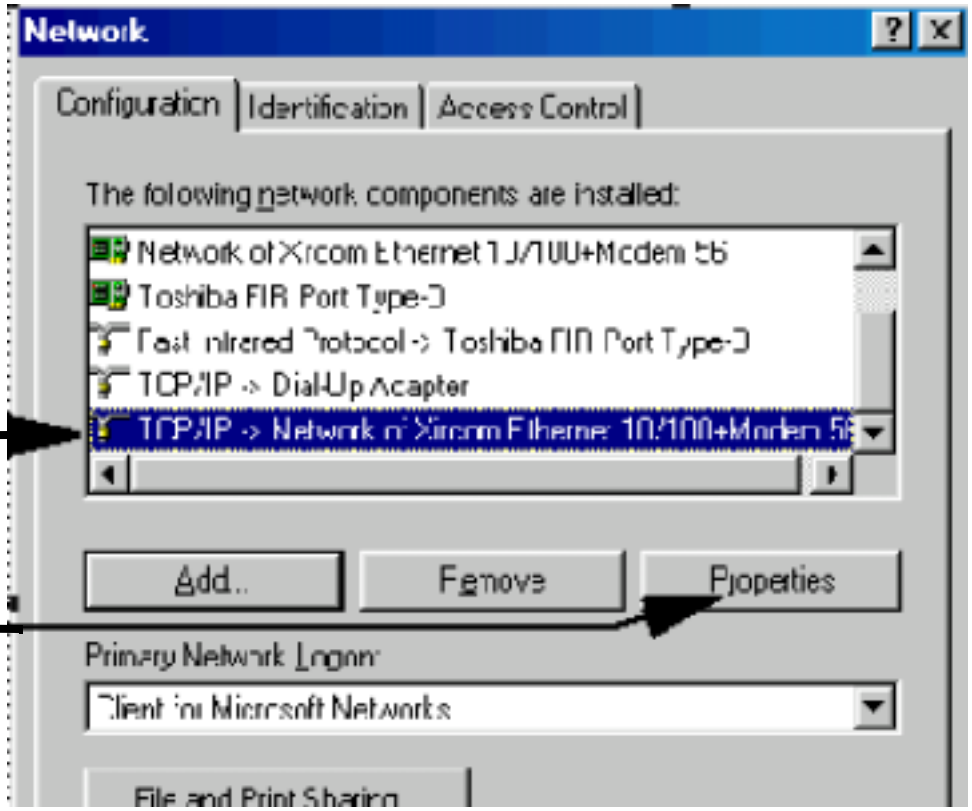
Access the Network Settings

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

Select the entry for your Ethernet network adapter, then...

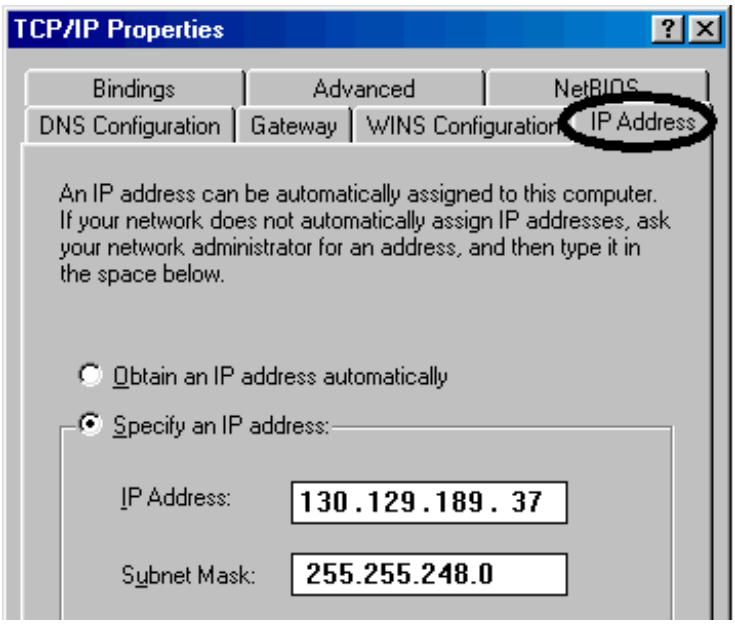
select Properties to list the TCP/IP settings for your adapter.



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).

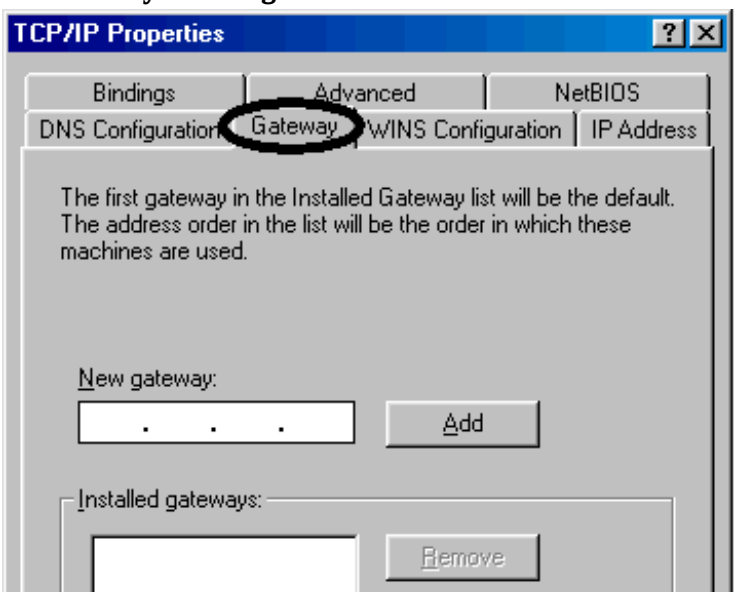
Figure 4. Specifying the Computer's IP Address and Subnet Mask



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.

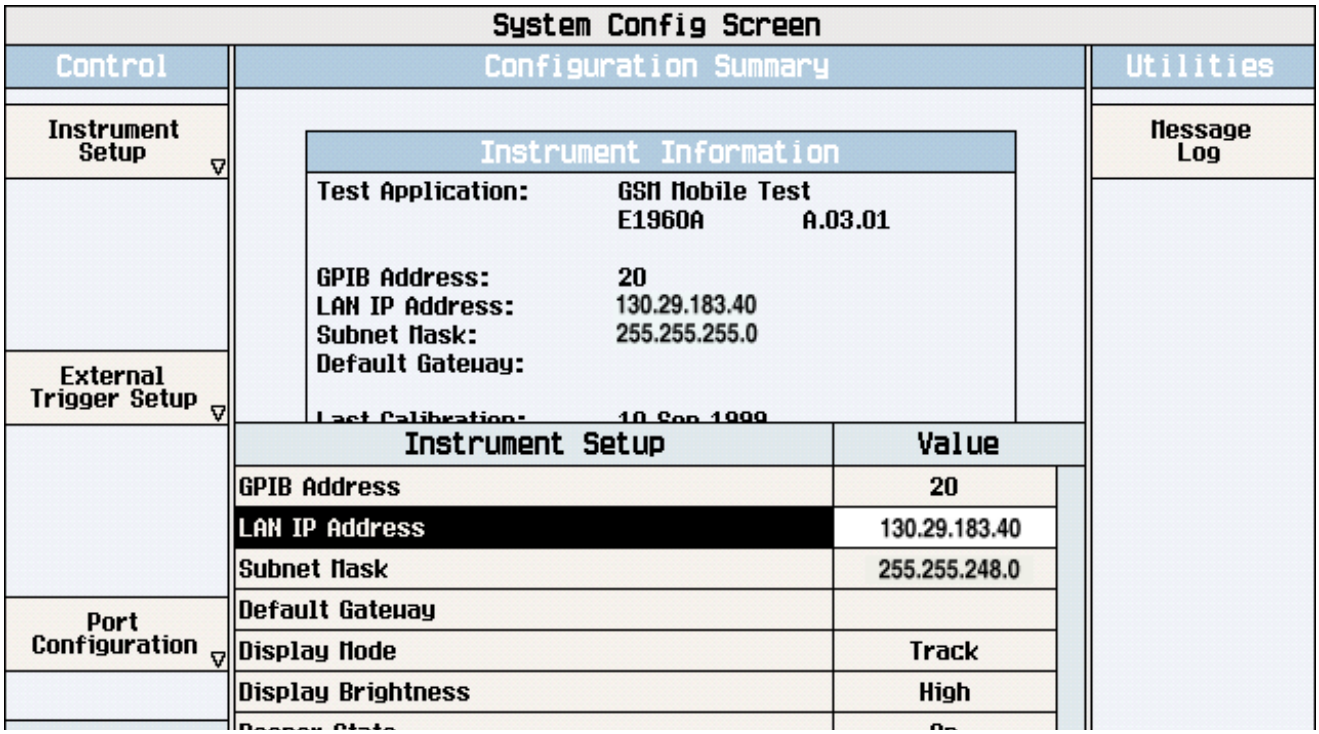
Figure 5. Accessing the Gateway Setting



Restart Windows

Depending on your LAN network adapter, your computer may or may not apply the network configuration changes as they are made. It is import that you restart Windows NOW to make sure new LAN settings are in effect when you try to connect to the test set.

Changing the LAN Settings on Your Test Set 1.Press the **SYSTEM CONFIG** key on the test set to display the current LAN settings.



2. Press the **F1** (`Instrument Setup`) key.

NOTE Changing the LAN IP Address may alter the Subnet Mask setting. Therefore, change the LAN IP Address first, then change the Subnet Mask. Also, The last entry in the IP Address must not be >254 or 0.

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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

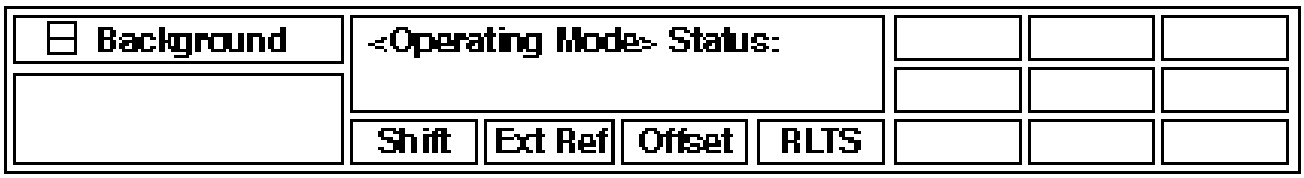
X-refs will be placed here.

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.

Instrument Status Area

6 Troubleshooting

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” on page 221.

See “Integrity Indicator” .

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 33 and “Audio Analyzer Block Diagram” on page 35.

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 32).

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 32).

Interpreting Integrity Indicator Values

See “Integrity Indicator” on page 190.

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.

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" on page 221.

See "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"

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” .

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” on page 221.

See “Integrity Indicator” .

Error Messages

Error Mesage Descriptions

"Fixed Timer Messages" on page 591

"Manual User Error Messages" on page 594

"-400 through -499 Error Message Descriptions" on page 597

"-300 through -399 Error Message Descriptions" on page 598

"-200 through -299 Error Message Descriptions" on page 600

"-100 through -199 Error Message Descriptions" on page 603

"+100 through +199 Error Message Descriptions" on page 607

"+200 through +299 Error Message Descriptions" on page 610

"+300 through +399 Link Control Device-Specific Error" on page 613

"+400 through +499 Error Message Descriptions" on page 614

"+500 through +599 Test Application Hardware Device-Specific Error" on page 617

"+600 through +699 Error Message Descriptions" on page 618

"+700 through +799 Error Message Descriptions" on page 619

"+800 through +899 Error Message Descriptions" on page 620

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 528

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

Fixed Timer Messages

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

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 6.

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 6.

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.

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.

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.

-100 through -199 Error Message Descriptions

Error Message	Description
-113 Undefined header	Indicates the header is syntactically correct, but it is undefined for this specific device. For example, *XYZ is not defined for any device.
-114 Header suffix out of range	Indicates the value of a header suffix attached to a program mnemonic makes the header invalid.
-120 Numeric data error	This error, as well as errors -121 through -129, are generated when parsing a data element which appears to be numeric, including non-decimal numeric types. This particular error is used if the device cannot detect a more specific error.
-121 Invalid character in number	Indicates an invalid character for the data type being parsed was encountered. For example, an alpha in a decimal numeric or a “9” in octal data.
-123 Exponent too large	Indicates the magnitude of an exponent was greater than 32000, see IEEE 488.2, 7.7.2.4.1.
-124 Too many digits	Indicates the mantissa of a decimal numeric data element contained more than 255 digits excluding leading zeros, see IEEE 488.2, 7.7.2.4.1.
-128 Numeric data not allowed	Indicates that a legal numeric data element was received, but the device does not accept one in this position for the header.
-130 Suffix error	This error, as well as errors -131 through -139, are generated when parsing a suffix. This particular error message is used if the device cannot detect a more specific error.
-131 Invalid suffix	Indicates the suffix does not follow the syntax described in IEEE 488.2, 7.7.3.2, or the suffix is inappropriate for this device.
-134 Suffix too long	Indicates the suffix contain more than 12 characters, see IEEE 488.2, 7.7.3.4.
-138 Suffix not allowed	Indicates that a suffix was encountered after a numeric element that does not allow suffixes.
-140 Character data error	This error, as well as errors -141 through -149, are generated when parsing a character data element. This particular error message is used if the device cannot detect a more specific error.
-141 Invalid character data	Indicates that the character data element contains an invalid character or the particular element received is not valid for the header.
-144 Character data too long	Indicates the character data element contains more than twelve characters, see IEEE 488.2, 7.7.1.4.

Error Message	Description
-148 Character not allowed	Indicates a legal character data element was encountered where prohibited by the device.
-150 String data error	This error, as well as errors -151 through -159, are generated when parsing a string data element. This particular error message is used if the device cannot detect a more specific error.
-151 Invalid string data	Indicates that a string data element was expected, but was invalid, see IEEE 488.2, 7.7.5.2. For example, an END message was received before the terminal quote character.
-158 String data not allowed	Indicates that a string data element was encountered but was not allowed by the device at this point in parsing.
-160 Block data error	This error, as well as errors -161 through -169, are generated when parsing a block data element. This particular error message is used if the device cannot detect a more specific error.
-161 Invalid block data	Indicates a block data element was expected, but was invalid, see IEEE 488.2, 7.7.6.2. For example, and END message was received before the end length was satisfied.
-168 Block data not allowed	Indicates a legal block data element was encountered, but not allowed by the device at this point in parsing.
-170 Expression error	This error, as well as errors -171 through -179, are generated when parsing an expression data element. This particular error message is used if the device cannot detect a more specific error.
-171 Invalid expression	Indicates the expression data element was invalid, see IEEE 488.2, 7.7.7.2. For example, unmatched parentheses or an illegal character.
-178 Expression data not allowed	Indicates a legal expression data was encountered, but was not allowed by the device at this point in parsing.
-180 Macro error	This error, as well as error -181 through -189, are generated when defining a macro or execution a macro. This particular error message is used if the device cannot detect a more specific error.
-181 Invalid output macro definition	Indicates that a macro parameter place holder was encountered outside of a macro definition.
-183 Invalid inside macro definition	Indicates that the program message unit sequence, sent with a *DDT or a *DMC command, is syntactically invalid, see IEEE 488.2, 10.7.6.3.

Error Message	Description
-184 Macro parameter error	Indicates that a command inside the macro definition had the wrong number or type of parameters.

+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.

+100 through +199 Error Message Descriptions

Error Message	Description
+113 Internal error; <VI NAME> forced inactive	Indicates that a VI is inactivated when not executed. <VI NAME> includes : “IntVmVI”,”GprsBsEmulVI”, “GsmComBsEmulVI”,“GSMFixedVI”, “MiscVI”, “GSMSacchMriVI”, “IQSelfCalVI1”, “IQSelfCalVI2”, “TA RevisionVI”, “TdmaTaBsEmulVI”.
+114 Internal error; <VI NAME> not responding	Indicates that a VI has not been instantiated or the state is not available. <VI NAME> includes : “IntVmVI”,”GprsBsEmulVI”, “GsmComBsEmulVI”, “GSMFixedVI”, “MiscVI”, “GSMSacchMriVI”, “IQSelfCalVI1”, “IQSelfCalVI2”, “TA RevisionVI”, “TdmaTaBsEmulVI” , “RfHwAccessVI”.
+115 Internal error; <VI NAME> inactive	Indicates that a VI has been made inactive. <VI NAME> includes : “IntVmVI”, “GSMFixedVI”, “MiscVI”, “GSMSacchMriVI”, “IQSelfCalVI1”, “IQSelfCalVI2”, “TA RevisionVI”.
+120 Warning; Receiver over range due to requested settings	Indicates the total received power (a combination of received power and amplitude offset) is above the range of the test set.
+121 Warning; Receiver under range due to requested settings	Indicates the total received power (a combination of received power and amplitude offset) is below the range of the test set.
+122 Warning; Reference out of lock	Indicates the test set’s internal reference is out of lock.
+123 Warning; Duplicate RF IN/OUT Amplitude Offset Frequency entry. First frequency entry in RF IN/OUT Amplitude Offset table will be used.	Indicates that an amplitude offset value for that frequency has already been entered. The test set will use the amplitude offset value entered first.
+124 Warning; Source over range due to requested settings	The setting selected for total transmit power (a combination of cell power, awgn power, amplitude offset) is above the test set’s range.
+125 Warning; Source under range due to requested settings	The setting selected for total transmit power (a combination of cell power, awgn power, amplitude offset) is below the test set’s range.
+130 Configuration error; Unable to switch to indicated Test Application	The test application selected is not available for this test set.
+131 Configuration error; Current Test Application is not licensed (License = N). Select another Test Application	The test application selected is not licensed. Select another revision or test application that is licensed (License = L).

Error Message	Description
+132 Configuration error; Selected Test Application Format is not available.	Indicates that the fast switching operation will not activate a particular radio format. Check the revision number of the test application associated with the radio format, does the revision correspond with what the fast switching test application needs?
+133 Configuration error; Selected Test Application Format is not licensed, (License = N).	The radio format selected is not licensed. Select another revision or obtain a licensed revision of the test application test application that is licensed (License = L).
+134 Configuration error; Unable to switch to selected Test Application Format	The Test Application Format name used is correct but for some reason the test set can not switch to that format.
+142 Configuration error; Functionality not available	An attempt has been made to access lab application functions from a test application.
+150 Calibration operation; Recalibrating due to present temperature	Indicates that the test set is recalibrating due to hardware inaccuracies based on temperature changes. Any measurements that are running will be temporarily aborted and then restarted after the recalibration is complete.

+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 7.

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.

Table 7.

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 8. 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 8. 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 503 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	

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.

+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 9. 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

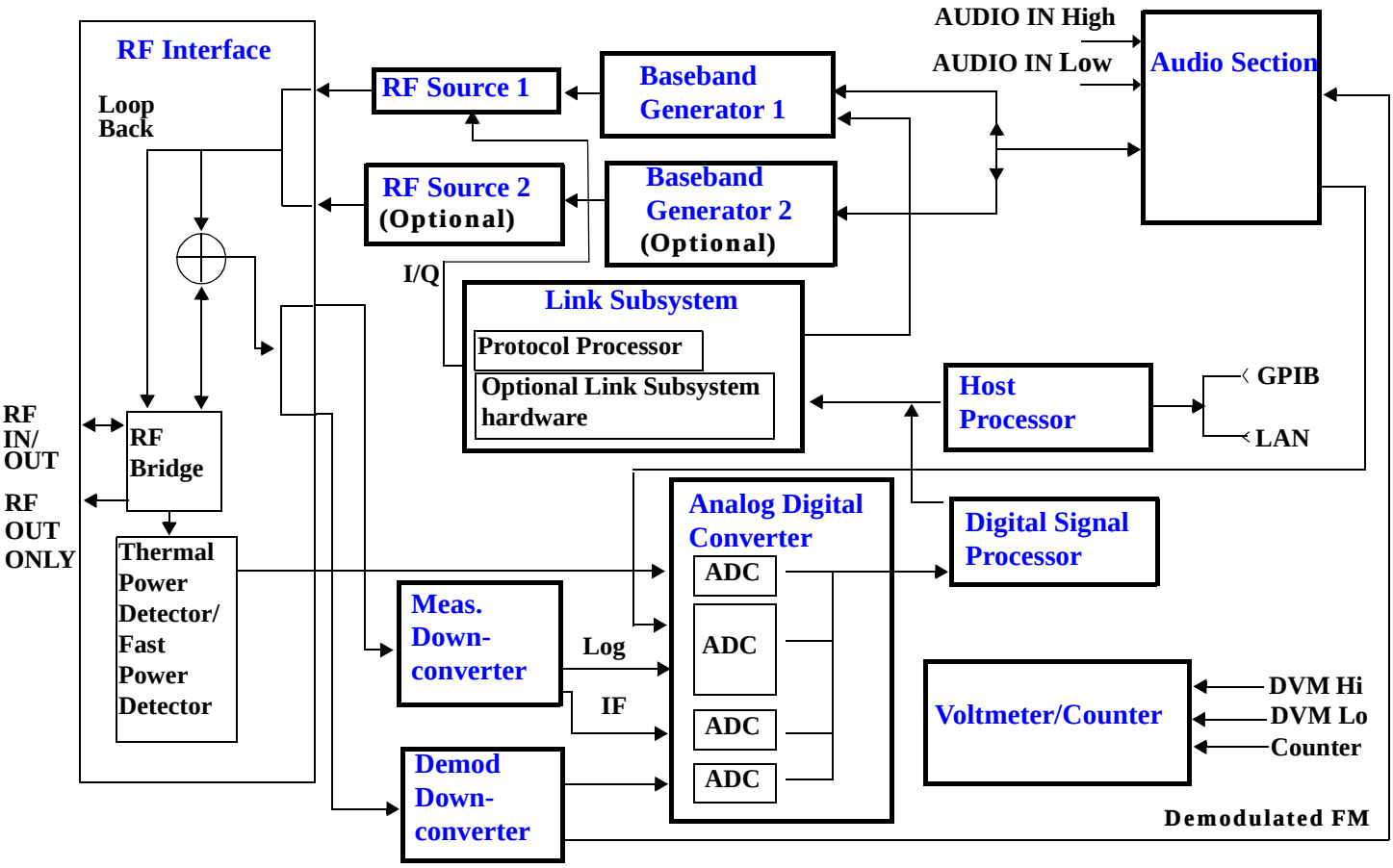
These errors are generated when a problem occurs that is specific to one of the test set's core measurements (such as analog audio).

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

Block Diagram

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:

- demodulating 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

Block Diagram

7 Configuration

Obtaining Identification Information (*IDN)

Description

Test set information is returned from a *IDN? query. The *IDN? query provides information about the Manufacturer, Model Number, Serial Number, and Firmware Revision. *IDN? is defined in IEEE Std. 488.2-1992, 10.14.

Test Set Information

*IDN? query returns identification information as a comma separated string.

```
DIM A$[100]
OUTPUT 714;"*IDN?" !returns manufacturer,model number, serial number and "0"
                   !separated by commas
ENTER 714;A$
PRINT A$           !prints, for example "Agilent Technologies, 8960 Series 10 E5515B,
                    !US38020105,0
```

- Agilent Technologies is the manufacturer.
- Printable ASCII characters excluding comma and semicolon up to a 25-character string.

  Model number example: 8960 Series 10 E5515B
- Printable ASCII characters excluding comma and semicolon up to a 10-character string.

  Serial number example: US00000123
- Printable ASCII characters excluding comma and semicolon up to a 20-character string.

  Firmware revision example: 0

NOTE The *IDN? query will always indicate that the firmware revision is zero. SYSTem:APPLication[:CURRent]:REVision? is the recommended way to query the firmware revision.

Related Topics

"Hardware Configuration Report"

Hardware Configuration Report

Description

You can generate a list of the test set's hardware configuration over the LAN or GPIB.

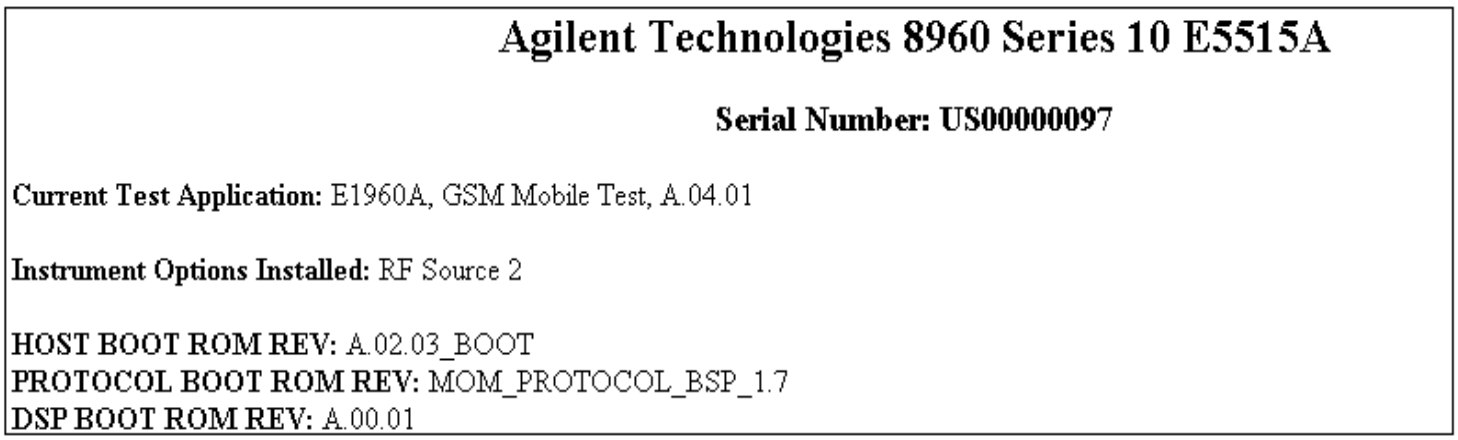
The LAN query is the easiest and most direct way to query the test set's hardware configuration. This method uses your web browser to display a formatted report.

The GPIB query returns an unformatted character string that must be buffered and saved to an HTML file to provide formatted text.

LAN Query

1. Refer to the SYSTEM CONFIG screen to determine the LAN address.
2. Open a web browser and enter <LAN address>/iconfig. For example, if your LAN address is 130.2.2.147, you would enter:

   130.2.2.147/iconfig
3. The web browser will then display formatted text. A partial list of the hardware configuration information is shown below:



GPIB Query

Use the following Basic example as a model to store the test set's configuration as an HTML file.

GPIB Example:

```
10    DIM Buf1$[20000],Buf2$[20000] ! This is the minimum space for the arrays
20    OUTPUT 714;"SYSTEM:CONFIGURE:INFORMATION:HARDWARE:VERBOSE?"
30    ENTER 714;Buf1$,Buf2$
40    CREATE "HW.htm",1              ! Create an HTML file
50    ASSIGN @File TO "HW.htm"
60    OUTPUT @File;Buf1$,Buf2$
70    END
```

In the future, the hardware configuration report may increase in length. More space would then need to be allocated for the arrays.

Display the HTML file using a web browser or HTML text editor.

Related Topics

"SYSTem:CONFigure:INFormation:HARDware:VERBose?" on page 515

"Obtaining Identification Information (*IDN)" on page 628

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 311

“STATus:OPERation:KEYPressed Register Bit Assignments” on page 458

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 514

"Error Messages" on page 588

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 516

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 642

“SYSTem:APPLication” on page 507

“SYSTem:CURRent:TA” on page 526

“Test Application Name” on page 644

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 640

"SYSTem:APPLication" on page 507

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 507

"Test Application Switching" on page 640

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