

**Agilent Technologies 8960 Series 10 Wireless Communications Test Set  
Agilent Technologies E1962B cdma2000/IS-95/AMPS Mobile Test Application**

# **Reference Guide**

cdma2000 Test Application Revision B.03  
1000-1748 (not orderable)

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**[www.agilent.com/find/8960support/](http://www.agilent.com/find/8960support/)**



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U.S.A.

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## **Edition/Print Date**

All Editions and Updates of this manual and their creation dates are listed below.

March 2001 E1962B cdma2000 Test Application Revision B.01

September 2001 E1962B cdma2000 Test Application Revision B.02

November 2001 E1962B cdma2000/IS-95/AMPS Test Application Revision B.03

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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.

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**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.**







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**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.

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## 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.

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## 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.

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## CERTIFICATION

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

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# Agilent Technologies Warranty Statement for Commercial Products

**Agilent Technologies 8960 Series 10 Wireless Communications Test Set  
Agilent Technologies E1962B cdma2000/IS-95/AMPS Mobile Test Application**

## **Duration of Warranty: 1 year**

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 WARRANTY OR 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.**

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## **ASSISTANCE**

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

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## Service and Support

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

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

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

### **United States Test and Measurement Call Center**

(Toll free in US)

(800) 452-4844

### **Europe**

(31 20) 547 9900

### **Canada**

(905) 206-4725

### **Japan Measurement Assistance Center**

(81) 426 56 7832

(81) 426 56 7840 (FAX)

### **Latin America**

(305) 267 4288 (FAX)

### **Australia/New Zealand**

1 800 629 485 (Australia)

0800 738 378 (New Zealand)

### **Asia-Pacific**

(852) 2599 7777

(852) 2506 9285 (FAX)



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## Regional Sales Offices

### United States of America:

Agilent Technologies(tel) 1 800 452 4844  
Test and Measurement Call Center  
P.O. Box 4026  
Englewood, CO 80155-4026

### Canada:

Agilent Technologies Canada Inc.(tel) 1 877 894 4414  
2660 Matheson Blvd. E  
Mississauga, Ontario  
L4W 5M2

### Europe:

Agilent Technologies(tel) (3120) 547 9999  
European Marketing Organization  
P.O. Box 999  
1180 AZ Amstelveen  
The Netherlands

### Japan:

Agilent Technologies Japan Ltd.(tel) (81) 456-56-7832  
Measurement Assistance Center(fax) (81) 426-56-7840  
9-1 Takakura-Cho, Hachioji-Shi,  
Tokyo 192-8510, Japan

### Latin America:

Agilent Technologies(tel) (305) 267 4245  
Latin America Region Headquarters(fax) (305) 267 4286  
5200 Blue Lagoon Drive,  
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Miami, Florida 33126  
U.S. A.

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Agilent Technologies Australia Pty Ltd.AustraliaNew Zealand  
347 Burwood Highway(tel) 1 800 629 485 (tel) 0 800 738 378  
Forest Hill, Victoria 3131(fax) (61 3) 9272 0749(fax) (64 4) 802 6881

### Asia Pacific:

Agilent Technologies(tel) (852) 3197 7777  
24/F, Cityplaza One,(fax) (852) 2506 9233  
111 Kings Road,  
Taikoo Shing, Hong Kong

# DECLARATION OF CONFORMITY

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

**Manufacturer's Name:** Agilent Technologies UK Ltd. Agilent Technologies, Inc.  
**Manufacturer's Address:** Electronic Products & Solutions 24001 E. Mission Avenue  
Group - Queensferry Liberty Lake  
South Queensferry Washington  
West Lothian, EH30 9TG 99019-9599  
Scotland, United Kingdom USA

**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:

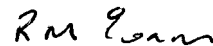
The product herewith compiles with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EFC (including 93/68/EFC) and carries the CE Marking accordingly.

EMC	Standard	Limit
	IEC 61326-1:1997+A1:1998/EN 61326-1:1997+A1:1998 CISPR 11:1990 / EN 55011:1991 IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995	Group 1 Class A <sup>[1]</sup> 4kV CD, 8kV AD
	IEC 61000-4-3:1995 / EN 61000-4-3:1995 IEC 61000-4-4:1995 / EN 61000-4-4:1995 IEC 61000-4-5:1995 / EN 61000-4-5:1995 IEC 61000-4-6:1996 / EN 61000-4-6:1996 IEC 61000-4-11:1994 / EN 61000-4-11:1994	3 V/m, 80-1000 MHz 0.5V signal lines, 1kV power lines 0.5 kV line-line, 1 kV line-ground 3V, 0.15-80 MHz 1 cycle, 100%
<b>Safety:</b>	IEC 61010-1:1990+A1:1992+A2:1995 / EN 61010-1:1993+A2:1995 Canada CSA C22.2 No. 1010.1:1992	

## Supplemental Information:

<sup>[1]</sup> 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

**Manufacturer's Name:** Agilent Technologies UK Ltd. Agilent Technologies, Inc.  
**Manufacturer's Address:** Electronic Products & Solutions 24001 E. Mission Avenue  
Group - Queensferry Liberty Lake  
South Queensferry Washington  
West Lothian, EH30 9TG 99019-9599  
Scotland, United Kingdom USA

**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:

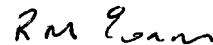
The product herewith compiles with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EFC (including 93/68/EFC) and carries the CE Marking accordingly.

EMC	Standard	Limit
	IEC 61326-1:1997+A1:1998/EN 61326:1997/A1:1998 CISPR 11:1990 / EN 55011:1991 IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995 IEC 61000-4-3:1995 / EN 61000-4-3:1995 IEC 61000-4-4:1995 / EN 61000-4-4:1995 IEC 61000-4-5:1995 / EN 61000-4-5:1995 IEC 61000-4-6:1996 / EN 61000-4-6:1996 IEC 61000-4-11:1994 / EN 61000-4-11:1994	Group 1 Class A <sup>[1]</sup> 4kV CD, 8kV AD  3 V/m, 80-1000 MHz 0.5kV signal lines, 1kV power lines 0.5 kV line-line, 1 kV line-ground 3V, 0.15-80 MHz  1 cycle, 100%
<b>Safety:</b>	IEC 61010-1:1990+A1:1992+A2:1995 / EN 61010-1:1993+A2:1995 Canada: CSA C22.2 No. 1010.1:1992	

## Supplemental Information:

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

01 May 2001



R.M. Evans / Quality Manager

01 May 2001



W.V. Roland / Reliability & Regulatory  
Engineering Manager

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

# DECLARATION OF CONFORMITY

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

**Manufacturer's Name:** Agilent Technologies, Inc.

**Manufacturer's Address:** 24001 E. Mission Avenue  
Liberty Lake  
Washington  
99019-9599  
USA

**Declares, that the product**

**Product Name:** 8960 Series 10 Wireless Communications Test Set

**Model Number:** E5515T

**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.

<b>EMC</b>	<b>Standard</b>	<b>Limit</b>
	IEC 61326-1:1997+A1:1998/EN 61326-1:1997+A1:1998 CISPR 11:1990 / EN 55011:1991 IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995	Group 1 Class A <sup>[1]</sup> 4kV CD, 8kV AD
	IEC 61000-4-3:1995 / EN 61000-4-3:1995 IEC 61000-4-4:1995 / EN 61000-4-4:1995 IEC 61000-4-5:1995 / EN 61000-4-5:1995 IEC 61000-4-6:1996 / EN 61000-4-6:1996 IEC 61000-4-11:1994 / EN 61000-4-11:1994	3 V/m, 80-1000 MHz 0.5V signal lines, 1kV power lines 0.5 kV line-line, 1 kV line-ground 3V, 0.15-80 MHz 1 cycle, 100%
<b>Safety:</b>	IEC 61010-1:1990+A1:1992+A2:1995 / EN 61010-1:1993+A2:1995 Canada CSA C22.2 No. 1010.1:1992	

## **Supplemental Information:**

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

**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

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## **Manufacturer's Declaration**

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

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

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

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## **Herstellerbescheinigung**

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

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



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# Measurements

## Instrument Configuration Measurement Matrix

The following table shows which measurements are available for the various instrument configurations.

**Table 1.**

	Active Cell				IS-2000 Test		AVC Test	CW Mode	Cell Off
	IS-2000		IS-95	AMPS	RC3, RC4, RC5	RC1, RC2			
	RC3, RC4, RC5	RC1, RC2							
Digital Average Power	X	X			X	X			
Channel Power	X	X			X	X			
Waveform Quality, Code Domain	X	X <sup>a</sup>			X	X <sup>a</sup>			
Access Probe Power	X	X							
Frame Error Rate	X	X							
TDSO Frame Error Rate	X								
Handoff Waveform Quality	X								
Gated Power		X				X			
Time Response of Open Loop Power	X	X			X	X			
Code Channel Time and Phase	X				X				
TX Spurious Emissions	X	X			X	X			
Analog TX Power				X			X	X	
Frequency Stability				X			X	X	
FM: deviation, distortion, frequency				X			X	X	
Audio <sup>b</sup> : level, SINAD, frequency, distortion, swept audio	X	X		X	X	X	X	X	X

a. Code domain is not available in RC1, RC2, or IS-95, but it is displayed on the instrument's display for these configurations.

b. These are instrument selection measurements. They are supported in all states.

---

## Access Probe Power Measurement Description

### How is an Access Probe Power measurement made?

The access probe power measurement is a channel power measurement (see [“Channel Power Measurement Description”](#)) triggered by a rise in RF power detected on the test set’s RF input. The power threshold is approximately -55 dBm/BW.

Access probe sequences are transmitted by the mobile station during registrations or mobile station originated calls. Access probe sequences consist of a series of RF power “steps” which increase in power according to the step size setting until the maximum number of steps is reached or the call processing event completes, for example when the call connects.

When the test set is making access probe power measurements in the continuous trigger arm state, it will display the power level of the most recent access probe power measurement.

### Considerations when making Access Probe Power measurements

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**IMPORTANT** Access probe power measurements must not be left in Continuous Trigger Arm mode. Attempting any other measurements while in this state will result in 4 dashes (----).

---

The access probe measurement setup menu provides control over the following access probe parameters:

- Number of Steps in the access probe sequence (NUM\_STEP in the standards).
- Power Step (PWR\_STEP in the standards). This parameter specifies the step increase in transmit power between each access probe within an access probe sequence.
- Maximum Request Sequence (MAX\_REQ\_SEQ in the standards). This parameter specifies the maximum number of access probe sequences for an access channel request.

Changing the number of steps and step size will affect the power level displayed if more than one access probe is transmitted by the mobile station. However, the number of access probes transmitted depends on whether or not the test set responds by acknowledging the access request, thereby ending the access attempt. To prevent the test set from responding to the access probe request, turn the Call Limit Mode feature On (key F10 in Call Params, 2 of 3 screen). For the GPIB command syntax, see [“CALL:CONNected:LIMit\[:STATe\]”](#).

To measure only the first access probe and prevent triggering on subsequent access probes, set Trigger Arm in the Access Probe Power Setup menu to Single and press the START SINGLE hardkey.

When the mobile station performs any type of registration, an access probe power measurement will likely be triggered. Registrations can occur on mobile station power-up, which is a function of the mobile station’s programming. Registrations may be requested by the test set at pre-determined time intervals, which will periodically cause the access probe power measurement to update. To control timer based registrations, access the Registration Parameters menu (see [“C. Set registration parameters.”](#)). For GPIB syntax information on timer-based registrations, see [“CALL:REGister”](#).

## **Input Signal Requirements**

See [“Input Signal Requirements”](#)

## **Related Topics**

[“Programming an Access Probe Power Measurement”](#)

[“CALL\[:CELL\]:APARAmeter”](#)

[“SETup:CAPPower”](#)

[“FETCh:CAPPower”](#)

[“INITiate”](#)

[“READ”](#)

[“ABORt”](#)

[“Test Adherence to Standards”](#)

[“Access Probe Power Troubleshooting”](#)

[“Channel Power Measurement Description”](#)

---

## Analog Transmit Power Measurement Description

### How is an Analog Transmit Power measurement made?

Analog Transmit Power measures the mean power from the mobile at the test set's RF IN/OUT port when transmitting an analog carrier. The test set correctly measures the level with or without frequency modulation (FM) present to make AMPS power measurements. Tests can be made with the mobile in the analog test mode or when connected on an active voice channel. See IS-137A, section 3.2.1.1, Analog RF Power.

The trigger source for this measurement is always immediate.

### Input Signal Requirements

The Analog Transmit Power measurement meets or exceeds specifications when the following requirements are met:

- The frequency of the signal being measured must be in the range of 800 MHz to 960 MHz or 1.7 GHz to 2.0 GHz, and within 100 kHz of the expected frequency.
- The signal level into the test set's RF IN/OUT connector must be in the range of -25 dBm to +43 dBm peak, and within 3 dBm of the expected input power to meet specifications. Results are provided for signals within +5 dB to -10 dB of the expected power, but performance is not warranted.

See [“Active Cell Operating Mode” on page 90](#), and [“Receiver Control” on page 213](#) for information on setting the expected input frequency and power level.

### Considerations When Making Manual Analog Transmit Power Measurements

When manually controlling the test set from the front panel, all measurements default to using continuous triggering. If you make digital measurements on a DTC using RF Rise or Protocol triggering, and then hand off to an AVC and select an analog measurement, the analog measurement may not trigger and display a result. This is because the digital measurement is still waiting for a burst transmission to trigger it (which it won't get from an analog signal) and therefore the measurements “freeze”. To prevent this from happening when making analog measurements, either turn off the digital measurements or set their trigger source to Immediate.

### Related Topics

[“Analog Transmit Power Troubleshooting” on page 725](#)

[“Programming an Analog Transmit Power Measurement” on page 170](#)

[“Test Adherence to Standards” on page 79](#)

[“Statistical Measurement Results” on page 238](#)

[“Triggering of Measurements” on page 240](#)

[“Timeouts” on page 239](#)

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## 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” on page 43](#).

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  $1.414 V_{\text{Peak}}$  when the Peak detector is used. A 1-volt peak input signal would measure  $0.707 V_{\text{RMS}}$  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  $7.07 \text{ mV}_{\text{peak}}$  ( $5 \text{ mV}_{\text{rms}}$ ) to  $20 \text{ V}_{\text{peak}}$ . Remember, measuring a 1-volt rms sinewave input signal would require a  $1.414 \text{ V}_{\text{peak}}$  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.

## Expander 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 expander (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.

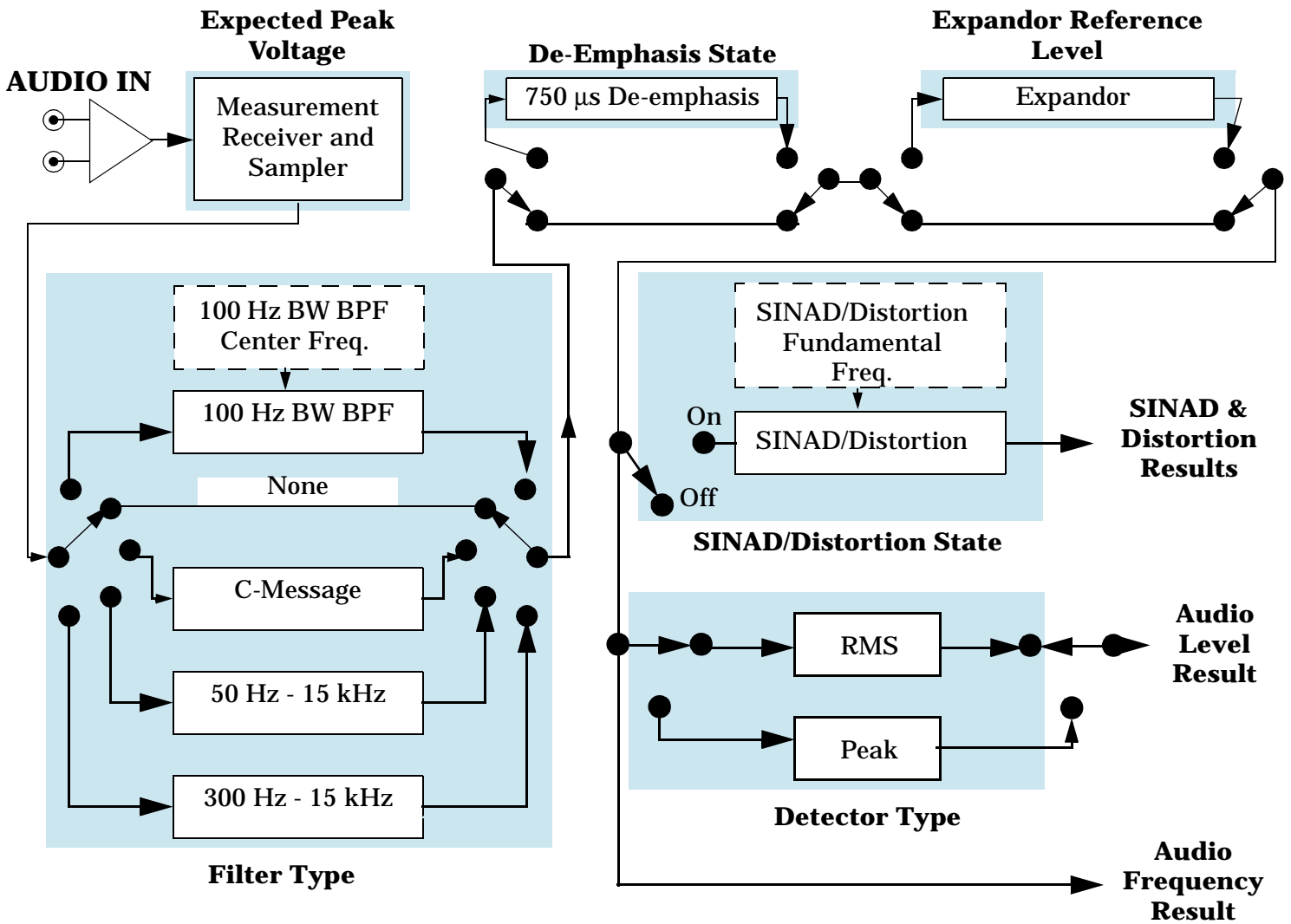
## Considerations When Making Manual Audio Analyzer Measurements

When manually controlling the test set from the front panel, all measurements default to using continuous triggering. If you make digital measurements on a DTC using RF Rise or Protocol triggering, and then hand off to an AVC and select an analog measurement, the analog measurement may not trigger and display a result. This is because the digital measurement is still waiting for a burst transmission to trigger it (which it won't get from an analog signal) and therefore the measurements "freeze". To prevent this from happening when making analog measurements, either turn off the digital measurements or set their trigger source to Immediate.

## **Related Topics**

- [“Audio Analyzer Block Diagram” on page 43](#)
- [“AFANalyzer Troubleshooting” on page 726](#)
- [“Audio Level Measurement Description” on page 45](#)
- [“Audio Frequency Measurement Description” on page 44](#)
- [“SINAD Measurement Description” on page 66](#)
- [“Distortion Measurement Description” on page 54](#)
- [“Programming an Audio Frequency Measurement” on page 174](#)
- [“Programming an Audio Level Measurement” on page 172](#)
- [“Programming a SINAD Measurement” on page 197](#)
- [“Programming a Distortion Measurement” on page 184](#)
- [“Statistical Measurement Results” on page 238 \(Multi-measurements\)](#)
- [“Triggering of Measurements” on page 240](#)
- [“Timeouts” on page 239](#)

# Audio Analyzer Block Diagram



## Related Topics

[“Audio Analyzer Measurement Description” on page 40](#)

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# Audio Frequency Measurement Description

## Considerations When Making Manual Audio Frequency Measurements

When manually controlling the test set from the front panel, all measurements default to using continuous triggering. If you make digital measurements on a DTC using RF Rise or Protocol triggering, and then hand off to an AVC and select an analog measurement, the analog measurement may not trigger and display a result. This is because the digital measurement is still waiting for a burst transmission to trigger it (which it won't get from an analog signal) and therefore the measurements "freeze". To prevent this from happening when making analog measurements, either turn off the digital measurements or set their trigger source to Immediate.

## Related Topics

["Programming an Audio Frequency Measurement" on page 174](#)

["Audio Analyzer Measurement Description" on page 40](#)

["Audio Analyzer Block Diagram" on page 43](#)

["AFANalyzer Troubleshooting" on page 726](#)

---

## 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<sub>peak</sub> to 20V<sub>peak</sub>. 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.

For information on using the Audio Analyzer, see [“Audio Analyzer Measurement Description” on page 40](#).

This measurement is not affected by the Amplitude Offset setting.

### Considerations When Making Manual Audio Level Measurements

When manually controlling the test set from the front panel, all measurements default to using continuous triggering. If you make digital measurements on a DTC using RF Rise or Protocol triggering, and then hand off to an AVC and select an analog measurement, the analog measurement may not trigger and display a result. This is because the digital measurement is still waiting for a burst transmission to trigger it (which it won't get from an analog signal) and therefore the measurements “freeze”. To prevent this from happening when making analog measurements, either turn off the digital measurements or set their trigger source to Immediate.

### Related Topics

[“Programming an Audio Level Measurement” on page 172](#)

[“AFANalyzer Troubleshooting” on page 726](#)

[“Audio Analyzer Measurement Description” on page 40](#)

[“Audio Analyzer Block Diagram” on page 43](#)

---

## Channel Power Measurement Description

### How is a Channel Power measurement made?

Channel power measurements are made by analyzing a digitized version of the input signal's downconverted IF using the test set's DSP (see ["Block Diagram"](#)). Triggering occurs on the test set's internal 20 ms frame clock. The measurement is cross-calibrated with the detected average power to determine the absolute power level.

Channel power measurements are limited to a 1.23 MHz bandwidth, and can be made on either power-gated or non-power-gated input signals.

### Channel Power Measurement Calibration

Channel power measurements are calibrated using the ["CALibration:CPOWER?"](#) command. Refer to ["CALibration Subsystem"](#) for a description of channel power calibration.

### Channel Power Measurement Speed

There are two channel power measurement speeds, fast and normal. See ["SETup:CPOWER:MSpeed"](#) for GPIB command syntax.

Normal channel power measurements, like average power measurements, analyze a 10 millisecond sample of the input signal, which is one-half of a CDMA frame. Since there is always at least one "on" power control group in each half-frame the test set is able to "search" for and measure power during at least one "on" period. Therefore, normal channel power measurements can be made when the mobile station is transmitting less than full data rate, or is in one of the echo service options (mobile station is gating its output power according to speech activity).

Fast channel power measurements do not perform the search for "on" power control groups. Fast channel power measurements only sample the input signal for 1.25 milliseconds, and are applicable only when the input signal power is not power-gated. An example of a condition which would result in the mobile station transmitting a non power-gated signal would be when the mobile station is in a loopback service option (on a call or not) and is transmitting full-rate data.

### Input Signal Requirements

The channel power measurement meets or exceeds specifications when the following input signal requirements are met:

- The frequency of the signal being measured must be within the range of 412 MHz to 483 MHz, 800 MHz to 960 MHz, or 1.7 GHz to 2.0 GHz, and be within 100 kHz of the expected frequency.
- The average power level of the signal at the RF IN/OUT connector must be between -61 dBm to +37 dBm. The test set can autorange to a signal that is between +8 dBm to -20 dBm of the expected level (see ["RFANalyzer:AUTO:POWER\[:SElected\]?"](#) ).

## **Related Topics**

[“READ? Subsystem”](#)

[“SETup:CPOWer”](#)

[“INITiate”](#)

[“FETCh:CPOWer”](#)

[“Digital Average Power Measurement Description”](#)

[“Test Adherence to Standards”](#)

## Code Channel Timing and Phase Measurement Description

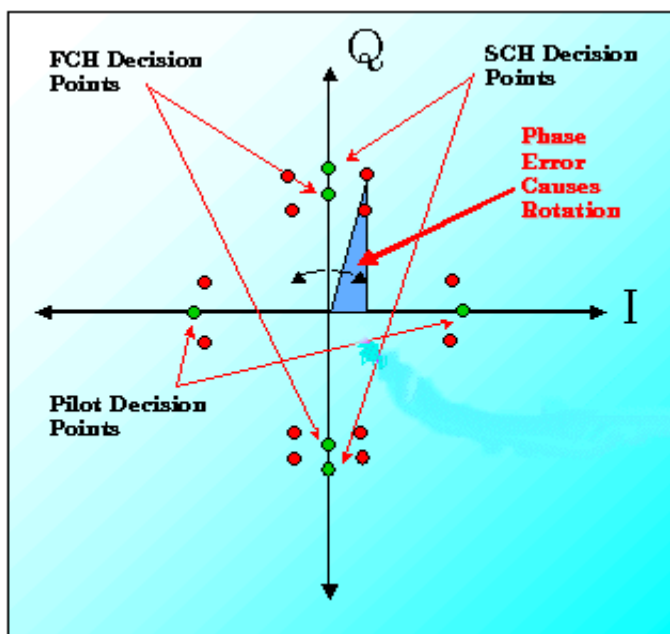
### How is a Code Channel Timing and Phase measurement made?

This measurement is designed to analyze signals that contain a reverse pilot channel. A call must be connected with one of the following radio configurations selected:

- Fwd3, Rvs3
- Fwd4, Rvs3
- Fwd 5, Rvs4

Each code channel timing and phase measurement tests the time and phase alignment of each code channel relative to the reverse channel pilot signal. The time error returns any offset, in nanoseconds, that is detected between the coding of each Walsh channel and the reverse channel pilot. The phase error measurement determines whether there is any phase difference, as shown in Figure 1., that would cause a rotation in the I/Q constellation away from the decision points.

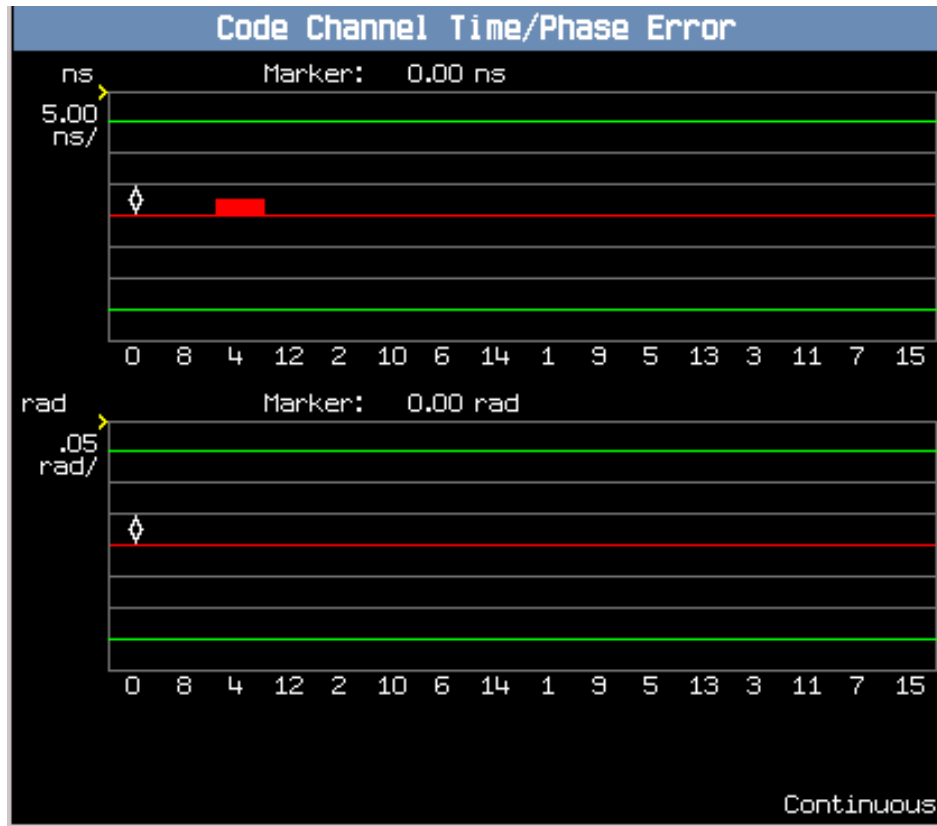
**Figure 1. I/Q Constellation Showing Phase Error**



Code channel time/phase error 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 mobile station transmitter's Walsh spreading function for each channel. The DSP then generates a representation of what the "ideal" signal would be given the coding and data in use at the time of transmission. The ideal waveform is then compared with the waveform being measured to determine code channel time error and phase error.

A Code Channel Time/Phase Error display is shown below.



**Figure 2. Code Channel Time/Phase Error**


---

**NOTE** If the amount of timing or phase error is negligible, the red error bars may momentarily disappear.

---

Table 2. on page 49 lists the code channel time and phase measurement results:

**Table 2. Code Channel Time/Phase Error Measurement Results**

Code Channel Time/Phase Error
Code Channel Time
Code Channel Phase

## Code Channel Time/Phase Measurement Graphical Display

The Code Channel measurement displays up to 16 bins<sup>1</sup> of timing error information and 16 bins of phase error information. Each bin represents one active code channel.

The IS-2000 system achieves high data rates by combining multiple code channels. To facilitate the display of high data rate channels in contiguous blocks, the Walsh code sequence along the graph's x-axis is displayed in "bit reversed" order. See [Table 3. "Walsh Numbering on Code Channel Timing and Phase Graphs"](#)

The code channel sequence along the graph's x-axis is displayed in "bit reversed" order. See [Table 3. "Walsh Numbering on Code Channel Timing and Phase Graphs"](#)

**Table 3. Walsh Numbering on Code Channel Timing and Phase Graphs**

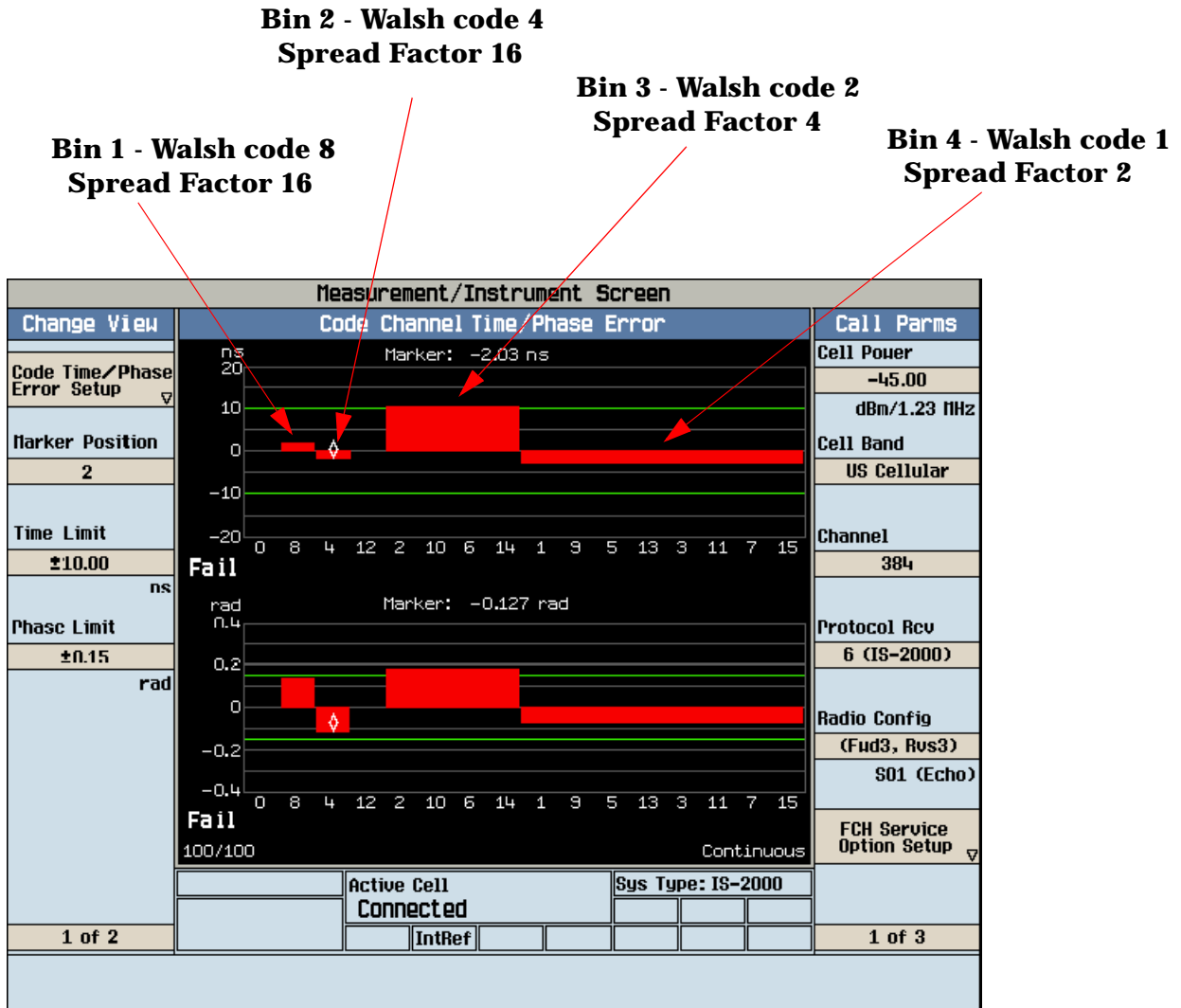
Bin Number (with spreading factors = 16)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Walsh Code Channel	0	8	4	12	2	10	6	14	1	9	5	13	3	11	7	15

The timing and phase graphs, because of the bit-reversed order, can display channels with a spreading factor less than 16, such as the R-SCH (Reverse Supplemental CHannel), using one bin.

For example, [Figure 3.](#) shows four active code channels displayed in four bins. In bin four, Walsh code channels 1, 3, 5, 7, 9, 11, 13, and 15 are all included in a single channel. If the Walsh numbering on the test set's display were sequential, the this channel would have to be displayed as eight bars, each separated by one Walsh code.

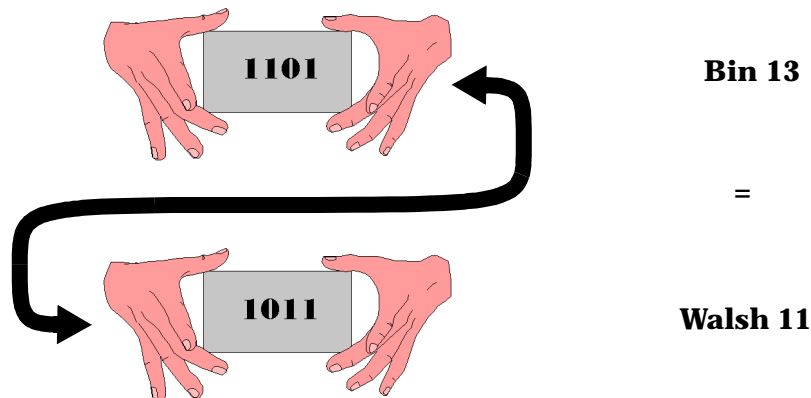
1. Bins are the bars that appear on the graph. When high data rate channels such as the F-SCH channel are transmitted from the mobile station, wider bins are displayed. The wider bins represent code channels that occupy multiple orthogonal channels.

**Figure 3. Code Channel Timing Graph With R-SCH**



An example of bit reversal is shown in [Figure 4](#). Bin 13 has a binary coded decimal value of 1101. If you reverse that sequence, the result is 1011. When 1011 is converted back to a decimal value, the result is Walsh code 11.

**Figure 4. Walsh Channel Bit Reversal**



## Measurement Behavior

Bin 0 corresponds with Walsh will always return zero for Time Error zero and phase error because all other measurements are relative to the pilot channel, which is located at Walsh 0, bin 0.

## Input Signal Requirements

The Code Channel Timing and Phase measurement meets or exceeds specifications when the following requirements are met:

- The frequency of the signal being measured must be in the range of 412 MHz to 483 MHz, 800 MHz to 960 MHz, or 1.7 GHz to 2.0 GHz, and within 100 kHz of the expected frequency.
- The signal level into the test set's RF IN/OUT connector must be in the range of -25 dBm to +37 dBm, and within 9 dBm of the expected input power (see [“RFAnalyzer:AUTO:POWER\[:SElected\]?”](#) ) to meet specifications.

## Related Topics

[“Programming a Code Channel Time/Phase Measurement”](#)

[“SETup:CCTPhase”](#)

[“FETCh:CCTPhase”](#)

[“INITiate”](#)

[“READ”](#)

[“ABORT”](#)

[“Test Adherence to Standards”](#)

[“Code Channel Time/Phase Error Measurement Troubleshooting”](#)

---

## Digital Average Power Measurement Description

### How is a Digital Average Power measurement made?

Digital average power measurements are broadband power measurements made on the RF input before frequency downconversion (see “[Block Diagram](#)”). Digital average power measurements return the true rms power level of the input signal. Triggering is handled by internal mechanisms and autoranging is used. No external triggering is available.

The input waveform is detected by a peak detector with sufficient AM bandwidth to track the instantaneous power changes of a CDMA signal. Each measurement is made by analyzing a 10 millisecond period (one-half of a frame) of the detected waveform.

The test set's digital signal processor (DSP) determines the true rms value of the signal. If the input signal is power-gated, only the active power control groups will be measured.

This measurement uses autoranging based on the open loop power control response of the mobile station to set up the receiver signal path attenuation.

### Digital Average Power measurement characteristics

The digital average power measurement has greater than 2 GHz bandwidth. For this reason, significant signal energy outside the IS-2000 SR1 (1.25 MHz) signal bandwidth will increase the measured value.

This measurement can be made on signals that are power-gated or signals that are not power-gated. It is not necessary to specify whether the input signal is power-gated.

### Input Signal Requirements

The digital average power measurement meets or exceeds specifications when the following requirements are met:

- The frequency of the signal being measured must be in the range of 412 MHz to 483 MHz, 800 MHz to 960 MHz, or 1.7 GHz to 2.0 GHz.
- The signal level into the test set's RF IN/OUT connector must be between +37 dBm and -30 dBm. The test set can autorange to a signal that is between +8 dBm to -20 dBm of the expected level (see “[RFANalyzer:AUTO:POWER\[:SElected\]?”](#) ).

### Related Topics

[“READ? Subsystem”](#)

[“SETup:DAPower”](#)

[“INITiate”](#)

[“FETCh:DAPower”](#)

[“Channel Power Measurement Description”](#)

[“Test Adherence to Standards”](#)

---

## 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 demodulated tones sent over an analog voice channel (AVC).

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 40](#).

The distortion measurement can be used to perform the audio harmonic distortion test. In this test, 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. See IS-137A, section 2.2.2.5 for more information.

### Considerations When Making Manual Distortion Measurements

When manually controlling the test set from the front panel, all measurements default to using continuous triggering. If you make digital measurements on a DTC using RF Rise or Protocol triggering, and then hand off to an AVC and select an analog measurement, the analog measurement may not trigger and display a result. This is because the digital measurement is still waiting for a burst transmission to trigger it (which it won't get from an analog signal) and therefore the measurements “freeze”. To prevent this from happening when making analog measurements, either turn off the digital measurements or set their trigger source to Immediate.

### Related Topics

[“Audio Analyzer Measurement Description” on page 40](#)

[“AFANalyzer Troubleshooting” on page 726](#)

[“Programming a Distortion Measurement” on page 184](#)

[“Test Adherence to Standards” on page 79](#)

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## Frame Error Rate Measurement Description

### How is an FER (frame error rate) measurement made?

FER measurements are used to test the performance of a mobile station receiver.

During each FER measurement the test set sends a sequence of bits to the mobile station and the mobile station attempts to demodulate and re-transmit the same bits back to the test set. The test set keeps a running count of the measured frames and the number of frames that contained bit errors.

A call must be connected with a loopback service option selected (see [“CALL\[:CELL\]:SOPTION”](#)) to perform frame error rate measurements.

Intermediate measurement results are periodically available on the front panel display, but are not available programmatically through the GPIB interface.

### Confidence Level Description

Confidence level testing is a feature of FER measurements that applies statistical analysis to FER measurements so that pass/fail test results can be obtained in the shortest possible time. When confidence level is on, the FER measurement will keep track of the number of frames measured, the number of frame errors, and perform a statistical analysis of the probability that the value entered in the FER requirement field will (or will not) be exceeded.

The confidence level parameter is typically set at 95 percent. Each FER measurement will return a Pass result before the maximum frame count is reached if statistically there is a 95 percent probability that the percentage of frame errors would not exceed the FER requirement value if the measurement were allowed to reach the maximum frame count. The FER measurement will return a Fail result before the maximum frame count is reached if statistically there is a 95 percent probability that the percentage of frame errors counted would exceed the FER requirement if the measurement were allowed to reach the maximum frame count. If confidence level is off, or the number of frame errors counted did not result in a pass or a fail result, max frames will be returned and the measurement result will be the FER percentage.

Several hundred frames of data must be measured before confidence limit checking can begin. A speed-up feature, which is always active, allows the test set to end an FER measurement before reaching the minimum number of frames required to apply confidence limit checking. The speed-up feature calculates a maximum value of frame errors allowed before confidence limit checking begins, and ends the FER measurement with a fail indication if this limit is exceeded.

### Input Signal Requirements

The FER measurement meets or exceeds specifications when the following requirements are met:

- The frequency of the signal being measured must be in the range of 412 MHz to 483 MHz, 800 MHz to 960 MHz, or 1.7 GHz to 2.0 GHz, and within 100 kHz of the expected frequency.
- The signal level into the test set's RF IN/OUT connector must be in the range of -25 dBm to +37 dBm, and within 9 dBm of the expected input power (see [“RFANalyzer:AUTO:POWER\[:SElected\]?”](#) to meet specifications.

## **Related Topics**

[“READ? Subsystem”](#)

[“SETup:CFERror”](#)

[“INITiate”](#)

[“FETCh:CFERror”](#)

[“Test Adherence to Standards”](#)



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## Frequency Modulation (FM) Measurement Description

### How is a frequency modulation measurement made?

The Analog Frequency Modulation measurement measures the frequency deviation and, if enabled, the total harmonic distortion and modulation frequency, for frequency modulated analog signals (such as AMPS transmitters). Measurements are performed after any filtering, de-emphasis, and expansion are performed (selected by the user in the setup parameters).

The distortion value is not returned if the Distortion State is set to OFF. The modulation frequency value is not returned if the Modulation Frequency State is set to OFF.

The FM deviation and distortion measurements are not affected by a static (constant) frequency error on the input signal as long as the input signal is within 2.5 kHz of the expected frequency.

This measurement is not used for digital signals.

Refer to IS-137, 3.3.1, for more information on measuring analog modulation characteristics.

### Triggering

Triggering is always immediate for this measurement. Trigger Delay and other trigger sources are not used.

### Considerations When Making Manual FM Measurements

When manually controlling the test set from the front panel, all measurements default to using continuous triggering. If you make digital measurements on a DTC using RF Rise or Protocol triggering, and then hand off to an AVC and select an analog measurement, the analog measurement may not trigger and display a result. This is because the digital measurement is still waiting for a burst transmission to trigger it (which it won't get from an analog signal) and therefore the measurements "freeze". To prevent this from happening when making analog measurements, either turn off the digital measurements or set their trigger source to Immediate.

### Distortion State and Distortion Fundamental Frequency Operation

The Distortion Fundamental Frequency value specifies the demodulated audio frequency to use when making a distortion measurement, and must be entered to make a valid measurement. However, specifying the fundamental frequency does not affect the measurement state. The Distortion State must be turned On separately to make the measurement.

### Modulation Frequency State

The modulation frequency measurement is enabled and disabled using the Mod Freq State setting. The modulation frequency measurement is made after any filtering is applied, and can be used to make measurements such as SAT frequency.

## Filter Type

The following filters are available to make measurements on the demodulated FM (baseband) signal.

- 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 the type of detector to use when making FM deviation measurements: RMS, Peak+, Peak-. The Peak+ and Peak- detectors measure the greatest positive or negative frequency excursion in carrier frequency during the sample. The RMS detector measures the root mean squared value. This setting does not affect the distortion measurement.

## De-emphasis State

Select On or Off to enable or disable (respectively) 750  $\mu$ s de-emphasis.

## Expandor State

Select On to compensate for signal compression on the mobile's transmitted signal.

## Related Topics

[“Programming a Frequency Modulation \(FM\) Measurement” on page 189](#)

[“Frequency Modulation \(FM\) Troubleshooting” on page 732](#)

[“Statistical Measurement Results” on page 238](#)

[“Timeouts” on page 239](#)

[“Triggering of Measurements” on page 240](#)

[“Test Adherence to Standards” on page 79](#)

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## Frequency Stability Measurement Description

### How is a frequency stability measurement made?

The Frequency Stability measurement measures the transmitter frequency and frequency error of analog signals (including AMPS) with a 1 Hz resolution. Frequency Error is determined by comparing the frequency of the measured signal to the expected frequency. These parameters are determined by the receiver control settings (see [“Manual Receiver Control Parameters” on page 213](#)).

### Operating Considerations

This measurement is performed with the test set's CW operating mode (see [“CALL\[:CELL\]:OPERating”](#) ).

This measurement is not used for digital signals.

For the best accuracy, connect the timebase of the signal source with the test set's timebase. See [“10 MHZ REF IN” on page 713](#) and [“10 MHZ REF OUT” on page 713](#).

### Input Signal Requirements

The received signal's frequency must be within the interval 293 MHz to 2.7 GHz and be within 200 kHz of the expected frequency. See [“Measurement receiver frequency” on page 214](#).

The power level of the signal source must be between -30 to +43 dBm and be within 3 dB of the expected power. See [“CW receiver power” on page 213](#).

If the received signal has FM, the modulation index must be no greater than three and the modulation frequency must be between 100 Hz and 15 kHz.

### Worst Case Frequency Error

Frequency and Frequency Error measurement results are returned over GPIB in units of Hz. Worst Case Frequency Error, the greatest error measured during the total sample(s), is returned in units of ppm (parts per million). Worst Case Frequency error is only displayed on the test set's display when multi-measurements are used, but is always available via GPIB (regardless of the multi-measurement state).

### Triggering

Triggering is always immediate for this measurement. Trigger Delay and other trigger sources are not used.

### Related Topics

[“READ? Subsystem”](#)

[“SETup:FSTability”](#)

[“INITiate”](#)

[“FETCh:FSTability”](#)

[“Receiver Control”](#)

[“Test Adherence to Standards”](#)

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## Gated Power Measurement Description

### What is a Gated Power Measurement?

Gated power measurements provide a graphical representation of the time response of the mobile station average transmitter power during periods when the power is gated on. During power gated transmission, power from the mobile station is delivered in bursts. A measurement mask delineates the boundaries that the signal's amplitude trace must conform to.

Four views of the power versus time graph are available after the test set analyzes measurement data. The resolution of the traces has been designed to provide detail at the most critical points in the trace. There are four views available:

- Rise
- Fall
- Full
- Zoomed

The Rise (part of Rise/Fall) trace details the rising edge of the burst, from -15 uS to +10 uS relative to the beginning of the burst. The beginning of the burst corresponds with the gated-on power control group clock edge<sup>1</sup>.

The Fall (part of Rise/Fall) trace details the falling edge of the burst, from 1237 to 1262 uS after the beginning of the burst.

The Full (part of Full/Zoomed) trace encompasses the entire burst with decreased resolution. This trace spans the time period from -15 uS to 1262 uS relative the the beginning of the burst.

The Zoomed (part of Full/Zoomed) trace details the area highlighted by a vertical bar displayed on the Full trace. This vertical bar can be positioned in any one of 14 locations along the entire length of the zoomed burst. (The extreme left and right vertical bar positions encompass the Rise/Fall time periods.)

A marker displaying the power level (from +10 to -45 dB) at each time increment is provided for all traces except for Full. If a gated power measurement fails, the marker will be automatically positioned at the first fail point.

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

---

1. Traffic channel frames are subdivided into 16 1.25 mS segments, called power control groups. When the traffic data rate is set to half, quarter, or eighth, the mobile station transmits only during randomly selected power control groups. These are referred to as "gated-on" power control groups.

## How is a Gated Power Measurement Made?

Each gated power measurement is triggered internally by the test set. During the gated power measurement, a DSP (Digital Signal Processor) samples the signal and returns 5,625 amplitude versus time data points. Data points return power levels, relative to the average power during the middle of the burst, that correspond with time intervals before, during, and after the burst.

The gated power measurement analyzes the rising and falling edges of the burst to determine where the -3 dB points are. Using the -3 dB points to determine the center of the burst, the test set positions the measurement mask (green lines on the display) to align in time with the center of the burst.

Since the middle portion of the burst is compressed in time, the scaling is different when compared to the rising or falling portions. The following formulas can be used to calculate the time associated with each data point from 0 to 5,264 as returned by the `"FETCh:GPOWer:TRACe?"` command:

### Equation 1. Time Association For Data Points 0 through 370

$$t1 \times (p - 222)$$

where  $t1$  is the sampling period for each data point, and  $p$  is the data point of interest (from 0 to 5,264).

$$t1 = 1 / (12 \times 1.2288 \times 10^6) \approx 67.82nS$$

### Equation 2. Time Association For Data Points 371 through 4893

$$4 \times t1 \times ((p - 2667) \div 8)$$

where  $t1$  is the sampling period for each data point, and  $p$  is the data point of interest (from 0 to 5,264).

$$t1 = 1 / (12 \times 1.2288 \times 10^6) \approx 67.82nS$$

### Equation 3. Time Association For Data Points 4894 through 5264

$$t1 \times (p + 13347)$$

where  $t1$  is the sampling period for each data point, and  $p$  is the data point of interest (from 0 to 5,264).

$$t1 = 1 / (12 \times 1.2288 \times 10^6) \approx 67.82nS$$

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**NOTE**      Data point 222 corresponds with time 0 on the gated power graph.

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On the test set's display, data points are graphed as follows:

- For the rising trace, data points 0 through 370 (the first 371) are displayed with each data point occupying one display pixel.
- For the falling trace, data points 4894 through 5264 (the last 371) are displayed with each data point occupying one display pixel.
- For the Full/Zoomed trace spanning the entire 1277  $\mu$ s measurement period, averaging over groups of data points will be performed to include all 5,264 data points using the display's 371 pixels.
- For the Full/Zoomed trace that zooms in on the area highlighted by the vertical bar, the correlation between data points and pixels is as follows:
  - For the first or last zoomed segment the correlation between data points and display pixels will be identical to the Rise/Fall traces, with the first or last 371 data points displayed on 371 pixels.
  - For all of the middle 12 zoomed segments, the time period (when compared with rise/fall graphs) will be compressed in time. Each data point will span a time period four times longer than the rise/fall data points. This will result in about one fourth the display resolution when compared with the rise/fall traces.

**Table 4. Graticule Line Labeling for all Zoomed Traces**

Zoom Position	DSP Output Range (points)	Count of Data Points	$\mu$ s Graticule Line 0	$\mu$ s Graticule Line 2	$\mu$ s Graticule Line 4	$\mu$ s Graticule Line 6	$\mu$ s Graticule Line 8	$\mu$ s Graticule Line 10
0	0-370	371	-15	-10	-5	0	5	10
1	371 to 747	377	10	31	51	71	92	112
2	748 to 1124	377	112	133	153	174	194	214
3	1125 to 1501	377	215	235	255	276	296	317
4	1502 to 1878	377	317	337	358	378	399	419
5	1879 to 2255	377	419	440	460	480	501	521
6	2256 to 2632	377	521	542	562	583	603	623
7	2633 to 3008	376	624	644	664	685	705	726
8	3009 to 3385	377	726	746	767	787	808	828
9	3386 to 3762	377	828	849	869	889	910	930
10	3763 to 4139	377	930	951	971	992	1012	1032
11	4140 to 4516	377	1033	1053	1073	1094	1114	1135
12	4517 to 4893	377	1135	1155	1176	1196	1216	1237
13	4894 to 5264	371	1237	1242	1247	1252	1257	1262

## Gated Power Measurement Behavior

Gated Power measurements can not be made concurrently with any other measurement, and no other measurement can be made while a gated power measurement is in progress.

The pass/fail result indicates whether or not the trace conformed to the mask.

To make the test run faster, reduce the number of averages (multi-measurement count). The default is 100.

Most failures occur during the rising or falling portions of the burst.

Gated power measurements are expressed in dB, relative to the average of the power levels across the number of 1.25 mS burst specified in the multi-measurement count.

## Measurement Requirements

### Setup:

The following settings are required for the gated power measurement:

- Operating Mode must be Active Cell
- System Type must be IS-95 or IS-2000 with Radio Config set to (Fwd1, Rvs1) or (Fwd2, Rvs2)
- FCH Service Option Setup must be set to SO2 or SO9 (loopback service option)
- Traffic Data Rate must be set to Eighth.

### Input Signal:

The gated power measurement meets or exceeds specifications when the following input signal requirements are met:

- The frequency of the signal being measured must be within the range of 411 MHz to 484 MHz, 804 MHz to 934 MHz, 1.75 GHz to 1.78 GHz, or 1.85 GHz to 1.98 GHz, and be within 100 kHz of the expected frequency.
- The average power level of the signal at the RF IN/OUT connector must be between -20 dBm to +30 dBm. The test set can autorange to a signal that is between +8 dBm to -20 dBm of the expected level (see [“RFAnalyzer:AUTO:POWer\[:SElected\]?”](#) ).

## Related Topics

[“Programming a Gated Power Measurement”](#)

[“SETup:GPOWer”](#)

[“FETCh:GPOWer”](#)

[“INITiate”](#)

[“READ”](#)

[“ABORt”](#)

[“Test Adherence to Standards”](#)

[“Gated Power Measurement Troubleshooting”](#)

## Handoff Waveform Quality Measurement Description

### How is a Handoff Waveform Quality measurement made?

Handoff waveform quality measurements test a transmitter's modulation accuracy during transmission of a single code channel, the reverse Pilot Channel. The handoff involves changing the current pn (pseudo-noise) offset to force the mobile station to transmit a preamble on the Pilot Channel only. Reverse link power control is changed to alternating up/down bits and waveform quality is measured. After the measurement, the pn offset is returned to the original setting and the power control is returned to the original setting.

Each handoff waveform quality measurement returns a number of measurements which include rho, the percentage of signal energy that correlates with a perfect IS-2000 signal after time offset and frequency error have been removed.

This measurement is designed to analyze signals that are made up of multiple code channels, as in the case of radio configurations three and above.

Waveform quality 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 mobile station transmitter's Walsh spreading function for each channel. The DSP then generates a representation of what the "ideal" signal would be given the coding and data in use at the time of transmission. The ideal waveform is then compared with the waveform being measured to determine the waveform quality.

Table 5. lists the Handoff Waveform Quality measurements:

**Table 5. Handoff Waveform Quality measurement results**

Handoff Waveform Quality
Rho
Frequency Error
Timing Error
Carrier Feedthrough
Phase Error
Magnitude Error

### Measurement Behavior

The handoff waveform quality measurement does not provide the Multi-Measurement Count feature in the setup menu.

Handoff waveform quality measurements are always triggered singly (press the START SINGLE key to initiate a measurement from the front panel).



## Measurement Requirements

### Setup:

The following settings are required for the handoff waveform quality measurement:

- Operating Mode must be Active Cell
- System Type must be IS-2000 with Radio Config set to (Fwd3, Rvs3) or (Fwd4, Rvs3)
- A call must be connected

### Input Signal:

The handoff waveform quality measurement meets or exceeds specifications when the following input signal requirements are met:

- The frequency of the signal being measured must be in the range of 412 MHz to 483 MHz, 800 MHz to 960 MHz, or 1.7 GHz to 2.0 GHz, and within 100 kHz of the expected frequency.
- The signal level into the test set's RF IN/OUT connector must be in the range of -25 dBm to +37 dBm, and within 9 dBm of the expected input power (see [“RFANalyzer:AUTO:POWER\[:SElected\]?”](#) ) to meet specifications.

## Related Topics

[“Programming a Handoff Waveform Quality Measurement”](#)

[“SETup:HWQuality”](#)

[“FETCh:HWQuality”](#)

[“INITiate”](#)

[“READ”](#)

[“ABORT”](#)

[“Test Adherence to Standards”](#)

[“Handoff Waveform Quality Measurement Troubleshooting”](#)

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## SINAD Measurement Description

### How is a SINAD measurement made?

SINAD is a receiver audio quality measurement for mobiles on an analog voice channel (AVC). 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” on page 40](#).

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  $\geq 12$  dB SINAD reading.

See IS-137A, section 2.3.1.1, for more information.

### 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.

### Considerations When Making Manual SINAD Measurements

When manually controlling the test set from the front panel, all measurements default to using continuous triggering. If you make digital measurements on a DTC using RF Rise or Protocol triggering, and then hand off to an AVC and select an analog measurement, the analog measurement may not trigger and display a result. This is because the digital measurement is still waiting for a burst transmission to trigger it (which it won't get from an analog signal) and therefore the measurements “freeze”. To prevent this from happening when making analog measurements, either turn off the digital measurements or set their trigger source to Immediate.

### Related Topics

[“Programming a SINAD Measurement” on page 197](#)

[“AFANalyzer Troubleshooting” on page 726](#)

[“Audio Analyzer Measurement Description” on page 40](#)

[“Test Adherence to Standards” on page 79](#)

## Swept Audio Measurements Description

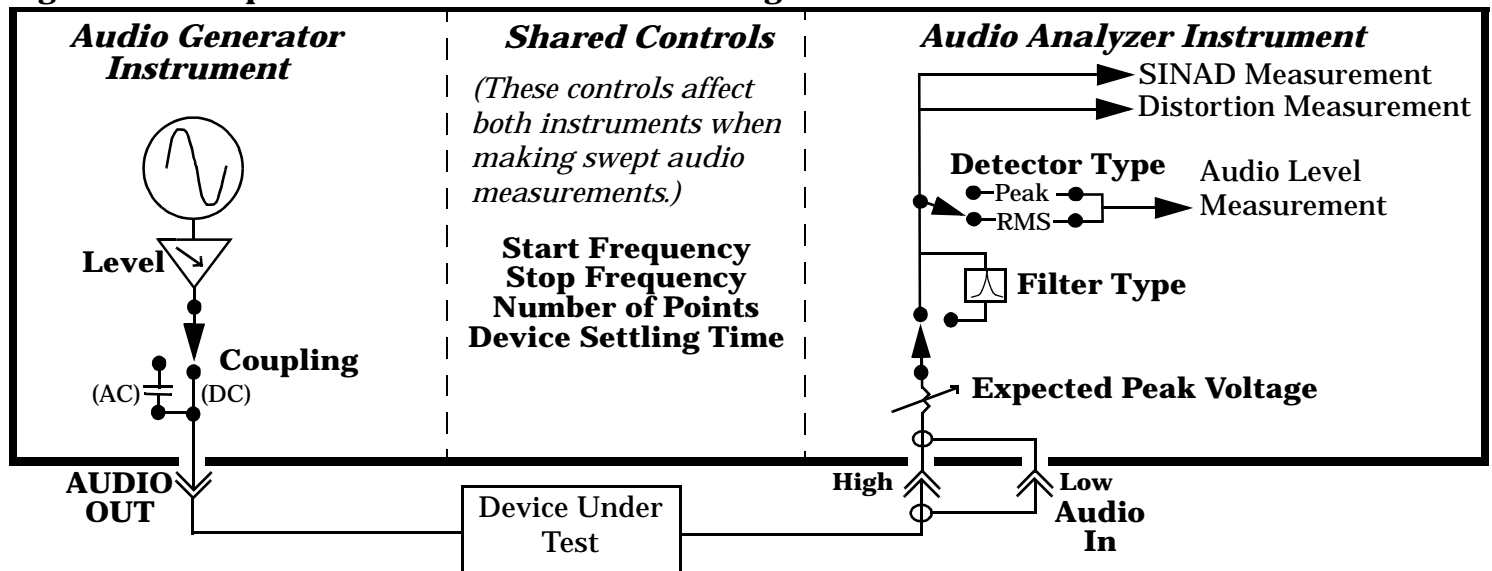
### Description

#### How are swept audio measurements made?

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

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

**Figure 5. Swept Audio Measurements Block Diagram**



The audio generator's signal is output through the front panel AUDIO OUT port to the device under test. The audio signal from the device under test is sent to the audio analyzer through the AUDIO IN ports.

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

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

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

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

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

## Operating Considerations

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

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

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

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

**Specifying a Specific Measurement Frequency Point Within a Sweep** If you need to make sure that a measurement is performed at a specific frequency within the sweep, you can use the following algorithms to calculate the values to enter:

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

$$n = 1 + INT\left(\frac{(F - S)(P - 1)}{E_{min} - S}\right)$$

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

$E_{min}$  = minimum upper sweep frequency

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

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

$$E = \frac{(F - S)(P - 1)}{(n - 1)} + S$$

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

## **Related Topics**

[“Programming a Swept Audio Measurement” on page 199](#)

[“Swept Audio Measurement Troubleshooting” on page 737](#)

[“Audio Analyzer Measurement Description” on page 40](#)

[“Audio Level Measurement Description” on page 45](#)

[“Distortion Measurement Description” on page 54](#)

[“SINAD Measurement Description” on page 66](#)

[“Test Adherence to Standards” on page 79](#)

## TDSO Frame Error Rate Measurement Description

### What is a TDSO (Test Data Service Option) FER (Frame Error Rate) measurement?

TDSO FER measurements are used to test the performance of a mobile station receiver while a supplemental (high speed data) channel is connected and TDSO (Service Option 32) is selected.

This measurement provides a report from the mobile station indicating the status of traffic frames received during high speed data transfer on the F-SCH (forward supplemental channel).

---

**NOTE** At firmware revision B.03 a new TDSO service option was introduced. When a call is made with this service option, SO32 (+SCH), the supplemental channel is transmitted on both the forward and reverse links. TDSO FER measurements, however, are made only on the *forward* supplemental channel.

---

Since the measurement values displayed are obtained from the mobile station, there are no multi-measurement results available, such as measurement averaging.

### How is a TDSO FER Measurement Made?

The test set attempts a TDSO FER measurement when a call is connected using Service Options SO32 (+F-SCH) or SO32 (+SCH). See [“CALL\[:CELL\]:SOPTION”](#).

See [“CALL\[:CELL\]:SOPTION”](#). To establish a call with Service Option 32 you must select Radio Config (Fwd3, Rvs3) or Radio Config (Fwd4, Rvs3). A mobile station originated call can be made or you can press the Originate Call (F3) key. A TDSO FER display is shown below in [Figure 6](#). with 512 frames selected.

**Figure 6. TDSO FER Display**

TDSO Frame Error Rate			
<b>FER</b>			
<b>0.00 %</b>			
<b>RX Good Frames:</b>	<b>512</b>	<b>Confidence:</b>	<b>---- %</b>
<b>RX Blank Frames:</b>	<b>0</b>	<b>FER Requirement:</b>	<b>1.00 %</b>
<b>TX Good Frames:</b>	<b>512</b>	<b>F-SCH Eb/Nt:</b>	<b>7.47 dB</b>
<b>TX Blank Frames:</b>	<b>0</b>		
512 /512		Single	

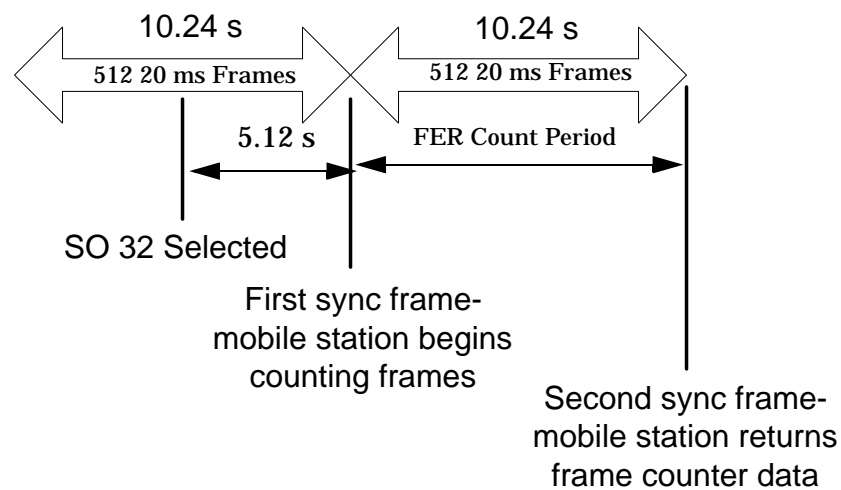
The time period required for TDSO FER measurements depends on the timing of the call connection.

All traffic channels, including the F-SCH, are subdivided into segments of 10.24 seconds each. Testing begins when the first frame (called a sync frame) of the first full segment is received by the mobile station. For example, [Figure 7](#) shows two full F-SCH segments. In this example, the SO 32 call is connected half way through the first segment. Approximately 5.12 s later the mobile station receives the first sync frame from the test set and computes the PRBS data pattern the test set is about to send.

The time period between the successful negotiation of a SO32 connection and the start of the FER Count Period is based on the current long code state, and will range from 0 seconds to 10.24 seconds.

The mobile station also resets its frame counters upon receiving the first sync frame.

**Figure 7. TDSO FER With Frame Count Set to 512 Frames**



During the second sync frame interval, the mobile station keeps a running count of:

- Good Frames Received
- Bad Frames Received
- Blank Frames Received
- Bad Frames Instead of Blank Frames Received
- Total Bad Frames Received

Also during the second frame interval, the test set keeps a running count of:

- Good Frames Transmitted
- Blank Frames Transmitted

At the end of the second frame interval, the test set retrieves frame count data from the mobile station and

calculates percent FER based on the following formula:

$$FER = 1 - \frac{TotalGoodFramesReceived}{TotalTransmittedFrames}$$

## Possible Setup Issues

A call must be setup using SO32 (+F-SCH) or SO32 (+SCH) and that call must be currently connected to make TDSO FER measurements.

---

**IMPORTANT** PRBS data must be selected on the forward supplemental channel if you are making any type of code domain measurement on the reverse supplemental channel.

---

The F-SCH Parameters menu allows for the selection of PRBS or Fixed Pattern in the Data Source field. This choice is also applied to the reverse supplemental channel (see [“Configuring the R-SCH \(Reverse Supplemental Channel\)”](#) ). To correctly detect reverse supplemental code channel parameters, PRBS is the only data source supported. If PRBS data is not selected, the code domain power results (see [“Waveform Quality/Code Domain Measurement Description”](#) ) will not display distinct code channels with the expected spreading factors.

When PRBS is selected in the Data Source field, code domain power results will not be correct until after the first sync frame occurs (see [“How is a TDSO FER Measurement Made?”](#) ).

The measurement setup menu allows for specifying the FER confidence requirement. The FER confidence requirement establishes a target FER rate. To meet standard minimum specifications, a specified FER percentage must be attained with a confidence level of 95%. The TDSO FER measurement returns the confidence level based on the actual average FER result obtained over the fixed frame count length. If the confidence level is less than 95% for the specified FER confidence requirement, the test has not passed minimum standards.

The supplemental channel information menu provides channel setup parameters including the supplemental channel data rate, encoder type, and power level. Standards specify data rates and Eb/Nt. Eb/Nt can be set by adjusting F-SCH and AWGN level.

If trigger arm is set to Single, the first TDSO FER measurement will be displayed and then the test set will wait until it is triggered by a GPIB command or the START SINGLE key before the next sync frame is staged.

If “No F-SCH” is displayed in the bottom right portion of the display, the supplemental channel is not connected. If “No Sync” is displayed, the sync channel has not been sent to the mobile station yet.

Interim results are displayed when the frame count is greater than 512 and the test set is able to retrieve mobile station counter values after intermediate sync frames.

Integrity indicators (see [“Integrity Indicator”](#) ) do not apply to this measurement.



## Related Topics

[“Programming a TDSO Frame Error Rate Measurement”](#)

[“CALL\[:CELL\]:SOPTION”](#)

[“SETup:TFERror”](#)

[“FETCh:TFERror”](#)

[“INITiate”](#)

[“READ”](#)

[“ABORt”](#)

[“Test Adherence to Standards”](#)

[“TDSO FER \(Frame Error Rate\) Troubleshooting”](#)

## Tx Spurious Emissions Measurement Description

### How is a Tx Spurious Emissions measurement made?

For cellular frequency bands, and NMT 450, the Tx spurious emissions measurement analyzes the signal energy at the following frequency offsets relative to the channel's center frequency:

- $\pm 885$  kHz (lower and upper adjacent channels)
- $\pm 1.98$  MHz (lower and upper alternate channels)

For PCS frequency bands the Tx spurious emissions measurement analyzes the signal energy at the following frequency offsets relative to the channel's center frequency:

- $\pm 1.25$  MHz (lower and upper adjacent channels)
- $\pm 1.98$  MHz (lower and upper alternate channels)

The relative signal energy (dBc) is measured within a 30 kHz bandwidth.

A graphical view or a numeric view can be displayed.

Tx Spurious Emissions measurements are triggered by a 20 ms clock derived from signaling protocol.

### Tx Spurious Emissions measurement characteristics

Tx Spurious Emissions measurements are usually made with the mobile station transmitting at its full power (traffic channel and fundamental channel control is available in the measurement setup menu).

Limit lines are shown on the graphical display. These lines are set based on the current Cell Band selection. If the signal energy exceeds a limit line the word Fail appears on the display.

The x-axis on the graphical display is fixed to -2.5 MHz to 2.5 MHz

The y-axis on the graphical display is fixed to 0 dBc/30 kHz to -70 dBc/30 kHz.

A marker is provided to display measurement levels at each offset frequency.

An overall pass/fail indicator is available via GPIB commands (see "[FETCh:CTXSpurious\[:ALL\]?](#)" )

### Input Signal Requirements

The Tx Spurious Emissions measurement meets or exceeds specifications when the following requirements are met:

- The frequency of the signal being measured must be in the range of 411 MHz to 484 MHz, 804 MHz to 934 MHz, 1.75 GHz to 1.78 GHz, or 1.85 GHz to 1.98 GHz, and be within 100 kHz of the expected frequency.
- The signal level into the test set's RF IN/OUT connector must be in the range of 0 dBm to +30 dBm, and within 9 dBm of the expected input power (see "[RFANalyzer:AUTO:POWER\[:SElected\]?](#)" ) to meet specifications.

## **Related Topics**

[“Programming a Tx Spurious Emissions Measurement”](#)

[“Tx Spurious Emissions Measurement Troubleshooting”](#)

## Waveform Quality/Code Domain Measurement Description

### How is a Waveform Quality/Code Domain Power measurement made?

Each waveform waveform quality measurement returns a number of measurements which includes:

- Rho, the percentage of signal energy that correlates with a perfect IS-2000 signal after time offset and frequency error have been removed
- Code domain power, the power levels of each code channel transmitted by the mobile station.
- Code domain power and noise, the total of power and noise of each code channel transmitted by the mobile station.

This measurement is designed to analyze signals that may be made up of multiple code channels. Multiple code channels are used in calls setup using radio configurations three (Fwd3, Rvs3) and above. Any time a call is connected, waveform quality measurements can be made. Any combination of service option, radio configuration, or data rate can be measured.

Waveform quality 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 mobile station transmitter's Walsh spreading function for each channel. The DSP then generates a representation of what the "ideal" signal would be given the coding and data in use at the time of transmission. The ideal waveform is then compared with the waveform being measured to determine the waveform quality.

[Table 6. "Waveform Quality/Code Domain Power Measurement Results"](#) lists the Waveform Quality/Code Domain Power measurements:

**Table 6. Waveform Quality/Code Domain Power Measurement Results**

Waveform Quality	Code Domain Power
Rho	Code Domain Power (I-Channel)
Frequency Error	Code Domain Power (Q-Channel)
Timing Error	Code Domain Power + Noise (I-Channel)
Carrier Feedthrough	Code Domain Power + Noise (Q-Channel)
Phase Error	
Magnitude Error	
Error Vector Magnitude (EVM)	

## Code Domain Power Graphical Display

The Code Domain Power measurement displays up to 16 I-channel and up to 16 Q-channel bins<sup>1</sup>. Each bin represents one active code channel. The IS-2000 system achieves high data rates by combining multiple code channels. To facilitate the display of high data rate channels in contiguous blocks, the Walsh code sequence along the graph's x-axis is displayed in "bit reversed" order. See [Table 7. "Walsh Numbering on Code Domain Power Graphs"](#)

To facilitate the display of measurement results in contiguous blocks the Walsh code sequence along the graph's x-axis is displayed in "bit reversed" order. See [Table 7. "Walsh Numbering on Code Domain Power Graphs"](#)

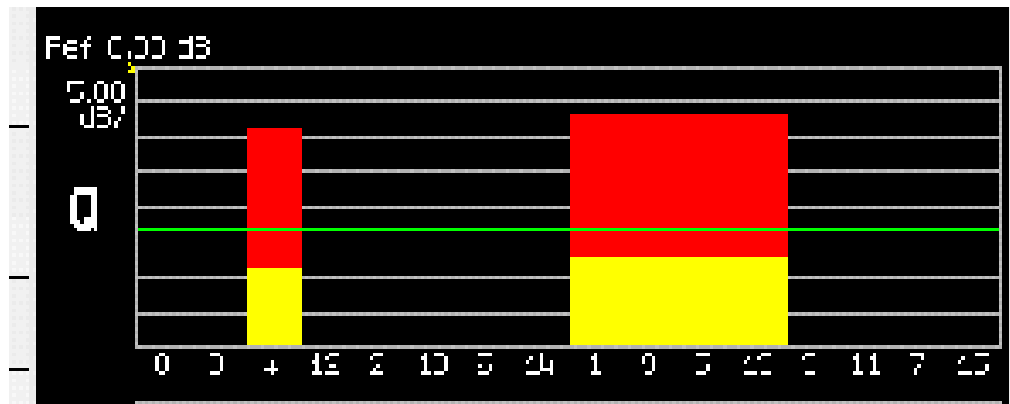
**Table 7. Walsh Numbering on Code Domain Power Graphs**

Bin Number	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Walsh Code Channel	0	8	4	12	2	10	6	14	1	9	5	13	3	11	7	15

The power and power + noise graphs, because of the bit-reversed order, can display channels with a spreading factor of less than 16, such as the R-SCH (Reverse Supplemental CHannel), using one bin. For example, [Figure 8.](#) shows the Q channel with:

- the R-FCH (Reverse Fundamental CHannel) in bin 1 on channel 4,
- the R-SCH in bin 2 on channel 1 (composed of channels 1, 9, 5, 13),

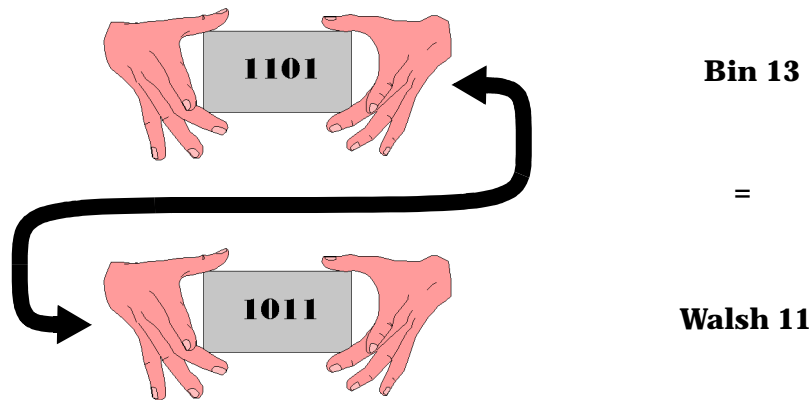
**Figure 8. Code Domain Power Graph with R-SCH**



An example of bit reversal is shown in [Figure 9](#). Bin 13 has a binary coded decimal value of 1101. If you reverse that sequence, the result is 1011. When 1011 is converted back to a decimal value, the result is Walsh code 11.

1. Bins are the bars that appear on the graph. When high data rate channels such as the F-SCH channel are transmitted from the mobile station, wider bins are displayed. The wider bins represent code channels that occupy multiple orthogonal channels.

**Figure 9. Walsh Channel Bit Reversal**



## Input Signal Requirements

The Waveform Quality measurement meets or exceeds specifications when the following requirements are met:

- The frequency of the signal being measured must be in the range of 412 MHz to 483 MHz, 800 MHz to 960 MHz, or 1.7 GHz to 2.0 GHz, and within 100 kHz of the expected frequency.
- The signal level into the test set's RF IN/OUT connector must be in the range of -25 dBm to +37 dBm, and within 9 dBm of the expected input power (see [“RFANalyzer:AUTO:POWER\[:SElected\]?”](#)) to meet specifications.

---

**IMPORTANT** PRBS data is required if you are making any of the code domain measurements on the reverse supplemental channel

---

The F-SCH Parameters menu allows for the selection of PRBS or Fixed Pattern in the Data Source field. This choice is also applied to the reverse supplemental channel. See [“Configuring the F-SCH \(Forward Supplemental Channel\)”](#). To correctly detect reverse supplemental code channel parameters, PRBS is the only data source supported. If PRBS data is not selected, the code domain power results will not display distinct code channels with the expected spreading factors.

## Related Topics

[“READ? Subsystem”](#)

[“SETup:WQuality”](#)

[“INITiate”](#)

[“FETCh:WQuality”](#)

[“Test Adherence to Standards”](#)

## Test Adherence to Standards

### Standards Table

This table lists the capabilities of the E1962B Test Application. This test capability is effective with the release of revision B.02.

**Table 8. IS-98-D Standards**

TIA/EIA-98-D	E1962B
1.3 Fundamental Channel Test Mode 1 (F/R RC1)	Yes, supports SO2 and SO55 on the Traffic Channel.
1.3 Fundamental Channel Test Mode 2 (F/R RC2)	Yes, supports SO9 and SO55 on the Traffic Channel.
1.3 Fundamental Channel Test Mode 3 (F/R RC3)	Yes, supports SO2 and SO55 on the Traffic Channel.
1.3 Supplemental Channel Test Mode 3 (Forward RC3)	Yes, supports SO32 (TDSO) on F-SCH.
1.3 Supplemental Channel Test Mode 4 (F-RC4 & R-RC3)	Yes, supports SO2 and SO55 on F-FCH & R-FCH.
1.3 Supplemental Channel Test Mode 4 (Forward RC4)	Yes, supports SO32 (TDSO) on F-SCH.
1.3 Fundamental Channel Test Mode 5 (F-RC5 & R-RC4)	Yes, supports SO9 and SO55 on F-FCH & R-FCH.
1.3 Supplemental Channel Test Mode 5 (Forward RC5)	Yes, supports SO32 (TDSO) on F-SCH.
3.1 Frequency Requirements	Supports Band Class 0, 1, 3, 4, 5, & 6
3.2.1.1 Idle Handoff in Non-slotted Mode (Test 1)	No, requires two synchronized Base Station Emulators.
3.2.1.1 Idle Handoff in Non-slotted Mode (Test 2)	No, requires two synchronized Base Station Emulators.
3.2.1.2 Idle Handoff in Slotted Mode on Paging Channel	No, requires two synchronized Base Station Emulators.
3.2.1.3 Idle Handoff in Slotted Mode on Forward Common Control Channel	No, requires two synchronized Base Station Emulators.
3.2.1.4 Idle Handoff to another frequency	No, requires two synchronized Base Station Emulators.
3.2.2.1 Neighbor Set Pilot Detection & Incorrect Detection in Soft Handoff	No, requires Soft Handoff capability and Pilot Measurement detection.
3.2.2.2 Candidate Set Pilot Detection & Incorrect Detection in Soft Handoff	No, requires Soft Handoff capability and Pilot Measurement detection.
3.2.2.3 Active Set Pilot Loss Detection in Soft Handoff	No, requires Soft Handoff capability and Pilot Measurement detection.
3.2.3.1 Access Probe Handoff	No, requires two synchronized Base Station Emulators.
3.2.3.2 Access Handoff	No, requires two synchronized Base Station Emulators.

**Table 8. IS-98-D Standards**

TIA/EIA-98-D	E1962B
3.3.1 Demodulation of Non-Slotted Paging Channel with AWGN	No. The Test Set can set up the proper forward channel conditions. The Test Set cannot retrieve the mobile accumulated statistics parameters.
3.3.2 Demodulation of slotted Paging Channel with AWGN	No, the Test Set cannot send an Audit Order
3.3.2.2.1 Spreading Rate 1 Paging Channel	No. The Test Set supports only IS-2000 rev.0 channels. It does not support enhanced access, FCCCH, BCC,CPCCH.
3.3.2.2.2 Spreading Rate 3 Paging Channel	No. Possible future enhancement.
3.3.3 Demodulation of Broadcast Control Channel in AWGN.	No. Possible future enhancement.
3.3.3.2.1 Spreading Rate 1 BCC.	No. Possible future enhancement.
3.3.3.2.2 Spreading Rate 3 BCC.	No. Possible future enhancement.
3.3.4 Demodulation of Broadcast Control Channel in Multipath Fading Channel.	No. Possible future enhancement.
3.3.4.2.1 Spreading Rate 1 BCC.	No. Possible future enhancement.
3.3.4.2.2 Spreading Rate 3 BCC.	No. Possible future enhancement.
3.3.5 Demodulation of forward Common Control Channel	No. Possible future enhancement.
3.3.5.2.1 Spreading Rate 1 F-CCCH.	No. Possible future enhancement.
3.3.5.2.2 Spreading Rate 3 F-CCCH.	No. Possible future enhancement.
3.3.6 Reception of Common Power Control Channel and Common Assignment Channel	No. Possible future enhancement.
3.3.6.2.1 Spreading Rate 1 Forward Common Power Control Channel and Common Assignment Channel with Rate = 1/4	No. Possible future enhancement.



**Table 8. IS-98-D Standards**

TIA/EIA-98-D	E1962B
3.3.6.2.2 Spreading Rate 1 Forward Common Power Control Channel and Common Assignment Channel with Rate = 1/2	No. Possible future enhancement.
3.3.6.2.3 Spreading Rate 1 Forward Common Power Control Channel and Common Assignment Channel with Rate = 1/2	No. Possible future enhancement.
3.4.1 Demodulation of Forward Traffic Channel with AWGN	Yes, For F-FCH , the test set uses loopback Service Options 002, 009, or 055 For F-SCH, the test set uses Test Data Service Option (S032)
3.4.2 Demodulation of Forward Traffic Channel with Fading	Yes, requires an external fader and AWGN generator to perform per the standards. F-SCH uses TDSO (Service Option 32)
3.4.3 Demodulation of Forward Traffic Channel During Soft Handoff	No, requires soft handoff capability
3.4.4 Decision of Power Control Bit for Channels Belonging to Different Power Control Sets During Soft Handoff - Test 1 and Test 2	No, requires soft handoff capability
3.4.5 Decision of Power Control Bit for Channels Belonging to the Same Power Control Set	No, requires soft handoff capability
3.4.6 Demodulation of Power Control Subchannel During Soft Handoff	No, requires soft handoff capability
3.4.7 Demodulation of Forward Traffic Channel in Multipath Fading Channel with Closed Loop Power Control (FPC_MODE=000)	No, possible future enhancement
3.4.8 Demodulation of Forward Traffic Channel During Soft Handoff with Closed Loop Power Control (FPC_MODE=000)	No, possible future enhancement
3.4.9 Demodulation of Forward Traffic Channel in Multipath Fading Channel with Closed Loop Power Control (FPC_MODE=000 or 100)	No, possible future enhancement
3.4.10 Demodulation of Forward Traffic Channel in Multipath Fading Channel with Closed Loop Power Control (FPC_MODE=000) and Transmit Diversity (OTD or STS)	No, possible future enhancement
3.4.12 Demodulation of Power Control Subchannel During Reverse Fundamental Channel Gating	No, possible future enhancement

**Table 8. IS-98-D Standards**

TIA/EIA-98-D	E1962B
3.4.13 Behavior of the Quality Indicator Bit of the Forward Dedicated Control Channel	No, possible future enhancement
3.5.1 Receiver Sensitivity and Dynamic Range	Yes
3.5.2 Single Tone Desensitization Tests 1 and 2	Yes, with external signal generator
3.5.3 Intermodulation Spurious Response Attenuation Tests 1 and 2	Yes, with external signal generator
3.5.4 Adjacent Channel Selectivity	Yes, with external CDMA generator
3.6.1 Conducted Spurious Emissions	No, use the HP 859XE +HP 85725C CDMA Spectrum Analyzer
3.6.2 Radiated Spurious Emissions	No, use the HP 859XE +HP 85725C CDMA Spectrum Analyzer
3.7.1 Supervision Paging Channel	Partially, but the test set does not provide timing measurements
3.7.2 Supervision Forward Channel - Test 1 and Test 2	No
4.1 Transmit Frequency Accuracy	Yes, uses the rho or EVM measurement method
4.2.1 CDMA to CDMA Hard Handoff	Partially, performs $F_1$ to $F_2$ Hard handoffs, but cannot make the required timing measurement
4.2.2 Transmit Power after Hard Handoff	No
4.2.3 Candidate Frequency Single Search	No
4.3.1 Time Reference	Yes, uses the rho or EVM measurement method.
Time Reference Slew Rate	Partially, requires an external fader & external timing measurement device. E1962A requires mobile test mode to set-up call
4.3.2 Reverse Pilot Channel to Code Channel Time Tolerance	Yes
4.3.3 Reverse Pilot Channel to Code Channel Phase Tolerance	Yes
4.3.4 Waveform Quality and Frequency Accuracy	Yes, uses the rho or EVM measurement method. The test set also measures multi-coded waveform quality, a non-standard but more useful measurement.
4.3.5 Code Domain Power	Yes
4.4.1 Range of Open Loop Output Power	Yes, Uses access probe power measurement. Enhanced Access Channel is not currently supported.

**Table 8. IS-98-D Standards**

TIA/EIA-98-D	E1962B
4.4.2 Time Response of Open Loop Power Control	No
4.4.3 Access Probe Output Power	Yes, use call limit feature to prevent call from connecting. Support for SR1 and SR3 Enhanced Access Channel is a possible future enhancement.
4.4.4 Range of Closed Loop Power Control	Yes, but does not make timing measurements. Test 2 not supported.
4.4.5 Maximum RF Output Power	Yes. Spurious emissions requires an external spectrum analyzer.
4.4.6 Minimum Controlled Output Power	Uses channel power measurement.
4.4.7 Standby Output Power and Gated Output Power	Partially, the E1962B has graphical Gated Power measurements.
4.4.8 Power up Function Output Power	No
4.4.9 Code Channel to Reverse Pilot Output Power Accuracy	Yes, except Enhanced Access Channel Header, Enhanced Access Channel Data and Reverse Common Control Channel Data.
4.4.10 Reverse Pilot Channel Phase Discontinuity	No. The test set provides call setup. HP859XE and HP 85725C are needed to make the measurement.
4.5.1 Conducted Spurious Emissions	Yes.
4.5.2 Radiated Spurious Emissions	Yes. Requires external spectrum analyzer.
4.5.3 Occupied Bandwidth (Band classes 3 & 6 only)	Yes. Requires external spectrum analyzer.

**Table 8. IS-98-D Standards**

<b>TIA/EIA-98-D</b>	<b>E1962B</b>

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## 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

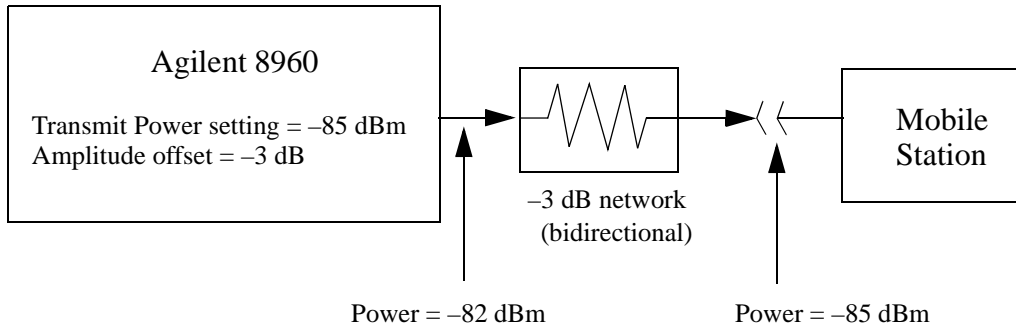
When the amplitude offset table entries accurately represent the loss in all components (cabling, connectors, and test fixturing) in the signal path between the test set and the mobile station, the test set will make the necessary adjustments in both receiver and transmitter measurements.

### 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 10. Amplitude Offset Mobile Station Receiver Example**



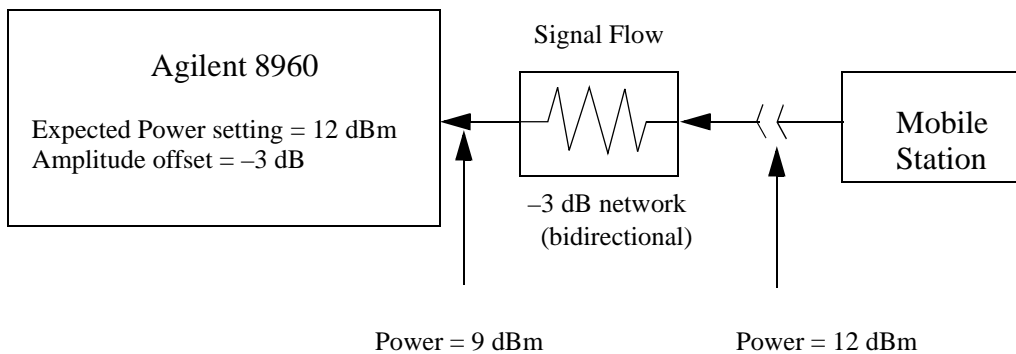
### Mobile Station Transmitter Example

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 11. 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.

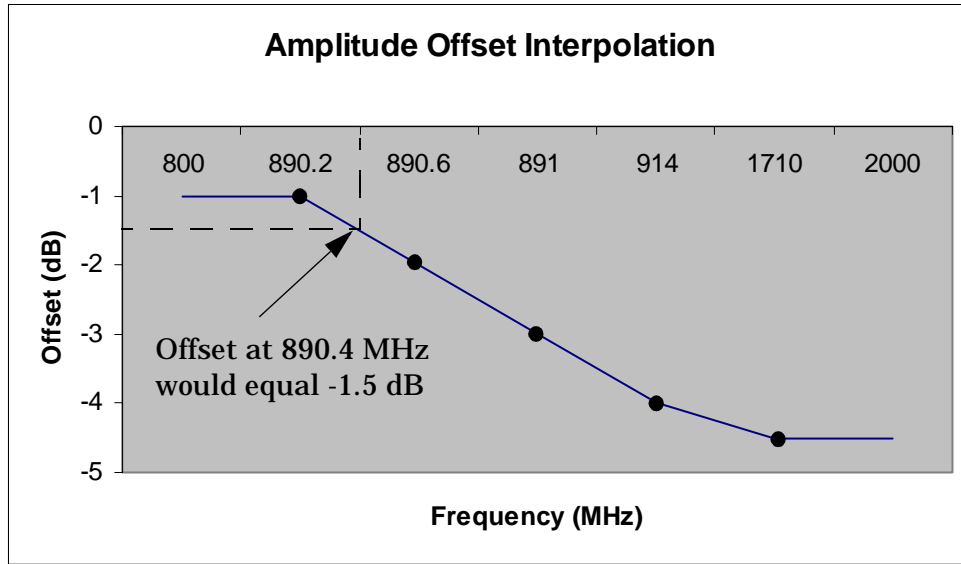
**Figure 12. RF IN/OUT Amplitude Offset Setup**

System Config Screen						
RF IN/OUT	RF IN/OUT Amplitude Offset					Utilities
	RF IN/OUT Amplitude Offset State: On					Message Log
	<u>Number</u>	<u>Frequency (MHz)</u>	<u>Offset (dB)</u>			
	1	890.20	-1.00			
	2	890.60	-2.00			
	3	891.00	-3.00			
	4	914.00	-4.00			
	5	1710.20	-4.50			
	6	Off	Off			
	7	Off	Off			
	8	Off	Off			
RF IN/OUT Amptd Offset Setup ▾	RF IN/OUT Amplitude Offset Setup			Value		
	RF In/Out Amplitude Offset State			On		
	Frequency 1			890.200 MHz		
	Offset 1			-1.00 dB		
	Frequency 2			890.600 MHz		
	Offset 2			-2.00 dB		
	Frequency 3			891.000 MHz		
	Offset 3			-3.00 dB		
Close Menu	Frequency 4			914.000 MHz		
	Active Cell Idle			Sys Type: IS-2000		
		IntRef	Offset			
						1 of 2

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 13](#) 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 12](#). "RF IN/OUT Amplitude Offset Setup". Each of the five points are shown on a non-scaled frequency versus amplitude offset graph. At a test frequency of 890.4 MHz, which is midway between point number one (-1 dB) and point number two (-2 dB) the test set applies an offset of -1.5 dB. Be aware that since amplitude offsets are in units of dB, this piece-wise linear interpolation does not produce a linear transition from point to point.

**Figure 13. Amplitude Offset Interpolation**



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

---

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

---

## Related Topics

[“SYSTEM:CORREction”](#)



# Call Processing

---

## Active Cell Operating Mode

Active cell mode is used to emulate an IS-2000 cell interacting with the mobile station (MS), and is the default operating mode.

### Active Cell Features

The basic features provided by active cell operating mode are:

- Selection of radio configuration.
- Selection of service options (voice echo or data loopback).
- Call setup and disconnection, both mobile station originated and paging.
- Zone-based and timer-based registration controls.
- Hard handoffs between frequency bands and physical RF channels.
- Service option negotiation during access state or on traffic channels.
- Voice echoing through the mobile's earpiece.
- Automatic frequency control and power ranging of the test set's receiver.
- Mobile station reported information, such as mobile station parameters.
- Closed loop power control.

### Setting the Test Set's Operating Mode to Active Cell Mode

The active cell operating mode is set using the following test set command:  
OUTPUT 714;"CALL:OPERating:MODE CALL"

### Related Topics

["CW Operating Mode" on page 96](#)

["CALL\[:CELL\]:SYSTem" on page 423](#)

["CALL:STATus:CELL:SYSTem\[:TYPE\]?" on page 408](#)

["IS-2000 Test Operating Mode" on page 95](#)

---

## AVC Test Operating Mode

Analog Voice Channel (AVC) test mode provides a forward voice channel for operating AMPS mobiles in test mode. This allows you to get the mobile transmitting on an AVC and test many functions in the mobile without the need to register or page the mobile.

### AVC Test Mode Operation

When the test set's operating mode is AVC test mode:

- No over the air signaling is available.
- Changes to the test set's AVC channel assignment occur immediately.
- When the test set's AVC channel is changed, the base station emulator is automatically reconfigured to receive the corresponding reverse AVC signal from the mobile. If needed, you can disable this operation by selecting manual receiver frequency control. See ["Receiver Control" on page 213](#).
- Changes to the MS TX Level automatically set the expected analog input power. If needed, you can disable this operation by selecting manual receiver power control. See ["Receiver Control" on page 213](#).
- SAT modulation of the test set's forward AVC can be turned on or off, and can be set to any of the three color code frequencies.
- Internal FM of the forward AVC is available for various audio frequency tests.
- An external FM source can be used to provide addition frequency modulation of the forward AVC.

### Forward Channel FM Operation

Frequency modulation of the forward channel in AVC test mode is a combination of the SAT, internal FM, and external FM settings. No wideband data is present.

To meet specifications, the total peak FM deviation cannot exceed 20 kHz. Limitations for each FM source are as follows:

- SAT - can be turned on or off, and has three color code selections: SAT1 (5970 Hz), SAT2 (6000 Hz), SAT3 (6030 Hz). Peak deviation is fixed at 2 kHz.
- Internal FM - can be turned on or off, has a rate range of 100 Hz to 20 kHz, and a peak deviation range of 0 Hz to 20 kHz.
- External FM - uses the test set's rear-panel FM Mod In port to connect an external modulation source. The fixed peak deviation for a 100 Hz to 20 kHz tone is 20 kHz/Volt.

### AVC Test Mode Operation Using Automated Receiver Control

The following procedure demonstrates the use of AVC test mode where the base station emulator's RF generator frequency, measurement receiver frequency, and expected input power are automatically set by the call control settings used. This is the most common way to use test mode because it requires less individual configuration of call parameters.

This procedure provides general programming steps, but is not written around any specific test requirements. Some of the settings shown are the default power up settings for AVC Test mode.

## AVC Test Operating Mode

Putting the mobile in analog test mode at the correct channel number and power setting is the responsibility of the user.

**1. Select AVC Test mode.**

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

**2. Turn on the base station emulator's RF Generator and set the output level to -50 dBm.**

```
OUTPUT 714;"CALL:POWer -50"
```

**3. Set the AVC channel number to 777.**

```
OUTPUT 714;"CALL:SETup:AVC 777"
```

**4. Set the MS TX Level to two (2). (This is the mobile's power level setting, not the expected power in dBm.)**

```
OUTPUT 714;"CALL:SETup:MS:ANALog:TXLevel:CELLular 2"
```

**5. Turn the forward channel AVC SAT on.**

```
OUTPUT 714;"CALL:AVCTest:AVC:SATone:STATE ON"
```

**6. Set the SAT color code to SAT1 (5970 Hz).**

```
OUTPUT 714;"CALL:SETup:AVC:SATone SAT1"
```

**7. Turn on internal FM, and set the deviation to 8.0 kHz and the rate to 1004 Hz.**

```
OUTPUT 714;"CALL:FM:INTernal 8 KHZ;INT:FREQuency 1004 HZ"
```

**If you do not want internal FM on, use the FM State command to turn it off:**

```
OUTPUT 714;"CALL:FM:INTernal:STATE OFF"
```

**8. Turn external FM off.**

```
OUTPUT 714;"CALL:FM:EXTernal:STATE OFF"
```

**9. Connect the mobile's antenna port to the test set's RF IN/OUT port and put the mobile in analog test mode, transmitting at power level two on channel 777.**

If your mobile's audio is not muted, you should hear a 1004 Hz tone out of its speaker. If you have an acoustic or direct connection to the mobile's audio output, you can make audio measurements through the test set's AUDIO IN connections. See ["Audio Analyzer Measurement Description" on page 40](#).

You can also make analog transmit power and frequency stability measurements on the mobile's reverse channel carrier. If you modulate your mobile's carrier, you can measure the frequency modulation characteristics. See ["Analog Transmit Power Measurement Description" on page 39](#), ["Frequency Stability Measurement Description" on page 59](#), and ["Frequency Modulation \(FM\) Measurement Description" on page 57](#).

## AVC Test Mode Operation Using Manual Receiver Control

Note: Changing the operating mode affects manual receiver control parameters. See [“Effects on Receiver Control When Changing Operating Mode” on page 215](#).

The following procedure demonstrates the use of AVC test mode where the base station emulator’s RF generator frequency, measurement receiver frequency, and expected input power are manually configured. Manual control is not commonly used in production testing, but is provided to allow the measurement receiver and RF generator to be used to perform tests where automated control may not be used; such as when tuning the receiver to make measurements outside of the cellular band during AMPS testing.

This procedure provides general programming steps, but is not written around any specific test requirements. Some of the settings shown are the default power up settings for AVC Test mode.

Putting the mobile in analog test mode at the correct channel number and power setting is the responsibility of the user.

### 1. Select AVC Test mode.

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

### 2. Turn on the base station emulator’s RF Generator and set the output level to -50 dBm.

```
OUTPUT 714;"CALL:POWer -50"
```

### 3. Set the base station emulator’s RF generator to 893.310 MHz; the forward channel frequency for channel 777.

```
OUTPUT 714;"CALL:RFGenerator:FREQuency 893.310 MHZ"
```

### 4. Enable manual receiver frequency control and tune the measurement receiver to 848.31 MHz (reverse channel 777).

```
OUTPUT 714;"RFANalyzer:MANual:MEASurement 848.310 MHZ"
```

### 5. Enable manual control of the receiver’s expected analog input level power setting.

```
OUTPUT 714;"RFANalyzer:CONTRol:POWer:AUTO OFF"
```

### 6. Set the expected input level value to correspond to mobile station power level two.

```
OUTPUT 714;"RFANalyzer:MANual:ANALog:POWer 28 DBM"
```

### 7. Turn the forward channel AVC SAT on.

```
OUTPUT 714;"CALL:AVCTest:AVC:SATone:STATE ON"
```

### 8. Set the SAT color code to SAT1 (5970 Hz).

```
OUTPUT 714;"CALL:SETup:AVC:SATone SAT1"
```

### 9. Turn on internal FM, and set the deviation to 8.0 kHz and the rate to 1004 Hz.

```
OUTPUT 714;"CALL:FM:INTernal 8 KHZ;INT:FREQuency 1004 HZ"
```

If you do not want internal FM on, use the FM State command to turn it off:

```
OUTPUT 714;"CALL:FM:INTernal:STATE OFF"
```

### 10. Turn external FM off.

```
OUTPUT 714;"CALL:FM:EXTernal:STATE OFF"
```

### 11. Connect the mobile’s antenna port to the test set’s RF IN/OUT port and put the mobile in analog test mode, transmitting at power level two and channel 777.

## AVC Test Operating Mode

If your mobile's audio is not muted, you should hear a 1004 Hz tone out of the speaker. If you have an acoustic or direct connection to the mobile's audio output, you can make audio measurements through the test set's AUDIO IN connections. See [“Audio Analyzer Measurement Description” on page 40](#).

You can also make analog transmit power and frequency stability measurements on the mobile's reverse channel carrier. If you modulate your mobile's carrier, you can measure the frequency modulation characteristics. See [“Analog Transmit Power Measurement Description” on page 39](#), [“Frequency Stability Measurement Description” on page 59](#), and [“Frequency Modulation \(FM\) Measurement Description” on page 57](#).

## Related Topics

[“Programming: Getting Started Guide for cdma2000 Mobile Test” on page 124](#)

[“Receiver Control” on page 213](#)

---

## IS-2000 Test Operating Mode

When the test set is in IS-2000 test operating mode (as opposed to active cell operating mode) it is necessary for the mobile station under test to be capable of independently performing operations that normally occur through over-the-air signaling. This capability is referred to as test mode and is usually accomplished using commands which are sent to the mobile station from a system controller (usually a personal computer) through a proprietary digital interface. See <test mode paper>.

To make measurements on the reverse channel in test mode, the mobile station must first synchronize to the test set's forward pilot channel and demodulate the sync and paging channels. This is consistent with normal system acquisition procedures and results in the mobile station reaching the mobile station idle state. In active cell operating mode, the mobile station at this point would autonomously perform a power-up registration after entering the idle state. A call could then be initiated, using over-the-air call processing, and the fundamental channel would be established and maintained according to the applicable message protocol.

However, in test mode the test set and mobile station are directed to the same FCH (fundamental channel) by the system controller or through manual user interfaces without over-the-air call processing.

### Forward CDMA channels available in test mode

In test mode, the test set can be configured to transmit a forward channel that emulates a base station operating in radio configuration (RC) 1, 2, 3, 4 or 5. See [“Forward Channel Description” on page 784](#)

### Related Topics

- [“CALL\[:CELL\]:OPERating”](#)
- [“How Do I Change Cell Information?” on page 687](#)

---

## 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: Changing the operating mode affects manual receiver control parameters. See [“Effects on Receiver Control When Changing Operating Mode” on page 215](#).

### CW Test Mode Operation

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

- No over the air signaling is used.
- 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.
- 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”

### Related Topics

[“Active Cell Operating Mode” on page 90](#)

[“IS-2000 Test Operating Mode” on page 95](#)

[“Triggering of Measurements” on page 240](#)



---

## Selecting a Cellular System Type

To select a cellular system type using the test set's front panel, see [“How Do I Set Up a Call?” on page 683](#)

The mobile station's cellular system type is selected using the [“CALL\[:CELL\]:SYSTEM\[:TYPE\]”](#) call processing subsystem commands.

### Available System Types

The following system types are displayed under the System Type menu when the Operating Mode is set to Active Cell (see [“Active Cell Operating Mode”](#) ) or Cell Off.

- IS-2000 (CALL:SYSTEM DIGital2000)
- IS-95 (CALL:SYSTEM DIGital95)
- AMPS (CALL:SYSTEM AMPS)

## Selecting a Cellular System Type

---

## Setting the Cell Band

The test set's base station emulator provides a selection of cell bands. To set the cell band using the test set's front panel, see [“How Do I Set Up a Call?” on page 683](#).

### Cell Bands

The following GPIB subsystem describes the cell bands:

[“CALL:BAND” on page 296](#)

---

## Setting the Radio Configuration

The test set's base station emulator provides five radio configuration selections. To set the the radio configuration using the test set's front panel, see [“How Do I Set Up a Call?” on page 683](#).

### Radio Configuration

The following GPIB subsystem describes the radio configuration settings:

[“CALL\[:CELL\]:RCONfig”](#)

To select a service option for the selected radio configuration, see [“CALL\[:CELL\]:SOPTION”](#)

---

## Setting the Cell Band

The test set's base station emulator provides a selection of cell bands. To set the cell band using the test set's front panel, see [“How Do I Set Up a Call?” on page 683](#).

### Cell Bands

The following GPIB subsystem describes the cell bands:

[“CALL:BAND” on page 296](#)

## Setting Cell Parameters

The test set's base station emulator provides control over the cell parameters described below. To access cell parameters using the test set's front panel, see [“How Do I Change Cell Information?” on page 687](#).

### IS-2000/IS-95 Cell Parameters

The following cell parameters are displayed under the Cell Parameters menu when the following two conditions exist:

1. The Operating Mode field is set to Active Cell (see [“Active Cell Operating Mode”](#)), IS-2000 Test, or Cell Off, and
2. If Active Cell is the current operation mode, IS-2000 or IS-95 is selected in the System Type field.
  - System ID (SID). [“CALL\[:CELL\]:SIDentity”](#)
  - Network ID (NID). See [“CALL\[:CELL\]:NIDentity” on page 350](#).
  - Escape Mode. See [“CALL\[:CELL\]:ESCAPE\[:MODE\]” on page 308](#).
  - Cell MCC. See [“CALL\[:CELL\]:MCCode” on page 317](#).
  - Cell MNC. See [“CALL\[:CELL\]:MNCcode” on page 318](#).
  - Paging Data Rate. See [“CALL:PAGING:DRATE” on page 357](#).
  - Max Slot Cycle Index. See [“CALL:PAGING:SCINDEX\[:MAXimum\]” on page 359](#).
  - F-QPCH State. [“CALL:QPCHannel:STATE”](#)<sup>1</sup>  
 To access the GPIB command for Curr F-QPCH State (displayed in the Cell Parameters table) see [“CALL:STATUS:QPCHannel:STATE\[:SELECTed\]?”](#)
  - F-QPCH Relative to Pilot Level. [“CALL:QPCHannel:LEVEL:RTPilot\[:SELECTed\]”](#)<sup>1</sup>  
 To access the GPIB command for Curr F-QPCH Level (Rel to Pilot) (displayed in the Cell Parameters table) see [“CALL:STATUS:QPCHannel\[:LEVEL\]:RTPilot\[:SELECTed\]?”](#)
  - RL Traffic to Pilot Gain. See [“CALL\[:CELL\]:RLGain\[:TTPilot\]” on page 378](#).<sup>1</sup>

1. Only displayed when System Type is IS-2000.

## Setting Cell Power and AWGN Power Levels

The test set's base station emulator provides control over the RF power levels described below. To access the cell power parameter using the test set's front panel, see [“How Do I Change Call Parameters?” on page 686](#).

To access the AWGN power parameter and display the Generated Power Level Information table:

1. Press the **CALL SETUP** key.
2. Press the **More** key on the left side of the display.
3. Press the **Generator Info (F3)** key.
4. Press the **AWGN Power (F3)** key.

### RF Power Parameters

The following RF Power parameters are displayed in the Generated Power Level Information table.

**Table 9. RF Power Levels**

Parameter	Current Level	Desired Level
Cell Power	“CALL:STATus:CELL:POWer:AMPLitude[:SElected]?”	“CALL[:CELL]:POWer:AMPLitude[:SElected]”
AWGN Power	“CALL:AWGNoise:POWer:AMPLitude[:SElected]”	“CALL:SYNC:LEVel[:SElected]”
Total RF Power <sup>a</sup>	“CALL:TOTal:POWer[:AMPLitude][:SElected]?”	“CALL:PAGing:LEVel[:SElected]”

a. Total RF Power can only be queried. It is the sum of the Cell Power and AWGN power levels.

## Setting Access Parameters

The test set's base station emulator provides control over the cellular system access parameters described below.

To set access parameters using the test set's front panel, see [“B. Set access parameters.” on page 688](#).

### IS-2000/IS-95 Access Parameters

The following cell parameters are displayed under the Cell Parameters menu when the following two conditions exist:

1. The Operating Mode field is set to Active Cell (see [“Active Cell Operating Mode”](#)) or Cell Off, and
2. IS-2000 or IS-95 is selected in the System Type field.
  - Nominal Power. [“CALL\[:CELL\]:APARAmeter:POWer:NOMinal\[:OFFset\]”](#)
  - Nominal Power Extended. [“CALL\[:CELL\]:APARAmeter:POWer:NOMinal:EXTended”](#) <sup>1</sup>
  - Initial Power. [“CALL\[:CELL\]:APARAmeter:POWer:INITial”](#)
  - Power Step. [“CALL\[:CELL\]:APARAmeter:POWer:STEP\[:LEVel\]”](#)
  - Number of Steps. [“CALL\[:CELL\]:APARAmeter:POWer:STEP:COUNT”](#)
  - Maximum Request Sequence. [“CALL\[:CELL\]:APARAmeter:SEQuence:RESPOuse\[:MAXimum\]”](#)
  - Maximum Response Sequence. [“CALL\[:CELL\]:APARAmeter:SEQuence:REQuest\[:MAXimum\]”](#)
  - Preamble Size. [“CALL\[:CELL\]:APARAmeter:PREAmble”](#)

1. Displayed when System Type is IS-95. Grey when System Type is IS-2000.



---

## Setting Registration Parameters

The test set's base station emulator provides control over the registration parameters described below.

To set registration parameters using the test set's front panel, see [“C. Set registration parameters.” on page 689](#).

### IS-2000/IS-95 Registration Parameters

The following cell parameters are displayed under the Cell Parameters menu when the following two conditions exist:

1. The Operating Mode field is set to Active Cell (see [“Active Cell Operating Mode”](#)) or Cell Off, and
  2. IS-2000 or IS-95 is selected in the System Type field.
- Timer Based Registration State. [“CALL:REGister:TIMer:STAtE”](#)
  - Registration Period. [“CALL:REGister:TIMer:RPERiod”](#)

## Configuring the F-FCH/Traffic Channel (Forward Fundamental/Traffic Channel)

The F-FCH (traffic) channel parameters are configured using the following call processing subsystem functions and commands:

[“CALL:FCHannel” on page 309](#)

### Settable F-FCH Parameters

- F-FCH level.
- F-FCH state.
- F-FCH Walsh code (call status state must be idle).
- F-FCH data rate (see [“CALL:TRAFfic:DRATe”](#) )

### GPIO Examples:

#### Setting the F-FCH level and state (complex command)

```
OUTPUT 714;"CALL:FCH -10 DB"
```

would set the F-FCH state to on and set the F-FCH power level to –10 dBm. See [“CALL:FCHannel\[:SLEVel\]\[:SELEcted\]”](#) .

#### Setting the F-FCH Walsh code

```
OUTPUT 714;"CALL:FCH:WALSH CODE14"
```

would set the F-FCH Walsh code to 14. See [“CALL:FCHannel:WALSh”](#) .

### Operating Considerations

The terms traffic and fundamental channels are used interchangeably within IS-2000. Commands that control parameters for either code channel control both. For instance, setting the data rate using the [“CALL:TRAFfic”](#) commands set the data rate for the fundamental channel.

When changing F-FCH Walsh codes, the call processing state must be idle.

If the data rate is changed while an echo service option is selected, the data rate value will be stored for use when a loopback service option is selected.

Parameters can be queried from the test set regardless of the state of the test set.

### Related Topics

[“CALL:FCHannel”](#)

[“CALL:TRAFfic”](#)

[“How Do I Change Code Channel Levels?”](#)

## Configuring the F-Paging Channel (F-PCH)

The F-Paging channel parameters are configured using the following call processing subsystem functions and commands:

[“CALL:PAGing” on page 356](#)

### Settable F-Paging Parameters

- F-Paging level.
- F-Paging state.
- F-Paging data rate.
- F-Paging IMSI type.
- F-Paging IMSI MCC (mobile country code).
- F-Paging IMSI MNC (mobile network code).
- F-Paging IMSI MSIN (mobile station identification number).
- F-Paging maximum slot cycle index.

### Fixed F-Paging Parameters

The F-Paging Walsh code is fixed at code channel number 1.

### GPIB Examples:

#### Setting the F-Paging state and level (complex command)

```
OUTPUT 714;"CALL:PAG -12 DB"
```

would set the F-Paging state on and set the level to –12 dB. See [“CALL:PAGing\[:SLEVel\]\[:SElected\]”](#).

#### Setting the F-Paging data rate

```
OUTPUT 714;"CALL:PAGING:DRATE HALF"
```

would set the F-Paging data rate to half-rate. See [“CALL:PAGing:DRATE”](#).

### Operating Considerations

The Walsh code number for the F-Paging channel is fixed at code 1 from the 64 Walsh code set.

The test set will page the mobile station in slotted mode unless the mobile station has registered as non-slotted. The test set will use the lesser value of [“CALL:MS:REPorted:SCINdex?”](#), a mobile station reported parameter, or [“CALL:PAGing:SCINdex\[:MAXimum\]”](#), a settable paging channel parameter, for slotted mode paging.

The test set will automatically update the F-Paging mobile station phone number whenever a new MIN1 and MIN2 or MSIN are received from the mobile station.

Configuring the F-Paging Channel (F-PCH)

## **Related Topics**

[“CALL:PAGing”](#)

[“Configuring the F-QPCH \(Forward Quick Paging Channel\)”](#)

[“How Do I Change Code Channel Levels?”](#)

## Configuring the F-SCH (Forward Supplemental Channel)

The F-SCH channel parameters are configured using the following call processing subsystem functions and commands:

[“CALL:SCHannel” on page 379](#)

### Settable F-SCH Parameters

See [“Front panel access to the Forward Supplemental Channel data rate”](#).

- F-SCH level.
- F-SCH state.
- Service option.
- F-SCH data rate
- F-SCH encoder type (convolutional or turbo)
- F-SCH data source (also applied to the reverse supplemental channel).
- F-SCH fixed pattern

### Fixed F-SCH Parameters

The F-SCH Walsh code is fixed at code channel number 3.

When the F-SCH data rate is below 19.2 kbps, the forward channel convolutional encoder will be selected regardless of the encoder setting.

### GPB Examples:

#### Setting the F-SCH level and state (complex command)

```
OUTPUT 714;"CALL:SCH -15.6 DB"
```

would set the F-SCH state on and set the level to –15.6 dB. See [“CALL:SCHannel\[:FORWard\]\[:SLEVel\]\[:SElected\]”](#).

#### Setting the F-SCH data rate

```
OUTPUT 714;"CALL:SCH:DRATE:RCONFIG3 BPS38400"
```

would set the F-SCH data rate for forward channel radio configuration 3 to 38400. See [“CALL:SCHannel\[:FORWard\]:DRATE:RCONfig3”](#).

Configuring the F-SCH (Forward Supplemental Channel)

## **Operating Considerations**

The F-SCH is available only when the operating mode is set to IS-2000 or IS-2000 Test.

## **Related Topics**

[“CALL:SCHannel”](#)

[“How Do I Change Code Channel Levels?”](#)

---

## Configuring the F-Pilot Channel (Forward PICH)

The F-Pilot parameters are configured using the following call processing subsystem functions and commands.

### Settable F-Pilot Parameters

- F-Pilot level.
- F-Pilot state.
- PN Offset

### Fixed F-Pilot Parameters

- F-Pilot Walsh code is fixed at code channel number 0.

### GPIB Examples:

#### Setting the F-Pilot Level

```
OUTPUT 714;"CALL:PIL -8 DB"
```

would set the F-Pilot state on and set the level to –8 dB. See [“CALL:PILOT\[:SLEVel\]\[:SElected\]”](#) .

#### Querying the F-Pilot Level

```
OUTPUT 714;"CALL:PIL:LEVel?"
```

would query the last setting that was made to the F-Pilot level. See [“CALL:PILOT:LEVel\[:SElected\]”](#) .

### Operating Considerations

The Walsh code number for the F-Pilot channel is fixed at code 0 of the Walsh 64 set.

### Related Topics

[“CALL:PIlot”](#)

[“How Do I Change Code Channel Levels?”](#)

---

## Configuring the F-OCNS (Forward Orthogonal Channel Noise Simulator)

The F-OCNS channel parameters are configured using the following call processing subsystem functions and commands.

### Settable F-OCNS Parameters

- F-OCNS Walsh code.

### Fixed F-OCNS Parameters

- F-OCNS level (calculated value based on summation of all other code channels)
- OCNS\_CCI\_SUPPORTED is fixed at 0.
- NUM\_OCNS is fixed at 1.
- F-OCNS Walsh code is fixed at code channel number 80.

### GPIB Examples:

#### Setting F-OCNS Walsh code

```
OUTPUT 714;"CALL:OCNSOURCE:WALSH CODE5"
```

would set the F-OCNS Walsh code to 10. See ["CALL:OCNSource:WALSh\[:SElected\]"](#) .

#### Querying F-OCNS level

```
OUTPUT 714;"CALL:OCNSOURCE:LEVEL?"
```

would query the last F-OCNS calculation. See ["CALL:OCNSource:LEVel\[:SElected\]?"](#) .

### Operating Considerations

F-OCNS is a read-only value.

The F-OCNS value is calculated to provide a summing value that results in a total code channel value equalling 100% of cell power. If the current desired code channel levels do not allow for a valid OCNS calculation an error message will be displayed.

### Related Topics

["CALL:OCNSource"](#)

["How Do I Change Code Channel Levels?"](#)



## Configuring the F-QPCH (Forward Quick Paging Channel)

The quick paging channel parameters are configured using the following call processing subsystem functions and commands.

### Settable F-QPCH Parameters

- QPCH Level (relative to pilot channel power).
- QPCH Level (relative to cell power).
- QPCH State (on or off).
- QPCH Indicator bits (applied only when the test set's operating mode is IS-2000 test mode. (See [“CALL:D2KTest:QPCHannel:INDicator\[:PAGing\]”](#) .)

### Fixed F-QPCH Parameters

- QPCH\_RATE is fixed at 9600 bps
- QPCH\_CCI\_SUPPORTED is fixed at 0.
- NUM\_QPCH is fixed at 1.
- The F-QPCH Walsh code is fixed at code channel number 80.

### GPIB Examples:

#### Setting F-QPCH Level (relative to pilot channel level)

```
OUTPUT 714;"CALL:QPCH:RTP -3 DB"
```

would set the F-QPCH state on and set the level, relative to the forward channel pilot, to –3 dB. See [“CALL:QPCHannel\[:SLEVel\]:RTPilot\[:SElected\]”](#) .

#### Querying F-QPCH Level (relative to cell power level)

```
OUTPUT 714;"CALL:QPCH:LEVel?"
```

would query the last F-QPCH relative to cell power level setting. See [“CALL:QPCHannel:LEVel\[:RTCell\]\[:SElected\]?”](#) .

## Operating Considerations

The Walsh code number for the QPCH channel is fixed at code 80 from the Walsh 128 set.

When the QPCH state is on, the test set will send out slotted quick pages (single mode) regardless of the mobile station's ability to support quick paging. If the mobile station does not support quick paging, the presence of quick pages should not affect its ability to respond to normal pages.

The QPCH relative to pilot level is sent to the mobile station in the Extended System Parameters message to allow mobile stations to adjust their expected receiver power level.

When the state of the QPCH is on (see [“CALL:QPCHannel:STATE”](#) ), OCNS (see [“Configuring the F-OCNS \(Forward Orthogonal Channel Noise Simulator\)”](#) ) is calculated based on the channel power when QPCH is present in the signal. When the QPCH state is off, the output power is not fully calibrated.

## Related Topics

[“CALL:QPCHannel”](#)

[“How Do I Change Code Channel Levels?”](#)

---

## Configuring the F-Sync Channel (Forward SYNC)

The F-Sync channel parameters are configured using the following call processing subsystem functions and commands.

### Settable F-Sync Parameters

- F-Sync level.
- F-Sync state.

### Fixed F-Sync Parameters

The F-Sync Walsh code is fixed at code channel number 32.

### GPIB Examples:

#### Setting the F-Sync state and level (complex command)

```
OUTPUT 714;"CALL:SYNC -16 DB"
```

would set the F-Sync state on and set the level to -16 dB. See [“CALL:SYNC\[:SLEVel\]\[:SElected\]”](#) .

#### Querying the F-Sync Level

```
OUTPUT 714;"CALL:SYNC:LEVel?"
```

would query the last setting that was made to the F-PICH level. See [“CALL:PILOT:LEVel\[:SElected\]”](#) .

### Related Topics

[“CALL:SYNC”](#)

[“How Do I Change Code Channel Levels?”](#)

## Configuring the R-SCH (Reverse Supplemental Channel)

The R-SCH channel parameters are configured using the following call processing subsystem functions and commands:

[“CALL:SCHannel” on page 379](#)

### Settable R-SCH Parameters

- Service Option. (See [“Front panel access to the Reverse Supplemental Channel data rate”](#) .)
- Data Rate. (See [“Front panel access to the Reverse Supplemental Channel data rate”](#) .)
- Encoder Type. (See [“Front panel access to the Reverse Supplemental Channel data rate”](#) .)
- Data Source and Fixed (data source) Pattern. (See [“Front panel access to the Forward and Reverse Supplemental Channel data sources”](#) .)

### GPIO Examples:

#### Setting the R-SCH data rate

```
OUTPUT 714;"CALL:SCH:REVERSE:DRATE:RCONFIG3 BPS38400"
```

would set the R-SCH data rate for reverse channel radio configuration 3 to 38400. See [“CALL:SCHannel:REVerse:DRATE:RCONfig3”](#) .

### Operating Considerations

The R-SCH is available only when the operating mode is set to IS-2000 with one of the following Radio Config choices:.

- (Fwd3, Rvs3)
- (Fwd4, Rvs3)

---

**IMPORTANT** PRBS data is required if you are making any of the code domain measurements on the reverse supplemental channel

---

The F-SCH Parameters menu allows for the selection of PRBS or Fixed Pattern in the Data Source field. This choice is also applied to the reverse supplemental channel . To correctly detect reverse supplemental code channel parameters, PRBS is the only data source supported. If PRBS data is not selected, the code domain power results (see [“Waveform Quality/Code Domain Measurement Description”](#) ) will not display distinct code channels with the expected spreading factors.

### Related Topics

[“CALL:SCHannel”](#)

---

## Setting the Paging IMSI

The test set's base station emulator provides control over the paging IMSI parameters described below. To set paging IMSI parameters using the test set's front panel, see ["Repeat Calls" on page 685](#).

### Paging IMSI Parameters

The following paging IMSI parameters are displayed under the Paging IMSI Setup menu when the following two conditions exist:

1. The Operating Mode field is set to Active Cell (see ["Active Cell Operating Mode"](#)) or Cell Off, and
  2. IS-2000 or IS-95 is selected in the System Type field.
- Paging Type. ["CALL:PAGing:IMSI:TYPE"](#)
  - Paging MSIN. ["CALL:PAGing:IMSI:MSIN"](#)
  - Paging MCC. ["CALL:PAGing:IMSI:MCC"](#)
  - Paging MNC. ["CALL:PAGing:IMSI:MNC"](#)

---

## Setting Handoff Parameters

The test set's base station emulator provides control over the handoff parameters described below. To set handoff parameters using the test set's front panel, see [“How Do I Perform a Handoff?” on page 691](#).

### Handoff Parameters

The following paging handoff parameters are displayed under the Handoff Setup menu when the following two conditions exist:

1. The Operating Mode field is set to Active Cell (see [“Active Cell Operating Mode”](#)) or Cell Off, and
  2. IS-2000 or IS-95 is selected in the System Type field.
- Handoff System Type. [“CALL:PAGing:IMSI:TYPE”](#)
  - Handoff Cell Band. [“CALL:PAGing:IMSI:MSIN”](#)
  - Handoff Channel. [“CALL:PAGing:IMSI:MCC”](#)
  - MS TX Level. [“CALL:PAGing:IMSI:MNC”](#)
  - SAT Color Code [“CALL:PAGing:IMSI:MNC”](#)
  - Analog Voice Channel. [“CALL:PAGing:IMSI:MNC”](#)
  - Analog Voice Channel. [“CALL:PAGing:IMSI:MNC”](#)

## **Establishing an Active Link with the Mobile Station**

### **Making a Mobile Station Originated Call**

See [“Mobile Station initiated connection”](#)

### **Making a Base Station Originated Call**

See [“Making a Base Station Originated Call”](#)

### **Related Topics**

[“How Do I Set Up a Call?”](#) on page 683

---

## Performing a Handoff

### Making a Handoff

See [“How Do I Perform a Handoff?”](#)

### Related Topics

[“Setting Handoff Parameters” on page 118](#)

[“How Do I Perform a Handoff?” on page 691](#)

[“How Do I Change Cell Information?” on page 687](#)



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## Performing a Registration

### Registering a Mobile Station

Registering a mobile station can be performed when the mobile station has found service with the test set's base station emulator in active cell operating mode. When a registration has completed, the Mobile Station Information window will display the registration data received from the mobile station.

The test set has the capability to initiate two types of registrations. One is a zone-based registration, also referred to as "forced" registration. The other type is timer-based registrations, a feature which provides a setting for the time interval between registrations. See ["CALL:REGister" on page 374](#).

Many mobile stations will also perform a registration upon being powered on. This usually only takes a few seconds, and is currently not controlled by the test set.

### Related Topics

["How Do I Change Cell Information?" on page 687](#)

## Performing a Registration

# Programming

# Programming: Getting Started Guide for cdma2000 Mobile Test

---

## Introduction

The Getting Started Guide is organized around the basic set of tasks a control program normally performs when testing a mobile station in a manufacturing environment.

## 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 E1962B cdma2000 mobile test application installed.

The variable `Test_set` used in the steps of the Getting Started Guide refers to the test set's GPIB address.

## How to use this Getting Started Guide

The most effective way to use this Getting Started Guide is with the Programming Flowchart 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:

[www.agilent.com/find/8960support/](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 , also known as RMB or Rocky Mountain BASIC, and C programming languages. 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:CPOW:TIM:STAT ON"
```

- The syntax below is used to assign a value to the parameter.

```
OUTPUT Test_set;"SET:CPOW:TIM:TIME 10 S"
```

- Both of the above actions can be accomplished with one syntax command:

```
OUTPUT Test_set;"SET:CPOW: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:CPOW:TIM 10 S"
```

This is the format that will be used throughout this guide.

## Step 1: Set up the Test Set

This step explains how to:

- “Fully Preset the Test Set”
- “Declare Variables, Set Path Losses and Timeouts, Activate GPIB Debugger”

### Fully Preset the Test Set

To set up the test set, you begin by sending the \*RST and \*OPC commands along with a global timeout. The \*RST command is used to perform a full reset of the test set, returning it to a known state. The \*OPC command clears all status registers to assure accurate query functionality.

```

31      CLEAR SCREEN
40      Testset=714
41  !
42  !*****
43  ! PRESET TEST SET
44  !*****
45  !
46      OUTPUT Testset;"*RST"
47      OUTPUT Testset;"*OPC?"
48      ENTER Testset;Opc$
49      !

```

## Step 1: Set up the Test Set

### Declare Variables, Set Path Losses and Timeouts, Activate GPIB Debugger

Another useful tool that you may want to turn on at this time is the system command GPIB debugger. When on, error messages appear on the test set's screen when the test set receives an unknown GPIB command.

```
51 !*****
52 ! VARIABLE DECLARATIONS FOR CALL SET UP - MOBILE SPECIFIC
53 !*****
54 !
61     Systype$="DIGITAL2000"
70     Band$="USCELLULAR"
80     Channel=384
81     Handoffchan=500
90     Sid=1
100    Nid=1
110    Radio_config$="F3R3"
120    Service_opt$="S02"
142 !
143 !*****
144 ! SET PATH LOSS VALUES
145 !*****
146 !
150     Loss_frequency$=" 851 MHZ,896 MHZ"
160     Expected_loss$=" -2,-2"
170     OUTPUT Testset;"SYST:CORR:FREQ";Loss_frequency$
180     OUTPUT Testset;"SYST:CORR";Expected_loss$
200 !
210 !*****
211 ! SET UP TIMEOUTS
212 !*****
213 !
214     ON TIMEOUT 7,20 CALL Timeout
220 !
233 !*****
234 ! TURN ON 8960 GP-IB DEBUGGER - COMMENT OUT WHEN DONE DEBUGGING PROGRAM
235 !*****
236 !
237     OUTPUT Testset;"SYST:COMM:GPIB:DEB:STAT ON"
```



## Step 2: Configure Test Set and Mobile Station Parameters

### Configure the Test Set Parameters

The programming example below illustrates several cell configurations along with specifications to the setup of the generated code channels.

```

252  !*****
253  ! SET UP CALL PARAMETERS
254  !*****
255  !
256      DISP "Setting up Test Set Parameters"
257      OUTPUT Testset;"DISP:MODE FAST"
258      OUTPUT Testset;"CALL:OPER:MODE CALL"
270      OUTPUT Testset;"CALL:SYST `;Systype$"
280      OUTPUT Testset;"CALL:BAND `;Band$"
290      OUTPUT Testset;"CALL:CHAN `;Channel"
300      OUTPUT Testset;"CALL:POW -50"
310      OUTPUT Testset;"CALL:SID `;Sid"
320      OUTPUT Testset;"CALL:NID `;Nid"
330      OUTPUT Testset;"CALL:RCON `;Radio_config$"
340      OUTPUT Testset;"CALL:SOPT `;Service_opt$"
350      OUTPUT Testset;"CALL:PROT PREV6"
360      OUTPUT Testset;"CALL:PAG:DRAT FULL"
370      OUTPUT Testset;"CALL:PIL -7"
380      OUTPUT Testset;"CALL:SYNC -16"
390      OUTPUT Testset;"CALL:PAG -12"
400      OUTPUT Testset;"CALL:FCH -15.6"
401      !
402      OUTPUT Testset;"SYST:SYNC?"
403      ENTER Testset;Syst_sync$
420

```

### Configure the Mobile Station Parameters

There are no mobile station parameters configured in this program example.

---

## Step 3: Set Measurement Parameters

This step gives an example of how you can configure measurement parameters. For more information about measurement parameters, refer to the *Introduction to Programming the Agilent Technologies 8960, Step 3*.

```
10 OUTPUT Testset;"SET:CONT OFF"  
20 OUTPUT Testset;"SET:WQU:TIM:STIM 10"  
30 OUTPUT Testset;"SET:DAP:TIM:STIM 5"  
40 OUTPUT Testset;"SET:CPOW:TIM:STIM 5"  
50 !
```

## Step 4: Make a connection

### Select an example

The mobile station (MS) must be connected with the test set in order to perform measurements. The origination of this connection can either be the mobile station or the test set. Use one of two sections of code below to fit your testing need.

### Test Set initiated connection

The following code queries the test set for the connection status and then stops the program if a connection is not established. A hard handoff is also performed.

```

513 !*****
514 ! CONNECT CALL
515 !*****
516 !
526 !***Page the mobile station***
527 !
528     DISP "Paging mobile station..."
529     OUTPUT Testset;"CALL:ORIG"
530     OUTPUT Testset;"CALL:CONN:STAT?"
531     ENTER Testset;Call_connected
532     IF NOT Call_connected THEN
540         PRINT "Call attempt failed"
550         STOP
560     ELSE
570         PRINT "Call connected"
571         PRINT
580     END IF
581     Tot_timer=TIMEDATE

```

### Mobile Station initiated connection

In this case, there is no need to use atimeout or arm the state change detector. These two functions occur automatically when attempting a test set originated call.

```

1 PRINT "Originate a call on the mobile now."
10 OUTPUT Testset;"CALL:CONN:ARM" !Arm the Call-State-Change Detector
20 OUTPUT Testset;"CALL:CONN?" !Query state
30 ENTER Testset;Callstate
40 IF NOT Callstae THEN
41     PRINT "Call Attempt Failed"
42     STOP
43 ELSE
44     PRINT "Call Connected"
45 END IF
50 !

```

## Step 5: INITiate and FETCh Measurements

### INITiate measurements and FETCh results

Below are examples of performing tests and retrieving their results. Refer to the *Introduction to 8960 Programming* for more information about the different measurement results that are available and how to fetch them.

```

785  !*****
786  ! WAVEFORM QUALITY TEST*
787  !*****
788  !
789  !***Specify test parameters for waveform quality test***
790  !
791      Ior=-75
792      Pilot=-7
793      Traffic=-7.4
794  !
796  !***Set up measurement parameters***
797  !
799      OUTPUT Testset;"CALL:POW ";Ior
800      OUTPUT Testset;"CALL:PIL ";Pilot
810      OUTPUT Testset;"CALL:FCH ";Traffic
820  !
830  !***Obtain and display measurement results***
831  !
840      OUTPUT Testset;"SYST:SYNC?"
841      ENTER Testset;Syst_sync$
842      !
843      Wqu_timer=TIMEDATE
850      OUTPUT Testset;"INIT:WQU"
860      LOOP
870          OUTPUT Testset;"INIT:DONE?"
880          ENTER Testset;Meas_done$
890      EXIT IF Meas_done$="WQU"
900      END LOOP
910      OUTPUT Testset;"FETC:WQU"
920      ENTER Testset;Integrity,Rho,Freq_error,Time_error,Carr_feed,Phase_err,Mag_err,Evm
921  !
930  !***Print Waveform Quality Results
931  !
932      DISP "Waveform Quality Test complete"
933      PRINT "Waveform Quality Test Results:"
934  !
935      PRINT "      Integrity indicator = ",Integrity
940      Print_results("Rho = ",Rho,"")
941      Print_results("Frequency error = ",Freq_error,"Hz")
942      Print_results("Time error = ",Time_error,"us")
943      Print_results("Carrier feedthrough = ",Carr_feed,"dBc")
950      Print_results("Phase error = ",Phase_err,"deg")
951      Print_results("Magnitude error = ",Mag_err,"%")

```

```

952     Print_results("Error vector magnitude = ",Evm,"%")
953     PRINT
980     Wqu_time=PROUND(TIMEDATE-Wqu_timer,-2)
981     Print_results("WQU Test Time= ",Wqu_time,"secs")
982     PRINT
983     !
984     !
985 !*****
986 ! FRAME ERROR RATE TEST*
987 !*****
988 !
989 !***Set up measurement parameters***
990 !
991     Ior=-70
993     Pilot=-7
994     Traffic=-15.6
995 !
997     OUTPUT Testset;"CALL:POW ";Ior
998     OUTPUT Testset;"CALL:PIL ";Pilot
999     OUTPUT Testset;"CALL:FCH ";Traffic
1000 !
1001 !***Obtain measurement results***
1002     Fer_timer=TIMEDATE
1003     OUTPUT Testset;"INIT:CFER"
1004     DISP "Measuring FER"
1005     LOOP
1006         OUTPUT Testset;"INIT:DONE?"
1007         ENTER Testset;Meas_done$
1008         EXIT IF Meas_done$="CFER"
1009     END LOOP
1010     OUTPUT Testset;"FETC:CFER?"
1012     ENTER Testset;Integrity,Fer_test,Fer_ratio,Fer_count,Frames_tested
1013 !
1014     SELECT Fer_test
1015     CASE 0
1016         Pass_fail$="PASSED"
1017     CASE 1
1018         Pass_fail$="FAILED"
1019     CASE 2
1020         Pass_fail$="MAXIMUM NUMBER OF FRAMES WERE TESTED"
1021     CASE 3
1022         Pass_fail$="UNKNOWN"
1023     END SELECT
1024     !
1025 !***Print FER Results***
1026 !
1027     DISP "FER Test complete"
1028     !
1029     PRINT "Frame Error Rate Test Results:"
1030 !
1031     PRINT "     Integrity indicator =     ",Integrity
1032     Print_res_str("FER Test Results",Pass_fail$)
1033     Print_results("FER Ratio",Fer_ratio,"%")

```

## Step 5: INITiate and FETCh Measurements

```
1034     Print_results("FER Errors Count",Fer_count,"frames")
1035     Print_results("Frames Tested",Frames_tested,"")
1036     PRINT
1037     !
1039     Fer_time=PROUND(TIMEDATE-Fer_timer,-2)
1040     Print_results("FER Test Time= ",Fer_time,"secs")
1041     PRINT
1042     !
1043 !*****
1044 !Max Power Test*
1045 !*****
1046 !
1047 !***Set up measurement parameters***
1048 !
1049     Ior=-70
1051     Pilot=-7
1052     Traffic=-7.4
1053 !
1055     OUTPUT Testset;"CALL:POW ";Ior
1056     OUTPUT Testset;"CALL:PIL ";Pilot
1057     OUTPUT Testset;"CALL:FCH ";Traffic
1058     OUTPUT Testset;"CALL:CLPC:REV:MODE UP"
1060 !***Obtain measurement results***
1061 !
1062     WAIT 1!Settling time
1063     Max_timer=TIMEDATE
1064     OUTPUT Testset;"INIT:DAP"
1065     LOOP
1066         OUTPUT Testset;"INIT:DONE?"
1067         ENTER Testset;Meas_done$
1068         EXIT IF Meas_done$="DAP"
1069     END LOOP
1070     OUTPUT Testset;"FETC:DAP?"
1071     ENTER Testset;Integrity,Avg_power_dbm
1072     !
1073     Avg_power_dbw=Avg_power_dbm-30
1074 !
1075 !***Display measurements if the mobile station did not drop the call***
1076 !
1077     OUTPUT Testset;"CALL:STAT?"
1078     ENTER Testset;Call_status$
1079     IF Call_status$<>"CONN" THEN
1080         PRINT "Mobile station dropped call, invalid results"
1081     END IF
1082     !
1083 !***Print Max Power Test Results
1084 !
1085     DISP "Max Power Test complete"
1086     PRINT "Max Power Test Results:"
1087 !
1088 !
1089     PRINT "     Integrity indicator = ",Integrity
1090     Print_results("Maximum Power dBm:",Avg_power_dbm,"dBm")
```

```

1091     Print_results("Maximum Power dBW:",Avg_power_dbw,"dBW")
1095     PRINT
1097     !
1098     Max_time=PROUND(TIMEDATE-Max_timer,-2)
1099     Print_results("Max Power Test Time= ",Max_time,"secs")
1100     PRINT
1101     !
1102     !***Post Test clean up***
1103     !
1104     OUTPUT Testset;"CALL:CLPC:REV:MODE ACT"
1105     !
1106     !*****
1107     !Minimum Power Test*
1108     !*****
1109     !
1110     !
1111     !***Set up measurement parameters***
1112     !
1113     Ior=-25
1114     Pilot=-7
1115     Traffic=-7.4
1116     !
1118     OUTPUT Testset;"CALL:CONN:DROP:TIM 0"
1119     OUTPUT Testset;"CALL:POW ";Ior
1120     OUTPUT Testset;"CALL:PIL ";Pilot
1121     OUTPUT Testset;"CALL:FCH ";Traffic
1122     OUTPUT Testset;"CALL:CLPC:REV:MODE DOWN"
1124     !
1125     !***Obtain measurement results***
1126     !
1127     WAIT 1
1128     Min_timer=TIMEDATE
1129     OUTPUT Testset;"INIT:CPOW"
1130     LOOP
1131         OUTPUT Testset;"INIT:DONE?"
1132         ENTER Testset;Meas_done$
1133         EXIT IF Meas_done$="CPOW"
1134     END LOOP
1135     !
1136     OUTPUT Testset;"FETC:CPOW?"
1137     ENTER Testset;Integrity,Channel_power
1138     !
1139     !
1140     IF Integrity=6 THEN
1142         OUTPUT Testset;"RFAN:CONT:POW:AUTO OFF"
1143         OUTPUT Testset;"RFAN:MAN:POW ";INT(Channel_power);" DBM"
1145     END IF
1146     EXIT IF Meas_done$="CPOW" AND Integrity=0
1147     END LOOP
1148     !
1149     !
1150     ***Print measurement results
1151     !

```

## Step 5: INITiate and FETCh Measurements

```
1152     DISP "Min Power Test complete"
1153     PRINT "Min Power Test Results:"
1154     PRINT "     Integrity indicator =     ", Integrity
1155     Print_results("Maximum Power dBm:", Channel_power, "dBm/1.23 MHz")
1156     PRINT
1157     Min_time=PROUND(TIMEDATE-Min_timer,-2)
1158     Print_results("Min Power Test Time= ", Min_time, "secs")
1159     PRINT
1160     !
1161     !***Post Minimum Power Test Cleanup***
1162     !
1163     OUTPUT Testset;"CALL:CLPC:REV:MODE ACT"
1164     OUTPUT Testset;"CALL:CONN:DROP:TIM:STAT 1"
1165     OUTPUT Testset;"RFAN:CONT:POW:AUTO ON"
```



## Step 6: Reconfigure Test Set and Mobile Station Connection Parameters

### Reconfigure the Test Set

The example below contains the code appropriate for handing the call off to a different channel.

```

600    !***Set up a hard handoff***
610        OUTPUT Testset;"CALL:SET:BAND USC"
620        OUTPUT Testset;"CALL:SET:CHAN ";Handoffchan
630    !
640    !***Perform a hard handoff***
650        OUTPUT Testset;"CALL:HAND"
660        OUTPUT Testset;"CALL:CONN:STAT?"
670        ENTER Testset;Call_connected
680        IF NOT Call_connected THEN
690            DISP "Handoff attempt failed, program stopped"
700            STOP
710        ELSE
720            PRINT "Handoff completed"
730            DISP "Call connected"
731            PRINT
740        END IF
784    !

```

### Reconfigure the MS

There are no MS parameters reconfigured in this program example.

## Step 7: End the Connection

### End the Connection

The CALL:END command ends the mobile connection. Subroutines which are called in the program are also shown.

```

1172 !*****
1173 ! End of All Testing
1174 !*****
1175 !
1176 !***End Call and Return to default call processing settings***
1177 !
1178     OUTPUT Testset;"CALL:POW:DIG2000 -50"
1179     OUTPUT Testset;"CALL:END"
1180     OUTPUT Testset;"CALL:STAT:STAT?"
1181     ENTER Testset;Call_status$
1182     PRINT "Call Ended, Status:",Call_status$
1183     Tot_time=PROUND(TIMEDATE-Tot_timer,-2)
1184     PRINT
1185     Print_results("Test Time= ",Tot_time,"secs")
1186     PRINT
1187     !
1188     !***End Program***
1189 End_program: ! Secondary timeout handler
1190             DISP "End of Program"
1191             END
1192 !
1193 !*****
1194 ! Subroutine Section*
1195 !*****
1196 !
1197 Timeout: SUB Timeout
1198             PRINT "Program timed out"
1199             CLEAR 7
1200             CLEAR 714
1201             STOP
1202     SUBEND
1203 Print_results: SUB Print_results(Meas_name$,Res1,Units$)
1204 !
1205             PRINT USING "5X,20A,5X,M4D.2D,1X,5A";Meas_name$;Res1;Units$
1206 !
1404     SUBEND
1414 Print_res_str: SUB Print_res_str(String_name$,Results$)
1415 !
1424             PRINT USING "5X,20A,5X,20A";String_name$;Results$
1425 !
1444     SUBEND

```

---

## Control Program Example

### HP BASIC

For your convenience we have combined the programming examples shown in the Getting Started Guide into one program. This program, written using HP BASIC, is a fully functional cdma2000 control program. You can use this as a starting point for developing your own program. Click on the link below to view this program.

- [Getting Started Guide Control Program Example](#)

---

## 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.

### Step 3: Set Measurement Parameters

**Measurement Trigger Parameters** There are three measurement trigger parameters. They control the arming of a measurement, the source of the trigger, and the trigger's delay.

- The trigger arm parameter determines whether the test set makes one measurement and then stops (single), or automatically re-arms upon completion of one measurement and repeats the process (continuous). The recommended setting when writing a control program is single (CONTInuous OFF).
- The trigger source parameter selects the source of the measurement trigger signal. The recommended Trigger Source setting when writing a control program is AUTO.

---

**NOTE** Trigger source is always IMMEDIATE for analog measurements and cannot be changed by the user.

---

- The trigger delay parameter controls the delay between the trigger event (the point in time at which the trigger signal is received) and the start of sampling. Negative values indicate that the sampling should occur prior to the trigger event.

---

**NOTE** Trigger delay is not applicable to analog measurements.

---

### Measurement Trigger Parameters

Parameter	Command Syntax
Trigger Arm	SETup:<meas-mnemonic>:CONTInuous <ON 1 OFF 0>
Trigger Source	SETup:<meas-mnemonic>:TRIGger:SOURce <AUTO IMMEDIATE PROTOCOL RISE>
Trigger Delay	SETup:<meas-mnemonic>:TRIGger:DELay <numeric value>[<suffix>]

---

**NOTE** You can set the Trigger Arm for all measurements to single (CONTInuous OFF) using the following command syntax:

```
SETup[:ALL]:CONTInuous:OFF
```

---

#### Example 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.

### Step 3: Set Measurement Parameters

#### Example 9. Program Example Setting Both Generic and Measurement-Specific Measurement Parameters

```
! Set trigger arm to single for all measurements:
!
OUTPUT Test_set;"SET:CONT:OFF"
!
! *****
! Configure Modulation Accuracy Measurement:
!
OUTPUT Test_set;"SET:MACC:COUN 5"
! Example of using a complex command to set both the
! measurement count state and number at the same time.
!
OUTPUT Test_set;"SET:MACC:TRIG:SOUR AUTO"
! Sets trigger source to auto.
!
OUTPUT Test_set;"SET:MACC:TIM 15"
! Sets timeout state to ON and time to 15 sec.
!
OUTPUT Test_set;"SET:MACC:EVM10:STAT ON"
! Turns the EVM10 State ON
!
! *****
! Configure Digital TX Power Measurement:
!
OUTPUT Test_set;"SET:DTXP:COUN 5"
OUTPUT Test_set;"SET:DTXP:TRIG:SOUR AUTO"
OUTPUT Test_set;"SET:DTXP:TIM 5"
!
! *****
! Configure Frequency Stability Measurement:
!
OUTPUT Test_set;"SET:FST:COUN 3"
OUTPUT Test_set;"SET:FST:TIM 10"
!
! *****
! Configure Analog TX Power Measurement:
!
OUTPUT Test_set;"SET:ATXP:COUN 5"
OUTPUT Test_set;"SET:ATXP:TRIG:SOUR AUTO"
OUTPUT Test_set;"SET:ATXP:TIM 15"
```

## Step 4: Make Connection

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

### Description

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

#### Contents

- [“Establish a Call in Active Cell Mode”](#)
- [“Make a Test Mode Connection”](#)

### Establish a Call in Active Cell Mode

To test a mobile station in active cell mode, you must first establish a call between the test set and mobile station. Your control program must issue the commands necessary to initiate the call connection process, either to the test set (for a base station originated call) or to the mobile station (for a mobile station originated call). Your control program must then determine when the call has successfully connected so that it can proceed to testing. The control program must also determine if the call has not been successfully connected so that it can take appropriate action.

**Call States** At any instant in time a call can be in a stable state such as the idle or the connected state, or in one of many transitory states such as alerting, handoff, registering, releasing or paging. These are referred to as transitory states because the amount of time which the call can spend in any of these states is limited by the mobile station's protocol. The call is not allowed to stay in a transitory state indefinitely.

---

**NOTE** If repeat paging or repeat registration are on, it is possible for the call process to stay in one of the transitory states beyond the time specified by the mobile station's protocol timers.

---

**Call Connection Synchronization Commands** The test set has a set of commands designed specifically for call connection and release synchronization.

#### Call Connection Synchronization Commands

Synchronization Command	Command Syntax
Call-Connected-State Query	CALL:CONNected[:STATe]?
Call-State-Change Detector Arm	CALL:CONNected:ARM[:IMMediate]
Call-State-Change Detector Timeout	CALL:CONNected:TIMEout

#### Step 4: Make Connection

- **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.

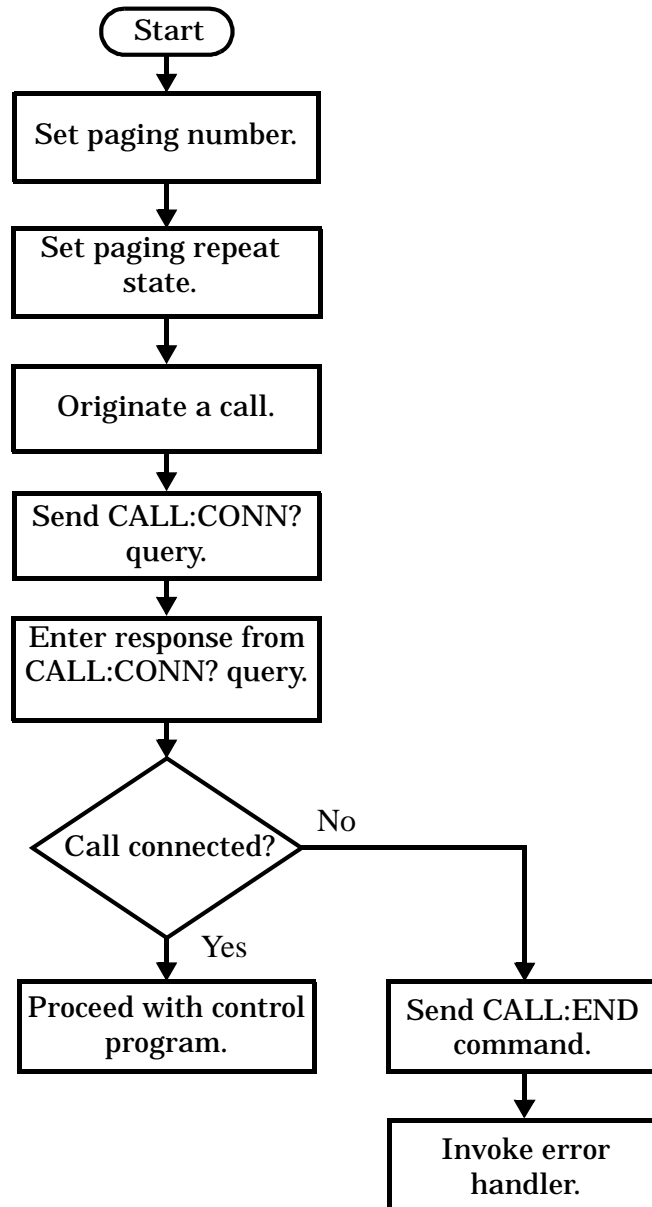
- **Call-State-Change Detector Timeout Command**

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 14. Process for Making a Base Station Originated Call**

---

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

---

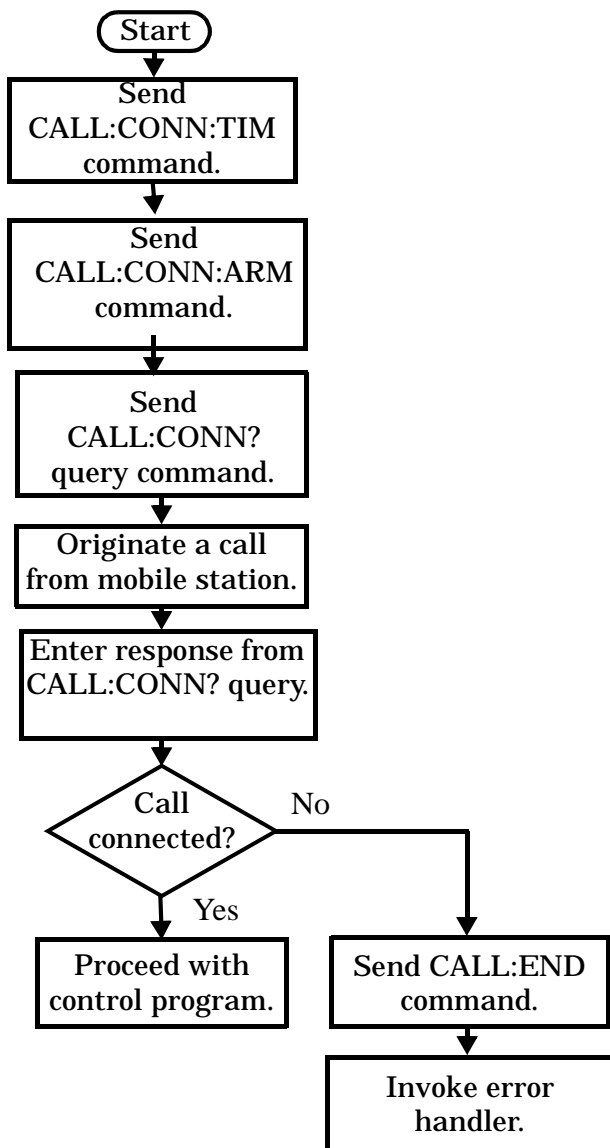
#### Step 4: Make Connection

### Example 10. Programming Example

```
OUTPUT Test_set;"CALL:PAG:PNUM `0000574016`"! Set paging number
OUTPUT Test_set;"CALL:PAG:REP ON" ! Set paging repeat state
OUTPUT Test_set;"CALL:ORIG" ! Start a base station originated call
OUTPUT Test_set;"CALL:CONN?" ! Hanging GPIB query
ENTER Test_set;Call_connected      ! Program hangs here until
                                   ! origination passes or fails

IF NOT Call_connected THEN
    OUTPUT Test_set;"CALL:END"
! <put error handler here>
END IF
! Call is connected so proceed with control program
```

### Process for Making a Mobile Station Originated Call Figure 15. 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.

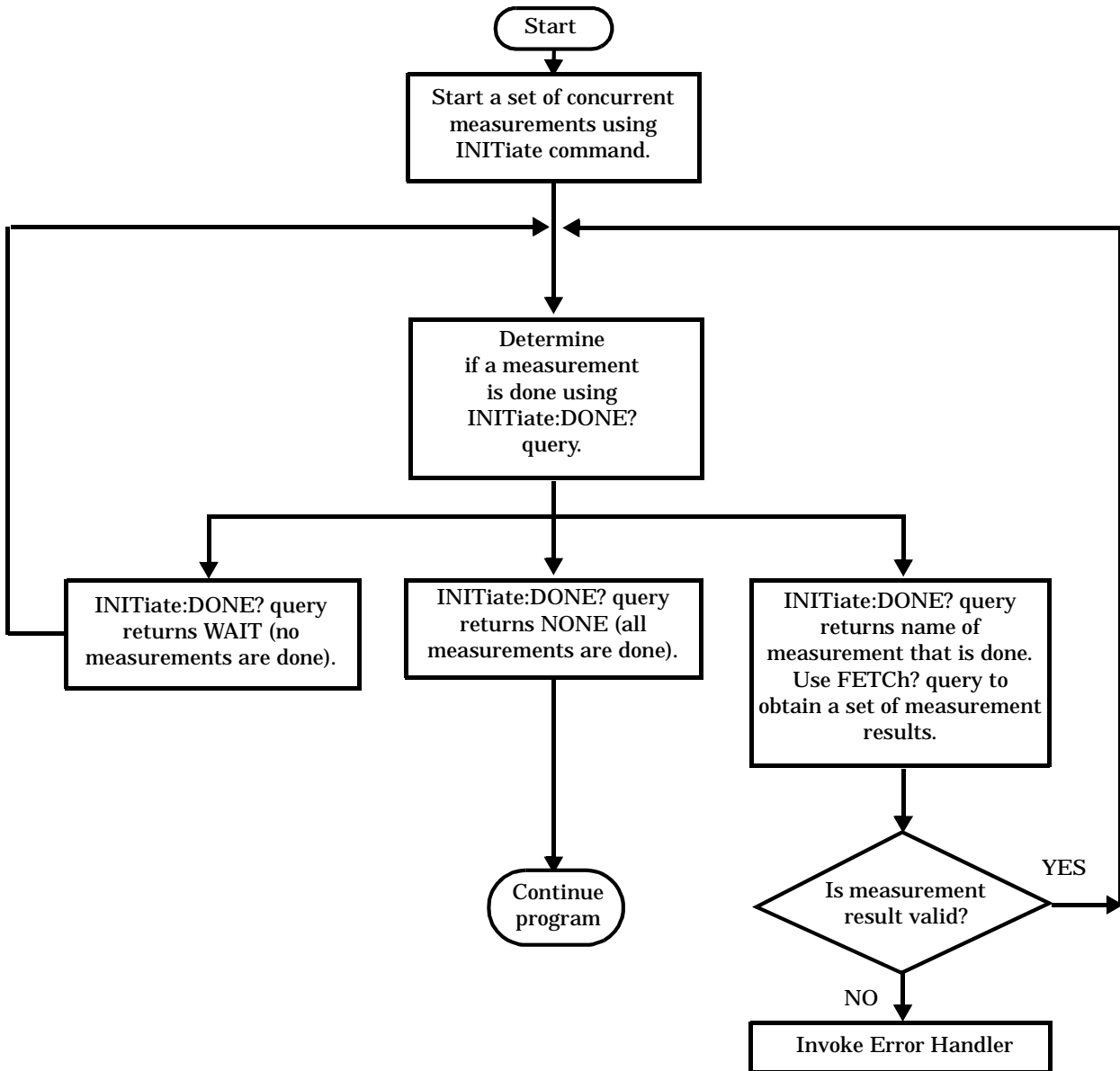
The test set has multiple signal paths and processors, which means you can make measurements concurrently and reduce test time. Making concurrent measurements involves starting a group of measurements, fetching the results of the measurements as they complete, and then verifying that the results are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

### **Contents**

- [“Concurrent Measurement Process”](#)
- [“Alternative Measurement Process”](#)

**Concurrent Measurement Process**

**Figure 16. Process for Making Concurrent Measurements**



## Step 5: INITiate and FETCh 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 10. 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

```

## Step 5: INITiate and FETCh Measurements

**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.

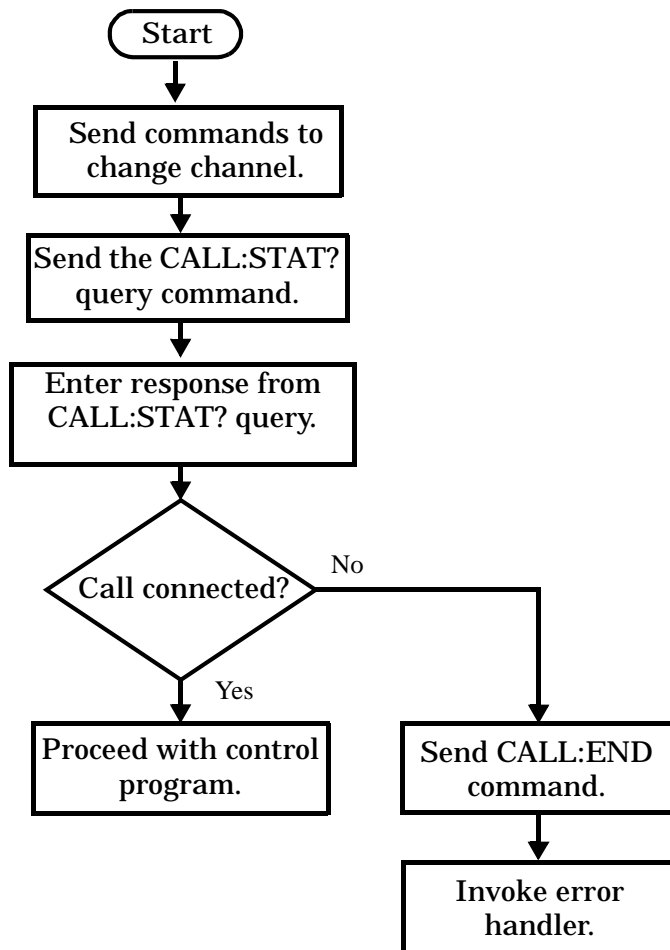
The CALL:STATus? query immediately returns the state of the call at the time the query is received.

#### 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 17. 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”](#)

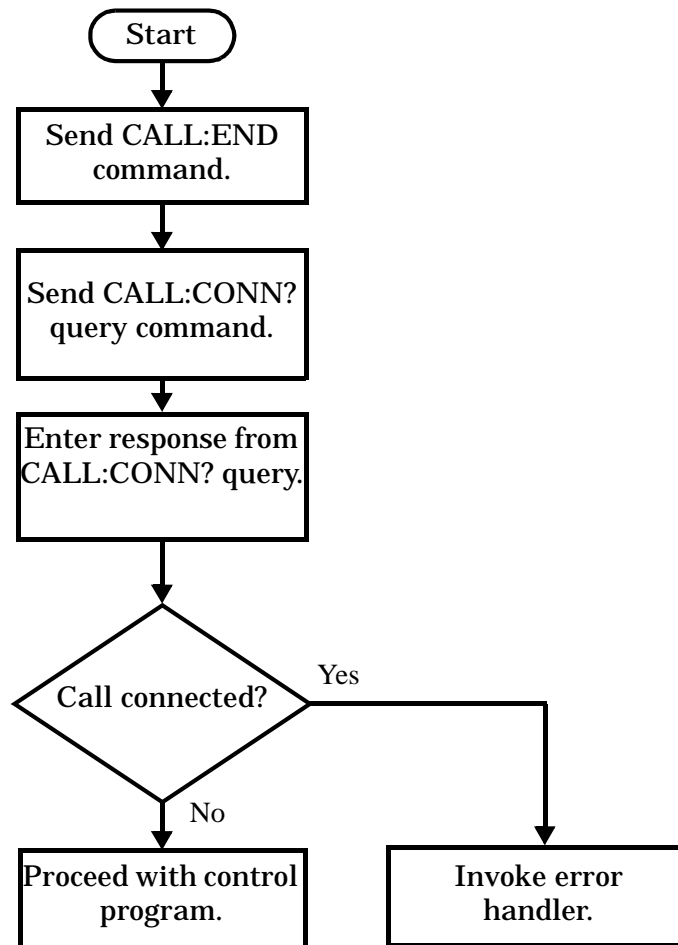
### Release the Call in Active Cell Mode

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

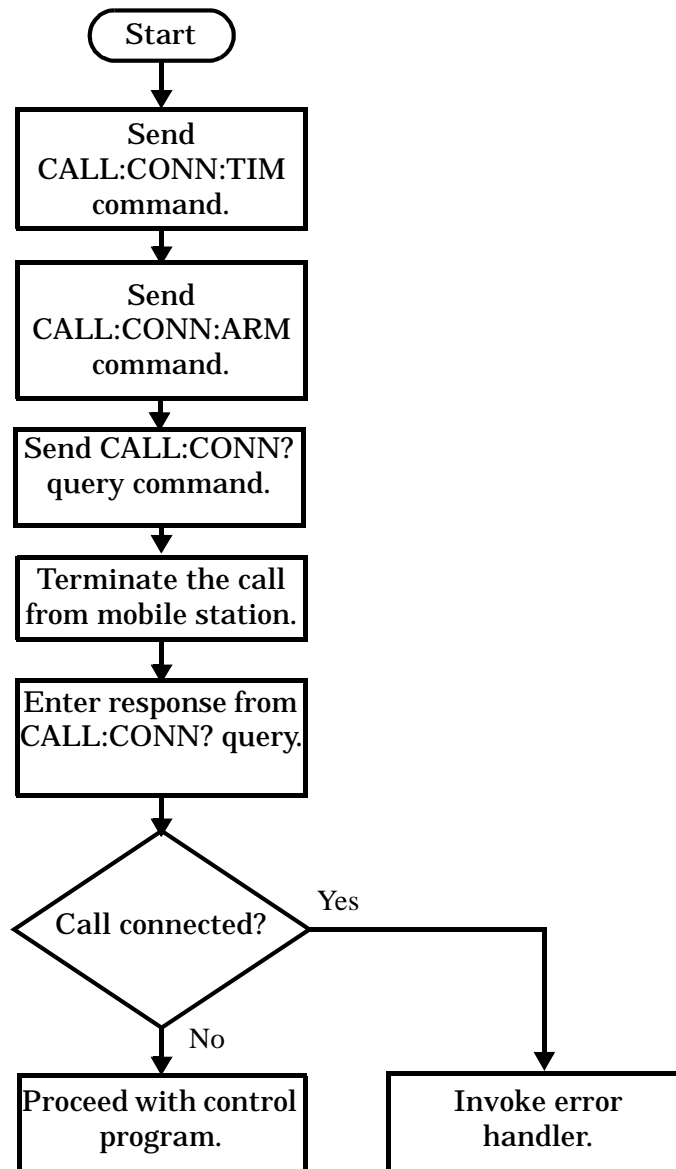
**Figure 18. Process for Releasing an Active Call from the Base Station**



### 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 19. 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.

## Step 7: End Connection

### Example 16. Programming Example

```
OUTPUT Test_set;"CALL:CONN:TIM 5" !Set timeout time to 5 seconds.
OUTPUT Test_set;"CALL:CONN:ARM"   !Arm the change detector.
DISP "Terminate the call from the mobile station."
OUTPUT Test_set;"CALL:CONN?" !Initiate call connected state query.
ENTER Test_set;Call_connected     !Program hangs here until state
                                   !change or timer expires.
IF Call_connected THEN            !Check if disconnection successful.
! <put error handler here>
END IF
! Call is disconnected so proceed with control program
```

### End the Mobile Station Test Mode Transmission

In test mode, you must send the necessary test mode commands to end the mobile station transmission.

### Partially Preset the Test Set

At this point, it is good practice to partially preset the test set by sending the SYST:PRES3 command. This command stops all measurement and call processing processes, but does not reset all values to default.

## Programming an Access Probe Power Measurement

This section provides an example of how to make access probe power measurements via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

The basic procedure to measure access probe power remotely is:

1. Turn the access probe power measurement timeout timer on using the `"SETup:CAPPower:TIMEout:STATE"` command. If the timeout timer is not turned on, and an access probe is not received, the measurement will hang on the `FETCh?` command indefinitely.
2. Turn on the mobile station and perform a registration (wait for power-on or send `"CALL:REGister[:IMMediate]"` ).
3. Turn off timer-based registrations (see `"CALL:REGister:TIMER:STATE"` ).
4. Set the trigger arm state to single (see `"SETup:CAPPower:CONTInuous"` ).

---

**NOTE** Continuous trigger arming can also be used to measure access probe power sequences, however single triggering allows program counters to synchronize with mobile station transmitted power steps. This is important if you want measurement triggering to stop when an access probe sequence has completed.

---

5. Turn call limit on (see `"CALL:CONNected:LIMit[:STATE]"` on page 303).
6. Set up initial power, step size, number of steps, and the maximum number of access probes for requests and responses ( see `"CALL[:CELL]:APARAmeter"` on page 288).
7. Perform a page or mobile station originated call.
8. Initiate the access probe power measurement using the `"INITiate:<measurement mnemonic>[:ON]"` on page 496. The `<measurement mnemonic>` for access probe power measurements is CAPP.
9. Use the `"FETCh:CAPPower[:ALL]?"` command to obtain the measurement results.
10. Repeat steps 8 and 9 for each power step.

---

**IMPORTANT** Return the trigger arm to single state before attempting a different measurement or attempting any call processing procedure.

---

### Programming Example

```

10 ! RE-SAVE "c:\roadhog\programs\acc_probe.txt"
20 !This program measures an access probe sequence
30 !See "Access Probe Output Power" in TIA/EIA-98-D for specifications and standards
40 CLEAR SCREEN
50 A=714
60 !***Specify call parameters***
70 Systype$="DIGITAL2000"
80 Band$="USCELLULAR"

```

## Programming an Access Probe Power Measurement

```
90 Channel=384
100 Sid=1
110 Nid=1
120 Radio_config$="F3R3"
130 Service_opt$="SO2"
140 !
150 !***Specify test parameters***
160 Loss_frequency$="836 MHZ,881 MHZ"
170 Expected_loss$="-2,-2"
180 Acc_prb_steps=3
190 Acc_prb_size=4
200 Ior=-90
210 Pilot=-7
220 Paging_ch=-12
230 Sync=-16
240 Traffic=-15.5
250 !
260 ON TIMEOUT 7,20 CALL Timeout
270 OUTPUT A;"SETUP:CAPP:TIMEOUT:STIME 3 S"
280 OUTPUT A;"SYST:COMM:GPIB:DEB:STAT ON"
290 !
300 !***Set up path loss***
310 OUTPUT A;"SYSTEM:CORRECTION:SFREQUENCY ";Loss_frequency$
320 OUTPUT A;"SYSTEM:CORRECTION:SGAIN ";Expected_loss$
330 !
340 !***Set up access/paging parameters***
350 OUTPUT A;"CALL:OPER:MODE CALL"
360 OUTPUT A;"CALL:BAND ";Band$
370 OUTPUT A;"CALL:CHAN ";Channel
380 OUTPUT A;"CALL:POW -50"
390 OUTPUT A;"CALL:SID ";Sid
400 OUTPUT A;"CALL:NID ";Nid
410 OUTPUT A;"CALL:RCON ";Radio_config$
420 OUTPUT A;"CALL:SOPTION ";Service_opt$
430 OUTPUT A;"CALL:PROT PREV6"
440 OUTPUT A;"CALL:PAG ";Paging_ch
450 OUTPUT A;"CALL:PAG:DRAT FULL"
460 OUTPUT A;"CALL:PIL ";Pilot
470 OUTPUT A;"CALL:SYNC ";Sync
480 OUTPUT A;"CALL:FCH ";Traffic
490 !
500 PRINT "Turn on mobile station...press continue when it has found service and registered"
510 PAUSE
520 CLEAR SCREEN
530 OUTPUT A;"CALL:REGISTER:TIMER:STATE OFF"
540 WAIT 2
550 !
560 !***Set up measurement parameters***
570 OUTPUT A;"SETUP:CAPP:CONTINUOUS OFF"
580 OUTPUT A;"CALL:CONNECTED:LIMIT 1"
590 OUTPUT A;"CALL:APARAMETER:POWER:STEP ";Acc_prb_size
600 OUTPUT A;"CALL:APARAMETER:POWER:STEP:COUNT ";Acc_prb_steps
610 !
```



```

620  !***Page the mobile station***
630  DISP "Paging mobile station..."
640  OUTPUT A;"CALL:ORIG"
650  DISP "Measuring Access probe power"
660  !
670  !***Obtain measurement results***
680  FOR I=1 TO Acc_prb_steps
690      OUTPUT A;"INITIATE:CAPP"
750      OUTPUT A;"FETCH:CAPP?"
760      ENTER A;Acp_integ,Acp
770      PRINT "Access probe ";I;" integrity = ";Acp_integ
780      PRINT "Access probe ";I;" power = ";Acp
790  NEXT I
800  DISP "Access probe measurements completed"
810  DISP "Test complete"
811  !
820  !***Return to default call processing states***
830  OUTPUT A;"CALL:END"
840  OUTPUT A;"CALL:CONNECTED:LIMIT 0"
850  OUTPUT A;"CALL:REGISTER:TIMER:STATE ON"
860  END
861  !
870  Timeout: SUB Timeout
880      PRINT "Program timed out"
890      CLEAR 7
900      CLEAR 714
910  SUBEND

```

## Returned Values

This query returns an integrity indicator followed by a channel power measurement result (if results are available).

## Related Topics

[“Access Probe Power Measurement Description” on page 37](#)

[“Access Probe Power Troubleshooting” on page 724](#)

[“Control Program Example” on page 1](#)

## Programming an Analog Transmit Power Measurement

This section provides an example of how to make Analog Transmit Power (ATXP) measurements via GPIB.

The following program example assumes that the mobile's antenna output is connected to the RF IN/OUT connector, and the mobile is on an analog voice channel (AVC). For information on configuring the test set to get the mobile on an active call, see [“Establishing an Active Link with the Mobile Station” on page 119](#).

The basic procedure to test Analog Transmit Power is as follows:

1. Enter the expected power level.
2. Define the Analog Transmit Power Setup parameters as desired for triggering, measurement timeout, and multi-measurements.
3. Use the INITiate:ATXPower command to trigger the measurement.
4. Use the FETCh? command to obtain the measurement results.

### Programming Example

```

10 !Set the expected power level.
20 OUTPUT 714;"SETup:ATXPower:CONTinuous Off" !Set the analog transmit power
30                                     !measurement to single trigger mode.
40 OUTPUT 714;"SETup:ATXPower:TIMEout 1S" !Set a timeout value of 1 second
50                                     !in case the measurement cannot be made.
60 OUTPUT 714;"SETup:ATXPower:COUNT:NUMBer 5" !Set multi-measurements to 5.
70 OUTPUT 714;"INITiate:ATXPower" !Start the measurement.
80 OUTPUT 714;"FETCh:ATXPower?" !Query the returned integrity indicator and the
90                                     !Average analog transmit power measurement.
100 ENTER 714;Integrity,Atxpower !Enter the returned values into variables.
110 IF Integrity=0 THEN !See if the integrity value = 0 (valid measurement).
120 ELSE
130 PRINT "Measurement problem; check for signal level over/under range condition."
140 END IF
150 END

```

### Returned Values

The measurements returned by this program are:

- `Integrity` returns the measurement integrity indicator (see [“Integrity Indicator” on page 244](#)); 0 means a successful measurement with no errors.
- `Atxpower` returns the Average Analog Transmit Power measurement value in dBm.

## Related Topics

[“Analog Transmit Power Measurement Description” on page 39](#)

[“Analog Transmit Power Troubleshooting” on page 725](#)

[“INITiate” on page 494](#)

[“SETup:ATXPower” on page 534](#)

[“Amplitude Offset” on page 85](#)

[“FETCh:ATXPower” on page 444](#)

[“Control Program Example” on page 1](#)

[“Receiver Control” on page 213](#)

## 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” on page 40](#).

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 244](#).
- `Audio_level` returns the analog audio level in volts rms.

## Related Topics

[“Audio Analyzer Measurement Description” on page 40](#)

[“AFANalyzer Troubleshooting” on page 726](#)

[“INITiate” on page 494](#)

[“SETup:AFANalyzer” on page 525](#)

[“FETCh:AFANalyzer” on page 435](#)

[“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” on page 40](#).

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 measurement.
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 44](#)

[“AFANalyzer Troubleshooting” on page 726](#)

[“Audio Analyzer Measurement Description” on page 40](#)

[“INITiate” on page 494](#)

[“SETup:AFANalyzer” on page 525](#)

[“FETCh:AFANalyzer” on page 435](#)

[“Control Program Example” on page 1](#)

## Programming a Channel Power Measurement

This section provides an example of how to make a channel power measurement via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

For information on configuring the test set for a call, see [“Step 4: Make a connection” on page 131](#).

The basic procedure to measure digital average power is as follows:

1. Make a call.
2. Configure the digital average power setup parameters using the [“SETUp:CPOWer”](#) subsystem.
3. Use open and/or closed loop power control to set the mobile station power level.
4. Start the channel power measurement using the [“INITiate”](#) subsystem.
5. Use the [“FETCh:CPOWer”](#) command to obtain the measurement results.

### Programming Example

```

10 RE-SAVE "c:\roadhog\programs\chan_pwr.txt"
20 !This program measures Channel Power
30 !Refer to "Minimum Controlled Output Power" in TIA/EIA-98-D for standards and
specifications
40 CLEAR SCREEN
50 A=714
60 !
70 !***Specify call parameters***
80 Systype$="DIGITAL2000" !Cell system type
90 Band$="USCELLULAR" !Cell band
100 Channel=384 !RF channel
110 Sid=1 !System Identification
120 Nid=1 !Network Identification
130 Radio_config$="F3R3" !Radio configuration
140 Service_opt$="S02" !Service Option
150 !
160 !***Specify test parameters***
170 Loss_frequency$="836 MHZ,881 MHZ" !Reverse channel, forward channel frequencies for
amplitude offset (path loss)
180 Expected_loss$="-3,-3" !Path loss at reverse channel, forward channel frequencies
190 Ior=-25 !Cell Power
200 Pilot=-7 !Pilot channel power level
210 Traffic=-7.4 !Traffic channel power level
220 !
230 ON TIMEOUT 7,20 CALL Timeout !Calls "Timeout" routine
240 OUTPUT A;"SYST:COMM:GPIB:DEB:STAT ON" !Turns GPIB debug state on
250 OUTPUT A;"SETUP:CPOWER:TIMEOUT:STIME 10 S" !Sets channel power timeout to 10 seconds
260 !
270 !***Set up path loss***
280 OUTPUT A;"SYSTEM:CORRECTION:SFREQUENCY ";Loss_frequency$ !Enters frequencies in
Amplitude Offset table

```

## Programming a Channel Power Measurement

```
290 OUTPUT A;"SYSTEM:CORRECTION:SGAIN ";Expected_loss$ !Enters loss values in
Amplitude Offset table
300 !
310 !***Set up call parameters***
320 OUTPUT A;"CALL:OPER:MODE CALL" !Sets Operating Mode to Active Cell
330 OUTPUT A;"CALL:SYSTEM ";Systype$ !Sets System Type
340 OUTPUT A;"CALL:BAND ";Band$ !Sets Cell band for selected System Type
350 OUTPUT A;"CALL:CHANNEL ";Channel !Sets Channel for selected System Type and Cell Band
360 OUTPUT A;"CALL:POW -50" ! Sets and turns on Cell Power for selected System Type
370 OUTPUT A;"CALL:SID ";Sid ! Sets System Identification
380 OUTPUT A;"CALL:NID ";Nid !Sets Network Identification
390 OUTPUT A;"CALL:RCON ";Radio_config$ !Sets Radio Configuration
400 OUTPUT A;"CALL:SOPTION ";Service_opt$ !Sets service option for the selected System Type
and Radio Configuration
410 OUTPUT A;"CALL:PROT PREV6" !Sets Protocol Revision for the selected System Type
420 OUTPUT A;"CALL:PAG:DRAT FULL" !Sets F-Paging data rate to full rate
430 OUTPUT A;"CALL:PIL -7" !Sets pilot to default
440 OUTPUT A;"CALL:SYNC -16" !Sets sync to default
450 OUTPUT A;"CALL:PAG -12" !Sets paging to default
460 OUTPUT A;"CALL:FCH -15.6"!Sets traffic to default
470 !
480 PRINT "Turn on mobile station...press continue when it has found service and registered"
490 PAUSE
500 CLEAR SCREEN
510 OUTPUT A;"CALL:REGISTER:TIMER:STATE OFF" !turns off timer-based registration
520 WAIT 2 !Waits 2 seconds for any timer-based registrations in progress to complete
530 !
540 !***Page the mobile station***
550 DISP "Paging mobile station..."
560 OUTPUT A;"CALL:ORIG" !Pages the mobile station
570 OUTPUT A;"CALL:CONNECTED:STATE?" !Queries for connected/idle state...hangs until state
change detector is disarmed
580 ENTER A;Call_connected
590 IF NOT Call_connected THEN
600 DISP "Call attempt failed"
610 STOP
620 ELSE
630 DISP "Call connected"
640 END IF
650 !
660 !***Set up measurement parameters***
670 OUTPUT A;"SETUP:CPOWER:CONTINUOUS OFF" !Sets trigger arm state to single
680 OUTPUT A;"CALL:CONNECTED:DROP:TIMER:STATE 0" !Turns off call drop timer
690 OUTPUT A;"CALL:POW ";Ior !Sets and turns on Cell Power for selected System Type
700 OUTPUT A;"CALL:CLPCONTROL:REVERSE:MODE DOWN" !Starts transmission of All Down (1) power
control bits
710 OUTPUT A;"CALL:PIL ";Pilot !Sets pilot channel level
720 OUTPUT A;"CALL:FCH ";Traffic !Sets traffic channel level
730 !
740 !***Obtain measurement results***
750 WAIT 1 !Settling time
760 OUTPUT A;"INITIATE:CPOWER" !Initiates a channel power measurement
820 OUTPUT A;"FETCh:CPOWER?"
```



```

830  ENTER A;Integrity,Channel_power
840  DISP "Test complete"
850  !
860  !***Display measurement results
870  PRINT "Integrity indicator = ";Integrity
880  PRINT "Minimum power = ";Channel_power;" dBm/1.23 MHz"
890  !
900  !***Return to default call processing states***
910  OUTPUT A;"CALL:CLPCONTROL:REVERSE:MODE ACTIVE" !Returns to active power control bits
920  OUTPUT A;"CALL:CONNECTED:DROP:TIMER:STATE 1" !Returns call drop timer to ON
930  OUTPUT A;"CALL:REGISTER:TIMER:STATE ON" !Returns timer-based registration to ON
940  OUTPUT A;"CALL:POW -50" ! Returns cell power to -50 dBm/1.23 MHz
950  !
960  DISP "Test complete"
970  OUTPUT A;"CALL:END" !Ends the call
980  END
990 Timeout: SUB Timeout      ! Global timeout handler
1000 PRINT "Program timed out"
1010 CLEAR 7
1020 CLEAR 714
1030 SUBEND

```

## Returned Values

This query returns an integrity indicator followed by a channel power measurement result (if results are available).

## Related Topics

[“Channel Power Measurement Description” on page 46](#)

[“Channel Power Measurement Troubleshooting” on page 728](#)

[“Control Program Example” on page 1](#)

[“CALibration Subsystem” on page 279](#)

## Programming a Code Channel Time/Phase Measurement

This section provides an example of how to make a code channel time/phase measurement via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

The basic procedure to measure waveform quality is:

1. Make a call (radio configuration three or above).
2. Configure the code channel time/phase measurement setup parameters using the "SETup:CCTPhase" subsystem.
3. Start the code channel time/phase measurement using the "INITiate" subsystem.
4. Use the "FETCh:CCTPhase" command to obtain pass/fail measurement results.

### Programming Example

```

10 RE-SAVE "c:\roadhog\programs\code_chan.txt"
20 !This program measures handoff waveform quality
30 !Refer to "Reverse Pilot Channel to Code Channel Time Tolerance" and
40 !"Reverse Pilot Channel to Code Channel Time Tolerance" for standards and specifications
50 CLEAR SCREEN
60 A=714
70 !***Specify call parameters***
80 Systype$="DIGITAL2000" !Cell System Type must be DIGITAL2000
90 Band$="USCELLULAR" !Cell band
100 Channel=384 !RF Channel
110 Sid=1 !System Identification
120 Nid=1 !Network Identification
130 Radio_config$="F3R3" !for code channel time/phase error, radio configuration must be
F3R3, F4R3, or F5R4
140 !
150 !***Specify test parameters***
160 Loss_frequency$="851 MHZ,896 MHZ" !Reverse channel, forward channel frequencies for
amplitude offset (path loss)
170 Expected_loss$="-2,-2" !Path loss at reverse channel, forward channel frequencies
180 !
190 ON TIMEOUT 7,20 CALL Timeout ! Calls "Timeout" routine
200 OUTPUT A;"SETUP:CCTPhase:TIMEOUT:STIME 10 S" !Sets waveform quality measurement timeout
to 10 seconds
210 OUTPUT A;"SYST:COMM:GPIB:DEB:STAT ON"!Turns debug state on
220 !
230 !***Set up call parameters***
240 OUTPUT A;"CALL:OPER:MODE CALL" !Sets Operating Mode to Active Cell
250 OUTPUT A;"CALL:SYSTEM ";Systype$ !Sets System Type
260 OUTPUT A;"CALL:BAND ";Band$ !Sets Cell Band for selected System Type
270 OUTPUT A;"CALL:CHAN ";Channel !Sets RF Channel for selected System Type and Cell Band
280 OUTPUT A;"CALL:POW -50" !Sets and turns on Cell Power
290 OUTPUT A;"CALL:SID ";Sid! Sets System Identification
300 OUTPUT A;"CALL:NID ";Nid! Sets Network Identification

```

```

310 OUTPUT A;"CALL:RCON ";Radio_config$!Sets Radio configuration
320 OUTPUT A;"CALL:PROT PREV6" !Sets Protocol Revision for the selected System Type
330 !
340 PRINT "Turn on mobile station...press continue when it has found service and registered"
350 PAUSE
360 CLEAR SCREEN
370 OUTPUT A;"CALL:REGISTER:TIMER:STATE OFF" !Turns off timer-based registrations
380 WAIT 2 ! Waits for any timer-based registrations to clear out
390 !
400 !***Page the mobile station***
410 DISP "Paging mobile station..."
430 OUTPUT A;"CALL:ORIG" !Pages the mobile station
440 OUTPUT A;"CALL:CONNECTED:STATE?" !Queries for connected/idle state...hangs until state
change detector is disarmed
450 ENTER A;Call_connected
460 IF NOT Call_connected THEN
470     DISP "Call attempt failed"
480     STOP
490 ELSE
500     DISP "Call connected"
510 END IF
520 !
530 !***Set up measurement parameters***
540 OUTPUT A;"SETUP:CCTPhase:CONTINUOUS OFF" !Sets trigger arm state to single
550 OUTPUT A;"SETUP:CCTPhase:TERROR:LIMit 10ns" !Sets the time error pass/fail limit to 10
ns
560 OUTPUT A;"SETUP:CCTPhase:PERror:LIMit 0.15rad" !Sets the phase error pass/fail limit to
0.15 radians
570 !
580 !***Obtain and display code channel time/phase pass/fail results***
590 WAIT 1
600 OUTPUT A;"INITIATE:CCTPhase" !Initiates a code channel time/phase error measurement
610 OUTPUT A;"FETCh:CCTPhase?" !Queries the test set for waveform quality measurement
results
620 ENTER A;Integrity,Time_err,Phase_err
630 PRINT "Integrity indicator = ";Integrity
640 IF Time_err THEN
650     PRINT "Time error test failed"
660 ELSE
670     PRINT "Time error test passed"
680 END IF
690 IF Phase_err THEN
700     PRINT "Phase error test failed"
710 ELSE
720     PRINT "Phase error test passed"
730 END IF
740 !
750 DISP "Test complete"
760 !
770 !***Return to idle call processing state***
780 OUTPUT A;"CALL:END"
790 END
800 Timeout: SUB Timeout      ! Global timeout handler (from Step 1)

```

## Programming a Code Channel Time/Phase Measurement

```
810     PRINT "Program timed out"  
820     CLEAR 7  
830     CLEAR 714  
840     SUBEND
```

### **Related Topics**

[“Code Channel Timing and Phase Measurement Description”](#)

[“Code Channel Time/Phase Error Measurement Troubleshooting”](#)

[“Control Program Example” on page 1](#)

## Programming a Digital Average Power Measurement

This section provides an example of how to make a digital average power measurement via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

For information on configuring the test set for a call, see [“Step 4: Make a connection” on page 131](#).

The basic procedure to measure digital average power is as follows:

1. Make a call.
2. Configure the digital average power setup parameters using the [“SETup:DAPower”](#) subsystem.
3. Start the digital average power measurement using the [“INITiate”](#) subsystem.
4. Use the [“FETCh:DAPower”](#) command to obtain the measurement results.

### Programming Example

```

10  RE-SAVE "c:\roadhog\programs\avg_pwr.txt"
20  !This program measures average power
30  !Refer to "Maximum RF Output Power" in TIA/EIA-98-D for standards and specifications
40  CLEAR SCREEN
50  A=714
60  !
70  !***Specify call parameters***
80  Systype$="DIGITAL2000" !Cell System Type
90  Band$="USCellular" !Cell band
100 Channel=384 !RF channel
110 Sid=1 !System Identification
120 Nid=1 !Network Identification
130 Radio_config$="F3R3" !Radio Configuration
140 Service_opt$="S02" !Service Option
150 !
160 !***Specify test parameters***
170 Loss_frequency$="836 MHZ,881 MHZ" !Reverse channel, forward channel frequencies for
amplitude offset (path loss)
180 Expected_loss$="-1,-1" !Path loss at reverse channel, forward channel frequencies
190 Ior=-104 !Cell Power
200 Pilot=-7 !Pilot channel power level
210 Traffic=-7.4 !Traffic channel power level
220 !
230 ON TIMEOUT 7,20 CALL Timeout ! Calls "Timeout" routine
240 OUTPUT A;"SETUP:DAPOWER:TIMEOUT:STIME 10 S" !***Sets average power measurement timeout
to 10 seconds***
250 OUTPUT A;"SYST:COMM:GPIB:DEB:STAT ON"!***Turn debug state on***
260 !
270 !***Set up path loss***
280 OUTPUT A;"SYSTEM:CORRECTION:SFREQUENCY ";Loss_frequency$ !Enters frequencies in
Amplitude Offset table
290 OUTPUT A;"SYSTEM:CORRECTION:SGAIN ";Expected_loss$ !Enters loss values in Amplitude
Offset table

```

## Programming a Digital Average Power Measurement

```
300  !
310  !***Set up call parameters***
320  OUTPUT A;"CALL:OPER:MODE CALL" !***Sets Operating Mode to Active Cell***
330  OUTPUT A;"CALL:SYSTEM ";Systype$ !Sets System Type
340  OUTPUT A;"CALL:BAND ";Band$ !Sets Cell band for selected System Type
350  OUTPUT A;"CALL:CHAN ";Channel !Sets Channel for selected System Type and Cell Band
360  OUTPUT A;"CALL:POW -50" ! Sets and turns on Cell Power for selected System Type
370  OUTPUT A;"CALL:SID ";Sid ! Sets System Identification
380  OUTPUT A;"CALL:NID ";Nid ! Sets Network Identification
390  OUTPUT A;"CALL:RCON ";Radio_config$ !Sets Radio configuration
400  OUTPUT A;"CALL:SOPTION ";Service_opt$ !Sets service option for the selected System Type
and Radio Configuration
410  OUTPUT A;"CALL:PROT:DIG2000 PREV6" ! Sets Protocol Revision for the selected System Type
420  OUTPUT A;"CALL:PAG:DRAT FULL" !Sets F-Paging data rate to full rate
430  OUTPUT A;"CALL:PIL -7" !Sets pilot to default
440  OUTPUT A;"CALL:SYNC -16" !Sets sync to default
450  OUTPUT A;"CALL:PAG -12" !Sets paging to default
460  OUTPUT A;"CALL:FCH -15.6"!Sets traffic to default
470  !
480  PRINT "Turn on mobile station...press continue when it has found service and registered"
490  PAUSE
500  CLEAR SCREEN
510  OUTPUT A;"CALL:REGISTER:TIMER:STATE OFF" !Turns timer-based registration off
520  WAIT 2 !Waits 2 seconds for timer-based registrations in progress to clear out
530  !
540  !***Page the mobile station***
550  DISP "Paging mobile station..."
560  OUTPUT A;"CALL:ORIG" !Pages the mobile station
570  OUTPUT A;"CALL:CONNECTED:STATE?" !Queries for connected/idle state...hangs until state
change detector is disarmed
580  ENTER A;Call_connected
590  IF NOT Call_connected THEN
600     DISP "Call attempt failed"
610     STOP
620  ELSE
630     DISP "Call connected"
640  END IF
650  !
660  !***Set up measurement parameters***
670  OUTPUT A;"SETUP:DAPOWER:CONTINUOUS OFF" !Sets trigger arm state to single
680  OUTPUT A;"CALL:POW ";Ior !Sets Cell Power for the selected System Type
690  OUTPUT A;"CALL:CLPCONTROL:REVERSE:MODE UP" !Starts transmission of All Up (0) power
control bits
700  OUTPUT A;"CALL:PIL ";Pilot !Sets pilot channel level
710  OUTPUT A;"CALL:FCH ";Traffic !Sets traffic channel level
720  !
730  !***Obtain measurement results***
740  WAIT 1 !Settling time
750  OUTPUT A;"INITIATE:DAPOWER" !Initiates an Average Power measurement
810  OUTPUT A;"FETCh:DAPOWER?"
820  ENTER A;Integrity,Avg_power_dbm
830  Avg_power_dbw=Avg_power_dbm-30
840  !
```

```

850  !***Display measurements if the mobile station did not drop the call***
860  OUTPUT A;"CALL:STATUS?"
870  ENTER A;Call_status$
880  IF Call_status$="CONN" THEN
890      PRINT "Integrity indicator = ";Integrity
900      PRINT "Maximum power = ";Avg_power_dbm;"dBm";", ";Avg_power_dbw;"dBW"
910  ELSE
920      PRINT "Mobile station dropped call, invalid results"
930  END IF
940  !
950  !***Return to default call processing states***
960  OUTPUT A;"CALL:CLPCONTROL:REVERSE:MODE ACTIVE" ! Returns to active power control bits
970  OUTPUT A;"CALL:POW:DIG2000 -50" ! Returns cell power to -50 dBm/1.23 MHz
980  !
990  DISP "Test complete"
1000 OUTPUT A;"CALL:END"
1010 END
1020 Timeout: SUB Timeout
1030     PRINT "Program timed out"
1040     CLEAR 7
1050     CLEAR 714
1060 SUBEND

```

## Returned Values

This program returns an integrity indicator followed by a digital average power measurement result (if results are available).

## Related Topics

[“Digital Average Power Measurement Description” on page 53](#)

[“Digital Average Power Troubleshooting” on page 730](#)

[“Control Program Example” on page 1](#)

## Programming a Distortion Measurement

This section provides an example of how to make distortion measurements via GPIB. It is patterned after TIA/EIA IS-137, Audio Harmonic Distortion (section 2.2.2.5).

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 40](#).

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  $\pm 8$  kHz peak deviation, and a 6000 Hz SAT at  $\pm 2$  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 expander.
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 244](#).
- `Distortion` returns the Distortion measurement value in percent (%).

## Related Topics

[“Audio Analyzer Measurement Description” on page 40](#)

[“AFANalyzer Troubleshooting” on page 726](#)

[“Distortion Measurement Description” on page 54](#)

[“INITiate” on page 494](#)

[“SETup:AFANalyzer” on page 525](#)

[“FETCh:AFANalyzer” on page 435](#)

[“Control Program Example” on page 1](#)

## Programming an FER (Frame Error Rate) Measurement

This section provides an example of how to make an FER measurement via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

For information on configuring the test set for a call, see [“Step 4: Make a connection” on page 131](#).

The basic procedure to test FER is as follows:

1. Make a SO (service option) 2, 9, or 55 call (see [“CALL\[:CELL\]:SOPTION” on page 398](#)).
2. Configure the FER Setup parameters using the [“SETup:CFERror”](#) subsystem.
3. Start the FER measurement using the [“INITiate”](#) subsystem.
4. Use the [“FETCh:CFERror”](#) command to obtain the measurement results.

### Programming Example

```

10  RE-SAVE "c:\roadhog\programs\fer.txt"
20  !This program measures frame error rate
30  !See "Receiver Sensitivity and Dynamic Range" in TIA/EIA-98-D for specifications and
standards
40  CLEAR SCREEN
50  A=714
60  !***Specify call parameters***
70  Systype$="DIGITAL2000" !Cell System Type
80  Band$="USCELLULAR" !Cell band
90  Channel=384 !RF Channel
100 Sid=1 !System Identification
110 Nid=1 !Network Identification
120 Radio_config$="F3R3" !Radio Configuration
130 Service_opt$="S02" !Service Option
140  !
150 !***Specify test parameters***
160 Loss_frequency$="836 MHZ,881 MHZ" !Reverse channel, forward channel frequencies for
amplitude offset (path loss)
170 Expected_loss$="-2,-2" !Path loss at reverse channel, forward channel frequencies
180 Ior=-104 !Cell power
190 Pilot=-7 !Pilot channel power level
200 Traffic=-15.5 !Traffic channel power level
210  !
220 ON TIMEOUT 7,20 CALL Timeout ! Calls "Timeout" routine
230 OUTPUT A;"SETUP:CFER:TIMEOUT:STIME 10 S" !Sets FER measurement timeout to 10 seconds
240 OUTPUT A;"SYST:COMM:GPIB:DEB:STAT ON" !Turns debug state on
250  !
260 !***Set up path loss***
270 OUTPUT A;"SYSTEM:CORRECTION:SFREQUENCY ";Loss_frequency$ !Enters frequencies in
Amplitude Offset table
280 OUTPUT A;"SYSTEM:CORRECTION:SGAIN ";Expected_loss$ !Enters loss values in Amplitude
Offset table
290  !

```

```

300  !***Set up call parameters***
310  OUTPUT A;"CALL:OPER:MODE CALL" !Sets Operating Mode to Active Cell
320  OUTPUT A;"CALL:SYSTEM ";Systype$ !Sets System Type
330  OUTPUT A;"CALL:BAND ";Band$ !Sets Cell Band for selected System Type
340  OUTPUT A;"CALL:CHAN ";Channel ! Sets Channel for selected System Type and Cell Band
350  OUTPUT A;"CALL:POWER -50" !Sets and turns on Cell Power for selected System Type
360  OUTPUT A;"CALL:SID ";Sid! Sets System Identification
370  OUTPUT A;"CALL:NID ";Nid! Sets Network Identification
380  OUTPUT A;"CALL:RCON ";Radio_config$ !Sets Radio Configuration
390  OUTPUT A;"CALL:SOPTION ";Service_opt$ !Sets service option for selected System Type and
Radio Configuration
400  OUTPUT A;"CALL:PROT PREV6" !Sets Protocol Revision for the selected System Type
410  OUTPUT A;"CALL:PAG:DRAT FULL" !Sets Paging channel data rate to full rate
420  OUTPUT A;"CALL:PIL -7" !Sets Pilot to default
430  OUTPUT A;"CALL:SYNC -16" !Sets Sync to default
440  OUTPUT A;"CALL:PAG -12" !Sets Paging to default
450  OUTPUT A;"CALL:FCH -15.6" !Sets Traffic to default
460  !
470  PRINT "Turn on mobile station...press continue when it has found service and registered"
480  PAUSE
490  CLEAR SCREEN
500  OUTPUT A;"CALL:REG:TIMER:STATE 0" !Turns timer-based registrations off
510  WAIT 2 !Waits 2 seconds for any timer-based registrations to clear out
520  !
530  !***Page the mobile station***
540  DISP "Paging mobile station..."
550  OUTPUT A;"CALL:ORIG" !Pages the mobile station
560  OUTPUT A;"CALL:CONNECTED:STATE?" !Queries for connected/idle state...hangs until state
change detector is disarmed
570  ENTER A;Call_connected
580  IF NOT Call_connected THEN
590     DISP "Call attempt failed"
600     STOP
610  ELSE
620     DISP "Call connected"
630  END IF
640  !
650  !***Set up measurement parameters***
660  OUTPUT A;"SETUP:CFERROR:CONTINUOUS OFF" !Sets trigger arm state to single
670  OUTPUT A;"CALL:POW ";Ior ! Sets Cell Power for the selected System Type
680  OUTPUT A;"CALL:PIL ";Pilot !Sets Pilot channel level
690  OUTPUT A;"CALL:FCH ";Traffic !Sets Traffic channel level
700  !
710  !***Obtain measurement results***
720  OUTPUT A;"INITIATE:CFERROR" !Initiates a frame error rate measurement
730  DISP "Measuring FER"
800  OUTPUT A;"FETCh:CFERROR?" !Queries the test set for frame error rate measurement results
805  DISP "FER test completed"
810  ENTER A;Integrity,Fer_test,Fer_ratio,Fer_count,Frames_tested
820  !
830  SELECT Fer_test !Assign pass/fail results to a string
840  CASE 0
850     Pass_fail$="PASSED"

```

## Programming an FER (Frame Error Rate) Measurement

```
860 CASE 1
870     Pass_fail$="FAILED"
880 CASE 2
890     Pass_fail$="MAXIMUM NUMBER OF FRAMES WERE TESTED"
900 CASE 3
910     Pass_fail$="UNKNOWN"
920 END SELECT
930 !
940 PRINT "Integrity indicator = ";Integrity
950 PRINT "FER test results = ";Pass_fail$,"FER ratio = ";Fer_ratio,"FER count = ";Fer_count
960 PRINT "Number of frames tested = ";Frames_tested
970 DISP "Test complete"
980 !***Return to default call processing states***
990 OUTPUT A;"CALL:POW:DIG2000 -50" ! Returns cell power to -50 dBm/1.23 MHz
1000 OUTPUT A;"CALL:REG:TIMER:STATE ON" !Returns timer-based registration to ON
1010 !
1020 OUTPUT A;"CALL:END" !Ends the call
1030 END
1040 Timeout: SUB Timeout      ! Global timeout handler
1050     PRINT "Program timed out"
1060     CLEAR 7
1070     CLEAR 714
1080 SUBEND
```

## Related Topics

[“Programming a TDSO Frame Error Rate Measurement”](#)

[“Frame Error Rate Measurement Description” on page 55](#)

[“Frame Error Rate Measurement Troubleshooting” on page 731](#)

[“Control Program Example” on page 1](#)

## Programming a Frequency Modulation (FM) Measurement

This section provides an example of how to make analog FM deviation and distortion measurements via GPIB.

The following program example assumes that the mobile's antenna output is connected to the RF IN/OUT connector, and the mobile is on an analog voice channel (AVC). For information on configuring the test set to get the mobile on an active call, see [“Establishing an Active Link with the Mobile Station” on page 119](#).

The test set uses the AVC Channel (CALL:SET:AVC) and MS TX Level (CALL:SET:MS:ANALog:TXLevel) settings of the base station emulator for the expected frequency and power level. To manually set the expected frequency and power, see [“Receiver Control” on page 213](#).

The basic procedure to test Frequency Stability is as follows:

1. Enter the expected frequency and power.
2. Define the Frequency Modulation SETup parameters as desired to enable the distortion measurement and set its fundamental frequency, and to define other settings such as measurement timeout and multi-measurements.
3. Use the INITiate:FM command to start the measurement.
4. Use the FETCh? command to obtain the measurement results.

### Programming Example

```

10 !Set the expected frequency and power.
20 OUTPUT 714;"SETup:FM:COUNT 5" !Set multi-measurements to 5.
30 OUTPUT 714;"SETup:FM:DISTortion:STATE ON" !Enable the distortion measurement.
40 OUTPUT 714;"SETup:FM:DISTortion:FREQuency 1004 HZ" !Set the distortion measurement
50                                     !Fundamental Frequency (1004 HZ).
60 OUTPUT 714;"SETup:FM:FREQ:STATE ON" !Turn on the modulation frequency measurement.
70 OUTPUT 714;"SETup:FM:FILTer CMESsage" !Select the C-Message filter.
80 OUTPUT 714;"SETup:FM:DETEctor PPEak" !Select the Peak + detector.
90 OUTPUT 714;"SETup:FM:DEMPHasis:STATE OFF" !Make sure de-emphasis is off.
100 OUTPUT 714;"SETup:FM:EXPandor:STATE OFF" !Make sure the expandor is off.
110 OUTPUT 714;"SETup:FM:CONTinuous OFF" !Set the FM measurement to single trigger mode.
120 OUTPUT 714;"SETup:FM:TIMEout 1 S" !Set a timeout value of 1 second
130                                     !in case the measurement cannot be made.
140 OUTPUT 714;"INITiate:FM" !Start the measurement.
150 OUTPUT 714;"FETCh:FM?" !Query the returned integrity indicator and the
160                                     !average FM deviation and average FM distortion results.
170 ENTER 714;Integrity,Fm_dev,Fm_dist,Fm_freq !Enter the returned values into variables.
180 IF Integrity=0 THEN !See if the integrity value = 0 (valid measurement).
190 ELSE
200 PRINT "Measurement problem; check for signal level over/under range condition."
210 END IF
220 END

```

## Returned Values

The measurements returned by this program are:

- `Integrity` returns the measurement integrity indicator (see [“Integrity Indicator” on page 244](#)); 0 means a successful measurement with no errors.
- `FM_dev` returns the average FM deviation in kHz. `FM_dist` returns the average FM distortion in percent (%). `FM_freq` returns the average modulation frequency in Hz.

## Related Topics

[“Frequency Modulation \(FM\) Measurement Description” on page 57](#)

[“Frequency Modulation \(FM\) Troubleshooting” on page 732](#)

[“INITiate” on page 494](#)

[“SETup:FM” on page 561](#)

[“FETCh:FM” on page 461](#)

[“Control Program Example” on page 1](#)

[“Receiver Control” on page 213](#)

## Programming a Frequency Stability Measurement

This section provides an example of how to make analog frequency stability measurements via GPIB.

The following program example assumes that a signal within the measurements range is connected to the RF IN/OUT connector (see “[Input Signal Requirements](#)” on page 59).

The basic procedure to test Frequency Stability is as follows:

1. Set the operating mode to CW (see “[CALL\[:CELL\]:OPERating](#)”).
2. Enter the expected power (see “[RFANalyzer:CW:EXPEcted:POWer](#)”).
3. Enter the expected frequency (see “[RFANalyzer:MANual:MEASurement\[:MFRequency\]](#)”).
4. Define the Frequency Stability Setup parameters as desired for measurement timeout and multi-measurements (see “[SETup:FSTability](#)” on page 567).
5. Use the “[INITiate](#)” command to start the measurement.
6. Use the “[FETCh:FSTability](#)” command to obtain the measurement results.

### Programming Example

```

10 !Set the expected frequency and power.
20 OUTPUT 714;"SETup:FSTability:CONTinuous OFF" !Set the frequency stability
30                                     !measurement to single trigger mode.
40 OUTPUT 714;"SETup:FSTability:TIMEout 1 S" !Set a timeout value of 1 second
50                                     !in case the measurement cannot be made.
60 OUTPUT 714;"SETup:FSTability:COUNT 5" !Set multi-measurements to 5.
70 OUTPUT 714;"INITiate:FSTability" !Start the measurement.
80 OUTPUT 714;"FETCh:FSTability?" !Query the returned integrity indicator and the
90                                     !Worst Case Frequency Error and average Frequency measurements.
100 ENTER 714;Integrity,Freq_error,Frequency !Enter the returned values into variables.
110 IF Integrity=0 THEN !See if the integrity value = 0 (valid measurement).
120 ELSE
130 PRINT "Measurement problem; check for signal level over/under range condition."
140 END IF
150 END

```

### Returned Values

The measurements returned by this program are:

- `Integrity` returns the measurement integrity indicator; 0 means a successful measurement with no errors.
- `Freq_error` returns the worst case frequency error in parts per million (PPM). `Frequency` returns the average frequency.

## **Related Topics**

[“Frequency Stability Measurement Description” on page 59](#)

[“Frequency Stability Measurement Troubleshooting” on page 734](#)

[“Control Program Example” on page 1](#)



## Programming a Gated Power Measurement

This section provides an example of how to make a gated power measurement via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

The basic procedure to measure gated power is as follows:

1. Make a call using IS-95 or IS-2000 system type with F1R1 (radio configuration 1) or F2R2 (radio configuration 2). See ["CALL\[:CELL\]:RCONfig"](#).
2. Select a loopback service option (SO2, SO9, or SO55).
3. Select eighth rate data (see ["CALL:TRAFfic:DRATe"](#)).
4. Configure the gated power measurement setup parameters using the ["SETup:GPOWER"](#) subsystem.
5. Start the waveform quality measurement using the ["INITiate"](#) subsystem.
6. Use the ["FETCh:GPOWER"](#) command to obtain gated power measurement results.

---

**NOTE** Gated power measurement display trace data is available using the ["FETCh:GPOWER:TRACe?"](#) command.

---

### Programming Example

```

10 RE-SAVE "c:\roadhog\programs\gated_power.txt"
20 !This program measures gated power
30 !See "Standby Output Power and Gated Output Power" in TIA/EIA-98-D for specifications
and standards
40 CLEAR SCREEN
50 A=714
60 !***Specify call parameters***
70 Systype$="DIGITAL2000" !Cell System Type
80 Band$="USC" !Frequency Band
90 Channel=384 !RF Channel
100 Sid=1 !System Identification
110 Nid=1 !Network Identification
120 Radio_config$="F2R2" !Radio Configuration 1 or 2 is required for Gated Power
measurements
130 Service_opt$="SO9" !Service Option
150 !
160 !***Specify test parameters***
170 Loss_frequency$="1900 MHZ,1945 MHZ" !Reverse channel, forward channel frequencies for
amplitude offset (path loss)
180 Expected_loss$="-2,-2" !Path loss at reverse channel, forward channel frequencies
190 Ior=-75 !Cell power for gated power testing
200 Pilot=-7 !Pilot channel power level for gated power testing
210 Traffic=-7.4 !Traffic channel power level for gated power testing
220 Data_pnt=300
230 !

```

## Programming a Gated Power Measurement

```
240 ON TIMEOUT 7,20 CALL Timeout ! Calls "Timeout" routine
250 OUTPUT A;"SETUP:CFER:TIMEOUT:STIME 10 S" !Sets FER measurement timeout to 10 seconds
260 OUTPUT A;"SYST:COMM:GPB:DEB:STAT ON" !Turns debug state on
270 !
280 !***Set up path loss***
290 OUTPUT A;"SYSTEM:CORRECTION:SFREQUENCY ";Loss_frequency$ !Enters frequencies in
Amplitude Offset table
300 OUTPUT A;"SYSTEM:CORRECTION:SGAIN ";Expected_loss$ !Enters loss values in Amplitude
Offset table
310 !
320 !***Set up call parameters***
330 OUTPUT A;"CALL:OPER:MODE CALL" !Sets Operating Mode to Active Cell
340 OUTPUT A;"CALL:SYSTEM ";Systype$ !Sets System Type
350 OUTPUT A;"CALL:BAND ";Band$ !Sets Cell Band for selected System Type
360 OUTPUT A;"CALL:CHAN ";Channel ! Sets Channel for selected System Type and Cell Band
370 OUTPUT A;"CALL:POWER -50" !Sets and turns on Cell Power for call setup
380 OUTPUT A;"CALL:SID ";Sid! Sets System Identification
390 OUTPUT A;"CALL:NID ";Nid! Sets Network Identification
400 OUTPUT A;"CALL:RCON ";Radio_config$ !Sets Radio Configuration
410 OUTPUT A;"CALL:SOPTION ";Service_opt$ !Sets service option for selected System Type and
Radio Configuration
420 OUTPUT A;"CALL:PROT PREV6" !Sets Protocol Revision for the selected System Type
430 OUTPUT A;"CALL:PAG:DRAT FULL" !Sets Paging channel data rate to full rate
440 OUTPUT A;"CALL:TRAFFIC:DRATE EIGHTH" !Sets traffic/fundamental channel data rate to
eighth
450 OUTPUT A;"CALL:PIL -7" !Sets Pilot to default
460 OUTPUT A;"CALL:SYNC -16" !Sets Sync to default
470 OUTPUT A;"CALL:PAG -12" !Sets Paging to default
480 OUTPUT A;"CALL:FCH -15.6" !Sets Traffic to default
490 !
500 PRINT "Turn on mobile station...press continue when it has found service and registered"
510 PAUSE
520 CLEAR SCREEN
530 OUTPUT A;"CALL:REG:TIMER:STATE OFF" !Turns timer-based registrations off
540 WAIT 2 !Waits 2 seconds for any timer-based registrations to clear out
550 !
560 !***Page the mobile station***
570 DISP "Paging mobile station..."
580 OUTPUT A;"CALL:ORIG" !Pages the mobile station
590 OUTPUT A;"CALL:CONNECTED:STATE?" !Queries for connected/idle state...hangs until state
change detector is disarmed
600 ENTER A;Call_connected
610 IF NOT Call_connected THEN
620     DISP "Call attempt failed"
630     STOP
640 ELSE
650     DISP "Call connected"
660 END IF
670 !
680 !***Set up measurement parameters***
690 OUTPUT A;"SETUP:GPOWER:CONTINUOUS OFF" !Sets trigger arm state to single
700 OUTPUT A;"CALL:POW ";Ior ! Sets Cell Power for gated power measurement
710 OUTPUT A;"CALL:PIL ";Pilot !Sets Pilot channel level
```

```

720 OUTPUT A;"CALL:FCH ";Traffic !Sets Traffic channel level
730 !
740 !***Obtain pass/fail measurement results***
750 OUTPUT A;"INITIATE:GPOWER" !Initiates a gated power measurement
760 DISP "Measuring gated power"
770 OUTPUT A;"FETCh:GPOWER?" !Queries the test set for gated power measurement results
780 DISP "Gated Power measurement completed"
790 ENTER A;Integrity,Passfail
800 SELECT Passfail !Assign pass/fail results to a string
810 CASE 0
820     Pass_fail$="PASSED"
830 CASE 1
840     Pass_fail$="FAILED"
850 END SELECT
860 PRINT "Integrity indicator = ";Integrity
870 PRINT "Gated power test results = ";Pass_fail$
880 !
890 OUTPUT A;"CALL:END" !Ends the call
1000 END
1010 Timeout: SUB Timeout      ! Global timeout handler
1020     PRINT "Program timed out"
1030     CLEAR 7
1040     CLEAR 714
1050 SUBEND

```

## Related Topics

[“Gated Power Measurement Description”](#)

[“Gated Power Measurement Troubleshooting”](#)

[“Control Program Example” on page 1](#)

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## Programming a Handoff Waveform Quality Measurement

### Related Topics

[“Handoff Waveform Quality Measurement Description”](#)

[“Handoff Waveform Quality Measurement Troubleshooting”](#)

[“Control Program Example” on page 1](#)

## Programming a SINAD Measurement

This section provides an example of how to make SINAD measurement via GPIB. It is patterned after TIA/EIA IS-137, Analog RF Sensitivity (section 2.3.1.1).

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 40](#).

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  $\pm 8$  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 expander.
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 244](#).
- `SINAD` returns the SINAD value in dB.

## Related Topics

[“Audio Analyzer Measurement Description” on page 40](#)

[“AFANalyzer Troubleshooting” on page 726](#)

[“INITiate” on page 494](#)

[“SETup:AFANalyzer” on page 525](#)

[“FETCh:AFANalyzer” on page 435](#)

[“Control Program Example” on page 1](#)

## Programming a Swept Audio Measurement

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

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

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

### Programming Example

```

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

```

## Returned Values

The results returned by this program are:

- `Integrity` returns the measurement integrity indicator (see [“Integrity Indicator” on page 244](#)); 0 means a successful measurement with no errors.
- `Lev1` through `Lev5` return the audio level (voltage) at each of the five measurement points. In this example, the value is returned in volts peak because the peak detector was specified.
- `Dist1` through `Dist5` return the distortion value at each of the five measurement points.
- `Sinad1` through `Sinad5` return the SINAD value at each of the five measurement points.

## Related Topics

[“Swept Audio Measurements Description” on page 67](#)

[“Swept Audio Measurement Troubleshooting” on page 737](#)

[“INITiate” on page 494](#)

[“SETup:SAUDio” on page 577](#)

[“FETCh:SAUDio” on page 477](#)

[“Control Program Example” on page 1](#)



## Programming a TDSO Frame Error Rate Measurement

This section provides an example of how to make a TDSO (Test Data Service Option) FER measurement via the GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

The basic procedure to test TDSO FER is as follows:

1. Make a SO 32 (F-SCH) call (see ["CALL\[:CELL\]:SOPTION" on page 398](#)).
2. Configure the TDSO FER Setup parameters using the ["SETup:CFERror"](#) subsystem.
3. Start the FER measurement using the ["INITiate"](#) subsystem.
4. Use the ["FETCh:CFERror"](#) command to obtain the measurement results.

### Programming Example

```

10 RE-SAVE "c:\roadhog\programs\tdso_fer.txt"
20 !This program measures tdso (test data service option) frame error rate
30 !See "Receiver Sensitivity and Dynamic Range" in TIA/EIA-98-D for specifications and
standards
40 CLEAR SCREEN
50 A=714
60 !***Specify call parameters***
70 Systype$="DIGITAL2000" !Cell System Type
80 Band$="USPC" !US PCS band
90 Channel=1125 !RF Channel
100 Sid=1 !System Identification
110 Nid=1 !Network Identification
120 Radio_config$="F3R3" !Radio Configuration
130 Service_opt$="SOF32" !Service Option SO32 (+F-SCH). This service option must be
selected
140 !before bringing up a call for testing tdso fer
141 !
150 !***Specify test parameters***
160 Loss_frequency$="836 MHZ,881 MHZ" !Reverse channel, forward channel frequencies for
amplitude offset (path loss)
170 Expected_loss$="-2,-2" !Path loss at reverse channel, forward channel frequencies
180 Ior=-60 !Cell power
190 Pilot=-7 !Pilot channel power level
200 Traffic=-15.5 !Traffic channel power level
201 Confidence=2 !Confidence requirement ratio
210 !
220 ON TIMEOUT 7,30 CALL Timeout ! Calls "Timeout" routine
240 OUTPUT A;"SYST:COMM:GPIB:DEB:STAT ON" !Turns debug state on
250 !
260 !***Set up path loss***
270 OUTPUT A;"SYSTEM:CORRECTION:SFREQUENCY ";Loss_frequency$ !Enters frequencies in
Amplitude Offset table
280 OUTPUT A;"SYSTEM:CORRECTION:SGAIN ";Expected_loss$ !Enters loss values in Amplitude

```

## Programming a TDSO Frame Error Rate Measurement

Offset table

```
290  !
300  !***Set up call parameters***
310  OUTPUT A;"CALL:OPER:MODE CALL" !Sets Operating Mode to Active Cell
320  OUTPUT A;"CALL:SYSTEM ";Systype$ !Sets System Type
330  OUTPUT A;"CALL:BAND ";Band$ !Sets Cell Band for selected System Type
340  OUTPUT A;"CALL:CHAN ";Channel ! Sets Channel for selected System Type and Cell Band
350  OUTPUT A;"CALL:POWER -50" !Sets and turns on Cell Power for selected System Type
360  OUTPUT A;"CALL:SID ";Sid! Sets System Identification
370  OUTPUT A;"CALL:NID ";Nid! Sets Network Identification
380  OUTPUT A;"CALL:RCON ";Radio_config$ !Sets Radio Configuration
390  OUTPUT A;"CALL:SOPTION ";Service_opt$ !Sets service option for selected System Type and
Radio Configuration
400  OUTPUT A;"CALL:PROT PREV6" !Sets Protocol Revision for the selected System Type
410  OUTPUT A;"CALL:PAG:DRAT FULL" !Sets Paging channel data rate to full rate
420  OUTPUT A;"CALL:PIL -7" !Sets Pilot to default
430  OUTPUT A;"CALL:SYNC -16" !Sets Sync to default
440  OUTPUT A;"CALL:PAG -12" !Sets Paging to default
450  OUTPUT A;"CALL:FCH -15.6" !Sets Traffic to default
460  !
470  PRINT "Turn on mobile station...press continue when it has found service and registered"
480  PAUSE
490  CLEAR SCREEN
500  OUTPUT A;"CALL:REG:TIMER:STATE 0" !Turns timer-based registrations off
510  WAIT 2 !Waits 2 seconds for any timer-based registrations to clear out
520  !
530  !***Page the mobile station***
540  DISP "Paging mobile station..."
550  OUTPUT A;"CALL:ORIG" !Pages the mobile station
560  OUTPUT A;"CALL:CONNECTED:STATE?" !Queries for connected/idle state...hangs until state
change detector is disarmed
570  ENTER A;Call_connected
580  IF NOT Call_connected THEN
590     DISP "Call attempt failed"
600     STOP
610  ELSE
620     DISP "Call connected"
630  END IF
640  !
650  !***Set up measurement parameters***
660  OUTPUT A;"SETUP:TFERROR:CONTINUOUS OFF" !Sets trigger arm state to single
670  OUTPUT A;"CALL:POW ";Ior ! Sets Cell Power for the selected System Type
680  OUTPUT A;"CALL:PIL ";Pilot !Sets Pilot channel level
690  OUTPUT A;"CALL:FCH ";Traffic !Sets Traffic channel level
691  OUTPUT A;"SETUP:TFERROR:CONFIDENCE:REQUIREMENT:RATIO ";Confidence
700  !
710  !***Obtain measurement results***
720  OUTPUT A;"INITIATE:TFERROR" !Initiates a frame error rate measurement
730  DISP "Measuring TDSO FER"
731  LOOP
732  WAIT 1
740  OUTPUT A;"INIT:DONE?"
760  ENTER A;Tfer_done$
```

```

770 EXIT IF Tfer_done$="TFER"
780 END LOOP
800 OUTPUT A;"FETCh:TFERROR?" !Queries the test set for frame error rate measurement results
805 DISP "FER test completed"
810 ENTER A;Integrity,Fer,Rx_good,Rx_blank,Tx_good,Tx_blank,Conf
820 !
940 PRINT "Integrity indicator = ";Integrity
950 PRINT "TDSO FER test results = ";Fer
960 PRINT "Number of received good frames = ";Rx_good
961 PRINT "Number of received blank frames = ";Rx_blank
962 PRINT "Number of transmitted good frames = ";Tx_good
963 PRINT "Number of transmitted blank frames = ";Tx_blank
964 PRINT "Confidence result = ";Conf
970 DISP "Test complete"
980 !***Return to default call processing states***
990 OUTPUT A;"CALL:POW:DIG2000 -50" ! Returns cell power to -50 dBm/1.23 MHz
1000 OUTPUT A;"CALL:REG:TIMER:STATE ON" !Returns timer-based registration to ON
1010 !
1020 OUTPUT A;"CALL:END" !Ends the call
1030 END
1040 Timeout: SUB Timeout ! Global timeout handler
1050 PRINT "Program timed out"
1060 CLEAR 7
1070 CLEAR 714
1080 SUBEND

```

## Related Topics

[“TDSO Frame Error Rate Measurement Description”](#)

[“TDSO FER \(Frame Error Rate\) Troubleshooting”](#)

[“Control Program Example” on page 1](#)

## Programming a Tx Spurious Emissions Measurement

This section provides an example of how to make transmitter spurious emissions measurements via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

The basic procedure to measure spurious emissions remotely is:

1. Turn on the mobile station and perform a registration (wait for power-on or send `"CALL:REGister[:IMMediate]"` ).
2. Turn off timer-based registrations (see `"CALL:REGister:TIMER:STATE"` ).
3. Set up nominal power, initial power, step size, number of steps, and the maximum number of access probes for responses ( see `"CALL[:CELL]:APARAmeter"` on page 288).
4. Set the trigger arm state to single (see `"SETUp:CTXSpurious:CONTInuous"` ).
5. Perform a page or mobile station originated call.
6. Initiate the spurious emissions measurement using the `"INITiate:<measurement mnemonic>[:ON]"` on page 496. The <measurement mnemonic> for the cdma2000 transmitter spurious emissions measurement is CTXS.
7. Use the `"FETCh:CTXSpurious[:ALL]?"` command to obtain the measurement results.

### Programming Example

```

10 RE-SAVE "c:\roadhog\programs\tx_spurious.txt"
20 !This program measures conducted spurious emissions from the mobile station
30 !See "Conducted Spurious Emissions" in TIA/EIA-98-D for specifications and standards
40 CLEAR SCREEN
50 A=714
60 !***Specify call parameters***
70 Systype$="DIGITAL2000"
80 Band$="USCELLULAR"
90 Channel=384
100 Sid=1
110 Nid=1
120 Radio_config$="F3R3" !The test standard requires measurements at each radio config
130 Service_opt$="S02"
140 !
150 !***Specify test parameters***
160 Loss_frequency$="836 MHZ,881 MHZ"
170 Expected_loss$="-2,-2"
180 Nom_pwr=7
190 Init_pwr=15
200 Acc_prb_steps=7
210 Num_step=7
220 Max_rsp_seq=15
230 Acc_prb_size=4
240 Ior=-90
250 Pilot=-7.4

```

```

260 Paging_ch=-12
270 Sync=-16
280 Traffic=-15.5
290 !
300 ON TIMEOUT 7,20 CALL Timeout
310 OUTPUT A;"SETUP:CTXSpurious:TIMEOUT:STIME 3 S"
320 OUTPUT A;"SYST:COMM:GPIB:DEB:STAT ON"
330 !
340 !***Set up path loss***
350 OUTPUT A;"SYSTEM:CORRECTION:SFREQUENCY ";Loss_frequency$
360 OUTPUT A;"SYSTEM:CORRECTION:SGAIN ";Expected_loss$
370 !
380 !***Set up access/paging parameters***
390 OUTPUT A;"CALL:OPER:MODE CALL"
400 OUTPUT A;"CALL:BAND ";Band$
410 OUTPUT A;"CALL:CHAN ";Channel
420 OUTPUT A;"CALL:POW -50"
430 OUTPUT A;"CALL:SID ";Sid
440 OUTPUT A;"CALL:NID ";Nid
450 OUTPUT A;"CALL:RCON ";Radio_config$
460 OUTPUT A;"CALL:SOPTION ";Service_opt$
470 OUTPUT A;"CALL:PROT PREV6"
480 OUTPUT A;"CALL:PAG ";Paging_ch
490 OUTPUT A;"CALL:PAG:DRAT FULL"
500 OUTPUT A;"CALL:PIL ";Pilot
510 OUTPUT A;"CALL:SYNC ";Sync
520 OUTPUT A;"CALL:FCH ";Traffic
530 !
540 PRINT "Turn on mobile station...press continue when it has found service and registered"
550 PAUSE
560 CLEAR SCREEN
570 OUTPUT A;"CALL:REGISTER:TIMER:STATE OFF"
580 WAIT 2
590 !
600 !***Set up measurement parameters***
610 OUTPUT A;"SETUP:CTXSpurious:CONTINUOUS OFF"
620 OUTPUT A;"CALL:APAR:POW:NOM ";Nom_pwr
630 OUTPUT A;"CALL:APAR:POW:INIT ";Init_pwr
640 OUTPUT A;"CALL:APARAMETER:POWER:STEP ";Acc_prb_size
650 OUTPUT A;"CALL:APAR:POW:STEP:COUNT ";Num_step
660 OUTPUT A;"CALL:APARAMETER:POWER:STEP:COUNT ";Acc_prb_steps
670 OUTPUT A;"CALL:APAR:SEQ:RESP:MAX ";Max_rsp_seq
680 !
690 !***Make a call***
700 DISP "Paging mobile station..."
710 OUTPUT A;"CALL:ORIG"
720 OUTPUT A;"CALL:CONNECTED:STATE?"
730 ENTER A;Call_connected
740 IF NOT Call_connected THEN
750     DISP "Call attempt failed"
760     STOP
770 ELSE
780     DISP "Call connected"

```

## Programming a Tx Spurious Emissions Measurement

```
790 END IF
800 !
810 !***Send all up power control bits***
820 OUTPUT A;"CALL:CLPC:REVERSE:MODE UP"
821 !
830 DISP "Measuring Tx Spurious Emissions"
840 !
850 !***Obtain measurement results***
860 OUTPUT A;"INITIATE:CTXSpurious"
870 OUTPUT A;"FETCH:CTXSpurious?"
880 ENTER A;Integ,Passfail,Lower_adj,Upper_adj,Lower_alt,Upper_alt
890 PRINT "Integrity indicator = ";Integ
900 IF Passfail THEN
910     PRINT "Test failed"
920 ELSE
930     PRINT "Test passed"
940 END IF
960 PRINT "Lower adjacent channel power = ";Lower_adj
970 PRINT "Upper adjacent channel power = ";Upper_adj
980 PRINT "Lower alternate power = ";Lower_adj
990 PRINT "Upper alternate power = ";Upper_adj
1000 DISP "Test complete"
1010 !
1020 !***Return to default call processing states***
1030 OUTPUT A;"CALL:CLPC:REVERSE:MODE ACTIVE" !Returns to active power control bits
1040 OUTPUT A;"CALL:END"
1050 OUTPUT A;"CALL:REGISTER:TIMER:STATE ON"
1060 END
1070 !
1080 Timeout: SUB Timeout
1090     PRINT "Program timed out"
1100     CLEAR 7
1110     CLEAR 714
1120 SUBEND
```

## Returned Values

This query returns an integrity indicator followed by a channel power measurement result (if results are available).

## Related Topics

[“Tx Spurious Emissions Measurement Description”](#)

[“Tx Spurious Emissions Measurement Troubleshooting”](#)

[“Control Program Example” on page 1](#)

## Programming a Waveform Quality/Code Domain Measurement

This section provides an example of how to make a waveform quality measurement via GPIB.

The following program example assumes that the mobile station's antenna output is connected to the RF IN/OUT connector, and the mobile station has found service.

The basic procedure to measure waveform quality is as follows:

1. Make a call.
2. Configure the waveform quality measurement setup parameters using the "SETup:WQQuality" subsystem.
3. Start the waveform quality measurement using the "INITiate" subsystem.
4. Use the "FETCh:WQQuality" command to obtain waveform quality measurement results.
5. Use the "FETCh:WQQuality:CDPower:ICHannel[:ALL]?" or "FETCh:WQQuality:CDPower:QChannel[:ALL]?" commands to obtain code domain power measurement results.

### Programming Example

```

10 RE-SAVE "c:\roadhog\programs\wqu.txt"
20 !This program measures waveform quality
30 !Refer to "Waveform Quality and Frequency Accuracy" in EIA/TIA-IS-98D for standards and
specifications
40 CLEAR SCREEN
50 A=714
60 !***Specify call parameters***
70 Systype$="DIGITAL2000" !Cell System Type
80 Band$="USCELLULAR" !Cell band
90 Channel=384 !RF Channel
100 Sid=1 !System Identification
110 Nid=1 !Network Identification
120 Radio_config$="F3R3" !Radio Configuration
130 Service_opt$="S02" !Loopback service option
140 !
150 !***Specify test parameters***
160 Loss_frequency$="851 MHZ,896 MHZ" !Reverse channel, forward channel frequencies for
amplitude offset (path loss)
170 Expected_loss$="-2,-2" !Path loss at reverse channel, forward channel frequencies
180 Ior=-50!Cell power
190 Pilot=-7 !Pilot channel power level
200 Traffic=-7.4 !Traffic channel power level
210 !
220 ON TIMEOUT 7,20 CALL Timeout ! Calls "Timeout" routine
230 OUTPUT A;"SETUP:WQU:TIMEOUT:STIME 10 S" !Sets waveform quality measurement timeout to 10
seconds
240 OUTPUT A;"SYST:COMM:GPIB:DEB:STAT ON"!Turns debug state on
250 !
260 !***Set up call parameters***
270 OUTPUT A;"CALL:OPER:MODE CALL" !Sets Operating Mode to Active Cell

```

## Programming a Waveform Quality/Code Domain Measurement

```
280 OUTPUT A;"CALL:SYSTEM ";Systype$ !Sets System Type
290 OUTPUT A;"CALL:BAND ";Band$ !Sets Cell Band for selected System Type
300 OUTPUT A;"CALL:CHAN ";Channel !Sets RF Channel for selected System Type and Cell Band
310 OUTPUT A;"CALL:POW -35" !Sets and turns on Cell Power
320 OUTPUT A;"CALL:SID ";Sid! Sets System Identification
330 OUTPUT A;"CALL:NID ";Nid! Sets Network Identification
340 OUTPUT A;"CALL:RCON ";Radio_config$!Sets Radio configuration
350 OUTPUT A;"CALL:SOPTION ";Service_opt$ !Sets service option for selected System Type and
Radio Configuration
360 OUTPUT A;"CALL:PROT PREV6" !Sets Protocol Revision for the selected System Type
370 OUTPUT A;"CALL:PAG:DRAT FULL" !Sets Paging data rate to full rate
380 OUTPUT A;"CALL:PIL -7" !Sets pilot to default
390 OUTPUT A;"CALL:SYNC -16" !Sets sync to default
400 OUTPUT A;"CALL:PAG -12" !Sets paging to default
410 OUTPUT A;"CALL:FCH -15.6" !Sets traffic to default
420 !
430 PRINT "Turn on mobile station...press continue when it has found service and registered"
440 PAUSE
450 CLEAR SCREEN
460 OUTPUT A;"CALL:REGISTER:TIMER:STATE OFF" !Turns off timer-based registrations
470 WAIT 2 ! Waits for any timer-based registrations to clear out
480 !
490 !***Page the mobile station***
500 DISP "Paging mobile station..."
510 OUTPUT A;"CALL:ORIG" !Pages the mobile station520 OUTPUT A;"CALL:CONNECTED:STATE?"
!Queries for connected/idle state...hangs until state change detector is disarmed
530 ENTER A;Call_connected
540 IF NOT Call_connected THEN
550 DISP "Call attempt failed"
560 STOP
570 ELSE
580 DISP "Call connected"
590 END IF
600 !
610 !***Set up measurement parameters***
620 OUTPUT A;"SETUP:WQUALITY:CONTINUOUS OFF" !Sets trigger arm state to single
630 OUTPUT A;"CALL:POW ";Ior !Sets Cell Power for the selected System Type
640 OUTPUT A;"CALL:CLPCONTROL:REVERSE:MODE ALT" !Alternating up/down power control bits
650 OUTPUT A;"CALL:PIL ";Pilot !SetsPilot channel level
660 OUTPUT A;"CALL:FCH ";Traffic !Sets Fundamental (Traffic) channel level
661 OUTPUT A;"SETUP:WQUALITY:CDPOWER:IQInactive:LIMIT -23"
670 !
680 !***Obtain and display waveform quality measurement results***
690 WAIT 1
700 OUTPUT A;"INITIATE:WQUALITY" !Initiates a Waveform Quality measurement
760 OUTPUT A;"FETCh:WQUALITY?" !Queries the test set for waveform quality measurement
results
770 ENTER A;Integrity,Rho,Freq_error,Time_error,Carr_feed,Phase_err,Mag_err,Evm
780 PRINT "Integrity indicator = ";Integrity
790 PRINT "Rho = ";Rho,"Frequency error = ";Freq_error,"Time error = ";Time_error,"Carrier
feedthrough = ";Carr_feed
800 PRINT "Phase error = ";Phase_err,"Magnitude error = ";Mag_err,"Error vector magnitude =
";Evm
```



```

801  !
802  !***Obtain and display code domain power pass/fail measurement results***
803  OUTPUT A;"FETCh:WQQuality:CDPower:IQInactive?"
804  ENTER A;Iq_passfail
805  SELECT Iq_passfail
806  CASE 0
807     PRINT "Code domain power passed"
808  CASE 1
809     PRINT "Code domain power failed"
811  END SELECT
813  !***Obtain and display code domain power measurement results (I-channel)***
814  DIM Ichannel$[1000]
815  OUTPUT A;"FETCh:WQUALITY:CDPower:ICH?"
816  ENTER A;Ichannel$
830  INTEGER I,Comma,Nextcomma !I represents the 16 bins, Comma is the current substring
position
840  Comma=1 !Initialize Comma to the first character of the Ichannel$ ascii character string
860  PRINT "I-Channel active/inactive = ";Ichannel$[Comma;16]
870  Comma=Comma+17
890  PRINT "I-channel bin 0 walsh channel number = ";Ichannel$[Comma;16]
891  Comma=Comma+17
900  PRINT "I-channel bin 0 spread factor = ";Ichannel$[Comma;16]
905  Comma=Comma+17
910  PRINT "I-channel bin 0 power level = ";Ichannel$[Comma;16]
920  DISP "Test complete"
930  !
940  !***Return to default call processing settings***
950  OUTPUT A;"CALL:CLPCONTROL:REVERSE:MODE ACTIVE" !Return to active power control bits
960  OUTPUT A;"CALL:POW:DIG2000 -50" ! Returns cell power to -50 dBm/1.23 MHz
970  OUTPUT A;"CALL:END"
980  END
990 Timeout: SUB Timeout      ! Global timeout handler (from Step 1)
1000     PRINT "Program timed out"
1010     CLEAR 7
1020     CLEAR 714
1030  SUBEND

```

## Related Topics

[“Waveform Quality/Code Domain Measurement Description” on page 76](#)

[“Waveform Quality Measurement Troubleshooting” on page 740](#)

[“Control Program Example” on page 1](#)

## 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 11. 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 11. 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 12. Full Preset Behavior**

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

**Table 12. 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 using call control settings. You may want to control the test set's receiver parameters manually rather than allowing the test set to control them. This ability is referred to as manual receiver control.

Refer to the [“Block Diagram”](#) for a description of the [“Signal Downconversion”](#) paths.

### Manual Receiver Control Parameters

The following parameters manually control the test set's receiver:

- Digital receiver power (Rcvr Power Ctrl)
- CW receiver power
- Measurement receiver frequency (Meas Frequency)
- Demodulation receiver frequency

### Manual vs. Automatic Receiver Control

- Auto mode is the default for all operating modes except CW (which defaults to manual mode). The receiver's expected power and frequency settings are set automatically according to the call control settings you specify (Channel number, AVC Channel, Anl MS TX Level, Cell Band, Cell Power, and amplitude offset).
- Manual mode allows you to override some or all of the automatic settings by first selecting the manual mode for the setting and then specifying the desired value. You can set the receiver's expected power by pressing the Call Parm, More key until 3 of 3 is displayed. Then, select Manual in the Rcvr Power Ctrl field. You can set the receiver's measurement downconverter tune frequency manually by pressing the Manual key with the Meas Frequency field. A full or partial preset of the test set, including cycling power, returns the test set back to auto mode.

### Manual Receiver Control

The following parameters manually control the test set's receiver:

#### Digital receiver power

For all operating modes except for CW and Active Cell with AMPS system type selected, the expected power from the mobile station is set manually using the [“RFANalyzer:MANual:POWer\[:SElected\]”](#) command. If a call is connected, and reverse power control (Rvs Power Ctrl) is set to active bits, closed loop power control will immediately control the mobile station's power level to the value entered in the Receiver Power field. To control the mobile station's power level using open loop power control, specify alternating bits in the Rvs Power Ctrl field and adjust the Cell Power level.

#### CW receiver power

For CW operating mode, the expected power from the mobile station is set manually using the [“RFANalyzer:CW:EXpected:POWer”](#) commands.

## Analog (AMPS Cellular) receiver power

For Active Cell operating mode with AMPS selected as the system type, the expected power from the mobile station is set manually using the “[RFANalyzer:MANual:ANALog:POWer\[:SELEcted\]](#)” commands

---

**NOTE** During manual receiver power control, make sure you are using the correct operating mode for the type of measurement you are making. Trying to make a digital measurement while operating in AVC Test operating mode, or making an analog measurement while operating in IS-2000 Test mode, will result in an error. The error occurs because the test set uses the expected power setting for the operating mode you are using, and uses different methods to measure analog and digital signals. Using the analog method to measure a digital signal, or vice versa, results in the error.

Also, it is recommended that you specify the expected power each time you perform a handoff to a new band or system type during manual receiver control. This ensures that the correct expected power is set for the new channel settings.

---

## Measurement receiver frequency

Measurement receiver frequency commands are used to manually tune the test set’s measurement downconverter input signal path (see “[Block Diagram](#)”).

The commands are:

- “[RFANalyzer:CONTRol:MEASurement:FREQuency:AUTO](#)” (to turn manual mode on/off)
- “[RFANalyzer:MANual:MEASurement\[:MFRequency\]](#)” (to specify a frequency and turn manual mode on)
- “[RFANalyzer:MANual:MEASurement:FREQuency](#)” (to specify a frequency)

## Demodulation 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 reverse channel transmissions. The commands are:

- “[RFANalyzer:CONTRol:UPLink:FREQuency:AUTO](#)” (to turn manual mode on/off)
- “[RFANalyzer:MANual:UPLink\[:MFRequency\]](#)” (to specify a frequency and turn manual mode on)
- “[RFANalyzer:MANual:UPLink:FREQuency](#)” (to specify a frequency)

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**NOTE** Manual control of the demodulation receiver frequency is rarely needed. Use the measurement receiver when manual receiver frequency control is required.

---

## Automatic Receiver Control

## Expected Power

To make accurate measurements, the test set needs to know how much power to expect at the test set's RF IN/OUT port; referred to as the Expected Power. It gets this value from the call control MS TX Level setting during automatic receiver control, or by the user specifying the expected power with the receiver power control set to manual.

You can set the expected power level beyond the capability of the test set's hardware because expected power is intended to reflect the potential range of RF power at the DUT. This range of RF power is meant to accommodate the use of a gain or loss network between the DUT and the test set. See [“Setting Up Amplitude Offsets and Frequency Points” on page 85](#) for details about amplitude offset.

The upper and lower limits of expected power provide boundaries for the combination of amplitude offset and expected power. If you set expected power to +52 dBm and the amplitude offset to -3 dB, the calculated receiver power will be 49 dBm, but the test set shall be set to +43 dBm, the upper limit of the hardware. If the calculated value of receiver power goes below -25 dB, the lower limit of the hardware, the test set shall be set to -25 dB.

## Cellular Band (800 MHz) Mobile Power Class Considerations for Expected Input Level

The nominal power output for power settings 0, 1, 8, 9, and 10 are different for power class 1 and power class 4 mobiles *when operating in the cellular (800 MHz) band*, and affect the expected input level. (Power levels 0 to 7 are used for analog and digital signals, but power levels 8, 9, and 10 are only used for digital signals.)

When the MS TX Level is set to power level 0 or power level 1, the test set *assumes you are testing a power class 1 mobile* and sets the expected input level accordingly. If you are testing a power class 4 mobile and have the MS TX Level set to 0 or 1, the test set will likely display an under range condition when making a measurement, indicating that the signal being measured is well below the expected input level. This is because power levels 0 and 1 = 4W (36 dBm) for a power class 1 mobile, but only 0.6W (about 28 dBm) for a class 4 mobile.

When the MS TX Level is set to power level 8, 9, or 10, the test set *assumes you are testing a power class 4 mobile* and sets the expected input level accordingly. If you are testing a power class 1 mobile, the test set may display an over range condition when making a measurement, indicating that the signal being measured is well above the expected level. This is because power levels 8, 9, and 10 are about 5 dB higher for a power class 1 mobile than for a class 4 mobile.

If an under range or over range condition occurs during a measurement due to a power class difference, use manual receiver control to set the correct expected level. See [“Expected Power” on page 215](#).

## 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”](#)

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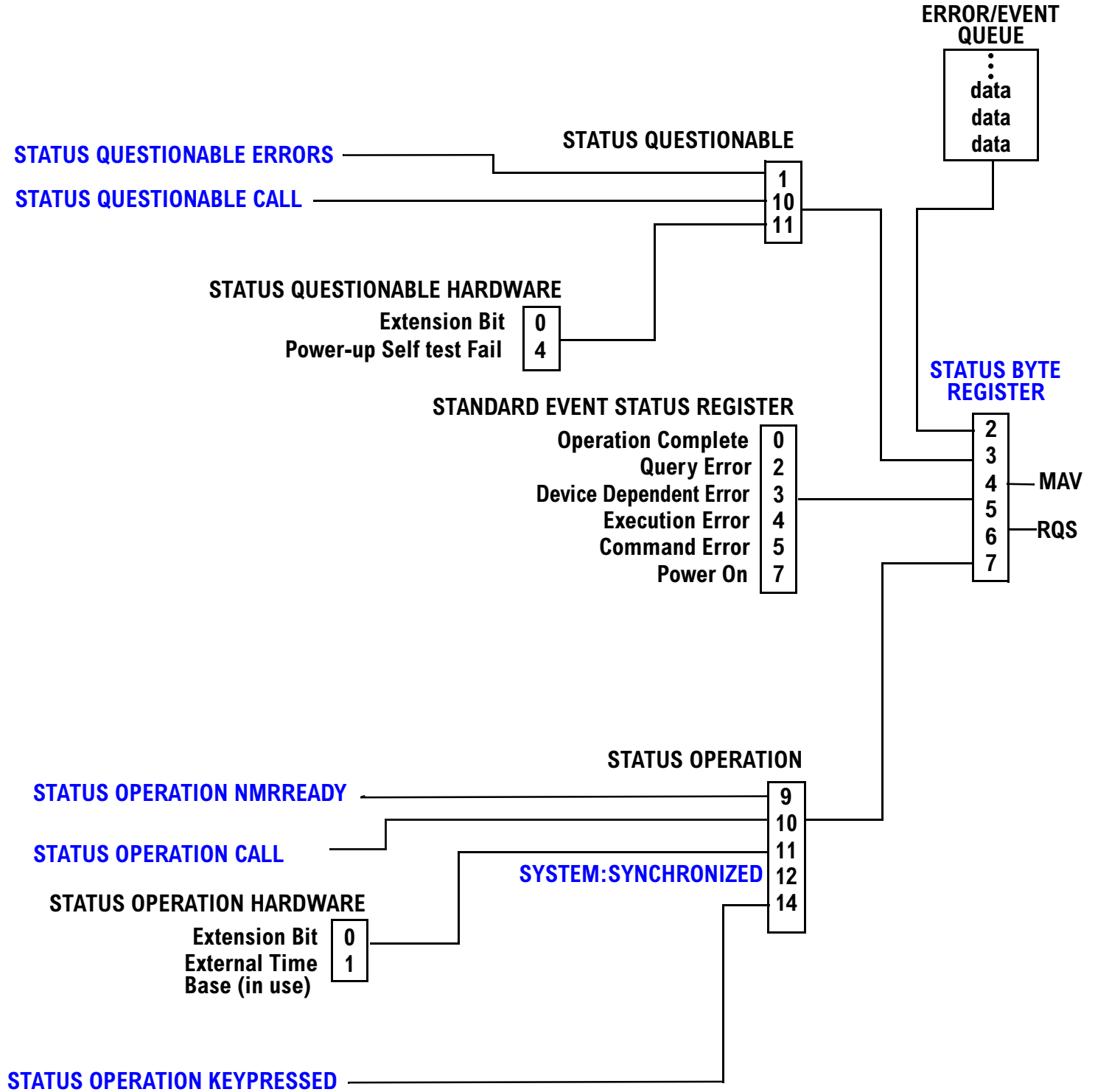
## **Status Subsystem Overview**

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**

**STATUS QUESTIONABLE CALL**

Extension Bit	0
COMMon Summary	1
GSM Summary	2
AMPS Summary	3
DIGital 136 Summary	4
TA136 Summary	5
DIGital 95 Summary	6
DIGital 2000 Summary	7
CDMA Summary	8
TA 2000 Summary	9
GPRS Summary	12

Bit 10  
STATUS  
QUESTIONABLE

**STATUS QUESTIONABLE ERRORS**

Extension Bit	0
COMMon Summary	1
GSM Summary	2
AMPS Summary	3
DIGital 136 Summary	4
TA136 Summary	5
DIGital 95 Summary	6
DIGital 2000 Summary	7
CDMA Summary	8
TA 2000 Summary	9
FDD Summary	10
WCDMA Summary	11
GPRS Summary	12

Bit 1  
STATUS  
QUESTIONABLE

Some status registers are not functional at this time.

**STATUS OPERATION CALL**

Extension Bit	0
COMMon Summary	1
GSM Summary	2
AMPS Summary	3
DIGital 136 Summary	4
TA136 Summary	5
DIGital 95 Summary	6
DIGital 2000 Summary	7
CDMA Summary	8
TA 2000 Summary	9

Bit 10  
STATUS  
OPERATION

**STATUS OPERATION NMRREADY**

Extension Bit	0
COMMon Summary	1
GSM Summary	2
AMPS Summary	3
DIGital 136 Summary	4
TA136 Summary	5
DIGital 95 Summary	6
DIGital 2000 Summary	7
CDMA Summary	8
TA 2000 Summary	9
FDD Summary	10
WCDMA Summary	11
GPRS Summary	12

Bit 9  
STATUS  
OPERATION

**Status Reporting Structure For STATus OPERation KEYPressed Register**

**STATUS OPERATION KEYPRESSED**

F1 softkey	0	Bit 14 STATUS OPERATION
F2 softkey	1	
F3 softkey	2	
F4 softkey	3	
F5 softkey	4	
F6 softkey	5	
F7 softkey	6	
F8 softkey	7	
F9 softkey	8	
F10 softkey	9	
F11 softkey	10	
F12 softkey	11	

## Status Reporting Structures for the COMMON Registers

### STATUS QUESTIONABLE ERRORS COMMON

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

Bit 1  
STATUS  
QUESTIONABLE  
ERRORS

### STATUS OPERATION CALL COMMON

Extension Bit	0
Call Control Status Idle	1
Call Control Status Connected	2
Call Control Status Alerting	3
Call Control Status Registering	4
Call Control Status Handover	5
Call Control Status Changing	6
BS Originating	7
Reserved	8
Registering (BS Initiated)	9
Call Control Status Paging	10
Call Control Status Releasing	11
Call Control Status Set Up Request	12
Call Control Status Access Probe	13
Data Summary	14

Bit 1  
STATUS  
OPERATION  
CALL

### STATUS OPERATION CALL COMMON DATA

Extension Bit	0
Data Connection Status Idle	1
Data Connection Status Attached	2
Data Connection Status Transferring	3
Data Connection Status Data Connected	4
Data Connected Status Off	5
Data Connected Control Status Changing	6
Starting Data Connection	7
PDP Active State	8

Bit 14  
STATUS  
OPERATION  
CALL COMMON

### STATUS OPERATION NMRREADY COMMON

Extension Bit	0
Audio Analyzer	1
Swept Audio	2

Bit 1  
STATUS  
OPERATION  
NMRREADY

## Status Reporting Structure for the GSM Registers

### STATUS QUESTIONABLE CALL GSM

Extension Bit	0
Date Link Failure	1
Radio Link Failure	2
Immediate Assignment Failure	3
Channel Assignment Failure	4
Handover Failure	5
No Response to Page	6
Channel Assignment > Frames Identification Failure	7
Channel Mode Not Supported	8
	9

Bit 2  
STATUS  
QUESTIONABLE

### STATUS QUESTIONABLE ERRORS GSM

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

Bit 2  
STATUS  
QUESTIONABLE  
ERRORS

### STATUS OPERATION NMRREADY GSM

Extension Bit	0
Tx Power	1
Power vs. Time	2
Phase/Freq Error	3
Output RF Spectrum	4
Analog Audio	5
Decoded Audio	6
Fast Bit Error Rate	7
Bit Error	8
I/Q Tuning	9
Dynamic Power	10

Bit 2  
STATUS  
OPERATION  
NMRREADY

### STATUS OPERATION CALL GSM

Extension Bit	0
Idle	1
Connected	2
Alerting	3
BCH Changing	4
TCH Changing	5
Control Status Changing	6
BS Originating	7
BS Disconnecting	8

Bit 2  
STATUS  
OPERATION  
CALL

### Status Reporting Structure For the GPRS Registers

#### STATUS QUESTIONABLE CALL GPRS

Extension Bit	0
Attach Failure	1
Detach Failure	2
Routing Area Update Failure	3
Start Data Connection Failure	4
No Data Received Recently	5
Downlink Timed Out	6
Uplink Immediate Assignment Failure	7
Downlink Immediate Assignment Failure	8
MS Unexpectedly Ended TBF	9
End Data Connection Failure	10

Bit 12  
STATUS  
QUESTIONABLE  
CALL

#### STATUS QUESTIONABLE ERRORS GPRS

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

Bit 12  
STATUS  
QUESTIONABLE  
ERRORS

#### STATUS OPERATION NMRREADY GPRS

Extension Bit	0
Tx Power	1
Power vs. Time	2
Phase/Freq Error	3
Output RF Spectrum	4
Reserved for future use	5
Reserved for future use	6
Reserved for future use	7
Reserved for future use	8
Reserved for future use	9
Reserved for future use	10
GBER	11

Bit 12  
STATUS  
OPERATION  
NMRREADY

## Status Reporting Structure for the AMPS Registers

### STATUS QUESTIONABLE ERRORS AMPS

Extension Bit	0
+100 Messages	1
+200 Messages	2
+300 Messages	3
+400 Messages	4
+500 Messages	5
+600 Messages	6
+700 Messages	7
+800 Messages	8
+900 Messages	9
Reserved for future use	10
Reserved for future use	11
Reserved for future use	12
Reserved for future use	13
MUI Maskable Message	14

Bit 3  
STATUS  
QUESTIONABLE  
ERRORS

### STATUS OPERATION NMRREADY AMPS

Extension Bit	0
Analog Transmit Power	1
Frequency Stability	2
Frequency Modulation	3

Bit 3  
STATUS  
OPERATION  
NMRREADY

## Status Reporting Structure for the DIGital136 Registers

### STATUS QUESTIONABLE ERRORS DIGITAL 136

Extension Bit	0	
+100 Messages	1	
+200 Messages	2	
+300 Messages	3	
+400 Messages	4	
+500 Messages	5	Bit 4 STATUS QUESTIONABLE ERRORS
+600 Messages	6	
+700 Messages	7	
+800 Messages	8	
+900 Messages	9	

### STATUS OPERATION NMRREADY DIGITAL 136

Extension Bit	0	
Digital Transmit Power	1	
Modulation Accuracy	2	
Adjacent Channel Power	3	Bit 4 STATUS OPERATION NMRREADY
Loopback BER	4	
Digital IQ Adjust	5	
Digital Dynamic Power	6	



## Status Reporting Structures for the TA136 Registers

### STATUS QUESTIONABLE ERRORS TA136

Extension Bit	0	
+100 Messages	1	
+200 Messages	2	
+300 Messages	3	
+400 Messages	4	
+500 Messages	5	Bit 5 STATUS QUESTIONABLE ERRORS
+600 Messages	6	
+700 Messages	7	
+800 Messages	8	
+900 Messages	9	

## Status Reporting Structure for the DIGital95 Registers

### STATUS QUESTIONABLE ERRORS DIGITAL 95

Extension Bit	0	
+100 Messages	1	
+200 Messages	2	
+300 Messages	3	
+400 Messages	4	
+500 Messages	5	
+600 Messages	6	Bit 6 STATUS QUESTIONABLE ERRORS
+700 Messages	7	
+800 Messages	8	
+900 Messages	9	
Reserved for future use	10	
Reserved for future use	11	
Reserved for future use	12	
Reserved for future use	13	
MUI Maskable Message	14	

## Status Reporting Structure for the DIGital 2000 Registers

### STATUS QUESTIONABLE ERRORS DIGITAL 2000

Extension Bit	0	Bit 7 STATUS QUESTIONABLE ERRORS
+100 Messages	1	
+200 Messages	2	
+300 Messages	3	
+400 Messages	4	
+500 Messages	5	
+600 Messages	6	
+700 Messages	7	
+800 Messages	8	
+900 Messages	9	
Reserved for future use	10	
Reserved for future use	11	
Reserved for future use	12	
Reserved for future use	13	
MUI Maskable Message	14	

### STATUS OPERATION CALL DIGITAL 2000

Extension Bit	0	Bit 7 STATUS OPERATION CALL
F-SCH Synchronized	1	

### STATUS OPERATION NMRREADY DIGITAL 2000

Extension Bit	0	Bit 7 STATUS OPERATION NMRREADY
Handoff Waveform Quality	1	
Code Channel Time and Phase	2	
TDSO Frame Error Rate	3	

## Status Reporting Structure for the CDMA Registers

### STATUS QUESTIONABLE ERRORS CDMA

Extension Bit	0
+100 Messages	1
+200 Messages	2
+300 Messages	3
+400 Messages	4
+500 Messages	5
+600 Messages	6
+700 Messages	7
+800 Messages	8
+900 Messages	9
Reserved for future use	10
Reserved for future use	11
Reserved for future use	12
Reserved for future use	13
MUI Maskable Message	14

Bit 8  
STATUS  
QUESTIONABLE  
ERRORS

### STATUS QUESTIONABLE CALL CDMA

Extension Bit	0
Traffic channel preamble not received	1
Service Option or Radio Configuration rejected by MS	2
Service connect completion not received	3
Call drop timer timed out	4
Reserved for future use	5
Reserved for future use	6
Reserved for future use	7
Reserved for future use	8
Reserved for future use	9
Reserved for future use	10
Reserved for future use	11
Reserved for future use	12
Reserved for future use	13
MUI Maskable Message	14

Bit 8  
STATUS  
QUESTIONABLE  
CALL

**STATUS OPERATION NMRREADY CDMA**

Extension Bit	0	
DA Power	1	
WQuality	2	<b>Bit 8 STATUS OPERATION NMRREADY</b>
C Power	3	
CFERror	4	
CAPPower	5	
TROPwer	6	
GPOWER	7	
CTXSpurious	8	

**Status Reporting Structure for the TA 2000 Registers**

**STATUS QUESTIONABLE ERRORS TA 2000**

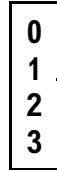
Extension Bit	0	
+100 Messages	1	
+200 Messages	2	
+300 Messages	3	
+400 Messages	4	
+500 Messages	5	Bit 9 STATUS QUESTIONABLE ERRORS
+600 Messages	6	
+700 Messages	7	
+800 Messages	8	
+900 Messages	9	
Reserved for future use	10	
Reserved for future use	11	
Reserved for future use	12	
Reserved for future use	13	
MUI Maskable Message	14	

**STATUS QUESTIONABLE CALL TA 2000**

Extension Bit	0	
Release order not received	1	Bit 9 STATUS QUESTIONABLE CALL
Handoff completion not received	2	
Carrier not detected on new channel	3	
MS reject order received	4	
Reserved for future use	5	
Reserved for future use	6	
Reserved for future use	7	
Reserved for future use	8	
Reserved for future use	9	
Reserved for future use	10	
Reserved for future use	11	
Reserved for future use	12	
Reserved for future use	13	
MUI Maskable Message	14	

**STATUS OPERATION NMRREADY TA 2000**

Reserved for future use  
Reserved for future use  
Reserved for future use  
Reserved for future use



**Bit 9**  
**STATUS**  
**OPERATION**  
**NMRREADY**

## Status Reporting Structure for the FDD Registers

### STATUS QUESTIONABLE ERRORS FDD

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

### STATUS OPERATION NMRREADY FDD

Extension Bit	0	
Thermal Power	1	Bit 2 STATUS OPERATION NMRREADY
Adjacent Channel Leakage	2	
Waveform Quality	3	
Channel Power	4	
Bit Error	5	

## Status Reporting Structure for the WCDMA Registers

### STATUS QUESTIONABLE ERRORS FDD

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

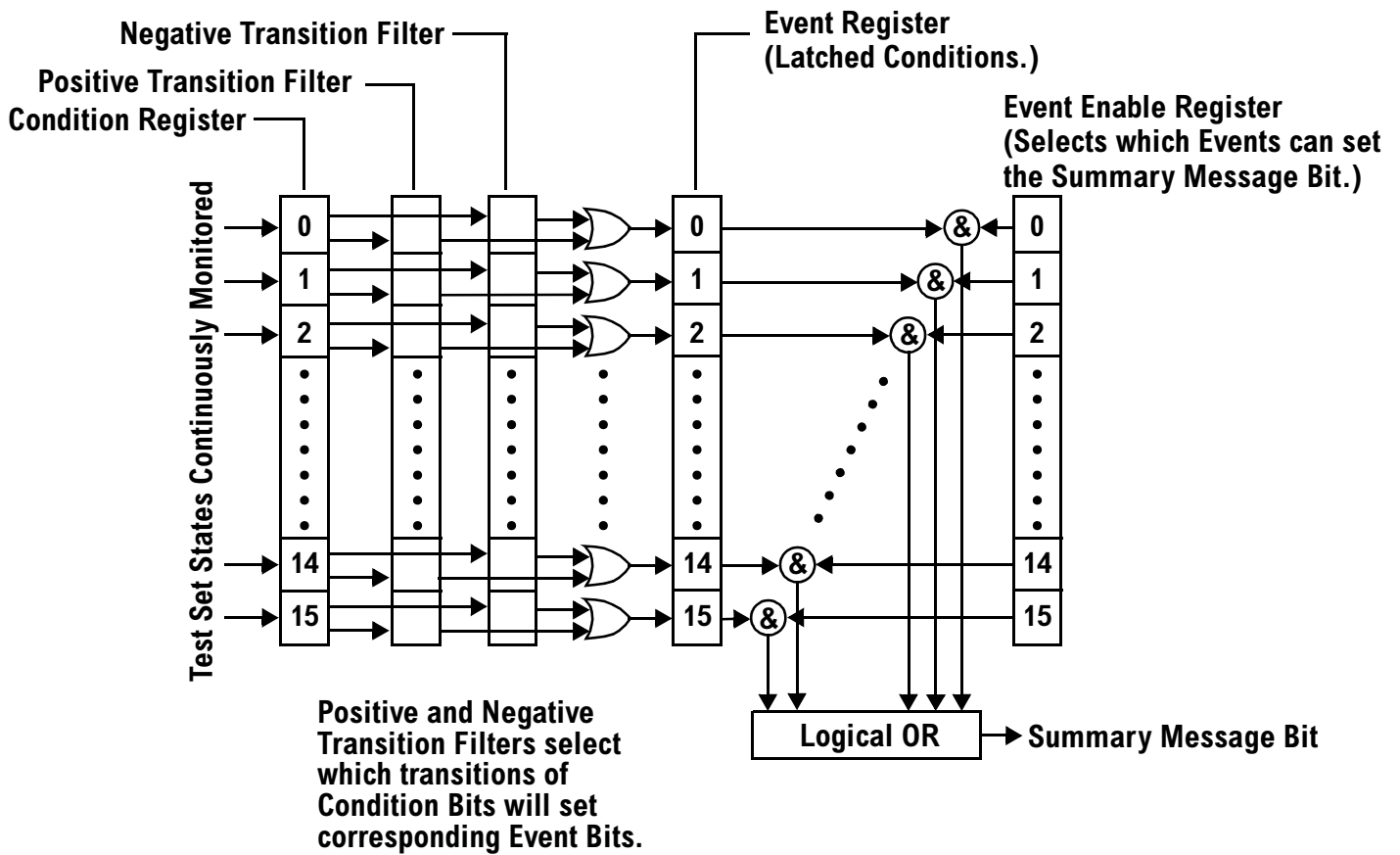
### STATUS OPERATION NMRREADY WCDMA

No bits are defined at this time	0	Bit 2 STATUS OPERATION NMRREADY
	1	
	2	
	3	
	4	
	5	
	6	



### Status Data Structure - Register Model

The generalized status register model consists of a Condition Register, Transition Filters, an Event Register, an Enable Register, and a Summary Message Bit.



### Condition Register

A condition is a test set state that is either TRUE or FALSE (a GPIB command error has occurred or a GPIB command error has not occurred). Each bit in a Condition Register is assigned to a particular test set state. A Condition Register continuously monitors the hardware and firmware states assigned to it. There is no latching or buffering of any bits in a Condition Register; it is updated in real time. Condition Registers are read-only. Condition Registers in the test set are 16 bits long and may contain unused bits. All unused bits return a zero value when read.

**Transition Filters** In the test set, the Transition Filters are implemented as two registers: a 16-bit positive transition (PTR) register and a 16-bit negative transition (NTR) register.

For each bit in the Condition Register, a Transition Filter bit determines the state transitions which will set a corresponding bit in the Event Register. Transition Filters may be set to pass positive transitions (PTR), negative transitions (NTR) or either (PTR or NTR). A positive transition refers to a condition bit which has changed from 0 to 1. A negative transition refers to a condition bit which has changed from 1 to 0.

A positive transition of a bit in the Condition register will be latched in the Event Register if the corresponding bit in the positive transition filter is set to 1. A positive transition of a bit in the Condition register will not be latched in the Event Register if the corresponding bit in the positive transition filter is set to 0.

A negative transition of a bit in the Condition register will be latched in the Event Register if the corresponding bit in the negative transition filter is set to 1. A negative transition of a bit in the Condition register will not be latched in the Event Register if the corresponding bit in the negative transition filter is set to 0. Either transition (PTR or NTR) of a bit in the Condition Register will be latched in the Event Register if the corresponding bit in both transition filters is set to 1. No transitions (PTR or NTR) of a bit in the Condition Register will be latched in the Event Register if the corresponding bit in both transition filters is set to 0.

Transition Filters are read-write.

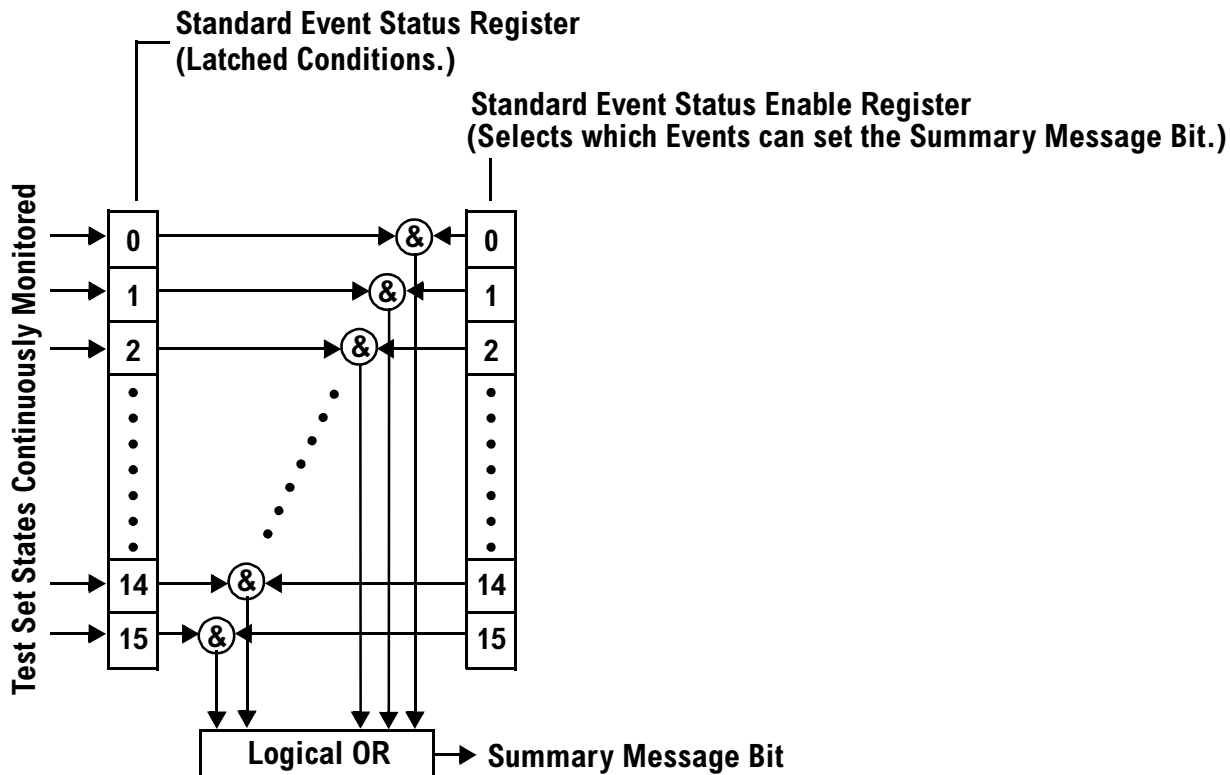
Transition Filters are unaffected by a \*CLS (clear status) command.

Transitions Filters are set to pass positive transitions (all 16 bits of the PTR register are set to 1 and all 16 bits of the NTR register are set to 0) at power on or after receiving the \*RST (reset) command.

**Event Register** The Event Register captures bit-state transitions in the Condition Register as defined by the Transition Filters. Each bit in the Event Register corresponds to a bit in the Condition Register. Bits in the Event Register are latched, and, once set, they remain set until cleared by a query of the Event Register or a \*CLS (clear status) command. This guarantees that the application can't miss a bit-state transition in the Condition Register. There is no buffering; so while an event bit is set, subsequent transitions in the Condition Register corresponding to that bit are ignored. Event Registers are read-only. Event Registers in the test set are 16 bits long and may contain unused bits. All unused bits return a zero value when read.

**Event Enable Register** The Event Enable Register defines which bits in the Event Register will be used to generate the Summary Message. Each bit in the Enable Register has a corresponding bit in the Event Register. The test set logically ANDs corresponding bits in the Event and Enable registers and then performs an inclusive OR on all the resulting bits to generate the Summary Message. By using the enable bits the application program can direct the test set to set the Summary Message to the 1 or TRUE state for a single event or an inclusive OR of any group of events. Enable Registers are read-write. Enable Registers in the test set are 16 bits long and may contain unused bits which correspond to unused bits in the associated Event Register. All unused bits return a zero value when read and are ignored when written to. Enable Registers are unaffected by a \*CLS (clear status) command or queries.

### Standard Event Status Register Model

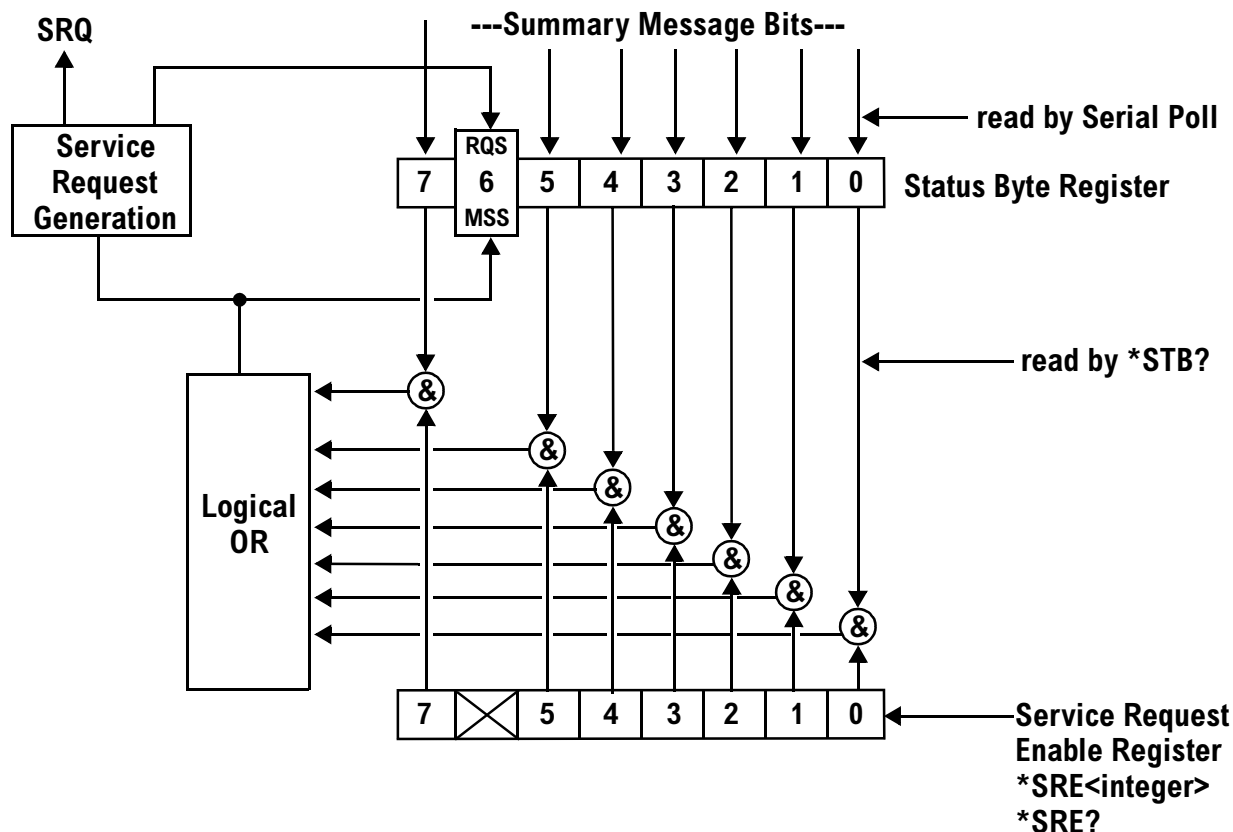


**Summary Message Bit** The Summary Message is a single-bit message which indicates whether or not one or more of the enabled events have occurred since the last reading or clearing of the Event Register. The test set logically ANDs corresponding bits in the Event and Enable registers and then performs an inclusive OR on all the resulting bits to generate the Summary Message. By use of the enable bits, the application program can direct the test set to set the Summary Message to the 1, or TRUE, state for a single event or an inclusive OR of any group of events.

The Summary Message is TRUE, logic 1, if the register contains some information and an enabled event in the Event Register is set TRUE.

The Summary Message is FALSE, logic 0, if the queue is empty and no enabled events are TRUE. Registers can be cleared by reading all the information from the queue. Registers can also be cleared using the \*CLS (clear status) command.

## Service Request Enabling Register Model



**Status Byte Register** The Status Byte Register is an 8 bit register that provides single bit summary messages, each summary message summarizes and overlaying status data structure. Summary messages always track the current status of the associated status data structure. Service request enabling determines if one or more of the summary messages will generate a message. Device status reporting is defined in IEEE 488.2-1992, 11.1.

The Status Byte Register contains the STB and RQS (or MSS) messages from the test set. The Status 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 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” on page 593](#)

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## 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:DAPOWER:COUNT 10" !Enters a Digital Average Power count
                                         !of 10, and turns the Digital Average Power
                                         !multi-measurement state on.
```

### Related Topics

["Measurement Progress Report"](#)

---

## 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, its 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"](#)

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## 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.

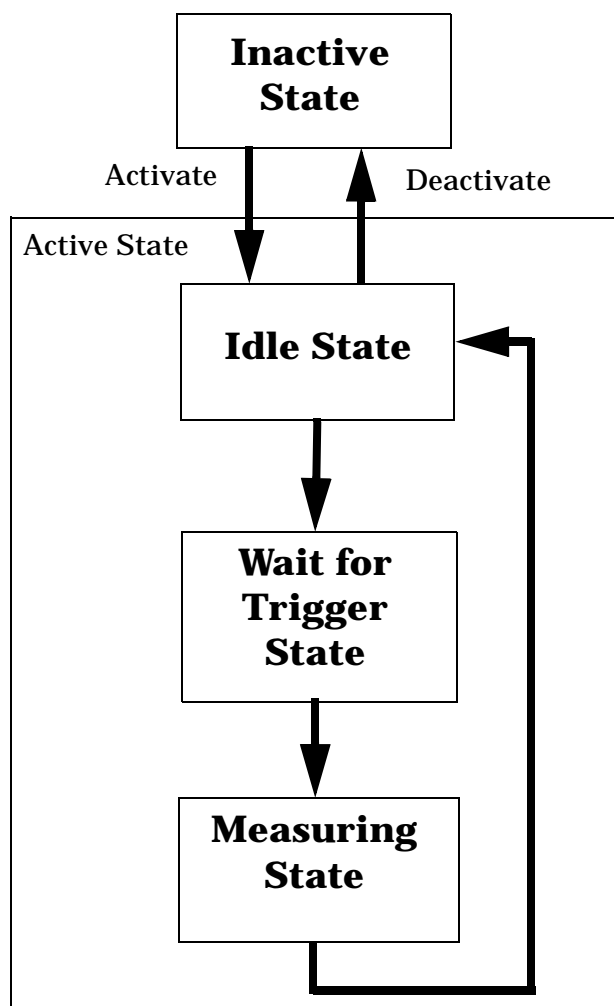


## Triggering Process Description

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 20. The Test Set's Measurement States**



## Measurement States

The following examples describe states of the test set under various conditions. Refer to [Figure 20. on page 241.](#)

### Example 17. 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 18. 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 19. 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 20. 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 13. 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”](#)

## 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 14.**

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 14.**

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 14.**

Integrity Indicator Number	Integrity Indicator Message
17	<p>Can not Correlate: Indicates that the test sets internally generated reference signal does not correlate with the received signal.</p> <p>Some conditions that could cause this integrity indicator result include the following:</p> <ul style="list-style-type: none"> <li>• an input signal that is corrupted</li> <li>• the input signal is extremely distorted</li> <li>• the input signal is off by more than 10 ms.</li> <li>• the frequency of the input signal deviates more than allowed</li> <li>• something is wrong with the long-code mask coming from the mobile ID</li> </ul>
18	<p>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.</p>
19	<p>Uncalibrated Due To Temperature: Indicates that the current temperature of the test set is different than the calibration data temperature by more than <math>\pm 10</math> degrees C, when attempting a Channel Power Measurement.</p>
20	<p>Potential Receiver Saturation: Indicates that an input signal immediately prior to the measured input was high enough to potentially saturate the receiver hardware.</p>
21	<p>Parameter Error: Indicates that a measurement setup parameter has been set in a way that gives invalid measurement results.</p>
22	<p>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.</p>
23	<p>Call Processing Operation Failed: Indicates that a call processing operation, (base station emulator) needed in the course of making the measurement could not complete.</p>

## 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

["Reading Error Messages"](#)

---

# 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.

## Example

```
OUTPUT 714;"FETCH:DAPOWER:ICOUNT?" !Returns the approximate number of
                                     !multi-measurement cycles completed during a
                                     !multi-measurement count cycle
```

## Related Topics

["Statistical Measurement Results"](#)



---

## 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.

### Related Topics

[“Block Diagram”](#)

---

## 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.

## Dealing With Semicolon Separated Response Data Lists

One possible workaround is to enter all the data into a single string variable, replace all semicolons with line feeds and then enter the data from the string into the individual data items. For example:

```
DIM Response$(500)
!
!
OUTPUT 714;"CALL:MS:REP:IMSI?;PCL?;REV?;SBAN?;ONUM?;MCC?;MNC?;LAC?"
ENTER 714;Response$
Semicolon=POS(Response$,";")
WHILE Semicolon
Response$[Semicolon,Semicolon]=CHR$(10)
Semicolon=POS(Response$,";")
END WHILE
ENTER Response$;Imsi$,Pcl,Rev$,Sban$,Onum$,Mcc,Mnc,La
```

### Semicolon Separated Response Data Lists Containing Only Numeric Data Types

Semicolon separated response data lists containing only numeric data types do not present the types of problem associated with semicolon separated response data lists containing mixed data types. The number building routines in most languages will use any non-numeric character (that is, anything other than +/- 0123456789 E.) as the data item terminator. Consequently when the number building routines encounter the semicolon the data item is terminated. The following example illustrates this:

```
OUTPUT 714;"FETCH:TXP:INT?;POW:MIN?;MAX?"
ENTER 714;Integrity,Min_power,Max_power
```

# 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 494](#) for more details about this query.

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

- "CPOW" - The channel power measurement results are available.
- "DAP" - The digital average power measurement results are available.
- "WQU" - 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 498](#). 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 498](#). This would indicate that all measurements results are available or none have been initiated.

## Programming Example

The following example assumes that the mobile is transmitting on a digital traffic channel and no measurements other than digital TX power (DTXP) and digital modulation accuracy (MACC) are being triggered. See [“Transition Filters” on page 233](#).

```

10 OUTPUT 714;"SETup:DAPower:CONTinuous OFF" !Sets digital average power
20                                     !trigger mode to single.
30 OUTPUT 714;"SETUP:WQQuality:CONTinuous OFF" !Sets wavrform quality
40                                     !trigger mode to single.
50 OUTPUT 714;"INITiate:DAPower;WQQuality" !Begin digital average power and
60                                     !waveform quality measurements.
70 REPEAT
80 OUTPUT 714;"INITiate:DONE?" !Queries the test set for measurements
90                                     !that are done
100 ENTER 714;Meas_done$ !String value representing DONE measurements,
```

## Measurement Event Synchronization

```
110             ! NONE if no measurements are done.
120 SELECT Meas_done$ !This variable will be set to WAIT until measurements
130             !are DONE.
140 CASE "DAP" !Characters must be upper case.
150 OUTPUT 714;"FETCH:DAPower?" !If this case is selected,
160             !digital average power is FETCHed.
170 ENTER 714;Integrity,Dapower_meas
180 PRINT "Digital Average Power is ";Dapower_meas
190 CASE "WQU" !Characters must be uppercase.
200 OUTPUT 714;"FETCH:WQuality:RHO?" !If this case is selected,
210             !the rho measurement is FETCHed.
220 ENTER 714;rho_meas
230 PRINT "Rho is ";rho_meas
240 END SELECT
250 UNTIL Meas_done$="NONE" !When all triggered measurements have completed,
260             !the INITiate:DONE? query returns NONE.
270 END
```

## Operating Considerations

Only one indicator is returned per query.

To ensure that when a measurement completes it will remain in a state that qualifies it as DONE, use the SETup subsystem to set all active measurements to single (CONTinuous:OFF) trigger mode.

---

## Call Processing State Synchronization

### Call Processing State Query

The CALL:STATUS:STATE query returns the current call processing state.

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

- “IDLE”  
Idle is returned when the test set is not on a call.
- “PAG”  
Paging is returned when the test set is in the process of paging the MS.
- “CALL”  
Call is returned when an alert message is sent to the MS during a call setup due to a page.
- “CONN”  
Connected is returned when the test set and the MS are connected on a call.
- “APR”  
Access probe is returned when the test set has received an access probe.
- “REL”  
Releasing is returned when the test set is in the process of releasing the MS from a call using over the air signalling as part of a MS or BS originated release procedure.
- “HAND”  
Handoff is returned when the test set is in the process of handing off the MS.
- “REG”  
Registering is returned when the test set is in the process of performing a registration with the MS.

The following command returns the current state of a call:

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

See the [“Instrument Status Area” on page 721](#) for call processing state information.

## Description

### Connected/Idle Query

This query will determine if a call is connected or disconnected by returning an integer value. The value indicates if the call state is idle or connected, not if any call state change has occurred.

Query returns one of the following:

- 0 = idle
- 1 = connected

If the call is in the setup request, proceeding, alerting, or disconnecting state, this command will not return a value until the call status proceeds to either connected or idle.

```
OUTPUT 714;"CALL:CONNECTED:STATE?"
```

### Example 21. 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 22. 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 originated call. Continue when done."
50  PAUSE
60  OUTPUT 714;"CALL:CONNECTED:STATE?" ! The connected/idle query.
70  ENTER 714;Call_connected
80  IF Call_connected=1 THEN
90      DISP "Call is connected."
100     WAIT 2
110     ELSE
120     DISP "Call is not connected."
130     WAIT 2
140     END IF
150     END
```

**Call State Change Detector Timeout** If a state change does not occur, the user needs a way to control how long to wait for the change detector. The change detector is disarmed by the timeout timer. After a timeout, the connected/idle query will return a 1 for connected or a 0 for idle. The timeout timer is user settable, but the user setting is only applied during mobile station originated call processing operations. For base station originated call processing operations, the timeout timer is automatically set to 60 seconds by the test set.

## **Related Topics**

[“CALL:CONNEcted:TIMEout” on page 302](#)

[“CALL:CONNEcted:ARM\[:IMMEdiate\]” on page 301](#)

[“CALL:STATus\[:STATe\]?” on page 406](#)

[“Instrument Status Area” on page 721](#)

---

## 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 15. 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.	<pre> 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 </pre> <p>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</p>
: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.	<pre> OUTPUT 714; "CALL:TCH:SEQ 65" </pre> <p>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.</p>
:WAIT	Forces the test set to wait until the associated command's pending operation flag is false before executing any more commands.	<pre> 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 </pre> <p>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.</p>

**Table 15. 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.	<pre> 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 </pre> <p>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.</p>

### Operating Considerations

When using the call processing subsystem overlapped command synchronization commands, check the conditions that set the operation's pending operation flag (POF) false to avoid unexpected results.

## Call Processing Subsystem Overlapped Commands

**Table 16. Overlapped Commands**

Call Processing Command	Purpose Of Command	Pending Operation Flag (POF) is false when
CALL:ORIGinate See "CALL:ORIGinate" .	Performs a base station call origination.	The call processing state leaves the Idle state (when the operating mode is active cell), or  The test set has noted this parameter change (when the operating mode is test mode).
CALL:REGister See "CALL:REGister" .	Performs a zone-based (forced) registration.	The mobile station has responded to the registration.
CALL:CONNected:ARM[:IMMediate] See "CALL:CONNected[:STATE]" .	Arms the call control status change detector.	The call control status change detector has been disarmed.  See "Connected/Idle Query" .

## **Related Topics**

[“Call Processing State Synchronization” on page 255](#)

[“Test System Synchronization Overview” on page 263](#)

[“Measurement Event Synchronization” on page 253](#)

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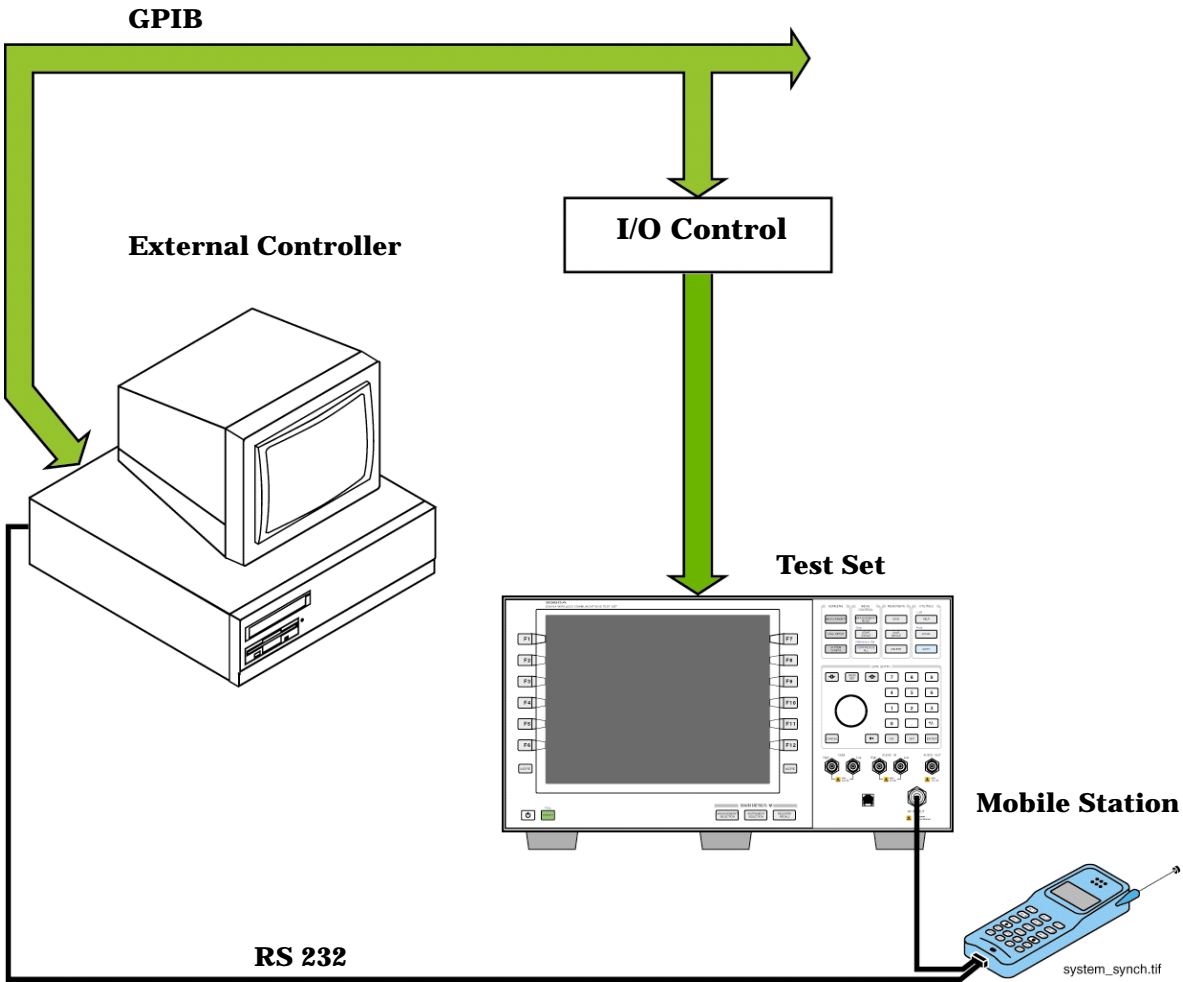
## Test System Synchronization Overview

### 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 21. 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 401](#)  
This command queries the test set's current call processing state. This command supports synchronization method five. See [“Call Processing State Synchronization” on page 255](#).
- [“CALL:STATus” on page 401](#)  
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 256](#). 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 260](#).
- :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 260](#).
- :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 260](#).
- [“INITiate:DONE?” on page 497](#)  
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 497](#).

- **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 606](#) 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” on page 593](#).
- **“SYSTEM:SYNChronized” on page 671**  
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 600](#). This command supports synchronization four and six.
- **“\*OPC” on page 676, “\*OPC?” on page 676, and “\*WAI” on page 677 (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 255](#)

[“Measurement Event Synchronization” on page 253](#)

[“Call Processing Event Synchronization” on page 259](#)

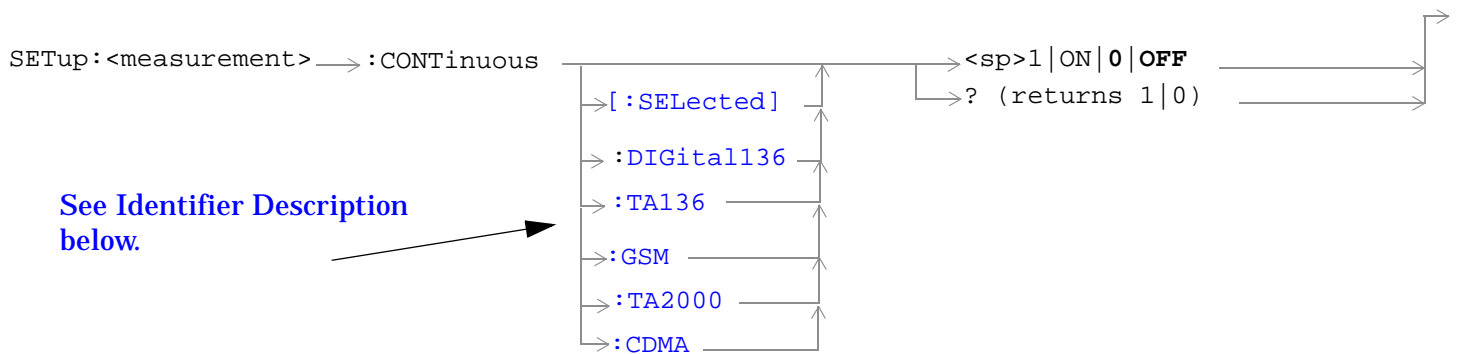
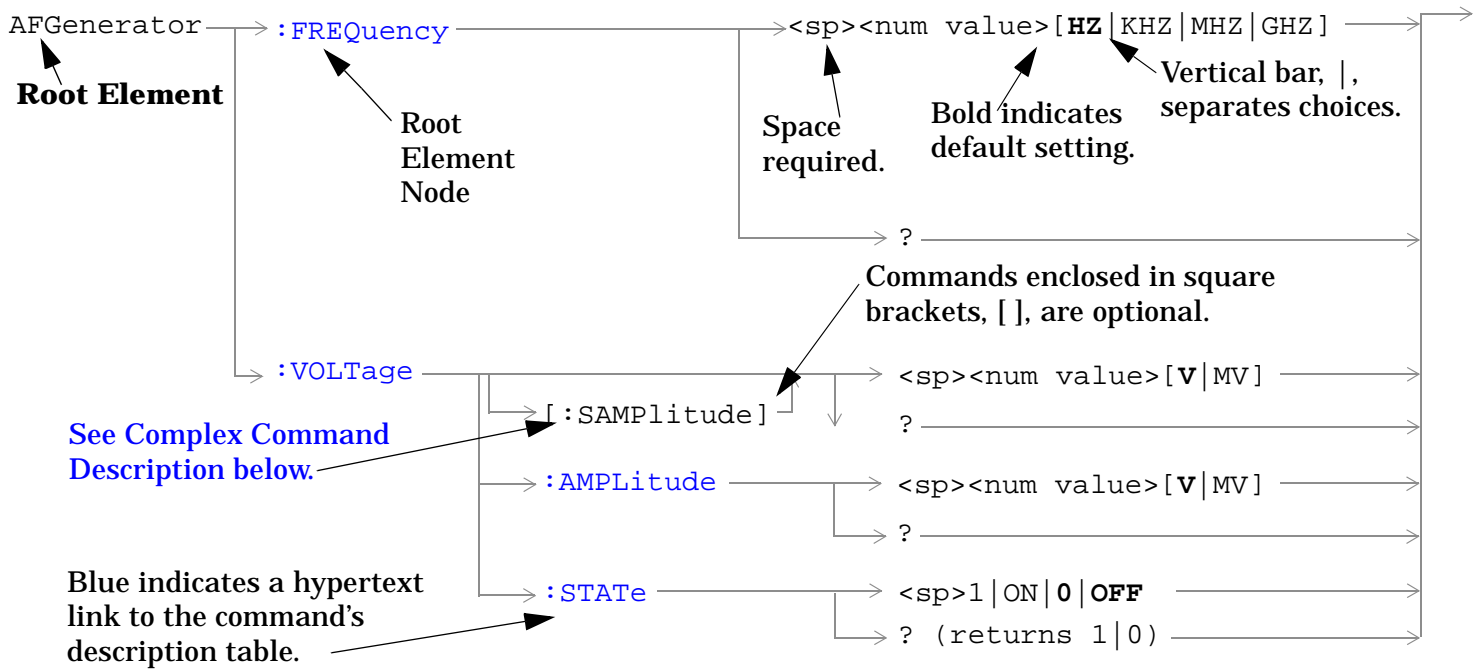
[“SYSTEM:SYNChronized” on page 671](#)

---

# 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.

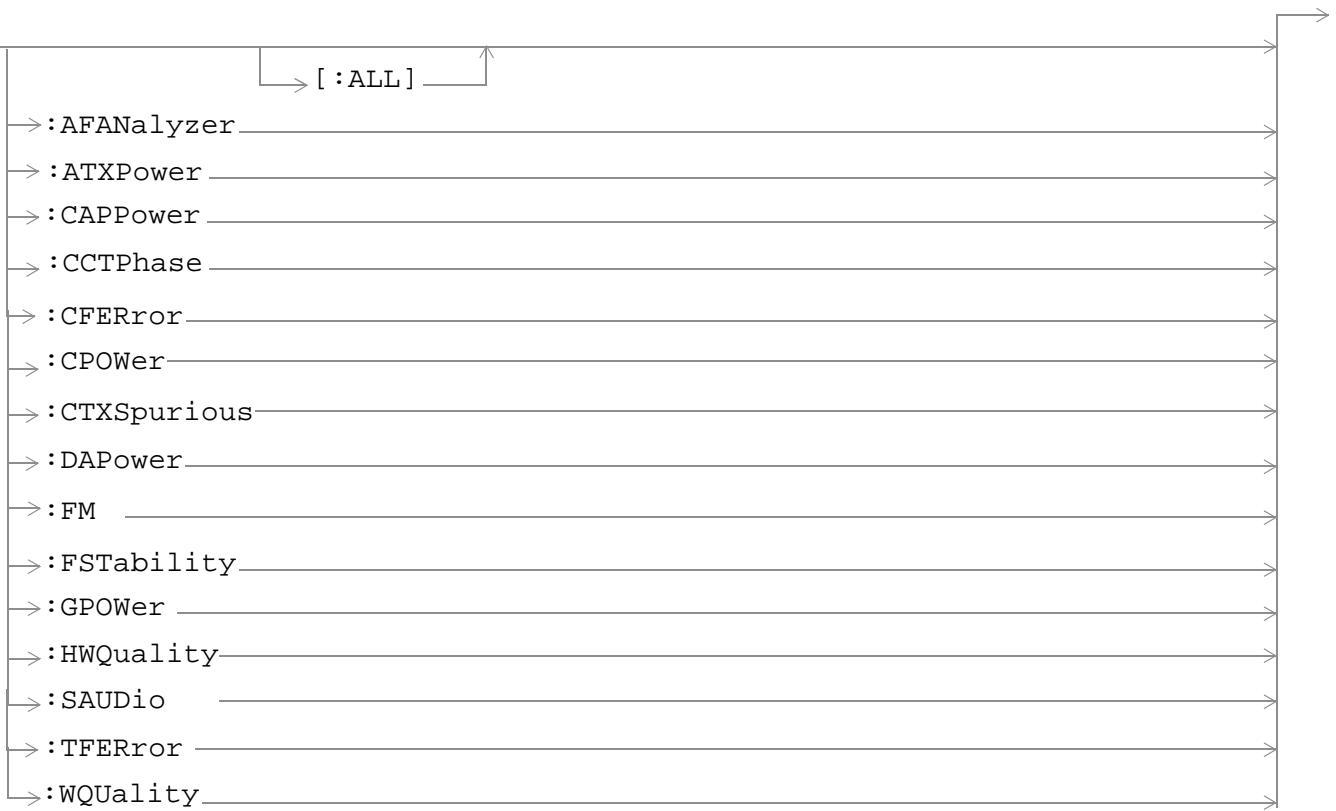
READ:<meas>? will execute an ABORt:<meas> action that aborts just one trigger sequence and then combines the INITiate and FETCh? commands.

### Syntax Diagram and Command Descriptions

“ABORt”

# ABORt

ABORt



“Diagram Conventions” on page 268

## ABORt

### ABORt[:ALL]

Function	<p>Stops all measurements that are active.</p> <p>If the trigger arm is set to single, the measurements will go to the idle state.</p> <p>If the trigger arm is set to continuous, the measurements will re-arm and initiate again.</p>
Setting	<p>Range</p> <ul style="list-style-type: none"><li>• AFANalyzer - AF Analyzer measurement</li><li>• ATXPower - Analog Transmitter Power measurement</li><li>• CAPPower - Access Probe Power measurement</li><li>• CCTPhase - Code Channel Time/Phase error measurement</li><li>• CPOWer - Channel Power measurement</li><li>• CFERror - Frame Error Rate measurement</li><li>• CTXSpurious - TX Spruious Emmissions measurement</li><li>• FSTability - Frequency Stability measurement</li><li>• FM - Frequency Modulation measurement</li><li>• GPOWer - Gated Power measurement</li><li>• HWQuality - Handoff Waveform Quality measurement</li><li>• SAUDio - Swept Audio measurement</li><li>• TFERror - TDSO Frame Error Rate measurement</li><li>• WQQuality - Waveform Quality measurement</li></ul>
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"ABORT:ALL" !Aborts all active measurements in progress.</pre>	

### ABORt:<meas-mnemonic>

Function	<p>Stops the selected measurement if it is active.</p> <p>If the trigger arm is set to single, the measurements will go to the idle state.</p> <p>If the trigger arm is set to continuous the measurements will re-arm and initiate again.</p>
----------	--



<p><b>Setting</b></p>	<p><b>Range</b></p> <ul style="list-style-type: none"> <li>• AFANalyzer - AF Analyzer measurement</li> <li>• ATXPower - Analog Transmitter Power measurement</li> <li>• CAPPower - Access Probe Power measurement</li> <li>• CCTPhase - Code Channel Time/Phase error measurement</li> <li>• CPOWer - Channel Power measurement</li> <li>• CFERror - Frame Error Rate measurement</li> <li>• CTXSpurious - TX Spruious Emmissions measurement</li> <li>• FSTability - Frequency Stability measurement</li> <li>• FM - Frequency Modulation measurement</li> <li>• GPOWer - Gated Power measurement</li> <li>• HWQuality - Handoff Waveform Quality measurement</li> <li>• SAUDio - Swept Audio measurement</li> <li>• TFERror - TDSO Frame Error Rate measurement</li> <li>• WQQuality - Waveform Quality measurement</li> </ul>
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"ABORT:WQUALITY" !Aborts the waveform quality/code domain power measurements.</pre>	

---

## AFGenerator Subsystem

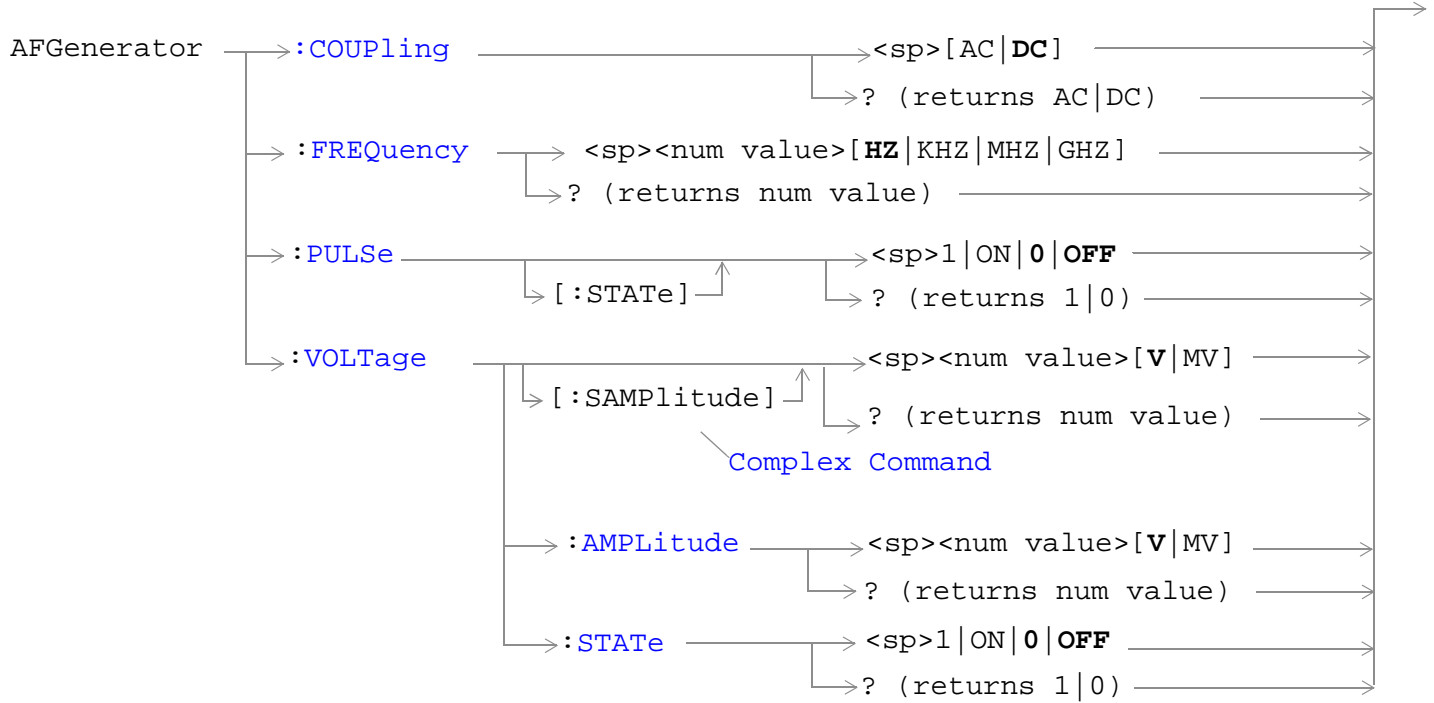
### Description

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 275](#)

# AFGenerator



[“Diagram Conventions” on page 268](#)

**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
<b>Programming Example</b> 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
<b>Programming Example</b> 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)
<b>Programming Example</b> 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: <ul style="list-style-type: none"> <li>• 0.5 mV pk. &lt;= 1 V pk. output</li> <li>• 5 mV pk. &gt; 1 V pk. output</li> </ul>
Query	Range: 0 to 9 V pk. Resolution: <ul style="list-style-type: none"> <li>• 0.5 mV pk. &lt;= 1 V pk. output</li> <li>• 5 mV pk. &gt; 1 V pk. output</li> </ul>
*RST setting	0 V
<b>Programming Example</b>	
<pre>OUTPUT 714;"AFGENERATOR:VOLTAGE 2.1" !Sets the state to on and the output !voltage to 2.1 volts.</pre>	

**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: <ul style="list-style-type: none"> <li>• 0.5 mV pk. &lt;= 1 V pk. output</li> <li>• 5 mV pk. &gt; 1 V pk. output</li> </ul>
Query	Range: 0 to 9 V pk. Resolution: <ul style="list-style-type: none"> <li>• 0.5 mV pk. &lt;= 1 V pk. output</li> <li>• 5 mV pk. &gt; 1 V pk. output</li> </ul>
*RST setting	0 V
<b>Programming Example</b>	
<pre>OUTPUT 714;"AFGENERATOR:VOLTAGE:AMPLITUDE 1.414" !Sets the audio generator output !voltage to 1.414 volts peak.</pre>	

## AFGenerator

### AFGenerator:VOLTage:STATE

Function	Sets/queries the audio generator state
Setting	0   OFF   1   ON
Query	0   1
*RST setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"AFGENERATOR:VOLTAGE:STATE ON" !Set the audio generator state to ON.	

---

## CALibration Subsystem

### Description

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

- I/Q calibration
- Channel Power calibration
- Digital Average Power calibration

### Calibration Procedures

- I/Q calibration

This calibration is required if the Baseband Generator or the Vector Output modules are serviced or swapped. The CALibration:IQ subsystem should not be used as part of frequent (i.e. daily, weekly or monthly) test set calibration.

- Channel Power calibration

Channel Power calibration takes about two minutes.

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

This calibration generates calibration data for channel power measurements (see [“Channel Power Measurement Description”](#)), access probe power measurements, and other test set functions.

During calibration the internal temperature of the test set will be measured and calibration data will be generated that covers the measurement amplitude range of the available frequency bands. During channel power measurements, the test set will once again measure the internal temperature and calibrate the temperature measurement that was made when calibration data was generated.

An integrity bit is set true and is returned with Channel Power measurement results when the measurement is uncalibrated due to temperature drift. See [“Integrity Indicator”](#).

---

**NOTE** Channel power calibration data is also used when performing test set functions other than channel power measurements. Waveform quality measurements are one such function.

---

- Digital Average Power calibration

Digital average power measurement (see [“Digital Average Power Measurement Description”](#)) calibration loops back a CDMA signal from within the test set to the average power meter to generate a table of calibration values.

Digital Average Power measurement calibration takes about ten minutes.

During Digital Average Power calibration no power should be applied to the front panel RF IN/OUT connector.

Power must be cycled off then back on after the Digital Average Power calibration routine has completed.

Remotely initiating any of the calibration routines is accomplished through the use of single query-only header. The test set returns a numeric value indicating the outcome of the calibration attempt.

Manually initiating the IQ calibration routines requires pressing the SYSTEM CONFIG hardkey, then pressing the 1 of 2 hardkey, then pressing the Service softkey. Manually initiating the channel power or digital average power calibrations is performed by selecting the measurement and pressing a softkey.

## Recommended Calibration Intervals

**Table 17.**

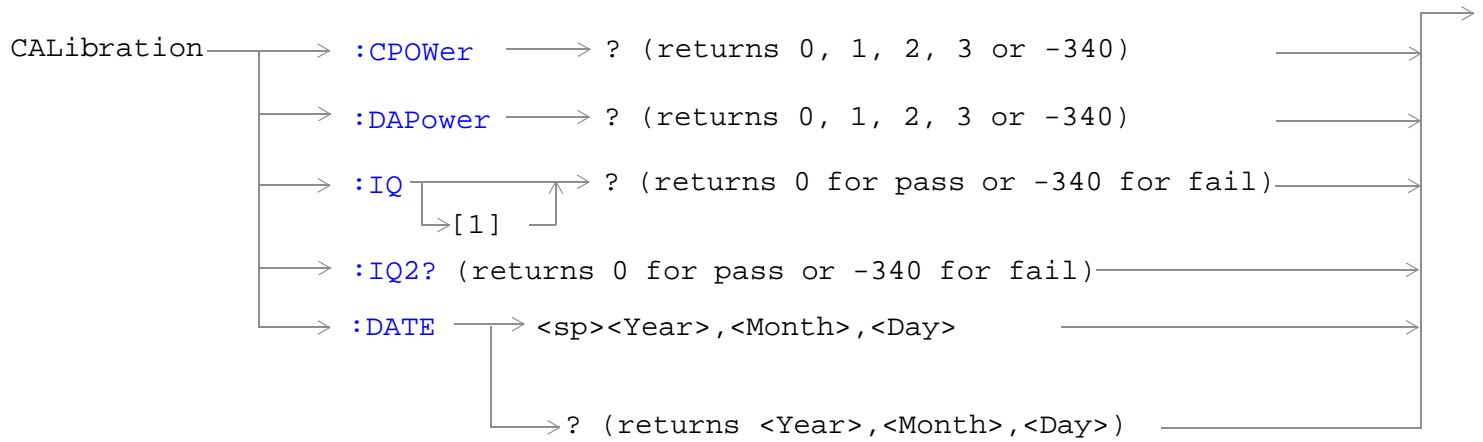
Condition:	Calibrating Channel Power Measurements	Calibrating Digital Average Power Measurements	I/Q Calibration
When Test Set is being used for the first time (allow 30-minute warmup period).	✓		
After firmware is upgraded	✓		
If the ambient temperature changes more than 5 degrees C since latest calibration	✓		
Every month	✓		

## Syntax Diagram and Command Descriptions

“CALibration”



## CALibration



[“Diagram Conventions” on page 268](#)

**CALibration:CPOWer?**

Function	Initiates IF level calibration used by access probe power and channel power measurements. No other GP-IB commands are processed until this calibration has completed.
Query	Range <ul style="list-style-type: none"> <li>• 0 = Calibration passed</li> <li>• 1 = Channel power calibration failed due to temperature drift. Wait for temperature to stabilize.</li> <li>• 2 = Channel power calibration failed due to oven temperature out of range.</li> <li>• 3 = Channel power calibration failed due to loopback switch problem.</li> <li>• -340 = Calibration failed</li> </ul>
<b>Programming Example</b> <pre>OUTPUT 714;"CALIBRATION:CPOWer?" !Initiates the IF level calibration process and queries the pass/fail result.</pre>	

**CALibration:DAPower?**

Function	Initiates digital average power measurement calibration. RF power must not be applied to the test set's front panel RF IN/OUT connector during calibration. Digital average power measurement calibration will take about 10 minutes. Power must be cycled when digital average power measurement calibration has completed. No other GP-IB commands are processed until this calibration has completed.
Query	Range <ul style="list-style-type: none"> <li>• 0 = Calibration passed</li> <li>• 1 = Digital average power calibration failed due to temperature drift. Wait for temperature to stabilize.</li> <li>• 2 = Digital average power calibration failed due to oven temperature out of range.</li> <li>• 3 = Digital average power calibration failed due to loopback switch problem.</li> <li>• -340 = Calibration failed</li> </ul>
<b>Programming Example</b> <pre>OUTPUT 714;"CALIBRATION:DAPower?" !Initiates the digital average power measurement calibration process and queries the pass/fail result.</pre>	

**CALibration:IQ[:1]?**

Function	Sets/queries the calibration of the IQ modulator for RF generator 1. It takes some time to complete calibration and can't be aborted except by cycling the power switch. <ul style="list-style-type: none"> <li>Calibrates the IQ modulator for RF generator 1.</li> <li>Returns a value indicating success or failure of calibration.</li> </ul>
Query	Range <ul style="list-style-type: none"> <li>0 = Pass</li> <li>-340 = Fail</li> </ul>
<b>Programming Example</b> OUTPUT 714;"CALIBRATION:IQ1?" !Performs a calibration of the IQ modulator for RF generator 1 and returns 0 or -340	

---

**NOTE** When the the calibration is done the test set display will display:  
IQ Calibration completed successfully for modulator 1.

---

**CALibration:IQ2?**

Function	Sets/queries the calibration of the IQ modulator for RF generator 2. It takes some time to complete calibration and can't be aborted except by cycling the power switch. <ul style="list-style-type: none"> <li>Calibrates the IQ modulator for RF generator 2.</li> <li>Returns a value indicating success or failure of calibration.</li> </ul>
Query	Range <ul style="list-style-type: none"> <li>0 = Pass</li> <li>-340 = Fail</li> </ul>
<b>Programming Example</b> OUTPUT 714;"CALIBRATION:IQ2?" !Performs a calibration of the IQ modulator for RF generator 2 and returns 0 or -340	

---

**NOTE** When the the calibration is done the test set display will display:  
IQ Calibration completed successfully for modulator 2.

---

## CALibration

### CALibration:DATE

Function	Sets/queries the date of the last system calibration done to the test set; not the IQ calibration date. Returns a comma separated list YYYY,MM,DD in that order.
Setting	Sets the system calibration date. Range <ul style="list-style-type: none"><li>• Year = 0000 to 9999</li><li>• Month = 01 to 12</li><li>• Day = 01 to 31</li></ul>
Query	Returns the date when system calibration was performed. Range <ul style="list-style-type: none"><li>• Year = 0000 to 9999</li><li>• Month = 1 to 12</li><li>• Day = 1 to 31</li></ul>
<b>Programming Example</b>  OUTPUT 714;"CALIBRATION:DATE 1999,01,04" !Sets the date of the last system calibration year, month and day.	

# CALL Subsystem

## Description

The CALL subsystem handles all setup, control, and query functions for call processing. This includes mobile station (MS) and Base Station (cell) functions.

## Syntax Diagrams and Command Descriptions

- “CALL:ACC” on page 287
- “CALL[:CELL]:APARAmeter” on page 288
- “CALL:AVCTest” on page 292
- “CALL:AWGNoise:POWer” on page 293
- “CALL:BAND” on page 296
- “CALL:CHANnel” on page 297
- “CALL[:CELL]:CLPControl” on page 299
- “CALL:CONNected[:STATe]” on page 300
- “CALL[:CELL]:CONTRol:DOWNlink:FREQuency:AUTO” on page 304
- “CALL:D2KTest” on page 305
- “CALL:END” on page 307
- “CALL[:CELL]:ESCAPE[:MODE]” on page 308
- “CALL:FCHannel” on page 309
- “CALL:FM” on page 312
- “CALL:HANDoff” on page 316
- “CALL[:CELL]:MCCode” on page 317
- “CALL[:CELL]:MNCode” on page 318
- “CALL:MS:ANALog” on page 319
- “CALL:MS:REPorted:<BCL,BWT>” on page 320
- “CALL:MS:REPorted:CAPability:CCHannel:DEDicated” on page 321
- “CALL:MS:REPorted:CAPability:FCHannel” on page 323
- “CALL:MS:REPorted:CAPability:QUERy” on page 325
- “CALL:OCNSource” on page 351
- “CALL[:CELL]:OPERating” on page 353
- “CALL:ORIGinate” on page 354
- “CALL:PAGing” on page 356
- “CALL:PILOt” on page 361
- “CALL[:CELL]:PNOFfset” on page 363
- “CALL[:CELL]:POWer” on page 364
- “CALL[:CELL]:PROTOcol” on page 368
- “CALL:QPCHannel” on page 370
- “CALL[:CELL]:RCONfig” on page 373
- “CALL:REGister” on page 374
- “CALL[:CELL]:RFGenerator” on page 377
- “CALL[:CELL]:RLGain” on page 378
- “CALL:SCHannel” on page 379
- “CALL:SETup:AVC” on page 388
- “CALL:SETup:BAND” on page 390
- “CALL:SETup:CHANnel” on page 391
- “CALL:SETup:HANDoff” on page 393
- “CALL:SETup:MS:ANALog” on page 394
- “CALL:SETup:SYSTEM” on page 396
- “CALL[:CELL]:SIDentity” on page 397
- “CALL[:CELL]:SOPTION” on page 398
- “CALL:STATus” on page 401

## CALL Subsystem

“CALL:MS:REPorted:CAPability:SCHannel:FORWard” on page 326

“CALL:MS:REPorted:CAPability:SCHannel:REVerse” on page 330

“CALL:MS:REPorted:CLEar” on page 334

“CALL:MS:REPorted:CPClass” on page 335

“CALL:MS:REPorted:CTXType” on page 336

“CALL:MS:REPorted:DUAL[:MODE]” on page 337

“CALL:MS:REPorted:<EIRP,ESN>” on page 338

“CALL:MS:REPorted:<MCC,MIN1,MIN2,MNC,MSIN>” on page 340

“CALL:MS:REPorted:<ONUM,OPER,PCL,PCON,PNUM,PREV,QPCH>” on page 343

“CALL:MS:REPorted:<RCON,REG,REV,SCIN,SCL,TXT>” on page 347

“CALL[:CELL]:NIDentity” on page 350

“CALL:SYNC” on page 421

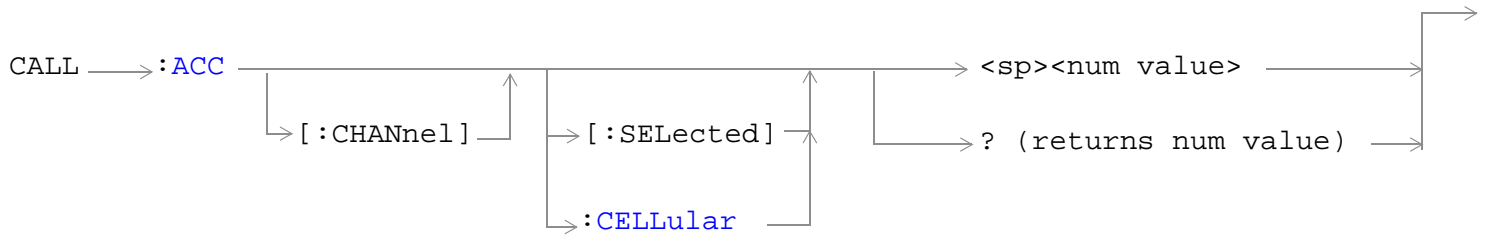
“CALL[:CELL]:SYSTem” on page 423

“CALL:TOTal:POWER[:AMPLitude][:SElected]?” on page 425

“CALL:TRAFfic” on page 426

“CALL:TRIGGer:TYPE” on page 429

## CALL:ACC



[“Diagram Conventions” on page 268](#)

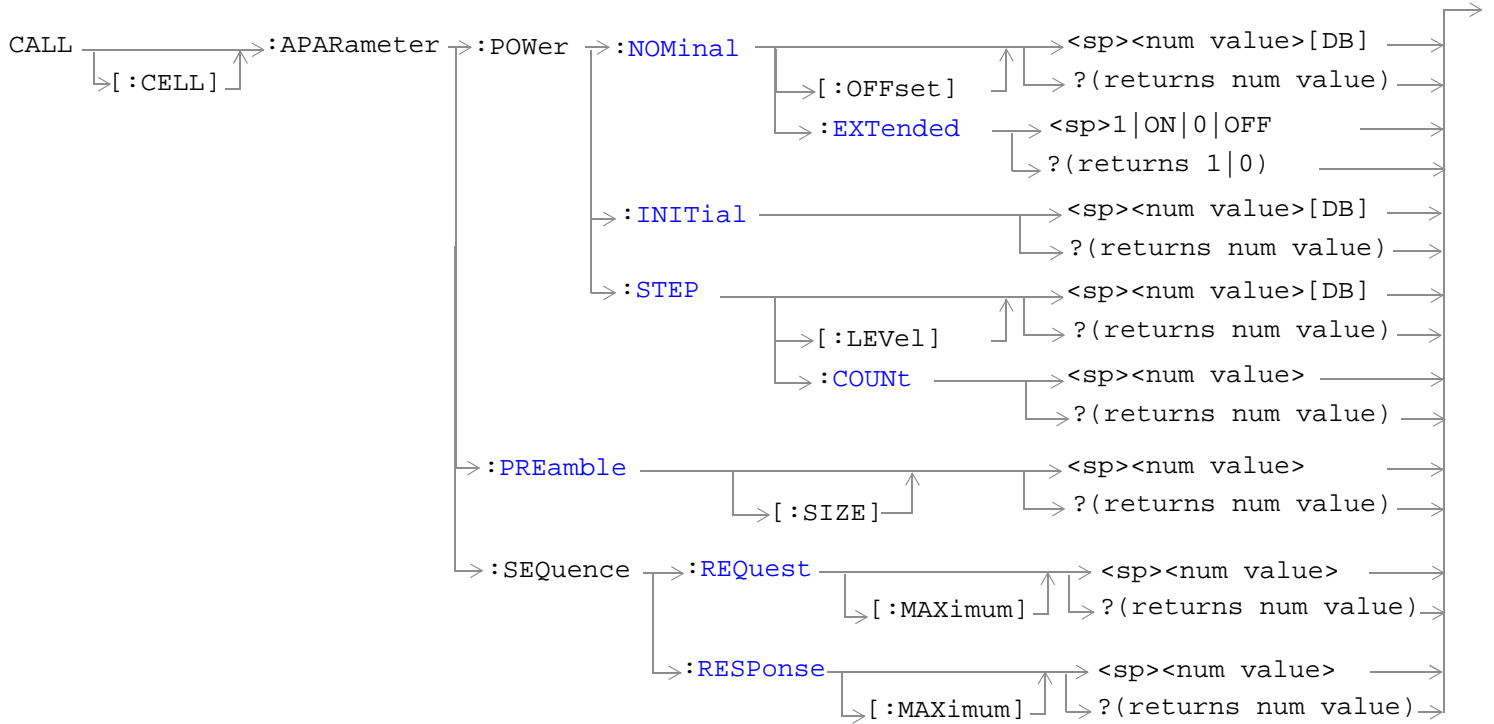
### CALL:ACC[:CHANnel][:SElected]

Function	Specifies the RF channel number of the analog control channel (cellular band is inferred).
Setting	range: 1 to 799, 991 to 1023
Query	range: 1 to 799, 991 to 1023
*RST Setting	333
Programming Example	
OUTPUT 714;"CALL:ACC:CHANNEL:SELECTED 799" !Sets the analog control channel to 799.	

### CALL:ACC[:CHANnel]:CELLular

Function	Specifies the RF channel number of the analog control channel (cellular band is specified).
Setting	range: 1 to 799, 991 to 1023
Query	range: 1 to 799, 991 to 1023
*RST Setting	333
Programming Example	
OUTPUT 714;"CALL:ACC:CHANNEL:CELLULAR 991" !Set cell band analog control channel to 991.	

# CALL[:CELL]:APARAmeter



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**CALL[:CELL]:APARAmeter:POWer:NOMinal[:OFFset]**

Function	Sets/queries the nominal power offset. This offset value serves as a correction factor to the open loop power control equation.
Setting	Range: -8 to 7 dBm with nominal power extended set to 0 (false). See <a href="#">“CALL[:CELL]:APARAmeter:POWer:NOMinal:EXTended”</a> . Resolution: integer
Query	Range: -8 to 7 dBm with nominal power extended set to 0 (false). See <a href="#">“CALL[:CELL]:APARAmeter:POWer:NOMinal:EXTended”</a> . Resolution: integer
*RST Setting	0
<b>Programming Example</b> OUTPUT 714; "CALL:CELL:APARAMETER:POWER:NOMINAL:OFFSET -5" !Sets the nominal power offset to -5 dB.	

**CALL[:CELL]:APARAmeter:POWer:NOMinal:EXTended**

Function	Sets/queries extended nominal power. Setting this parameter to 1 (true) introduces a -16 dB offset to the open loop power control correction range. The extended nominal power range is from -24 dB to -9 dB inclusive. With this parameter set to 0 (false) the open loop power control correction range is -8 dB to 7 dB. See <a href="#">“CALL[:CELL]:APARAmeter:POWer:NOMinal[:OFFset]”</a> .
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0
<b>Programming Example</b> OUTPUT 714; "CALL:CELL:APARAMETER:POWER:NOMINAL:EXTENDED ON"	

CALL[:CELL]:APARAmeter

### CALL[:CELL]:APARAmeter:POWer:INITIAL

Function	Sets/queries the initial power correction the mobile station will apply to the open loop equation to adjust power during system access (when transmitting the initial access probe in an access probe sequence).
Setting	Range: -16 to 15 dB Resolution: 1 dB
Query	Range: -16 to 15 dB Resolution: 1 dB
*RST Setting	0
<b>Programming Example</b>  OUTPUT 714;"CALL:CELL:APARAMETER:POWER:INITIAL -10" !Sets the initial power to -10 dB.	

### CALL[:CELL]:APARAmeter:POWer:STEP[:LEVel]

Function	Sets/queries the step increase between each mobile station access probe during each access probe sequence.
Setting	Range: 0 to 7 dB per step Resolution: integer
Query	Range: 0 to 7 dB per step Resolution: integer
*RST Setting	3 dB
<b>Programming Example</b>  OUTPUT 714;"CALL:CELL:APARAMETER:POWER:STEP 5" !Sets the power step size to 5 dB per step.	

### CALL[:CELL]:APARAmeter:POWer:STEP:COUNT

Function	Sets/queries the the maximum number of power level steps in a single access probe sequence.
Setting	Range: 0 to 7
Query	Range: 0 to 7
*RST Setting	3
<b>Programming Example</b>  OUTPUT 714;"CALL:CELL:APARAMETER:POWER:STEP:COUNT 5" !Sets the number of access probes in a single access probe sequence to 5.	

**CALL[:CELL]:APARAmeter:PREAmble**

Function	Sets/queries the access parameters message preamble length. The access channel preamble length is expressed in units of 20 millisecond frames.
Setting	Range: 0 to 15 Resolution: integer
Query	Range: 0 to 15 Resolution: integer
*RST Setting	10
<b>Programming Example</b> <pre>OUTPUT 714;"CALL:CELL:APARAMETER:PREAMBLE 5" !Sets the preamble size to 5.</pre>	

**CALL[:CELL]:APARAmeter:SEQUence:REQuest[:MAXimum]**

Function	Sets/queries the maximum number of access probes the mobile station will transmit per access channel request.
Setting	Range: 1 to 15 Resolution: integer
Query	Range: 1 to 15 Resolution: integer
*RST Setting	1
<b>Programming Example</b> <pre>OUTPUT 714;"CALL:CELL:APARAMETER:SEQUENCE:REQUEST:MAXIMUM 5" !Sets the maximum number of access probes the mobile station will transmit per access channel !request to 5.</pre>	

**CALL[:CELL]:APARAmeter:SEQUence:RESPonse[:MAXimum]**

Function	Sets/queries the maximum number of access probes the mobile station will transmit per access channel response.
Setting	Range: 1 to 15 Resolution: integer
Query	Range: 1 to 15 Resolution: integer
*RST Setting	1
<b>Programming Example</b> <pre>OUTPUT 714;"CALL:CELL:APARAMETER:SEQUENCE:RESPONSE:MAXIMUM 5" !Sets the maximum number of access probes the mobile station will transmit per access channel !response to 5.</pre>	

## CALL:AVCTest

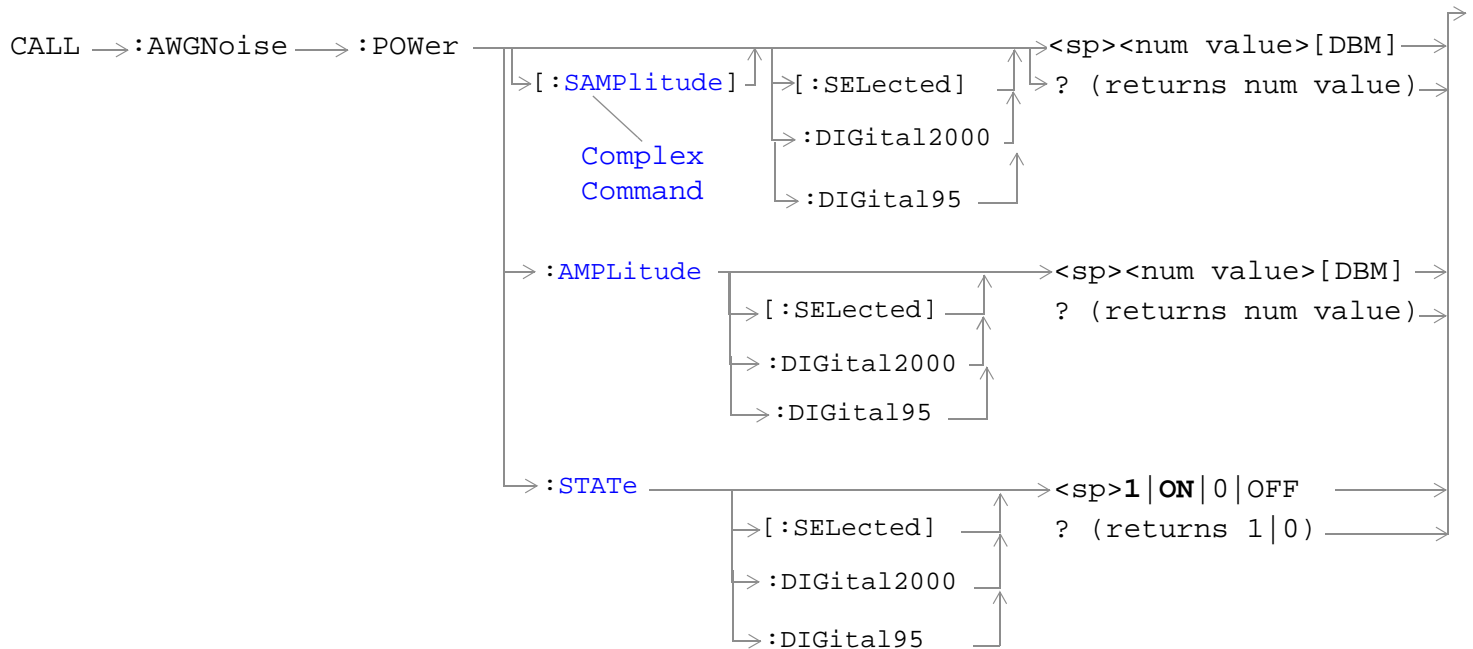
CALL → :AVCTest → :AVC → :SATone → :STATE → <sp>1 | ON | 0 | OFF →  
 → ? (returns 1 | 0) →

[“Diagram Conventions” on page 268](#)

### CALL:AVCTest:AVC:SATone:STATE

Function	Turns SAT on or off. Applies only in AVC test mode. In active cell mode SAT state is not controlled by the user.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	1 (on)
<b>Programming Example</b>	
OUTPUT 714; "CALL:AVCTEST:AVC:SATONE:STATE 0" !Turns the supervisory audio tone off.	

## CALL:AWGNoise:POWer



“Diagram Conventions” on page 268

### CALL:AWGNoise:POWer[:SAMPLitude][:SELEcted]

Function	<p>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.</p> <p>The optional [:SELEcted] keyword in this command specifies that the AWGN power level being queried applies to the current system type.</p> <p>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:</p> <ul style="list-style-type: none"> <li>• Sum of AWGN and cell power causing total RF power limits to be exceeded (see “CALL:TOTal:POWer[:AMPLitude][:SELEcted]?” for the allowable range of total RF power.)</li> <li>• Greater than 10 dB difference between cell power and AWGN.</li> <li>• Amplitude offset causing total RF power limits to be exceeded (see “SYSTem:CORRection:GAIN” to set or query the amplitude offset value).</li> </ul>
Setting	<p>Range: -170 dBm/1.23 MHz to +35dBm/1.23 MHz, NAN</p> <p>Resolution: 0.01 dB</p>
Query	<p>Range: -170 dBm/1.23 MHz to +35 dBm/1.23 MHz, NAN</p> <p>Resolution: 0.01 dB</p>
*RST Setting	NAN

## CALL:AWGNoise:POWer

### Programming Example

```
OUTPUT 714;"CALL:AWGNOISE:POWER:SAMPLITUDE -30" !Sets the AWGN power level to -30 dBm/1.23 MHz and turns the state on.
```

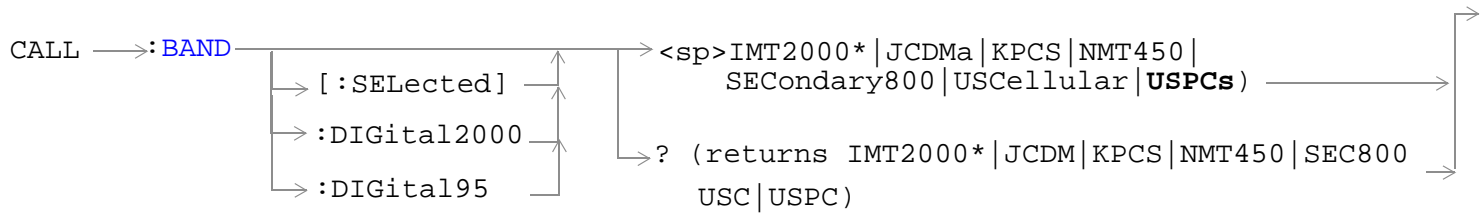
## CALL:AWGNoise:POWer:AMPLitude[:SElected]

Function	<p>Sets/queries the additive white gaussian noise (AWGN) level.</p> <p>The optional [:SElected] keyword in this command specifies that the AWGN power level being queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SElected] keyword.</p> <p>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:</p> <ul style="list-style-type: none"><li>• Sum of AWGN and cell power causing total RF power limits to be exceeded (see "CALL:TOTal:POWer[:AMPLitude][:SElected]?") for range of total RF power.)</li><li>• Greater than 10 dB difference between cell power and AWGN.</li><li>• Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).</li></ul>
Setting	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz, NAN Resolution: 0.01 dB
Query	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz, NAN Resolution: 0.01 dB
*RST Setting	NAN
Programming Example	<pre>OUTPUT 714;"CALL:AWGNOISE:POWER:AMPLITUDE -30" !Set the AWGN level to -30 dBm/1.25 MHz.</pre>

**CALL:AWGNoise:POWer:STATe[:SELEcted]**

Function	<p>Sets/queries the additive white gaussian noise (AWGN) state.</p> <p>The optional [:SELEcted] keyword in this command specifies that the AWGN power level being queried applies to the current system type.</p> <p>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:</p> <ul style="list-style-type: none"> <li>• Sum of AWGN and cell power causing total RF power limits to be exceeded (see “CALL:TOTal:POWer[:AMPLitude][:SELEcted]?” for range of total RF power.)</li> <li>• Greater than 10 dB difference between cell power and AWGN.</li> <li>• Amplitude offset causing total RF power limits to be exceeded (see “SYSTem:CORRection:GAIN” to set or query the amplitude offset value).</li> </ul>
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	OFF
<p><b>Programming Example</b></p> <p>OUTPUT 714; "CALL:AWGNOISE:POWER:STATE:SELECTED ON" !Turns on AWGN.</p>	

## CALL:BAND



\* Does not apply to DIGital95

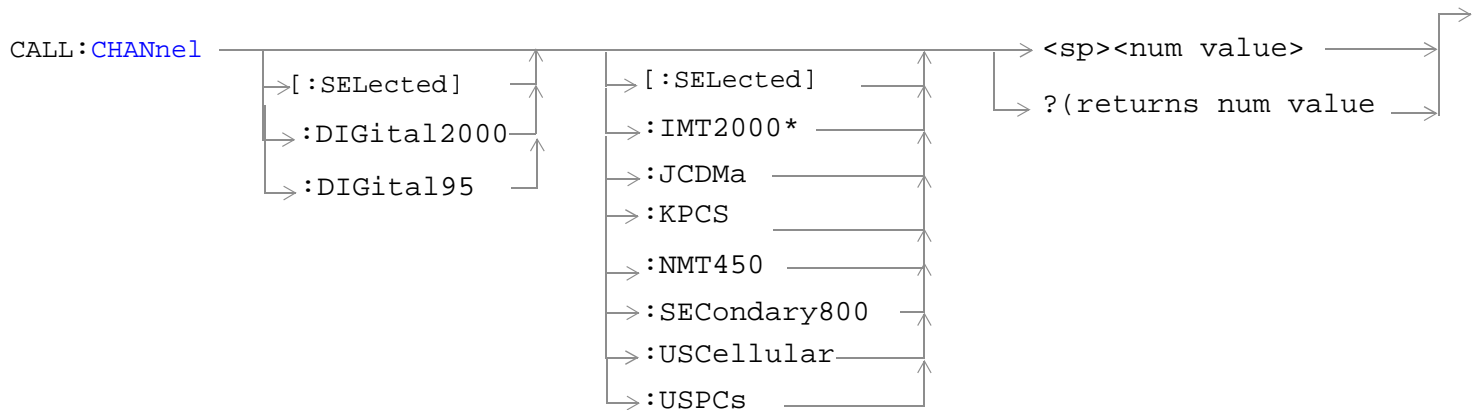
[“Diagram Conventions” on page 268](#)

### CALL:BAND[:SElected]

Function	Sets/queries a frequency band for the system type specified by the command's system type parameter.  Frequency bands are: IMT2000, Japan CDMA (JCDM), Korean PCS (KPCS), NMT450, secondary 800 MHz band (SEC800), U.S. Cellular (USC), and U.S. PCS (USPC).  The optional [:SElected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.
Setting	Range: IMT2000   JCdMa   KPCS   NMT450   SECondary800   USCellular   USPCs
Query	Range: IMT2000   JCdM   KPCS   NMT450   SEC800   USC   USPC
*RST Setting	USPCs
Requirements	Test Application Revision: B.03.00: Added secondary 800 MHz band, deleted China Cellular band.
<b>Programming Example</b> OUTPUT 714;"CALL:BAND KPCS" !Selects the Korean PCS cell band.	



## CALL:CHANnel



\* Does not apply to DIGital95

[“Diagram Conventions” on page 268](#)

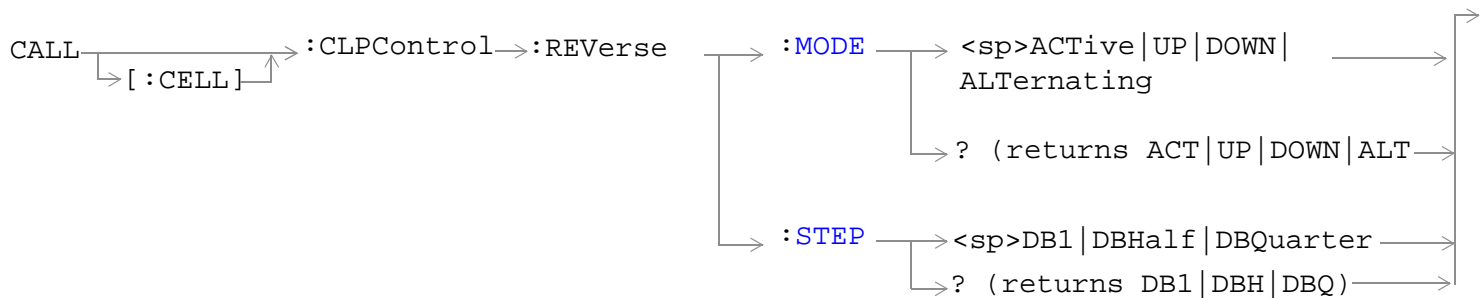
### CALL:CHANnel[:SElected][:SElected]

<p><b>Function</b></p>	<p>Sets/queries the physical channel number for the system type and frequency band specified by command parameters.</p> <p>The first optional [:SElected] keyword in this command specifies that the channel being set/queried applies to the current system type. See <a href="#">“CALL[:CELL]:SYSTEM[:TYPE]”</a> to query or change the current system type.</p> <p>To set (make current) a system type, use the <a href="#">“CALL[:CELL]:SYSTEM”</a> commands.</p> <p>The second optional [:SElected] keyword in this command specifies that the channel being set/queried applies to the current cell band.</p> <p>Note: If the current system type evaluates to DIGital95, cell band IMT2000 does not apply and attempting to specify IMT2000 as the DIGital95 cell band will cause an instrument error.</p> <p>Specifying a non-current band when setting a channel number will cause the test set to store the channel number for use when the specified band is made current. Also, specifying a non-current band when querying a channel number will return a stored channel number that is not the current channel the test set is transmitting.</p> <p>To set (make current) a frequency band or query the current frequency band, use the <a href="#">“CALL:BAND”</a> command.</p>
<p><b>Setting</b></p>	<p>Range (depending on selected system type):</p> <ul style="list-style-type: none"> <li>• IMT2000: 0 to 1199</li> <li>• JCDMa (Japanese CDMA): 1 to 799, 801 to 1039, 1041 to 1199</li> <li>• KPCS (Korean PCS): 0 to 599</li> <li>• NMT450: 1 to 300, 539 to 871, 1039 to 1473, 1792 to 2016</li> <li>• SECondary800 (secondary 800 MHz band): 0 to 919</li> <li>• USCellular (U.S. Cellular): 1 to 799, 991 to 1023</li> <li>• USPCs (U.S. PCS): 0 to 1199</li> </ul>

**CALL:CHANnel**

Query	<b>Range (depending on selected system type):</b> <ul style="list-style-type: none"> <li>• IMT2000: 0 to 1199</li> <li>• JCDM (Japanese CDMA): 1 to 799, 801 to 1039, 1041 to 1199</li> <li>• KPCS (Korean PCS): 0 to 599</li> <li>• NMT450: 1 to 300, 539 to 871, 1039 to 1473, 1792 to 2016</li> <li>• SEC800 (secondary 800 MHz band): 0 to 919</li> <li>• USC (U.S. Cellular): 1 to 799, 991 to 1023</li> <li>• USPC (U.S. PCS): 0 to 1199</li> </ul>
*RST Setting	Channel 525 (US PCS band)
Requirements	Test Application Revision: B.03.00: Added secondary 800 MHz band, deleted China cellular band.
<b>Programming Example</b> <pre> OUTPUT 714;"CALL:CHANNEL?" !Queries the channel number of the currently selected system and band.  OUTPUT 714;"CALL:CHANNEL 384" !Sets the channel number of the currently selected system and band.  OUTPUT 714;"CALL:CHANNEL:DIGital2000:KPCS 384" !Sets the channel number for the Digital 2000 system and Korean PCS band to 384. If this system and !band are not current the value 384 is stored and will be transmitted when Digital 2000 and Korean !PCS are current. </pre>	

## CALL[:CELL]:CLPControl



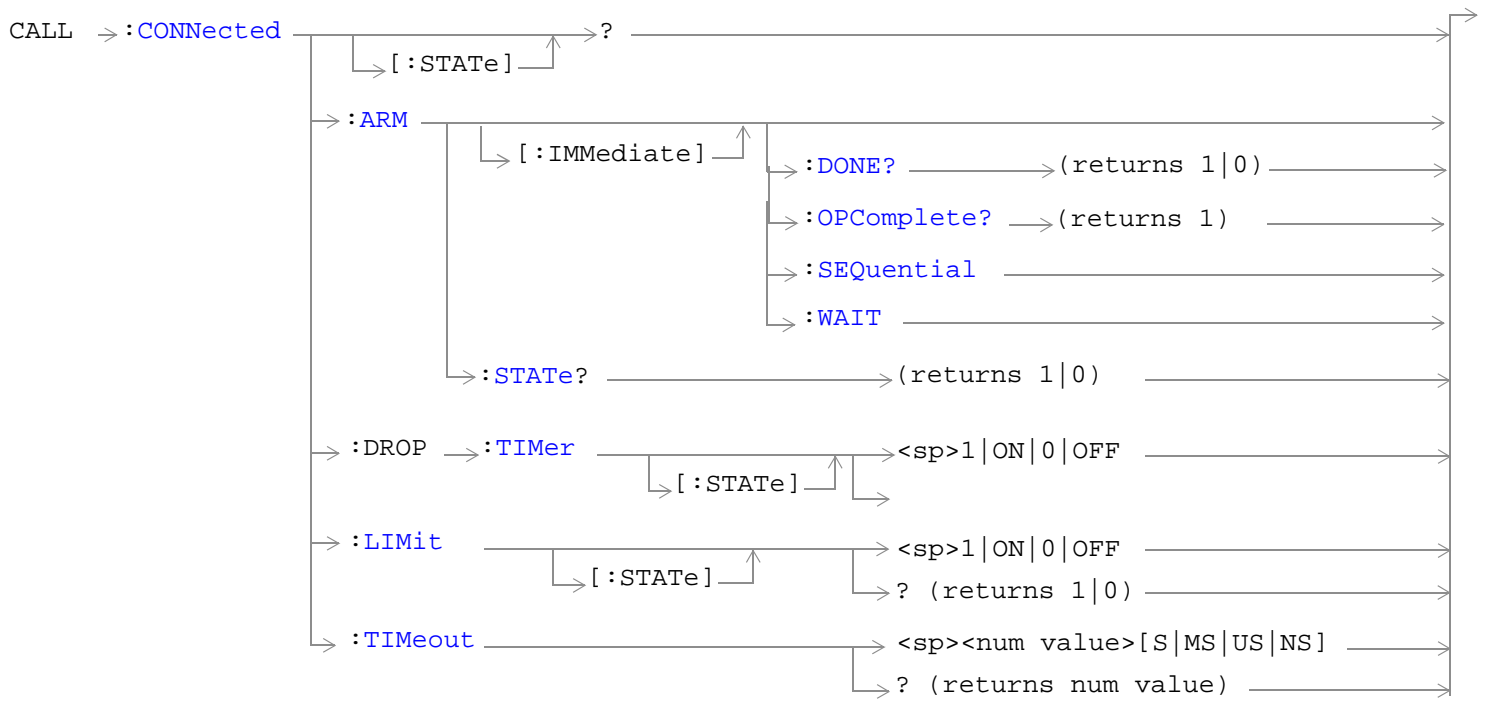
[“Diagram Conventions” on page 268](#)

### CALL[:CELL]:CLPControl:REverse:MODE

Function	Sets/queries the reverse CDMA channel closed loop power control mode. When ACTive is selected, the test set will send power control bits that raise or lower the power level of the mobile station depending on the received signal strength of the reverse channel. 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 ALternate is selected, the test set sends alternating up/down power control bits.
Setting	Range: ACTive   UP   DOWN   ALternate
Query	Range: ACT   UP   DOWN   ALT
*RST Setting	ACTive
<b>Programming Example</b> OUTPUT 714; "CALL:CELL:CLPCONTROL:REVERSE:MODE ALTERNATING" !Sets the closed loop power control mode to alternating up, down bits.	

### CALL[:CELL]:CLPControl:REverse:STEP

Function	Sets/queries the reverse CDMA channel closed loop power control step size. This setting tells the mobile station how much to increase or decrease the power according to the power control bit.
Setting	Range: DB1   DBHalf   DBQuarter
Query	Range: DB1   DBH   DBQ
*RST Setting	DB1 (1 dB)
<b>Programming Example</b> OUTPUT 714; "CALL:CELL:CLPCONTROL:REVERSE:STEP DBQUARTER" !Sets the closed loop power control step size to 0.25 dB.	

**CALL:CONNeCTed[:STATe]****“Diagram Conventions”**

**CALL:CONNected[:STATe]**

Function	<p>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.</p> <p>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 <a href="#">“Connected/Idle Query”</a> and <a href="#">“Call State Change Detector”</a>.</p>
Query	Range: 0 1
*RST Setting	0
<b>Programming Example</b> OUTPUT 714;"CALL:CONNECTED:STATE?" !returns 1 if call is connected, 0 if call is idle.	

**CALL:CONNected:ARM[:IMMediate]**

Function	<p>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.</p> <p>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.</p> <p>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 <a href="#">“Call State Change Detector”</a>.</p>
<b>Programming Example</b> OUTPUT 714;"CALL:CONNECTED:ARM:IMMEDIATE" !Arms the call-state-change detector.	

**CALL:CONNected:ARM:STATe?**

Function	<p>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 <a href="#">“Call State Change Detector”</a></p>
Query	Range: 1 0
*RST Setting	0
<b>Programming Example</b> OUTPUT 714;"CALL:CONN:ARM:STATE?" !Returns arm state of the call-state-change detector.	

**CALL:CONNeCTed[:STATe]****CALL:CONNeCTed:TIMEout**

Function	<p>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.</p> <p>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 protocol timers take over and prevent the call state from staying in a transitory state forever. See <a href="#">“Call Processing State Synchronization”</a> .</p>
Setting	<p>Range: 0 to 100 seconds Resolution: 0.1 seconds</p>
Query	<p>Range: 0 to 100 seconds Resolution: 0.1 seconds</p>
*RST Setting	10 seconds
<p><b>Programming Example</b></p> <pre>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.</pre>	

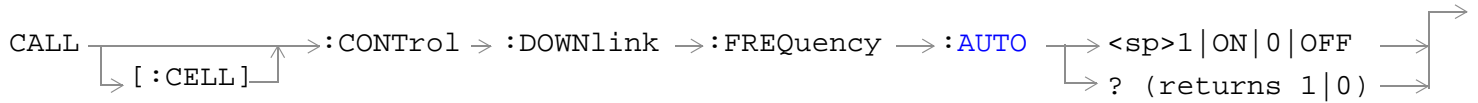
**CALL:CONNeCTed:DROP:TIMER[:STATe]**

Function	<p>Sets/queries the call drop timer. The call drop timer indicates loss of reverse link. This timer also determines when the demodulation of the reverse link has been unsuccessful for a fixed period.</p> <p>The call drop timer is actually a counter that counts bad frames. The counter counts for 250 consecutive bad frames (which takes about 5 seconds). The counter is reset whenever a good frame is received.</p>
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	ON
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"CALL:CONNECTED:DROP:TIMER:STATE 0"</pre>	

**CALL:CONNEcted:LIMit[:STATe]**

Function	When call limit mode is on, the test set will not respond to the access probe for origination or page responses from the mobile. For either a base station page or mobile station origination, this command forces the mobile to repeatedly send access probes.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	ON
<b>Programming Example</b>	
OUTPUT 714 ; "CALL:CONNECTED:LIMIT 0"	

## CALL[:CELL]:CONTRol:DOWNlink:FREQuency:AUTO



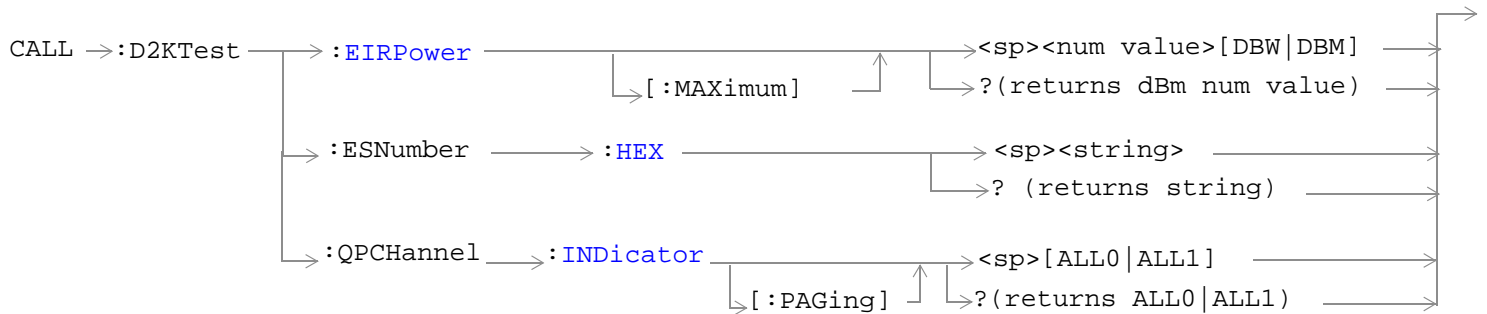
[“Diagram Conventions” on page 268](#)

### 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 CDMA forward 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. This is done by mapping the selected CDMA physical channel number to a frequency as defined in applicable standards.  If set to off (0), the forward channel frequency is directly settable. Refer to <a href="#">“CALL[:CELL]:RFGenerator”</a> to set the CDMA forward channel frequency.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	1 (auto)
<b>Programming Example</b> <pre>OUTPUT 714;"CALL:CELL:CONTROL:DOWNLINK:FREQUENCY:AUTO OFF" !Enables manual frequency setting.</pre>	



## CALL:D2KTest



“Diagram Conventions” on page 268

### CALL:D2KTest:EIRPower[:MAXimum]

Function	<p>Sets/queries the test mode maximum EIRP (Effective Isotropic Radio Power).</p> <p>The test set will adjust its receiver power range expecting a normal open loop power control response from the mobile station. However, when cell power is lowered the expected power to the test set's receiver will not increase beyond max EIRP.</p> <p>If an amplitude offset is turned on (see “<a href="#">SYSTEM:CORREction[:SGain]</a>”), the test set will automatically adjust the max EIRP value to correct for path loss.</p>
Setting	<p>Range: -30 to +10 dBW</p> <p>Resolution: 1 dBW</p>
Query	<p>Range: -30 to +10 dBW</p> <p>Resolution: 1 dBW</p>
*RST Setting	-7 dBW
<p><b>Programming Example</b></p> <p>OUTPUT 714; "CALL:D2KTEST:EIRPOWER:MAXIMUM -2" !Sets the mobile station max EIRP to -2 dBW.</p>	

CALL:D2KTest

**CALL:D2KTest:ESNumber:HEX**

Function	Sets/queries the test mode ESN (Electronic Serial Number).
Setting	Range: Up to eight characters containing alphanumerics 0123456789ABCDEF or NULL
Query	Range: String of up to eight characters containing alphanumerics 0123456789ABCDEF or NULL
*RST Setting	"00000000"
<b>Programming Example</b> OUTPUT 714;"CALL:D2KTEST:ESNUMBER:HEX 'ABCD1234'" !Sets the mobile station's ESN to ABCD1234.	

**CALL:D2KTest:QPCHannel:INDicator[:PAGing]**

Function	Sets/queries the QPCH (Quick Paging Channel) paging indicators. Setting this parameter to ALL1 will cause the slotted mode mobile station operating in the idle state to monitor the paging channel during each assigned slot. When this parameter is set to ALL0 the mobile station will not monitor the paging channel.  Note: QPCH configuration change indicators are not settable. The test set will always transmit configuration change indicators as 0 bits.
Setting	Range: ALL0   ALL1
Query	Range: ALL0   ALL1
*RST Setting	ALL0
<b>Programming Example</b> OUTPUT 714;"CALL:D2KTEST:QPCH:IND ALL0" !Sets the paging indicators to 0 (off).	

---

## CALL:END

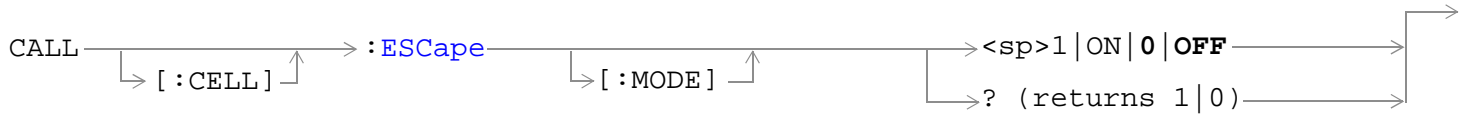


[“Diagram Conventions” on page 268](#)

## 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.
Programming Example	
OUTPUT 714; "CALL:END"	

## CALL[:CELL]:ESCape[:MODE]

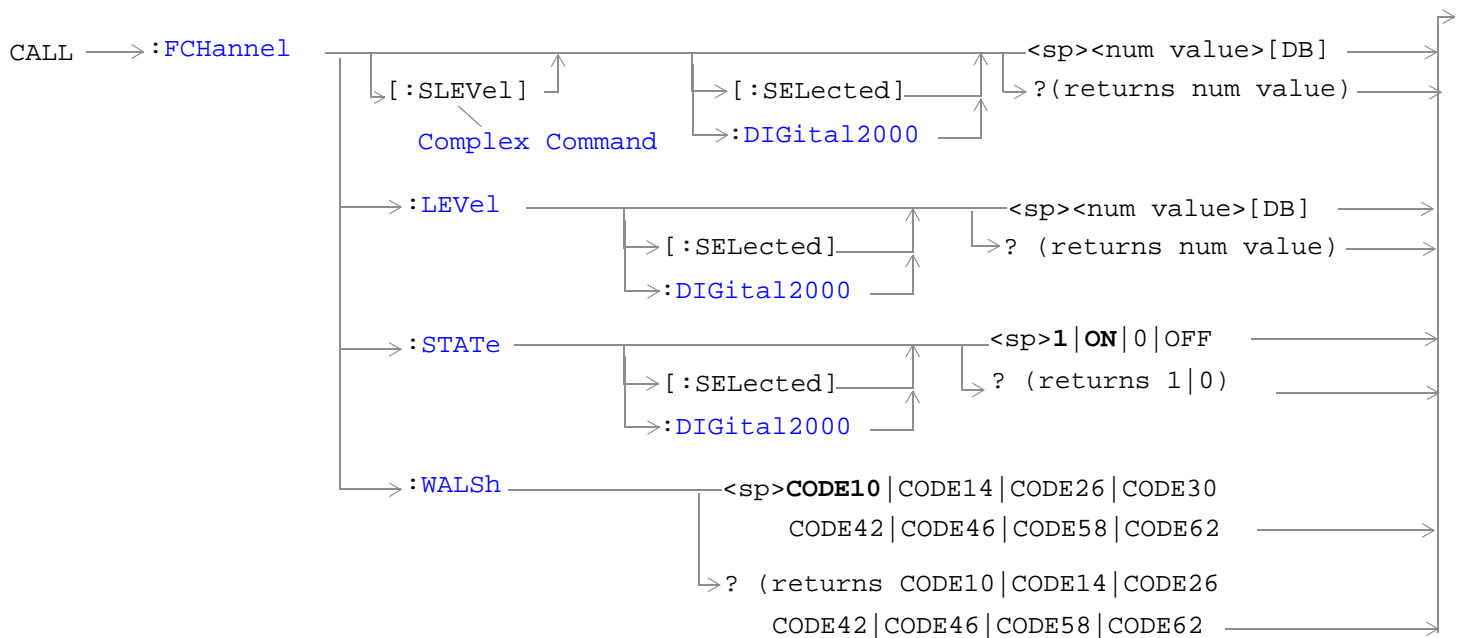


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### CALL[:CELL]:ESCape[:MODE]

Function	Sets/queries CDG escape mode. When escape mode is on, the test set is configured as a base station that sends (in its overhead messages) all 1's in the messaging fields used to signal mobile country code (MCC) and mobile network code (MNC). A mobile station that supports escape mode will respond by assuming MCC/MNC compatability and perform registrations using only the mobile station identification number (MSIN).
Setting	Range: 1   ON   0   OFF
Query	Range: 0   1
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714; "CALL:CELL:ESCAPE:MODE 1" !Sets CDG escape mode on.	

## CALL:FCHannel



[“Diagram Conventions” on page 268](#)

### CALL:FCHannel[:SLEVel][:SElected]

Function	<p>The setting form of this command performs two functions: (1) sets the forward fundamental channel (FCH) level, and (2) turns the FCH state to ON.</p> <p>The query form of this command returns the FCH level.</p> <p>The optional [:SElected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SElected] keyword.</p>
Setting	<p>Range: 0 to -30 dB</p> <p>Resolution: 0.01 dB</p>
Query	<p>Range: 0 to -30 dB</p> <p>Resolution: 0.01 dB</p>
*RST Setting	-15.6 dB
<p><b>Programming Example</b></p> <pre> OUTPUT 714; "CALL:FCHANNEL:SLEVEL:DIGITAL2000 -10 dB" !Sets the forward fundamental channel (FCH) state to ON and sets the level to -10 dB. </pre>	

CALL:FCHannel

**CALL:FCHannel:LEVel[:SElected]**

Function	Sets/queries the level of the forward fundamental channel (FCH). The optional [:SElected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SElected] keyword.
Setting	Range: 0 to -30 dB Resolution: 0.01 dB
Query	Range: 0 to -30 dB Resolution: 0.01 dB
*RST Setting	-15.6 dB
<b>Programming Example</b> OUTPUT 714;"CALL:FCHANNEL:LEVEL:SELECTED -10 dB"	

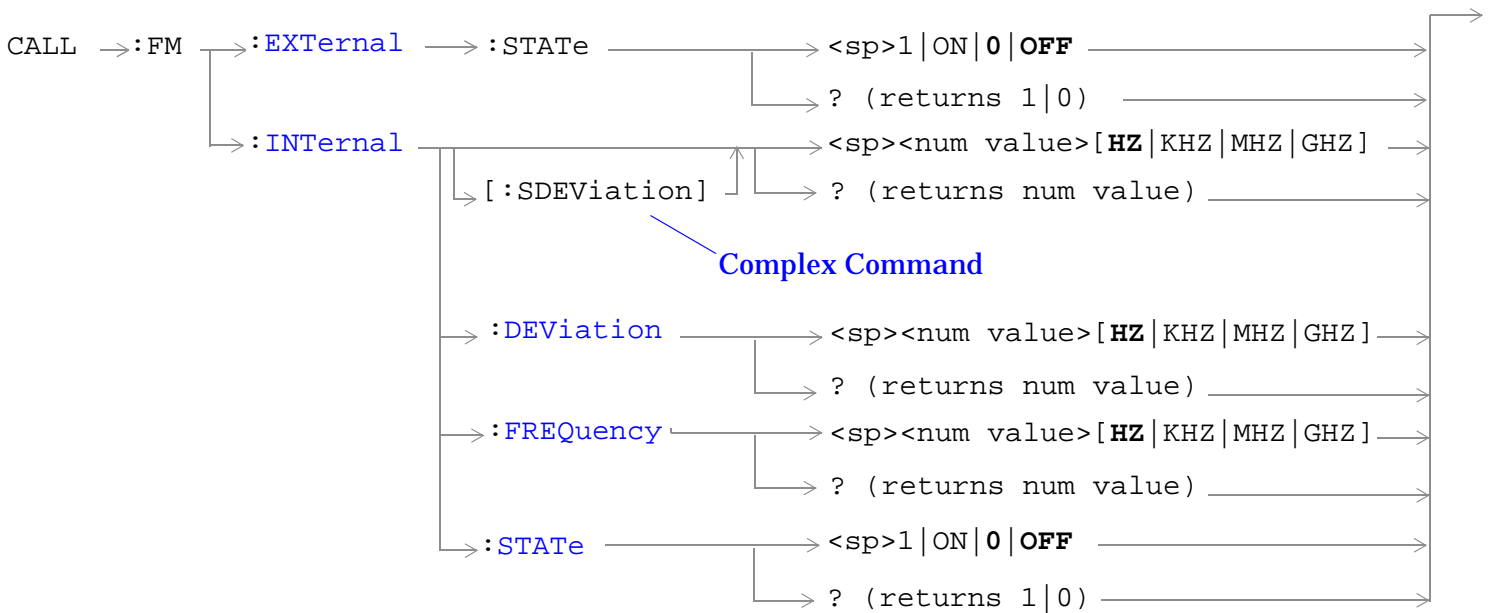
**CALL:FCHannel:STATe[:SElected]**

Function	Sets/queries the on/off state of the forward fundamental channel (FCH). The optional [:SElected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SElected] keyword.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	ON
<b>Programming Example</b> OUTPUT 714;"CALL:FCHANNEL:STATE:DIGITAL2000 OFF" !Turns off the forward fundamental channel.	

**CALL:FCHannel:WALSh**

Function	Sets/queries the Walsh code used for the forward fundamental channel. The Walsh codes allowed for use with this command are part of a reserved codespace that has been created by fixing other code channels to pre-determined values. Reserving this codespace eliminates the possibility of conflicts that can arise with lower walsh code sets which are used in certain radio configurations.
Setting	Range: CODE10   CODE14   CODE26   CODE30   CODE42   CODE46   CODE58   CODE62
Query	Range: CODE10   CODE14   CODE26   CODE30   CODE42   CODE46   CODE58   CODE62
*RST Setting	CODE10
<b>Programming Example</b> <pre>OUTPUT 714;"CALL:FCHANNEL:WALSH CODE14" !Sets the forward fundamental channel walsh code to 14.</pre>	

## CALL:FM



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### CALL:FM:EXternal:STATE

Function	Sets/queries the external FM input (on or off). The FM deviation is fixed at 20 kHz/volt with a 1 volt maximum input voltage. You must make sure that the sum of the three FM sources (internal FM, external FM, and SAT) do not exceed 20 kHz deviation. The performance of the signal is not specified beyond 20 kHz deviation.  While in active cell mode, the internal and external FM states parameters will be overridden and FM turned off temporarily by the call processing state machine during wideband signaling with the mobile station. Querying during this temporary state will return user defined values. This command applies in active cell mode while on an AVC, and in AVC test mode.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
Programming Example	
OUTPUT 714; "CALL:FM:EXTERNAL:STATE ON" !Turns on the external FM input.	

### CALL:FM:INTERNAL[:SDEVIation]

Function	Sets/queries the internal FM source's deviation and automatically sets the internal FM state to ON. This is "complex" command.
----------	--



Setting	Range: 0 to 20 kHz Resolution: 0.1 Hz
Query	Range: 0 to 20 kHz Resolution: 0.1 Hz
*RST Setting	Internal FM: OFF Internal FM: OFF
<b>Programming Example</b> <pre>OUTPUT 714;"CALL:FM:INTERNAL:SDEVIATION 10 kHz" !Sets internal FM deviation to 10 kHz and !automatically turns on the internal FM !source.</pre>	

## CALL:FM

### CALL:FM:INTernal:DEVIation

Function	<p>Sets/queries the internal FM source's deviation. When querying the internal FM deviation, the current setting of this parameter will always be returned regardless of the setting for the internal FM state.</p> <p>You must make sure that the sum of the three FM sources (internal FM, external FM, and SAT) do not exceed 20 kHz deviation. The performance of the signal is not specified beyond 20 kHz deviation.</p> <p>This command applies in active cell mode while on an AVC, and in AVC test mode.</p>
Setting	<p>Range: 0 to 20 kHz</p> <p>Resolution: 0.1 Hz</p>
Query	<p>Range: 0 to 20 kHz</p> <p>Resolution: 0.1 Hz</p>
*RST Setting	8 kHz
<b>Programming Example</b> OUTPUT 714;"CALL:FM:INTERNAL:DEVIATION 10 KHZ" !Sets internal FM deviation to 10 kHz.	

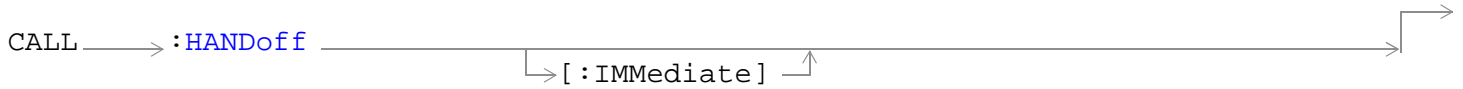
### CALL:FM:INTernal:FREQUency

Function	<p>Sets/queries the frequency of the internal FM source. Applies in active cell mode while on an AVC, and in AVC test mode.</p>
Setting	<p>Range: 20 Hz to 20 kHz</p> <p>Resolution: 0.1 Hz</p>
Query	<p>Range: 20 Hz to 20 kHz</p> <p>Resolution: 0.1 Hz</p>
*RST Setting	1004 Hz
<b>Programming Example</b> OUTPUT 714;"CALL:FM:INTERNAL:FREQUENCY 60 HZ" !Sets the internal FM source's frequency to 160 Hz.	

**CALL:FM:INTernal:STATe**

Function	Sets/queries the internal FM source (on or off). While in active cell mode, the internal and external FM states parameters will be overridden and FM turned off temporarily by the call processing state machine during wideband signaling with the mobile station. Querying during this temporary state will return user defined values. This command applies in active cell mode while on an AVC, and in AVC test mode.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b>	
OUTPUT 714;"CALL:FM:INTERNAL:STATE ON" !Turns on the internal FM source.	

## CALL:HANDoff



[“Diagram Conventions” on page 268](#)

### CALL:HANDoff[:IMMEDIATE]

<b>Function</b>	<p>Initiates a handoff to:</p> <ul style="list-style-type: none"> <li>• the handoff system type selected by the “CALL:SETup:SYSTem” command.</li> <li>• the handoff frequency band selected by the “CALL:SETup:BAND” command.</li> <li>• the handoff physical channel selected by the “CALL:SETup:CHANnel” command.</li> </ul> <p>A handoff will occur within the current system if the current cell system type (see “CALL[:CELL]:SYSTem” ) is the same as the current handoff system type (see “CALL:SETup:SYSTem” ).</p>
<b>Programming Example</b> <pre>OUTPUT 714;"CALL:HANDOFF:IMMEDIATE" !initiates a handoff.</pre>	

## CALL[:CELL]:MCCode



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### CALL[:CELL]:MCCode

Function	Sets/queries the mobile country code (MCC). This parameter can be set any time and will be sent out in the next overhead message. When escape mode is on (see “CALL[:CELL]:ESCAPE[:MODE]” command description), this parameter is not used.
Setting	Range: 0 to 999
Query	Range: 0 to 999
*RST Setting	310
<b>Programming Example</b> OUTPUT 714;"CALL:CELL:MCCODE 310" !Sets the mobile country code to 310.	

## CALL[:CELL]:MNCode



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### CALL[:CELL]:MNCode

Function	Sets/queries the mobile network code (MNC, also referred to as IMSI_11_12 or cell network code). This parameter can be set any time and will be sent out in the next overhead message. When escape mode is on (see the “CALL[:CELL]:ESCAPE[:MODE]” command description), this parameter is not used.
Setting	Range: 0 to 99
Query	Range: 0 to 99
*RST Setting	0
<b>Programming Example</b> OUTPUT 714; "CALL:CELL:MNCODE 10" !Sets the mobile network code to 10.	

## CALL:MS:ANALog

CALL → :MS → :ANALog → :TXLevel → <sp><num value> →

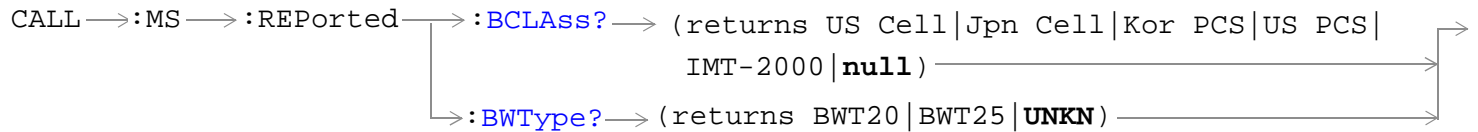
↳[:IMMEDIATE] ↵

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### CALL:MS:ANALog:TXLevel[:IMMEDIATE]

Function	Sets/queries the mobile station transmit level while on an analog voice channel. This command is used in active cell operating mode to immediately change the mobile level while on an AVC.
Setting	Range: 0 to 7 MS TX Level 0: expected power, 36 dBm* MS TX Level 1: expected power, 32 dBm MS TX Level 2: expected power, 28 dBm MS TX Level 3: expected power, 24 dBm MS TX Level 4: expected power, 20 dBm MS TX Level 5: expected power, 16 dBm MS TX Level 6: expected power, 12 dBm MS TX Level 7: expected power, 8 dBm  *all values for MS TX level assume 0 dB antenna gain
Query	Range: 0 to 7
*RST Setting	2
<b>Programming Example</b> OUTPUT 714;"CALL:MS:ANALOG:TXLEVEL 5" !Sets mobile station AVC transmit power level to 5 (expected power 16 dBm).	

## CALL:MS:REPorted:<BCL,BWT>



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### CALL:MS:REPorted:BCLass?

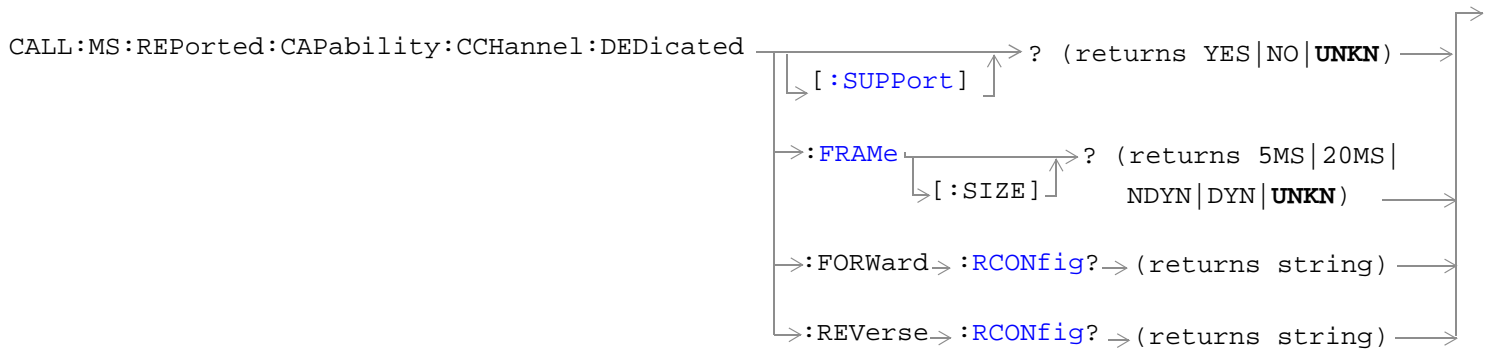
Function	<p>This query returns up to three concatenated mobile station reported frequency band classes (frequency bands supported by the mobile station).</p> <p>Each band that is included in the returned string is right-justified within an 8-character slot. Each 8-character slot is followed by a comma and a space until the last band is sent. The last band in the string will not have an appended comma and a space.</p> <p>The return values for “CALL:MS:REPorted:OPERating:MODE?” and “CALL:MS:REPorted:EIRPower[:MAXimum]?” will consist of an operating mode and a maximum EIRP for each band returned by this command.</p> <p>Each time a new mobile station registers with the test set, the test set will have the mobile station report band classes, mobile station reported operating mode for each band class, and mobile station reported max EIRP (if the operating mode is CDMA) for each band class. These results are referred to as Status Request Information.</p>
Query	Range: US Cell, Jpn Cell, Kor PCS, US PCS, IMT-2000, null
*RST Setting	Null
<b>Programming Example</b> <pre> OUTPUT 714; "CALL:MS:REPORTED:BCLASS?" !when sent to a mobile station supporting US cellular and US PCS bands, returns the string: !"&lt;sp&gt;US&lt;sp&gt;Cell,&lt;sp&gt;&lt;sp&gt;&lt;sp&gt;US&lt;sp&gt;PCS". !Note: string is 16 characters (8 per band) plus a comma and space separating the two bands. </pre>	

### CALL:MS:REPorted:BWTtype?

Function	Queries station class mark bandwidth support.
Query	Range: BWT20   BWT25   UNKN
*RST Setting	UNKN
<b>Programming Example</b> <pre> OUTPUT 714; "CALL:MS:REPORTED:BWTYPE?" </pre>	



## CALL:MS:REPorted:CAPability:CCHannel:DEDicated



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CALL:MS:REPorted:CAPability:CCHannel:DEDicated

### CALL:MS:REPorted:CAPability:CCHannel:DEDicated[:SUPPort]?

Function	This query only command returns the mobile station's capability to support a dedicated control channel (DCCH), as reported by the mobile station.
Query	Range: YES   NO   UNKN
*RST Setting	UNKN
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:CCHANNEL:DEDICATED:SUPPORT?"	

### CALL:MS:REPorted:CAPability:CCHannel:DEDicated:FRAMe[:SIZE]?

Function	This query only command returns the mobile station's capability to support different frame sizes on the dedicated control channel (DCCH), as reported by the mobile station.  Returned values are 5 millisecond only, 20 milliseconds only, 5 or 20 milliseconds not dynamic, 5 or 20 milliseconds dynamic, or unknown.
Query	Range: 5MS   20MS   NDYN   DYN   UNKN
*RST Setting	UNKN
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:CCHANNEL:DEDICATED:FRAME:SIZE?"	

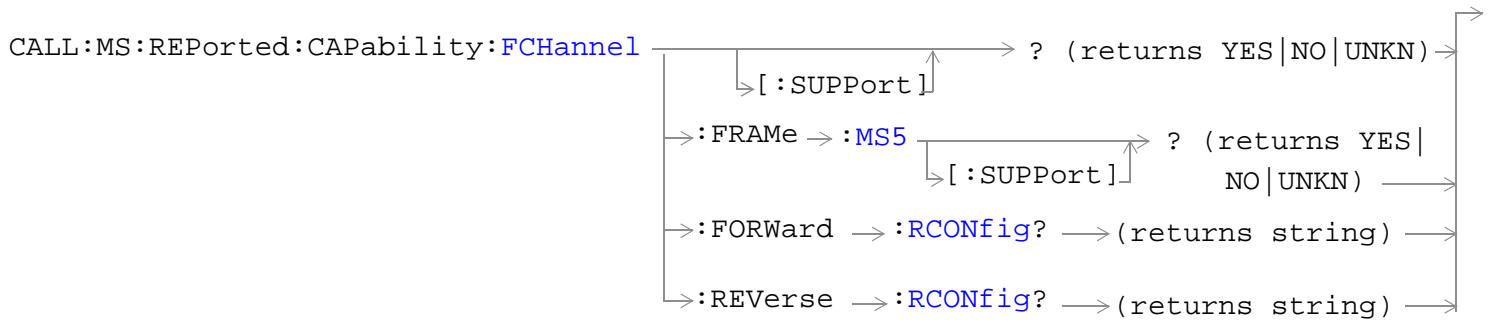
### CALL:MS:REPorted:CAPability:CCHannel:DEDicated:FORWard:RCONfig?

Function	This query only command returns the mobile station's capability to support forward dedicated control channels, as reported by the mobile station.  This query returns a comma-separated string of any combination of 3, 4, 5, or null.
Query	Range: 3   4   5   null
*RST Setting	null
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:CCHANNEL:DEDICATED:FORWARD:RCONFIG?"	

### CALL:MS:REPorted:CAPability:CCHannel:DEDicated:REVerse:RCONfig?

Function	This query only command returns the mobile station's capability to support reverse dedicated control channels, as reported by the mobile station.  This query returns a comma-separated string of any combination of 3, 4, 5, or null.
Query	Range: 3   4   5   null
*RST Setting	null
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:CCHANNEL:DEDICATED:REVERSE:RCONFIG?"	

## CALL:MS:REPorted:CAPability:FCHannel



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CALL:MS:REPorted:CAPability:FCHannel

### CALL:MS:REPorted:CAPability:FCHannel[:SUPPort]?

Function	This query only command returns the mobile station's capability to support a fundamental channel, as reported by the mobile station.
Query	Range: YES   NO   UNKN
*RST Setting	UNKN
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:FCHANNEL?"	

### CALL:MS:REPorted:CAPability:FCHannel:FRAME:MS5[:SUPPort]?

Function	This query only command returns the mobile station's capability to support a fundamental channel with 5 ms frames, as reported by the mobile station.
Query	Range: YES   NO   UNKN
*RST Setting	UNKN
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:FCHANNEL:FRAME:MS5:SUPPORT?"	

### CALL:MS:REPorted:CAPability:FCHannel:FORWARD:RCONfig?

Function	This query only command returns the mobile station's capability to support radio configurations on the forward fundamental radio channel, as reported by the mobile station. This query returns a comma-separated string of any combination of 1, 2, 3, 4, 5, or null.
Query	Range: 1   2   3   4   5   null
*RST Setting	null
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:FCHANNEL:FORWARD:RCONFIG?"	

### CALL:MS:REPorted:CAPability:FCHannel:REVERSE:RCONfig?

Function	This query only command returns the mobile station's capability to support radio configurations on the reverse fundamental radio channel, as reported by the mobile station. This query returns a comma-separated string of any combination of 1, 2, 3, 4, 5, or null.
Query	Range: 1   2   3   4   5   null
*RST Setting	null
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:FCHANNEL:REVERSE:RCONFIG?"	

**CALL:MS:REPorted:CAPability:QUERy**

CALL:MS:REPorted:CAPability → :QUERy

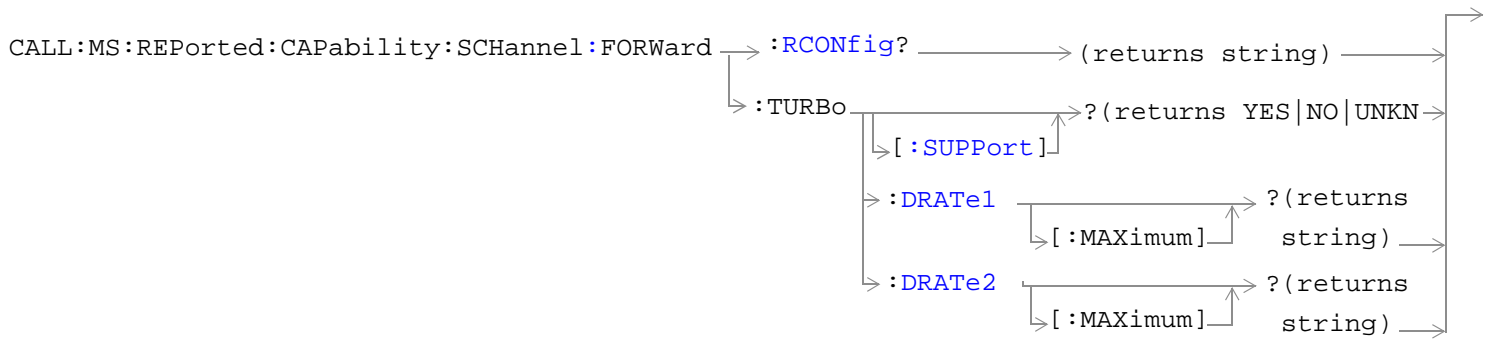
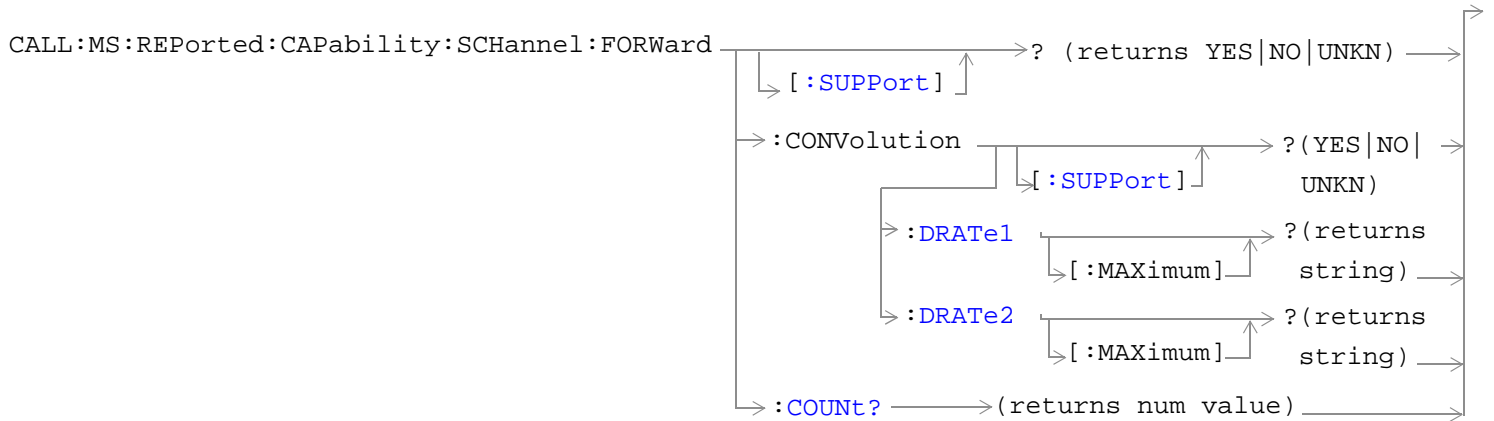


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**CALL:MS:REPorted:CAPability:QUERy**

Function	This command causes the test set to obtain the queryable mobile station capability results. This command is only applicable to active cell mode in the IS-2000 system.
Query	N/A
*RST Setting	N/A
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:QUERY" obtains queryable mobile station capability results from the mobile station.	

## CALL:MS:REPorted:CAPability:SCHannel:FORWard



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**CALL:MS:REPorted:CAPAbility:SCHannel:FORWARD[:SUPPort]?**

Function	This query only command returns the mobile station's capability to support a forward supplemental channel (SCH), as reported by the mobile station.
Query	Range: YES   NO   UNKN
*RST Setting	UNKN
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:SUPPPORT?"	

**CALL:MS:REPorted:CAPAbility:SCHannel:FORWARD:CONVolution[:SUPPort]?**

Function	This query only command returns the mobile station's capability to support convolutional coding on the forward supplemental channel, as reported by the mobile station.
Query	Range: YES   NO   UNKN
*RST Setting	UNKN
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:CONVOLUTION:SUPPORT?"	

**CALL:MS:REPorted:CAPAbility:SCHannel:FORWARD:CONVolution:DRATE1[:MAXimum]?**

Function	This query only command returns the mobile station's maximum convolutional coder data rate on the forward supplemental channel for rate set 1, as reported by the mobile station.
Query	Range: BPS9600   BPS19200   BPS76800   BPS153600   BPS307200   UNKN
*RST Setting	UNKN
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:CONVOLUTION:DRATE1:MAXIMUM?"	

**CALL:MS:REPorted:CAPAbility:SCHannel:FORWARD:CONVolution:DRATE2[:MAXimum]?**

Function	This query only command returns the mobile station's maximum convolutional coder data rate on the forward supplemental channel for rate set 2, as reported by the mobile station.
Query	Range: BPS14400   BPS28800   BPS57600   BPS230400   UNKN
*RST Setting	UNKN
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:CONVOLUTION:DRATE2:MAXIMUM?"	

CALL:MS:REPorted:CAPability:SCHannel:FORWard

### CALL:MS:REPorted:CAPability:SCHannel:FORWard:COUNt?

Function	This query only command returns the mobile station's capability to support multiple forward supplemental channels, as reported by the mobile station.
Query	Range: 0   1   2, 9.91 E+37
*RST Setting	9.91 E+37
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:COUNT?"	

### CALL:MS:REPorted:CAPability:SCHannel:FORWard:RCONfig?

Function	This query only command returns the mobile station's capability to support forward supplemental channel radio configurations, as reported by the mobile station. This query returns a comma-separated string of any combination of 3, 4, 5, or null.
Query	Range: 3   4   5   null
*RST Setting	null
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:RCONFIG?"	

### CALL:MS:REPorted:CAPability:SCHannel:FORWard:TURBo[:SUPPort]?

Function	This query only command returns the mobile station's capability to support the forward supplemental channel turbo coder, as reported by the mobile station.
Query	Range: YES   NO   UNKN
*RST Setting	UNKN
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:TURBO:SUPPORT?"	

### CALL:MS:REPorted:CAPability:SCHannel:FORWard:TURBo:DRATe1[:MAXimum]?

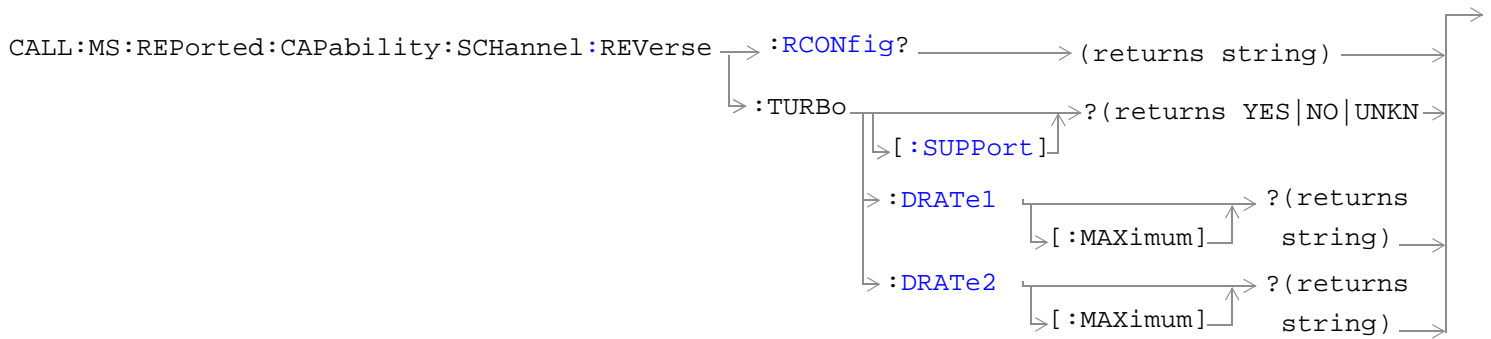
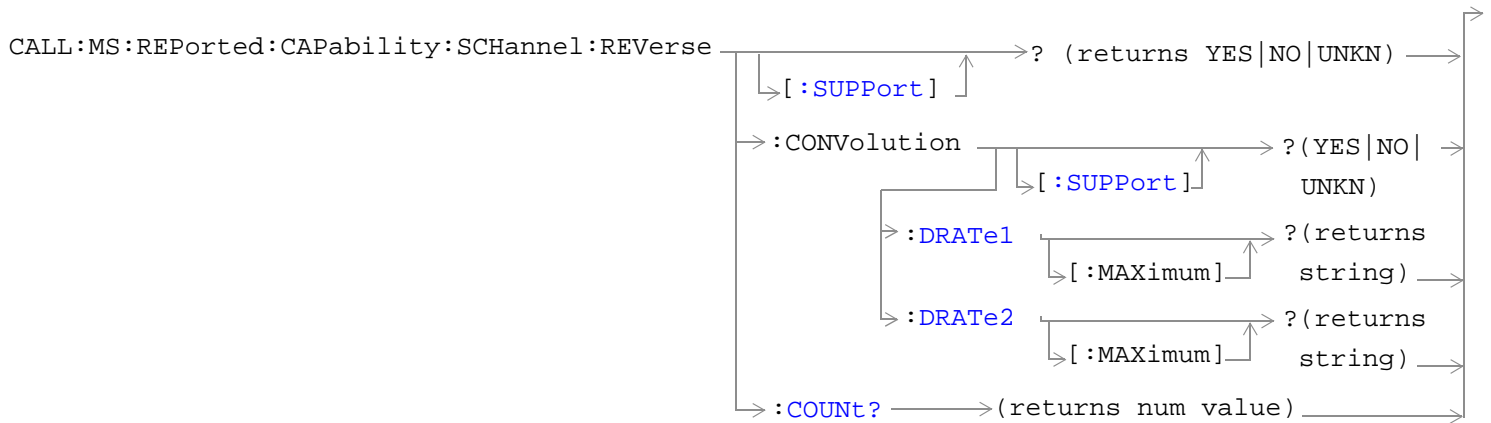
Function	This query only command returns the mobile station's maximum turbo coder data rate on the forward supplemental channel for rate set 1, as reported by the mobile station.
Query	Range: BPS9600   BPS19200   BPS76800   BPS153600   BPS307200   UNKN
*RST Setting	UNKN
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:TURBO:DRATE1:MAXIMUM?"	



**CALL:MS:REPorted:CAPability:SCHannel:FORWard:TURBo:DRATe2[:MAXimum]?**

Function	This query only command returns the mobile station's maximum turbo coder data rate on the forward supplemental channel for rate set 2, as reported by the mobile station.
Query	Range: BPS14400   BPS28800   BPS57600   BPS230400   UNKN
*RST Setting	UNKN
<b>Programming Example</b>	
OUTPUT 714 ; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:FORWARD:TURBO:DRATE2:MAXIMUM?"	

## CALL:MS:REPorted:CAPability:SCHannel:REVerse



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**CALL:MS:REPorted:CAPability:SCHannel:REVerse[:SUPPort]?**

Function	This query only command returns the mobile station's capability to support the reverse supplemental channel, as reported by the mobile station.
Query	Range: YES   NO   UNKN
*RST Setting	UNKN
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:SUPPORT?"	

**CALL:MS:REPorted:CAPability:SCHannel:REVerse:CONVolution[:SUPPort]?**

Function	This query only command returns the mobile station's capability to support convolutional coding on the reverse supplemental channel, as reported by the mobile station.
Query	Range: YES   NO   UNKN
*RST Setting	UNKN
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:CONVOLUTION:SUPPORT?"	

**CALL:MS:REPorted:CAPability:SCHannel:REVerse:CONVolution:DRATe1[:MAXimum]?**

Function	This query only command returns the mobile station's maximum convolutional coder data rate on the reverse supplemental channel for rate set 1, as reported by the mobile station.
Query	Range: BPS9600   BPS19200   BPS76800   BPS153600   BPS307200   UNKN
*RST Setting	UNKN
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:CONVOLUTION:DRATE1:MAXIMUM?"	

**CALL:MS:REPorted:CAPability:SCHannel:REVerse:CONVolution:DRATe2[:MAXimum]?**

Function	This query only command returns the mobile station's maximum convolutional coder data rate on the reverse supplemental channel for rate set 2, as reported by the mobile station.
Query	Range: BPS14400   BPS28800   BPS57600   BPS230400   UNKN
*RST Setting	UNKN
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:CONVOLUTION:DRATE2:MAXIMUM?"	

**CALL:MS:REPorted:CAPability:SCHannel:REVerse:COUNT?**

Function	This query only command returns the mobile station's capability to support multiple reverse supplemental channels, as reported by the mobile station.
Query	Range: 0   1   2, 9.91 E+37
*RST Setting	9.91 E+37
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:COUNT?"	

**CALL:MS:REPorted:CAPability:SCHannel:REVerse:RCONfig?**

Function	This query only command returns the mobile station's capability to support reverse supplemental channel radio configurations, as reported by the mobile station.  This query returns a comma-separated string of any combination of 3, 4, 5, or null.
Query	Range: 3   4   5   null
*RST Setting	null
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:RCONFIG?"	

**CALL:MS:REPorted:CAPability:SCHannel:REVerse:TURBo[:SUPPort]?**

Function	This query only command returns the mobile station's capability to support the reverse supplemental channel turbo coder, as reported by the mobile station.
Query	Range: YES   NO   UNKN
*RST Setting	UNKN
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:TURBO:SUPPORT?"	

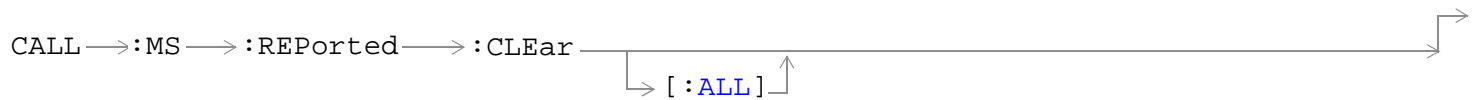
**CALL:MS:REPorted:CAPability:SCHannel:REVerse:TURBo:DRATe1[:MAXimum]?**

Function	This query only command returns the mobile station's maximum turbo coder data rate on the reverse supplemental channel for rate set 1, as reported by the mobile station.
Query	Range: BPS9600   BPS19200   BPS76800   BPS153600   BPS307200   UNKN
*RST Setting	UNKN
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:TURBO:DRATE1:MAXIMUM?"	

**CALL:MS:REPorted:CAPability:SCHannel:REVerse:TURBo:DRATe2[:MAXimum]?**

Function	This query only command returns the mobile station's maximum turbo coder data rate on the reverse supplemental channel for rate set 2, as reported by the mobile station.
Query	Range: BPS14400   BPS28800   BPS57600   BPS230400   UNKN
*RST Setting	UNKN
<b>Programming Example</b>	
OUTPUT 714 ; "CALL:MS:REPORTED:CAPABILITY:SCHANNEL:REVERSE:TURBO:DRATE2:MAXIMUM?"	

## CALL:MS:REPorted:CLEar



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### CALL:MS:REPorted:CLEar[:ALL]

<b>Function</b>	<p>Clears the mobile station (MS) information database.</p> <p>The following mobile station data is cleared:</p> <ul style="list-style-type: none"> <li>• Page MS Information,</li> <li>• Status Request Information,</li> <li>• Queriable MS Information (mobile capabilities),</li> <li>• Registration Type,</li> <li>• Mobile Protocol Capability Indication,</li> <li>• MS Called Party Number.</li> </ul> <p>After the MS database is cleared, the test set will re-acquire the mobile station for the Status Request Information during the next registration.</p>
<b>Programming Example</b> <pre>OUTPUT 714; "CALL:MS:REPORTED:CLEAR:ALL"</pre>	

## CALL:MS:REPorted:CPClass

CALL → :MS → :REPorted → :CPClass? → (returns num value) →

[“Diagram Conventions” on page 268](#)

### CALL:MS:REPorted:CPClass?

Function	Queries the mobile reported power class as part of the station class mark (SCM) for IS-95 mobiles. Used only in active cell operating mode.
Query	Range: 1, 2, 3, or 9.91 E+37
*RST Setting	9.91 E+37
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:PCLASS:SELECTED?" !Returns the MS reported power class.	

## CALL:MS:REPorted:CTXType

CALL → :MS → :REPorted → :CTXType? → (returns CONT | DISC | **UNKN**)



[“Diagram Conventions” on page 268](#)

### CALL:MS:REPorted:CTXType?

Function	Queries the mobile reported transmission mode for IS-95, cdma2000 systems.
Query	Range: CONT   DISC   UNKN
*RST Setting	UNKN
<b>Programming Example</b> OUTPUT 714 ; "CALL:MS:REPORTED:CTXTYPE?"	



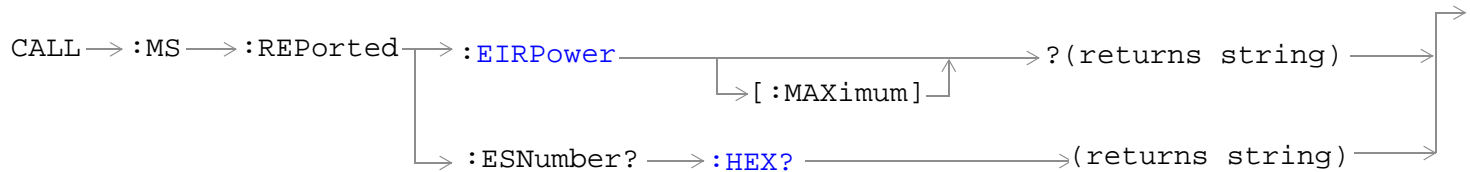
## CALL:MS:REPorted:DUAL[:MODE]

CALL→:MS→:REPorted→:DUAL → [ :MODE ] → ?(returns CDMA ONLY | DUAL MODE | **NULL**) →

[“Diagram Conventions” on page 268](#)

### CALL:MS:REPorted:DUAL[:MODE]?

Function	Queries the mobile reported operating mode for IS-95, cdma2000 systems.
Query	Range: CDMA ONLY   DUAL MODE   NULL
*RST Setting	NULL
<b>Programming Example</b> OUTPUT 714; "CALL:MS:REPORTED:DUAL?"	

**CALL:MS:REPorted:<EIRP,ESN>**

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**CALL:MS:REPorted:EIRPower[:MAXimum]?**

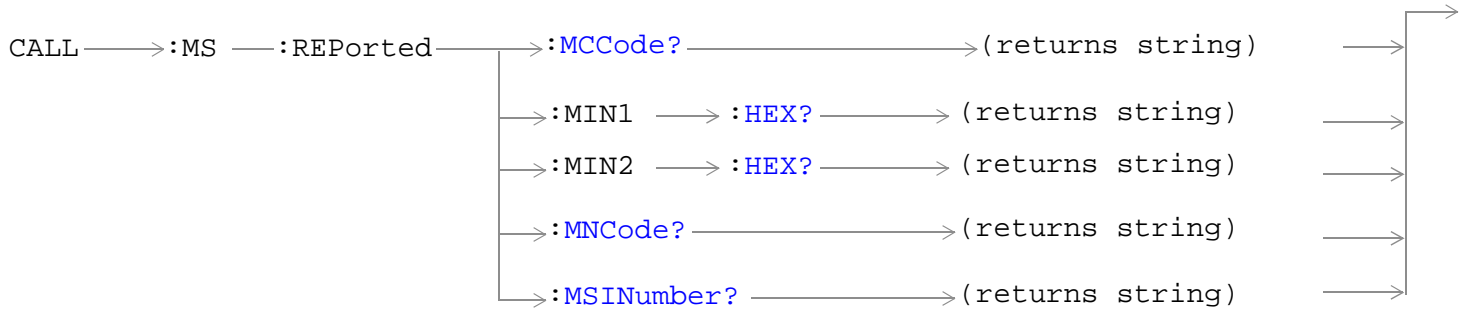
Function	<p>This query returns, in units of dBW, up to three concatenated mobile station reported maximum EIRP (effective isotropic radiated power).</p> <p>Each maximum EIRP value that is included in the returned string is right-justified within an 8-character slot. Each 8-character slot is followed by a comma and a space until the last maximum EIRP value is sent. The last maximum EIRP value in the string will not have an appended comma and a space.</p> <p>Each maximum EIRP value that is included in the returned string will correspond, by its position in the string, with the position of each band class in the string returned by the command <b>“CALL:MS:REPorted:BCLass?”</b> .</p> <p>Each time a new mobile station registers with the test set, the test set will have the mobile station report band classes, mobile station reported operating mode for each band class, and mobile station reported max EIRP (if the operating mode is CDMA) for each band class. These results are referred to as Status Request Information.</p>
Query	Range: -xx, null (where xx is a numeric value)
*RST Setting	Null
<p><b>Programming Example</b></p> <p>OUTPUT 714; "CALL:MS:REPORTED:EIRP?" !when sent to a mobile station supporting US cellular (analog operating mode) and US PCS (CDMA operating mode) bands, might return something similar to the following string:</p> <p>"&lt;null substring&gt;, &lt;sp&gt;-50&lt;sp&gt;&lt;sp&gt;&lt;sp&gt;&lt;sp&gt;&lt;sp&gt;" .</p> <p>Note that this string consists of a leading comma and space denoting a null substring, followed by the maximum EIRP for the second band, US PCS (CDMA operating mode).</p>	

**CALL:MS:REPorted:ESNumber:HEX?**

Function	Queries the hexadecimal formatted version of the electronic serial number. Returns a string of hexadecimal characters. Used only in active cell operating mode.
Query	Range: 0x00000000 to 0xFFFFFFFF, or null
*RST Setting	null
<b>Programming Example</b>	
OUTPUT 714;"CALL:MS:REPORTED:ESNUMBER:HEX?" !Queries the Hexadecimal value of the ESN.	

---

## CALL:MS:REPorted:<MCC,MIN1,MIN2,MNC,MSIN>



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**CALL:MS:REPorted:MCCode?**

Function	Queries the mobile country code (MCC), as reported by the mobile station.
Query	Range: 0 to 999
*RST Setting	Null string
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:MCCODE?"	

**CALL:MS:REPorted:MIN1:HEX?**

Function	<p>Queries the 24 bits of the mobile identification number that represent the mobile station's 7 digit phone number. Returns a string of hexadecimal characters.</p> <p>When the MS registers, the MS sends a 34 bit Mobile Identification Number that is divided into MIN1 (24 bits) representing the MS's 7 digit phone number and MIN2 (10 bits) representing the 3 digit area code. When the 34 bit Mobile Identification Number value is received by the test set, Paging Phone Number, MIN1 and MIN2 will be updated.</p> <p>Used only in active cell operating mode.</p>
Query	Range: 0x000000 to 0xFFFFFFFF, or null
*RST Setting	null
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:MIN1:HEX?" !Returns the MIN1 value.	

**CALL:MS:REPorted:MIN2:HEX?**

Function	<p>Queries the 10 bits of the mobile identification number that represent the mobile station's 3 digit area. Returns a string of hexadecimal characters. Used only in active cell operating mode.</p> <p>When the MS registers, the MS sends a 34 bit Mobile Identification Number that is divided into MIN1 (24 bits) representing the MS's 7 digit phone number and MIN2 (10 bits) representing the 3 digit area code. When the 34 bit Mobile Identification Number value is received by the test set, Paging Phone Number, MIN1 and MIN2 will be updated.</p>
Query	Range: 0x000 to 0x3FF, or null
*RST Setting	null
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:MIN2:HEX?"	

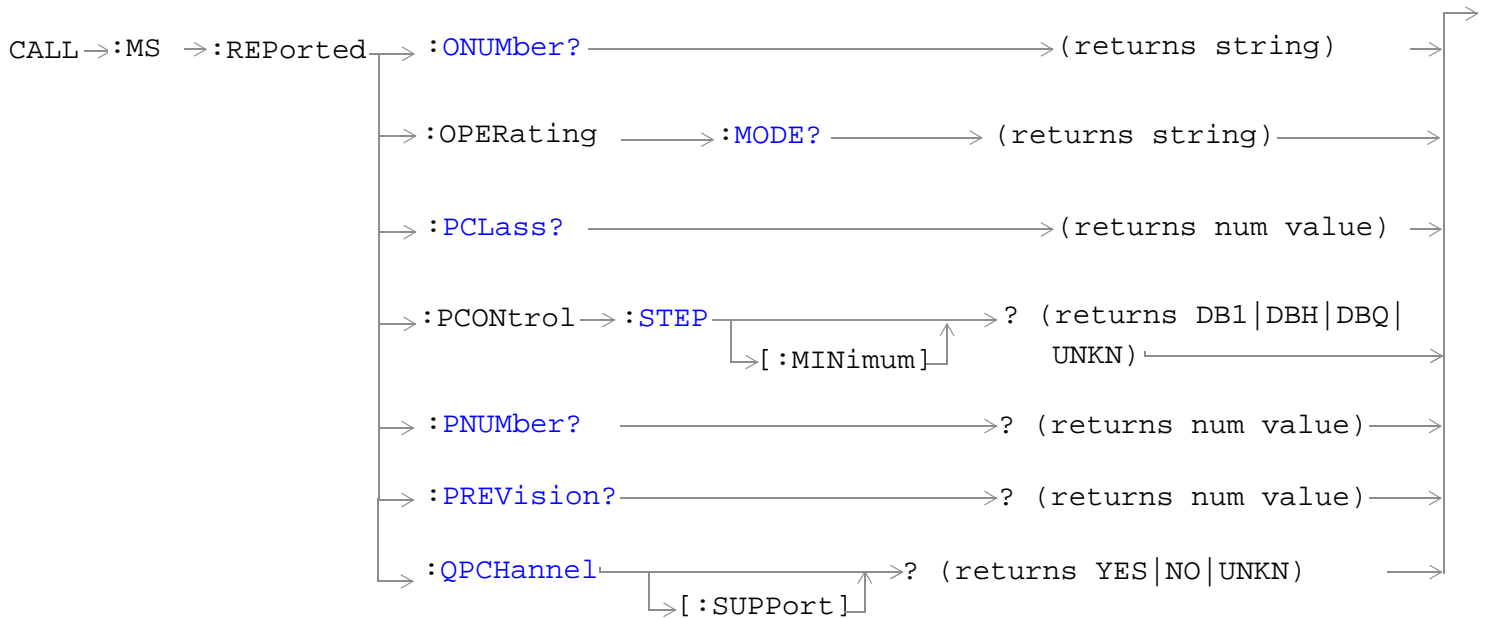
CALL:MS:REPorted:<MCC,MIN1,MIN2,MNC,MSIN>

### CALL:MS:REPorted:MNCCode?

Function	Queries the mobile network code (MNC), as reported by the mobile station.
Query	Range: 0 to 999
*RST Setting	Null string
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:MNCODE?"	

### CALL:MS:REPorted:MSINumber?

Function	Queries the mobile station reported mobile station identification number.
Query	Range: returns up to 10 digits
*RST Setting	Null string
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:MSINUMBER?"	

**CALL:MS:REPorted:<ONUM,OPER,PCL,PCON,PNUM,PREV,QPCH>**

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CALL:MS:REPorted:<ONUM, OPER,PCL,PCON,PNUM,PREV,QPCH>

### CALL:MS:REPorted:ONUMber?

Function	Queries the phone number the mobile station dialed in a mobile originated call. Used only in active cell mode. Returns a string of up to 16 digits.
Query	Range: up to 16 digits: 0 through 9, *,#, or null
*RST Setting	null
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:ONUMBER?" !Returns the phone number the mobile dialed.	

### CALL:MS:REPorted:OPERating:MODE?

Function	<p>This query returns up to three concatenated mobile station reported operating modes.</p> <p>Each operating mode that is included in the returned string is right-justified within an 8-character slot. Each 8-character slot is followed by a comma and a space until the last band is sent. The last band in the string will not have an appended comma and a space.</p> <p>Each operating mode that is included in the returned string will correspond, by its position in the string, with the position of each band class in the string returned by the command "CALL:MS:REPorted:BClass?" .</p> <p>Each time a new mobile station registers with the test set, the test set will have the mobile station report band classes, mobile station reported operating mode for each band class, and mobile station reported max EIRP ( if the operating mode is CDMA) for each band class. These results are referred to as Status Request Information.</p>
Query	Range: DualMode   CDMA   Analog   N-Analog   W-Analog   Null
*RST Setting	Null
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:OPER:MODE? !when sent to a mobile station supporting US cellular and US PCS bands, might return something similar to the following string: "<sp><sp>Analog,<sp><sp><sp><sp><sp>CDMA". Note that this string consists of 16 characters (8 for each band) plus a comma and space separating the two operating mode.	

### CALL:MS:REPorted:PClass[:SElected]?

Function	<p>Queries the mobile reported power class as part of the station class mark (SCM) for the active (that is the selected) radio format.</p> <p>Used only in active cell operating mode.</p>
Query	Range: 1 through 8, 9.91 E+37
*RST Setting	9.91 E+37
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:PCLASS:SELECTED?" !Returns the MS reported power class.	



**CALL:MS:REPorted:PCONtrol:STEP[:MINimum]?**

Function	Queries the mobile reported minimum power control step size.  The actual power control step size used by the mobile during closed loop power control is set using the "CALL[:CELL]:CLPControl:REVerse:STEP" command. The mobile reported minimum power control step size indicates the smallest step the mobile is capable of making during closed loop power control.
Query	Range: DB1   DBH   DHQ   UNKN
*RST Setting	DB1
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:PCON:STEP:MINIMUM?"	

**CALL:MS:REPorted:PNUMber?**

Function	Queries the mobile station reported phone number. When the mobile station registers, the 34 bit mobile identification number (MIN) is used to set the MS reported phone number and paging phone number. If the MIN does not translate into a valid phone number, set the ms reported phone number nad paging phone number to 0000000000. Used only in active cell operating mode.
Query	Range: Up to 10 characters 0 through 9, or null
*RST Setting	null
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:PNUMBER?" !Returns the phone number of the mobile.	

**CALL:MS:REPorted:PREVision?**

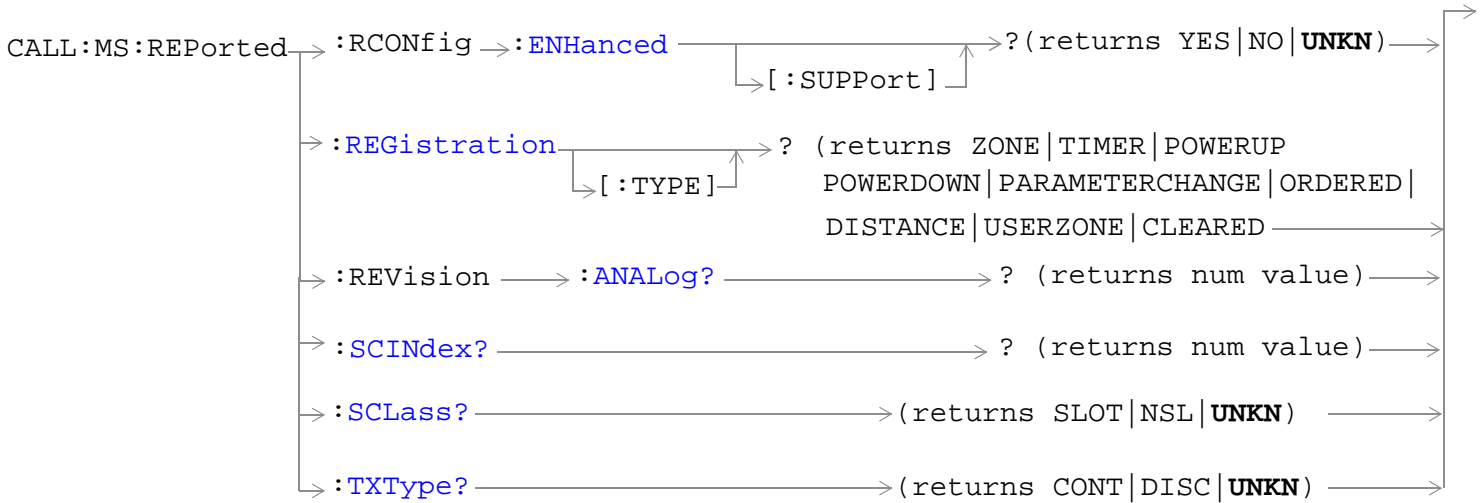
Function	Queries the mobile reported protocol revision. The values returned have the following definitions:  0 = Null String 1 = J_STD-008 (if CELL:BAND? returns USPC) or Korean PCS (if CELL:BAND? returns KPCS) 2 = Null String 3 = TSB-74 (if CELL:BAND? returns USC) or ARIB_T53 (if CELL:BAND? returns JCDM) 4 = IS-95B 5 = IS-95B plus 6 = IS-2000 Rev0 7 = Null string
Query	Range: 0 to 7, 9.91 E+36
*RST Setting	9.91 E+36
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:PREVISION?"	

CALL:MS:REPorted:<ONUM, OPER,PCL,PCON,PNUM,PREV,QPCH>

### CALL:MS:REPorted:QPCHannel[:SUPPort]?

Function	Queries whether the mobile supports quick paging. When the test set's quick paging channel state is on it will send out slotted quick pages.
Query	Range: YES   NO   UNKN
*RST Setting	CLEARED
<b>Programming Example</b> OUTPUT 714 ; "CALL:MS:REPORTED:QPCHANNEL:SUPPORT?"	

## CALL:MS:REPorted:<RCON,REG,REV,SCIN,SCL,TXT>



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### CALL:MS:REPorted:RCONfig:ENHanced[:SUPPORT]?

Function	Queries whether or not the mobile station supports enhanced radio configurations, as reported by the mobile station. If the mobile station supports any radio configuration in radio configuration class 2, this mobile station reported result will be YES.
Query	Range: YES   NO   UNKN
*RST Setting	UNKN
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:RCON:ENH?"	

CALL:MS:REPorted:<RCON,REG,REV,SCIN,SCL,TXT>

### CALL:MS:REPorted:REGistration[:TYPE]?

Function	Queries the type of registration that was last received by the test set, as reported by the mobile station.
Query	Range: ZONE   TIMER   POWERUP   POWERDOWN   PARAMETERCHANGE   ORDERED   DISTANCE   USERZONE   CLEARED
*RST Setting	CLEARED
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:REGISTRATION?"	

### CALL:MS:REPorted:REVision:ANALog

Function	Queries the analog mobile reported protocol version that the mobile station supports. Used only in active cell operating mode.
Query	Range: 0 to 3, 9.91E+37  Protocol Version: 0 (TIA/EIA-553/IS-54-A MS) 1 (TIA/EIA 627 dual-mode MS) 2 (IS-95 dual mode MS) 3 (TIA/EIA-136 dual-mode MS) 9.91E+37
*RST Setting	9.91 E+37
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:REVISION:ANALOG?"	

### CALL:MS:REPorted:SCINdex?

Function	Queries the mobile reported slot cycle index, as reported by the mobile station.
Query	Range: 0 to 7, 9.91 E+37
*RST Setting	9.91 E+37
Programming Example	
OUTPUT 714; "CALL:MS:REPORTED:SCINDEX?"	

**CALL:MS:REPorted:SClass?**

Function	Queries the mobile reported slot cycle index, as reported by the mobile station. The test set will page the mobile station in slotted mode unless the mobile station has registered as non-slotted (NSL).
Query	Range: SLOT   NSL   UNKN
*RST Setting	UNKN
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:SCLASS?"	

**CALL:MS:REPorted:TXType?**

Function	Queries the mobile reported discontinuous transmission support as part of the station class mark (SCM) for AMPS systems.
Query	Range: CONT   DISC   UNKN
*RST Setting	UNKN
<b>Programming Example</b> OUTPUT 714;"CALL:MS:REPORTED:TXTYPE?"	

## CALL[:CELL]:NIDentity

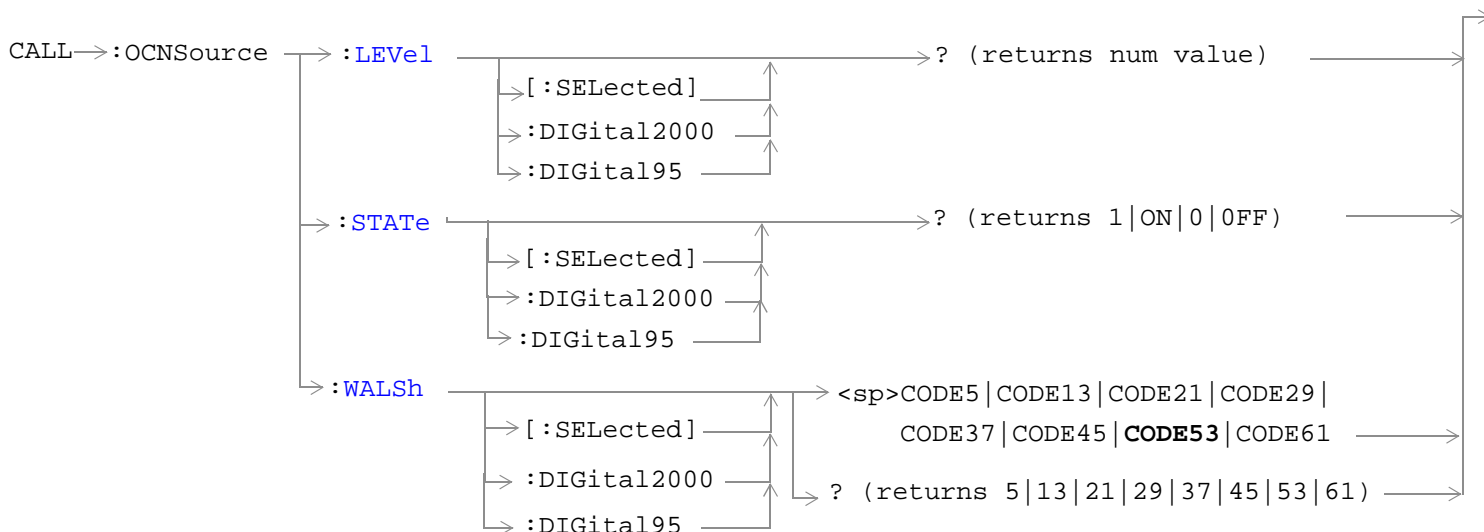


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### CALL[:CELL]:NIDentity

Function	Sets/queries the network ID (NID). This parameter can be set any time and will be sent out in the next overhead message.
Setting	Range: 0 to 65535
Query	Range: 0 to 65595
*RST Setting	1
<b>Programming Example</b> OUTPUT 714;"CALL:CELL:NIDENTITY 3056" !Sets the network identifier to 3056.	

## CALL:OCNSource



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### CALL:OCNSource:LEVel[:SElected]?

<p><b>Function</b></p>	<p>Queries the calculated level of the orthogonal channel noise simulator (OCNS).</p> <p>The optional [:SElected] keyword in this command specifies that the OCNS level being queried applies to the current system type.</p> <p>The OCNS level is a calculated value used to balance the relative power levels of the following channels to sum to 100%:</p> <ul style="list-style-type: none"> <li>• OCNS</li> <li>• Paging (PCH)</li> <li>• Pilot (PICH)</li> <li>• Sync (SCH)</li> <li>• Fundamental (FCH)</li> <li>• Supplemental (SCH)</li> <li>• Quick Paging (QPCH)</li> </ul> <p>If the contribution of OCNS is calculated to be -30 dB or less, the OCNS state is turned off.</p>
<p><b>Query</b></p>	<p>Range: 0 to -20 dB, NAN</p> <p>Resolution: 0.01 dB</p>
<p><b>*RST Setting</b></p>	<p>NAN</p>
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"CALL:OCNSOURCE:LEVEL?" !Queries the calculated OCNS level.</pre>	

**CALL:OCNSource:STATe[:SElected]?**

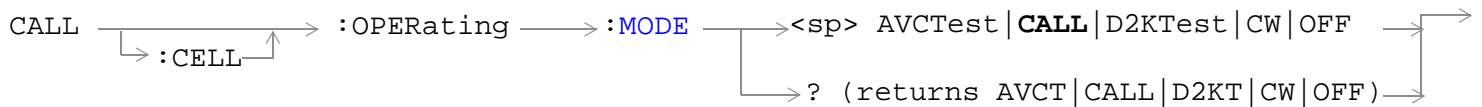
Function	<p>Queries the on/off state of the orthogonal channel noise simulator (OCNS)</p> <p>The optional [:SElected] keyword in this command specifies that the OCNS on/off state being queried applies to the current system type.</p> <p>The OCNS level is a calculated value used to balance the relative power levels of the following channels to sum to 100%:</p> <ul style="list-style-type: none"> <li>• OCNS</li> <li>• Paging (PCH)</li> <li>• Pilot (PICH)</li> <li>• Sync (SCH)</li> <li>• Fundamental (FCH)</li> <li>• Supplemental (SCH)</li> <li>• Quick Paging (QPCH)</li> </ul> <p>If the contribution of OCNS is calculated to be -30 dB or less, the OCNS state is turned off.</p>
Setting	Range: 1   0
*RST Setting	1 (on)
<b>Programming Example</b> OUTPUT 714; "CALL:OCNSOURCE:STATE?"	

**CALL:OCNSource:WALSh[:SElected]**

Function	<p>Sets/queries the Walsh code used for the orthogonal channel noise simulator (OCNS).</p> <p>The optional [:SElected] keyword in this command specifies that the OCNS Walsh code being set/queried applies to the current system type.</p> <p>The Walsh codes allowed for use with this command are part of a reserved codespace that has been created by fixing other code channels to pre-determined values. Reserving this codespace eliminates the possibility of conflicts that can arise with lower walsh code sets which are used in certain radio configurations.</p>
Setting	Range: CODE5   CODE13   CODE21   CODE29   CODE37   CODE45   CODE53   CODE61
Query	Range: 5   13   21   29   37   45   53   61
*RST Setting	CODE53
<b>Programming Example</b> OUTPUT 714; "CALL:OCNSOURCE:WALSH CODE13" !Sets the OCNS channel walsh code to 13.	



## CALL[:CELL]:OPERating



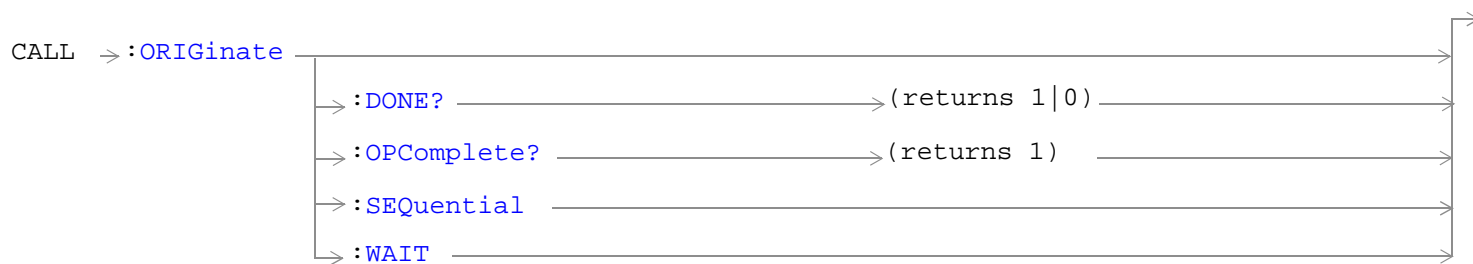
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### CALL[:CELL]:OPERating:MODE

Function	<p>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.</p> <p>CALL is the default operating mode. In CALL mode (also called active cell mode), signaling between the mobile station and the base station emulator is used for call origination, handoffs, and other operations that simulate in-service mobile interaction. When CALL is selected, closed loop power control will be automatically set to its active mode. See “CALL[:CELL]:CLPControl:REVerse:MODE” for closed loop power control commands.</p> <p>D2KTest mode commands the test set to transmit a forward CDMA channel with no call processing capability. In this mode, a mobile station that complies with IS-2000 test mode will camp on to the forward channel. The test set will continually send an F-FCH on the user entered Walsh code, which the mobile station can use to make FER measurements. The mobile station must begin transmitting the R-FCH before reverse link measurements can be made.</p>
Setting	Range: AVCTest   CALL   D2KTest   CW
Query	Range: AVCT   CALL   D2KT   CW
*RST Setting	CALL
<b>Programming Example</b> OUTPUT 714; "CALL:CELL:OPERATING:MODE D2KTEST" !Selects IS-2000 test mode.	

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## 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.
Programming Example	
OUTPUT 714;"CALL:ORIGINATE" !pages the mobile station	

**CALL:ORIGinate:DONE?**

Function	See <a href="#">"Call Processing Event Synchronization"</a>
Query	Range: 1   0
Programming Example	
OUTPUT 714;"CALL:ORIGINATE:DONE?"	

**CALL:ORIGinate:OPComplete?**

Function	See <a href="#">"Call Processing Event Synchronization"</a>
Query	Range: 1
Programming Example	
OUTPUT 714;"CALL:ORIGINATE:OPCOMPLETE?"	

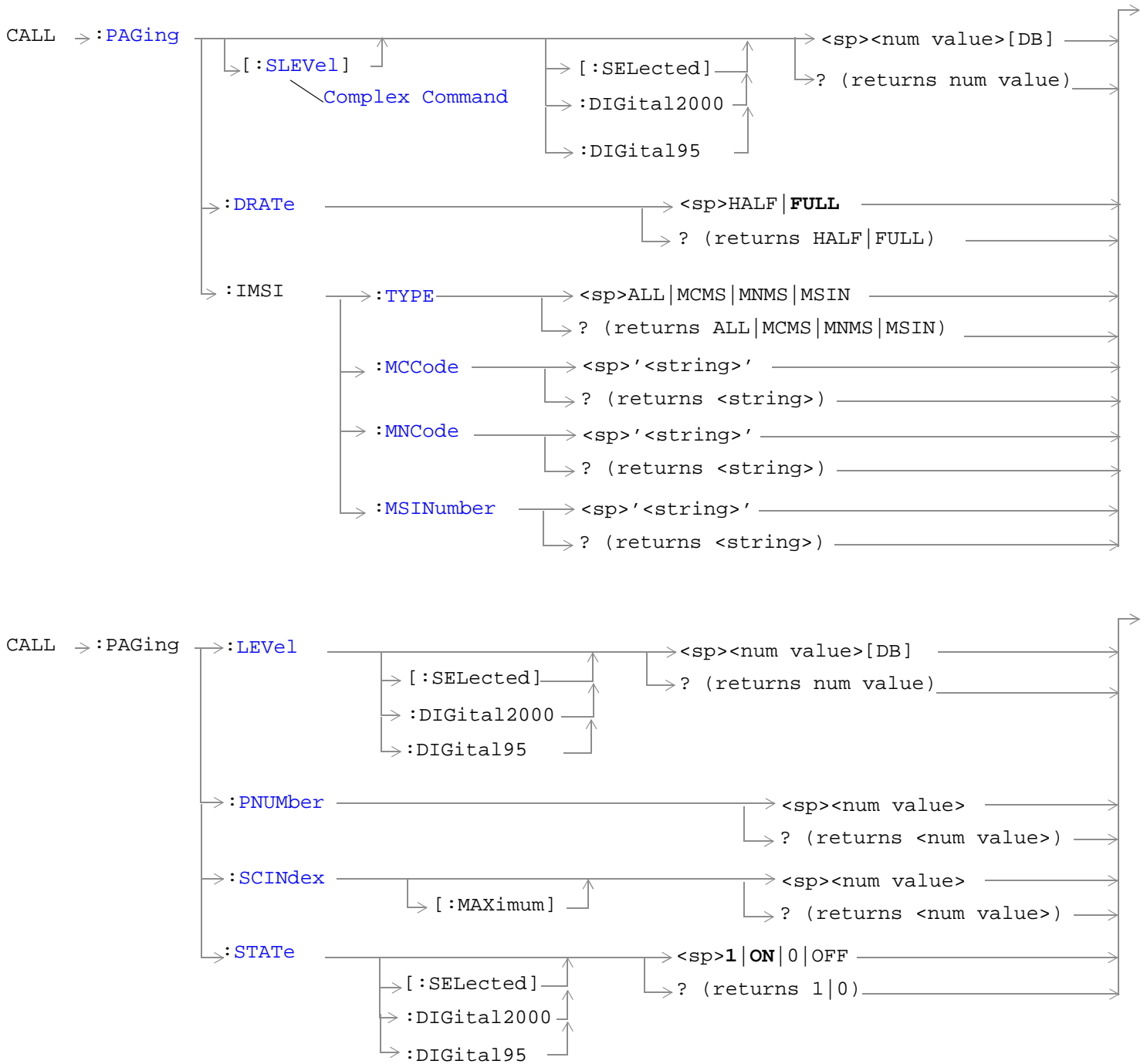
**CALL:ORIGinate:SEQuential**

Function	See <a href="#">"Call Processing Event Synchronization"</a>
Programming Example	
OUTPUT 714;"CALL:ORIGINATE:SEQUENTIAL"	

**CALL:ORIGinate:WAIT**

Function	See <a href="#">"Call Processing Event Synchronization"</a>
Programming Example	
OUTPUT 714;"CALL:ORIGINATE:WAIT"	

# CALL:PAGing



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**CALL:PAGing[:SLEVel][:SElected]**

Function	The setting form of this command performs two functions: (1) sets the PCH (forward paging channel) level, and (2) turns the PCH on/off state to ON.  The query form returns the PCH level.  The optional [:SElected] keyword in this command specifies that the PCH level and state being set/queried applies to the current system type. See " <a href="#">CALL[:CELL]:SYSTEM[:TYPE]</a> " to query or change the current system type.
Setting	Range: 0 to -20 dB
Query	Range: 0 to -20 dB, NAN
*RST Setting	-12 dB
Programming Example	
OUTPUT 714;"CALL:PAGING:SLEVEL:SELECTED -10"	

**CALL:PAGing:DRATe**

Function	Sets/queries the forward paging channel (PCH) data rate.
Setting	Range: FULL   HALF
Query	Range: FULL   HALF
*RST Setting	FULL
Programming Example	
OUTPUT 714;"CALL:PAGING:DRATE HALF" !Sets the PCH data rate to half.	

**CALL:PAGing:IMSI:TYPE**

Function	Sets/queries the international mobile subscriber identity IMSI type.  This parameter will be overwritten when a new MSIN (Mobile Station Identification Number) is reported by the mobile station during registration.
Setting	Range: ALL   MCMS   MNMS   MSIN  MCMS = mobile country code (MCC) + mobile station identification number (MSIN) MNMC = mobile network code (MNC) + mobile station identification number (MSIN) MSIN = mobile station identification number (MSIN) only.
Query	Range: ALL   MCMS   MNMS   MSIN
*RST Setting	ALL
Programming Example	
OUTPUT 714;"CALL:PAGING:IMSI:TYPE MCMS"	

## CALL:PAGing

### CALL:PAGing:IMSI:MCC

Function	Sets/queries the mobile country code.  This parameter will be overwritten when a new MSIN (Mobile Station Identification Number) is reported by the mobile station during registration. If paging MCC is reported by the mobile station and there are fewer digits than expected, the test set will assume leading zeroes.
Setting	Range: 3 digit string
Query	Range: 3 digit string
*RST Setting	310
Programming Example OUTPUT 714;"CALL:PAGING:IMSI:MCC '222' "	

### CALL:PAGing:IMSI:MNC

Function	Sets/queries the mobile network code.  This parameter will be overwritten when a new MSIN (Mobile Station Identification Number) is reported by the mobile station during registration. If paging MNC is reported by the mobile station and there are fewer digits than expected, the test set will assume leading zeroes.
Setting	Range: 2 digit string
Query	Range: 2 digit string
*RST Setting	00
Programming Example OUTPUT 714;"CALL:PAGING:IMSI:MNC '10' "	

### CALL:PAGing:IMSI:MSIN

Function	Sets/queries the mobile country code.  This parameter will be overwritten when a new MSIN (Mobile Station Identification Number) is reported by the mobile station during registration. If paging MSIN is reported by the mobile station and there are fewer digits than expected, the test set will assume leading zeroes.
Setting	Range: 10 digit string
Query	Range: 10 digit string
*RST Setting	5099214001
Programming Example OUTPUT 714;"CALL:PAGING:IMSI:MSIN '5099213572' " !sets the paging IMSI MSIN to 5099213572.	

**CALL:PAGing:LEVel[:SElected]**

Function	Sets/queries the paging level. The optional [:SElected] keyword in this command specifies that the paging channel level being set/queried applies to the current system type. See " <a href="#">CALL[:CELL]:SYSTem[:TYPE]</a> " to query or change the current system type.
Setting	Range: 0 to -20 dB
Query	Range: 0 to -20 dB, NAN
*RST Setting	-12 dB
Programming Example	
OUTPUT 714;"CALL:PAGING:LEVEL:SELECTED -10"	

**CALL:PAGing:PNUMBER**

Function	Sets/queries the paging phone number. When the mobile station registers, the 34 bit mobile identification number (MIN) is used to set the MS reported phone number and paging phone number. If the MIN does not translate into a valid phone number, the ms reported phone number and paging phone number are set to 0000000000. This setting is overwritten when the phone number is updated.  When setting the paging number, the value is entered as a string (not as a numeric entry). Be sure to enclose the paging number in single quotes.
Setting	Range: up to 10 characters: 0 through 9, or null
Query	Range: up to 10 characters: 0 through 9, or null
*RST Setting	null
Programming Example	
OUTPUT 714;"CALL:PAGING:PNUMBER '8005551212'" !Set the paging number to 8005551212.	

**CALL:PAGing:SCINdex[:MAXimum]**

Function	Sets/queries the maximum slot cycle index. The test set will page the mobile station using slotted mode unless the mobile station has registered as non-slotted. The test set will use the lesser value of maximum slot cycle index or " <a href="#">CALL:MS:REPorted:SCINdex?</a> " for slotted paging.
Setting	Range: 0 to 7
Query	Range: 0 to 7
*RST Setting	1
Programming Example	
OUTPUT 714;"CALL:PAGING:SCINDEX 2"	

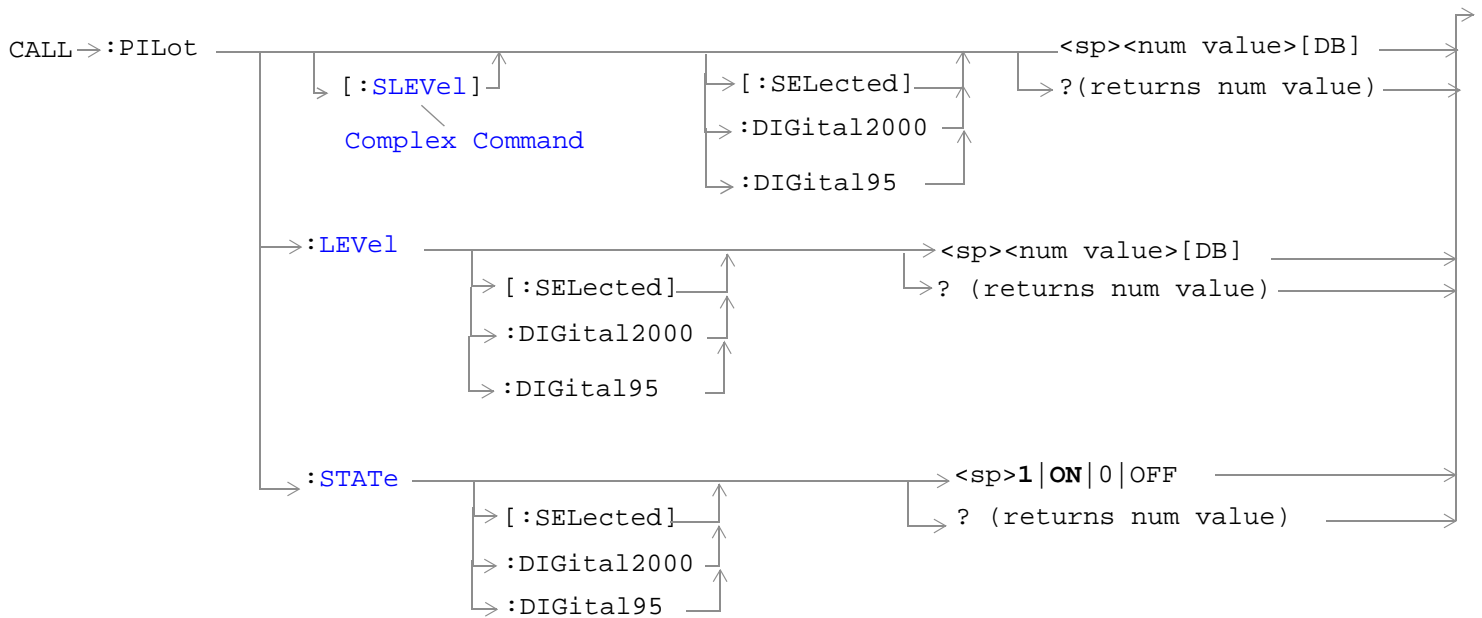
## CALL:PAGing

### CALL:PAGing:STATe[:SElected]

Function	Sets/queries the forward paging channel on/off state. The optional [:SElected] keyword in this command specifies that the paging channel state being set/queried applies to the current system type. See " <a href="#">CALL[:CELL]:SYSTem[:TYPE]</a> " to query or change the current system type.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	1 (on)
<b>Programming Example</b>  OUTPUT 714;"CALL:PAGING:STATE:DIGITAL2000 OFF" !Sets the IS-2000 paging on/off state to off.	



## CALL:PILOT



[“Diagram Conventions” on page 268](#)

### CALL:PILOT[:SLEVel][:SElected]

Function	<p>The setting form of this command performs two functions: (1) sets the PICH (forward pilot channel) level, and (2) turns the PICH state to ON.</p> <p>The query form returns the PICH level.</p> <p>The optional [:SElected] keyword in this command specifies that the pilot channel state and level being set/queried applies to the current system type. See <a href="#">“CALL[:CELL]:SYSTEM[:TYPE]”</a> to query or change the current system type.</p>
Setting	<p>Range: 0 to -10 dB</p> <p>Resolution: 0.01 dB</p>
Query	<p>Range: 0 to -10 dB</p> <p>Resolution: 0.01 dB</p>
*RST Setting	-7 dBm
<p><b>Programming Example</b></p> <pre> OUTPUT 714;"CALL:PILOT:SLEVel -10" !Sets the cell pilot state to ON and sets the level to -10 dB.           </pre>	

**CALL:PILOT:LEVel[:SElected]**

Function	Sets/queries the forward pilot channel (PICH) level. The optional [:SElected] keyword in this command specifies that the pilot level being set/queried applies to the current system type. See “CALL[:CELL]:SYSTem[:TYPE]” to query or change the current system type.
Setting	Range: 0 to -10 dB Resolution: 0.01 dB
Query	Range: 0 to -10 dB Resolution: 0.01 dB
*RST Setting	-7 dB
Programming Example OUTPUT 714;"CALL:PILOT:LEVEL -10"	

**CALL:PILOT:STATe[:SElected]**

Function	Sets/queries the forward pilot channel (PICH) state. The optional [:SElected] keyword in this command specifies that the pilot state being set/queried applies to the current system type. See “CALL[:CELL]:SYSTem[:TYPE]” to query or change the current system type.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	1 (on)
Programming Example OUTPUT 714;"CALL:PILOT:STATE OFF"	

## CALL[:CELL]:PNOffset

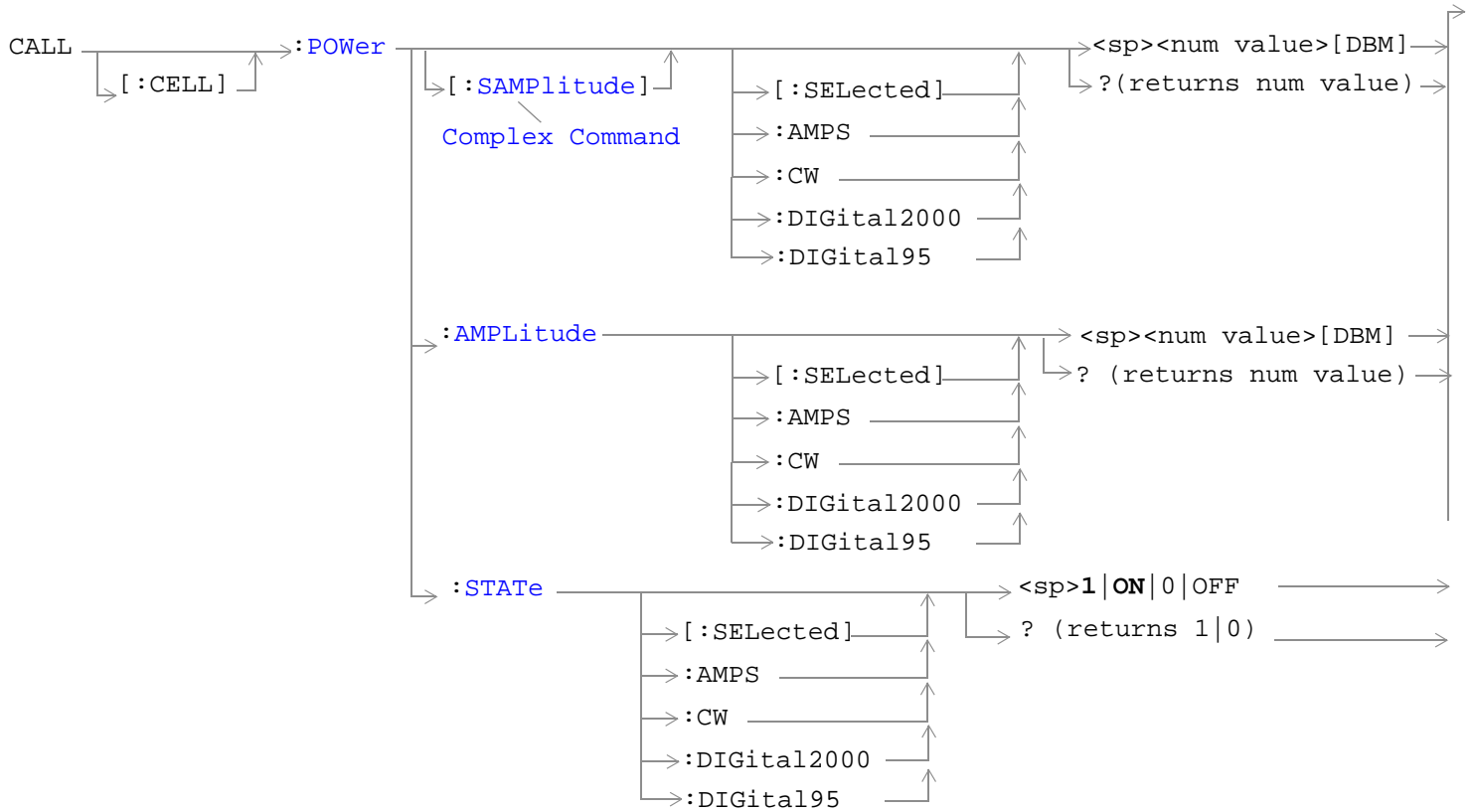


[“Diagram Conventions” on page 268](#)

### CALL[:CELL]:PNOffset

Function	Sets/queries the pseudonoise (PN) offset. The PN offset is the timing of the cell's short codes relative to system time.  This command may take up to 2 seconds to complete. The PN offset cannot be changed while a call is connected.
Setting	Range: 0 to 511
Query	Range: 0 to 511
*RST Setting	12
<b>Programming Example</b> OUTPUT 714;"CALL:CELL:PNOFFSET 333" sets the PN offset to 333.	

## CALL[:CELL]:POWer



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**CALL[:CELL]:POWer[:SAMPlitude][:SElected]**

Function	<p>The setting form of this command performs two functions: (1) sets the cell power level and (2) turns the cell power on/off state to on. The query form returns the cell power level (including compensation for amplitude offset) or NAN.</p> <p>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.</p> <p>Cell power and AWGN (see "CALL:AWGNoise:POWer" ) are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, a cell power level may be within the range listed below but cause an error message to be displayed. Possible causes are:</p> <ul style="list-style-type: none"> <li>• Sum of cell power and AWGN causing total RF power limits to be exceeded (see "CALL:STATus:TOTal:POWer[:AMPLitude][:SElected]?") for the allowable range of total RF power levels.)</li> <li>• Greater than 10 dB difference between cell power and AWGN.</li> <li>• Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).</li> </ul>
Setting	<p>Range:</p> <ul style="list-style-type: none"> <li>• CDMA: -170 dBm/1.23 MHz to 35 dBm/1.23 MHz</li> <li>• AMPS: -10 to -127 dBm</li> </ul> <p>Resolution: 0.01 dB</p>
Query	<p>Range: Same as setting range.</p> <p>Resolution: 0.01 dB</p>
*RST Setting	<ul style="list-style-type: none"> <li>• CDMA: -55 dBm/1.23 MHz</li> <li>• AMPS: -50 dBm</li> </ul>
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"CALL:CELL:POWER:SAMPLITUDE -30" !Sets the cell power state to ON and sets RF output power to -30 dBm.</pre>	

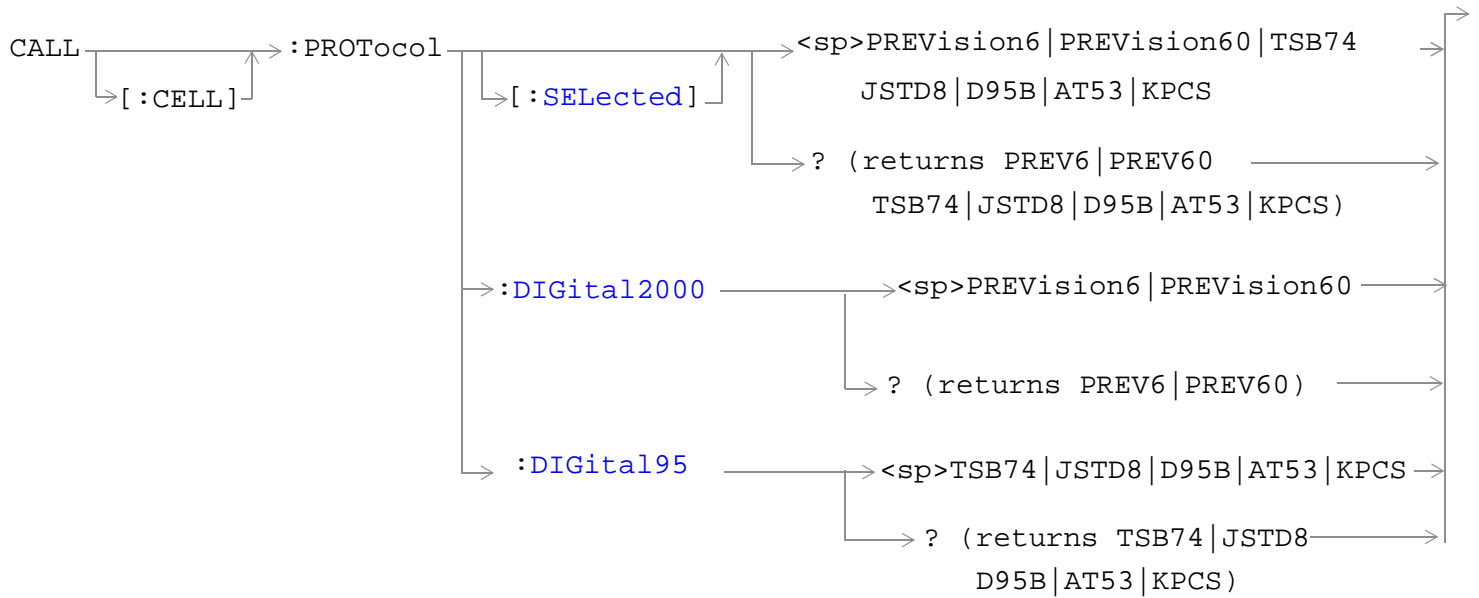
**CALL[:CELL]:POWER:AMPLitude[:SElected]**

Function	<p>Sets/queries the cell power level (including compensation for amplitude offset).</p> <p>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.</p> <p>Cell power and AWGN (see "CALL:AWGNoise:POWER" ) are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, a cell power level may be within the range listed below but cause an error message to be displayed. Possible causes are:</p> <ul style="list-style-type: none"> <li>• Sum of cell power and AWGN causing total RF power limits to be exceeded (see "CALL:STATus:TOTal:POWer[:AMPLitude][:SElected]?" for the allowable range of total RF power levels.)</li> <li>• Greater than 10 dB difference between cell power and AWGN.</li> <li>• Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORREction:GAIN" to set or query the amplitude offset value).</li> </ul>
Setting	<p>Range:</p> <ul style="list-style-type: none"> <li>• CDMA: -170 dBm/1.23 MHz to 35 dBm/1.23 MHz</li> <li>• AMPS: -10 to -127 dBm</li> </ul> <p>Resolution: 0.01 dB</p>
Query	<p>Range: Same as setting range.</p> <p>Resolution: 0.01 dB</p>
*RST Setting	<ul style="list-style-type: none"> <li>• CDMA: -55 dBm/1.23 MHz</li> <li>• AMPS: -50 dBm</li> </ul>
<p><b>Programming Example</b></p> <pre>OUTPUT 714; "CALL:CELL:POWER:AMPLITUDE -30 " !Sets the cell power level -30 dBm.</pre>	

**CALL[:CELL]:POWER:STATE[:SElected]**

Function	<p>Sets/queries the cell power state.</p> <p>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.</p> <p>Cell power and AWGN (see “CALL:AWGNoise:POWER” ) are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, a cell power level may be within the range listed below but cause an error message to be displayed. Possible causes are:</p> <ul style="list-style-type: none"> <li>• Sum of cell power and AWGN causing total RF power limits to be exceeded (see “CALL:STATUS:TOTAL:POWER[:AMPLitude][:SElected]?” for the allowable range of total RF power levels.)</li> <li>• Greater than 10 dB difference between cell power and AWGN.</li> <li>• Amplitude offset causing total RF power limits to be exceeded (see “SYSTEM:CORRection:GAIN” to set or query the amplitude offset value).</li> </ul>
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	ON
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"CALL:CELL:POWER:STATE OFF" !Turns off cell power.</pre>	

## CALL[:CELL]:PROTOcol



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**CALL[:CELL]:PROTOCOL[:SELEcted]**

Function	Sets/queries the protocol standard for the selected System Type.
Setting	Range: PREVISION6
Query	Range: 6
*RST Setting	PREV6 (IS-2000_Rev0)   D95B (IS-95B)
Programming Example	
OUTPUT 714; "CALL:CELL:PROT PREV6 "	

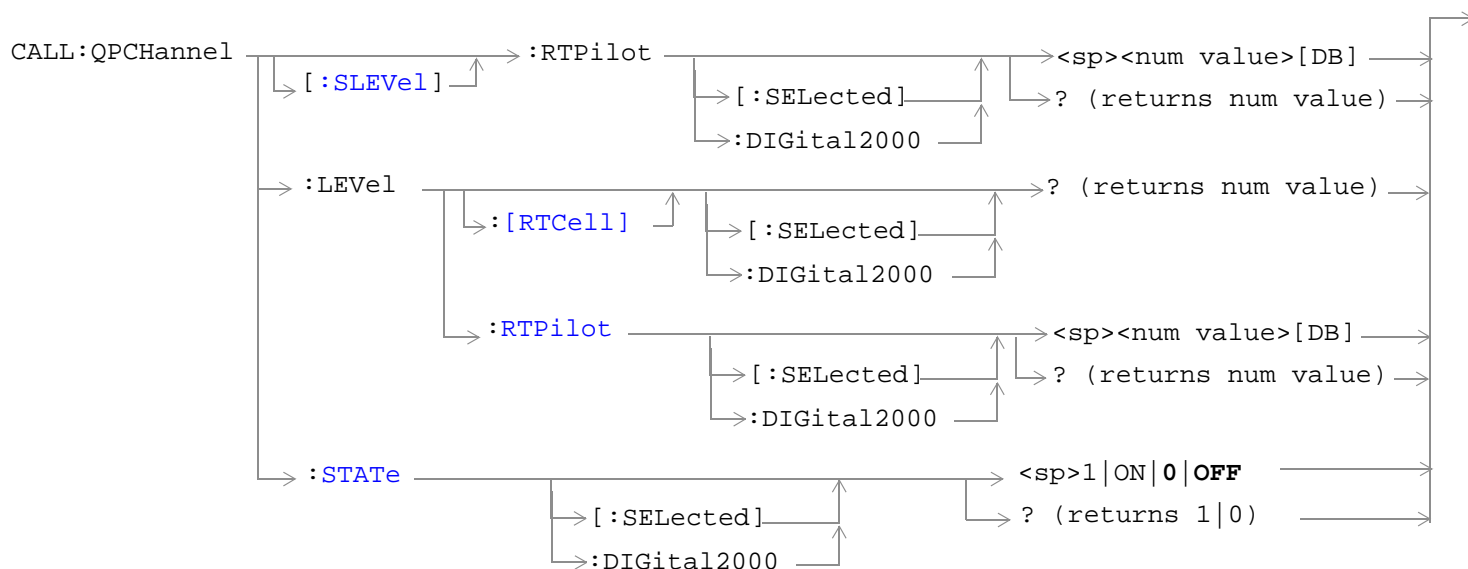
**CALL[:CELL]:PROTOCOL:DIG2000**

Function	Sets/queries the protocol standard for the IS-2000 System Type.
Setting	Range: PREVISION6 (IS-2000_Rev0)   PREVISION60 (IS-2000_Rev0 pre addendum)
Query	Range: PREVISION6   PREVISION60
*RST Setting	PREV6
Programming Example	
OUTPUT 714; "CALL:CELL:PROT PREV6 "	

**CALL[:CELL]:PROTOCOL:DIG95**

Function	Sets/queries the protocol standard for the IS-95 System Type.
Setting	Range: TSB74   JSTD8   D95B (IS-95B)   AT53 (ARIB T-53)   KPCS (Korean PCS)
Query	Range: TSB74   JSTD8   D95B   AT53   KPCS
*RST Setting	D95B (IS-95B)
Programming Example	
OUTPUT 714; "CALL:CELL:PROT PREV6 "	

## CALL:QPCHannel



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### CALL:QPCHannel[:SLEVel]:RTPilot[:SElected]

Function	<p>The setting form of this command performs two functions: (1) sets the forward quick paging channel (QPCH) level relative to the pilot level, and (2) turns the QPCH state to ON.</p> <p>The query form returns the QPCH level relative to the pilot level.</p> <p>The optional [:SElected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.</p> <p>The QPCH channel is slotted (pulsed).</p> <p>When the state of the QPCH is on (see <a href="#">“CALL:QPCHannel:STATE”</a>), OCNS is calculated based on the channel power when QPCH is present in the signal. When the QPCH state is off, the output power is not fully calibrated.</p>
Query	<p>Range: +2 to -5 dB</p> <p>Resolution: integer</p>
*RST Setting	-3
<b>Programming Example</b> <pre> OUTPUT 714;"CALL:QPCHANNEL:SLEVEL:RTPILLOT:SELECTED?" ! Sets the QPCH level state to on and queries the QPCH level relative to the pilot power. </pre>	

**CALL:QPCHannel:LEVel[:RTCell][:SElected]?**

Function	<p>Queries the forward quick paging channel (QPCH) level relative to the cell power level.</p> <p>The optional [:SElected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.</p> <p>The QPCH channel is slotted (pulsed). When the state of the QPCH is on, OCNS is calculated based on the channel power when QPCH is present in the signal. When QPCH is not present, the output power is not fully calibrated.</p>
Query	<p>Range: 0 to -15 dB, NAN</p> <p>Resolution: 0.01 dB</p>
*RST Setting	-10 dB
<b>Programming Example</b> <pre>OUTPUT 714; "CALL:QPCHANNEL:LEVEL:RTCELL:DIGITAL2000?"</pre>	

**CALL:QPCHannel:LEVel:RTPilot[:SElected]**

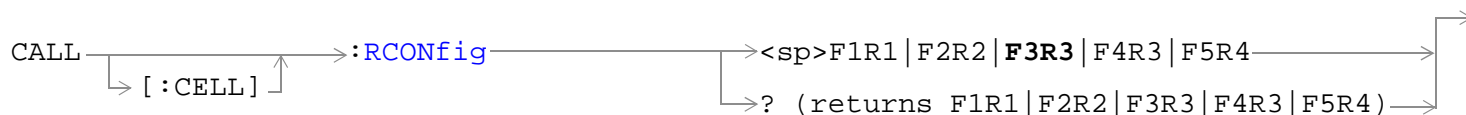
Function	<p>Sets/queries the forward quick paging channel (QPCH) level relative to the pilot level</p> <p>The optional [:SElected] keyword in this command specifies that the frequency band being set/queried applies to the current system type.</p> <p>The QPCH channel is slotted (pulsed). The test set adjusts OCNS (orthogonal channel noise simulator) to an appropriate level for the periods of time when the slotted QPCH signal is pulsed on. When QPCH is pulsed off, the output level will not be fully calibrated.</p>
Query	<p>Range: +2 to -5 dB</p> <p>Resolution: integer</p>
*RST Setting	-3
<b>Programming Example</b> <pre>OUTPUT 714; "CALL:QPCHANNEL:LEVEL:RTPILLOT:SELECTED?" !queries the QPCH level relative to the pilot level.</pre>	

CALL:QPCHannel

**CALL:QPCHannel:STATE**

Function	<p>Sets/queries the forward quick paging channel's (QPCH) state. When the state of the forward QPCH channel is on, the test set will transmit it even if the mobile station does not support QPCH.</p> <p>The QPCH channel is slotted (pulsed). The test set adjusts OCNS (orthogonal channel noise simulator) to an appropriate level for the periods of time when the slotted QPCH signal is pulsed on. When QPCH is pulsed off, the output level will not be fully calibrated.</p>
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"CALL:QPCHANNEL:STATE ON" !Turns on the quick paging channel.	

## CALL[:CELL]:RCONfig

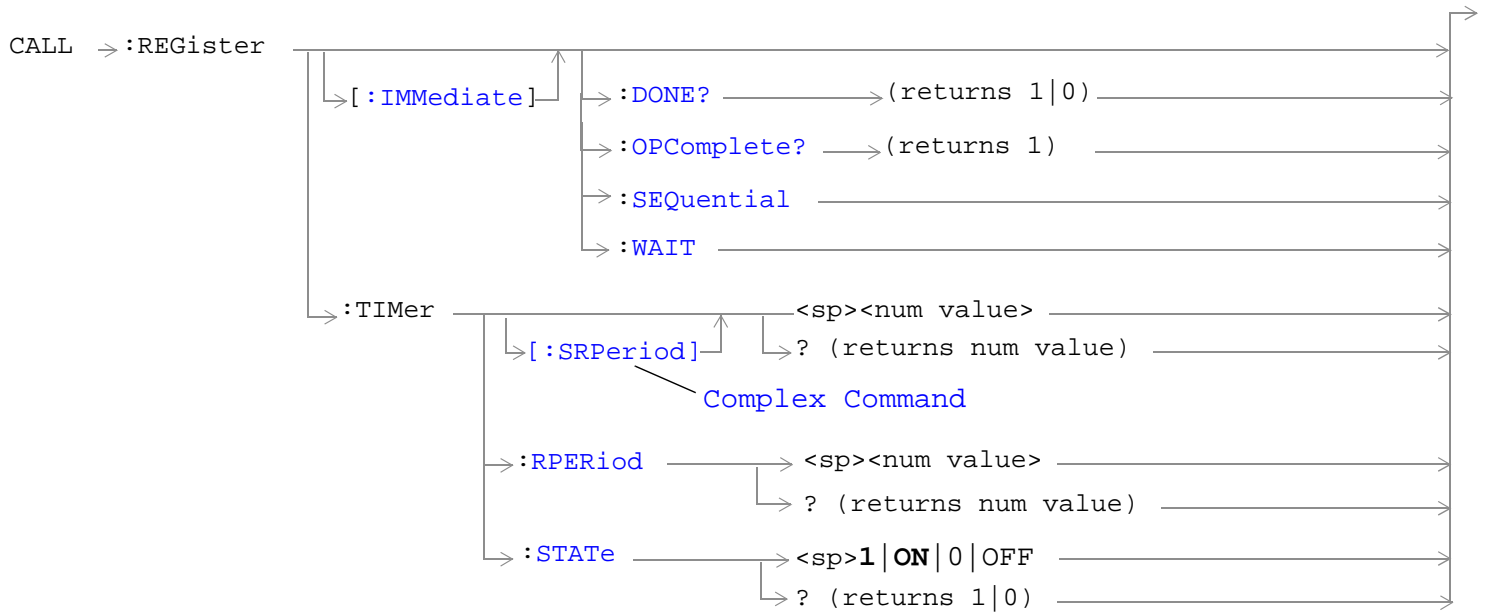


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### CALL[:CELL]:RCONfig

Function	<p>Sets/queries the current radio configuration.</p> <p>The radio configuration specifies the base data rate and service options supported.</p> <p>Data rates for the F-FCH can be set using the “CALL:TRAFfic” commands. Data rates for the F-SCH can be set using the “CALL:SCHannel” commands.</p> <p>Radio configurations are often referred to in a shorthand terms. These terms are:</p> <ul style="list-style-type: none"> <li>• RC1 (for F1R1)</li> <li>• RC2 (for F2R2)</li> <li>• RC3 (for F3R3)</li> <li>• RC4 (for F4R3)</li> <li>• RC5 (for F5R4)</li> </ul>
Setting	Range: F1R1   F2R2   F3R3   F4R3   F5R4
Query	Range: F1R1   F2R2   F3R3   F4R3   F5R4
*RST Setting	F3R3
<p>Programming Example</p> <pre>OUTPUT 714;"CALL:CELL:RCONFIG F1R1" !Sets the radio configuration to RC1.</pre>	

## CALL:REGister



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**CALL:REGister[:IMMediate]**

Function	Generates a zone based (forced) registration.
Programming Example	
OUTPUT 714;"CALL:ORIGINATE"	

**CALL:REGister[:IMMediate]:DONE?**

Function	See <a href="#">"Call Processing Event Synchronization"</a> .
Query	Range: 1   0
Programming Example	
OUTPUT 714;"CALL:ORIGINATE:DONE?"	

**CALL:REGister[:IMMediate]:OPComplete?**

Function	See <a href="#">"Call Processing Event Synchronization"</a> .
Query	Range: 1
Programming Example	
OUTPUT 714;"CALL:ORIGINATE:OPCOMPLETE?"	

**CALL:REGister[:IMMediate]:SEQuential**

Function	See <a href="#">"Call Processing Event Synchronization"</a> .
Programming Example	
OUTPUT 714;"CALL:ORIGINATE:SEQUENTIAL"	

**CALL:REGister[:IMMediate]:WAIT**

Function	See <a href="#">"Call Processing Event Synchronization"</a> .
Programming Example	
OUTPUT 714;"CALL:ORIGINATE:WAIT"	

**CALL:REGister:TIMer[:SRPeriod]**

Function	Sets the time between time based registrations (when timer based registration is on) and turns the timer based registration state to on.  The value is not the actual time. The registration period is used in the following equation to determine the time between registrations:  time between registrations= [integer portion of $2^{(\text{reg\_period}/4)}$ ] x 0.08 seconds
Setting	Range: 29 to 85 Resolution: integer
Query	Range: 29 to 85
*RST Setting	29 (12 seconds)
<b>Programming Example</b>  OUTPUT 714;"CALL:REGISTER:TIMER:SRPERIOD 35" !Turns the timer's state on, and sets the registration period to 35.	

**CALL:REGister:TIMer:STATe**

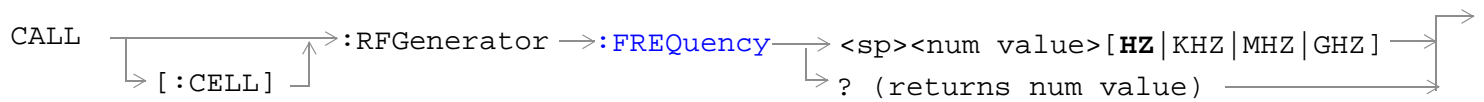
Function	Sets the state of timer based registrations.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	ON
<b>Programming Example</b>  OUTPUT 714;"CALL:REGISTER:TIMER:STATE OFF"	

**CALL:REGister:TIMer:RPERiod**

Function	Sets the time between time based registrations (when timer based registration is on). The value is not the actual time. The registration period is used in the following equation to determine the time between registrations.  time between registrations = [integer portion of $2^{(\text{reg\_period}/4)}$ ] x 0.08 seconds
Setting	Range: 29 to 85 Resolution: integer
Query	Range: 29 to 85
*RST Setting	29 (12 seconds)
<b>Programming Example</b>  OUTPUT 714;"CALL:REGISTER:TIMER:RPERIOD 35"	



## CALL[:CELL]:RFGenerator

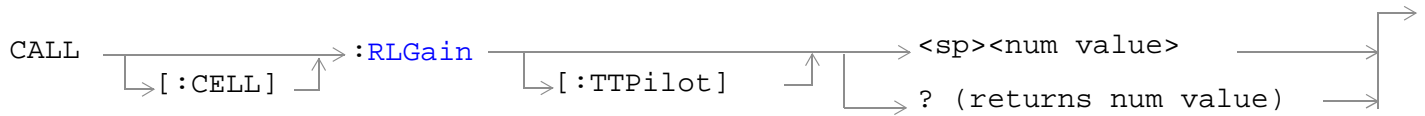


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### CALL[:CELL]:RFGenerator:FREQUENCY

Function	Sets/queries the RF generator CDMA forward 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
<b>Programming Example</b>  OUTPUT 714; "CALL:CELL:RFGENERATOR:FREQUENCY 450 MHZ" !Sets the CDMA forward channel frequency to 450 MHz.	

## CALL[:CELL]:RLGain

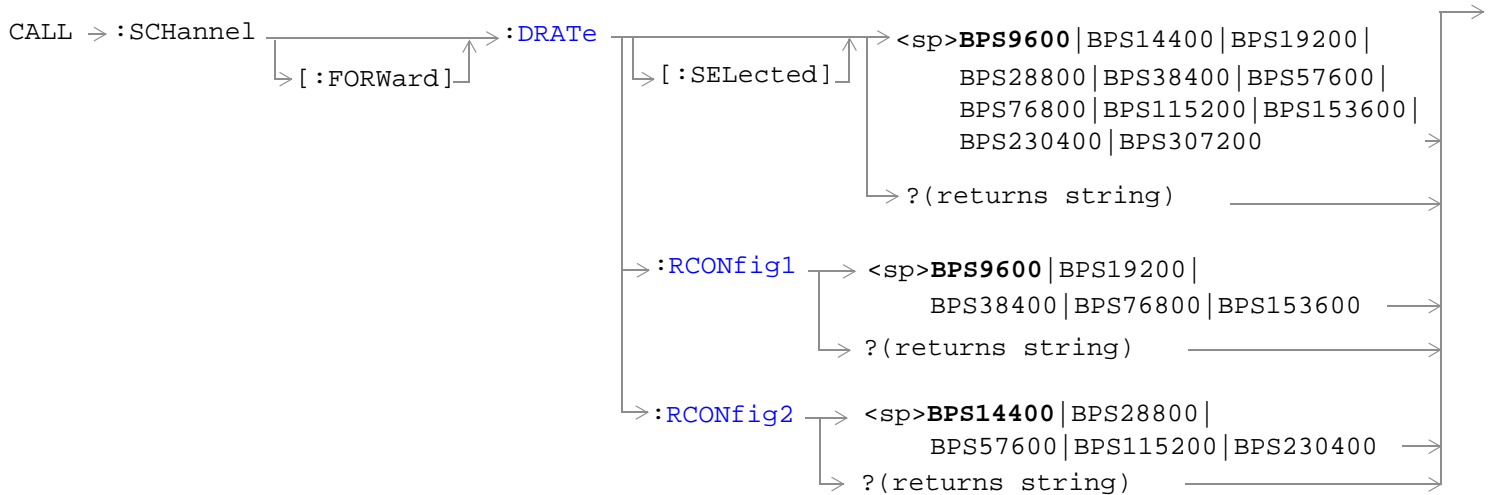
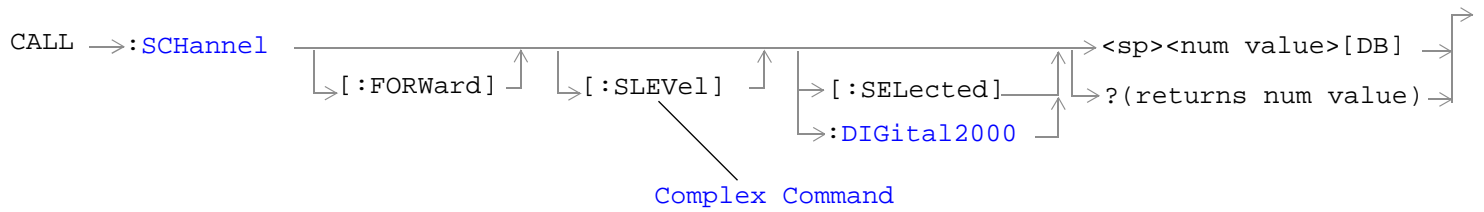


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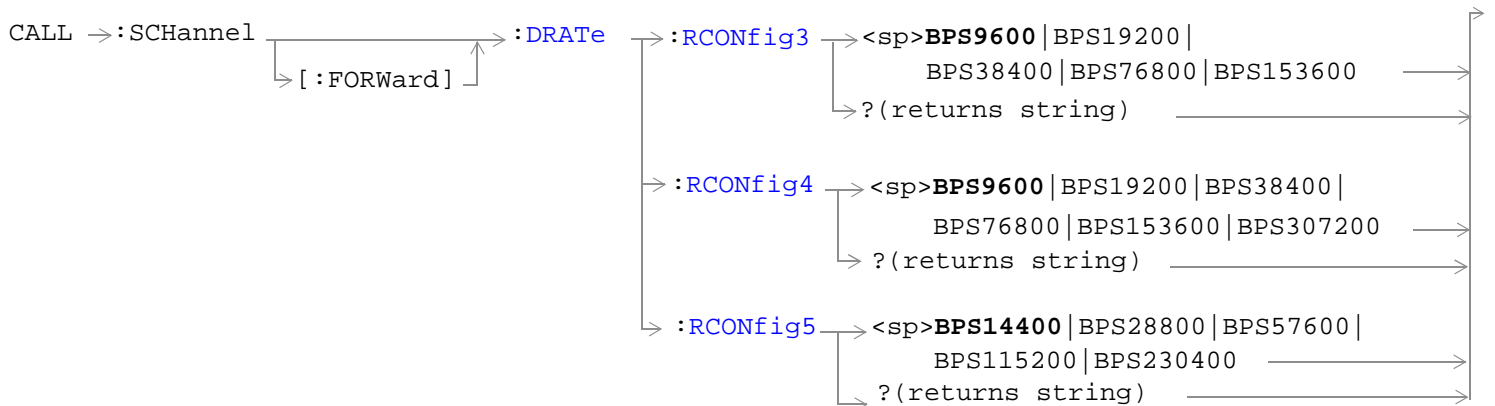
### CALL[:CELL]:RLGain[:TTPilot]

Function	Sets/queries reverse link, traffic-to-pilot level (RLGAIN_TRAFFIC_PILOT) gain. RLGAIN_TRAFFIC_PILOT is sent in an overhead message to the mobile station and is used by the mobile station to adjust the reverse channel traffic channel level, relative to the reverse channel pilot. This parameter applies only when the current radio configuration is greater than 2. Each integer translates into a 1/8 dB step.
Setting	Range: -32 to +31 Resolution: integer
Query	Range: -32 to+31 Resolution: integer
*RST Setting	0
Programming Example	
OUTPUT 714; "CALL:CELL:RLGAIN:TTPILLOT 8"	

## CALL:SCHannel

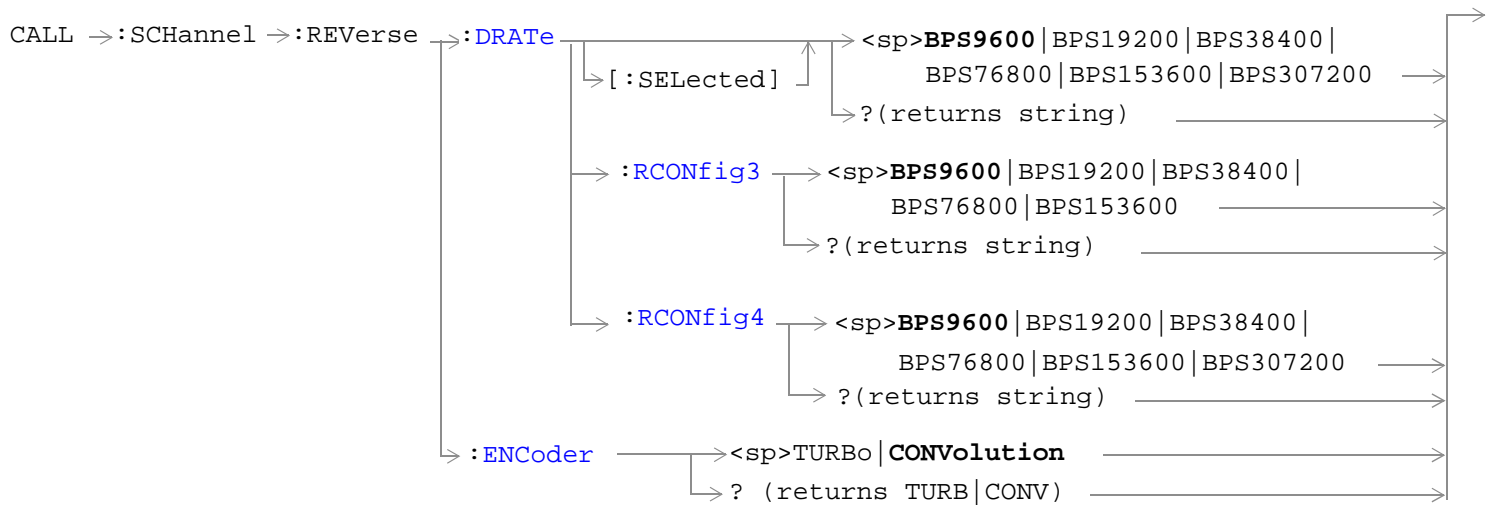
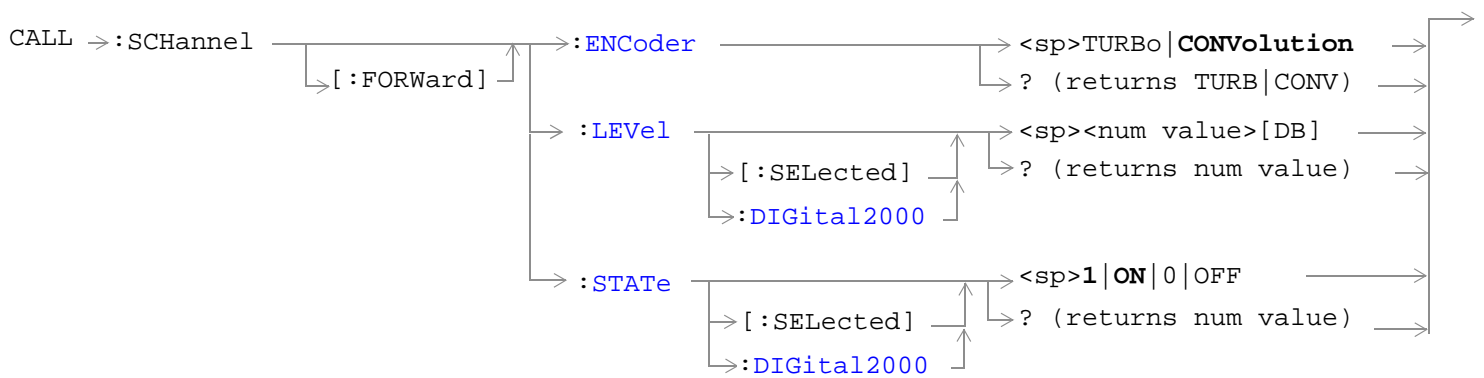


Note: Data rates used with the SElected keyword must be compatible with the currently selected radio configuration. If a data rate that does not belong to the selected radio configuration's rate set is used, an error message will be generated.

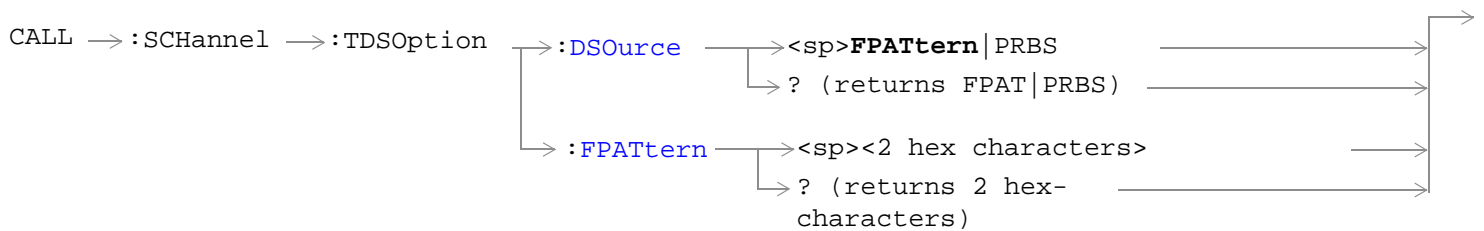


Note: Data rates used with the SElected keyword must be compatible with the currently selected radio configuration. If a data rate that does not belong to the selected radio configuration's rate set is used, an error message will be generated.

## CALL:SCHannel



Note: Data rates used with the SElected keyword must be compatible with the currently selected radio configuration. If a data rate that does not belong to the selected radio configuration's rate set is used, an error message will be generated.



See [“Diagram Conventions” on page 268](#)

**CALL:Schannel[:FORWARD][:SLEVEL][:SElected]**

Function	<p>The setting form of this command performs two functions: (1) sets the level of the forward supplemental channel (F-SCH), and (2) turns the state of the F-SCH on.</p> <p>The query form of this command returns the requested level of the F-SCH.</p> <p>The optional [:SElected] keyword in this command specifies that the F-SCH level being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SElected] keyword.</p>
Setting	<p>Range: 0 to -20 dB</p> <p>Resolution: 0.01 dB</p>
Query	<p>Range: 0 to -20 dB</p> <p>Resolution: 0.01 dB</p>
*RST Setting	-15.6 dB
Requirements	Test Application Revision: B.03.00: Added optional [:FORWARD]
<b>Programming Example</b> <pre>OUTPUT 714;"CALL:SCHANNEL:FORWARD:SLEVEL:SELECTED -10" !Sets the cell's forward supplemental channel state to on and the level to -10 dB.</pre>	

**CALL:Schannel[:FORWARD]:DRATE[:SElected]**

Function	<p>Sets/queries the data rate of the forward supplemental channel (F-SCH) for the currently selected radio configuration.</p> <p>To find out which radio configuration is currently selected, see <a href="#">"CALL[:CELL]:RCONfig"</a> .</p> <p>Entering a data rate that is not included in the radio configuration's set of valid entries will cause the test set to generate an error message.</p>
Setting	Range: See command descriptions for RCONfig1 through RCONfig5.
Query	Range: See command descriptions for RCONfig1 through RCONfig5.
*RST Setting	BPS9600
Requirements	Test Application Revision: B.03.00: Added optional [:FORWARD]
<b>Programming Example</b> <pre>OUTPUT 714;"CALL:SCHANNEL:FORWARD:DRATE?" !Queries the data rate for the currently selected radio configuration</pre>	

CALL:Schannel

### CALL:Schannel[:FORWARD]DRATE:RCONfig1

Function	Sets/queries the data rate of the radio configuration 1 (RC1) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS9600   BPS19200   BPS38400   BPS76800   BPS153600
Query	Range: BPS9600   BPS19200   BPS38400   BPS76800   BPS153600
*RST Setting	BPS9600
Requirements	Test Application Revision: B.03.00: Added optional [:FORWARD]
<b>Programming Example</b> OUTPUT 714; "CALL: SCHANNEL: FORWARD: DRATE: RCONFIG1 BPS38400"	

### CALL:Schannel[:FORWARD]:DRATE:RCONfig2

Function	Sets/queries the data rate of the radio configuration 2 (RC2) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS14400   BPS28800   BPS57600   BPS115200   BPS230400
Query	Range: BPS14400   BPS28800   BPS57600   BPS115200   BPS230400
*RST Setting	BPS14400
Requirements	Test Application Revision: B.03.00: Added optional [:FORWARD]
<b>Programming Example</b> OUTPUT 714; "CALL: SCHANNEL: FORWARD: DRATE: RCONFIG2 BPS28800"	

### CALL:Schannel[:FORWARD]:DRATE:RCONfig3

Function	Sets/queries the data rate of the radio configuration 3 (RC3) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS9600   BPS19200   BPS38400   BPS76800   BPS153600
Query	Range: BPS9600   BPS19200   BPS38400   BPS76800   BPS153600
*RST Setting	BPS9600
Requirements	Test Application Revision: B.03.00: Added optional [:FORWARD]
<b>Programming Example</b> OUTPUT 714; "CALL: SCHANNEL: FORWARD: DRATE: RCONFIG3 BPS38400"	

**CALL:Schannel[:FORWARD]:DRATE:RCONfig4**

Function	Sets/queries the data rate of the radio configuration 4 (RC4) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS9600   BPS19200   BPS38400   BPS76800   BPS153600   BPS307200
Query	Range: BPS9600   BPS19200   BPS38400   BPS76800   BPS153600   BPS307200
*RST Setting	BPS9600
Requirements	Test Application Revision: B.03.00: Added optional [:FORWARD]
<b>Programming Example</b> OUTPUT 714; "CALL: SCHANNEL: FORWARD: DRATE: RCONFIG4 BPS76800"	

**CALL:Schannel[:FORWARD]:DRATE:RCONfig5**

Function	Sets/queries the data rate of the radio configuration 5 (RC5) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS14400   BPS28800   BPS57600   BPS115200   BPS230400
Query	Range: BPS14400   BPS28800   BPS57600   BPS115200   BPS230400
*RST Setting	BPS14400
Requirements	Test Application Revision: B.03.00: Added optional [:FORWARD]
<b>Programming Example</b> OUTPUT 714; "CALL: SCHANNEL: FORWARD: DRATE: RCONFIG5 BPS57600"	

**CALL:Schannel[:FORWARD]:ENCoder**

Function	<p>Sets/queries which encoder is used for the forward supplemental data.</p> <p>If the F-SCH data rate has been set to the base rate for the current radio configuration (base rates are data rates below 19.2 kbps), the convolutional encoder is used regardless of this parameter setting.</p> <p>The current radio configuration is selected by the "CALL[:CELL]:RCONfig" command.</p>
Setting	Range: TURBo   CONVolution
Query	Range: TURB   CONV
*RST Setting	CONVolution
Requirements	Test Application Revision: B.03.00: Added optional [:FORWARD]
<b>Programming Example</b> OUTPUT 714; "CALL: SCHANNEL: FORWARD: ENCODER TURBO" !Sets the F-SCH encoder to turbo mode.	

CALL:Schannel

**CALL:Schannel[:FORWARD]:LEVEL[:SElected]**

Function	Sets/queries the level of the forward supplemental channel (SCH). The optional [:SElected] keyword in this command specifies that the F-SCH level being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SElected] keyword.
Setting	Range: 0 to -20 dB Resolution: 0.01 dB
Query	Range: 0 to -20 dB Resolution: 0.01 dB
*RST Setting	-15.6 dB
Requirements	Test Application Revision: B.03.00: Added optional [:FORWARD]
<b>Programming Example</b> OUTPUT 714; "CALL: SCHANNEL: FORWARD: LEVEL: SELECTED -10"	

**CALL:Schannel[:FORWARD]:STATE[:SElected]**

Function	Sets/queries the on/off state of the forward supplemental channel (F-SCH). The optional [:SElected] keyword in this command specifies that the F-SCH state being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SElected] keyword.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	ON
Requirements	Test Application Revision: B.03.00: Added optional [:FORWARD]
<b>Programming Example</b> OUTPUT 714; "CALL: SCHANNEL: FORWARD: STATE: SELECTED OFF" !Turns off the forward supplemental channel.	



**CALL:Schannel:REVerse:DRATe[:SElected]**

Function	Sets/queries the data rate of the reverse supplemental channel (R-SCH) for the currently selected radio configuration.  To find out which radio configuration is currently selected, see " <a href="#">CALL[:CELL]:RCONfig</a> ".  Entering a data rate that is not included in the radio configuration's set of valid entries will cause the test set to generate an error message.
Setting	Range: BPS9600   BPS19200   BPS38400   BPS76800   BPS15360   BPS307200
Query	Range: BPS9600   BPS19200   BPS38400   BPS76800   BPS15360   BPS307200
*RST Setting	BPS9600
Requirements	Test Application Revision: B.03.00
<b>Programming Example</b>	
<pre>OUTPUT 714; "CALL:SCHANNEL:REVERSE:DRATE?" !Queries the data rate for the R-SCH of the currently selected radio configuration</pre>	

**CALL:Schannel:REVerse:DRATe:RCONfig3**

Function	Sets/queries the data rate of the radio configuration 3 (RC3) reverse supplemental channel (R-SCH) in bits per second.
Setting	Range: BPS9600   BPS19200   BPS38400   BPS76800   BPS153600
Query	Range: BPS9600   BPS19200   BPS38400   BPS76800   BPS153600
*RST Setting	BPS9600
Requirements	Test Application Revision: B.03.00
<b>Programming Example</b>	
<pre>OUTPUT 714; "CALL:SCHANNEL:REVERSE:DRATE:RCONFIG3 BPS38400"</pre>	

**CALL:Schannel:REVerse:DRATe:RCONfig4**

Function	Sets/queries the data rate of the radio configuration 4 (RC4) reverse supplemental channel (R-SCH) in bits per second.
Setting	Range: BPS9600   BPS19200   BPS38400   BPS76800   BPS153600   BPS307200
Query	Range: BPS9600   BPS19200   BPS38400   BPS76800   BPS153600   BPS307200
*RST Setting	BPS9600
Requirements	Test Application Revision: B.03.00
<b>Programming Example</b>	
<pre>OUTPUT 714; "CALL:SCHANNEL:REVERSE:DRATE:RCONFIG4 BPS76800"</pre>	

**CALL:Schannel:REverse:ENCoder**

Function	<p>Sets/queries which encoder is used for the reverse supplemental data.</p> <p>Changes to reverse encoder while an R-SCH is established in Active Cell status will be rejected with an execution error. Changes to reverse encoder when not in Active Cell status will be stored and applied when an R-SCH is established.</p> <p>If the SCH data rate has been set to the base rate for the current radio configuration (base rates are data rates below 19.2 kbps), the convolutional encoder is used regardless of this parameter setting.</p> <p>The current radio configuration is selected by the “CALL[:CELL]:RCONfig” command.</p>
Setting	Range: TURBo   CONVolution
Query	Range: TURB   CONV
*RST Setting	CONVolution
Requirements	Test Application Revision: B.03.00
<b>Programming Example</b> <pre>OUTPUT 714;"CALL:SCHANNEL:REVERSE:ENCODER TURBO" !Sets the R-SCH encoder to turbo mode.</pre>	

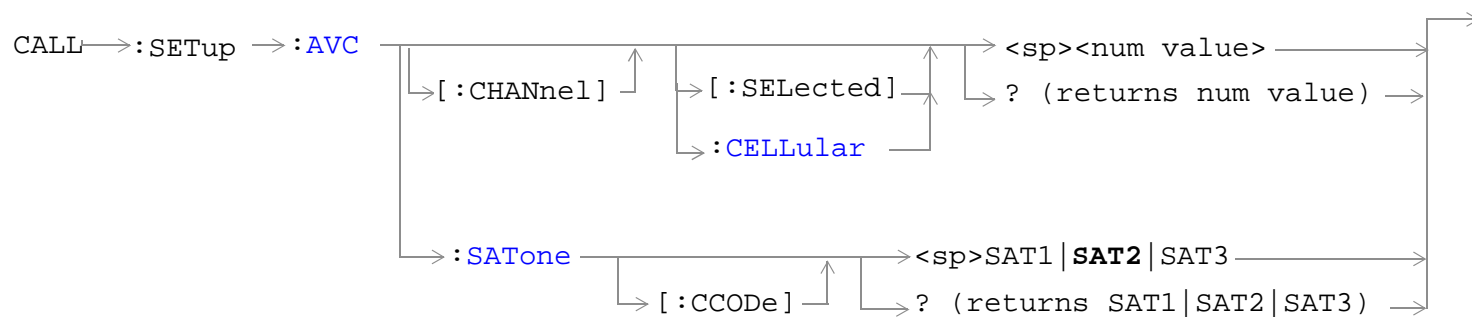
**CALL:Schannel:TDSOption:DSOURCE**

Function	<p>Sets/queries whether fixed pattern data (FPAT) or a pseudorandom bit sequence (PRBS) is sent on the forward and reverse supplemental channels (F-SCH) when using an SO32 Service Option (test data service option (TDSO)).</p> <hr/> <p><b>IMPORTANT</b> PRBS data is required if you are making any of the code domain measurements on the reverse supplemental channel</p> <hr/> <p>.</p> <p>If fixed data is selected, the “CALL:Schannel:TDSOption:FPATtern” command determines the fixed data pattern that is used.</p> <p>If you attempt to set the F-SCH TDSO data source while a data connection is established, an error will be generated and the setting rejected.</p>
Setting	Range: FPATtern   PRBS
Query	Range: FPAT   PRBS
*RST Setting	FPAT
Requirements	Test Application Revision: B.03.00
<b>Programming Example</b> <pre>OUTPUT 714;"CALL:SCHANNEL:TDSOPTION:DSOURCE PRBS"</pre>	

**CALL:Schannel:TDSOption:FPATtern**

<b>Function</b>	Sets/queries the fixed pattern data (FPAT) that is sent on the forward supplemental channel when using Service Option 032 (test data service option (TDSO)).
<b>Setting</b>	Range: 00 to FF (hexadecimal)
<b>Query</b>	Range: 00 to FF (hexadecimal)
<b>*RST Setting</b>	96
<b>Requirements</b>	Test Application Revision: B.03.00
<b>Programming Example</b>	
OUTPUT 714;"CALL:SCHANNEL:TDSOPTION 'FF'" !sets the fixed data pattern to all 1's.	

## CALL:SETup:AVC



[“Diagram Conventions” on page 268](#)

**CALL:SETup:AVC[:CHANnel][:SELEcted]**

Function	Sets/queries the RF channel number of the analog voice channel.  During active cell operating mode, this setting does not take affect until a call is originated on the AVC or a handoff occurs to a new AVC. This setting takes effect immediately during AVC Test operating mode.
Setting	Range: 1 through 799, 991 through 1023, 9.91 E+37
Query	Range: 1 through 799, 991 through 1023, 9.91 E+37
*RST Setting	300
<b>Programming Example</b>  OUTPUT 714;"CALL:SETUP:AVC:CHANNEL:SELECTED 799" !Set the AVC to channel 799.	

**CALL:SETup:AVC[:CHANnel]:CELLular**

Function	Sets/queries the RF channel number of the analog voice channel, specifying the cellular band (800 MHz).  During active cell operating mode, this setting does not take affect until a call is originated on the AVC or a handoff occurs to a a new AVC. This setting takes effect immediately during AVC Test operating mode. PCS band analog operation is currently not supported.
Setting	Range: 1 through 799, 991 through 1023, 9.91 E+37
Query	Range: 1 through 799, 991 through 1023, 9.91 E+37
*RST Setting	300
<b>Programming Example</b>  OUTPUT 714;"CALL:SETUP:AVC:CHANNEL:CELLULAR 799" !Set the AVC to cell band channel 799.	

**CALL:SETup:AVC:SATone[:CCODE]**

Function	Sets/queries the supervisory audio tone's color code (frequency).  In active cell mode, this command sets/queries the SAT color code (frequency) to be used on the next handoff.  In test mode, this command sets/queries the current SAT color code (frequency).
Setting	Range: SAT1   SAT2   SAT3  SAT1 = 5970 Hz SAT2 = 6000 Hz SAT3 = 6030 Hz
Query	Range: SAT1   SAT2   SAT3
*RST Setting	SAT2
<b>Programming Example</b>  OUTPUT 714;"CALL:SETUP:AVC:SATONE:CCODE SAT1" !Sets the SAT frequency to 5970 Hz.	

## CALL:SETup:BAND

```
CALL->:SETup->:BAND
  |
  |> [:SElected]
  |> :DIGital2000
  |> :DIGital195
  |
  |> <sp>IMT2000* | JCDMa | KPCS | NMT450 | SECondary800 |
  |> USCellular | USPCs )
  |> ? (returns IMT2000* | JCDM | KPCS | NMT450 | SEC800 |
  |> USC | USPC)
```

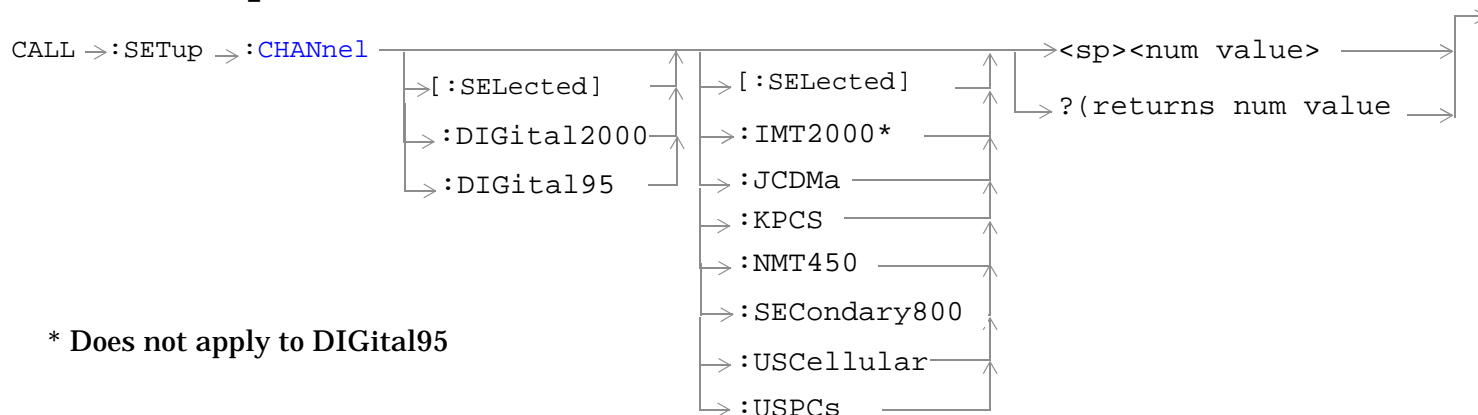
\* Does not apply to DIGital95

[“Diagram Conventions” on page 268](#)

### CALL:SETup:BAND:[:SElected]

Function	<p>Sets/queries the frequency band that the mobile station will be handed off to. To set or query the frequency band for a call ( the current frequency band), use the “<a href="#">CALL:BAND:[:SElected]</a>” commands.</p> <p>Frequency bands are: IMT2000, Japan CDMA (JCDM), Korean PCS (KPCS), NMT450, Secondary 800 MHz band (SEC800), U.S. Cellular (USC), and U.S. PCS (USPC).</p> <p>Handoff frequency bands are associated with a handoff system type. The “<a href="#">CALL:SETup:SYSTem</a>” command determines the current handoff system type.</p> <p>The optional [:SElected] keyword in this command specifies that the handoff frequency band being set/queried applies to the current handoff system type.</p> <p>To initiate (execute) a handoff, see the “<a href="#">CALL:HANDOff</a>” command description.</p>
Setting	<p>Range:</p> <ul style="list-style-type: none"> <li>DIGital2000   IMT2000   JCDMa   KPCS   NMT450   SECondary800   USCellular   USPCs</li> </ul>
Query	<p>Range:</p> <ul style="list-style-type: none"> <li>DIG2000   IMT2000   JCDM   KPCS   NMT450   SEC800   USC   USPC</li> </ul>
*RST Setting	USPCs
Requirements	Test Application Revision: B.03.00: Added secondary 800 MHz band, deleted China cellular band.
<p><b>Programming Example</b></p> <pre>OUTPUT 714; "CALL:SETUP:BAND KPCS" !Sets the handoff frequency band to Korean PCS cell band for handoffs to the IS-2000 system type.</pre>	

## CALL:SETup:CHANnel



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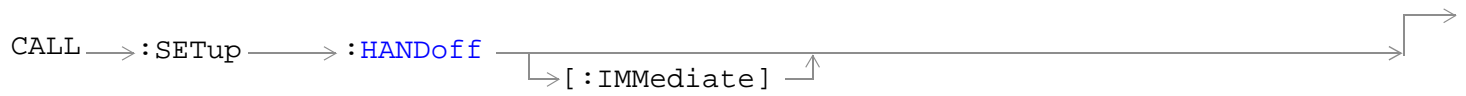
### CALL:SETup:CHANnel[:SElected][:SElected]

Function	<p>Sets/queries the handoff physical channel. To set or query the physical channel for a call ( the current physical channel), use the <b>“CALL:CHANnel[:SElected][:SElected]”</b> commands.</p> <p>The handoff physical channel number is associated with a handoff system type and a handoff cell band.</p> <p>The first optional [:SElected] keyword in this command specifies that the channel being set/queried applies to the current handoff system type. See <b>“CALL:SETup:SYSTEM”</b> to query or change the current handoff system type.</p> <p>The second optional [:SElected] keyword in this command specifies that the channel being set/queried applies to the current handoff cell band. See <b>“CALL:SETup:BAND”</b> to query or change the current handoff cell band.</p> <p>Note: If the current system type evaluates to DIGital95, handoff cell band IMT2000 does not apply and attempting to specify IMT2000 as the DIGital95 handoff cell band will cause an instrument error.</p> <p>Specifying a non-current handoff system type or handoff cell band when setting a channel number will cause the test set to store the channel number. Specifying a non-current handoff system type or handoff cell band when querying a channel number will return a stored channel number that is not current.</p> <p>To initiate a hard handoff to a physical channel, see the <b>“CALL:HANDoff”</b> command description.</p>
Setting	<p>Range (depending on selected system type):</p> <ul style="list-style-type: none"> <li>• IMT2000: 0 to 1199</li> <li>• JCDM (Japanese CDMA): 1 to 799, 801 to 1039, 1041 to 1199</li> <li>• KPCS (Korean PCS): 0 to 599</li> <li>• NMT450: 1 to 300, 539 to 871, 1039 to 1473, 1792 to 2016</li> <li>• SECondary800 (secondary 800 MHz band): 0 to 919</li> <li>• USC (US Cellular): 1 to 799, 991 to 1023</li> <li>• USPC (US PCS): 0 to 1199</li> </ul>

## CALL:SETup:CHANnel

Query	Range (depending on selected system type): <ul style="list-style-type: none"><li>• IMT2000: 0 to 1199</li><li>• JCDM (Japanese CDMA): 1 to 799, 801 to 1039, 1041 to 1199</li><li>• KPCS (Korean PCS): 0 to 599</li><li>• NMT450: 1 to 300, 539 to 871, 1039 to 1473, 1792 to 2016</li><li>• SEC800 (secondary 800 MHz band): 0 to 919</li><li>• USC (US Cellular): 1 to 799, 991 to 1023</li><li>• USPC (US PCS): 0 to 1199</li></ul>
*RST Setting	Channel 525 (US PCS band)
Requirements	Test Application Revision: B.03.00: Added secondary 800 MHz band, deleted China cellular band.
<b>Programming Example</b> <pre>OUTPUT 714;"CALL:SETUP:CHANNEL?" !Queries the channel number of the current handoff system and band.  OUTPUT 714;"CALL:SETUP:CHANNEL 384" !Sets the channel number of the current handoff system and band.  OUTPUT 714;"CALL:SETUP:CHANNEL:DIGital2000:KPCS 384" !Sets the handoff channel number for the IS-2000 system and Korean PCS band to 384. If this system !and band are not being handed off to, the value 384 is stored and will be transmitted when Digital !2000 and Korean PCS are handed off to.</pre>	



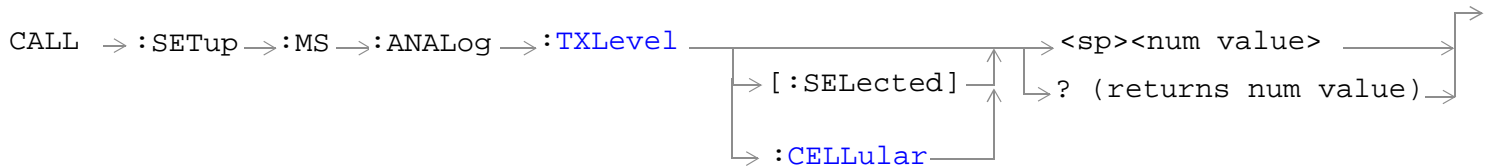
**CALL:SETup:HANDoFF**

[“Diagram Conventions” on page 268](#)

**CALL:SETup:HANDoFF[:IMMEDIATE]**

Function	Initiates a handoff within the current system or between systems.
Programming Example	
OUTPUT 714; "CALL:SETUP:HANDOFF:IMMEDIATE"	

## CALL:SETup:MS:ANALog



“Diagram Conventions” on page 268

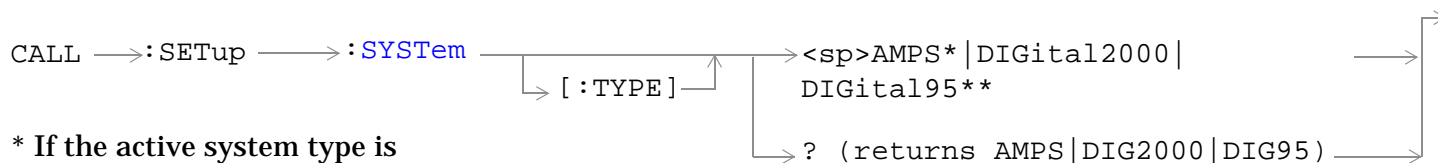
### CALL:SETup:MS:ANALog:TXLevel[:SElected]

Function	Sets/queries the mobile power level to be used when originating a call on an AVC, or when performing a handoff to an AVC in the selected band, when in active cell operating mode. In AVC Test operating mode, this command immediately changes the expected analog MS TX level.
Setting	Range: 0 to 7 MS TX Level 0: expected power, 36 dBm* MS TX Level 1: expected power, 32 dBm MS TX Level 2: expected power, 28 dBm MS TX Level 3: expected power, 24 dBm MS TX Level 4: expected power, 20 dBm MS TX Level 5: expected power, 16 dBm MS TX Level 6: expected power, 12 dBm MS TX Level 7: expected power, 8 dBm  *all values for MS TX level assume 0 dB antenna gain
Query	Range: 0 to 7
*RST Setting	2
<b>Programming Example</b> OUTPUT 714;"CALL:SETUP:MS:ANALOG:TXLEVEL:SELECTED 5" !Sets the handoff transmit power level to 5.	

**CALL:SETup:MS:ANALog:TXLevel:CELLular**

Function	Sets/queries the mobile power level to be used when originating a call on an AVC, or when performing a handoff to an AVC in the cellular (800 MHz) band, when in active cell operating mode.  In AVC Test operating mode, this command immediately changes the expected analog MS TX level.
Setting	Range: 0 to 7  MS TX Level 0: expected power, 36 dBm* MS TX Level 1: expected power, 32 dBm MS TX Level 2: expected power, 28 dBm MS TX Level 3: expected power, 24 dBm MS TX Level 4: expected power, 20 dBm MS TX Level 5: expected power, 16 dBm MS TX Level 6: expected power, 12 dBm MS TX Level 7: expected power, 8 dBm  *all values for MS TX level assume 0 dB antenna gain
Query	Range: 0 to 7
*RST Setting	2
<b>Programming Example</b>  OUTPUT 714;"CALL:SETUP:MS:ANALOG:TXLEVEL:CELLULAR 5" !Sets the handoff transmit power level to 5 in the cellular band.	

## CALL:SETup:SYSTEM



\* If the active system type is AMPS, handoffs to other system types are not allowed.

\*\* If the active system type is DIGital2000, handoffs to DIGital95 are not allowed.

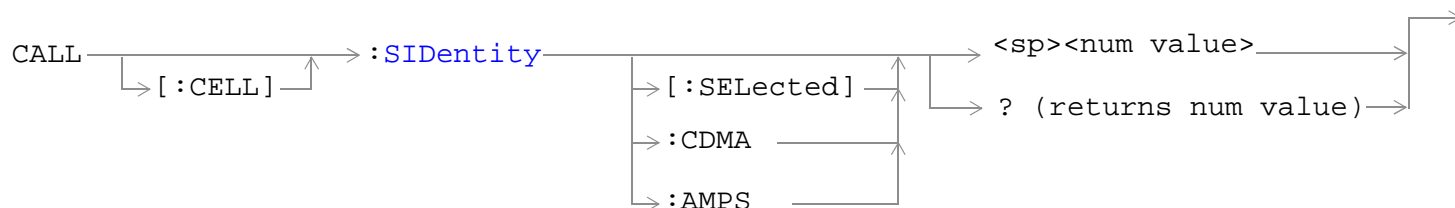
[“Diagram Conventions” on page 268](#)

### CALL:SETup:SYSTEM[:TYPE]

Function	Sets/queries the system type that will the mobile station will be handed off to when the “CALL:HANDOff” command is used.  If handoff system type is the same as active cell system type (see “CALL[:CELL]:SYSTEM” ), the mobile station will be handed off within the current system. If handoff system type is different than active cell system type, the call will be handed off to the system indicated by this command.
Setting	Range: AMPS <sup>a</sup>   DIGital2000   DIGital95
Query	Range: AMPS   DIG2000   DIG95
*RST Setting	DIG2000
Programming Example	
OUTPUT 714; "CALL:SETUP:SYSTEM:TYPE DIG2000" !Selects IS-2000 as the handoff system type.	

a. If the active system type is AMPS ( as set by “CALL[:CELL]:SYSTEM” ), handoffs to other system types are not allowed.

## CALL[:CELL]:SIDentity

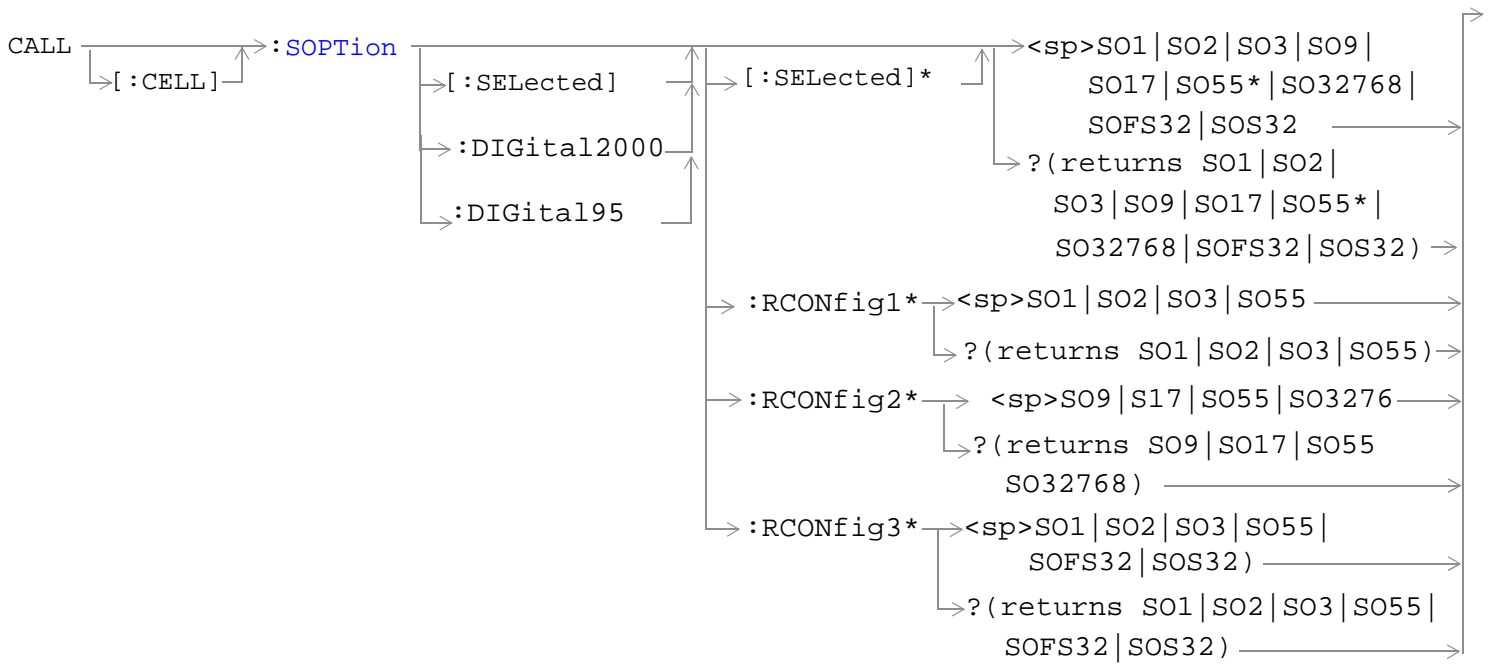


[“Diagram Conventions” on page 268](#)

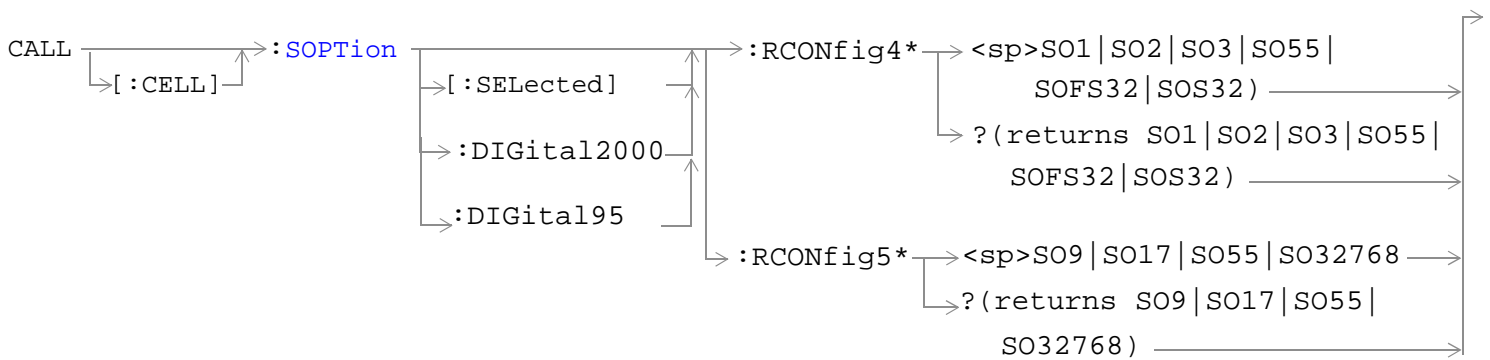
### CALL[:CELL]:SIDentity

Function	Sets/queries the system identification number. Use the CALL[:CELL]:SIDentity:CDMA command when the current system type is DIG2000 or DIG95. Use the CALL[:CELL]:SIDentity:AMPS command when the current system type is AMPS.
Setting	Range: 0 to 32767
Query	Range: 0 to 32767
*RST Setting	331
<b>Programming Example</b> OUTPUT 714;"CALL:CELL:SIDENTITY 231" !Sets the system identifier to 231.	

# CALL[:CELL]:SOPTION



\* Does not apply to DIGital95



\* Does not apply to DIGital95

["Diagram Conventions" on page 268](#)

## CALL[:CELL]:SOPTION[:SElected][:SElected]

Function	<p>Sets/queries the service option for the system type and radio configuration specified by command parameters.</p> <p>The first optional [:SElected] keyword in this command specifies that the service option being set/queried applies to the current system type. See “CALL[:CELL]:SYSTEM[:TYPE]” to query or change the current system type.</p> <p>The second optional [:SElected] keyword in this command specifies that the service option being set/queried applies to the current radio configuration. This keyword only applies in situations where DIGital2000 is the selected system type, since no other system type uses radio configurations.</p> <p>Note: If the current system type evaluates to DIGital95, radio configurations (RCONfig 1-5) do not apply and attempting to specify a radio configuration will cause an error.</p> <p>Specifying a non-current radio configuration when setting a service option will cause the test set to store that service option for use when the specified radio configuration is current.</p> <p>Specifying a non-current radio configuration when querying a service option will return a stored service option that is not the current service option.</p> <p>To set (make current) a radio configuration or query the current radio configuration, use the “CALL[:CELL]:RCONfig” command.</p> <ul style="list-style-type: none"> <li>• SO1 = SO1(Echo)</li> <li>• SO2 = SO2 (Loopback)</li> <li>• SO3 = SO3 (Echo)</li> <li>• SO9 = SO9 (Loopback)</li> <li>• SO17 = SO17 (Echo)</li> <li>• SO55 = SO55 (Loopback)</li> <li>• SO32768 = SO32768 (Echo)</li> <li>• SOFS32 = SO32 (+ F-SCH), SO32 with Forward Supplemental Channel only</li> <li>• SOS32 = SO32 (+ SCH), SO32 with both Forward and Reverse Supplemental Channels</li> </ul>
Setting	Range: SO1   SO2   SO3   SO9   SO17   SO55   SO32768   SOFS32   SOS32 depending on system type and radio configuration.
Query	Range: SO1   SO2   SO3   SO9   SO17   SO55   SO32768   SOFS32   SOS32 depending on system type and radio configuration.
*RST Setting	<p>SO2 when system type is DIGital95 or when system type is DIGital2000 and radio configuration RCONfig1, RCONfig3, or RCONfig4 are selected.</p> <p>SO17 when system type is DIGital2000 and radio configuration RCONfig2 or RCONfig5 are selected.</p>
Requirements	Test Application Revision: B.03.00: Added SOFS32, SOS32

## CALL[:CELL]:SOPTION

### Programming Example

```
OUTPUT 714;"CALL:CELL:SOPTION?"
```

```
!Queries the service option of the currently selected system type and radio configuration.
```

```
OUTPUT 714;"CALL:CELL:SOPTION SO3"
```

```
!Selects service option 3 for the currently selected system type and radio configuration.
```

```
OUTPUT 714;"CALL:CELL:SOPTION:DIGital2000:RCONFIG3 SO3"
```

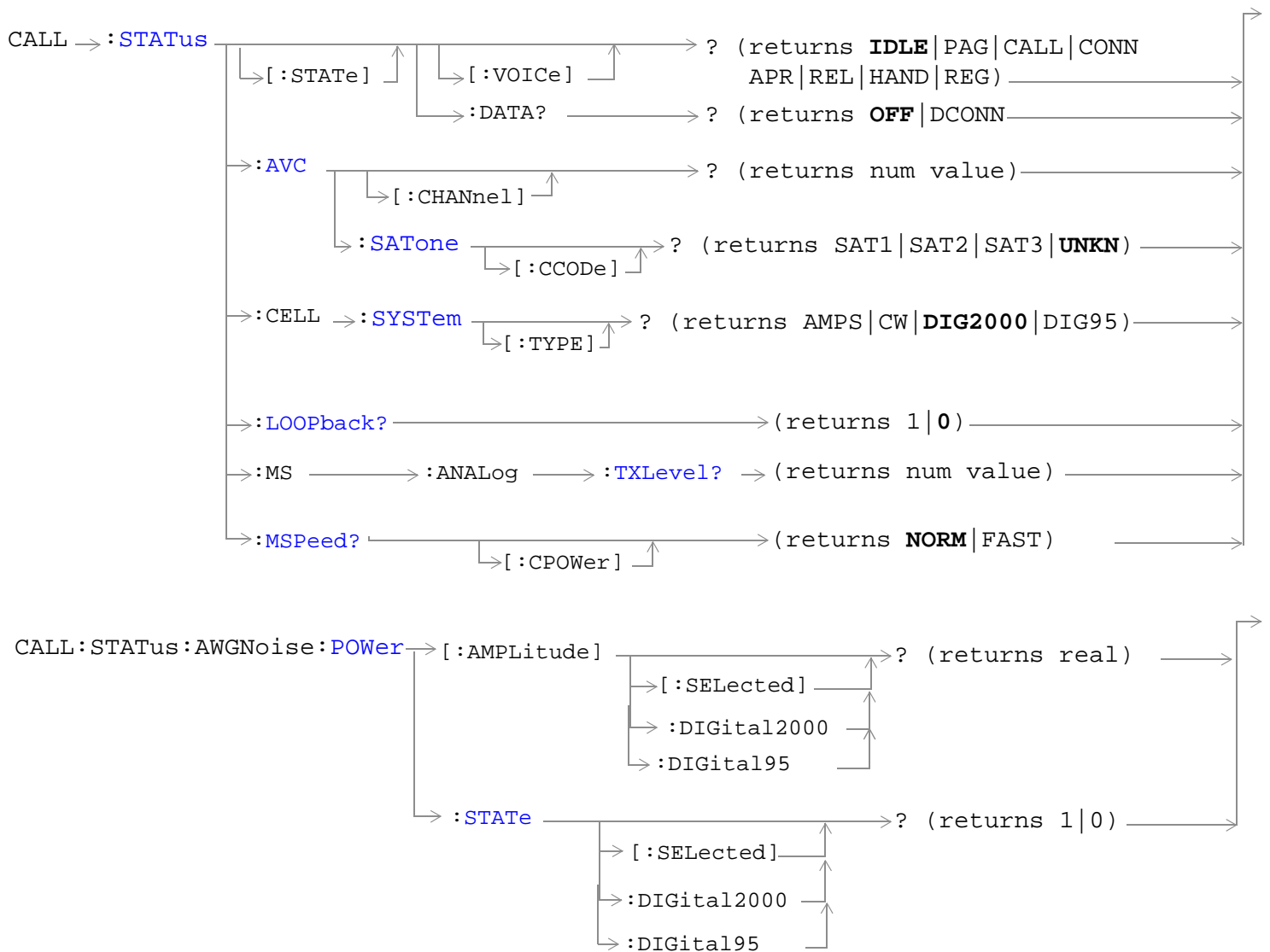
```
!Sets the service option for the digital 2000 system and radio configuration 3 to service option 3.
```

```
!If this system and radio configuration are not current, service option 3 is stored and will be
```

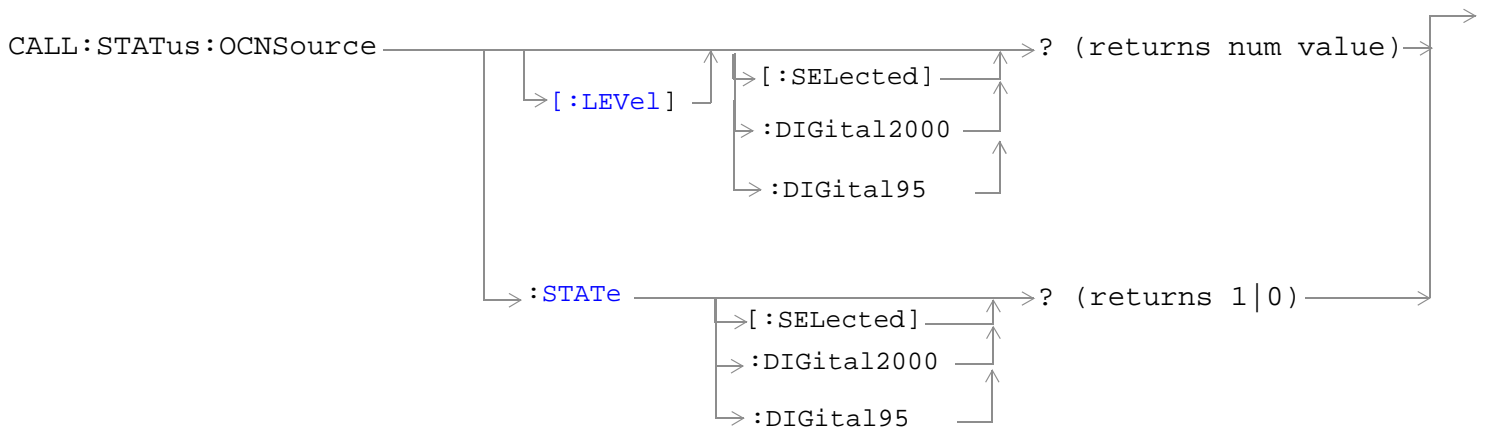
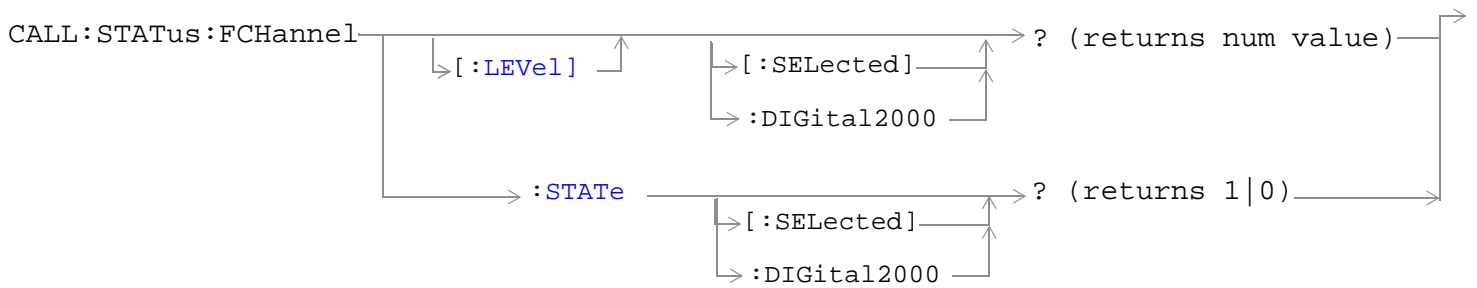
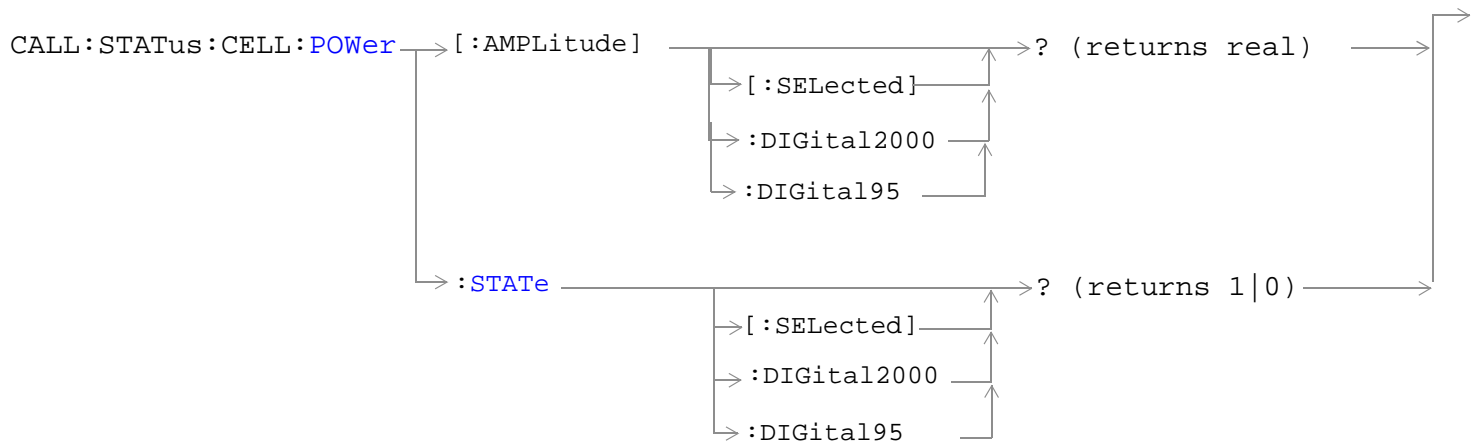
```
!used when digital 2000 and radio configuration 3 are current.
```

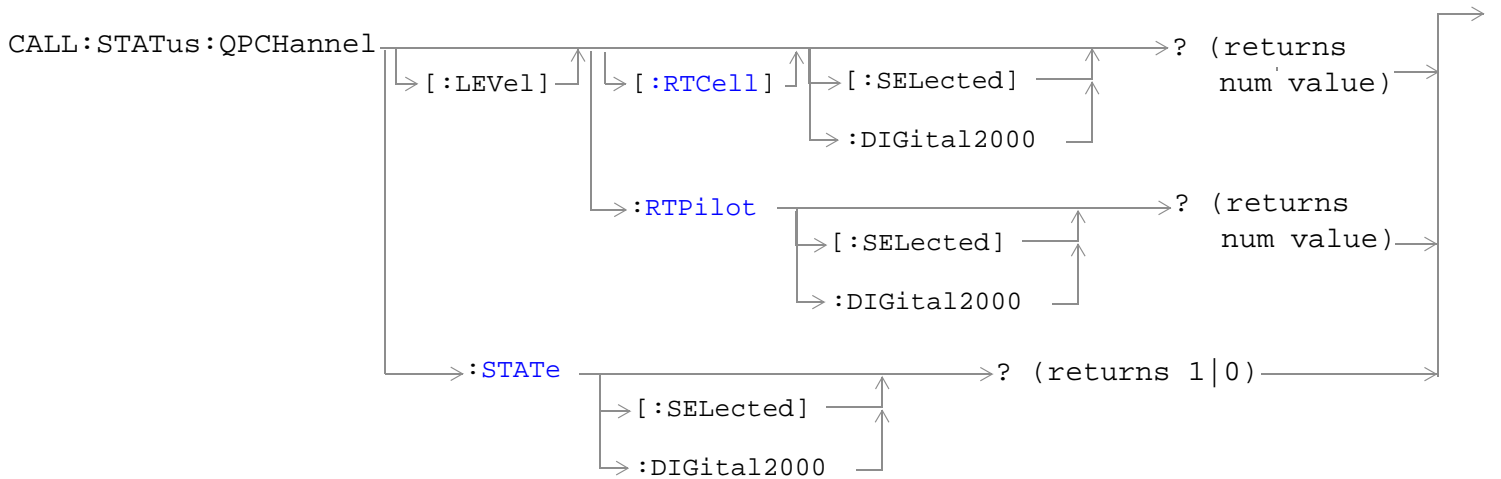
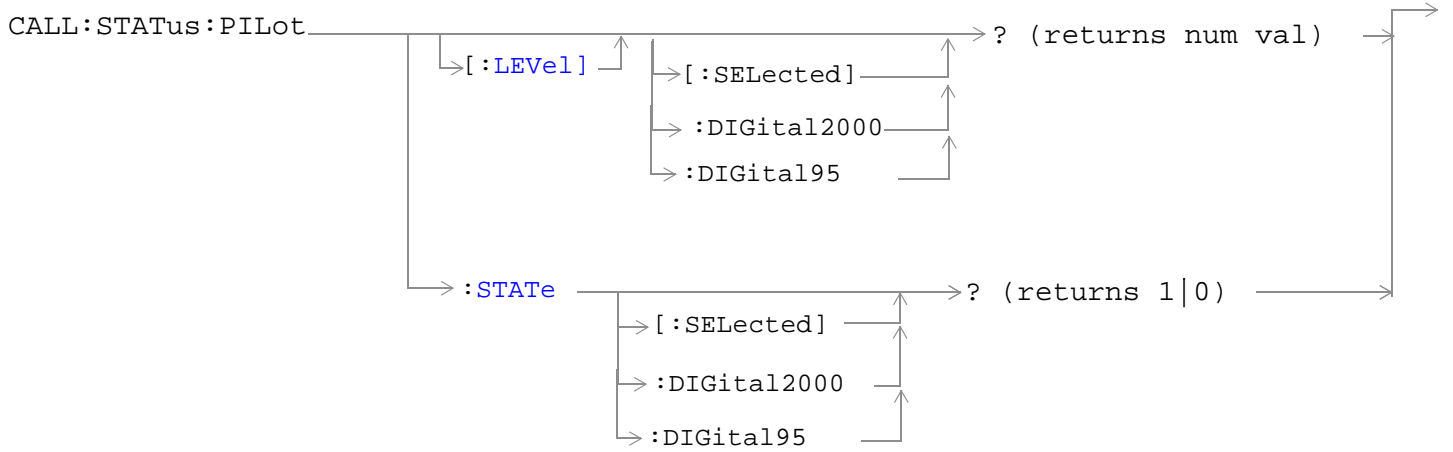
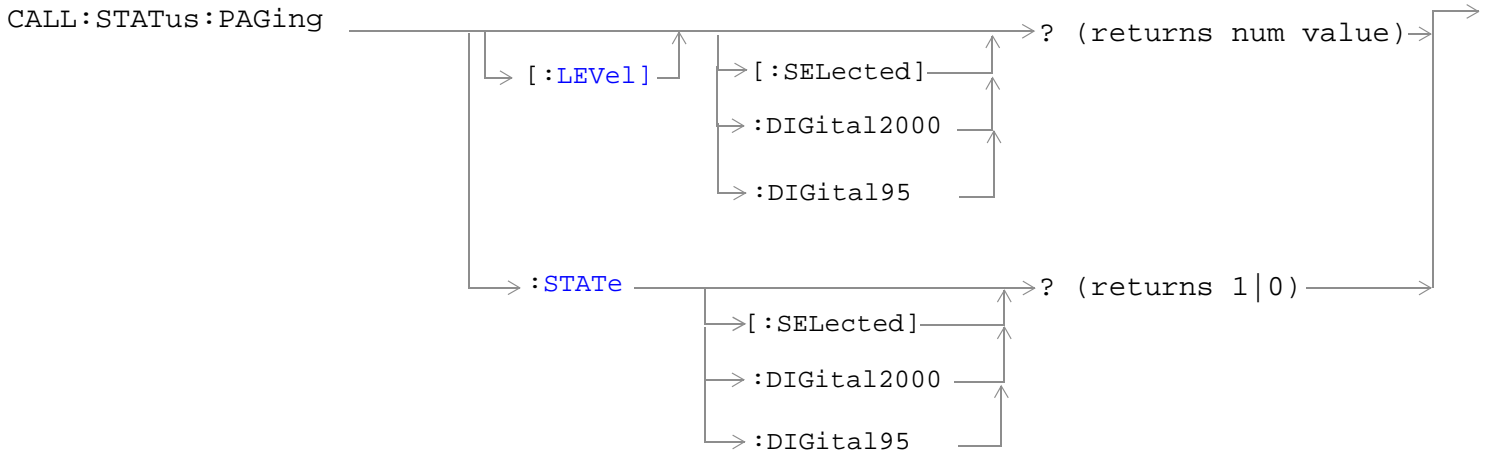


## CALL:STATUS

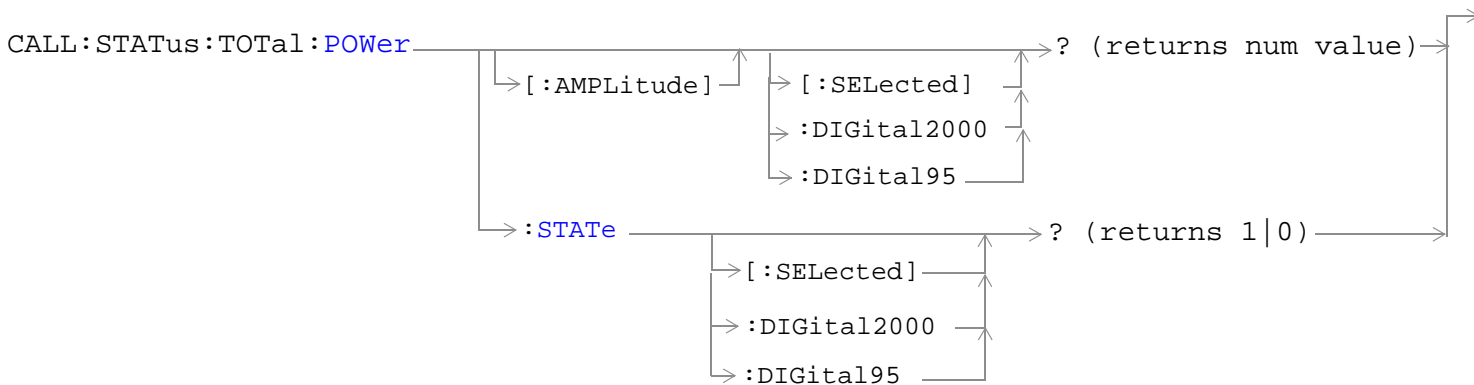
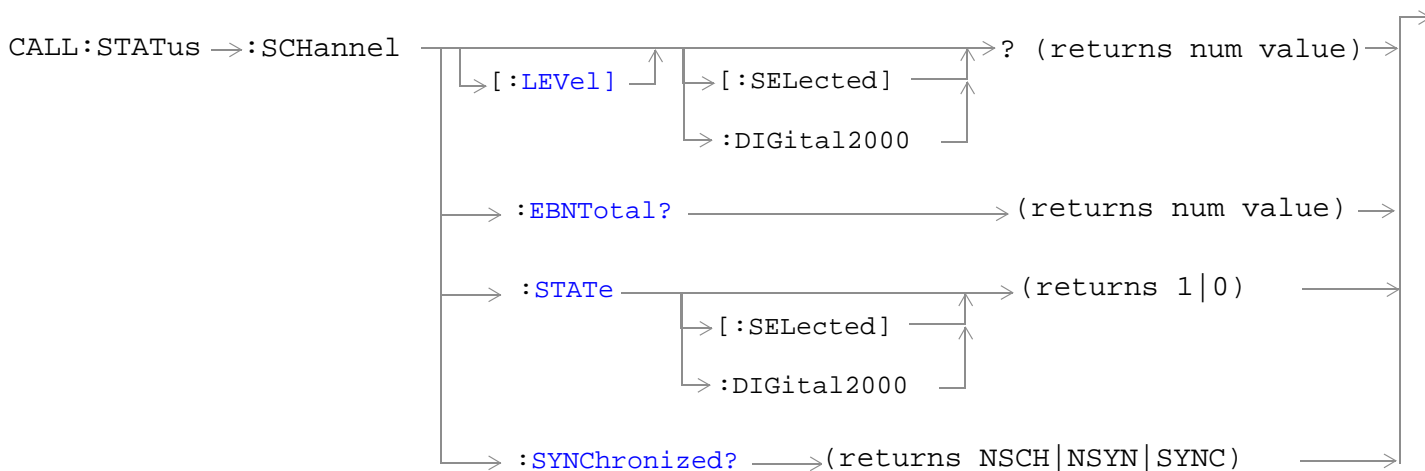
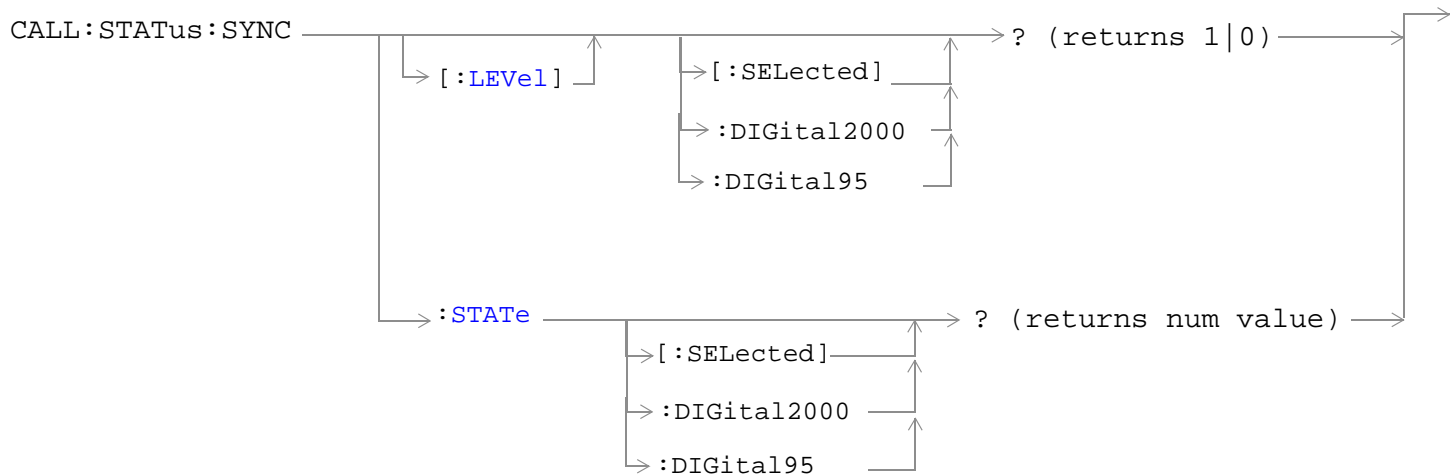


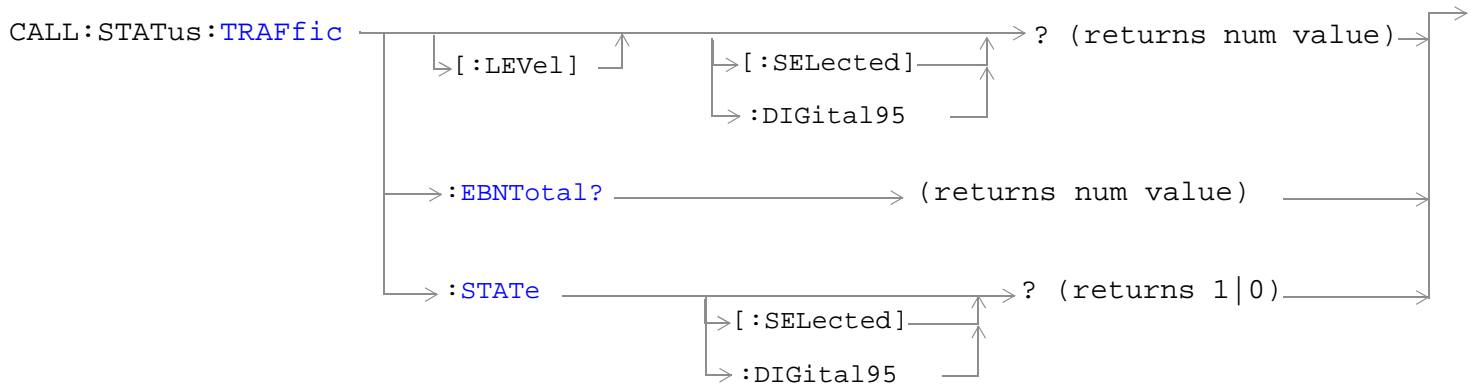
## CALL:STATUS





CALL:STATUS





["Diagram Conventions" on page 268](#)

## CALL:STATUS

### CALL:STATUS[:STATE]?

Function	Queries the status of the call. Status can be idle, paging, call (alerting), connected, access probe, releasing, handoff, or registering.
Query	Range: IDLE   PAG   CALL   CONN   APR   REL   HAND   REG
*RST Setting	IDLE
<b>Programming Example</b> OUTPUT 714;"CALL:STATUS?" !Returns the current call processing state.	

### CALL:STATUS[:STATE]:DATA?

Function	Queries the status of the data connection. Status can be off, or data connected (DCON).
Query	Range: IDLE   PAG   CALL   CONN   APR   REL   HAND   REG
*RST Setting	IDLE
<b>Programming Example</b> OUTPUT 714;"CALL:STATUS?" !Returns the current call processing state.	

### CALL:STATUS:AVC[:CHANNEL]?

Function	Queries the active channel number when connected on an analog voice channel. Only used in active cell operating mode.
Query	Range: 1 through 799, 991 through 1023, 9.91 E+37
*RST Setting	9.91E37 (*RST disconnects the call, so the mobile is no longer on an AVC.)
<b>Programming Example</b> OUTPUT 714;"CALL:STATUS:AVC:CHANNEL?"	

### CALL:STATUS:AVC:SATone[:CCODE]?

Function	Queries the active supervisory audio tone frequency when connected on an analog voice channel. Only used in active cell operating mode.
Query	Range: SAT1   SAT2   SAT3   UNKN SAT1 = 5970 Hz SAT2 = 6000 Hz SAT3 = 6030 Hz
*RST Setting	UNKN (*RST disconnects the call, so the mobile is no longer on an AVC.)
<b>Programming Example</b> OUTPUT 714;"CALL:STATUS:AVC:SATONE:CCODE?"	

**CALL:STATUS:AWGNoise:POWER:AMPLitude[:SElected]?**

Function	<p>Queries the current power level of the additive white Gaussian noise (AWGN) source for the currently selected system type.</p> <p>AWGN power level is set using the "<a href="#">CALL:AWGNoise:POWER</a>" commands.</p> <p>The optional [:SElected] keyword in this command specifies that the AWGN power level being queried applies to the current system type.</p>
Query	<p>Range: -170 dBm/1.23 MHz to 35 dBm/1.23 MHz (including amplitude offset, if on).</p> <p>Resolution: 0.01 dB</p>
*RST Setting	-54.0 dBm/1.23 MHz
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"CALL:STATUS:AWGNOISE:POWER:AMPLITUDE:SELECTED?" !Queries the current AWGN power for the current system type.</pre>	

**CALL:STATUS:AWGNoise:POWER:STATE[:SElected]?**

Function	<p>Queries the current on/off state of the additive white Gaussian noise (AWGN) source for the currently selected system type.</p> <p>AWGN power level on/off state is set using the "<a href="#">CALL:AWGNoise:POWER</a>" commands.</p> <p>The optional [:SElected] keyword in this command specifies that the AWGN power state being queried applies to the current system type.</p>
Query	Range: 1   0
*RST Setting	0 (Off)
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"CALL:STATUS:AWGNOISE:POWER:STATE:SELECTED?"</pre>	

**CALL:STATUS:CELL:POWER:AMPLITUDE[:SElected]?**

Function	Queries the current cell power for the selected system type. Cell power is set using the “CALL[:CELL]:POWER” commands. The optional [:SElected] keyword in this command specifies that the cell power level being queried applies to the current system type.
Query	Range: -170 dBm/1.23 MHz to 35 dBm/1.23 MHz (including amplitude offset if on). Resolution: 0.01 dB
*RST Setting	-55.0 dBm/1.23 MHz
Programming Example OUTPUT 714; "CALL:STATUS:CELL:POWER:AMPLITUDE:SELECTED?"	

**CALL:STATUS:CELL:POWER:STATE[:SElected]?**

Function	Queries the state of the cell power measurement for the currently selected system type. Cell power state is set using the “CALL[:CELL]:POWER” commands. The optional [:SElected] keyword in this command specifies that the power state being queried applies to the current system type.
Query	Range: 1   0
*RST Setting	0 (Off)
Programming Example OUTPUT 714; "CALL:STATUS:CELL:POWER:STATE:SELECTED?"	

**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. 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: DIG2000   CW   AMPS   DIG95
*RST Setting	DIG2000
Programming Example OUTPUT 714; "CALL:STATUS:CELL:SYSTEM:TYPE?"	



**CALL:STATUS:FCHannel:LEVel[:SElected]?**

Function	<p>Queries the current forward fundamental channel (FCH) level.</p> <p>The forward fundamental channel level is set using the “CALL:FCHannel” commands.</p> <p>The optional [:SElected] keyword in this command specifies that the fundamental channel level being queried applies to the current system type.</p>
Query	<p>Range: 0 to 30 dB, 9.91 E+37</p> <p>Resolution: 0.01 dB</p>
*RST Setting	9.91 E+37
<b>Programming Example</b> OUTPUT 714; "CALL:STATUS:FCHANNEL:LEVEL?"	

**CALL:STATUS:FCHannel:STATe[:SElected]?**

Function	<p>Queries the current forward fundamental channel (FCH) on/off state.</p> <p>The forward fundamental channel on/off state is set using the “CALL:FCHannel” commands.</p> <p>The optional [:SElected] keyword in this command specifies that the fundamental channel state being queried applies to the current system type.</p>
Query	Range: 1   0
*RST Setting	0 (Off)
<b>Programming Example</b> OUTPUT 714; "CALL:STATUS:FCHANNEL:STATE:DIGITAL2000?"	

**CALL:STATUS:LOOPback?**

Function	<p>Queries the current loopback mode.</p> <p>Loopback mode indicates if the selected service option is currently SO2, SO9 or SO55 (loopback) and a call is connected in the current system. (The test set does not attempt to verify that data is actually being looped back by the mobile station when responding to this query).</p> <p>Loopback mode is set using the “CALL[:CELL]:SOPTION” command.</p>
Query	Range: 1   0
*RST Setting	0 (Off)
<b>Programming Example</b> OUTPUT 714; "CALL:STATUS:LOOPBACK?"	

**CALL:STATUS:MS:ANALog:TXLevel?**

Function	<p>Queries the power level setting of the mobile on an active analog voice channel. Only used in active cell operating mode.</p>
----------	--

## CALL:STATUS

Query	Range: 0 to 7, 9.91E37 MS TX Level 0: expected power, 36 dBm* MS TX Level 1: expected power, 32 dBm MS TX Level 2: expected power, 28 dBm MS TX Level 3: expected power, 24 dBm MS TX Level 4: expected power, 20 dBm MS TX Level 5: expected power, 16 dBm MS TX Level 6: expected power, 12 dBm MS TX Level 7: expected power, 8 dBm  *all values for MS TX level assume 0 dB antenna gain
*RST Setting	9.91E37 (*RST disconnects the call, so the mobile is no longer on an AVC.)
<b>Programming Example</b>  OUTPUT 714 ; "CALL : STATUS : MS : ANALOG : TXLEVEL ? "	

**CALL:STATus:MSpeed[:CPOWer]?**

Function	Queries the current measurement speed being used by the channel power measurement. This speed is based on the current system's service option and traffic data rate, and may differ from the setting requested by the "SETup:CPOWer:MSpeed" command.
Query	Range: NORM   FAST
*RST Setting	NORM
Programming Example	
OUTPUT 714; "CALL:STATUS:MSPEED:CPOWER?"	

**CALL:STATus:OCNSource[:LEVel][:SElected]?**

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	9.91 E+37
Programming Example	
OUTPUT 714; "CALL:STATUS:OCNSOURCE:LEVEL:SELECTED?"	

**CALL:STATus:OCNSource:STATe[:SElected]?**

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	0 (Off)
Programming Example	
OUTPUT 714; "CALL:STATUS:OCNS:STATE:SELECTED?"	

**CALL:STATus:PAGing:LEVel[:SElected]?**

Function	Queries the current paging level for the currently selected system type. The forward paging channel level is set using the "CALL:PAGing" commands. The optional [:SElected] keyword in this command specifies that the paging level being queried applies to the current system type.
----------	---

## CALL:STATUS

Query	Range: 0 to -20 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
<b>Programming Example</b> OUTPUT 714 ; "CALL : STATUS : PAGING : LEVEL : SELECTED? "	

**CALL:STATUS:PAGING:STATE[:SElected]?**

Function	Queries the current paging level state for the currently selected system type. The forward paging channel level is set using the "CALL:PAGING" commands. The optional [:SElected] keyword in this command specifies that the paging state being queried applies to the current system type.
Query	Range: 1   0
*RST Setting	0 (Off)
Programming Example	
OUTPUT 714 ; "CALL : STATUS : PAGING : STATE : SELECTED? "	

**CALL:STATUS:PILOT:LEVEL[:SElected]?**

Function	Queries the current forward pilot level for the currently selected system type. Forward pilot level is set using the "CALL:PILOT" commands. The optional [:SElected] keyword in this command specifies that the pilot level being queried applies to the current system type.
Query	Range: 0 to -10 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example	
OUTPUT 714 ; "CALL : STATUS : PILOT : LEVEL : SELECTED? "	

**CALL:STATUS:PILOT:STATE[:SElected]?**

Function	Queries the current forward channel pilot level state for the currently selected system type. Forward pilot level on/off state is set using the "CALL:PILOT" commands. The optional [:SElected] keyword in this command specifies that the pilot state being queried applies to the current system type.
Query	Range: 1   0
*RST Setting	0 (Off)
Programming Example	
OUTPUT 714 ; "CALL : STATUS : PILOT : STATE : SELECTED? "	

**CALL:STATUS:QPCHannel[:LEVel][:RTCell][:SElected]?**

Function	Queries the current forward quick paging channel (QPCH) level, relative to the cell power level. The forward quick paging channel level is set using the "CALL:QPCHannel" commands. The optional [:SElected] keyword in this command specifies that the quick paging channel level being queried applies to the current system type.
Query	Range: 0 to -15 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
<b>Programming Example</b> OUTPUT 714; "CALL:STATUS:QPCHANNEL:LEVEL:RTCELL:DIGITAL2000?"	

**CALL:STATUS:QPCHannel[:LEVel]:RTPilot[:SElected]?**

Function	Queries the current forward quick paging channel (QPCH) level, relative to the pilot level. The forward quick paging channel level is set using the "CALL:QPCHannel" commands. The optional [:SElected] keyword in this command specifies that the quick paging channel level being queried applies to the current system type.
Query	Range: +2 to -5 dB, 9.91 E+37 Resolution: integer
*RST Setting	9.91 E+37
<b>Programming Example</b> OUTPUT 714; "CALL:STATUS:QPCHANNEL:LEVEL:RTPILLOT:SELECTED?"	

**CALL:STATUS:QPCHannel:STATe[:SElected]?**

Function	Queries the current on/off state of the forward quick paging channel (QPCH). When the QPCH is set to off, the current QPCH level will be set to 9.91 E+37. The forward quick paging channel on/off state is set using the "CALL:QPCHannel" commands. The optional [:SElected] keyword in this command specifies that the quick paging channel state being queried applies to the current system type.
Query	Range: 1   0
*RST Setting	0 (Off)
Programming Example	
OUTPUT 714 ; "CALL : STATUS : QPCHANNEL : STATE ? "	

**CALL:STATUS:SCHannel:LEVel[:SElected]?**

Function	Queries the current current forward supplemental channel (SCH) level. The forward supplemental channel on/off state is set using the "CALL:SCHannel" commands. The optional [:SElected] keyword in this command specifies that the supplemental channel state being queried applies to the current system type.
Query	Range: 1   0
*RST Setting	0 (Off)
Programming Example	
OUTPUT 714 ; "CALL : STATUS : SCHANNEL : STATE ? "	

**CALL:STATUS:SCHannel:EBNTotal?**

Function	Queries the energy per bit to total noise ( $E_b/N_t$ ) in the supplemental channel.
Query	Range: -30 to 30 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example	
OUTPUT 714 ; "CALL : STATUS : SCHANNEL : EBNTOTAL ? "	

**CALL:STATUS:SCHannel:STATe[:SElected]?**

Function	Queries the current on/off state of the forward supplemental channel (SCH). The forward supplemental channel on/off state is set using the "CALL:SCHannel" commands. The optional [:SElected] keyword in this command specifies that the supplemental channel state being queried applies to the current system type.
Query	Range: 1   0

## CALL:STATUS

*RST Setting	0 (Off)
<b>Programming Example</b>	
OUTPUT 714 ; "CALL : STATUS : SCHANNEL : STATE? "	



**CALL:STATUS:SCHannel:SYNChronized?**

Function	Queries the if the data on the F-SCH is synchronized when in SO32 (TDSO). This is primarily used by the TDSO FER measurement. The returned setting is NSCH (no F-SCH assigned), NSYN (not synchronized), or SYNC (synchronized).  The forward supplemental channel on/off state is set using the "CALL:SCHannel" commands.
Query	Range: NSCH   NSYN   SYNC
*RST Setting	NSCH
Programming Example	
OUTPUT 714 ; "CALL : STATUS : SCHANNEL : SYNCHRONIZED "	

**CALL:STATUS:SYNC:LEVel[:SELEcted]?**

Function	Queries the current forward sync channel level for the currently selected system type.  The forward sync channel level is set using the "CALL:SYNC" commands.  The optional [:SELEcted] keyword in this command specifies that the sync 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	9.91 E+37
Programming Example	
OUTPUT 714 ; "CALL : STATUS : SYNC : LEVEL : SELECTED? "	

**CALL:STATUS:SYNC:STATe[:SELEcted]?**

Function	Queries the current sync channel level state for the currently selected system type.  The forward sync channel level on/off state is set using the "CALL:SYNC" commands.  The optional [:SELEcted] keyword in this command specifies that the sync state being queried applies to the current system type.
Query	Range: 1   0
*RST Setting	0 (Off)
Programming Example	
OUTPUT 714 ; "CALL : STATUS : SYNC : STATE : SELECTED? "	

**CALL:STATUs:TOTal:POWer[:AMPLitude][:SElected]?**

Function	<p>Queries the total RF power of the currently selected system type.</p> <p>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”).</p> <p>The optional [:SElected] keyword in this command specifies that the total RF power level being queried applies to the current system type.</p>
Query	<p>Range: -170 dBm/1.23 MHz to 35 dBm/1.23 MHz (including amplitude offset), 9.91 E+37</p> <p>Resolution: 0.01 dB</p>
*RST Setting	9.91 E+37
<b>Programming Example</b> OUTPUT 714; "CALL:STATUS:TOTAL:POWER:AMPLITUDE:SELECTED?"	

**CALL:STATUs:TOTal:POWer:STATe[:SElected]?**

Function	<p>Queries the current total RF power measurement's state for the currently selected system type.</p> <p>This query will return a 1 (on) if either current cell power (“CALL[:CELL]:POWer”) or current AWGN (“CALL:AWGNoise:POWer”) power states are on.</p> <p>The optional [:SElected] keyword in this command specifies that the power state being queried applies to the current system type.</p>
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714; "CALL:STATUS:TOTAL:POWER:STATE:SELECTED?"	

**CALL:STATUs:TRAFfic:LEVel[:SElected]?**

Function	<p>Queries the current forward traffic channel level.</p> <p>The forward fundamental channel level is set using the “CALL:TRAFfic:LEVel[:SElected]” commands.</p> <p>The optional [:SElected] keyword in this command specifies that the traffic channel level being queried applies to the current system type.</p>
Query	<p>Range: 0 to 30 dB, 9.91 E+37</p> <p>Resolution: 0.01 dB</p>
*RST Setting	9.91 E+37
<b>Programming Example</b> OUTPUT 714; "CALL:STATUS:FCHANNEL:LEVEL?"	

**CALL:STATUS:TRAFFIC:EBNTotal?**

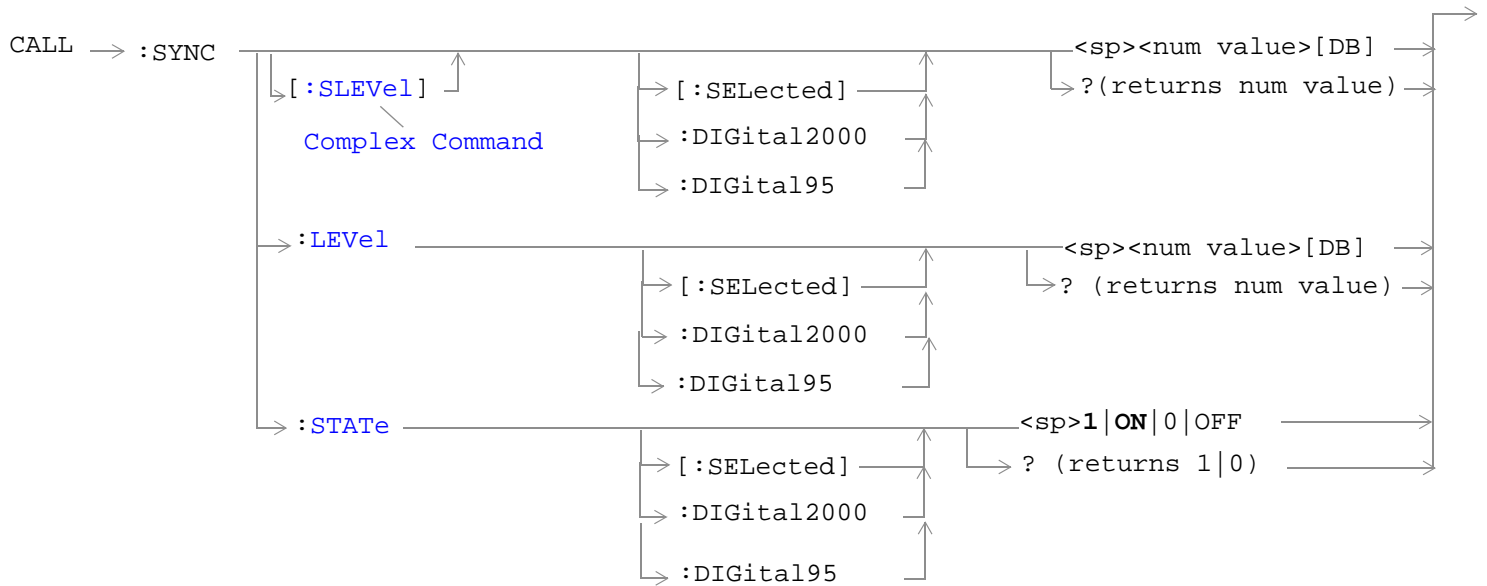
Function	Queries the energy per bit divided by noise, total ( $E_b/N_t$ ). If a call is not connected, this command will return 9.91 E+37.
Query	Range: -30.00 to +30.00 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example	
OUTPUT 714;"CALL:STATUS:TRAFFIC:EBNTOTAL?"	

**CALL:STATUS:TRAFFIC:STATE[:SElected]?**

Function	Queries the current forward traffic channel on/off state. The forward fundamental channel on/off state is set using the "CALL:TRAFFIC:STATE[:SElected]" commands. The optional [:SElected] keyword in this command specifies that the traffic channel state being queried applies to the current system type.
Query	Range: 1   0
*RST Setting	0 (Off)
Programming Example	
OUTPUT 714;"CALL:STATUS:TRAFFIC:STATE?"	



## CALL:SYNC



[“Diagram Conventions” on page 268](#)

### CALL:SYNC[:SLEVel][:SElected]

Function	<p>The setting form of this command performs two functions: (1) sets the SYNC (synchronization channel) level, and (2) turns the SYNC state to ON.</p> <p>The query form of this command returns the SYNC level for the current system type.</p> <p>The optional [:SElected] keyword in this command specifies that the SYNC level and state being set/queried applies to the current system type. See <a href="#">“CALL[:CELL]:SYSTEM[:TYPE]”</a> to query or change the current system type.</p>
Setting	<p>Range: 0 to -20 dB</p> <p>Resolution: 0.01 dB</p>
Query	<p>Range: 0 to -20 dB</p> <p>Resolution: 0.01 dB</p>
*RST Setting	-16 dB
<p><b>Programming Example</b></p> <pre> OUTPUT 714;"CALL:SYNC:SLEVel -16" !Sets the SYNC state to ON and sets the level to -16 dB. </pre>	

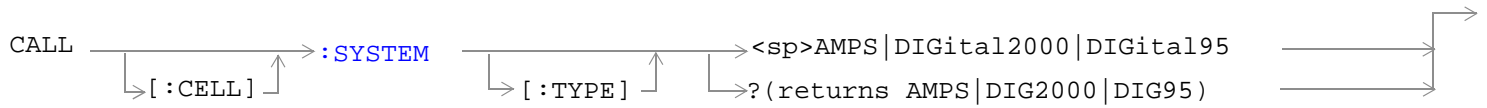
## CALL:SYNC

### CALL:SYNC:LEVEL[:SElected]

Function	Sets/queries the forward SYNC (synchronization channel) level. The optional [:SElected] keyword in this command specifies that the SYNC level being set/queried applies to the current system type. See " <a href="#">CALL[:CELL]:SYSTEM[:TYPE]</a> " to query or change the current system type.
Setting	Range: 0 to -20 dB Resolution: 0.01 dB
Query	Range: 0 to -20 dB Resolution: 0.01 dB
*RST Setting	-16 dB
<b>Programming Example</b> OUTPUT 714;"CALL:SYNC:LEVEL -16" !Set the SYNC channel level to -16 dB.	

### CALL:SYNC:STATE[:SElected]

Function	Sets/queries the SYNC (synchronization channel) state. The optional [:SElected] keyword in this command specifies that the SYNC state being set/queried applies to the current system type. See " <a href="#">CALL[:CELL]:SYSTEM[:TYPE]</a> " to query or change the current system type.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	ON
<b>Programming Example</b> OUTPUT 714;"CALL:SYNC:STATE OFF" !Turns off the SYNC channel.	

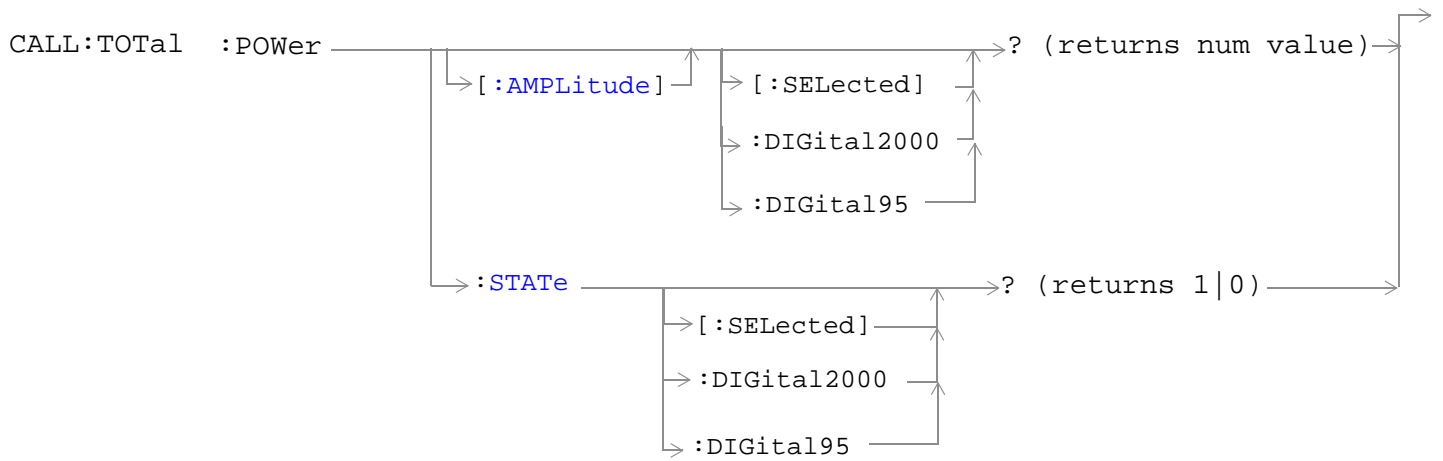
**CALL[:CELL]:SYSTEM**

[“Diagram Conventions” on page 268](#)

**CALL[:CELL]:SYSTEM[:TYPE]**

Function	Sets/queries the active cell system type.
Setting	Range: AMPS   DIGital2000   DIGital95
Query	Range: AMPS   DIG2000   DIGital95
*RST Setting	DIGital2000
<b>Programming Example</b>	
OUTPUT 714;"CALL:CELL:SYSTEM:TYPE DIG2000" !Sets the system type to DIGital2000.	

## CALL:TOTal:POWer



[“Diagram Conventions” on page 268](#)



**CALL:TOTal:POWer[:AMPLitude][:SElected]?**

Function	<p>Queries the total RF power settings for the current system type.</p> <p>Total RF power is the sum of cell power level and AWGN power level.</p> <p>The return value for this query is not necessarily the power level being transmitted by the test set at the moment this command is processed by the test set. It may return a value that the test set has been requested to transmit, but that has been pended or delayed for some reason. To query the power level the test set is transmitting at the moment the command is sent, use the <b>"CALL:STATus:TOTal:POWer[:AMPLitude][:SElected]?"</b> command.</p> <p>The optional [:SElected] keyword in this command specifies that this query applies to the current system type.</p>
Query	<p>Range: -170 dBm/1.23 MHz to +35 dBm/1.23 MHz, 9.91 E+37</p> <p>Resolution: 0.01 dB</p>
*RST Setting	9.91 E+37
<b>Programming Example</b> <pre>OUTPUT 714 ; "CALL : TOTAL : POWER : AMPLITUDE : SELECTED? "</pre>	

**CALL:TOTal:POWer:STATe[:SElected]?**

Function	<p>Queries the total RF power state for the current system type.</p> <p>The total RF power state is 1 (on) if either cell power or AWGN power is on.</p> <p>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 <b>"CALL:STATus:TOTal:POWer:STATe[:SElected]?"</b> command.</p> <p>The optional [:SElected] keyword in this command specifies that this query applies to the current system type.</p>
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> <pre>OUTPUT 714 ; "CALL : TOTAL : POWER : STATE : SELECTED? "</pre>	



**CALL:TRAFFic:DRATe**

Function	Sets/queries the TCH (traffic channel) and FCH (fundamental channel) data rates which are applied when a loopback service option is selected (see " <a href="#">CALL[:CELL]:SOPTION</a> ").  TCH/FCH data rate is not applied when a call is in echo mode (service options 1,3,17, and 32768). If one of these service options is selected, the data rate is stored. It will be applied when a loopback service option is selected.
Setting	Range: EIGHth   QUARter   HALF   FULL
Query	Range: EIGH   QUAR   HALF   FULL
*RST Setting	Full
<b>Programming Example</b>	
OUTPUT 714;"CALL:TRAFFic:DRATE HALF" !Set the data rate to half.	

**CALL:TRAFFic[:SLEVel][:SElected]**

Function	The setting form of this command performs two functions: (1) sets the forward traffic channel level, and (2) turns the traffic channel state to ON.  The query form of this command returns the traffic channel level.  <hr/> <b>NOTE</b> This command applies to IS-95 traffic channel only. To make level changes to the IS-2000 fundamental channel, see " <a href="#">CALL:FCHannel[:SLEVel][:SElected]</a> " <hr/>
Setting	Range: 0 to -30 dB Resolution: 0.01 dB
Query	Range: 0 to -30 dB Resolution: 0.01 dB
*RST Setting	-15.6 dB
<b>Programming Example</b>	
OUTPUT 714;"CALL:TRAFFic:SLEVEL:DIGITAL95 -10 dB" !Sets the forward traffic channel state to ON and sets the level to -10 dB.	

## CALL:TRAFfic

### CALL:TRAFfic:LEVel[:SELEcted]

Function	Sets/queries the level of the forward traffic channel. <hr/> <b>NOTE</b> This command applies to IS-95 traffic channel only. To make level changes to the IS-2000 fundamental channel, see " <a href="#">CALL:FCHannel:LEVel[:SELEcted]</a> "
Setting	Range: 0 to -30 dB Resolution: 0.01 dB
Query	Range: 0 to -30 dB Resolution: 0.01 dB
*RST Setting	-15.6 dB
<b>Programming Example</b> OUTPUT 714;"CALL:TRAFfic:LEVEL:SELECTED -10 dB"	

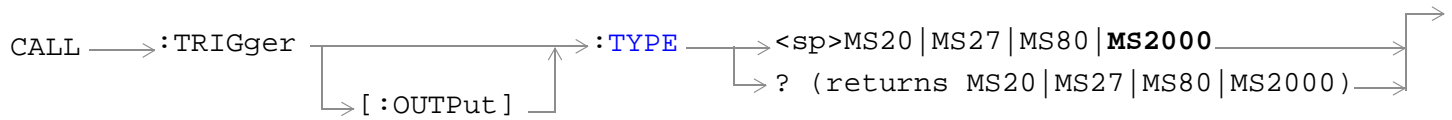
### CALL:TRAFfic:STATe[:SELEcted]

Function	Sets/queries the on/off state of the forward traffic channel. <hr/> <b>NOTE</b> This command applies to IS-95 traffic channel only. To make on/off state changes to the IS-2000 fundamental channel, see " <a href="#">CALL:FCHannel:STATe[:SELEcted]</a> "
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	ON
<b>Programming Example</b> OUTPUT 714;"CALL:TRAFfic:STATE:DIGITAL95 OFF" !Turns off the forward traffic channel.	

### CALL:TRAFfic:WALSh

Function	Sets/queries the Walsh code used for the DIGital95 traffic channel.
Setting	Range: CODE10   CODE14   CODE26   CODE30   CODE42   CODE46   CODE58   CODE62
Query	Range: CODE10   CODE14   CODE26   CODE30   CODE42   CODE46   CODE58   CODE62
*RST Setting	CODE10
<b>Programming Example</b> OUTPUT 714;"CALL:TRAFfic:WALSH CODE14" !Sets the forward traffic channel walsh code to 14.	

## CALL:TRIGger:TYPE



[“Diagram Conventions” on page 268](#)

### CALL:TRIGger[:OUTPut]:TYPE

Function	Sets/queries the frame clock that is routed to the TRIG OUT rear panel connector. See <a href="#">“Rear Panel Connectors” on page 709</a> . Each choice consists of a CDMA frame clock period. For example, MS20 is the 20 millisecond frame clock.  The triggers are based on the internally generated frame clock.  There is no on/off state setting for external triggers.
Setting	Range: MS20   MS27   MS80   MS2000
Query	Range: MS20   MS27   MS80   MS2000
*RST Setting	MS2000 (2 seconds)
<b>Programming Example</b>  <pre>OUTPUT 714;"CALL:TRIGGER:OUTPUT:TYPE MS27" !Sets the external trigger signal to 26.67 ms.</pre>	

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## 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.

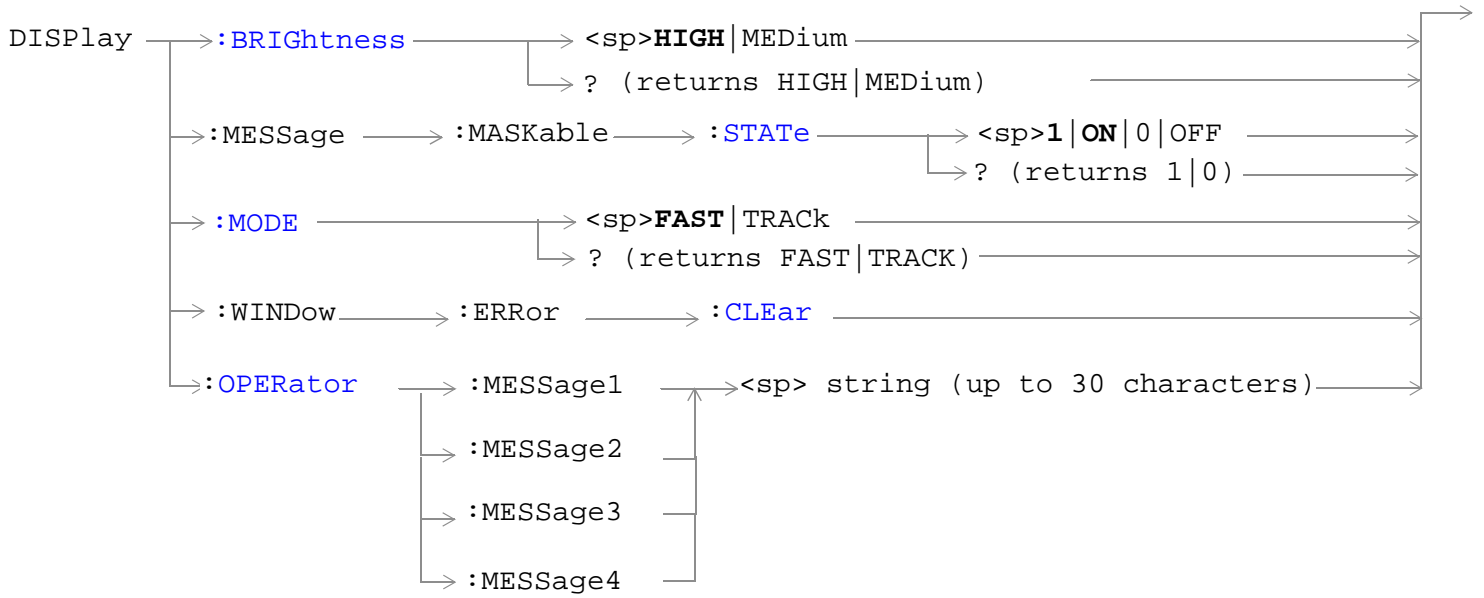
### Display Backlight Dimming

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 268

## DISPlay

### 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 <a href="#">"Display Backlight Dimming" on page 430.</a>
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)
<b>Programming Example</b> 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 <a href="#">"Error Messages" on page 741.</a>
Setting	Range: On   Off
Query	Range: On   Off
Factory setting	On
<b>Programming Example</b> 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 <a href="#">"Display Mode (Track/Fast)"</a> for a description of fast and track display modes.
Setting	Range: FAST   TRACK
Query	Range: FAST   TRAC
*RST setting	TRACK
<b>Programming Example</b> 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.
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.
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 435](#) (Audio Frequency Analyzer measurements)

[“FETCh:ATXPower” on page 444](#) (Analog Transmitter Power measurements)

[“FETCh:CAPPower” on page 447](#) (Access Probe Power measurements)

[“FETCh:CCTPhase” on page 448](#) (Code Channel Time/Phase Error measurements)

[“FETCh:CFERror” on page 452](#) (Frame Error Rate test results)

[“FETCh:CPOWer” on page 454](#) (Channel Power measurements)

[“FETCh:CTXSpurious” on page 456](#) (TX Spurious Emissions measurements)

[“FETCh:DAPower” on page 459](#) (Digital Average Power measurements)

[“FETCh:FM” on page 461](#) (Frequency Modulation measurements)

[“FETCh:FSTability” on page 467](#) (Frequency Stability measurments)

[“FETCh:GPOWer” on page 472](#) ( Gated Power measurments)

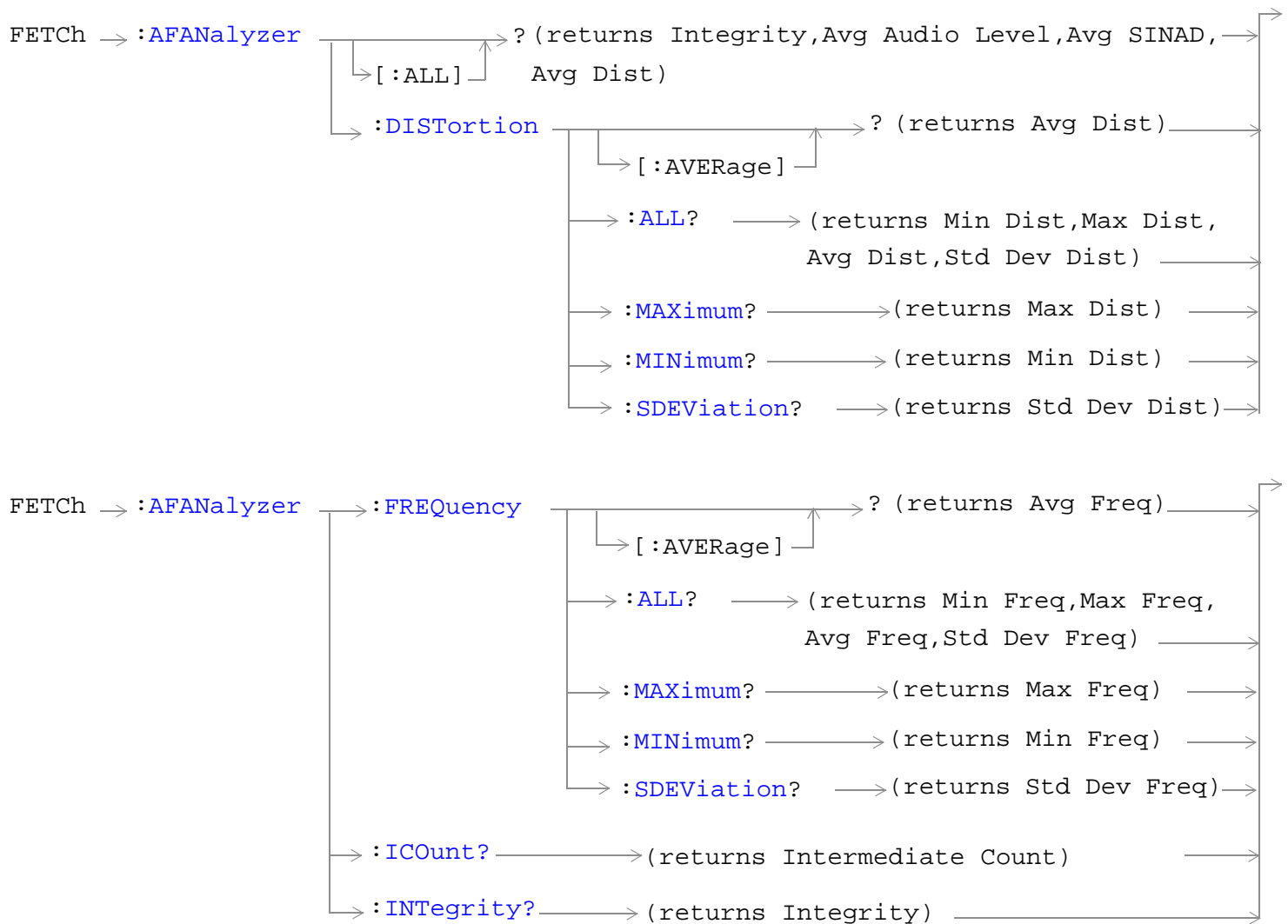
[“FETCh:HWQuality” on page 475](#) (Handoff Waveform Quality measurements)

[“FETCh:SAUDio” on page 477](#) (Swept Audio measurements)

[“FETCh:TFERror” on page 482](#) (TDSO Frame Error Rate measurements)

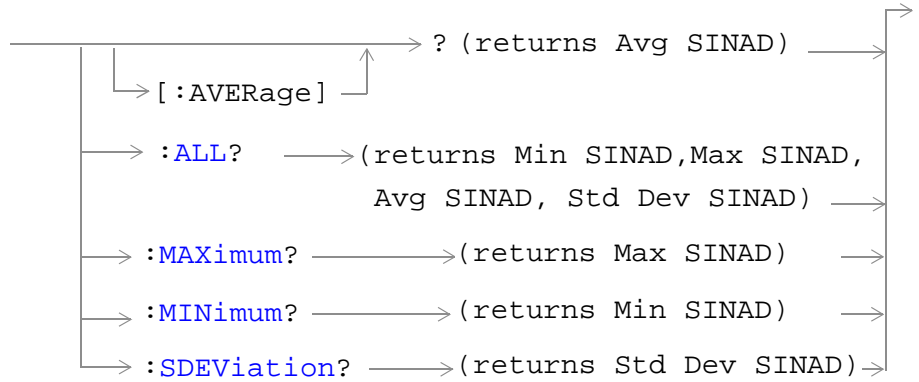
[“FETCh:WQQuality” on page 484](#) (Waveform Quality/Code Domain power measurements)

## FETCh:AFANalyzer

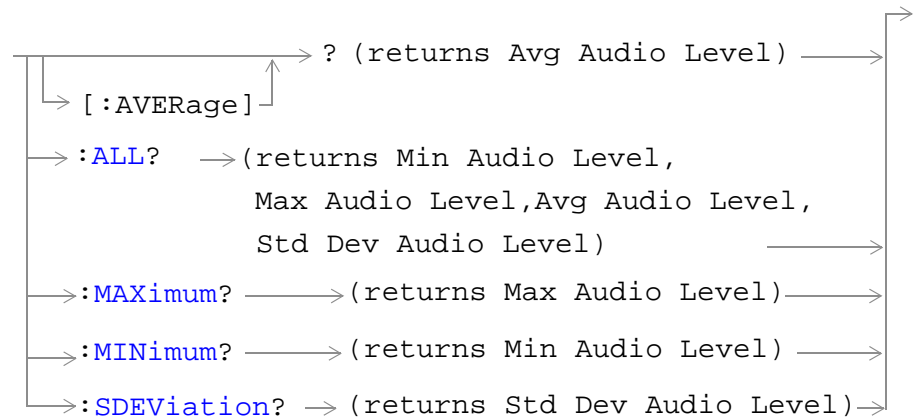


## FETCh:AFANalyzer

FETCh → :AFANalyzer → :SINAD



FETCh → :AFANalyzer → :VOLTage



[“Diagram Conventions” on page 268](#)

**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	<p>Average analog audio level</p> <ul style="list-style-type: none"> <li>• Range: 0 to 20 volts, 9.91 E+37</li> <li>• Resolution: The lesser of 4 significant digits or 10 uV</li> </ul> <p>Average SINAD</p> <ul style="list-style-type: none"> <li>• Range:-99 to 99 dB, 9.91 E+37</li> <li>• Resolution: 0.01 dB</li> </ul> <p>Average audio distortion</p> <ul style="list-style-type: none"> <li>• Range: 0 to 99%, 9.91 E+37</li> <li>• Resolution: 0.01%</li> </ul>

**Programming Example**

```
OUTPUT 714;"FETCh:AFANALYZER:ALL?"
!Returns integrity, average audio level, average SINAD,and average audio distortion.
```

**FETCh:AFANalyzer:DIS TORTion[:AVERAge]?**

Function	Queries the average audio distortion measurement.
Query	<p>Average audio distortion</p> <ul style="list-style-type: none"> <li>• Range: 0 to 99%, 9.91 E+37</li> <li>• Resolution: 0.01%</li> </ul>

**Programming Example**

```
OUTPUT 714;"FETCh:AFANALYZER:DIS TORTION:AVERAGE?"
```

**FETCh:AFANalyzer:DIS TORTion: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	Minimum, maximum, and average audio distortion: <ul style="list-style-type: none"> <li>• Range: 0 to 99%, 9.91 E+37</li> <li>• Resolution: 0.01%</li> </ul> Standard deviation audio distortion: <ul style="list-style-type: none"> <li>• Range: 0 to 99%, 9.91 E+37</li> <li>• Resolution: 0.001%</li> </ul>

**Programming Example**

```
OUTPUT 714;"FETCh:AFANALYZER:DIS TORTION:ALL?"
!Returns minimum, maximum, average, and standard deviation audio distortion.
```

**FETCh:AFANalyzer:DIS TORTion:MAXimum?**

Function	Queries the maximum audio distortion.
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.01%

**Programming Example**

```
OUTPUT 714;"FETCh:AFANALYZER:DIS TORTION:MAXIMUM?"
```

**FETCh:AFANalyzer:DIS TORTion:MINimum?**

Function	Queries the minimum audio distortion.
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.01%

**Programming Example**

```
OUTPUT 714;"FETCh:AFANALYZER:DIS TORTION:MINIMUM?"
```

**FETCh:AFANalyzer:DIS TORTion:SDEViation?**

Function	Queries the standard deviation audio distortion.
Query	Range: 0 to 99%, 9.91 E+37 Resolution: 0.001%

**Programming Example**

```
OUTPUT 714;"FETCh:AFANALYZER:DIS TORTION:SDEV IATION?"
```

**FETCh:AFANalyzer:FREQuency[:AVERAge]?**

Function	Queries the average audio frequency measurement.
Query	Average audio frequency <ul style="list-style-type: none"> <li>• Range: 0 to 99999 Hz, 9.91 E+37</li> <li>• Resolution: 0.1 Hz</li> </ul>

**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: <ul style="list-style-type: none"> <li>• Range: 0 to 99999 Hz, 9.91 E+37</li> <li>• Resolution: 0.1 Hz</li> </ul> Standard deviation audio frequency: <ul style="list-style-type: none"> <li>• Range: 0 to 99999 Hz, 9.91 E+37</li> <li>• Resolution: 0.01 Hz</li> </ul>

**Programming Example**

```
OUTPUT 714;"FETCh:AFANALYZER:FREQUENcy:ALL?"
!Returns minimum, 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

**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

**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

**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

**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 <a href="#">"Integrity Indicator" on page 244</a> for information about non-zero integrity results.
Query	Range: 1 through 16

**Programming Example**

```
OUTPUT 714;"FETCh:AFANalyzer:INTEgrity?"
!Query the integrity indicator for the AF analyzer results.
```

**FETCh:AFANalyzer:SINAD[:AVERage]?**

Function	Queries the average SINAD measurement.
Query	Average SINAD <ul style="list-style-type: none"> <li>• Range:-99 to 99 dB, 9.91 E+37</li> <li>• Resolution: 0.01 dB</li> </ul>

**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: minimum SINAD, maximum SINAD, average SINAD, and standard deviation SINAD.
Query	Minimum, maximum, average SINAD: <ul style="list-style-type: none"> <li>• Range: -99 to 99 dB, 9.91 E+37</li> <li>• Resolution: 0.01 dB</li> </ul> Standard deviation SINAD <ul style="list-style-type: none"> <li>• Range: -99 to 99 dB, 9.91 E+37</li> <li>• Resolution: 0.001 dB</li> </ul>

**Programming Example**

```
OUTPUT 714;"FETCh:AFANALYZER:SINAD:ALL?"
!Returns minimum, 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

**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

**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

**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

**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

**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

**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

**Programming Example**

OUTPUT 714; "FETCh:AFANALYZER:VOLTAGE:MAXIMUM?"

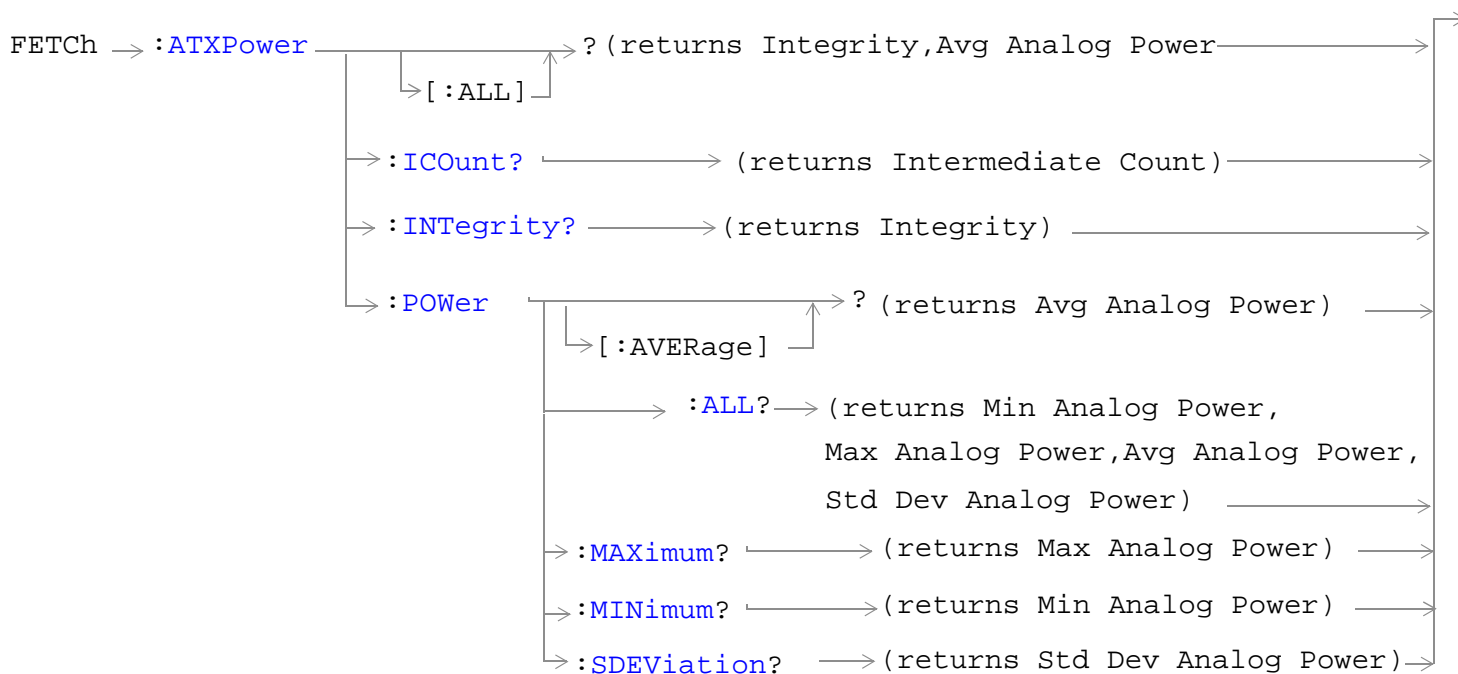
**FETCh:AFANalyzer:VOLTage:SDEVIation?**

Function	Queries the standard deviation audio level measurement.
Query	Range: 0 to 20 V, 9.91 E+37 Resolution: 4 significant digits

**Programming Example**

```
OUTPUT 714; "FETCh:AFANALYZER:VOLTAGE:SDEVIATION?"
```

## FETCh:ATXPower



[“Diagram Conventions” on page 268](#)

### FETCh:ATXPower[:ALL]?

Function	Queries the average analog transmitter power measurement. The query returns integrity, and average analog power.
Query	Range: -100 dBm to +100 dBm Resolution: 0.01 dB

#### Programming Example

OUTPUT 714;"FETCh:ATXPOWER:ALL?" !Returns integrity and average analog power.

**FETCh:ATXPower:ICount?**

Function	Queries the intermediate count of measurements completed in a multi-measurement.
Query	Range: 0 to 999

**Programming Example**

```
OUTPUT 714;"FETCh:ATXPOWER:ICOUNT?"
```

**FETCh:ATXPower:INTEGRITY?**

Function	Queries the measurement integrity indicator for the last analog transmitter power measurement completed.  Zero indicates a normal measurement. See <a href="#">"Integrity Indicator" on page 244</a> for information about non-zero integrity results.
Query	Range: 1 through 16

**Programming Example**

```
OUTPUT 714;"FETCh:ATXPower:INTEGRITY?"
!Query the integrity indicator for the analog TX power measurement.
```

**FETCh:ATXPower:POWER[:AVERAGE]?**

Function	Queries the average analog transmitter power.
Query	Range: -100 to 100 dBm Resolution: 0.01 dB

**Programming Example**

```
OUTPUT 714;"FETCh:ATXPOWER:POWER:AVERAGE?"
```

**FETCh:ATXPower:POWER:ALL?**

Function	Queries the analog transmitter power measurements.  Measurement results are returned in the following order: minimum analog power, maximum analog power, average analog power, standard deviation analog power.
Query	Minimum, maximum, and average analog power: <ul style="list-style-type: none"> <li>• Range: -100 to 100 dBm</li> <li>• Resolution: 0.01 dB</li> </ul> Standard deviation analog power: <ul style="list-style-type: none"> <li>• Range: 0 to 100 dB</li> <li>• Resolution: 0.001 dB</li> </ul>

**Programming Example**

```
OUTPUT 714;"FETCh:ATXPOWER:POWER:ALL?"
!Returns minimum, maximum, average, and standard deviation analog power.
```

## FETCh:ATXPower

### FETCh:ATXPower:POWer:MAXimum?

Function	Queries the maximum analog transmitter power.
Query	Range: -100 to 100 dBm Resolution: 0.01 dB

#### Programming Example

```
OUTPUT 714;"FETCh:ATXPower:POWer:MAXimum?"
```

### FETCh:ATXPower:POWer:MINimum?

Function	Queries the minimum analog transmitter power.
Query	Range: -100 to 100 dBm Resolution: 0.01 dB

#### Programming Example

```
OUTPUT 714;"FETCh:ATXPower:POWer:MINimum?"
```

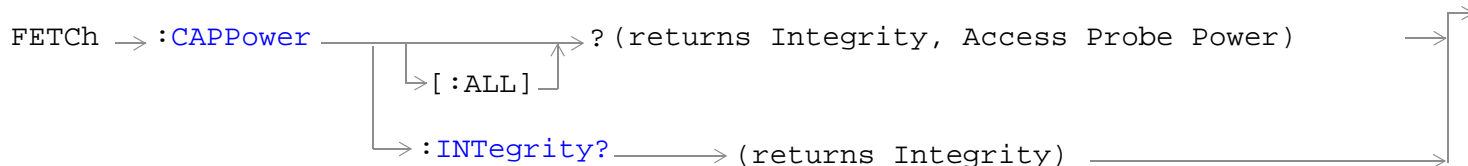
### FETCh:ATXPower:POWer:SDEVIation?

Function	Queries the standard deviation analog transmitter power.
Query	Range: 0 to 100 dB Resolution: 0.001 dB

#### Programming Example

```
OUTPUT 714;"FETCh:ATXPower:POWer:SDEVIation?"
```

## FETCh:CAPPower



“Diagram Conventions” on page 268

### FETCh:CAPPower[:ALL]?

Function	<p>Queries the access probe power measurement results.</p> <p>This query returns an integrity indicator followed by the most recent access probe power measurement result (if results are available).</p>
Query	<ul style="list-style-type: none"> <li>• Range: -100 to 100 dBm, 9.91 E+37</li> <li>• Resolution: 0.01 dBm</li> </ul>

#### Programming Example

```
OUTPUT 714;"FETCh:CAPPower:ALL?" !Returns integrity, access probe power measurement.
```

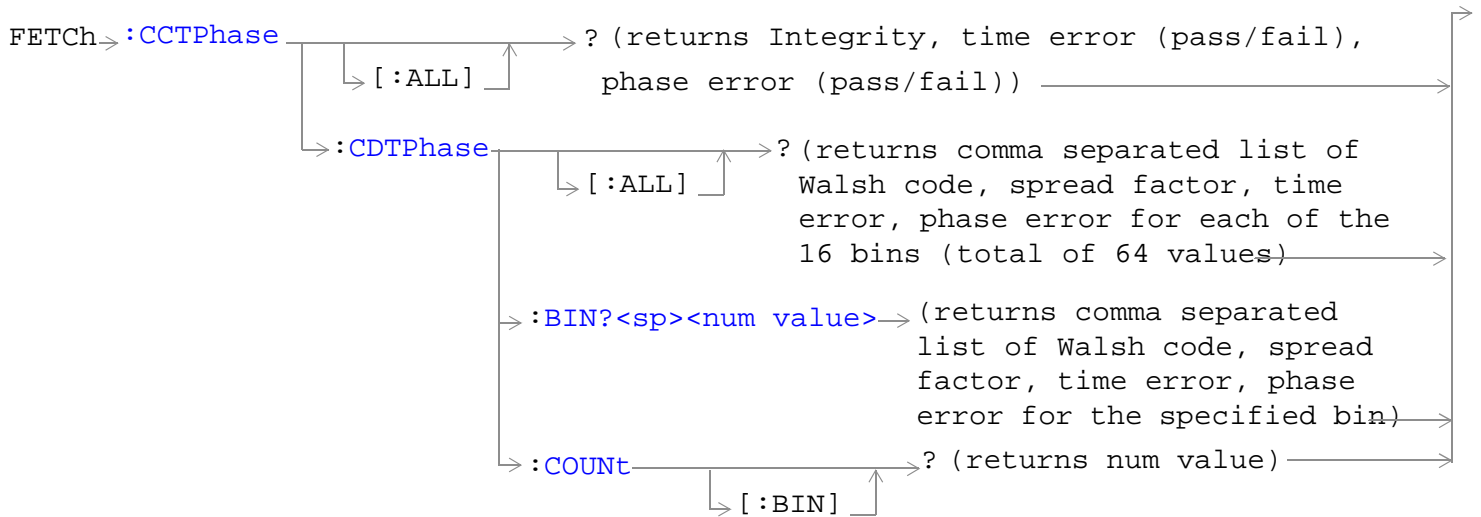
### FETCh:CAPPower:INTegrity?

Function	<p>Queries the measurement integrity indicator for the last access probe power measurement completed.</p> <p>Zero indicates a normal measurement. See “Integrity Indicator” on page 244 for information about non-zero integrity results.</p>
Query	<p>Range: 0 through 23</p>

#### Programming Example

```
OUTPUT 714;"FETCh:CAPPower:INTegrity?"
!Queries the integrity indicator for the most recent access probe power results.
```

## FETCh:CCTPhase



“Diagram Conventions” on page 268



**FETCh:CCTPhase[:ALL]?**

Function	<p>Queries the code channel time and phase error measurement results.</p> <p>This measurement returns results in the following order: integrity, time error pass/fail result, phase error pass/fail result.</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 23 see “<a href="#">Integrity Indicator</a>”</li> <li>• Resolution: 1</li> </ul> <p>Time error pass/fail result</p> <ul style="list-style-type: none"> <li>• Range: 0 to 1 (0 = passed, 1 = failed), 9.91 E+37</li> </ul> <p>Phase error pass/fail result</p> <ul style="list-style-type: none"> <li>• Range: 0 to 1 (0 = passed, 1 = failed), 9.91 E+37</li> </ul>

**Programming Example**

```
OUTPUT 714;"FETCh:CCTPhase:ALL?"
!Returns integrity, time error pass/fail result, phase error pass/fail result.
```

**FETCh:CCTPhase:CDTPHase[:ALL]?**

Function	<p>Queries the code domain time and phase error measurement results.</p> <p>This measurement returns 64 measurement results. For each bin containing measurement data, four results are returned in the following order: Walsh code, spread factor, time error (in seconds), and phase error (in radians). These results are followed by four 9.91 E+37 results for each bin that does not contain data (for a total of 64 results).</p>
Query	<p>Walsh code</p> <ul style="list-style-type: none"> <li>• Range: 0 to 15, 9.91 E+37</li> <li>• Resolution: 1</li> </ul> <p>Spread factor</p> <ul style="list-style-type: none"> <li>• Range: 2, 4, 8, 16, 9.91 E+37</li> </ul> <p>Time error</p> <ul style="list-style-type: none"> <li>• Range: -100.0 to +100.0 ns, 9.91 E+37</li> <li>• Resolution: 0.1</li> </ul> <p>Phase error</p> <ul style="list-style-type: none"> <li>• Range: -1.00 to +1.00 radians, 9.91 E+37</li> <li>• Resolution: 0.01 radians</li> </ul>

**Programming Example**

```
OUTPUT 714;"FETCh:CCTPhase:CDTPHase:ALL?"
!Returns Walsh code, spread factor, time error, and phase error for up to 16 bins.
```

**FETCH:CCTPhase:CDTPhase:BIN?<sp><num value>**

Function	<p>Queries the code domain time and phase error measurement results for a specific bin. A bin represents one bar on the measurement graph. The bars on the graph (bins) are numbered left to right, 0 to a maximum of 15. Unused bins will return four entries of 9.91 E+37 per bin.</p> <p>Bin 0 will always return a time error of zero, and a phase error of zero.</p> <p>This measurement returns results in the following order: Walsh code, spread factor, time error (in seconds), phase error (in radians).</p>
Query	<p>Walsh code</p> <ul style="list-style-type: none"> <li>• Range: 0 to 15, 9.91 E+37</li> <li>• Resolution: 1</li> </ul> <p>Spread factor</p> <ul style="list-style-type: none"> <li>• Range: 2, 4, 8, 16, 9.91 E+37</li> <li>• Resolution: 1</li> </ul> <p>Time error</p> <ul style="list-style-type: none"> <li>• Range: -100.0 to +100.0 ns, 9.91 E+37</li> <li>• Resolution: 0.1</li> </ul> <p>Phase error</p> <ul style="list-style-type: none"> <li>• Range: -1.00 to +1.00 radians, 9.91 E+37</li> <li>• Resolution: 0.01 radians</li> </ul>

**Programming Example**

```
OUTPUT 714;"FETCH:CCTPHASE:CDTPHASE:COUNT?" !Returns number of bins containing measurement data.
OUTPUT 714;"FETCH:CCTPHASE:CDTPHASE:BIN 0?"
!Returns Walsh code, spread factor, time error, and phase error for bin 0.
```

**FETCH:CCTPhase:CDTPhase:COUNT[:BIN]?**

Function	<p>Returns the number of bins containing measurement data. A bin represents one bar on the measurement graph. The bars on the graph (bins) are numbered left to right, 0 to a maximum of 15.</p>
Query	<p>Range: 0 to 16</p>

**Programming Example**

```
OUTPUT 714;"FETCH:CCTPHASE:CDTPHASE:COUNT:BIN?"
```

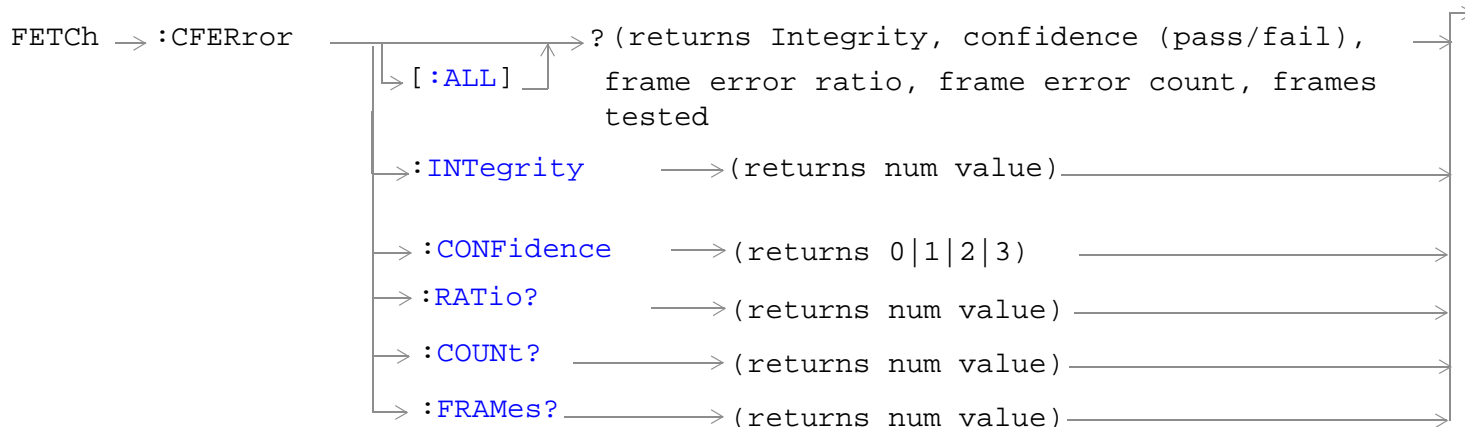
**FETCh:CCTPhase:ICount?**

Function	Queries the intermediate count of measurements completed in a multi-measurement. To set up multi-measurements, see " <a href="#">SETup:CCTPhase:COUNT[:SNUMBER]</a> ".
Query	Range: 0 to 999

**Programming Example**

```
OUTPUT 714; "FETCH:CCTPHASE:ICOUNT?"
```

## FETCh:CFERror



“Diagram Conventions” on page 268

### FETCh:CFERror[:ALL]?

Function	<p>Queries the frame error rate measurement results.</p> <p>This measurement returns up to 5 results in the following order: integrity, confidence limit pass/fail result, frame error ratio, frame error count, frames tested.</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 16 see “Integrity Indicator”</li> <li>• Resolution: 1</li> </ul> <p>Confidence limit pass/fail result</p> <ul style="list-style-type: none"> <li>• Range: 0 to 3 (0 = passed, 1 = failed, 2 = max frames, 3 = undetermined)</li> <li>• Resolution: 1</li> </ul> <p>Frame error ratio</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to 100.00, 9.91 E+37</li> <li>• Resolution: 0.01 %</li> </ul> <p>Frame error count</p> <ul style="list-style-type: none"> <li>• Range: 0 to 10,000,000, 9.91 E+37</li> <li>• Resolution: 1 frame</li> </ul> <p>Frames tested</p> <ul style="list-style-type: none"> <li>• Range: 0 to 10,000,000, 9.91 E+37</li> <li>• Resolution: 1 frame</li> </ul>

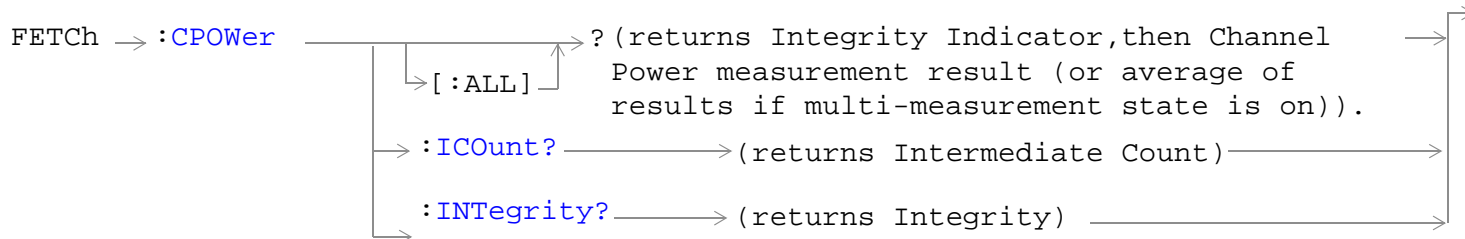
---

### Programming Example

OUTPUT 714;"FETCH:CFERROR?"

!Returns integrity, confidence limit pass/fail result, frame error ratio, frame error count, frames  
!tested.

## FETCh:CPOWer



“Diagram Conventions” on page 268

### FETCh:CPOWer[:ALL]?

Function	<p>Queries a channel power measurement result.</p> <p>This query returns an integrity indicator followed by a channel power measurement result (if results are available).</p> <p>If the multi-measurement state is on, the result represents the <i>average</i> of a number of channel power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see “SETup:CPOWer:COUNT[:SNUMber]” .</p>
Query	<ul style="list-style-type: none"> <li>• Range: -100 to 100 dBm, 9.91 E+37</li> <li>• Resolution: 0.01 dBm</li> </ul>

#### Programming Example

```
OUTPUT 714;"FETCh:CPOWer:ALL?" !Returns integrity, channel power measurement.
```

### FETCh:CPOWer:ICount?

Function	<p>Queries the intermediate count of measurements completed in a multi-measurement.</p> <p>To set up multi-measurements, see “SETup:CPOWer:COUNT[:SNUMber]” .</p>
Query	<p>Range: 0 to 999</p>

#### Programming Example

```
OUTPUT 714;"FETCh:CPOWer:ICOUNT?" !Returns the intermediate count of channel power multi-measurements.
```

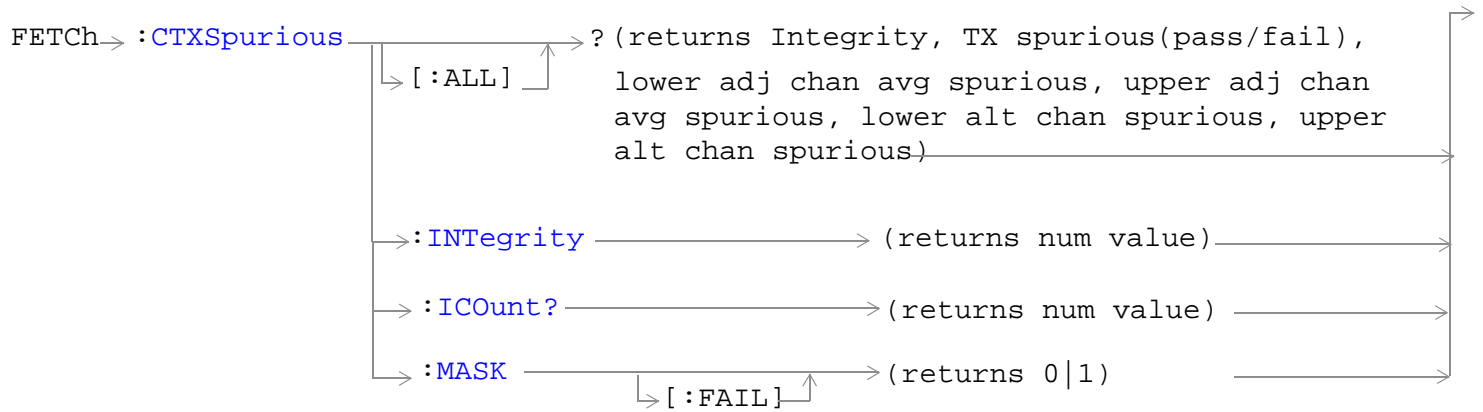
**FETCh:CPOWer:INTEgrity?**

Function	Queries the measurement integrity indicator for the last channel power measurement completed. Zero indicates a normal measurement. See <a href="#">"Integrity Indicator" on page 244</a> for information about non-zero integrity results.
Query	Range: 0 through 23

**Programming Example**

```
OUTPUT 714;"FETCh:CPOWer:INTEgrity?"  
!Queries the integrity indicator for the channel power results.
```

## FETCh:CTXSpurious



“Diagram Conventions” on page 268



**FETCh:CTXSpurious[:ALL]?**

Function	<p>Queries the TX spurious emissions measurement results.</p> <p>This measurement returns results in the following order: integrity, TX spurious emissions pass/fail result, lower adjacent channel (-0.885 or -1.25 MHz) average TX spurious emissions, upper adjacent channel (+0.885 or +1.25 MHz) average TX spurious emissions, lower alternate channel (-1.98 MHz) average TX spurious emissions, upper alternate channel (+1.98 MHz) average TX spurious emissions.</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 23 see <a href="#">“Integrity Indicator”</a></li> <li>• Resolution: 1</li> </ul> <p>TX spurious emissions pass/fail result</p> <ul style="list-style-type: none"> <li>• Range: 0 to 1 (0 = passed, 1 = failed), 9.91 E+37</li> </ul> <p>Lower adjacent channel spurious emissions</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to -70.00 dBc, 9.91 E+37</li> <li>• Resolution: 0.01 dBc</li> </ul> <p>Upper adjacent channel spurious emissions</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to -70.00 dBc, 9.91 E+37</li> <li>• Resolution: 0.01 dBc</li> </ul> <p>Lower alternate channel spurious emissions</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to -70.00 dBc, 9.91 E+37</li> <li>• Resolution: 0.01 dBc</li> </ul> <p>Upper alternate channel spurious emissions</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to -70.00 dBc, 9.91 E+37</li> <li>• Resolution: 0.01 dBc</li> </ul>

**Programming Example**

```
OUTPUT 714; "FETCH:CTXSPURIOUS?"
```

**FETCh:CTXSpurious:ICount?**

Function	<p>Queries the intermediate count of measurements completed in a multi-measurement.</p> <p>The multi-measurement state, by default, is off. To set up multi-measurements, see <a href="#">“SETup:CTXSpurious:COUNT[:SNUMBER]”</a> .</p>
Query	Range: 0 to 999

**Programming Example**

```
OUTPUT 714; "FETCH:CTXSPURIOUS:ICOUNT?"
```

FETCh:CTXSpurious

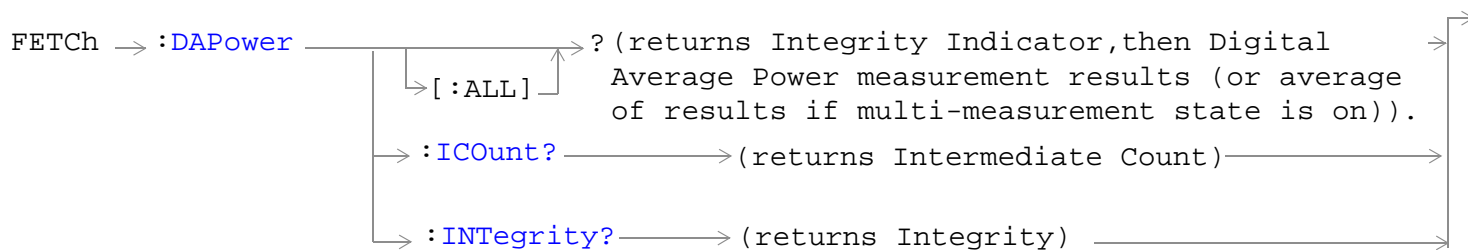
**FETCh:CTXSpurious:MASK[:FAIL]?**

Function	Queries the pass/fail indicator. Pass/fail results are based on fixed limit lines on display. Limit lines are determined by currently selected frequency band.
Query	Range: 0 (Pass)   1(Fail), 9.91 E+37

**Programming Example**

```
OUTPUT 714; "FETCh:CTXSPURIOUS:MASK:FAIL?"
```

## FETCh:DAPower



“Diagram Conventions” on page 268

### FETCh:DAPower[:ALL]?

Function	<p>Queries a digital average power measurement result.</p> <p>This query returns an integrity indicator followed by a digital average power measurement result (if results are available).</p> <p>If the multi-measurement state is on, the result represents the <i>average</i> of a number of digital average power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see “SETup:DAPower:COUNt[:SNUMber]” .</p>
Query	<ul style="list-style-type: none"> <li>• Range: -100 to 100 dBm, 9.91 E+37</li> <li>• Resolution: 0.01 dB</li> </ul>

#### Programming Example

```
OUTPUT 714;"FETCh:DAPOWER:ALL?" !Returns integrity, average transmit power.
```

### FETCh:DAPower:ICount?

Function	<p>Queries the intermediate count of measurements completed in a multi-measurement.</p> <p>The multi-measurement state, by default, is off. To set up multi-measurements, see “SETup:DAPower:COUNt[:SNUMber]”</p>
Query	<p>Range: 0 to 999</p>

#### Programming Example

```
OUTPUT 714;"FETCh:DAPOWER:ICOUNT?"
```

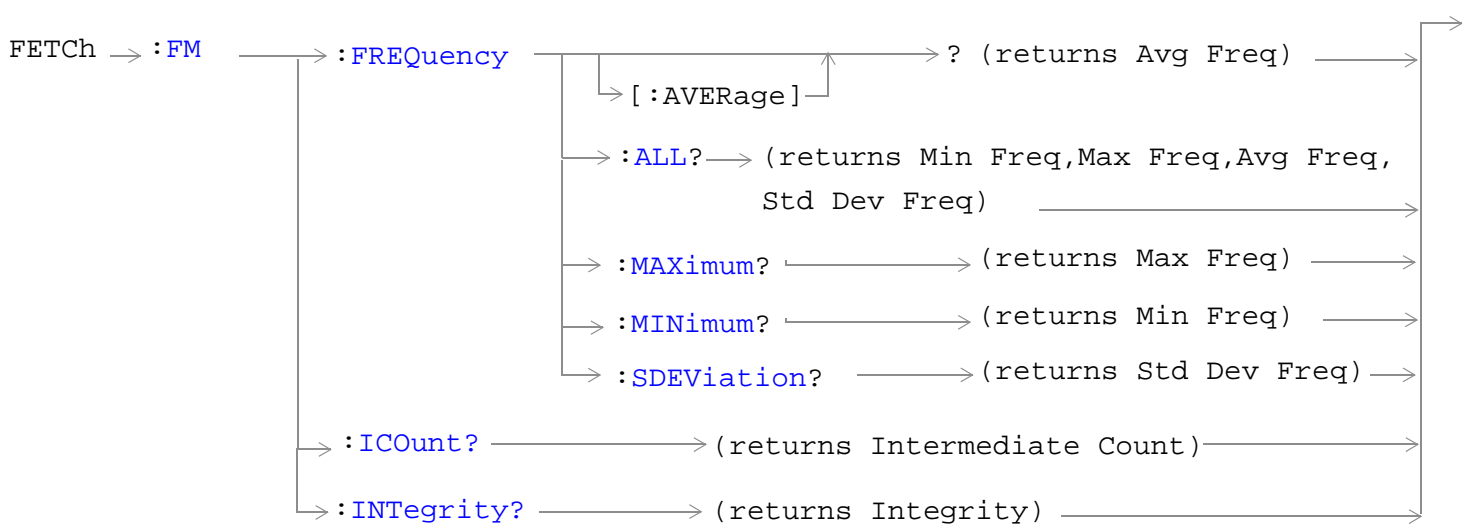
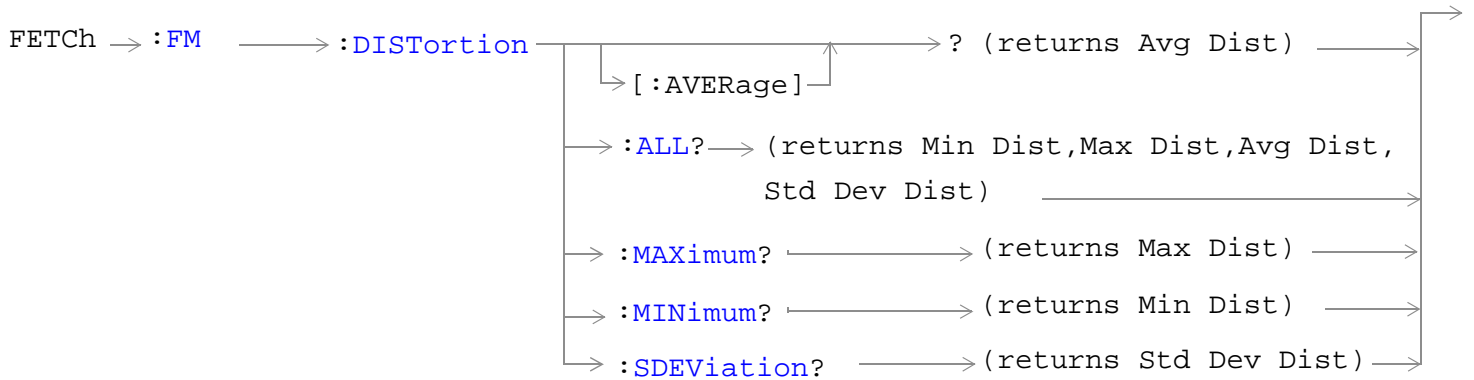
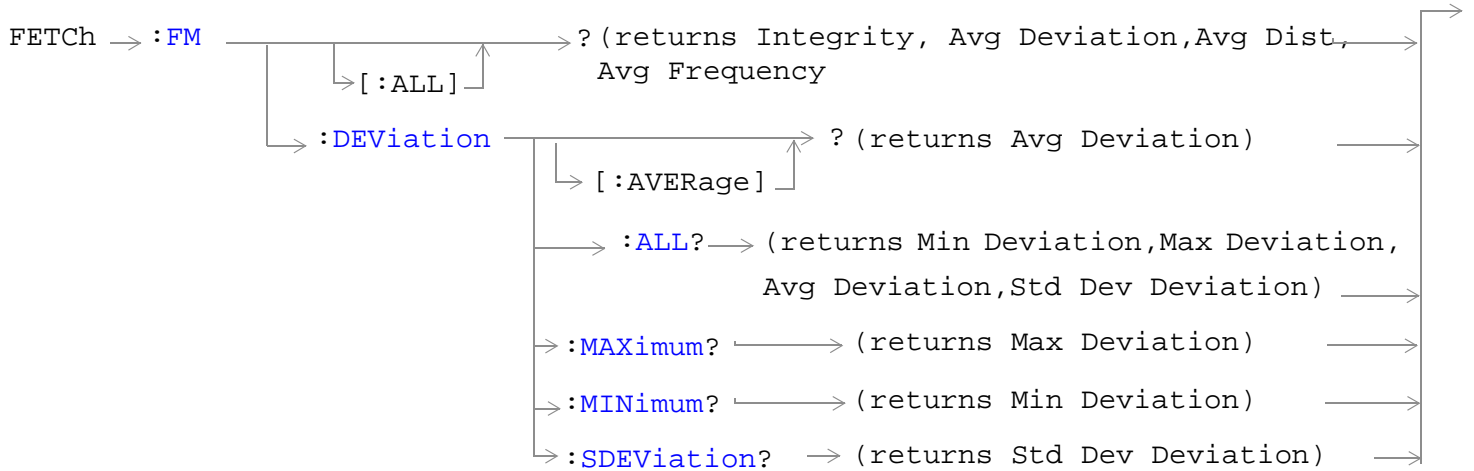
**FETCH:DAPower:INTEGRITY?**

Function	<p>Queries the measurement integrity indicator for the last digital average power measurement completed.</p> <p>Zero indicates a normal measurement. See <a href="#">“Integrity Indicator” on page 244</a> for information about non-zero integrity results.</p>
Query	Range: 1 through 16

**Programming Example**

```
OUTPUT 714;"FETCH:DAPOWER:INTEGRITY?"
!Queries the integrity indicator for the average digital transmit power results.
```

# FETCh:FM



“Diagram Conventions” on page 268

## FETCh:FM

### FETCh:FM[:ALL]?

Function	Queries the FM measurement. Returns integrity, average FM deviation, and average FM distortion.
Query	FM deviation <ul style="list-style-type: none"><li>• Range: 0 to 99 kHz, 9.91 E+37</li><li>• Resolution: 0.001 kHz</li></ul> FM distortion <ul style="list-style-type: none"><li>• Range: 0 to 100%, 9.91 E+37</li><li>• Resolution: 0.1%</li></ul>

#### Programming Example

```
OUTPUT 714;"FETCh:FM:ALL?" !Returns integrity, average FM deviation and average FM distortion.
```

### FETCh:FM:DEVIation[:AVERAge]?

Function	Queries the average FM deviation.
Query	Range: 0 to 99 kHz, 9.91 E+37 Resolution: 0.001 kHz

#### Programming Example

```
OUTPUT 714;"FETCh:FM:DEVIATION:AVERAGE?"
```

### FETCh:FM:DEVIation:ALL?

Function	Queries the FM deviation measurements. Measurement results are returned in the following order: minimum deviation, maximum deviation, average deviation, standard deviation deviation.
Query	Minimum, maximum, average FM deviation <ul style="list-style-type: none"><li>• Range: 0 to 99 kHz, 9.91 E+37</li><li>• Resolution: 0.001 kHz</li></ul> Standard deviation FM deviation <ul style="list-style-type: none"><li>• Range: 0 to 99 kHz, 9.91 E+37</li><li>• Resolution: 0.0001 kHz</li></ul>

#### Programming Example

```
OUTPUT 714;"FETCh:FM:DEVIATION:ALL?"  
!Returns minimum, maximum, average, and standard deviation FM deviation.
```

**FETCh:FM:DEVIation:MAXimum?**

Function	Queries the maximum FM deviation measurement.
Query	Range: 0 to 99 kHz, 9.91 E+37 Resolution: 0.001 kHz

**Programming Example**

```
OUTPUT 714;"FETCh:FM:DEVIation:MAXimum?"
```

**FETCh:FM:DEVIation:MINimum?**

Function	Queries the minimum FM deviation measurement.
Query	Range: 0 to 99 kHz, 9.91 E+37 Resolution: 0.001 kHz

**Programming Example**

```
OUTPUT 714;"FETCh:FM:DEVIation:MINimum?"
```

**FETCh:FM:DEVIation:SDEVIation?**

Function	Queries the standard deviation FM deviation measurement.
Query	Range: 0 to 99 kHz, 9.91 E+37 Resolution: 0.0001

**Programming Example**

```
OUTPUT 714;"FETCh:FM:DEVIation:SDEVIation?"
```

**FETCh:FM:DISToRTion[:AVERAge]?**

Function	Queries the average FM distortion measurement.
Query	Range: 0 to 100%, 9.91 E+37 Resolution: 0.1%

**Programming Example**

```
OUTPUT 714;"FETCh:FM:DISToRTion:AVERAGE?"
```

## FETCh:FM

### FETCh:FM:DISToRtion:ALL?

Function	Queries the FM distortion measurements. Measurement results are returned in the following order: minimum distortion, maximum distortion, average distortion, standard deviation distortion.
Query	Minimum, maximum, average FM distortion <ul style="list-style-type: none"><li>• Range: 0 to 100%, 9.91 E+37</li><li>• Resolution: 0.1%</li></ul> Standard deviation FM distortion <ul style="list-style-type: none"><li>• Range: 0 to 100%, 9.91 E+37</li><li>• Resolution: 0.01%</li></ul>

#### Programming Example

```
OUTPUT 714;"FETCh:FM:DISToRtion:ALL?"  
!Returns minimum, maximum, average, and standard deviation FM distortion.
```

### FETCh:FM:DISToRtion:MAXimum?

Function	Queries the maximum FM distortion measurement.
Query	Range: 0 to 100%, 9.91 E+37 Resolution: 0.1%

#### Programming Example

```
OUTPUT 714;"FETCh:FM:DISToRtion:MAXimum?"
```

### FETCh:FM:DISToRtion:MINimum?

Function	Queries the minimum FM distortion measurement.
Query	Range: 0 to 100%, 9.91 E+37 Resolution: 0.1%

#### Programming Example

```
OUTPUT 714;"FETCh:FM:DISToRtion:MINimum?"
```

### FETCh:FM:DISToRtion:SDEVIation?

Function	Queries the standard deviation FM distortion measurement.
Query	Range: 0 to 100%, 9.91 E+37 Resolution: 0.01%

#### Programming Example

```
OUTPUT 714;"FETCh:FM:DISToRtion:SDEVIation?"
```



**FETCh:FM:FREQuency[:AVERage]?**

Function	Queries the average audio frequency measurement.
Query	Average audio frequency <ul style="list-style-type: none"> <li>• Range: 0 to 99999 Hz, 9.91 E+37</li> <li>• Resolution: 0.1 Hz</li> </ul>

**Programming Example**

```
OUTPUT 714; "FETCh:FM:FREQuency:AVERage?"
```

**FETCh:FM: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	Minimum, maximum, and average audio frequency: <ul style="list-style-type: none"> <li>• Range: 0 to 99999 Hz, 9.91 E+37</li> <li>• Resolution: 0.1 Hz</li> </ul> Standard deviation audio frequency: <ul style="list-style-type: none"> <li>• Range: 0 to 99999 Hz, 9.91 E+37</li> <li>• Resolution: 0.01 Hz</li> </ul>

**Programming Example**

```
OUTPUT 714; "FETCh:FM:FREQuency:ALL?"
!Returns minimum, maximum, average, and standard deviation audio frequency.
```

**FETCh:FM:FREQuency:MAXimum?**

Function	Queries the maximum audio frequency.
Query	Range: 0 to 99999 Hz, 9.91 E+37 Resolution: 0.1 Hz

**Programming Example**

```
OUTPUT 714; "FETCh:FM:FREQuency:MAXimum?"
```

**FETCh:FM:FREQuency:MINimum?**

Function	Queries the minimum audio frequency.
Query	Range: 0 to 99999 Hz, 9.91 E+37 Resolution: 0.1 Hz

**Programming Example**

```
OUTPUT 714; "FETCh:FM:FREQuency:MINimum?"
```

## FETCh:FM

### FETCh:FM:FREQUency:SDEVIation?

Function	Queries the standard deviation audio frequency.
Query	Range: 0 to 99999 Hz, 9.91 E+37 Resolution: 0.01 Hz

#### Programming Example

```
OUTPUT 714;"FETCh:FM:FREQUency:SDEVIation?"
```

### FETCh:FM:ICount?

Function	Queries the intermediate count of measurements completed in a multi-measurement.
Query	Range: 0 to 99

#### Programming Example

```
OUTPUT 714;"FETCh:FM:ICount?"
```

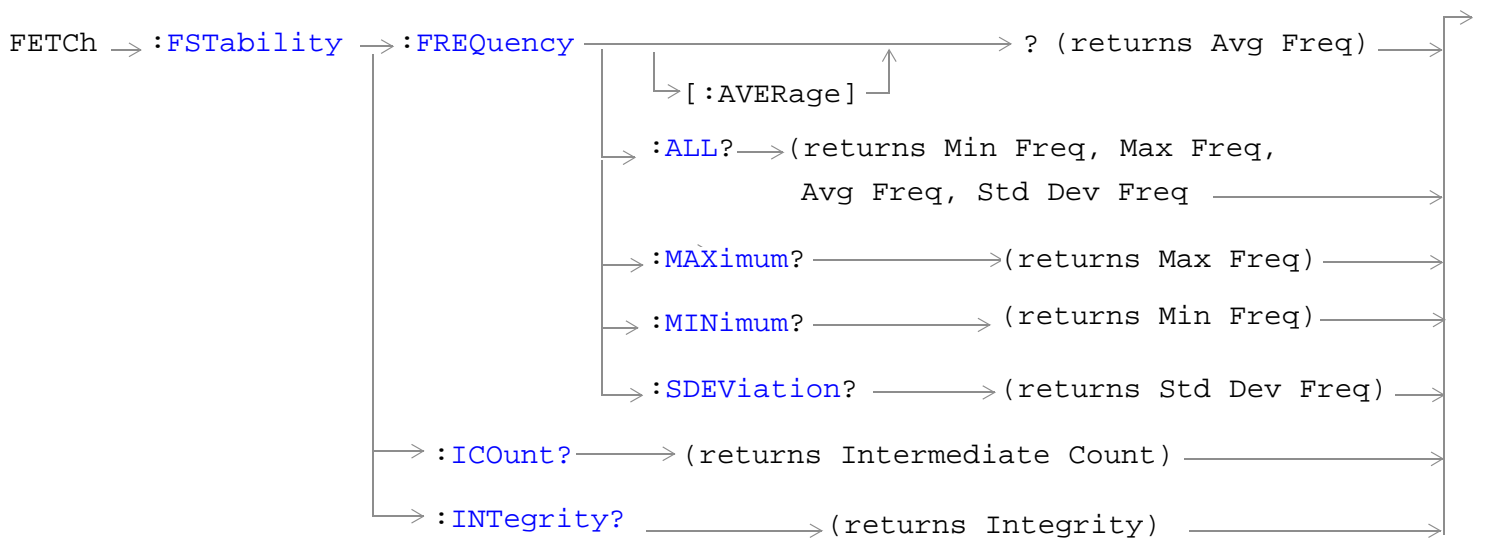
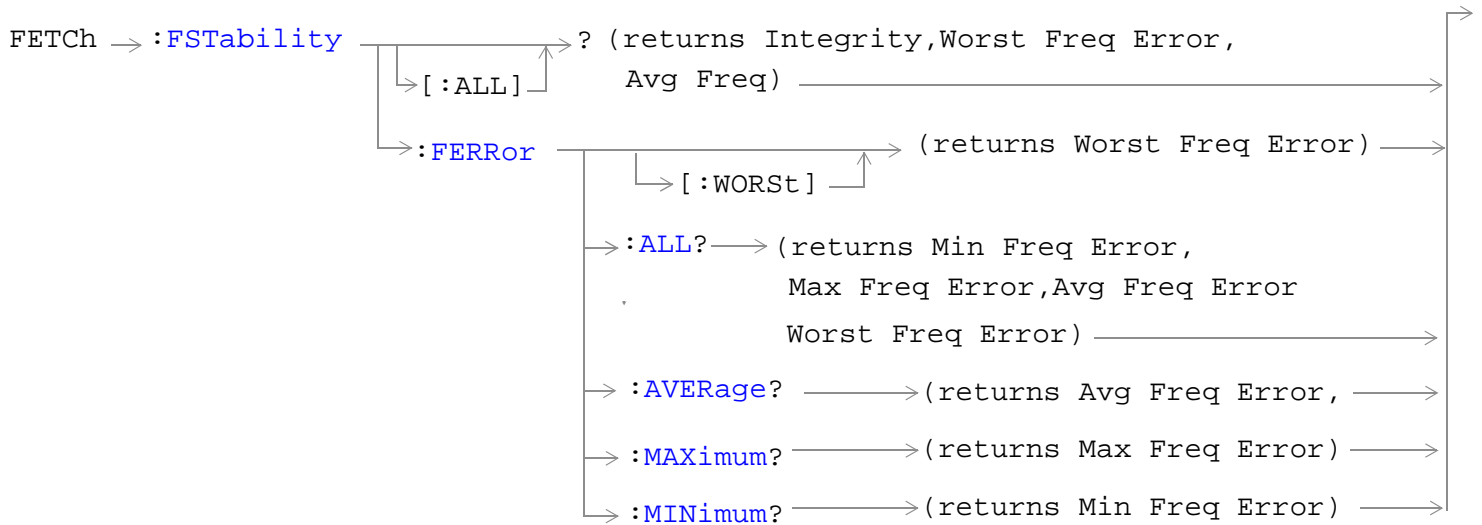
### FETCh:FM:INTEgrity?

Function	Queries the measurement integrity indicator for the last FM measurement completed. Zero indicates a normal measurement. See <a href="#">"Integrity Indicator" on page 244</a> for information about non-zero integrity results.
Query	Range: 1 through 16

#### Programming Example

```
OUTPUT 714;"INITiate:FM" !Start FM measurement.
OUTPUT 714;"FETCh:FM?" !Request measurement results.
ENTER 714;Integrity,Fm_dev_dist !Read measurement results.
IF Integrity = 0 THEN !If 0 then measurement was successful.
PRINT "FM =" ;Fm_dev_dist !Measurement results printed if measurement is successful.
ELSE
PRINT "Measurement integrity questionable, integrity value = ";Integrity
END IF
END
```

## FETCh:FSTability



“Diagram Conventions” on page 268

## FETCH:FStability

### FETCH:FStability[:ALL]?

Function	Queries the full results of a frequency stability measurement. Returns integrity, worst-case frequency error, and average frequency.
Query	Worst-case frequency error: <ul style="list-style-type: none"><li>• Range: -500 to 500 parts per million (ppm)</li><li>• Resolution: 0.01 ppm</li></ul> Average frequency: <ul style="list-style-type: none"><li>• Range: 100 E+6 to 3 E+9 Hz</li><li>• Resolution: 0.01 ppm</li></ul>

#### Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:ALL?"  
!Returns integrity, worst-case frequency error, and average frequency.
```

### FETCH:FStability:FERRor[:WORSt]?

Function	Queries the worst case frequency stability measurement during a multi-measurement.
Query	Range: -500 to 500 parts per million (ppm) Resolution: 0.01 ppm

#### Programming Example

```
OUTPUT 714;"FETCH:FSTABILITY:FERROR:WORST?"
```

**FETCh:FSTability:FERRor:ALL?**

Function	Queries the full results of a frequency stability . Measurement results are returned in the following order: minimum frequency error, maximum frequency error, average frequency error, worst-case frequency error.
Query	<p>Maximum, minimum frequency error:</p> <ul style="list-style-type: none"> <li>• Range: -500 E+3 to 500 E+3 Hz</li> <li>• Resolution: 1 Hz</li> </ul> <p>Average frequency error:</p> <ul style="list-style-type: none"> <li>• Range: -500 E+3 to 500 E+3 Hz</li> <li>• Resolution: 1 Hz</li> </ul> <p>Worst-case frequency error:</p> <ul style="list-style-type: none"> <li>• Range: -500 to 500 parts per million (ppm)</li> <li>• Resolution: 0.01</li> </ul>

**Programming Example**

```
OUTPUT 714;"FETCh:FSTABILITY:FERRor:ALL?"
!Returns minimum, maximum, average, and worst-case frequency error.
```

**FETCh:FSTability:FERRor:AVERAge?**

Function	Queries the average frequency error measurement.
Query	<p>Range: -500 E+3 to 500 E+3 Hz</p> <p>Resolution: 1 Hz</p>

**Programming Example**

```
OUTPUT 714;"FETCh:FSTABILITY:FERRor:AVERAGE?"
```

**FETCh:FSTability:FERRor:MAXimum?**

Function	Queries the maximum frequency error measurement of a multi-measurement.
Query	<p>Range: -500 E+3 to 500 E+3 Hz</p> <p>Resolution: 1 Hz</p>

**Programming Example**

```
OUTPUT 714;"FETCh:FSTABILITY:FERRor:MAXIMUM?"
```

## FETCh:FSTability

### FETCh:FSTability:FERRor:MINimum?

Function	Queries the minimum frequency error measurement of a multi-measurement.
Query	Range: -500 E+3 to 500 E+3 Hz Resolution: 1 Hz

#### Programming Example

```
OUTPUT 714;"FETCh:FSTABILITY:FERRor:MINIMUM" !.
```

### FETCh:FSTability:FREQUency[:AVERage]?

Function	Queries the frequency stability average frequency of a multi-measurement.
Query	Range: 100 E+6 to 3 E+9 Hz Resolution: 1 Hz

#### Programming Example

```
OUTPUT 714;"FETCh:FSTABILITY:FREQUency:AVERAGE?"
```

### FETCh:FSTability:FREQUency:ALL?

Function	Queries the frequency stability frequency measurement. Measurement results are returned in the following order: minimum frequency, maximum frequency, average frequency, and standard deviation frequency.
Query	Minimum, maximum, average frequency: <ul style="list-style-type: none"><li>• Range: 100 E+6 to 3 E+9</li><li>• Resolution: 1 Hz</li></ul> Standard deviation frequency: <ul style="list-style-type: none"><li>• Range: 0 to 500 E+3 Hz</li><li>• Resolution: 0.1 Hz</li></ul>

#### Programming Example

```
OUTPUT 714;"FETCh:FSTABILITY:FREQUency:ALL?"  
!Returns minimum, maximum, average, and standard deviation frequency.
```

### FETCh:FSTability:FREQUency:MAXimum?

Function	Queries the frequency stability maximum frequency of a multi-measurement.
Query	Range: 100 E+6 to 3 E+9 Resolution: 1 Hz

#### Programming Example

```
OUTPUT 714;"FETCh:FSTABILITY:FREQUency:MAXIMUM?"
```

**FETCh:FSTability:FREQuency:MINimum?**

Function	Queries the frequency stability minimum frequency of a multi-measurement.
Query	Range: 100 E+6 to 3 E+9 Resolution: 1 Hz

**Programming Example**

```
OUTPUT 714;"FETCH:FSTABILITY:FREQUENCY:MINIMUM?"
```

**FETCh:FSTability:FREQuency:SDEVIation?**

Function	Queries the frequency stability frequency standard deviation of a multi-measurement.
Query	Range: 0 to 500 E+3 Hz Resolution: 0.1 Hz

**Programming Example**

```
OUTPUT 714;"FETCH:FSTABILITY:FREQUENCY:SDEVIATION?"
```

**FETCh:FSTability:ICount?**

Function	Queries the intermediate count of measurements completed in a multi-measurement.
Query	Range: 0 to 999

**Programming Example**

```
OUTPUT 714;"FETCH:FSTABILITY:ICOUNT?"
```

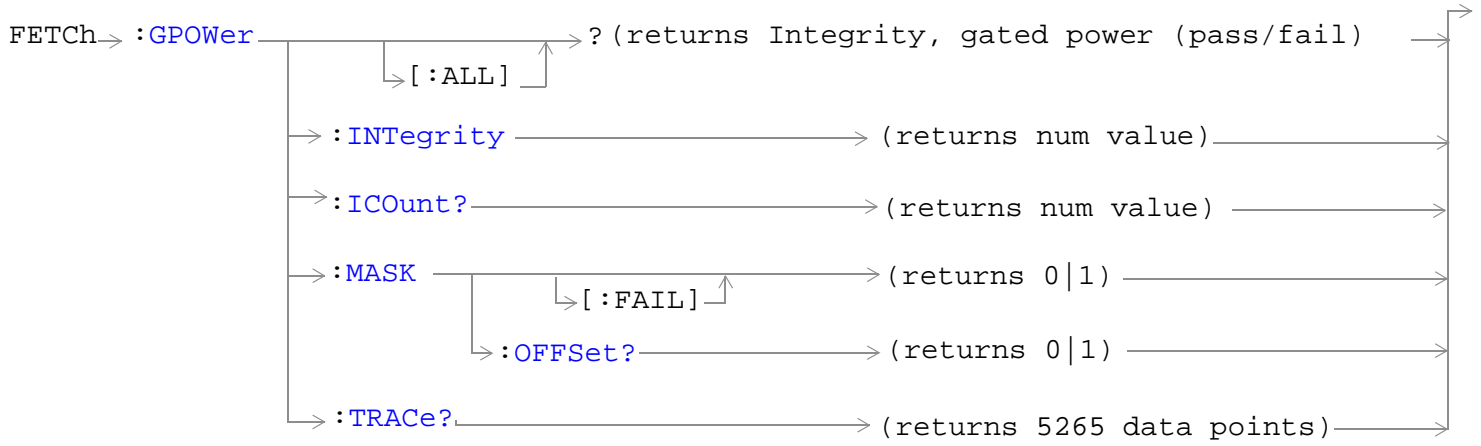
**FETCh:FSTability:INTEgrity?**

Function	Queries the measurement integrity indicator for the last frequency stability measurement completed.  Zero indicates a normal measurement. See <a href="#">"Integrity Indicator" on page 244</a> for information about non-zero integrity results.
Query	Range: 1 through 16

**Programming Example**

```
OUTPUT 714;"FETCH:FSTABILITY:INTEGRITY"  
!Returns the integrity indicator for the frequency stability measurement.
```

# FETCh:GPOWer



[“Diagram Conventions” on page 268](#)



**FETCh:GPOWer[:ALL]?**

Function	Queries the gated power measurement results. This measurement returns results in the following order: integrity, gated power pass/fail result.
Query	Integrity <ul style="list-style-type: none"> <li>• Range: 0 to 23 ( see <a href="#">“Integrity Indicator”</a> )</li> <li>• Resolution: 1</li> </ul> Gated Power pass/fail result <ul style="list-style-type: none"> <li>• Range: 0 to 1 (0 = passed, 1 = failed), 9.91 E+37</li> </ul>

**Programming Example**

```
OUTPUT 714; "FETCh:GPOWer?"
```

**FETCh:GPOWer: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 <a href="#">“SETup:GPOWer:COUNt[:SNUMber]”</a> .
Query	Range: 0 to 999

**Programming Example**

```
OUTPUT 714; "FETCh:GPOWer:ICOUNT?"
```

**FETCh:GPOWer:MASK[:FAIL]?**

Function	Queries the pass/fail results of the gated power measurement. If any measurement data points fail to meet the requirements of the mask shown on the test set's display, the measurement will fail.
Query	Range: 0 (pass), 1 (fail), 9.91 E+37

**Programming Example**

```
OUTPUT 714; "FETCh:GPOWer:MASK:FAIL?"
```

**FETCh:GPOWer:MASK:OFFSet?**

Function	Queries the offset (in seconds) of the test limit mask from its default position. For example, a return value of 2.0 E-6 indicates the pass/fail status of the measurement was determined by comparing measured data with a test limit mask moved 2 microseconds to the right of its default location.
Query	Range: -10 to +10 $\mu$ s, 9.91 E+37

**Programming Example**

```
OUTPUT 714; "FETCh:GPOWer:MASK:OFFSet?"
```

FETCh:GPOWer

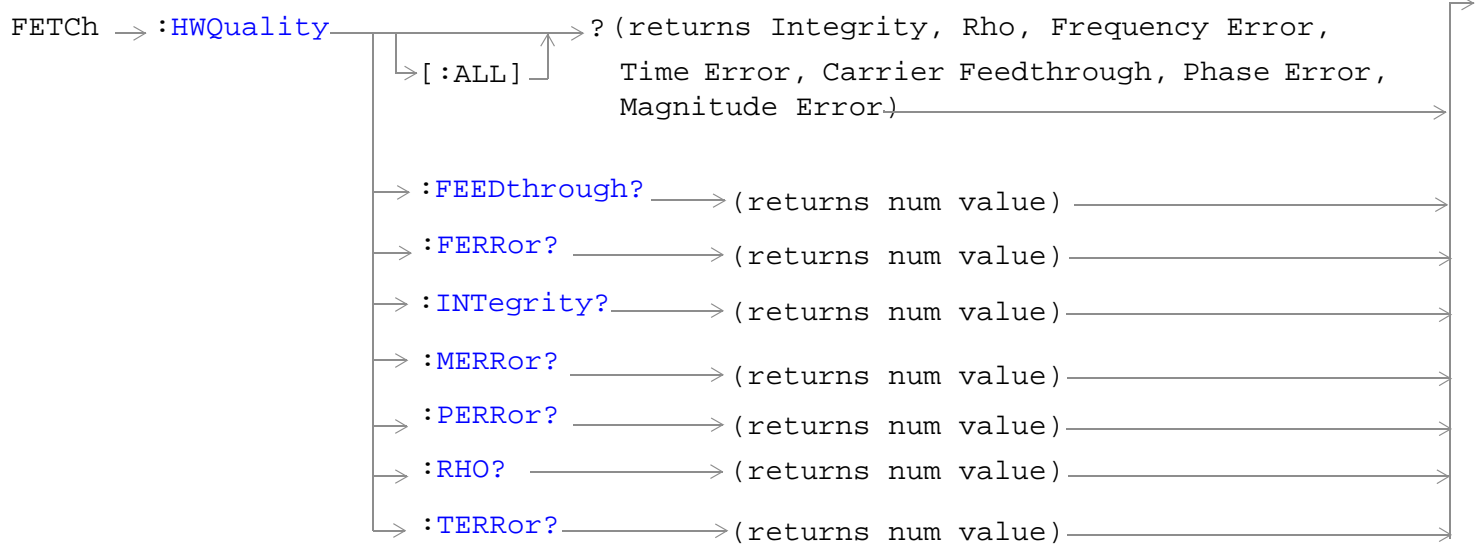
### FETCh:GPOWer:TRACe?

Function	Queries the relative power data points across the display trace. Query returns 5,265 comma-separated values, each corresponding to a point in time across the trace. Data point 222 corresponds with time = 0 on the trace. See <a href="#">"How is a Gated Power Measurement Made?"</a> for time values corresponding to all other data points.
Query	Range: +10 to -45 dB, 9.91 E+37 Resolution: 0.01

#### Programming Example

```
OUTPUT 714 ; "FETCh:GPOWer:TRACe?"
```

## FETCh:HWQuality



[“Diagram Conventions” on page 268](#)

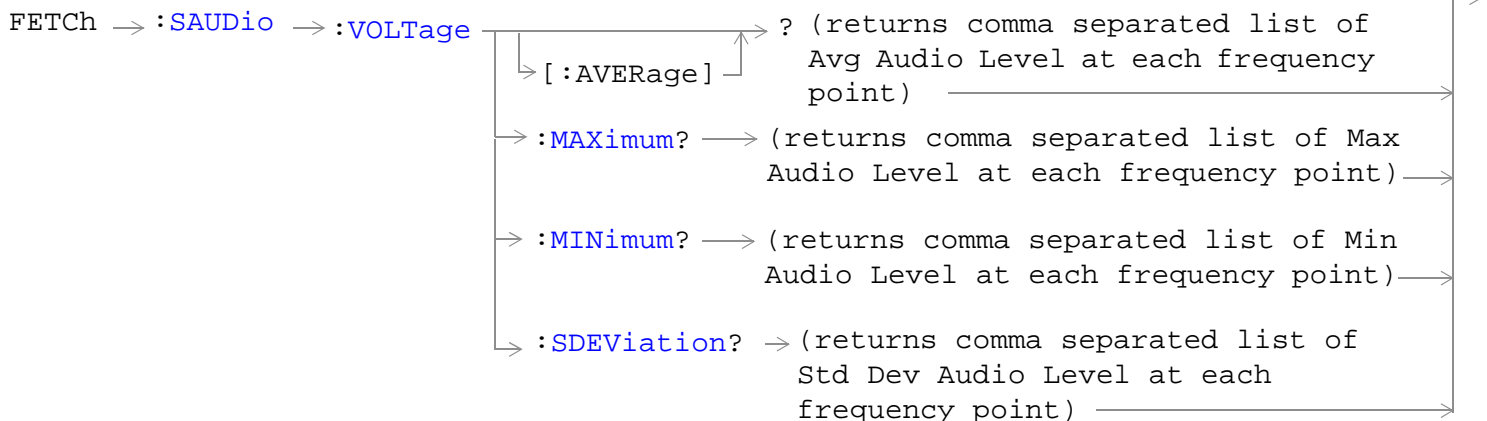
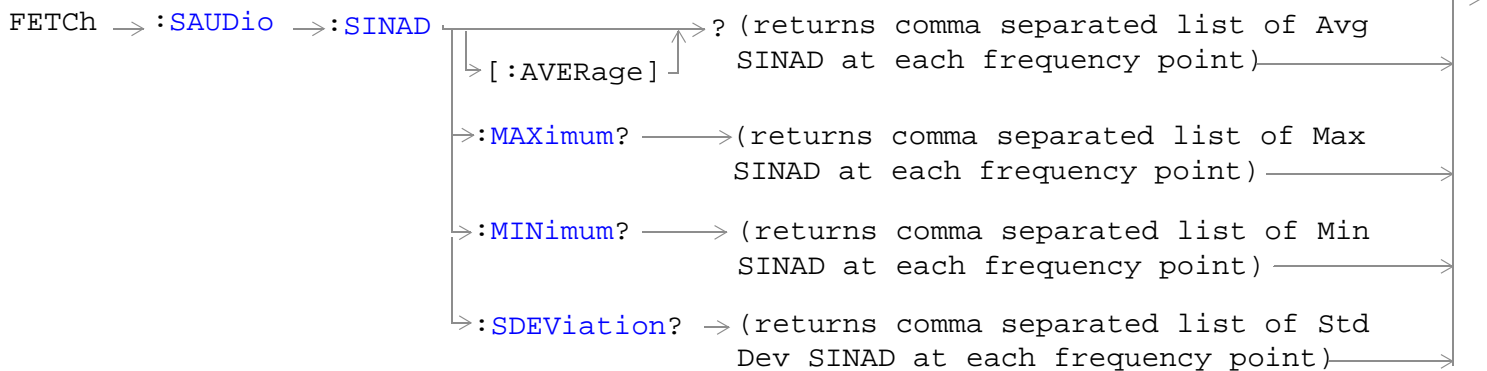
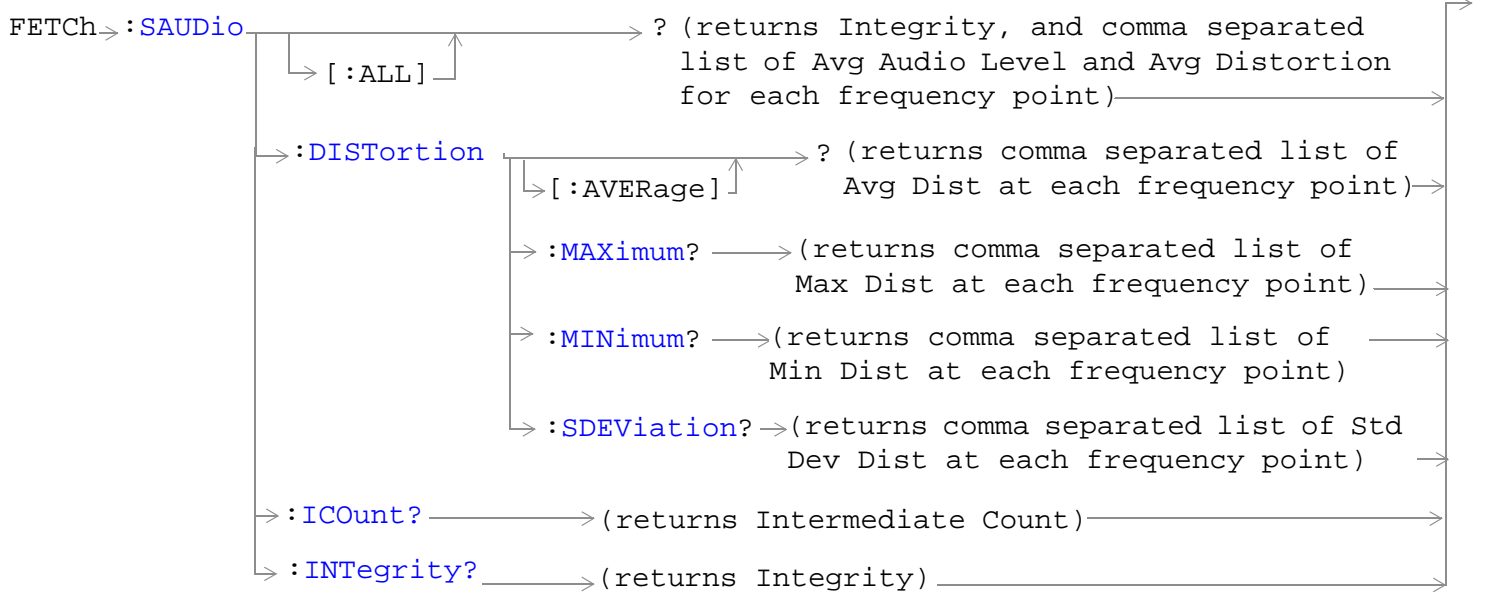
**FETCH:HWQuality[:ALL]?**

Function	<p>Queries the handoff waveform quality measurements.</p> <p>Measurement results are returned in the following order: integrity, rho, frequency error, time error, carrier feedthrough, phase error, magnitude error.</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 16</li> <li>• Resolution: 1</li> </ul> <p>Rho</p> <ul style="list-style-type: none"> <li>• Range: 0.000 to 1.000, 9.91 E+37</li> <li>• Resolution: 0.001</li> </ul> <p>Frequency Error</p> <ul style="list-style-type: none"> <li>• Range: -9999.0 to 9999.0 Hz, 9.91 E+37</li> <li>• Resolution: 0.1 Hz</li> </ul> <p>Time Error</p> <ul style="list-style-type: none"> <li>• Range: -99.99 to 99.99 <math>\mu</math>s, 9.91 E+37</li> <li>• Resolution: 0.01 <math>\mu</math>s</li> </ul> <p>Carrier Feedthrough</p> <ul style="list-style-type: none"> <li>• Range: -100 to 0.0 dB, 9.91 E+37</li> <li>• Resolution: 0.1</li> </ul> <p>Phase Error</p> <ul style="list-style-type: none"> <li>• Range: -180.0 to 180.0 degrees</li> <li>• Resolution: 0.1</li> </ul> <p>Magnitude Error</p> <ul style="list-style-type: none"> <li>• Range: 0 to 100%, 9.91 E+37</li> <li>• Resolution: 0.01</li> </ul>

**Programming Example**

```
OUTPUT 714; "FETCH:HWQUALITY:ALL?"
!Returns integrity, rho, frequency error, time error, carrier feedthrough, phase error,
!magnitude error, EVM.
```

## FETCh:SAUDio



[“Diagram Conventions” on page 268](#)

### FETCh:SAUDio[:ALL]?

Function	<p>This query returns the swept audio measurement results. This query returns results in the following order: integrity indicator, average swept audio level and average distortion for the first frequency point, average swept audio level and average distortion for the second frequency point, and so on. The number of frequency points is determined with the <a href="#">“SETup:SAUDio:FREQUency:POINts”</a> command.</p> <p>For frequencies above 10 kHz, this measurement returns 9.91 E+37.</p>
Query	<p>Integrity indicator</p> <ul style="list-style-type: none"> <li>• Range: See <a href="#">“Integrity Indicator” on page 244</a>.</li> <li>• Resolution: 1</li> </ul> <p>Average audio level</p> <ul style="list-style-type: none"> <li>• Range: 1 mV to 20 V, 9.91 E+37</li> <li>• Resolution: the lesser of 4 significant digits or 10 uV</li> </ul> <p>Average distortion</p> <ul style="list-style-type: none"> <li>• Range: 0 to 99.9%, 9.91 E+37</li> <li>• Resolution: 0.01%</li> </ul>

### FETCh:SAUDio:DISToRtion[:AVERAge]?

Function	<p>This query returns a comma separated list of the audio distortion measured at each frequency point in the sweep. The number of frequency points is determined with the <a href="#">“SETup:SAUDio:FREQUency:POINts”</a> command.</p> <p>For frequencies above 10 kHz, this measurement returns 9.91 E+37.</p>
Query	<p>Average audio distortion</p> <ul style="list-style-type: none"> <li>• Range: 0 to 99.9%, 9.91 E+37</li> <li>• Resolution: 0.01%</li> </ul>

### FETCh:SAUDio:DISToRtion:MAXimum?

Function	<p>This query returns a comma separated list of the maximum audio distortion measured at each frequency point in the sweep. The number of frequency points is determined with the <a href="#">“SETup:SAUDio:FREQUency:POINts”</a> command.</p> <p>For frequencies above 10 kHz, this measurement returns 9.91 E+37.</p>
Query	<p>Range: 0 to 99.9%, 9.91 E+37 Resolution: 0.01%</p>

**FETCh:SAUDio:DISTortion:MINimum?**

Function	This query returns a comma separated list of the minimum audio distortion measured at each frequency point in the sweep. For frequencies above 10 kHz, this measurement returns 9.91 E+37.
Query	Range: 0 to 99.9%, 9.91 E+37 Resolution: 0.01%

**FETCh:SAUDio:DISTortion:SDEVIation?**

Function	This query returns a comma separated list of the standard deviation audio distortion measured at each frequency point in the sweep. The number of frequency points is determined with the <a href="#">"SETup:SAUDio:FREQuency:POINts"</a> command. For frequencies above 10 kHz, this measurement returns 9.91 E+37.
Query	Range: 0 to 99.9%, 9.91 E+37 Resolution: 0.001%

**FETCh:SAUDio:ICount?**

Function	This query returns the intermediate count of swept audio multi-measurements completed. The total measurement count is the number of measurements specified in with the multi-measurement count command, <a href="#">"SETup:SAUDio:COUnT[:SNUMber]"</a> , times the number of frequency points specified with the <a href="#">"SETup:SAUDio:FREQuency:POINts"</a> . Therefore, when completing a 5 point sweep with multi-measurements turned off, the measurement will return 5 not 1. See also <a href="#">"SETup:SAUDio:ICount:MAXimum?"</a>
Query	Range: 1 to 999 x 60 Resolution: 1

**FETCh:SAUDio:INTEgrity?**

Function	This query returns the integrity indicator for the last swept audio measurement completed. Zero indicates a normal measurement. See <a href="#">"Integrity Indicator" on page 244</a> for descriptions of non-zero integrity indicators.
Query	Range: See <a href="#">"Integrity Indicator" on page 244</a> . Resolution: 1

**FETCh:SAUDio:SINAD[:AVERAge]?**

Function	This query returns a comma separated list of the average SINAD measured at each frequency point in the sweep. The number of frequency points is determined with the <a href="#">"SETup:SAUDio:FREQuency:POINts"</a> command.
Query	Average SINAD <ul style="list-style-type: none"> <li>• Range: -99.99 to 99.99 dB, 9.91 E+37</li> <li>• Resolution: 0.01 dB</li> </ul>

**FETCh:SAUDio****FETCh:SAUDio:SINAD:MAXimum?**

Function	This query returns a comma separated list of the maximum SINAD measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" command.
Query	Range: -99.99 to 99.99 dB, 9.91 E+37 Resolution: 0.01 dB

**FETCh:SAUDio:SINAD:MINimum?**

Function	This query returns a comma separated list of the minimum SINAD measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" command.
Query	Range: -99.99 to 99.99 dB, 9.91 E+37 Resolution: 0.01 dB

**FETCh:SAUDio:SINAD:SDEVIation?**

Function	This query returns a comma separated list of the standard deviation of SINAD measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" command.
Query	Range: 0 to 99.99 dB, 9.91 E+37 Resolution: 0.001 dB

**FETCh:SAUDio:VOLTage[:AVERage]?**

Function	This query returns a comma separated list of the average swept audio level measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" command. Value is returned in units of V.
Query	Range: 1 mV to 20, 9.91 E+37 Resolution: 4 significant digits

**FETCh:SAUDio:VOLTage:MAXimum?**

Function	This query returns a comma separated list of the maximum audio voltage measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" command.
Query	Range: 1 mV to 20 V, 9.91 E+37 Resolution: 4 significant digits



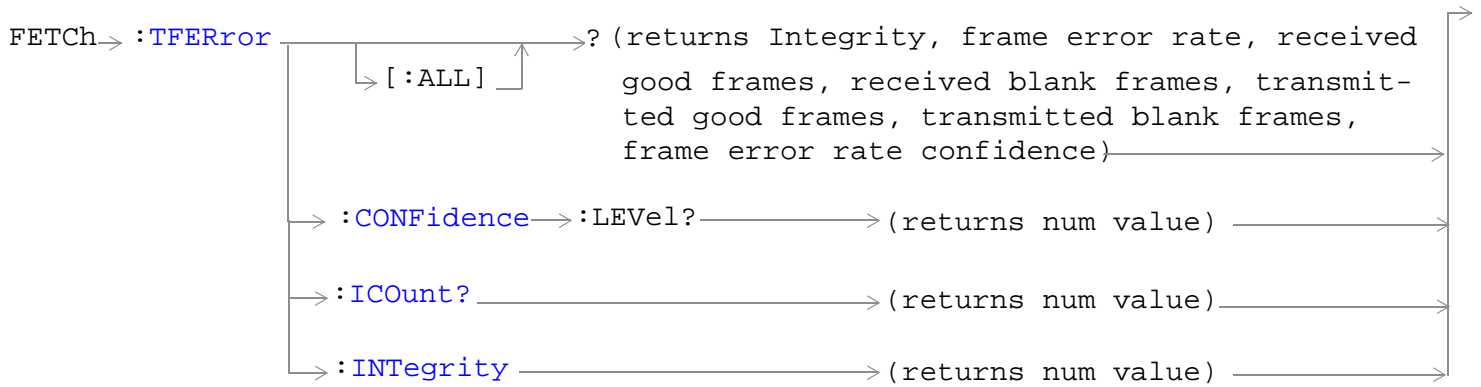
**FETCh:SAUDio:VOLTage:MINimum?**

Function	This query returns a comma separated list of minimum audio voltage measured at each frequency point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" command.
Query	Range: 1 mV to 20 V, 9.91 E+37 Resolution: 4 significant digits

**FETCh:SAUDio:VOLTage:SDEVIation?**

Function	This query returns a comma separated list of the standard deviation of audio voltage measured at each point in the sweep. The number of frequency points is determined with the "SETup:SAUDio:FREQuency:POINts" command.
Query	Range: 1 mV to 20 V, 9.91 E+37 Resolution: 4 significant digits

## FETCh:TFERror



“Diagram Conventions” on page 268

### FETCh:TFERror[:ALL]?

Function	<p>Queries the TDSO frame error rate measurement results.</p> <p>This measurement returns results in the following order: integrity, frame error ratio (in percent), received good frames, received blank frames, transmitted good frames, transmitted blank frames, frame error rate confidence (in percent).</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 16 see <a href="#">“Integrity Indicator”</a></li> <li>• Resolution: 1</li> </ul> <p>TDSO frame error ratio (Ratio)</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to 100.00%, 9.91 E+37</li> </ul> <p>Received good frames (RX Good)</p> <ul style="list-style-type: none"> <li>• Range: 0 to 999936, 9.91 E+37</li> </ul> <p>Received blank frames (RX Blank)</p> <ul style="list-style-type: none"> <li>• Range: 0 to 999936, 9.91 E+37</li> </ul> <p>Transmitted good frames (TX Good)</p> <ul style="list-style-type: none"> <li>• Range: 0 to 999936, 9.91 E+37</li> </ul> <p>Transmitted blank frames (TX Blank)</p> <ul style="list-style-type: none"> <li>• Range: 0 to 999936, 9.91 E+37</li> </ul> <p>Frame error rate confidence (in percent)</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to 100.00%, 9.91 E+37</li> <li>• Resolution: 0.01%</li> </ul>

#### Programming Example

```
OUTPUT 714;"FETCh:TFERror?" !Fetches all of the TDSO FER results.
```

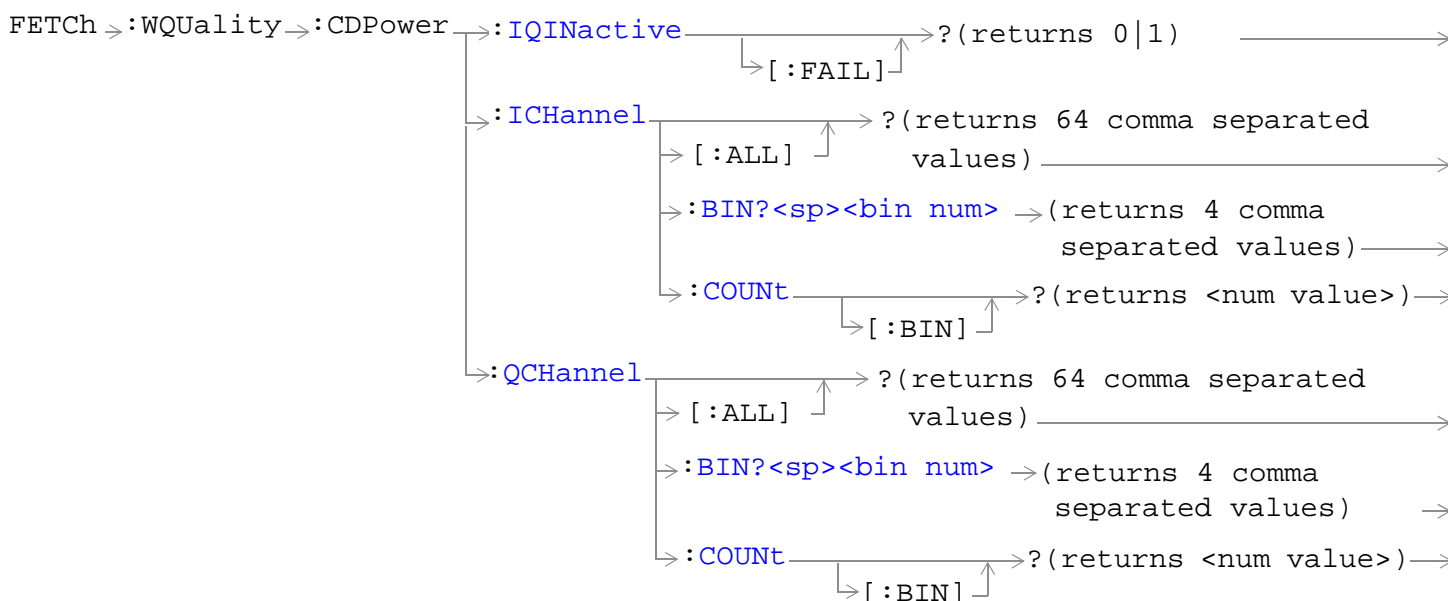
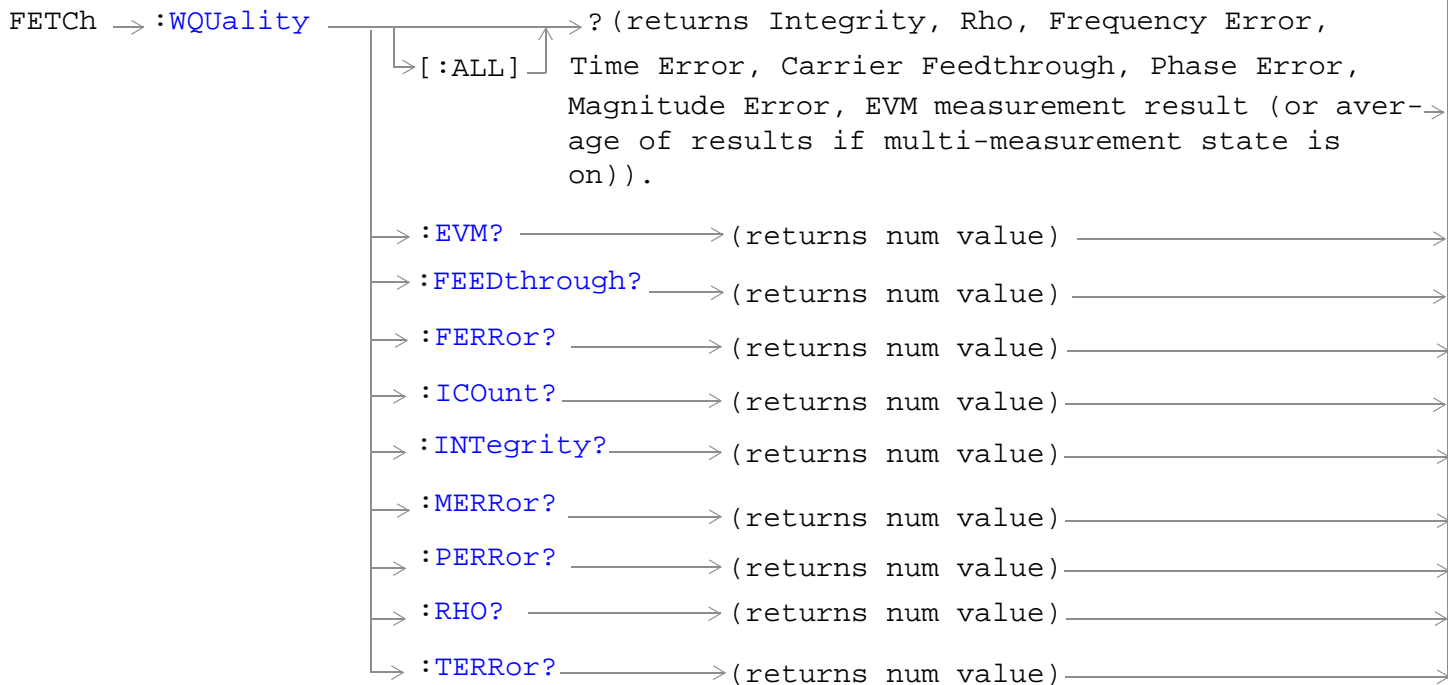
### FETCh:TFERror:ICount?

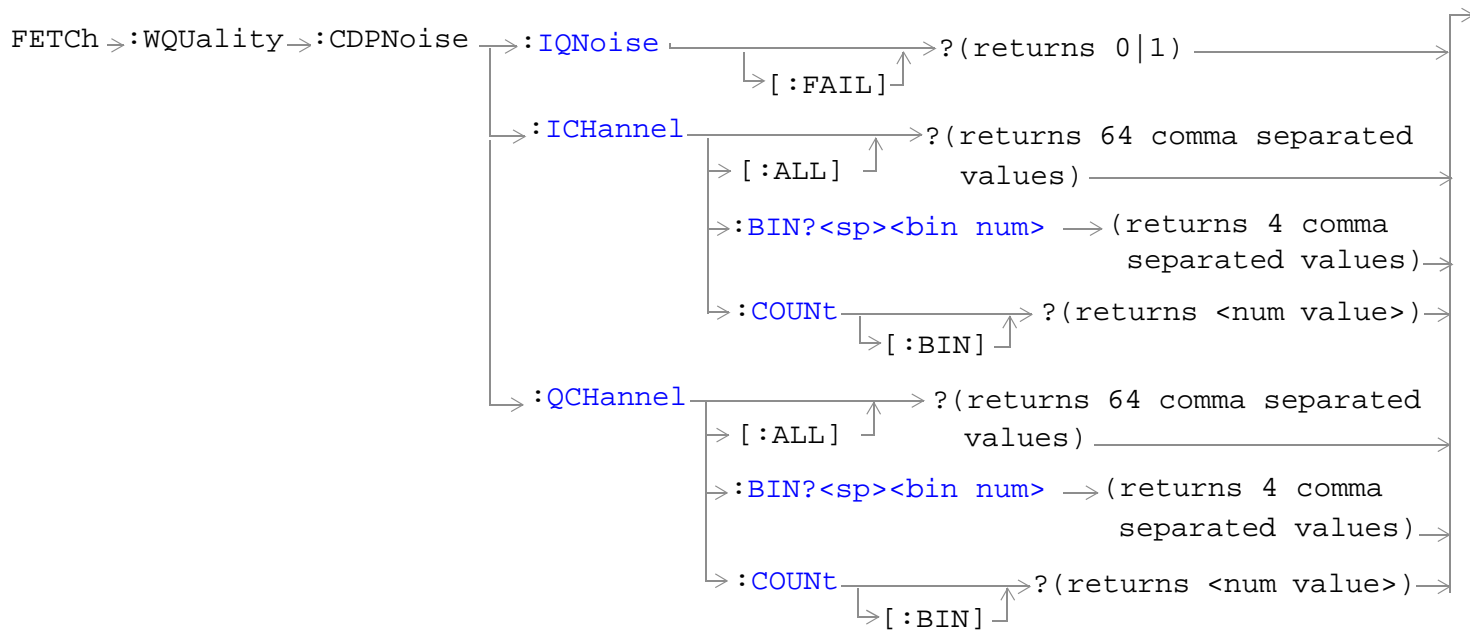
Function	<p>Queries the intermediate count of transmitted frames.</p> <p>To set up the number of transmitted frames, see <a href="#">“SETup:TFERror:COUnT”</a> .</p>
Query	Range: 0 to 999936

#### Programming Example

```
OUTPUT 714;"FETCh:TFERror:ICOUNT?"
```

# FETCh:WQQuality





“Diagram Conventions” on page 268

**FETCh:WQuality[:ALL]?**

<p>Function</p>	<p>Queries the waveform quality/code domain power measurements.</p> <p>Measurement results are returned in the following order: integrity, rho, frequency error, time error, carrier feedthrough, phase error, magnitude error, and error vector magnitude (EVM).</p> <p>If the multi-measurement state is on, each result represents the <i>average</i> of a number of waveform quality/code domain power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see “SETup:WQuality:COUNT[:SNUMber]” .</p>
<p>Query</p>	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 16</li> <li>• Resolution: 1</li> </ul> <p>Rho</p> <ul style="list-style-type: none"> <li>• Range: 0.000 to 1.000, 9.91 E+37</li> <li>• Resolution: 0.001</li> </ul> <p>Frequency Error</p> <ul style="list-style-type: none"> <li>• Range: -9999.0 to 9999.0 Hz, 9.91 E+37</li> <li>• Resolution: 0.1 Hz</li> </ul> <p>Time Error</p> <ul style="list-style-type: none"> <li>• Range -99.99 to 99.99 <math>\mu</math>s, 9.91 E+37</li> <li>• Resolution: 0.01 <math>\mu</math>s</li> </ul> <p>Carrier Feedthrough</p> <ul style="list-style-type: none"> <li>• Range: -100 to 0.0 dB, 9.91 E+37</li> <li>• Resolution: 0.1</li> </ul> <p>Phase Error</p> <ul style="list-style-type: none"> <li>• Range: -180.0 to 180.0 degrees</li> <li>• Resolution: 0.1</li> </ul> <p>Magnitude Error</p> <ul style="list-style-type: none"> <li>• Range: 0 to 100%, 9.91 E+37</li> <li>• Resolution: 0.01</li> </ul> <p>Error Vector Magnitude (EVM)</p> <ul style="list-style-type: none"> <li>• Range: 0 to 100%</li> <li>• Resolution: 0.01%</li> </ul>

**Programming Example**

```

OUTPUT 714;"FETCh:WQUALITY:ALL?"
!Returns integrity, rho, frequency error, time error, carrier feedthrough, phase error,
!magnitude error, EVM.
    
```

### FETCh:WQuality:ICount?

Function	Queries the intermediate count of measurements completed in a multi-measurement.
Query	Range: 0 to 999

#### Programming Example

```
OUTPUT 714; "FETCh:WQUALITY:ICOUNT?"
```

### FETCh:WQuality:CDPower:IQInactive[:FAIL]?

Function	Queries the code domain measurement's pass/fail result indicating whether the power level in the inactive code channels exceeded the level set using the "SETup:WQuality:CDPower:IQInactive[:LIMit]" command.
Query	Range: 0   1, 9.91 E+37 0 = passed, 1 = failed, 9.91 E+37 = undefined

#### Programming Example

```
OUTPUT 714; "FETCh:WQUALITY:CDPOWER:IQINACTIVE:FAIL?"
```

### FETCh:WQuality:CDPower:ICHannel[:ALL]?

Function	<p>Queries the I-channel code domain power measurement results for all 16 measurement graph bars (bins).</p> <p>This query returns a string consisting of 64 comma-separated values. These represent 4 values for each of 16 bins (maximum).</p> <p>Since measurements will usually have less than 16 bins, higher numbered bins frequently return 9.91 E+37 results.</p>
Query	"FETCh:WQuality:CDPower:ICHannel:ALL?" returns: 1 (active) or 0 (inactive), Walsh code, spread factor, and power for bin 0. The integer value following power for bin 0 will be the beginning of bin 1; 1 (active) or 0 (inactive), Walsh code, spread factor, and power for bin 1. This pattern will repeat until the values for the last bin (bin 15) have been returned.

#### Programming Example

```
OUTPUT 714; "FETCh:WQUALITY:CDPOWER:ICHANNEL:ALL?"
```

## FETCh:WQuality

### FETCh:WQuality:CDPower:ICHannel:BIN? <bin num>

Function	Queries the I-channel results for a specific measurement graph bar (bin) on the code domain graph. Bins are numbered 0 through 15 starting from the left side of the graph to the right side of the graph.  This query returns a string of 4 comma separated values: 1 (active) or 0 (inactive), Walsh code, spread factor, and power.
Setting	<bin num> range: 0 to 15
Query	"FETCh:WQuality:CDPower:ICHannel:BIN? 0" returns: 1 (active) or 0 (inactive), Walsh code, spread factor, and power for bin 0.

#### Programming Example

```
OUTPUT 714; "FETCh:WQUALITY:CDPOWER:ICHANNEL:BIN? 13"  
!Queries the I-channel code domain power level in bin 13.
```

### FETCh:WQuality:CDPower:ICHannel:COUNT[:BIN]?

Function	This query indicates how many bins contain measurement data. For example, if 13 is returned, bins 0 through 12 contain measurement data and bins 13 through 15 contain 9.91 E+37 results.
Query	Range: 0 to 15

#### Programming Example

```
OUTPUT 714; "FETCh:WQUALITY:CDPOWER:ICHANNEL:COUNT:BIN?"
```

### FETCh:WQuality:CDPower:QChannel[:ALL]?

Function	Queries the code domain power in the Q-channel.  This query returns a string of 64 comma-separated values. These represent 4 values for each of 16 bins (maximum).
Query	"FETCh:WQuality:CDPower:QChannel:ALL?" returns: 1 (active) or 0 (inactive), Walsh code, spread factor, and power for bin 0. The integer value following power for bin 0 will be the beginning of bin 1; 1 (active) or 0 (inactive), Walsh code, spread factor, power for bin 1. This pattern will repeat until the values for the last bin (bin 15) have been returned.

#### Programming Example

```
OUTPUT 714; "FETCh:WQUALITY:CDPOWER:QCHANNEL:ALL?"
```



### FETCh:WQQuality:CDPower:QCHannel:BIN? <bin num>

Function	<p>Queries a specific bin on the code domain graph. The bars on the graph (bins) are numbered 0 through 15 starting from the left side of the graph to the right side of the graph.</p> <p>This query returns a string of 4 comma separated values: 1 (active) or 0 (inactive), Walsh code, spread factor, and power.</p>
Query	<p>"FETCh:WQQuality:CDPower:QCHannel:BIN? 0" returns: 1 (active) or 0 (inactive), Walsh code, spread factor, and power for bin 0.</p>

#### Programming Example

```
OUTPUT 714;"FETCh:WQQuality:CDPower:QCHannel:BIN? 13"
!Queries the Q-channel power in bin 13.
```

### FETCh:WQQuality:CDPower:QCHannel:COUNT[:BIN]?

Function	<p>This query indicates how many bins contain measurement data. For example, if 13 is returned, bins 0 through 12 contain measurement data and bins 13 through 15 contain 9.91 E+37 results.</p>
Query	<p>Range: 0 to 15</p>

#### Programming Example

```
OUTPUT 714;"FETCh:WQQuality:CDPower:QCHannel:COUNT:BIN?"
```

### FETCh:WQQuality:CDPNoise:IQNoise[:FAIL]?

Function	<p>Queries the code domain power + noise measurement pass/fail indicator indicating whether the noise power level exceeded the level set using the "SETup:WQQuality:CDPNoise:IQNoise[:LIMit]" command..</p> <p>0 = passed, 1 = failed, 9.91 E+37 = undefined</p>
Query	<p>Range: 0   1   9.91 E+37</p>

#### Programming Example

```
OUTPUT 714;"FETCh:WQQuality:CDPNoise:IQNoise:FAIL?"
```

### FETCh:WQQuality:CDPNoise:ICHannel[:ALL]?

Function	<p>Queries the code domain noise power in the I-channel.</p> <p>This query returns 64 comma-separated values. These represent 4 values for each of 16 bins (maximum).</p>
Query	<p>"FETCh:WQQuality:CDPNoise:ICHannel:ALL?" returns: Walsh code, spread factor, noise power, and power for bin 0. The integer value following power for bin 0 will be the beginning of bin 1; Walsh code, spread factor, noise power, and power for bin 1. This pattern will repeat until the values for the last bin (bin 15) have been returned.</p>

#### Programming Example

```
OUTPUT 714;"FETCh:WQQuality:CDPNoise:ICHannel:ALL?"
```

## FETCh:WQQuality

### FETCh:WQQuality:CDPNoise:ICHannel:BIN? <bin num>

Function	Queries a specific bin on the code domain graph. The bars on the graph (bins) are numbered 0 through 15 starting from the left side of the graph to the right side of the graph. This query returns 4 comma separated values: Walsh code, spread factor, noise power, and power.
Query	"FETCh:WQQuality:CDPNoise:ICHannel:BIN? 0" returns: Walsh code, spread factor, noise power, and power for bin 0.

#### Programming Example

```
OUTPUT 714;"FETCh:WQQuality:CDPNoise:ICHannel:BIN? 13"
```

```
!Queries the I-channel code domain power + noise measurement results for bin 13.
```

### FETCh:WQQuality:CDPNoise:ICHannel:COUNT[:BIN]?

Function	This query indicates how many bins contain measurement data. For example, if 13 is returned, bins 0 through 12 contain measurement data and bins 13 through 15 contain 9.91 E+37 results.
Query	Range: 0 to 15

#### Programming Example

```
OUTPUT 714;"FETCh:WQQuality:CDPNoise:ICHannel:COUNT:BIN?"
```

### FETCh:WQQuality:CDPNoise:QChannel[:ALL]?

Function	Queries the code domain noise power in the Q-channel. This query returns 64 comma-separated values. These represent 4 values for each of 16 bins (maximum).
Query	"FETCh:WQQuality:CDPNoise:QChannel:ALL?" returns: Walsh code, spread factor, noise power, and power for bin 0. The integer value following power for bin 0 will be the beginning of bin 1; Walsh code, spread factor, noise power, and power for bin 1. This pattern will repeat until the values for the last bin (bin 15) have been returned.

#### Programming Example

```
OUTPUT 714;"FETCh:WQQuality:CDPNoise:QChannel:ALL?"
```

### FETCh:WQQuality:CDPNoise:QChannel:BIN? <bin num>

Function	Queries a specific bin on the code domain graph. The bars on the graph (bins) are numbered 0 through 15 starting from the left side of the graph to the right side of the graph. This query returns 4 comma separated values:Walsh code, spread factor, noise power, and power.
Query	"FETCh:WQQuality:CDPNoise:QChannel:BIN? 0" returns: Walsh code, spread factor, noise power, and power for bin 0.

#### Programming Example

```
OUTPUT 714;"FETCh:WQQuality:CDPNoise:QChannel:BIN? 13"
```

```
!Queries the Q-channel power in bin 13.
```

**FETCH:WQuality:CDPNoise:QCHannel:COUNT[:BIN]?**

Function	This query indicates how many bins contain measurement data. For example, if 13 is returned, bins 0 through 12 contain measurement data and bins 13 through 15 contain 9.91 E+37 results.
Query	Range: 0 to 15

**Programming Example**

OUTPUT 714; "FETCH:WQUALITY:CDPNOISE:QCHANNEL:COUNT:BIN?"

---

## INITiate Subsystem

### Syntax Diagrams and Command Descriptions

[“INITiate” on page 494](#)

### 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 253](#).

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 242](#).

---

**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.

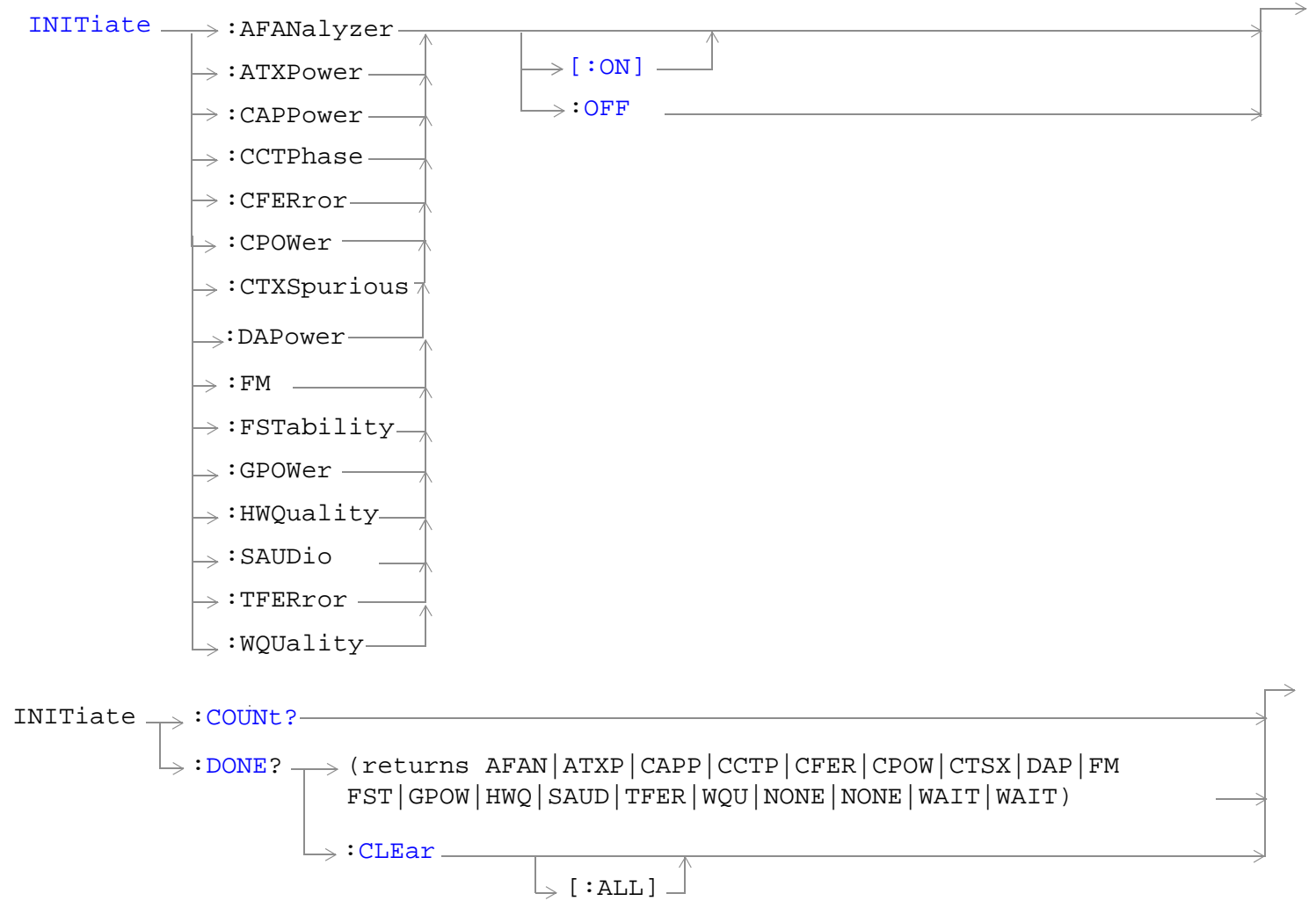
---

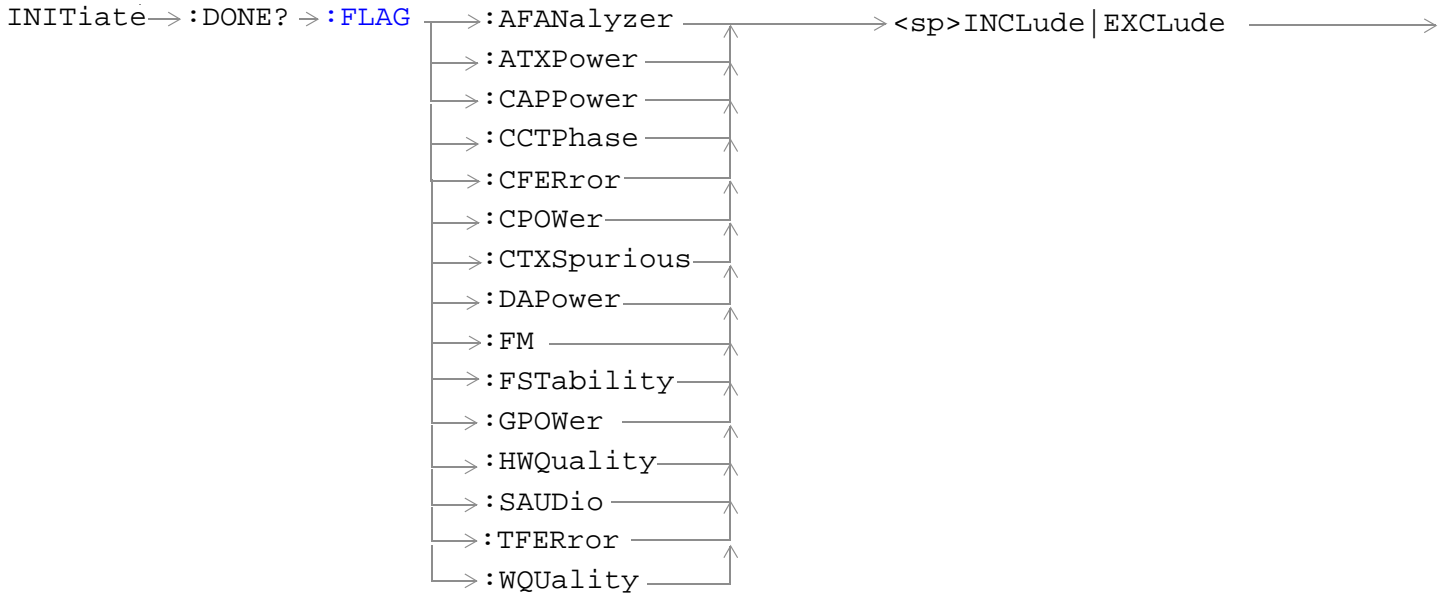
```

10 OUTPUT 714;"SETup:ALL:CONTinuous:OFF" ! selects single trigger mode.
20 OUTPUT 714;"INITiate:DAPower;WQQuality" ! starts digital average power and
30                                     !waveform accuracy 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 "DAP" !tests for the string "DTXP", indicating digital average power measurement is
done.
90 OUTPUT 714;"FETCh:DAPower:POWer?" !Queries average digital TX power measurement.
100 ENTER 714;Dtxpower
110 CASE "WQU" !tests for the string "WQU", indicating that the waveform quality
120                                     !measurement is done.
130 OUTPUT 714;"FETCh:WQU:RHO?" !Queries rho.
140 ENTER 714;rho
150 END SELECT
160 EXIT IF Meas_complete$="NONE"
170 END LOOP
180 END

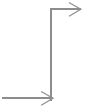
```

# INITiate





INITiate->:ON? —> (returns comma-separated list of AFAN|ATXP|CAPP|CCTP|CFER|CPOW|CTSX|DAP|FM|FST|GPOW|HWQ|SAUD|TFER|WQU|NONE)



“Diagram Conventions” on page 268

## INITiate

### INITiate:<measurement mnemonic>[:ON]

<p>Function</p>	<p>These commands initiate (start) the following measurements:</p> <ul style="list-style-type: none"> <li>• AFANalyzer - Audio Frequency Analyzer measurement</li> <li>• ATXPower - Analog Transmitter Power</li> <li>• CAPPower - Access Probe Power measurement</li> <li>• CCTPhase - Code Channel Time/Phase error measurement</li> <li>• CPOWer - Channel Power measurement</li> <li>• CFERror - Frame Error Rate measurement</li> <li>• CTXSpurious - TX Spruious Emmissions measurement</li> <li>• DAPower - Digital Average Power measurement</li> <li>• FM - Frequency Modulation measurement</li> <li>• FSTability - Frequency Stability measurement</li> <li>• GPOWer - Gated Power measurement</li> <li>• HWQuality - Handoff Waveform Quality measurement</li> <li>• SAUDio - Swept Audio measurement</li> <li>• TFERror - TDSO Frame Error Rate measurement</li> <li>• WQQuality - Waveform Quality measurement</li> </ul> <p>This command also queries the active state using the ON? keyword in place of a measurement mnemonic.</p> <p>The INITiate command is associated with the SETup “<a href="#">SETup Subsystem</a>” on page 523 and the “<a href="#">FETCh? Subsystem</a>” on page 434.</p> <p>One or more measurements can be initiated with the same program line (see “<a href="#">Concurrent Measurements</a>” on page 249 and the Programming Example below).</p> <p>This command is also used to activate a measurement. See “<a href="#">INITiate Programming Examples (how INIT commands are used)</a>” on page 492.</p>
<p>Range</p>	<p>AFAN   ATXP   CAPP   CCTP   CFER   CPOW   CTSX   DAP   FM   FST   GPOW   HWQ   SAUD   TFER   WQU   NONE</p>
<p><b>Programming Example</b></p> <pre>OUTPUT 714; "INITIATE:CPOWER;WQUALITY:ON"</pre> <p>!Initiates a channel power and a waveform quality measurement.</p>	



**INITiate:ON?**

Function	Queries the measurements that are on. Returns a comma separated list of measurement mnemonics.
Range	AFAN   ATXP   CAPP   CCTP   CFER   CPOW   CTSX   DAP   FM   FST   GPOW   HWQ   SAUD   TFER   WQU   NONE
<b>Programming Example</b> <pre>OUTPUT 714;"INITIATE:ON?"</pre>	

**INITiate:<measurement mnemonic>:OFF**

Function	Deactivates the selected measurement. See <a href="#">“Measurement States” on page 242</a> . Only one measurement can be deactivated at a time. To stop one or more measurements and leave them in the active state, use <a href="#">“ABORT” on page 271</a> .
<b>Programming Example</b> <pre>OUTPUT 714;"INITIATE:CPOWER:OFF" !Deactivates the channel power measurement.</pre>	

**INITiate:COUNt?**

Function	Queries the number of measurements that have been initiated (are active). See <a href="#">“Measurement States” on page 242</a> .
Query	Range: 0 to 10
<b>Programming Example</b> <pre>OUTPUT 714;"INITIATE:COUNT?"</pre>	

**INITiate:DONE?**

Function	Queries (one at a time) which measurements, if any, are finished or have timed-out. See <a href="#">“Measurement Event Synchronization” on page 253</a> for how to use this command. See <a href="#">“Measurement States” on page 242</a> to understand the test set’s measurment states. See <a href="#">“INITiate:DONE:FLAG:&lt;measurement mnemonic&gt;” on page 498</a> for include or exclude commands.
Range	AFAN   ATXP   CAPP   CCTP   CFER   CPOW   CTSX   DAP   FM   FST   GPOW   HWQ   SAUD   TFER   WQU   NONE   WAIT

## INITiate

### INITiate:DONE:CLEAr

Function	Clears the done flag from all measurements.
<b>Programming Example</b> OUTPUT 714;"INITIATE:DONE:CLEAR" !Clears the done flag.	

### INITiate:DONE:FLAG[:ALL]

Function	<p>Specifies that all measurements are either included or excluded when the INITiate:DONE? query is sent.</p> <p>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:&lt;measurement mnemonic&gt;" .</p> <p>Use INITiate:DONE:FLAG:ALL EXCLude to exclude all measurements.</p> <p>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.</p>
Setting	Range: INCLude   EXCLude
<b>Programming Example</b> OUTPUT 714;"INITIATE:DONE:FLAG:ALL INCLUDE" !Includes all measurements in the INITIATE:DONE? query.	

### INITiate:DONE:FLAG:<measurement mnemonic>

Function	<p>Specifies if a measurement done flag is considered (using the INCLude or EXCLude settings) when the INITiate:DONE? query is sent.</p> <p>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.</p> <p>The test set will not reset any excluded measurement to included with any type of preset.</p>
Setting	Range: INCLude   EXCLude
<b>Programming Example</b> OUTPUT 714;"INITIATE:DONE:FLAG:DAP EXCLUDE" !Excludes the digital average power measurement from responding to the INITIATE:DONE? query.	

---

## READ? Subsystem

### Syntax Diagram and Command Descriptions

[“READ” on page 501](#)

### 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).

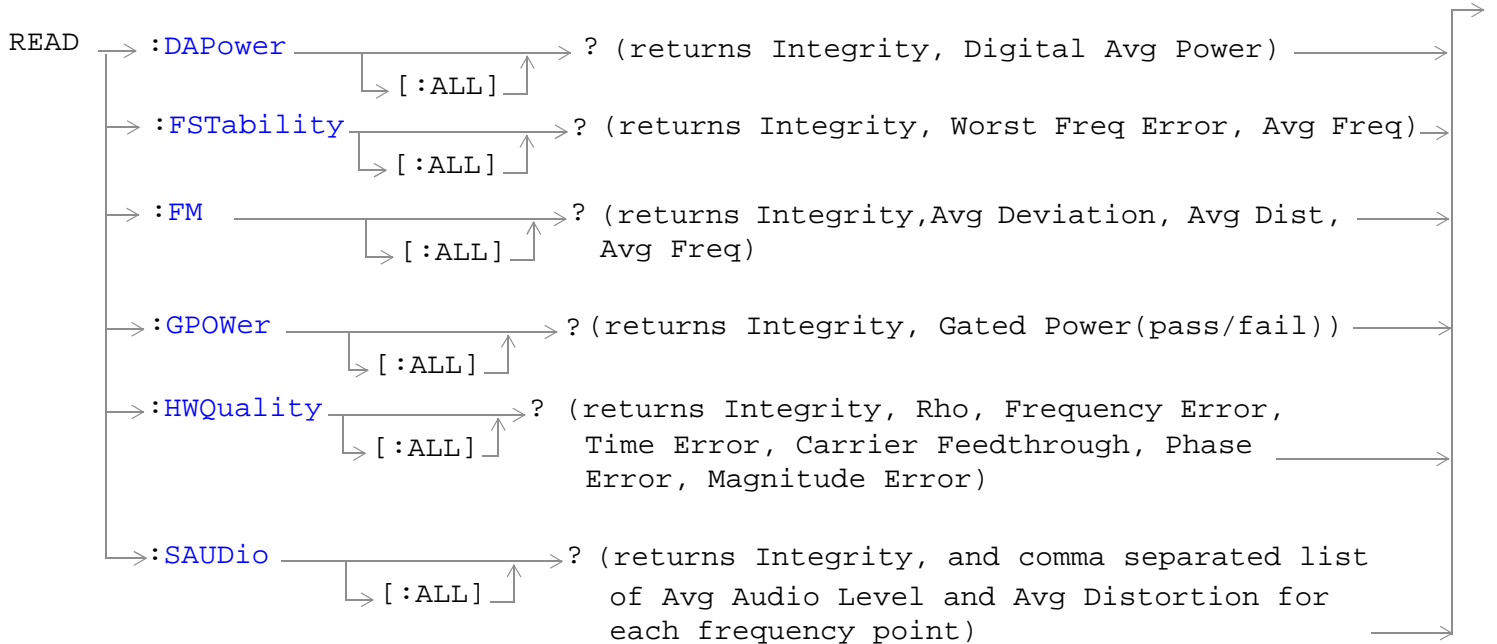
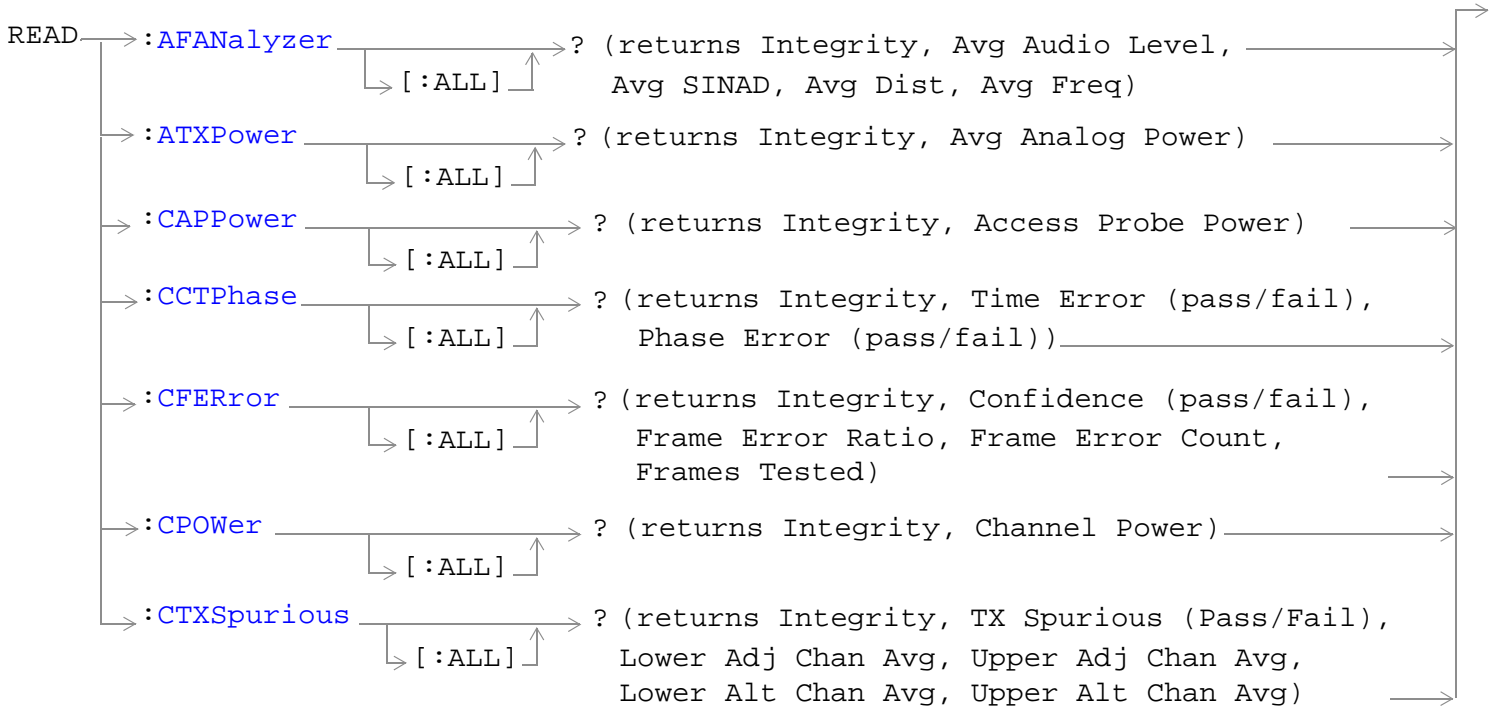
---

## Program Example - READ:DAPower?

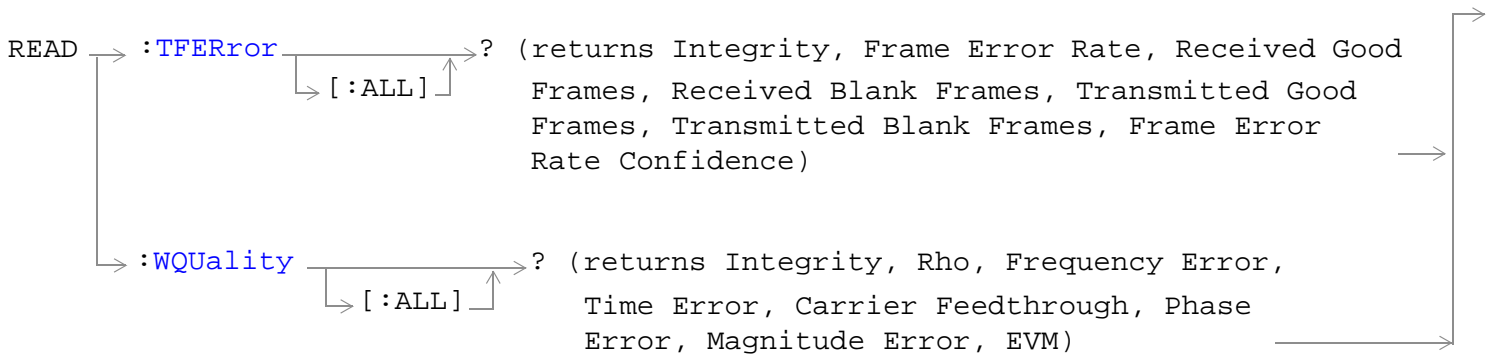
```
OUTPUT 714;"READ:DAPower?" !Starts digital average power measurement. As soon as the
!measurement cycle has completed, the test set
!provides the digital average power measurement results to the
!controlling application.
```

```
ENTER 714;Integrity, Digital_power !Enters the integrity indicator and
!digital average power measurement values into
!controlling application.
```

# READ



**READ**



“Diagram Conventions” on page 268

**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	<p><b>Integrity</b></p> <ul style="list-style-type: none"> <li>• Range: 0 to 23 see “Integrity Indicator”</li> <li>• Resolution: 1</li> </ul> <p><b>Average audio level</b></p> <ul style="list-style-type: none"> <li>• Range: 0 to 20 volts, 9.91 E+37</li> <li>• Resolution: the lesser of 4 significant digits or 10 uV.</li> </ul> <p><b>Average SINAD</b></p> <ul style="list-style-type: none"> <li>• Range: -99.00 to 99.00 dB, 9.91 E+37</li> <li>• Resolution: 0.01 dB</li> </ul> <p><b>Average audio distortion</b></p> <ul style="list-style-type: none"> <li>• Range: 0.00 to 99.00%, 9.91 E+37</li> <li>• Resolution: 0.01%</li> </ul>

**READ:ATXPower[:ALL]?**

Function	Initiates and fetches an analog transmitter power measurement as a sequential operation. Measurement results are returned in the following order: integrity, average analog power.
----------	--

Query	<p data-bbox="326 201 435 233">Integrity</p> <ul data-bbox="326 254 841 331" style="list-style-type: none"><li data-bbox="326 254 841 285">• Range: 0 to 23 see <a href="#">“Integrity Indicator”</a></li><li data-bbox="326 300 521 331">• Resolution: 1</li></ul> <p data-bbox="326 348 753 380">Average analog transmitter power</p> <ul data-bbox="326 401 870 478" style="list-style-type: none"><li data-bbox="326 401 870 432">• Range: -100.00 to 100.00 dBm, 9.91 E+37</li><li data-bbox="326 447 602 478">• Resolution: 0.01 dB</li></ul>
-------	---

## READ

### READ:CAPPower[:ALL]?

Function	Initiates and fetches an access probe power measurement as a sequential operation. Measurement results are returned in the following order: integrity, access probe power.
Query	Integrity <ul style="list-style-type: none"><li>• Range: 0 to 23 see “<a href="#">Integrity Indicator</a>”</li><li>• Resolution: 1</li></ul> Access probe power <ul style="list-style-type: none"><li>• Range: -100.00 to 100.00 dBm, 9.91 E+37</li><li>• Resolution: 0.01 dB</li></ul>

### READ:CCTPhase[:ALL]?

Function	Initiates and fetches a code channel time and phase error measurement as a sequential operation. Measurement results are returned in the following order: integrity, time error pass/fail indication, phase error pass/fail indication.
Query	Integrity <ul style="list-style-type: none"><li>• Range: 0 to 23 see “<a href="#">Integrity Indicator</a>”</li><li>• Resolution: 1</li></ul> Time error pass/fail indicator: <ul style="list-style-type: none"><li>• Range: 0 (pass), 1 (fail), 9.91 E+37</li></ul> Phase error pass/fail indicator: <ul style="list-style-type: none"><li>• Range: 0 (pass), 1 (fail), 9.91 E+37</li></ul>



**READ:CFERror[:ALL]?**

Function	<p>Initiates and fetches the FER (frame error rate) measurements as a sequential operation.</p> <p>FER measurement results are returned in the following order: integrity, confidence limit pass/fail result, frame error ratio, frame error count, frames tested.</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 23 see “<a href="#">Integrity Indicator</a>”</li> <li>• Resolution: 1</li> </ul> <p>Confidence limit pass/fail result</p> <ul style="list-style-type: none"> <li>• Range: 0 to 2 (0 = passed, 1 = failed, 2 = max frames), 9.91 E+37</li> </ul> <p>Frame error ratio</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to 100.00, 9.91 E+37</li> <li>• Resolution: 0.01 %</li> </ul> <p>Frame error count</p> <ul style="list-style-type: none"> <li>• Range: 0 to 10,000,000, 9.91 E+37</li> <li>• Resolution: 1 frame</li> </ul> <p>Frames tested</p> <ul style="list-style-type: none"> <li>• Range: 0 to 10,000,000, 9.91 E+37</li> <li>• Resolution: 1 frame</li> </ul>

**READ:CPOWer[:ALL]?**

Function	<p>Initiates and fetches a channel power measurement as a sequential operation.</p> <p>Measurement results are returned in the following order: integrity, average channel power.</p> <p>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 “<a href="#">SETup:CPOWer:COUNT[:SNUMBER]</a>” .</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 23 see “<a href="#">Integrity Indicator</a>”</li> <li>• Resolution: 1</li> </ul> <p>Channel power</p> <ul style="list-style-type: none"> <li>• Range: -100.00 to 100.00 dBm, 9.91 E+37</li> <li>• Resolution: 0.01 dB</li> </ul>

READ

READ:CTXSpurious[:ALL]?

Function	<p>Initiates and fetches the TX spurious emission measurement as a sequential operation.</p> <p>FER measurement results are returned in the following order: integrity, TX spurious emission pass/fail result, lower adjacent channel (-0.885 or -1.25 MHz) average spurious emissions, upper adjacent channel (+0.885 or +1.25 MHz) average spurious emissions, lower alternate channel (-1.98 MHz) average spurious emissions, upper alternate channel (+1.98 MHz) average spurious emissions.</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 23 see “<a href="#">Integrity Indicator</a>”</li> <li>• Resolution: 1</li> </ul> <p>TX spurious emissions pass/fail result</p> <ul style="list-style-type: none"> <li>• Range: 0 to 1 (0 = passed, 1 = failed), 9.91 E+37</li> </ul> <p>Lower adjacent channel spurious emissions</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to -70.00 dBc, 9.91 E+37</li> <li>• Resolution: 0.01 dBc</li> </ul> <p>Upper adjacent channel spurious emissions</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to -70.00 dBc, 9.91 E+37</li> <li>• Resolution: 0.01 dBc</li> </ul> <p>Lower alternate channel spurious emissions</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to -70.00 dBc, 9.91 E+37</li> <li>• Resolution: 0.01 dBc</li> </ul> <p>Upper alternate channel spurious emissions</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to -70.00 dBc, 9.91 E+37</li> <li>• Resolution: 0.01 dBc</li> </ul>

**READ:DAPower[:ALL]?**

Function	<p>Initiates and fetches a digital average power measurement as a sequential operation.</p> <p>Measurement results are returned in the following order: integrity, digital average transmit power.</p> <p>If the multi-measurement state is on, the result represents the <i>average</i> of a number of digital average power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see <a href="#">“SETup:DAPower:COUNt[:SNUMber]”</a> .</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 23 see <a href="#">“Integrity Indicator”</a></li> <li>• Resolution: 1</li> </ul> <p>Digital average power:</p> <ul style="list-style-type: none"> <li>• Range: -100.00 to 100.00 dBm, 9.91 E+37</li> <li>• Resolution: 0.01 dB</li> </ul>

**READ:FM[:ALL]?**

Function	<p>Initiates and fetches an FM measurement as a sequential operation.</p> <p>Measurement results are returned in the following order: integrity, average frequency deviation, average distortion.</p> <p>The distortion measurement must be enabled before a measurement result (other than 9.91E+37) is reported. See <a href="#">“SETup:AFANalyzer:SDISortion:STate”</a> on page 531.</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 23 see <a href="#">“Integrity Indicator”</a></li> <li>• Resolution: 1</li> </ul> <p>Average FM frequency deviation</p> <ul style="list-style-type: none"> <li>• Range: 0.000 to 99.000 kHz, 9.91 E+37</li> <li>• Resolution: 0.001 Hz</li> </ul> <p>Average FM distortion</p> <ul style="list-style-type: none"> <li>• Range :0.0 to 100.0%, 9.91 E+37</li> <li>• Resolution: 0.1%</li> </ul> <p>Average FM frequency</p> <ul style="list-style-type: none"> <li>• Range: 0.0 to 99999.0 Hz, 9.91 E+37</li> <li>• Resolution: 0.1 Hz</li> </ul>

## READ

### READ:FSTability[:ALL]?

Function	Initiates and fetches a frequency stability measurement as a sequential operation. Measurement results are returned in the following order: integrity, worst-case frequency error, average frequency.
Query	Integrity <ul style="list-style-type: none"><li>• Range: 0 to 23 see “Integrity Indicator”</li><li>• Resolution: 1</li></ul> Worst-case frequency error <ul style="list-style-type: none"><li>• Range: -500.00 to 500.00 parts per million (ppm), 9.91 E+37</li><li>• Resolution: 0.01</li></ul> Average frequency <ul style="list-style-type: none"><li>• Range: 100 E+6 to 3 E+9 Hz, 9.91 E+37</li><li>• Resolution: 1 Hz</li></ul>

### READ:GPOWer[:ALL]?

Function	Initiates and fetches a gated power measurement as a sequential operation. Measurement results are returned in the following order: integrity, gated power pass/fail indication.
Query	Integrity <ul style="list-style-type: none"><li>• Range: 0 to 23 see “Integrity Indicator”</li><li>• Resolution: 1</li></ul> Pass/fail indicator: <ul style="list-style-type: none"><li>• Range: 0 (pass), 1 (fail), 9.91 E+37</li></ul>

**READ:HWQuality[:ALL]?**

Function	<p>Initiates and fetches the handoff waveform quality measurements as a sequential operation. Measurement results are returned in the following order: integrity, rho, frequency error, time error, carrier feedthrough, phase error, magnitude error.</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 23</li> <li>• Resolution: 1</li> </ul> <p>Rho</p> <ul style="list-style-type: none"> <li>• Range: 0.000 to 1.000, 9.91 E+37</li> <li>• Resolution: 0.001</li> </ul> <p>Frequency Error</p> <ul style="list-style-type: none"> <li>• Range: -9999.0 to 9999.0 Hz, 9.91 E+37</li> <li>• Resolution: 0.1 Hz</li> </ul> <p>Time Error</p> <ul style="list-style-type: none"> <li>• Range: -99.99 to 99.99 <math>\mu</math>s, 9.91 E+37</li> <li>• Resolution: 0.01 <math>\mu</math>s</li> </ul> <p>Carrier Feedthrough</p> <ul style="list-style-type: none"> <li>• Range: -100 to 0.0 dB, 9.91 E+37</li> <li>• Resolution: 0.1</li> </ul> <p>Phase Error</p> <ul style="list-style-type: none"> <li>• Range: -180.0 to 180.0 degrees</li> <li>• Resolution: 0.1</li> </ul> <p>Magnitude Error</p> <ul style="list-style-type: none"> <li>• Range: 0 to 100%, 9.91 E+37</li> <li>• Resolution: 0.01</li> </ul>

READ

READ:SAUDio[:ALL]?

Function	<p>Initiates and fetches a swept audio measurement as a sequential operation.</p> <p>Measurement results are returned in the following order: integrity, and a comma separated list of average audio level and average audio distortion for each frequency point in the sweep.</p> <p>For frequencies about 10 kHz, the measurement will return 9.91 E+37.</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"><li>• Range: 0 to 23 see <a href="#">“Integrity Indicator”</a></li><li>• Resolution: 1</li></ul> <p>Average Audio Level</p> <ul style="list-style-type: none"><li>• Range: 1 mV to 20 V, 9.91 E+37</li><li>• Resolution: the lesser of 4 significant digits or 10 uV</li></ul> <p>Average Audio Distortion</p> <ul style="list-style-type: none"><li>• Range: 0 to 99.9%, 9.91E+37</li><li>• Resolution: 0.1</li></ul>

**READ:TFERror[:ALL]?**

<p>Function</p>	<p>Initiates and fetches the TDSO FER (test data service option (SO32) frame error rate) measurements as a sequential operation.</p> <p>FER measurement results are returned in the following order: integrity, frame error rate (%), received good frames, received blank frames, transmitted good frames, transmitted blank frames, frame error rate confidence (%).</p>
<p>Query</p>	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 23 see <a href="#">“Integrity Indicator”</a></li> <li>• Resolution: 1</li> </ul> <p>Frame error rate</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to 100.00, 9.91 E+37</li> <li>• Resolution: 0.01 %</li> </ul> <p>Received good frames</p> <ul style="list-style-type: none"> <li>• Range: 0 to 999936, 9.91 E+37</li> </ul> <p>Transmitted blank frames</p> <ul style="list-style-type: none"> <li>• Range: 0 to 999936, 9.91 E+37</li> </ul> <p>Received good frames</p> <ul style="list-style-type: none"> <li>• Range: 0 to 999936, 9.91 E+37</li> </ul> <p>Transmitted blank frames</p> <ul style="list-style-type: none"> <li>• Range: 0 to 999936, 9.91 E+37</li> </ul> <p>Frame error rate confidence</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to 100.00, 9.91 E+37</li> <li>• Resolution: 0.01 %</li> </ul>

READ

READ:WQuality[:ALL]?

Function	<p>Initiates and fetches the waveform quality measurements as a sequential operation.</p> <p>Measurement results are returned in the following order: integrity, rho, frequency error, time error, carrier feedthrough, phase error, magnitude error, EVM.</p> <p>If the multi-measurement state is on, each result represents the <i>average</i> of a number of waveform quality measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see “SETup:WQuality:COUNT[:SNUMBER]” .</p>
Query	<p>Integrity</p> <ul style="list-style-type: none"> <li>• Range: 0 to 23</li> <li>• Resolution: 1</li> </ul> <p>Rho</p> <ul style="list-style-type: none"> <li>• Range: 0.000 to 1.000, 9.91 E+37</li> <li>• Resolution: 0.001</li> </ul> <p>Frequency Error</p> <ul style="list-style-type: none"> <li>• Range: -9999.0 to 9999.0 Hz, 9.91 E+37</li> <li>• Resolution: 0.1 Hz</li> </ul> <p>Time Error</p> <ul style="list-style-type: none"> <li>• Range: -99.99 to 99.99 <math>\mu</math>s, 9.91 E+37</li> <li>• Resolution: 0.01 <math>\mu</math>s</li> </ul> <p>Carrier Feedthrough</p> <ul style="list-style-type: none"> <li>• Range: -100.0 to 0.0 dB, 9.91 E+37</li> <li>• Resolution: 0.1 dB</li> </ul> <p>Phase Error</p> <ul style="list-style-type: none"> <li>• Range: -180.0 to 180.0 degrees</li> <li>• Resolution: 0.1 degrees</li> </ul> <p>Magnitude Error</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to 100.00%, 9.91 E+37</li> <li>• Resolution: 0.01%</li> </ul> <p>Error Vector Magnitude (EVM)</p> <ul style="list-style-type: none"> <li>• Range: 0.00 to 100.00%</li> <li>• Resolution: 0.01%</li> </ul>



---

## 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

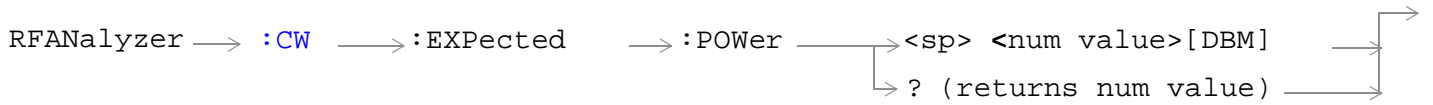
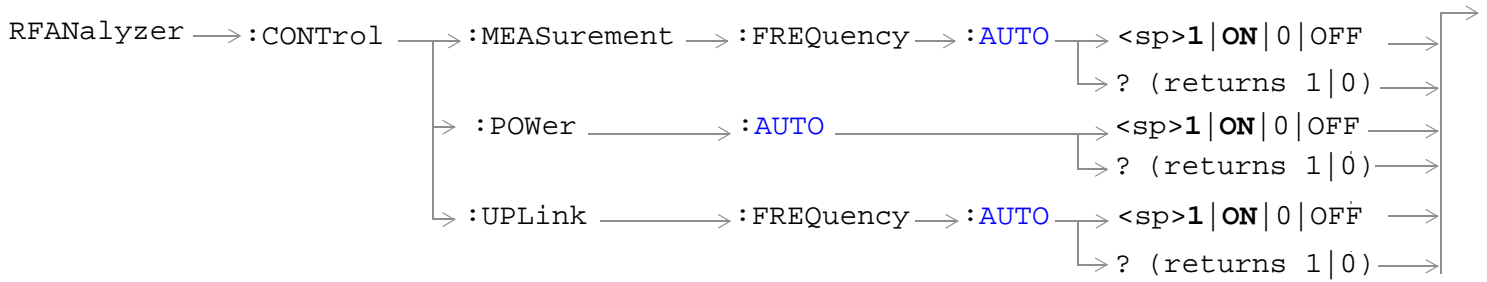
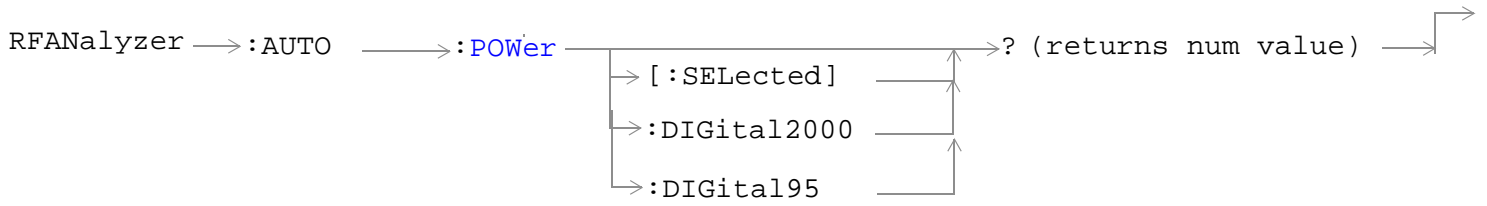
Refer to the [“Block Diagram” on page 779](#) for a description of the signal paths.

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.

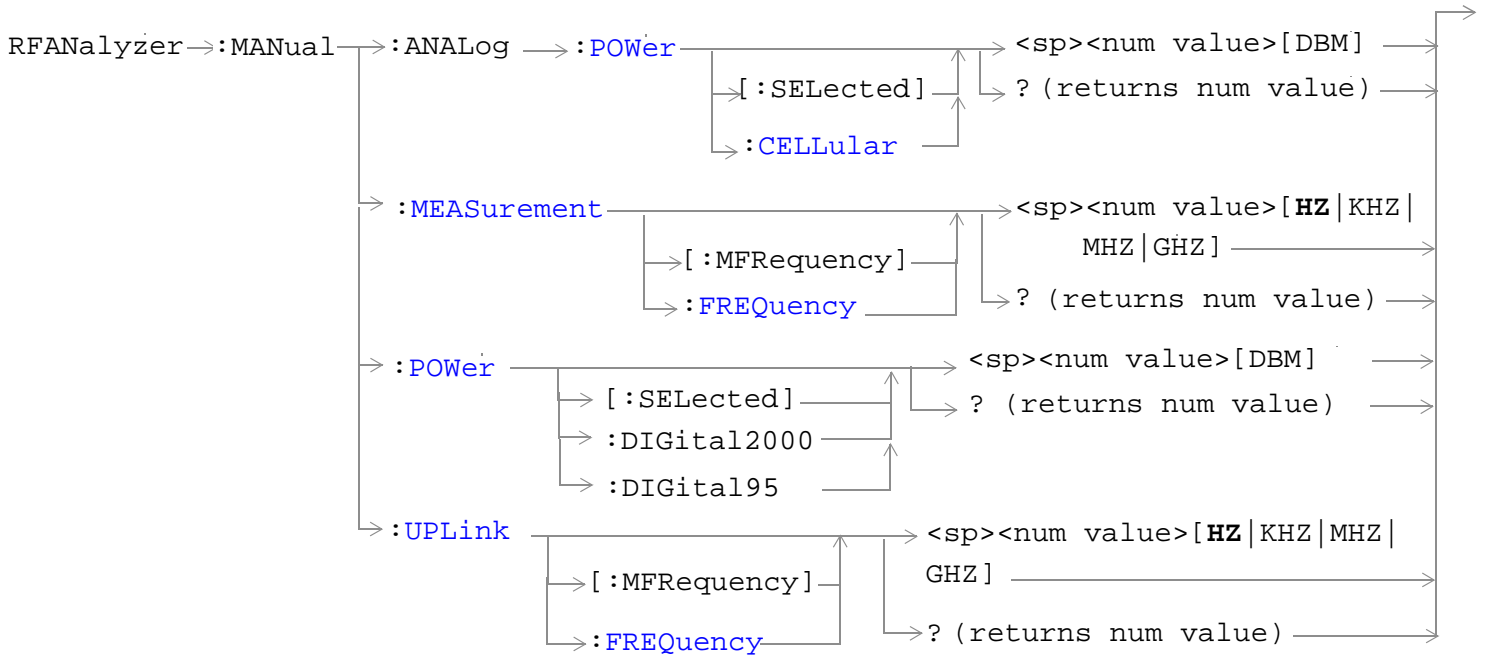
### Syntax Diagrams and Command Descriptions

[“RFANalyzer” on page 514](#)

# RFAnalyzer



“Diagram Conventions” on page 268



**RFANalyzer:AUTO:POWer[:SElected]?**

Function	<p>Queries the expected input power when the test set's power detector control mode is set to automatic.</p> <p>The optional [:SElected] keyword in this command specifies that the expected input power setting being queried applies to the current system type.</p> <p>The test set's power control mode is set by the "RFANalyzer:CONTRol:POWer:AUTO" command.</p>
Query	<p>Range: -69 dBm to +30 dBm</p> <p>Resolution: 0.01 dBm</p>
*RST setting	13 dBm
<p><b>Programming Example</b></p> <pre>OUTPUT 714; "RFANalyzer:AUTO:POWer:SElected?"</pre> <p>!Queries the expected input power for the currently selected system type when the power detector is !set to automatic control mode.</p>	

**RFANalyzer:CONTRol:MEASurement:FREQuency:AUTO**

Function	<p>Turns on/off the auto Meas Frequency feature which determines the measurement downconverter signal path frequency control mode. (See "Block Diagram" .)</p> <p>ON = automatic</p> <p>OFF = manual</p>
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST setting	1 (on)
<p><b>Programming Example</b></p> <pre>OUTPUT 714; "RFANalyzer:CONTRol:MEASurement:FREQuency:AUTO OFF"</pre> <p>!Enables manual control of the measurement signal path tune frequency.</p>	

**RFANalyzer:CONTRol:POWer:AUTO**

Function	<p>Sets/queries the test set's receiver input power control mode.</p> <p>ON = automatic</p> <p>OFF = manual</p>
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST setting	1 (on)
<p><b>Programming Example</b></p> <pre>OUTPUT 714; "RFANALYZER:CONTRol:POWer:AUTO OFF"</pre> <p>!Enables manual control of the expected input power level.</p>	

**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)
<b>Programming Example</b> <pre>OUTPUT 714;"RFANALYZER:CONTROL:UPLINK:FREQUENCY:AUTO OFF" !Enables manual control of the demodulation signal path tune frequency.</pre>	

**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 " <a href="#">CALL[:CELL]:OPERating</a> " .)
Setting	Range: -60 dBm to +53 dBm
Query	Range: -60 dBm to +53 dBm
*RST setting	+13 dBm
<b>Programming Example</b> <pre>OUTPUT 714;"RFANALYZER:CW:EXPECTED:POWER -20"</pre>	

**RFAnalyzer:MANual:POWER[:SElected]**

Function	<p>Sets/queries the receiver expected input power when the test set's receiver input power control mode is set to manual. See "<a href="#">Digital receiver power</a>".</p> <p>The optional [:SElected] keyword in this command specifies that the expected input power setting being queried applies to the current system type.</p> <p>The test set's receiver power control mode is set by the "<a href="#">RFAnalyzer:CONTROL:POWER:AUTO</a>" command.</p> <p>The test set's measuring receiver will consider any amplitude offsets that are defined along with this setting to calculate input power range settings.</p>
Setting	<p>Range: Test application and system type dependent (approximately -25 to +43 dBm).</p> <p>Resolution: 0.01 dBm</p>
Query	Range: Test application and system type dependent (approximately -25 to +43 dBm).
*RST setting	-75 dBm
<b>Programming Example</b> <pre>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.</pre>	

**RFAnalyzer:MANual:ANALog:POWer[:SELEcted]**

Function	Sets/queries the expected power when the mobile is on an analog voice channel. The selected band is currently limited to the cellular band (800 MHz).
Setting	Range: -60 dBm to +53 dBm (interacts with the Amplitude Offset setting to determine the available range) Resolution: 0.01 dB
Query	Range: -60 dBm to +53 dBm Resolution: 0.01 dBm
*RST setting	13 dBm
<b>Programming Example</b>	
OUTPUT 714;"RFAnalyzer:MANual:ANALog:POWer:SELEcted 24 DBM"	

**RFAnalyzer:MANual:ANALog:POWer:CELLular**

Function	Sets/queries the expected power when the mobile is on a cellular band (800 MHz) analog voice channel.
Setting	Range: -60 dBm to +53 dBm (interacts with the Amplitude Offset setting to determine the available range) Resolution: 0.01 dBm
Query	Range: -60 dBm to +53 dBm
*RST setting	13 dBm
<b>Programming Example</b>	
OUTPUT 714;"RFAnalyzer:MANual:ANALog:POWer:CELLular 24 DBM"	

**RFAnalyzer:MANual:MEASurement[:MFRequency]**

Function	<p>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 <a href="#">"Block Diagram"</a> .)</p> <p>The query form of this command returns the tune frequency of the test set's measurement signal path.</p> <p>The tune mode for the test set's measurement signal path can be returned to auto using the <a href="#">"RFAnalyzer:CONTRol:MEASurement:FREQuency:AUTO"</a> command.</p>
Setting	<p>Range: 292.5 MHz to 2700 MHz</p> <p>Resolution: 0.1 Hz</p>
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz
<p><b>Programming Example</b></p> <pre>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.</pre>	

**RFAnalyzer:MANual:MEASurement:FREQuency**

Function	<p>Sets/queries Meas Frequency, the measurement downconverter signal path frequency control mode. (See <a href="#">"Block Diagram"</a> .)</p> <p>This setting is applied when manual mode is selected (see <a href="#">"RFAnalyzer:CONTRol:MEASurement:FREQuency:AUTO"</a> ).</p>
Setting	<p>Range: 292.5 MHz to 2700 MHz</p> <p>Resolution: 0.1 Hz</p>
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz
<p><b>Programming Example</b></p> <pre>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.</pre>	

**RFANalyzer:MANual:UPLink[:MFRequency]**

Function	<p>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.</p> <p>The query form of this command returns the tune frequency of the test set's demodulation signal path.</p> <p>The tune mode for the test set's demodulation path can be returned to auto using the "RFANalyzer:CONTRol:UPLink:FREQuency:AUTO" command.</p>
Setting	<p>Range: 292.5 MHz to 2700 MHz</p> <p>Resolution: 0.1 Hz</p>
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"RFANALYZER:MANUAL:UPLINK:MFREQUENCY 1955.030 MHZ"</pre> <p>!Enables manual control of the demodulation signal path tune frequency and sets the tune frequency !to 1955.030 MHz.</p>	

**RFANalyzer:MANual:UPLink:FREQuency**

Function	<p>Sets/queries the tune frequency of the test set's demodulation signal path.</p> <p>This setting is applied when manual mode is selected (see "RFANalyzer:CONTRol:UPLink:FREQuency:AUTO").</p>
Setting	<p>Range: 292.5 MHz to 2700 MHz</p> <p>Resolution: 0.1 Hz</p>
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"RFANALYZER:MANUAL:UPLINK:FREQUENCY 942.6 MHZ"</pre> <p>!Sets the test set's demodulation signal path tune frequency to 942.6 MHz.</p>	



---

## RFGenerator Subsystem

### Description

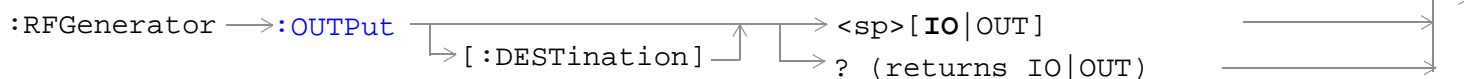
The RFGenerator subsystem selects the RF generator output port on test sets equipped with both the RF IN/OUT port and the RF OUT ONLY port. If the test set does not have the RF OUT ONLY port, an error message is generated when attempting to switch output ports.

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 522](#)

## RFGenerator:OUTPUT



[“Diagram Conventions” on page 268](#)

### RFGenerator:OUTPUT[:DESTINATION]

Function	<p>Sets/queries the RF output port destination: RF IN/OUT (IO) or RF OUT ONLY (OUT).</p> <p>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.</p> <p>The query form will always return a value, regardless of the hardware version.</p>
Setting	<p>Range: 292 MHz to 2700 MHz</p> <p>Resolution: 0.1 Hz</p>
Query	<p>Range: 292 MHz to 2700 MHz</p> <p>Resolution: 0.1 Hz</p>
*RST Setting	851 MHz
Requirements	<p>Test Application Revision: B.03.00 and above</p> <p>Hardware: RF Input/Output module with second RF output connector, modified front panel.</p>
<p><b>Programming Example</b></p> <pre> OUTPUT 714;"RFGENERATOR:OUTPUT:DESTINATION OUT" !Sets the RF generator's output destination to the RF Out Only port.                     </pre>	

---

## 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\[:ALL\]:CONTinuous” on page 533](#)

[“SETup:AFANalyzer” on page 525](#)

[“SETup:ATXPower” on page 534](#)

[“SETup:CAPPower” on page 538](#)

[“SETup:CCTPhase” on page 541](#)

[“SETup:CFERror” on page 545](#)

[“SETup:CPOWer” on page 549](#)

[“SETup:CTXSpurious” on page 553](#)

[“SETup:DAPower” on page 557](#)

[“SETup:FM” on page 561](#)

[“SETup:FSTability” on page 567](#)

[“SETup:GPOWer” on page 571](#)

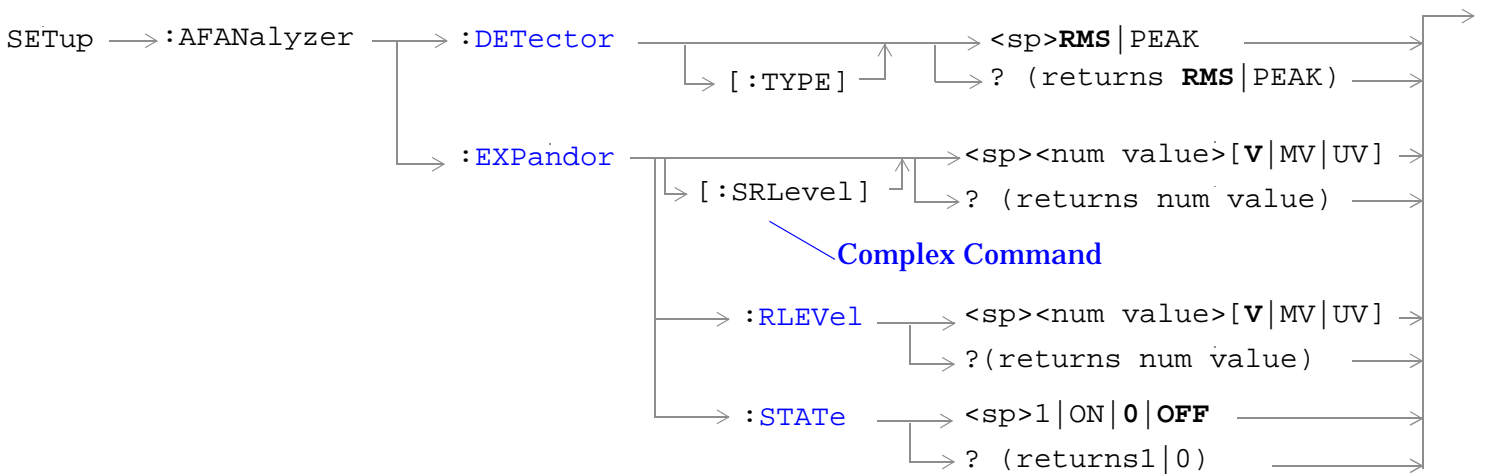
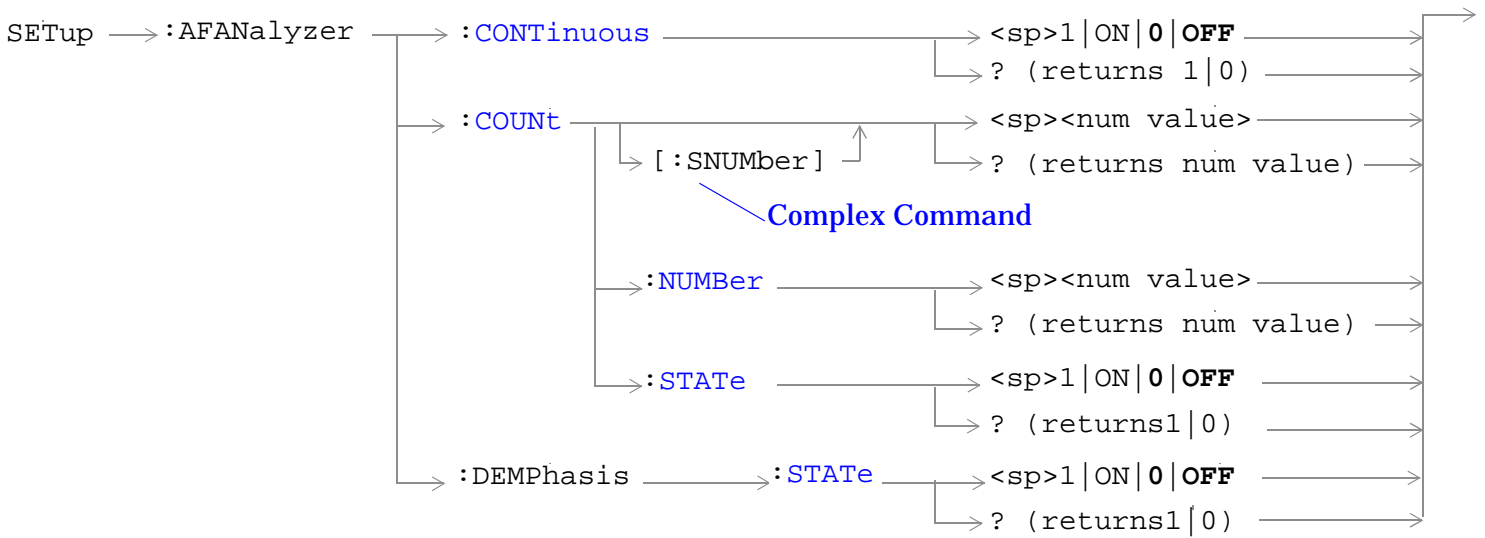
[“SETup:HWQuality” on page 575](#)

[“SETup:SAUDio” on page 577](#)

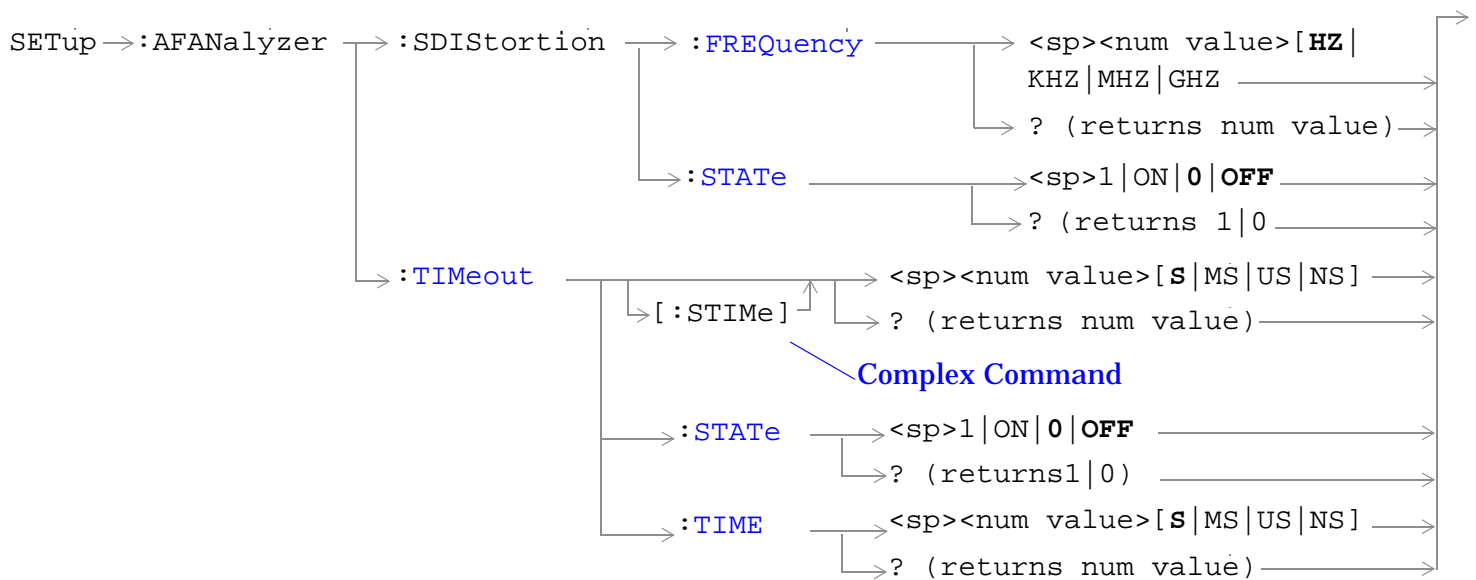
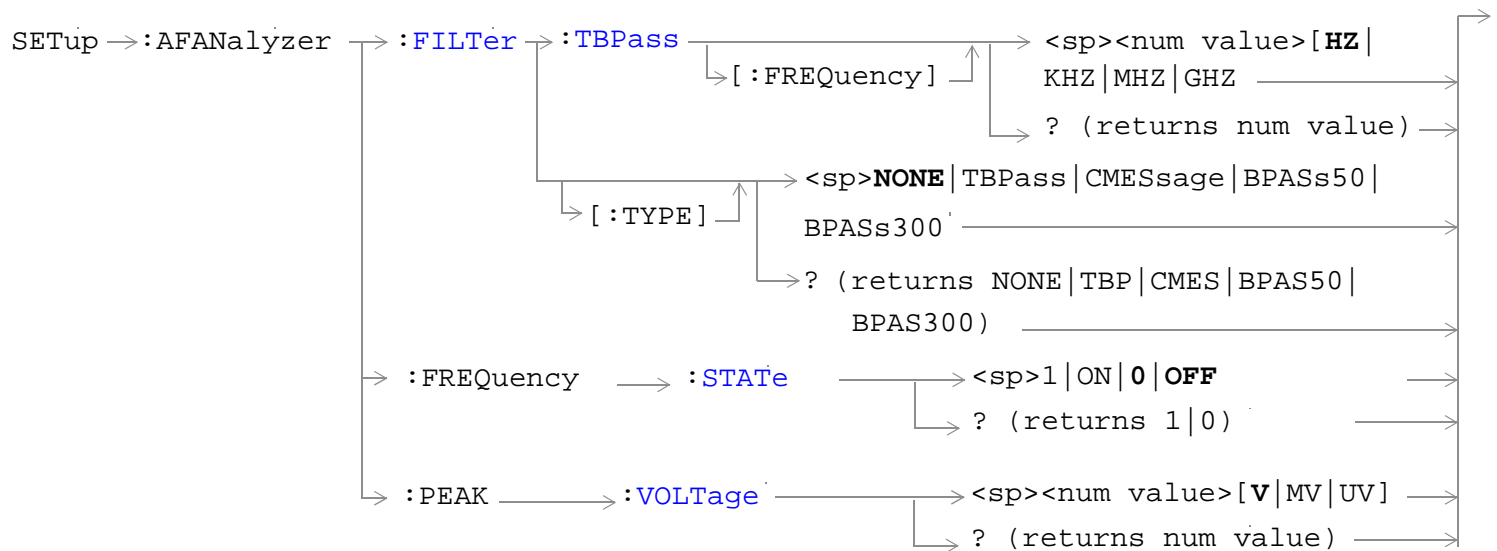
[“SETup:TFERror” on page 586](#)

[“SETup:WQUality” on page 589](#)

## SETup:AFANalyzer



## SETup:AFANalyzer



“Diagram Conventions” on page 268

**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)
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:AFANALYZER:CONTINUOUS OFF" !Sets measurement to single trigger mode.</pre>	

**SETup:AFANalyzer:COUNT[:SNUMber]**

Function	Sets/queries the number of AF analyzer measurements to be made in a multi-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)
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:AFANALYZER:COUNT:SNUMBER 5" !Turns on multi-measurements and sets the number of measurements to 5.</pre>	

**SETup:AFANalyzer:COUNT:NUMBER**

Function	Sets/queries the number of AF analyzer measurements to be made when multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:AFANALYZER:COUNT:NUMBER 5" !Sets the number of measurements to 5 when the multi-measurement state is set to ON.</pre>	

**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

## SETup:AFANalyzer

*RST Setting	0 (off)
<b>Programming Example</b>	
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)
Programming Example	
OUTPUT 714;"SETUP:AFANALYZER:DEMPHESIS: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
Programming Example	
OUTPUT 714;"SETUP:AFANALYZER:DETECTOR:TYPE PEAK"	

**SETup:AFANalyzer:EXPANDOR[:SRLevel]**

Function	Sets/queries the expander's reference level and automatically sets the expander'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
Programming Example	
OUTPUT 714;"SETUP:AFANALYZER:EXPANDOR:SRLEVEL 5V" !Sets expander state to on and level to 5 V.	

**SETup:AFANalyzer:EXPANDOR:RLEVEL**

Function	Sets/queries the expander's reference level to be used when the expander'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
Programming Example	
OUTPUT 714;"SETUP:AFANALYZER:EXPANDOR:RLEVEL 5V" !Sets expander reference level to 5 V.	

**SETup:AFANalyzer:EXPandor:STATE**

Function	Sets/queries whether the expander is enabled.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:AFANALYZER:EXPANDOR:STATE ON"	

**SETup:AFANalyzer:FILTer[:TYPE]**

Function	Sets/queries the filter type for audio measurements.
Setting	Range: NONE   TBPAss   CMESsage   BPASs50   BPASs300
Query	Range: NONE   TBP   CMES   BPAS50   BPAS300
*RST setting	NONE
<b>Programming Example</b> 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
<b>Programming Example</b> 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)
<b>Programming Example</b> 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
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
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)
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

## SETup:AFANalyzer

### Programming Example

```
OUTPUT 714;"SETUP:AFANALYZER:TIMEOUT:STIME 5S"  
!Sets timeout state to ON and sets the timeout time to 5 seconds.
```

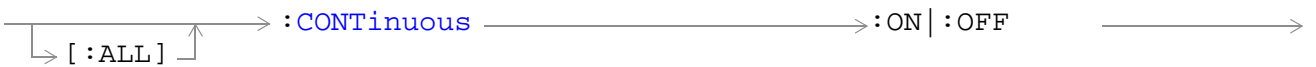
## SETup:AFANalyzer:TIMEout:STATE

Function	Sets/queries the AF analyzer measurement's timeout state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b>	
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
<b>Programming Example</b>	
OUTPUT 714;"SETUP:AFANALYZER:TIMEOUT:TIME 5S"	

## SETup[:ALL]:CONTInuous

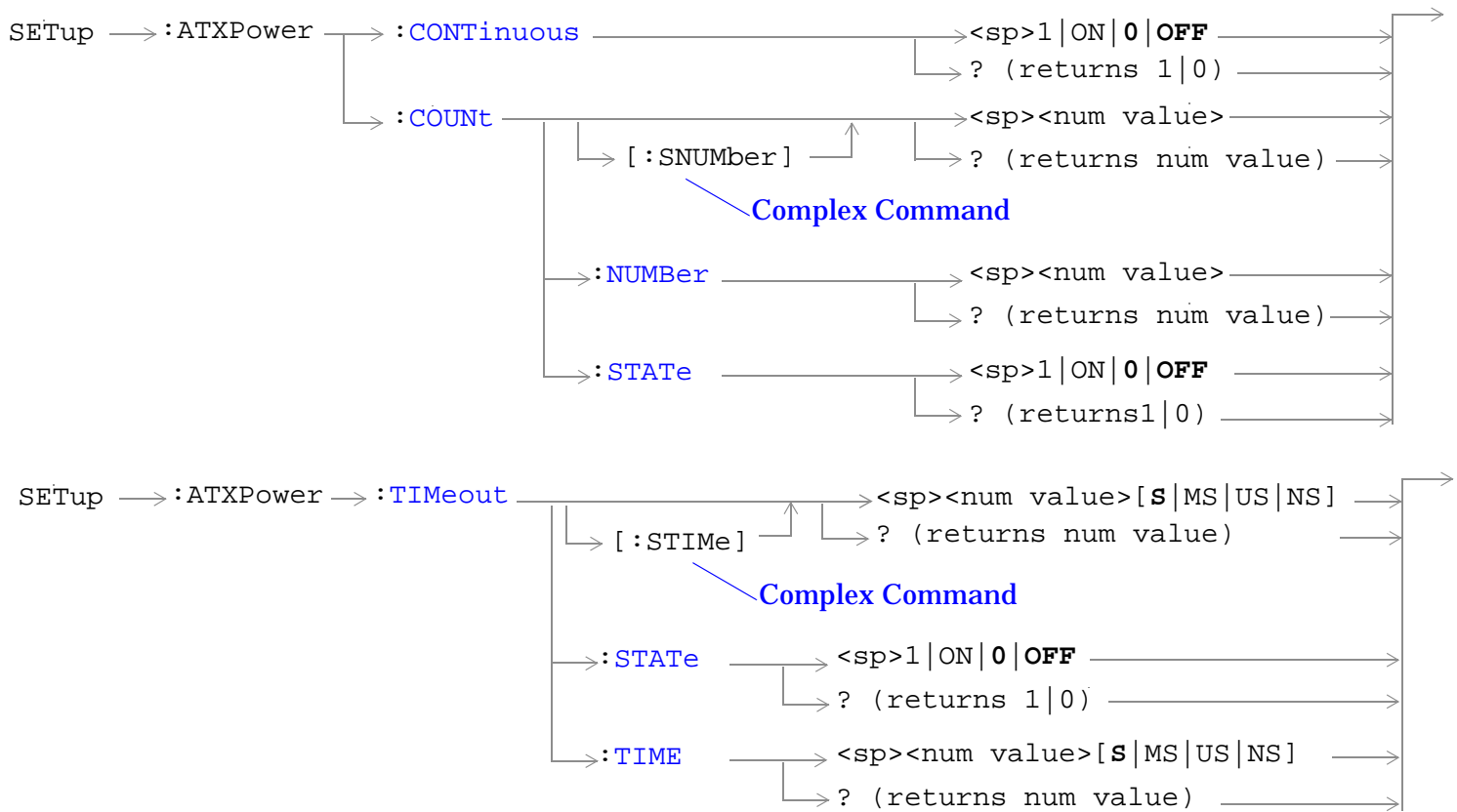
SETup  :CONTInuous | :OFF

[“Diagram Conventions” on page 268](#)

### SETup[:ALL]:CONTInuous

Function	Sets 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 individual measurements.
Setting	Range: ON, OFF
<b>Programming Example</b> OUTPUT 714;"SETup:ALL:CONTInuous:OFF" !Sets all measurements to single trigger mode.	

## SETup:ATXPower



“Diagram Conventions” on page 268

**SETup:ATXPower:CONTInuous**

Function	Sets/queries the trigger arm state for the analog transmitter power 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)
<b>Programming Example</b> OUTPUT 714;"SETUP:ATXPOWER:CONTINUOUS ON" !Sets measurement to continuous trigger mode.	

**SETup:ATXPower:COUNT[:SNUMBER]**

Function	Sets/queries the number of analog transmitter power measurements to be made in a multi-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	10, on
<b>Programming Example</b> OUTPUT 714;"SETUP:ATXPOWER:COUNT:SNUMBER 5" !Turns on multi-measurements and sets the number of measurements to 5.	

**SETup:ATXPower:COUNT:NUMBER**

Function	Sets/queries the number of analog transmitter power measurements to be made when multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
<b>Programming Example</b> OUTPUT 714;"SETUP:ATXPOWER:COUNT:NUMBER 5" !Sets the number of measurements to 5 when the multi-measurement state is set to ON.	

## SETup:ATXPower

### SETup:ATXPower:COUNT:STATe

Function	Sets/queries the multi-measurement state of the analog transmitter power measurement.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:ATXPOWER:COUNT:STATE ON" !Turns on multi-measurements.	

### SETup:ATXPower:TIMEout[:STIME]

Function	Sets/queries the analog transmitter power measurement's timeout setting and automatically sets the timeout state to ON.
Setting	Range: 0.1 to 999 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999
*RST Setting	10 seconds, on
<b>Programming Example</b> OUTPUT 714;"SETUP:ATXPOWER:TIMEOUT:STIME 5S" !Sets timeout state to ON and sets the timeout time to 5 seconds.	

### SETup:ATXPower:TIMEout:STATe

Function	Sets/queries the analog transmitter power measurement's timeout state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:ATXPOWER:TIMEOUT:STATE ON"	



**SETup:ATXPower:TIMEout:TIME**

Function	Sets/queries the analog transmitter power measurement's timeout setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 999 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999
*RST Setting	10 seconds
<b>Programming Example</b>	
OUTPUT 714;"SETUP:ATXPOWER:TIMEOUT:TIME 5S"	

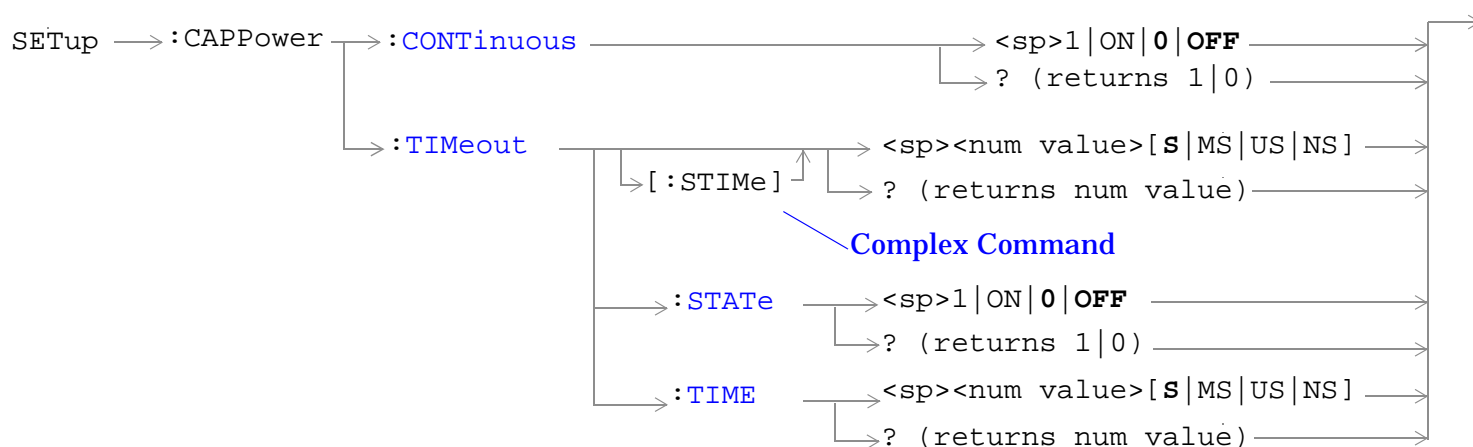
## SETup:CAPPower

**NOTE** The following three parameters directly affect access probe power measurements:

- Power Step
- Number of Steps
- Maximum Request Sequence

GPIB commands for these three parameters can be found in the “CALL[:CELL]:APARAmeter” syntax diagrams.

To limit a call attempt to the access attempt state, see “CALL:CONNected[:STATe]”



“Diagram Conventions” on page 268

**SETup:CAPPower:CONTinuous**

Function	Sets/queries the trigger arm state for the access probe power measurement. The trigger arm state determines whether the access probe power measurement will be made on the first access probe in an access probe sequence then stop (0   OFF (single)), or automatically re-arm and make measurements on each of the following access probes (1   ON (continuous)).
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:CAPPOWER:CONTINUOUS OFF" !Sets measurement to single trigger mode.</pre>	

**SETup:CAPPower:TIMEout[:STIME]**

Function	The setting form of this command performs two functions: (1) sets the access probe power measurement's timeout (see "Timeouts" ) value, and (2) sets the access probe power measurement's timeout STATE to 1 (on).  The query form returns the access probe 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
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:CAPPOWER:TIMEOUT:STIME 5 S" !Sets timeout state to ON and sets the timeout time to 5 seconds.</pre>	

**SETup:CAPPower:TIMEout:STATE**

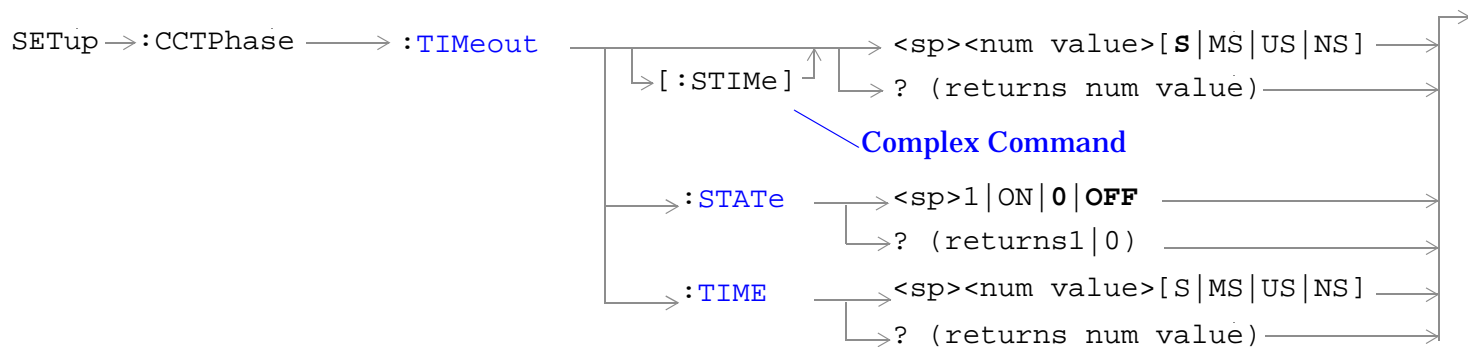
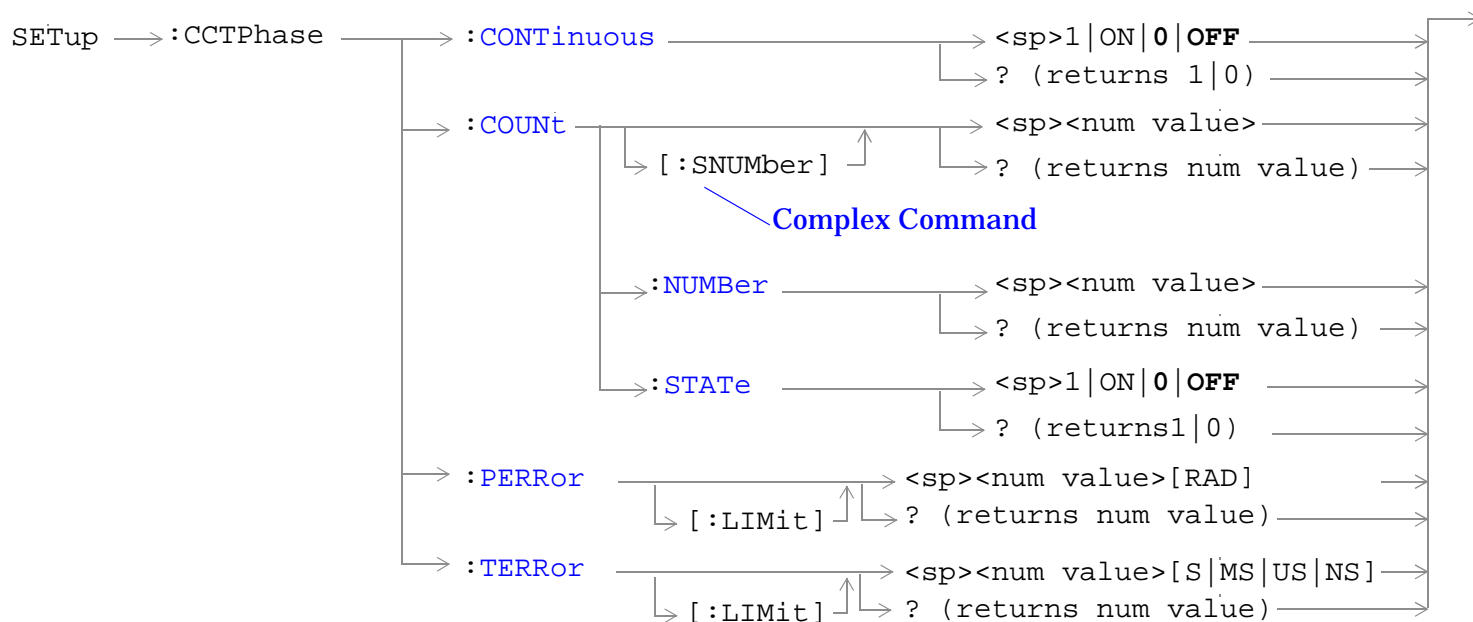
Function	Sets/queries the access probe power measurement's timeout (see "Timeouts" ) state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:CAPPOWER:TIMEOUT:STATE ON"</pre>	

SETup:CAPPower

**SETup:CAPPower:TIMEout:TIME**

Function	Sets/queries the access probe power measurement's timeout (see "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
<b>Programming Example</b> OUTPUT 714; "SETUP:CAPPOWER:TIMEOUT:TIME 5 S"	

## SETup:CCTPhase



“Diagram Conventions” on page 268

## SETup:CCTPhase

### SETup:CCTPhase:CONTInuous

Function	Sets/queries the trigger arm state for the code channel timing and phase error measurements. The trigger arm state determines whether the code channel timing and phase error measurements 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)
<b>Programming Example</b>  OUTPUT 714;"SETUP:CCTPHASE:CONTINUOUS OFF" !Sets measurement to single trigger mode.	

### SETup:CCTPhase:COUNT[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of code channel timing and phase error 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 code channel timing and phase error multi-measurements to be made when mult-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATE = On)
<b>Programming Example</b>  OUTPUT 714;"SETUP:CCTPHASE:COUNT:SNUMBER 5" !Turns on multi-measurements and sets the number of measurements to 5.	

### SETup:CCTPhase:COUNT:NUMBER

Function	Sets/queries the number of code channel timing and phase error measurements to be made when the mult-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
<b>Programming Example</b>  OUTPUT 714;"SETUP:CCTPHASE:COUNT:NUMBER 5" !Sets the number of code channel timing and phase error multi-measurements to 5.	

**SETup:CCTPhase:COUNT:STATE**

Function	Sets/queries the code channel timing and phase error multi-measurement state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714; "SETUP:CCTPHASE:COUNT:STATE ON" !Turns on code channel timing and phase error multi-measurements.	

**SETup:CCTPhase:PERRor[:LIMit]**

Function	Sets/queries the code channel phase error limit.
Setting	Range: 0 to 1.00 radian Resolution: 0.01 radian
Query	Range: 0 to 1.00 radian
*RST Setting	0.15 radian
<b>Programming Example</b> OUTPUT 714; "SETUP:CCTPHASE:PERROR 0.25 "	

**SETup:CCTPhase:TERRor[:LIMit]**

Function	Sets/queries the code channel timing error limit.
Setting	Range: 0 to 100.0 ns Resolution: 0.1 ns
Query	Range: 0 to 100.0 ns
*RST Setting	10.0 ns
<b>Programming Example</b> OUTPUT 714; "SETUP:CCTPHASE:TERROR 25 "	

## SETup:CCTPhase

### SETup:CCTPhase:TIMEout[:STIME]

Function	The setting form of this command performs two functions: (1) sets the code channel timing and phase error measurements' timeout (see "Timeouts" ) value, and (2) sets the code channel timing and phase error measurements' timeout STATE to 1 (on).  The query form returns the code channel timing and phase error measurements' 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
<b>Programming Example</b>  OUTPUT 714;"SETUP:CCTPHASE:TIMEOUT:STIME 5 S" !Sets timeout state to ON and sets the timeout time to 5 seconds.	

### SETup:CCTPhase:TIMEout:STATE

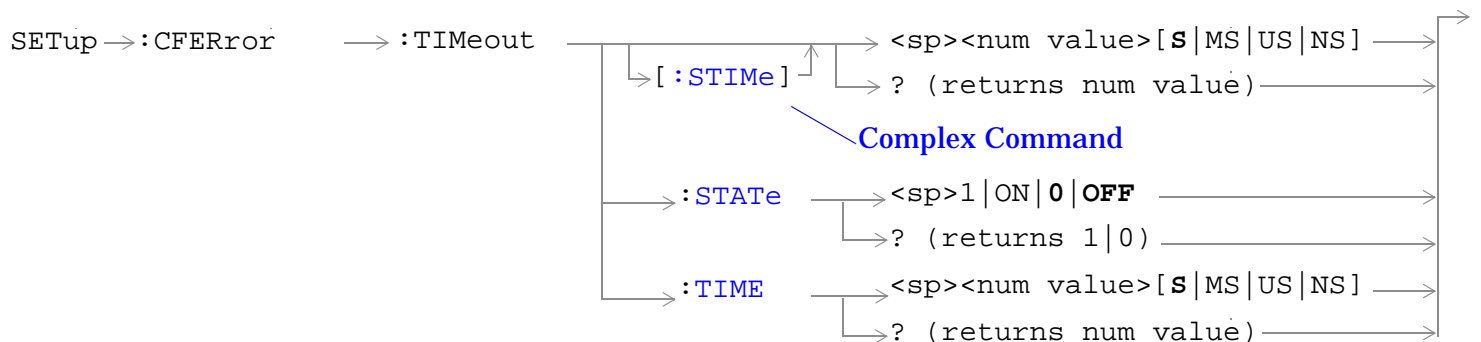
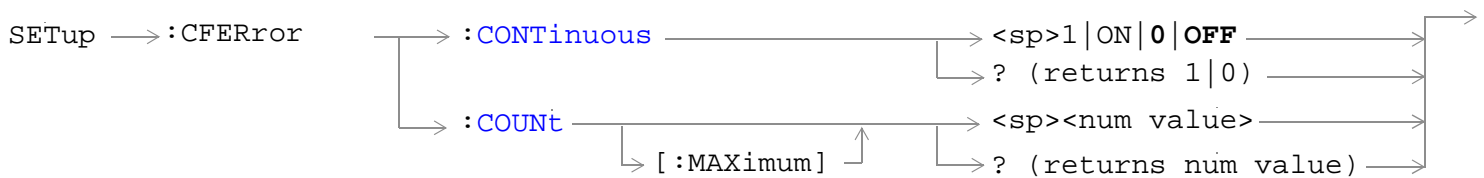
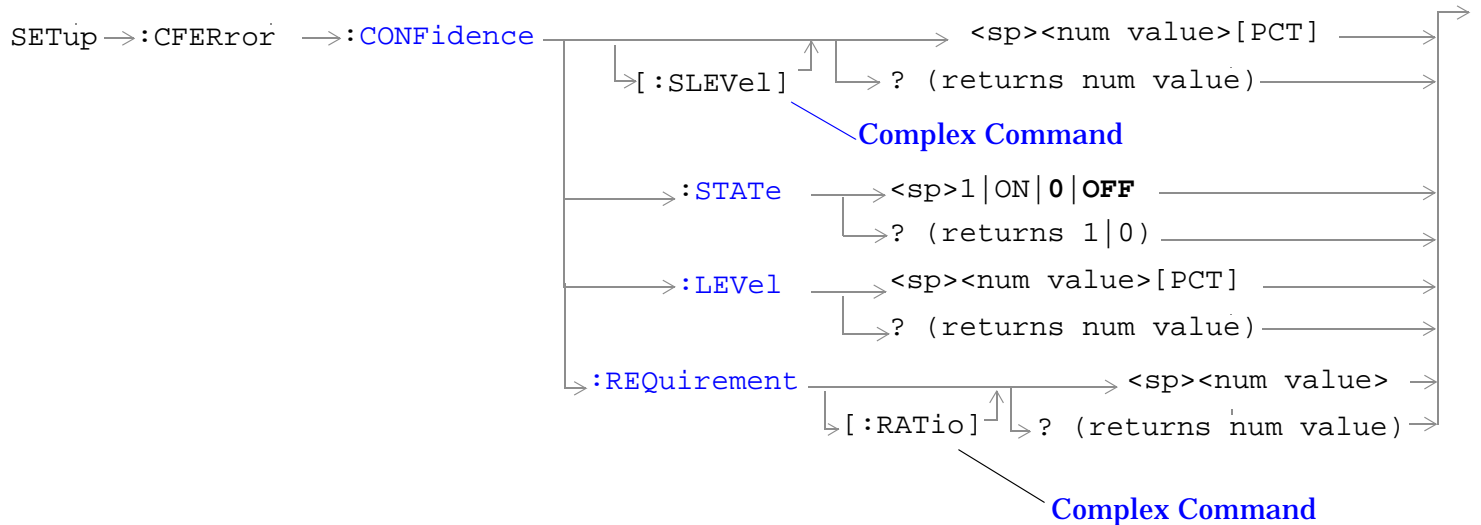
Function	Sets/queries the code channel timing and phase error measurements's timeout (see "Timeouts" ) state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b>  OUTPUT 714;"SETUP:CCTPHASE:TIMEOUT:STATE ON" !Sets the timeout state to ON.	

### SETup:CCTPhase:TIMEout:TIME

Function	Sets/queries the code channel timing and phase error measurements' timeout (see "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
<b>Programming Example</b>  OUTPUT 714;"SETUP:CCTPHASE:TIMEOUT:TIME 5 S" !Sets the timeout time to five seconds.	



## SETup:CFERror



“Diagram Conventions” on page 268

## SETup:CFERror

### SETup:CFERror:CONFidence[:SLEVel]

Function	The setting form of this command performs two functions: (1) sets the FER (frame error rate) measurement's confidence level, and (2) sets the FER measurement's confidence limit STATE to 1 (on). The query form of this command returns the FER measurement's confidence level setting.
Setting	Range: 80 to 99.99 percent Resolution: 0.01 percent
Query	Range: 80 to 99.99
*RST Setting	95 percent, On
<b>Programming Example</b> OUTPUT 714;"SETUP:CFERROR:CONFIDENCE 95" !sets the FER confidence level to 95 percent	

### SETup:CFERror:CONFidence:STATE

Function	Sets/queries the FER (frame error rate) measurement confidence limit testing on/off state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:CFERROR:CONFIDENCE:STATE ON"	

### SETup:CFERror:CONFidence:LEVel

Function	Sets/queries the FER (frame error rate) measurement's confidence limit level.
Setting	Range: 80 to 99.99%
Query	Range: 80 to 99.99
*RST Setting	95%, on
<b>Programming Example</b> OUTPUT 714;"SETUP:CFERROR:CONFIDENCE:LEVEL 95" !sets the confidence level to 95%.	

**SETup:CFERror:CONFidence:REQUIREment[:RATIo]**

Function	Sets/queries the FER (frame error rate) measurement's FER requirement. This value specifies the percentage of frame errors used in determining confidence limit pass/fail results.
Setting	Range: 0.10 to 5.0
Query	Range: 0.10 to 5.0
*RST Setting	1.00 %
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:CFERROR:CONFIDENCE:REQUIREMENT 2 PCT" !sets the confidence limit requirement to 2.00 percent.</pre>	

**SETup:CFERror:CONTInuous**

Function	Sets/queries the trigger arm state for the FER (frame error rate) 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)
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:CFERROR:CONTINUOUS OFF" !Sets the FER measurement to single trigger mode.</pre>	

**SETup:CFERror:COUNt[:MAXimum]**

Function	<p>The setting form of this command sets the maximum frame count parameter for frame error rate measurements.</p> <p>If the confidence level parameter is off, the FER (frame error rate) measurement will continue until the maximum frame count is reached. If the confidence level parameter is on and the FER measurement reaches max frames, the FER measurement will return the string value "Max Frames" (see "FETCh:CFERror[:ALL]?").</p> <p>The query form returns the maximum frame count parameter.</p>
Setting	Range: 25 to 10,000,000
Query	Range: 25 to 10,000,000
*RST Setting	10,000
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:CFERror:COUNT 10000" !sets the maximum frames value to 10,000.</pre>	

## SETup:CFERror

### SETup:CFERror:TIMEout[:STIME]

Function	The setting form of this command performs two functions: (1) sets the FER (frame error rate) measurement's timeout value, and (2) sets the FER measurement's timeout STATE to 1 (on). The query form returns the FER measurement's timeout value.
Setting	Range: 1 to 200,000 seconds Resolution: 1 second
Query	Range: 1 to 200,000
*RST Setting	200 seconds, on
<b>Programming Example</b>  OUTPUT 714;"SETUP:CFERROR:TIMEOUT:STIME 200S" !Sets timeout state to ON and sets the timeout time to 200 seconds.	

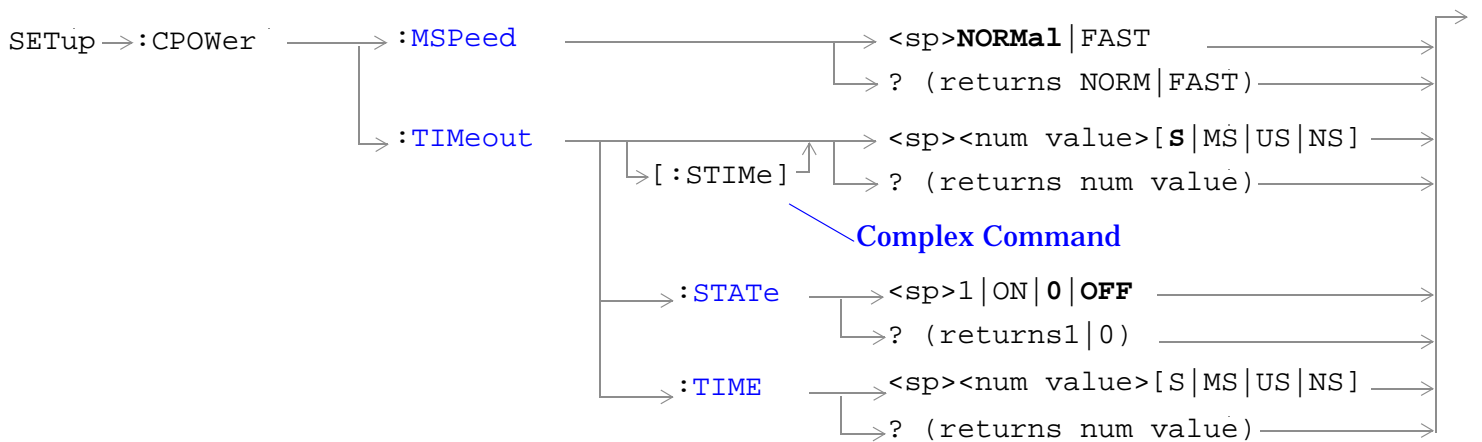
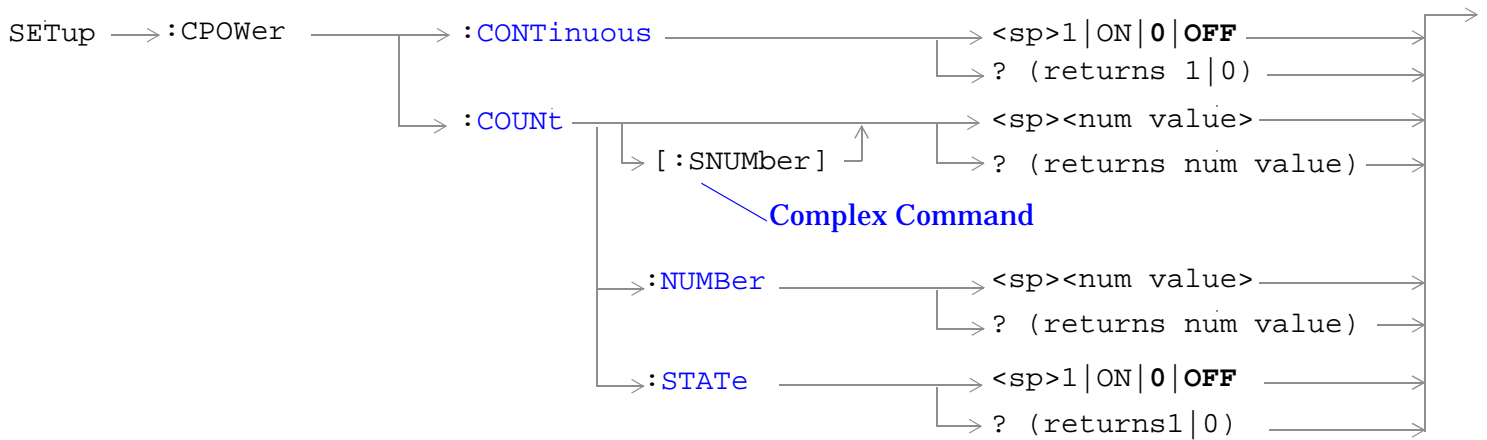
### SETup:CFERror:TIMEout:STATE

Function	Sets/queries the FER (frame error rate) measurement's timeout state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b>  OUTPUT 714;"SETUP:CFERROR:TIMEOUT:STATE ON"	

### SETup:CFERror:TIMEout:TIME

Function	Sets/queries the FER (frame error rate) measurement's timeout setting to be used when the timeout state is set to ON.
Setting	Range: 1 to 200,000 seconds Resolution: 1 second
Query	Range: 1 to 200,000
*RST Setting	200 seconds
<b>Programming Example</b>  OUTPUT 714;"SETUP:CFERROR:TIMEOUT:TIME 200S"	

## SETup:CPOWer



“Diagram Conventions” on page 268

## SETup:CPOWer

### SETup:CPOWer: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)
<b>Programming Example</b>  OUTPUT 714;"SETUP:CPOWER:CONTINUOUS OFF" !Sets measurement to single trigger mode.	

### SETup:CPOWer: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 mult-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATE = On)
<b>Programming Example</b>  OUTPUT 714;"SETUP:CPOWER:COUNT:SNUMBER 5" !Turns on multi-measurements and sets the number of measurements to 5.	

### SETup:CPOWer:COUNT:NUMBER

Function	Sets/queries the number of channel power measurements to be made when the mult-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
<b>Programming Example</b>  OUTPUT 714;"SETUP:CPOWER:COUNT:NUMBER 5" !Sets the number of channel power multi-measurements to 5.	

**SETup:CPOWer: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)
<b>Programming Example</b> OUTPUT 714;"SETUP:CPOWER:COUNT:STATE ON" !Turns on channel power multi-measurements.	

**SETup:CPOWer:MSpeed**

Function	<p>Sets/queries the channel power measurement speed.</p> <p>Channel power measurement speed is determined by the measurement sampling period. NORMAL channel power measurements are sampled for 10 milliseconds, while FAST channel power measurements are sampled for 1.25 milliseconds.</p> <p>NORMAL speed channel power measurements are compatible with both gated (RF) or non-gated signals. Since NORMAL channel power measurements are slower than FAST measurements, use NORMAL when measuring gated input signals. Gated input signals occur when radio configuration 1 or 2 are selected and any data rate other than full is selected. See "CALL:TRAFfic" and "CALL[:CELL]:RCONfig".</p> <p>FAST channel power measurement speed is compatible only with non-gated (RF) signals. Non-gated signals occur when radio configuration 3, 4, or 5 are selected or radio configuration 1 or 2 is selected with full rate. See "CALL:TRAFfic" and "CALL[:CELL]:RCONfig".</p>
Setting	Range: NORMAl   FAST
Query	Range: NORM   FAST
*RST Setting	NORM
<b>Programming Example</b> OUTPUT 714;"SETUP:CPOWER:MSPEED FAST" !Sets up fast channel power measurements.	

## SETup:CPOWer

### SETup:CPOWer:TIMEout[:STIME]

Function	The setting form of this command performs two functions: (1) sets the channel power measurement's timeout (see "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
<b>Programming Example</b>  OUTPUT 714;"SETUP:CPOWER:TIMEOUT:STIME 5 S" !Sets timeout state to ON and sets the timeout time to 5 seconds.	

### SETup:CPOWer:TIMEout:STATE

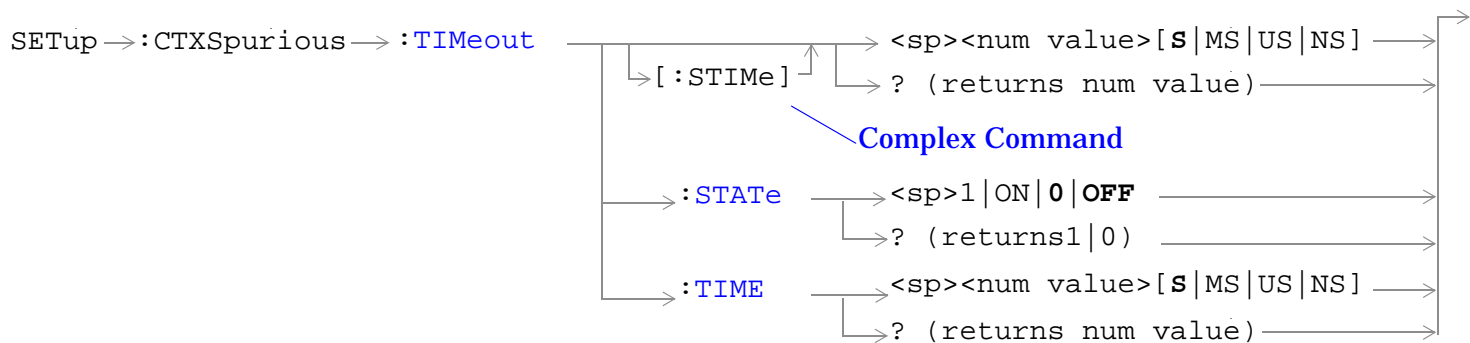
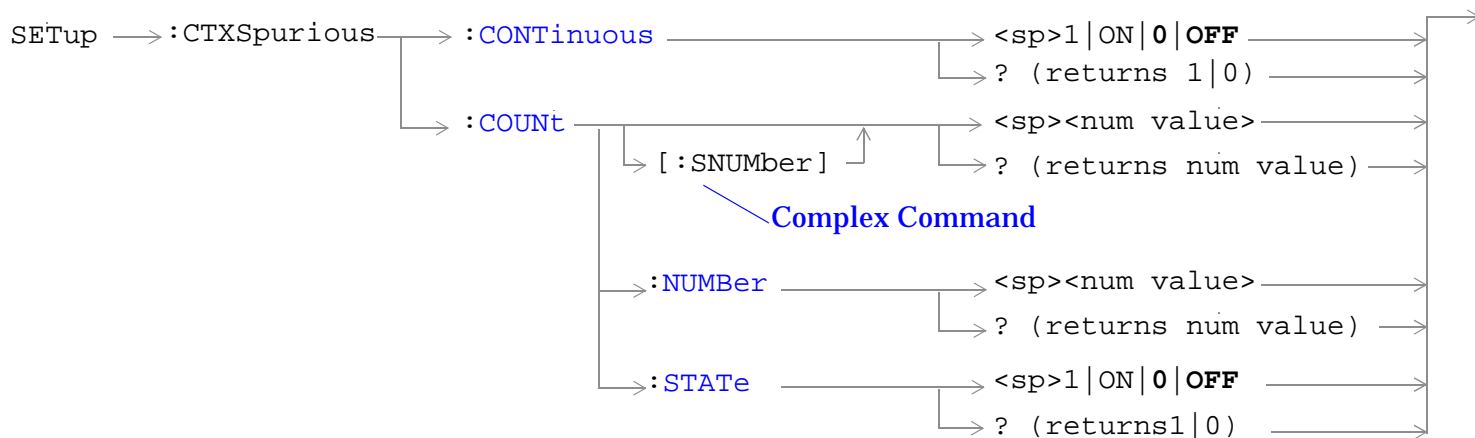
Function	Sets/queries the channel power measurement's timeout (see "Timeouts" ) state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b>  OUTPUT 714;"SETUP:CPOWER:TIMEOUT:STATE ON"	

### SETup:CPOWer:TIMEout:TIME

Function	Sets/queries the channel power measurement's timeout (see "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
<b>Programming Example</b>  OUTPUT 714;"SETUP:CPOWER:TIMEOUT:TIME 5 S"	



## SETup:CTXSpurious



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## SETup:CTXSpurious

### SETup:CTXSpurious:CONTInuous

Function	Sets/queries the trigger arm state for the tx spurious emissions measurement. The trigger arm state determines whether the tx spurious emissions 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)
<b>Programming Example</b>  OUTPUT 714;"SETUP:CTXSPURIOUS:CONTINUOUS OFF" !Sets measurement to single trigger mode.	

### SETup:CTXSpurious:COUNT[:SNUMBER]

Function	The setting form of this command performs two functions: (1) sets the number of tx spurious emissions 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 tx spurious emissions multi-measurements to be made when mult-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATE = On)
<b>Programming Example</b>  OUTPUT 714;"SETUP:CTXSPURIOUS:COUNT:SNUMBER 5" !Turns on multi-measurements and sets the number of measurements to 5.	

### SETup:CTXSpurious:COUNT:NUMBER

Function	Sets/queries the number of tx spurious emissions measurements to be made when the mult-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
<b>Programming Example</b>  OUTPUT 714;"SETUP:CTXSPURIOUS:COUNT:NUMBER 5" !Sets the number of tx spurious emissions multi-measurements to 5.	

**SETup:CTXSpurious:COUNT:STATE**

Function	Sets/queries the tx spurious emissions multi-measurement state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:CTXSPURIOUS:COUNT:STATE ON" !Turns on tx spurious emissions multi-measurements.	

**SETup:CTXSpurious:TIMEout[:STIME]**

Function	The setting form of this command performs two functions: (1) sets the tx spurious emissions measurement's timeout (see "Timeouts" ) value, and (2) sets the tx spurious emissions measurement's timeout STATE to 1 (on).  The query form returns the tx spurious emissions 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
<b>Programming Example</b> OUTPUT 714;"SETUP:CTXSPURIOUS:TIMEOUT:STIME 5 S" !Sets timeout state to ON and sets the timeout time to 5 seconds.	

**SETup:CTXSpurious:TIMEout:STATE**

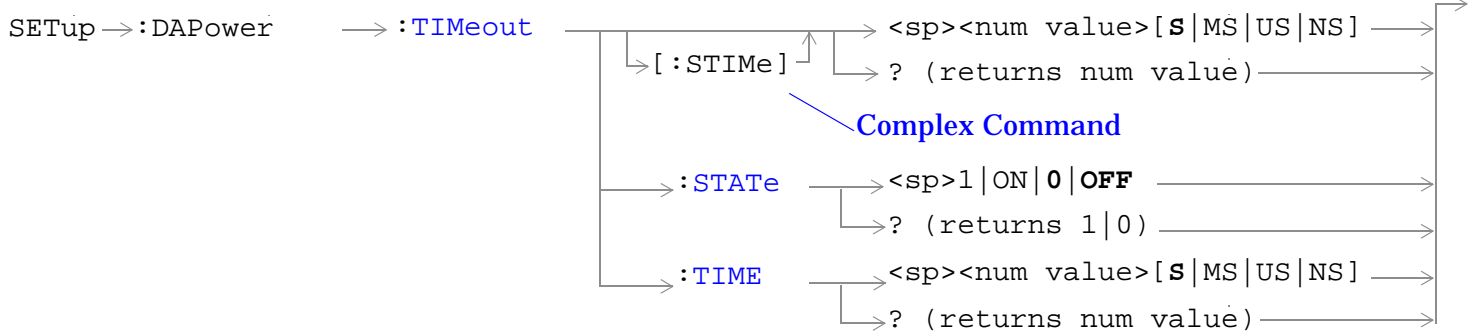
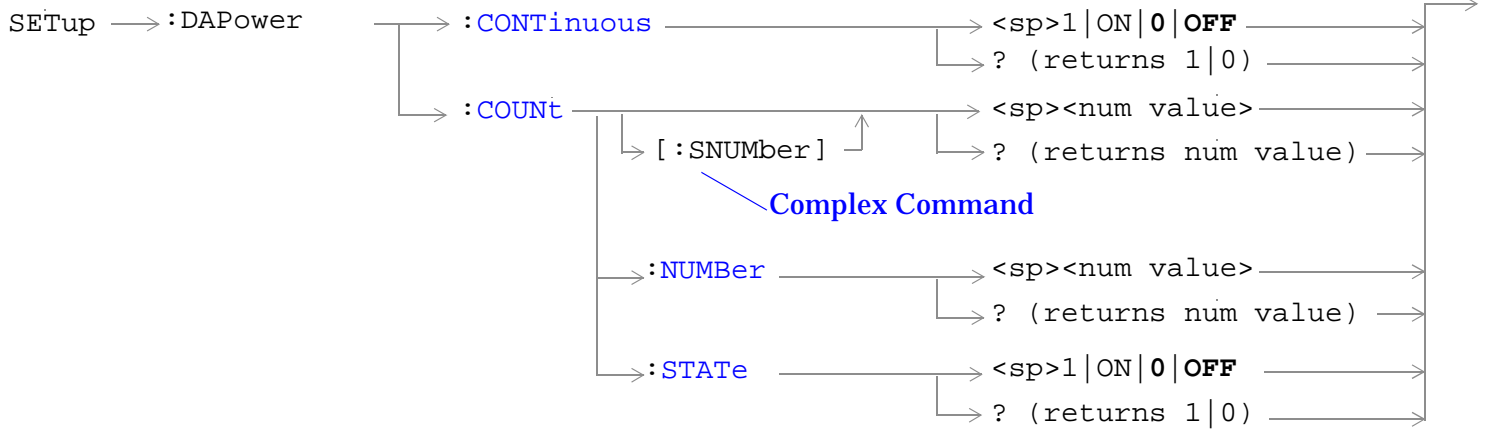
Function	Sets/queries the tx spurious emissions measurement's timeout (see "Timeouts" ) state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:CTXSPURIOUS:TIMEOUT:STATE ON"	

## SETup:CTXSpurious

### SETup:CTXSpurious:TIMEout:TIME

Function	Sets/queries the tx spurious emissions measurement's timeout (see "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
<b>Programming Example</b> OUTPUT 714; "SETUP:CTXSPURIOUS:TIMEOUT:TIME 5 S"	

## SETup:DAPower



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## SETup:DAPower

### SETup:DAPower:CONTInuous

Function	Sets/queries the trigger arm state for the digital average power measurement. The trigger arm state determines whether the digital average 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)
<b>Programming Example</b>  OUTPUT 714;"SETUP:DAPOWER:CONTINUOUS ON" !Sets measurement to single trigger mode.	

### SETup:DAPower:COUNT[:SNUMBER]

Function	The setting form of this command performs two functions: (1) sets the number of digital average 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 digital average 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)
<b>Programming Example</b>  OUTPUT 714;"SETUP:DAPOWER:COUNT:SNUMBER 5" !Turns on multi-measurements and sets the number of measurements to 5.	

### SETup:DAPower:COUNT:NUMBER

Function	Sets/queries the number of digital average 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
<b>Programming Example</b>  OUTPUT 714;"SETUP:DAPOWER:COUNT:NUMBER 5" !Sets the number of measurements to 5 when the multi-measurement state is set to ON.	

**SETup:DAPower:COUNT:STATE**

Function	Sets/queries the multi-measurement state of the digital average power measurement.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:DAPOWER:COUNT:STATE ON" !Turns on multi-measurements.	

**SETup:DAPower:TIMEout[:STIME]**

Function	The setting form of this command performs two functions: (1) sets the digital average power measurement's timeout value, and (2) sets the digital average 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
<b>Programming Example</b> OUTPUT 714;"SETUP:DAPOWER:TIMEOUT:STIME 5S" !Sets timeout state to ON and sets the timeout time to 5 seconds.	

**SETup:DAPower:TIMEout:STATE**

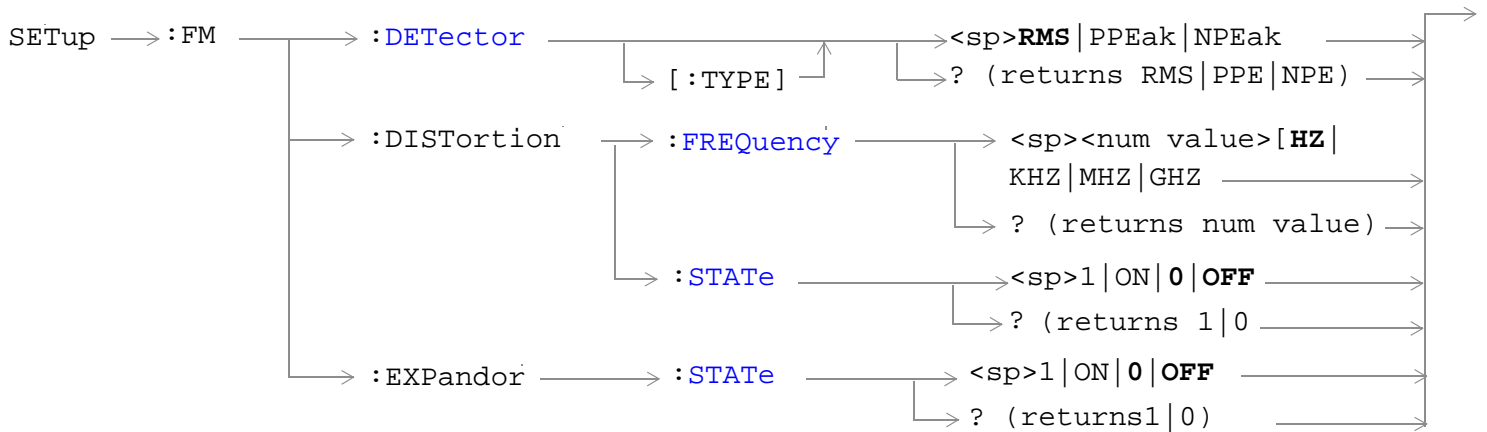
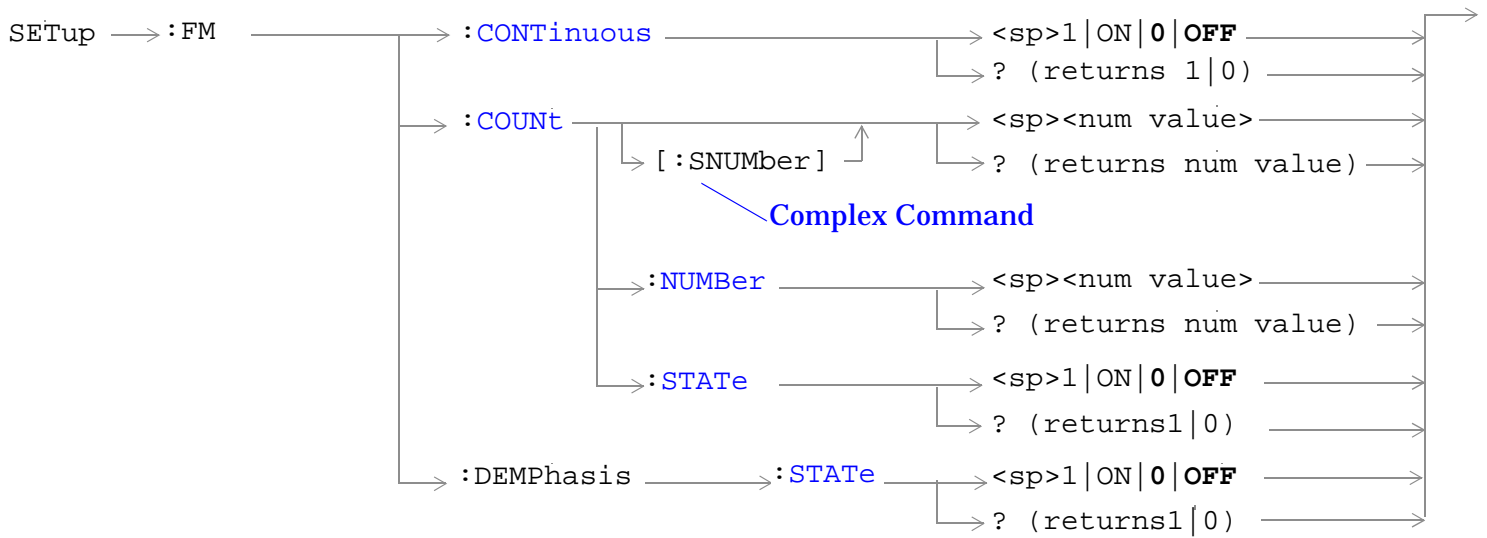
Function	Sets/queries the digital average power measurement's timeout state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:DAPOWER:TIMEOUT:STATE ON"	

**SETup:DAPower:TIMEout:TIME**

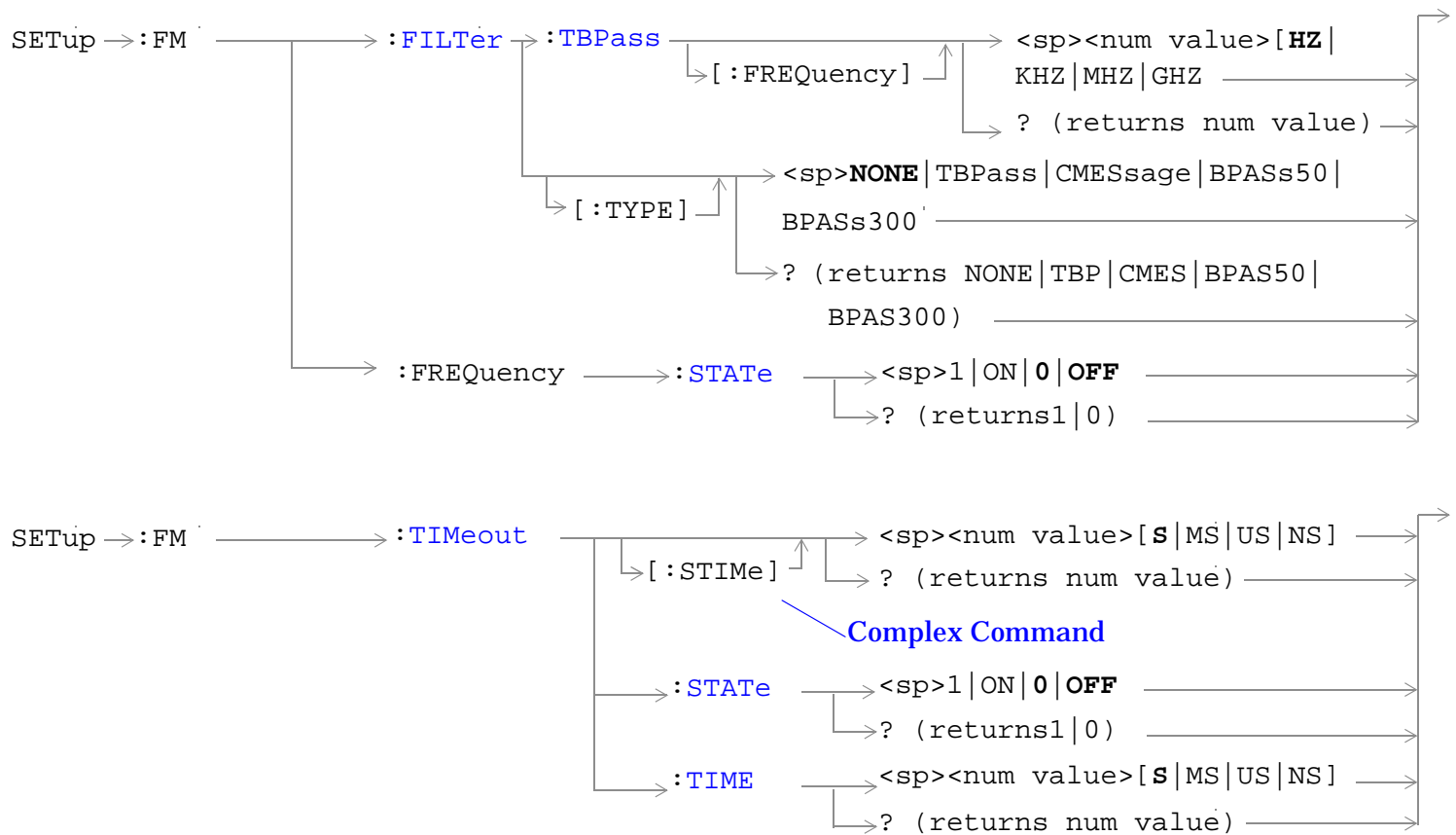
Function	Sets/queries the digital average power measurement's timeout setting to be used when the timeout state is set to ON.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds
<b>Programming Example</b> OUTPUT 714; "SETUP:DAPOWER:TIMEOUT:TIME 5S"	



## SETup:FM



## SETup:FM



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## SETup:FM:CONTInuous

Function	Sets/queries the trigger arm state for the FM 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)
<b>Programming Example</b> OUTPUT 714;"SETUP:FM:CONTINUOUS ON" !Sets measurement to continuous trigger mode.	

**SETup:FM:COUNT[:SNUMBER]**

Function	Sets/queries the number of FM measurements to be made in a multi-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	10, on
<b>Programming Example</b> OUTPUT 714;"SETUP:FM:COUNT:SNUMBER 5" !Turns on multi-measurements and sets the number of measurements to 5.	

**SETup:FM:COUNT:NUMBER**

Function	Sets/queries the number of FM measurements to be made when multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
<b>Programming Example</b> OUTPUT 714;"SETUP:FM:COUNT:NUMBER 5" !Sets the number of measurements to 5 when the multi-measurement state is set to ON.	

**SETup:FM:COUNT:STATE**

Function	Sets/queries the multi-measurement state of the FM measurement.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:FM:COUNT:STATE ON" !Turns on multi-measurements.	

**SETup:FM: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)
<b>Programming Example</b> 10 OUTPUT 714;"SETUP:FM:DEMPHasis:STATE ON"	

## SETup:FM

### SETup:FM:DETECTOR[:TYPE]

Function	Sets/queries the detector type for FM measurements.
Setting	Range: RMS   PPEak   NPEak
Query	Range: RMS   PPE   NPE
*RST setting	RMS
Programming Example 10 OUTPUT 714;"SETUP:FM:DETECTOR:TYPE PEAK"	

### SETup:FM:DIS TORTion:FREQUency

Function	Sets/queries the FM distortion fundamental frequency.
Setting	Range: 100 to 10000 Hz Resolution: 1 Hz
Query	Range: 100 to 10000 Hz
*RST setting	1004 Hz
Programming Example 10 OUTPUT 714;"SETUP:FM:DIS TORTION:FREQUENCY 300HZ"	

### SETup:FM:DIS TORTion:STATe

Function	Sets/queris whether the FM distortion measurement is enabled.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST setting	0 (off)
Programming Example 10 OUTPUT 714;"SETUP:FM:SDIS TORTION:STATE ON"	

### SETup:FM:EXPandor:STATe

Function	Sets/queries whether the expander is enabled.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST setting	0 (off)
Programming Example 10 OUTPUT 714;"SETUP:FM:EXPANDOR:STATE ON"	

**SETup:FM:FILTer[:TYPE]**

Function	Sets/queries the filter type for FM measurements.
Setting	Range: NONE   TBPass   CMESsage   BPASs50   BPASs300
Query	Range: NONE   TBP   CMES   BPAS50   BPAS300
*RST setting	NONE
<b>Programming Example</b> 10 OUTPUT 714;"SETUP:FM:FILTER:TYPE BPAS50" !Selects the 50 Hz to 15 kHz bandpass filter.	

**SETup:FM:FILTer:TBPass[:FREQUENCY]**

Function	Sets/queries the center frequency for the 100 Hz tunable bandpass filter (TBPass).
Setting	Range: 300.0 to 15000 Hz Resolution: 0.1 Hz
Query	Range: 300.0 to 15000 Hz
*RST setting	1004 Hz
<b>Programming Example</b> 10 OUTPUT 714;"SETUP:FM:FILTER:TBPASS:FREQUENCY 300HZ"	

**SETup:FM:FREQUENCY:STATe**

Function	Sets/queries whether the FM modulation frequency measurement is enabled.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:FM:FREQUENCY:STATE ON"	

## SETup:FM

### SETup:FM:TIMEout[:STIME]

Function	Sets/queries the FM measurement's timeout setting and automatically sets the timeout state to ON.
Setting	Range: 0.1 to 999 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999
*RST Setting	10 seconds, on
<b>Programming Example</b> OUTPUT 714;"SETUP:FM:TIMEOUT:STIME 5S" !Sets timeout state to ON and sets the timeout time to 5 seconds.	

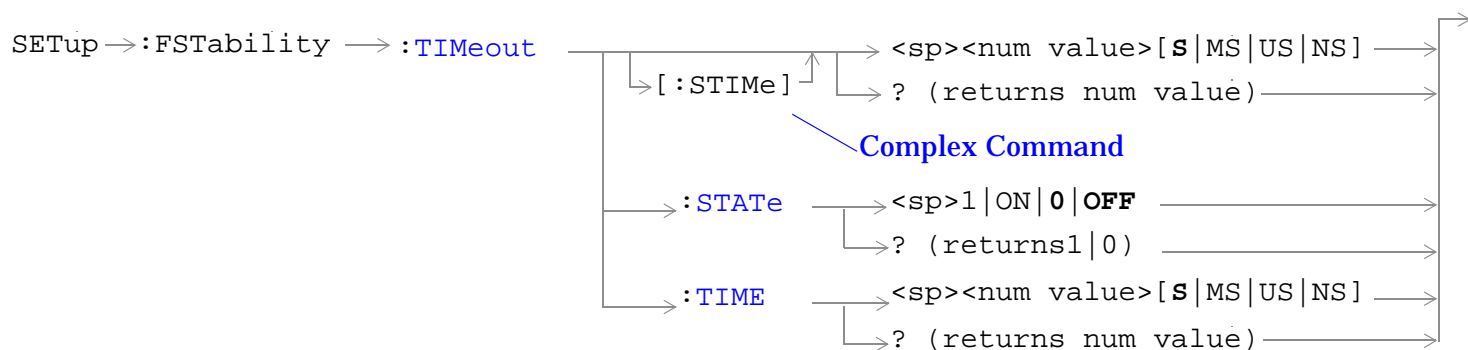
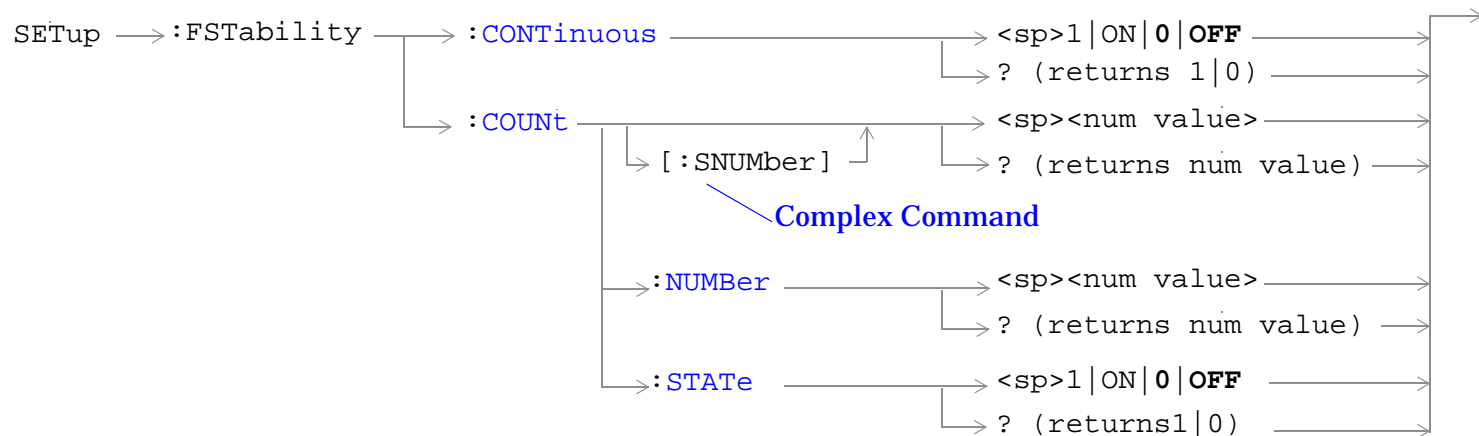
### SETup:FM:TIMEout:STATE

Function	Sets/queries the FM measurement's timeout state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:FM:TIMEOUT:STATE ON"	

### SETup:FM:TIMEout:TIME

Function	Sets/queries the FM measurement's timeout setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 999 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999
*RST Setting	10 seconds
<b>Programming Example</b> OUTPUT 714;"SETUP:FM:TIMEOUT:TIME 5S"	

## SETup:FSTability



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## SETup:FSTability

### SETup:FSTability:CONTInuous

Function	Sets/queries the trigger arm state for the frequency stability 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)
<b>Programming Example</b>  OUTPUT 714;"SETUP:FSTABILITY:CONTINUOUS ON" !Sets measurement to continuous trigger mode.	

### SETup:FSTability:COUNT[:SNUMber]

Function	Sets/queries the number of frequency stability measurements to be made in a multi-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	10, on
<b>Programming Example</b>  OUTPUT 714;"SETUP:FSTABILITY:COUNT:SNUMBER 5" !Turns on multi-measurements and sets the number of measurements to 5.	

### SETup:FSTability:COUNT:NUMBer

Function	Sets/queries the number of frequency stability measurements to be made when multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
<b>Programming Example</b>  OUTPUT 714;"SETUP:FSTABILITY:COUNT:NUMBER 5" !Sets the number of measurements to 5 when the multi-measurement state is set to ON.	



**SETup:FSTability:COUNT:STATE**

Function	Sets/queries the multi-measurement state of the frequency stability measurement.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:FSTABILITY:COUNT:STATE ON" !Turns on multi-measurements.	

**SETup:FSTability:TIMEout[:STIME]**

Function	Sets/queries the frequency stability measurement's timeout setting and automatically sets the timeout state to ON.
Setting	Range: 0.1 to 999 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999
*RST Setting	10 seconds, on
<b>Programming Example</b> OUTPUT 714;"SETUP:FSTABILITY:TIMEOUT:STIME 5S" !Sets timeout state to ON and sets the timeout time to 5 seconds.	

**SETup:FSTability:TIMEout:STATE**

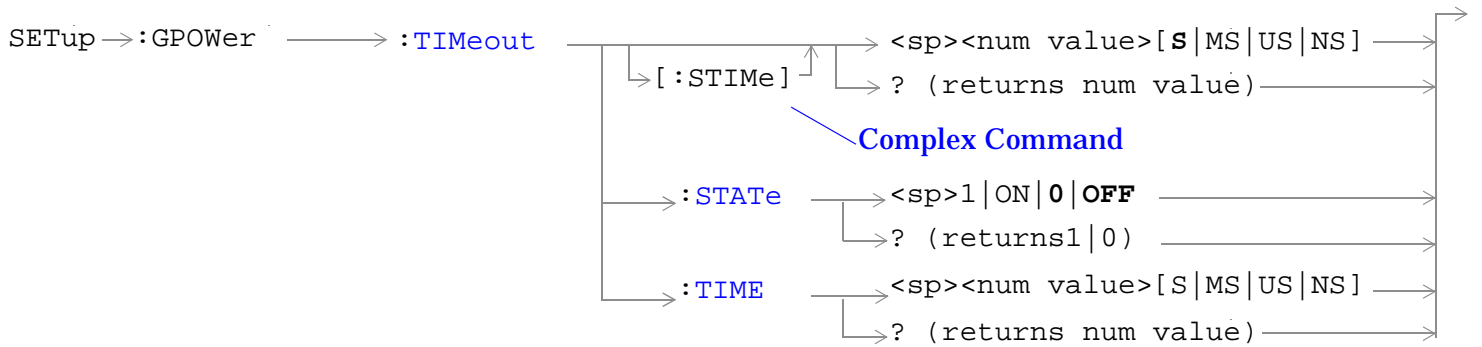
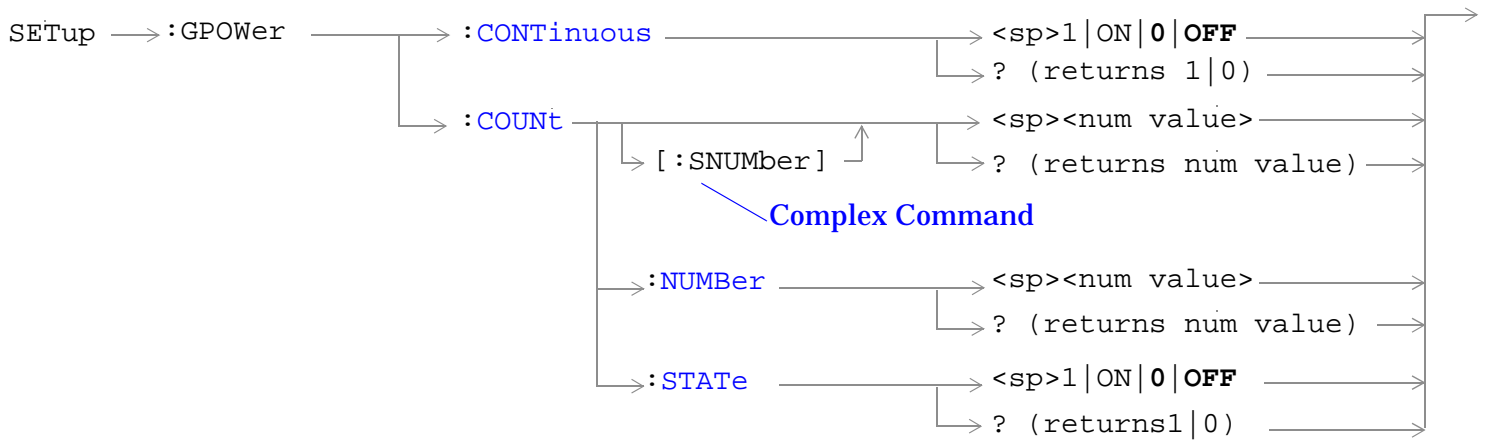
Function	Sets/queries the frequency stability measurement's timeout state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:FSTABILITY:TIMEOUT:STATE ON"	

## SETup:FSTability

### SETup:FSTability:TIMEout:TIME

Function	Sets/queries the frequency stability measurement's timeout setting.
Setting	Range: 0.1 to 999 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999 seconds Resolution: 0.1 second
*RST Setting	10 seconds, on
<b>Programming Example</b> OUTPUT 714;"SETUP:FSTABILITY:TIMEOUT:TIME 5S"	

## SETup:GPOWer



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## SETup:GPOWer

### SETup:GPOWer:CONTInuous

Function	Sets/queries the trigger arm state for the gated power measurement. The trigger arm state determines whether the gated 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)
<b>Programming Example</b>  OUTPUT 714;"SETUP:GPOWER:CONTINUOUS OFF" !Sets measurement to single trigger mode.	

### SETup:GPOWer:COUNT[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of gated 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 gated power multi-measurements to be made when multit-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATE = On)
<b>Programming Example</b>  OUTPUT 714;"SETUP:GPOWER:COUNT:SNUMBER 5" !Turns on multi-measurements and sets the number of measurements to 5.	

### SETup:GPOWer:COUNT:NUMBER

Function	Sets/queries the number of gated power measurements to be made when the multit-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
<b>Programming Example</b>  OUTPUT 714;"SETUP:GPOWER:COUNT:NUMBER 5" !Sets the number of gated power multi-measurements to 5.	

**SETup:GPOWer:COUNT:STATe**

Function	Sets/queries the gated power multi-measurement state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:GPOWER:COUNT:STATE ON" !Turns on gated power multi-measurements.	

**SETup:GPOWer:TIMEout[:STIME]**

Function	<p>The setting form of this command performs two functions: (1) sets the gated power measurement's timeout (see "Timeouts" ) value, and (2) sets the gated power measurement's timeout STATE to 1 (on).</p> <p>The query form returns the gated power measurement's timeout value.</p>
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds, on
<b>Programming Example</b> OUTPUT 714;"SETUP:GPOWER:TIMEOUT:STIME 5 S" !Sets timeout state to ON and sets the timeout time to 5 seconds.	

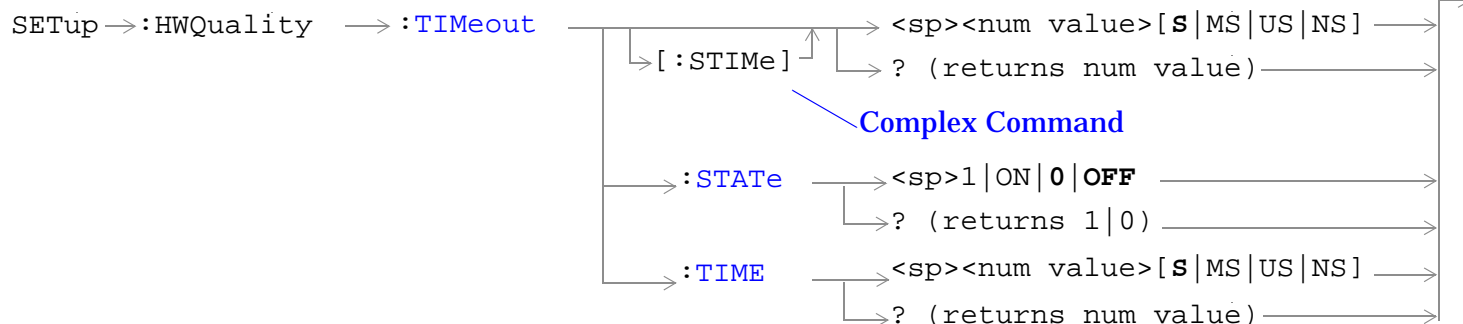
**SETup:GPOWer:TIMEout:STATe**

Function	Sets/queries the gated power measurement's timeout (see "Timeouts" ) state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:GPOWER:TIMEOUT:STATE ON"	

**SETup:GPOWer:TIMEout:TIME**

Function	Sets/queries the gated power measurement's timeout (see "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
<b>Programming Example</b> OUTPUT 714;"SETUP:GPOWER:TIMEOUT:TIME 5 S"	

## SETup:HWQuality



[“Diagram Conventions” on page 268](#)

### SETup:HWQuality:TIMEout[:STIME]

Function	Sets the handoff waveform quality measurement's timeout value, and 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
Programming Example	
<pre>OUTPUT 714;"SETUP:HWQUALITY:TIMEOUT:STIME 5 S" !Sets timeout state to ON and sets the timeout time to 5 seconds.</pre>	

### SETup:HWQuality:TIMEout:STATE

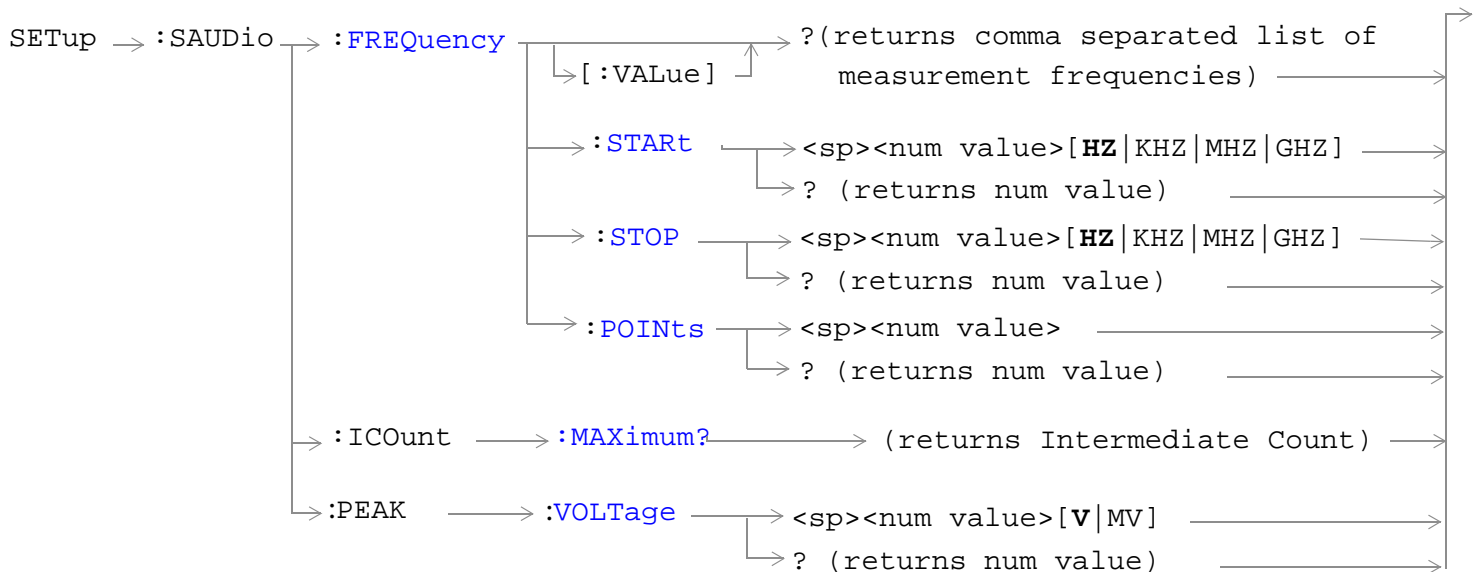
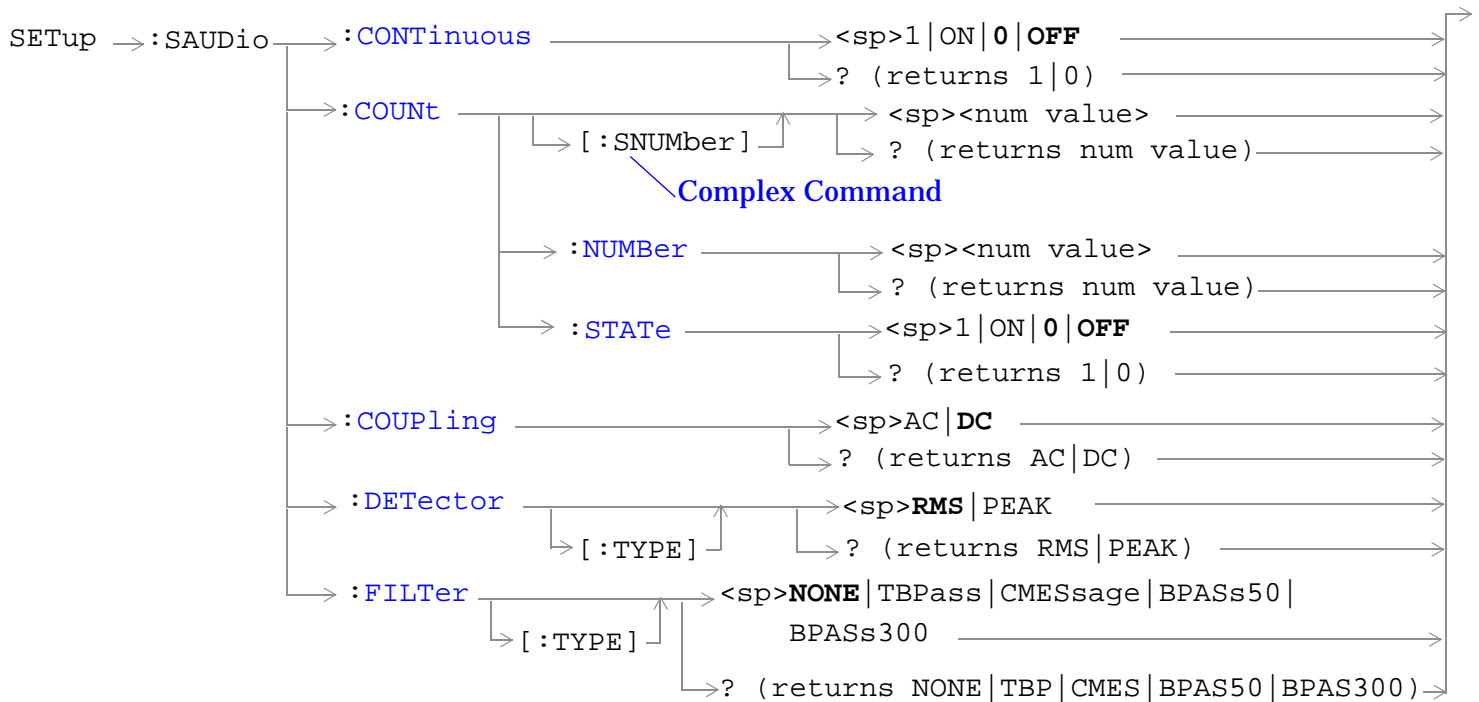
Function	Sets/queries the handoff waveform quality measurement's timeout state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
Programming Example	
<pre>OUTPUT 714;"SETUP:HWQUALITY:TIMEOUT:STATE ON"</pre>	

**SETup:HWQuality:TIMEout:TIME**

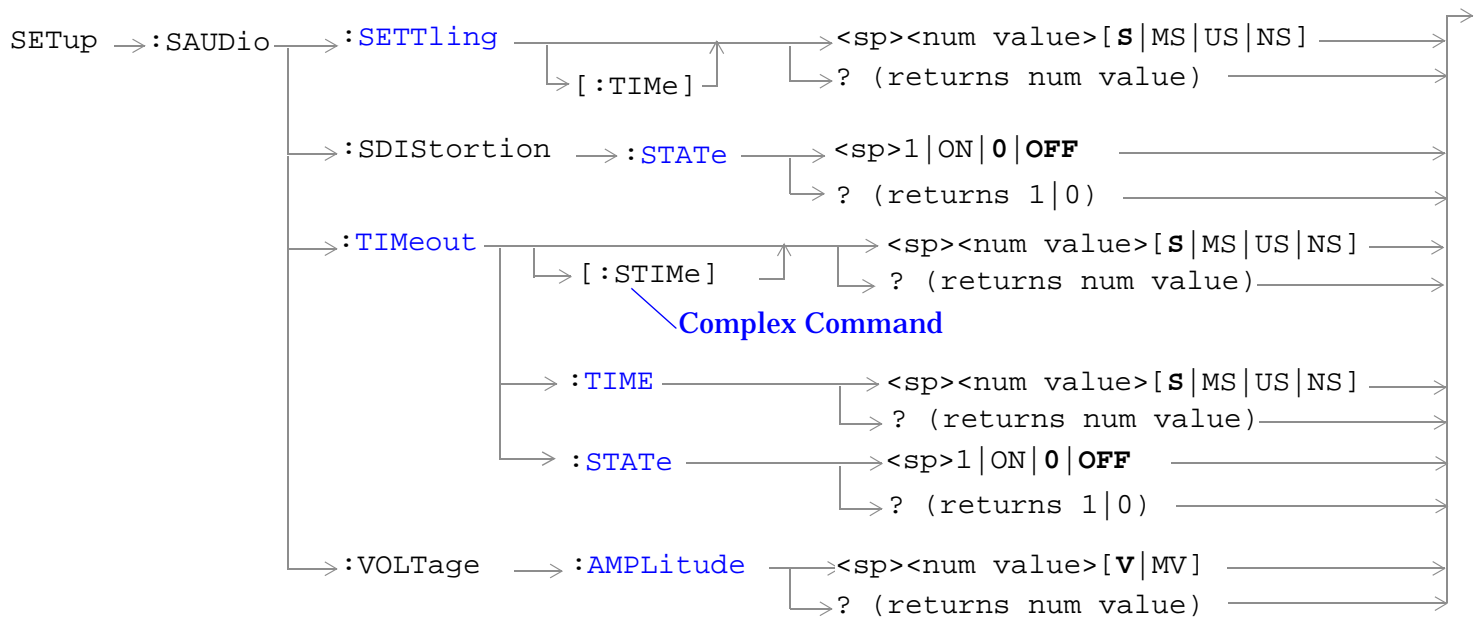
Function	Sets/queries the handoff waveform quality measurement's timeout setting to be used when the timeout state is set to ON.
Setting	Range: 1 to 999 seconds Resolution: 1 second
Query	Range: 1 to 999
*RST Setting	10 seconds
<b>Programming Example</b>	
OUTPUT 714; "SETUP:HWQUALITY:TIMEOUT:TIME 5 S"	



## SETup:SAUDio



SETup:SAUDio



[“Diagram Conventions” on page 268](#)

**SETup:SAUDio:CONTInuous**

Function	Sets/queries the trigger arm state for the swept audio measurement. Determines whether measurement will make one measurement then stop (0   OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (1   ON (continuous)).
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:SAUDIO:CONTINUOUS ON" !Turns on continuous triggering.	

**SETup:SAUDio:COUNT[:SNUMBER]**

Function	Sets/queries the number of audio measurements to perform at each measurement point in a single multi-measurement sweep. This command sets the count, and automatically sets the multi-measurement STATE command to 1 (on).
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
<b>Programming Example</b> OUTPUT 714;"SETUP:SAUDIO:COUNT:SNUMBER 5" !Turns on multi-measurements and makes 5 measurements at each frequency point in the sweep.	

**SETup:SAUDio:COUNT:NUMBER**

Function	Sets/queries the number of audio measurements to perform at each measurement point in a single multi-measurement sweep when the "SETup:SAUDio:COUNT:STATE" is set to 1 (on).
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10
<b>Programming Example</b> OUTPUT 714;"SETUP:SAUDIO:COUNT:NUMBER 5" !Makes 5 measurements at each frequency point in the sweep.	

## SETup:SAUDio

### SETup:SAUDio:COUNT:STATE

Function	Selects/queries the swept audio measurement's multi-measurement count state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b> OUTPUT 714;"SETUP:SAUDIO:COUNT:STATE ON" !Turns on multi-measurement for the swept audio measurement.	

### SETup:SAUDio:COUPLing

Function	Sets/queries the audio generator's coupling to the AUDIO OUT port.
Setting	Range: AC   DC
Query	Range: AC   DC
*RST Setting	DC
<b>Programming Example</b> OUTPUT 714;"SETUP:SAUDIO:COUPLING AC" !Select AC coupling to the AUDIO OUT port.	

### SETup:SAUDio:DETEctor[:TYPE]

Function	Sets/queries the type of level detector used in swept audio measurements.
Setting	Range: RMS   PEAK
Query	Range: RMS   PEAK
*RST Setting	RMS
<b>Programming Example</b> OUTPUT 714;"SETUP:SAUDIO:DETECTOR:TYPE PEAK" !Select the peak detector for the AF analyzer.	

**SETup:SAUDio:FILTer[:TYPE]**

Function	Sets/queries the type of filter on the sampled data, before any measurements are performed. The filter choices are: none, TBPass (100 Hz bandwidth bandpass), CMESsage (C-Message), BPASs50 (50 Hz to 15 kHz bandpass), BPASs300 (300 Hz to 15 kHz bandpass)
Setting	Range: NONE   TBPass   CMESsage   BPASs50   BPASs300
Query	Range: NONE   TBP   CMES   BPAS50   BPAS300
*RST Setting	None
<b>Programming Example</b> OUTPUT 714;"SETUP:SAUDIO:FILTER:TYPE TBPASS" !Selects the 100 Hz bandpass filter.	

**SETup:SAUDio:FREQuency[:VALue]?**

Function	Returns a comma-separated list of the generated frequency for each frequency point (see <a href="#">"SETup:SAUDio:FREQuency:POINts"</a> ). When you specify the start frequency, stop frequency, and the number of measurement points, the test set calculates the intermediate frequencies that are generated. You cannot directly set the intermediate frequencies using this command, you can only query them.
Query	Range: up to 60 comma separated values
<b>Programming Example</b> OUTPUT 714;"SETUP:SAUDIO:FREQUENCY:VALUE?" !Queries the list of generated frequencies.	

**SETup:SAUDio:FREQuency:POINts**

Function	Sets/queries the number of evenly-spaced frequency points in the sweep. If this value is set to 1, only the start frequency is used in the sweep.
Setting	Range: 1 to 60
Query	Range: 1 to 60
*RST Setting	5
<b>Programming Example</b> OUTPUT 714;"SETUP:SAUDIO:FREQUENCY:POINTS 20" !Make audio measurements at 20 frequency points in the sweep.	

## SETup:SAUDio

### SETup:SAUDio:FREQuency:STARt

Function	Sets/queries the frequency at which to begin the sweep. The default units are Hz. It is possible to set the start frequency higher than the stop frequency. If this is done, the sweep starts at the higher frequency and stops at the lower frequency.
Setting	Range: 300.0 to 15000.0 Hz
Query	Range: 300.0 to 15000.0 Hz
*RST Setting	300 Hz
<b>Programming Example</b> OUTPUT 714;"SETUP:SAUDIO:FREQUENCY:START 450HZ" !Start the frequency sweep at 450 Hz.	

### SETup:SAUDio:FREQuency:STOP

Function	Sets/queries the frequency at which to end the sweep. The default units are Hz. It is possible to set the stop frequency lower than the start frequency. If this is done, the sweep starts at the higher frequency and stops at the lower frequency.
Setting	Range: 300.0 to 15000.0 Hz
Query	Range: 300.0 to 15000.0 Hz
*RST Setting	3000 Hz
<b>Programming Example</b> OUTPUT 714;"SETUP:SAUDIO:FREQUENCY:STOP 1500HZ" !Stop the frequency sweep at 1500 Hz.	

### SETup:SAUDio:ICount:MAXimum?

Function	Queries the total multi-measurement count. This is equal to the number of frequency points in the sweep multiplied by the multi-measurement count set for the swept audio measurement.
Query	Range: 1 to 59940 (60 measurement points multiplied by 999 multi-measurements)
*RST Setting	5
<b>Programming Example</b> OUTPUT 714;"SETUP:SAUDIO:ICOUNT:MAXIMUM?" !Queries the total number of measurements made.	

**SETup:SAUDio:PEAK:VOLTage**

Function	Sets/queries the expected peak voltage of the swept audio measurement. This determines the range and resolution of the sampled voltage values.
Setting	Range: 1 mV to 20 V Resolution: 1 mV
Query	Range: 1 mV to 20 V
*RST Setting	20 V peak
Programming Example	
OUTPUT 714;"SETUP:SAUDIO:PEAK:VOLTAGE 5V"	

**SETup:SAUDio:SETTLing[:TIME]**

Function	Sets/queries how long swept audio measurements wait to start an audio measurement after setting the audio source's frequency. A setting of 0.0 seconds let's swept audio measurements run at maximum speed.  Settling time may be needed when testing a device that has a time delay through the audio path. Path delays can cause the audio generator's signal to change frequencies before the output signal can be analyzed at that frequency. Specifying a settling time ensures that the audio generator stays at each frequency point long enough for the audio analyzer to correctly measure the device's audio output.
Setting	Range: 0.0 to 999 ms Resolution: 1 ms
Query	Range: 0.0 to 999 ms
*RST Setting	0 ms
Programming Example	
OUTPUT 714;"SETUP:SAUDIO:SETTLING:TIME 20MS"	

**SETup:SAUDio:SDISTortion:STATE**

Function	Sets/queries whether SINAD and distortion measurements are enabled. Turning on SINAD/Distortion measurements will cause the swept audio measurement to run significantly slower because of added sampling and calculation times.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
Programming Example	
OUTPUT 714;"SETUP:SAUDIO:SDISTORTION:STATE ON"	

## SETup:SAUDio

### SETup:SAUDio:TIMEout[:STIME]

Function	Selects/queries the timeout value in seconds that is used for swept audio measurements and sets the timeout state to ON. Units (S   MS) are optional, if no units are specified then units default to S (seconds).
Setting	Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query	Range: 0.1 to 999 seconds
*RST Setting	10 seconds
<b>Programming Example</b>  OUTPUT 714;"SETUP:SAUDIO:TIMEOUT:STIME 10" !Enables timeouts and sets the value to 10 seconds.	

### SETup:SAUDio:TIMEout:TIME

Function	Selects/queries the timeout value in seconds that is used for swept audio measurements when the timeout state is set to ON. Units (S   MS) are optional, if no units are specified then units default to S (seconds).
Setting	Range: 0.1 to 999 seconds Resolution: 0.1 seconds
Query	Range: 0.1 to 999 seconds
*RST Setting	10 seconds
<b>Programming Example</b>  OUTPUT 714;"SETUP:SAUDIO:TIMEout:TIME 10" !Sets the timeout value to 10 seconds.	

### SETup:SAUDio:TIMEout:STATE

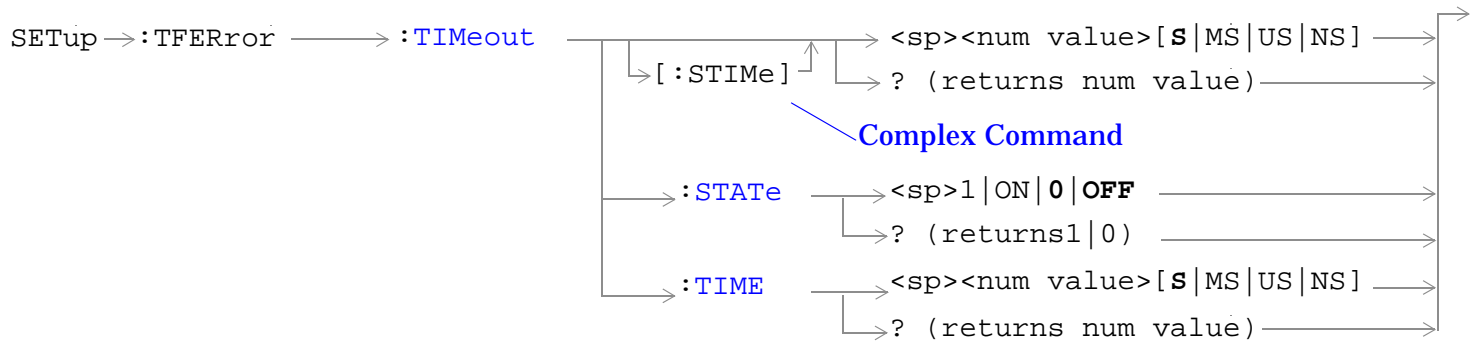
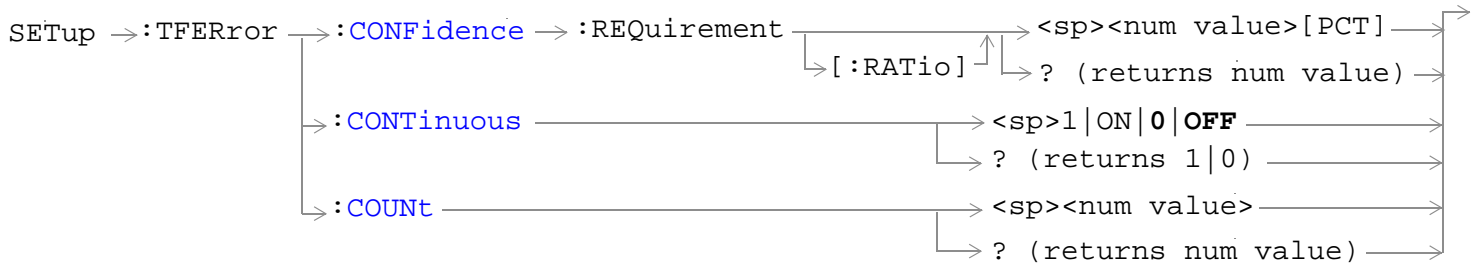
Function	Selects/queries the swept audio measurement timeout state. Timeout is set using the <a href="#">"SETup:SAUDio:TIMEout:TIME"</a> command.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b>  OUTPUT 714;"SETUP:SAUDIO:TIMEOUT:STATE ON" !Enables timeouts for swept audio measurements.	



**SETup:SAUDio:VOLTage:AMPLitude**

Function	Sets/queries the output level (peak voltage) of the audio generator when it is turned on. This command does not turn on the audio generator.
Setting	Range: 0.0 to 9.0 V peak ( $R_L > 600$ ohms) Resolution: <ul style="list-style-type: none"> <li>• &lt; 0.5 mV peak (less than or equal to 1 V peak output)</li> <li>• &lt; 5 mV peak (greater than 1 V peak output)</li> </ul>
Query	Range: 0.0 to 9.0 V peak ( $R_L > 600$ ohms)
*RST Setting	0.0 V peak
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:SAUDIO:VOLTAGE:AMPLITUDE 1V" !Set the audio generator's output to 1Vpeak.</pre>	

## SETup:TFERror



“Diagram Conventions” on page 268

**SETup:TFERror:CONFidence:REQUIREment[:RATIo]**

Function	Sets/queries the test data service option frame error rate (TDSO FER) confidence requirement.
Setting	Range: 0.10 to 15.00 percent Resolution: 0.01 percent
Query	Range: 0.10 to 15.00 percent Resolution: 0.01 percent
*RST Setting	1.00
<b>Programming Example</b> OUTPUT 714;"SETUP:TFERROR:CONFIDENCE:REQUIREMENT:RATIO 0.50"	

**SETup:TFERror:CONTInuous**

Function	Sets/queries the trigger arm state for the test data service option frame error rate (TDSO FER) measurement. The trigger arm state determines whether the TDSO FER 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)
<b>Programming Example</b> OUTPUT 714;"SETUP:TFERROR:CONTINUOUS OFF" !Sets measurement to single trigger mode.	

**SETup:TFERror:COUNT**

Function	Sets/queries the the number of frames to be counted during a test data service option frame error rate (TDSO FER) measurement.
Setting	Range: 512 to 999,936 Resolution: integer multiples of 512
Query	Range: 512 to 999,936 Resolution: integer multiples of 512
*RST Setting	512
<b>Programming Example</b> OUTPUT 714;"SETUP:TFERROR:COUNT 1536"	

## SETup:TFERror

### SETup:TFERror:TIMEout[:STIME]

Function	The setting form of this command performs two functions: (1) sets the TDSO frame error rate measurement's timeout (see "Timeouts" ) value, and (2) sets the TDSO frame error rate measurement's timeout STATE to 1 (on).  The query form returns the TDSO frame error rate measurement's timeout value.
Setting	Range: 0.1 to 200000.0 seconds Resolution: 0.1 second
Query	Range: 0.1 to 200000.0
*RST Setting	200 seconds, off
<b>Programming Example</b>  OUTPUT 714;"SETUP:TFERROR:TIMEOUT:STIME 120 S" !Sets timeout state to ON and sets the timeout time to 120 seconds.	

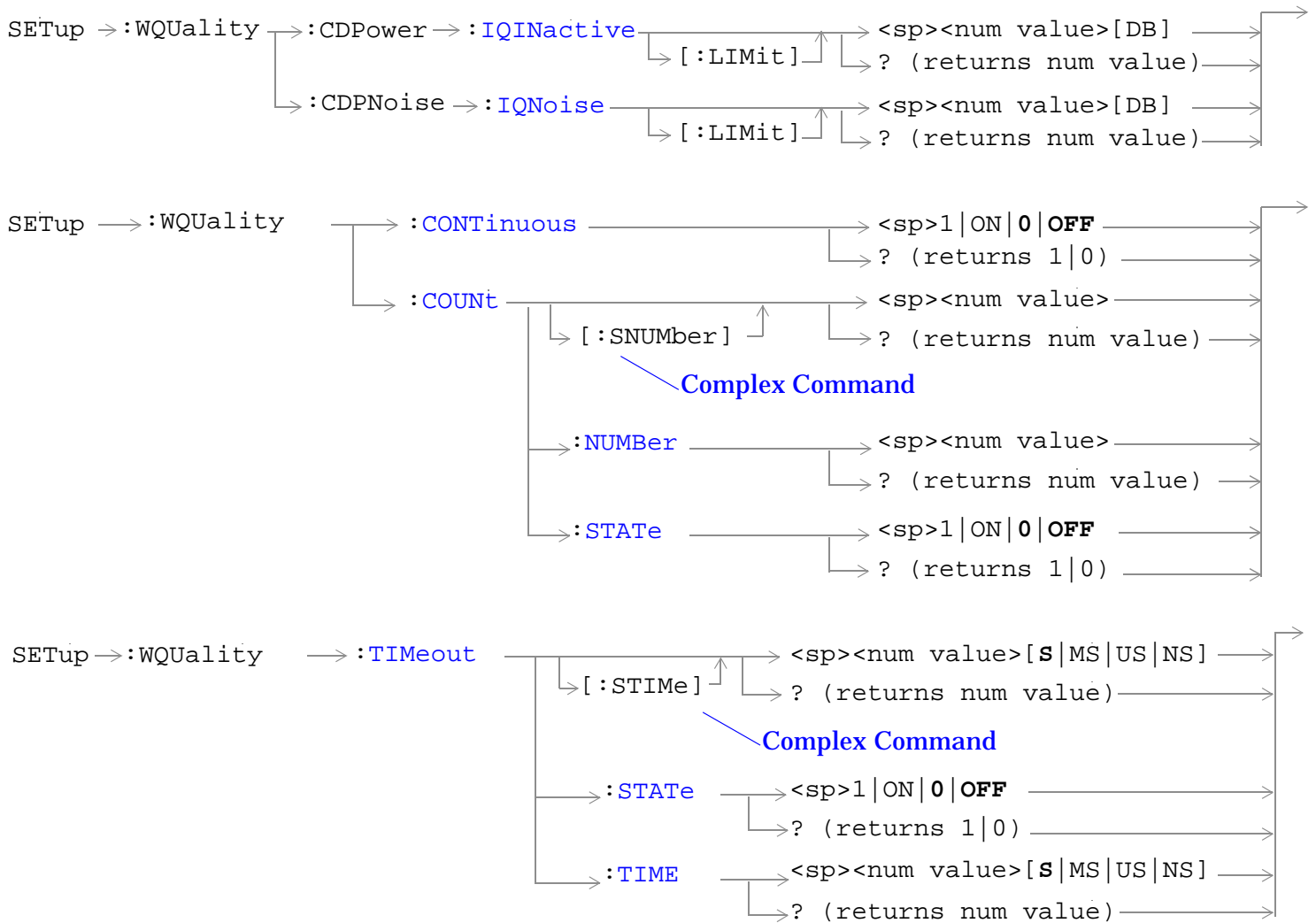
### SETup:TFERror:TIMEout:STATE

Function	Sets/queries the test data service option (TDSO) frame error rate measurement's timeout (see "Timeouts" ) state.
Setting	Range: 1   ON   0   OFF
Query	Range: 1   0
*RST Setting	0 (off)
<b>Programming Example</b>  OUTPUT 714;"SETUP:TFERROR:TIMEOUT:STATE ON"	

### SETup:TFERror:TIMEout:TIME

Function	Sets/queries the test data service option (TDSO) frame error rate measurement's timeout (see "Timeouts" ) setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 200000.0 seconds Resolution: 0.1 second
Query	Range: 0.1 to 200000.0 seconds
*RST Setting	200 seconds
<b>Programming Example</b>  OUTPUT 714;"SETUP:TFERROR:TIMEOUT:TIME 120 S"	

## SETup:WQuality



“Diagram Conventions” on page 268

**SETup:WQuality:CDPower:IQInactive[:LIMit]**

Function	Sets/queries the pass/fail limit for inactive channel power on the Code Domain Power measurement .
Setting	Range: -100 to 0 dB
Query	Range: -100 to 0 dB
*RST Setting	-26 dB
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:WQUALITY:CDPOWER:IQINACTIVE:LIMIT -26 DB" !Sets code domain power measurement's pass/fail limit.</pre>	

**SETup:WQuality:CDNoise:IQNoise[:LIMit]**

Function	Sets/queries the pass/fail limit for noise energy measured by the Code Domain Power and Noise measurement.
Setting	Range: -100 to 0 dB
Query	Range: -100 to 0 dB
*RST Setting	-26 dB
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:WQUALITY:CDNOISE:IQNOISE:LIMIT?" !Queries the code domain power plus noise measurement's pass/fail limit.</pre>	

**SETup:WQuality: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)
<b>Programming Example</b> <pre>OUTPUT 714;"SETUP:WQUALITY:CONTINUOUS OFF" !Sets measurement to single trigger mode.</pre>	

**SETup:WQuality: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)
<b>Programming Example</b>  OUTPUT 714;"SETUP:WQUALITY:COUNT:SNUMBER 5" !Turns on multi-measurements and sets the number of measurements to 5.	

**SETup:WQuality: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
<b>Programming Example</b>  OUTPUT 714;"SETUP:WQUALITY:COUNT:NUMBER 5" !Sets the number of measurements to 5 when the multi-measurement state is set to ON.	

**SETup:WQuality: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)
<b>Programming Example</b>  OUTPUT 714;"SETUP:WQUALITY:COUNT:STATE ON" !Turns on multi-measurements.	

## SETup:WQQuality

### SETup:WQQuality: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
<b>Programming Example</b>  OUTPUT 714;"SETUP:WQUALITY:TIMEOUT:STIME 5S" !Sets timeout state to ON and sets the timeout time to 5 seconds.	

### SETup:WQQuality: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)
<b>Programming Example</b>  OUTPUT 714;"SETUP:WQUALITY:TIMEOUT:STATE ON"	

### SETup:WQQuality: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
<b>Programming Example</b>  OUTPUT 714;"SETUP:WQUALITY:TIMEOUT:TIME 5S"	



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# STATus Subsystem

## 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 594](#)

[“STATus:PRESet” on page 614](#)

[“STATus:QUEStionable” on page 615](#)

[“Status Byte Register” on page 640](#)

[“Standard Event Status Register” on page 641](#)

## Status Register Bit Definitions

[“Status Byte Register Bit Assignments” on page 640](#)

[“Standard Event Status Register Bit Assignment” on page 642](#)

[“STATus:QUEStionable Condition Register Bit Assignment” on page 621](#)

[“STATus:QUEStionable:CALL Condition Register Bit Assignment” on page 622](#)

[“STATus:QUEStionable:ERRors Condition Register Bit Assignment” on page 625](#)

[“STATus:QUEStionable:HARDware Condition Register Bit Assignment” on page 638](#)

[“STATus:OPERation Register Bit Assignments” on page 600](#)

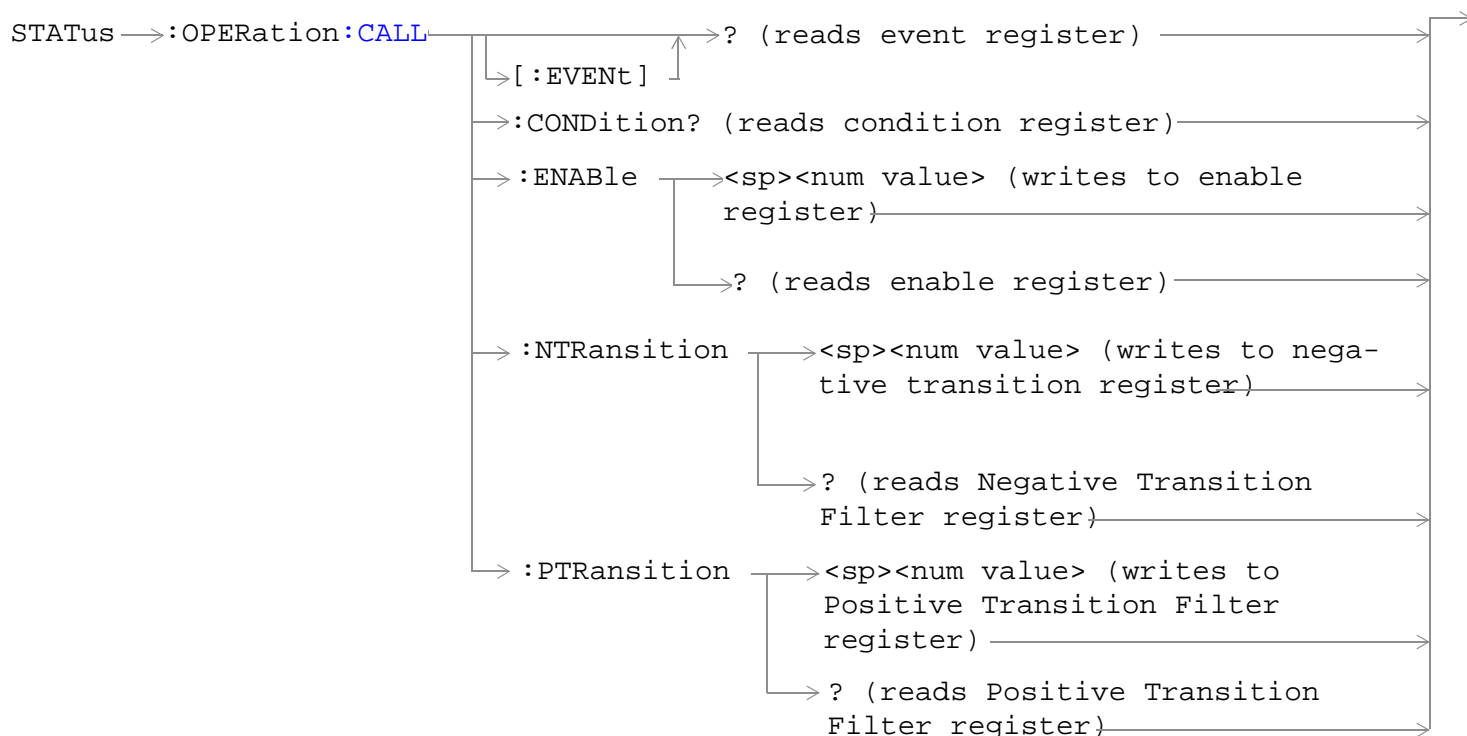
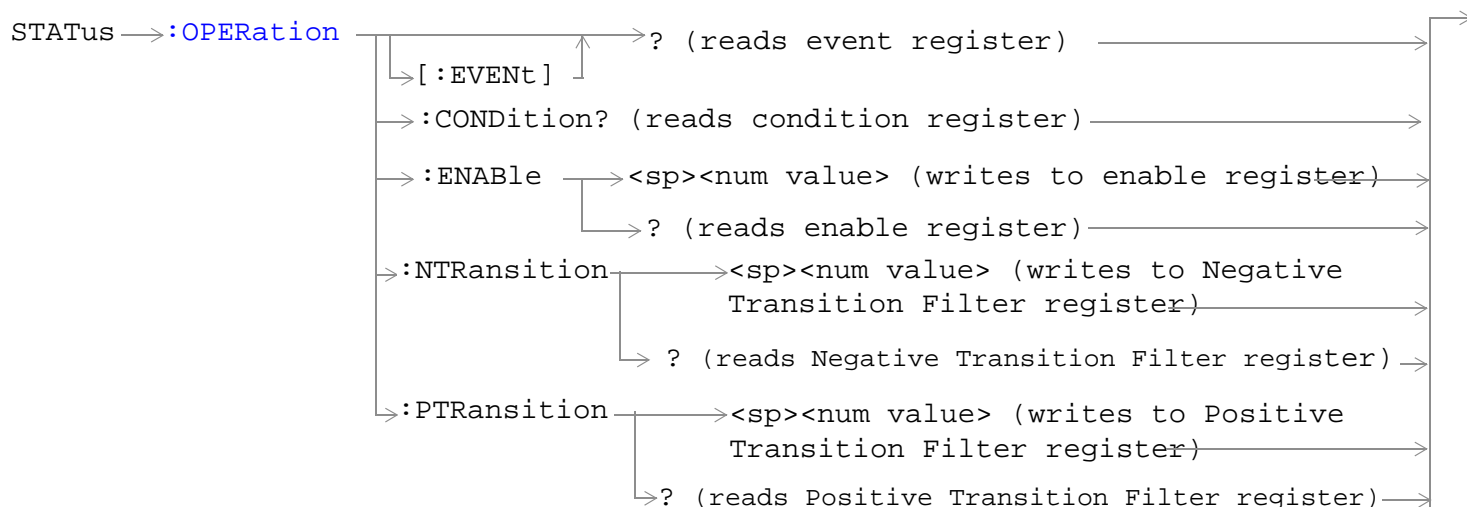
[“STATus:OPERation:CALL Condition Register Bit Assignment” on page 601](#)

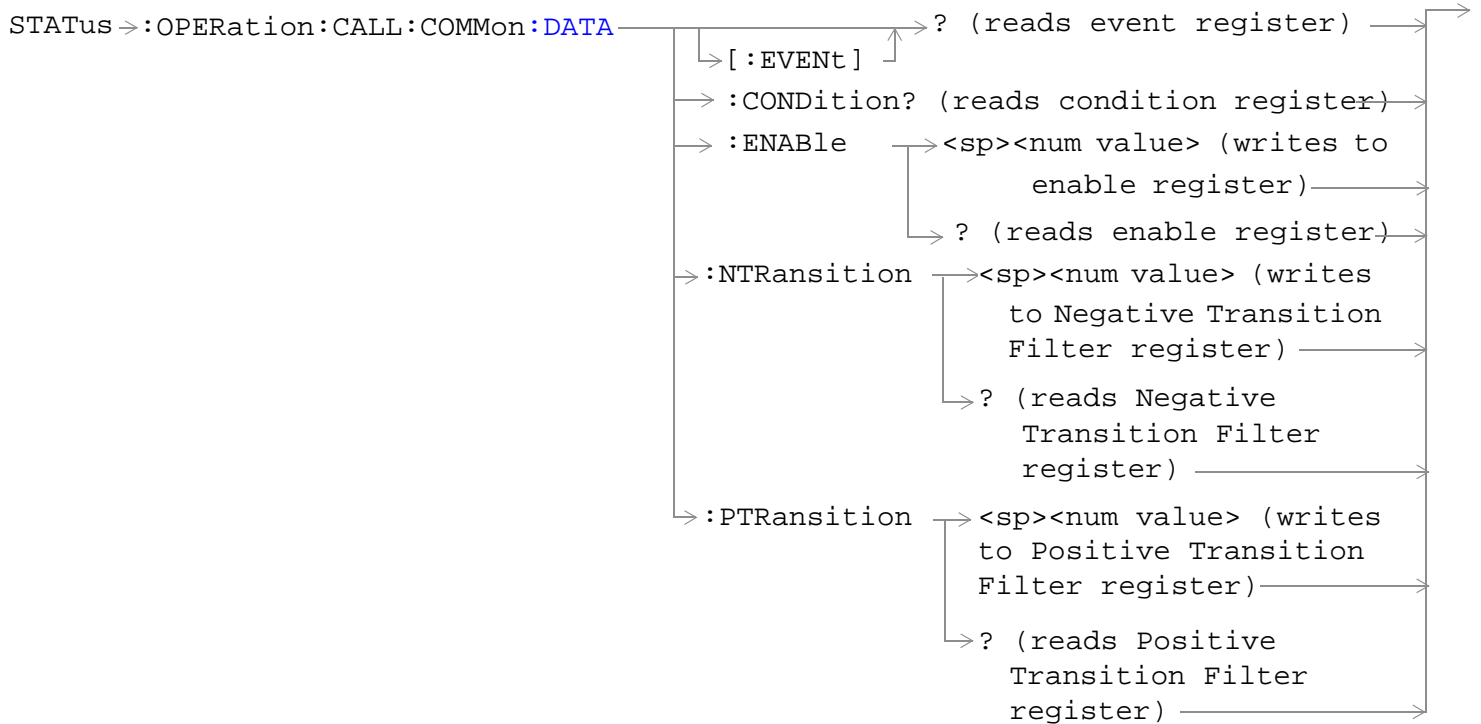
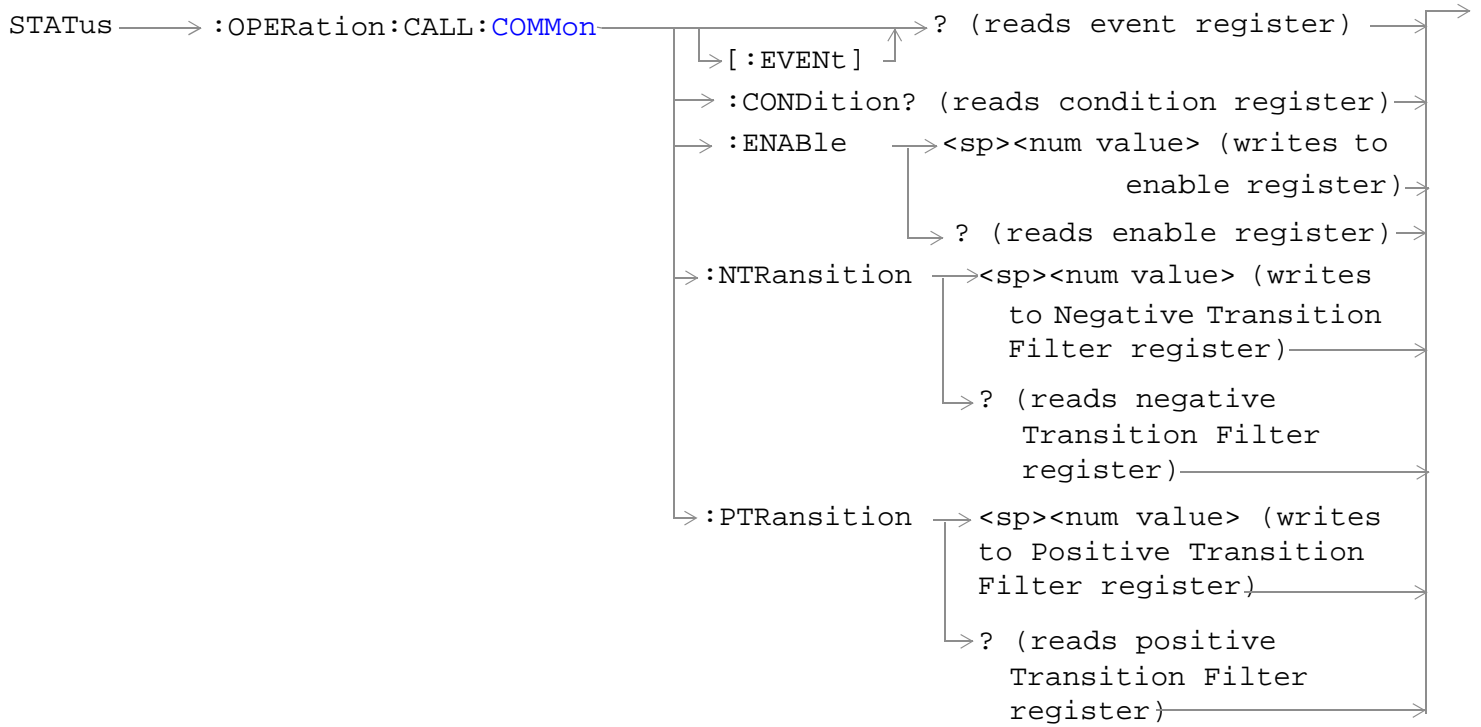
[“STATus:OPERation:NMRReady Register Bit Assignments” on page 606](#)

## Related Topics

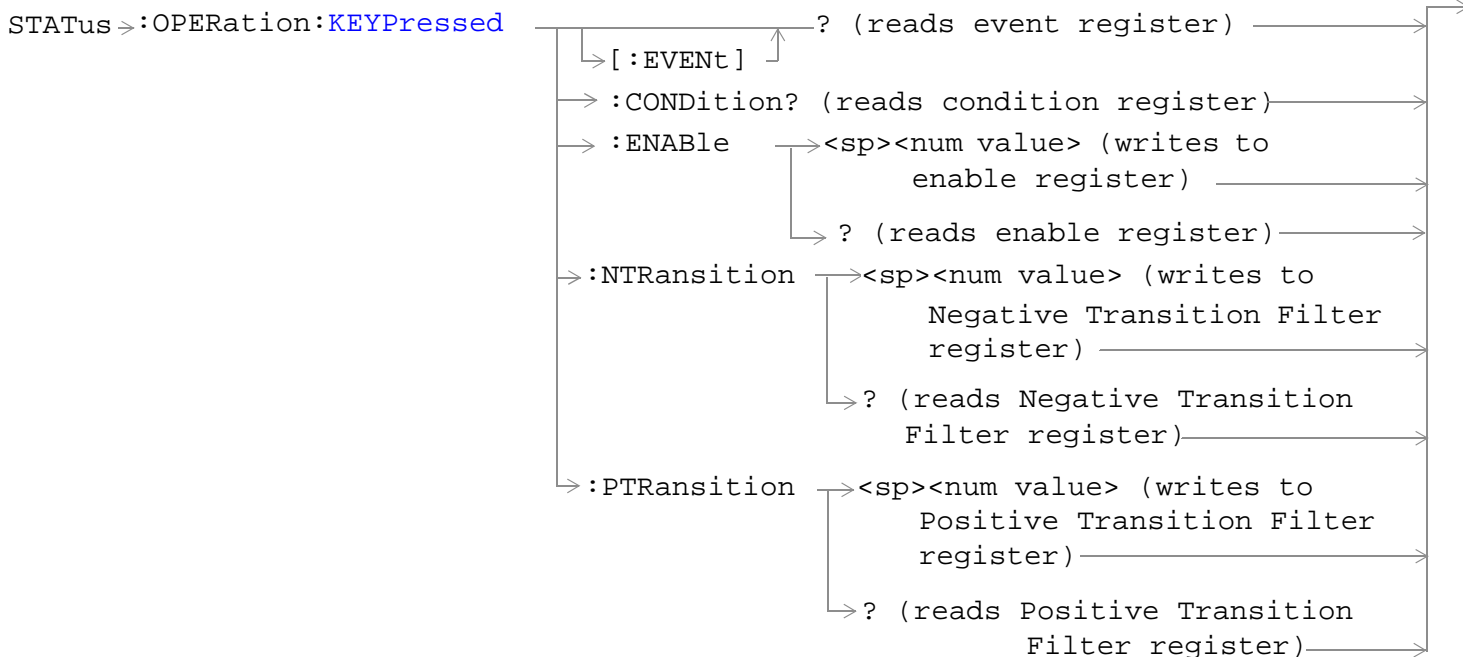
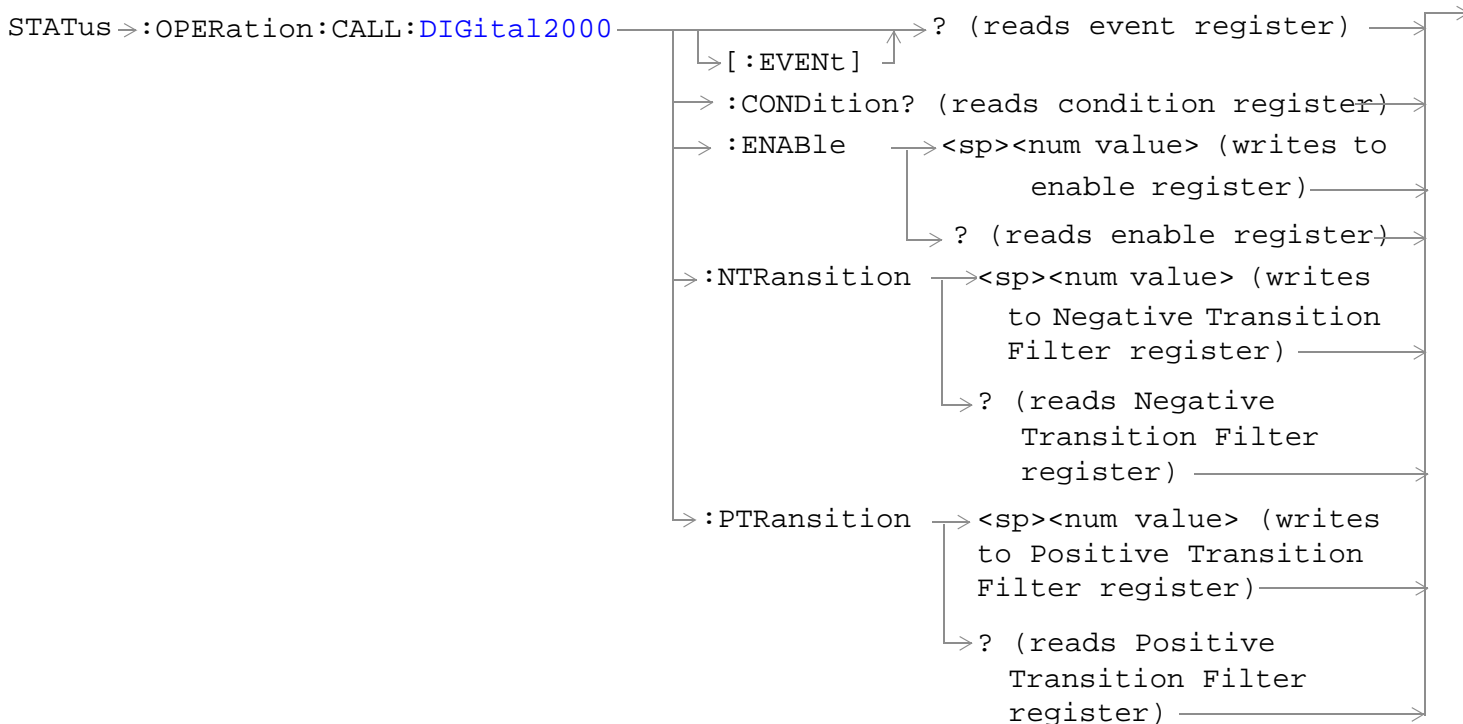
[“Status Subsystem Overview” on page 216](#)

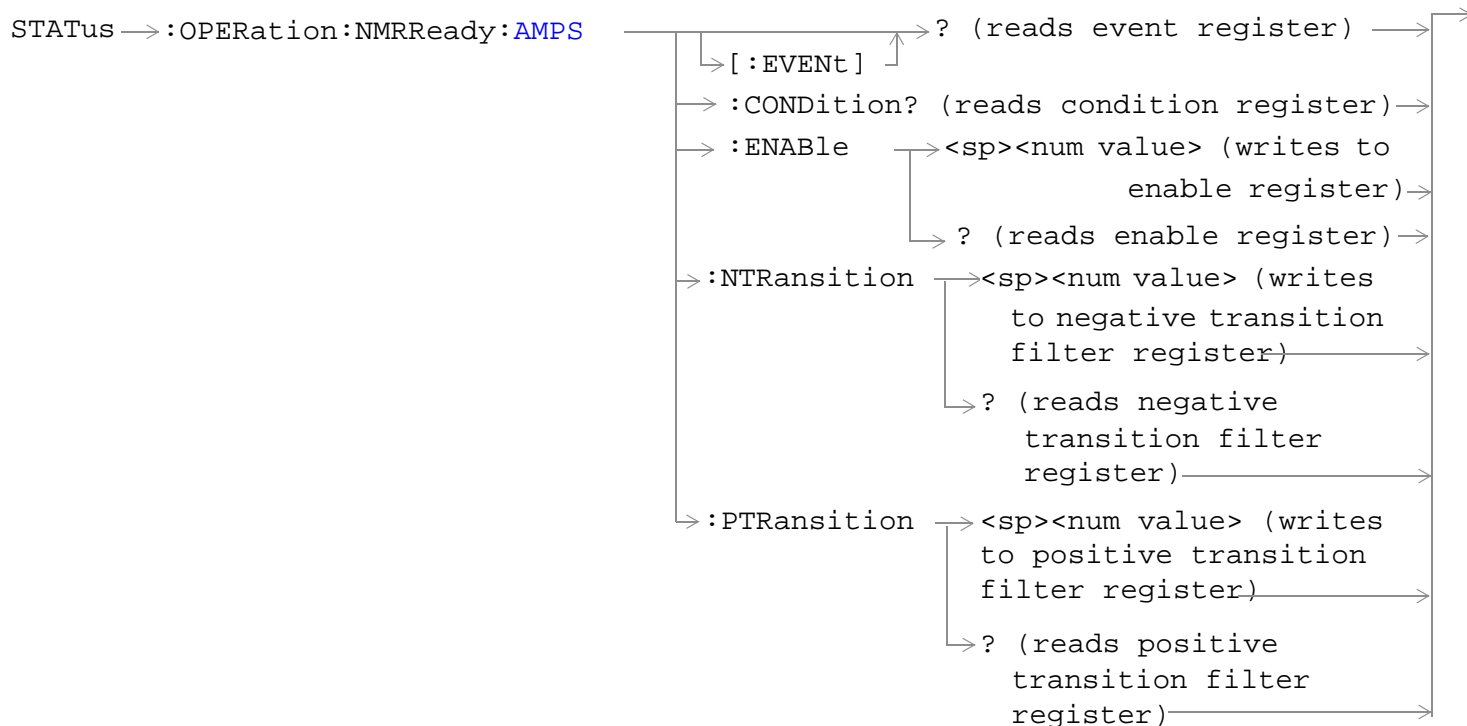
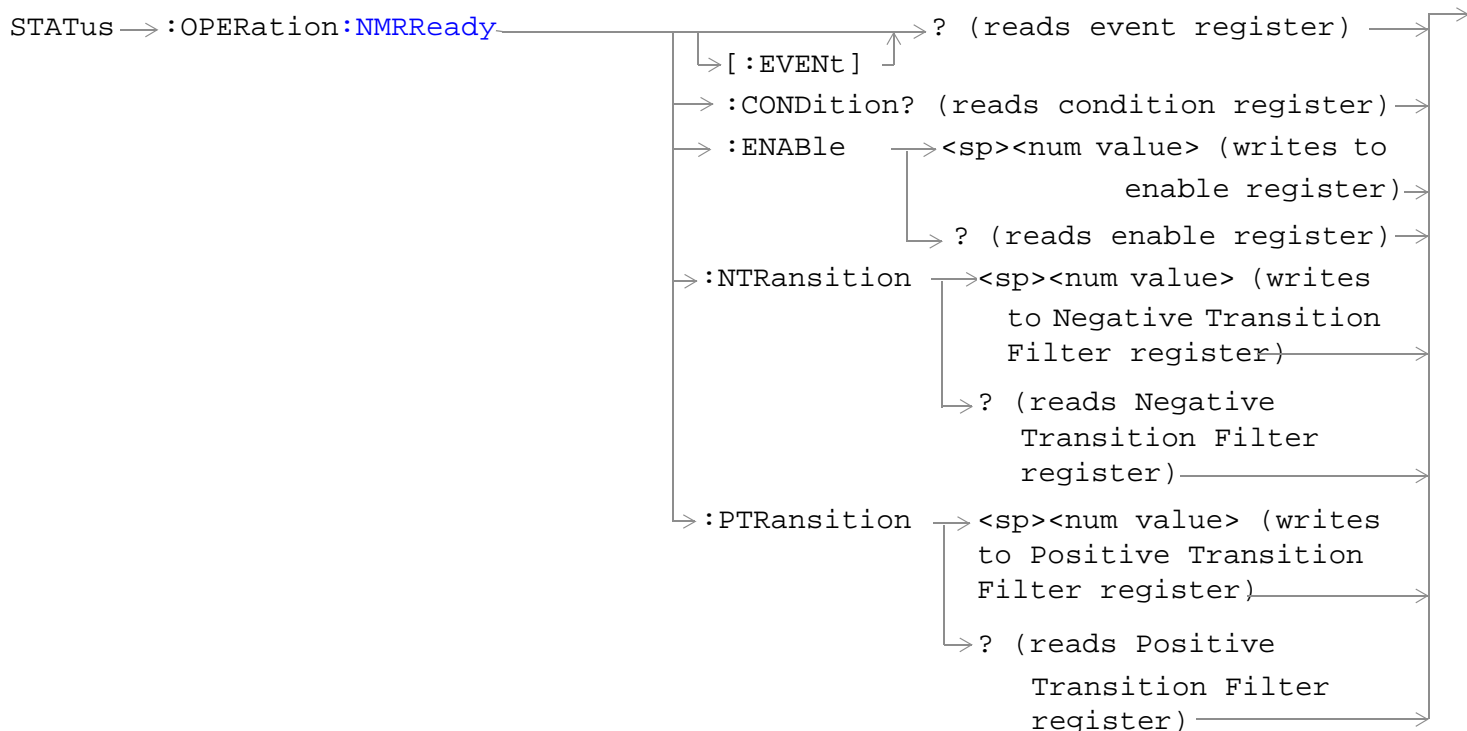
## STATUS:OPERation:



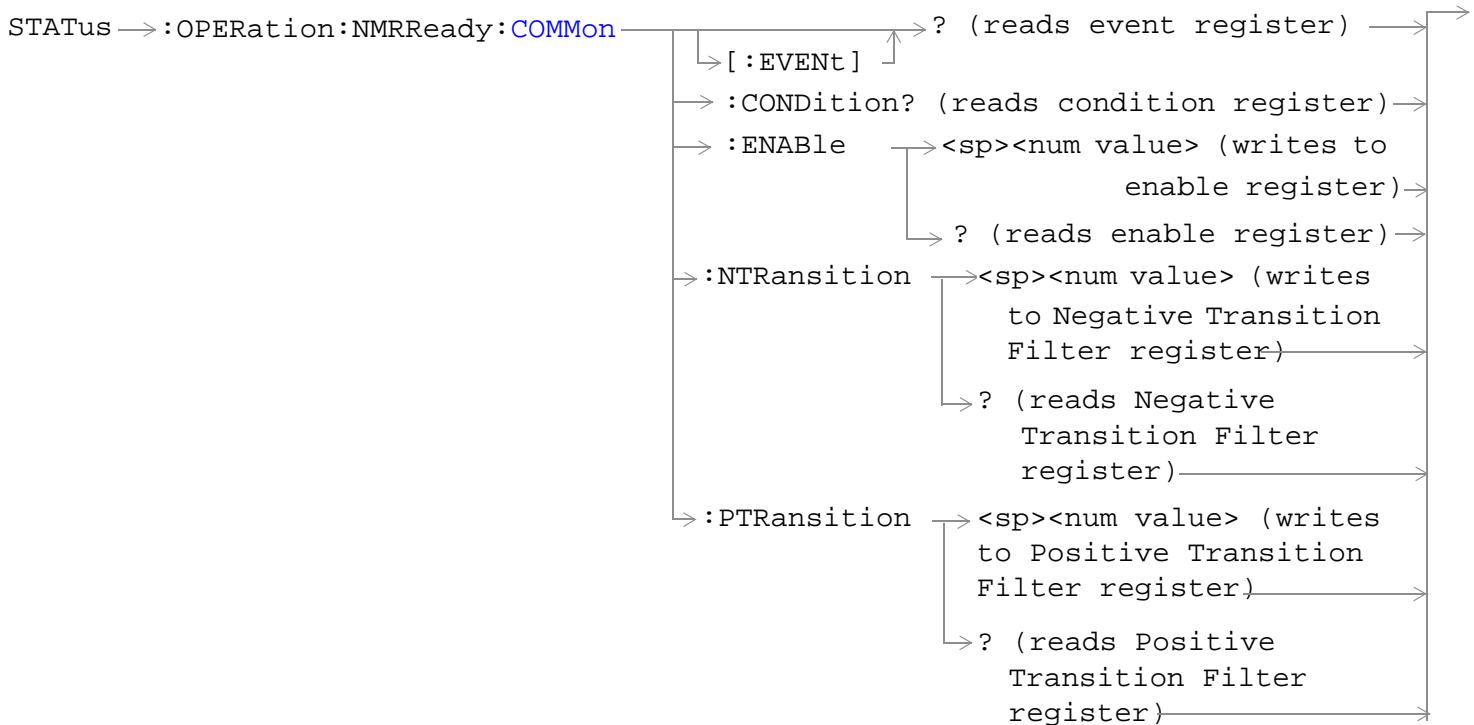
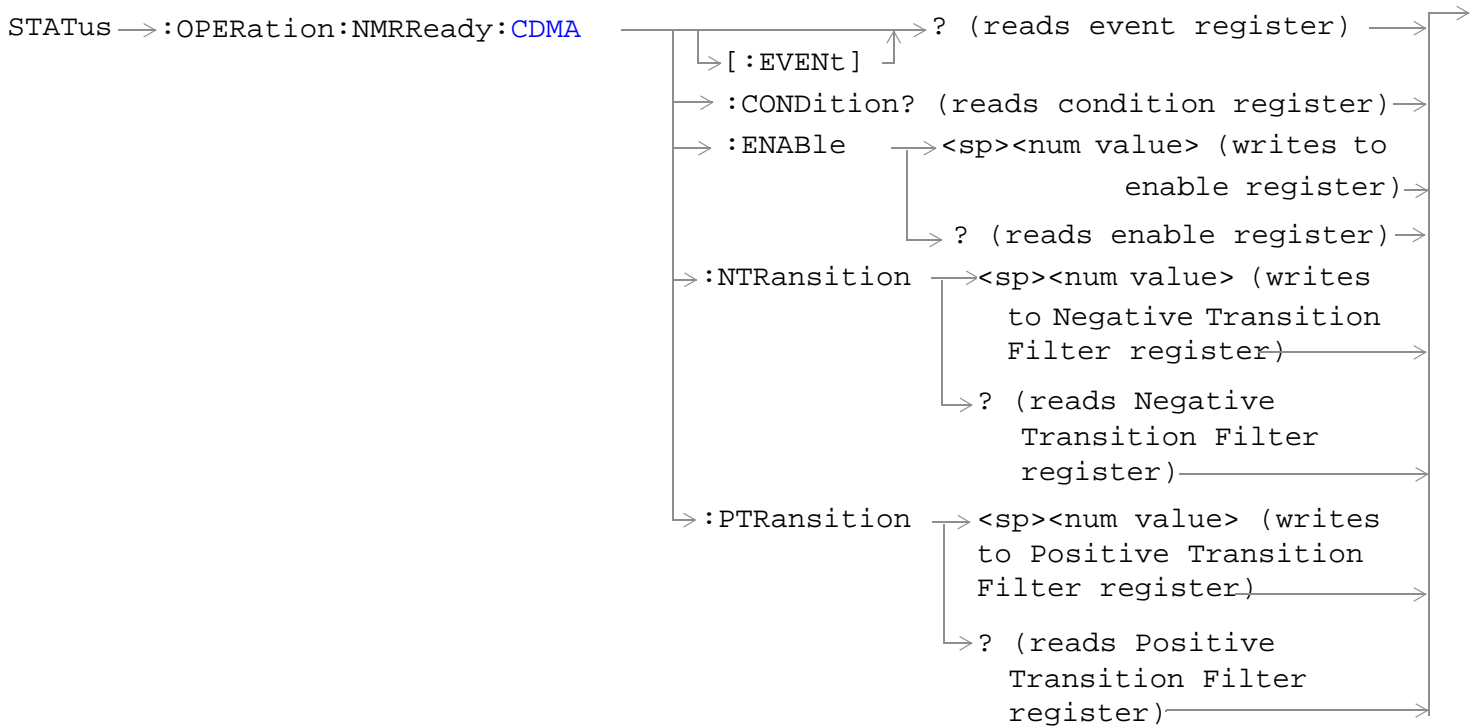


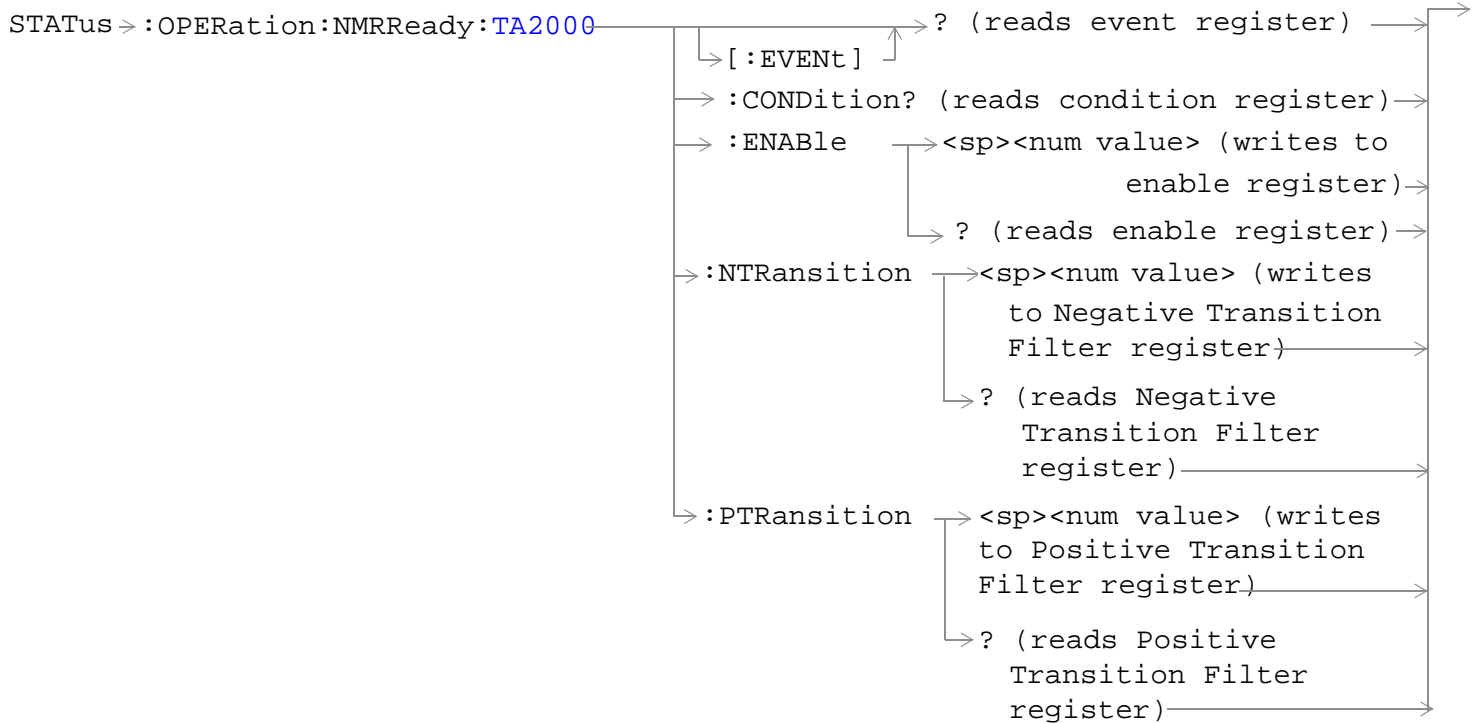
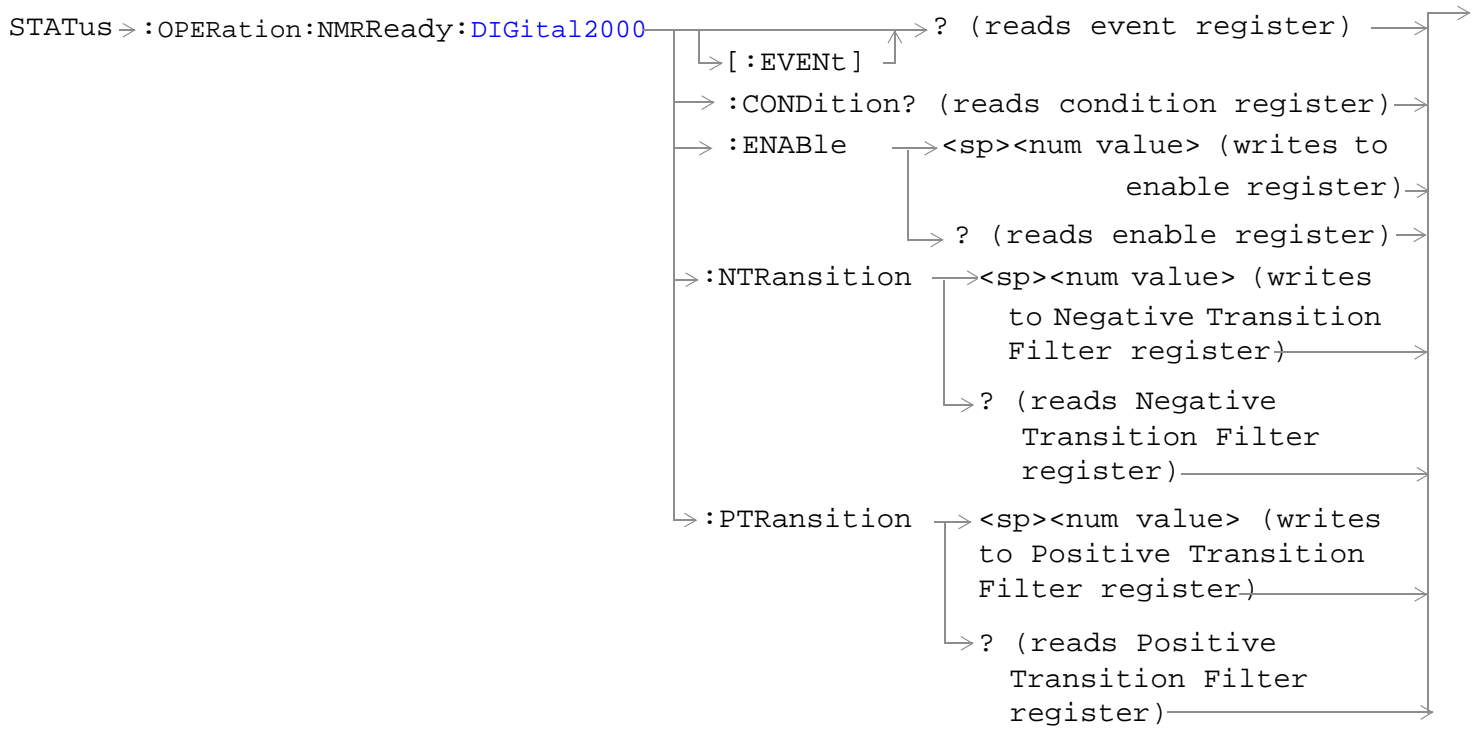
STATUS:OPERation:





STATUS:OPERation:





“Diagram Conventions” on page 268

STATUS:OPERation:

## 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:

### 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: <ul style="list-style-type: none"><li>• Active Cell mode - the call processing state leaves the idle state</li><li>• Test mode - the test set has noted a base station origination.</li></ul>
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: <ul style="list-style-type: none"> <li>Active Cell mode - the data connection status leaves the idle state</li> <li>Test mode - the test set has noted a base station origination.</li> </ul>
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.

**STATUS:OPERation:**

Bit Number	Binary Weighting	Condition	Description
2	4	Data Connection Status Attached	This bit is set to 1 when the data connection status is Attached.
1	2	Data Connection Status Idle	This bit is set to 1 when the data connection status is Idle.
0	1	Extension Bit	This bit will always be 0.

**Program Examples STATUS:OPERation:CALL:COMMON:DATA**

```

OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:DATA:EVENT?" !Queries and clears the Operation
!Call Common Data Event Register
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:DATA:CONDITION?" !Queries and clears the Operation
!Call Common Data Condition
!Register
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:DATA:ENABLE 128" !Sets the Operation Call Common
!Data Enable Register for bit 7
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:NTRANSITION 2" !Sets the Operation Call Common
!Data Negative Transition Filter
!Register for bit 1
OUTPUT 714;"STATUS:OPERATION:CALL:COMMON:PTRANSITION 2" !Set the Operation Call Common
!Data Positive Transition Filter
!Register for bit 1

```

**STATUS:OPERation:CALL:DIGital2000 Register Bit Assignment**

The STATUS:OPERation:CALL:DIGital2000 register bits will be used to indicate status of processes that occur during DIGital2000 call processing operations.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
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.

STATUS:OPERation:

Bit Number	Binary Weighting	Condition	Description
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.

Bit Number	Binary Weighting	Condition	Description
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	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 Register
!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:

### 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 Register 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 <a href="#">“Triggering of Measurements” on page 240.</a>
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 <a href="#">“Triggering of Measurements” on page 240.</a>
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 <a href="#">“Triggering of Measurements” on page 240.</a>
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 <a href="#">“Triggering of Measurements” on page 240.</a>
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 <a href="#">“Triggering of Measurements” on page 240.</a>

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 <a href="#">"Triggering of Measurements" on page 240.</a>
2	4	WQQuality 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 <a href="#">"Triggering of Measurements" on page 240.</a>
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 <a href="#">"Triggering of Measurements" on page 240.</a>
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 Register
                !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.

Bit Number	Binary Weighting	Condition	Description
13	8192	Reserved for future use.	This bit is always 0.
12	4096	Reserved for future use.	This bit is always 0.
11	2048	Reserved for future use.	This bit is always 0.
10	1024	Reserved for future use.	This bit is always 0.
9	512	Reserved for future use.	This bit is always 0.
8	256	Reserved for future use.	This bit is always 0.
7	128	Reserved for future use.	This bit is always 0.
6	64	Reserved for future use.	This bit is always 0.
5	32	Reserved for future use.	This bit is always 0.
4	16	Reserved for future use.	This bit is always 0.
3	8	Reserved for future use.	This bit is always 0.
2	4	Reserved for future use.	This bit is always 0.
1	2	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:

### STATUS:OPERation:NMRReady:DIGital2000 Register Bit Assignments

The STATUS:OPERation:NMRReady:DIGital2000 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	TFERror 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 <a href="#">“Triggering of Measurements” on page 240.</a>
2	4	CCTPhase 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 <a href="#">“Triggering of Measurements” on page 240.</a>
1	2	HWQuality 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 <a href="#">“Triggering of Measurements” on page 240.</a>

Bit Number	Binary Weighting	Condition	Description
0	1	Extension Bit	<p>This bit is a 1 if the measurement has been completed and has produced new results.</p> <p>This bit is a zero at power on, after a preset and while a measurement is in Measuring States. See <a href="#">"Triggering of Measurements" on page 240.</a></p>

**Program Examples - STATUS:OPERation:NMRReady:DIGital2000**

```

OUTPUT 714;"STATUS:OPERATION:NMRREADY:DIGITAL2000:EVENT?" !Queries the New Measurement
!Results Ready DIG2000 Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:DIGITAL2000:CONDITION?" !Queries the New
!Measurement Results Ready DIG2000
!Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:DIGITAL2000:ENABLE 8" !Sets New Measurement Results
!Ready DIG2000 Enable Register
!for bit 3.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:DIGITAL2000:NTR 2" !Sets the New Measurement Results
!Ready DIG2000 Negative Transition
!Register for bit 1.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:DIGITAL2000:PTR 4" !Sets the New Measurement
!Results Ready DIG2000 Positive
!Transition Register
!for bit 2

```

## STATus:PRESet

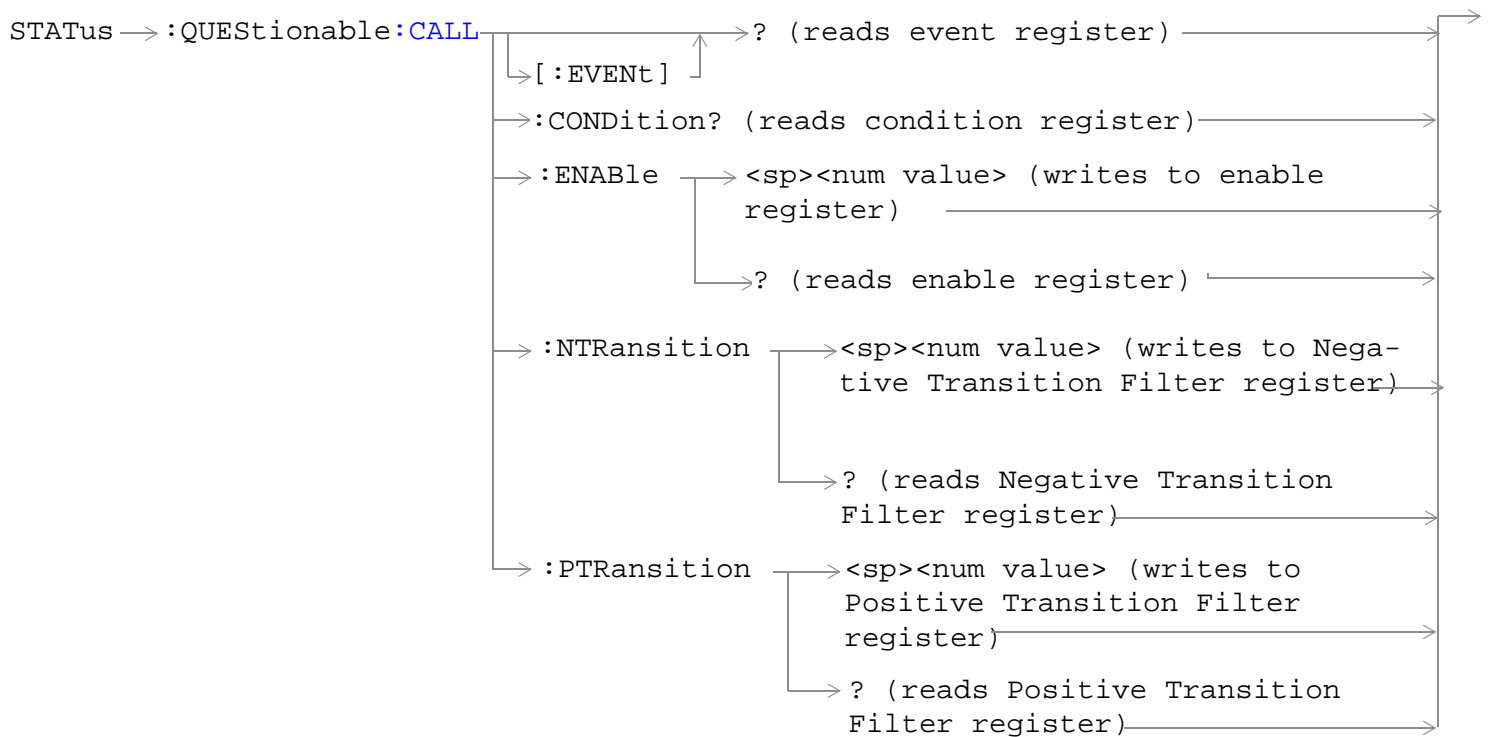
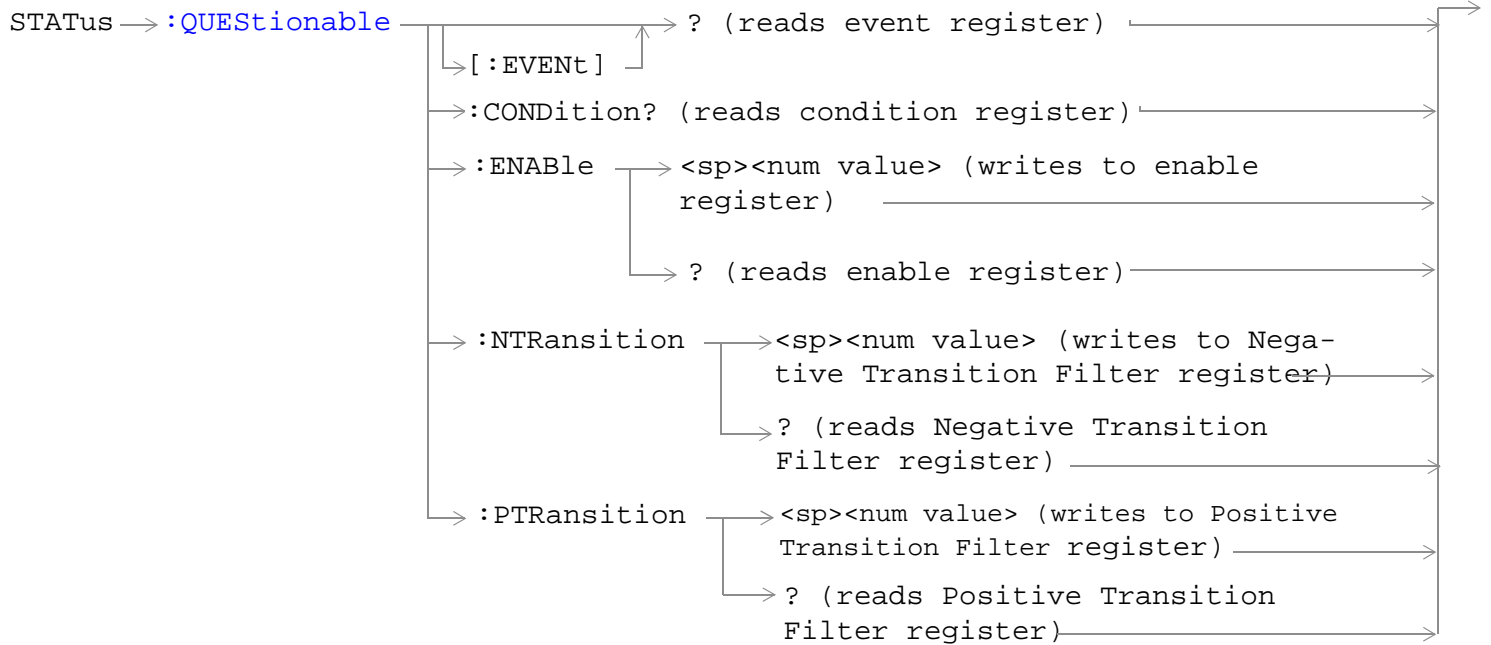
STATus → :PRESet →

[“Diagram Conventions” on page 268](#)

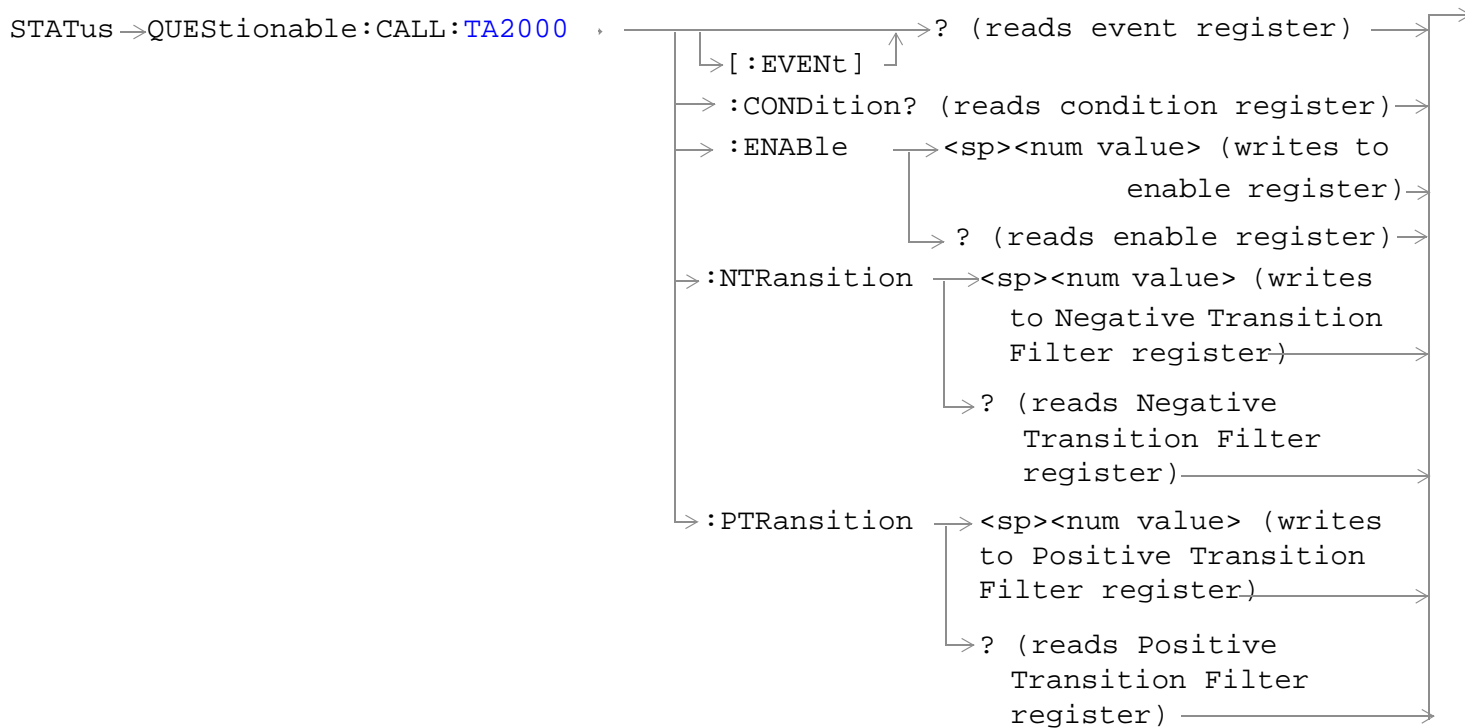
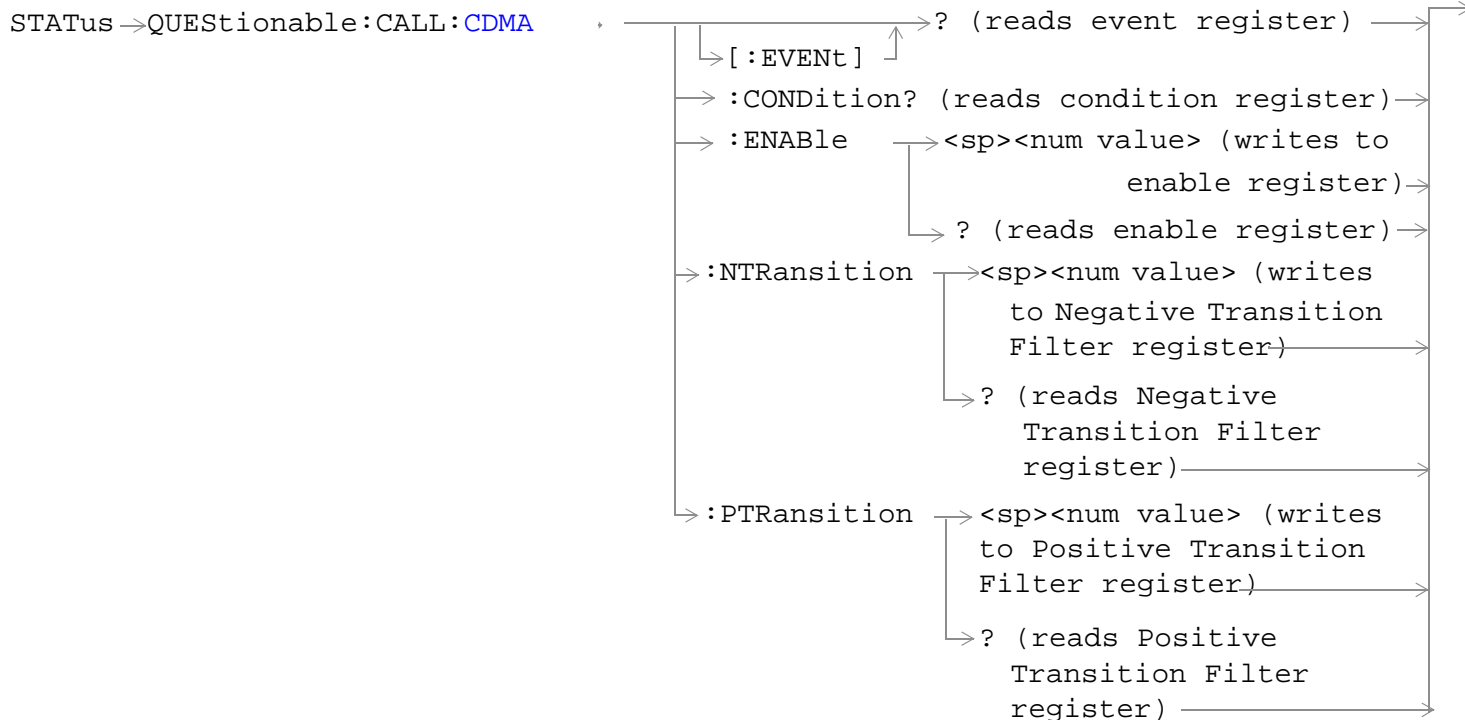
### STATus:PRESet

<p>Function</p>	<p>Presets the status subsystem.</p> <p>Presetting the status subsystem performs the following functions:</p> <ul style="list-style-type: none"> <li>• All enable registers are set to 0 (not enabled)</li> <li>• All Positive Transition Registers (PTR's) are set to 1 (positive transitions enabled).</li> <li>• All Negative Transition Registers (NTR's) are set to 0 (negative transitions disabled).</li> </ul>
-----------------	--

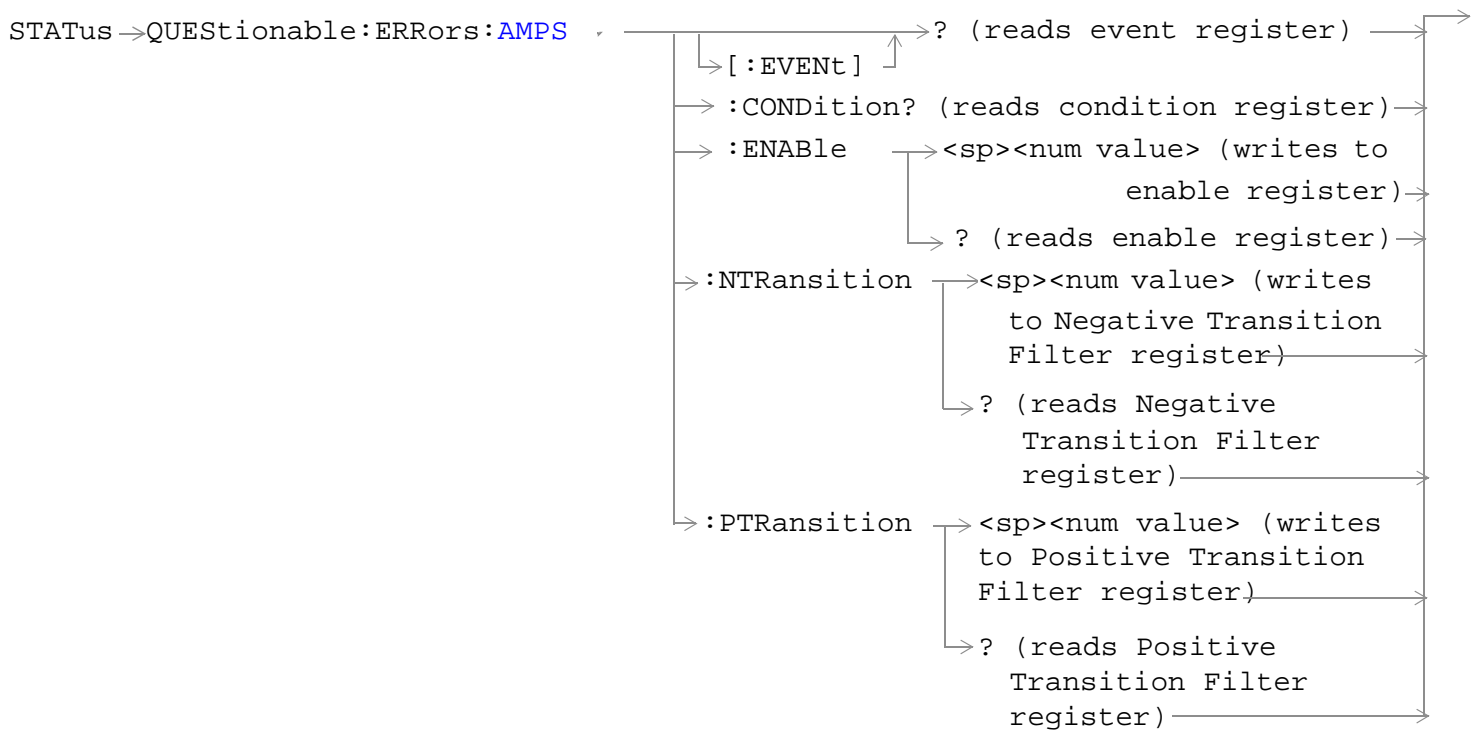
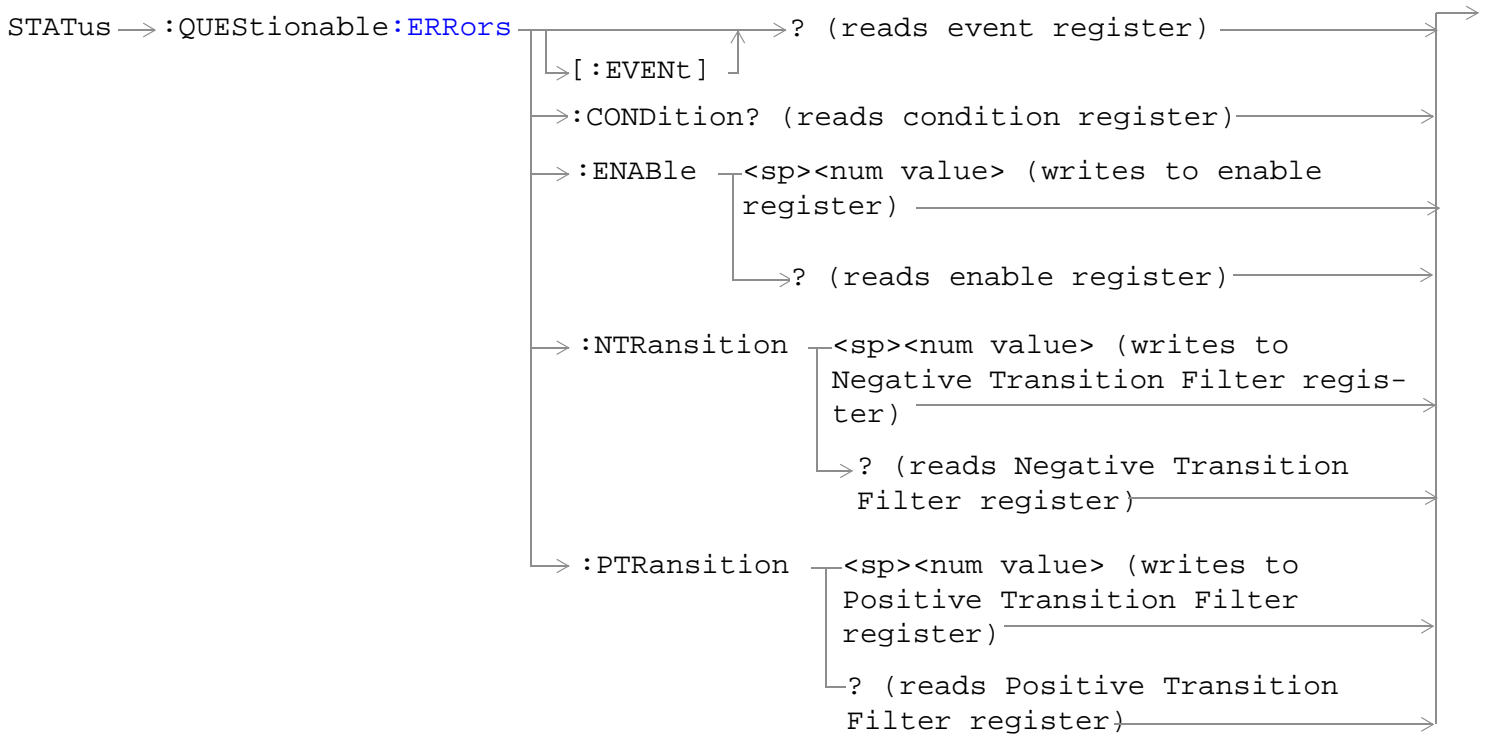
## STATUS:QUESTIONABLE



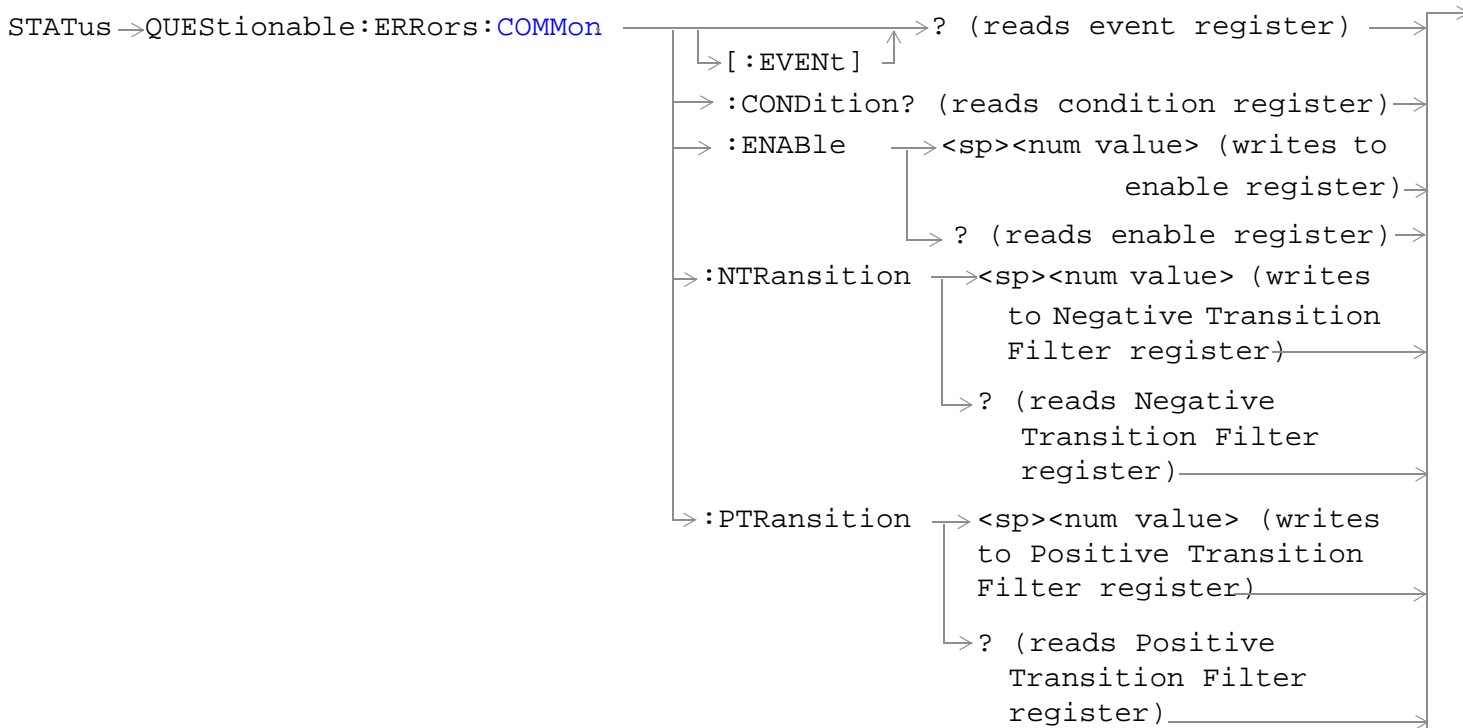
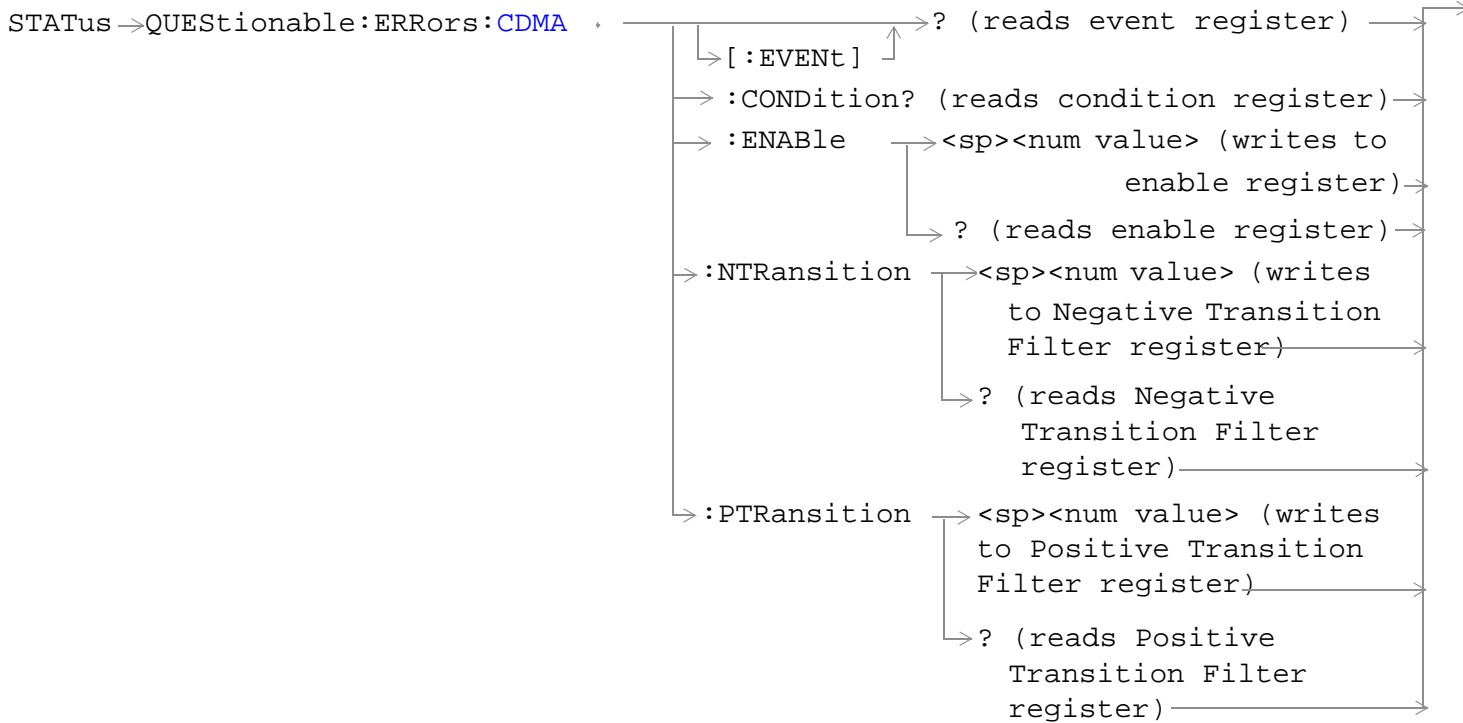
STATUS:QUESTIONABLE



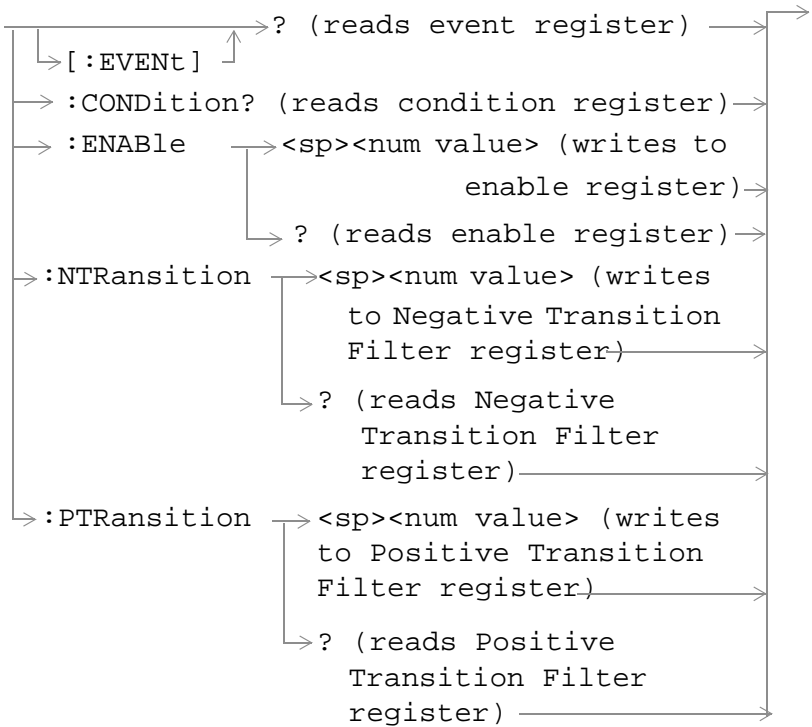




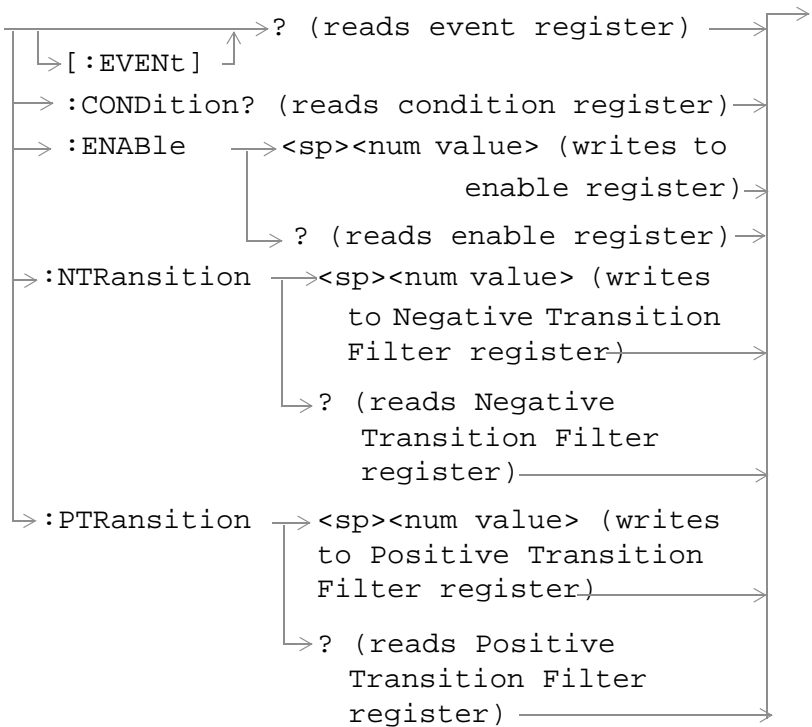
STATUS:QUESTIONABLE

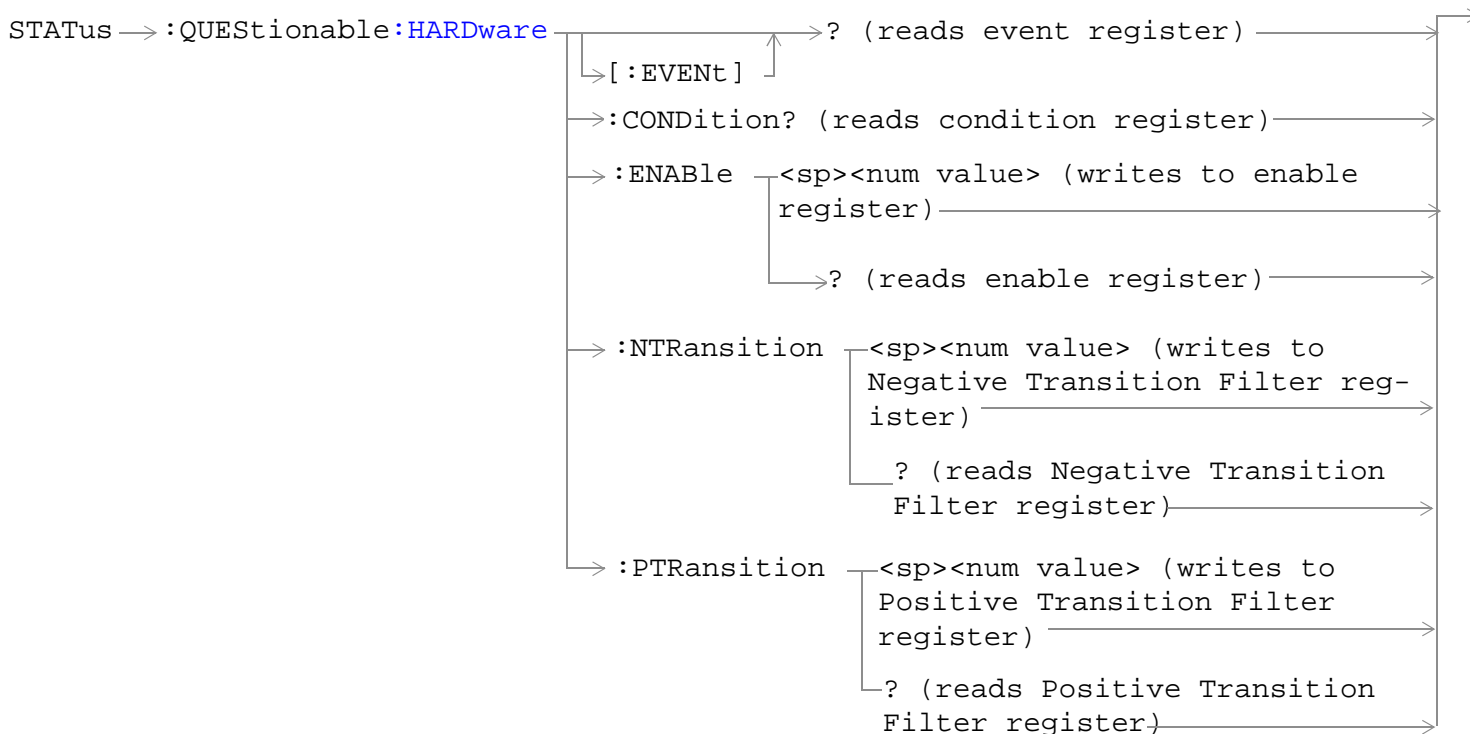
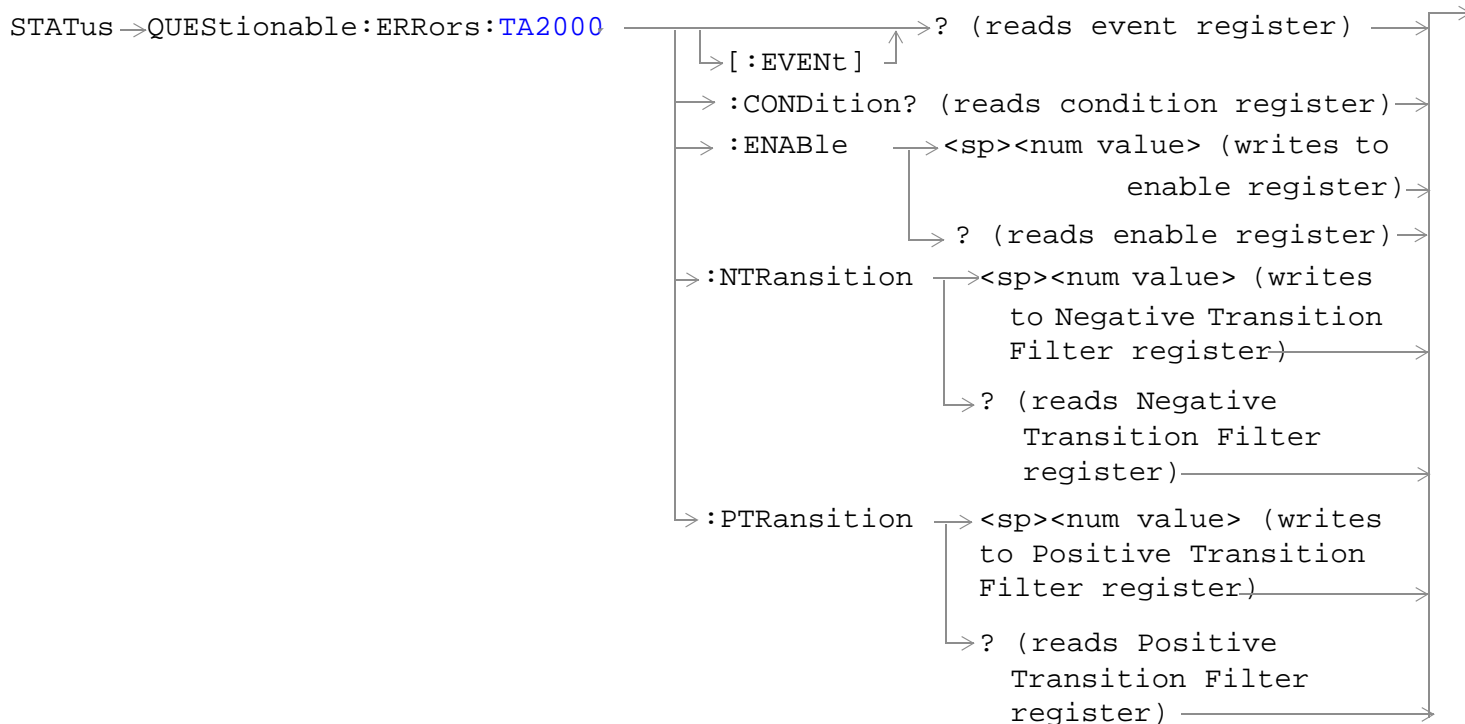


STATUS →QUESTIONABLE:ERRORS:DIGital2000



STATUS →QUESTIONABLE:ERRORS:DIGital95





“Diagram Conventions” on page 268

### 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.

STATUS:QUESTIONABLE

Bit Number	Binary Weighting	Condition	Description
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.



Bit Number	Binary Weighting	Condition	Description
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.

## STATUS:QUESTIONABLE

Bit Number	Binary Weighting	Condition	Description
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 occurred. 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.

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

STATUS:QUESTIONABLE

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

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

STATUS:QUESTIONABLE

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

**Program Example - STATUS:QUESTIONABLE:ERRORS: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 Transition
!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.

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

STATUS:QUESTIONABLE

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

**Program Example - STATUS:QUESTIONABLE:ERRORS: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 Transition
!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.



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

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

**Program Example - STATUS:QUESTIONABLE:ERRORS: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
!Questionable 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.

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

STATUS:QUESTIONABLE

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

**Program Example - STATUS:QUESTIONABLE:ERRORS:DIGITAL95 Condition Register Bit Assignment**

```

OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:DIGITAL95:EVENT?" !Queries and clears the
!Questionable Errors
!DIGITAL95 Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:DIGITAL95:CONDITION?" !Queries and clears the
!Questionable 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: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.

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

STATUS:QUESTIONABLE

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

**Program Example - STATUS:QUESTIONABLE:ERRORS:TA2000 Condition Register Bit Assignment**

```

OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:TA2000:EVENT?" !Queries and clears the
!Questionable Errors
!TA2000 Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:TA2000:CONDITION?" !Queries and clears the
!Questionable 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:HARDWARE Condition Register Bit Assignment**

The STATUS:QUESTIONABLE:HARDWARE register bits give an indication that the data/signals currently being acquired or generated are of questionable quality.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit is always 0.
14	16384	Reserved for future use.	This bit is always 0.
13	8192	Reserved for future use.	This bit is always 0.

Bit Number	Binary Weighting	Condition	Description
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	Reserved for future use.	This bit will always be 0.
8	256	Reserved for future use.	This bit will always be 0.
7	128	Reserved for future use.	This bit will always be 0.
6	64	Reserved for future use.	This bit will always be 0.
5	32	Reserved for future use.	This bit will always be 0.
4	16	Power-up Self Test(s) Failed	This bit will be a 1 if the power-up self tests failed.
3	8	Reserved for future use.	This bit will always be 0.
2	4	Reserved for future use.	This bit will always be 0.
1	2	Reserved for future use.	This bit will always be 0.
0	1	Extension Bit.	This bit will always be 0.

**Program Example - STATUS:QUESTIONABLE:HARDWARE Condition Register Bit Assignment**

```

OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:EVENT?" !Queries and clears the Questionable
!Hardware Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:CONDITION?" !Queries and clears the Questionable
!Hardware Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:ENABLE 1024" !Sets the Questionable
!Hardware Enable
!Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:NTRANSITION 2" !Sets the Questionable
!Hardware Negative Transition Filter
!Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:PTRANSITION 2" !Sets the Questionable
!Hardware Positive Transition Filter
!Register for bit 1
    
```

## Status Byte Register

\*STB?

\*STB?

**NOTE** The Status Byte Register can also be read with a serial poll. For example, the command "Status\_byte = SPOLL(714)" would perform a serial poll of the Status Byte Register, returning and releasing RQS (bit 6).

### Status Byte Register Bit Assignments

Bit Number	Binary Weighting	Label	Description
7	128	STATUS: OPERATION	Summarizes the STATUS: OPERATION Status Register, which fans out to the NMRReady and CALL Status Registers.
6	64	RQS (SRQ TRUE?)/Master Summary Status	RQS is read by a serial poll (SPOLL) Master Summary Status is read by a *STB? query - defined by IEEE 488.2
5	32	Standard Event Status Register	Summarizes the Standard Event Status Register
4	16	Message Available	SCPI - Defined
3	8	STATUS: QUESTIONABLE Status Register	Summary Message comes from the STATUS: QUESTIONABLE Status Register, which fans out to the CALL and HARDWARE Status Registers
2	4	Error/ Event Queue	SCPI - Defined
1	2	Reserved	
0	1	Reserved	

### Program Example - Status Byte Register Bit Assignments

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



---

## Standard Event Status Register

### \*ESR?

\*ESR? → Reads and clears the Std Event Status Register. →

### \*ESE?

\*ESE? → Reads the Std Event Status Register Enable Register →

### \*ESE

\*ESE → Writes to the Std Event Status Register Enable Register →

[“Diagram Conventions” on page 268](#)

## 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: <ul style="list-style-type: none"> <li>• An IEEE 488.2 syntax error. The test set received a message that did not follow the syntax defined by the standard.</li> <li>• A semantic error. For example the test set received an incorrectly spelled command.</li> <li>• The test set received a group execution trigger (GET) inside a program message</li> </ul>
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: <ul style="list-style-type: none"> <li>• A &lt;PROGRAM DATA&gt; 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.</li> <li>• The test set could not execute a valid command due to some test set hardware/firmware condition.</li> </ul>
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: <ul style="list-style-type: none"> <li>• An attempt is made to read data from the output queue when no data is present or is pending.</li> <li>• Data in the output queue has been lost. An example of this would be an output queue overflow.</li> </ul>
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 performs system level configuration functions of the test set.

## Syntax Diagrams and Command Descriptions

[“SYSTem:APPLication” on page 645](#)

[“SYSTem:BEEPer” on page 652](#)

[“SYSTem:COMMunicate” on page 654](#)

[“SYSTem:CONFigure:INFormation:HARDware:VERBose?”  
on page 653](#)

[“SYSTem:CORRection” on page 658](#)

[“SYSTem:CURRent:TA” on page 664](#)

[“SYSTem:DATE” on page 665](#)

[“SYSTem:ERRor?” on page 666](#)

[“SYSTem:MEASurement:RESet” on page 667](#)

[“SYSTem:PRESet” on page 668](#)

[“SYSTem:ROSCillator” on page 670](#)

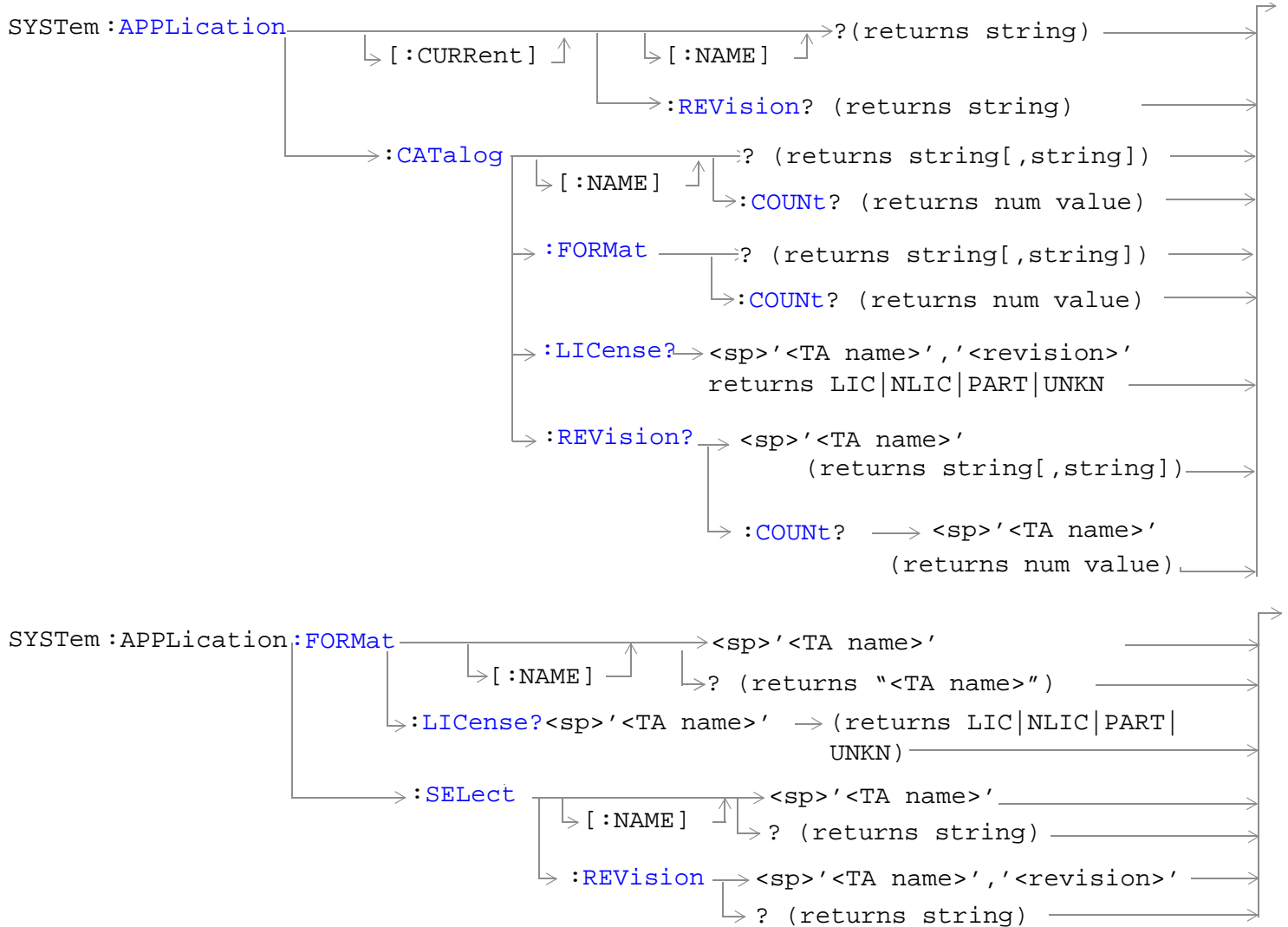
[“SYSTem:SYNChronized” on page 671](#)

[“SYSTem:TIME” on page 672](#)

[“SYSTem:TZONE” on page 673](#)

[“SYSTem:UTC” on page 674](#)

## SYSTEM:APPLICATION



### “Diagram Conventions”

**SYSTem:APPLication[:CURRent][:NAME]?**

Function	Queries the test set for the name of the currently running test application.
Query	Range: AMPS/136 Mobile Test CDMA 2000 Mobile Test GSM Mobile Test GPRS Mobile Test WCDMA Mobile Test null string
<b>Programming Example</b> OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:NAME?"	

**SYSTem:APPLication[:CURRent]:REVision?**

Function	Queries 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.
<b>Programming Example</b> OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:REVISION?"	

**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: <ul style="list-style-type: none"> <li>• "LIC" indicates this is a licensed test application.</li> <li>• "NLIC" indicates this is not a licensed test application.</li> <li>• "PART" only part of the test application with multiple radio formats is licensed</li> <li>• "UNKN" indicates that license status is unknown.</li> </ul>
Query	Range: LIC   NLIC   UNKN
<b>Programming Example</b> OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:LICENSE? 'GSM mobile test','A.05.06'"	

**SYSTem:APPLication:CATalog:REVision? '<test application name>'**

Function	<p>Query the test set for all of the revision numbers stored on the test set's hard drive. You must specify a test application.</p> <p>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.</p>
Query	Range: One or more comma separated strings or a null string
<p><b>Programming Example</b></p> <p>OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION? 'AMPS/136 MOBILE TEST' "</p>	

**SYSTem:APPLication:CATalog:REVision:COUNt? '<test application name>'**

Function	<p>Queries the test set for the number of revisions present on the hard disk for a specified test application. Up to 30 revisions can be stored for a test application.</p> <p>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.</p>
Query	Range: 0 through 30
<p><b>Programming Example</b></p> <p>OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION:COUNT? 'AMPS/136 MOBILE TEST' "</p>	

**SYSTem:APPLication:CATalog[:NAME]?**

Function	<p>Queries the test set for all of the names of the test applications stored on the hard drive.</p> <p>This query returns one or more strings, each string is separated by a comma.</p>
Query	<p>Range:</p> <p>AMPS/136 Mobile Test</p> <p>CDMA 2000 Mobile Test</p> <p>GSM Mobile Test</p> <p>GSM/GPRS Mobile Test</p> <p>GSM_AMPS/136_GPRS Mobile</p>
<p><b>Programming Example</b></p> <p>OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME? "</p>	

**SYSTEM:APPLICATION:CATALOG[:NAME]:COUNT?**

Function	Queries 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
<b>Programming Example</b> 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: <ul style="list-style-type: none"> <li>• 'GSM'</li> <li>• 'AMPS/136'</li> <li>• 'GPRS'</li> <li>• 'IS-2000/IS-95/AMPS'</li> <li>• 'WCDMA'</li> </ul>
<b>Programming Example</b> 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
<b>Programming Example</b> OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:FORMAT:COUNT?"	



**SYSTem:APPLication:FORMat[:NAME]**

Function	<p>Switches formats in a fast switching test application. A licensed fast switching test application must be selected to use this command.</p> <p>Queries the test set for the name of the currently active format. This string is not case sensitive.</p>
Setting	<p>Range:</p> <ul style="list-style-type: none"> <li>• 'GSM'</li> <li>• 'AMPS/136'</li> <li>• 'GPRS'</li> <li>• 'S-2000/IS-95/AMPS'</li> <li>• 'WCDMA'</li> </ul>
Query	<p>Range:</p> <ul style="list-style-type: none"> <li>• 'GSM'</li> <li>• 'AMPS/136'</li> <li>• 'GPRS'</li> <li>• 'S-2000/IS-95/AMPS'</li> <li>• 'WCDMA'</li> </ul>
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"SYSTEM:APPLICATION:FORMAT:NAME 'GSM' "</pre> <pre>OUTPUT 714;"SYSTEM:APPLICATION:FORMAT:NAME?"</pre>	

**SYSTem:APPLication:FORMat:LICense? '<format name>'**

Function	<p>Queries the test set for the license status of the fast switching test application.</p> <p>The returned values are:</p> <ul style="list-style-type: none"> <li>• LIC indicates this is a licensed test application.</li> <li>• NLIC indicates this is not a licensed test application.</li> <li>• PART indicates that only part of the test application with multiple formats is licensed.</li> <li>• UNKN indicates that license status is unknown.</li> </ul>
Query	<p>Range: LIC   NLIC   PART   UNKN</p>
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"SYSTEM:APPLICATION:FORMAT:LICENSE? 'AMPS/136' "</pre>	

**SYSTem:APPLication:SELEct[:NAME] '<test application name>'**

<p><b>Function</b></p>	<p>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.</p> <p>Queries the test set for the test application that is selected and will run after the next reboot of the test set. This string is not case sensitive.</p> <p>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.</p> <hr/> <p><b>NOTE</b>      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.</p> <hr/>
<p><b>Setting</b></p>	<p>Range:</p> <p>AMPS/136 Mobile Test</p> <p>CDMA 2000 Mobile Test</p> <p>GSM Mobile Test</p> <p>GPRS Mobile Test</p> <p>WCDMA Mobile Test</p>
<p><b>Query</b></p>	<p>Range:</p> <p>AMPS/136 Mobile Test</p> <p>CDMA 2000 Mobile Test</p> <p>GSM Mobile Test</p> <p>GPRS Mobile Test</p> <p>WCDMA Mobile Test</p> <p>null string</p>
<p><b>Programming Example</b></p> <p>OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME `AMPS/136 MOBILE TEST` "</p> <p>OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME? "</p>	

**SYSTem:APPLication:SElect:REVision '<test application name>','<revision>'**

<p>Function</p>	<p>Selects a test application revision and a test application.</p> <p>The revision does not need to be set in order to switch test applications. The only time you select revisions is to change revisions.</p> <p>Queries the test set for the revision of a specified test application.</p> <p>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.</p> <hr/> <p><b>NOTE</b> 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.</p> <hr/>
<p>Setting</p>	<p>Range: A valid test application name and revision number for any licensed test application.</p>
<p>Query</p>	<p>Range: A string up to 20 characters, or the null string.</p>
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION 'CDMA 2000 MOBILE TEST','01011210'" OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION? 'CDMA 2000 MOBILE TEST'"</pre>	

**Related Topics**

- [“Test Application Switching” on page 808](#)
- [“Test Application Revisions and Licenses” on page 810](#)
- [“Test Application Name” on page 812](#)
- [“SYSTem:CURRent:TA” on page 664](#)

## SYSTem:BEEPer



“Diagram Conventions” on page 268

### 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)
Related Topics	“Test Set Beeper”
<b>Programming Example</b> OUTPUT 714;"SYSTEM:BEEPER:STATE OFF" !Sets beeper state to off.	

## SYSTem:CONFigure:INFormation:HARDware:VERBose?

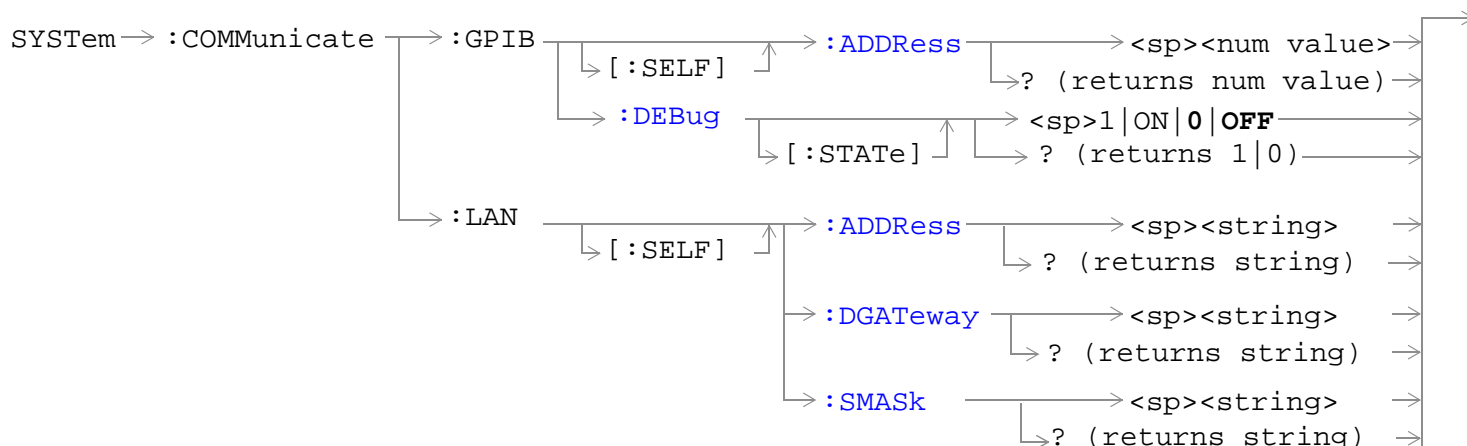
SYSTem:CONFigure:INFormation:HARDware:VERBose?

### “Diagram Conventions”

#### 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.
Related topics	<a href="#">“Hardware Configuration Report”</a>
<b>Programming Example</b> OUTPUT 714;"SYSTEM:CONFIGURE:INFORMATION:HARDWARE:VERBOSE?" !Queries system hardware.	

## SYSTem:COMMunicate



“Diagram Conventions” on page 268

### 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)
Related Topics	<a href="#">“Configuring the Test Set's GPIB” on page 806</a>
Programming Example	
OUTPUT 714;"SYSTEM:COMMUNICATE:GPIB:SELF:ADDRESS 14" !Sets the GPIB address to 14.	

### SYSTem:COMMunicate:GPIB:DEBUg[:STATe]

Function	<p>Sets/queries the test set's SCPI debugger state.</p> <p>When the state is on; enhanced error messages (generated from GPIB commands with syntax errors) are shown the test set display.</p> <p>The error message is printed along with the syntax. &lt;ERR&gt; is displayed at the end of the incorrect node. Non-printable characters will be replaced with the \$ symbol. See <a href="#">“Error Messages” on page 741</a> for a list of the errors.</p> <p>The debugger state should be set to on only during GPIB code development. Test times will increase if the debugger state is left on.</p>
Setting	Range: 0 OFF   1 ON

Query	0   1
*RST setting	0   off
<b>Programming Example</b> 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 <a href="#">"SYSTem:COMMunicate:LAN[:SELF]:SMASK" on page 657</a> .  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)
<i>Related Topics</i>	<a href="#">"Configuring the Test Set's LAN" on page 804</a>
<b>Programming Example</b>	
<pre>OUTPUT 714;"SYSTEM:COMMUNICATE:LAN:SELF:ADDRESS '130.015.156.255'" !Sets the   !LAN IP   !address.</pre>	

**SYSTem:COMMunicate:LAN[:SELF]:DGATeway**

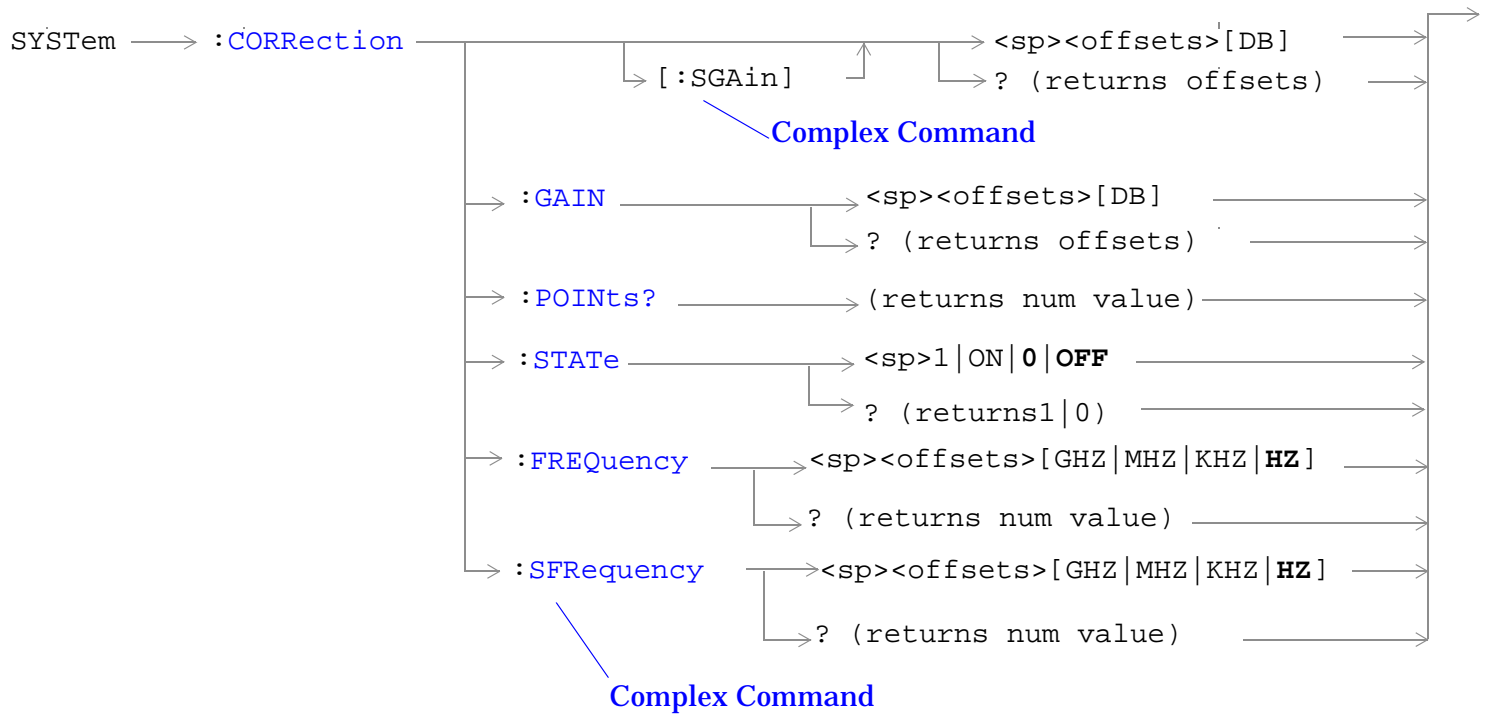
Function	Sets/queries the LAN IP router/gateway address for the test set.
Setting	Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces), blank field
Query	Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D = 0 to 255 (no embedded spaces). blank field
Factory setting	blank field, (this parameter is not affected by any reset operation)
<b>Programming Example</b>	
<pre>OUTPUT 714;"SYSTEM:COMMUNICATE:LAN:SELF:DGATEWAY '130.2.6.200'"</pre>	



**SYSTem:COMMunicate:LAN[:SELF]:SMASK**

<p><b>Function</b></p>	<p>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.</p> <p>If A is less than or equal to 127, the subnet mask is 255.0.0.0.</p> <p>If A is greater than 127 and less or equal to 191, the subnet mask is 222.255.0.0.</p> <p>If A is grater than 191, the subnet mask is 255.255.255.0.</p> <p>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.</p>
<p><b>Setting</b></p>	<p>Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D are between = 0 to 255 (no embedded spaces)</p>
<p><b>Query</b></p>	<p>Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D are between = 0 to 255 (no embedded spaces)</p>
<p><b>Factory setting</b></p>	<p>0.0.0.0 (this parameter is not affected by any reset operation and can only be changed by direct user access)</p>
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"SYSTEM:COMMUNICATE:LAN:SELF:SMASK '255.2.6.200'"</pre>	

# SYSTem:CORRection



“Diagram Conventions” on page 268

**SYSTem:CORRection[:SGain]**

Function	<p>Sets/queries up to 20 comma-separated amplitude offset values in dB. This command sets the state to On.</p> <p>See <a href="#">“Amplitude Offset” on page 85</a>.</p> <p>The units, dB, are optional. If no units are specified then units default to dB.</p> <p>Sending a null list (no values) sets the state of all offsets to Off.</p>
Setting	<p>Range: 0 to 20 values between -100 to +100</p> <p>Resolution: 0.01</p>
Query	<p>Range: 1 to 20 values between -100 to +100, and NAN (9.91E+37)</p> <p>Resolution: 0.01</p>
Factory Setting	<p>Offsets 1 through 20, are set to 0.00 dB, state is set to Off</p>
<p><b>Programming Example</b></p> <pre> 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                     </pre>	

**SYSTem:CORRection:FREQuency**

Function	<p>Sets/queries up to 20 comma-separated frequency values in MHz. Each frequency value corresponds with a gain setting. See <a href="#">“SYSTem:CORRection:GAIN”</a> .</p> <p>The units, (GHz, MHz, kHz, Hz) are optional. If no units are specified, units default to Hz.</p> <p>See <a href="#">“Amplitude Offset” on page 85</a>.</p> <p>Sending a null list (no values) sets the state of all frequencies to Off.</p>
Setting	<p>Range: 0 to 20 comma separated values ranging from 292.5 MHz to 2700 MHz</p> <p>Resolution: 1 Hz</p>
Query	<p>Range: 1 to 20 comma separated values ranging from 292.5 MHz to 2700 MHz, and NAN (9.91E+37)</p> <p>Resolution: 1 HZ</p>

## SYSTEM:CORRection

<b>Factory Setting</b>	<ol style="list-style-type: none"><li>1. 800.00 MHz Off</li><li>2. 810.00 MHz Off</li><li>3. 820.00 MHz Off</li><li>4. 830.00 MHz Off</li><li>5. 840.00 MHz Off</li><li>6. 850.00 MHz Off</li><li>7. 860.00 MHz Off</li><li>8. 870.00 MHz Off</li><li>9. 880.00 MHz Off</li><li>10. 890.00 MHz Off</li><li>11. 900.00 MHz Off</li><li>12. 910.00 MHz Off</li><li>13. 920.00 MHz Off</li><li>14. 930.00 MHz Off</li><li>15. 940.00 MHz Off</li><li>16. 950.00 MHz Off</li><li>17. 960.00 MHz Off</li><li>18. 970.00 MHz Off</li><li>19. 980.00 MHz Off</li><li>20. 990.00 MHz Off</li></ol>
<b>Programming Example</b>  <pre>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</pre>	

**SYSTem:CORRection:GAIN**

Function	<p>Sets/queries the up to 20 comma separated offset gain values in units of dB. Each gain value corresponds with a frequency setting. See <a href="#">“SYSTem:CORRection:FREQuency”</a> .</p> <p>See <a href="#">“Amplitude Offset” on page 85</a>.</p> <p>The units, dB, are optional. If no units are specified, units default to dB.</p> <p>Sending a null list (no values) sets the state of all offsets to Off.</p>
Setting	<p>Range: 0 to 20 values between -100 to +100</p> <p>Resolution: 0.01</p>
Query	<p>Range: 1 to 20 values between -100 to +100, and NAN (9.91E+37)</p> <p>Resolution: 0.01</p>
Factory Setting	<p>Offsets 1 through 20, are set to 0.00 dB, state is set to off</p>
<p><b>Programming Example</b></p> <pre>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.</pre>	

**SYSTem:CORRection:POINTs**

Function	<p>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.</p> <p>See <a href="#">“Amplitude Offset” on page 85</a>.</p>
Query	<p>Range: 1 to 20, and NAN (9.91E+37)</p> <p>Resolution: 1</p>
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"SYSTEM:CORRECTION:POINTS?" !Returns the number of frequencies and offsets with their state set to On.</pre>	

**SYSTem:CORRection:SFRequency**

<p><b>Function</b></p>	<p>Sets/queries up to 20 comma separated frequency values in MHz. This command sets the state to On.</p> <p>The units (GHz, MHz, kHz, Hz) are optional. If no units are specified, units default to MHz.</p> <p>See <a href="#">“Amplitude Offset” on page 85</a>.</p> <p>Sending a null list (no values) sets the state of all frequencies to Off.</p>
<p><b>Setting</b></p>	<p>Range: 0 to 20 comma separated values from 292.5 MHz to 2700 MHz</p> <p>Resolution: 1 Hz</p>
<p><b>Query</b></p>	<p>Range: 1 to 20 comma separated values from 292.5 MHz to 2700 MHz, and NAN (9.91E+37)</p> <p>Resolution: 1 HZ</p>
<p><b>Factory Setting</b></p>	<ol style="list-style-type: none"> <li>1. 800.00 MHz Off</li> <li>2. 810.00 MHz Off</li> <li>3. 820.00 MHz Off</li> <li>4. 830.00 MHz Off</li> <li>5. 840.00 MHz Off</li> <li>6. 850.00 MHz Off</li> <li>7. 860.00 MHz Off</li> <li>8. 870.00 MHz Off</li> <li>9. 880.00 MHz Off</li> <li>10. 890.00 MHz Off</li> <li>11. 900.00 MHz Off</li> <li>12. 910.00 MHz Off</li> <li>13. 920.00 MHz Off</li> <li>14. 930.00 MHz Off</li> <li>15. 940.00 MHz Off</li> <li>16. 950.00 MHz Off</li> <li>17. 960.00 MHz Off</li> <li>18. 970.00 MHz Off</li> <li>19. 980.00 MHz Off</li> <li>20. 990.00 MHz Off</li> </ol>

**Programming Example**

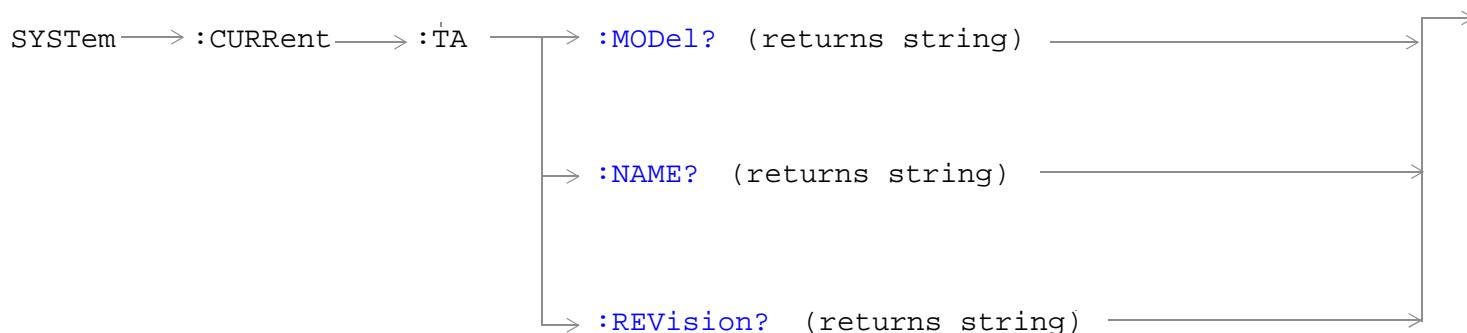
```
OUTPUT 714;"SYSTEM:CORRECTION:SFREQUENCY 1710.2 MHZ,1805.2 MHZ,1784.8 MHZ,1879.8 MHZ"
!Sets up to 20 comma separated frequencies and sets the state to On for the frequency,
!offset, and RF IN/OUT Amplitude Offset State
```

```
OUTPUT 714;"SYSTEM:CORRECTION:SFREQUENCY"
!Sets the state for all frequencies and offsets to Off
```

**SYSTem:CORRection:STATe**

Function	<p>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.</p> <p>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.</p> <p>Setting any of the frequency or offset states to On will set the RF IN/OUT Amplitude Offset State to On.</p> <p>See <a href="#">"Amplitude Offset" on page 85</a>.</p>
Setting	0   OFF   1   ON
Query	0   1
Factory Setting	0 (off)
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"SYSTEM:CORRECTION:STATE ON" !Sets the RF IN/OUT !Amplitude Offset State to On</pre>	

## SYSTem:CURRent:TA



### “Diagram Conventions”

#### SYSTem:CURRent:TA:MODEl?

Function	Queries 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

#### SYSTem:CURRent:TA:NAME?

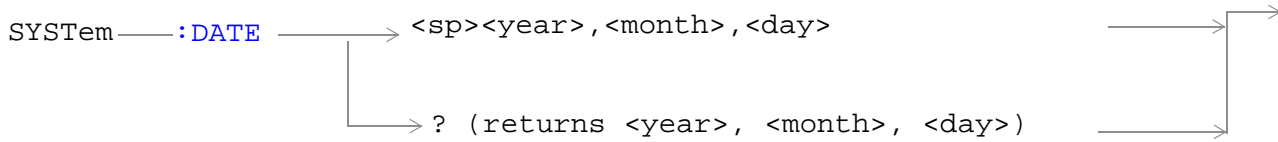
Function	Queries the name of the test application running. Printable ASCII characters up to a 25 character string. This command is not recommended see “SYSTem:APPLication[:CURRent]:NAME?” .
Query	Range: ASCII codes 32 - 126 decimal excluding comma and semicolon
*RST Setting	non volatile, read from the test set’s hard disk

#### SYSTem:CURRent:TA:REVision?

Function	Queries 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[:CURRent]:REVision?” .
Query	Range: ASCII codes 32 - 126 decimal excluding comma and semicolon
*RST Setting	non volatile, read from the test set’s hard disk.



## SYSTem:DATE



[“Diagram Conventions” on page 268](#)

### SYSTem:DATE

Function	Sets/queries the date.
Setting	<p>Range:</p> <ul style="list-style-type: none"> <li>• &lt;year&gt; 2000 to 2099</li> <li>• &lt;month&gt; 1 to 12 (the number 1 corresponds to January)</li> <li>• &lt;day&gt; 1 to the number of days in the month specified by the &lt;month&gt; parameter</li> </ul>
Query	<p>Range:</p> <ul style="list-style-type: none"> <li>• &lt;year&gt; 2000 to 2099</li> <li>• &lt;month&gt; 1 to 12 (the number 1 corresponds to January)</li> <li>• &lt;day&gt; 1 to the number of days in the month specified by the &lt;month&gt; parameter</li> </ul>
*RST Setting	This feature is not affected by instrument preset
Requirements	Test Application Revision: B.03.00 and above
<p><b>Programming Example</b></p> <p>OUTPUT 714;"SYSTEM:DATE 2001,9,27" !Sets the date to September 27,2001.</p> <p>OUTPUT 714;"SYSTEM:DATE? !Returns "+2001,+9,+27" if the date has been set to September 27,2001.</p>	

### Related Topics

[“SYSTem:UTC:DATE”](#)

## SYSTem:ERRor?

SYSTem → :ERRor? → (returns num value, string) →

[“Diagram Conventions” on page 268](#)

### SYSTem:ERRor?

Function	<p>Queries the contents of the error/event queue. The error/event queue may contain one or more messages with an error or event description.</p> <p>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. For example, manual user errors are not displayed with SYSTem:ERRor?. They are viewed from the Message Log. See <a href="#">“Error Messages”</a>.</p>
Query	<p>Error/Event Queue</p> <ul style="list-style-type: none"> <li>• Range: 0 to 100 messages up to 255 characters in length</li> </ul>
<p><b>Programming Example</b></p> <p>OUTPUT 714;"SYSTEM:ERROR?" !Query the contents of the Error/Event Queue</p>	

## SYSTem:MEASurement:RESet

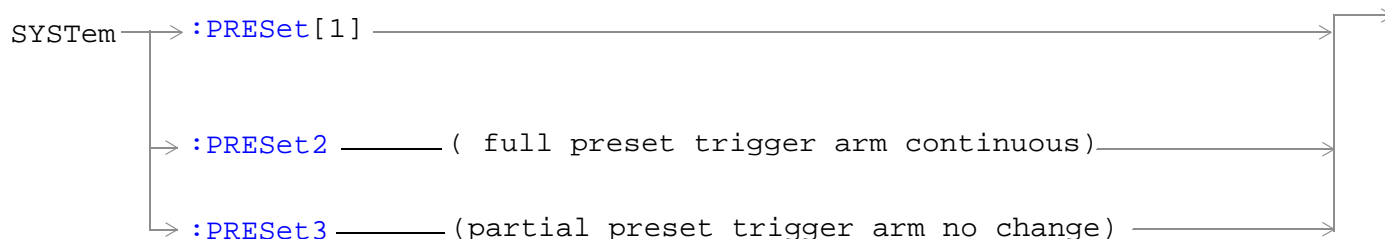


[“Diagram Conventions” on page 268](#)

### SYSTem:MEASurement:RESet

Function	Aborts all measurements. If continuous triggering is enabled, measurements will begin a new measurement cycle.
Setting	Measurement results are set to their default values when measurement reset occurs.

## SYSTem:PRESet



[“Diagram Conventions” on page 268](#)

### SYSTem:PRESet[1] (not recommended for use)

Function	<p>Not recommended for use at this time. See <a href="#">“SYSTem:PRESet3”</a> for a recommended partial preset.</p> <p>Performs a partial preset. This command is intended to be used when changing from remote operation to manual operation and a partial preset is needed.</p> <p>Any call in process is disconnected and all measurements are aborted and inactivated. Measurement parameters are not changed.</p> <p>A partial preset will not modify any measurement settings including trigger arm. See <a href="#">“Trigger Arm (Single or Continuous) Description” on page 242</a>.</p>
Related Topics	See <a href="#">“Partial Preset” on page 210</a> for more details
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"SYSTEM:PRESET" !Partial preset when changing from remote to manual operation.</pre>	

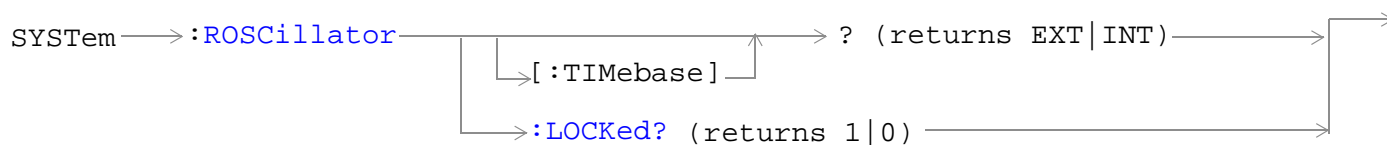
### SYSTem:PRESet2

Function	<p>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.</p> <p>All parameters are set to their default values. All measurements are aborted the trigger arm is set to continuous. See <a href="#">“Trigger Arm (Single or Continuous) Description” on page 242</a>.</p> <p>The *RST command will set the trigger arm to single.</p>
Related Topics	See <a href="#">“Full Preset” on page 211</a> for details about the *RST full preset.
<p><b>Programming Example</b></p> <pre>OUTPUT 714;"SYSTEM:PRESET2" !Full preset, trigger arm set to continuous.</pre>	

**SYSTem:PRESet3**

<b>Function</b>	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.
<b>Related Topics</b>	See " <a href="#">Partial Preset</a> " for more details.
<b>Programming Example</b>  OUTPUT 714;"SYSTEM:PRESET3" !Partial preset when in remote operation.	

## SYSTem:ROSCillator



“Diagram Conventions” on page 268

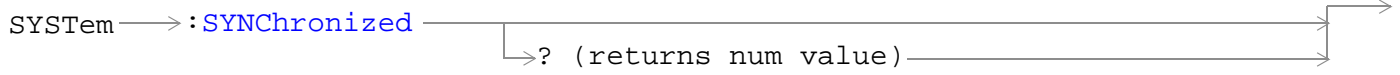
### SYSTem:ROSCillator[:TIMEbase]?

Function	<p>Queries the timebase source.</p> <p>If an external timebase is used, it must have these characteristics:</p> <ul style="list-style-type: none"> <li>• an output level of 0 to +13 dBm</li> <li>• frequency of 10 MHz</li> </ul>
Query	<p>Range:</p> <p>INT = internal source</p> <p>EXT = external source</p>

### SYSTem:ROSCillator:LOCKed?

Function	<p>Queries the timebase to find out if it is locked or unlocked. Returns 0 or 1.</p>
Query	<p>Range:</p> <p>0 = unlocked</p> <p>1 = locked</p>

## SYSTem:SYNChronized

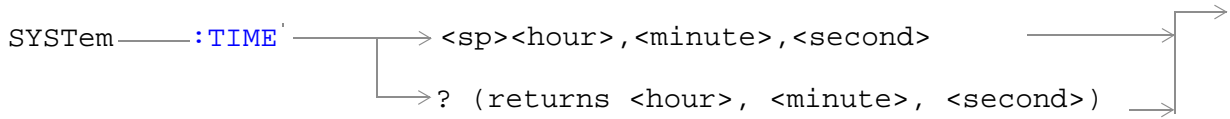


[“Diagram Conventions” on page 268](#)

### 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

## SYSTem:TIME



[“Diagram Conventions” on page 268](#)

### SYSTem:TIME

Function	<p>Sets/queries the local time of day.</p> <p>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.</p> <p>Changes to time zone will cause changes to local time, but will not directly affect UTC time.</p>
Setting	<p>Range:</p> <ul style="list-style-type: none"> <li>• &lt;hour&gt; 0 to 23</li> <li>• &lt;minute&gt; 0 to 59</li> <li>• &lt;second&gt; 0 to 59</li> </ul> <hr/> <p><b>NOTE</b>      The resolution of local time setting is minutes. A number within the parameter range must be entered for &lt;second&gt; but it will not affect the minute setting.</p>
Query	<p>Range:</p> <ul style="list-style-type: none"> <li>• &lt;hour&gt; 0 to 23</li> <li>• &lt;minute&gt; 0 to 59</li> <li>• &lt;second&gt; 0 to 59</li> </ul> <hr/> <p><b>NOTE</b>      The resolution of the local time setting is minutes. The value returned for &lt;second&gt; will not provide useful information.</p>
*RST Setting	This feature is not affected by instrument preset
Requirements	Test Application Revision: B.03.00 and above
<p><b>Programming Example</b></p> <pre> 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.         </pre>	

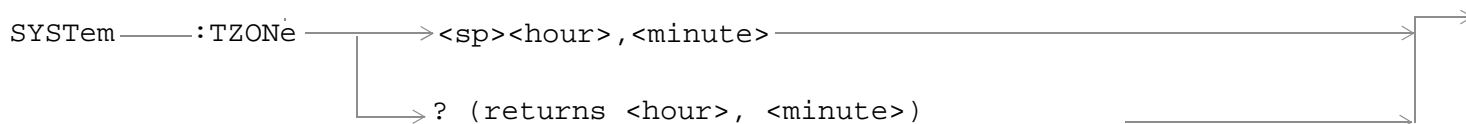
### Related Topics

[“SYSTem:UTC\[:TIME\]”](#)

[“SYSTem:TZONE”](#)



## SYSTem:TZONE



[“Diagram Conventions” on page 268](#)

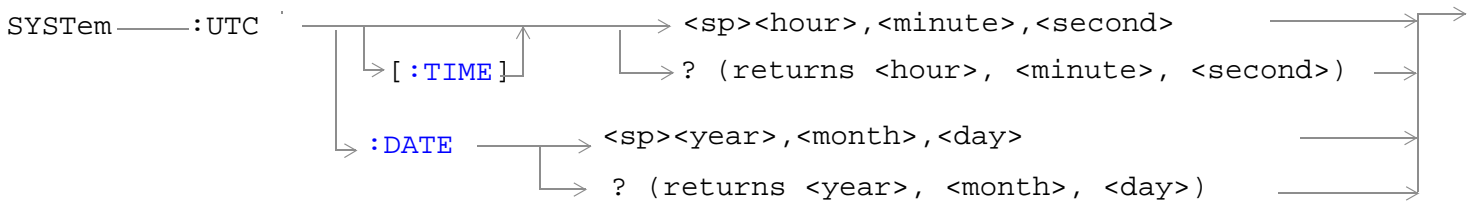
### SYSTem:TZONE

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: <ul style="list-style-type: none"> <li>• &lt;hour&gt; -12 to +15</li> <li>• &lt;minute&gt; 0 to 59</li> </ul>
Query	Range: <ul style="list-style-type: none"> <li>• &lt;hour&gt; -12 to +15</li> <li>• &lt;minute&gt; 0 to 59</li> </ul>
*RST Setting	This feature is not affected by instrument preset
Requirements	Test Application Revision: B.03.00 and above
<b>Programming Example</b> 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 268

### 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	<p>Range:</p> <ul style="list-style-type: none"> <li>• &lt;hour&gt; 0 to 23</li> <li>• &lt;minute&gt; 0 to 59</li> <li>• &lt;second&gt; 0 to 59</li> </ul> <hr/> <p><b>NOTE</b>      The resolution of the UTC time setting is minutes. A number within the parameter range must be entered for &lt;second&gt; but it will not affect the minute setting.</p>
Query	<p>Range:</p> <ul style="list-style-type: none"> <li>• &lt;hour&gt; 0 to 23</li> <li>• &lt;minute&gt; 0 to 59</li> <li>• &lt;second&gt; 0 to 59</li> </ul> <hr/> <p><b>NOTE</b>      The resolution of the UTC time setting is minutes. The value returned for &lt;second&gt; will not provide useful information.</p>
*RST Setting	This feature is not affected by instrument preset
Requirements	Test Application Revision: A.05.05 and above
<p><b>Programming Example</b></p> <pre> 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.         </pre>	

**SYSTEM:UTC:DATE**

Function	Sets/queries the Universal Coordinated Time (UTC) date. (UTC is also known as UCT, Zulu, and Greenwich Mean Time.)
Setting	<p>Range:</p> <ul style="list-style-type: none"> <li>• &lt;year&gt; 2000 to 2099</li> <li>• &lt;month&gt; 1 to 12 (the number 1 corresponds to January)</li> <li>• &lt;day&gt; 1 to the number of days in the month specified by the &lt;month&gt; parameter</li> </ul>
Query	<p>Range:</p> <ul style="list-style-type: none"> <li>• &lt;year&gt; 2000 to 2099</li> <li>• &lt;month&gt; 1 to 12 (the number 1 corresponds to January)</li> <li>• &lt;day&gt; 1 to the number of days in the month specified by the &lt;month&gt; parameter</li> </ul>
*RST Setting	This feature is not affected by instrument preset
Requirements	Test Application Revision: B.03.00 and above
<p><b>Programming Example</b></p> <p>OUTPUT 714;"SYSTEM:UTC:DATE 2001,9,27" !Sets the UTC date to September 27,2001.</p> <p>OUTPUT 714;"SYSTEM:UTC:DATE?" !Returns "+2001,+9,+27" if the UTC date has been set to September 27,2001.</p>	

**Related Topics**

["SYSTEM:DATE"](#)

["SYSTEM:TIME"](#)

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## 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 returned 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”](#)



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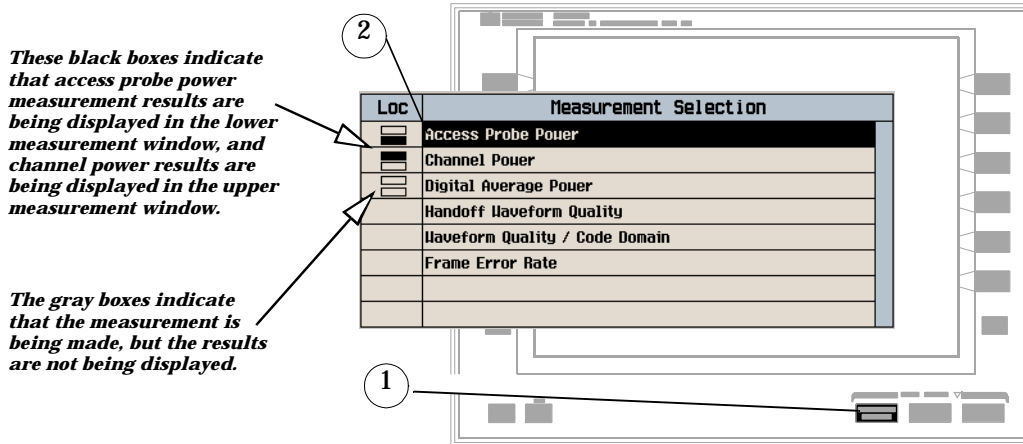
# Manual Operation

## How Do I Make Measurements on a Mobile Station?

### A. Establish a call.

1. Connect the mobile station to the Test Set.
2. Make a call (see “How Do I Set Up a Call?” on page 683).

### B. Select measurements.



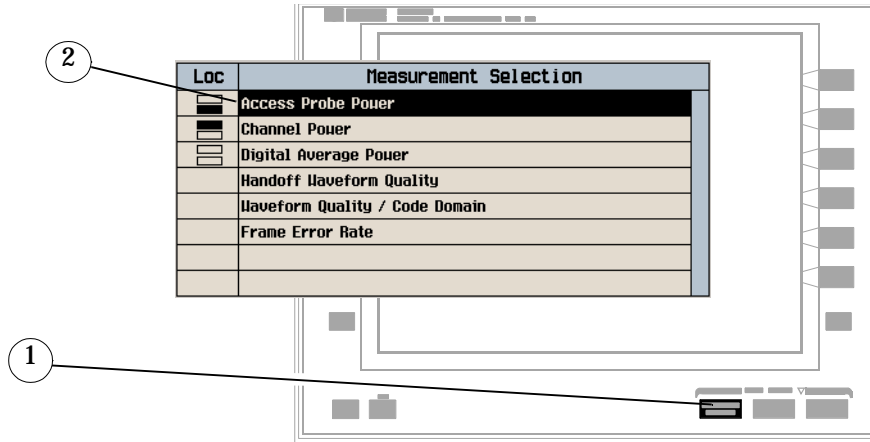
1. Press the **Measurement selection** key.
2. Highlight a measurement and press the knob.
3. Repeat steps 1 and 2 to select additional measurements.

For a complete list of measurement procedures, see “[cdma2000/IS-95/AMPS Measurement Procedures](#)” on page 695



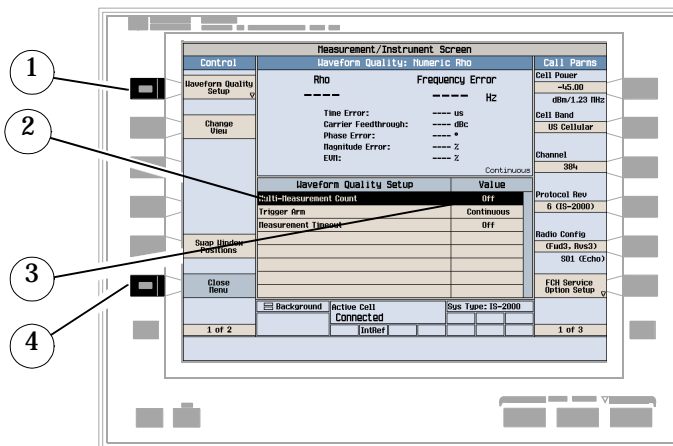
## How Do I Change the Measurement Setup?

### 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.

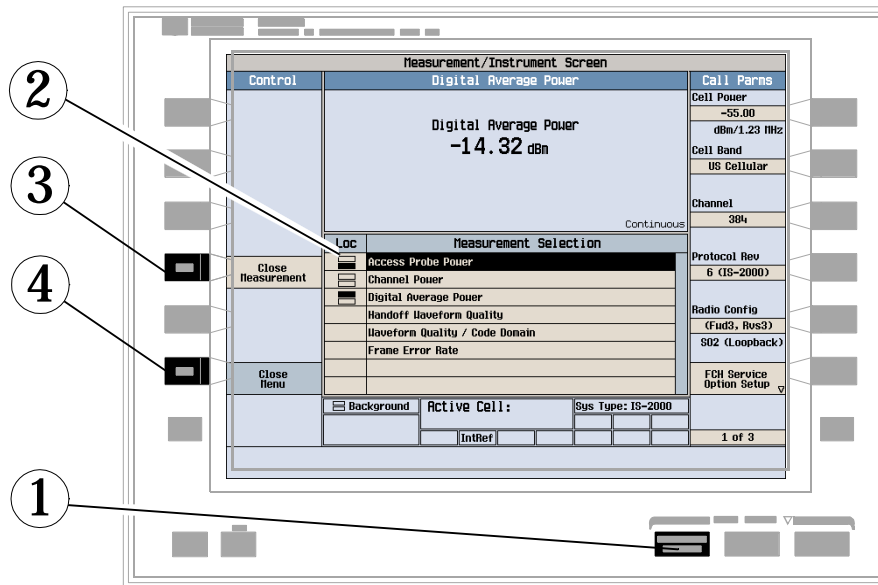


1. Press the **MEASUREMENT** key.
2. Press the **Control (F1)** key to display the measurement's setup menu.
3. Highlight a parameter and press the knob.
4. Enter a value or selection and press the knob.

**NOTE** For statistical measurement results, highlight the **Multi-Measurement Count** parameter and press the **ON** key. The number of averages will default to 10.

5. Press the **Close Menu (F6)** key.

## How Do I Turn Off a Measurement?



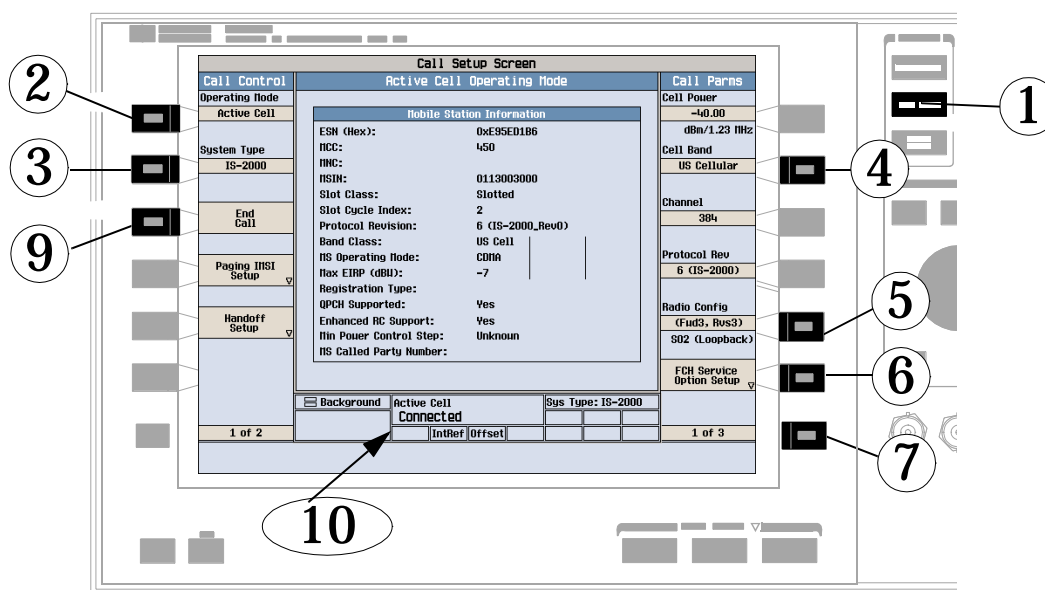
1. Press the **Measurement selection** key.
2. Use the knob to highlight the measurement you want to turn off.
3. Press **Close Measurement (F4)**.
4. Press **Close Menu (F6)**.

## How Do I Set Up a Call?

- “How Do I Set Up an IS-2000 Call?” on page 683
- “How Do I Set Up an IS-95 Call?” on page 684

## How Do I Set Up an IS-2000 Call?

The Call Parms keys and Call Control keys provide access to the parameters needed to set up a call.



1. Press the **CALL SETUP** key.
2. Press the Operating Mode (**F1**) key and set the operating mode to Active Cell.
3. Press the System Type (**F2**) key and select IS-2000.
4. Press the Cell Band (**F8**) key and select the band in which you would like to bring up the call.
5. Press the Radio Config (**F11**) key and select the radio configuration in which you would like to bring up the call.
6. Press the FCH Service Option Setup (**F12**) key and set the service option for the radio configurations you plan on testing.

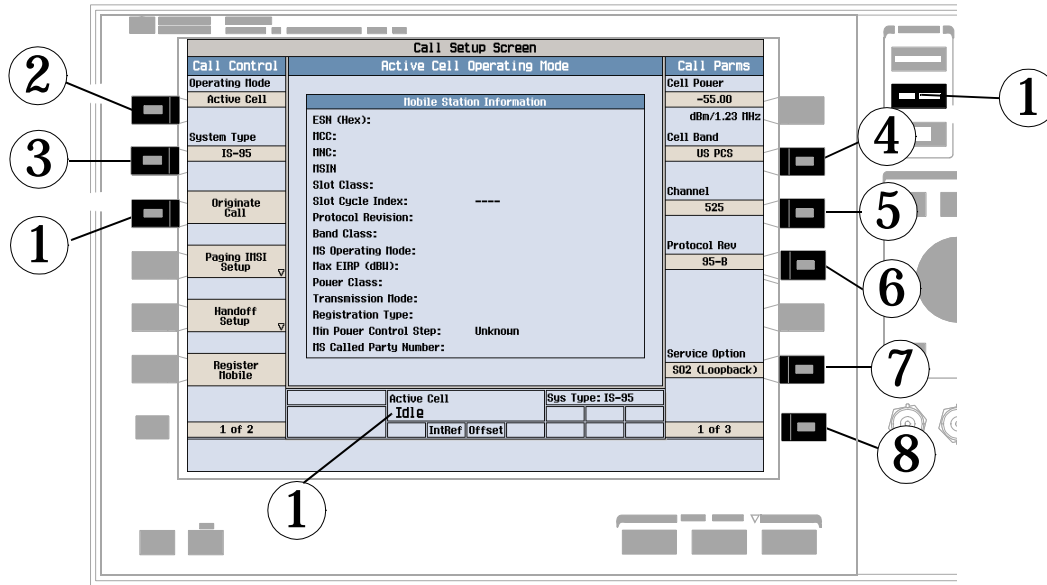
**NOTE** SO55 (Service Option 55) is not supported by some mobile stations. If your mobile station does not support SO55 calls cannot be connected, and you will need to select one of the other loopback or echo service options.

7. Check the rest of the Call Parms settings by pressing the **More** key to display the 2 of 3 and 3 of 3 menus. You may also need to change cell settings such as SID (System Identification) to allow the mobile station to find service. See “How Do I Change Cell Information?” on page 687

## How Do I Set Up a Call?

- Turn on power to the mobile station and wait for an indication that it has found service.
- Make a mobile station originated call (by entering a phone number and pressing SEND on the mobile station handset); or, wait for the mobile station to perform a power up registration and press the Originate Call (F3) key.
- Verify that the call is connected.

## How Do I Set Up an IS-95 Call?

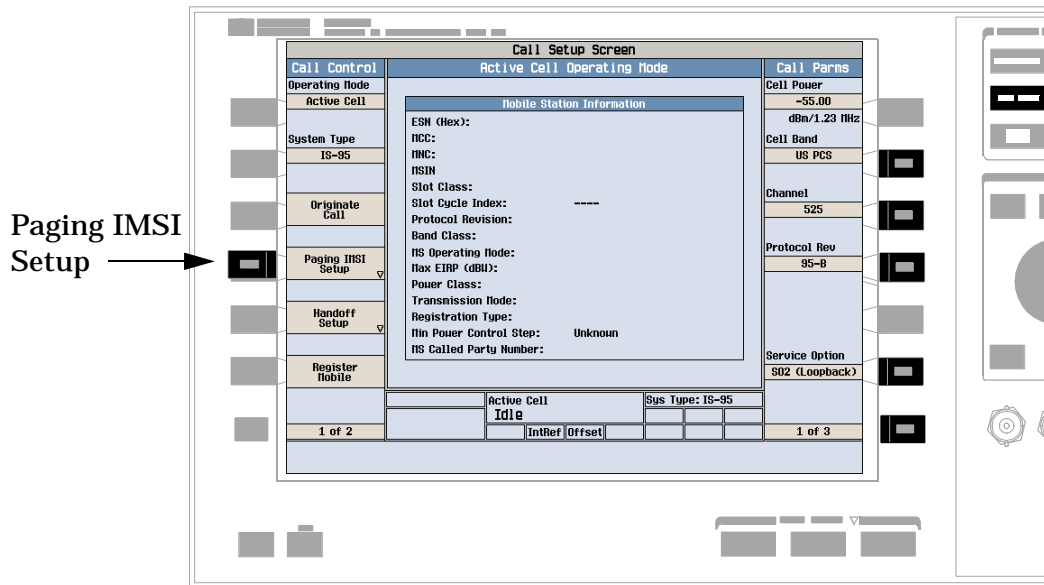


- Press the **CALL SETUP** key.
- Press the Operating Mode (F1) key and set the operating mode to Active Cell.
- Press the System Type (F2) key and select IS-95.
- Press the Cell Band (F8) key and select the band in which you would like to bring up the call.
- Press the Channel (F9) key and set the RF channel number.
- Press the Protocol Rev (F10) key and set the protocol revision supported by the mobile station.
- Press the Service Option (F12) key and select a service option for the call.
- Check the rest of the Call Params settings by pressing the **More** key to display the 2 of 3 and 3 of 3 menus.
- You may need to change cell settings such as SID (System Identification) to allow the mobile station to find service. See [“How Do I Change Cell Information?”](#) on page 687.
- Turn on power to the mobile station and wait for an indication that it has found service.
- Make a mobile station originated call (by entering a phone number and pressing SEND on the mobile station handset), or wait for the mobile station to perform a power up registration and press the Originate Call (F3) key.
- Verify that the call is connected.

## Repeat Calls

If the mobile station has been connected on a call, has successfully registered with the test set, or the Paging IMSI information has been entered directly into the Paging IMSI Setup field, it is not necessary to wait for the power-up registration before originating a call from the test set.

To enter Paging IMSI information, press the Paging IMSI Setup (F4) key and set the parameters required by the mobile station paging type.

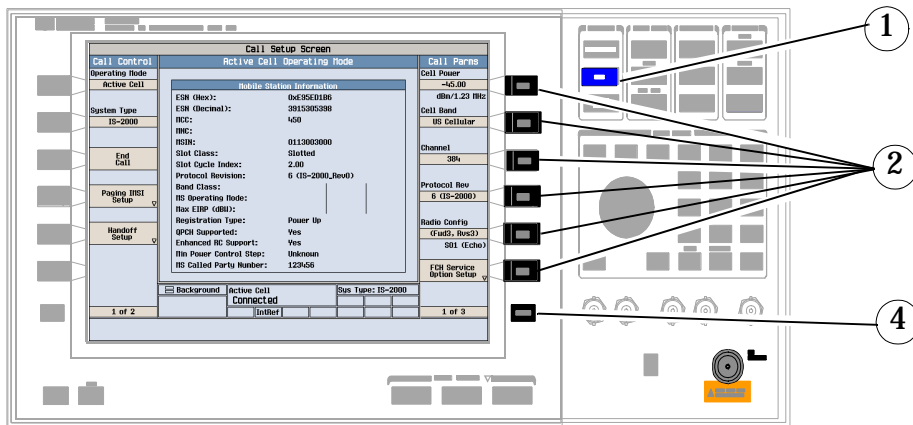



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**NOTE** When the mobile station registers or is connected on a call, the Paging IMSI information is automatically entered into the Paging IMSI Setup fields. This information is retained through instrument presets but not retained through power up cycles.

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## How Do I Change Call Parameters?



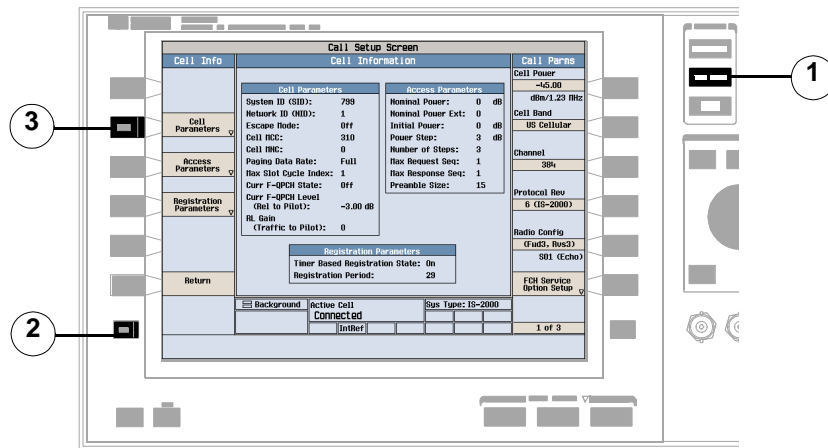
1. Press the **CALL SETUP** key.
2. On the Call Params menu (1 of 2) press any key.
3. Highlight a selection and press the knob. Enter a value.
4. Press the **More** key for additional call parameters.

## How Do I Change Cell Information?

There are three types of cell information: cell parameters, access parameters, and registration parameters.

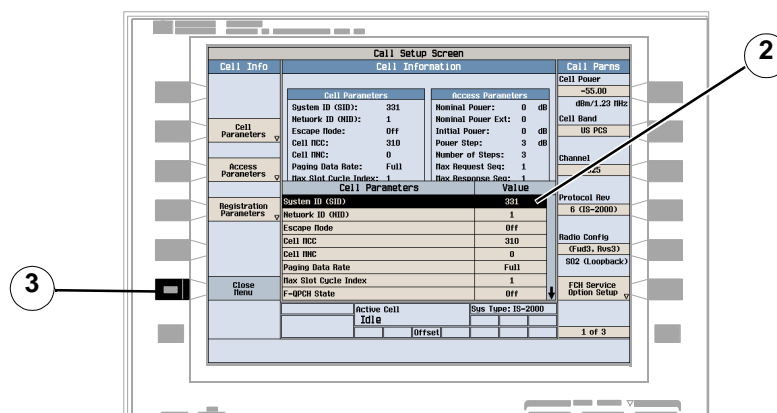
### A. Set cell parameters.

#### 1. Select the Cell Parameters menu.



1. Press the **CALL SETUP** key.
2. Press the **More** key.
3. Press the **Cell Info (F2)** key.
4. Press the **Cell Parameters (F2)** key.

#### 2. Set a cell parameter.

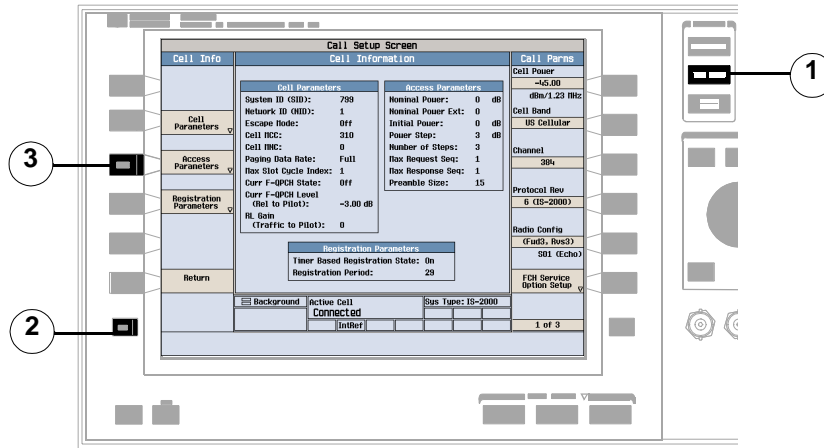


1. Turn the knob to highlight a parameter and then press the knob.
2. Enter a value or selection and press the knob.
3. Press the **Close Menu (F6)** key.

## How Do I Change Cell Information?

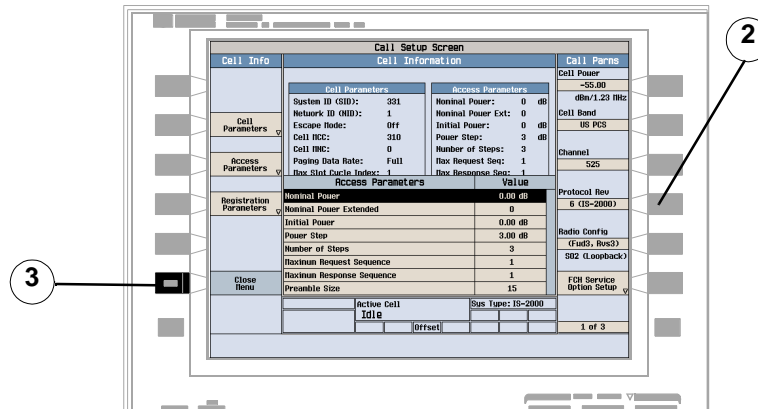
### B. Set access parameters.

#### 1. Select the Access Parameters menu.



1. Press the **CALL SETUP** key.
2. Press the **More** key.
3. Press the **Cell Info (F2)** key.
4. Press the **Access Parameters (F3)** key.

#### 2. Set an access parameter.

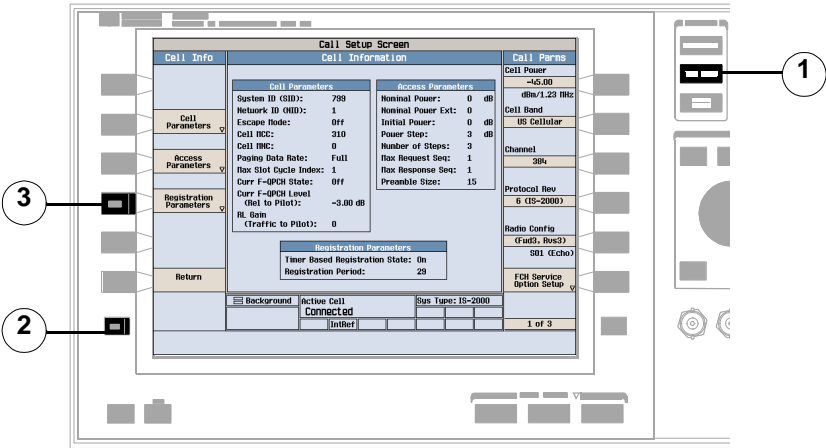


1. Turn the knob to highlight a parameter and then press the knob.
2. Enter a value or selection and press the knob.
3. Press the **Close Menu (F6)** key.



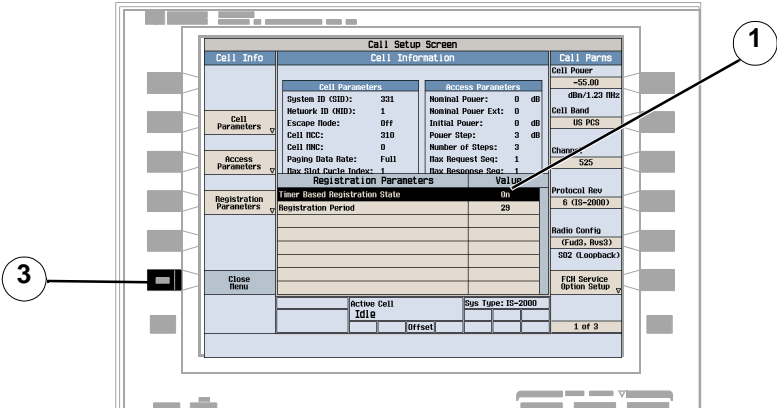
### C. Set registration parameters.

#### 1. Select the Registration Parameters menu.



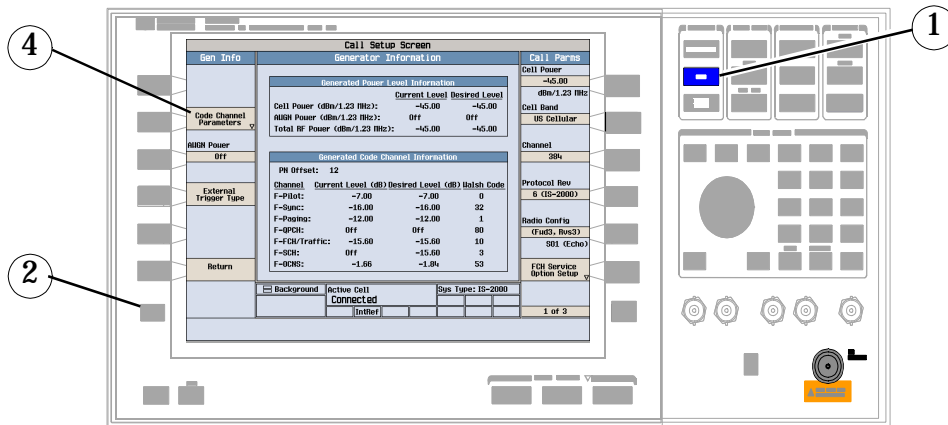
1. Press the **CALL SETUP** key.
2. Press the **More** key.
3. Press the **Cell Info (F2)** key.
4. Press the **Registration Parameters (F4)** key.

#### 2. Set a registration parameter.



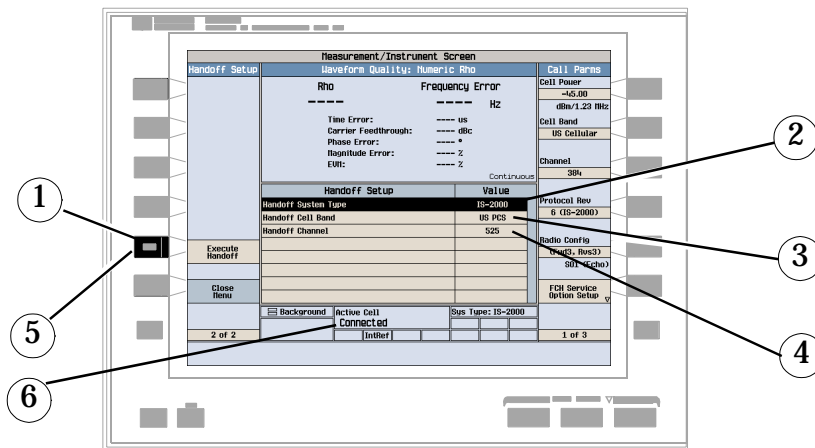
1. Turn the knob to highlight a parameter and then press the knob.
2. Enter a value or selection and press the knob.
3. Press the **Close Menu (F6)** key.

## How Do I Change Code Channel Levels?



1. Press the **CALL SETUP** key.
2. Press the **More** key.
3. Press the Generator Info (**F3**) key.
4. Press the Code Channel Parameters (**F2**) key.
5. Set the level of the desired channel by using the knob and numeric keys.

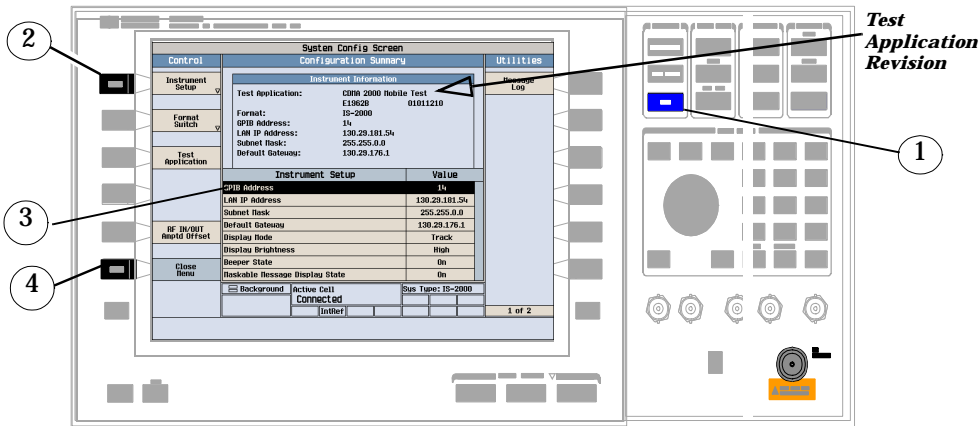
## How Do I Perform a Handoff?



1. On the Call Setup screen, press the Call/Handoff Setup (F5) key.
2. Highlight the Handoff System Type parameter and select the desired system.
3. Highlight the Handoff Cell Band parameter and select the desired band.
4. Highlight the Handoff Channel parameter and select the desired channel.
5. Press the Execute Handoff (F5) key to complete the handoff, or the Close Menu (F6) key to abort the handoff.
6. Check for Connected in the Active Cell status field.

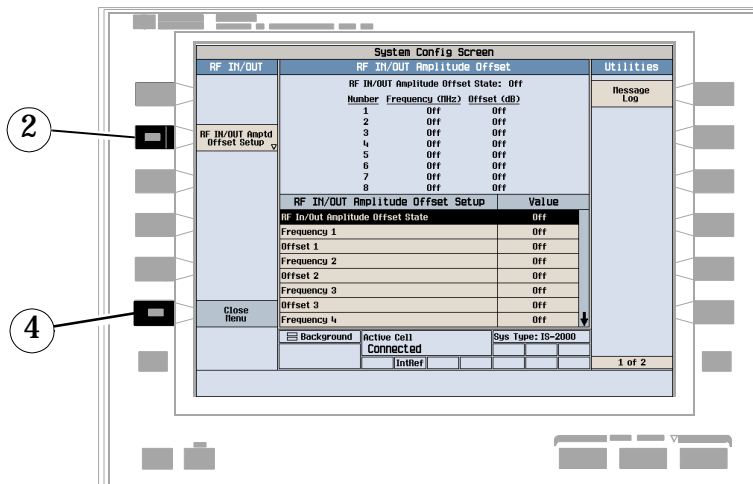
## How Do I Configure the Test Set for My Test System?

### A. Configure instrument information and setup.



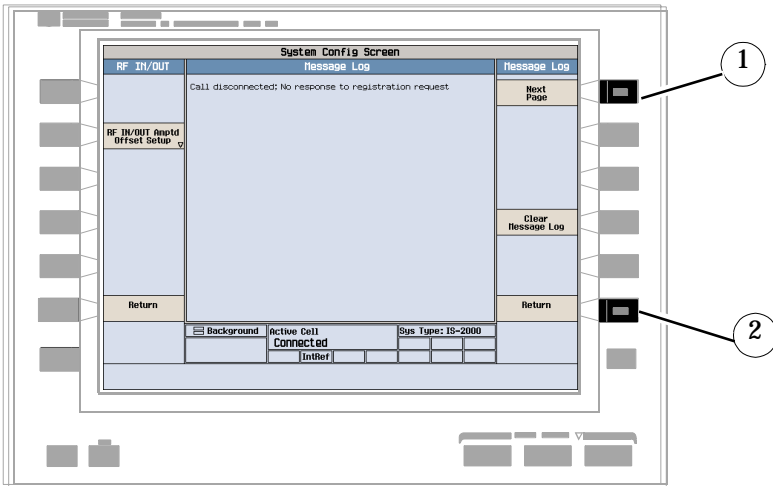
1. Press the **SYSTEM CONFIG** key.
2. Press the Instrument Setup (**F1**) key.
3. Adjust an instrument setting.
4. Press the Close Menu (**F6**) key.

### B. Set amplitude offsets.



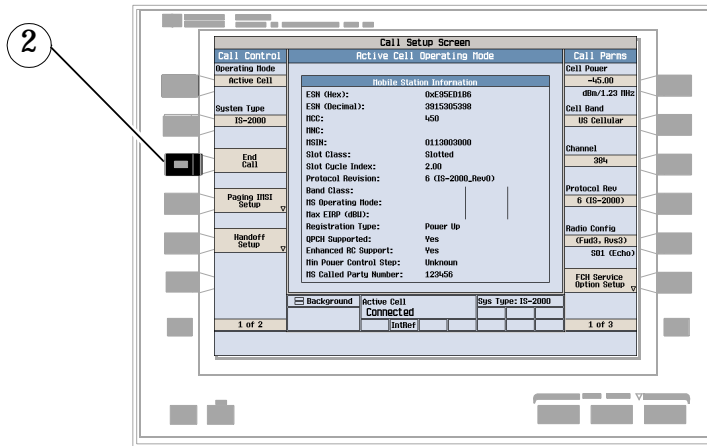
1. On the Configuration Summary screen (not shown), press the RF IN/OUT Amptd Offset (**F5**) key.
2. On the RF IN/OUT Amplitude Offset screen, press the RF IN/OUT Amptd Offset Setup (**F2**) key.
3. Enter the amplitude offset for the test frequencies you use.
4. Press the Close Menu (**F6**) key.

### C. Check message log.



1. From any System Config screen, press the Message Log (F7) key and view the message log.
2. Press the Return (F12) key.

## How Do I End a Call?



1. Press the **CALL SETUP** key.
2. Press the End Call (**F3**) key, or end the call from the mobile.
3. Check for Idle in the Active Cell status field.

---

## cdma2000/IS-95/AMPS Measurement Procedures

The following step-by-step procedures explain how to manually perform specific measurements available on the cdma2000/IS-95/AMPS Test Application. A detailed description of each measurement is given in the *Reference* information on the documentation CD-ROM and at the Agilent 8960 support website (<http://www.agilent.com/find/8960support/>).

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

---

**NOTE** To obtain measurement results a call must first be connected See [“A. Establish a call.” on page 680](#)

---

The following measurement procedures are provided:

- [“Measuring Waveform Quality” on page 695](#)
- [“Measuring Handoff Waveform Quality”](#)
- [“Measuring Digital Average Power” on page 698](#)
- [“Measuring Channel Power” on page 699](#)
- [“Measuring Access Probe Power” on page 699](#)
- [“Measuring Frame Error Rate \(FER\)” on page 700](#)
- [“Measuring Code Domain Power and Code Domain Power + Noise” on page 701](#)
- [“Measuring Code Channel Time/Phase Error” on page 703](#)
- [“Measuring Gated Power” on page 704](#)
- [“Measuring TX Spurious Emissions” on page 706](#)

### Measuring Waveform Quality

Each waveform quality measurement returns a number of measurements which includes rho.

1. Select the Waveform Quality/Code Domain measurement (see [“B. Select measurements.” on page 680](#)). A

typical display is shown below.

Waveform Quality: Numeric Rho	
Rho	Frequency Error
<b>0.9964</b>	<b>-2.6 Hz</b>
Time Error:	-7963.55 us
Carrier Feedthrough:	-40.61 dBc
Phase Error:	2.76 °
Magnitude Error:	3.62 %
EVM:	6.03 %
Continuous	

2. Set up the measurement parameters as needed for your measurement situation (see [“B. Set up the measurement.”](#) on page 681).

Numeric rho is the screen currently displayed. In addition to rho, it also provides the following measurements, calculated from the same data:

- Time Error
- Carrier Feedthrough
- Phase Error
- Magnitude Error
- EVM

There are graphical measurement results available as a result of performing this measurement. See [“Measuring Code Domain Power and Code Domain Power + Noise”](#) on page 701.

## Measuring Handoff Waveform Quality

Each waveform quality measurement returns a number of measurements which includes rho.

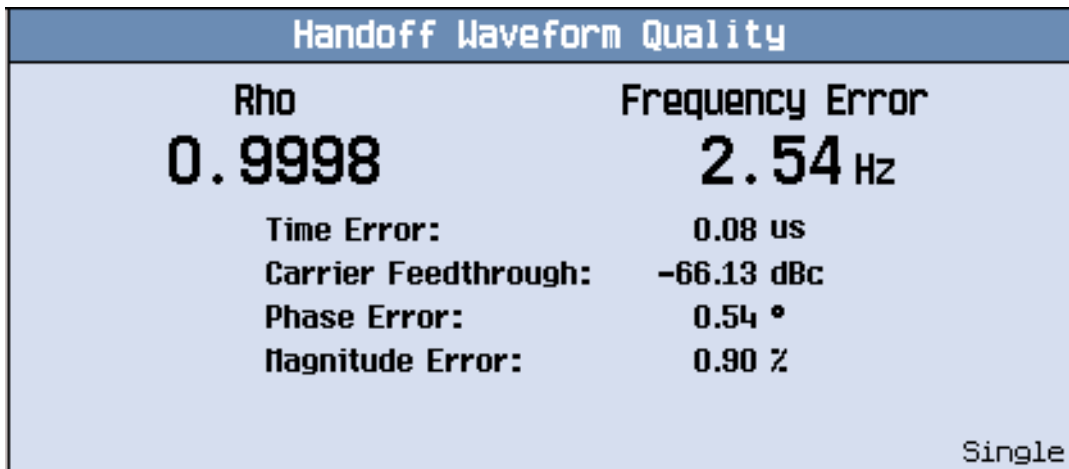
These measurements can be made only when one of the following radio configurations (see [“How Do I Set Up a Call?”](#) on page 683) is selected:

- (Fwd3, Rvs3)
- (Fwd4, Rvs3)

1. Select the Handoff Waveform Quality measurement (see [“B. Select measurements.”](#) on page 680).
2. Set up the measurement parameters (Measurement Timeout is the only parameter provided with this measurement) as needed for your measurement situation (see [“B. Set up the measurement.”](#) on page 681.)



3. Press the **START SINGLE** key. A typical display is shown below.

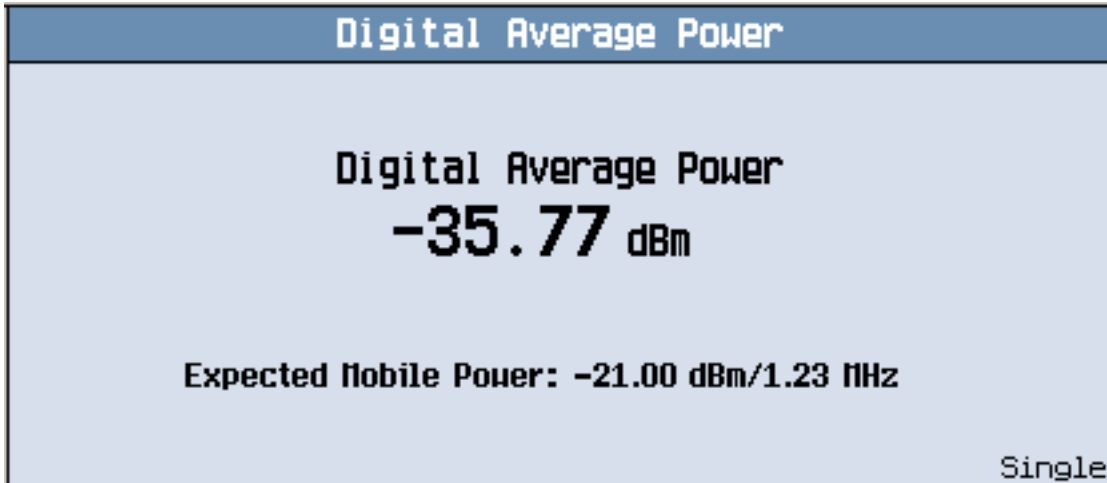


In addition to rho, the waveform quality measurement also provides the following measurements, calculated from the same data:

- Time Error
- Carrier Feedthrough
- Phase Error
- Magnitude Error

## Measuring Digital Average Power

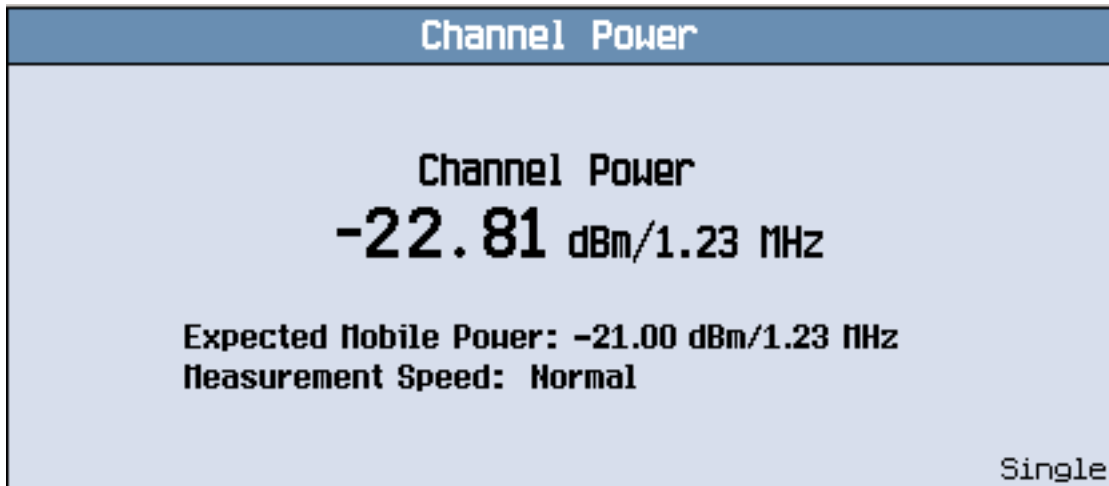
1. Select the Digital Average Power measurement (see [“B. Select measurements.”](#) on page 680). A typical display is shown below.



2. Press the Digital Average Power Setup (F1) key.
3. Set up the measurement parameters as needed for your measurement situation (see [“B. Set up the measurement.”](#) on page 681).

## Measuring Channel Power

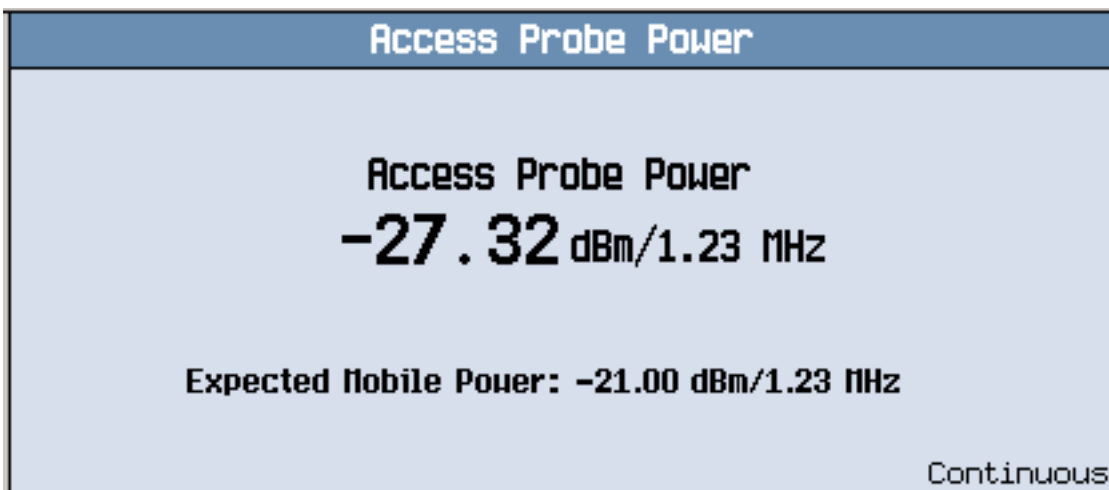
1. Select the Channel Power measurement (see “[B. Select measurements.](#)” on page 680). A typical display is shown below.



2. Set up the measurement parameters as needed for your measurement situation (see “[B. Set up the measurement.](#)” on page 681).

## Measuring Access Probe Power

1. Press the CALL SETUP key.
2. Press the End Call key (F3).
3. Select the Access Probe Power measurement (see “[B. Select measurements.](#)” on page 680).
4. Press the Register Mobile key (F6). A typical display is shown below.




---

**NOTE** The remainder of this procedure lists the steps required to make access probe power measurements using call limit mode. Call limit mode provides testing of complete access probe sequences during a call origination.

---

5. Set up the measurement parameters as needed for your measurement situation (see “B. Set up the measurement.” on page 681).
6. Press the **More** key on the lower left side of the display (Call Control) until 2 of 2 is displayed. Press the **Cell Info key (F2)** key, then the **Registration Parameters** key.
7. Turn the **Timer Based Registration State** off.
8. Press the **MEASUREMENT** key.
9. Press the **More** key on the lower right side of the display (Call Parms) until 2 of 3 is displayed. Press the **Call Limit Mode key (F9)** key and turn call limiting on.
10. Press the **Originate Call key (F3)**. Wait for the **Access Probe** call status indication in the **Active Cell** field below the measurement window. A typical display is shown below.
11. Turn off call limiting.

### Measuring Frame Error Rate (FER)

1. Press the **Measurement selection** key.
2. Select the **Frame Error Rate** measurement.
3. Press the **Frame Error Rate Setup (F1)** key. A typical display is shown below.

Frame Error Rate	
Confidence	FER
Pass	0.00 %
Frame Error Count:	0
Frames Tested:	306
Maximum Frame Count:	10000
Eb/Nt:	---- dB
FER Requirement:	1.00 %
	Single

4. Set up the measurement parameters as needed for your measurement situation.

### Measuring TDSO (Test Data Service Option) Frame Error Rate (FER)

1. Press the **CALL SETUP** key.
2. If a call is currently connected, press the **End Call key (F3)**.
3. Press the **Radio Config key (F11)**.
4. Select one of the following radio configurations:
  - (Fwd3, Rvs3)
  - (Fwd4, Rvs3)
5. Press the **FCH Service Option Setup key (F12)**.

6. Select the Service Option for the currently selected radio configuration, then select SO32 (+F-SCH).
7. Press the **Measurement selection** key.
8. Select the TDSO Frame Error Rate measurement.
9. Press the TDSO FER Setup (F1) key.
10. Set up the measurement parameters as needed for your measurement situation.
11. Press the **CALL SETUP** key.
12. Press the Originate Call key (F3).
13. Press the **MEASUREMENT** key. Wait for the call to connect, then wait approximately 10 seconds for the measurement to begin. A typical display is shown below.

TDSO Frame Error Rate			
<b>FER</b>			
<b>0.00 %</b>			
<b>RX Good Frames:</b>	<b>512</b>	<b>Confidence:</b>	<b>---- %</b>
<b>RX Blank Frames:</b>	<b>0</b>	<b>FER Requirement:</b>	<b>1.00 %</b>
<b>TX Good Frames:</b>	<b>512</b>	<b>F-SCH Eb/Nt:</b>	<b>7.47 dB</b>
<b>TX Blank Frames:</b>	<b>0</b>		
512 /512		Single	

14. Press the TDSO FER Setup (F1) key.
15. Set up the measurement parameters as needed for your measurement situation.

### Measuring Code Domain Power and Code Domain Power + Noise

These measurements can be made only when one of the following radio configurations (see [“How Do I Set Up a Call?” on page 683](#)) is selected:

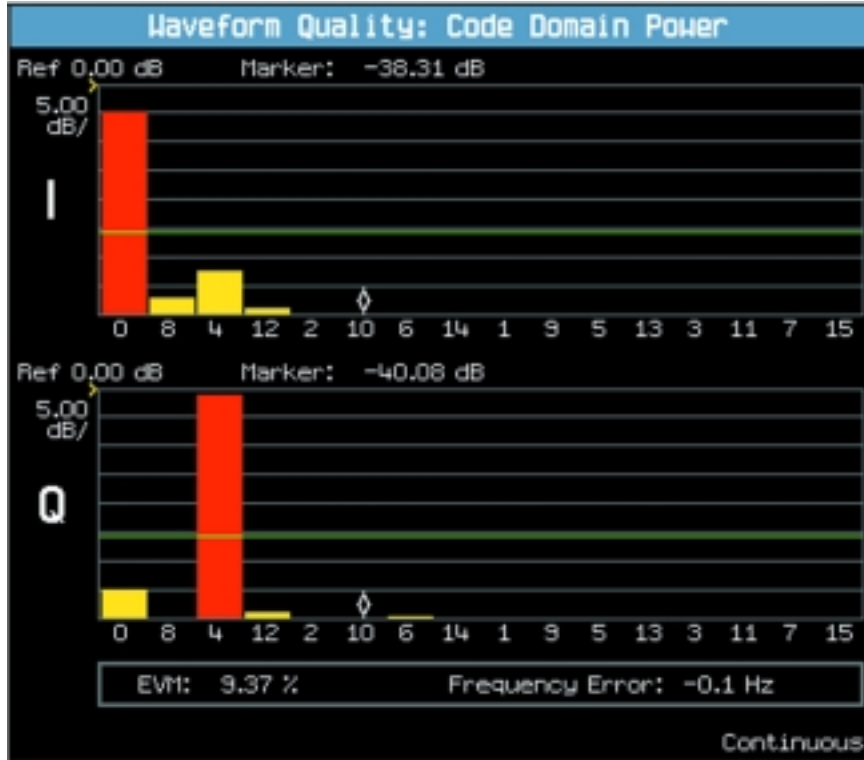
- (Fwd3, Rvs3)
- (Fwd4, Rvs3)
- (Fwd5, Rvs4)

1. Select the Waveform Quality/Code Domain measurement (see [“B. Select measurements.” on page 680](#)).

2. Press the Code Domain Power (F3) key. A typical display is shown below.

*The red bars indicate power levels*

*The yellow bars indicate noise levels*



3. Press the Graph Control key (F6). Change the value in the Limit field.

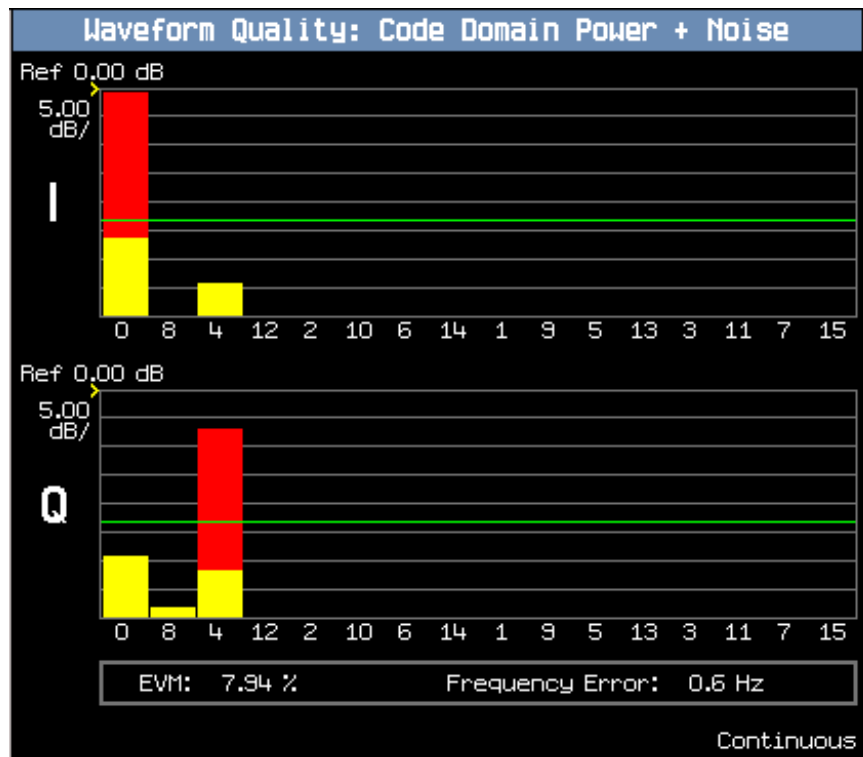
Note that both green lines, indicating the I and Q channel noise limits, move together.

4. Press the Return key (F6).

5. Press the Code Domain Power + Noise (F4) key. A typical display is shown below.

*The red bars indicate power levels*

*The yellow bars indicate noise levels*



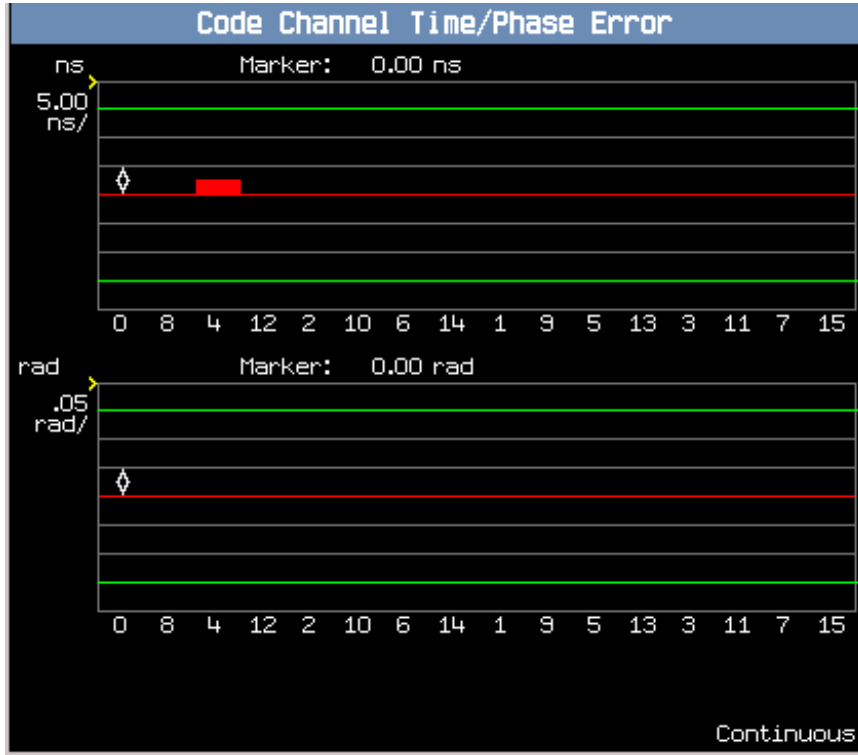
6. Return to the numeric Rho display at any time by pressing the Numeric Rho key (F2).

### Measuring Code Channel Time/Phase Error

These measurements can be made only when one of the following radio configurations (see [“How Do I Set Up a Call?”](#) on page 683) is selected:

- (Fwd3, Rvs3)
- (Fwd4, Rvs3)
- (Fwd5, Rvs4)

1. Select the Code Channel Time/Phase Error measurement (see “[B. Select measurements.](#)” on page 680). A typical display is shown below.



2. Set up the Time Limit and Phase Limit using the (F3) and (F4) keys.

## Measuring Gated Power

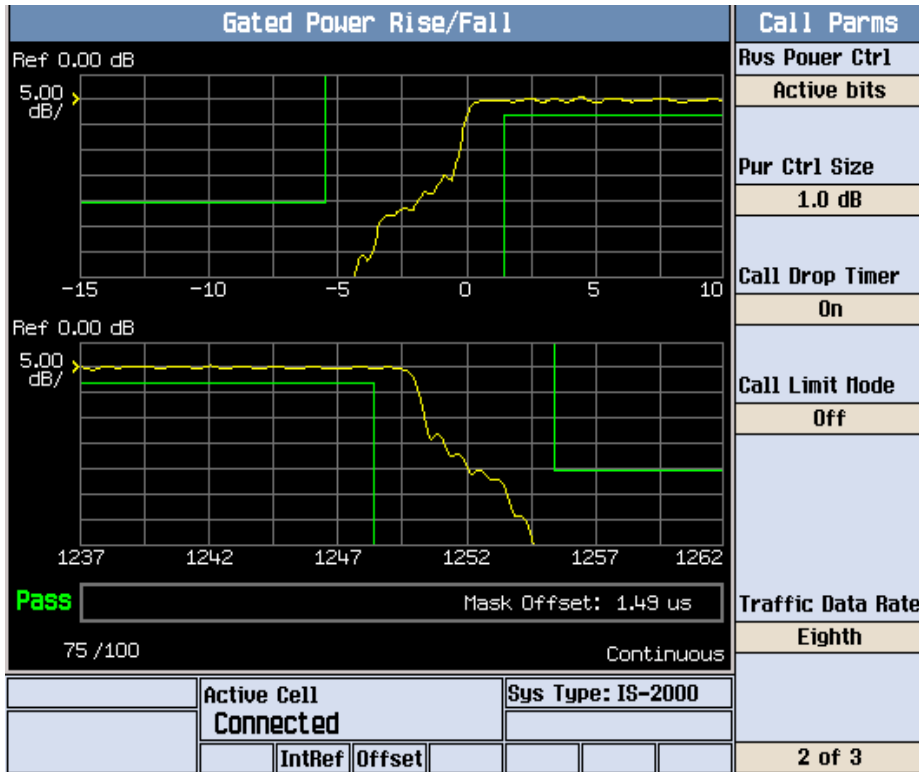
These measurements can be made only when one of the following radio configurations is selected (see “[How Do I Set Up a Call?](#)” on page 683):

- (Fwd1, Rvs1)
- (Fwd2, Rvs2)

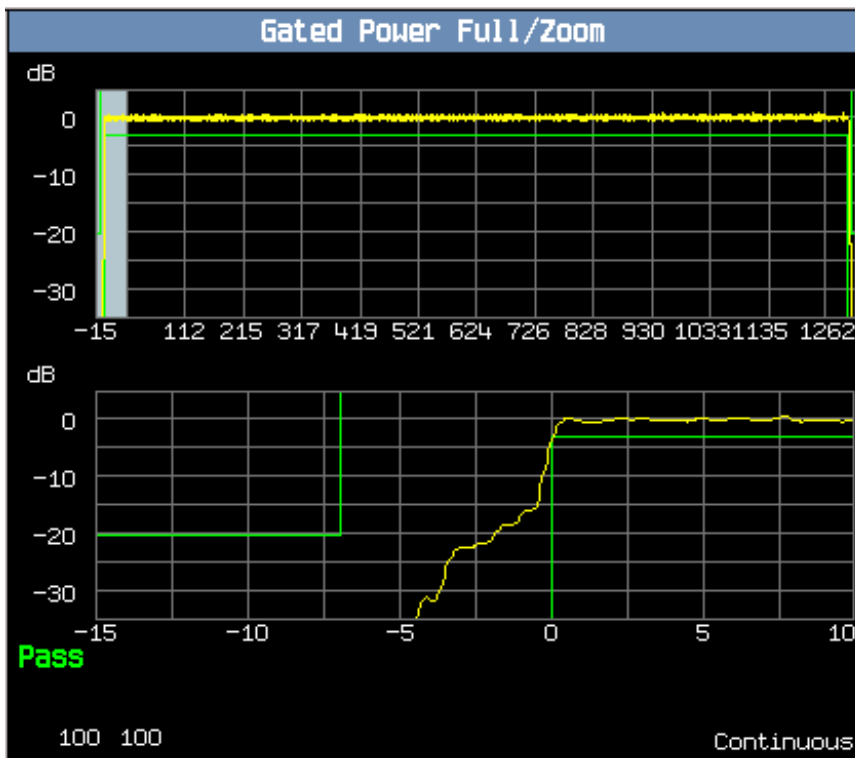
1. Press the **More** key on the lower right side of the display (Call Params) until 2 of 3 is displayed. Press the Traffic Data Rate key (F12) key, then select **Eighth**.



2. Select the Gated Power measurement (see “B. Select measurements.” on page 680).



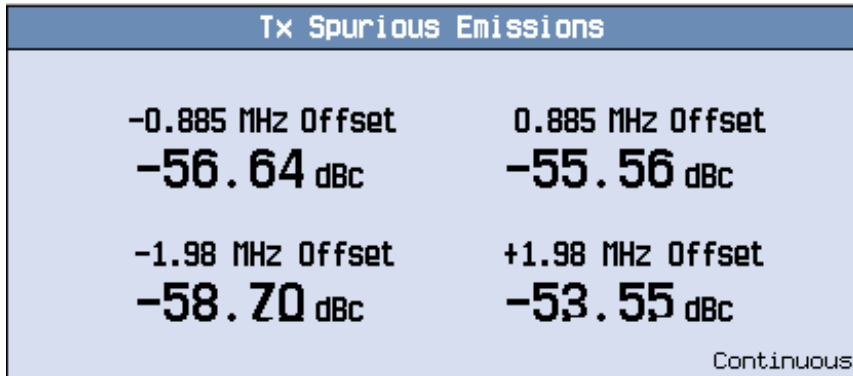
3. Press the Full/Zoom key (F2).



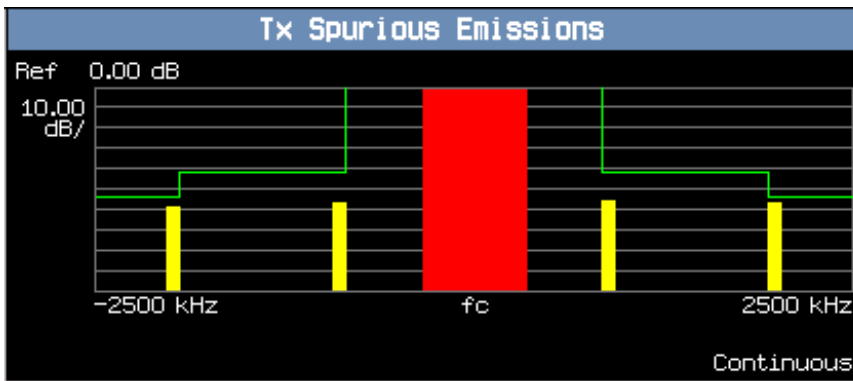
4. Press the (F3) key to select Zoom Position.
5. Turn the knob clockwise slowly to display the entire burst. Note the falling edge of the burst at the last zoom position on the right side of the display.

### Measuring TX Spurious Emissions

1. Select the Tx Spurious Emissions measurement (see “B. Select measurements.” on page 680). A typical display is shown below.



2. Press the Graph (F3) key.




---

**NOTE** Press the Numeric (F2) key if you want to return to Tx Spurious Emissions measurement results displayed in tables.

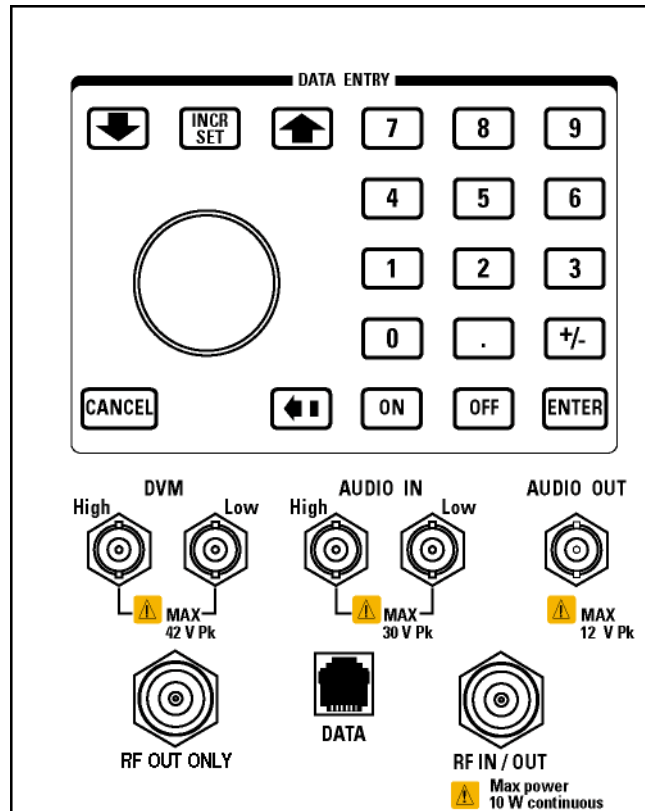
---

### Related Topics

Refer to Product Note 5988-1989EN Multi-Coded Waveform Quality and Code Domain Measurements for cdma2000 for more information about Code Domain Power measurements. This is located on the web or CDROM under Technical notes.

## 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.

## Front Panel Connectors

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**

---

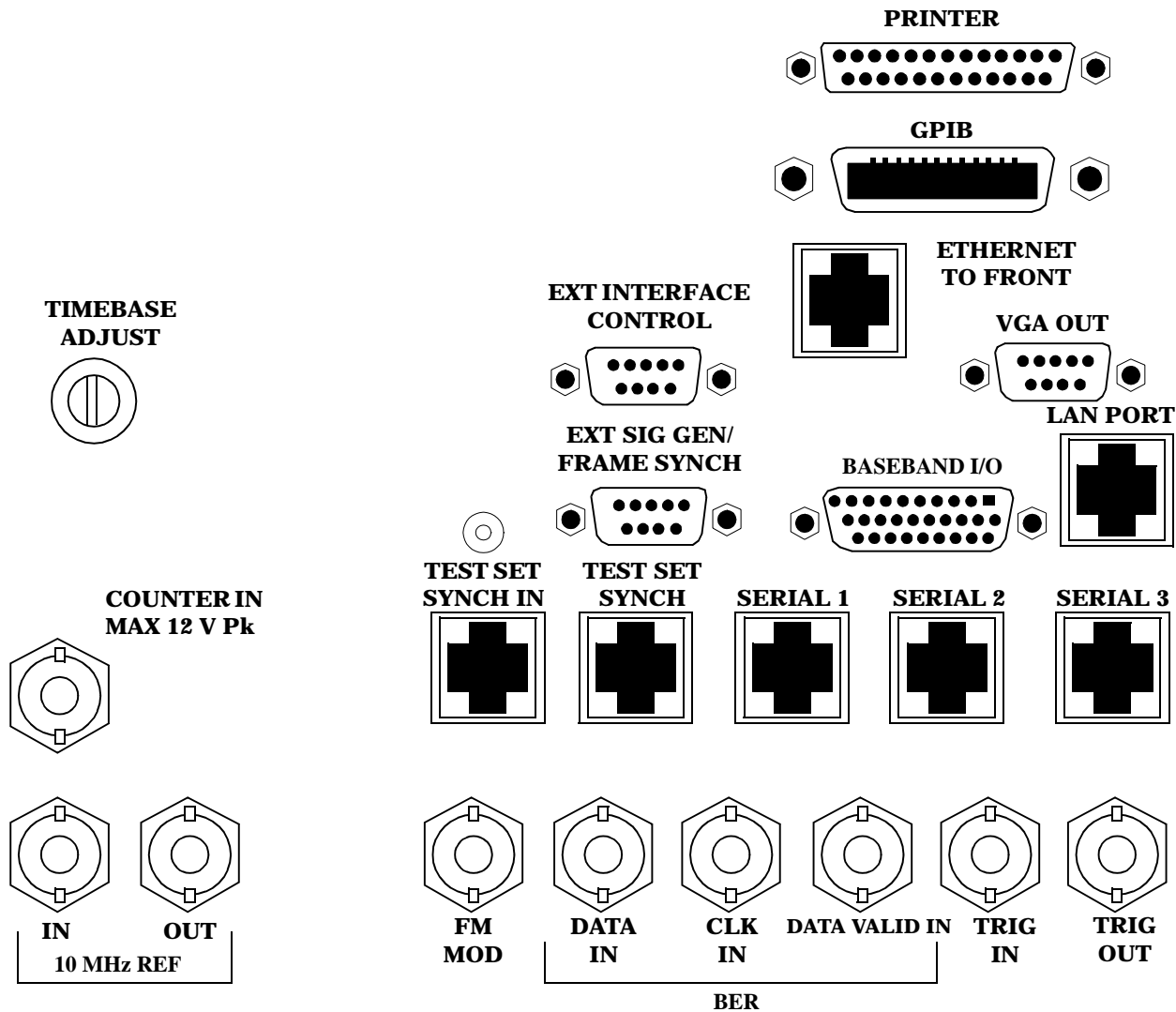
**NOTE** This port is usable only with the E1962B and E1963A test applications.

---

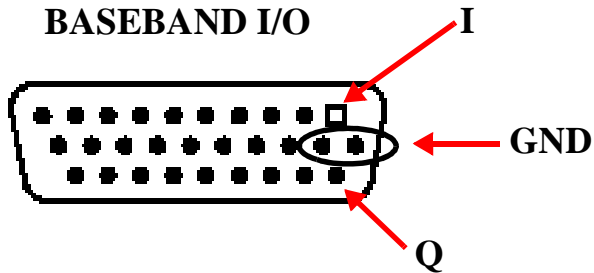
This Type-N connector is an optional path for all RF signals out of the test set. Front panel selection of this port is provided by the RF Output Port (**F6**) control on the System Config screen, and by the RFGenerator:OUTPut[:DESTination] IO/OUT command. The same amplitude offsets and output power settings are used for either selected port (RF IN/OUT or RF OUT ONLY). Refer to the technical specifications for more information.

# 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 let's you 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**

The GPIB connector allows test set control with compatible devices.

## **LAN PORT**

This RJ-45 connector provides connection for down loading 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**

Not functional for this release.

## **TRIG OUT**

This BNC connector allows for synchronization of the test set to other equipment and is configured by setting Frame Trigger Parameters.

## **VGA OUT**

This DB-15 connector allows the user 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.

### Related Topics

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## Printing Screens

### Printing and Saving Screen Images

The test set's local area network (LAN) connection can be used to dump the currently-displayed screen image into a personal computer's web browser. The computer must either be connected to an existing LAN or have a LAN adapter installed that can be connected directly to the test set.

#### Computer Requirements for LAN Communications with the Test Set

The computer used to capture screen images from the test set must meet the following requirements:

- 10 Base-T, IEEE 802.3 compliant, ethernet network interface using TCP/IP protocol and configured to run in half-duplex mode.
- Windows 95, 98, 2000 or NT 4.0 (Windows 95, Windows 98, Windows 2000 and Windows NT 4.0 are U.S. registered trademarks of Microsoft Corporation.)

#### Test Set to Computer Connections

The test set's LAN connection can be made at either the rear-panel LAN PORT or at the front-panel DATA port. When using the DATA port, be sure to have the factory supplied jumper cable installed between the rear-panel LAN PORT and the ETHERNET TO FRONT PANEL port.

Connections from the test set to the computer must be made using the *correct type* of LAN cable:

- If the test set is being connected to the computer through an existing network, use a *standard* LAN cable.
- If the test set is being connected directly to the computer's LAN adapter, use a *crossover* LAN cable (such as the one shipped with the test set or with an older test application upgrade kit).

#### Capturing the Screen Image

1. Press the test set's **SYSTEM CONFIG** key to display the test set's LAN settings, and record the LAN IP Address for use later in this procedure.
2. Start a web browser application on your computer.
3. Display the test set screen that you want to capture.
4. Enter the following address/location into your web browser: `http://<lan address>/display.htm` where <lan address> is the LAN IP address of the *test set*.
5. Within a few seconds, the test set's screen image appears in your browser. If the image does not appear on your browser within 30 seconds, refer to ["Test Your LAN Connections and Configuration by "Pinging" the Test Set"](#) below.
6. To print the image, select `File, Print`.
7. To save the file:
  - a. Select `File`, or right-click on the image, and select `Save As` or `Save Picture As`.
  - b. Enter the desired file name and directory path for saving the image as a GIF file.

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

## Test Your LAN Connections and Configuration by “Pinging” the Test Set

Perform this operation only if you were not successful in downloading the test set screen image into your browser.

1. Display the Command Prompt window on your computer. This is typically done in the Microsoft Windows operating system by selecting Start -> Programs -> Command Prompts.
2. At the command prompt, enter the following command: `ping <lan address>`. The <lan address> is the test set's LAN IP address. (The command prompt does not have to be at the root (c:\) level before entering the command.)

This example shows what should happen when you enter the ping command for a test set with the LAN IP address of 111.22.333.44. The test set should reply back to the Command Prompt screen indicating that data was received.

```

Microsoft(R) Windows NT(TM)
(C) Copyright 1985-1996 Microsoft Corp.
C:\WINNT\Profiles\caesar\Desktop>ping 111.22.333.44
Pinging 111.22.333.44 with 32 bytes of data:
Reply from 111.22.333.44: bytes=32 time<10ms TTL=63
Reply from 111.22.333.44: bytes=32 time<10ms TTL=63
Reply from 111.22.333.44: bytes=32 time<10ms TTL=63
Reply from 111.22.333.44: bytes=32 time<10ms TTL=63
C:\WINNT\Profiles\caesar\Desktop>_
  
```

Entering this command...  
should result in these messages being displayed to confirm data exchange between the test set and the computer.

3. If the message “Request Timed Out” is displayed instead of a reply from the test set, try entering the command again. If the request times out again, your LAN connections are incorrect and/or your LAN settings for the two devices do not match.

## Troubleshooting LAN Connections

If your web browser did not display the test set's screen, or you could not “ping” your test set from your browser, refer to the following information to find the cause and fix the problem.

**Try Altering Connections** • If you are using the test set's front panel DATA port, make sure the jumper between the rear-panel LAN PORT and ETHERNET TO FRONT PANEL port is in place; or try connecting directly to the rear-panel LAN PORT.

- Try using a different type of LAN cable. If you were using a crossover cable, try using a standard LAN cable; if using a standard LAN cable, try using a crossover cable. If this doesn't fix the problem, be sure to replace the cable with the type recommended in “[Test Set to Computer Connections](#)” above.

**Reconfigure the Computer and Test Set LAN Settings** If the test set's image is still not displayed on your web browser, and the ping command still indicates that the test set is not communicating with the computer, you need to verify that the LAN settings for the computer and the test set are compatible. The following sections provide general guidelines in getting the LAN settings configured for both instruments to communicate with each other.

Perform the configuration in the following order:

1. Configure the computer's LAN settings.
2. Restart Windows on the computer to start using the new LAN configuration.
3. Configure the test set's LAN settings to work with the computer's settings. (It is important that the computer be configured and re-started before configuring the test set's LAN settings.)
4. Turn the test set off and back on to make sure it finds the computer's newly-configured LAN card on power up.

### LAN Setting Guidelines

- It is highly recommended that the Subnet Mask be set to 255.255.248.0 for the test set and the computer when using a direct computer-to-test set connection.
- The first three groups of numbers for the LAN IP Address of the test set and the computer must match. Example; if the test set's LAN IP Address is set to 130.29.189.33, the computer's LAN IP address must begin with 130.29.189.

The number in the fourth group of digits in the computer's and test set's LAN IP Addresses must NOT match. Example; if the test set is set to LAN IP Address 130.29.189.33, set the computer's LAN IP Address to 130.29.183.34 (or 130.29.183.77, 130.29.183.42...- just so the last number is not also set to 33). The last entry in the IP Address must not be >254 or 0.

**Changing the LAN Setting on Your Computer** Network configuration procedures vary between operating systems. You may have to refer to your computer's help system, or your LAN adapter card's documentation, for assistance.

Perform the following steps to alter the network settings for most PCs using a Microsoft Windows operating system.

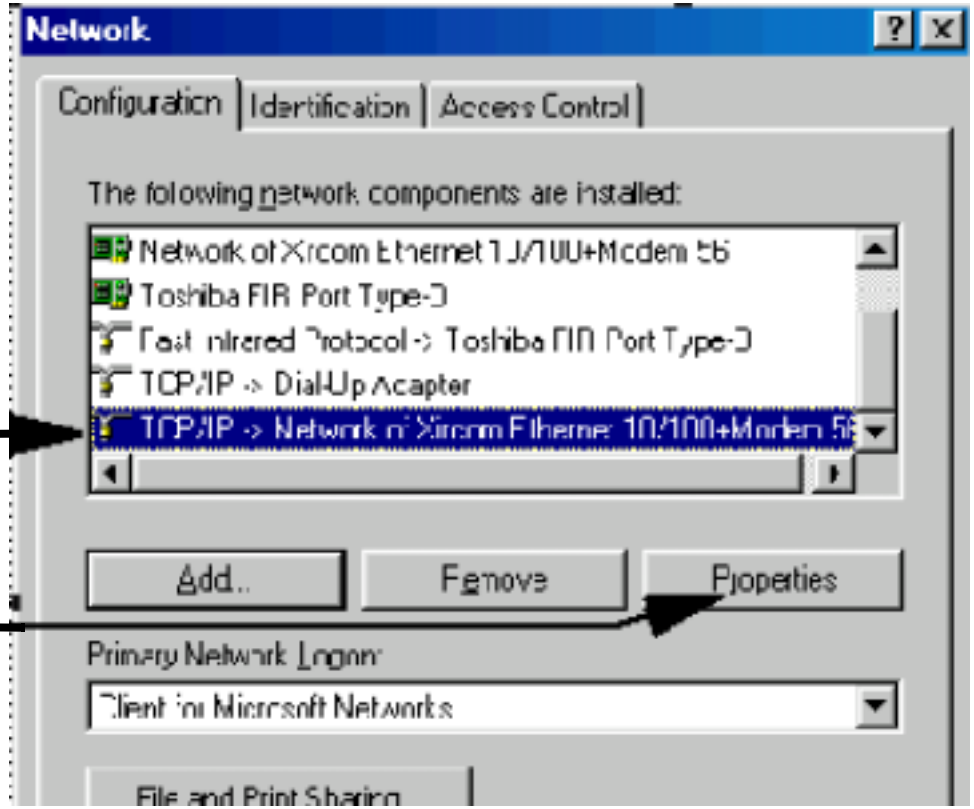
### Access the Network Settings

1. Double-click on the `My Computer` icon on the Windows desk top.
2. Double-click on the `Control Panel` icon.
3. Double-click on the `Network` icon.
4. Select the `TCP/IP-> [your Ethernet network adapter]` entry from the list of components. Note: Do not select `TCP/IP Dial-Up Adapter settings` if present.
5. Select `Properties` to access the TCP/IP settings screen.

**Figure 22. Accessing Your Computer's LAN Settings**

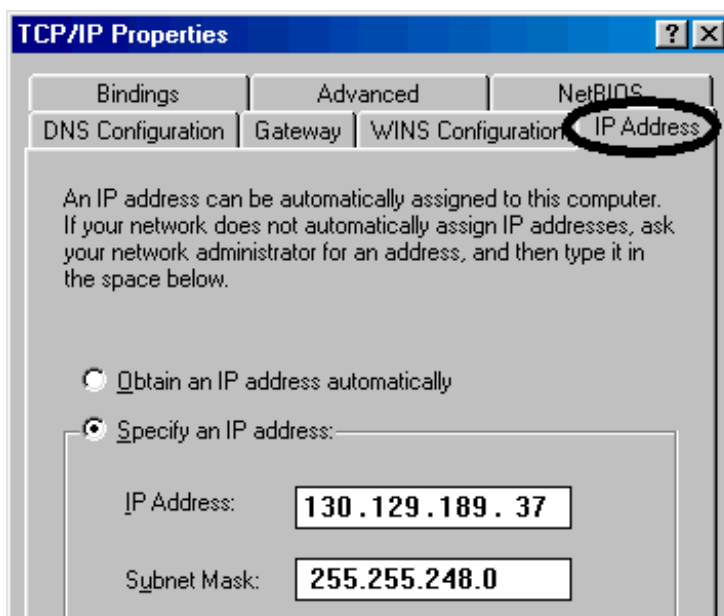
Select the entry for your Ethernet network adapter, then...

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

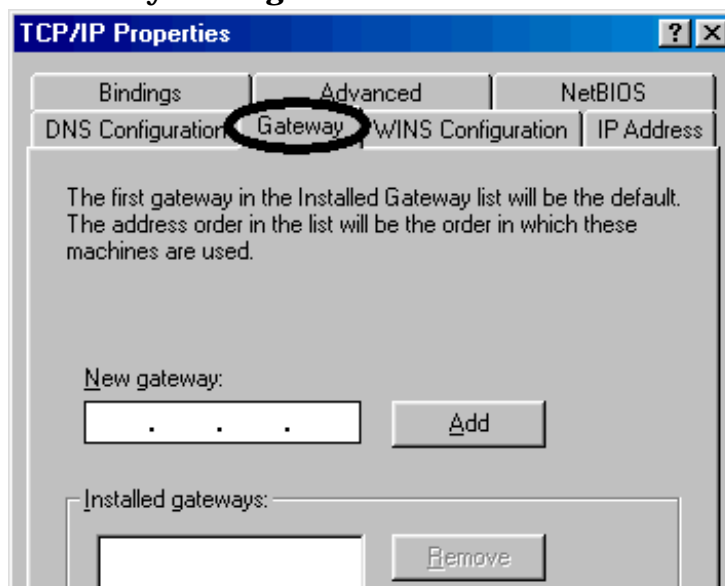


### Set the IP Address and Subnet Mask

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 23. 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 24. 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 important 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.

System Config Screen																			
Control	Configuration Summary		Utilities																
Instrument Setup ▾	<table border="1"> <thead> <tr> <th colspan="2">Instrument Information</th> </tr> </thead> <tbody> <tr> <td>Test Application:</td> <td>GSM Mobile Test E1960A A.03.01</td> </tr> <tr> <td>GPIB Address:</td> <td>20</td> </tr> <tr> <td>LAN IP Address:</td> <td>130.29.183.40</td> </tr> <tr> <td>Subnet Mask:</td> <td>255.255.255.0</td> </tr> <tr> <td>Default Gateway:</td> <td></td> </tr> <tr> <td>Last Calibration:</td> <td>10 Sep 1999</td> </tr> </tbody> </table>		Instrument Information		Test Application:	GSM Mobile Test E1960A A.03.01	GPIB Address:	20	LAN IP Address:	130.29.183.40	Subnet Mask:	255.255.255.0	Default Gateway:		Last Calibration:	10 Sep 1999	Message Log		
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Subnet Mask:	255.255.255.0																		
Default Gateway:																			
Last Calibration:	10 Sep 1999																		
External Trigger Setup ▾	<table border="1"> <thead> <tr> <th>Instrument Setup</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>GPIB Address</td> <td>20</td> </tr> <tr> <td>LAN IP Address</td> <td>130.29.183.40</td> </tr> <tr> <td>Subnet Mask</td> <td>255.255.248.0</td> </tr> <tr> <td>Default Gateway</td> <td></td> </tr> <tr> <td>Display Mode</td> <td>Track</td> </tr> <tr> <td>Display Brightness</td> <td>High</td> </tr> <tr> <td>Power State</td> <td>On</td> </tr> </tbody> </table>		Instrument Setup	Value	GPIB Address	20	LAN IP Address	130.29.183.40	Subnet Mask	255.255.248.0	Default Gateway		Display Mode	Track	Display Brightness	High	Power State	On	
Instrument Setup	Value																		
GPIB Address	20																		
LAN IP Address	130.29.183.40																		
Subnet Mask	255.255.248.0																		
Default Gateway																			
Display Mode	Track																		
Display Brightness	High																		
Power State	On																		
Port Configuration ▾																			

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.

---

- Turn the knob to highlight the setting you want to change.
- Press the knob to select the setting.
- Enter the new value using the keypad, and press the knob to complete the setting.
- 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 25. Status Area of the Test Set Display**

<input type="checkbox"/> Background	<Operating Mode> Status:			
	Shift	Ext Ref	Offset	RLTS

### Background

Users are able to initiate more than one measurement at a time with the test set. The test set's display will show a maximum of 2 measurements. When 3 or more measurements are initiated, or the MEASUREMENT screen is not displayed, the Background annunciator reminds you that measurements are active but not displayed.

### <Operating Mode> Status

The call processing status and the operating modes are displayed in this area. This area may change (depending on the TA that is active) in order to provide TA specific information.

### Shift

This annunciator indicates that the blue SHIFT key has been pressed, and that the next key you press will perform the shifted function indicated, also in blue.

### Ext Ref

When a suitable external time base is connected to the rear panel 10MHz REF IN connector, this annunciator will turn on.

### Int Ref

When a suitable external time base is not connected to the rear panel 10MHz REF IN connector, this annunciator will turn on.

### Offset

Indicates that the Amplitude Offset state is set to On.

## **R L T S**

This annunciator indicates the state of four different conditions of the test set:

- Remote annunciator. 'R' turns on when the test set is operated remotely.
- Listen annunciator. 'L' turns on when the test set is listening to a command.
- Talk annunciator. 'T' turns on when the test set is providing information over GPIB.
- SRQ annunciator. 'S' turns on when an SRQ is active.

---

# Troubleshooting

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## Access Probe Power Troubleshooting

### Possible Setup Issues

---

**IMPORTANT** If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the **“SETup:CAPPower:CONTInuous”** command to set the trigger arm state to single and retry this measurement.

---

During remote operation of this measurement, you should configure the Trigger Arm to Single. See **“SETup:CAPPower:CONTInuous”**. If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

The input signal must conform to **“Input Signal Requirements”** on page 38.

Access probe power measurement results are affected by the Amplitude Offset value. Use the **“SYSTEM:CORRection:GAIN”** command to determine offset values.

Access probe power measurements are triggered by a rise in RF power that crosses approximately -55 dBm. See **“Access Probe Power Measurement Description”** on page 37 for details.

### Interpreting Integrity Indicator values

See **“Integrity Indicator”** on page 244.

If over range (5) is returned the input power has exceeded the test set’s internal sampler maximum value during some part of the sampling or the input power has exceeded the calibrated range of the test set’s power detector.

If under range (6) is returned the measurement result is below the expected input power level. Under range is also indicated if the input power is below the calibrated range of the test set’s power detector.

If the signal has both over range and under range conditions, only the over range (5) will be indicated.

### Related Topics

**“Integrity Indicator”** on page 244

**“Access Probe Power Measurement Description”** on page 37

---

## Analog Transmit Power Troubleshooting

### Possible Setup Issues

During remote operation of the Analog Transmit Power measurement, you should configure the Trigger Arm to Single. See [“SETup:ATXPower” on page 534](#). If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

If digital measurements are active, turn them off or set their trigger source to Immediate. See [“Triggering of Measurements” on page 240](#).

The measurement results are altered by the Amplitude Offset value. See [“Setting Up Amplitude Offsets and Frequency Points” on page 85](#).

The expected signal amplitude and channel number (or frequency) must be specified for accurate measurements. See [“Active Cell Operating Mode” on page 90](#), [“AVC Test Operating Mode” on page 91](#), and [“Receiver Control” on page 213](#) for information on setting the expected input frequency and power level.

The trigger source is always immediate for the Analog Transmit Power measurement. No synchronization or external signals are required.

Over range and under range conditions may occur when testing a power class 4 mobile at power levels 0 or 1, or when testing a power class 1 mobile at power levels 8, 9, and 10 (digital mode only). See [“Cellular Band \(800 MHz\) Mobile Power Class Considerations for Expected Input Level”](#) for an explanation of why this occurs and what to do about it.

### Interpreting Integrity Indicator values

See [“Integrity Indicator” on page 244](#).

If over range (5) is returned; the input power has exceeded the test set's internal sampler maximum value by at least 3 dB during some part of the sampling or the input power has exceeded the calibrated range of the test set's power detector for the expected power setting.

If under range (6) is returned; the Analog Transmit Power result is more than 10 dB below the expected input power level. Under range is also indicated if the input power is more than 2 dB below the calibrated range of the test set's power detector (-30 dBm).

If the signal has both over range and under range conditions only the over range (5) will be indicated.

---

## 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.

If digital measurements are active, turn them off or set their trigger source to Immediate. See [“Triggering of Measurements” on page 240](#).

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  $V_{\text{peak}}$ , regardless of the Detector Type selected, and cannot exceed  $20 V_{\text{peak}}$  ( $14.1 V_{\text{rms}}$ ).

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 40](#) and [“Audio Analyzer Block Diagram” on page 43](#).

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 45](#)).

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 45](#)).

### Interpreting Integrity Indicator Values

See [“Integrity Indicator” on page 244](#).

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.

---

# Code Channel Time/Phase Error Measurement Troubleshooting

## Possible Setup Issues

---

**IMPORTANT** If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the **“SETup:CAPPower:CONTinuous”** command to set the trigger arm state to single and retry this measurement.

---

During remote operation of this measurement, you should configure the Trigger Arm to Single. See **“SETup:DAPower”** . If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

The input signal must conform to **“Input Signal Requirements”** on page 53.

Digital average power measurement results are affected by the Amplitude Offset value. Use the **“SYSTem:CORRection:GAIN”** command to determine offset values.

The test set receiver’s expected signal amplitude and channel number (or frequency) must be set up correctly for accurate measurements. This is normally done automatically (see **“Active Cell Operating Mode”** ) but can also be done manually (see **“Receiver Control”** on page 213) .

## Interpreting Integrity Indicator values

See **“Integrity Indicator”** on page 244.

If over range (5) is returned the input power has exceeded the test set’s internal sampler maximum value during some part of the sampling or the input power has exceeded the calibrated range of the test set’s power detector.

If under range (6) is returned the measurement result is below the expected input power level. Under range is also indicated if the input power is below the calibrated range of the test set’s power detector.

If the signal has both over range and under range conditions, only the over range (5) will be indicated.

## Related Topics

**“Integrity Indicator”** on page 244

**“Digital Average Power Measurement Description”** on page 53

---

## Channel Power Measurement Troubleshooting

### Possible Setup Issues

---

**IMPORTANT** If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the **“SETup:CAPPower:CONTinuous”** command to set the trigger arm state to single and retry this measurement.

---

During remote operation of this measurement, you should configure the Trigger Arm to Single. See **“SETup:CPOWer” on page 549**. If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

Digital average power measurement results are affected by the Amplitude Offset value. Use the **“SYSTem:CORRection:GAIN”** command to set offset values.

The test set receiver’s expected signal amplitude and channel number (or frequency) must be set up correctly for accurate measurements. This is normally done automatically (see **“Active Cell Operating Mode”**) but can also be done manually (see **“Receiver Control” on page 213**).

See **“Triggering of Measurements” on page 240** for a description of each trigger setting.

### Interpreting Integrity Indicator values

If Over Range (5) is returned; the input power has exceeded +37 dBm or is greater than 8 dB above the expected power level of the receiver.

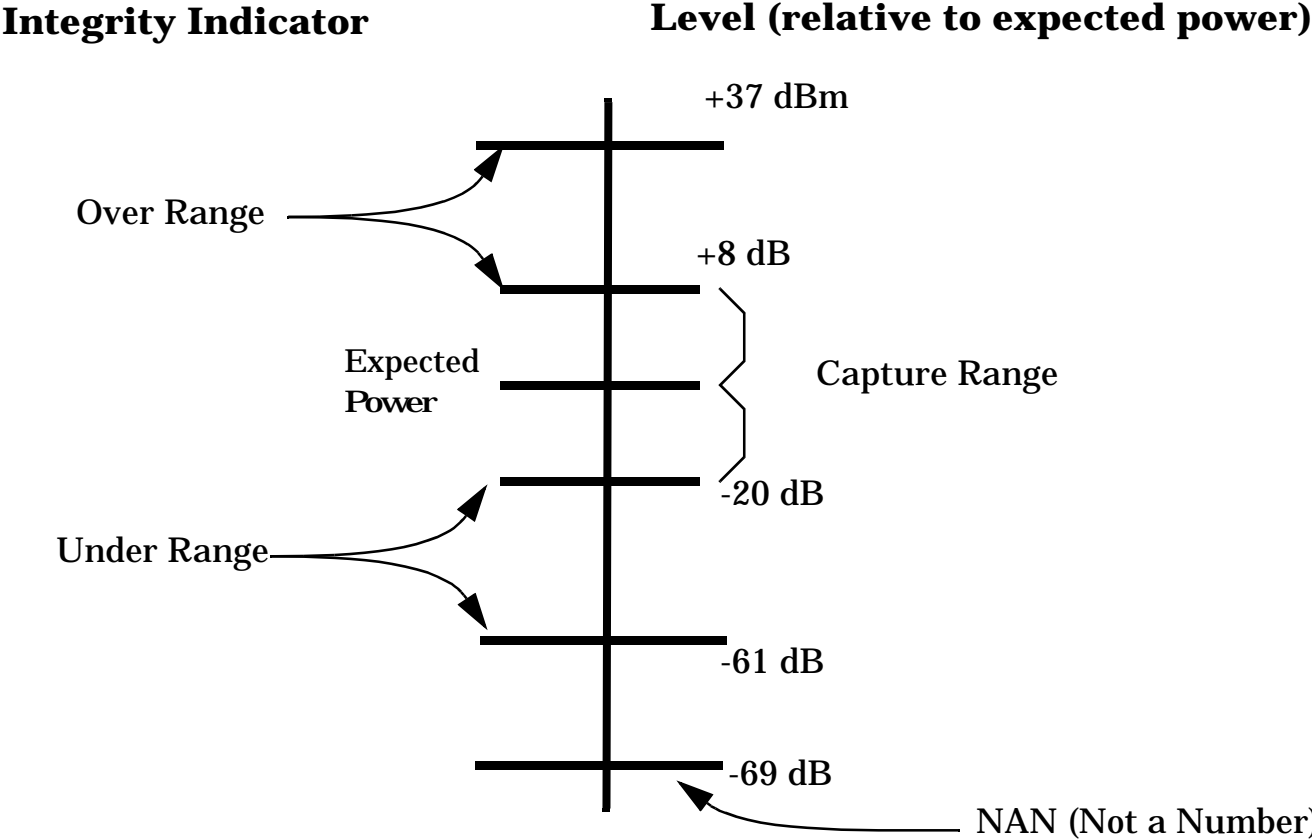
If Under Range (6) is returned; the input power is below -69 dBm or is less than -20 dB below the expected power level of the receiver.

See **“RFANalyzer:AUTO:POWer[:SELEcted]?” on page 516** for the GPIB command to query expected power.

If the signal has both over range and under range conditions, only the over range (5) will be indicated.



**Figure 26. Channel Power Under Range/Over Range Integrity Indicators**



**Related Topics**

[“Integrity Indicator” on page 244](#)

[“Channel Power Measurement Description” on page 46](#)

---

# Digital Average Power Troubleshooting

## Possible Setup Issues

---

**IMPORTANT** If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the **“SETup:CAPPower:CONTinuous”** command to set the trigger arm state to single and retry this measurement.

---

During remote operation of this measurement, you should configure the Trigger Arm to Single. See **“SETup:DAPower”** . If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

The input signal must conform to **“Input Signal Requirements”** on page 53.

Digital average power measurement results are affected by the Amplitude Offset value. Use the **“SYSTem:CORRection:GAIN”** command to determine offset values.

The test set receiver’s expected signal amplitude and channel number (or frequency) must be set up correctly for accurate measurements. This is normally done automatically (see **“Active Cell Operating Mode”** ) but can also be done manually (see **“Receiver Control”** on page 213) .

## Interpreting Integrity Indicator values

See **“Integrity Indicator”** on page 244.

If over range (5) is returned the input power has exceeded the test set’s internal sampler maximum value during some part of the sampling or the input power has exceeded the calibrated range of the test set’s power detector.

If under range (6) is returned the measurement result is below the expected input power level. Under range is also indicated if the input power is below the calibrated range of the test set’s power detector.

If the signal has both over range and under range conditions, only the over range (5) will be indicated.

## Related Topics

**“Integrity Indicator”** on page 244

**“Digital Average Power Measurement Description”** on page 53

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## Frame Error Rate Measurement Troubleshooting

### Possible Setup Issues

---

**IMPORTANT** If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the [“SETup:CAPPower:CONTInuous”](#) command to set the trigger arm state to single and retry this measurement.

---

During remote operation of this measurement, you should configure the Trigger Arm to Single. See [“SETup:CFERror:CONTInuous” on page 547](#). If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

The test set receiver’s expected signal amplitude and channel number (or frequency) must be set up correctly for accurate measurements. This is normally done automatically (see [“Active Cell Operating Mode”](#)) but can also be done manually (see [“Receiver Control” on page 213](#)).

A call must be connected with a loopback service option selected (see [“CALL\[:CELL\]:SOPTION”](#)) to perform frame error rate measurements.

Frame error rate measurements require an accurate Amplitude Offset value because of the low levels transmitted during sensitivity measurements. Use the [“SYSTEM:CORRection:GAIN”](#) command to set offset values.

### Interpreting Integrity Indicator values

See [“Integrity Indicator” on page 244](#).

### Related Topics

[“Frame Error Rate Measurement Description” on page 55](#)

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## Frequency Modulation (FM) Troubleshooting

### Possible Setup Issues

The Trigger Arm should always be set to Single for GPIB operation (not Continuous).

If digital measurements are active, turn them off or set their trigger source to Immediate. See [“Triggering of Measurements” on page 240](#).

The distortion measurement is only returned if it has been enabled (SET:FM:DIST:STAT ON), otherwise the value 9.91E+37 is returned, signifying that a valid measurement was not made.

Distortion measurements require that the Distortion Fundamental Frequency to be specified (SET:FM:DIST:FREQ <value in Hz>).

The modulation frequency measurement is only returned if it has been enabled (SET:FM:FREQ:STAT ON), otherwise the value 9.91E+37 is returned, signifying that a valid measurement was not made.

Both FM distortion and audio distortion measurements are available in the test set. Make sure you are querying the FM Distortion measurement (FETCh:FM:DIST?) in your program and *not* the audio distortion measurement (FETCh:AFAN:DIST?) when making an FM distortion measurement.

Be sure to use the type of detector specified for deviation measurements in the applicable standard. For example, if the measurement specification is for *peak* deviation, be sure to use the Peak+ or Peak- detector instead of the RMS detector. If the signal being measured is noisy, you can use the RMS detector to make a more stable measurement and then multiply the result by 1.414 to arrive at the peak value.

All measurements are performed after any filtering, de-emphasis, and expansion are performed. When measuring SAT deviation and frequency, the Filter Type should normally be set to 100 Hz BW BPF and the 100 Hz BW BPF Center Frequency should be set to the SAT frequency. The C-message filter is often used for measurements made on signals with FM rates in the normal voice frequency range (such as the 1004 Hz tone used for distortion measurements).

This measurement can only be used for analog signals, such as an analog voice channel (AVC). You cannot use this measurement when the mobile is on a digital traffic channel (DTC).

The expected signal frequency (or AVC channel number) and input level must be specified in your program for accurate measurements. This is done either through the base station emulator settings, when the mobile is first put on an AVC, or by manually controlling the test set's measurement receiver. See [“Active Cell Operating Mode” on page 90](#), [“Active Cell Operating Mode” on page 90](#), and [“Receiver Control” on page 213](#) for information on setting the expected input frequency.

To meet performance specifications, the input signal must be in the frequency range of 800 MHz to 960 MHz or 1.70 GHz to 2.0 GHz, and be within 2.5 kHz of the expected input frequency, at a power level (at the RF IN/OUT connector) of -15 dBm to +40 dBm. The specified FM deviation range is 0 Hz to 16 kHz, at a modulation rate of 100 Hz to 15 kHz. FM Distortion is specified over the modulation rate range of 100 Hz to 10 kHz.

The trigger source is always immediate for this measurement. No trigger delay or protocol triggering is used.

## Interpreting Integrity Indicator values

If over range (5) is returned; the input power has exceeded the test set's internal sampler maximum value by at least 6 dB during some part of the sampling or the input power has exceeded the calibrated range of the test set's power detector for the expected power setting.

If under range (6) is returned; the measured input power is more than 20 dB below the expected input power level. Under range is also indicated if the input power is more than 2 dB below the calibrated range of the test set's power detector (-30 dBm). If the expected input power setting is correctly set for the signal level into the test set, an under range condition can still occur if the receiver has not been tuned to the signal's frequency.

If the signal has both over range and under range conditions only the over range (5) will be indicated.

---

## Frequency Stability Measurement Troubleshooting

### Possible Setup Issues

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**IMPORTANT** If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the [“SETup:CAPPower:CONTinuous”](#) command to set the trigger arm state to single and retry this measurement.

---

During remote operation of this measurement, you should configure the Trigger Arm to Single. See [“SETup:FSTability:CONTinuous” on page 568](#). If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

This measurement is not designed to measure digital signals.

See [“Input Signal Requirements” on page 59](#).

### Interpreting Integrity Indicator values

See [“Integrity Indicator” on page 244](#).

### Related Topics

[“Frequency Stability Measurement Description” on page 59](#)

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# Gated Power Measurement Troubleshooting

## Possible Setup Issues

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**IMPORTANT** If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the [“SETup:CAPPower:CONTInuous”](#) command to set the trigger arm state to single and retry this measurement.

---

During remote operation of this measurement, you should configure the Trigger Arm to Single. See [“SETup:GPOWer:CONTInuous”](#) . If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

The test set receiver’s expected signal amplitude and channel number (or frequency) must be set up correctly for accurate measurements. This is normally done automatically (see [“Active Cell Operating Mode”](#) ) but can also be done manually (see [“Receiver Control” on page 213](#) ) .

The following settings are required for the gated power measurement:

- Operating Mode must be Active Cell
- System Type must be IS-95 or IS-2000 with Radio Config set to (Fwd1, Rvs1) or (Fwd2, Rvs2)
- FCH Service Option Setup must be set to SO2 or SO9 (loopback service option)
- Traffic Data Rate must be set to Eighth.

The input signal must conform to [“Measurement Requirements”](#) .

## Related Topics

[“Integrity Indicator” on page 244](#)

[“Gated Power Measurement Description”](#)

---

## Handoff Waveform Quality Measurement Troubleshooting

### Possible Setup Issues

If a handoff waveform quality measurement is attempted while in active cell operating mode, a call must be connected so that long code information can be obtained from the mobile station and measurement triggers can be synchronized to the CDMA frame clock inside the test set.

A radio configuration 3 (F3R3) or radio configuration 4 (F4R3) call must be connected.

The START SINGLE key initiates a handoff waveform quality measurement from the front panel (see [“Measuring Handoff Waveform Quality”](#) for manual measurement instructions).

---

**IMPORTANT** If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the [“SETup:CAPPower:CONTinuous”](#) command to set the trigger arm state to single and retry this measurement.

---

The test set receiver’s expected signal amplitude and channel number (or frequency) must be set up correctly for accurate measurements. This is normally done automatically (see [“Active Cell Operating Mode”](#)) but can also be done manually (see [“Receiver Control” on page 213](#)).

### Interpreting Integrity Indicator values

An integrity indicator of 17 (Can not correlate), indicates that the received signal did not correlate with an internally generated reference signal. See [“Integrity Indicator” on page 244](#).

### Related Topics

[“Integrity Indicator” on page 244](#)

[“Handoff Waveform Quality Measurement Description”](#)



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## Swept Audio Measurement Troubleshooting

### Possible Setup Issues

During remote operation of the Swept Audio measurement, you should always set the Trigger Arm setting to Single. The length of time required to return a measurement over GPIB using continuous triggering varies, but is always longer than when using single triggering. Continuous triggering can also cause problems when the INITiate:DONE? query is used.

If digital measurements are active, turn them off or set their trigger source to Immediate. See [“Triggering of Measurements” on page 240](#).

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  $V_{\text{peak}}$ , regardless of the Detector Type selected, and cannot exceed  $20 V_{\text{peak}}$  ( $14.1 V_{\text{rms}}$ ).

For accurate measurements, always set the Detector Type, Filter Type, and other audio analyzer settings for the type of measurement being made. The SINAD and Distortion measurements typically use different settings than the Audio Level measurement. See [“Audio Analyzer Measurement Description” on page 40](#) and [“Audio Analyzer Block Diagram” on page 43](#).

For very low level audio signals, or for measurements made in a noisy environment, use the 100 Hz BW BPF filter to reduce the affects of noise (see [“Audio Level Measurement Description” on page 45](#)).

### Interpreting Integrity Indicator Values

See [“Integrity Indicator” on page 244](#).

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.

---

## TDSO FER (Frame Error Rate) Troubleshooting

### TDSO FER Setup Issues

TDSO FER results may take up to 20.48 seconds to display

A call must be setup using one of the following service options:

- SO32 (+F-SCH) or
- SO32 (+ SCH)

If “No F-SCH” is displayed in the bottom right portion of the display, the supplemental channel is not connected.

The TDSO FER test returns the confidence level based on the average FER result obtained over the fixed frame count length. If the confidence level is less than 95% for the specified FER confidence requirement, the test has not passed minimum standards.

If the test set misses an FER results message from the mobile station, a GPIB query of that measurement will include the integrity indicator Call Processing Operation Failed.

### Related Topics

[“TDSO Frame Error Rate Measurement Description”](#)

[“Integrity Indicator” on page 244](#)

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## Tx Spurious Emissions Measurement Troubleshooting

### Possible Setup Issues

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**IMPORTANT** If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the [“SETup:CAPPower:CONTInuous”](#) command to set the trigger arm state to single and retry this measurement.

---

During remote operation of this measurement, you should configure the Trigger Arm to Single. See [“SETup:CTXSpurious:CONTInuous”](#) . If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

The input signal must conform to [“Input Signal Requirements”](#) .

The test set receiver’s expected signal amplitude and channel number (or frequency) must be set up correctly for accurate measurements. This is normally done automatically (see [“Active Cell Operating Mode”](#) ) but can also be done manually (see [“Receiver Control”](#) on page 213) .

### Related Topics

[“Integrity Indicator”](#) on page 244

[“Tx Spurious Emissions Measurement Description”](#)

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## Waveform Quality Measurement Troubleshooting

### Possible Setup Issues

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**IMPORTANT** If the Access Probe Power measurement is currently selected and the Trigger Arm setting is Continuous, all other measurements are disabled. Use the [“SETup:CAPPower:CONTinuous”](#) command to set the trigger arm state to single and retry this measurement.

---

During remote operation of this measurement, you should configure the Trigger Arm to Single. See [“SETup:WQQuality:CONTinuous”](#) on page 590. If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

If a waveform quality measurement is attempted while in active cell operating mode, a call must be connected so that long code information can be obtained from the mobile station and measurement triggers can be synchronized to the CDMA frame clock inside the test set.

The test set receiver’s expected signal amplitude and channel number (or frequency) must be set up correctly for accurate measurements. This is normally done automatically (see [“Active Cell Operating Mode”](#) ) but can also be done manually (see [“Receiver Control”](#) on page 213) .

### Interpreting Integrity Indicator values

An integrity indicator of 17 (Can not correlate), indicates that the received signal did not correlate with an internally generated reference signal. See [“Integrity Indicator”](#) on page 244.

### Related Topics

[“Waveform Quality/Code Domain Measurement Description”](#) on page 76

## Error Messages

### Error Message Descriptions

[“Fixed Timer Messages” on page 744](#)

[“Manual User Error Messages” on page 747](#)

[“-400 through -499 Error Message Descriptions” on page 752](#)

[“-300 through -399 Error Message Descriptions” on page 753](#)

[“-200 through -299 Error Message Descriptions” on page 755](#)

[“-100 through -199 Error Message Descriptions” on page 758](#)

[“+100 through +199 Error Message Descriptions” on page 762](#)

[“+200 through +299 Error Message Descriptions” on page 767](#)

[“+300 through +399 Link Control Device-Specific Error” on page 770](#)

[“+400 through +499 Error Message Descriptions” on page 771](#)

[“+500 through +599 Test Application Hardware Device-Specific Error” on page 774](#)

[“+600 through +699 Error Message Descriptions” on page 775](#)

[“+700 through +799 Error Message Descriptions” on page 776](#)

[“+800 through +899 Error Message Descriptions” on page 778](#)

## 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 666](#)

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## Error Message Log

### Description

When an error message is displayed, it is also logged in the error message log. This log is only accessible manually; it is not available through GPIB. The error message log can be displayed by pressing the F7 menu key from the SYSTEM CONFIG screen. Next Page and Previous Page controls are provided.

All errors and events that are generated are displayed in the error message log. When the log is full a new message is sent to the log and the oldest message is removed from the log. The log is cleared when the test set powers up or when you press F10 (Clear Error Message Log).

### Related Topics

[“Error Messages” on page 741](#)

## Fixed Timer Messages

### Description

This is the list of fixed timers with a brief explanation and their values. A timer expiry message appears in its own window, on the test set display. The user has no access to these values and can not change them. None of the fixed timers are active when operating mode is Test Mode.

Timer Name	Description	Value
T100 RADIO-LINK-TIMEOUT	Detects the presence of the radio link by detecting SACCH frames every 480 ms.	4 SACCH multiframes. That is 1.92 seconds if the SACCH is completely absent.
T200 Data link timer	Used for re-transmission on the data link. The value varies depending on the message type.	155 ms for FACCH
T301 Alerting (ringing) timer	Timer used to limit the amount of time a user has to answer a call.	20 seconds
T303 Mobility Management connection timer	Time the network waits after sending a CM SERVICE REQUEST until receiving a response. This occurs before initiating call clearing procedures towards the MS.	10 seconds
T305 Release timer	Time the network waits after transmitting a DISCONNECT message until receiving a RELEASE message.	10 seconds
T306 In-band tones release timer	Time the network waits after transmitting a DISCONNECT message while in-band tones/announcements are provided, until receiving a RELEASE message.	10 seconds
T308 Release timer	Time the network waits after sending a RELEASE message until receiving a RELEASE COMPLETE message. This occurs before re-transmitting the RELEASE or releasing the Mobility Management connection.	10 seconds
T310 Call proceeding timer	Time the network waits after receiving a CALL CONFIRMED message until receiving a ALERTING, CONNECT, or DISCONNECT message before initiating clearing procedures towards the MS.	10 seconds



Timer Name	Description	Value
T313 Connect acknowledge timer	Time the network waits after transmitting a CONNECT message until receiving the CONNECT ACKNOWLEDGE message before performing clearing procedures with the MS.	10 seconds
T323 Modify complete timer	Time the network waits after sending a MODIFY message during call mode changes, until receiving a MODIFY COMPLETE or MODIFY REJECT message before initiating call clearing procedures.	10 seconds
T3101 Immediate assignment timer	Time the network waits after sending the IMMEDIATE ASSIGNMENT or IMMEDIATE ASSIGNMENT EXTENDED message until the main signalling link is established before releasing the newly allocated channels.	1 second
T3103 Handover timer	Time the network waits after transmitting a HANDOVER COMMAND message until receiving HANDOVER COMPLETE or HANDOVER FAILURE or the MS re-establishes the call before the old channels are released. If the timer expires and the network has not received a correctly decoded L2 (format A or B) or TCH frame, then the newly allocated channels are released.	2 seconds
T3105 Physical information repetition timer	Time the network waits after sending the PHYSICAL INFORMATION message until receiving a correctly decoded L2 (format A or B) or TCH frame. This occur before re-transmitting the PHYSICAL INFORMATION message or releasing the newly allocated channels.	50 ms
T3107 Channel assignment timer	Time the network waits after transmitting an ASSIGNMENT COMMAND message until receiving the ASSESSMENT FAILURE message or the MS re-establishes the call before releasing the old and the new channels.	3 seconds
T3109 Signalling disconnection timer	Time the network waits after sending the CHANNEL RELEASE message before disconnecting the signalling link.	5 seconds
T3111 Channel deactivation after disconnection timer	Time the network waits after disconnecting the signalling link before deactivating the channel.	500 ms

Fixed Timer Messages

Timer Name	Description	Value
T3113 Paging timer	Time the network waits after transmitting the PAGING REQUEST message until receiving the PAGING RESPONSE message. This occurs before re-transmitting the PAGING REQUEST (if the maximum number of re-transmissions have not been exceeded).	5 seconds
T3212 Location update timer	The location update timer is set to zero, periodic location update by the MS are disabled. If the MS camps to the BCH and decodes a new MCC or MNC from the one it last camped on, it should perform a location update.	zero = infinite time
T3250 TMSI reallocation timer	Time the network waits after sending the TMSI REALLOCATION COMMAND until receiving TMSI REALLOCATION COMPLETE. This occurs before aborting the procedure and releasing the Radio Resource connection.	5 seconds
T3260 Authentication response timer	Time the network waits after an AUTHENTICATION REQUEST until receiving AUTHENTICATION RESPONSE. This occurs before aborting the procedure and releasing the Radio Resource connection.	5 seconds

## Manual User Error Messages

### Description

These messages are intended to be displayed on the manual user interface only, and are not entered into the Error/Event Queue.

Error Message	Description
The function you requested is not yet available.	The test set does not have this capability.
IQ Calibration completed successfully for modulator <N>	<N> is the IQ modulator number that you are attempting to calibrate, <N> is 1 or 2.
IQ Calibration failed for modulator <N>	<N> is the IQ modulator number that you are attempting to calibrate, <N> is 1 or 2.
The function you requested is not available in this TA.	This function is used in another Test Application.
IQ Calibration for modulator 1 in progress (10 minutes). Call processing disabled.	This error is cleared by either the; IQ Calibration completed successfully for modulator <N>, or IQ Calibration failed for modulator <N>.
IQ Calibration for modulator 2 in progress (6 minutes). Call processing disabled.	This error is cleared by either the; IQ Calibration completed successfully for modulator <N>, or IQ Calibration failed for modulator <N>.
Instrument warning: Audio generator instrument has been closed.	The audio generator instrument was closed automatically by the test set.
Measurement warning: Audio Analyzer instrument has been closed.	The audio analyzer instrument was closed automatically by the test set.
Measurement warning: Analog audio measurement has been closed.	Analog audio measurements have been closed by the test set.
Protocol warning: Setting change has terminated the link with the DUT	Some setting change has caused the call to disconnect.
Warning: Call processing disabled	The call processing functions are not active because the test set is performing calibration operations.
IQ first modulator calibration X%	IQ modulator calibration in progress, X represents the percent complete.
IQ second modulator calibration X%	IQ modulator calibration in progress, X represents the percent complete.

**Device Specific MUI Errors****TA2000 MUI Errors**

Error Message	Description
Call processing disabled	<p>This error, during calibration, is part of the test set's normal operation.</p> <p>If this error occurs during mobile station testing, an internal error has occurred in the test set's firmware.</p>

**CDMA MUI Errors**

Error Message	Description
Call processing disabled	<p>This error, during calibration, is part of the test set's normal operation.</p> <p>If this error occurs during mobile station testing, an internal error has occurred in the test set's firmware.</p>
Channel power calibration completed successfully	
Channel power calibration failed due to oven out of range	<p>This error message occurs when the internal temperature of the test set has drifted more than +/- 10 deg C since the last calibration. Normally, letting the test set fully warm up before calibrating will eliminate this problem.</p>
Channel power calibration failed due to loopback switch problem	<p>The only user requirement for performing calibration is to make sure the test set is warmed up and to remove RF power to the front panel RF IN/OUT connector. If these requirements have been met and this message appears a test set failure condition exists.</p>
Channel power calibration failed due to under range condition	<p>The only user requirement for performing calibration is to make sure the test set is warmed up and to remove RF power to the front panel RF IN/OUT connector. If these requirements have been met and this message appears a test set failure condition exists.</p>
Channel power calibration failed due to over range condition	<p>The only user requirement for performing calibration is to make sure the test set is warmed up and to remove RF power to the front panel RF IN/OUT connector. If these requirements have been met and this message appears a test set failure condition exists.</p>
Channel power calibration failed due to correlation problem	<p>The only user requirement for performing calibration is to make sure the test set is warmed up and to remove RF power to the front panel RF IN/OUT connector. If these requirements have been met and this message appears a test set failure condition exists.</p>

**CDMA MUI Errors (Continued)**

Error Message	Description
Channel power calibration failed	The only user requirement for performing calibration is to make sure the test set is warmed up and to remove RF power to the front panel RF IN/OUT connector. If these requirements have been met and this message appears a test set failure condition exists.
Channel power calibration in progress. Do not apply RF power during calibration.	This error message is displayed for information purposes only.
Channel power calibration<x>%.	This error message is displayed for information purposes only.
Digital average power calibration completed successfully. Cycle power to continue.	This error message is displayed for information purposes only.
Digital average power calibration failed due to temperature drift. Wait for temperature to stabilize.	This error message occurs when the internal temperature of the test set has drifted more that +/- 10 deg C since the last calibration. Normally, letting the test set fully warm up before calibrating will eliminate this problem.
Digital average power calibration failed due to oven out of range	This error message occurs when the internal temperature of the test set has drifted more that +/- 10 deg C since the last calibration. Normally, letting the test set fully warm up before calibrating will eliminate this problem.
Digital average power calibration failed due to loopback switch problem	The only user requirement for performing calibration is to make sure the test set is warmed up and to remove RF power to the front panel RF IN/OUT connector. If these requirements have been met and this message appears a test set failure condition exists.
Digital average power calibration failed	The only user requirement for performing calibration is to make sure the test set is warmed up and to remove RF power to the front panel RF IN/OUT connector. If these requirements have been met and this message appears a test set failure condition exists.
Digital average power calibration in progress. Do not apply RF power during calibration	This error message is displayed for information purposes only.
Digital average power calibration <x>%.	This error message is displayed for information purposes only.
Digital average power measurement has been closed	This error message is displayed for information purposes only.
Waveform quality measurement has been closed	This error message is displayed for information purposes only.
Channel power measurement has been closed	This error message is displayed for information purposes only.

**CDMA MUI Errors (Continued)**

Error Message	Description
Frame error rate measurement has been closed	This error message is displayed for information purposes only.
Access probe power measurement has been closed	This error message is displayed for information purposes only.
Time response of open loop power control measurement has been closed	This error message is displayed for information purposes only.
Gated power measurement has been closed	This error message is displayed for information purposes only.
Tx spurious emissions measurement has been closed	This error message is displayed for information purposes only.
Gated power measurement requires a loopback service option	Select an IS-95 loopback service option using the Service Option (F12) key, or select an IS-2000 radio configuration 1 or 2 loopback service option using the FCH Service Option Setup (F12) key.
Gated power measurement requires 1/8 traffic data rate	Select "Eighth" in the Traffic Data Rate field before attempting Gated Power measurements.
TX spurious emissions measurement requires full traffic data rate	Select "Full" in the Traffic Data Rate field before attempting TX Spurious measurements.

**Digital2000 MUI Errors**

Error Message	Description
Call processing disabled	<p>This error, during calibration, is part of the test set's normal operation.</p> <p>If this error occurs during mobile station testing, an internal error has occurred in the test set's firmware.</p>
Handoff waveform quality measurement has been closed	This error message is displayed for information purposes only.
Code channel time/phase measurement has been closed	This error message is displayed for information purposes only.
TDSO frame error rate measurement has been closed	This error message is displayed for information purposes only.

**Digital95 MUI Errors**

Error Message	Description
Call processing disabled	<p>This error, during calibration, is part of the test set's normal operation.</p> <p>If this error occurs during mobile station testing, an internal error has occurred in the test set's firmware.</p>

## -400 through -499 Error Message Descriptions

### Description

A Query error is generated either when data in the instrument's GPIB output queue has been lost, or when an attempt is being made to read data from the output queue when no output is present or pending.

Error Message	Description
-400 Query error	This event bit (Bit 2) indicates that an attempt to read data from the Output Queues when no output is present or pending, to data in the Output Queue has been lost see IEEE488.2, 11.5.1.1.7.
-410 Query INTERRUPTED	Indicates the test set has been interrupted by a new program message before it finishes sending a RESPONSE MESSAGE see IEEE 488.2, 6.3.2.3.
-420 Query UNTERMINATED	Indicates an incomplete Query in the program see IEEE 488.2, 6.3.2.2.
-430 Query DEADLOCKED	Indicates that the Input Buffer and Output Queue are full see IEEE 488.2, 6.3.1.7.
-440 Query UNTERMINATED after indefinite response	Indicates that a query was received in the same program message after a query requesting an indefinite response was executed see IEEE 488.2, 6.5.7.5.



## -300 through -399 Error Message Descriptions

### Description

A device-specific error indicates that the instrument has detected an error that occurred because some operations did not properly complete, possibly due to an abnormal hardware or firmware condition. For example, an attempt by the user to set an out of range value will generate a device specific error. When one of these errors is generated, the device specific error bit in the event status register is set.

Error Message	Description
-300 Device specific error	This event bit (Bit 3) indicates that a device operation did not properly complete due to some condition, such as overrange see IEEE 488.2, 11.5.1.1.6.
-311 Memory error	Indicates some physical fault in the devices memory, such as a parity error.
-312 PUD memory lost	Indicates protected user data saved by the *PUD command has been lost, see IEEE 488.2, 10.27.
-313 Calibration memory lost	Indicates that nonvolatile calibration data used by the *CAL? command has been lost, see IEEE 488.2, 10.2.
-314 Save/recall memory lost	Indicates that the nonvolatile data saved by the *SAV command has been lost, see IEEE 488.2, 10.33.
-315 Configuration memory lost	Indicates that nonvolatile configuration data saved by the device has been lost.
-320 Storage fault	Indicates that the firmware detected a fault when using data storage. This is not an indication of physical damage or failure of any mass storage element.
-321 Out of memory	An internal operation needed more memory than was available
-330 Self test failed	Indicates a problem with the device that is not covered by a specific error message. The device may require service.
-340 Calibration failed	Indicates a problem during calibration of the device that is not covered by a specific error.
-350 Queue overflow	Indicates that there is no room in the queue and an error occurred but was not recorded. This code is entered into the queue in lieu of the code that caused the error.
-360 Communication error	This is the generic communication error for devices that cannot detect the more specific errors described for error -361 through -363.

-300 through -399 Error Message Descriptions

Error Message	Description
-361 Parity error in program message	Parity bit not correct when data received for example, on a serial port.
-362 Framing error in program message	A stop bit was not detected when data was received for example, on a serial port (for example, a baud rate mismatch).
-363 Input buffer overrun	Software or hardware input buffer on serial port overflows with data caused by improper or nonexistent pacing.

## -200 through -299 Error Message Descriptions

### Description

These errors are generated when something occurs that is incorrect in the current state of the instrument. These errors may be generated by a user action from either the remote or the manual user interface.

Error Message	Description
-200 Execution error	This event bit (Bit 4) indicates a PROGRAM DATA element following a header was outside the legal input range or otherwise inconsistent with the device's capabilities, see IEEE 488.2, 11.5.1.1.5.
-203 Command protected	Indicates that a legal password-protected program command or query could not be executed because the command was disabled.
-220 Parameter error	Indicates that a program data element related error occurred.
-221 Setting conflict	Indicates that a legal program data element was parsed but could not be executed due to the current device state.
-222 Data out of range	Indicates that a legal program data element was parsed but could not be executed because the interpreted value was outside the legal range defined by the devices
-223 Too much data	Indicates that a legal program data element of block, expression, or string type was received that contained more data than the device could handle due to memory or related device-specific requirements.
-224 Illegal parameter value	Indicates that the value selected was not part of the list of values given.
-225 Out of memory	The device has insufficient memory to perform the requested operation.
-226 Lists not the same length	Attempted to use LIST structure having individual LIST's of unequal lengths.
-230 Data corrupt or stale	Indicates invalid data, a new reading started but not completed since the last access.
-231 Data questionable	Indicates that measurement accuracy is suspect.

-200 through -299 Error Message Descriptions

Error Message	Description
-233 Invalid version	Indicates that a legal program data element was parsed but could not be executed because the version of the data is incorrect to the device. For example, a not supported file version, a not supported instrument version.
-240 Hardware error	Indicates that a legal program command or query could not be executed because of a hardware problem in the device.
-241 Hardware missing	Indicates that a legal program command or query could not be executed because of missing device hardware. For example, an option was not installed.
-250 Mass storage error	Indicates that a mass storage error occurred. The device cannot detect the more specific errors described for errors -251 through -259.
-251 Missing mass storage	Indicates that a legal program command or query could not be executed because of missing mass storage.
-252 Missing media	Indicates that a legal program command or query could not be executed because of missing media. For example, no disk.
-253 Corrupt media	Indicates that a legal program command or query could not be executed because of corrupt media. For example, bad disk or wrong format.
-254 Media full	Indicates that a legal program command or query could not be executed because the media is full. For example, there is no room left on the disk.
-255 Directory full	Indicates that a legal program command or query could not be executed because the media directory was full.
-256 File name not found	Indicates that a legal program command or query could not be executed because the file name was not found on the media.
-257 File name error	Indicates that a legal program command or query could not be executed because the file name on the device media was in error. For example, an attempt was made to read or copy a nonexistent file.
-258 Media protected	Indicates that a legal program command or query could not be executed because the media was protected. For example, the write-protect switch on a memory card was set.
-270 Macro error	Indicates that a macro related execution error occurred.

Error Message	Description
-271 Macro syntax error	Indicates that a syntactically legal macro program data sequence, according to IEEE 488.2, 10.7.2, could not be executed due to a syntax error within the macro definition.
-272 Macro execution error	Indicates that a syntactically legal macro program data sequence could not be executed due to some error in the macro definition, see IEEE 488.2, 10.7.6.3.
-273 Illegal macro label	Indicates that the macro label was not accepted, it did not agree with the definition in IEEE 488.2, 10.7.3
-274 Macro parameter error	Indicates that the macro definition improperly used a macro parameter placeholder, see IEEE 488.2, 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 could 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 than twelve characters, see IEEE 488.2, 7.6.1.4.1.

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

-100 through -199 Error Message Descriptions

Error Message	Description
-148 Character not allowed	Indicates a legal character data element was encountered where prohibited by the device.
-150 String data error	This error, as well as errors -151 through -159, are generated when parsing a string data element. This particular error message is used if the device cannot detect a more specific error.
-151 Invalid string data	Indicates that a string data element was expected, but was invalid, see IEEE 488.2, 7.7.5.2. For example, an END message was received before the terminal quote character.
-158 String data not allowed	Indicates that a string data element was encountered but was not allowed by the device at this point in parsing.
-160 Block data error	This error, as well as errors -161 through -169, are generated when parsing a block data element. This particular error message is used if the device cannot detect a more specific error.
-161 Invalid block data	Indicates a block data element was expected, but was invalid, see IEEE 488.2, 7.7.6.2. For example, an 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.



<b>Error Message</b>	<b>Description</b>
-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>	<p>&lt;message1&gt; will appear as:</p> <p>If the DSP generated the assert:</p> <p style="padding-left: 40px;">;P:DSP T:&lt;task ID&gt; E:&lt;error code&gt; C:&lt;error classif.&gt; F1:&lt;flag 1&gt; F2:&lt;flag 2&gt;</p> <p>If the Protocol processor generated the assert:</p> <p style="padding-left: 40px;">;P:Protocol T:&lt;task ID&gt; L:&lt;line number&gt; F:&lt;file name&gt;</p> <p>If the Host processor generated the assert:</p> <p style="padding-left: 40px;">;P:Host T:&lt;task ID&gt; L:&lt;line number&gt; F:&lt;file name&gt;</p>
+102 Exception; Cycle power. Exception message<message2>	<p>&lt;message2&gt; will appear as: T:&lt;task ID&gt; or V:&lt;vector number&gt; or PC:&lt;program counter&gt; or DA:&lt;data adrs reg value&gt;.</p> <p>Vector number, program counter and data address register values are hexadecimal format.</p>
+103 Failure; No measurements or settings can be made	Indicates none of the VI's are operational because a serious problem exists.
+104 Failure; No settling operations will take place	Indicates none of the VI's are operational because a serious problem exists.
+105 Failure; No measurements or setting can be made for the function selected	Indicates none of the VI's are operational because a serious problem exists.
+110 Input pacing; Internal communication queue overflow likely	Indicates that GPIB commands are too fast for the device input queue and should be slowed.
+111 Input pacing; Internal communication queue overflow imminent. Pacing increased	Indicates that GPIB commands were too fast and the device input queue has not kept pace.
+112 Internal error; Protocol error <message3>	<message3> is an eight digit hexadecimal number that is the error code reported by protocol.

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

+100 through +199 Error Message Descriptions

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

## Device Specific General Errors

### Digital2000 General Errors

Error Message	Description
+181 Setting deferred: Cell power and AWGN power >10 dB apart	A setting is deferred when that setting causes incompatibility between related settings. The test set will allow the entry of incompatible settings but the change will not affect signal levels until the incompatibility is resolved.
+182 Setting deferred: One or more code channel levels >30 dB below total RF power	A setting is deferred when that setting causes incompatibility between related settings. The test set will allow the entry of incompatible settings but the change will not affect signal levels until the incompatibility is resolved.
+183 Setting deferred: Cell power and AWGN power >10 dB apart	A setting is deferred when that setting causes incompatibility between related settings. The test set will allow the entry of incompatible settings but the change will not affect signal levels until the incompatibility is resolved.
+190 Settings conflict: F-FCH level changed due to rate set change	Lowering Traffic Data Rate with the Traffic Level set too high, or increasing the Traffic level at low (for example, eighth) Traffic Data Rate can cause this error message. The test set will decreased Traffic Level to a setting compatible with the current Traffic Data Rate.
+190 Settings conflict: F-FCH level changed due to traffic data rate change	Lowering Traffic Data Rate with the Traffic Level set too high, or increasing the Traffic level at low (for example, eighth) Traffic Data Rate can cause this error message. The test set will decreased Traffic Level to a setting compatible with the current Traffic Data Rate.

### Digital95 General Errors

Error Message	Description
+181 Setting deferred: Cell power and AWGN power >10 dB apart	A setting is deferred when that setting causes incompatibility between related settings. The test set will allow the entry of incompatible settings but the change will not affect signal levels until the incompatibility is resolved.
+182 Setting deferred: One or more code channel levels >30 dB below total RF power	A setting is deferred when that setting causes incompatibility between related settings. The test set will allow the entry of incompatible settings but the change will not affect signal levels until the incompatibility is resolved.

**Digital95 General Errors**

Error Message	Description
+183 Setting deferred: Cell power and AWGN power >10 dB apart	A setting is deferred when that setting causes incompatibility between related settings. The test set will allow the entry of incompatible settings but the change will not affect signal levels until the incompatibility is resolved.
+190 Settings conflict: Traffic level changed due to rate set change	Lowering Traffic Data Rate with the Traffic Level set too high, or increasing the Traffic level at low (for example, eighth) Traffic Data Rate can cause this error message. The test set will decreased Traffic Level to a setting compatible with the current Traffic Data Rate.
+190 Settings conflict: Traffic level changed due to traffic data rate change	Lowering Traffic Data Rate with the Traffic Level set too high, or increasing the Traffic level at low (for example, eighth) Traffic Data Rate can cause this error message. The test set will decreased Traffic Level to a setting compatible with the current Traffic Data Rate.

## +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. Errors are categorized as follows:

- TA2000: errors with test application scope
- CDMA: errors common to the IS-95 and IS-2000 System Types
- Digital2000: errors applicable to only the IS-2000 System Type
- Digital95: errors applicable to only the IS-95 System Type

When one of these errors is generated, the +200 errors bit in the questionable error status register is set.

**Table 18. TA2000 Call Processing Errors**

Error Message	Description
+271 Release order not received	This error message is displayed for information purposes only.
+272 Handoff completion not received	This error message is displayed for information purposes only.
+273 Carrier not detected on new channel	This error message is associated with a dropped or released call.
+274 MS reject order received <reason>	This error message is displayed for information purposes only.
+275 Unexpected message received and ignored	This error message is displayed for information purposes only.

**Table 19. CDMA Call Processing Errors**

Error Message	Description
+270 Traffic channel preamble not received	This error message is associated with a failed call attempt.
+271 MS ack of initial BS ack order not received	This error message is displayed for information purposes only.
+272 MS ack order not received	This error message is displayed for information purposes only.

**Table 19. CDMA Call Processing Errors (Continued)**

Error Message	Description
+273 Service Option or Radio Configuration rejected by MS	Some mobile stations do not support all service options provided for a given radio configuration. Use the FCH Service Option Setup (F12) key to select a different service option.
+274 Service response not received	This error message is associated with a failed call attempt or dropped call.
+275 Service request not received	This error message is associated with a failed call attempt or dropped call.
+276 Service connect completion not received	This error message is associated with a failed call attempt or dropped call.
+277 Call drop timer timed out	This error message is associated with a dropped call.
+278 Status response not received	This error message is displayed for information purposes only.
+279 Walsh code cannot be changed while a call is connected	This error message is displayed for information purposes only.
+280 PN Offset cannot be changed while a call is connected	This error message is displayed for information purposes only.
+281 Origination failed due to F-FCH/Traffic state off	This error message is associated with a failed call attempt.
+282 Power control step size rejected	This error message is displayed for information purposes only.

**Table 20. Digital2000 Call Processing Errors**

Error Message	Description
+270 F-SCH assign ignored due to F-SCH state off	This error message is displayed for information purposes only.
+271 F-SCH assign ignored due to no call connected	This error message is displayed for information purposes only.
+272 F-SCH assign ignored due to lack of support in current radio configuration	This error message is displayed for information purposes only.
+275 Radio configuration cannot be changed while a data connection is established	This error message is displayed for information purposes only.
+273 Query MS capability info ignored due to no call connected	This error message is displayed for information purposes only.
+276 F-FCH service option cannot be changed while a data connection is established	This error message is displayed for information purposes only.



**Table 20. Digital2000 Call Processing Errors**

Error Message	Description
+277 SCH data rate cannot be changed while a data connection is established	This error message is displayed for information purposes only.
+278 SCH encoder cannot be changed while a data connection is established	This error message is displayed for information purposes only.
+279 SCH service option cannot be changed while a data connection is established	This error message is displayed for information purposes only.
+280 Service option change to SO32 not allowed while a call is connected	This error message is displayed for information purposes only.
+281 Radio configuration change causing service option SO32 not allowed while a call is connected	This error message is displayed for information purposes only.
+282 F-SCH assign rejected	This error message is associated with a failed call attempt.
+283 Service option control message not received	This error message is displayed for information purposes only.
+284 F-SCH SO32 data change not allowed while a data connection is established	This error message is displayed for information purposes only.

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## **+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 641](#) for information on this register.

**No link control errors are currently defined for this test application.**

## +400 through +499 Error Message Descriptions

### Description

These errors are generated when a problem occurs in one of the test set's hardware modules that is part of the test set's core instrument.

When one of these errors is generated, the '+400 errors' bit in the questionable error status register is set.

Error Message	Description
+400 Hardware failure; Hardware is not available	
+401 Hardware failure; Protocol processor hardware is not responding	
+402 Hardware failure; Demod receiver hardware is not responding	
+403 Hardware failure; Measurement receiver hardware is not responding	
+404 Hardware failure; RF source 1 hardware is not responding	
+405 Hardware failure; RF source 1 digital modulation hardware is not responding	
+406 Hardware failure; RF source 1 level hardware is not responding	
+407 Hardware failure; DSP demod control hardware is not responding	
+408 Hardware failure; 2nd demod receiver hardware is not responding	
+409 Hardware failure; Base station emulator trigger hardware is not responding	
+410 Hardware failure; Audio source hardware is not responding	
+411 Hardware failure; RF source 2 hardware is not responding	
+412 Hardware failure; Internal voltmeter hardware is not responding	
+413 Hardware failure; Fixed timebase input is not responding	

+400 through +499 Error Message Descriptions

Error Message	Description
+414 Hardware failure; Fixed external reference output is not responding	
+415 Hardware failure; Instrument reference is not responding	
+416 Hardware failure; Bit clock A is not responding	
+417 Hardware failure; RF source 2 frequency hardware is not responding	
+418 Hardware failure; RF source 2 digital modulation hardware is not responding	
+419 Hardware failure; RF source 2 level hardware is not responding	
+420 Hardware failure; RF source hopping hardware is not responding	
+421 Hardware failure; Digital demod hopping hardware is not responding	
+422 Hardware failure; Misc VI hardware is not responding	
+423 Hardware failure; Unable to access networking information	
+424 Hardware failure; Bit clock B is not responding	
+425 Hardware failure; Invalid EEPROM checksum <EEPROM board ID>	See the list of EEPROM board ID names below.
+426 Hardware failure; Unable to write to EEPROM <EEPROM board ID>	See the list of EEPROM board ID names below.
+427 Hardware failure; Unable to read from EEPROM <EEPROM board ID>	See the list of EEPROM board ID names below.
+428 Hardware failure; Board not identified <board ID>	See the list of board ID names below.
+429 Hardware failure; Could not create board identification <board ID>	See the list of board ID names below.
+430 Hardware failure; Control version not compatible with FW <board ID>	See the list of board ID names below.
+431 Hardware failure; RF IO DAC cannot be calibrated due to present temperature	
+432 Hardware failure; RF hardware is not responding	
+433 Hardware failure; RF source FM hardware is not responding	
+434 Hardware failure; Audio source FM hardware is not responding	

Error Message	Description
+460 Hardware failure; Hardware doesn't support requested operation	This error occurs when a setting is attempted that is not possible with the test set's hardware. The current firmware needs new hardware in order to work.
+461 Hardware failure; Link subsystem hardware is not responding. Call processing functionality not operational.	This error occurs any time the link subsystem is not operating correctly. The message is persistent to warn the user that any call processing operations will not work.
+462 Hardware error; Hardware not supported; <board ID><part_number>	This error appears when an operation was attempted that requires hardware that is not installed in the test set.
+463 Hardware error: RFIO version does not support loopback switching.	
+464 Hardware error: RFIO version does not support RF out only selection.	This error occurs when trying to select the RF OUT ONLY port when the test set has the RF I/O module that only has the RF IN/OUT port.

#### <board ID> names

3 GHZ ATTENUATOR 1 | ;3GHZ ATTENUATOR 2 | ;AUDIO BD | ;ROM BASEBAND GENERATOR 1 | ;ROM BASEBAND GENERATOR 2 | ;DEMOD DOWNCONVERTER | ;VECTOR OUTPUT BOARD 1 | ;VECTOR OUTPUT BOARD 2 | ;IVF MEASUREMENT | ;MEASUREMENT DOWCONVERTER | ;RF POWER DETECTORS | ;REFERENCE MODULE | ;SYNTH DOUBLER 1 | ;SYNTH DOUBLER 2 | ;TIMING REF | ;MOMENTUM INSTRUMENT | ;RF MOTHER BOARD | ;JUMPER BOARD | ;DIGITAL MOTHER BOARD | ;FLAT PANEL ADAPTER | ;REAR PANEL BOARD

#### <EEPROM board ID> names

Instrument Eeprom ID State | ;Atten 1 Eeprom ID State | ;Atten 2 Eeprom ID State | ;Audio Eeprom ID State | ;BaseBandGen 1 Eeprom ID State | ;BaseBandGen 2 Eeprom ID State | ;Demod DC Eeprom ID State | ;Digital Mother Board Eeprom ID State | ;IQ Output 1 Eeprom ID State | ;IQ Output 2 Eeprom ID State | ;IVF Meas Eeprom ID State | ; Jumper Board Eeprom ID State | ; Meas DC Eeprom ID State | ;RF Mother Board Eeprom ID State | ;RF Interface Eeprom ID State | ; Ref Mod Eeprom ID State | ;Sig Gen 1 Eeprom ID State | ; Sig Gen 2 Eeprom ID State | ;Time Ref Eeprom ID State | ;Display Interface Eeprom ID State | ;Rear Panel Eeprom ID State

---

## **+500 through +599 Test Application Hardware Device-Specific Error**

### **Description**

These errors are generated when a problem occurs with a hardware module that is required for a particular test application.

When one of these errors is generated, the '+500 errors' bit in the questionable error status register is set.

**No hardware specific errors are currently defined for this test application.**

---

## +600 through +699 Error Message Descriptions

### Description

These errors are generated when a problem occurs that is specific to one of the test set's instruments. These errors are part of the test set's core. Note that these measurements may not be present in every test application and therefore, these errors may not be present in every test application. There is no plan at present to support test application specific instruments.

An instrument in this context refers to the measurement-like functionality such as the audio generator and not to the test set as a whole.

When one of these errors is generated, the '+600 errors' bit in the questionable error status register is set.

Error Message	Description
+601 Instrument failure; Audio generator hardware is not responding	Indicates a problem occurs when attempting to control the test set's audio generator.

## +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. Errors are categorized as follows:

- TA2000: errors common to the test application
- CDMA: errors common to the IS-95 and IS-2000 system type
- Digital2000: errors applicable to only the IS-2000 system type
- Digital95: errors applicable to only the IS-95 system type

When one of these errors is generated, the +700 errors bit in the questionable error status register is set.

**Table 21. CDMA Measurement Errors**

Error Message	Description
+701 Digital average power measurement is not responding	This error message indicates an internal software or hardware error.
+702 Waveform quality measurement is not responding	This error message indicates an internal software or hardware error.
+703 Channel power measurement is not responding	This error message indicates an internal software or hardware error.
+704 Frame error rate measurement is not responding	This error message indicates an internal software or hardware error.
+705 Access probe power measurement is not responding	This error message indicates an internal software or hardware error.
+706 Time response of open loop power control measurement is not responding	This error message indicates an internal software or hardware error.
+707 Gated power measurement is not responding	This error message indicates an internal software or hardware error.
+708 Tx spurious emissions measurement is not responding	This error message indicates an internal software or hardware error.



**Table 22. Digital2000 Measurement Errors**

Error Message	Description
+701 Handoff waveform quality measurement is not responding	This error message indicates an internal software or hardware error.
+702 Code channel time/phase error measurement is not responding	This error message indicates an internal software or hardware error.
+703 TDSO frame error rate measurement is not responding	This error message indicates an internal software or hardware error.
+721 Handoff waveform quality measurement first PN offset handoff failure	This error message indicates an internal software or hardware error.
+722 Handoff waveform quality measurement second PN offset handoff failure	This error message indicates an internal software or hardware error.

---

## +800 through +899 Error Message Descriptions

### Description

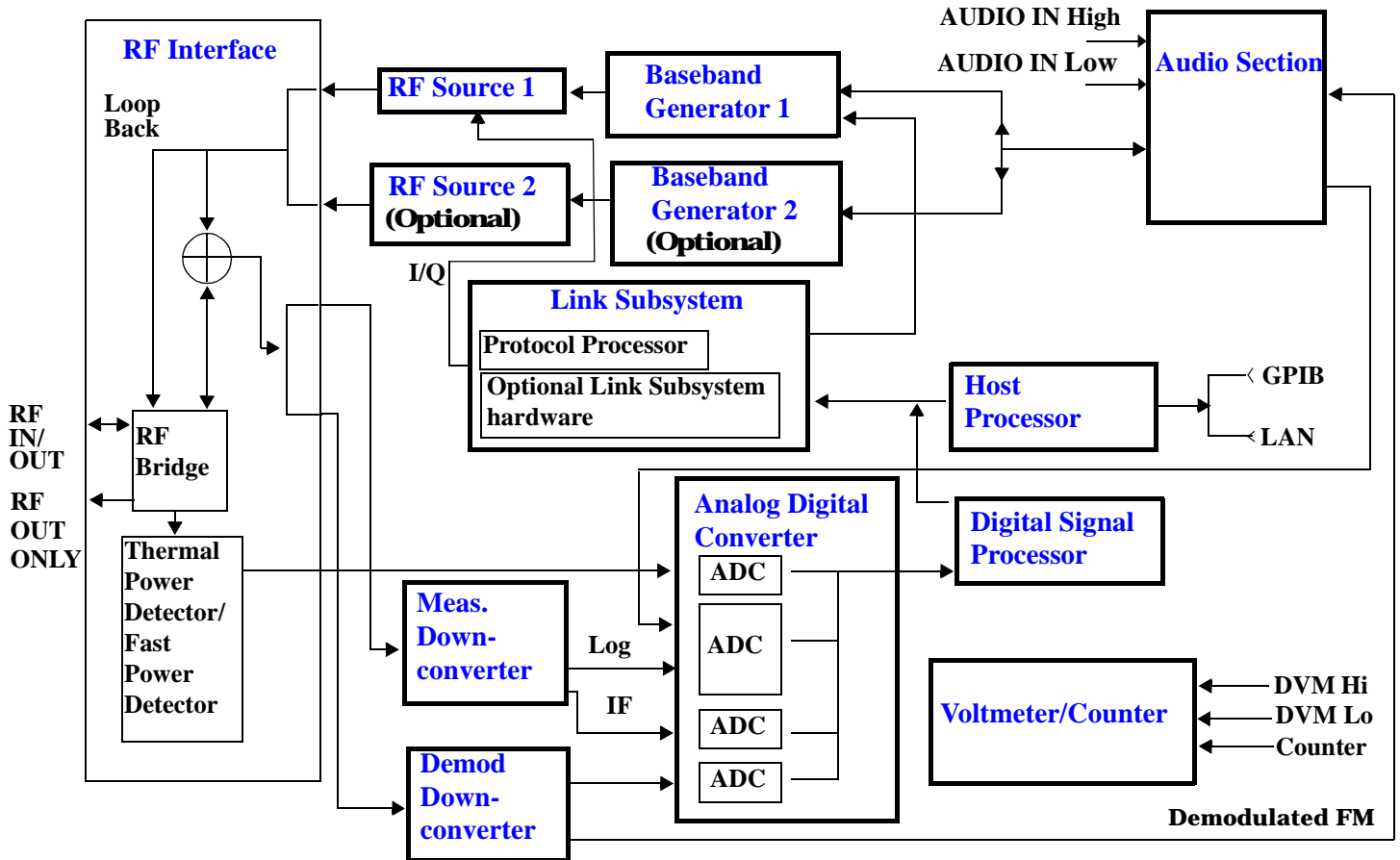
These errors are generated when a problem occurs that is specific to one of the test set's core measurements (such as analog audio).

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 from 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

---

## Forward Channel Description

### Test Mode Forward Channel Description

The forward channels transmitted by the test set when IS-2000 Test is selected in the Operating Mode field include:

- Pilot Channel (see [“CALL:PILot”](#) )
- Sync Channel (see [“CALL:SYNC”](#) )
- Paging Channel (overhead messages only) (see [“CALL:PAGing”](#) )
- 1 Quick Paging Channel (all on or all off indicators) (see [“CALL:QPCHannel”](#) )
- 1 Traffic or Fundamental Channel (depending on the radio configuration) (see [“CALL:TRAFfic”](#) )
- 1 Supplemental Channel (RC3, RC4 or RC5 only) (see [“CALL:SCHannel”](#) )
- 1 OCNS Channel (see [“CALL:OCNSource”](#) )
- AWGN (see [“CALL:AWGNoise:POWer”](#) )

Relative power levels can be set for all channels except for OCNS (orthogonal channel noise simulator) , which is used to simulate other fundamental code channls on the forward CDMA channel. OCNS is calculated to make the sum of the walsh coded channels equal to the cell power setting. Cell power is set using the [“CALL\[:CELL\]:POWer”](#) commands.

### Active Cell Forward Channel Description

The forward channels transmitted by the test set when Active Cell is selected in the Operating Mode field include:

- Pilot Channel (see [“CALL:PILot”](#) )
- Sync Channel (see [“CALL:SYNC”](#) )
- Paging Channel (overhead messages only) (see [“CALL:PAGing”](#) )
- 1 Quick Paging Channel (all on or all off indicators) (see [“CALL:QPCHannel”](#) )
- 1 Traffic or Fundamental Channel (depending on the radio configuration) (see [“CALL:TRAFfic”](#) )
- 1 Supplemental Channel (RC3, RC4 or RC5 only) (see [“CALL:SCHannel”](#) )
- 1 OCNS Channel (see [“CALL:OCNSource”](#) )
- AWGN (see [“CALL:AWGNoise:POWer”](#) )

Relative power levels can be set for all channels except for OCNS (orthogonal channel noise simulator) , which is used to simulate other fundamental code channls on the forward CDMA channel. OCNS is calculated to make the sum of the walsh coded channels equal to the cell power setting. Cell power is set using the [“CALL\[:CELL\]:POWer”](#) commands.



## Data Patterns/Rates

All data patterns are  $2^{15-1}$  PRBS.

Data rates available on the FCH (fundamental channel) depend on the RC (radio configuration) and include:

**Table 23. Forward FCH Data Rates**

RC1	RC2	RC3	RC4	RC5
1.2 kbps	1.8 kbps	1.5 kbps	1.5 kbps	1.8 kbps
2.4 kbps	3.6 kbps	2.7 kbps	2.7 kbps	3.6 kbps
4.8 kbps	7.2 kbps	4.8 kbps	4.8 kbps	7.2 kbps
9.6 kbps	14.4 kbps	9.6 kbps	9.6 kbps	14.4 kbps

FCH data rates can be set using the **“CALL:TRAFfic”** commands.

Data rates available on the SCH (supplemental channel) also depend on the RC (radio configuration) and include:

**Table 24. Forward SCH Data Rates**

RC3	RC4	RC5
9.6 kbps	9.6 kbps	14.4 kbps
19.2 kbps	19.2 kbps	28.8 kbps
38.4 kbps	38.4 kbps	57.6 kbps
76.8 kbps	76.8 kbps	115.2 kbps
153.6 kbps	153.6 kbps	240.4 kbps
NA	307.2 kbps	NA

SCH data rates can be set using the **“CALL:SCHannel”** commands.

## **Closed Loop Power Control**

The closed loop power control bit patterns available are:

- Active bits
- Alternating bits
- All up bits
- All down bits

Closed loop power control bit patterns can be set using the “[CALL\[:CELL\]:CLPControl](#)” commands.

# 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:

**Agilent Technologies 8960 Series 10 E5515A**

**Serial Number: US00000097**

**Current Test Application:** E1960A, GSM Mobile Test, A.04.01

**Instrument Options Installed:** RF Source 2

**HOST BOOT ROM REV:** A.02.03\_BOOT  
**PROTOCOL BOOT ROM REV:** MOM\_PROTOCOL\_BSP\_1.7  
**DSP BOOT ROM REV:** A.00.01

## GPIB Query

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

### GPIB Example:

```

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

```

## Hardware Configuration Report

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 653](#)

[“Obtaining Identification Information \(\\*IDN\)” on page 788](#)

---

## cdma2000/IS-95/AMPS Revision Information

This document describes features and functionality that are part of the Agilent Technologies E1962B CDMA2000 Mobile Test Application releases. This document contains the original features, as well as enhancements that have been added over time.

Select the appropriate link below to view the required release.

- [“B.01 release - March 2001”](#)
- [“B.02 release - September 2001”](#)
- [“B.03 release - November 2001”](#)

### B.03 release - November 2001

This firmware release adds four new features:

- The capability to assign the mobile station to a reverse supplemental channel. This feature, along with generation of the forward supplemental channel, provides further TDSO (test data service option) support.
- On the supplemental channel another choice of data, PRBS (pseudo random bit sequence), has been added. PRBS data, when selected, will be transmitted on both the forward and reverse supplemental channels. When making code domain measurements with a supplemental channel service option PRBS data is required.
- A graphic display of the rising and falling portions of the mobile station amplitude burst during gated on periods is also included in B.03.
- Secondary 800 MHz Band (Band Class 10) support.

This firmware release will run on an E5515C chassis with Option 003 (Option 002 is recommended). If you wish to run this firmware on an E5515B or E5515T chassis, contact your local sales representative.

## cdma2000 Features

### Transmitter tests

- Reverse Supplemental Channel (SO32 (+SCH))

This implementation of TDSO service option 32 (SO32 (+SCH)) assigns the mobile station to both forward and reverse supplemental channels. There is no measurement selection or standard tests associated with the reverse supplemental channel.

The implementation of TDSO service option 32 that was introduced at B.02 (SO32(+ F-SCH)) provided non-loopback frame error rate measurements on the forward supplemental channel. When SO32 (+SCH) is selected, frame error rate measurements on the forward supplemental channel are still available.

#### Related topics:

[“TDSO Frame Error Rate Measurement Description” on page 70](#)

[“CALL\[:CELL\]:SOPTion\[:SELEcted\]\[:SELEcted\]” on page 399](#)

- Front panel display graphics for Gated Power Rise/Fall measurements. (TIA/EIA-98-D test 4.4.7 Standby Output Power<sup>1</sup> and Gated Output Power.)

Beginning with release B.02 the graphical Gated Power measurement included a “Full” and “Zoom” view of the mobile station’s signal during the gated on period. The gated power measurement now includes expanded views of the rising portion and falling portion of the mobile station’s transmitter power during gated operation. Gated power occurs only when the mobile station is operating in IS-95 mode or IS-2000 mode with radio configuration 1 or 2 selected and eighth rate data is selected.

**Related topics:**

[“Gated Power Measurement Description” on page 60](#)

**Receiver Tests**

- PRBS (Pseudo random bit sequence) for TDSO (service option 32) frame error rate tests.

PRBS is an acronym for pseudo random bit sequence. PRBS is a new data pattern available for TDSO frame error rate tests. When making code domain measurements with a supplemental channel service option PRBS data is required.

When a test data service option is selected, the test set sends data bits to the mobile station on the forward supplemental channel. The mobile station demodulates the forward supplemental channel data and reports frame errors to the test set on the reverse fundamental channel. (See [“TDSO Frame Error Rate Measurement Description” on page 70](#) for additional details.)

**Related topics:**

[“CALL:SCHannel:TDSOption:DSourc” on page 386](#)

**Base Station Emulation**

- Secondary 800 MHz Band

Secondary 800 MHz Band (Band Class 10) has been added to the list of supported bands.

**Related topics:**

[“CALL:BAND:\[:SElected\]” on page 296](#)

[“CALL:SETup:BAND:\[:SElected\]” on page 390](#)

[“CALL:CHANnel\[:SElected\]\[:SElected\]” on page 297](#)

[“CALL:SETup:CHANnel\[:SElected\]\[:SElected\]” on page 391](#)

**IS-95 Features**

There are no new IS-95 features in this release.

**AMPS Features**

There are no new AMPS features in this release.

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1. The Gated Output Power portion of this test is performed by the test set. The test set does not have capability to perform Standby Output Power.



## Other Features

- System Time and Date

The test set now provides settings for local and universal time and date.

**Related topics:**

[“Configuring System Time and Date” on page 807](#)

[“SYSTem:DATE”](#)

[“SYSTem:TIME”](#)

[“SYSTem:TZONE”](#)

[“SYSTem:UTC”](#)

- RF Out Only front panel connector

A type-N RF connector on the test set’s front panel provides an optional path for the forward channel or analog signal.

**Related topics:**

[“RF OUT ONLY” on page 708](#)

[“RFGenerator:OUTPut\[:DESTination\]” on page 522](#)

## B.02 release - September 2001

This firmware release adds IS-95 and AMPS system types as well as many cdma2000 features. This firmware release will run on an E5515C chassis with Option 003 (Option 002 is recommended). If you wish to run this firmware on an E5515B or E5515T chassis, contact your local sales representative.

### cdma2000 Features

#### Transmitter tests

- Code Channel Timing and Phase (TIA/EIA-98-D test 4.3.2 Reverse Pilot Channel to Code Channel Time Tolerance, and 4.3.3 Reverse Pilot Channel to Code Channel Phase Tolerance)

These tests assess any differences in timing or phase between active reverse code channels and the reverse pilot channel (see [“Code Channel Timing and Phase Measurement Description”](#) ).

- Gated Power (TIA/EIA-98-D test 4.4.7 Standby Output Power<sup>1</sup> and Gated Output Power)

This test (which is similar to the GSM power versus time measurement) verifies that mobile station transmitters conform to gated output power test limits. Transmitter output power is gated when operating in IS-95 or cdma 2000 radio configuration one or two modes with partial (eighth) rate data selected. (See [“Gated Power Measurement Description”](#) .)

1. The Gated Output Power portion of this test is performed by the test set. The test set does not have capability to perform Standby Output Power.

- Tx Spurious Emissions (TIA/EIA-98-D test 4.5.1 Conducted Spurious Emissions)

This test provides a collection of signal energy measurements at only the alternate and adjacent frequency offsets specified by test standards to ensure that mobile stations do not transmit excessive signal energy outside of their transmit channels. (See [“Tx Spurious Emissions Measurement Description”](#) .) Measurements at 12.5

- Handoff Waveform Quality (performed at the explicit action time of the *Universal Handoff Direction Message*) (TIA/EIA-98-D test 4.3.4 Waveform Quality and Frequency Accuracy)

This measurement has been added to provide a collection of waveform quality measurements acquired during mobile station transmission of a single code channel. This measurement can be performed only during a handoff, as specified in the TIA/EIA-98-D test standard. (See [“Handoff Waveform Quality Measurement Description”](#) .)

The Handoff Waveform Quality measurement provides the same suite of measurement results as the multi-code waveform quality measurement (see [“Waveform Quality/Code Domain Measurement Description”](#) ), excluding EVM (Error Vector Magnitude) and code domain power measurements.

## Receiver Tests

- Service Option 32 TDSO (F-SCH FER) (TIA/EIA-98-D test 3.4.1 Demodulation of Forward Traffic Channel with AWGN). Supports the following radio configurations:

- Radio Configuration 3 (Forward 3, Reverse 3) at data rates from 9.6 to 153.6 kbps.

- Radio Configuration 4 (Forward 4, Reverse 3) at data rates from 9.6 to 307.2 kbps.

TDSO Frame Error Rate measurements provide a test of the mobile station receiver's ability to demodulate the forward supplemental channel. To obtain test results, the test set signals the mobile station under test to count errors that occur while the mobile station is demodulating fixed pattern data sent from the test set. Only convolutional encoding is supported. The test set then displays FER results received from the mobile station. (See [“TDSO Frame Error Rate Measurement Description”](#) .)

## Base Station Emulation

- Intersystem Handoffs

The following handoffs between CDMA and AMPS systems can now be performed.

- cdma2000 to AMPS

Handoffs to AMPS allow user-specified voice channel, transmit level, and SAT color code.

- cdma2000 to IS-95

Handoffs to IS-95 allow user-specified band, handoff channel, and IS-95 protocol. (Handoffs to IS-95 require the call to be in loopback service options SO2 or SO9 with full data rate selected.)

- IS-95 to AMPS

Handoffs to AMPS allow user-specified voice channel, transmit level, and SAT color code.

## IS-95 Features

### Transmitter tests (similar to cdma2000)

- Access Probe Power
- Channel Power
- Digital Average Power
- Waveform Quality
- Tx Spurious Emissions
- Gated Power

### Receiver tests

- Frame Error Rate

### Base Station Emulation (similar to cdma2000)

- Registration
  - Supported IS-95 registration procedures are the same as cdma2000 (zone based, timer based, power up, mobile station originated calls, and base station pages).
- One-Button Page
- Autoanswer MS Origination
- Hard Handoff (Band and Channel)
- RF Generator
  - AWGN
  - Cell Power (Ior)
    - Similar to cdma2000. Also known total output power. Cell Power is a summation of the following sources:
      - Pilot, Sync, Paging, Traffic, and OCNS channels
        - Similar to cdma2000 radio configurations (Fwd1,Rvs1), (Fwd2,Rvs2).
- Protocol Revisions
  - TSB-74 (Protocol Revision 3)
  - J-STD-008 (Protocol Revision 1)
  - 95-B (Protocol Revision 4)
  - ARIB T-53 (Protocol Revision 3)
  - Korean PCS (Protocol Revision 1)

- Service Options
  - Echo (SO1, SO3, SO17, SO32768)
  - Loopback (SO2, SO9)
- Cell Bands
  - US Cellular (band class 0)
  - US PCS (band class 1)
  - Korean PCS (band class 4)
  - Japan CDMA (band class 3)
  - NMT-450 (band class 5)

## **AMPS Features**

### **Transmitter tests**

- Frequency Modulation
  - FM Deviation
  - Distortion
  - Modulation Frequency
- Frequency Stability
  - Frequency Error
  - Frequency
- Analog Transmit Power

### **Instruments**

- Swept Audio
  - Audio generator
  - Audio analyzer
  - SINAD meter
  - Distortion meter
- Audio Generator
  - Amplitude measurements
  - Frequency measurements

- Audio Analyzer
  - Audio level measurements
  - Audio frequency measurements
  - SINAD measurements
  - Distortion measurements

### **Base Station Emulation**

- Call Setup
- Registrations
- Handoffs to Analog Voice Channel, Mobile Station Transmit Level
- SAT Color Code

### **B.01 release - March 2001**

These are the original features of the Agilent E1962B.

### **Transmitter Measurements**

- Channel Power
- Average Power
  - Peak Detector
  - Thermal Detector
- Access Probe Power
- Modulation Quality
  - Rho
  - Frequency Error
  - Time Error
- Modulation Quality
  - Multi-Code Rho
  - Frequency Error
  - Time Error
  - EVM
  - Code Domain Power

## **Receiver Measurements**

- Sensitivity
- Dynamic Range
- Access Probe Power
- Demodulation of FCH with AWGN
- Loopback Support with Service Option 002,009, and 055

## **IS-2000 Functionality**

- Call Processing
  - Registration
  - One-Button Page
  - Autoanswer MS Origination
  - Hard Handoff (Band and Channel)
- RF Generator
  - Pilot, Sync, Paging, Quick Paging, FCH, OCNS, and AWGN Channels
- Radio Configuration Support
  - Forward RC1 + Reverse RC1
  - Forward RC2 + Reverse RC2
  - Forward RC3 + Reverse RC3
  - Forward RC4 + Reverse RC3
  - Forward RC5 + Reverse RC4

---

## Display Brightness

### Description

This parameter allows you to adjust the brightness of the test set's display. The test set's display screen has two brightness settings:

- medium brightness
- high brightness

### Example

```
OUTPUT 714;"DISPLAY:BRIGHTNESS MEDIUM" ! sets screen brightness to medium.
```

### Related Topics

["DISPlay" on page 431](#)

---

## 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 431](#)

[“STATus:OPERation:KEYPressed Register Bit Assignments” on page 605](#)

---

## 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 652](#)

---

## 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 654](#)

---

## 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 810](#)

["SYSTEM:APPLICATION" on page 645](#)

["SYSTEM:CURRENT:TA" on page 664](#)

["Test Application Name" on page 812](#)

---

## 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 808](#)

[“SYSTEM:APPLICATION” on page 645](#)

---

## 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 645](#)

["Test Application Switching" on page 808](#)

## Symbols

\*IDN?, 788

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