Agilent X-Series Signal Analyzer

This manual provides documentation for the following X-Series Analyzers:

PXA Signal Analyzer N9030A
MXA Signal Analyzer N9020A
EXA Signal Analyzer N9010A
CXA Signal Analyzer N9000A

N9072A & W9072A cdma2000 Measurement Application User's and Programmer's Reference

Agilent Technologies

Notices

Trademark Acknowledgements

Microsoft® is a U.S. registered trademark of Microsoft Corporation.

Windows® and MS Windows® are U.S. registered trademarks of Microsoft Corporation.

Adobe Reader® is a U.S. registered trademark of Adobe System Incorporated.

Java™ is a U.S. trademark of Sun Microsystems, Inc.

MATLAB® is a U.S. registered trademark of Math Works, Inc.

Norton Ghost™ is a U.S. trademark of Symantec Corporation.

Manual Part Number

N9072-90006
Supersedes: February 2009

Print Date

April 2011

Printed in USA

Agilent Technologies, Inc.
1400 Fountaingrove Parkway
Santa Rosa, CA 95403

Warranty

The material contained in this document is provided "as is," and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights Legend

If software is for use in the performance of a U.S. Government prime contract or subcontract, Software is delivered and licensed as "Commercial computer software" as defined in DFAR 252.227-7014 (June 1995), or as a "commercial item" as defined in FAR 2.101(a) or as "Restricted computer software" as defined in FAR 52.227-19 (June 1987) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to Agilent Technologies' standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (June 1987). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

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

Warranty

This Agilent technologies instrument product is warranted against defects in material and workmanship for a period of one year from the date of shipment. During the warranty period, Agilent Technologies will, at its option, either repair or replace products that prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by Agilent Technologies. Buyer shall prepay shipping charges to Agilent Technologies and Agilent Technologies shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to Agilent Technologies from another country.

Where to Find the Latest Information

Documentation is updated periodically. For the latest information about this analyzer, including firmware upgrades, application information, and product information, see the following URLs:

http://ww.agilent.com/find/pxa

http://www.agilent.com/find/mxa

http://www.agilent.com/find/exa

http://ww.agilent.com/find/cxa

To receive the latest updates by email, subscribe to Agilent Email Updates:

http://www.agilent.com/find/emailupdates

Information on preventing analyzer damage can be found at:

http://www.agilent.com/find/tips

Is your product software up-to-date?

Periodically, Agilent releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Agilent Technical Support website at

www.agilent.com/find/techsupport.

Contents

1 Using Help

Welcome to the X-Series Signal Analyzer Help system!

The online Help system is "context-sensitive". This means that the information displayed when you invoke the Help system depends on the selected Analyzer Mode, Measurement and key.

TIP	To view help for any front-panel key or menu key, press that key with this Help Window open. To scroll any page vertically (to see the whole of a long topic), press the **Down Arrow** key on the front panel to scroll down (or the **Up Arrow** key to scroll up). To locate these keys, see “Front Panel Keys used by the Help System” on page 109.

See “Navigating the Help Window Without a Mouse” on page 114 for complete information about **Using Help without an attached Mouse and Keyboard**. For specific details of how to navigate to topics, see “Finding a Topic without a Mouse and Keyboard” on page 123.

See “Navigating the Help Window with a Mouse” on page 113 to learn about **Using Help with an attached Mouse and Keyboard**.

You can view Help on the Analyzer itself, or you can **View Help on Another Computer**, by copying the Help files and viewing Help there. For details, see the Section “Viewing Help on a separate Computer” on page 103.

To locate **Other Available Help Resources**, see “Locating Other Help Resources” on page 102.

Key Path	**Help**

Locating Other Help Resources

All available documentation is present on the Analyzer’s hard disk, either as HTML Help or Acrobat PDF files.

In addition to the interactive Windows (HTML) Help system, the Analyzer’s hard disk contains Application Notes, tutorial documents, etc.

This same documentation is also included on the Documentation CD shipped with your Analyzer.

Many of the supporting documents use the Adobe Acrobat (PDF) file format. You can view PDF files using the pre-installed Adobe Reader software.

The Adobe Reader user interface differs from the Windows Help interface. For full details on how to navigate within Acrobat documents using Adobe Reader, see “Navigating Acrobat (PDF) Files” on page 118.

Viewing Help on a separate Computer

You may want to view the help pages **without** having them appear on top of the Analyzer's screen.

There are two separate Help files for each Analyzer Mode, which contain all the same help pages in different formats:

1. A file in HTML Help (CHM) format,
2. A file in Acrobat (PDF) format.

You can copy any of the Help files to another computer, then open and view the help pages in the file on that computer.

Your choice of which file to copy and view may depend on what you want to do with the file (for example, whether you want to print it and read the paper copy, or view it on the computer). The table below compares the relative advantages of the two formats:

Format Type	**HTML Help** Format (**CHM** Files)	**Acrobat** Format (**PDF** Files)
File Extension	CHM	PDF
Software Required to view file	Microsoft Windows operating system only, with Microsoft Internet Explorer installed.	Free Adobe Reader software can be downloaded for many operating systems, including: Microsoft Windows, Macintosh, Linux, Solaris.
Full Text Search?	Yes	Yes
Printable?	Yes, but with limited control.	Yes. Full print control.
Printable Table of Contents?	No	Yes
Navigable without a Mouse and Keyboard?	Yes, but with some loss of functionality.	No
Has Page Numbers?	No	Yes
Context-Sensitive Display?	Yes, when viewed using the X-Series Analyzer application window.	No
Indexed?	Yes	No
Active Hyperlinks?	Yes	Yes

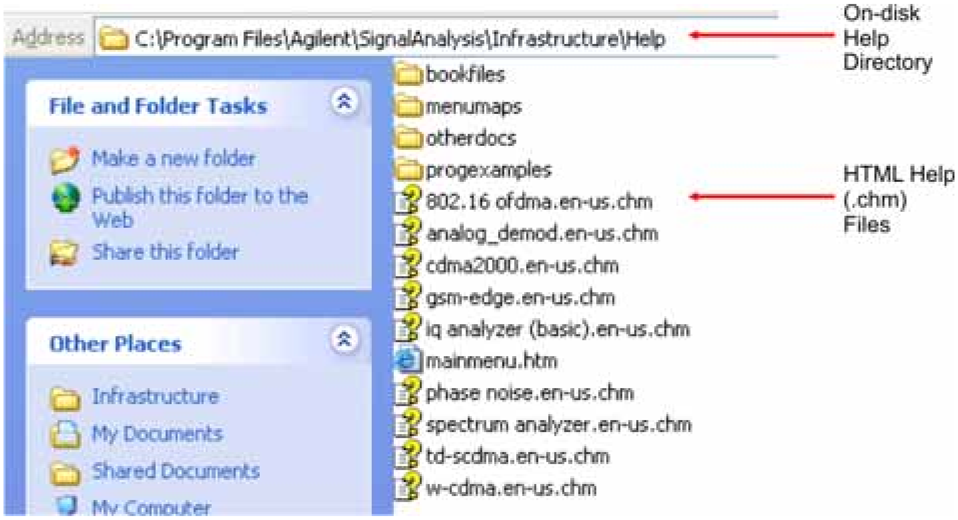
Copying the HTML Help (CHM) Files

You can copy the HTML Help file(s) you need to a separate computer running Microsoft Windows. Each HTML Help file has a .chm extension.

You can find the HTML Help (.chm) files:

- **Either**, on the documentation CD that came with the Analyzer,

- **Or**, in a special directory on the Analyzer's hard disk. The directory path is:
  `C:\Program Files\Agilent\SignalAnalysis\Infrastructure\Help`
  The illustration below shows an example listing of the HTML Help files in this directory, viewed using Windows Explorer.
  Depending on which Analyzer software licenses you purchased, the content of the directory on your machine may vary.



NOTE	You can open and view the HTML Help files only on a PC that has Microsoft Windows and Microsoft Internet Explorer installed.

Copying the Acrobat (PDF) Files

You can copy the Acrobat file(s) you need to a separate computer running any of several different operating systems. Each Acrobat file has a `.pdf` extension.

You can find the Acrobat (`.pdf`) files:

- **Either**, on the documentation CD that came with the Analyzer,
- **Or**, in a special directory on the Analyzer's hard disk. The directory path is:
  `C:\Program Files\Agilent\SignalAnalysis\Infrastructure\Help\bookfiles`

  — The illustration below shows an example listing of the Acrobat files in this directory, viewed using Windows Explorer.

  — The PDF versions of the help files are named `<mode>_ref.pdf`, where `<mode>` is the name of the Analyzer Mode. For example, the name of the PDF file for GSM/EDGE Mode is `gsmedge_ref.pdf`. (Note that the directory also contains other PDF documents.)

  — When you open any `<mode>_ref.pdf` document, the title page displays "`<Mode> User's and Programmer's Reference`", where `<Mode>` is the name of the Analyzer Mode described by the document.

  — Depending on which Analyzer software licenses you purchased, the content of the directory on your machine may vary.


Address
C:\Program Files\Agilent\SignalAnalysis\Infrastructure\Help\bookfiles
On-disk Book Files Directory
Name
File and Folder Tasks
Make a new folder
Publish this folder to the Web
Share this folder
Other Places
Help
My Documents
Shared Documents
My Computer
My Network Places
analog_demod_meas.pdf
analog_demod_ref.pdf
exa_functest.pdf
exa_specs.pdf
functest.pdf
getstart.pdf
gsmedge_meas.pdf
gsmedge_ref.pdf
iqanalyzer_ref.pdf
messages.pdf
mxa_functest.pdf
mxa_specs.pdf
ofdma_meas.pdf
ofdma_ref.pdf
pnoise_meas.pdf
pnoise_ref.pdf
Acrobat (.pdf) Files

How Help is Organized

This topic contains the following sections:

"Help Contents Listing" on page 106

"System Functions" on page 107

"Key Descriptions for Each Measurement" on page 107

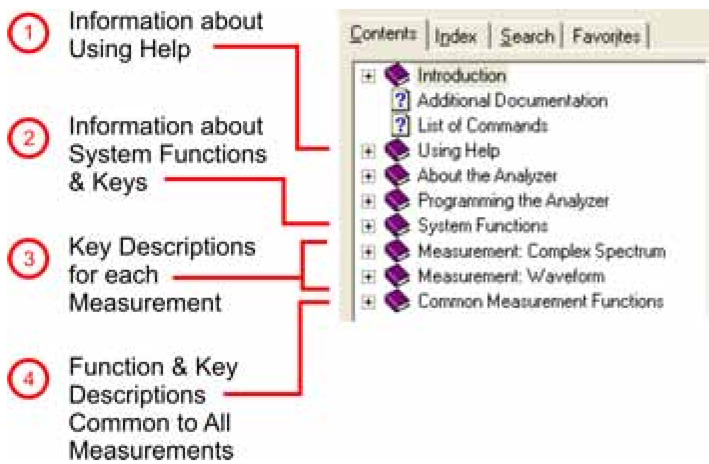
"Key Information for Softkeys" on page 108

"Common Measurement Functions" on page 108

Help Contents Listing

The listing under the Contents tab in the Help Window includes a topic for each Front-panel key and each softkey, for each available measurement.

The Contents listing is split into several major sections, as shown below for the HTML Help version of the document. The structure of the PDF version is similar.



Help information is split between these sections as follows:

1. Using Help: this section.
2. System Functions. See "System Functions" on page 107 below.
3. Measurement Functions. See "Key Descriptions for Each Measurement" on page 107 below.
4. Common Measurement Functions. See "Common Measurement Functions" on page 108 below.

System Functions

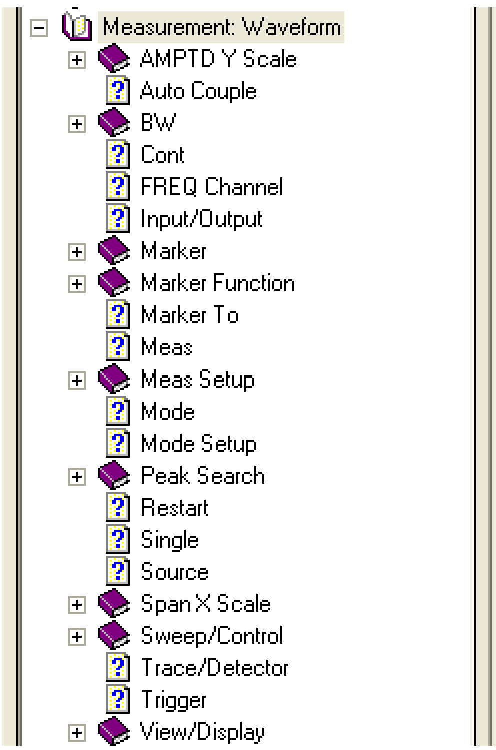
This section contains information for the following keys, which are listed in alphabetical order: **File**, **Preset**, **Print**, **Quick Save**, **Recall**, **Save**, **System**, **User Preset**.

The functions of these keys do not vary between measurements: they operate the same way, irrespective of which Analyzer measurement you have selected.

The sections for **Recall** and **Save** contain only cross-references to the respective sections in "Common Measurement Functions" on page 108, and are included here for convenience.

Key Descriptions for Each Measurement

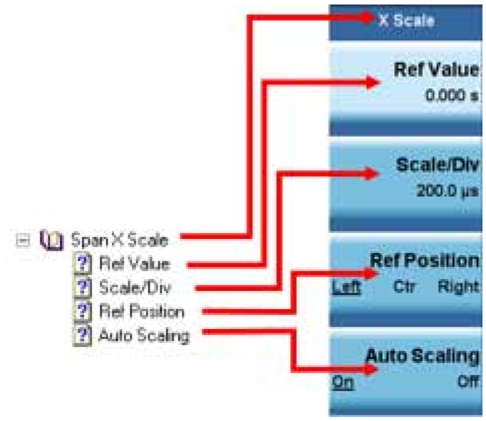
The Contents section for each Measurement is sub-divided into topics for each Front-panel key, in alphabetical order, as shown below.



If you don't see a topic for a Front-panel key in the Measurement-specific section, then it is located in the section "System Functions" on page 107.

Key Information for Softkeys

Information for each softkey that appears when you press a Front-panel key (or a softkey with a submenu) is listed under the entry for that key in the Help Contents. The example below shows the submenu under the **SPAN X Scale** Front-panel key in the "Waveform" Measurement, alongside the actual softkeys for that menu.



In these subsections, all softkeys are listed in the order they appear in their menu (that is, **not** in alphabetical order).

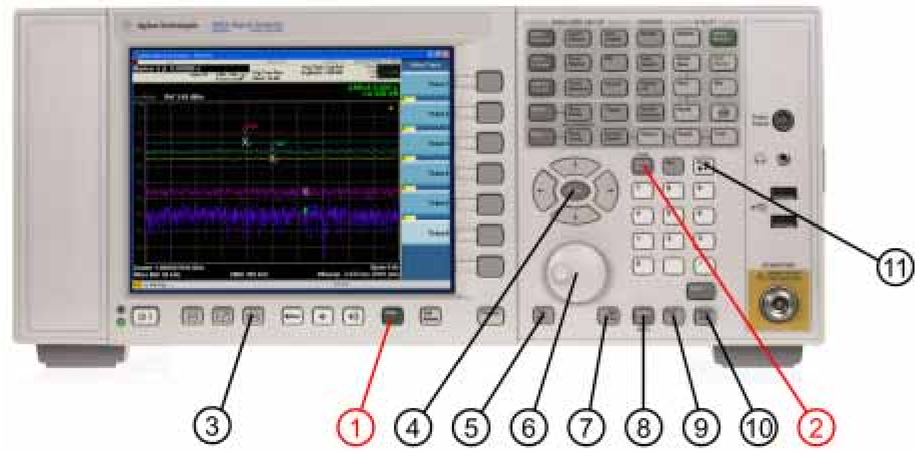
Common Measurement Functions

This section groups together function and key information that is shared between measurements. However, there is a listing for every Front-panel key and subkey in the section for each measurement, so you will generally not need to refer to this section.

The key subsections are listed alphabetically.

Front Panel Keys used by the Help System

The interactive Help system uses the Front-panel keys shown below.

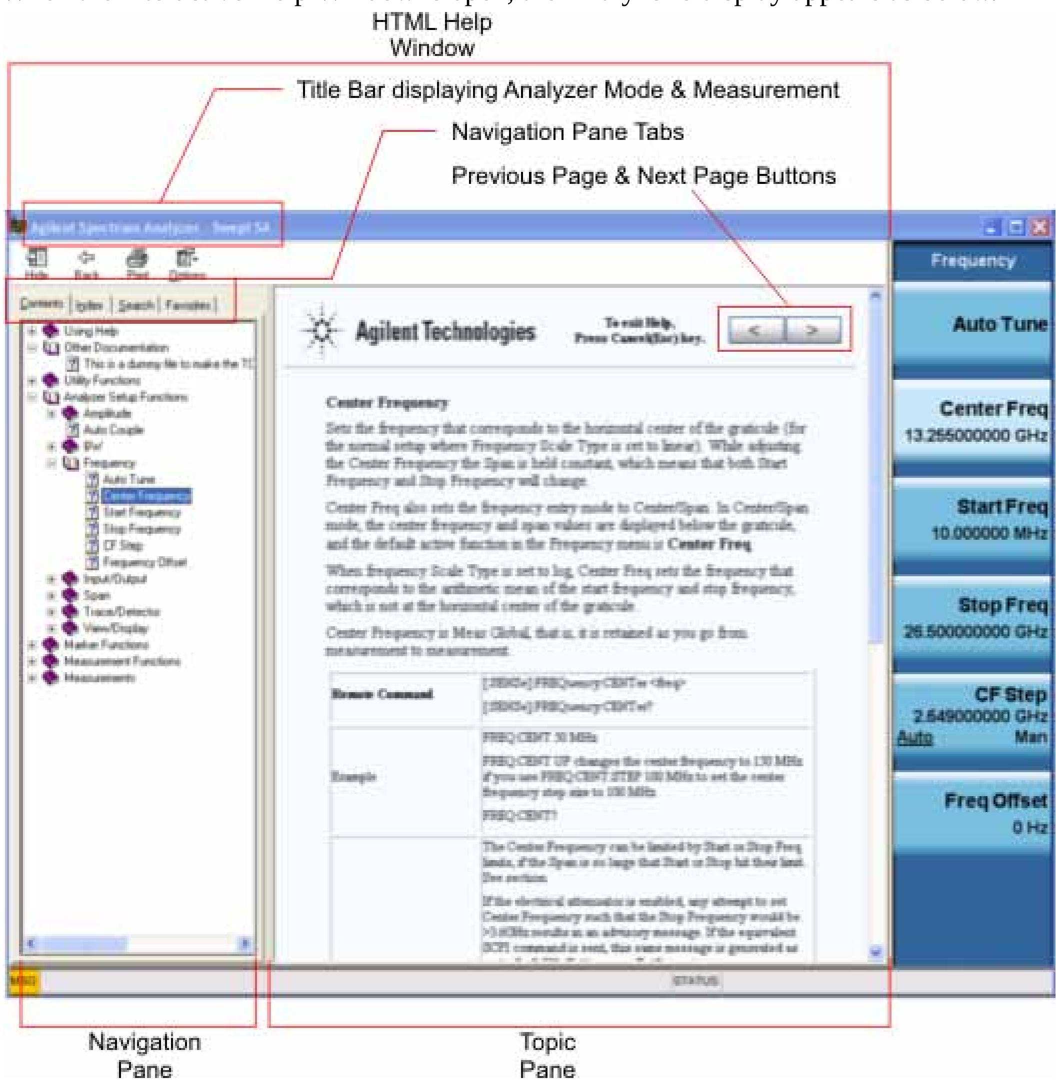


Item #	Item Name	Description
1	Help Key	Opens Help (displaying the topic for the last key pressed).
2	Cancel (Esc) Key	Exits Help.
3	Next Window Key	Changes the current window pane selection.
4	Arrow / Enter Keys	A central **Enter** key, surrounded by four directional arrow keys. Navigates within the Help system.
5	Backward Tab Key	Moves between controls in the Help display.
6	Knob	For future use.
7	Forward Tab Key	Moves between controls in the Help display.
8	Select / Space Key	Navigates within the Help system, in conjunction with other keys.
9	Ctrl Key	Navigates within the Help system, in conjunction with other keys. See “Navigating Windows HTML Help (CHM) Files” on page 110.
10	Alt Key	Navigates within the Help system, in conjunction with other keys. See “Navigating Windows HTML Help (CHM) Files” on page 110.
11	Bk Sp (Backspace) Key	Acts as a "Back" key when navigating the pages of the Help system.

Navigating Windows HTML Help (CHM) Files

HTML Help Window Components

When the interactive Help Window is open, the Analyzer's display appears as below.



The HTML Help Window appears on top of, and to the left of, the measurement display. You can still see and use the current softkey menu when the HTML Help Window is open. However, pressing a softkey when the Help window is open displays Help for that softkey, but does **not** execute the softkey's function.

When the Help Window is open, the Analyzer retains its current Mode and Measurement, as shown in the Title Bar.

The HTML Help Window itself consists of two panes, as shown in the diagram above.

On the left is the Navigation Pane, and on the right is the Topic Pane.

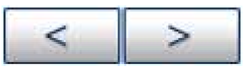
The Help Window Navigation Pane

The Navigation Pane is further divided into four tabs: Contents, Index, Search and Favorites, as shown below.

For details of how to switch between these tabs, if you don't have a mouse attached to the Analyzer, see the Section "To Switch the Active Tab within the Navigation Pane" on page 115.

The Help Window Topic Pane

This pane displays the text for the topic that you have selected. It also contains clickable **Previous Page** and **Next Page** buttons (as shown below), which can be used to move to the previous or next page in the Help file.



Basic Help Window Operations

This topic contains the following sections:

"Opening Help" on page 111

"Getting Help for a Specific Key" on page 111

"Closing the Help Window" on page 112

"Viewing Help on How to Use Help" on page 112

"Exiting Help on How to Use Help" on page 112

To locate the keys mentioned in this section, see "Front Panel Keys used by the Help System" on page 109.

Opening Help

To access the Help system, press the green **Help** key below the front panel display (shown below) while an Agilent application is running.

Note that the softkeys remain visible when the Help window is open.

Getting Help for a Specific Key

1. If the Help window **is** already open, press the desired key. The relevant Help topic appears.

   Note that the function normally invoked by the key is **not** executed when the key is pressed with the Help window open. If you want to execute the key's function, first close Help by pressing the **Cancel (Esc)** key (as described in "Closing the Help Window" on page 112), then press the key, before opening Help again (if required).

2. If the Help window is **not** already open, press the desired key (which executes the key’s function), then press the **Help** key to display the relevant Help page. Help is available for all softkeys, and for all the Front-panel keys listed under the "System Functions" and "Measurement" sections.

For details of how to navigate within the panes of the Help window, see “Navigating Windows HTML Help (CHM) Files” on page 110.

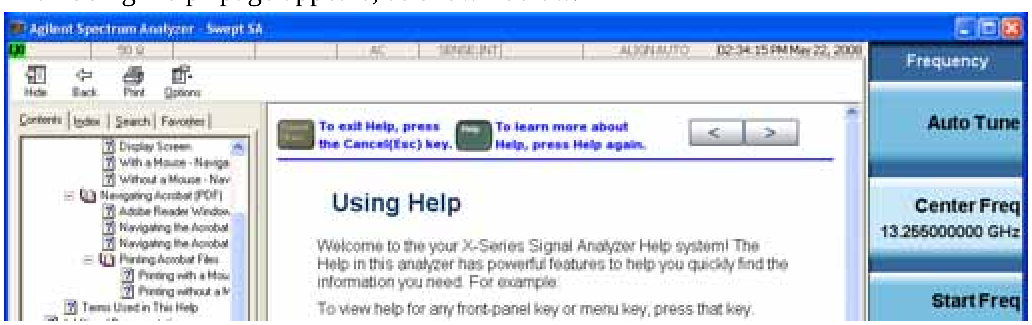
Closing the Help Window

To close the Help window, and return to the measurement application, press the **Cancel (Esc)** key (depicted below).

Viewing Help on How to Use Help

With the Help window open, press the green **Help** key again.

The "Using Help" page appears, as shown below.



Exiting Help on How to Use Help

See the Section “To Go Back or Forward: display the Previously-viewed or Next-viewed Topic in the Topic Pane” on page 116 for details of several methods to accomplish this.

Navigating the Help Window

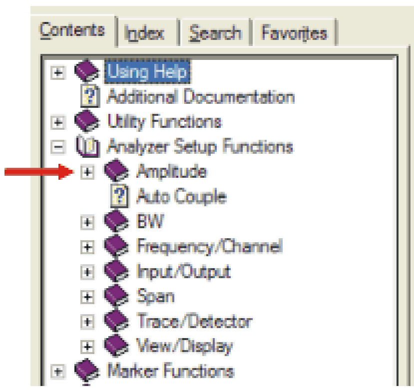
The way you navigate around the HTML Help Window depends on whether you have a mouse and keyboard attached to your Analyzer:

- If you have a mouse and keyboard attached, see the Section “Navigating the Help Window with a Mouse” on page 113.
- If you don’t have a mouse and keyboard attached, see the Section “Navigating the Help Window Without a Mouse” on page 114.

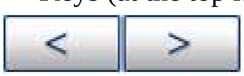
Navigating the Help Window with a Mouse

When the HTML Help window is open, you can point-and-click to navigate, as you would when using Help for any Microsoft Windows computer application. The basic navigational features the Help systems of all X-Series Analyzers are as follows:

- If necessary, press the green **Help** key on the Front Panel, as described in "Opening Help" on page 111, to open the HTML Help window.
- Choose the desired topic from the list under the Contents Tab of the HTML Help Window's Navigation Pane, then click on the topic title to display the first page of the topic.
- To expand the listing of a topic, click on the **+** icon to the left of the topic's book icon, as shown below. A list of subtopics and pages appears.

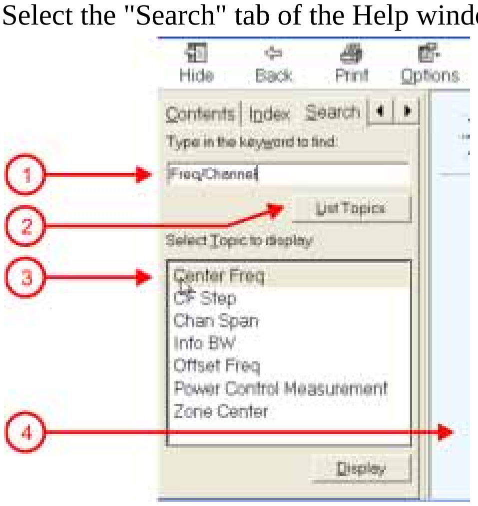


- To move to the Next or Previous Page within the Topic Pane, click the **Next Page** or **Previous Page** Keys (at the top right of the **Topic** Pane), as shown below.



Searching for a Help Topic If you also have a keyboard attached to the Analyzer, you can use the Help system's full-text search feature to locate help for any topic, by typing in a key name, a topic name, or any other desired text.

Select the "Search" tab of the Help window's Navigation Pane, then use the following procedure:



1. Type the desired topic name into the Search window as shown in the diagram above. Note that the text search is **not** case-sensitive.
2. Click on the **List Topics** button.
3. **Either**:

   Double-click on the desired topic in the list,

   Or:

   Click on the desired topic to select it, then click the **Display** button beneath the list.
4. The topic is then displayed in the Topic Pane (right-hand side of display).

Navigating the Help Window Without a Mouse

Most features of the Help system can be accessed and navigated without the necessity to attach a mouse or keyboard to the Analyzer. There are, however, a few exceptions to this rule, which are noted in the Section "Functions that cannot be used without a Mouse and Keyboard" on page 117.

For information about how to perform common tasks in the Help system, click on one of the following links:

"To Toggle the Focus between the Navigation Pane and the Topic Pane" on page 114

"To Switch the Active Tab within the Navigation Pane" on page 115

"To Scroll up or down the list of Topics within the Contents or Index Tabs of the Navigation Pane" on page 115

"To Expand or Collapse a selected topic within the Contents Tab of the Navigation Pane" on page 115

"To Display a selected Help topic in the Topic Pane from the Contents Tab of the Navigation Pane" on page 115

"To Display a Help topic in the Topic Pane from the Index Tab of the Navigation Pane" on page 116

"To Scroll up or down within a topic in the Topic Pane" on page 116

"To Go to the Next or Previous Page in the Topic Pane" on page 116

"To Go Back or Forward: display the Previously-viewed or Next-viewed Topic in the Topic Pane" on page 116

"To Scroll horizontally or vertically within the Contents Tab of the Navigation Pane" on page 117

"To Print the topic currently displayed" on page 117

To locate all the keys mentioned in this section, see "Front Panel Keys used by the Help System" on page 109.

To Toggle the Focus between the Navigation Pane and the Topic Pane Press the **Next Window** key.

To Switch the Active Tab within the Navigation Pane Perform this procedure to display either the Contents, Index, Search or Favorites tab of the Help window's Navigation Pane.

Hold down the **Ctrl** key, then press either the **Forward Tab** key, **or** the **Backward Tab** key.

To Scroll up or down the list of Topics within the Contents or Index Tabs of the Navigation Pane

With the focus in the Navigation Pane, press the **Up Arrow** or **Down Arrow** keys.

To Expand or Collapse a selected topic within the Contents Tab of the Navigation Pane With the focus in the Navigation Pane, press the **Right Arrow** key to **expand** the selected topic:

Or press the **Left Arrow** key to **collapse** the selected topic.

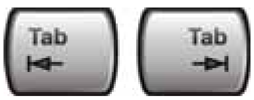
To Display a selected Help topic in the Topic Pane from the Contents Tab of the Navigation Pane

With the focus in the Contents Tab of the Navigation Pane, press the **Enter** key. If the selected topic was not already expanded, it expands in the Navigation Pane.

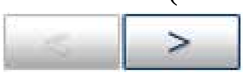
To Display a Help topic in the Topic Pane from the Index Tab of the Navigation Pane With the focus in the Index Tab of the Navigation Pane, press the **Enter** key.

To Scroll up or down within a topic in the Topic Pane With the focus in the Topic Pane, press either the **Up Arrow** key or **Down Arrow** key.

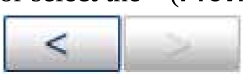
To Go to the Next or Previous Page in the Topic Pane With the focus in the Topic Pane, press either **Forward Tab** or **Backward Tab** keys



to select the **>** (**Next Page**) key at the top right of the Pane, if you want to go to the **next** page,



or select the **<** (**Previous Page**) key at the top right of the Pane, if you want to go to the **previous** page.



Press **Enter**.

To Go Back or Forward: display the Previously-viewed or Next-viewed Topic in the Topic Pane

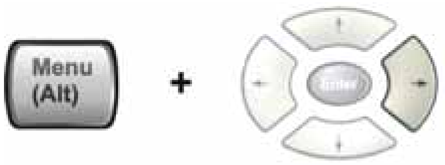
To go **back**, **either**:

Hold down the **Alt** key, then press the **Left Arrow** key.

Or:

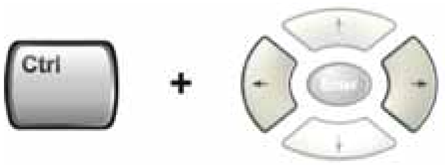
Press the **Bk Sp** key.

To go **forward**, hold down the **Alt** key, then press the **Right Arrow** key.

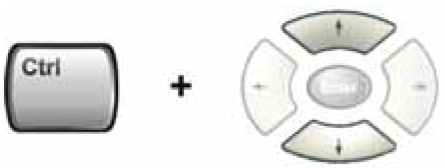


(The "Go Forward" operation has no effect unless there have been previous “Go Back” operations)

To Scroll horizontally or vertically within the Contents Tab of the Navigation Pane To scroll **horizontally**: with the focus in the Contents Tab of the Navigation Pane, hold down the **Ctrl** key, then press either the **Left Arrow** or **Right Arrow** keys.



To scroll **vertically**: with the focus in the Contents Tab of the Navigation Pane, hold down the **Ctrl** key, then press either the **Up Arrow** or **Down Arrow** keys.



To Print the topic currently displayed Press the Front-panel **Print** key

Functions that cannot be used without a Mouse and Keyboard The following parts of the HTML Help System **cannot** easily be used without attaching a mouse and keyboard to the Analyzer.

- The menu options at the top of the Help Window, consisting of: **Hide**, **Back**, **Print** and **Options**.
- The functionality of the Search Tab of the Navigation Pane.
- The functionality of the Favorites Tab of the Navigation Pane.

Navigating Acrobat (PDF) Files

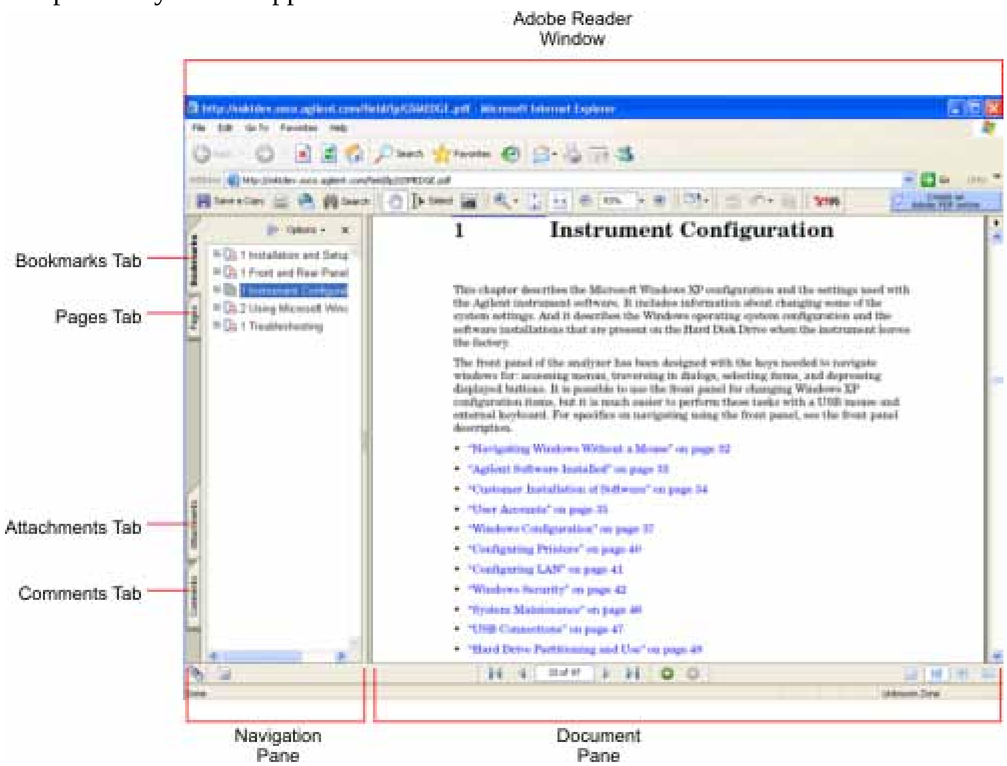
IMPORTANT To navigate PDF files effectively, you must attach a mouse and keyboard to the Analyzer.

If it is not possible to attach a mouse and keyboard to the Analyzer, you should copy the PDF file to a separate computer, then open it on that computer. Every PDF file that is present on the Analyzer's hard disk can also be found on the Documentation CD shipped with the Analyzer. For details, see "Copying the Acrobat (PDF) Files" on page 104.

Adobe Reader Window

When an Adobe Acrobat (PDF) file is open and being viewed, the Analyzer's display appears as below.

Note that, unlike the HTML Help Window, the Acrobat Reader Window is **not** embedded in the Analyzer's Application window. It is a separate window, which can be resized, moved and closed independently of the Application window.



The Adobe Reader Window itself consists of two panes, as shown in the diagram above.

On the left is the Navigation Pane (which may be hidden), and on the right is the Document Pane.

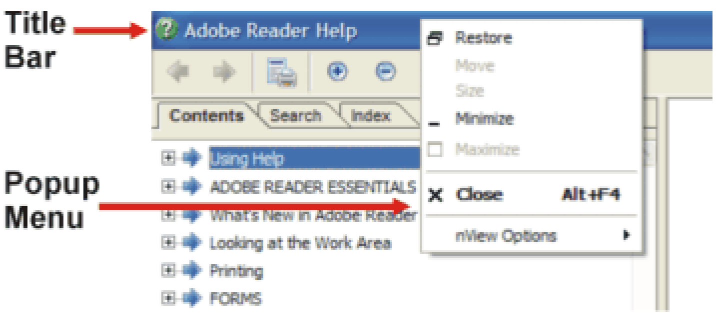
The Navigation Pane is further subdivided into four tabs: Bookmarks, Pages, Attachments and Comments. Typically, PDF files supplied with the Agilent X-Series Analyzers contain useful content only under the Bookmarks and Pages Tabs: the Attachments and Comments Tabs are not used.

Navigating the Acrobat Reader Window

The online Help for Adobe Reader provides detailed information on how to use the Reader. To access the online Help, do the following:

- With the Adobe Reader window open, click **Help**, **Adobe Reader Help** in the menu at the top of the screen. This opens the Help window on top of the document window.
- To close the Help window, **either** click the Red **X** at the top right of the window, **or** right-click

anywhere in the title bar, then select **Close** from the popup menu.



Printing Acrobat Files

NOTE	The driver for the appropriate printer must be installed on the Analyzer’s hard disk before any file can be printed.

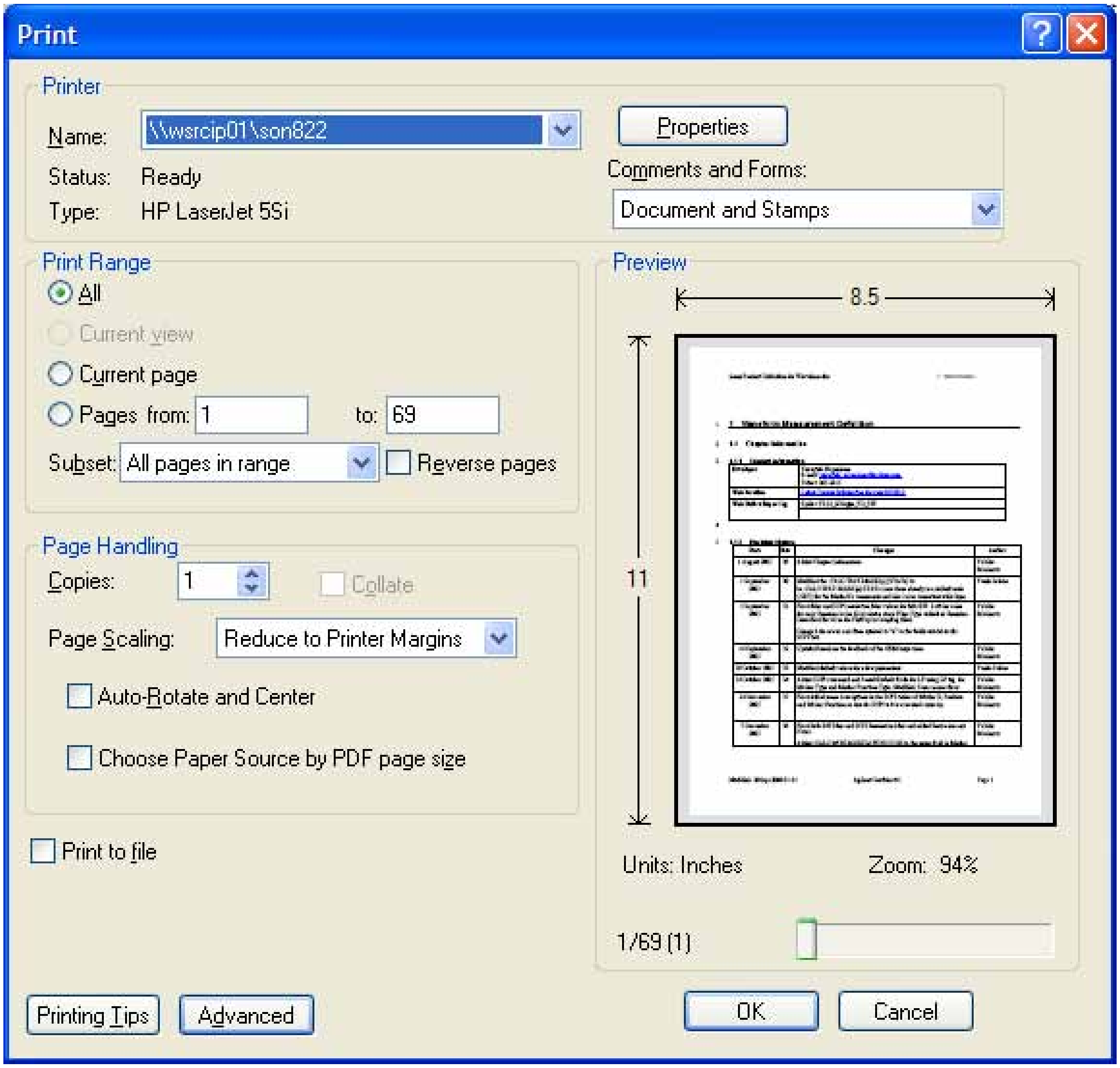
To print all or part of an open Acrobat file, do the following:

1. **Either**,

   a. click on the `Print` icon in the Acrobat Reader toolbar,

   b. **or**, select `File > Print` from the menu.

2. The Acrobat Reader Print dialog opens, as shown below.



3. Choose the desired options within the Print dialog, then click `OK` to print (or click `Cancel` to cancel the printing).

NOTE	Clicking the `Properties` button within the Print dialog opens a window containing controls that are specific to the printer model installed. Check the printer manufacturer's documentation for details of these capabilities.

Terms Used in This Documentation

Many special terms are used throughout this documentation. Please refer to the "Getting Started Guide" for detailed explanations of all these terms.

The Section below provides a brief description of special terms used in the Key parameter tables.

Terms used in Key Parameter Tables

The following terms are used in the parameter tables for each front-panel key or softkey. However, a particular key description may not use all the terms listed.

Term	Meaning
Default Unit	The default measurement unit of the setting.
Default Terminator	Indicates the units that will be attached to the numeric value that you have entered. This default will be used from the front panel, when you terminate your entry by pressing the **Enter** key, rather then selecting a units key. This default will be used remotely when you send the command without specifying any units after your value(s).
Dependencies/ Couplings	Some commands may be unavailable when other parameters are set in certain ways. If applicable, any such limitations are described here.
Example	Provides command examples using the indicated remote command syntax.
Factory Preset	Describes the function settings after a **Factory Preset**.
Key Path	The sequence of Front-panel keys that accesses the function or setting.
Knob Increment/Decrement	The numeric value of the minimum increment or decrement that is applied when turning the thumb wheel knob.
Max	The Maximum numerical value that the setting can take.
Min	The Minimum numerical value that the setting can take.
Meas Global	The functionality described is the same in all measurements.
Meas Local	The functionality described is only true for the measurement selected.
Mode Global	The functionality described is the same for all modes.
Preset	In some cases, a Preset operation changes the status of a parameter. If the operation of the key specified is modified by a Preset operation, the effect is described here.
Range	Describes the range of the smallest to largest values to which the function can be set. If you try to set a value below the minimum value, the analyzer defaults to the minimum value. If you try to set a value above the maximum value, the analyzer defaults to the maximum value.
Remote Command	Shows the syntax requirements for each SCPI command.

Term	Meaning
Remote Command Notes	Additional notes regarding Remote Commands.
Resolution	Specifies the smallest change that can be made to the numeric value of a parameter.
SCPI Status Bits/OPC Dependencies	Pressing certain keys may affect one or more status bits. If applicable, details are given here.
State Saved	Indicates what happens to a particular function when the Analyzer state is saved (either to an external memory device or the internal D: drive). It also indicates whether the current settings of the function are maintained if the Analyzer is powered on or preset using **Power On Last State** or **User Preset**.

Context Sensitive Help not Available

You have been directed to this page because interactive help for the key you selected is not available.

The following information may help you to find related topics of interest:

- If your Analyzer has an attached Mouse and Keyboard, see the Section “Searching for a Help Topic” on page 113.
- If your Analyzer does **not** have an attached Mouse and Keyboard, see the Section “Finding a Topic without a Mouse and Keyboard” on page 123 below.
- If you want to learn how to select on-page links **without** a Mouse attached to your Analyzer, see the Section “Selecting a Hyperlink without a Mouse” on page 124 below.

TIP If you want to understand the organization of Help, see the Section “How Help is Organized” on page 106.

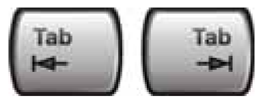
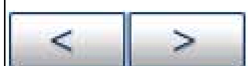
Finding a Topic without a Mouse and Keyboard

Follow this procedure when you want to display a different Help topic by selecting it from the Contents tab of the Help window’s Navigation Pane, but you do not have a mouse attached to the Analyzer.

Perform this action:	Using these keys:
1. If necessary, toggle the focus between the Contents tab of the Navigation Pane (left side of display) and the Topic Pane (right side of display) by pressing the **Next Window** key. Ensure that the focus is in the **Contents tab of the Navigation** Pane.	
2. Move up or down the Contents list, by pressing the **Up Arrow** or **Down Arrow** keys. Topics become highlighted upon selection.	
3. Display the selected topic, by pressing the **Enter** key.	

Selecting a Hyperlink without a Mouse

Follow this procedure when you want to select and follow a hyperlink on a Help page, but you do not have a mouse attached to the Analyzer.

Perform this action:	**Using these keys:**
1. If necessary, toggle the focus between the Contents tab of the Navigation Pane (left side of display) and the Topic Pane (right side of display) by pressing the **Next Window** key. Ensure that the focus is in the **Topic Pane**.	
2. Move from link to link in the Topic Pane (right side of display) by pressing the **Forward Tab** and **Backward Tab** keys. Links become highlighted upon selection. NOTE: When a Help page is first displayed, no link is selected. Clicking the **Forward Tab** key once selects the **Previous Page** key. Clicking the **Forward Tab** key a second time selects the **Next Page** key. Clicking the **Forward Tab** key for a third time selects the first hyperlink on the page. It is sometimes difficult to see the highlighting of the **Previous** and **Next Page** keys.	Use the **Forward** and **Backward Tab** keys  to select the **Previous** and **Next Page** keys 
3. When you have selected the desired link, activate it by pressing the **Enter** key.	

2 About the Analyzer

The X-Series signal analyzer measures and monitors complex RF and microwave signals. Analog baseband analysis is available on MXA. The analyzer integrates traditional spectrum measurements with advanced vector signal analysis to optimize speed, accuracy, and dynamic range. The analyzer has Windows XP Pro® built in as an operating system, which expands the usability of the analyzer.

With a broad set of applications and demodulation capabilities, an intuitive user interface, outstanding connectivity and powerful one-button measurements, the analyzer is ideal for both R&D and manufacturing engineers working on cellular, emerging wireless communications, general purpose, aerospace and defense applications.

Installing Application Software

When you want to install a measurement application after your initial hardware purchase, you actually only need to license it. All of the available applications are loaded in your analyzer at the time of purchase.

So when you purchase an application, you will receive an entitlement certificate that is used to obtain a license key for that particular measurement application. Enter the license key that you obtain into the Signal Analyzer to activate the new measurement application. See below for more information.

For the latest information on Agilent Signal Analyzer measurement applications and upgrade kits, visit the following internet URL.

http://www.agilent.com/find/sa_upgrades

Viewing a License Key

Measurement personalities purchased with your instrument have been installed and activated at the factory before shipment. The instrument requires a unique **License Key** for every measurement application purchased. The license key is a hexadecimal string that is specific to your measurement application, instrument model number and serial number. It enables you to install, or reactivate that particular application.

Press **System**, **Show**, **System** to display which measurement applications are currently licensed in your analyzer.

Go to the following location to view the license keys for the installed measurement applications:

C:\Programing Files\Agilent\Licensing

NOTE	You may want to keep a copy of your license key in a secure location. You can print out a copy of the display showing the license numbers to do this. If you should lose your license key, call your nearest Agilent Technologies service or sales office for assistance.

Obtaining and Installing a License Key

If you purchase an additional application that requires installation, you will receive an “Entitlement Certificate” which may be redeemed for a license key for one instrument. Follow the instructions that accompany the certificate to obtain your license key.

Installing a license key for the selected application can be done automatically using a USB memory device. To do this, you would put the license file on the USB memory device at the root level. Follow the instructions that come with your software installation kit.

Installing a license key can also be done manually using the license management application in the instrument. It is found through the instrument front panel keys at **System**, **Licensing. . .** , or internally at C:\Programming Files\Agilent\Licensing.

NOTE	You can also use these procedures to reinstall a license key that has been accidentally deleted, or lost due to a memory failure.

Missing and Old Measurement Application Software

All the software applications were loaded at the time of original instrument manufacture. It is a good idea to regularly update your software with the latest available version. This assures that you get any improvements and expanded functionality that is available.

Because the software was loaded at the initial purchase, there may be additional measurement applications that are now available. If the application you are interested in licensing is not available, you will need to do a software update. (Press **System**, **Show**, **System**.)

Check the Agilent internet website for the latest software versions available for downloading:

http://www.agilent.com/find/pxa_software
http://www.agilent.com/find/mxa_software
http://www.agilent.com/find/exa_software
http://www.agilent.com/find/cxa_software

You must load the updated software package into the analyzer from a USB drive, or directly from the internet. An automatic loading program is included with the files.

X-Series Options and Accessories

Advanced Measurement Application Software

For a current list of application software, go to the following URLs.

For PXA,

http://www.agilent.com/find/pxa/options

Select the **PXA N9030A, Options and Measurement Applications** link on the top of the page.

For MXA,

http://www.agilent.com/find/mxa/options

Select the **MXA N9020A, Options and Measurement Applications** link on the top of the page.

For EXA,

http://www.agilent.com/find/exa/options

Select the **EXA N9010A, Options and Measurement Applications** link on the top of the page.

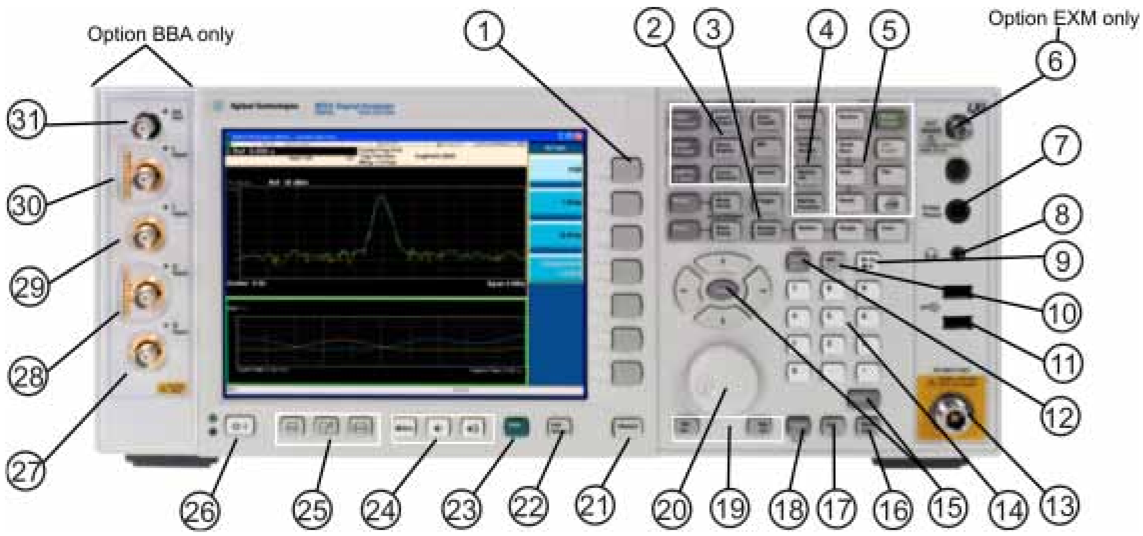
For CXA,

http://www.agilent.com/find/cxa/options

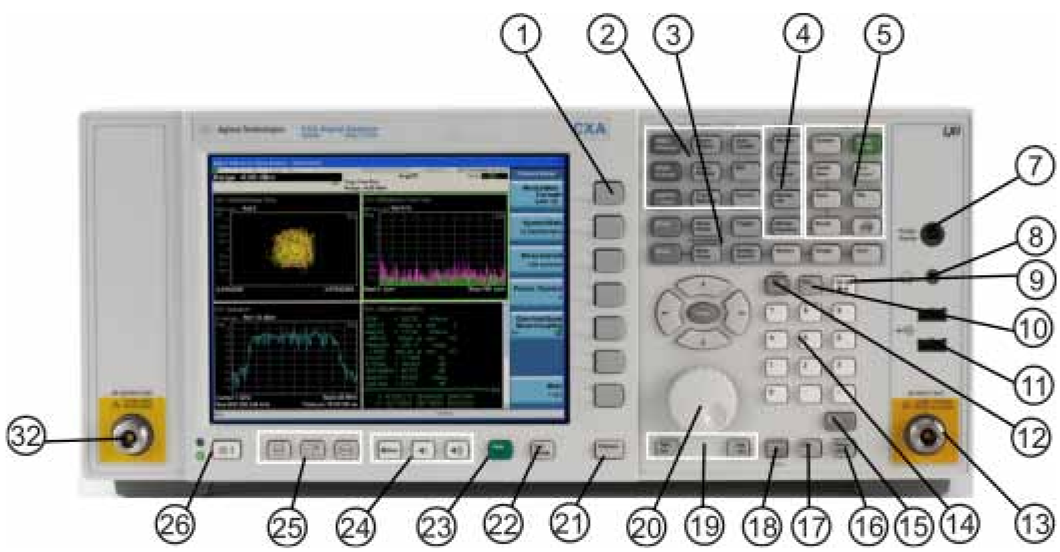
Select the **CXA N9000A, Options and Measurement Applications** link on the top of the page.

Front-Panel Features

PXA, MXA, and EXA



CXA



Item		Description
#	Name	
1	Menu Keys	Key labels appear to the left of the menu keys to identify the current function of each key. The displayed functions are dependent on the currently selected Mode and Measurement, and are directly related to the most recent key press.

Item		Description
#	Name	
2	Analyzer Setup Keys	These keys set the parameters used for making measurements in the current Mode and Measurement.
3	Measurement Keys	These keys select the Mode and the Measurement within the mode. They also control the initiation and rate of recurrence of measurements.
4	Marker Keys	Markers are often available for a measurement to measure a very specific point/segment of data within the range of the current measurement data.
5	Utility Keys	These keys control system-wide functionality such as: • instrument configuration information and I/O setup, • printer setup and printing, • file management, save and recall, • instrument presets.
6	Ext Mixer	Provides LO output signal to and receives IF input signals from an external mixer. See the Specifications Guide for details on signal levels. PXA only.
7	Probe Power	Supplies power for external high frequency probes and accessories.
8	Headphones Output	Headphones can be used to hear any available audio output.
9	Back Space Key	Press this key to delete the previous character when entering alphanumeric information. It also works as the Back key in Help and Explorer windows.
10	Delete Key	Press this key to delete files or to perform other deletion tasks.
11	USB Connectors	Standard USB 2.0 ports, Type A. Connect to external peripherals such as a mouse, keyboard, DVD drive, or hard drive.
12	Local/Cancel/(Esc) Key	If you are in remote operation, Local: • returns instrument control from remote back to local (the front panel). • turns the display on (if it was turned off for remote operation). • can be used to clear errors. (Press the key once to return to local control, and a second time to clear error message line.) If you have not already pressed the units or Enter key, Cancel exits the currently selected function without changing its value. Esc works the same as it does on a PC keyboard. It: • exits Windows dialogs • clears errors • aborts printing • cancels operations.
13	RF Input	Connector for inputting an external signal. Make sure that the total power of all signals at the analyzer input does **not** exceed +30 dBm (1 watt).
14	Numeric Keypad	Enters a specific numeric value for the current function. Entries appear on the upper left of the display, in the measurement information area.

Item		Description
#	Name	
15	Enter and Arrow Keys	The Enter key terminates data entry when either no unit of measure is needed, or you want to use the default unit. The arrow keys: • Increment and decrement the value of the current measurement selection. • Navigate help topics. • Navigate or make selections within Windows dialogs. • Navigate within forms used for setting up measurements. • Navigate within tables. NOTE The arrow keys cannot be used to move a mouse pointer around on the display.
16	Menu/ (Alt) Key	Alt works the same as a PC keyboard. Use it to change control focus in Windows pull-down menus.
17	Ctrl Key	Ctrl works the same as a PC keyboard. Use it to navigate in Windows applications or to select multiple items in lists.
18	Select / Space Key	Select is also the Space key and it has typical PC functionality. For example, in Windows dialogs, it selects files, checks and unchecks check boxes, and picks radio button choices. It opens a highlighted Help topic.
19	Tab Keys	Use these keys to move between fields in Windows dialogs.
20	Knob	Increments and decrements the value of the current active function.
21	Return Key	Exits the current menu and returns to the previous menu. Has typical PC functionality.
22	Full Screen Key	Pressing this key turns off the softkeys to maximize the graticule display area. Press the key again to restore the normal display.
23	Help Key	Initiates a context-sensitive Help display for the current Mode. Once Help is accessed, pressing a front panel key brings up the help topic for that key function.
24	Speaker Control Keys	Enables you to increase or decrease the speaker volume, or mute it.
25	Window Control Keys	These keys select between single or multiple window displays. They zoom the current window to fill the data display, or change the currently selected window. They can be used to switch between the Help window navigation pane and the topic pane.
26	Power Standby/ On	Turns the analyzer on. A green light indicates power on. A yellow light indicates standby mode. NOTE The front-panel switch is a standby switch, **not** a LINE switch (disconnecting device). The analyzer continues to draw power even when the line switch is in standby. The main power cord can be used as the system disconnecting device. It disconnects the mains circuits from the mains supply.

Item		Description
#	Name	
27	$\overline{Q}$ Input	Input port for the $\overline{Q}$ channel when in differential mode.[a]
28	Q Input	Input port for the Q channel for either single or differential mode.[a]
29	$\overline{I}$ Input	Input port for the $\overline{I}$ channel when in differential mode.[a]
30	I Input	Input port for the I channel for either single or differential mode.[a]
31	Cal Out	Output port for calibrating the I, $\overline{I}$, Q and $\overline{Q}$ inputs and probes used with these inputs.[a]
32	RF Out	Output port for Options T03/07 (CXA only)

a. Status of the LED indicates whether the current state of the port is active (green) or is not in use (dark).

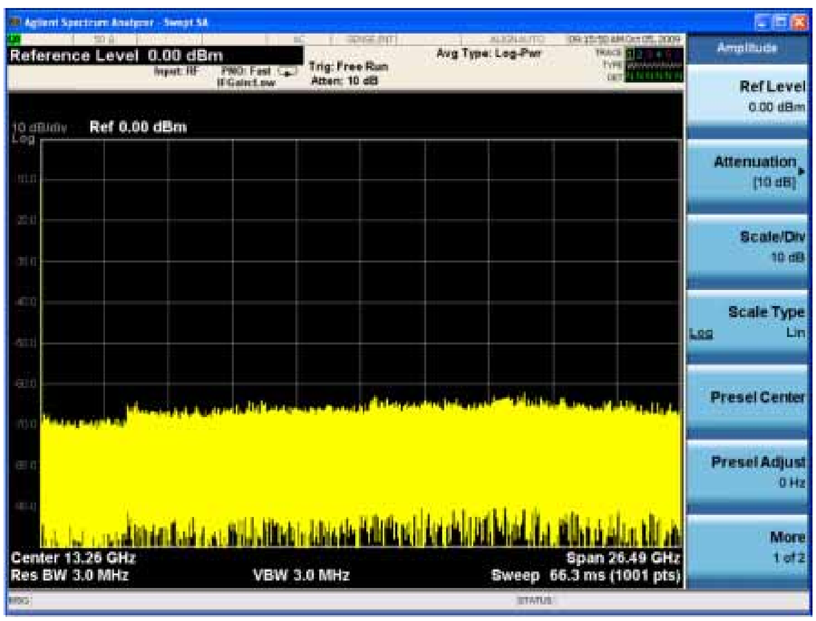
Overview of key types

The keys labeled **FREQ Channel**, **System**, and **Marker Functions** are all examples of front-panel keys.

Most of the dark or light gray keys access menus of functions that are displayed along the right side of the display. These displayed key labels are next to a column of keys called menu keys.

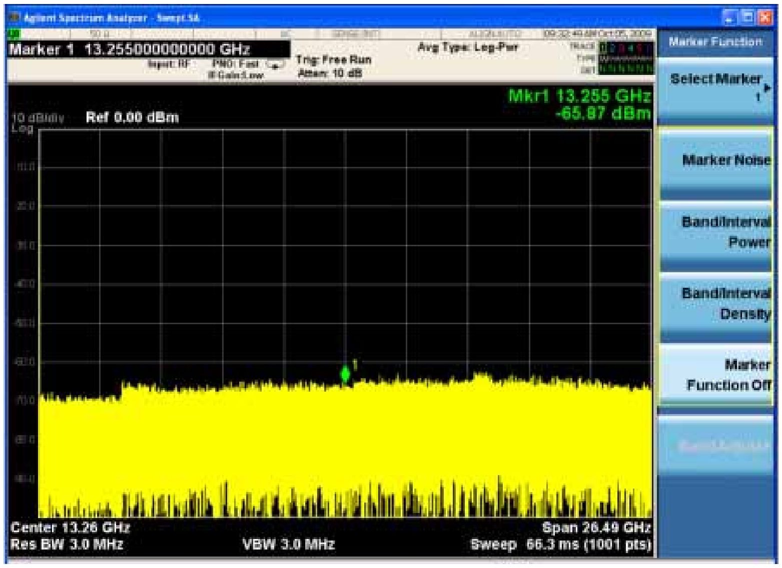
Menu keys list functions based on which front-panel key was pressed last. These functions are also dependant on the current selection of measurement application (**Mode**) and measurement (**Meas**).

If the numeric value of a menu key function can be changed, it is called an active function. The function label of the active function is highlighted after that key has been selected. For example, press **AMPTD Y Scale**. This calls up the menu of related amplitude functions. The function labeled **Ref Level** (the default selected key in the Amplitude menu) is highlighted. **Ref Level** also appears in the upper left of the display in the measurement information area. The displayed value indicates that the function is selected and its value can now be changed using any of the data entry controls.



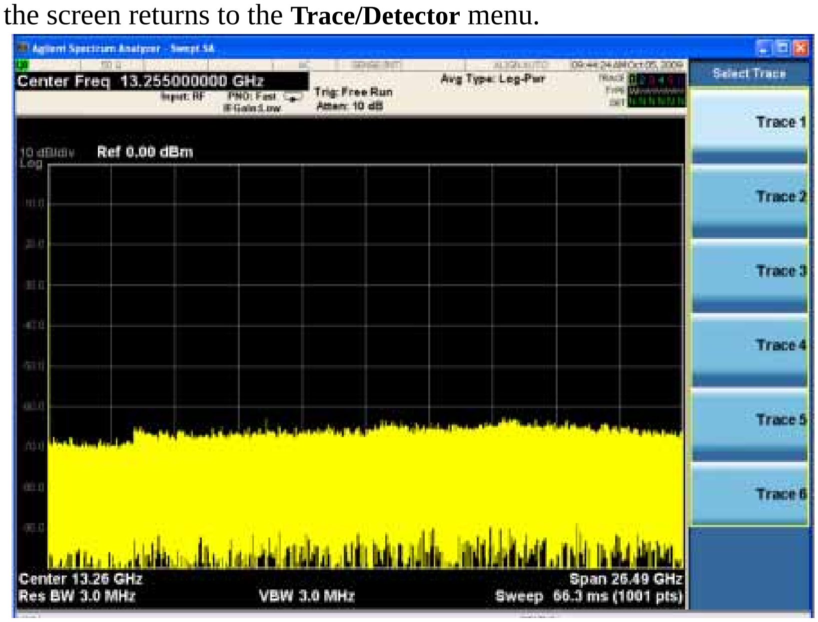
Some menu keys have multiple choices on their label, such as **On**/**Off**, **Auto**/**Man**, or **Log/Lin** (as shown above). The different choices are selected by pressing the key multiple times. For example, the Auto/Man type of key. To select the function, press the menu key and notice that Auto is underlined and the key becomes highlighted. To change the function to manual, press the key again so that Man is underlined. If there are more than two settings on the key, keep pressing it until the desired selection is underlined.

When a menu first appears, one key label is highlighted to show which key is the default selection. If you press **Marker Function**, the **Marker Function Off** key is the menu default key, and is highlighted.

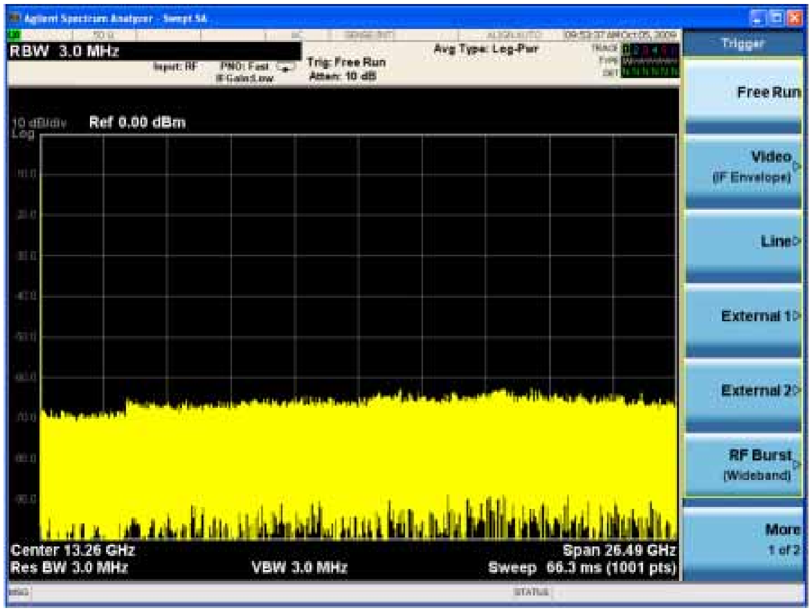


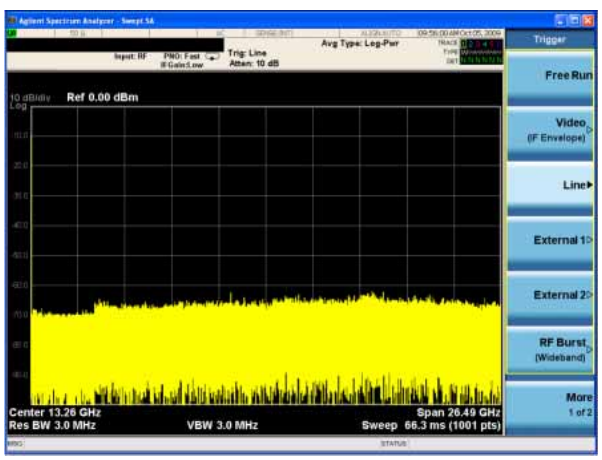
Some of the menu keys are grouped together by a yellow bar running behind the keys near the left side or by a yellow border around the group of keys. When you press a key within the yellow region, such as **Marker Noise**, the highlight moves to that key to show it has been selected. The keys that are linked are related functions and only one of them can be selected at any one time. For example, a marker can only have one marker function active on it. So if you select a different function it turns off the previous selection. If the current menu is two pages long, the yellow bar or border could include keys on the second page of keys.

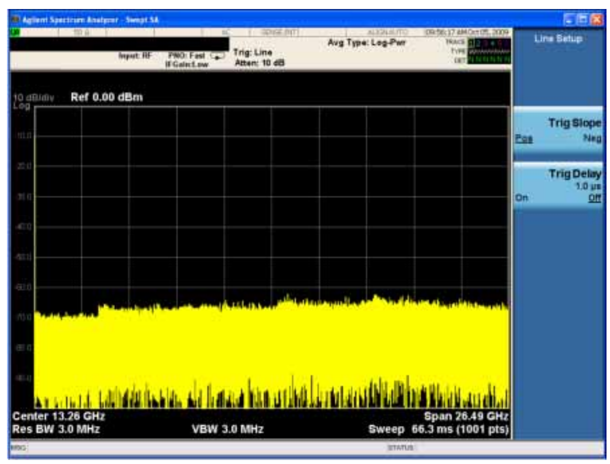
In some key menus, a key label is highlighted to show which key has been selected from multiple available choices. And the menu is immediately exited when you press one of the other keys. For example, when you press the **Select Trace** key (in the **Trace/Detector** menu), it brings up its own menu of keys. The **Trace 1** key is highlighted. When you press the **Trace 2** key, the highlight moves to that key and the screen returns to the **Trace/Detector** menu.



If a displayed key label shows a small solid-black arrow tip pointing to the right, it indicates that additional key menus are available. If the arrow tip is not filled in solid then pressing the key the first time selects that function. Now the arrow is solid and pressing it again brings up an additional menu of settings.

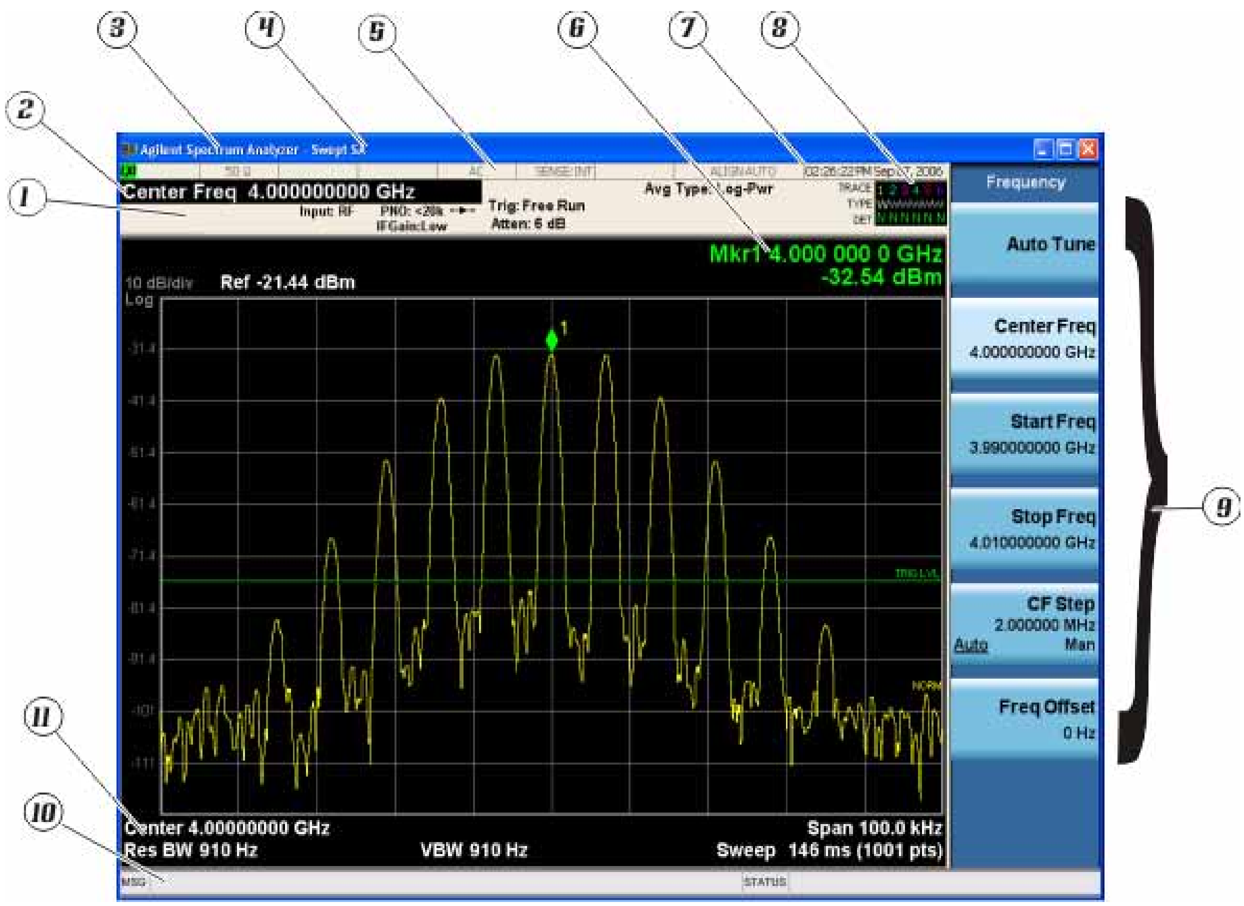


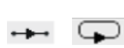




Display Annotations

This section describes the display annotation as it is on the Spectrum Analyzer Measurement Application display. Other measurement application modes have some annotation differences.

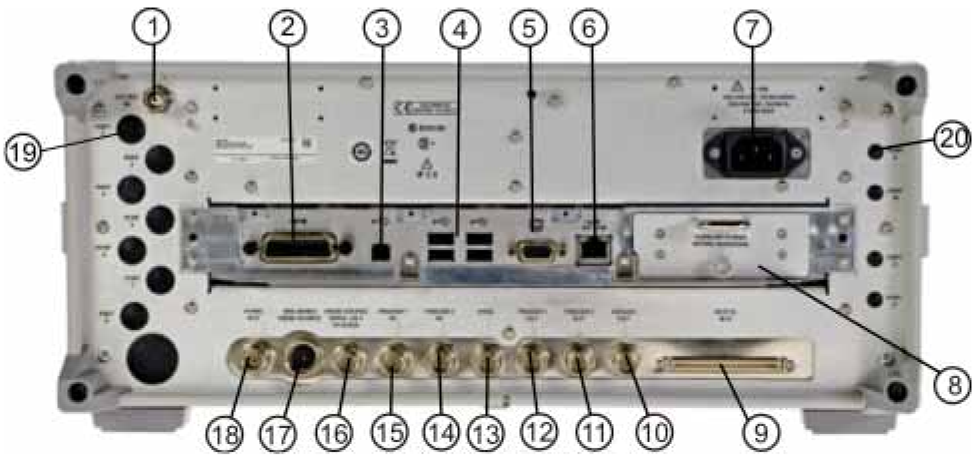


Item	Description	Function Keys
1	Measurement bar - Shows general measurement settings and information.  Indicates single/continuous measurement. Some measurements include limits that the data is tested against. A Pass/Fail indication may be shown in the lower left of the measurement bar.	All the keys in the Analyzer Setup part of the front panel.
2	Active Function (measurement bar) - when the current active function has a settable numeric value, it is shown here.	Currently selected front panel key.
3	Banner - shows the name of the selected application that is currently running.	**Mode**
4	Measurement title - shows title information for the current measurement, or a title that you created for the measurement.	**Meas** **View/Display**, **Display**, **Title**

Item	Description	Function Keys
5	Settings panel - displays system information that is not specific to any one application. • Input/Output status - green LXI indicates the LAN is connected. RLTS indicate Remote, Listen, Talk, SRQ • Input impedance and coupling • Selection of external frequency reference • Setting of automatic internal alignment routine	**Local** and **System, I/O Config** **Input/Output**, **Amplitude**, **System** and others
6	Active marker frequency, amplitude or function value	**Marker**
7	Settings panel - time and date display.	**System**, **Control Panel**
8	Trace and detector information	**Trace/Detector**, **Clear Write (W) Trace Average (A) Max Hold (M) Min Hold (m)** **Trace/Detector**, **More, Detector, Average (A) Normal (N) Peak (P) Sample (S) Negative Peak (p)**
9	Key labels that change based on the most recent key press.	Softkeys
10	Displays information, warning and error messages. Message area - single events, Status area - conditions	
11	Measurement settings for the data currently being displayed in the graticule area. In the example above: center frequency, resolution bandwidth, video bandwidth, frequency span, sweep time and number of sweep points.	Keys in the Analyzer Setup part of the front panel.

Rear-Panel Features

Current PXA, MXA and EXA

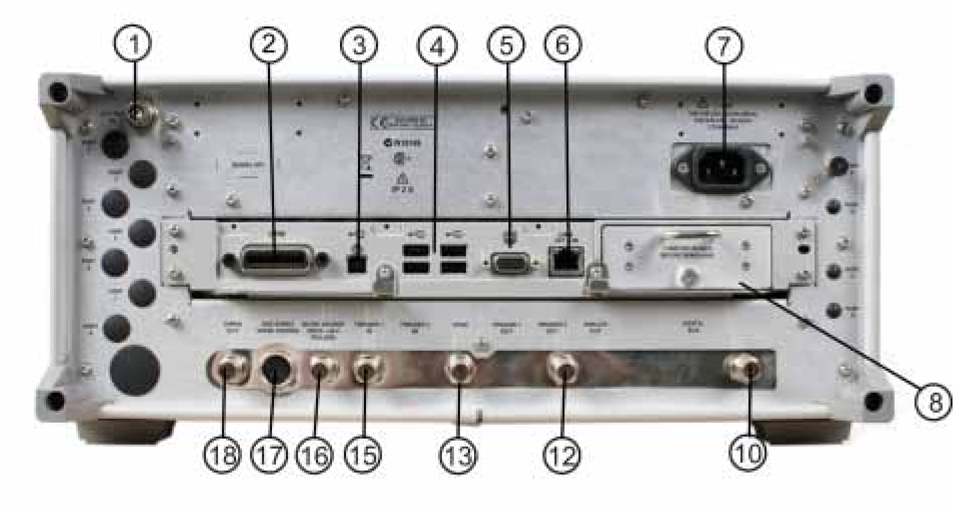


Older MXA and EXA

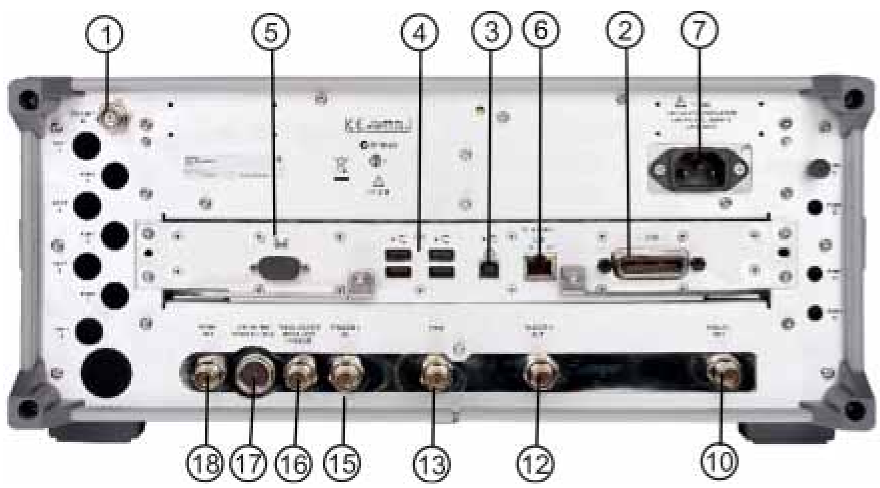
Item		Description
#	Name	
1	EXT REF IN	Input for an external frequency reference signal: For PXA – 1 to 50 MHz For MXA – 1 to 50 MHz For EXA – 10 MHz.
2	GPIB	A General Purpose Interface Bus (GPIB, IEEE 488.1) connection that can be used for remote analyzer operation.

Item		Description
#	Name	
3	USB Connector	USB 2.0 port, Type B. USB TMC (test and measurement class) connects to an external pc controller to control the instrument and for data transfers over a 480 Mbps link.
4	USB Connectors	Standard USB 2.0 ports, Type A. Connect to external peripherals such as a mouse, keyboard, printer, DVD drive, or hard drive.
5	MONITOR	Allows connection of an external VGA monitor.
6	LAN	A TCP/IP Interface that is used for remote analyzer operation.
7	Line power input	The AC power connection. See the product specifications for more details.
8	Removable Disk Drive	Standard on current analyzers. Optional on older MXAs and EXAs.
9	Digital Bus	Reserved for future use.
10	Analog Out	For PXA Option YAV: Screen Video Log Video Linear Video For Option EMC: Demod Audio
11	TRIGGER 2 OUT	A trigger output used to synchronize other test equipment with the analyzer. Configurable from the Input/Output keys.
12	TRIGGER 1 OUT	A trigger output used to synchronize other test equipment with the analyzer. Configurable from the Input/Output keys.
13	Sync	Reserved for future use.
14	TRIGGER 2 IN	Allows external triggering of measurements.
15	TRIGGER 1 IN	Allows external triggering of measurements.
16	Noise Source Drive +28 V (Pulsed)	For use with Agilent 346A, 346B, and 346C Noise Sources.
17	SNS Series Noise Source	For use with Agilent N4000A, N4001A, N4002A Smart Noise Sources (SNS).
18	10 MHz OUT	An output of the analyzer internal 10 MHz frequency reference signal. It is used to lock the frequency reference of other test equipment to the analyzer.
19	Preselector Tune Out	Reserved for future use.
20	Aux IF Out	CR3 Second IF Out (PXA, MXA, and EXA) CRP Arbitrary IF Out (PXA, MXA, and EXA) ALV Log Video (PXA)

CXA with Option PC3 (S/N MY/US/SG49370546 or higher)



CXA (for S/N less than MY/US/SG49370546)

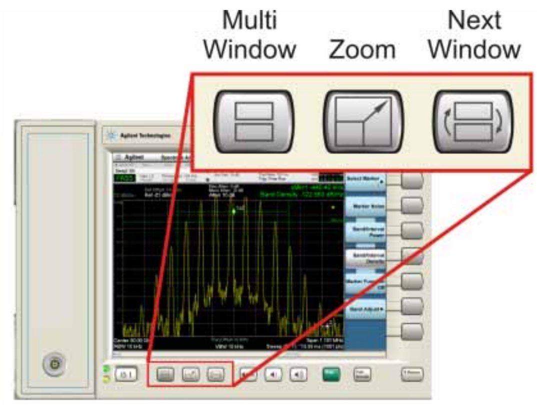


Item		Description
#	Name	
1	EXT REF IN	Input for an external frequency reference signal: For CXA – 10 MHz.
2	GPIB	A General Purpose Interface Bus (GPIB, IEEE 488.1) connection that can be used for remote analyzer operation.

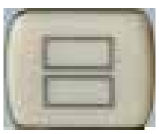
Item		Description
#	Name	
3	USB Connector	USB 2.0 port, Type B. USB TMC (test and measurement class) connects to an external pc controller to control the instrument and for data transfers over a 480 Mbps link.
4	USB Connectors	Standard USB 2.0 ports, Type A. Connect to external peripherals such as a mouse, keyboard, printer, DVD drive, or hard drive.
5	MONITOR	Allows connection of an external VGA monitor.
6	LAN	A TCP/IP Interface that is used for remote analyzer operation.
7	Line power input	The AC power connection. See the product specifications for more details.
8	Removable Disk Drive	Option PC3. Only available on instruments with S/N MY/US/SG49370546 or higher.
10	Analog Out	For Option EMC: Demod Audio
12	TRIGGER 1 OUT	A trigger output used to synchronize other test equipment with the analyzer. Configurable from the Input/Output keys.
13	Sync	Reserved for future use.
15	TRIGGER 1 IN	Allows external triggering of measurements.
16	Noise Source Drive +28 V (Pulsed)	For use with Agilent 346A, 346B, and 346C Noise Sources.
17	SNS Series Noise Source	For use with Agilent N4000A, N4001A, N4002A Smart Noise Sources (SNS).
18	10 MHz OUT	An output of the analyzer internal 10 MHz frequency reference signal. It is used to lock the frequency reference of other test equipment to the analyzer.

Window Control Keys

The instrument provides three front-panel keys for controlling windows. They are **Multi Window**, **Zoom**, and **Next Window**. These are all “immediate action” keys.



Multi-Window



The **Multi Window** front-panel key will toggle you back and forth between the Normal View and the last Multi Window View (Zone Span, Trace Zoom or Spectrogram) that you were in, when using the Swept SA measurement of the Spectrum Analyzer Mode. It remembers which View you were in through a Preset. This “previous view” is set to Zone Span on a Restore Mode Defaults.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Zoom

Zoom is a toggle function. Pressing once Zooms the selected window; pressing again un-zooms.

When Zoom is on for a window, that window will get the entire primary display area. The zoomed window, since it is the selected window, is outlined in green.

Zoom is local to each Measurement. Each Measurement remembers its Zoom state. The Zoom state of each Measurement is part of the Mode’s state.

NOTE	Data acquisition and processing for the other windows continues while a window is zoomed, as does all SCPI communication with the other windows.

Remote Command	`:DISPlay:WINDow:FORMat:ZOOM`
Remote Command	`:DISPlay:WINDow:FORMat:TILE`
Example	:DISP:WIND:FORM:ZOOM sets zoomed :DISP:WIND:FORM:TILE sets un-zoomed
Preset	TILE
Initial S/W Revision	Prior to A.02.00

Next Window

Selects the next window of the current view.

When this key is selected in Help Mode, it toggles focus between the table of contents window and the topic pane window.

Remote Command	`:DISPlay:WINDow[:SELect] <number>` `:DISPlay:WINDow[:SELect]?`
Example	:DISP:WIND 1
Preset	1
Min	1
Max	If <number> is greater than the number of windows, limit to <number of windows>
Initial S/W Revision	Prior to A.02.00

Selected Window

One and only one window is always selected. The selected window has the focus and all key presses are going to that window.

The selected window has a green boundary. If a window is not selected, its boundary is gray.

If a window in a multi-window display is zoomed it is still outlined in green. If there is only one window, the green outline is not used. This allows the user to distinguish between a zoomed window and a display with only one window.

The selected window is local to each Measurement. Each Measurement remembers which window is selected. The selected window for each Measurement is remembered in Mode state.

Navigating Windows

When the Next Window key is pressed, the next window in the order of precedencebecomes selected. If the selected window was zoomed, the next window will also be zoomed.

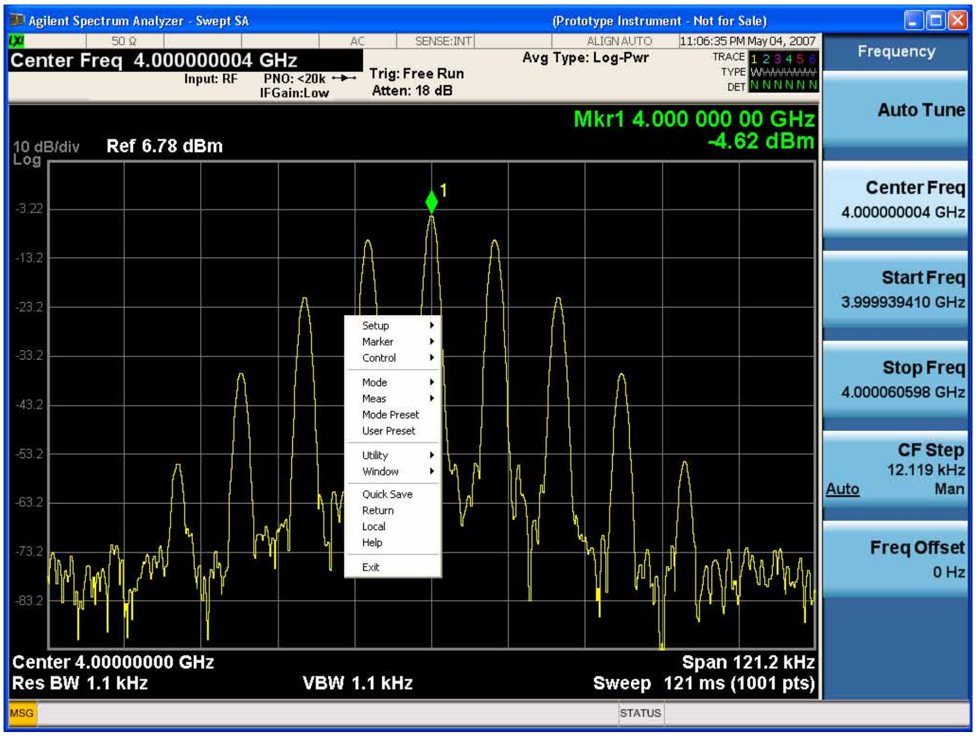
The window navigation does NOT use the arrow and select keys. Those are reserved for navigation within a window.

Mouse and Keyboard Control

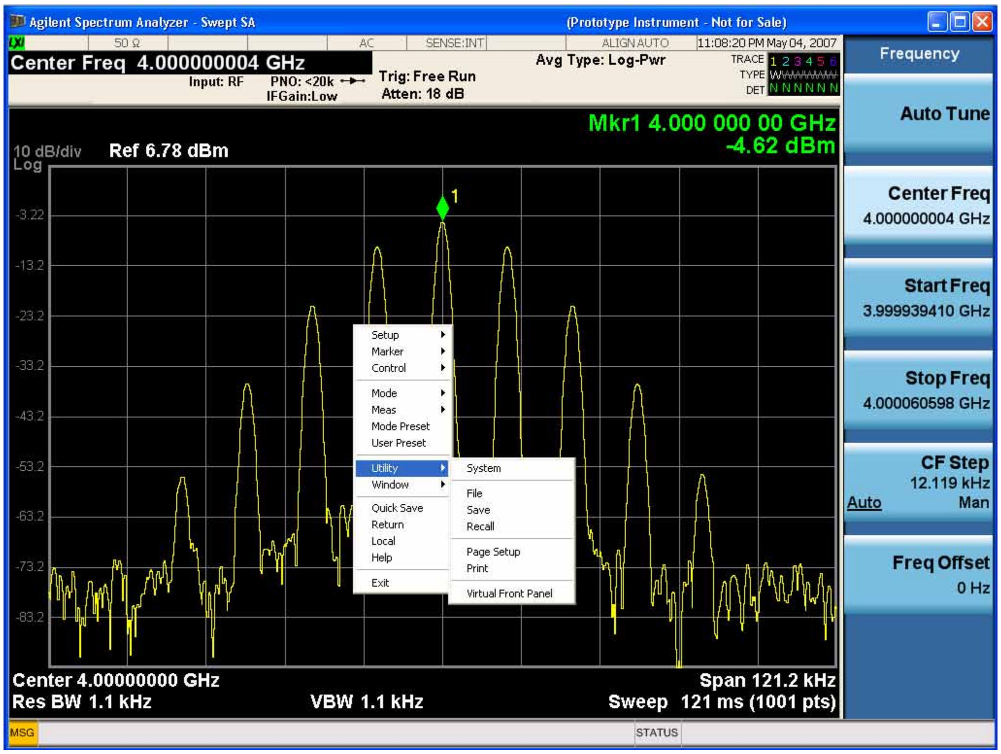
If you do not have access to the instrument front-panel, there are several ways that a mouse and PC Keyboard can give you access to functions normally accessed using the front-panel keys.

Right-Click

If you plug in a mouse and right-click on the analyzer screen, a menu will appear as below:

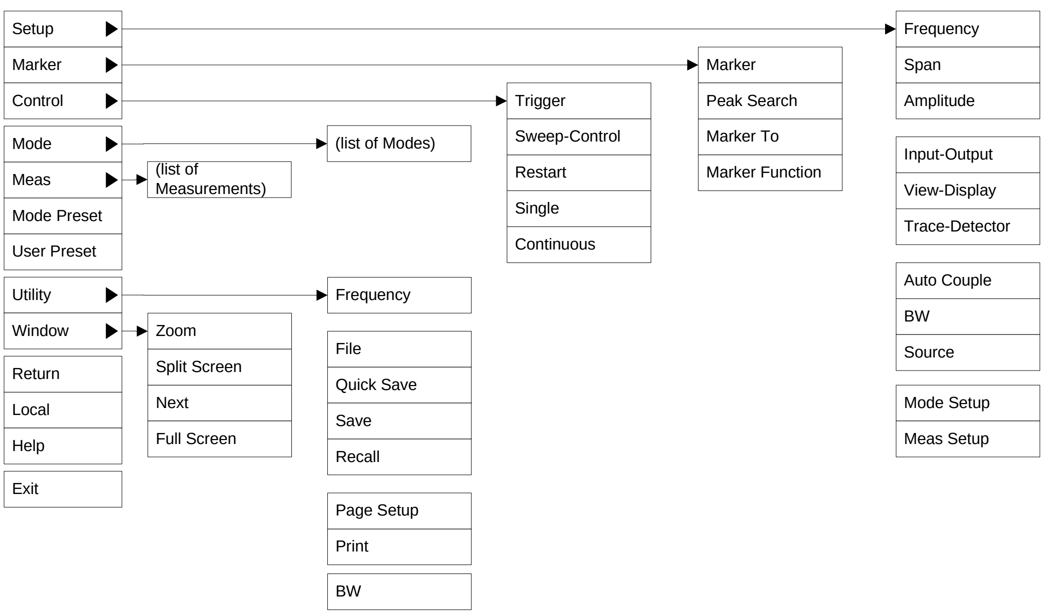


Placing the mouse on one of the rows marked with a right arrow symbol will cause that row to expand, as for example below where the mouse is hovered over the “Utility” row:



This method can be used to access any of the front-panel keys by using a mouse; as for example if you are accessing the instrument through Remote Desktop.

The array of keys thus available is shown below:



PC Keyboard

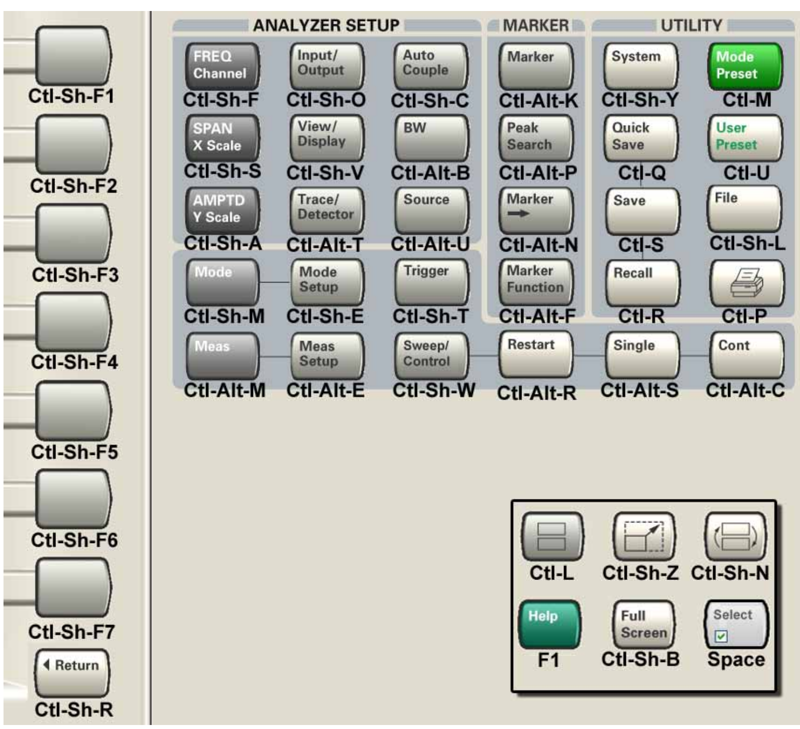
If you have a PC keyboard plugged in (or via Remote Desktop), certain key codes on the PC keyboard map to front-panel keys on the GPSA front panel. These key codes are shown below:

Front-panel key	Key code
Frequency	CTRL+SHIFT+F
Span	CTRL+SHIFT+S
Amplitude	CTRL+SHIFT+A
Input/Output	CTRL+SHIFT+O
View/Display	CTRL+SHIFT+V
Trace/Detector	CTRL+ALT+T
Auto Couple	CTRL+SHIFT+C
Bandwidth	CTRL+ALT+B
Source	CTRL+SHIFT+E
Marker	CTRL+ALT+K
Peak Search	CTRL+ALT+P
Marker To	CTRL+ALT+N
Marker Function	CTRL+ALT+F
System	CTRL+SHIFT+Y
Quick Save	CTRL+Q
Save	CTRL+S
Recall	CTRL+R
Mode Preset	CTRL+M
User Preset	CTRL+U
Print	CTRL+P
File	CTRL+SHIFT+L
Mode	CTRL+SHIFT+M
Measure	CTRL+ALT+M
Mode Setup	CTRL+SHIFT+E
Meas Setup	CTRL+ALT+E
Trigger	CTRL+SHIFT+T
Sweep/Control	CTRL+SHIFT+W

Front-panel key	Key code
Restart	CTRL+ALT+R
Single	CTRL+ALT+S
Cont	CTRL+ALT+C
Zoom	CTRL+SHIFT+Z
Next Window	CTRL+SHIFT+N
Split Screen	CTRL+L
Full Screen	CTRL+SHIFT+B
Return	CTRL+SHIFT+R
Mute	Mute
Inc Audio	Volume Up
Dec Audio	Volume Down
Help	F1
Control	CTRL
Alt	ALT
Enter	Return
Cancel	Esc
Del	Delete
Backspace	Backspace
Select	Space
Up Arrow	Up
Down Arrow	Down
Left Arrow	Left
Right Arrow	Right
Menu key 1	CTRL+SHIFT+F1
Menu key 2	CTRL+SHIFT+F2
Menu key 3	CTRL+SHIFT+F3
Menu key 4	CTRL+SHIFT+F4
Menu key 5	CTRL+SHIFT+F5
Menu key 6	CTRL+SHIFT+F6
Menu key 7	CTRL+SHIFT+F7

Front-panel key	Key code
Backspace	BACKSPACE
Enter	ENTER
Tab	Tab
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	0

This is a pictorial view of the table:



Instrument Security & Memory Volatility

If you are using the instrument in a secure environment, you may need details of how to clear or sanitize its memory, in compliance with published security standards of the United States Department of Defense, or other similar authorities.

For the X Series analyzers, this information is contained in the document "Security Features and Certificate of Volatility". This document is **not** included in the Documentation CD, or the instrument's on-disk library, but it may be downloaded from Agilent's web site.

To obtain a copy of the document, click on or browse to the following URL:

http://www.agilent.com/find/security

To locate and download the document, select Model Number "N9020A", then click "Submit". Then, follow the on-screen instructions to download the file.

3 About the cdma2000 Measurement Application

This chapter provides overall information on cdma2000 communications systems, and describes cdma2000 measurements made by the analyzer.

What Does the cdma2000 Application Do?

This analyzer can be used for testing a cdma2000 transmitter and IS95 signals with the Radio configuration 1 and 2. It is manufactured according to the following standards documents:

- 3GPP2 C.S0002 Physical Layer Standard for cdma2000 Spread Spectrum Systems
- 3GPP2 C. S0010 Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations
- 3GPP2 C. S0011Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations

These documents define complex, multi-part measurements used to create and maintain an interference-free environment. For example, the documents include standardized test methods for the measurement of power in a carrier, a spectrum emission mask, and other critical measurements.

The instrument automatically makes these measurements using the measurement methods and limits defined in the documents. The detailed results displayed by the measurements enable you to analyze cdma2000 system performance. You may alter the measurement parameters for specialized analysis. For infrastructure test, the analyzer will test transmitters of base stations in a non-interfering manner using a coupler or power splitter.

This analyzer makes the following measurements of cdma2000 signals:

- Channel Power
- Adjacent Channel Power (ACP)
- Spectrum Emission Mask
- Spurious Emissions
- Occupied BW
- Code Domain
- Modulation Accuracy (Composite RHO)
- Power Stat CCDF
- QPSK EVM
- Monitor Spectrum
- IQ Waveform (Time Domain)

Installing Application Software

When you want to install a measurement application after your initial hardware purchase, you actually only need to license it. All of the available applications are loaded in your analyzer at the time of purchase.

So when you purchase an application, you will receive an entitlement certificate that is used to obtain a license key for that particular measurement application. Enter the license key that you obtain into the N9020A Signal Analyzer to activate the new measurement application. See below for more information.

For the latest information on Agilent Signal Analyzer measurement applications and upgrade kits, visit the following internet URL.

http://www.agilent.com/find/sa_upgrades

Viewing a License Key

Measurement personalities purchased with your instrument have been installed and activated at the factory before shipment. The instrument requires a unique **License Key** for every measurement application purchased. The license key is a hexadecimal string that is specific to your measurement application, instrument model number and serial number. It enables you to install, or reactivate that particular application.

Press **System**, **Show**, **System** to display which measurement applications are currently licensed in your analyzer.

Press **System**, **More**, **Licensing. . .** to view the license keys for the installed measurement applications.

NOTE	You may want to keep a copy of your license key in a secure location. You can print out a copy of the display showing the license numbers to do this. If you should lose your license key, call your nearest Agilent Technologies service or sales office for assistance.

Obtaining and Installing a License Key

If you purchase an additional application that requires installation, you will receive an “Entitlement Certificate” which may be redeemed for a license key for one instrument. Follow the instructions that accompany the certificate to obtain your license key.

Installing a license key for the selected application can be done automatically using a USB memory device. To do this, you would put the license file on the USB memory device at the root level. Follow the instructions that come with your software installation kit.

Installing a license key can also be done manually using the license management application in the instrument. It is found through the instrument front panel keys at **System**, **Licensing. . .** , or internally at C:\Programming Files\Agilent\Licensing.

NOTE	You can also use these procedures to reinstall a license key that has been

accidentally deleted, or lost due to a memory failure.

Missing and Old Measurement Application Software

All the software applications were loaded at the time of original instrument manufacture. It is a good idea to regularly update your software with the latest available version. This assures that you get any improvements and expanded functionality that is available.

Because the software was loaded at the initial purchase, there may be additional measurement applications that are now available. If the application you are interested in licensing is not available, you will need to do a software update. (Press **System**, **Show**, **System**.)

Check the Agilent internet website for the latest software versions available for downloading:

http://www.agilent.com/find/pxa_software
http://www.agilent.com/find/mxa_software
http://www.agilent.com/find/exa_software
http://www.agilent.com/find/cxa_software

You must load the updated software package into the analyzer from a USB drive, or directly from the internet. An automatic loading program is included with the files.

4 Programming the Analyzer

This chapter provides introductory information about the programming documentation included with your product.

What Programming Information is Available?

The X-Series Documentation can be accessed through the Additional Documentation page in the instrument Help system and is included on the Documentation CD shipped with the instrument. It can also be found in the instrument at: `C:\ProgramsFiles\Agilent\SignalAnalysis\Infrastructure\Help\otherdocs`, or online at: http://www.agilent.com/find/mxa_manuals.

The following resources are available to help you create programs for automating your X-Series measurements:

Resource	Description
X-Series Programmer's Guide	Provides general SCPI programming information on the following topics: • Programming the X-Series Applications • Programming fundamentals • Programming examples Note that SCPI command descriptions for measurement applications are NOT in this book, but are in the User's and Programmer's Reference.
User's and Programmer's Reference manuals	Describes all front-panel keys and softkeys, including SCPI commands for a measurement application. Note that: • Each measurement application has its own User's and Programmer's Reference. • The content in this manual is duplicated in the analyzer's Help (the Help that you see for a key is identical to what you see in this manual).
Embedded Help in your instrument	Describes all front-panel keys and softkeys, including SCPI commands, for a measurement application. Note that the content that you see in Help when you press a key is identical to what you see in the User's and Programmer's Reference.
X-Series Getting Started Guide	Provides valuable sections related to programming including: • Licensing New Measurement Application Software - After Initial Purchase • Configuring instrument LAN Hostname, IP Address, and Gateway Address • Using the Windows XP Remote Desktop to connect to the instrument remotely • Using the Embedded Web Server Telnet connection to communicate SCPI This printed document is shipped with the instrument.
Agilent Application Notes	Printable PDF versions of pertinent application notes.
Agilent VISA User's Guide	Describes the Agilent Virtual Instrument Software Architecture (VISA) library and shows how to use it to develop I/O applications and instrument drivers on Windows PCs.

IEEE Common GPIB Commands

Numeric values for bit patterns can be entered using decimal or hexi-decimal representations. (that is,. 0 to 32767 is equivalent to #H0 to #H7FFF).

Calibration Query

*CAL? Performs a full alignment and returns a number indicating the success of the alignment. A zero is returned if the alignment is successful. A one is returned if any part of the alignment fails. The equivalent SCPI command is CALibrate[:ALL]?

See “Alignments” on page 217 for details of *CAL?.

Clear Status

Clears the status byte register. It does this by emptying the error queue and clearing all bits in all of the event registers. The status byte register summarizes the states of the other registers. It is also responsible for generating service requests.

Key Path	**No equivalent key. Related key System, Show Errors, Clear Error Queue**
Remote Command	`*CLS`
Example	*CLS Clears the error queue and the Status Byte Register.
Notes	For related commands, see the SYSTem:ERRor[:NEXT]? command. See also the STATus:PRESet command and all commands in the STATus subsystem.
Status Bits/OPC dependencies	Resets all bits in all event registers to 0, which resets all the status byte register bits to 0 also.
Initial S/W Revision	Prior to A.02.00

Standard Event Status Enable

Selects the desired bits from the standard event status enable register. This register monitors I/O errors and synchronization conditions such as operation complete, request control, query error, device dependent error, status execution error, command error, and power on. The selected bits are OR’d to become a summary bit (bit 5) in the byte register which can be queried.

The query returns the state of the standard event status enable register.

Key Path	**No equivalent key. Related key System, Show Errors, Clear Error Queue**
Remote Command	`*ESE <integer>` `*ESE?`

Example	*ESE 36 Enables the Standard Event Status Register to monitor query and command errors (bits 2 and 5). *ESE? Returns a 36 indicating that the query and command status bits are enabled.
Notes	For related commands, see the STATus subsystem and SYSTem:ERRor[:NEXT]? commands.
Preset	255
State Saved	Not saved in state.
Min	0
Max	255
Status Bits/OPC dependencies	Event Enable Register of the Standard Event Status Register.
Initial S/W Revision	Prior to A.02.00

Standard Event Status Register Query

Queries and clears the standard event status event register. (This is a destructive read.) The value returned is a hexadecimal number that reflects the current state (0/1) of all the bits in the register.

Remote Command	*ESR?
Example	*ESR? Returns a 1 if there is either a query or command error, otherwise it returns a zero.
Notes	For related commands, see the STATus subsystem commands.
Preset	0
Min	0
Max	255
Status Bits/OPC dependencies	Standard Event Status Register (bits 0 – 7).
Initial S/W Revision	Prior to A.02.00

Identification Query

Returns a string of instrument identification information. The string will contain the model number, serial number, and firmware revision.

The response is organized into four fields separated by commas. The field definitions are as follows:

- Manufacturer
- Model
- Serial number
- Firmware version

Key Path	**No equivalent key. See related key System, Show System.**

Remote Command	`*IDN?`
Example	*IDN? Returns instrument identification information, such as: Agilent Technologies,N9020A,US01020004,A.01.02
Initial S/W Revision	Prior to A.02.00

Instrument Model Number

ID? - Returns a string of the instrument identification. The string will contain the model number.

When in Remote Language compatibility mode the query will return the model number of the emulated instrument, when in any other mode the returned model number will be that of the actual hardware.

Operation Complete

The *OPC command sets bit 0 in the standard event status register (SER) to “1” when pending operations have finished, that is when all overlapped commands are complete. It does not hold off subsequent operations. You can determine when the overlapped commands have completed either by polling the OPC bit in SER, or by setting up the status system such that a service request (SRQ) is asserted when the OPC bit is set.

The *OPC? query returns a “1” after all the current overlapped commands are complete. So it holds off subsequent commands until the "1” is returned, then the program continues. This query can be used to synchronize events of other instruments on the external bus.

Remote Command	`*OPC` `*OPC?`
Example	INIT:CONT 0 Selects single sweeping. INIT:IMM Initiates a sweep. *OPC? Holds off any further commands until the sweep is complete.
Status Bits/OPC dependencies	Not global to all remote ports or front panel. *OPC only considers operation that was initiated on the same port as the *OPC command was issued from. *OPC is an overlapped command, but *OPC? is sequential.
Initial S/W Revision	Prior to A.02.00

Query Instrument Options

Returns a string of all the installed instrument options. It is a comma separated list with quotes, such as: “503,P03,PFR”.

To be IEEE compliant, this command should return an arbitrary ascii variable that would not begin and end with quotes. But the quotes are needed to be backward compatible with previous SA products and software. So, the actual implementation will use arbitrary ascii. But quotes will be sent as the first and last ascii characters that are sent with the comma-separated option list.

Remote Command	`*OPT?`
Initial S/W Revision	Prior to A.02.00

Recall Instrument State

This command recalls the instrument state from the specified instrument memory register.

- If the state being loaded has a newer firmware revision than the revision of the instrument, no state is recalled and an error is reported
- If the state being loaded has an equal firmware revision than the revision of the instrument, the state will be loaded.
- If the state being loaded has an older firmware revision than the revision of the instrument, the instrument will only load the parts of the state that apply to the older revision.

Remote Command	`*RCL <register #>`
Example	*RCL 7 Recalls the instrument state that is currently stored in register 7.
Notes	Registers 0 through 6 are accessible from the front panel in menu keys for Recall Registers.
Min	0
Max	127
Status Bits/OPC dependencies	The command is sequential.
Initial S/W Revision	Prior to A.02.00

Save Instrument State

This command saves the current instrument state and mode to the specified instrument memory register.

Remote Command	`*SAV <register #>`
Example	*SAV 9 Saves the instrument state in register 9.
Notes	Registers 0 through 6 are accessible from the front panel in menu keys for Save Registers.
Min	0
Max	127
Status Bits/OPC dependencies	The command is sequential.
Initial S/W Revision	Prior to A.02.00

Service Request Enable

This command enables the desired bits of the service request enable register.

The query returns the value of the register, indicating which bits are currently enabled.

Remote Command	`*SRE <integer>` `*SRE?`
Example	*SRE 22 Enables bits 1, 2, and 4 in the service request enable register.
Notes	For related commands, see the STATus subsystem and SYSTem:ERRor[:NEXT]? commands.
Preset	0
Min	0
Max	255
Status Bits/OPC dependencies	Service Request Enable Register (all bits, 0 – 7).
Initial S/W Revision	Prior to A.02.00

Status Byte Query

Returns the value of the status byte register without erasing its contents.

Remote Command	`*STB?`
Example	*STB? Returns a decimal value for the bits in the status byte register. For example, if a 16 is returned, it indicates that bit 5 is set and one of the conditions monitored in the standard event status register is set.
Notes	See related command *CLS.
Status Bits/OPC dependencies	Status Byte Register (all bits, 0 – 7).
Initial S/W Revision	Prior to A.02.00

Trigger

This command triggers the instrument. Use the :TRIGger[:SEQuence]:SOURce command to select the trigger source.

Key Path	**No equivalent key. See related keys Single and Restart.**
Remote Command	`*TRG`
Example	*TRG Triggers the instrument to take a sweep or start a measurement, depending on the current instrument settings.
Notes	See related command :INITiate:IMMediate.

Initial S/W Revision	Prior to A.02.00

Self Test Query

This query performs the internal self-test routines and returns a number indicating the success of the testing. A zero is returned if the test is successful, 1 if it fails.

Remote Command	`*TST?`
Example	*TST? Runs the self-test routines and returns 0=passed, 1=some part failed.
Initial S/W Revision	Prior to A.02.00

Wait-to-Continue

This command causes the instrument to wait until all overlapped commands are completed before executing any additional commands. There is no query form for the command.

Remote Command	`*WAI`
Example	INIT:CONT OFF; INIT;*WAI Sets the instrument to single sweep. Starts a sweep and waits for its completion.
Status Bits/OPC dependencies	Not global to all remote ports or front panel. *OPC only considers operation that was initiated on the same port as the *OPC command was issued from.
Initial S/W Revision	Prior to A.02.00

5 System Functions

File

Opens a menu that enables you to access various standard and custom Windows functions. Press any other front-panel key to exit

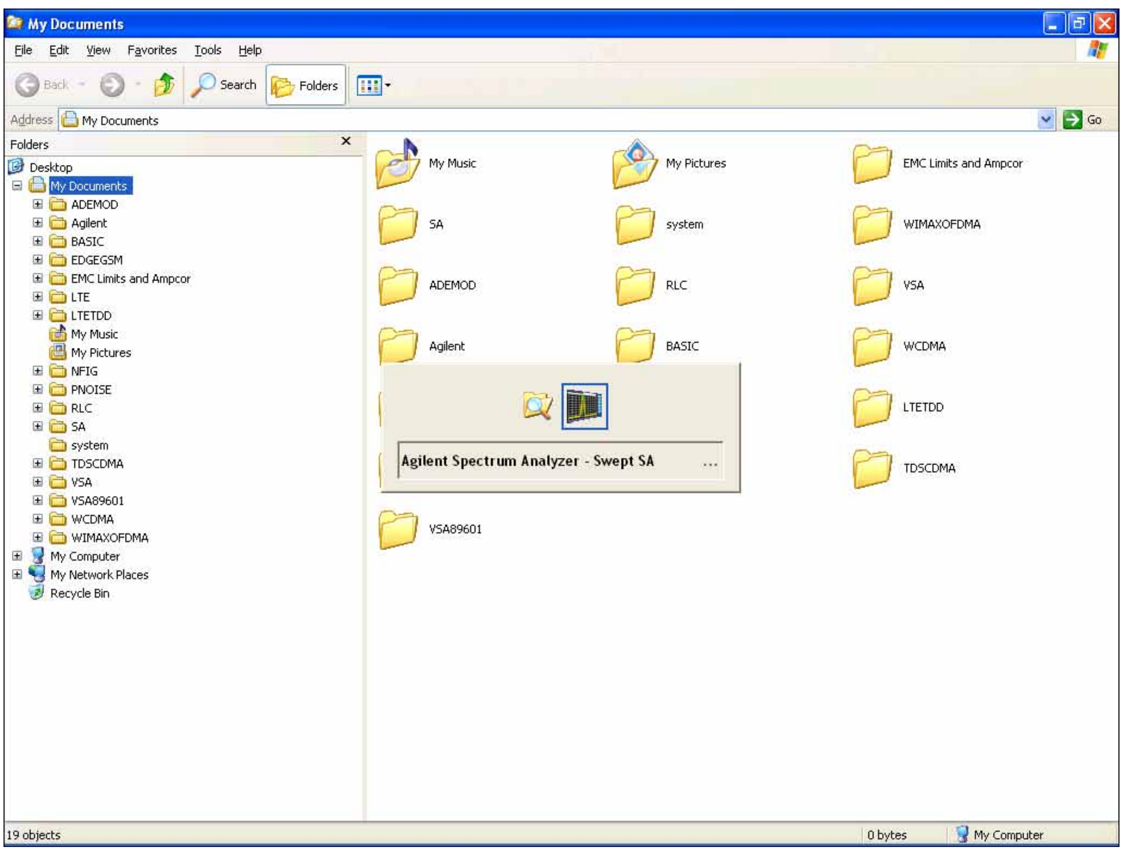
Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

File Explorer

Opens the standard Windows File Explorer. The File Explorer opens in the My Documents directory for the current user.

The File Explorer is a separate Windows application, so to return to the analyzer once you are in the File Explorer, you may either:

Exit the File Explorer by clicking on the red X in the upper right hand corner, with a mouse



Or use Alt-Tab: press and hold the Alt 

key and press and release the Tab key until the Analyzer logo is showing in the window in the center of the screen, as above, then release the Alt key.

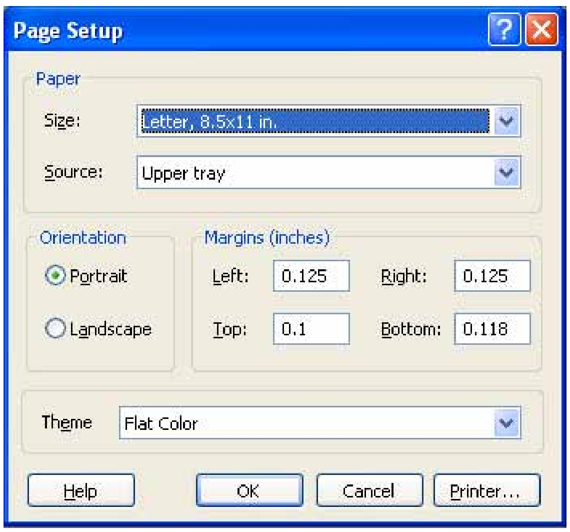
Key Path	**File**
Initial S/W Revision	Prior to A.02.00

Page Setup

The Page Setup key brings up a Windows Page Setup dialog that allows you to control aspects of the pages sent to the printer when the PRINT hardkey is pressed.

Key Path	**File**
Initial S/W Revision	Prior to A.02.00

Paper size, the printer paper source, the page orientation and the margins are all settable. Just like any standard Windows dialog, you may navigate the dialog using front-panel keys, or a mouse. There are no SCPI commands for controlling these parameters.



Also contained in this dialog is a drop-down control that lets you select the Theme to use when printing. For more on Themes, see information under View/Display, Display, System Display Settings, Theme. The Theme control has a corresponding SCPI command:

Parameter Name	Print Themes
Parameter Type	Enum
Mode	All
Remote Command	`:SYSTem:PRINt:THEMe TDColor|TDMonochrome|FCOLor|FMONochrome` `:SYSTem:PRINt:THEMe?`
Example	:SYST:PRIN:THEM FCOL
Setup	:SYSTem:DEFault MISC

Preset	FCOL; not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Print

The Print key opens a Print dialog for configured printing (for example, to the printer of your choice). Refer to your Microsoft Windows Operating System manual for more information.

Maximize/Restore Down

These keys allow the Instrument Application to be maximized and then restored to its prior state. Only one of the two keys is visible at a time. When not already maximized the Maximize Application key is visible, and when maximized, the Restore Down Application key is visible and replaces the Maximize Application key.

Maximize

This key allows you to Maximize the Instrument Application which causes the analyzer display to fill the screen. Once the application is maximized, this key is replaced by the Restore Down key.

Key Path	**File**
Mode	**All**
Notes	No equivalent remote command for this key.
State Saved	No
Initial S/W Revision	A.05.01

Restore Down

This key allows you to Restore Down the Instrument Application and reverses the action taken by Maximize. This key is only visible when the application has been maximized, and after the Restore Down action has been completed this key is replaced by the Maximize key.

Key Path	**File**
Mode	**All**
Notes	No equivalent remote command for this key.
State Saved	No
Initial S/W Revision	A.05.01

Minimize

The Minimize key causes the analyzer display to disappear down into the task bar, allowing you to see the Windows Desktop. You can use Alt-Tab (press and hold the Alt 

key and press and release the Tab key) to restore the analyzer display.

Key Path	**File**
Mode	**All**
Notes	No equivalent remote command for this key.
State Saved	No
Initial S/W Revision	A.05.01

Exit

This key, when pressed, will exit the Instrument Application. A dialog box is used to confirm that you intended to exit the application:

Key Path	**File**
Mode	All
Notes	The Instrument Application will close. No further SCPI commands can be sent. Use with caution!
Initial S/W Revision	Prior to A.02.00

Mode Preset

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings

See “How-To Preset” on page 168 for more information.

Key Path	**Front-panel key**
Remote Command	`:SYSTem:PRESet`
Example	:SYST:PRES
Notes	*RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0.
Couplings	A Mode Preset aborts the currently running measurement, activates the default measurement, and. gets the mode to a consistent state with all of the default couplings set.
Initial S/W Revision	Prior to A.02.00

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	**SCPI Command**	**Front Panel Access**
Auto Couple	:COUPle ALL	Auto Couple front-panel key
Meas Preset	:CONFigure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODes	System Menu; Restore System Default Menu
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPut	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGn	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERSistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu
Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu

Restore Mode Defaults

Resets the state for the currently active mode by resetting the mode persistent settings to their factory default values, clearing mode data and by performing a Mode Preset. This function will never cause a mode switch. This function performs a full preset for the currently active mode; whereas, Mode Preset performs a partial preset. Restore Mode Defaults does not affect any system settings. System settings are reset by the Restore System Defaults function. This function does reset mode data; as well as settings.

Key Path	**Mode Setup**
Remote Command	`:INSTrument:DEFault`
Example	:INST:DEF
Notes	Clears all pending OPC bits. The Status Byte is set to 0. A message comes up saying: “If you are sure, press key again”.
Couplings	A Restore Mode Defaults will cause the currently running measurement to be aborted and causes the default measurement to be active. It gets the mode to a consistent state with all of the default couplings set.
Initial S/W Revision	Prior to A.02.00

*RST (Remote Command Only)

*RST is equivalent to :SYST:PRES;:INIT:CONT OFF which is a Mode Preset in the Single measurement state. This remote command is preferred over Mode Preset remote command - :SYST:PRES, as optimal remote programming occurs with the instrument in the single measurement state.

Remote Command	`*RST`
Example	*RST
Notes	Sequential Clears all pending OPC bits and the Status Byte is set to 0.
Couplings	A *RST will cause the currently running measurement to be aborted and cause the default measurement to be active. *RST gets the mode to a consistent state with all of the default couplings set.
Initial S/W Revision	Prior to A.02.00

Print

This front-panel key is equivalent to performing a File, Print, OK. It immediately performs the currently configured Print to the Default printer.

The :HCOPy command is equivalent to pressing the PRINT key. The HCOPy:ABORt command can be used to abort a print which is already in progress. Sending HCOPy:ABORt will cause the analyzer to stop sending data to the printer, although the printer may continue or even complete the print, depending on how much data was sent to the printer before the user sent the ABORt command.

Key Path	**Front-panel key**
Remote Command	`:HCOPy[:IMMediate]`
Initial S/W Revision	Prior to A.02.00

Key Path	**SCPI command only**
Remote Command	`:HCOPy:ABORt`
Initial S/W Revision	Prior to A.02.00

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions::

Register saves are not remembered as Saves for the purpose of the Quick Save function

If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

.

NOTE If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

Key Path	**Front-panel key**
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

Recall

Accesses a menu that enables you to select the information that you want to recall.

The options are State, Trace and Data. (screen images can be saved, but not recalled.) The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	**Front-panel key**
Notes	No remote command directly controls the Recall Type that this key controls. The Recall type is a node in the :MMEM:LOAD command. An example is :MMEM:LOAD:STATe <filename>.
Initial S/W Revision	Prior to A.02.00

State

Accesses a menu that enables you to recall a State that has previously been saved. Recalling a saved state returns the analyzer as close as possible to the mode context and may cause a mode switch if the file selected is not for the current active mode. A State file can be recalled from either a register or a file. Once you select the source of the recall in the State menu, the recall will occur.

See “More Information” on page 174.

Key Path	**Recall**
Mode	All
Example	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
Notes	See “Open” on page 177.
Initial S/W Revision	Prior to A.02.00

More Information

In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

You want to recall state and one trace's data, leaving other traces unaffected.	Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed.	On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.
You want to recall all traces	Save Trace+State from ALL traces.	On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)
You want all traces to load exactly as they were when saved.	Save State	On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten.

Register 1 thru Register 6

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified.

Registers are shared by all modes, so recalling from any one of the 6 registers may cause a mode switch to the mode that was active when the save to the Register occurred.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

Key Path	**Recall, State**
Example	*RCL 1
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Recall, State**
Example	*RCL 2
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Recall, State**
Example	*RCL 3
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Recall, State**
Example	*RCL 4
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Recall, State**
Example	*RCL 5
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Recall, State**
Example	*RCL 6
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

From File\ File Open

Brings up the standard Windows® File Open dialog and its corresponding key menu.

When you first enter this dialog, the State File default path is in the Look In: box in this File Open dialog. The File Open dialog is loaded with the file information related to the State Save Type. The first *.state file is highlighted. The only files that are visible are the *.state files and the Files of type is *.state, since.state is the file suffix for the State save type. For more details, refer to “File Open Dialog and Menu” on page 182.

Key Path	**Recall, State**
Notes	Brings up the Open dialog for recalling a State Save Type
Initial S/W Revision	Prior to A.02.00

Open

The recalling State function must first verify the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, and then loading the State from the saved state file to as close as possible to the context in which the save occurred. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.

If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and it returns a warning message of what it did.

NOTE	No Trace data is loaded when recalling a State File. Measurements that support loading of trace data will include a Trace key in the Recall menu and will load State + Trace data from.trace files under that key.

Key Path	**Recall, State, From File…**
Remote Command	`:MMEMory:LOAD:STATe <filename>`
Example	:MMEM:LOAD:STAT "myState.state" recalls the file myState.state on the default path
Notes	Auto return to the State menu and the Open dialog goes away. Advisory Event "Recalled File <file name>" after recall is complete.
Notes	If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. Although the trace data is included in the .state file it is not recalled. Recalling trace data is left for .trace files only for measurements that support recalling of trace data. Errors are generated if the specified file is empty or does not exist, or there is a file type mismatch.
Initial S/W Revision	Prior to A.02.00

The state of a mode includes all of the variables affected by doing a full preset. It not only recalls Mode Preset settings, but it also recalls all of the mode persistent settings and data if the mode has either. Each mode determines whether data is part of mode state and if the mode has any persistent settings. **Recall State** also recalls all of the **Input/Output** system settings, since they are saved with each State File for each mode.

The Recall State function does the following:

- Verifies that the file is recallable on this instrument using the version number and model number.
- Aborts the currently running measurement.
- Clears any pending operations.
- Switches to the mode of the selected Save State file.
- Sets mode State and Input/Output system settings to the values in the selected Saved State file.
- Limits settings that differ based on model number, licensing or version number.
- Makes the saved measurement for the mode the active measurement.
- Clears the input and output buffers.
- Status Byte is set to 0.
- Executes a *CLS

Trace (+State)

Selects Trace as the data type to be recalled. Trace files include the state of the mode they were saved from as well as the trace data, with internal flags to indicate which trace the user was trying to save, which may include ALL traces. They are otherwise identical to State files. Recalling **trace data** may cause a mode switch if the file selected is not for the currently active mode.

Not all modes support saving of trace data with the state, and for modes that do, not all measurements do. The Trace key is grayed out for measurements that do not support trace recall. It is blanked for modes that do not support trace recall.

This key will not actually cause the recall, since the recall feature still needs to know from which file to recall the trace and which trace to recall it into. Pressing this key will bring up the Recall Trace menu that provides you with the options of where to retrieve the trace.

For quick recalls, the Trace menu lists 5 registers to recall from or you can select a file to recall from.

Key Path	**Recall**
Mode	SA
Example	MMEM:LOAD:TRAC TRACE2,"MyTraceFile.trace" This loads the trace file data (on the default file directory path) into the specified trace. :MMEM:LOAD:TRAC:REG TRACE1,2 restores the trace data in register 2 to Trace 1
Notes	
Initial S/W Revision	Prior to A.02.00

Register 1 thru Register 5

Selecting any one of these register keys causes the Traces and State from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified.

Trace registers are shared by all modes, so recalling from any one of the 5 registers may cause a mode switch to the mode that was active when the save to the Register occurred.

After the recall completes, the message “Trace Register <register number> recalled” appears in the message bar.

Key Path	**Recall, Trace**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Recall, Trace**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Recall, Trace**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Recall, Trace**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Recall, Trace**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

To Trace

These menu selections let you pick which Trace to recall the saved trace into. Not all modes have the full 6 traces available. The default is the currently selected trace, selected in this menu or in the Trace/Detector, Export Data, Import Data, or Save Trace menus, except if you have chosen All, then it remains chosen until you specifically change it to a single trace.

If the .trace file is an "all trace" file, "**To Trace**" is ignored and the traces each go back to the trace they were saved from.

Once selected, the key returns back to the Recall Trace menu and the selected Trace number is annotated on the key. Now you have selected exactly where the trace needs to be recalled.To trigger a recall of the selected Trace, you must select the **Open** key in the Recall Trace menu.

Key Path	**Save, Data, Trace**
Mode	SA
Initial S/W Revision	Prior to A.02.00

Open…

Accesses the standard Windows File Open dialog and its corresponding File Open menu. When you navigate to this selection, you have already determined you are recalling Trace and now you want to specify from which file to do the recall.

When you first enter this dialog, the State File default path is in the Look In: box. The **File Open** dialog is loaded with the file information related to the State Save Type. The first *.trace file is highlighted. Also, the only files that are visible are the *.trace files and the Files of type is *.trace, since .trace is the file suffix for the Trace save type. For more details, refer to “File Open Dialog and Menu” on page 182.

Key Path	**Recall, Trace**
Mode	SA
Notes	Brings up Open dialog for recalling a Trace Save Type
Initial S/W Revision	Prior to A.02.00

Open

The recalling Trace function must first verify the file is recallable in this instrument by checking instrument software version and model number, since it includes State. If everything matches, a full recall proceeds by aborting the currently running measurement, and loading the state from the saved state file to as close as possible to the context in which the save occurred. You can open .trace files from any mode that supports them, so recalling a Trace file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file and the saved measurement of the mode becomes the newly active measurement, and the data relevant to the measurement (if there is any) is recalled.

Once the state is loaded, the trace data must be loaded. The internal flags are consulted to see which trace to load and the "To Trace" setting to see where to load it. Trace data is always loaded with the specified trace set to View, so that the data is visible and not updating (so as not to erase the recalled data). If the file is an "all trace" file, all traces are loaded with the saved data (to the original trace the data was saved from) and set to View. Traces whose data is not loaded are restored to the update state that existed when they were saved.

In every other way a Trace load is identical to a State load. See section “Open” on page 177 “Open” on page 177 for details.

Key Path	**Recall, Trace, Open…**
Remote Command	`:MMEMory:LOAD:TRACe TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6,<filename>` `:MMEMory:LOAD:TRACe:REGister TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6,<integer>`
Example	:MMEM:LOAD:TRAC TRACE2,"myState.trace" recalls the file myState.trace on the default path; if it is a "single trace" save file, that trace is loaded to trace 2, and is set to be not updating. :MMEM:LOAD:TRAC:REG TRACE1,2 restores the trace data in register 2 to Trace 1
Notes	Auto return to the Trace menu and the Open dialog goes away. Advisory Event "Recalled File <file name>" after recall is complete. Some modes and measurements do not have available all 6 traces. Phase Noise mode command, for example, is: MMEMory:LOAD:TRACe TRACE1|TRACE2|TRACE3,<filename> The load trace command actually performs a load state, which in the Swept SA measurement includes the trace data. However it looks in the recalled state file to see how it was flagged at save time. The possibilities are: If the trace file was saved using one of the TRACE# enums, it is flagged as a single trace save file. The trace that was flagged as the one that was saved, is loaded to the trace specified. The trace is loaded with update off and display on, and none of the other traces are loaded. If the trace file was saved using one the ALL enum, it is flagged as an "all traces" file. And all traces will be loaded. All of the traces are loaded with Update=Off to keep them from updating, regardless of the setting of "Recall State w/Trace Update".
Initial S/W Revision	Prior to A.02.00

Data (Import)

Importing a data file loads data that was previously saved from the current measurement or from other measurements and/or modes that produce the same type of data. The Import Menu only contains Data Types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by the user prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Importing Data loads measurement data from the specified file into the specified or default destination, depending on the data type selected. Selecting an Import Data menu key will not actually cause the importing to occur, since the analyzer still needs to know from where to get the data. Pressing the Open key in this menu brings up the Open dialog and Open menu that provides you with the options from where to recall the data. Once a filename has been selected or entered in the Open menu, the recall occurs as soon as the Open key is pressed.

Key Path	**Recall**
Mode	All
Notes	The menu is built from whatever data types are available for the mode. Some keys will be missing completely, so the key locations in the sub-menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:LOAD commands.
Dependencies	If a file type is not used by a certain measurement, it is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset	Is not affected by Preset or shutdown, but is reset during Restore Mode Defaults
Readback	The data type that is currently selected
Initial S/W Revision	Prior to A.02.00

Open…

Accesses the standard Windows File Open dialog and the File Open key menu. When you navigate to this selection, you have already determined you are recalling a specific Data Type and now you want to specify which file to open.

When you first enter this dialog, the path in the Look In: field depends on which import data type you selected.

The only files that are visible are those specific to the file type being recalled.

Key Path	**Recall, Data**
Notes	The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type
Initial S/W Revision	Prior to A.02.00

Open

The import starts by checking for errors. Then the import can start. For all data types, the actual import starts by aborting the currently running measurement. Then the import does data type specific behavior:

File Open Dialog and Menu

The **File Open** is a standard Windows dialog and has a **File Open** key menu. Each key in this menu corresponds to the selectable items in the **File Open** dialog box. The menu keys can be used for easy navigation between the selections within the dialog or the standard **Tab** and **Arrow** keys can be used for dialog navigation. When you navigate to this selection, you have already limited the file recall type and now you want to specify which file to open.

Initial S/W Revision	Prior to A.02.00

Open

This selection and the **Enter** key, when a filename has been selected or specified, cause the load to occur. **Open** loads the specified or selected file to the previously selected recall type of either **State** or a specific import data type.

Notes	Advisory Event "File <file name> recalled" after recall is complete.
Initial S/W Revision	Prior to A.02.00

File/Folder List

This menu key navigates to the center of the dialog that contains the list of files and folders. Once here you can get information about the file.

Key Path	**Recall, <various>, Open…**
Notes	Pressing this key navigates you to the files and folders list in the center of the dialog.
Initial S/W Revision	Prior to A.02.00

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately.

Key Path	**Recall, <various>, Open…**
Notes	No SCPI command directly controls the sorting.
Initial S/W Revision	Prior to A.02.00

By Date

Accesses a menu that enables you to sort the list of files within the scope of the File Open dialog in ascending or descending data order. The date is the last data modified.

Key Path	**Recall, <various>, Open…, Sort**
Notes	Files in the File Open dialog are sorted immediately in the selected order
Initial S/W Revision	Prior to A.02.00

By Name

Accesses a menu that enables you to sort the list of files within the scope of the File Open dialog in ascending or descending order based on the filename.

Key Path	**Recall, <various>, Open…, Sort**
Notes	Files in the File Open dialog are sorted immediately in the selected order
Initial S/W Revision	Prior to A.02.00

By Extension

Accesses a menu that enables you to sort the list of files within the scope of the File Open dialog in ascending or descending order based on the file extension for each file.

Key Path	**Recall, <various>, Open…, Sort**
Notes	Files in the File Open dialog are sorted immediately in the selected order
Initial S/W Revision	Prior to A.02.00

By Size

Accesses a menu that enables you to sort the list of files within the scope of the File Open dialog in ascending or descending order based on file size.

Key Path	**Recall, <various>, Open…, Sort**
Notes	Files in File Open dialog are sorted immediately in the selected order
Initial S/W Revision	Prior to A.02.00

Ascending

This causes the display of the file list to be sorted, according to the sort criteria, in ascending order.

Key Path	**Recall, <various>, Open…, Sort**
Notes	Files in File Open dialog are sorted immediately in the selected order
Initial S/W Revision	Prior to A.02.00

Descending

This causes the display of the file list to be sorted, according to the sort criteria, in descending order.

Key Path	**Recall, <various>, Open…, Sort**
Notes	Files in File Open dialog are sorted immediately in the selected order
Initial S/W Revision	Prior to A.02.00

Files Of Type

This menu key corresponds to the Files Of Type selection in the dialog. It follows the standard Windows supported Files Of Type behavior. It shows the current file suffix that corresponds to the type of file the user has selected to save. If you navigated here from recalling State, "State File (*.state)" is in the dialog selection and is the only type available in the pull down menu. If you navigated here from recalling Trace, "Trace+State File (*.trace)" is in the dialog selection and is the only type available under the pull down menu.

If you navigated here from importing a data file, the data types available will be dependent on the current measurement and the selection you made under **Import Data**. For example:

Amplitude Corrections: pull down menu shows

- Amplitude Corrections (*.csv)
- Legacy Cable Corrections (*.cbl)
- Legacy User Corrections (*.amp)
- Legacy Other Corrections (*.oth)
- Legacy Antenna Corrections (*.ant)

Limit: pull down menu shows

- Limit Data (*.csv)
- Legacy Limit Data (*.lim)

Trace: pull down menu shows

- Trace Data (*.csv)

Key Path	**Recall, <various>, Open…**
Notes	Pressing this key causes the pull down menu to list all possible file types available in this context.
Initial S/W Revision	Prior to A.02.00

Up One Level

This menu key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. It follows the standard Windows supported Up One Level behavior. When pressed, it directs the file and folder list to navigate up one level in the directory structure.

Key Path	**Recall, <various>, Open…**
Notes	When pressed, the file and folder list is directed up one level of folders and the new list of files and folders is displayed.
Initial S/W Revision	Prior to A.02.00

Cancel

Cancels the current File Open request. It follows the standard Windows supported Cancel behavior.

Key Path	**Recall, <various>, Open…**
Notes	Pressing this key causes the Open dialog to go away and auto return.
Initial S/W Revision	Prior to A.02.00

Save

Accesses a menu that provides the save type options. The **Save Type** options are **State**, **Trace**, **Data**, or a **Screen Image** depending on the active mode.

Key Path	**Front-panel key**
Mode	All
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

State

Selects **State** as the save type and accesses a menu that provides the options of where to save. You can save either to a register or a file. This menu key will not actually cause the save until the location is chosen.

Saving the state is the only way to save this exact measurement context for the current active mode. The entire state of the active mode is saved in a way that when a recall is requested, the mode will return to as close as possible the context in which the save occurred. This includes all settings and data for only the current active mode.

It should be noted that the Input/Output settings will be saved when saving State, since these settings plus the state of the mode best characterize the current context of the mode, but the mode independent System settings will not be saved.

For rapid saving, the State menu lists registers to save to, or you can select a file to save to. Once they select he destination of the save in the State menu, the save will occur.

Key Path	**Save**
Mode	All
Example	MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Notes	See “Save” on page 192.
Initial S/W Revision	Prior to A.02.00

Register 1 thru Register 6

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified.

These 6 registers are all that is available from the front panel for all modes in the instrument. There are not 6 registers available for each mode. From remote, 127 Registers are available. Registers are files that are visible to the user in the My Documents\System folder.

Key Path	**Save, State**
Mode	All
Example	*SAV 1
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Save, State**
Mode	All
Example	*SAV 2
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Save, State**
Mode	All
Example	*SAV 3
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Save, State**
Mode	All
Example	*SAV 4
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Save, State**
Mode	All
Example	*SAV 5

Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Save, State**
Mode	All
Example	*SAV 6
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

To File . . .

Accesses a menu that enables you to select the location for saving the State. This menu is similar to a standard Windows® **Save As** dialog.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer). This path is the **Save In:** path in the **Save As** dialog for all State Files when they first enter this dialog.

Key Path	**Save, State**
Mode	All
Notes	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision	Prior to A.02.00

Save As . . .

Accesses a menu that enables you to select the location where you can save the State. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

When you first enter this dialog, the path in the **Save In:** field depends on the data type. The only files that are visible are the *.state files and the Save As type is *.state, since .state is the file suffix for the State Save Type.

Key Path	**Save, State**
Mode	All
Notes	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision	Prior to A.02.00

Save

Saves all of the State of the currently active mode plus the system level Input/Output settings to the specified file.

While the save is being performed, the floppy icon shows up in the settings bar near the Continuous/Single sweep icon. After the save completes, the Advisory Event "File <register number> saved" is displayed.

Key Path	**Save, State, To File…**
Mode	All
Remote Command	`:MMEMory:STORe:STATe <filename>`
Example	:MMEM:STOR:STAT "myState.state" saves the file myState.state on the default path
Notes	If the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote. Auto return to the State menu and the Save As dialog goes away.
Backwards Compatibility SCPI	For a backwards compatibility only, the following parameters syntax is supported: :MMEMory:STORe:STATe 1,<filename> The "1" is just ignored. The command is sequential.
Initial S/W Revision	Prior to A.02.00

Trace (+State)

Selects a state file which includes trace data for recalling as the save type and accesses a menu that enables you to select which trace to save. You can save to either a register or a file. Not all modes support saving trace data with the state, and for modes that do, not all measurements do. This key is grayed out for measurements that do not support trace saves. It is blanked for modes that do not support trace saves. Saving **Trace** is identical to saving State except a .trace extension is used on the file instead of .state, and internal flags are set in the file indicating which trace was saved. You may also select to save ALL traces.

This key will not actually cause the save, since the save feature still needs to know which trace to save and where to save it. Pressing this key accesses the Save Trace menu that provides the user with these options.

For rapid saving, the Trace menu lists registers to save to, or you can select a file to save to. Once you pick the destination of the save in the Trace menu, the save will occur.

Key Path	**Save**
Mode	SA
Example	MMEM:STOR:STATe TRACE2,"MyTraceFile.trace" This stores trace 2 data in the file MyTraceFile.trace in the default directory. :MMEM:STOR:TRAC:REG TRACE1,2 stores trace 1 data in trace register 2 :MMEM:STOR:TRAC:REG ALL,3 saves the data for all 6 traces in trace register 3
Notes	See “Save” on page 192.
Initial S/W Revision	Prior to A.02.00

Register 1 thru Register 5

Selecting any one of these register menu keys causes the Trace(s) specified under From Trace, along with the state of the currently active mode, to be saved to the specified Trace Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified.

These 5 trace registers are all that is available for all modes in the instrument. At present, only the Swept SA measurement of the Spectrum Analyzer mode supports saving to Trace+State files. Registers are files that are visible to the user in the My Documents\System folder.

Key Path	**Save, Trace**
Mode	SA
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Save, Trace**
Mode	SA
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Save, Trace**

Mode	SA
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Save, Trace**
Mode	SA
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

Key Path	**Save, Trace**
Mode	SA
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision	Prior to A.02.00

From Trace

Accesses a menu that enables you to select the trace to be saved. Once a trace is selected, the key returns to the Save Trace menu and the selected trace number is annotated on the key. The default is the currently selected trace, selected in this menu or in the Trace/Det, Export Data, Import Data or Recall Trace menus, except if you have chosen All then it remains chosen until you specifically change it to a single trace. To save the Trace you must select **Save As**.

These keys let you pick which trace to save. Now you have selected exactly what needs to be saved. To trigger a save of the selected **Trace**, you must select the **Save As** key in the Save Trace menu.

Key Path	**Save, Trace + State**
Mode	SA
Initial S/W Revision	Prior to A.02.00

Save As . . .

This menu lets you select the location where you can save the Trace. It is a standard Windows® dialog with Save As menu keys.

The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all State Files including .trace files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

When you first enter this dialog, the path in the Save In: field depends on the data type. The only files that are visible are the *.trace files and the Save As type is *.trace, since .trace is the file suffix for the Trace Save Type.

Key Path	**Save, Trace (+State)**
Mode	SA
Notes	Brings up the Save As dialog for saving a Trace Save Type
Initial S/W Revision	Prior to A.02.00

Save

This key initiates the save of the .trace file. All of the State of the currently active mode plus the system level Input/Output settings are saved to the specified file as well as all of the trace data, including internal flags set in the file indicating which trace is to be saved.

While the save is being performed, the floppy icon shows up in the settings bar near the Continuous/Single sweep icon. After the save completes, the Advisory Event "File <register number> saved" is displayed.

Key Path	**Save, Trace, Save As…**
Mode	SA
Remote Command	`:MMEMory:STORe:TRACe TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6|ALL,<filename>` `:MMEMory:STORe:TRACe:REGister TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6|ALL,<integer>`
Example	:MMEM:STOR:TRAC TRACE1,“myState.trace” saves the file myState.trace on the default path and flags it as a “single trace” file with Trace 1 as the single trace (even though all of the traces are in fact stored). :MMEM:STOR:TRAC ALL,“myState.trace” saves the file myState.trace on the default path and flags it as an “all traces” file :MMEM:STOR:TRAC:REG TRACE1,2 stores trace 1 data in trace register 2

Notes	Some modes and measurements do not have available all 6 traces. The Phase Noise mode command, for example, is: MMEMory:STORe:TRACe TRACE1|TRACE2|TRACE3|ALL,<filename> This command actually performs a save state, which in the Swept SA measurement includes the trace data. However it flags it (in the file) as a "save trace" file of the specified trace (or all traces). The range for the register parameter is 1–5 If the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during a instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote. Auto return to the State menu and the Save As dialog goes away.
Initial S/W Revision	Prior to A.02.00

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

Key Path	**Save**
Mode	All
Notes	The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:STORe commands.
Dependencies	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset	Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults
Readback	The data type that is currently selected
Initial S/W Revision	Prior to A.02.00

Save As . . .

This menu lets you select the location where you can save Data Type files. It is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the Quick Save key documentation for more on the automatic file naming algorithm.

When you first enter this dialog, the path in the Save In: field depends on the data type. The only files that are visible are the files with the corresponding data type suffix, and the **Save As** type lists the same suffix.

For example, if the Data Type is **Amplitude Corrections**, the file suffix is .csv and the *.csv files are the only visible files in the **Save As** dialog and .csv is the Save As Type.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<mode name>\data\<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<mode name>\data\captureBuffer

Key Path	**Save, Data**
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type
Initial S/W Revision	Prior to A.02.00

Save

Saves the specified Data Type. This section describes any specific save behavior relevant to Data that is common to all modes.

When a Save of a specific Data File is requested, the specified data is saved to the specified or selected file. The save is performed immediately and does not wait until the measurement is complete.

If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK** or you can **Cancel** the request.

While the save is being performed, the floppy icon will show up in the settings bar near the Continuous/Single icon. After a register save completes, the corresponding register softkey annotation is updated with the date the time and an advisory message that the file was saved appears in the message bar.

Key Path	**Save, Data, Save As…**
Notes	If the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during a instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote.
Initial S/W Revision	Prior to A.02.00

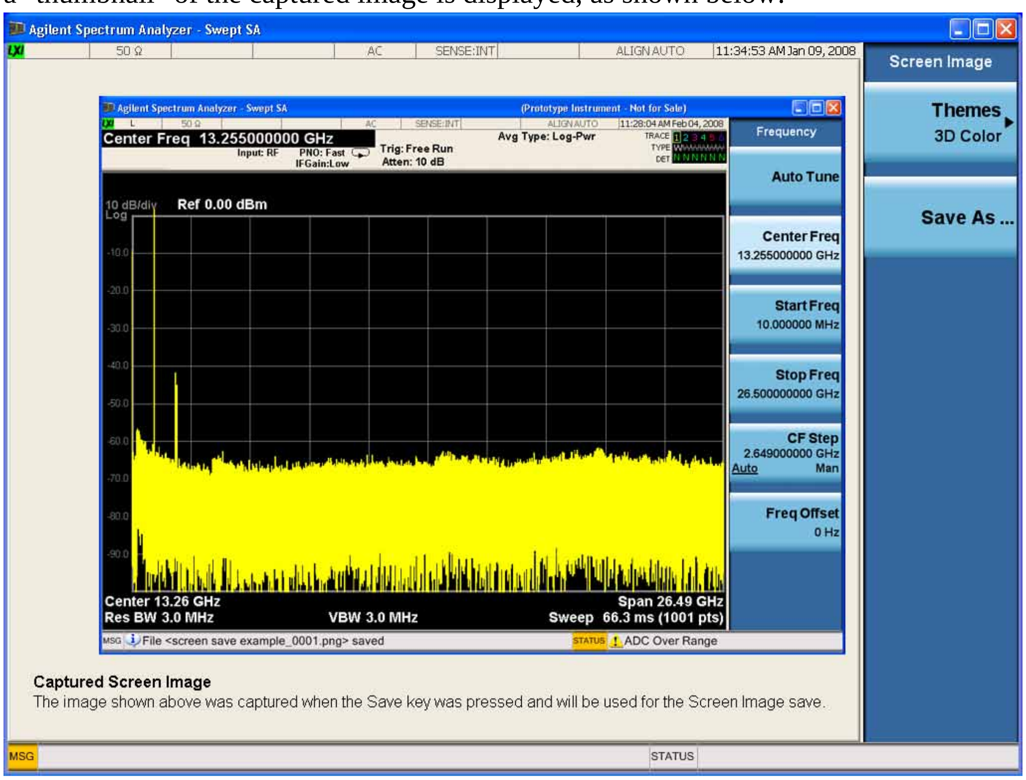
Screen Image

Accesses a menu of functions that enable you to specify a format and location for the saved screen image.

Pressing Screen Image brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE	For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

Key Path	**Save**
Mode	All
Example	MMEM:STOR:SCR "MyScreenFile.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Notes	See
Initial S/W Revision	Prior to A.02.00

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path	**Save, Screen Image**
Remote Command	`:MMEMory:STORe:SCReen:THEMe TDColor|TDMonochrome|FCOLor|FMONochrome` `:MMEMory:STORe:SCReen:THEMe?`
Example	:MMEM:STOR:SCR:THEM TDM
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback	3D Color | 3D Mono | Flat Color | Flat Mono
Initial S/W Revision	Prior to A.02.00

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	**Save, Screen Image, Themes**
Example	MMEM:STOR:SCR:THEM TDC
Readback	3D Color
Initial S/W Revision	Prior to A.02.00

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path	**Save, Screen Image, Themes**
Example	MMEM:STOR:SCR:THEM TDM
Readback	3D Mono
Initial S/W Revision	Prior to A.02.00

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	**Save, Screen Image, Themes**
Example	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	**Save, Screen Image, Themes**
Example	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

Save As…

Accesses a menu that enables you to select the location where you can save the Screen Image. This menu is a standard Windows® dialog with Save As menu keys. The **Save As** dialog is loaded with the file information related to the Screen Image Type. The filename is filled in using the auto file naming algorithm for the Screen Image Type and is highlighted. The only files that are visible are the *.png files and the Save As Type is *.png, since .png is the file suffix for the Screen Image Type.

The default path for Screen Images is

My Documents\<mode name>\screen.

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

This path is the **Save In:** path in the **Save As** dialog for all Screen Files when you first enter this dialog.

Key Path	**Save, Screen Image**
Notes	Brings up Save As dialog for saving a Screen Image Save Type
Initial S/W Revision	Prior to A.02.00

Save

Saves the screen image to the specified file using the selected theme. The image that is saved is the measurement display prior to when the **Save As** dialog appeared. The save is performed immediately and does not wait until the measurement is complete.

Key Path	**Save, Screen Image, Save As…**
Remote Command	`:MMEMory:STORe:SCReen <filename>`
Example	:MMEM:STOR:SCR "myScreen.png"
Notes	If the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during a instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote. Auto return to the Screen Image menu and the Save As dialog goes away. Advisory Event "File <file name> saved" after save is complete.
Initial S/W Revision	Prior to A.02.00

Save As . . .

Accesses a standard Windows dialog with the **Save As** key menu. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the Quick Save key documentation for more on the automatic file naming algorithm.

The **Save As** dialog has the last path loaded in **Save In:** for this particular file type. User specified paths are remembered and persist through subsequent runs of the mode. These remembered paths are mode specific and are reset back to the default using **Restore Mode Defaults**.

Initial S/W Revision	Prior to A.02.00

Save

Performs the actual save to the specified file of the selected type. The act of saving does not affect the currently running measurement and does not require you to be in single measurement mode to request a save. It performs the save as soon as the currently running measurement is in the idle state; when the measurement completes. This ensures the State or Data that is saved includes complete data for the current settings. The save only waits for the measurement to complete when the state or data that depends on the measurement setup is being saved. The save happens immediately when exporting corrections or when saving a screen image.

If the file already exists, a dialog appears with corresponding menu keys that allow you to replace the existing file with an **OK** or to **Cancel** the request.

While the save is being performed, the floppy icon shows up in the settings bar near the Continuous/Single icon. After the save completes, the corresponding register menu key annotation is updated with the date the time and the message "File <file name> saved" appears in the message bar.

Notes	If the file already exists, the File Exist dialog appears and allows you to replace it or not by selecting the Yes or No menu keys that appear with the dialog.Then the key causes an auto return and Save As dialog goes away. Advisory Event "File <file name> saved" after save is complete.
Initial S/W Revision	Prior to A.02.00

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file.

Key Path	**Save, <various>, Save As…**
Notes	Pressing this key enables you to navigate to the files and folders list in the center of the dialog.
Initial S/W Revision	Prior to A.02.00

File Name

Accesses the Alpha Editor. Use the knob to choose the letter to add and the Enter front-panel key to add the letter to the file name. In addition to the list of alpha characters, this editor includes a **Space** key and a **Done** key. The **Done** key completes the filename, removes the Alpha Editor and returns back to the **File Open** dialog and menu, but does not cause the save to occur. You can also use **Enter** to complete the file name entry and this will cause the save to occur.

Key Path	**Save, <various>, Save As…**
Notes	Brings up the Alpha Editor. Editor created file name is loaded in the File name field of the Save As dialog.
Initial S/W Revision	Prior to A.02.00

Save As Type

This key corresponds to the **Save As Type** selection in the dialog. It follows the standard Windows® supported **Save As Type** behavior. It shows the current file suffix that corresponds to the type of file you have selected to save. If you navigated here from saving State, "State File (*.state)" is in the dialog selection and is the only type available under the pull down menu. If you navigated here from saving Trace, "Trace+State File (*.trace)" is in the dialog selection and is the only type available under the pull down menu. If you navigated here from exporting a data file, "Data File (*.csv)" is in the dialog and is available in the pull down menu. Modes can have other data file types and they would also be listed in the pull down menu.

Key Path	**Save, <various>, Save As…**
Notes	Pressing this key causes the pull down menu to list all possible file types available in this context. All types available are loaded in a 1-of-N menu key for easy navigation.
Initial S/W Revision	Prior to A.02.00

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. It follows the standard Windows® supported **Up One Level** behavior. When pressed, it causes the file and folder list to navigate up one level in the directory structure.

Key Path	**Save, <various>, Save As…**
Notes	When pressed, the file and folder list is directed up one level of folders and the new list of files and folders is displayed
Initial S/W Revision	Prior to A.02.00

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. It follows the standard Windows® supported **Create New Folder** behavior. When pressed, a new folder is created in the current directory with the name **New Folder** and allows you to enter a new folder name using the Alpha Editor.

Key Path	**Save, <various>, Save As…**
Notes	Creates a new folder in the current folder and lets the user fill in the folder name using the Alpha Editor.
Initial S/W Revision	Prior to A.02.00

Cancel

This key corresponds to the **Cancel** selection in the dialog. It follows the standard Windows supported **Cancel** behavior. It causes the current **Save As** request to be cancelled.

Key Path	**Save, <various>, Save As…**

Notes	Pressing this key causes the Save As dialog to go away and auto return.
Initial S/W Revision	Prior to A.02.00

Mass Storage Catalog (Remote Command Only)

Remote Command	`:MMEMory:CATalog? [<directory_name>]`
Notes	The string must be a valid logical path. Query disk usage information (drive capacity, free space available) and obtain a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It shall return two numeric parameters and as many strings as there are files and directories. The first parameter shall indicate the total amount of storage currently used in bytes. The second parameter shall indicate the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> shall indicate the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. In case of directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty.
Initial S/W Revision	Prior to A.02.00

Mass Storage Change Directory (Remote Command Only)

Remote Command	`:MMEMory:CDIRectory [<directory_name>]`
	
	`:MMEMory:CDIRectory?`

Notes	The string must be a valid logical path. Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
Initial S/W Revision	Prior to A.02.00

Mass Storage Copy (Remote Command Only)

Remote Command	`:MMEMory:COPY <string>,<string>[,<string>,<string>]`
Notes	The string must be a valid logical path. Copies an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn’t exist or the destination file already exists.

Mass Storage Delete (Remote Command Only)

Remote Command	`:MMEMory:DELete <file_name>[,<directory_name>]`
Notes	The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed.
Initial S/W Revision	Prior to A.02.00

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

Remote Command	`:MMEMory:DATA <file_name>, <data>` `:MMEMory:DATA? <file_name>`
Notes	The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format.
Initial S/W Revision	Prior to A.02.00

Mass Storage Make Directory (Remote Command Only)

Remote Command	:MMEMory:MDIRectory <directory_name>
Notes	The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created.
Initial S/W Revision	Prior to A.02.00

Mass Storage Move (Remote Command Only)

Remote Command	:MMEMory:MOVE <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.
Initial S/W Revision	Prior to A.02.00

Mass Storage Remove Directory (Remote Command Only)

Remote Command	:MEMMory:RDIRectory <directory_name>
Notes	The string must be a valid logical path. Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.
Initial S/W Revision	Prior to A.02.00

System

Opens a menu of keys that access various configuration menus and dialogs.

Key Path	**Front-panel key**
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

Show

Accesses a menu of choices that enable you to select the information window you want to view.

Key Path	**System**
Mode	All
Remote Command	`:SYSTem:SHOW OFF|ERRor|SYSTem|HARDware|LXI|HWSTatistics|ALIGnment|SOFTware|CAPPlication` `:SYSTem:SHOW?`
Example	:SYST:SHOW SYST
Notes	This command displays (or exits) the various System information screens.
Preset	OFF
State Saved	No
Range	OFF| ERRor | SYSTem | HARDware | LXI | HWSTatistics | ALIGNment | SOFTware|CAPPlication
Initial S/W Revision	Prior to A.02.00

Errors

There are two modes for the Errors selection, History and Status.

The list of errors displayed in the Errors screen does not automatically refresh. You must press the Refresh key or leave the screen and return to it to refresh it.

History brings up a screen displaying the event log in chronological order, with the newest event at the top. The history queue can hold up to 100 messages (if a message has a repeat count greater than 1 it only counts once against this number of 100). Note that this count bears no relation to the size of the SCPI queue. If the queue extends onto a second page, a scroll bar appears to allow scrolling with a mouse. Time is displayed to the second.

Status brings up a screen summarizing the status conditions currently in effect. Note that the time is displayed to the second.

The fields on the Errors display are:

Type (unlabelled) - Displays the icon identifying the event or condition as an error or warning.

ID - Displays the error number.

Message - Displays the message text.

Repeat (RPT) - This field shows the number of consecutive instances of the event, uninterrupted by other events. In other words, if an event occurs 5 times with no other intervening event, the value of repeat will be 5.

If the value of Repeat is 1 the field does not display. If the value of Repeat is >1, the time and date shown are those of the most recent occurrence. If the value of repeat reaches 999,999 it stops there.

Time - Shows the most recent time (including the date) at which the event occurred.

Key Path	**System, Show**
Mode	All
Remote Command	`:SYSTem:ERRor[:NEXT]?`
Example	:SYST:ERR?
Notes	The return string has the format: "<Error Number>,<Error>" Where <Error Number> and <Error> are those shown on the Show Errors screen
State Saved	No
Initial S/W Revision	Prior to A.02.00

Next Page

Next Page and Previous Page menu keys move you between pages of the log, if it fills more than one page. These keys are grayed out in some cases:

- If on the last page of the log, the Next Page key is grayed out
- If on the first page of the log, the Previous Page key is grayed out.
- If there is only one page, both keys are grayed out.

Key Path	**System, Show, Errors**
Initial S/W Revision	Prior to A.02.00

Previous Page

See "Next Page" on page 205.

Key Path	**System, Show, Errors**

Initial S/W Revision	Prior to A.02.00

History

The History and Status keys select the Errors view. The Status key has a second line which shows a number in [square brackets]. This is the number of currently open status items.

Key Path	**System, Show, Errors**
Initial S/W Revision	Prior to A.02.00

Status

See "History" on page 206

Verbose SCPI On/Off

This is a capability that will allow the SCPI data stream to be displayed when a SCPI error is detected, showing the characters which stimulated the error and several of the characters preceding the error.

Key Path	**System, Show, Errors**
Mode	All
Remote Command	`:SYSTem:ERRor:VERBose OFF|ON|0|1` `:SYSTem:ERRor:VERBose?`
Example	:SYST:ERR:VERB ON
Preset	OFF
Preset	This is unaffected by Preset but is set to OFF on a "Restore System Defaults->Misc"
State Saved	No
Range	On | Off
Initial S/W Revision	Prior to A.02.00

Refresh

When pressed, refreshes the Show Errors display.

Key Path	**System, Show, Errors**
Initial S/W Revision	Prior to A.02.00

Clear Error Queue

This clears all errors in all error queues.

Note the following:

Clear Error Queue does not affect the current status conditions.

Mode Preset does not clear the error queue.

Restore System Defaults will clear all error queues.

*CLS only clears the queue if it is sent remotely and *RST does not affect any error queue.

Switching modes does not affect any error queues.

Key Path	**System, Show, Errors**
Initial S/W Revision	Prior to A.02.00

System

The System screen is formatted into three groupings: product descriptive information, options tied to the hardware, and software products:

```
<Product Name> <Product Description>
Product Number: N9020A
Serial Number: US46220924
Firmware Revision: A.01.01
Computer Name: <hostname>
Host ID: N9020A,US44220924

N9020A-503     Frequency Range to 3.6 GHz
N9020A-PFR     Precison Frequency Reference
N9020A-P03     Preamp 3.6 GHz

N9060A-2FP     Spectrum Analysis Measurement Suite   1.0.0.0
N9073A-1FP     WCDMA                                 1.0.0.0
N9073A-2FP     WCDMA with HSDPA                      1.0.0.0
```

The Previous Page is grayed-out if the first page of information is presently displayed. The Next Page menu key is grayed-out if the last page is information is presently displayed.

Key Path	**System, Show**
Mode	All
Example	SYST:SHOW SYST
Initial S/W Revision	Prior to A.02.00

Hardware

The show hardware screen is used to view details of the installed hardware. This information can be used to determine versions of hardware assemblies and field programmable devices, in the advent of future upgrades or potential repair needs.

The screen is formatted into two groupings: product descriptive information and hardware information. The hardware information is listed in a table format:

Hardware Information
MXA Signal Analyzer
Product Number: N9020A
Serial Number: US46220107
Firmware Revision: A.01.14

Assembly Name	Part #	Serial #	Matl Rev	Rev	OF Rev	Hw Id	Misc
Analog IF	E441060104	78060200131	003	0	C	15	
YIG Tuned Filter	50877305	11061500550	005	0	A	11	
Digital IF	E441060105	78060100559	003	0	F	14	
Front End Controller	E441060101	78060100147	004	2	A	8	
Low Band Switch	E441060170	78060800346	005	1	A	10	
LO Synthesizer	E441060102	78060100226	003	3	G	2	
Reference	E441060108	78060300420	004	1	C	16	
Front End	E441060154	13062800820	010	2	B	9	

The Previous Page is grayed-out if the first page of information is presently displayed. The Next Page menu key is grayed-out if the last page is information is presently displayed.

Key Path	**System, Show**
Mode	All
Example	SYST:SHOW HARD
Initial S/W Revision	Prior to A.02.00

LXI

This key shows you the product number, serial number, firmware revision, computer name, IP address, Host ID, LXI Class, LXI Version, MAC Address, and the Auto-MDIX Capability.

Key Path	**System, Show**

Initial S/W Revision	Prior to A.02.00

Power On

Enables you to select how the instrument should power on. The options are: Mode and Input/Output Defaults, User Preset and Last State.

Key Path	**System**
Mode	All
Remote Command	`:SYSTem:PON:TYPE MODE|USER|LAST|PRESet` `:SYSTem:PON:TYPE?`
Example	:SYST:PON:TYPE MODE
Preset	MODE
Preset	This is unaffected by a Preset but is set to Mode on a “Restore System Defaults->All”
State Saved	No
Initial S/W Revision	Prior to A.02.00

Mode and Input/Output Defaults

When the analyzer is powered on in Mode and Input/Output Defaults, it performs a Restore Mode Defaults to all modes in the instrument and also performs a Restore Input/Output Defaults.

Persistent parameters (such as Amplitude Correction tables or Limit tables) are not affected at poweron, even though they are normally cleared by Restore Input/Output Defaults and/or Restore Mode Defaults.

Key Path	**System, Power On**
Mode	All
Example	SYST:PON:TYPE MODE
Readback Text	Defaults
Initial S/W Revision	Prior to A.02.00

User Preset

Sets **Power On** to **User Preset**. When the analyzer is powered on in User Preset, it will User Preset each mode and switch to the power-on mode. Power On User Preset will not affect any settings beyond what a normal User Preset affects.

NOTE	An instrument could never power up for the first time in User Preset.

Key Path	**System, Power On**

Mode	All
Example	SYST:PON:TYPE USER
Readback Text	User Preset
Initial S/W Revision	Prior to A.02.00

Last State

Sets **Power On** to **Last.** When the analyzer is powered on, it will put all modes in the last state they were in prior to when the analyzer was put into Power Standby and it will wake up in the mode it was last in prior to powering off the instrument. The saving of the active mode prior to shutdown happens behind the scenes when a controlled shutdown is requested by using the front panel power **Standby** key or by using the remote command SYSTem:PDOWn. The non-active modes are saved as they are deactivated and recalled by Power On Last State.

NOTE An instrument could never power up for the first time in Last.

If line power to the analyzer is interrupted, for example by pulling the line cord plug or by switching off power to a test rack, Power On Last State will not work properly.

Key Path	**System, Power On**
Mode	All
Example	SYST:PON:TYPE LAST
Notes	Power on Last State only works if the user has done a controlled shutdown prior to powering on in Last. If a controlled shutdown is not done when in Power On Last State, the instrument will power up in the last active mode, but it may not power up in the active mode's last state. If an invalid mode state is detected, a Mode Preset will occur. To control the shutdown under remote control use the :SYSTem:PDOWn command.
Readback Text	Last State
Initial S/W Revision	Prior to A.02.00

Power On Application

Accesses a menu that lists the available Modes and lets you select which Mode is to be the power-on application.

This application is used for Power On Type "Mode and Input/Output Defaults" and Restore System Defaults All.

Key Path	**System, Power On**
Mode	All

Remote Command	`:SYSTem:PON:MODE SA|BASIC|ADEMOD|NFIGURE|PNOISE|CDMA2K|TDSCDMA|VSA|VSA89601|WCDMA|WIMAXOFDMA` `:SYSTem:PON:MODE?`
Example	SYST:PON:MODE SA
Notes	The list of possible modes (and remote parameters) to choose from is dependent on which modes are installed in the instrument.
Preset	SA
Preset	This is unaffected by a Preset but is set on a “Restore System Defaults->All” to SA.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Configure Applications

The Configure Applications utility lets you do two things:

1. specify a subset of the available applications (Modes) to preload into memory at startup time
2. specify the order in which the Modes appear in the Mode menu

There are several reasons you might want to specify a subset of the available applications (Modes) to preload:

- During runtime, if a Mode which is not preloaded is selected by the user, there will be a pause while the Application is loaded. Configure Applications lets you decide whether you want that delay at startup of the analyzer program or the first time you select the Mode.
- In addition, there are more applications available for the X-Series than can fit into Windows Virtual Memory. The Configure Application utility allows you to choose which licensed applications to load into memory, if you have more licensed than can fit.

The Configure Applications utility can be used to select applications for preload and/or to determine how many applications can fit in memory at one time. This utility consists of a window with instructions, a set of “Select Application” checkboxes, a “fuel bar” style memory gauge, and softkeys that help you set up your configuration.

Preloading Applications

During operation of the analyzer, you select applications from the Mode menu. After startup of the analyzer program, the first time you select a particular application that application must be loaded into memory. Once loaded, the application stays loaded, so the next time you select it during a session, there is no delay. During runtime, if an application which is not yet loaded into memory is selected using the Mode menu or sending SCPI commands, there will be a pause while the Application is loaded. During this pause a message which says “Loading application, please wait …” is displayed.

You can use the Configure Applications utility to choose applications to “preload” at startup, to eliminate the runtime delay; if you do this, the delay will instead increase the time it takes to start up the analyzer program, but for many users this is preferable to having to wait the first time they select an application.

Asking for an application to be preloaded will cause it to be loaded into the analyzer's memory when the analyzer program starts up. Once it is loaded into memory, it cannot be unloaded without exiting and restarting the analyzer program.

Virtual memory usage

There are more applications available for the X-Series than can fit into memory at any one time, so the Configure Applications utility includes a memory tracker that serves two purposes:

It will not let you preload more applications than will fit into memory at once.

You can determine how many of your favorite applications can reside in memory at one time.

The utility provides a graphical representation of the amount of memory (note that the memory in question here is Virtual memory and is a limitation imposed by the operating system, not by the amount of physical memory you have in your analyzer). You select applications to preload by checking the boxes on the left. Checked applications preload at startup. The colored fuel bar indicates the total memory required when all the checked applications are loaded (either preloaded or selected during runtime).

Here is what the fuel bar colors mean:

RED: the applications you have selected cannot all fit into the analyzer's memory. You must deselect applications until the fuel bar turns yellow.

YELLOW: the applications you have selected can all fit into the analyzer's memory, but there is less than 10% of the memory left, probably not enough to load any other applications, either via preload or by selecting a Mode while the analyzer is running.

GREEN: The indicator is green when <90% of the memory limit is consumed. This means the applications you have selected can all fit into the analyzer's memory with room to spare. You will likely be able to load one or more other applications without running out of memory.

Access to Configure Applications utility

You may, at any time, manually call up the Configure Applications utility by pressing **System, Power On, Configure Applications**, to find a configuration that works best for you, and then restart the analyzer program.

The utility may also be called if, during operation of the analyzer, you attempt to load more applications than can fit in memory at once.

A version of the utility also runs the first time you power up the analyzer after purchasing it from Agilent. In this case the utility automatically configures preloads so that as many licensed applications as possible are preloaded while keeping the total estimated virtual memory usage below the limit. This auto-configuration only takes place at the very first run, and after analyzer software upgrades.

Key Path	**System, Power On**
Example	:SYST:SHOW CAPP Displays the Config Applications screen
Initial S/W Revision	A.02.00

Select All

Marks all applications in the selection list. This allows you to enable all applications licensed on the instrument for pre-loading, or is a convenience for selecting all applications in one operation and then letting you deselect individual applications.

Key Path	**System, Power On, Configure Applications**
Initial S/W Revision	A.02.00

Deselect All

Clears the marks from all applications in the selection list, with the exception of the Power On application. The Power On application cannot be eliminated from the pre-load list.

Key Path	**System, Power On, Configure Applications**
Initial S/W Revision	A.02.00

Move Up

The application list is the order in which applications appear in the Mode Menu. This key enables you to shift the selected application up in the list, thus moving the selected application earlier in the Mode Menu.

Key Path	**System, Power On, Configure Applications**
Initial S/W Revision	A.02.00

Move Down

The application list is the order in which applications appear in the Mode Menu. This key enables you to shift the selected application down in the list, thus moving the selected application later in the Mode Menu.

Key Path	**System, Power On, Configure Applications**
Initial S/W Revision	A.02.00

Select/Deselect

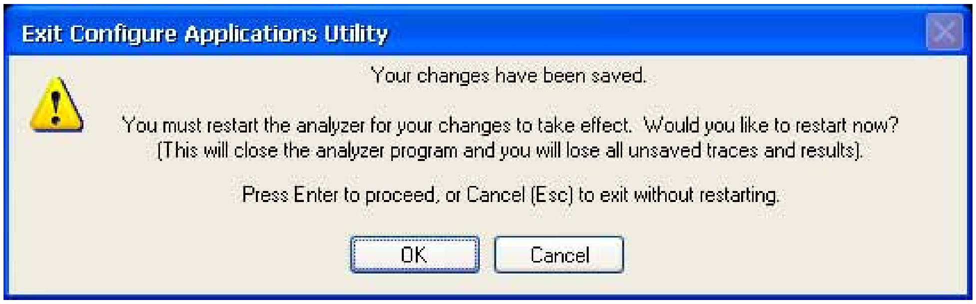
Toggles the currently highlighted application in the list.

Key Path	**System, Power On, Configure Applications**
Initial S/W Revision	A.02.00

Save Changes and Exit

Applies the configuration of the applications list. The marked applications will be pre-loaded in memory the next time the instrument application is started, and the order of the applications in the list will be the order of the applications in the Mode Menu.

After saving your changes, the analyzer asks you if you would like it to restart so that your changes can take effect (see dialog box, below). If you choose not to restart, no memory will be released until the next time you shut down and restart the analyzer.



Key Path	**System, Power On, Configure Applications**
Remote Command	`:SYSTem:PUP:PROCess`
Example	:SYST:PUP:PROC This is the SCPI command for restarting the analyzer. You must Wait after this command for the instrument application to restart
Notes	The softkey will be grayed-out when the virtual memory of the selected applications exceeds 100% of the limit.
Notes	You cannot use *WAI or *OPC? to synchronize operation after a restart. This command stops and restarts the instrument application, thus the SCPI operation is terminated and restarted. A remote program must use fixed wait time to resume sending commands to the instrument. The wait time will be dependent upon which applications are pre-loaded.
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.04.00

Exit Without Saving

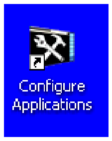
Pressing this key will exit the Configure Applications utility without saving your changes.

Key Path	**System, Power On, Configure Applications**
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.04.00

Configure Applications - Instrument boot-up

At start-up of the analyzer program dialog box similar to the one under the **System, Power On, Configure Applications** key will be displayed allowing you to choose which licensed applications are to be loaded. This dialog will only be displayed if the memory required to pre-load all of the licensed applications exceeds the Virtual Memory available.

Configure Applications - Windows desktop

The Configure Applications Utility may be run from the Windows Desktop. The utility is launched by double-clicking the 

icon on the desktop, which brings-up a dialog box similar to the one under the **System, Power On, Configure Applications** key, allowing you to choose which licensed applications are to be loaded when the analyzer program starts up. This dialog box has mouse buttons on it which do the job that the softkeys normally do in the **System, Power On, Configure Applications** menu.

Configure Applications - Remote Commands

The following topics provide details on the using remote commands to configure the list of applications want to load into the instrument memory or query the Virtual Memory utilization for your applications.

- "Configuration list (Remote Command Only)" on page 215
- "Configuration Memory Available (Remote Command Only)" on page 216
- "Configuration Memory Total (Remote Command Only)" on page 216
- "Configuration Memory Used (Remote Command Only)" on page 216
- "Configuration Application Memory (Remote Command Only)" on page 216

Configuration list (Remote Command Only)

This remote command is used to set or query the list of applications to be loaded in-memory.

Remote Command	:SYSTem:PON:APPLication:LLISt <string of INSTrument:SELect names> :SYSTem:PON:APPLication:LLISt?
Example	:SYST:PON:APPL:LLIS "SA,BASIC,WCDMA"
Notes	<string of INSTrument:SELect names> are from the enums of the :INSTrument:SELect command. The order of the <INSTrument:SELect names> is the order in which the applications are loaded into memory, and the order in which they appear in the Mode Menu. Error message –225 "Out of Memory" is reported when more applications are listed than can reside in Virtual Memory. When this occurs, the existing applications load list is unchanged.
Preset	Not affected by Preset
State Saved	Not saved in instrument state
Initial S/W Revision	A.02.00

Configuration Memory Available (Remote Command Only)

This remote command is used to query the amount of Virtual Memory remaining.

Remote Command	`:SYSTem:PON:APPLication:VMEMory[:AVAilable]?`
Example	:SYST:PON:APPL:VMEM?
Preset	Not affected by Preset
Initial S/W Revision	A.02.00

Configuration Memory Total (Remote Command Only)

This remote command is used to query the limit of Virtual Memory allowed for applications.

Remote Command	`:SYSTem:PON:APPLication:VMEMory:TOTal?`
Example	:SYST:PON:APPL:VMEM:TOT?
Preset	Not affected by Preset
Initial S/W Revision	A.02.00

Configuration Memory Used (Remote Command Only)

This remote command is a query of the amount of Virtual Memory used by all measurement applications.

Remote Command	`:SYSTem:PON:APPLication:VMEMory:USED?`
Example	:SYST:PON:APPL:VMEM:USED?
Preset	Not affected by Preset
Initial S/W Revision	A.02.00

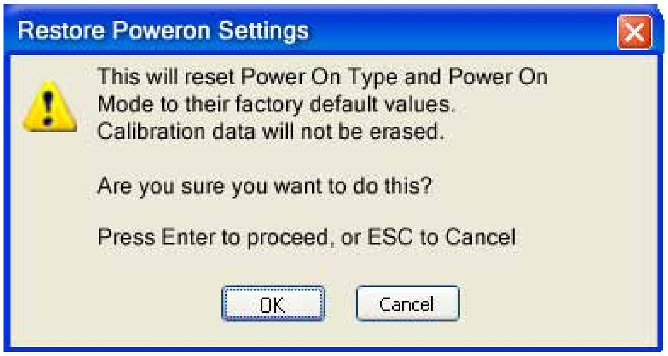
Configuration Application Memory (Remote Command Only)

This remote command is used to query the amount of Virtual Memory a particular application consumes.

Remote Command	`:SYSTem:PON:APPLication:VMEMory:USED:NAME? <INSTrument:SELect name>`
Example	:SYST:PON:APPL:VMEM:USED:NAME? CDMA2K
Notes	<INSTrument:SELect name> is from the enums of the :INSTrument:SELect command in Meas Common section 13.3 Value returned will be 0 (zero) if the name provided is invalid.
Preset	Not affected by Preset
Initial S/W Revision	Prior to A.02.00

Restore Power On Defaults

This selection causes the Power On Type and Power On Application settings to be a reset to their default values. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. The Power On key, under the Restore System Defaults menu, causes the same action.



If you press any key other than OK or Enter, it is construed as a Cancel, because the only path that will actually cause the reset to be executed is through OK or Enter.

Key Path	**System, Power On**
Example	:SYST:DEF PON
Initial S/W Revision	Prior to A.02.00

Alignments

The Alignments Menu controls and displays the automatic alignment of the instrument, and provides the ability to restore the default alignment values.

The current setting of the alignment system is displayed in the system Settings Panel along the top of the display, including a warning icon for conditions that may cause specifications to be impacted.

Key Path	**System**
Initial S/W Revision	Prior to A.02.00

Auto Align

Configures the method for which the automatic background alignment is run.

Automatic background alignments are run periodically between measurement acquisitions. The instrument’s software determines when alignments are to be performed to maintain warranted operation. The recommended setting for Auto Align is Normal.

An Auto Align execution cannot be aborted with the Cancel (ESC) key. To interrupt an Auto Align execution, select **Auto Align Off**.

Key Path	**System, Alignments**
Mode	All
Remote Command	`:CALibration:AUTO ON|PARTial|OFF` `:CALibration:AUTO?`
Example	:CAL:AUTO ON
Notes	While Auto Align is executing, bit 0 of Status Operation register is set.
Couplings	Auto Align is set to Off if Restore Align Data is invoked.
Preset	ON
Preset	This is unaffected by Preset but is set to ON upon a “Restore System Defaults->Align”.
State Saved	No
Status Bits/OPC dependencies	When Auto Align is executing, bit 0 in the Status Operational register is set.
Initial S/W Revision	Prior to A.02.00

Normal

Auto Align, Normal turns on the automatic alignment of all measurement systems. The Auto Align, Normal selection maintains the instrument in warranted operation across varying temperature and over time.

If the condition “Align Now, All required” is set, transition to Auto Align, Normal will perform the required alignments and clear the “Align Now, All required” condition and then continue with further alignments as required to maintain the instrument adequately aligned for warranted operation.

When **Auto Align**, **Normal** is selected the Auto Align Off time is set to zero.

When **Auto Align**, **Normal** is selected the Settings Panel indicates ALIGN AUTO.

Key Path	**System, Alignments, Auto Align**
Mode	All
Example	:CAL:AUTO ON
Notes	Alignment processing as a result of the transition to Normal will be executed sequentially. Thus, *OPC? or *WAI following CAL:AUTO ON will return when the alignment processing is complete. The presence of an external signal may interfere with the RF portion of the alignment. If so, the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference” is reported, and bit 11 is set in the Status Questionable Calibration register. After the interfering signal is removed, subsequent alignment of the RF will clear the condition, and clear bit 11 in the Status Questionable Calibration register.
Readback Text	Normal

Status Bits/OPC dependencies	An interfering user signal may prevent automatic alignment of the RF subsystem. If this occurs, the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference” is reported, the Status Questionable Calibration bit 11 is set, and the alignment proceeds. When a subsequent alignment of the RF subsystem succeeds, either by the next cycle of automatic alignment or from an **Align Now**, **RF**, the Error Condition and Status Questionable Calibration bit 11 are cleared.
Initial S/W Revision	Prior to A.02.00

Partial

Auto Align, **Partial** disables the full automatic alignment and the maintenance of warranted operation for the benefit of improved measurement throughput. Accuracy is retained for the Resolution Bandwidth filters and the IF Passband which is critical to FFT accuracy, demodulation, and many measurement applications. With Auto Align set to **Partial**, you are now responsible for maintaining warranted operation by updating the alignments when they expire. The **Auto Align**, **Alert** mechanism will notify you when alignments have expired. One solution to expired alignments is to perform the **Align All**, **Now** operation. Another is to return the **Auto Align** selection to **Normal**.

Auto Align, **Partial** is recommended for measurements where the throughput is so important that a few percent of improvement is more valued than an increase in the accuracy errors of a few tenths of a decibel. One good application of **Auto Align**, **Partial** would be an automated environment where the alignments can be called during overhead time when the device-under-test is exchanged.

When **Auto Align**, **Partial** is selected the elapsed time counter begins for Auto Align Off time.

When **Auto Align**, **Partial** is selected the Settings Panel indicates ALIGN PARTIAL with a warning icon. The warning icon is to inform the operator that they are responsible for maintaining the warranted operation of the instrument

Key Path	**System, Alignments, Auto Align**
Mode	All
Example	:CAL:AUTO PART
Notes	Auto Align Partial begins the elapsed time counter for Auto Align Off time.
Readback Text	Partial
Initial S/W Revision	Prior to A.02.00

Off

Auto Align, **Off** disables automatic alignment and the maintenance of warranted operation, for the benefit of maximum measurement throughput. With Auto Align set to **Off**, you are now responsible for maintaining warranted operation by updating the alignments when they expire. The **Auto Align**, **Alert** mechanism will notify you when alignments have expired. One solution to expired alignments is to perform the **Align All**, **Now** operation. Another is to return the **Auto Align** selection to **Normal**.

The **Auto Align**, **Off** setting is rarely the best choice, because **Partial** gives almost the same improvement in throughput while maintaining the warranted performance for a much longer time. The **Off** choice is intended for unusual circumstances such as the measurement of radar pulses where you might like the revisit time to be as consistent as possible.

When **Auto Align**, **Off** is selected the Auto Align Off time is initialized and the elapsed time counter begins.

When **Auto Align**, **Off** is selected the Settings Panel indicates ALIGN OFF with a warning icon. The warning icon is to inform the operator that they are responsible for maintaining the warranted operation of the instrument:

Key Path	**System, Alignments, Auto Align**
Mode	All
Example	:CAL:AUTO OFF
Notes	Auto Align Off begins the elapsed time counter for Auto Align Off time.
Couplings	Auto Align is set to Off if Restore Align Data is invoked.
Readback Text	Off
Initial S/W Revision	Prior to A.02.00

All but RF

Auto Align, **All but RF**, configures automatic alignment to include or exclude the RF subsystem. (Eliminating the automatic alignment of the RF subsystem prevents the input impedance from changing. The normal input impedance of 50 ohms can change to an open circuit when alignments are being used. Some devices under test do not behave acceptably under such circumstances, for example by showing instability.) When **Auto Align**, **All but RF ON** is selected, the operator is responsible for performing an **Align Now**, **RF** when RF-related alignments expire. The **Auto Align**, **Alert** mechanism will notify the operator to perform an **Align Now**, **All** when the combination of time and temperature variation is exceeded.

When **Auto Align**, **All but RF ON** is selected the Settings Panel indicates ALIGN AUTO/NO RF with a warning icon (warning icon is intended to inform the operator they are responsible for the maintaining the RF alignment of the instrument):

Key Path	**System, Alignments, Auto Align**
Mode	All
Remote Command	`:CALibration:AUTO:MODE ALL|NRF` `:CALibration:AUTO:MODE?`
Example	:CAL:AUTO:MODE NRF
Preset	ALL
Preset	This is unaffected by Preset but is set to ALL on a “Restore System Defaults->Align”.

State Saved	No
Readback Text	RF or NRF
Initial S/W Revision	Prior to A.02.00

Alert

The instrument will signal an Alert when conditions exist such that you will need to perform a full alignment (for example, **Align Now**, **All**). The Alert can be configured in one of four settings; **Time & Temperature**, **24 hours**, **7 days**, or **None**. A confirmation is required when a selection other than **Time & Temperature** is chosen. This prevents accidental deactivation of alerts.

With **Auto Align** set to **Normal**, the configuration of **Alert** is not relevant because the instrument's software maintains the instrument in warranted operation.

Key Path	**System, Alignments, Auto Align**
Mode	All
Remote Command	`:CALibration:AUTO:ALERt TTEMperature|DAY|WEEK|NONE` `:CALibration:AUTO:ALERt?`
Example	:CAL:AUTO:ALER TTEM
Notes	The alert that alignment is needed is the setting of bit 14 in the Status Questionable Calibration register.
Preset	TTEMperature
Preset	This is unaffected by Preset but is set to TTEMperature on a "Restore System Defaults->Align".
State Saved	No
Status Bits/OPC dependencies	The alert is the Error Condition message "Align Now, All required" and bit 14 is set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00

Time & Temperature

With Auto Align Alert set to **Time & Temperature** the instrument will signal an alert when alignments expire due to the combination of the passage of time and changes in temperature. The alert is the Error Condition message "Align Now, All required". If this choice for Alert is selected, the absence of an alert means that the analyzer alignment is sufficiently up-to-date to maintain warranted accuracy.

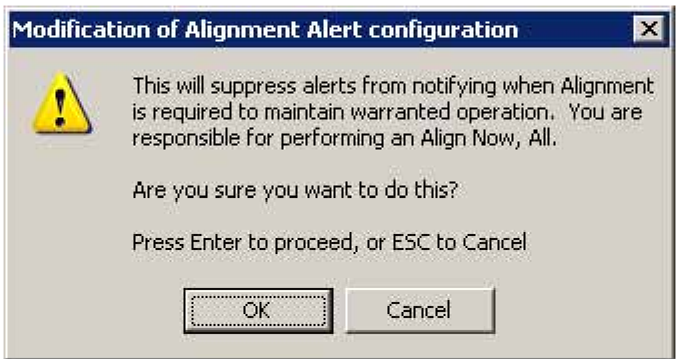
Key Path	**System, Alignments, Auto Align, Alert**
Mode	All
Example	:CAL:AUTO:ALER TTEM
Readback Text	Time & Temp
Status Bits/OPC dependencies	Bit 14 is set in the Status Questionable Calibration register.

Initial S/W Revision	Prior to A.02.00

24 hours

With Auto Align Alert set to **24 Hours** the instrument will signal an alert after a time span of 24 hours since the last successful full alignment (for example, **Align Now**, **All** or completion of a full Auto Align). You may choose this selection in an environment where the temperature is stable on a daily basis at a small risk of accuracy errors in excess of the warranted specifications. The alert is the Error Condition message “Align Now, All required”.

For front-panel operation, confirmation is required to transition into this setting of Alert. The confirmation dialog is:



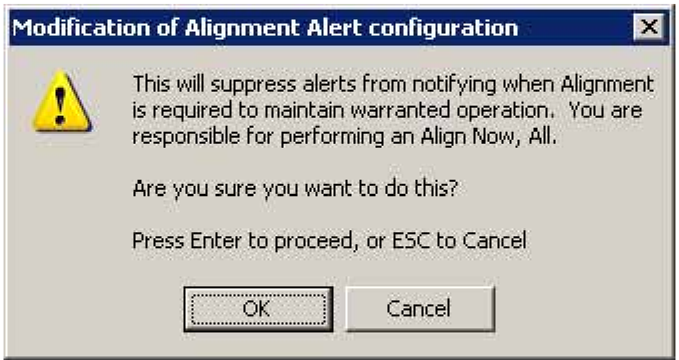
No confirmation is required when Alert is configured through a remote command.

Key Path	**System, Alignments, Auto Align, Alert**
Mode	All
Example	:CAL:AUTO:ALER DAY
Readback Text	24 hours
Status Bits/OPC dependencies	Bit 14 is set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00

7 days

With Auto Align Alert is set to **7 days** the instrument will signal an alert after a time span of 168 hours since the last successful full alignment (for example, **Align Now**, **All** or completion of a full Auto Align). You may choose this selection in an environment where the temperature is stable on a weekly basis, at a modest risk of accuracy degradations in excess of warranted performance. The alert is the Error Condition message “Align Now, All required”.

For front panel operation, confirmation is required for the customer to transition into this setting of Alert. The confirmation dialog is:



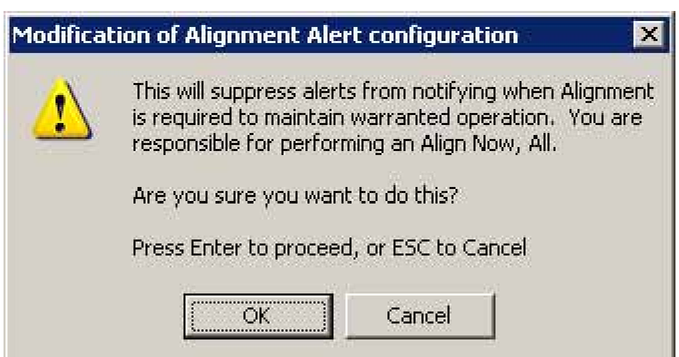
No confirmation is required when Alert is configured through a remote command.

Key Path	**System, Alignments, Auto Align, Alert**
Mode	All
Example	:CAL:AUTO:ALER WEEK
Readback Text	7 days
Status Bits/OPC dependencies	Bit 14 is set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00

None

With Auto Align Alert set to **None** the instrument will not signal an alert. This is provided for rare occasions where you are making a long measurement which cannot tolerate Auto Align interruptions, and must have the ability to capture a screen image at the end of the measurement without an alert posted to the display. Agilent does not recommends using this selection in any other circumstances, because of the risk of accuracy performance drifting well beyond expected levels without the operator being informed.

For front panel operation, confirmation is required to transition into this setting of Alert. The confirmation dialog is:



No confirmation is required when Alert is configured through a remote command.

Key Path	**System, Alignments, Auto Align, Alert**

Mode	All
Example	:CAL:AUTO:ALER NONE
Initial S/W Revision	Prior to A.02.00

Align Now

Accesses alignment processes that are immediate action operations. They perform complete operations and run until they are complete.

Key Path	**System, Alignments**
Initial S/W Revision	Prior to A.02.00

All

Immediately executes an alignment of all subsystems. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

If an interfering user signal is present at the RF Input, the alignment is performed on all subsystems except the RF. After completion, the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference” is generated. In addition the Error Condition message “Align Now, RF required” is generated, and bits 11 and 12 are set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration[:ALL]? or *CAL?) invokes the alignment of all subsystems and returns a success or failure value. An interfering user signal is not grounds for failure; if the alignment was able to succeed on all portions but unable to align the RF because of an interfering signal, the resultant will be the success value.

Successful completion of **Align Now**, **All** will clear the “Align Now, All required” Error Condition, and clear bit 14 in the Status Questionable Calibration register. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

If the Align RF subsystem succeeded in aligning (no interfering signal present), the elapsed time counter begins for Last Align Now, RF Time, and the temperature is captured for the Last Align Now, RF Temperature. In addition the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4.8 GHz interference” are cleared, the Error Condition “Align Now, RF required” is cleared, and bits 11 and 12 are cleared in the Status Questionable Calibration register

Align Now, **All** can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

In many cases, you might find it more convenient to change alignments to **Normal**, instead of executing **Align Now**, **All**. When the Auto Align process transitions to **Normal**, the analyzer will immediately start to update only the alignments that have expired, thus efficiently restoring the alignment process.

In models with the RF Preselector, such as the N9038A, the Align Now All alignment will immediately execute an alignment of all subsystems in the Spectrum Analyzer and partial subsystems of the RF

Preselector. The additional alignments are the System Gain, Mechanical attenuator and Electronic attenuator alignments on the RF Preselector path. The purpose of these alignments is to improve the RF Preselector path amplitude variation compared to the bypass path.

Key Path	**System, Alignments, Align Now**
Mode	All
Remote Command	`:CALibration[:ALL]` `:CALibration[:ALL]?`
Example	:CAL
Notes	:CALibration[:ALL]? returns 0 if successful :CALibration[:ALL]? returns 1 if failed :CALibration[:ALL]? is the same as *CAL? While Align Now, All is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 14 in the Status Questionable Calibration register. An interfering user signal is not grounds for failure of Align Now, All. However, bits 11 and 12 are set in the Status Questionable Calibration register to indicate Align Now, RF is required. An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.
Couplings	Initializes the time for the Last Align Now, All Time. Records the temperature for the Last Align Now, All Temperature. If Align RF component succeeded, initializes the time for the Last Align Now, RF Time. If Align RF component succeeded, records the temperature for the Last Align Now, RF Temperature.
Status Bits/OPC dependencies	Bits 11, 12, or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00

Mode	All
Remote Command	`*CAL?`
Example	*CAL?

Notes	*CAL? returns 0 if successful *CAL? returns 1 if failed :CALibration[:ALL]? is the same as *CAL? See additional remarks described with :CALibration[:ALL]? Everything about :CALibration[:ALL]? is synonymous with *CAL? including all conditions, status register bits, and couplings
Initial S/W Revision	Prior to A.02.00

All but RF

Immediately executes an alignment of all subsystems except the RF subsystem. The instrument will stop any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the **Restart** key). This can be used to align portions of the instrument that are not impacted by an interfering user input signal.

This operation might be chosen instead of **All** if you do not want the device under test to experience a large change in input impedance, such as a temporary open circuit at the analyzer input.

The query form of the remote commands (:CALibration:NRF?) will invoke the alignment and return a success or failure value.

Successful completion of **Align Now**, **All but RF** will clear the “Align Now, All required” Error Condition, and clear bit 14 in the Status Questionable Calibration register. If “Align Now, All required” was in effect prior to executing the All but RF, the Error Condition message “Align Now, RF required” is generated and bit 12 in the Status Questionable Calibration register is set. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

Align Now, **All but RF** can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the:ABORt SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be used for an individual subsystem, but not a full new set of data for all subsystems.

In models with the RF Preselector, such as the N9038A, the “All but RF” alignment will execute an alignment of all subsystems except the RF subsystem of the Spectrum Analyzer, as well as the system gain of the RF Preselector.

Key Path	**System, Alignments, Align Now**
Mode	All
Remote Command	`:CALibration:NRF` `:CALibration:NRF?`
Example	:CAL:NRF

Notes	:CALibration:NRF? returns 0 if successful :CALibration:NRF? returns 1 if failed While Align Now, All but RF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the:ABORt command. Successful completion will clear bit 14 in the Status Questionable Calibration register and set bit 12 if invoked with “Align Now, All required”.
Couplings	Initializes the time for the Last Align Now, All Time. Records the temperature for the Last Align Now, All Temperature.
Status Bits/OPC dependencies	Bits 12 or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00

RF

Immediately executes an alignment of the RF subsystem. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

This operation might be desirable if the alignments had been set to not include RF alignments, or if previous RF alignments could not complete because of interference which has since been removed.

If an interfering user signal is present at the RF Input, the alignment will terminate and generate the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference”, and Error Condition “Align Now, RF required”. In addition, bits 11 and 12 will be set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration:RF?) will invoke the alignment of the RF subsystem and return a success or failure value. An interfering user signal is grounds for failure.

Successful completion of **Align Now**, **RF** will begin the elapsed time counter for Last Align Now, RF Time, and capture the Last Align Now, RF Temperature.

Align Now, **RF** can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs, the Error Condition message “Align Now, RF required” is generated, and bit 12 is set in the Status Questionable Condition register. None of the new alignment data is used.

In models with the RF Preselector, such as the N9038A, the RF alignment will execute an alignment of the RF subsystem of the Spectrum Analyzer, as well as the RF subsystem on RF Preselector path.

Key Path	**System, Alignments, Align Now**
Mode	All
Remote Command	`:CALibration:RF` `:CALibration:RF?`

Example	:CAL:RF
Notes	:CALibration:RF? returns 0 if successful :CALibration:RF? returns 1 if failed (including interfering user signal) While Align Now, RF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion clears the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4800 MHz interference” and the Error Conditions “Align RF failed” and “Align Now, RF required”, and clears bits 3, 11, and 12 in the Status Questionable Calibration register. A failure encountered during alignment will generate the Error Condition message “Align RF failed” and set bit 3 in the Status Questionable Calibration register. An interfering user signal will result in bits 11 and 12 to be set in the Status Questionable Calibration register to indicate Align Now, RF is required. An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.
Couplings	Initializes the time for the Last Align Now, RF Time. Records the temperature for the Last Align Now, RF Temperature.
Status Bits/OPC dependencies	Bits 11, 12, or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00

External Mixer

Immediately executes an alignment of the External Mixer which is plugged into the USB port. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the **Restart** key). As this alignment calibrates the LO power to the mixer, this is considered an LO alignment; and failure is classified as an LO alignment failure.

The query form of the remote commands (:CALibration:EMIXer?) will invoke the alignment of the External Mixer and return a success or failure value.

Key Path	**System, Alignments, Align Now**
Mode	All
Remote Command	`:CALibration:EMIXer` `:CALibration:EMIXer?`
Example	:CAL:EMIX

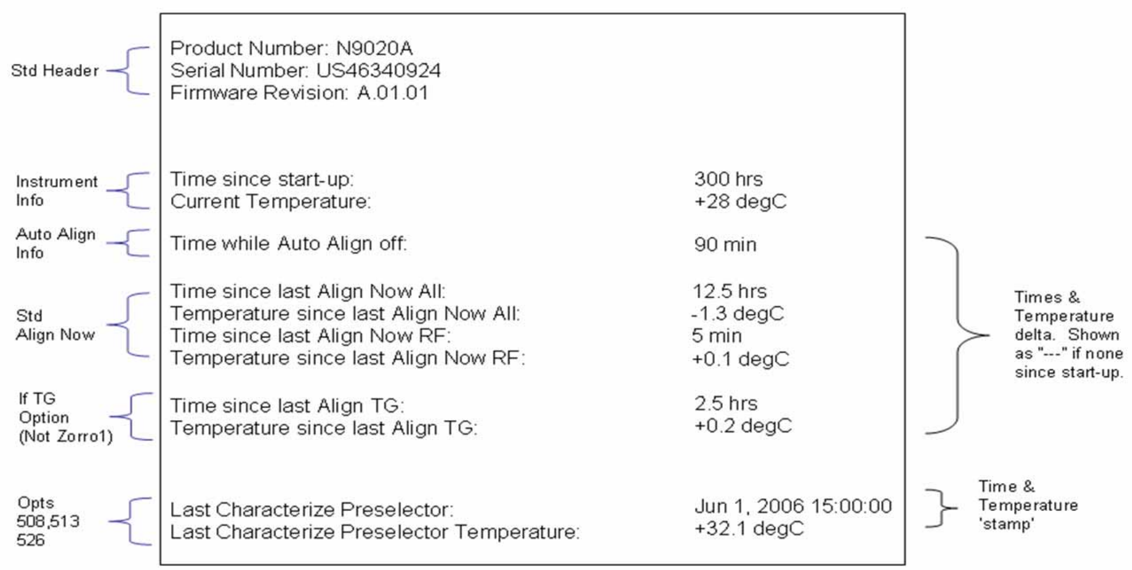
Notes	:CAL:EMIX? returns 0 if successful :CAL:EMIX? returns 1 if failed While Align Now, Ext Mix is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. A failure encountered during alignment will generate the Error Condition message “Align LO failed” and set bit 5 in the Status Questionable Calibration register. Successful completion will clear the “Align LO failed” message and bit 5 in the Status Questionable Calibration register.
Dependencies	This key does not appear unless option EXM is present and is grayed out unless a USB mixer is plugged in to the USB.
Status Bits/OPC dependencies	Bit3 may be set in the Status Questionable Calibration Extended Failure register.
Initial S/W Revision	A.08.00

Show Alignment Statistics

Shows alignment information you can use to ensure that the instrument is operating in a specific manner. The Show Alignment Statistics screen is where you can view time and temperature information.

Values which are displayed are only updated when the Show Alignment Statistics screen is invoked, they are not updated while the Show Alignment Statistics screen is being displayed. The remote commands which access this information obtain current values.

An example of the Show Alignment Statistics screen would be similar to:



A successful Align Now, RF will set the Last Align RF temperature to the current temperature, and reset the Last Align RF time. A successful Align Now, All or Align Now, All but RF will set the Last Align Now All temperature to the current temperature, and reset the Last Align Now All time. A successful Align Now, All will also reset the Last Align RF items if the RF portion of the Align Now succeeded.

Key Path	**System, Alignments**
Mode	All
Notes	The values displayed on the screen are only updated upon entry to the screen and not updated while the screen is being displayed.
Initial S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:SYSTem:PON:TIME?`
Example	:SYST:PON:TIME?
Notes	Value is the time since the most recent start-up in seconds.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TEMPerature:CURRent?`
Example	:CAL:TEMP:CURR?
Notes	Value is in degrees Centigrade. Value is invalid if using default alignment data (Align Now, All required)
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TIME:LALL?`
Example	:CAL:TIME:LALL?
Notes	Value is the elapsed time, in seconds, since the last successful Align Now, All or Align Now, All but RF was executed.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TEMPerature:LALL?`
Example	:CAL:TEMP:LALL?
Notes	Value is in degrees Centigrade at which the last successful Align Now, All or Align Now, All but RF was executed.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TIME:LRF?`
Example	:CAL:TIME:LRF?
Notes	Value is the elapsed time, in seconds, since the last successful Align Now, RF was executed, either individually or as a component of Align Now, All.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TEMPerature:LRF?`
Example	:CAL:TEMP:LRF?
Notes	Value is in degrees Centigrade at which the last successful Align Now, RF was executed, either individually or as a component of Align Now, All.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TIME:LPReselector?`
Example	:CAL:TIME:LPR?
Notes	Value is date and time the last successful Characterize Preselector was executed. The date is separated from the time by a space character. Returns “” if no Characterize Preselector has ever been performed on the instrument.

Dependencies	In models that do not include preselectors, this command is not enabled and any attempt to set or query will yield an error.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TEMPerature:LPReselector?`
Example	:CAL:TEMP:LPR?
Notes	Value is in degrees Centigrade at which the last successful Characterize Preselector was executed.
Dependencies	In models that do not include preselectors, this command is not enabled and any attempt to set or query will yield an error.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:AUTO:TIME:OFF?`
Example	:CAL:AUTO:TIME:OFF?
Notes	Value is the elapsed time, in seconds, since Auto Align has been set to Off or Off with Alert. The value is 0 if Auto Align is ALL or NORF.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TIME:RFPSelector:LCONducted?`
Example	:CAL:TIME:RFPS:LCON?
State Saved	No
Restriction and Notes	Values are the date and time the last successful Align Now, 20 Hz – 30 MHz was executed. The date is separated from the time by a semi-colon character.

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All

Remote Command	`:CALibration:TEMPerature:RFPSelector:LCONducted?`
Example	:CAL:TEMP:RFPS:LCON?
State Saved	No
Restriction and Notes	Value is in degrees Centigrade at which the last successful Align Now, 20 Hz – 30 MHz was executed.

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TIME:RFPSelector:LRADiated?`
Example	:CAL:TIME:RFPS:LRAD?
State Saved	No
Restriction and Notes	Value is the date and time the last successful Align Now, 30 MHz – 3.6 GHz was executed. The date is separated from the time by a semi-colon character.

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TEMPerature:RFPSelector:LRADiated?`
Example	:CAL:TEMP:RFPS:LRAD?
State Saved	No
Restriction and Notes	Value is in degrees Centigrade at which the last successful Align Now, 30 MHz – 3.6 GHz was executed.

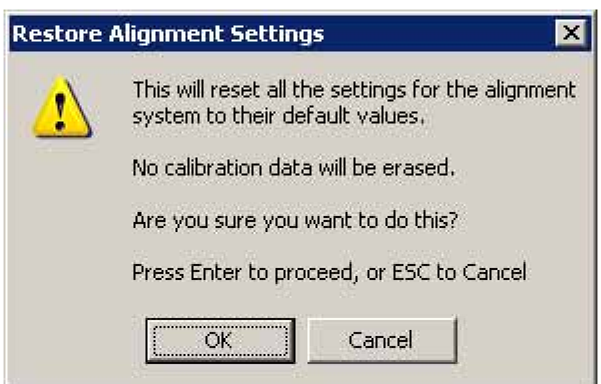
Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:RFPSelector:SCHeduler:TIME:NEXT?` This query returns data using the following format “YYYY/MM/DD; HH:MM:SS”
Example	:CAL:RFPS:SCH:TIME:NEXT?
State Saved	No

Restriction and Notes	The next run time will be updated based on the start date/time and recurrence set by the users. “date” is representation of the date the task will run in the form of “YYYY/MM/DD” where: YYYY is the four digit representation of year. (for example, 2009) MM is the two digit representation of month. (for example, 01 to 12) DD is the two digit representation of the day. (for example, 01 to 28, 29, 30 or 31 depending on the month and year) “time” is a representation of the time of day the task will run in the form of “HH:MM:SS” where: HH is the two digit representation of the hour in 24 hour format MM is the two digit representation of minute SS is the two digit representation of seconds For model N9038A only.

Restore Align Defaults

Initializes the alignment user interface settings, not alignment data, to the factory default values. Align Now, All must be executed if the value of the Timebase DAC results in a change.

For front panel operation, you are prompted to confirm action before setting the alignment parameters to factory defaults:



The parameters affected are:

Parameter	Setting
Timebase DAC	Calibrated
Timebase DAC setting	Calibrated value
Auto Align State	Normal (if the instrument is not operating with default alignment data, Off otherwise)
Auto Align All but RF	Off

Parameter	Setting
Auto Align Alert	Time & Temperature

Key Path	**System, Alignments**
Mode	All
Example	:SYST:DEF ALIG
Notes	Alignment processing that results as the transition to Auto Alignment Normal will be executed sequentially; thus *OPC? or *WAI will wait until the alignment processing is complete.
Initial S/W Revision	Prior to A.02.00

Backup or Restore Align Data…

Opens the utility for backing-up or restoring the alignment data.

Alignment data for the instrument resides on the hard drive in a database. Agilent uses high quality hard drives; however it is highly recommended the alignment data be backed-up to storage outside of the instrument. Additionally, for customers who use multiple CPU Assemblies or multiple disk drives, the alignment that pertains to the instrument must be transferred to the resident hard drive after a CPU or hard drive is replaced. This utility facilitates backing-up and restoring the alignment data.

NOTE This utility allows the operator to navigate to any location of the Windows file system. It is intended that the operator use a USB memory device or Mapped Network Drive to backup the alignment data to storage outside of the instrument.

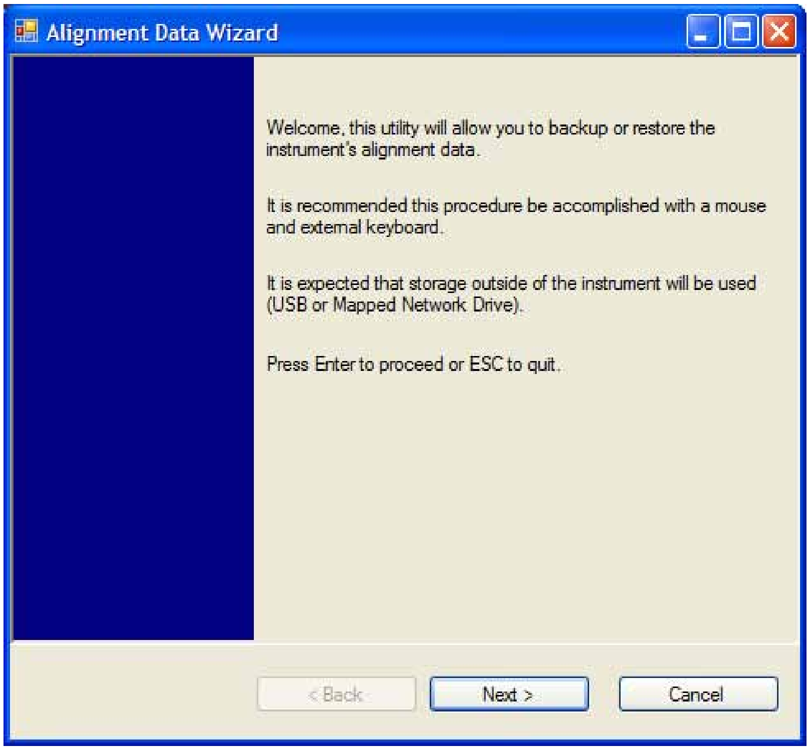
Key Path	**System, Alignments**
Initial S/W Revision	A.02.00

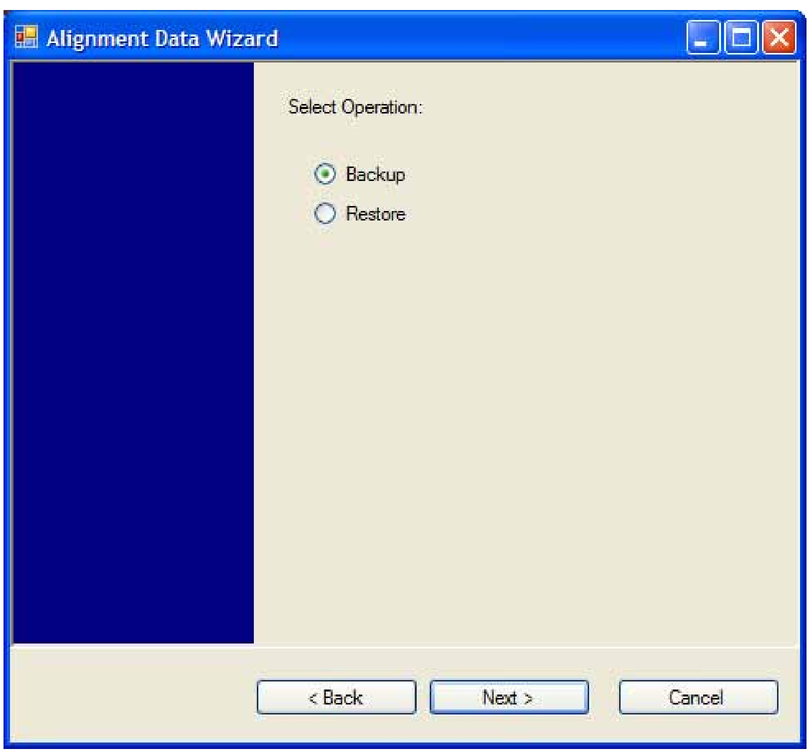
Key Path	**System, Alignments**
Mode	All
Remote Command	`:CALibration:DATA:DEFault`
Example	:CAL:DATA:DEF
Couplings	Sets Auto Align to Off. Sets bit 14 in the Status Questionable Calibration register. The Error Condition message “Align Now, All required” is generated.
Initial S/W Revision	Prior to A.02.00

Alignment Data Wizard

The Backup or Restore Alignment Data wizard will guide you through the operation of backing-up or restoring the alignment data.

The following dialogue boxes operate without a mouse or external keyboard when you use the default file names.

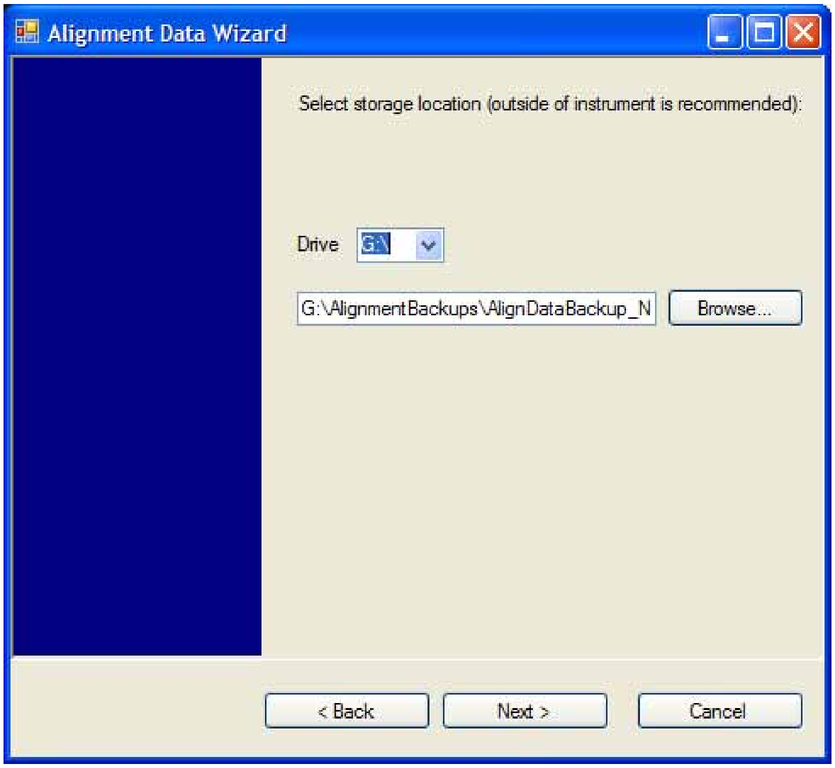




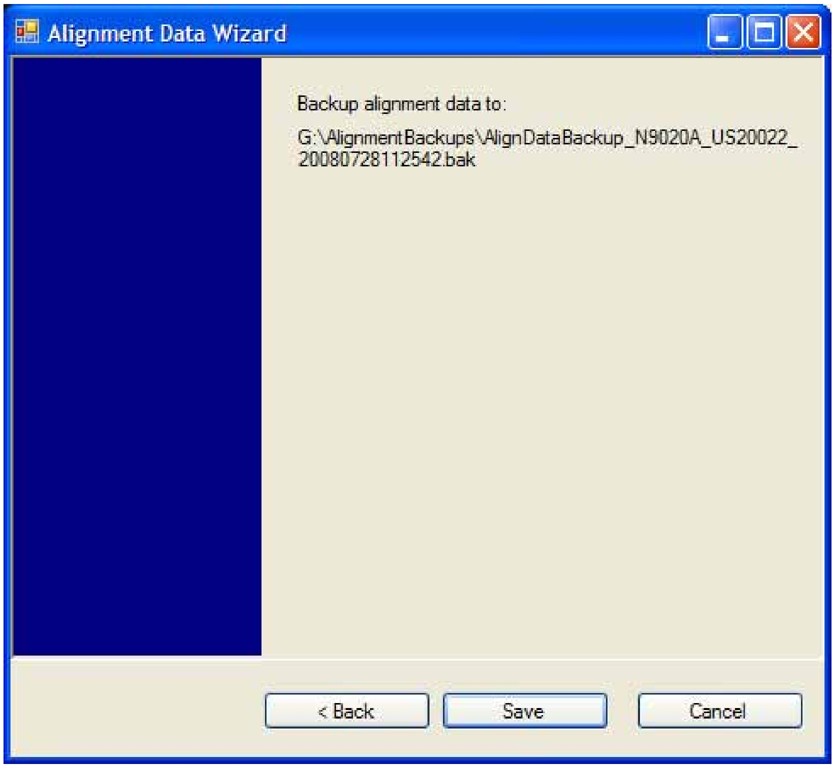
The backup screen will indicate the approximate amount of space required to contain the backup file.

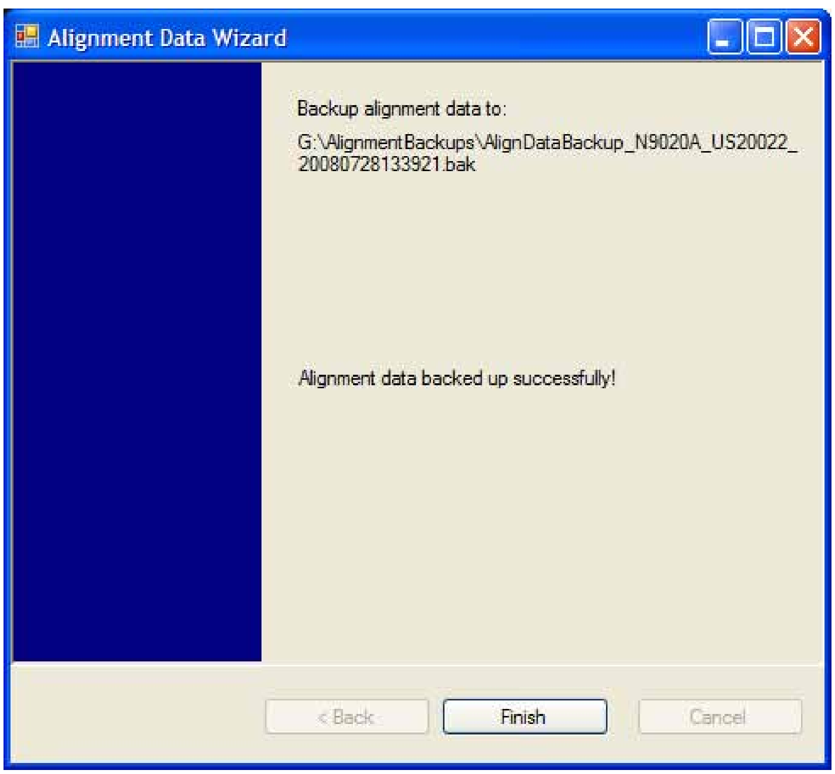
The default file name will be AlignDataBackup_<model number>_<serial number>_<date in YYYYMMDDHHMMSS>.bak.

For the N9030A the default backup location will be the internal F: drive which is a solid-state memory device located internally on the instrument.



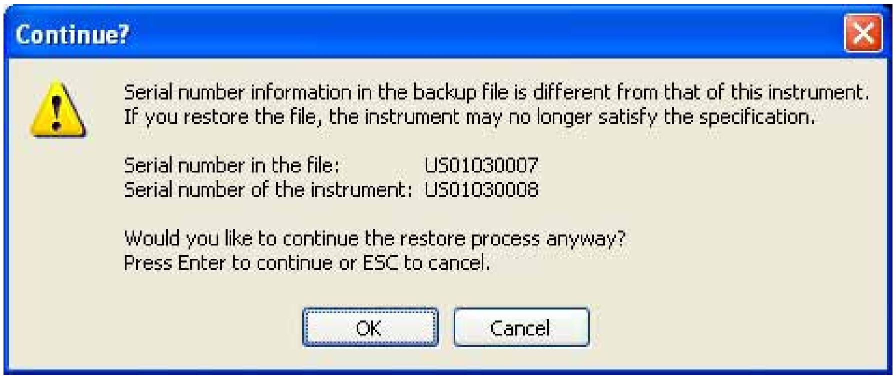
Changing the drive letter will also modify the path displayed in the box below. When this step is first loaded, the drive drop-down is populated with connected drives which provide the user with write access. If there are many unreachable network drives connected to the instrument, this step can take a few seconds. If a USB drive is present, it will be selected by default. The path defaults to the AlignmentBackups folder, and a filename will be automatically created in the form of AlignDataBackup_<model>_<serial number>_<date><time>. When the "Next >" button is pressed, the user will be prompted to create a new folder if the chosen path does not yet exist.



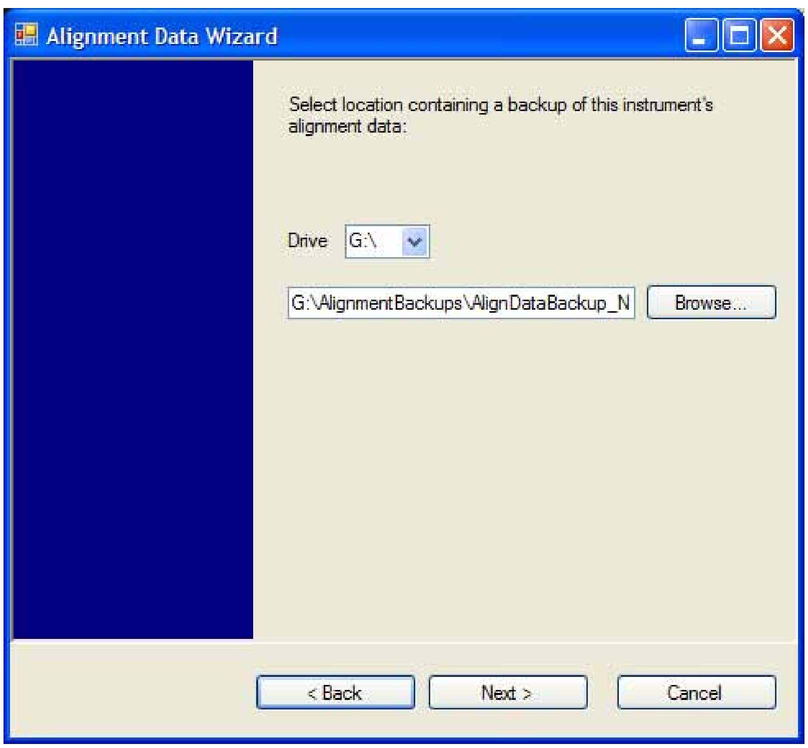


The restore operation will check the validity of the restore file using the database's built-in file validation. If the restore file is corrupt, the existing alignment data will remain in use.

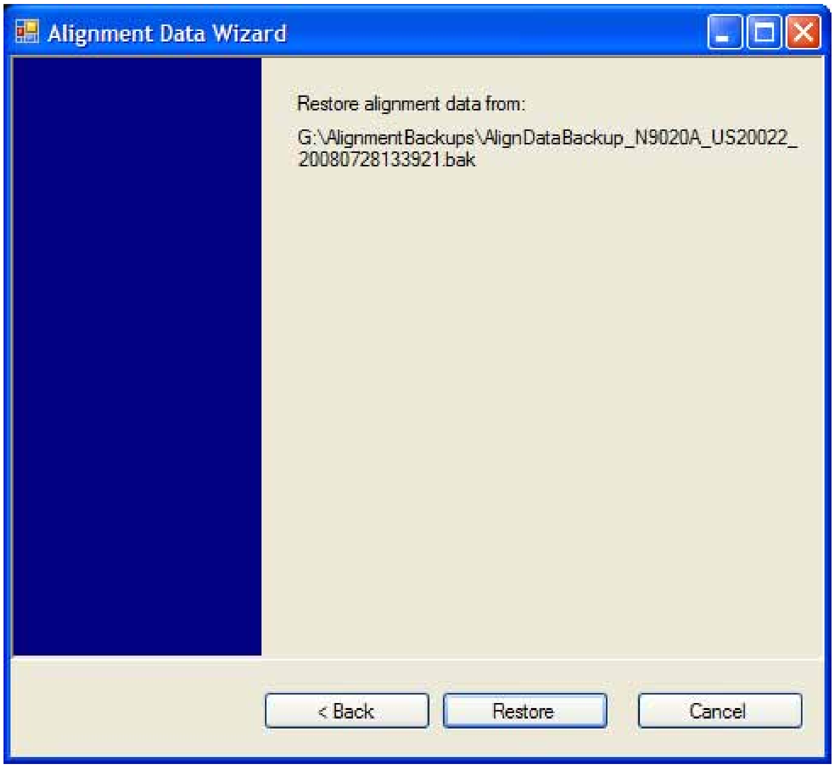
If the serial number information in the backup file being restored is different from that of the instrument, the following message appears (the serial number shown are examples):

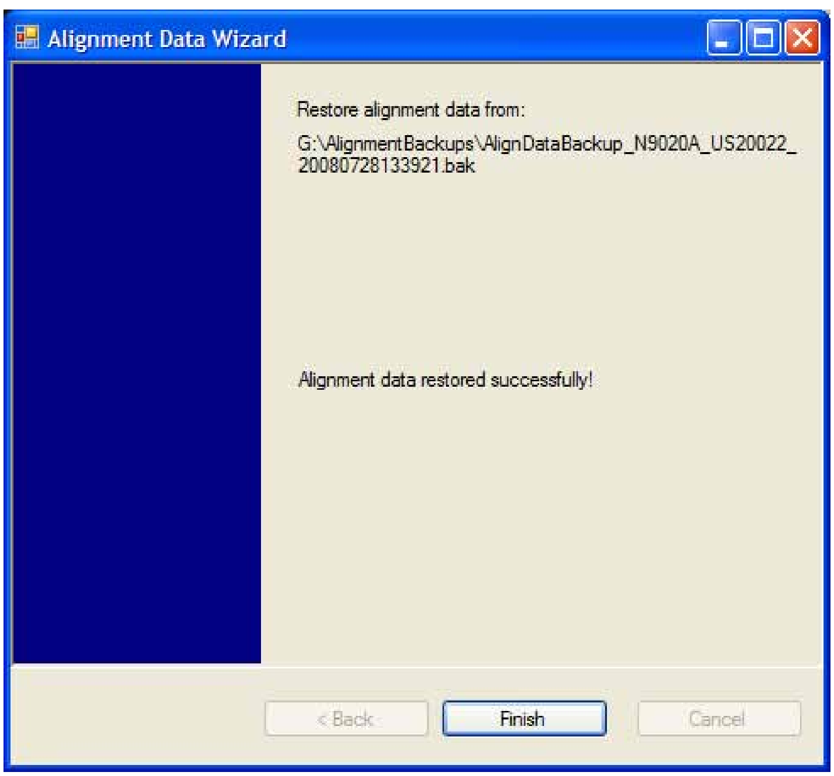


For the N9030A, the default restore location will be the internal F: drive which is a solid-state memory device located internally on the instrument. The default restore file will be the most recent file that matches the default backup file name format: AlignDataBackup_N9030A_<serial number>_<date>.bak



Changing the drive letter will also modify the path displayed in the box below. When this step is first loaded, the drive drop-down is populated with connected drives which provide the user with read access. The path defaults to the AlignBackups folder. The most recent *.bak file in the folder will also be selected by default.


Alignment Data Wizard
Restore alignment data from:
G:\AlignmentBackups\AlignDataBackup_N9020A_US20022_20080728133921.bak
< Back
Restore
Cancel


Alignment Data Wizard
Restore alignment data from:
G:\AlignmentBackups\AlignDataBackup_N9020A_US20022_20080728133921.bak
Alignment data restored successfully!
< Back
Finish
Cancel

Perform Backup (Remote Command Only)

Invokes an alignment data backup operation to the provided Folder.

NOTE It is recommended that the Folder provided is outside of the instrument (USB or Mapped Network Drive).

Remote Command	`:CALibration:DATA:BACKup <filename>`
Example	:CAL:DATA:BACK "F:\AlignDataBackup_N9020A_US00000001_2008140100.bak"
Initial S/W Revision	A.02.00

Perform Restore (Remote Command Only)

Invokes an alignment data restore operation from the provided filename.

Remote Command	`:CALibration:DATA:RESTore <filename>`
Example	:CAL:DATA:REST "F:\AlignDataBackup_N9020A_US00000001_2008140100.bak "
Initial S/W Revision	A.02.00

Advanced

Accesses alignment processes that are immediate action operations that perform operations that run until complete. Advanced alignments are performed on an irregular basis, or require additional operator interaction

Key Path	**System, Alignments**
Initial S/W Revision	Prior to A.02.00

Characterize Preselector (Only with Option 507, 508, 513, or 526)

The Preselector tuning curve drifts over temperature and time. Recognize that the **Amplitude**, **Presel Center** function adjusts the preselector for accurate amplitude measurements at an individual frequency. **Characterize Preselector** improves the amplitude accuracy by ensuring the Preselector is approximately centered at all frequencies without the use of the **Amplitude**, **Presel Center** function. **Characterize Preselector** can be useful in situations where absolute amplitude accuracy is not of utmost importance, and the throughput savings or convenience of not performing a **Presel Center** is desired. **Presel Center** is required prior to any measurement for best (and warranted) amplitude accuracy.

Agilent recommends that the **Characterize Preselector** operation be performed yearly as part of any calibration, but performing this operation every three months can be worthwhile.

Characterize Preselector immediately executes a characterization of the Preselector, which is a YIG-tuned filter (YTF). The instrument stops any measurement currently underway, performs the characterization, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

The query form of the remote commands (:CALibration:YTF?) will invoke the alignment of the YTF subsystem and return a success or failure value.

A failure encountered during alignment will generate the Error Condition message “Characterize Preselector failure” and set bit 3 in the STATus:QUEStionable:CALibration:EXTended:FAILure status register. Successful completion of **Characterize Preselector** will clear this Condition. It will also begin the elapsed time counter for Last Characterize Preselector Time, and capture the Last Characterize Preselector Temperature.

The last Characterize Preselector Time and Temperature survives across the power cycle as this operation is performed infrequently.

NOTE **Characterize Preselector** can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. None of the new characterization data is then used. However, since the old characterization data is purged at the beginning of the characterization, you now have an uncharacterized preselctor. You should re-execute this function and allow it to finish before making any further preselected measurements.

Key Path	**System, Alignments, Advanced**
Mode	All
Remote Command	`:CALibration:YTF` `:CALibration:YTF?`
Example	:CAL:YTF
Notes	:CALibration:YTF? returns 0 if successful :CALibration:YTF? returns 1 if failed (including interfering user signal) While Advanced, Characterize Preselector is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 9 in the Status Questionable Calibration register. A failure encountered during alignment will generate the Error Condition message “Characterize Preselector failed” and set bit 9 in the Status Questionable Calibration register. For Option 507, 508, 513, and 526 only.

Dependencies	This key does not appear in models that do not contain preselectors. In these models the SCPI command is accepted without error but no action is taken.
Couplings	Initializes the time for the Last Characterize Preselector Time. Records the temperature for the Last Characterize Preselector Temperature.
Initial S/W Revision	Prior to A.02.00

Timebase DAC

Allows control of the internal 10 MHz reference oscillator timebase. This may be used to adjust for minor frequency alignment between the signal and the internal frequency reference. This adjustment has no effect if the instrument is operating with an External Frequency Reference.

If the value of the Timebase DAC changes (by switching to Calibrated from User with User set to a different value, or in User with a new value entered) an alignment may be necessary. The alignment system will take appropriate action; which will either invoke an alignment or cause an Alert.

Key Path	**System, Alignments**
Mode	All
Remote Command	`:CALibration:FREQuency:REFerence:MODE CALibrated|USER` `:CALibration:FREQuency:REFerence:MODE?`
Example	:CAL:FREQ:REF:MODE CAL
Notes	If the value of the timebase is changed the alignment system automatically performs an alignment or alerts that an alignment is due. If the value of the timebase is changed the alignment system automatically performs an alignment or alerts that an alignment is due.
Preset	CAL
Preset	This is unaffected by Preset but is set to CALibrated on a “Restore System Defaults->Align”.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Calibrated

Sets the Timebase DAC to the value established during factory or field calibration. The value displayed on the menu key is the calibrated value.

Key Path	**System, Alignments, Timebase DAC**
Mode	All
Example	:CAL:FREQ:REF:MODE CAL
Readback Text	[xxx] < where xxx is the calibrated value
Initial S/W Revision	Prior to A.02.00

User

Allows setting the Timebase DAC to a value other than the value established during the factory or field calibration. The value displayed on the menu key is the calibrated value.

Key Path	**System, Alignments, Timebase DAC**
Mode	All
Example	:CAL:FREQ:REF:MODE USER
Readback Text	xxx < where xxx is the Timebase DAC setting
Initial S/W Revision	Prior to A.02.00

Key Path	**System, Alignments, Timebase DAC**
Mode	All
Remote Command	`:CALibration:FREQuency:REFerence:FINE <integer>` `:CALibration:FREQuency:REFerence:FINE?`
Example	:CAL:FREQ:REF:FINE 8191
Notes	If the value of the timebase is changed the alignment system automatically performs an alignment or alerts that an alignment is due.
Couplings	Setting :CAL:FREQ:REF:FINE sets :CAL:FREQ:REF:MODE USER
Preset	This is unaffected by Preset but is set to the factory setting on a “Restore System Defaults->Align”.
State Saved	No
Min	0
Max	16383
Initial S/W Revision	Prior to A.02.00

Remote Command	`:CALibration:FREQuency:REFerence:COARse <integer>` `:CALibration:FREQuency:REFerence:COARse?`
Example	:CAL:FREQ:REF:COAR 8191
Notes	This is an alias for CAL:FREQ:REF:FINE any change to COARse is reflected in FINE and vice-versa. See CAL:FREQ:REF:FINE for description of functionality.
Couplings	Setting :CAL:FREQ:REF:COAR sets :CAL:FREQ:REF:MODE USER
Initial S/W Revision	Prior to A.02.00

RF Preselector

This menu and all of its submenus are only available in models with the RF Preselector, such as the N9038A.

Align Now, 20 Hz to 30 MHz

Immediately executes an alignment of the receiver subsystem. The receiver will stop any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key).

The query form of the remote commands (:CALibration:RFPSelector:CONDucted?) will invoke the alignment of the RF Preselector on Conducted Band and return a success or failure value. Successful completion will clear the “Align 20 Hz to 30 MHz required” Error Condition, and clear the bit 1 in the Status Questionable Calibration Extended Needed register. The elapsed time counter will begin for Last Align Now, Conducted Time, and the temperature is captured for the Last Align Now, Conducted Temperature. The alignment can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs, the Error Condition “Align 20 Hz to 30 MHz required” is set because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

The “Align 20 Hz to 30 MHz required” Error Condition will appear when this alignment has expired. User is now responsible to perform the Align Now, 20 Hz to 30 MHz in order to keep the receiver in warranted operation. This alignment can only be performed by user as it is not part of the Auto Align process.

Key Path	**System, Alignments, RF Preselector, Align Now**
Mode	All
Remote Command	`:CALibration:RFPSelector:CONDucted` `:CALibration:RFPSelector:CONDucted?`
Example	:CAL:RFPS:COND

Notes	:CALibration:RFPSelector:CONDucted? Return 0 if successful :CALibration:RFPSelector:CONDucted? Return 1 if failed When Align 20 Hz to 30 MHz is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 1 in the Status Questionable Calibration Extended Needed register and bit 0 in Status Questionable Calibration Extended Failure register. A failure encountered during alignment will set the Error Condition “20 Hz to 30 MHz Alignment Failure” and set both bit 1 in the Status Questionable Calibration Extended Needed register and bit 9 in Status Questionable Calibration register. For model N9038A only.
Dependencies	This key does not appear in other than N9038A models, setting or querying the SCPI will generate an error.
Couplings	Initializes the time for the Last Align Conducted Now, Conducted Time. Records the temperature for the Last Align Conducted Now, Conducted Temperature.
Status Bits/OPC Dependencies	Bit 8 or 9 may be set in the Status Questionable Calibration register. Bit 1 may be set in the Status Questionable Calibration Extended Needed register. Bit 0 may be set in the Status Questionable Calibration Extended Failure register.
Initial S/W Revision	A.08.00

Align Now, 30 MHz to 3.6 GHz

Immediately executes an alignment of the receiver subsystem. The receiver will stop any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key).

The query form of the remote commands (:CALibration:RFPSelector:RADiated?) will invoke the alignment of the RF Preselector on Radiated Band and return a success or failure value. Successful completion will clear the “Align 30 MHz to 3.6 GHz required” Error Condition, and clear the bit 2 in the Status Questionable Calibration Extended Needed register. The elapsed time counter will begin for Last Align Now, Radiated Time, and the temperature is captured for the Last Align Now, Radiated Temperature. The alignment can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs, the Error Condition “Align 30 MHz to 3.6 GHz required” is set because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

The “Align 30 MHz to 3.6 GHz required” Error Condition will appear when this alignment has expired. User is now responsible to perform the Align Now, 30 MHz to 3.6 GHz in order to keep the receiver in warranted operation. This alignment can only be performed by user as it is not part of the Auto Align process.

Key Path	**System, Alignments, RF Preselector, Align Now**
Mode	All
Remote Command	`:CALibration:RFPSelector:RADiated` `:CALibration:RFPSelector:RADiated?`
Example	:CAL:RFPS:RAD
Notes	:CALibration:RFPSelector:RADiated? Return 0 if successful :CALibration:RFPSelector:RADiated? Return 1 if failed When Align 30 MHz to 3.6 GHz is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 2 in the Status Questionable Calibration Extended Needed register and bit 1 in Status Questionable Calibration Extended Failure register. A failure encountered during alignment will set the Error Condition “30 MHz to 3.6 GHz Alignment Failure” and set both bit 2 in the Status Questionable Calibration Extended Needed register and bit 9 in Status Questionable Calibration register. For model N9038A only.
Dependencies	This key does not appear in other than N9038A models, setting or querying the SCPI will generate an error.
Couplings	Initializes the time for the Last Align Radiated Now, Radiated Time. Records the temperature for the Last Align Radiated Now, Radiated Temperature.
Status Bits/OPC Dependencies	Bit 8 or 9 may be set in the Status Questionable Calibration register. Bit 2 may be set in the Status Questionable Calibration Extended Needed register. Bit 1 may be set in the Status Questionable Calibration Extended Failure register.
Initial S/W Revision	A.08.00

Align Now, 20 Hz to 3.6 GHz

Immediately executes an alignment of the receiver subsystem. The receiver will stop any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key).

The query form of the remote commands (:CALibration:RFPSelector:FULL?) will invoke the alignment of the RF Preselector on both Conducted and Radiated Band and return a success or failure value. Successful completion will clear the “Align 20 Hz to 3.6 GHz required” Error Condition, and clear the bit 1 and bit 2 in the Status Questionable Calibration Extended Needed register. The elapsed time counter will begin for Last Align Now, Conducted Time and Last Align Now Radiated Time and the temperature is captured for Last Align Now, Conducted Temperature and Last Align Now, Radiated Temperature. The alignment can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs, the Error Condition “Align 20 Hz to 3.6 GHz required” is set because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

The “Align 20 Hz to 3.6 GHz required” Error Condition will appear when this alignment has expired. User is now responsible to perform the Align Now, 20 Hz to 3.6 GHz in order to keep the receiver in warranted operation. This alignment can only be performed by user as it is not part of the Auto Align process.

Key Path	**System, Alignments, RF Preselector, Align Now**
Mode	All
Remote Command	`:CALibration:RFPSelector:FULL` `:CALibration:RFPSelector:FULL?`
Example	:CAL:RFPS:FULL
Notes	:CALibration:RFPSelector:FULL? Return 0 if successful :CALibration:RFPSelector:FULL? Return 1 if failed When Align 20 Hz to 3.6 GHz is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 1, bit 2 in the Status Questionable Calibration Extended Needed register and bit 0, bit 1 in Status Questionable Calibration Extended Failure register. A failure encountered during alignment will set the Error Condition “20 Hz to 3.6 GHz Alignment Failure” and set bit1, bit 2 in the Status Questionable Calibration Extended Needed register and bit 9 in Status Questionable Calibration register. For model N9038A only.
Dependencies	This key does not appear in other than N9038A models, setting or querying the SCPI will generate an error.

Couplings	Initializes the time for the Last Align Conducted Now, Conducted Time. Initializes the time for the Last Align Radiated Now, Radiated Time. Records the temperature for the Last Align Conducted Now, Conducted Temperature. Records the temperature for the Last Align Radiated Now, Radiated Temperature.
Status Bits/OPC Dependencies	Bit 8 or 9 may be set in the Status Questionable Calibration register. Bit 1 and 2 may be set in the Status Questionable Calibration Extended Needed register. Bit 0 and 1 may be set in the Status Questionable Calibration Extended Failure register.
Initial S/W Revision	A.08.00

Alert

Setting Alert to ON/OFF will enable/disable the display of RF Preselector alignment required message on the status line. The instrument will power up with Alert On mode.

Key Path	**System, Alignments, RF Preselector**
Mode	All
Remote Command	`:CALibration:RFPSelector:ALERt ON|OFF|0|1` `:CALibration:RFPSelector:ALERt?`
Example	:CAL:RFPS:ALER OFF
Notes	For model N9038A only. Error Condition will be generated when the alert is On and any of the RF Preselector alignments has expired.
Preset	This is unaffected by Preset but is set to ON on a “Restore System Defaults->Align”.
State Saved	No
Initial S/W Revision	A.08.00

Schedule Setup

To schedule a task to run automatically at the background based on the recurrence and time set in the scheduler. Make sure that the Instrument’s local time is accurate as the Scheduler relies on this information to execute the task.

Key Path	**System, Alignments, RF Preselector**
Initial S/W Revision	A.08.00

Task

There is Task 1 to 3 to be selected for the scheduler to run. Task 1 is the 20 Hz to 30 MHz alignment, Task 2 is the 30 MHz to 3.6 GHz alignment and Task 3 is the 20 Hz to 3.6 GHz alignment.

Key Path	**System, Alignments, RF Preselector, Schedule Setup**
Mode	All
Remote Command	`:CALibration:RFPSelector:SCHeduler:TASK T1|T2|T3` `:CALibration:RFPSelector:SCHeduler:TASK?`
Example	:CAL:RFPS:SCH:TASK T1
Notes	Changing the task will not reset the Scheduler time and the alignment is based on the current scheduled configuration to occur. For model N9038A only.
Preset	T3
Preset	This is unaffected by Preset but is set to T3 on a “Restore System Defaults->Align”.
State Saved	No
Range	Task 1 | Task 2 | Task 3
Initial S/W Revision	A.08.00

Date/Time

Configure the scheduler to run a task starting from this date and time. The date and time rely on the instrument’s local time to execute a scheduled task. The date is based on the format “YYYY/MM/DD” and the time is based on a 24 hour clock.

Key Path	**System, Alignments, RF Preselector, Schedule Setup**
Mode	All

Remote Command	`:CALibration:RFPSelector:SCHeduler:TIME:STARt ”date”,”time”`
	`:CALibration:RFPSelector:SCHeduler:TIME:STARt?`
	This query returns data using the following format ”YYYY/MM/DD; HH:MM:SS”

Example	:CAL:RFPS:SCH:TIME:STAR ”2009/8/20”,”12:00:00”

Notes	"date" is representation of the date the task will run in the form of "YYYY/MM/DD" where: YYYY is the four digit representation of year. (for example, 2009) MM is the two digit representation of month. (for example, 01 to 12) DD is the two digit representation of the day. (for example, 01 to 28, 29, 30 or 31 depending on the month and year) "time" is a representation of the time of day the task will run in the form of "HH:MM:SS" where: HH is the two digit representation of the hour in 24 hour format MM is the two digit representation of minute SS is the two digit representation of seconds For model N9038A only.
Preset	00:00:00
Preset	This is unaffected by Preset but is set to Current date and 00:00:00 on a "Restore System Defaults->Align".
State Saved	No
Initial S/W Revision	A.08.00

Date

Configure the date of the scheduled task. The SCPI command to configure the date and time parameters of the scheduler is the same; however, they each have their own front panel control.

Key Path	**System, Alignments, RF Preselector, Schedule Setup, Date/Time**
Notes	See section "Date/Time " on page 250 For model N9038A only.
Preset	Current date
Preset	This is unaffected by Preset but is set to Current date and 00:00:00 on a "Restore System Defaults->Align".
State Saved	No
Initial S/W Revision	A.08.00

Time

Configure the time of the scheduled task. The SCPI command to configure the date and time parameters of the scheduler is the same; however, they each have their own front panel control.

Key Path	**System, Alignments, RF Preselector, Schedule Setup, Date/Time**
Notes	See section "Date/Time " on page 250 For model N9038A only.

Preset	00:00:00
Preset	This is unaffected by Preset but is set to Current date and 00:00:00 on a “Restore System Defaults->Align”.
State Saved	No
Initial S/W Revision	A.08.00

Recurrence

Configure the scheduler to run the task recurrently on a scheduled date and time. You can schedule it to run daily, weekly or alternate weeks.

Key Path	**System, Alignments, RF Preselector, Schedule Setup**
Mode	All
Remote Command	`:CALibration:RFPSelector:SCHeduler:RECurrence DAY|WEEK|OFF` `:CALibration:RFPSelector:SCHeduler:RECurrence?`
Example	:CAL:RFPS:SCH:REC DAY
Notes	For model N9038A only.
Preset	This is unaffected by Preset but is set to OFF on a “Restore System Defaults->Align”.
State Saved	No
Range	DAY|WEEK |OFF
Initial S/W Revision	A.08.00

Every N Weeks

Configure the scheduler to run the task on a day in every number of week’s duration.

Key Path	**System, Alignments, RF Preselector, Schedule Setup, Recurrence**
Initial S/W Revision	A.08.00

N of Weeks

Set the number of week’s duration the scheduler will trigger a task.

Key Path	**System, Alignments, RF Preselector, Schedule Setup, Recurrence, Every N Weeks**
Mode	All
Remote Command	`:CALibration:RFPSelector:SCHeduler:RECurrence:WEEK <integer>` `:CALibration:RFPSelector:SCHeduler:RECurrence:WEEK?`

Example	:CAL:RFPS:SCH:REC:WEEK 2
Notes	New scheduled date to run the alignment task will get updated when this parameter is changed. For model N9038A only.
Preset	This is unaffected by Preset but is set to 1 on a "Restore System Defaults->Align".
State Saved	No
Range	1–52
Initial S/W Revision	A.08.00

Day

Set the Day of the Week the scheduler will run a scheduled task.

Key Path	**System, Alignments, RF Preselector, Schedule Setup, Recurrence, Every N Weeks**
Mode	All
Remote Command	`:CALibration:RFPSelector:SCHeduler:RECurrence:DAY SUN|MON|TUE|WED|THU|FRI|SAT` `:CALibration:RFPSelector:SCHeduler:RECurrence:DAY?`
Example	:CAL:RFPS:SCH:REC:DAY SUN
Notes	For model N9038A only.
Preset	This is unaffected by Preset but is set to SUN on a "Restore System Defaults->Align".
State Saved	No
Range	Sunday|Monday|Tuesday|Wednesday|Thursday|Friday|Saturday
Initial S/W Revision	A.08.00

Scheduler

Setting the Scheduler to ON will trigger the execution of the scheduled task based on the recurrence and time set in the scheduler since the last successful of the specific alignment. A warning condition of "RF Preselector alignment scheduler is ON" will be appeared when the scheduler is set to ON. OFF will turn off the Scheduler from running any scheduled task.

Key Path	**System, Alignments, RF Preselector**
Mode	All
Remote Command	`:CALibration:RFPSelector:SCHeduler:STATe ON|OFF|0|1` `:CALibration:RFPSelector:SCHeduler:STATe?`
Example	:CAL:RFPS:SCH:STAT OFF

Notes	For model N9038A only.
Preset	This is unaffected by Preset but is set to OFF on a “Restore System Defaults->Align”.
State Saved	No
Initial S/W Revision	A.08.00

I/O Config

Activates a menu for identifying and changing the I/O configuration for remote control.

Key Path	**System**
Initial S/W Revision	Prior to A.02.00

GPIB

Activates a menu for configuring the GPIB I/O port.

Key Path	**System, I/O Config**
Initial S/W Revision	A.02.00

GPIB Address

Select the GPIB remote address.

Key Path	**System, I/O Config, GPIB**
Mode	All
Remote Command	`:SYSTem:COMMunicate:GPIB[1][:SELF]:ADDRess <integer>` `:SYSTem:COMMunicate:GPIB[1][:SELF]:ADDRess?`
Example	:SYST:COMM:GPIB:ADDR 17
Notes	Changing the Address on the GPIB port requires all further communication to use the new address.
Preset	18
Preset	This is unaffected by Preset but is set to 18 on a “Restore System Defaults->Misc”
State Saved	No
Range	0 to 30
Initial S/W Revision	Prior to A.02.00

GPIB Controller

Sets the GPIB port into controller or device mode. In the normal state, GPIB controller is disabled, which allows the analyzer to be controlled by a remote computer. When GPIB Controller is enabled, the instrument can run software applications that use the instrument's computer as a GPIB controller; controlling devices connected to the instrument's GPIB port.

NOTE When GPIB Controller is enabled, the analyzer application itself cannot be controlled over GPIB. In this case it can easily be controlled via LAN or USB. The GPIB port cannot be a controller and device at the same time. Only one controller can be active on the GPIB bus at any given time. If the analyzer is the controller, an external PC cannot be a controller.

To control the instrument from the software that is performing GPIB controller operation, you can use an internal TCP/IP connection to the analyzer application. Use the address TCPIP0:localhost:inst0:INSTR to send SCPI commands to the analyzer application.

Key Path	**System, I/O Config, GPIB**

Mode	All
Scope	Mode Global
Remote Command	`:SYSTem:COMMunicate:GPIB[1][:SELF]:CONTroller[:ENABle] ON|OFF|0|1` `:SYSTem:COMMunicate:GPIB[1][:SELF]:CONTroller[:ENABle]?`
Example	:SYST:COMM:GPIB:CONT ON Will set GPIB port to Controller
Notes	When the instrument becomes the Controller bit 0 in the Standard Event Status Register is set (and when the instrument relinquishes Controller capability bit 0 is cleared in the Standard Event Status Register).
Preset	OFF
Preset	This is unaffected by Preset but is set to OFF on a "Restore System Defaults->Misc"
State Saved	No
Range	Disabled|Enabled
Initial S/W Revision	A.02.00

Disabled

Disables the GPIB Controller capability, this is the default (or normal) setting.

Key Path	**System, I/O Config, GPIB, GPIB Controller**
Example	:SYST:COMM:GPIB:CONT OFF Will set GPIB port to Device
Initial S/W Revision	A.02.00

Enabled

Enables the GPIB Controller capability.

Key Path	**System, I/O Config, GPIB, GPIB Controller**
Example	:SYST:COMM:GPIB:CONT ON Will set GPIB port to Controller
Initial S/W Revision	A.02.00

SCPI LAN

Activates a menu for identifying and changing the SCPI over a LAN configuration. There are a number of different ways to send SCPI remote commands to the instrument over LAN. It can be a problem to have multiple users simultaneously accessing the instrument over the LAN. These keys limit that somewhat by disabling the telnet, socket, and/or SICL capability.

Key Path	**System, I/O Config**
Initial S/W Revision	Prior to A.02.00

SCPI Telnet

Turns the SCPI LAN telnet capability On or Off allowing you to limit SCPI access over LAN through telnet.

Key Path	**System, I/O Config, SCPI LAN**
Mode	All
Remote Command	`:SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle OFF|ON|0|1` `:SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle?`
Example	:SYST:COMM:LAN:SCPI:TELN:ENAB OFF
Preset	ON
Preset	This is unaffected by Preset but is set to ON with a “Restore System Defaults->Misc”
State Saved	No
Range	On | Off
Initial S/W Revision	Prior to A.02.00

SCPI Socket

Turns the capability of establishing Socket LAN sessions On or Off. This allows you to limit SCPI access over LAN through socket sessions.

Key Path	**System, I/O Config, SCPI LAN**
Mode	All
Remote Command	`:SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle OFF|ON|0|1` `:SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle?`
Example	:SYST:COMM:LAN:SCPI:SOCK:ENAB OFF
Preset	ON
Preset	This is unaffected by a Preset but is set to ON with a “Restore System Defaults->Misc”
State Saved	No
Range	On | Off
Initial S/W Revision	Prior to A.02.00

SCPI Socket Control Port (Remote Command Only)

Returns the TCP/IP port number of the control socket associated with the SCPI socket session. This query enables you to obtain the unique port number to open when a device clear is to be sent to the instrument. Every time a connection is made to the SCPI socket, the instrument creates a peer control socket. The port number for this socket is random. The user must use this command to obtain the port number of the control socket. To force a device clear on this socket, open the port and send the string "DCL " to the instrument.

If this SCPI command is sent to a non SCPI Socket interface, then 0 is returned.

Mode	All
Remote Command	`:SYSTem:COMMunicate:LAN:SCPI:SOCKet:CONTrol?`
Example	:SYST:COMM:LAN:SCPI:SOCK:CONT?
Preset	This is unaffected by Preset or "Restore System Defaults->Misc".
State Saved	No
Range	0 to 65534
Initial S/W Revision	Prior to A.02.00

SICL Server

Turns the SICL server capability On or Off, enabling you to limit SCPI access over LAN through the SICL server. (SICL IEEE 488.2 protocol.)

Parameter	**Description**	**Setting**
Maximum Connections	The maximum number of connections that can be accessed simultaneously	5
Instrument Name	The name (same as the remote SICL address) of your analyzer	inst0
Instrument Logical Unit	The unique integer assigned to your analyzer when using SICL LAN	8
Emulated GPIB Name	The name (same as the remote SICL address) of the device used when communicating with your analyzer	gpib7
Emulated GPIB Logical Unit	The unique integer assigned to your device when it is being controlled using SICL LAN	8
Emulated GPIB Address	The emulated GPIB address assigned to your transmitter tester when it is a SICL server (the same as your GPIB address)	18

Key Path	**System, I/O Config, SCPI LAN**
Mode	All

Remote Command	`:SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle OFF|ON|0|1` `:SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle?`
Example	:SYST:COMM:LAN:SCPI:SICL:ENAB OFF
Preset	ON
Preset	This is unaffected by Preset, but is set to ON with a “Restore System Defaults->Misc”
State Saved	No
Range	On | Off
Initial S/W Revision	Prior to A.02.00

Reset Web Password

The embedded web server contains certain capability which are password protected; modifying the LAN configuration of the instrument, and access to web pages that can change the settings of the instrument. The default password from the factory is ‘agilent’ (without the quotes). The control provided here is the means to set the web password as the user desires, or to reset the password to the factory default.

Selecting Reset web password brings up a control for resetting the password as the user desires, or to the factory default. A keyboard is required to change the password from the factory default of ‘agilent’ or to set a new password that contains alphabetic characters. The control is:

If this control is entered without an external keyboard or mouse connected, you can cancel the control by pressing the Cancel (ESC) front-panel key.

Key Path	**System, I/O Config**
Mode	All
Initial S/W Revision	Prior to A.02.00

LXI

Opens a menu that allows you to access the various LXI configuration properties.

Key Path	**System, I/O Config**
Initial S/W Revision	Prior to A.02.00

LAN Reset

Resets the LAN connection.

Key Path	**System, I/O Config, LXI**
Initial S/W Revision	Prior to A.02.00

System IDN Response

This key allows you to specify a response to the *IDN? query, or to return the analyzer to the Factory response if you have changed it.

To choose the factory-set response, press the **Factory** key.

To specify your own response, press the **User** key, and enter your desired response.

Key Path	**System, I/O Config**
Mode	All
Remote Command	`:SYSTem:IDN <string>` `:SYSTem:IDN?`
Notes	• This affects the response given in all Modes of the Analyzer, unless the current Mode has also specified a custom response, in which case the current Mode's custom IDN response takes precedence over the System's, but only while that Mode is the current Mode. • It survives shutdown and restart of the software and therefore survives a power cycle • Null string as parameter restores the Factory setting
Preset	This is unaffected by Preset but is set to the original factory setting on a "Restore System Defaults->Misc"
State Saved	No
Initial S/W Revision	A.06.00

Factory

This key selects the factory setting, for example:

"Agilent Technologies,N9020A,MY00012345,A.05.01"

where the fields are manufacturer, model number, serial number, firmware revision.

Key Path	**System, I/O Config, IDN Response**
Example	:SYST:IDN "" null string, restores the factory setting
Initial S/W Revision	A.06.0

User

This key allows you to specify your own response to the *IDN? query. You may enter your desired response with the Alpha Editor or a plugin PC keyboard.

When you press this key, the active function becomes the current User string with the cursor at the end. This makes it easy to edit the existing string.

If you enter a null string (for example, by clearing the User String while editing and then pressing **Done**) the analyzer automatically reverts to the Factory setting.

Key Path	**System, I/O Config, IDN Response**
Example	:SYST:IDN "XYZ Corp,Model 12,012345,A.01.01" user specified response
Initial S/W Revision	A.06.00

Query USB Connection (Remote Command Only)

Enables you to determine the speed of the USB connection.

Mode	All
Remote Command	`:SYSTem:COMMunicate:USB:CONNection?`
Example	:SYST:COMM:USB:CONN?
Notes	NONE – Indicates no USB connection has been made. LSPeed – Indicates a USB low speed connection (1.5 Mbps). This is reserved for future use, the T+M488 protocol is not supported on low speed connections. HSPeed – Indicates that a USB high speed connection (480 Mbps) has been negotiated. FSPeed – Indicates that a USB full speed connection (12 Mbps) has been negotiated.
State Saved	No
Range	NONE|LSPeed|HSPeed|FSPeed
Initial S/W Revision	Prior to A.02.00

USB Connection Status (Remote Command Only)

Enables you to determine the current status of the USB connection.

Mode	All
Remote Command	`:SYSTem:COMMunicate:USB:STATus?`
Example	:SYST:COMM:USB:STAT?
Notes	SUSPended – Indicates that the USB bus is currently in its suspended state. The bus is in the suspended state when: The bus is not connected to any controller The controller is currently powered off The controller has explicitly placed the USB device into the suspended state. When in the suspended state, no USB activity, including start of frame packets are received. ACTive – Indicates that the USB device is in the active state. When the device is in the active state, it is receiving periodic start of frames but it isn’t necessarily receiving or transmitting data.
State Saved	No
Range	SUSPended|ACTive
Initial S/W Revision	Prior to A.02.00

USB Packet Count (Remote Command Only)

Enables you to determine the number of packets received and transmitted on the USB bus.

Mode	All
Remote Command	`:SYSTem:COMMunicate:USB:PACKets?`
Example	:SYST:COMM:USB:PACK?
Notes	Two integers are returned. The first is the number of packets received since application invocation, the second is the number of packets transmitted since application invocation. If no packets have been received or transmitted the response is 0,0. The packet count is initialized to 0,0 when the instrument application is started.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Restore Defaults

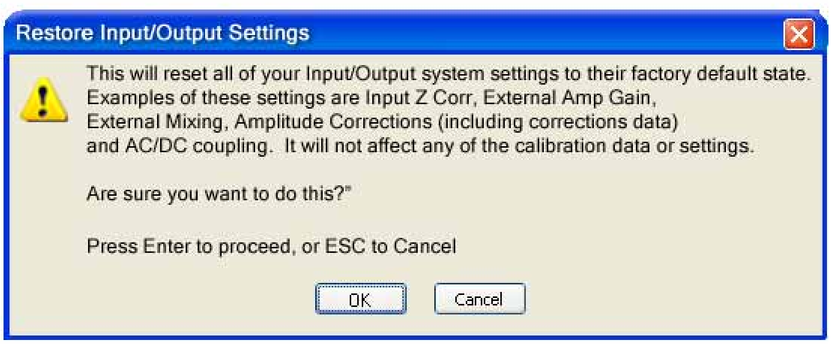
Provides incremental initialization of the system setting groups along with supporting a comprehensive reset of the entire instrument back to a factory default state. The menu selections are the groups of system settings and when one is selected, that particular group of system settings is reset back to their default values.

Key Path	**System**
Mode	All
Remote Command	`:SYSTem:DEFault [ALL]|ALIGn|INPut|MISC|MODes|PON`
Example	SYST:DEF
State Saved	No
Initial S/W Revision	Prior to A.02.00

Restore Input/Output Defaults

Causes the group of settings and data associated with Input/Output front-panel key to be a reset to their default values. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. .

Confirmation is required to restore the Input/Output setting. The confirmation dialog is:

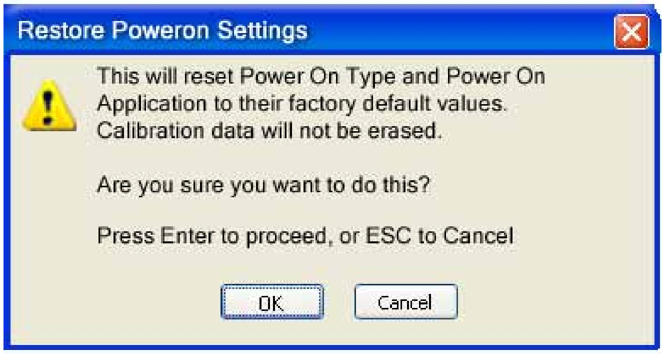


Key Path	**System, Restore System Defaults**
Example	:SYST:DEF INP
Initial S/W Revision	Prior to A.02.00

Restore Power On Defaults

This selection causes the Power On settings to be a reset to their default value. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. The Power On settings and their default values are Power On Type reset to Mode and Input/Output Defaults and Power On Application reset to whatever the factory set as its default value.

Confirmation is required to restore the factory default values. The confirmation dialog is:



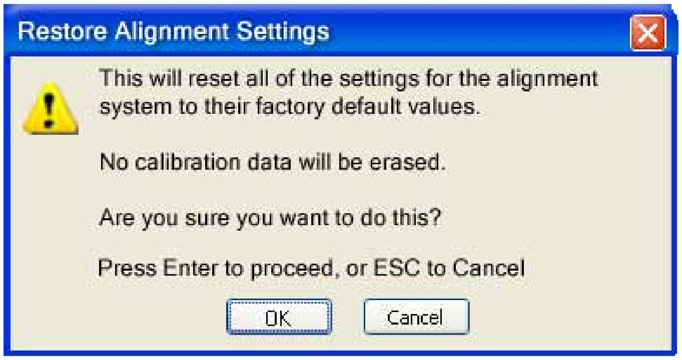
Key Path	**System, Restore System Defaults**
Example	:SYST:DEF PON
Initial S/W Revision	Prior to A.02.00

Restore Align Defaults

This selection causes the Alignment system settings to be a reset to their default values. This does not affect any Alignment data stored in the system. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch.

After performing this function, it may impact the auto-alignment time of the instrument until a new alignment baseline has been established.

Confirmation is required to restore the factory default values. The confirmation dialog is:



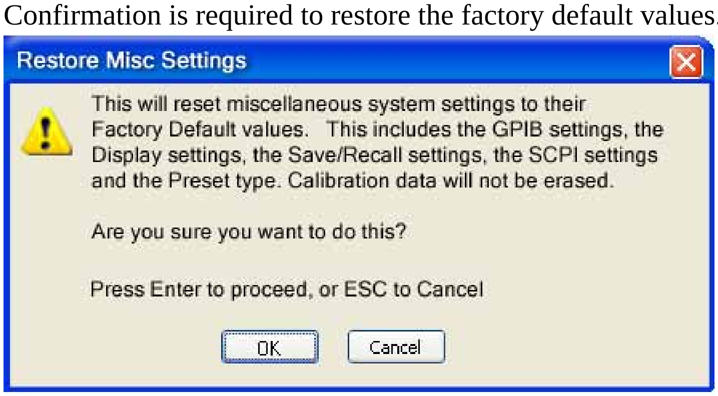
Key Path	**System, Restore System Defaults**
Example	:SYST:DEF ALIG
Initial S/W Revision	Prior to A.02.00

Restore Misc Defaults

This selection causes miscellaneous system settings to be reset to their default values. With this reset, you lose the GPIB address and it is reset to 18, so this should be used with caution. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. This miscellaneous group contains the rest of the settings that have not been part of the other Restore System Defaults groups. The following table is a complete list of settings associated with this group:

Miscellaneous Setting	Default Value
Verbose SCPI	Off
GPIB Address	18
Auto File Name Number	000
Save Type	State
State Save To	Register 1
Screen Save To	SCREEN000.png
DISP:ENABle	ON
Full Screen	Off
SCPI Telnet	ON
SCPI Socket	ON
SICL Server	ON
Display Intensity	100
Display Backlight	ON
Display Theme	TDColor
System Annotation	ON
The SYST:PRES:TYPE	MODE

Confirmation is required to restore the factory default values. The confirmation dialog is:

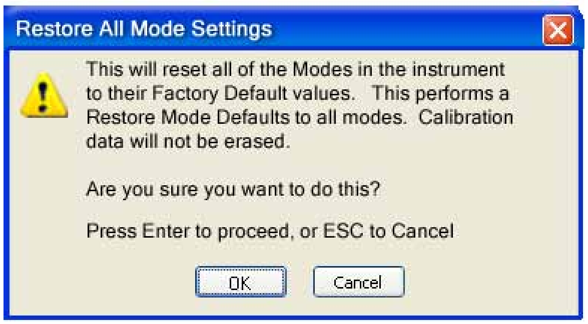


Key Path	**System, Restore System Defaults**
Example	:SYST:DEF MISC
Initial S/W Revision	Prior to A.02.00

Restore Mode Defaults (All Modes)

This selection resets all of the modes in the instrument back to their default state just as a Restore Mode Defaults does and it switches the instrument to the power-on mode and causes the default measurement for the power-on mode to be active. This level of Restore System Defaults does not affect any system settings, but it does affect the state of all modes and does cause a mode switch unless the instrument was already in the power-on mode.

Confirmation is required to restore the factory default values. The confirmation dialog is:

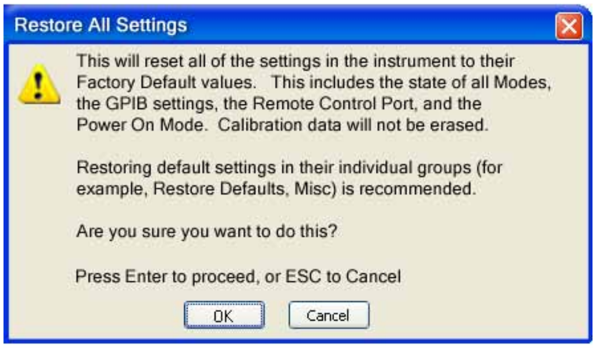


Key Path	**System, Restore System Defaults**
Example	:SYST:DEF MOD
Couplings	An All Mode will cause the currently running measurement to be aborted, mode switch to the power-on mode and activate the default measurement for the power-on mode. It gets the mode to a consistent state with all of the default couplings set.
Initial S/W Revision	Prior to A.02.00

All

This is the catastrophic function that does a comprehensive reset of ALL analyzer settings to their factory default values. It resets all of the system setting groups, causes a Restore Mode Defaults for all modes in the instrument, and switches back to the power-on mode. It does not affect the User Preset file or any user saved files.

Confirmation is required to restore the factory default values. The confirmation dialog is:



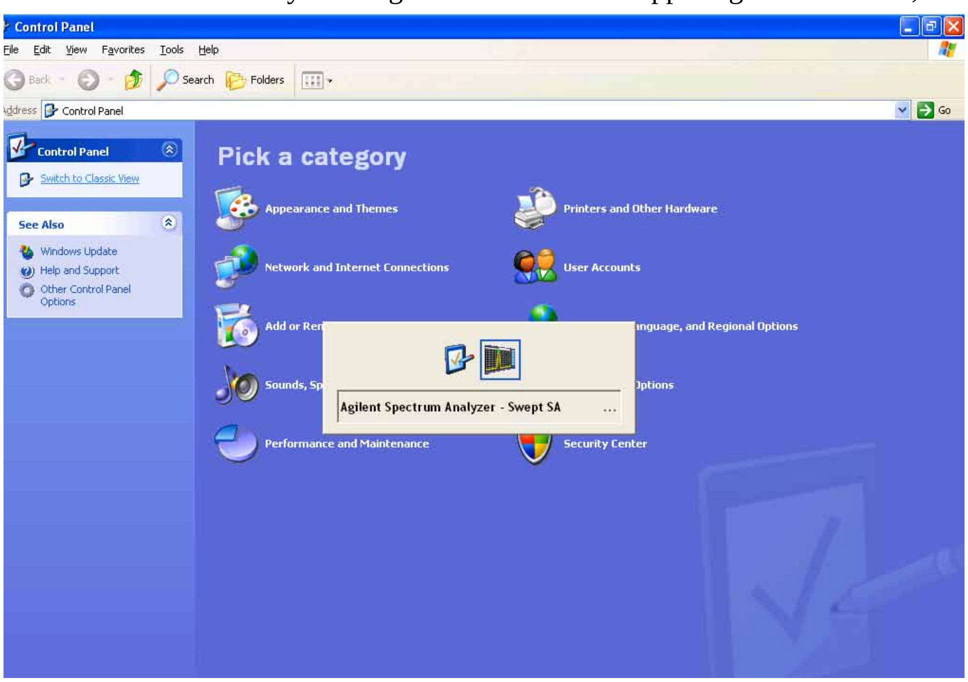
Key Path	**System, Restore System Defaults**
Example	:SYST:DEF ALL
Couplings	An All will cause the currently running measurement to be aborted and get all modes to a consistent state, so it is unnecessary to couple any settings.
Initial S/W Revision	Prior to A.02.00

Control Panel…

Opens the Windows Control Panel. The Control Panel is used to configure certain elements of Windows that are not configured through the hardkey/softkey System menus.

The Control Panel is a separate Windows application, so to return to the analyzer once you are in the Control Panel, you may either:

Exit the Control Panel by clicking on the red X in the upper right hand corner, with a mouse



Or use Alt-Tab: press and hold the Alt 

key and press and release the Tab key until the Analyzer logo is showing in the window in the center of the screen, as above, then release the Alt key.

Key Path	**System**
Notes	No remote command for this key.
Initial S/W Revision	Prior to A.02.00

Licensing…

Opens the license explorer.

For Help on this key, select Help in the menu bar at the top of the license explorer window.

Key Path	**System**
Notes	No equivalent remote command for this key.
Initial S/W Revision	Prior to A.02.00

Remote Command	:SYSTem:LKEY <”OptionInfo”>, <”LicenseInfo”>
Example	SYST:LKEY “N9073A–1FP”,”027253AD27F83CDA5673A9BA5F427FDA5E4F25AEB1 017638211AC9F60D9C639FE539735909C551DE0A91”
Notes	The <”OptionInfo”> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one, since the system knows which version is supported for each feature. The <”LicenseInfo”> contains the signature, the expiration date, and serial number for transport if transportable. You must specify the signature, but you can omit the other information. If you omit the expiration date, the system regards it as permanent. If you omit the serial number, the system regards it as non-transportable. As a result, this supports backward compatibility.
Initial S/W Revision	Prior to A.02.00

Remote Command	:SYSTem:LKEY:DELete <”OptionInfo”>,<”LicenseInfo”>
Example	SYST:LKEY:DEL ‘N9073A–1FP”,”027253AD27F83CDA5673A9BA5F427FDA5E4F25AEB1 017638211AC9F60D9C639FE539735909C551DE0A91”

Notes	The <”OptionInfo”> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one, if more than one version is installed. The <”LicenseInfo”> contains the signature, the expiration date, and whether or not be transportable. You must specify the signature, but you can omit the other information. If you omit the expiration date, the system regards it as permanent. If you omit the transportability, the system regards it as non-transportable. As a result, this supports backward compatibility.
Initial S/W Revision	Prior to A.02.00

Remote Command	`:SYSTem:LKEY:LIST?`
Notes	Return Value: An <arbitrary block data> of all the installed instrument licenses. The format of each license is as follows. <Feature>,<Version>,<Signature>,<Expiration Date>,<Serial Number for Transport> Return Value Example: #3136 N9073A–1FP,1.000,B043920A51CA N9060A–2FP,1.000,4D1D1164BE64 N9020A–508,1.000,389BC042F920 N9073A–1F1,1.000,5D71E9BA814C,13-aug–2005 <arbitrary block data> is: #NMMM<data> Where: N is the number of digits that describes the number of MMM characters. For example if the data was 55 bytes, N would be 2. MMM would be the ASCII representation of the number of bytes. In the previous example, N would be 55. <data> ASCII contents of the data
Initial S/W Revision	Prior to A.02.00

Remote Command	`:SYSTem:LKEY? <”OptionInfo”>`
Example	SYST:LKEY? “N9073A–1FP”

Notes	The <”OptionInfo”> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one. Return Value: <”LicenseInfo”> if the license is valid, null otherwise. <”LicenseInfo”> contains the signature, the expiration date, and serial number if transportable. Return Value Example: “B043920A51CA”
Initial S/W Revision	Prior to A.02.00

Remote Command	`:SYSTem:HID?`
Notes	Return value is the host ID as a string
Initial S/W Revision	Prior to A.02.00

Security

Accesses capabilities for operating the instrument in a security controlled environment.

Key Path	**System**
Initial S/W Revision	A.04.00

USB

The Windows operating system can be configured to disable write access to the USB ports for users who are in a secure environment where transferring data from the instrument is prohibited. This user interface is a convenient way for the customer to disable write access to USB.

Key Path	**System, Security**
Mode	All
Scope	Mode Global
Remote Command	`:SYSTem:SECurity:USB:WPRotect[:ENABle] ON|OFF|0|1` `:SYSTem:SECurity:USB:WPRotect[:ENABle]?`
Example	:SYST:SEC:USB:WPR ON Will set USB ports to Read-only
Notes	When the USB ports are in Read-only mode then no data can be stored to USB, including the internal USB memory used for a back-up location for the calibration data.
Dependencies	This key is grayed-out unless the current user has administrator privileges.
Preset	This is unaffected by Preset or any Restore System Defaults. An Agilent Recovery will set the USB to write protect OFF

State Saved	No
Range	Read-Write|Read only
Initial S/W Revision	A.04.00

Read-Write

Selection for allowing full read-write access to the USB ports.

Key Path	**System, Security, USB**
Example	:SYST:SEC:USB:WPR OFF Will set USB ports to Read-Write
Initial S/W Revision	A.04.00

Read only

Selection for disabling write access to the USB ports.

Key Path	**System, Security, USB**
Example	:SYST:SEC:USB:WPR ON Will set USB ports to Read only
Initial S/W Revision	A.04.00

Diagnostics

The Diagnostics key in the System menu gives you access to basic diagnostic capabilities of the instrument.

RF Preselector

This menu provides the ability to switch to the particular filter in the Conducted or Radiated Band in order to see the frequency response of the specific RF Preselector filter. The Conducted band has 13 fixed filters and Radiated band has 6 tunable filters and 1 fixed filter. The tunable filters will be characterized during the Factory Calibration test by executing the Characterize RF Preselector, All Bands button. Once after the filter is characterized, the amplitude correction for the RF Preselector path will be invalid and the receiver needs to go through the Factory Flatness calibration tests for the RF Preselector Path. The internal Calibrators for RF Preselector consists of DDS (Direct Digital Synthesizer) and Noise Source. The DDS operating range is from DC to 60 MHz whereas Noise Source is from 10 MHz to 4 GHz. Both the calibrators are used by the firmware to execute the RF Preselector System alignment to improve the amplitude variation of the RF Preselector path.

The Diagnostics key in the System menu gives you access to basic diagnostic capabilities of the instrument.

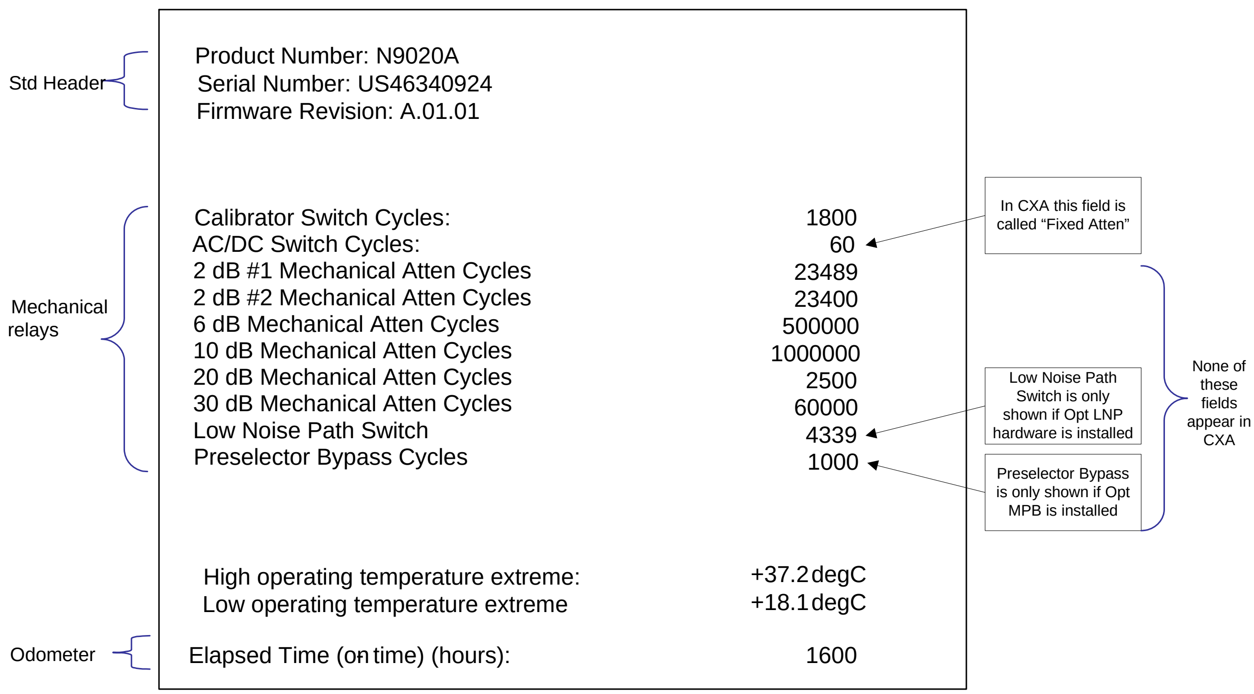
Key Path	**System**
Initial S/W Revision	Prior to A.02.00

Show Hardware Statistics

Provides a display of various hardware statistics. The statistics include the following:

- Mechanical relay cycles
- High and Low temperature extremes
- Elapsed time that the instrument has been powered-on (odometer)

The display should appear listing the statistics, product number, serial number, and firmware revision.



The data will be updated only when the Show Hardware Statistics menu key is pressed, it will not be updated while the screen is displayed.

The tabular data should be directly printable.

Key Path	**System, Diagnostics**
Mode	All
Notes	The values displayed on the screen are only updated upon entry to the screen and not updated while the screen is being displayed.
Initial S/W Revision	Prior to A.02.00

SCPI for Show Hardware Statistics (Remote Commands Only)

Each of the hardware statistic items can be queried via SCPI.

- "Query the Mechanical Relay Cycle Count" on page 273
- "Query the Operating Temperature Extremes" on page 273
- "Query the Elapsed Time since 1st power on" on page 274

Query the Mechanical Relay Cycle Count

Returns the count of mechanical relay cycles.

Remote Command	:SYSTem:MRELay:COUNt?
Example	:SYST:MREL:COUN?
Notes	Query Only The return value is a comma separated list of the individual counts for each mechanical relay. The position of the relays in the list is: "<Cal Signal>,<AC/DC>,<2dB #1 Atten>,<2dB #2 Atten>,<6dB Atten>,<10dB Atten>,<20dB Atten>,<30dB Atten>,<Fixed Atten>,<Low Noise Path Switch>,<Presel Bypass>" Items in the list not pertaining to your particular hardware configuration will return as –999 for those items.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00, A.04.00

Query the Operating Temperature Extremes

Returns the low operating temperature extreme value. The value survives a power-cycle and is the temperature extreme encountered since the value was reset by the factory or service center.

Mode	All
Remote Command	:SYSTem:TEMPerature:LEXTreme?
Example	:SYST:TEMP:LEXT?
Notes	Value is in degrees Celsius at which the lowest operating temperature has been recorded since 1st power-up.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Mode	All
Remote Command	:SYSTem:TEMPerature:HEXTreme?
Example	:SYST:TEMP:HEXT?

Notes	Value is in degrees Celsius at which the highest operating temperature has been recorded since 1st power-up.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Query the Elapsed Time since 1st power on

Returns the elapsed on-time in minutes since 1st power-on.

Remote Command	`:SYSTem:PON:ETIMe?`
Example	:SYST:PON:ETIM?
Notes	Query Only
Initial S/W Revision	Prior to A.02.00

Advanced

Accesses advanced diagnostic capabilities performed in the factory or under instructions from repair procedures. This menu key is only visible when the logged-in user is “saservice”. The first access to the Advanced Diagnostic Menu after invoking the instrument application will require an authentication, which is to enter the Service Code. Subsequent accesses to the Advanced Diagnostic Menu are unimpeded. The Authentication dialog looks like:

“OK” is the default key thus the Enter key is used to complete the entry. If invalid Service Code is entered authentication is not granted and you are provided the following dialog:

Key Path	**System, Diagnostics**
Notes	Password is required to access this menu.
Initial S/W Revision	Prior to A.02.00

Service

Accesses capabilities performed in the factory or under instructions from repair procedures. This menu key is only visible when the logged-in user is “advanceduser” or “saservice”. The first access to the Service Menu after invoking the instrument application will require an authentication Service Code.

Key Path	**System**
Initial S/W Revision	Prior to A.02.00

Internet Explorer…

This key launches Microsoft Internet Explorer. A mouse and external keyboard are highly desired for using Internet Explorer. When Internet Explorer is running, close Internet Explorer to return focus to the Instrument Application (or use Alt-Tab).

Key Path	**System**
Mode	**All**
Notes	No equivalent remote command for this key.
Initial S/W Revision	A.05.01

System Remote Commands (Remote Commands Only)

The commands in this section have no front panel key equivalent

Initial S/W Revision	Prior to A.02.00

System Powerdown (Remote Command Only)

Remote Command	`SYSTem:PDOWn [NORMal|FORCe]`
Notes	Shuts down the instrument in the normal way (NORMal) or forced way (FORCe). In case there is another application with modified data pending for saving, the application prompt the user. The system waits until the user responds in the normal mode. It will go off after 20 seconds of wait in the force mode and all data will be lost.

List installed Options (Remote Command Only)

Lists the installed options that pertain to the instrument (signal analyzer)..

Mode	All
Remote Command	`:SYSTem:OPTions?`
Example	:SYST:OPT?

Notes	The return string is a comma separated list of the installed options. For example: “503,P03,PFR” :SYSTem:OPTions? and *OPT? are the same.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Lock the Front-panel keys (Remote Command Only)

Disables the instrument keyboard to prevent local input when the instrument is controlled remotely. Annunciation showing a “K” for ‘Klock” (keyboard lock) alerts the local user that the keyboard is locked. Klock is similar to the GPIB Local Lockout function; namely that no front-panel keys are active with the exception of the Power Standby key. (The instrument is allowed to be turned-off if Klock is ON.) The Klock command is used in remote control situations where Local Lockout cannot be used.

Although primary intent of Klock is to lock-out the front panel, it will lock-out externally connected keyboards through USB. Klock has no effect on externally connected pointing devices (mice).

The front panel ‘Local’ key (Cancel/Esc) has no effect if Klock is ON.

Mode	All
Remote Command	`:SYSTem:KLOCk OFF|ON|0|1` `:SYSTem:KLOCk?`
Example	:SYST:KLOC ON
Notes	Keyboard lock remains in effect until turned-off or the instrument is power-cycled
Preset	Initialized to OFF at startup, unaffected by Preset
State Saved	No
Initial S/W Revision	Prior to A.02.00

List SCPI Commands (Remote Command Only)

Outputs a list of the valid SCPI commands for the currently selected Mode.

Remote Command	`:SYSTem:HELP:HEADers?`
Example	:SYST:HELP:HEAD?
Notes	The output is an IEEE Block format with each command separated with the New-Line character (hex 0x0A)
Initial S/W Revision	Prior to A.02.00

SCPI Version Query (Remote Command Only)

Returns the SCPI version number with which the instrument complies. The SCPI industry standard changes regularly. This command indicates the version used when the instrument SCPI commands were defined.

Remote Command	`:SYSTem:VERSion?`
Example	:SYST:VERS?
Initial S/W Revision	Prior to A.02.00

Date (Remote Command Only)

The recommended access to the Date, Time, and Time zone of the instrument is through the Windows native control (Control Panel or accessing the Task Bar). You may also access this information remotely, as shown in this command and Time (below).

Sets or queries the date in the instrument.

Mode	All
Remote Command	`:SYSTem:DATE “<year>,<month>,<day>”` `:SYSTem:DATE?`
Example	:SYST:DATE “2006,05,26”
Notes	<year> is the four digit representation of year. (for example, 2006) <month> is the two digit representation of year. (for example. 01 to 12) <day> is the two digit representation of day. (for example, 01 to 28, 29, 30, or 31) depending on the month and year
Initial S/W Revision	Prior to A.02.00

Time (Remote Command Only)

Sets or queries the time in the instrument.

Mode	All
Remote Command	`:SYSTem:TIME “<hour>,<minute>,<second>”` `:SYSTem:TIME?`
Example	:SYST:TIME “13,05,26”
Notes	<hour> is the two digit representation of the hour in 24 hour format <minute> is the two digit representation of minute <second> is the two digit representation of second
Initial S/W Revision	Prior to A.02.00

User Preset

Accesses a menu that gives you the following three choices:

User Preset – recalls a state previously saved using the **Save User Preset** function.

User Preset All Modes – presets all of the modes in the analyzer

Save User Preset – saves the current state for the current mode

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the **Save User Preset** menu key or the SCPI command, SYST:PRES:USER:SAV. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time **Save User Preset** was executed.

If a **Save User Preset** has not been done at any time, **User Preset** recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a **Save User Preset** is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by **Save User Preset**.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	**User Preset**
Remote Command	`:SYSTem:PRESet:USER`
Example	:SYST:PRES:USER:SAVE :SYST:PRES:USER

Notes	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed
Couplings	A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision	Prior to A.02.00

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	**User Preset**
Remote Command	`:SYSTem:PRESet:USER:ALL`
Example	:SYST:PRES:USER:SAVE :SYST:PRES:USER:ALL
Notes	Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state.

Couplings	A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision	Prior to A.02.00

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

Key Path	**User Preset**
Remote Command	`:SYSTem:PRESet:USER:SAVE`
Example	:SYST:PRES:USER:SAVE
Notes	:SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM: STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.
Initial S/W Revision	Prior to A.02.00

6 Channel Power Measurement

The Channel Power measurement is used to find the total power present in a specified bandwidth. The power spectral density (the power in the signal normalized to 1 Hz) is also reported. For measurement results and views, see "View/Display" on page 342.

This topic contains the following sections:

Measurement Commands for Channel Power

These commands are used to measure the total rms power in a specified integration bandwidth.

Use :INSTrument:SELect to set the mode.

`:CONFigure:CHPower`

`:CONFigure:CHPower:NDEFault`

`:INITiate:CHPower`

`:FETCh:CHPower[n]?`

`:MEASure:CHPower[n]?`

`:READ:CHPower[n]?`

`:FETCh:CHPower:CHPower?`

`:MEASure:CHPower:CHPower?`

`:READ:CHPower:CHPower?`

`:FETCh:CHPower:DENSity?`

`:MEASure:CHPower:DENSity?`

`:READ:CHPower:DENSity`

For more measurement related commands, see the SENSe subsystem, and the section "Remote Measurement Functions" on page 1257.

Remote CommandResults for Channel Power Measurement

For DVB-T/H and DTMB (CTTB) mode, see "DVB-T/H and DTMB (CTTB) Mode Remote Command Results" on page 282

For ISDB-T and CMMB mode, see "ISDB-T and CMMB mode Remote Command Results" on page 284.

Command	Return Value
FETCh:CHPower[n]? MEASure:CHPower[n]? READ:CHPower[n]?	Refer to the table below.
FETCh:CHPower:CHPower? MEASure:CHPower:CHPower? READ:CHPower:CHPower?	Returns the Channel Power (dBm) (BW compatibility functionality)
FETCh:CHPower:DENSity? MEASure:CHPower:DENSity? READ:CHPower:DENSity?	Returns the Power Spectral Density (dBm/Hz) (BW compatibility functionality)

n	Results Returned
n=1 (or not specified)	Returns scalar results: 1. Channel Power is a floating point number representing the total channel power in the specified integration bandwidth. 2. PSD (Power Spectral Density) is the power in the specified unit bandwidth. The unit bandwidth is selected by the PSD Unit parameter in either dBm/Hz or dBm/MHz.
2	Returns floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the signal. The frequency span of the captured trace data is specified by the Span key.

DVB-T/H and DTMB (CTTB) Mode Remote Command Results

The following commands are available only for DVB-T/H and DTMB (CTTB) mode.

Condition	n	Results Returned
	n=1 (or not specified)	Returns scalar results: 1. Channel Power is a floating point number representing the total channel power in the specified integration bandwidth. 2. PSD (Power Spectral Density) is the power in the specified unit bandwidth. The unit bandwidth is selected by the PSD Unit parameter in either dBm/Hz or dBm/MHz.
	2	Returns floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the signal. The frequency span of the captured trace data is specified by the Span key.

Condition	n	Results Returned
Mode = DVB-T/H or Mode = DTMB (CTTB)	3	Returns 7 comma-separated scalar results, in the following order. 1. The shoulder attenuation result (dB) 2. Lower shoulder attenuation result (dB) 3. Upper shoulder attenuation result (dB) 4. Lower Offset - MAX shoulder point power (dBm) 5. Lower Offset - MAX shoulder point frequency (MHz) 6. Upper Offset - MAX shoulder point power (dBm) 7. Upper Offset - MAX shoulder point frequency (MHz) If the results are not available,–999.0 is returned. For example, if current view is RF spectrum or spectrum mask, –999.0 is returned.
Mode = DVB-T/H or Mode = DTMB (CTTB)	4	Returns floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the signal in the left graph of the shoulder attenuation view. If the results are not available,–999.0 is returned. For example, if current view is RF spectrum or spectrum mask, –999.0 is returned.
Mode = DVB-T/H or Mode = DTMB (CTTB)	5	Returns floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the signal in the right graph of the shoulder attenuation view. If the results are not available,–999.0 is returned. For example, if current view is RF spectrum or spectrum mask, –999.0 is returned.
Mode = DVB-T/H or Mode = DTMB (CTTB)	6	Returns floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the mask in the spectrum mask view. If the results are not available,–999.0 is returned. For example, if current view is RF spectrum or shoulder attenuation, –999.0 is returned.

Condition	n	Results Returned
Mode = DVB-T/H or Mode = DTMB (CTTB)	7	Returns the failed point information in the following order: 1. the 1st failed point frequency (MHz) 2. the 1st failed point absolute power (dBm) 3. the 1st failed point relative power (dB) 4. the 2nd failed point frequency (MHz) 5. the 2nd failed point absolute power (dBm) 6. the 2nd failed point relative power (dB) … 3*N–2. the (3*N–2)th failed point frequency (MHz) 3*N–1. the (3*N–1)th failed point absolute power (dBm) 3*N. the (3*N)th failed point relative power (dB) If the number of failed points is less than 20, it will show all of them (frequency, power and relative power), N<20; If the number of failed points is great than 20, the first ten failed points and the last ten failed points will be show, N=20. If the results are not available,–999.0 is returned. For example, if current view is RF spectrum or shoulder attenuation, –999.0 is returned.

ISDB-T and CMMB mode Remote Command Results

The following commands are available only for ISDB-T and CMMB mode.

Condition	n	Results Returned
	n=1 (or not specified)	Returns scalar results: 1. Channel Power is a floating point number representing the total channel power in the specified integration bandwidth. 2. PSD (Power Spectral Density) is the power in the specified unit bandwidth. The unit bandwidth is selected by the PSD Unit parameter in either dBm/Hz or dBm/MHz.
	2	Returns floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the signal. The frequency span of the captured trace data is specified by the Span key.

Condition	n	Results Returned
Mode = ISDB-T or Mode = CMMB	3	Returns 7 comma-separated scalar results, in the following order. 1. The shoulder attenuation result (dB) 2. Lower shoulder attenuation result (dB) 3. Upper shoulder attenuation result (dB) 4. Lower Offset - MAX shoulder point power (dBm) 5. Lower Offset - MAX shoulder point frequency (MHz) 6. Upper Offset - MAX shoulder point power (dBm) 7. Upper Offset - MAX shoulder point frequency (MHz) If the results are not available,–999.0 is returned. For example, if current view is RF spectrum or spectrum mask, –999.0 is returned.
Mode = ISDB-T or Mode = CMMB	4	Returns floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the signal in the left window of the shoulder attenuation view. If the results are not available,–999.0 is returned. For example, if current view is RF spectrum or spectrum mask, –999.0 is returned.
Mode = ISDB-T or Mode = CMMB	5	Returns floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the signal in the right window of the shoulder attenuation view. If the results are not available,–999.0 is returned. For example, if current view is RF spectrum or spectrum mask, –999.0 is returned.

Key Path	**Meas**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. The parameter values are measurement independent, except all Attenuation valuesand the Internal Preamp selection, which are the same across all measurements.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Ref Value

Sets the value for the absolute power reference. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:CHP:VIEW:WIND:TRAC:Y:RLEV 10 dBm DISP:CHP:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode,ISDB-T mode, CMMB mode, Digital Cable TV mode, LTD mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10.00 dBm
State Saved	Saved in instrument state.
Min	–250.00 dBm
Max	250.00 dBm
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings. This key has read-back text that describes the total attenuator value.

See AMPTD Y Scale, "Attenuation" on page 1120 in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	Prior to A.02.00

Scale/Div

Sets the units per division of the vertical scale in the logarithmic display. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:CHP:VIEW:WIND:TRAC:Y:PDIV 2 DISP:CHP:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode,ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10.00 dB
State Saved	Saved in instrument state.
Min	0.10 dB
Max	20.00 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See “Presel Center” on page 1136 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	Prior to A.02.00

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

See “Preselector Adjust” on page 1137 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	Prior to A.02.00

Y Axis Unit

Allows you to change the vertical (Y) axis amplitude unit.

See “Y Axis Unit” on page 1138 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	A.04.00

Reference Level Offset

Adds an offset value to the displayed reference level. The reference level is the absolute amplitude represented by the top graticule line on the display.

See “Reference Level Offset” on page 1144 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	A.04.00

µW Path Control

The **µW Path Control** functions include the **µW Preselector Bypass** (Option MPB) and **Low Noise Path** (Option LNP) controls in the High Band path circuits.

See "µW Path Control " on page 1145 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	A.04.00

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See AMPTD Y Scale, "Internal Preamp" on page 1149 in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	Prior to A.02.00

Ref Position

Positions the reference level at the top, center, or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:CHP:VIEW:WIND:TRAC:Y:RPOS CENT DISP:CHP:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Auto Scaling

Toggles the Auto Scaling function between On and Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:CHP:VIEW:WIND:TRAC:Y:COUP OFF DISP:CHP:VIEW:WIND:TRAC:Y:COUP?
Couplings	When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically sets the scale per division to 10 dB and determines the reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Preset	1
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Auto Couple

See “Auto Couple” on page 1153 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

BW

Accesses a menu of functions that enable you to specify and control the video and resolution bandwidths. You can also select the type of filter for the measurement and set the filter bandwidth.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Res BW

Sets the value of the resolution bandwidth (RBW). If an unavailable bandwidth is entered with the numeric keypad, the closest available bandwidth is selected.

Key Path	**BW**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:CHPower:BANDwidth[:RESolution] <bandwidth>`
	`[:SENSe]:CHPower:BANDwidth[:RESolution]?`
	`[:SENSe]:CHPower:BANDwidth[:RESolution]:AUTO ON|OFF|1|0`
	`[:SENSe]:CHPower:BANDwidth[:RESolution]:AUTO?`

Example	CHP:BAND 5 MHz CHP:BAND? CHP:BAND:AUTO ON CHP:BAND:AUTO?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Sweep time is coupled to the RBW. As the RBW changes, the sweep time (if set to Auto) is changed to maintain amplitude calibration. Video bandwidth (VBW) is coupled to the RBW. As the resolution bandwidth changes, the video bandwidth (if set to Auto) changes to maintain the ratio of VBW/RBW (10:1). When the Res BW is set to Auto, the resolution bandwidth is auto-coupled to the span. The ratio of Span/RBW is approximately 106:1 when auto coupled. When Res BW is set to Man, and the bandwidths are entered manually, these bandwidths are used regardless of other analyzer settings.

Preset	SA: Auto WCDMA: 240 kHz C2K: 24 kHz WIMAX OFDMA: 100kHz 1xEVDO: 30kHz DVB-T/H: 3.9kHz DTMB (CTTB): 3.9kHz ISDB-T: 30kHz CMMB: 3.9kHz LTE: Auto LTETDD: Auto Digital Cable TV: 3.9kHz WCDMA, C2K, 1xEVDO , WIMAX OFDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, Digital Cable TV: OFF SA, LTE, LTETDD: ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Backwards Compatibility SCPI	[:SENSe]:CHPower:BWIDth[:RESolution]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Video BW

Changes the analyzer post-detection filter (VBW).

Key Path	**BW**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:CHPower:BANDwidth:VIDeo <bandwidth>`
	`[:SENSe]:CHPower:BANDwidth:VIDeo?`
	`[:SENSe]:CHPower:BANDwidth:VIDeo:AUTO ON|OFF|1|0`
	`[:SENSe]:CHPower:BANDwidth:VIDeo:AUTO?`

Example	CHP:BAND:VID 2.4 MHz CHP:BAND:VID? CHP:BAND:VID:AUTO OFF CHP:BAND:VID:AUTO?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	See Couplings
Couplings	Video bandwidth (VBW) is coupled to the RBW. As the resolution bandwidth changes, the video bandwidth (if set to Auto) changes to maintain the ratio set by VBW/RBW. Sweep Time is coupled to the Video Bandwidth (VBW). As the VBW is changed, the sweep time (when set to Auto) is changed to maintain amplitude calibration. This occurs because of common hardware between the two circuits, even though the Video BW filter is not actually “in-circuit” when the detector is set to Average. Because the purpose of the average detector and the VBW filter are the same, either can be used to reduce the variance of the result. Although the VBW filter is not “in-circuit” when using the average detector, the Video BW key can have an effect on (Auto) sweep time, and is not disabled. In this case, reducing the VBW setting increases the sweep time, which increases the averaging time, producing a lower-variance trace. When using the average detector with either Sweep Time set to Man, or in zero span, the VBW setting has no effect and is disabled (grayed out). When the video bandwidth is AUTO coupled, the video bandwidth value is set to: Resolution Bandwidth * Video Bandwidth to Resolution Bandwidth Ratio

Preset	SA: Auto WCDMA: 2.4MHz C2K: 240 kHz WIMAX OFDMA: Auto 1xEVDO: 300 kHz DVB-T/H: 39kHz DTMB (CTTB): 39kHz ISDB-T: 300kHz CMMB: 39kHz LTE: Auto LTETDD: Auto Digital Cable TV: 39kHz ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Filter Type

Selects the type of bandwidth filter that is used. The choices are Gaussian or Flat top.

Key Path	**BW**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:CHPower:BANDwidth:SHAPe GAUSsian|FLATtop` `[:SENSe]:CHPower:BANDwidth:SHAPe?`
Example	CHP:BAND:SHAP GAUS CHP:BAND:SHAP?
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian|Flattop
Backwards Compatibility SCPI	[:SENSe]:CHPower:BWIDth:SHAPe
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.02.00, A.03.00

Cont

See “Cont (Continuous Measurement/Sweep)” on page 1155 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

FREQ Channel

See “FREQ Channel” on page 1157 in the "Common Measurement Functions" fsection or more information.

Key Path	**Front-panel key**

Input/Output

See “Input/Output” on page 1165 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode to **Normal**, **Delta**, **Fixed** or **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area.

The default active function is the active function for the currently selected marker control mode. If the current control mode is Off, there is no active function and the active function is turned off.

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:CHP:MARK3:MODE POS CALC:CHP:MARK3:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision.
Preset	OFF

State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal**, **Delta,** or **Fixed**.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X ?`
Example	CALC:CHP:MARK3:X 0 CALC:CHP:MARK3:X?
Notes	The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency**.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	Saved in instrument state.
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker X Axis Position (Remote Command Only)

Sets the marker X Axis Scale position in trace points. This setting has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta**. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real> :CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?
Example	CALC:CHP:MARK10:X:POS 0 CALC:CHP:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker's reference marker in trace points if the control mode is **Delta**.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	Saved in instrument state.
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker Y Axis Value (Remote Command only)

Returns the marker Y Axis value in the current marker Y Axis unit.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?
Example	CALC:CHP:MARK11:Y?
Preset	Result dependent on Markers setup and signal source.
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Properties

Accesses the marker properties menu.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Relative To

Sets the reference marker to which the selected marker is relative.

<table>
<tr><td>Key Path</td><td>Marker, Properties</td></tr>
<tr><td>Mode</td><td>SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV</td></tr>
<tr><td>Remote Command</td><td>:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>
:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?</td></tr>
<tr><td>Example</td><td>CALC:CHP:MARK:REF 5
CALC:CHP:MARK:REF?</td></tr>
<tr><td>Notes</td><td>A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.”
When queried, a single value is returned (the specified marker numbers relative marker).
You must be in the Spectrum Analysis or WCDMA mode to use this command. Use :INSTrument:SELect to set the mode.</td></tr>
<tr><td>Preset</td><td>2|3|4|5|6|7|8|9|10|11|12|1</td></tr>
<tr><td>State Saved</td><td>Saved in instrument state.</td></tr>
<tr><td>Min</td><td>1</td></tr>
<tr><td>Max</td><td>12</td></tr>
<tr><td>Initial S/W Revision</td><td>Prior to A.02.00</td></tr>
<tr><td>Modified at S/W Revision</td><td>A.02.00, A.03.00</td></tr>
</table>

Marker Trace (DVB-T/H and DTMB (CTTB) only)

Accesses a menu that allows you to assign a specified marker to the designated trace. This function is only valid for DVB-T/H and DTMB (CTTB) mode.

Key Path	**Marker, Properties**
Mode	DVB-T/H, DTMB (CTTB)

Remote Command	:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFSPectrum|LSHoulder|RSHoulder|MASK :CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?
Example	CALC:CHP:MARK:TRAC RFSP CALC:CHP:MARK:TRAC?
Preset	RFSPectrum
State Saved	Saved in instrument state.
Range	RF Spectrum|Left Shoulder|Right Shoulder|Spectrum Mask
Initial S/W Revision	A.02.00

Marker Trace(ISDB-T and CMMB only)

Accesses a menu that allows you to assign a specified marker to the designated trace. This function is only valid for ISDB-T and CMMB mode.

Key Path	**Marker, Properties**
Mode	ISDB-T, CMMB
Remote Command	:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFSPectrum|LSHoulder|RSHoulder :CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?
Example	CALC:CHP:MARK:TRAC RFSP CALC:CHP:MARK:TRAC?
Preset	RFSPectrum
State Saved	Saved in instrument state.
Range	RF Spectrum|Left Shoulder|Right Shoulder
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.03.00

Couple Markers

When this function is active, moving any marker causes an “equal X Axis movement” of every other marker that is not set to **Off**. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

This may result in markers going off screen.

Key Path	**Marker**

Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:CHPower:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:CHPower:MARKer:COUPle[:STATe]?`
Example	CALC:CHPower:MARK:COUP ON
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	A.02.00

All Markers Off

Turns off all markers.

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:CHPower:MARKer:AOFF`
Example	CALC:CHP:MARK:AOFF
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Backward Compatibility SCPI Commands

Sets or queries the state of a marker. Setting a marker which is OFF to state ON or 1 puts it in Normal mode and places it at the center of the screen.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:STATe OFF|ON|0|1` `:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:STATe?`
Example	CALC:CHP:MARK3:STAT ON CALC:CHP:MARK3:STAT?
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker Function

There are no ‘Marker Functions’ supported in Channel Power, so this front-panel key displays a blank menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Marker To

There is no ‘Marker To’ functionality supported in Channel Power measurement, so this front-panel key displays a blank key menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas

See “Meas” on page 1257 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

Meas Setup

Displays the setup menu for the currently selected measurement. The parameters included in this menu are as follows.

- Averaging
- IF Gain
- Channel Power Span
- Integrated Bandwidth
- Filter Bandwidth
- Root Raised Cosine (RRC) Filter

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Avg/Hold Num

Specifies the number of measurement averages used to calculate the measurement result. The average is displayed at the end of each sweep. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:CHPower:AVERage:COUNt <integer>`
	`[:SENSe]:CHPower:AVERage:COUNt?`
	`[:SENSe]:CHPower:AVERage[:STATe] ON|OFF|1|0`
	`[:SENSe]:CHPower:AVERage[:STATe]?`

Example	CHP:AVER:COUN 15 CHP:AVER:COUN? CHP:AVER ON CHP:AVER?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode,ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA: 10 WCDMA: 200 WIMAX OFDMA, LTE, LTETDD: 200 CDMA2K: 20 1xEVDO: 20 DVB-T/H: 20 DTMB (CTTB): 20 ISDB-T: 10 CMMB: 10 Digital Cable TV: 10 ON
State Saved	Saved in instrument state.
Min	1
Max	10000
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Avg Mode

Allows you to select the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

When set to Exponential (Exp) the measurement averaging continues using the specified number of averages to compute each exponentially-weighted averaged value. The average is displayed at the end of each sweep.

When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:CHPower:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:CHPower:AVERage:TCONtrol?`
Example	CHP:AVER:TCON EXP CHP:AVER:TCON?

Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	EXP
State Saved	Saved in instrument state.
Range	Exp|Repeat
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Integ BW

Specifies the range of integration used in calculating the power in the channel. The integration bandwidth (IBW) is displayed on the trace as two markers connected by an arrow.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:CHPower:BANDwidth:INTegration <bandwidth>` `[:SENSe]:CHPower:BANDwidth:INTegration?`
Example	CHP:BAND:INT 10MHz CHP:BAND:INT?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	The minimum value of the span is coupled with the integration bandwidth.

Preset	SA: 2 MHz WCDMA: 5 MHz C2K: 1.23 MHz WIMAX OFDMA: 10 MHz 1xEVDO: 1.23 MHz DVB-T/H: 7.61MHz DTMB (CTTB): 8MHz ISDB-T: 5.6MHz CMMB: 8MHz LTE: 5 MHz LTETDD: 5 MHz Digital Cable TV: 8MHz
State Saved	Saved in instrument state.
Min	100 Hz
Max	1 GHz
Max	RF Input: 1 GHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

PhNoise Opt

Selects the LO (local oscillator) phase noise behaviour for various operating conditions.

Key Path	**Meas Setup**
Initial S/W Revision	A.04.20

PhNoise Opt Auto

Selects the LO (local oscillator) phase noise behavior to optimize dynamic range and speed for various instrument operating conditions.

The X-Series has two grades of LO; a high performance LO that gives the best phase noise performance; and a medium-performance LO that gives excellent performance.

In models with the high performance LO, Auto will choose:

Fast Tuning whenever Span > 44.44 MHz or RBW > 1.9 MHz

otherwise, if center frequency is < 195 kHz OR ALL of the following are true:

CF 1 MHz AND Span 1.3 MHz AND RBW 75 kHz

then Best Close in Phase Noise;

otherwise, Best Wide-offset Phase Noise

In models with the medium-performance LO, Auto will choose:

Fast Tuning whenever Span > 12.34 MHz or RBW > 250 kHz

otherwise, if center frequency is < 25 kHz OR ALL of the following are true:

CF >= 1 MHz AND Span <= 141.4 kHz AND RBW <= 5 kHz

then **Best Close in Phase Noise**;

otherwise, **Best Wide-offset Phase Noise**

In units whose hardware does not provide for an extra-fast tuning option, the settings for Fast Tuning are the same as Best Close-in, so in those models you will see no difference between these settings.

These rules apply whether in swept spans, zero span, or FFT spans.

Key Path	**Meas Setup**
Remote Command	`[:SENSe]:CHPower:FREQuency:SYNThesis:AUTO[:STATe] OFF|ON|0|1` `[:SENSe]:CHPower:FREQuency:SYNThesis:AUTO[:STATe]?`
Example	CHP:FREQ:SYNT:AUTO 1 CHP:FREQ:SYNT:AUTO?
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Readback Text	"Auto" is underlined when Auto is selected, otherwise Man is underlined.
Initial S/W Revision	A.04.20

PhNoise Opt State

Selects the LO (local oscillator) phase noise behavior for various operating conditions.

Key Path	**Meas Setup**
Remote Command	`[:SENSe]:CHPower:FREQuency:SYNThesis[:STATe] 1|2|3` `[:SENSe]:CHPower:FREQuency:SYNThesis[:STATe]?`
Example	CHP:FREQ:SYNT 1 CHP:FREQ:SYNT?
Notes	Parameter key: 1. optimizes phase noise for close-in from the carrier. 2. optimizes phase noise for wide-offset from the carrier. 3. optimizes LO for tuning speed.

Preset	3
State Saved	Saved in instrument state.
Range	Hardware Dependent: PXA: Best Close-in Noise [offset < 140 kHz] | Best Wide-offset Noise [offset > 160 kHz] | Fast Tuning MXA, CXA: Best Close-in Noise [offset < 20 kHz] | Best Wide-offset Noise [offset > 30 kHz] | Fast Tuning
Initial S/W Revision	A.04.20

IF Gain

Sets the IF Gain function to Auto, Low Gain or High Gain. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the auto rules for IF Gain. When Auto is active, the IF Gain is set to High Gain under any of the following conditions:

- The input attenuator is set to 0 dB
- The preamp is turned On and the frequency range is under 3.6 GHz

For other settings, Auto sets the IF Gain to Low Gain.

Key Path	**Meas Setup, IF Gain**
Remote Command	`[:SENSe]:CHPower:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:CHPower:IF:GAIN:AUTO[:STATe]?`
Example	CHP:IF:GAIN:AUTO ON CHP:IF:GAIN:AUTO?
Couplings	When the auto attenuation exists (for example, with an electrical attenuator), IF Gain State differs depending on the condition. Auto sets IF Gain to High Gain under any of the following conditions: The input attenuator is set to 0 dB, or the preamp is turned on and the frequency range is under 3.6 GHz. For other conditions, Auto sets IF Gain to Low Gain.
Preset	OFF
State Saved	Saved in instrument state.
Range	Off|On

Initial S/W Revision	Prior to A.02.00

IF Gain State

Selects the range of the IF Gain.

Key Path	**Meas Setup, IF Gain**
Remote Command	`[:SENSe]:CHPower:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:CHPower:IF:GAIN[:STATe]?`
Example	`CHP:IF:GAIN ON` `CHP:IF:GAIN?`
Notes	ON = high gain OFF = low gain
Couplings	When the auto attenuation exists (for example, with an electrical attenuator), IF Gain State differs depending on the condition. Auto sets IF Gain to High Gain under any of the following conditions: The input attenuator is set to 0 dB, or the preamp is turned on and the frequency range is under 3.6 GHz. For other conditions, Auto sets IF Gain to Low Gain.
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain|High Gain
Initial S/W Revision	Prior to A.02.00

RRC Filter

Turns the Root Raised Cosine (RRC) filter On or Off. The α value (roll off) for the filter is set to the value of the Filter Alpha parameter, and the RRC filter bandwidth is set to the Filter BW parameter.

Key Path	**Meas Setup**
Mode	SA, WCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:CHPower:FILTer[:RRC][:STATe] OFF|ON|0|1` `[:SENSe]:CHPower:FILTer[:RRC][:STATe]?`
Example	CHP:FILT OFF CHP:FILT?

Notes	This parameter is normally used when TETRA is selected as the Radio Std. You must be in the Spectrum Analysis mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, or W-CDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	For CDMA2K mode, this key is blank. For 1xEVDO mode, this key is blank.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Filter BW

Inputs the Root Raised Cosine (RRC) filter bandwidth. Normally, the filter bandwidth is the same as the symbol rate of the signal.

Key Path	**Meas Setup**
Mode	SA, WCDMA, WIMAX OFDMA, DVB-T/H, DTMB (CTTB), LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:CHPower:FILTer[:RRC]:BANDwidth <real>`
	
	`[:SENSe]:CHPower:FILTer[:RRC]:BANDwidth?`

Example	CHP:FILT:BAND 10MHz CHP:FILT:BAND?
Notes	This parameter is normally used when TETRA is selected as the Radio Std. You must be in the Spectrum Analysis mode, DVB-T/H mode, DTMB (CTTB) mode ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, or W-CDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	For CDMA2K mode, this key is blank. For 1xEVDO mode, this key is blank.

Preset	SA, LTE, LTETDD: 3.84MHz WCDMA: 3.84MHz WIMAX OFDMA: 10MHz DVB-T/H: 8MHz DTMB (CTTB): 7.56MHz ISDB-T: 5.6MHz CMMB: 7.512MHz Digital Cable TV: 6.9MHz
State Saved	Saved in instrument state.
Min	100 Hz
Max	100 MHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Filter Alpha

Inputs the alpha value for the Root Raised Cosine (RRC) filter.

Key Path	**Meas Setup**
Mode	SA, WCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:CHPower:FILTer[:RRC]:ALPHa <real>` `[:SENSe]:CHPower:FILTer[:RRC]:ALPHa?`
Example	CHP:FILT:ALPH 0.5 CHP:FILT:ALPH?
Notes	This parameter is normally used when TETRA is selected as the Radio Std. You must be in the Spectrum Analysis mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, or W-CDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	For CDMA2K mode, this key is blank.
Preset	SA, WCDMA, DVB-T/H, ISDB-T, CMMB, LTE, LTETDD: 0.22 DTMB (CTTB): 0.05 Digital Cable TV: 0.15
State Saved	Saved in instrument state.
Min	0.01

Max	1.00
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

PSD Unit

Sets the unit bandwidth for Power Spectral Density. The available units are dBm/Hz and dBm/MHz.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), LTE, LTETDD, Digital Cable TV
Remote Command	`:UNIT:CHPower:POWer:PSD DBMHZ|DBMMHZ` `:UNIT:CHPower:POWer:PSD?`
Example	UNIT:CHP:POW:PSD DBMMHZ UNIT:CHP:POW:PSD?
Couplings	When the PSD unit is changed, the PSD result of the “MEAS|READ|FETCH:CHP1?” is also changed by the PSD unit basis (in either dBm/Hz or dBm/MHz).
Preset	DBMHZ
State Saved	Saved in instrument state.
Range	dBm/Hz|dBm/MHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Meas Preset

Restores all the measurement parameters to their default values.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CONFigure:CHPower`
Example	CONF:CHP
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Shoulder Offset Start (Only for DVB-T/H and ISDB-T mode)

Specifies the start offset frequency from the center frequency used in calculating the shoulder attenuation results.

Key Path	**Meas Setup**
Mode	DVB-T/H, ISDB-T
Remote Command	`[:SENSe]:CHPower:SHOUlder:OFFSet:FREQuency:STARt <freq>` `[:SENSe]:CHPower:SHOUlder:OFFSet:FREQuency:STARt?`
Example	CHP:SHOU:OFFS:FREQ:STAR 3.3MHz CHP:SHOU:OFFS:FREQ:STAR?
Notes	You must be in the ISDB-T mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	The minimum value of the shoulder offset start frequency is coupled with integration bandwidth, the maximum value of the shoulder offset start frequency is coupled with shoulder offset stop frequency.
Preset	DVB-T/H: 4.105MHz ISDB-T: 3.3MHz
State Saved	Saved in instrument state.
Min	100 Hz
Max	1.0 GHz
Initial S/W Revision	A.03.00

Shoulder Offset Stop (Only for DVB-T/H and ISDB-T mode)

Specifies the stop offset frequency from the center frequency used in calculating the shoulder attenuation results.

Key Path	**Meas Setup**
Mode	DVB-T/H, ISDB-T
Remote Command	`[:SENSe]:CHPower:SHOUlder:OFFSet:FREQuency:STOP <freq>` `[:SENSe]:CHPower:SHOUlder:OFFSet:FREQuency:STOP?`
Example	CHP:SHOU:OFFS:FREQ:STOP 3.5MHz CHP:SHOU:OFFS:FREQ:STOP?
Notes	You must be in the ISDB-T mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	The minimum value of the shoulder offset stop frequency is coupled with shoulder offset start frequency, the maximum value of the shoulder offset stop frequency is coupled with span.

Preset	DVB-T/H: 4.505MHz ISDB-T: 3.5MHz
State Saved	Saved in instrument state.
Min	100 Hz
Max	1.0 GHz
Initial S/W Revision	A.03.00

Shoulder Offset (Only for DTMB (CTTB) and CMMB mode)

Specifies the offset frequency from the center frequency used in calculating the shoulder attenuation results.

Key Path	**Meas Setup**
Mode	DTMB (CTTB), CMMB
Remote Command	`[:SENSe]:CHPower:SHOUlder:OFFSet:FREQuency <freq>` `[:SENSe]:CHPower:SHOUlder:OFFSet:FREQuency?`
Example	CHP:SHOU:OFFS:FREQ 4.2MHz CHP:SHOU:OFFS:FREQ?
Notes	You must be in the CMMB mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	The minimum value of the shoulder offset frequency is coupled with integration bandwidth, the maximum value of the shoulder offset frequency is coupled with span.
Preset	4.2MHz
State Saved	Saved in instrument state.
Min	100 Hz
Max	1.0 GHz
Initial S/W Revision	A.03.00

Mode

See “Mode” on page 1271 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

Mode Setup

See “Mode Setup” on page 1291 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

Peak Search

Places the selected marker on the trace point with the maximum y-axis value. Pressing Peak Search with the selected marker Off causes the selected marker to be set to Normal, then a peak search is immediately performed.

Key Path	**Front panel key**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:CHP:MARK2:MAX
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.0, A.03.000

Recall

See “Recall” on page 174 for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Restart

See "Restart" on page 1299 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

Save

See “Save” on page 186 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

Single

See “Single (Single Measurement/Sweep)” on page 1305 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

Source

See “Source” on page 1307 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

Span X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Span

Changes the frequency range symmetrically about the center frequency.

The default (and minimum) Span is calculated using the number of carriers and the carrier width where;

Span = (Upper Carrier Freq + (max offset IBW * (1 + alpha)) / 2) - (Lower Carrier Freq - (max offset IBW * (1 + alpha)) / 2)

The span is increased by a factor of 1 + Filter Alpha if the RRC Filter in on.

Key Path	**Span X Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:CHPower:FREQuency:SPAN <freq>` `[:SENSe]:CHPower:FREQuency:SPAN?`
Example	CHP:FREQ:SPAN 10 MHz CHP:FREQ:SPAN?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When Res BW is set to Auto, the resolution bandwidth is auto-coupled to span. The ratio of span /RBW is approximately 106:1. When the Res BW is set to Man, bandwidths are entered by the user, and these bandwidths are used regardless of other analyzer settings. Since Span is coupled to Integ BW in the factory default condition, if you change the integration bandwidth setting, the span setting changes by a proportional amount until a limit value is reached. However, the span can be individually set. The minimum value of the span is coupled with the integration bandwidth.

Preset	SA: 3 MHz WCDMA: 7.5 MHz C2K: 1.845 MHz WIMAX OFDMA: 20 MHz 1xEVDO: 2.0MHz DVB-T/H: 10MHz DTMB (CTTB): 10MHz ISDB-T: 10MHz CMMB: 10MHz LTE: 7.5 MHz LTETDD: 7.5 MHz Digital Cable TV: 10MHz
State Saved	Saved in instrument state.
Min	100 Hz
Max	1 GHz
Max	RF Input: 1 GHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Full Span

Changes the span to show the full frequency range of the spectrum analyzer.

Key Path	**Span X Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:CHPower:FREQuency:SPAN:FULL`
Example	CHP:FREQ:SPAN:FULL
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Selecting full span changes the measurement span value.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Last Span

Changes the span to the previous span setting. If no previous span value exists, then the span remains unchanged.

Key Path	**Span X Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:CHPower:FREQuency:SPAN:PREVious`
Example	CHP:FREQ:SPAN:PREV
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Selecting last span changes the measurement span value.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Sweep/Control

Accesses a menu of functions that enable you to set up and control the sweep timeand source for the current measurement. See “Sweep/Control” on page 1309 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Sweep Time

Selects the length of time that the spectrum analyzer sweeps the displayed frequency span. Additional overhead time, which impacts the sweep rate, is not calculated as part of the sweep time. In fact:

- sweep rate = span/sweep time
- update rate = 1/(sweep time + overhead)
- sweep cycle time = sweep time + overhead

Sweep time is coupled to RBW and VBW, and is impacted by the number of sweep points, so changing those parameters may change the sweep time.

Key Path	**Sweep/Control**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:CHPower:SWEep:TIME <time>`
	`[:SENSe]:CHPower:SWEep:TIME?`
	`[:SENSe]:CHPower:SWEep:TIME:AUTO OFF|ON|0|1`
	`[:SENSe]:CHPower:SWEep:TIME:AUTO?`

Example	CHP:SWE:TIME 25ms CHP:SWE:TIME? CHP:SWE:TIME:AUTO OFF CHP:SWE:TIME:AUTO?

Preset	SA, WIMAX OFDMA: Automatically Calculated WCDMA: 1.0 ms CDMA2K: 9.4ms 1xEVDO: 2.66ms DVB-T/H: Automatically Calculated DTMB (CTTB): Automatically Calculated ISDB-T: Automatically Calculated CMMB: Automatically Calculated LTE: Automatically Calculated LTETDD: Automatically Calculated Digital Cable TV: Automatically Calculated
State Saved	Saved in instrument state.
Min	1 ms
Max	4000 s
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Sweep Setup

Accesses a menu that enables you to set the sweep state for the current measurement.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Auto Sweep Time Rules

Switches the analyzer between normal and accuracy sweep states.

Setting **Auto Sweep Time** to **Accy** results in slower sweep times, usually about three times as long, but yields better amplitude accuracy for CW signals. The instrument amplitude accuracy specifications only apply when **Auto Sweep Time** is set to **Accy**.

Additional amplitude errors which occur when **Auto Sweep Time** is set to **Norm** are usually well under 0.1 dB, though this is not guaranteed. Because of the faster sweep times and still low errors, **Norm** is the preferred setting of **Auto Sweep Time**. **Auto Sweep Time** is set to **Norm** on a **Preset** or **Auto Couple**. This means that in the Preset or Auto Coupled state, instrument amplitude accuracy specifications do not apply.

Key Path	**Sweep/Control, Sweep Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:CHPower:SWEep:TIME:AUTO:RULes NORMal|ACCuracy` `[:SENSe]:CHPower:SWEep:TIME:AUTO:RULes?`
Example	CHP:SWE:TIME:AUTO:RUL NORM CHP:SWE:TIME:AUTO:RUL?
Notes	In Zero Span, this key is irrelevant and inaccessible (because the whole Sweep Setup menu is grayed out in Zero Span), however its settings can be changed remotely with no error indication. Set to Norm when Auto Couple is pressed or sent remotely
Preset	NORMal
State Saved	Saved in instrument state.
Range	Norm|Accy
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Pause

Pauses a measurement after the current data acquisition is complete. When Paused, the label on the key changes to Resume. Pressing the Resume key resumes the measurement at the point it was at when paused. See “Pause/Resume” on page 1321 in “Common Measurement Functions” section for more details.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Gate

Accesses a menu that enables you to control the gating function. See “Gate ” on page 1322 in "Common Measurement Functions" section for more details.

The Gate functionality is used to view signals best viewed by qualifying them with other events.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Points

Sets the number of points per sweep. The resolution of setting the sweep time depends on the number of points selected. If Preset is selected, the number of points per sweep defaults to 1001. The current value of points is displayed parenthetically, next to the sweep time in the lower-right corner of the display.

Changing the number of points has several effects on the analyzer. Since markers are read at the point location, the marker reading may change. All trace data is cleared.

Key Path	**Sweep/Control**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:CHPower:SWEep:POINts <integer>` `[:SENSe]:CHPower:SWEep:POINts?`
Example	CHP:SWE:POIN 501 CHP:SWE:POIN?
Notes	Whenever the number of sweep points changes: All trace data is erased Any traces with Update Off also go to Display Off (like going from View to Blank in the older analyzers) Sweep time is re-quantized Any limit lines that are on are updated If averaging/hold is on, averaging/hold starts over
Couplings	Whenever the number of sweep points changes, the sweep time is re-quantized.
Preset	DVB-T/H: 2001 DTMB (CTTB): 2001 Other: 1001 ISDB-T: 2001 CMMB: 2001 1xEVDO: 512 Digital Cable TV: 2001
State Saved	Saved in instrument state.
Min	101
Max	20001
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Trace/Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Trace Type

Allows you to select the type of trace you want to use for the current measurement. The first page of this menu contains a 1–of–N selection of the trace type (**Clear Write, Average, Max Hold, Min Hold**) for the selected trace.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:TRACe:CHPower:TYPE WRITe|AVERage|MAXHold|MINHold` `:TRACe:CHPower:TYPE?`
Example	TRAC:CHP:TYPE WRIT TRAC:CHP:TYPE?
Notes	`WRITe` = Clear Write `AVERage` = Average `MAXHold` = Maximum Hold `MINHold` = Minimum Hold
Couplings	When Detector setting is “Auto” ([:SENSe]:CHPower:DETector:AUTO?), Detector ([:SENSe]:CHPower:DETector[:FUNCtion]?) switches aligning with the switch of this parameter: “NORMal” with WRITe (Clear Write), “AVERage” with AVERage, “POSitive (peak)” with MAXHold, and “NEGative (peak)” with MINHold.
Preset	AVERage
State Saved	Saved in instrument state.
Range	`ClearWrite|Average|MaxHold|MinHold`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement. The following choices are available:

- Auto- the detector selected depends on marker functions, trace functions, average type, and the trace averaging function.
- Normal-the detector determines the peak of the CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.
- Average-the detector determines the average of the signal within the sweep points. The averaging method depends upon the Average Type selection (voltage, power or log scales).
- Peak-the detector determines the maximum of the signal within the sweep points.
- Sample-the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- Negative Peak-the detector determines the minimum of the signal within the sweep points.

Key Path	**Detector**
Initial S/W Revision	Prior to A.02.00

Detector Selection

Selects a detector to be used by the analyzer for the current measurement.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:CHPower:DETector[:FUNCtion] NORMal|AVERage|POSitive|SAMPle|NEGative` `[:SENSe]:CHPower:DETector[:FUNCtion]?`
Example	CHP:DET NORM CHP:DET?

Notes	When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. The Normal detector determines the peak of CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This method of detection is also referred to as Rosenfell detection. The Average detector determines the average of the signal within the sweep points. The averaging method is Power Average (RMS). The Peak detector determines the maximum of the signal within the sweep points. The Sample detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point. The Negative Peak detector determines the minimum of the signal within the sweep points.
Couplings	When Detector setting is “Auto” ([:SENSe]:CHPower:DETector:AUTO?), Detector ([:SENSe]:CHPower:DETector[:FUNCtion]?) switches aligning with the switch of this parameter: “NORMal” with Clear Write, “AVERage” with AVERage, “POSitive (peak)” with MAXHold, and “NEGative (peak)” with MINHold.
Preset	AVERage
State Saved	Saved in instrument state.
Range	Normal|Average|Peak|Sample|Negative Peak
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Auto

Sets the detector for the currently selected trace to Auto.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:CHPower:DETector:AUTO ON|OFF|1|0` `[:SENSe]:CHPower:DETector:AUTO?`
Example	CHP:DET:AUTO ON CHP:DET:AUTO?
Couplings	When Detector setting is “Auto” ([:SENSe]:CHPower:DETector:AUTO?), Detector ([:SENSe]:CHPower:DETector[:FUNCtion]?) switches aligning with the switch of this parameter: “NORMal” with Clear Write, “AVERage” with AVERage, “POSitive (peak)” with MAXHold, and “NEGative (peak)” with MINHold.

Preset	Others: ON DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, Digital Cable TV: OFF
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Trigger

Accesses a menu of functions that enable you to select and control the trigger source for the current measurement.

See “Trigger” on page 1339 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

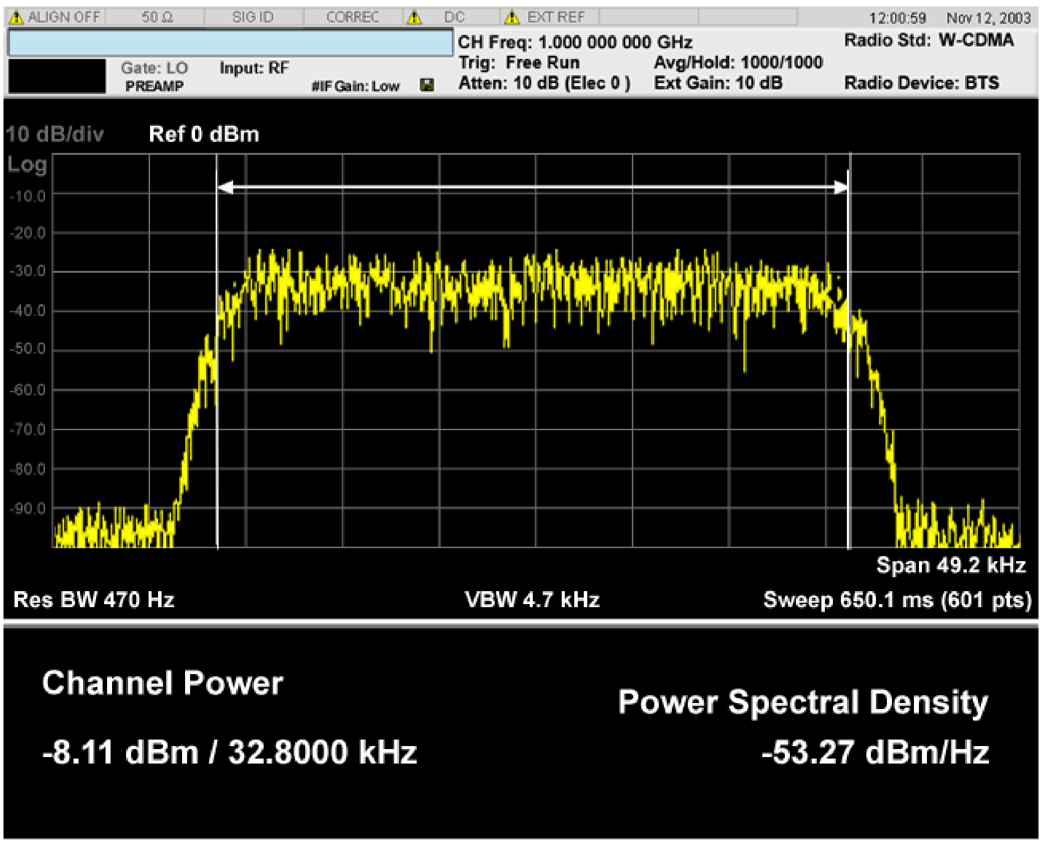
View/Display

Accesses a menu of functions that enable you to control the instrument display as well as turn the bar graph On and Off.

If current mode is NOT DVB-T/H, DTMB (CTTB), ISDB-T or CMMB mode, the front panel views only contain one view: Spectrum View. It can be displayed as a single spectrum trace view or displayed with a Bar Graph trace on the spectrum trace

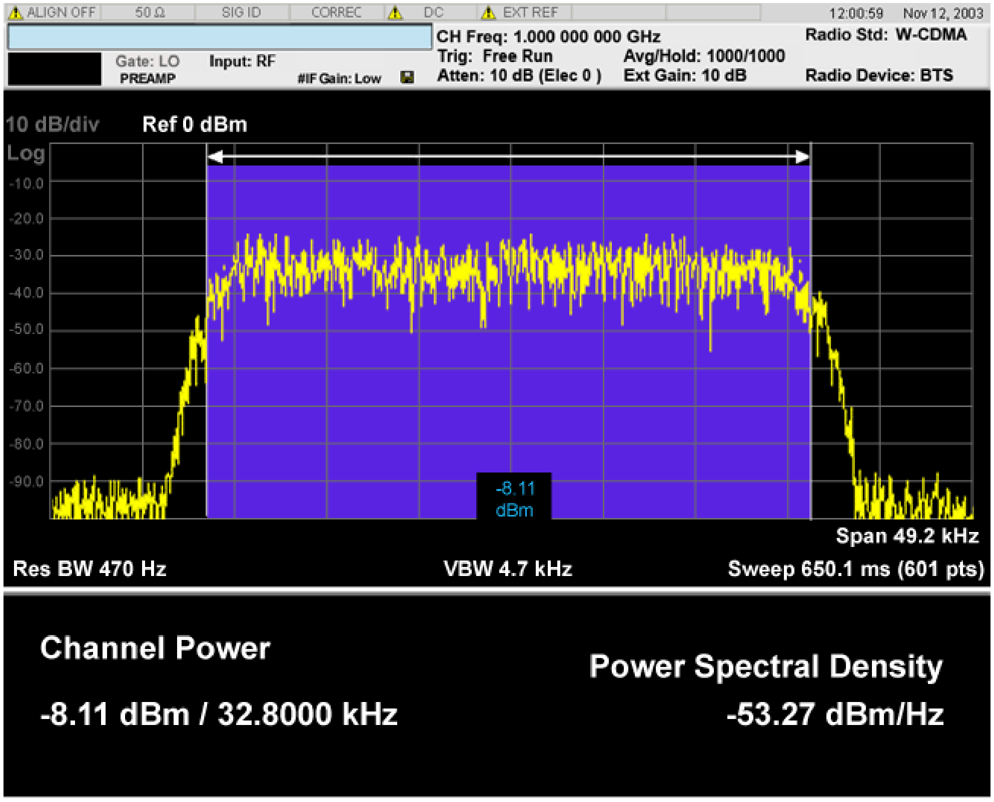
The results of the measurement can be displayed as a single spectrum trace view or displayed with a Bar Graph trace on the spectrum trace.

Spectrum View with Bar Graph off



Spectrum View with Bar Graph on

This View is the same as the 'Spectrum' view, but has a blue bar between the markers that indicates the measured output power level. The bar graph is activated when the "Bar Graph" Soft Key is set to ON under the View/Display menu. The actual measured output power level is displayed on the display at the bottom of the bar.



If current mode is DVB-T/H or DTMB (CTTB), the front panel views contain three views: RF Spectrum View, Shoulder Attenuation View and Spectrum Mask View.

If current mode is ISDB-T or CMMB, the front panel views contain two views: RF Spectrum View and Shoulder Attenuation View.

The RF Spectrum View is the common view, the same as the Spectrum view, and the Shoulder Attenuation View and Spectrum Mask View are special view for DVB-T/H, DTMB (CTTB), ISDB-T and CMMB.

View selection by name (DTMB (CTTB), DVB-T/H only)

Selects the results view. The following SCPI command allows you to select the desired measurement view by enumeration.

Key Path	**View/Display**
Mode	DVB-T/H, DTMB (CTTB)
Remote Command	`:DISPlay:CHPower:VIEW[:SELect] RFSPectrum|SHOUlder|MASK` `:DISPlay:CHPower:VIEW[:SELect]?`
Example	DISP:CHP:VIEW RFSP DISP:CHP:VIEW?
Preset	RFSPectrum

State Saved	Saved in instrument state.
Range	RF Spectrum | Shoulder Attenuation | Spectrum Mask
Initial S/W Revision	A.02.00

View selection by name (ISDB-T, CMMB only)

Selects the results view. The following SCPI command allows you to select the desired measurement view by enumeration.

Key Path	**View/Display**
Mode	ISDB-T, CMMB
Remote Command	`:DISPlay:CHPower:VIEW[:SELect] RFSPectrum|SHOUlder` `:DISPlay:CHPower:VIEW[:SELect]?`
Example	DISP:CHP:VIEW RFSP DISP:CHP:VIEW?
Preset	RFSPectrum
State Saved	Saved in instrument state.
Range	RF Spectrum | Shoulder Attenuation
Initial S/W Revision	A.03.00

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters.

See “Display” on page 1385 in the "Common Measurement Functions" section for more information.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Bar Graph

Turns the Bar Graph On and Off.

Key Path	**DVB-T/H, DTMB (CTTB), ISDB-T, CMMB: View/Display, RF Spectrum** **Others: View/Display**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`:DISPlay:CHPower:VIEW[1]:WINDow[1]:BGRaph ON|OFF|1|0` `:DISPlay:CHPower:VIEW[1]:WINDow[1]:BGRaph?`
Example	DISP:CHP:VIEW:WIND:BGR ON DISP:CHP:VIEW:WIND:BGR?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

RF Spectrum (Only for DVB-T/H, DTMB (CTTB), ISDB-T and CMMB)

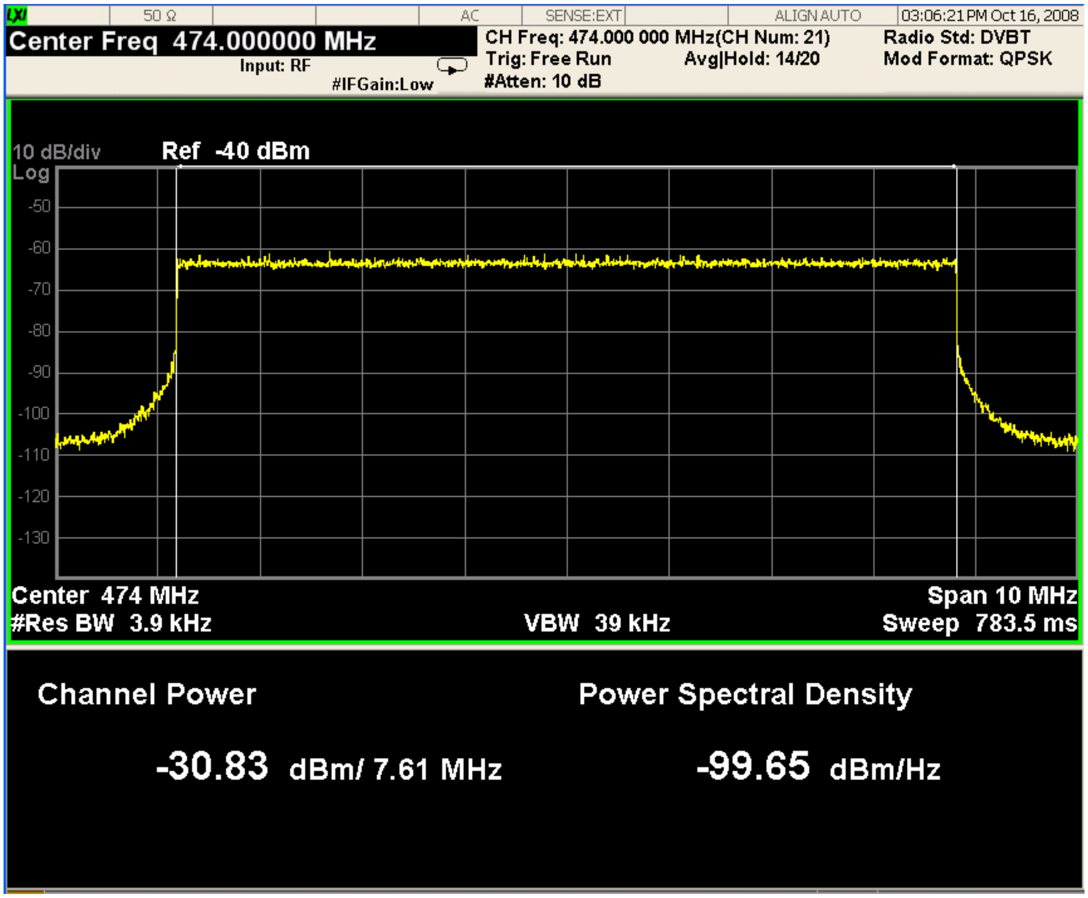
NOTE This view is the same as the Spectrum View above.

Selects the RF Spectrum view. This view consists of the following two windows:

“Traces Window” on page 347

“Results Window” on page 347

The measurement results are shown in a graph window and in a text window. The text window shows the absolute power and its mean power spectral density values over the specified bandwidth. This view also supports bar graph functionality. The bar graph is activated when the “Bar Graph” Soft Key is set to ON under the RF Spectrum menu. The actual measured output power level is displayed on the display at the bottom of the bar.


50 Ω
AC
SENSE:EXT
ALIGN AUTO
03:06:21 PM Oct 16, 2008
Center Freq 474.000000 MHz
Input: RF
#IFGain:Low
CH Freq: 474.000 000 MHz(CH Num: 21)
Trig: Free Run
Avg|Hold: 14/20
#Atten: 10 dB
Radio Std: DVBT
Mod Format: QPSK
10 dB/div
Log
Ref -40 dBm
-50
-60
-70
-80
-90
-100
-110
-120
-130
Center 474 MHz
#Res BW 3.9 kHz
VBW 39 kHz
Span 10 MHz
Sweep 783.5 ms
Channel Power
-30.83 dBm/ 7.61 MHz
Power Spectral Density
-99.65 dBm/Hz

Traces Window

Corresponding Trace	yellow - spectrum trace;

Results Window

Name	Corresponding Results
Channel Power	n=1, 1st element Total channel power in the specified integration bandwidth
	Channel Integration Bandwidth
Power Spectral Density	n=1, 2nd element The power in the specified unit bandwidth

Key Path	**View/Display**
Example	DISP:CHP:VIEW RFSP DISP:CHP:VIEW?
Initial S/W Revision	A.02.00

Shoulder Attenuation (Only for DVB-T/H, DTMB (CTTB), ISDB-T and CMMB)

Selects the Shoulder Attenuation view. This view is only available in DVB-T/H, DTMB (CTTB), ISDB-T and CMMB mode:

“Shoulder Attenuation view for DVB-T/H and ISDB-T mode” on page 348

“Shoulder Attenuation view for DTMB (CTTB) and CMMB mode” on page 348

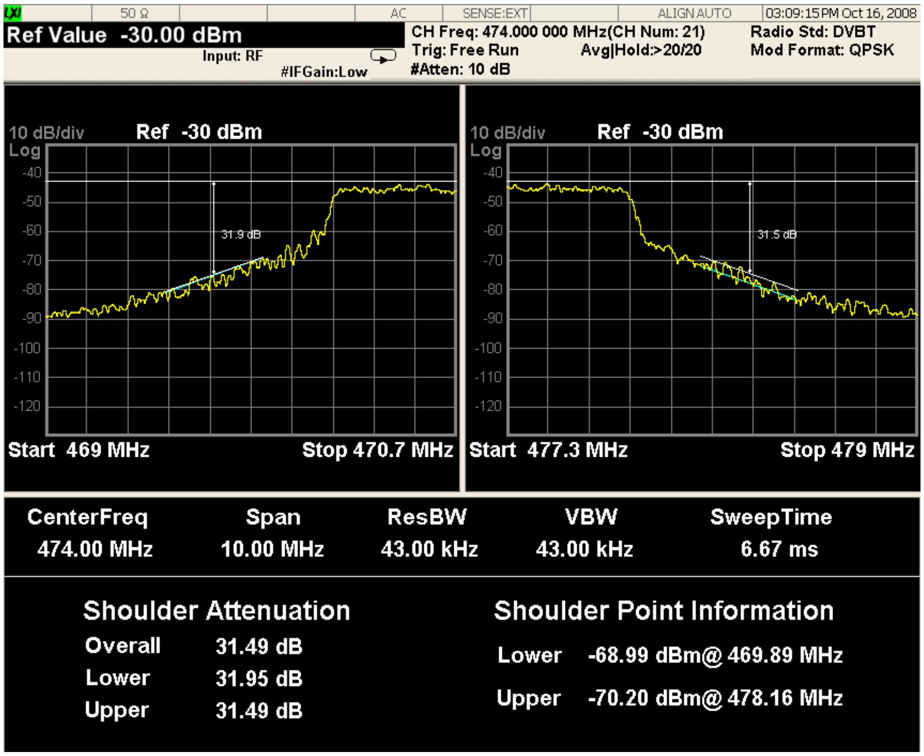
This view consists of the following three windows:

“Lower Shoulder Trace Window” on page 349

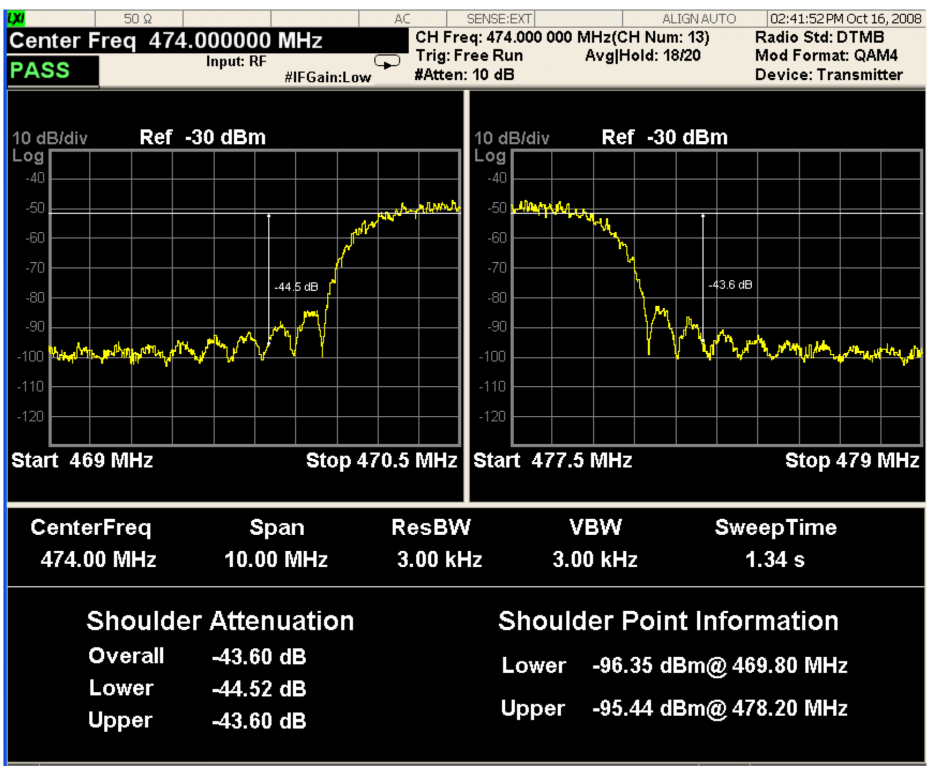
“Upper Shoulder Trace Window” on page 349

“Results Window” on page 349

Shoulder Attenuation view for DVB-T/H and ISDB-T mode



Shoulder Attenuation view for DTMB (CTTB) and CMMB mode



NOTE The pass/fail function is valid only in DTMB (CTTB) and CMMB mode:

In DTMB (CTTB) mode, when the device type (under mode setup panel) is Transmitter, the pass/fail limit is –36 dBc, and for the other type – Exciter, the pass/fail limit is –48 dBc.

In CMMB mode, when the device type (under mode setup panel) is Transmitter, the pass/fail limit is –35dBc, and for the other type – Exciter, the pass/fail limit is –50dBc.

Lower Shoulder Trace Window

Corresponding Trace *	yellow - lower edge of the spectrum trace; white - assistant lines to indicate the lower shoulder attenuation; **(Only for DVB-T/H)** cyan – assistant beeline from shoulder range begin point to the range end point;

Upper Shoulder Trace Window

Corresponding Trace *	yellow - upper edge of the spectrum trace; white - assistant lines to indicate the upper shoulder attenuation; **(Only for DVB-T/H)** cyan – assistant beeline from shoulder range begin point to the range end point;

Results Window

Name	**Corresponding Results**
CenterFreq (MHz)	The center frequency of the measurement
Span (MHz)	The span of the measurement
ResBW (kHz)	The resolution bandwidth of the measurement
VBW (kHz)	The video bandwidth of the measurement
SweepTime (ms)	The sweep time of the measurement
Overall Shoulder Attenuation (dB)	n=3, 1st element Shoulder attenuation result
Lower Shoulder Attenuation (dB)	n=3, 2nd element Lower shoulder attenuation result
Upper Shoulder Attenuation (dB)	n=3, 3rd element Upper shoulder attenuation result

Name	Corresponding Results
Lower Shoulder Point Power (dBm) **	n=3, 4th element The power value of the point with maximum power level in the lower edge of the spectrum
Lower Shoulder Point Frequency (MHz) **	n=3, 5th element The frequency of the point with maximum power level in the lower edge of the spectrum
Upper Shoulder Point Power (dBm) **	n=3, 6th element The power value of the point with maximum power level in the upper edge of the spectrum
Upper Shoulder Point Frequency (MHz) **	n=3, 7th element The frequency of the point with maximum power level in the upper edge of the spectrum

*: For DVB-T/H mode: All three traces are valid. The cyan line is connecting the measurement points 300kHz and 700kHz from each of the upper and lower edges of the spectrum (yellow trace).

For DTMB (CTTB), ISDB-T, and CMMB mode: There are only two traces: yellow trace and white trace.

**: For DVB-T/H mode: Shoulder Point Information shows the information of the maximum power level point between the points at 300 kHz and 700 kHz from each of the upper and lower edges of the spectrum trace. It contains two parts: the frequency and the power level.

For DTMB (CTTB) mode: Shoulder Point Information shows the power level of the fixed point, which is ±4.2MHz away from center frequency for 8MHz radio bandwidth and ±3.2MHz away from center frequency for 6MHz radio bandwidth.

For ISDB-T mode: Shoulder Point Information shows the information of the maximum power level point between the frequency range of –3.3 MHz to –3.5 MHz away from center frequency of the lower channel and of +3.3 MHz to +3.5 MHz away from the center frequency of the upper channel. It contains two parts: the frequency and the power level.

For CMMB mode: Shoulder Point Information shows the power level of the fixed point, which is ±4.2MHz away from center frequency for 8MHz radio bandwidth. It contains the frequency and the power level of the point.

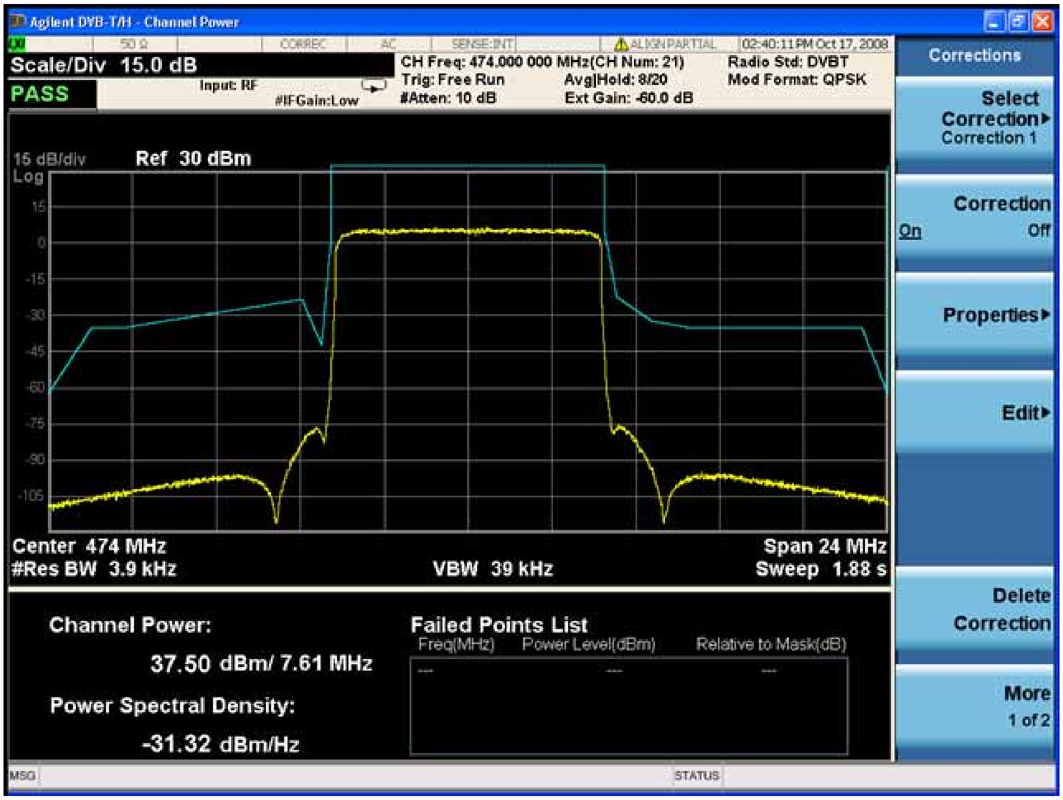
Key Path	**View/Display**
Example	DISP:CHP:VIEW SHOU DISP:CHP:VIEW?
Initial S/W Revision	A.02.00

Spectrum Mask(DTMB (CTTB), DVB-T/H only)

Selects the Spectrum Mask view. This view consists of the following two windows:

"Trace Window" on page 351

"Results Window" on page 352



NOTE	If the current radio bandwidth is not 8 MHz, the limit line (Mask) is not available and the failed points list shows "---". The STATUS message "No Result; No mask for X MHz" appears. (X may be 5, 6 and 7 for DVB-T/H mode and 6 for DTMB (CTTB) mode.)

Trace Window

Corresponding Trace	yellow - spectrum trace; cyan - limit line trace;

Results Window

Name	Corresponding Results
Channel Power	n=1, 1st element Total channel power in the specified integration bandwidth
	Channel Integration Bandwidth
Power Spectral Density	n=1, 2nd element The power in the specified unit bandwidth
Failed Points List *	n=7 The failed point's information: frequency, absolute power and relative power

*: If the number of the failed points is less than twenty, all of them (frequency, power and relative power) will be shown in the failed points list; and if the number of the failed points is more than twenty, only the first ten and the last ten failed points will be shown.

Key Path	**View/Display**
Example	DISP:CHP:VIEW MASK DISP:CHP:VIEW?
Initial S/W Revision	A.02.00

Mask - selection by Enum (Only for DVB-T/H mode)

Selects the mask line in the spectrum mask view. The following SCPI command allows you to select the desired mask by enumeration. It includes six kinds of limit line: L/SECAM/NICAM, G/PAL/NICAM, I/PAL/NICAM, G/PAL/A2, K/SECAM and K/PAL.

Key Path	**View/Display, Spectrum Mask**
Mode	DVB-T/H
Remote Command	`:DISPlay:CHPower:VIEW:MASK[:SELect] LSNI|GPNI|IPNI|GPA2|KSKP` `:DISPlay:CHPower:VIEW:MASK[:SELect]?`
Example	DISP:CHP:VIEW:MASK LSNI DISP:CHP:VIEW:MASK?
Dependencies	If current Radio BW is not 8 MHz, the STATUS message “No result” will be displayed. But the keys under the Spectrum Mask are still displayed.
Preset	LSNI
State Saved	Saved in instrument state.
Range	LSecam_Nicam | GPal_Nicam | IPal_Nicam | GPal_A2 | KSecam_KPal

Initial S/W Revision	A.02.00

Limit Mask (DTMB (CTTB), DVB-T/H only)

Turns the Mask Line On and Off.

Key Path	**View/Display, Spectrum Mask**
Mode	DVB-T/H, DTMB (CTTB)
Remote Command	`:CALCulate:CHPower:MASK:STATe ON|OFF|1|0` `:CALCulate:CHPower:MASK:STATe?`
Example	:CALC:CHP:MASK:STAT ON :CALC:CHP:MASK:STATe?
Notes	You must be in DVB-T/H mode and DTMB (CTTB) mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	On
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	A.06.00

Scroll

Accesses the Scroll menu, which contains features that enable you to navigate the display.

Key Path	**View/Display, Spectrum Mask**
Mode	DVB-T/H, DTMB (CTTB)
Initial S/W Revision	A.02.00

Prev Page

Moves the display one page back to the previous page of the result metrics window in Spectrum Mask view.

Key Path	**View/Display, Spectrum Mask, Scroll**
Mode	DVB-T/H, DTMB (CTTB)
Initial S/W Revision	A.02.00

Next Page

Moves the display one page forward to the next page of the result metrics window in Spectrum Mask view.

Key Path	**View/Display, Spectrum Mask, Scroll**

Mode	DVB-T/H, DTMB (CTTB)
Initial S/W Revision	A.02.00

Scroll Up

Moves one line upward from the current line of the result metrics window in Spectrum Mask view.

Pressing the up arrow hard key has the same effect as this function, if no active function is shown. If an active function is shown, the up arrow hard key controls the active function, but has no effect on line movement.

Key Path	**View/Display, Spectrum Mask, Scroll**
Mode	DVB-T/H, DTMB (CTTB)
Initial S/W Revision	A.02.00

Scroll Down

Moves one line downward from the current line of the result metrics window in Spectrum Mask view.

Pressing the down arrow hard key has the same effect as this function, if no active function is shown. If an active function is shown, the up arrow hard key controls the active function, but has no effect on line movement, as the Scroll Down function does.

Key Path	**View/Display, Spectrum Mask, Scroll**
Mode	DVB-T/H, DTMB (CTTB)
Initial S/W Revision	A.02.00

First Page

Moves the display to the first page of the result metrics window in Spectrum Mask view.

Key Path	**View/Display, Spectrum Mask, Scroll**
Mode	DVB-T/H, DTMB (CTTB)
Initial S/W Revision	A.02.00

Last Page

Moves the display to the last page of the result metrics window in Spectrum Mask view.

Key Path	**View/Display, Spectrum Mask, Scroll**
Mode	DVB-T/H, DTMB (CTTB)
Initial S/W Revision	A.02.00

7 ACP Measurement

ACP is a measurement of the amount of interference, or power, in an adjacent frequency channel. The results are displayed as a bar graph or as spectrum data, with measurement data at specified offsets. For measurement results and views, see “View/Display” on page 462.

This topic contains the following sections:

Measurement Commands for ACP

The following commands are used to retrieve the measurement results:

```
:CONFigure:ACP
:CONFigure:ACP:NDEFault
:INITiate:ACP
:FETCh:ACP[n]?
:READ:ACP[n]?
:MEASure:ACP[n]?
```

For more measurement related commands, see the SENSe subsystem, and the section “Remote Measurement Functions” on page 1257.

Remote Command Results for ACP Measurement

Condition	N	Results Returned
Mode = SA mode, Radio Std = None, Number of carriers = 1 and only offset A is on	Not specified or n = 1	Returns 3 comma-separated values that correspond to: Reference carrier power, lower-adjacent channel power (dBc), and upper-adjacent channel power (dBc).

Condition	N	Results Returned
Mode = DTMB (CTTB) or CMMB, Radio BW = 8 MHz, Number of carriers = 1 and Meas Type = Total power reference	Not specified or n = 1	Returns 32 comma-separated scalar results, in the following order. 1. 0.0 2. Total carrier power (dBm) 3. 0.0 4. Reference carrier power (dBm) 5. Lower offset A - relative power (dB) 6. Lower offset A - absolute power (dBm) 7. Upper offset A - relative power (dB) 8. Upper offset A - absolute power (dBm) 9. Lower offset B - relative power (dB) 10. Lower offset B - absolute power (dBm) 11. Upper offset B - relative power (dB) 12. Upper offset B - absolute power (dBm) ... 25. Lower offset F - relative power (dB) 26. Lower offset F - absolute power (dBm) 27. Upper offset F - relative power (dB) 28. Upper offset F - absolute power (dBm) 29. Inside Adjacent Channel - relative power (dB) 30. Inside Adjacent Channel - absolute power (dBm) 31. Outside Adjacent Channel - relative power (dB) 32. Outside Adjacent Channel - absolute power (dBm) If Radio Device = Exciter, the last four (29, 30, 31 and 32) results returned –999.0. If the results are not available,–999.0 is returned. Note: * Inside Adjacent Channel - absolute power: the maximum of the Lower offset A - absolute power and the Upper offset A - absolute power; ** Inside Adjacent Channel - relative power: the result of Reference carrier power subtracted from Inside Adjacent Channel - absolute power; *** Outside Adjacent Channel - absolute power: the root mean square of the absolute power of the offset B upper/lower, the offset C upper/lower and the offset D upper/lower; **** Outside Adjacent Channel - relative power: the result of Referenc carrier power subtracted from Outside Adjacent Channel - absolute power;

Condition	N	Results Returned
Mode = DTMB (CTTB) or CMMB, Radio BW = 8 MHz, Number of carriers = 1 and Meas Type = Power spectral density reference	not specified or n = 1	Returns 32 comma-separated scalar results, in the following order. 1. 0.0 2. Total carrier power (dBm/Hz or dBm/MHz) 3. 0.0 4. Reference carrier power (dBm/Hz or dBm/MHz) 5. Lower offset A - relative power (dB) 6. Lower offset A - absolute power (dBm/Hz or dBm/MHz) 7. Upper offset A - relative power (dB) 8. Upper offset A - absolute power (dBm/Hz or dBm/MHz) 9. Lower offset B - relative power (dB) 10. Lower offset B - absolute power (dBm/Hz or dBm/MHz) 11. Upper offset B - relative power (dB) 12. Upper offset B - absolute power (dBm/Hz or dBm/MHz) ... 25. Lower offset F - relative power (dB) 26. Lower offset F - absolute power (dBm/Hz or dBm/MHz) 27. Upper offset F - relative power (dB) 28. Upper offset F - absolute power (dBm/Hz or dBm/MHz) 29. –999.0 30. –999.0 31. –999.0 32. –999.0 The last four (29, 30, 31 and 32) results always returned –999.0. If the results are not available,–999.0 is returned.

Condition	N	Results Returned
Meas Type = Total power reference	Not specified or n = 1	Returns 28 comma-separated scalar results, in the following order. 1. 0.0 2. Total carrier power (dBm) 3. 0.0 4. Reference carrier power (dBm) 5. Lower offset A - relative power (dB) 6. Lower offset A - absolute power (dBm) 7. Upper offset A - relative power (dB) 8. Upper offset A - absolute power (dBm) 9. Lower offset B - relative power (dB) 10. Lower offset B - absolute power (dBm) 11. Upper offset B - relative power (dB) 12. Upper offset B - absolute power (dBm) ... 25. Lower offset F - relative power (dB) 26. Lower offset F - absolute power (dBm) 27. Upper offset F - relative power (dB) 28. Upper offset F - absolute power (dBm) If the results are not available,–999.0 is returned.

Condition	N	Results Returned
Meas Type = Power spectral density reference	not specified or n = 1	Returns 28 comma-separated scalar results, in the following order. 1. 0.0 2. Total carrier power (dBm/Hz or dBm/MHz) 3. 0.0 4. Reference carrier power (dBm/Hz or dBm/MHz) 5. Lower offset A - relative power (dB) 6. Lower offset A - absolute power (dBm/Hz or dBm/MHz) 7. Upper offset A - relative power (dB) 8. Upper offset A - absolute power (dBm/Hz or dBm/MHz) 9. Lower offset B - relative power (dB) 10. Lower offset B - absolute power (dBm/Hz or dBm/MHz) 11. Upper offset B - relative power (dB) 12. Upper offset B - absolute power (dBm/Hz or dBm/MHz) ... 25. Lower offset F - relative power (dB) 26. Lower offset F - absolute power (dBm/Hz or dBm/MHz) 27. Upper offset F - relative power (dB) 28. Upper offset F - absolute power (dBm/Hz or dBm/MHz) If the results are not available,–999.0 is returned.
Meas Method = FAST	not specified or n = 1	Returns 5 comma-separated results, in the following order: 1. Reference carrier - absolute power (dBm) 2. Lower offset A - absolute power (dBm) 3. Upper offset A - absolute power (dBm) 4. Lower offset B - absolute power (dBm) 5. Upper offset B - absolute power (dBm)

Condition	N	Results Returned
Meas Type = Total power reference	n = 2	Returns 48 scalar results, in the following order: 1. Channel (1) - relative power (dB) 2. Channel (1) - absolute power (dBm) 3. Channel (2) - relative power (dB) 4. Channel (2) - absolute power (dBm) ... 23. Channel (12) - relative power (dB) 24. Channel (12) - absolute power (dBm) 25. Lower offset A - relative power (dB) 26. Lower offset A - absolute power (dBm) 27. Upper offset A - relative power (dB) 28. Upper offset A - absolute power (dBm) 29. Lower offset B - relative power (dB) 30. Lower offset B - absolute power (dBm) 31. Upper offset B - relative power (dB) 32. Upper offset B - absolute power (dBm) ... 45. Lower offset F - relative power (dB) 46. Lower offset F - absolute power (dBm) 47. Upper offset F - relative power (dB) 48. Upper offset F - absolute power (dBm) If the results are not available, –999.0 is returned.

Condition	N	Results Returned
Meas Type = Power spectral density reference	n = 2	Returns 48 scalar results, in the following order: 1. Channel (1) - relative power (dB) 2. Channel (1) - absolute power (dBm/Hz or dBm/MHz) 3. Channel (2) - relative power (dB) 4. Channel (2) - absolute power (dBm/Hz or dBm/MHz) ... 23. Channel (12) - relative power (dB) 24. Channel (12) - absolute power (dBm/Hz or dBm/MHz) 25. Lower offset A - relative power (dB) 26. Lower offset A - absolute power (dBm/Hz or dBm/MHz) 27. Upper offset A - relative power (dB) 28. Upper offset A - absolute power (dBm/Hz or dBm/MHz) 29. Lower offset B - relative power (dB) 30. Lower offset B - absolute power (dBm/Hz or dBm/MHz) 31. Upper offset B - relative power (dB) 32. Upper offset B - absolute power (dBm/Hz or dBm/MHz) ... 45. Lower offset F - relative power (dB) 46. Lower offset F - absolute power (dBm/Hz or dBm/MHz) 47. Upper offset F - relative power (dB) 48. Upper offset F - absolute power (dBm/Hz or dBm/MHz) If the results are not available, –999.0 is returned.

Condition	N	Results Returned
Mode = DTMB (CTTB) or CMMB, Radio BW = 8 MHz and Meas Type = Total power reference	n = 3	Returns 28 scalar values of the pass/fail (0 = passed, or 1 = failed) determined by testing the relative to the reference carrier and by testing the absolute power limit of the offset frequencies (measured as total power in dB): 1. Lower offset A - relative limit result 2. Lower offset A - absolute limit result 3. Upper offset A - relative limit result 4. Upper offset A - absolute limit result 5. Lower offset B - relative limit result 6. Lower offset B - absolute limit result 7. Upper offset B - relative limit result 8. Upper offset B - absolute limit result ... 21. Lower offset F - relative limit result 22. Lower offset F - absolute limit result 23. Upper offset F - relative limit result 24. Upper offset F - absolute limit result 25. Inside Adjacent Channel - relative limit result 26. Inside Adjacent Channel - absolute limit result 27. Outside Adjacent Channel - relative limit result 28. Outside Adjacent Channel - absolute limit result If Radio Device = Exciter, the last four (25, 26, 27 and 28) results returned –999.0.

Condition	N	Results Returned
Mode = DTMB (CTTB) or CMMB, Radio BW = 8 MHz and Meas Type = Power spectral density reference	n = 3	Returns 28 scalar values of the pass/fail (0 = passed, or 1 = failed) determined by testing the relative to the reference carrier and by testing the absolute power limit of the offset frequencies (measured as power spectral density in dB): 1. Lower offset A - relative limit result 2. Lower offset A - absolute limit result 3. Upper offset A - relative limit result 4. Upper offset A - absolute limit result 5. Lower offset B - relative limit result 6. Lower offset B - absolute limit result 7. Upper offset B - relative limit result 8. Upper offset B - absolute limit result ... 21. Lower offset F - relative limit result 22. Lower offset F - absolute limit result 23. Upper offset F - relative limit result 24. Upper offset F - absolute limit result 25. –999.0 26. –999.0 27. –999.0 28. –999.0 The last four results always returned –999.0.

Condition	N	Results Returned
Meas Type = Total power reference	n = 3	Returns 24 scalar values of the pass/fail (0 = passed, or 1 = failed) determined by testing the relative to the reference carrier and by testing the absolute power limit of the offset frequencies (measured as total power in dB): 1. Lower offset A - relative limit result 2. Lower offset A - absolute limit result 3. Upper offset A - relative limit result 4. Upper offset A - absolute limit result 5. Lower offset B - relative limit result 6. Lower offset B - absolute limit result 7. Upper offset B - relative limit result 8. Upper offset B - absolute limit result ... 21 Lower offset F - relative limit result 22 Lower offset F - absolute limit result 23 Upper offset F - relative limit result 24 Upper offset F - absolute limit result
Meas Type = Power spectral density reference	n = 3	Returns 24 scalar values of the pass/fail (0 = passed, or 1 = failed) determined by testing the relative to the reference carrier and by testing the absolute power limit of the offset frequencies (measured as power spectral density in dB): 1. Lower offset A - relative limit result 2. Lower offset A - absolute limit result 3. Upper offset A - relative limit result 4. Upper offset A - absolute limit result 5. Lower offset B - relative limit result 6. Lower offset B - absolute limit result 7. Upper offset B - relative limit result 8. Upper offset B - absolute limit result ... 21 Lower offset F - relative limit result 22 Lower offset F - absolute limit result 23 Upper offset F - relative limit result 24 Upper offset F - absolute limit result
	n = 4	Returns <Num Pts> comma-separated scalar values representing the Y values in Trace 1

Condition	N	Results Returned
	n = 5	Returns <Num Pts> comma-separated scalar values representing the Y values in Trace 2
	n = 6	Returns <Num Pts> comma-separated scalar values representing the Y values in Trace 3

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. The parameter values are measurement independent, except all Attenuation values and the Internal Preamp selections, which are the same across all measurements.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Ref Value

Sets the value for the absolute power reference. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:ACP:VIEW:WIND:TRAC:Y:RLEV 100 DISP:ACP:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10dBm
State Saved	Saved in instrument state.
Min	–250.00 dBm
Max	250.00 dBm
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Attenuation

Accesses a menu of functions that enable you to change attenuation settings. This key has read-back text that describes the total attenuator value.

See AMPTD Y Scale, "Attenuation" on page 1120 in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Scale/Div

Sets the units-per-division of the vertical scale in the logarithmic display. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:ACP:VIEW:WIND:TRAC:Y:PDIV 5 DISP:ACP:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10.00 dB
State Saved	Saved in instrument state.
Min	0.10 dB
Max	20.00 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See AMPTD Y Scale, “Presel Center” on page 1136 in the “Common Measurement Functions” section for more information.

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest.

See AMPTD Y Scale, “Preselector Adjust” on page 1137 in the “Common Measurement Functions” section for more information.

Y Axis Unit

Allows you to change the vertical (Y) axis amplitude unit.

See “Y Axis Unit” on page 1138 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	A.04.00

Reference Level Offset

Adds an offset value to the displayed reference level. The reference level is the absolute amplitude represented by the top graticule line on the display.

See “Reference Level Offset” on page 1144 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	A.04.00

µW Path Control

The **µW Path Control** functions include the **µW Preselector Bypass** (Option MPB) and **Low Noise Path** (Option LNP) controls in the High Band path circuits.

See “µW Path Control ” on page 1145 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	A.04.00

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See AMPTD Y Scale, "Internal Preamp" on page 1149 in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Ref Position

Positions the reference level at the top, center, or bottom of the Y- scale display. Changing the reference position does not change the reference level value.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:ACP:VIEW:WIND:TRAC:Y:RPOS CENT DISP:ACP:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Auto Scaling

Toggles the Auto Scaling function between On and Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:ACP:VIEW:WIND:TRAC:Y:COUP ON DISP:ACP:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When Auto Scaling is On and the Restart front-panel key is pressed, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Auto Couple

See “Auto Couple” on page 1153 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

BW

Accesses a menu of functions that enable you to specify and control the video and resolution bandwidths. You can also select the type of filter for the measurement and set the filter bandwidth.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Res BW

Sets the value of the resolution bandwidth. If an unavailable bandwidth is entered with the numeric keypad, the closest available bandwidth is selected.

Key Path	**BW**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:BANDwidth[:RESolution] <bandwidth>`
	`[:SENSe]:ACPower:BANDwidth[:RESolution]?`
	`[:SENSe]:ACPower:BANDwidth[:RESolution]:AUTO ON|OFF|1|0`
	`[:SENSe]:ACPower:BANDwidth[:RESolution]:AUTO?`

Example	ACP:BAND 25kHz ACP:BAND? ACP:BAND:AUTO ON ACP:BAND:AUTO?
Notes	This key is available only in IBW mode. This parameter is preset by the Meas Method selection. Preset values are as follows: IBW: 100 kHz IBWR: 27 kHz FAST (WCDMA): 390 kHz You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	When Meas Method is RBW or FAST, this key is grayed out and disabled. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Couplings	The resolution bandwidth is coupled to the video bandwidth based on the video to resolution bandwidth ratio setting if AUTO is selected.

Preset	SA: 220 kHz WCDMA: 100 kHz WIMAX OFDMA: 100 kHz C2K: Method RBW: grayed out (1.2 MHz) Method IBW: 15 kHz TD-SCDMA: 30 kHz 1xEVDO: 30 kHz DVB-T/H: 39 kHz DTMB (CTTB): 39 kHz ISDB-T: 39 kHz CMMB: 39 kHz LTE: 100 kHz LTETDD: 100 kHz Digital Cable TV: 39 kHz 0
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Backwards Compatibility SCPI	[:SENSe]:ACPower:BWIDth[:RESolution] [:SENSe]:ACP:SWEep:BANDwidth|BWIDth[:RESolution] (PSA W-CDMA, PSA cdma2000)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Video BW

Changes the analyzer post-detection filter (VBW).

Key Path	**BW**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:BANDwidth:VIDeo <freq>`
	`[:SENSe]:ACPower:BANDwidth:VIDeo?`
	`[:SENSe]:ACPower:BANDwidth:VIDeo:AUTO OFF|ON|0|1`
	`[:SENSe]:ACPower:BANDwidth:VIDeo:AUTO?`

Example	ACP:BAND:VID 1kHz ACP:BAND:VID? ACP:BWID:VID:AUTO ON ACP:BWID:VID:AUTO?
Notes	The values shown in this table reflect the conditions after a Mode Preset.
Dependencies	When Meas Method is RBW or FAST, this key is grayed out and disabled. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Preset	SA: 22 kHz WCDMA, WIMAX OFDMA: 1 MHz C2K: Method RBW: grayed out (1.2 MHz) Method IBW: 150 kHz TD-SCDMA: 300 kHz 1xEVDO: 300 kHz DVB-T/H: 390 kHz DTMB (CTTB): 390 kHz ISDB-T: 390 kHz CMMB: 390 kHz LTE: 1 MHz LTETDD: 1 MHz Digital Cable TV: 390 kHz SA: ON WCDMA: OFF WIMAX OFDMA: OFF TD-SCDMA: OFF DVB-T/H: OFF DTMB (CTTB): OFF CDMA1xEVDO: OFF ISDB-T: OFF CMMB: OFF LTE: ON LTETDD: ON Digital Cable TV: OFF
State Saved	Saved in instrument state.

Min	1 Hz
Max	50 MHz
Backwards Compatibility SCPI	[:SENSe]:ACPower:BWIDth:VIDeo
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

RBW Control

Accesses a menu that enables you to select the filter bandwidth and type.

Key Path	**BW**
Initial S/W Revision	Prior to A.02.00

Filter Type

Selects the type of bandwidth filter that is used. The choices are Gaussian or Flat top.

Key Path	**BW, RBW Control**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:BANDwidth:SHAPe GAUSsian|FLATtop` `[:SENSe]:ACPower:BANDwidth:SHAPe?`
Example	ACP:BAND:SHAP GAUS ACP:BAND:SHAP?
Dependencies	When Meas Method is FAST, this key is grayed out and disabled. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian (Normal)|Flattop
Backwards Compatibility SCPI	[:SENSe]:ACPower:BWIDth:SHAPe
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Filter BW

Selects a Gaussian filter based on its –3 dB (Normal) bandwidth or its –6 dB bandwidth.

Key Path	**BW, RBW Control**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:BANDwidth:TYPE DB3|DB6` `[:SENSe]:ACPower:BANDwidth:TYPE?`
Example	ACP:BAND:TYPE DB3 ACP:BAND:TYPE?
Dependencies	When Filter Type is Flattop or Meas Method is RBW or FAST, this key is grayed out and disabled. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Preset	DB3
State Saved	Saved in instrument state.
Range	–3 dB (Normal)|–6 dB
Backwards Compatibility SCPI	[:SENSe]:ACPower:BWIDth:TYPE
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Cont

See “Cont (Continuous Measurement/Sweep)” on page 1155 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

FREQ Channel

See “FREQ Channel” on page 1157 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Input/Output

See “Input/Output” on page 1165 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement. Note that this hard key and all sub keys are unavailable when "Meas Method" on page 428 is set to RBW.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection. Note that this key is unavailable when "Meas Method" on page 428 is set to RBW.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode to **Normal**, **Delta**, **Fixed** or **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area.

The default active function is the active function for the currently selected marker control mode. If the current control mode is Off, there is no active function and the active function is turned off.

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:ACP:MARK2:MODE DELT CALC:ACP:MARK2:MODE?

Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area will display the marker value to its full entered precision. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	This key is unavailable when "Meas Method" on page 428 is set to RBW.
Preset	OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker X Axis Value (Remote Command only)

Sets the marker X axis value in the current marker X Axis Scale unit. This value has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal, Delta** or **Fixed.**

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <freq>`
	
	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`

Example	CALC:ACP:MARK3:X 0 CALC:ACP:MARK3:X?
Notes	The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. If the marker is **Off** the response is not a number.
Dependencies	Unavailable when "Meas Method" on page 428 is set to RBW.
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37

Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker X Axis Position (Remote Command only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering a value if the control mode is **Normal, Delta** or **Fixed**. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>` `:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:ACP:MARK10:X:POS 0 CALC:ACP:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker's reference marker in trace points if the control mode is **Delta**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points (see "Fractional Trace Points"). If the marker is **Off** the response is not a number. When a Marker is turned on, it is placed center of the screen on the trace. Therefore the default value depends on instrument condition, although the Preset/Default is defined as 500 (this value might be expected value when all offset is on).
Dependencies	Unavailable when "Meas Method" on page 428 is set to RBW.
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker Y Axis Value (Remote Command only)

Returns the marker Y axis value in the current marker Y axis unit.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:ACP:MARK11:Y?
Notes	Since the result value is always calculated from acquisition data, the default value is arbitrary. Although the Preset/Default values are defined.
Dependencies	Unavailable when “Meas Method” on page 428 is set to RBW.
Preset	Result dependent on markers setup and signal source.
State Saved	No
Backwards Compatibility SCPI	:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:RESult?
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Properties

Accesses the marker properties menu. Note that this key is unavailable when “Meas Method” on page 428 is set to RBW.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection. Note that this key is unavailable when “Meas Method” on page 428 is set to RBW.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Relative To

Selects the desired marker. The selected marker will be relative to its reference marker.

Key Path	**Marker, Properties**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer> :CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?
Example	CALC:ACP:MARK2:REF 6 CALC:ACP:MARK2:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from a remote command, generates error –221: “Settings conflict; marker cannot be relative to itself.” When queried a single value will be returned (the specified marker numbers relative marker). You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	This key is unavailable when “Meas Method” on page 428 is set to RBW.
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker Trace

Selects the trace that you want your marker to be placed on. A marker is associated with one and only one trace. This trace is used to determine the placement, result, and X Axis Scale of the marker. All markers have an associated trace, even **Fixed** markers; it is from that trace that they determine their attributes and behaviors, and it is to that trace that they go when they become Normal or Delta markers.

Key Path	**Marker, Properties**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe 1|2|3 :CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?
Example	CALC:ACP:MARK2:TRAC 2 CALC:ACP:MARK2:TRAC?

Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area will display the marker value to its full entered precision.
Dependencies	This key is unavailable when "Meas Method" on page 428 is set to RBW.
Couplings	This is not affected by Auto Coupling. Sending the remote command causes the addressed marker to become selected.
Preset	All Markers Off
State Saved	Saved in instrument state.
Range	1|2|3
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Couple Markers

When this function is On, moving any marker causes an equal X axis movement of every other marker which is not **Off**. By "equal X axis movement" we mean that we preserve the difference between each marker's X axis value (in the fundamental x-axis units of the trace that marker is on) and the X axis value of the marker being moved (in the same fundamental x-axis units).

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:ACPower:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:ACPower:MARKer:COUPle[:STATe]?`
Example	CALC:ACP:MARK:COUP ON
Dependencies	This key is unavailable when "Meas Method" on page 428 is set to RBW.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker All Off

Turns all active markers off.

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:ACPower:MARKer:AOFF`
Example	CALC:ACP:MARK:AOFF
Dependencies	This key is unavailable when "Meas Method" on page 428 is set to RBW.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Backward Compatibility Remote Commands

Sets or queries the state of a marker. Setting a marker which is off to the on state or 1 puts it in Normal mode and places it at the center of the screen.

Mode	SA, WCDMA, WIMAX OFDMA, C2K, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:STATe OFF|ON|0|1` `:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:STATe?`
Example	CALC:ACP:MARK2:STAT ON CALC:ACP:MARK2:STAT?
Notes	This parameter is also accessed from Marker, Properties, 1 You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker Function

There are no Marker Functions supported in the ACP measurement. The front-panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Marker To

There is no Marker To functionality supported in ACP. The front-panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas

See “Meas” on page 1257 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas Setup

Displays the setup menu for the currently selected measurement. The functions included in the measurement setup menu include setting the parameters for the carriers, offsets, bandwidths, measurement methods and types. This menu also allows you to turn noise correction on and off.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Average/Hold Number

Specifies the number of measurement averages used to calculate the measurement result. The average will be displayed at the end of each sweep. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:AVERage:COUNt <integer>`
	`[:SENSe]:ACPower:AVERage:COUNt?`
	`[:SENSe]:ACPower:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:ACPower:AVERage[:STATe]?`

Example	ACP:AVER:COUN 250 ACP:AVER:COUN? ACP:AVER OFF ACP:AVER?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	10 ON
State Saved	Saved in instrument state.
Min	1
Max	1000
Backwards Compatibility SCPI	[:SENSe]:ACPR:AVERage:COUNt [:SENSe]:MCPower:AVERage:COUNt (PSA Power Suite, PSA W-CDMA, PSA cdma2000)
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.02.00, A.03.00

Avg Mode

Enables you to set the averaging mode. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

When set to Exponential (Exp) the measurement averaging continues using the specified number of averages to compute each averaged value. The average will be displayed at the end of each sweep.

When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:ACPower:AVERage:TCONtrol?`
Example	ACP:AVER:TCON EXP ACP:AVER:TCON?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp|Repeat
Backwards Compatibility SCPI	[:SENSe]:ACPR:AVERage:TCONtrol
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Carrier Setup

Accesses a menu that contains Carriers, Ref Carrier, Ref Car Freq, Ref Car Pwr and Configure Carriers.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

Carriers

Specifies the number of carriers to be measured.

Key Path	**Meas Setup, Carrier Setup, Configure Carriers**

Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:COUNt <integer>` `[:SENSe]:ACPower:CARRier[1]|2:COUNt?`
Example	ACP:CARR:COUN 1 ACP:CARR:COUN?
Notes	Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	When Number of Carriers is 1, Ref Carrier is grayed out.
Couplings	Changing this parameter might affect to the Span. .
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Ref Carrier

Sets the reference carrier. Relative power measurements are made from the reference carrier.

If set to Auto, the measurement selects the carrier with the highest power as the reference carrier and the Ref Carrier parameter is updated. If a value is entered when Ref Carrier Mode is set to Auto, the mode changes to Man.

If set to Man, the value that you enter for the Ref Carrier is used as the reference carrier.

Key Path	**Meas Setup, Carrier Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:RCARrier <integer>`
	`[:SENSe]:ACPower:CARRier[1]|2:RCARrier?`
	`[:SENSe]:ACPower:CARRier[1]|2:RCARrier:AUTO OFF|ON|0|1`
	`[:SENSe]:ACPower:CARRier[1]|2:RCARrier:AUTO?`

Example	ACP:CARR:RCAR 1 ACP:CARR:RCAR? ACP:CARR:RCAR:AUTO OFF ACP:CARR:RCAR:AUTO?
Notes	Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	If there is only one carrier, this key will be grayed out.
Couplings	If you enter a carrier value that is currently configured as having no power present, that carrier will be changed to having power present. If you enter a ref carrier this parameter will be set to manual.
Preset	Auto determined
State Saved	Saved in instrument state.
Min	1
Max	Number of available carriers
Backwards Compatibility SCPI	[:SENSe]:MCPower:RCARrier[1]|2 (PSA Power Suite)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Ref Car Freq

Sets the reference carrier frequency.

Key Path	**Meas Setup, Carrier Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:RCFRequency <freq>`
	`[:SENSe]:ACPower:CARRier[1]|2:RCFRequency?`
	`[:SENSe]:ACPower:CARRier[1]|2:RCFRequency:AUTO OFF|ON|0|1`
	`[:SENSe]:ACPower:CARRier[1]|2:RCFRequency:AUTO?`

Example	ACP:CARR:RCFR 250 MHz ACP:CARR:RCFR? ACP:CARR:RCFR:AUTO OFF ACP:CARR:RCFR:AUTO?

Notes	Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Coupled to the Center Frequency. If the center frequency changes, the Ref Carrier Frequency is calculated using the following three steps; Ref Freq1 = Ctr Freq - (Total of all Carrier Widths / 2) Ref Freq2 = Ref Freq1 + (Total of all Carrier Widths up to Ref Carrier) Ref Freq = Ref Freq2 + (0.5 * Carrier Width of Ref Carrier) If reference carrier frequency changes the Center Frequency is calculated using the following three steps; Ctr Freq1 = Ref Freq - (0.5 * Carrier Width of Ref Carrier) Ctr Freq2 = Ctr Freq1 - (Total of all Carrier Widths up to Ref Carrier) Ctr Freq = Ctr Freq2 + (Total of all Carrier Widths / 2) This ensures that the carriers are always centered on the screen. If there is only one carrier present the Reference Carrier Frequency will be the same as the Center Frequency.
Preset	Calculated based on the current Center Frequency
State Saved	Saved in instrument state.
Min	–79.999995 MHz
Max	Hardware Dependent: Option 503 = 3.699999995 GHz Option 508 = 8.499999995 GHz Option 513 = 13.799999995 GHz Option 526 = 26.999999995 GHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Power Ref

Sets the power reference in the carrier that will be used to compute the relative values for the offsets.

Key Path	**Meas Setup, Carrier Setup**
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00, A.04.00

Total Power

Sets the multi-carrier power reference.

When set to Auto, the carrier power result reflects the measured power value in the selected reference carrier.

When set to Man, the result is referenced to the last measured value, or you may specify the reference for the multi-carrier power measurement. Relative values are displayed, referenced to the “Power Reference” value.

Key Path	**Meas Setup, Carrier Setup, Power Ref**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:CARRier[1]|2[:POWer] <real>`
	`[:SENSe]:ACPower:CARRier[1]|2[:POWer]?`
	`[:SENSe]:ACPower:CARRier[1]|2:AUTO[:STATe] OFF|ON|0|1`
	`[:SENSe]:ACPower:CARRier[1]|2:AUTO[:STATe]?`

Example	ACP:CARR 10 ACP:CARR? ACP:CARR:AUTO OFF ACP:CARR:AUTO?
Notes	Although the default value is defined, the value is recalculated by the measurement result just after measurement. Carrier sub op code: 1 for BTS, 2 for MS. Default is BTS. Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. The Unit Terminator keys differ depending on whether or not the mode supports Y Axis Unit and also which Y Axis Unit is selected. For details, see “Y Axis Unit” on page 1138. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	This key is available only when the Meas Type is TPRef. If the Meas Type is not TPRef, this key is grayed out.
Preset	0.0 ON
State Saved	Saved in instrument state.
Min	–200 dBm
Max	200 dBm
Backwards Compatibility SCPI	[:SENSe]:MCPower:CARRier[1]|2[:POWer]

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.04.00

PSD

Sets the power spectral density in the carrier (main channel) that is used to compute the relative power spectral density values for the offsets when Meas Type is set to PSD Ref. When the PSD Ref state is set to Auto, this will be set to the measured carrier power spectral density.

Key Path	**Meas Setup, Carrier Setup, Power Ref**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:CPSD <real>` `[:SENSe]:ACPower:CARRier[1]|2:CPSD?`
Example	ACP:CARR:CPSD 25 ACP:CARR:CPSD?
Notes	Although the default value is defined, the value is recalculated by the measurement result just after measurement. Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	This key is available only when the Meas Type is PSDRef. If the Meas Type is not PSDRef, this key is grayed out.
Couplings	The value of PSD is automatically converted when PSD Unit is changed.
Preset	0.0
State Saved	Saved in instrument state.
Min	–999
Max	999
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.04.00

Configure Carriers

Accesses a menu that contains Carrier, Carrier Pwr Present, Carrier Width and Carrier Integ BW parameters.

Key Path	**Meas Setup, Carrier Setup**

Initial S/W Revision	Prior to A.02.00

Carrier

Selects the carrier to configure for the current measurement.

Key Path	**Meas Setup, Carrier Setup, Configure Carriers**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Couplings	Max value is the number of available carriers, so this value might change when the number of carriers is changed.
Preset	1
State Saved	No
Min	1
Max	Number of available carriers
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Carrier Coupling

Couples carrier settings to carrier #1. The coupled parameters are Carrier Power Present, Carrier Spacing, Measurement Noise Bandwidth, Method, and Filter Alpha.

Key Path	**Meas Setup, Carrier Setup, Configure Carriers**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:COUPle OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1` `[:SENSe]:ACPower:CARRier[1]|2:LIST:COUPle?`
Example	ACP:CARR:LIST:COUP OFF ACP:CARR:LIST:COUP?
Notes	Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.

Couplings	When Couple is selected, the carrier settings are coupled to carrier #1. Coupled parameters are Carrier Power Present, Carrier Spacing, Measurement Noise Bandwidth, Method and Filter Alpha. When a setting is changed, the couple is set to Man automatically. Carrier #1 is always set to couple and cannot be changed. Couple/Man selection on the Carrier key is not displayed when selected carrier number is #1.
Preset	ON
State Saved	Saved in instrument state.
Range	Couple|Man
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Carrier Pwr Present

Configures the carriers for this measurement. It allows spaces to be inserted between carriers. Carriers with the power present parameter set to Yes are carriers, and those with the power present parameter set to No are spaces. Each carrier power present is set to Yes or No. The individual carriers can be set by selecting the desired carrier on the carrier menu key using the up down arrows, the knob, or numeric keypad, then toggling the carrier power present using the carrier power present menu key.

The query for this parameter returns the current values for all of the carriers. If a carrier is defined as having no power present, the power displayed will be relative to the reference carrier, otherwise the absolute power will be displayed.

If you change the carrier power present to no and that carrier is currently configured as the reference carrier, the next carrier to the left (or the right if there are no carriers to the left) will be assigned as the reference carrier. This also applies to the scenario where there are only two carriers configured as having power present and you configure only one carrier to have no power present.

Key Path	**Meas Setup, Carrier Setup, Configure Carriers**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:PPResent YES|NO, YES|NO, YES|NO, YES|NO, YES|NO, YES|NO` `[:SENSe]:ACPower:CARRier[1]|2:LIST:PPResent?`
Example	ACP:CARR2:LIST:PPR YES ACP:CARR2:LIST:PPR?

Notes	Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. When setting these values remotely, the position in the list sent corresponds to the carrier. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored.
Dependencies	If there is only one carrier, this key will be grayed out.
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list.
Preset	YES
State Saved	Saved in instrument state.
Range	Yes|No
Backwards Compatibility SCPI	[:SENSe]:MCPower:CARRier[1]|2:LIST:PPResent (PSA Power Suite)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Carrier Spacing

Sets the width of the carrier spacing. This will be the value applied to all the current slots, whether they are carriers or spaces.

Enter each carrier spacing value individually by selecting the desired carrier on the carrier menu key using the up down arrows, the knob, or the numeric keypad, then enter the carrier width using the carrier spacing menu key.

Key Path	**Meas Setup, Carrier Setup, Configure Carriers**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:WIDTh <bandwidth>, …` `[:SENSe]:ACPower:CARRier[1]|2:LIST:WIDTh?`
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:WIDTh <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>` `[:SENSe]:ACPower:CARRier[1]|2:LIST:WIDTh?`
Example	ACP:CARR2:LIST:WIDT 25kHz ACP:CARR2:LIST:WIDT?

Notes	Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. When setting these values remotely, the position in the list sent corresponds to the carrier. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list. Changing Carrier Spacing might affect the Span.
Preset	SA, WCDMA: 5 MHz WIMAX OFDMA: 10 MHz C2K: 1.25 MHz 1xEVDO: 1.25 MHz TD-SCDMA: 1.6 MHz DVB-T/H: 8 MHz DTMB (CTTB): 8 MHz ISDB-T: 6 MHz CMMB: 8 MHz LTE: 5 MHz LTETDD: 5 MHz Digital Cable TV: 8 MHz
State Saved	Saved in instrument state.
Min	0 Hz
Max	1 GHz
Backwards Compatibility SCPI	[:SENSe]:MCPower:CARRier[1]|2:LIST:WIDTh (PSA Power Suite)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Measurement Noise Bandwidth

Specifies the Measurement Noise Bandwidth used to calculate the power in the carriers.

Each Measurement Noise Bandwidth value is entered individually by selecting the desired carrier on the carrier menu key using the up down arrows, the knob, or the numeric keypad. Then enter the measurement noise bandwidth using the measurement noise bandwidth key.

Key Path	**Meas Setup, Carrier Setup, Configure Carriers**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	[:SENSe]:ACPower:CARRier[1]|2:LIST:BANDwidth[:INTegration] <freq>, … [:SENSe]:ACPower:CARRier[1]|2:LIST:BANDwidth[:INTegration]?
Remote Command	[:SENSe]:ACPower:CARRier[1]|2:LIST:BANDwidth[:INTegration] <freq>, <freq>, <freq>, <freq>, <freq>, <freq> [:SENSe]:ACPower:CARRier[1]|2:LIST:BANDwidth[:INTegration]?
Example	ACP:CARR2:LIST:BAND 25kHz ACP:CARR2:LIST:BAND?
Notes	In the WCDMA mode, the preset/default value is defined as 3.84 MHz. But internally, 4.6848 MHz is used as the default value. Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. When setting these values remotely, the position in the list sent corresponds to the carrier. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers is set to the number of entries in the parameter list.
Preset	SA: 2 MHz WCDMA: 3.84 MHz WIMAX OFDMA: 10 MHz C2K: 1.23MHz TD-SCDMA: 1.28 MHz 1xEVDO: 1.23 MHz DVB-T/H: 7.61 MHz DTMB (CTTB): 7.56 MHz ISDB-T: 5.6 MHz CMMB: 7.512 MHz LTE, LTETDD: 4.515 MHz|4.5 MHz Digital Cable TV: 8.0 MHz

State Saved	Saved in instrument state.
Min	10 Hz
Max	1 GHz
Backwards Compatibility SCPI	[:SENSe]:ACPower:BANDwidth:INTegration [:SENSe]:ACPower:BWIDth:INTegration [:SENSe]:ACPower:CARRier[1]|2:LIST:BWIDth[:INTegration] [:SENSe]:MCPower:CARRier[1]|2:LIST:BANDwidth[:INTegration] (PSA Power Suite) [:SENSe]:MCPower:CARRier[1]|2:LIST:BWIDth[:INTegration] (PSA Power Suite)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Method for Carrier

Accesses the carrier configuration method settings.

Key Path	**Meas Setup, Carrier Setup, Configure Carriers**
Mode	SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:FILTer[:RRC][:STATe] ON|OFF|1|0, …` `[:SENSe]:ACPower:CARRier[1]|2:LIST:FILTer[:RRC][:STATe]?`
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:FILTer[:RRC][:STATe] ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0` `[:SENSe]:ACPower:CARRier[1]|2:LIST:FILTer[:RRC][:STATe]?`
Example	ACP:CARR:LIST:FILT 0,0,0,0 ACP:CARR:LIST:FILT?
Notes	The binary values translate as follows: 1|ON = RRC Weighted 0|OFF = Integ BW Maximum of Array length depends on the number of carriers. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA, LTE, LTETDD: OFF WCDMA: ON WIMAX OFDMA: OFF TD-SCDMA: ON DVB-T/H: OFF DTMB (CTTB): ON ISDB-T, CMMB: OFF Digital Cable TV: OFF
State Saved	Saved in instrument state.
Range	IntegBW|RRC Weight
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Filter Alpha for Carrier

Inputs the alpha value for the filter used in the current carrier configuration.

Key Path	**Meas Setup, Carrier Setup, Configure Carriers, Method, RRC Weighted**
Mode	SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:FILTer:ALPHa <real>, …` `[:SENSe]:ACPower:CARRier[1]|2:LIST:FILTer:ALPHa?`
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:FILTer:ALPHa <real>, <real>, <real>, <real>, <real>, <real>` `[:SENSe]:ACPower:CARRier[1]|2:LIST:FILTer:ALPHa?`
Example	ACP:CARR2:LIST:FILT:ALPH 0.5 ACP:CARR2:LIST:FILT:ALPH?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	0.22 C2K: No DTMB (CTTB): 0.05 Digital Cable TV: 0.15
State Saved	Saved in instrument state.
Min	0.01
Max	1.0

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Offset/Limits

Accesses a menu of functions that contains Offset, Offset Freq/Offset To Edge, Offset Integ BW, Upper Offset Limit and Lower Offset parameters.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

Select Offset

Selects the offset to configure.

Key Path	**Meas Setup, Offset/Limits, Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Preset	A
State Saved	Saved in instrument state.
Range	Offset A|Offset B|Offset C|Offset D|Offset E|Offset F
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Offset Freq

This parameter determines the frequency difference between the center of the main channel and the center of the carrier.

Each Offset Freq state value is entered individually by selecting the desired carrier on the carrier menu key using the up down arrows, RPG or numeric keypad. Then enter the Offset Freq State using the Offset Frequency key.

The list contains up to six (6) entries, depending on the mode selected, for offset frequencies. Each offset frequency in the list corresponds to a reference bandwidth in the bandwidth list.

An offset frequency of zero turns the display of the measurement for that offset off, but the measurement is still made and reported. You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet:LIST:STATe command

Turning the offset off has the same effect as setting the frequency of the offset to 0 Hz and will cause it to be removed from the results screen.

Key Path	**Meas Setup, Offset/Limits**

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST[:FREQuency] <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:ACPower:OFFSet[1]|2:LIST[:FREQuency]?`
	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:STATe OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1`
	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:STATe?`

Example	ACP:OFFS1:LIST 0,0,0,0,0,0 ACP:OFFS1:LIST? ACP:OFFS2:LIST:STAT 1,1,0,0,0,0 ACP:OFFS2:LIST:STAT?
Notes	The label for this menu key will change depending on the currently selected radio standard or mode. For cdma2000 the label for the menu key will be Offset to Edge. For all other supported standards the label will be Offset Freq. When setting these values remotely, the position in the list sent corresponds to the offset. Missing values are not permitted, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored. Offset sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Changing Offset Frequency might affect the Span. See the Span key section for details.

Preset	SA: 3 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz, 0 Hz|3 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz, 0 Hz WCDMA: 5.0 MHz, 10.0 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz|5.0 MHz, 10.0 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz WIMAX OFDMA: 10 MHz, 20 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz| 10 MHz, 20 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz C2K:750KHz, 1.980 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz| 885 kHz, 1.980 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz TD-SCDMA: 1.6 MHz, 3.2 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz|1.6 MHz, 3.2 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz 1xEVDO: 750KHz, 1.98MHz, 3.125MHz, 4.000MHz, 7.500MHz, 7.500MHz|885KHz, 1.98MHz, 3.125MHz, 4.000MHz, 7.500MHz, 7.500MHz DVB-T/H: 8 MHz, 16 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz| 8 MHz, 16 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz DTMB (CTTB): 8 MHz, 16 MHz, 24 MHz, 32 MHz, 0 Hz, 0 Hz| 8 MHz, 16 MHz, 24 MHz, 32 MHz, 0 Hz, 0 Hz ISDB-T: 6 MHz, 12 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz| 6 MHz, 12 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz CMMB: 8 MHz, 16 MHz, 24 MHz, 32 MHz, 0 Hz, 0 Hz| 8 MHz, 16 MHz, 24 MHz, 32 MHz, 0 Hz, 0 Hz LTE, LTETDD: 5 MHz,10 MHz,0,0,0,0|5 MHz,10 MHz,0,0,0,0 Digital Cable TV: 8 MHz, 16 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz|8 MHz, 16 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz SA: ON, OFF, OFF, OFF, OFF, OFF|ON, OFF, OFF, OFF, OFF, OFF WCDMA: ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF WIMAX OFDMA: ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF TD-SCDMA: ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF DVB-T/H: ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF DTMB (CTTB): ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF CDMA1xEVDO: ON,ON,OFF,OFF,OFF,OFF| ON,ON,OFF,OFF,OFF,OFF ISDB-T: ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF CMMB: ON, ON, ON, ON, OFF, OFF|ON, ON, ON, ON, OFF, OFF LTE, LTETDD: ON, ON, OFF, OFF, OFF, OFF|ON, OFF, OFF, OFF, OFF, OFF Digital Cable TV: ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	0 Hz

Max	500 MHz
Backwards Compatibility SCPI	[:SENSe]:MCPower:OFFSet[1]|2:LIST[:FREQuency] (PSA Power Suite)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Integ BW

Sets the Integration Bandwidth for the offsets. If there is more than one bandwidth, the list must contain six (6) entries. Each resolution bandwidth in the list corresponds to an offset frequency in the list defined by [:SENSe]:ACP:OFFSet[n]:LIST[:FREQuency].

Enter each value individually by selecting the desired offset on the offset menu key using the up down arrows, the knob, or the numeric keypad, then enter the Offset Integration Bandwidth using the Offset Integration Bandwidth menu key.

You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n]:LIST:STATe command."

Key Path	**Meas Setup, Offset/Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth[:INTegration] <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth[:INTegration]?`
Example	ACP:OFFS2:LIST:BAND 2MHz,2MHz,2MHz,2MHz,2MHz,2MHz ACP:OFFS2:LIST:BAND?
Notes	When setting these values remotely, the position in the list sent corresponds to the offset. Missing values are not permitted i.e. if you want to change values 2 you must send all values up to 2. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored. Offset sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Changing Integ BW might affect to the Span. See Span section for details.

Preset	SA: 2 MHz, 2 MHz, 2 MHz, 2 MHz, 2 MHz, 2 MHz|2 MHz, 2 MHz, 2 MHz, 2 MHz, 2 MHz, 2 MHz WCDMA: 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz|3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz WIMAX OFDMA: 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz| 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz C2K: 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz|30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz TD-SCDMA: 1.28 MHz, 1.28 MHz, 1.28 MHz, 1.28 MHz, 1.28 MHz, 1.28 MHz 1xEVDO: C2K: 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz|30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz DVB-T/H: 7.61 MHz, 7.61 MHz, 7.61 MHz, 7.61 MHz, 7.61 MHz, 7.61 MHz| 7.61 MHz, 7.61 MHz, 7.61 MHz, 7.61 MHz, 7.61 MHz, 7.61 MHz DTMB (CTTB): 7.56 MHz, 7.56 MHz, 7.56 MHz, 7.56 MHz, 7.56 MHz, 7.56 MHz| 7.56 MHz, 7.56 MHz, 7.56 MHz, 7.56 MHz, 7.56 MHz, 7.56 MHz ISDB-T: 5.6 MHz, 5.6 MHz, 5.6 MHz, 5.6 MHz, 5.6 MHz, 5.6 MHz| 5.6 MHz, 5.6 MHz, 5.6 MHz, 5.6 MHz, 5.6 MHz, 5.6 MHz CMMB: 7.512 MHz, 7.512 MHz, 7.512 MHz, 7.512 MHz, 7.512 MHz, 7.512 MHz| 7.512 MHz, 7.512 MHz, 7.512 MHz, 7.512 MHz, 7.512 MHz, 7.512 MHz LTE, LTETDD: 4.515 MHz, 4.515 MHz, 4.515 MHz, 4.515 MHz, 4.515 MHz, 4.515 MHz|4.5 MHz, 4.5 MHz, 4.5 MHz, 4.5 MHz, 4.5 MHz, 4.5 MHz Digital Cable TV: 8.0 MHz, 8.0 MHz, 8.0 MHz, 8.0 MHz, 8.0 MHz, 8.0 MHz| 8.0 MHz, 8.0 MHz, 8.0 MHz, 8.0 MHz, 8.0 MHz, 8.0 MHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	1 GHz
Backwards Compatibility SCPI	[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth[:INTegration] [:SENSe]:ACPR:OFFSet[1]|2:LIST:BANDwidth [:SENSe]:ACPR:OFFSet[1]|2:LIST:BWIDth [:SENSe]:MCPower:OFFSet[1]|2:LIST:BANDwidth[:INTegration] (PSA Power Suite) [:SENSe]:MCPower:OFFSet[1]|2:LIST:BWIDth[:INTegration] (PSA Power Suite)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Offset BW

Accesses the offset bandwidth menu.

Key Path	**Meas Setup, Offset/Limits**
Initial S/W Revision	Prior to A.02.00

Res BW

Sets the resolution bandwidth. If an unavailable bandwidth is entered with the numeric keypad, the closest available bandwidth is selected.

Key Path	**Meas Setup, Offset/Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:RESolution <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>`
	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:RESolution?`
	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:RESolution:AUTO ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0`
	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:RESolution:AUTO?`

Example	ACP:OFFS2:LIST:BAND:RES 220kHz,220kHz,220kHz,220kHz,220kHz,220kHz ACP:OFFS2:LIST:BAND:RES? ACP:OFFS2:LIST:BAND:RES:AUTO 1,1,1,1,1,1 ACP:OFFS2:LIST:BAND:RES:AUTO?
Notes	This key is available only in the IBW mode. Offset sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	When Meas Method is RBW or FAST, this key is grayed out and disabled. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Couplings	When Res BW Mode is AUTO, this value is exactly same as Res BW under BW key. And when this value is changed by user, Res BW Mode is also changed to Man.

Preset	SA: 220 kHz, 220 kHz, 220 kHz, 220 kHz, 220 kHz, 220 kHz WCDMA: 100 kHz, 100 kHz, 100 kHz, 100 kHz, 100 kHz, 100 kHz WIMAX OFDMA: 100 kHz, 100 kHz, 100 kHz, 100 kHz, 100 kHz, 100 kHz C2K: Method:RBW 30 kHz Method: IBW C2K: 15 kHz, 15 kHz, 15 kHz, 15 kHz,15 kHz, 15 kHz|15 kHz, 15 kHz, 15 kHz, 15 kHz,15 kHz, 15 kHz TD-SCDMA: 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz 1xEVDO: 30KHz, 30KHz, 30KHz, 30KHz,30KHz, 30KHz |30KHz, 30KHz, 30KHz, 30KHz,30KHz, 30KHz DVB-T/H: 39 kHz, 39 kHz, 39 kHz, 39 kHz,39 kHz, 39 kHz|39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz DTMB (CTTB): 39 kHz, 39 kHz, 39 kHz, 39 kHz,39 kHz, 39 kHz|39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz ISDB-T: 39 kHz, 39 kHz, 39 kHz, 39 kHz,39 kHz, 39 kHz|39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz CMMB: 39 kHz, 39 kHz, 39 kHz, 39 kHz,39 kHz, 39 kHz|39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz LTE, LTETDD: 100 kHz,100 kHz,100 kHz,100 kHz,100kHz,100 kHz|100 kHz,100 kHz,100 kHz,100 kHz,100 kHz,100 kHz Digital Cable TV: 39 kHz, 39 kHz, 39 kHz, 39 kHz,39 kHz, 39 kHz|39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Backwards Compatibility SCPI	[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth:RESolution
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Video BW

Enables you to change the analyzer post-detection filter (VBW).

Key Path	**Meas Setup, Offset/Limits, Offset BW**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:VIDeo <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:VIDeo?`
	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:VIDeo:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1`
	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:VIDeo:AUTO?`

Example	ACP:OFFS2:LIST:BAND:VID 5MHz,5MHz,5MHz,5MHz,5MHz,5MHz ACP:OFFS2:LIST:BAND:VID? ACP:OFFS2:LIST:BAND:VID:AUTO 0,0,0,0,1,1 ACP:OFFS2:LIST:BAND:VID:AUTO?
Notes	The values shown in this table reflect the conditions after a Mode Preset. Offset sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode. .
Dependencies	When Meas Method is RBW or FAST, this key is grayed out and disabled. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.

Preset	SA: 22 kHz, 22 kHz, 22 kHz, 22 kHz, 22 kHz, 22 kHz WCDMA, WIMAX OFDMA: 1 MHz, 1 MHz, 1 MHz, 1 MHz, 1 MHz, 1 MHz C2K: 150 kHz, 150 kHz, 150 kHz, 150 kHz, 150 kHz, 150 kHz| 150 kHz, 150 kHz, 150 kHz, 1150 kHz, 1150 kHz, 150 kHz TD-SCDMA: 300 kHz, 300 kHz, 300 kHz, 300 kHz, 300 kHz, 300 kHz 1xEVDO: 300KHz, 300KHz, 300KHz, 300KHz, 300KHz, 300KHz | 300KHz, 300KHz, 300KHz, 300KHz, 300KHz, 300KHz DVB-T/H: 390 kHz, 390 kHz, 390 kHz, 390 kHz,390 kHz, 390 kHz|390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz DTMB (CTTB): 390 kHz, 390 kHz, 390 kHz, 390 kHz,390 kHz, 390 kHz|390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz ISDB-T: 390 kHz, 390 kHz, 390 kHz, 390 kHz,390 kHz, 390 kHz|390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz CMMB: 390 kHz, 390 kHz, 390 kHz, 390 kHz,390 kHz, 390 kHz|390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz LTE, LTETDD: 1 MHz,1 MHz,1 MHz,1 MHz,1 MHz,1 MHz Digital Cable TV: 390 kHz, 390 kHz, 390 kHz, 390 kHz,390 kHz, 390 kHz|390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz ON, ON, ON, ON, ON, ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Backwards Compatibility SCPI	[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth:VIDeo
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

RBW Control

Accesses the resolution bandwidth control menu.

Key Path	**Meas Setup, Offset/Limits, Offset BW**
Initial S/W Revision	Prior to A.02.00

Filter Type

Selects the type of bandwidth filter that is used.

Key Path	**Meas Setup, Offset/Limits, Offset BW, RBW Control**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:SHAPe GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:SHAPe?`
Example	ACP:OFFS2:LIST:BAND:SHAP FLAT,GAUS,GAUS,GAUS,GAUS,GAUS ACP:OFFS2:LIST:BAND:SHAP?
Notes	Offset sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	When Res BW Mode for the offset is Auto, this key is grayed out and disabled. Since Res BW Mode for the offset is presetted to Auto on changing Meas Method to RBW or FAST, this key is grayed out and disabled too. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Couplings	See the description above
Preset	GAUSsian, GAUSsian, GAUSsian, GAUSsian, GAUSsian, GAUSsian
State Saved	Saved in instrument state.
Range	GAUSsian|FLATtop
Backwards Compatibility SCPI	[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth:SHAPe
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Filter BW

Selects a Gaussian filter based on its –3 dB (Normal) bandwidth or its –6 dB bandwidth.

Key Path	**Meas Setup, Offset/Limits, Offset BW, RBW Control**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:TYPE DB3|DB6, DB3|DB6, DB3|DB6, DB3|DB6, DB3|DB6, DB3|DB6` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:TYPE?`
Example	ACP:OFFS2:LIST:BAND:TYPE DB3,DB3,DB3,DB3,DB3,DB3 ACP:OFFS2:LIST:BAND:TYPE?

Notes	Offset sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	When Filter Type if Flattop or Res BW Mode for the offset is Auto, this key is grayed out and disabled. Since Res BW Mode for the offset is presetted to Auto on changing Meas Method to RBW or FAST, this key is grayed out and disabled too. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Preset	DB3, DB3, DB3, DB3, DB3, DB3
State Saved	Saved in instrument state.
Range	–3 dB (Normal)| –6 dB
Backwards Compatibility SCPI	[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth:TYPE
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Limits

Limits key accesses a menu of functions that contains Select Offset, Abs Limit, Rel Limit and Fail Mask parameters.

Key Path	**Meas Setup, Offset/Limits**
Initial S/W Revision	A.03.00

Abs Limit

Enters an absolute limit value, which sets the absolute amplitude levels to test against for each of the custom offsets. The list must contain six (6) entries. If there is more than one offset, the offset closest to the carrier channel is the first one in the list. [:SENSe]:ACP:OFFSet[n]:LIST:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n]:LIST:STATe command.

The query returns the six (6) sets of real numbers that are the current absolute amplitude test limits.

Key Path	**Meas Setup, Offset/Limits, Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:ABSolute <real>, <real>, <real>, <real>, <real>, <real>` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:ABSolute?`

Example	ACP:OFFS2:LIST:ABS –10,–10,–10,–10,–10,–10 ACP:OFFS2:LIST:ABS?
Notes	Offset sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	None If current mode is DTMB (CTTB) or CMMB and current device type is Transmitter, the value from position 2 to position 4 are coupled, changing any one will change the others.
Preset	SA: 0dBm, 0 dBm, 0 dBm, 0 dBm, 0 dBm, 0 dBm|0dBm, 0 dBm, 0 dBm, 0 dBm, 0 dBm, 0 dBm WCDMA: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm|50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm C2K: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm|50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm WIMAX OFDMA: 50,50,50,50,50,50 TD-SCDMA: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm|50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm 1xEVDO: –27dBm, –27dBm, –13dBm, –13dBm, –13dBm, –13dBm |–27dBm, –27dBm, –13dBm, –13dBm, –13dBm, –13dBm DVB-T/H: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm|50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm DTMB (CTTB): 11.14 dBm, 11.14dBm, 11.14 dBm, 11.14 dBm, 50 dBm, 50 dBm|11.14 dBm, 11.14 dBm, 11.14 dBm, 11.14 dBm, 50 dBm, 50 dBm ISDB-T: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm|50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm CMMB: 11.14 dBm, 11.14dBm, 11.14 dBm, 11.14 dBm, 50 dBm, 50 dBm|11.14 dBm, 11.14 dBm, 11.14 dBm, 11.14 dBm, 50 dBm, 50 dBm LTE, LTETDD: –8.45,–8.45,–8.45,–8.45,–8.45,–8.45|–50.0,–50.0,–50.0,–50.0,–50.0,–50.0 Digital Cable TV: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm|50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm
State Saved	Saved in instrument state.
Min	–200.0 dBm
Max	50.0 dBm

Backwards Compatibility SCPI	[:SENSe]:ACPR:OFFSet[1]|2:LIST:ABSolute (PSA W-CDMA, PSA cdma2000) [:SENSe]:MCPower:OFFSet[1]|2:LIST:ABSolute (PSA W-CDMA)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Rel Lim (Car)

Enters a relative limit value for the carrier level. This sets the amplitude levels to test against for the specified offsets.

The amplitude level is relative to the carrier amplitude. If multiple offsets are available, the list contains six (6) entries. The offset closest to the carrier channel is the first one in the list. [:SENSe]:ACP:OFFSet:LIST:TEST selects the type of testing to be done at each offset.

[:SENSe]:ACP:OFFSet[n]:LIST[n]:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n]:LIST[n]:STATe command.

The query returns the six (6) sets of real numbers that are the current amplitude test limits, relative to the carrier, for each offset.

Offset[n] n = 1 is base station and n = 2 is mobiles. The default is base station (1).

Key Path	**Meas Setup, Offset/Limits, Limits,**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:RCARrier <real>, <real>, <real>, <real>, <real>, <real>` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:RCARrier?`
Example	ACP:OFFS2:LIST:RCAR 0,0,0,0,0,0 ACP:OFFS2:LIST:RCAR?
Notes	Offset sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	None If current mode is DTMB (CTTB) or CMMB and current device type is Transmitter, the value from position 2 to position 4 are coupled, changing any one will change the others.

Preset	SA: –45, –60, 0 , 0, 0, 0|–45, –60, 0, 0, 0, 0 WCDMA: –44.2, –49.2, –49.2, –49.2, –49.2, –49.2|–32.2, –42.2, –42.2, –42.2 , –42.2, –42.2 C2K: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0, 0 WIMAX OFDMA: –50,–60,0,0,0,0 TD-SCDMA: –40, –45, –45, –45, –45, –45|–33, –43, –43, –43 , –43, –43 1xEVDO: –45, –55, –55, –55, –55, –55|–45, –55, –55, –55, –55, –55 DVB-T/H: –60, –60, 0 , 0, 0, 0|–60, –60, 0, 0, 0, 0 DTMB (CTTB): –45, –60, –60 , –60, 50, 50|–45, –60, –60, –60, 50, 50 ISDB-T: –60, –60, 0 , 0, 0, 0|–60, –60, 0, 0, 0, 0 CMMB: –45, –60, –60 , –60, 50, 50|–45, –60, –60, –60, 50, 50 LTE, LTETDD: –44.2,–44.2,–44.2,–44.2,–44.2,–44.2|–29.2, –29.2, –29.2, –29.2, –29.2, –29.2 Digital Cable TV: –58, –62, –65, –73, –73, –73|–58, –62, –65, –73, –73, –73
State Saved	Saved in instrument state.
Min	–150
Max	50.0
Backwards Compatibility SCPI	[:SENSe]:MCPower:OFFSet[1]|2:LIST:RCARrier (PSA WCDMA)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.04.00

Positive Offset Limit

Enables you to set the upper limit for the upper segment of the specified offset pair.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:ACPower:OFFSet:LIST:LIMit:POSitive[:UPPer]:DATA <real>, <real>, <real>, <real>, <real>, <real>` `:CALCulate:ACPower:OFFSet:LIST:LIMit:POSitive[:UPPer]:DATA?`
Example	CALC:ACP:OFFS:LIST:LIM:POS:DATA 0,0,0,0,0,0 CALC:ACP:OFFS:LIST:LIM:POS:DATA?
Notes	SCPI only command

Preset	SA: –45, –60, 0, 0, 0, 0|–45, –60, 0, 0, 0, 0 WCDMA: –44.2, –49.2, –49.2, –49.2, –49.2, –49.2|–32.2, –42.2, –42.2, –42.2, –42.2, –42.2 C2K: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0, 0 WIMAX OFDMA: –50, –60, 0, 0 ,0, 0 TD-SCDMA: –40, –45, –45, –45, –45, –45|–33, –43, –43, –43, –43, –43 1xEVDO: –45, –55, –55, –55, –55, –55|–45, –55, –55, –55, –55, –55 DVB-T/H: –60, –60, 0, 0, 0, 0|–60, –60, 0, 0, 0, 0 DTMB (CTTB): –45, –60, –60, –60, 0, 0|–45, –60, –60, –60, 0, 0 Digital Cable TV: –58, –62, –65, –73, –73, –73|–58, –62, –65, –73, –73, –73
State Saved	Saved in instrument state.
Min	–150.0
Max	50.0
Backwards Compatibility SCPI	:CALCulate:MCPower:OFFSet:LIST:LIMit:POSitive[:UPPer]:DATA (PSA Power Suite)
Initial S/W Revision	A.04.00

Negative Offset Limit

Enables you to set the upper limit for the lower segment of the specified offset pair.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:ACPower:OFFSet:LIST:LIMit:NEGative[:UPPer]:DATA <real>, <real>, <real>, <real>, <real>, <real>` `:CALCulate:ACPower:OFFSet:LIST:LIMit:NEGative[:UPPer]:DATA?`
Example	CALC:ACP:OFFS:LIST:LIM:NEG:DATA 0,0,0,0,0,0 CALC:ACP:OFFS:LIST:LIM:NEG:DATA?
Notes	SCPI only command

Preset	SA: –45, –60, 0, 0, 0, 0|–45, –60, 0, 0, 0, 0 WCDMA: –44.2, –49.2, –49.2, –49.2, –49.2, –49.2|–32.2, –42.2, –42.2, –42.2, –42.2, –42.2 C2K: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0, 0 WIMAX OFDMA: –50, –60, 0, 0, 0, 0 TD-SCDMA: –40, –45, –45, –45, –45, –45|–33, –43, –43, –43, –43, –43 1xEVDO: –45, –55, –55, –55, –55, –55|–45, –55, –55, –55, –55, –55 DVB-T/H: –60, –60, 0, 0, 0, 0|–60, –60, 0, 0, 0, 0 DTMB (CTTB): –45, –60, –60, –60, 0, 0|–45, –60, –60, –60, 0, 0 Digital Cable TV: –58, –62, –65, –73, –73, –73|–58, –62, –65, –73, –73, –73
State Saved	Saved in instrument state.
Min	–150.0
Max	50.0
Backwards Compatibility SCPI	:CALCulate:MCPower:OFFSet:LIST:LIMit:NEGative[:UPPer]:DATA (PSA Power Suite)
Initial S/W Revision	A.04.00

Rel Lim (PSD)

Enters a relative limit value for the level of the power spectral density. This sets the amplitude levels to test against for any custom offsets. The amplitude level is relative to the power spectral density. If multiple offsets are available, the list contains six (6) entries. The offset closest to the carrier channel is the first one in the list.

[:SENSe]:ACP:OFFSet[n]:LIST[n]:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n]:LIST:STATe command.

The query returns the six (6) sets of real numbers that are the current amplitude test limits, relative to the power spectral density, for each offset.

Offset[n] n = 1 is base station and n = 2 is mobiles. The default is base station (1).

Key Path	**Meas Setup, Offset/Limits, Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:RPSDensity <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:RPSDensity?`
Example	ACP:OFFS2:LIST:RPSD 10,10,10,10,10,10 ACP:OFFS2:LIST:RPSD?

Notes	Offset sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: –28.87 dB, –43.87 dB, 0 dB, 0 dB, 0 dB, 0 dB|–28.87 dB, –43.87 dB, 0 dB, 0 dB, 0 dB, 0 dB WCDMA: –44.2 dB, –49.2 dB, –49.2 dB, –49.2 dB, –49.2 dB, –49.2 dB|–32.2 dB, –42.2 dB, –42.2 dB, –42.2 dB, –42.2 dB, –42.2 dB C2K: 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB|0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB WIMAX OFDMA: –25,–35,0,0,0,0 TD-SCDMA: –40 dB, –45 dB, –45 dB, –45 dB, –45 dB, –45 dB|–33 dB, –43 dB, –43 dB, –43 dB, –43 dB, –43 dB 1xEVDO: –45, –55, –55, –55, –55, –55|–45, –55, –55, –55, –55, –55 DVB-T/H: –60 dB, –60 dB, 0 dB, 0 dB, 0 dB, 0 dB|–60 dB, –60 dB, 0 dB, 0 dB, 0 dB, 0 dB DTMB (CTTB): 50 dB, 50 dB, 50 dB, 50 dB, 50 dB, 50 dB|50 dB, 50 dB, 50 dB, 50 dB, 50 dB, 50 dB ISDB-T: –60 dB, –60 dB, 0 dB, 0 dB, 0 dB, 0 dB|–60 dB, –60 dB, 0 dB, 0 dB, 0 dB, 0 dB CMMB: 50 dB, 50 dB, 50 dB, 50 dB, 50 dB, 50 dB|50 dB, 50 dB, 50 dB, 50 dB, 50 dB, 50 dB LTE, LTETDD: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0, 0 Digital Cable TV: 50 dB, 50 dB, 50 dB, 50 dB, 50 dB, 50 dB|50 dB, 50dB, 50 dB, 50 dB, 50 dB, 50 dB
State Saved	Saved in instrument state.
Min	–150.0 dB
Max	50.0 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Fail Mask

Accesses a menu that enables you to select one of the logic keys for the fail conditions between the measurement results and the test limits. The setting defines the type of testing to be done at any custom offset frequencies. The measured powers are tested against the absolute values defined with [:SENSe]:ACP:OFFSet[n]:LIST:ABSolute, or the relative values defined with [:SENSe]:ACP:OFFSet:LIST:RPSDensity and [:SENSe]:ACP:OFFSet:LIST:RCARrier.

You can turn off (not use) specific offsets with the [:SENS]:ACP:OFFSet:LIST:STATe command.

- Absolute – Fail is shown if one of the absolute ACP measurement results is larger than the limit for Abs Limit.
- Relative – Fail is shown if one of the relative ACP measurement results is larger than the limit for Rel Lim (Car) or Rel Lim (PSD).
- Abs AND Rel – Fail is shown if one of the absolute ACP measurement results is larger than the limit for Abs Limit AND one of the relative ACP measurement results is larger than the limit for Rel Lim (Car) or Rel Lim (PSD).
- Abs OR Rel– Fail is shown if one of the absolute ACP measurement results is larger than the limit for Abs Limit OR one of the relative ACP measurement results is larger than the limit for Rel Lim (Car) or Rel Lim (PSD).

Key Path	**Meas Setup, Offset/Limits, Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:TEST ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:TEST?`
Example	ACP:OFFS2:LIST:TEST ABS,ABS,ABS,ABS,ABS,ABS ACP:OFFS2:LIST:TEST?
Notes	Offset sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	None If current mode is DTMB (CTTB) or CMMB and current device type is Transmitter, the value from position 2 to position 4 are coupled, changing any one will change the others.

Preset	SA, WCDMA, C2K, TD-SCDMA: REL, REL, REL, REL, REL, REL|REL, REL, REL, REL, REL, REL WIMAX OFDMA: REL, REL, REL, REL, REL, REL DVB-T/H: REL, REL, REL, REL, REL, REL DTMB (CTTB): OR,AND, AND,AND, REL, REL CDMA1xEVDO: REL, REL, ABS, REL, REL, REL| REL, REL, ABS, REL, REL, REL ISDB-T : REL, REL, REL, REL, REL, REL CMMB : OR,AND, AND,AND, REL, REL LTE, LTETDD: AND, AND, AND, AND, AND, AND|AND, AND, AND, AND, AND, AND Digital Cable TV: REL, REL, REL, REL, REL, REL
State Saved	Saved in instrument state.
Range	Absolute|Relative|Abs AND Rel (fail if both fail)|Abs OR Rel (fail if either fails)
Backwards Compatibility SCPI	[:SENSe]:MCPower:OFFSet[1]|2:LIST:TEST
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.0, A.04.000

Offset Side

Enables you to turn off (not use) specific offsets.

- NEGative - negative (lower) sideband only
- BOTH - both of the negative (lower) and positive (upper) sidebands
- POSitive - positive (upper) sideband only

Key Path	**Meas Setup, Offset/Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:SIDE NEGative|BOTH|POSitive,NEGative|BOTH|POSitive,NEGative|BOTH|POSitive,NEGative|BOTH|POSitive,NEGative|BOTH|POSitive,NEGative|BOTH|POSitive` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:SIDE?`
Example	ACP:OFFS:LIST:SIDE BOTH ACP:OFFS:LIST:SIDE?

Notes	OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, 1xEVDO mode, WIMAX OFDMA mode, LTE mode or LTETDD mode to use this command. Use :INSTrument:SELect to set the mode. If you set POS or NEG in an offset, result of the inactive side will return –999.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH|BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Neg|Both|Pos
Initial S/W Revision	A.03.00

Method for Offset

This key allows you to turn RRC filtering of each offset on or off. The value (roll off) for the filter will be set to the value of the Filter Alpha parameter.

Key Path	**Meas Setup, Offset/Limits**
Mode	SA, WCDMA, WIMAX OFDMA,TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:FILTer[:RRC][:STATe] ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:FILTer[:RRC][:STATe]?`
Example	ACP:OFFS:LIST:FILT 1,0,0 ACP:OFFS:LIST:FILT?
Notes	1|ON = RRC Weighted, 0|OFF = Integ BW This parameter is not available for cdma2000 and 1xEVDO. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0,0 WCDMA:1, 1, 1, 1, 1, 1|1, 1, 1, 1, 1, 1 C2K: NO WIMAX OFDMA: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0,0 TD-SCDMA: 1, 1, 1, 1, 1, 1|1, 1, 1, 1, 1, 1 DVB-T/H: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0,0 DTMB (CTTB): 1, 1, 1, 1, 1, 1|1, 1, 1, 1, 1, 1 ISDB-T: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0,0 CMMB: 1, 1, 1, 1, 1, 1|1, 1, 1, 1, 1, 1 LTE: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0,0 LTETDD: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0,0 Digital Cable TV: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0,0
State Saved	Saved in instrument state.
Range	Integ BW|RRC Weighted
Initial S/W Revision	A.03.00

Filter Alpha for Offset

Sets the alpha value for the RRC Filter for each offset.

Key Path	**Meas Setup, Offset/Limits, Method, RRC Weighted**
Mode	SA, WCDMA, WIMAX OFDMA,TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:FILTer:ALPHa <real>, <real>, <real>, <real>, <real>, <real>` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:FILTer:ALPHa?`
Example	ACP:OFFS:LIST:FILT:ALPH 0.5,0.5,0.5,0.5,0.5,0.5 ACP:OFFS:LIST:FILT:ALPH?
Notes	This parameter is not available for cdma2000 and 1xEVDO. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA: 0.22,0.22,0.22,0.22,0.22,0.22|0.22,0.22,0.22,0.22,0.22,0.22 WCDMA: 0.22,0.22,0.22,0.22,0.22,0.22|0.22,0.22,0.22,0.22,0.22,0.22 WIMAX OFDMA: 0.22,0.22,0.22,0.22,0.22,0.22|0.22,0.22,0.22,0.22,0.22,0.22 C2K: NO TD-SCDMA: 0.22,0.22,0.22,0.22,0.22,0.22|0.22,0.22,0.22,0.22,0.22,0.22 DVB-T/H: 0.22,0.22,0.22,0.22,0.22,0.22|0.22,0.22,0.22,0.22,0.22,0.22 DTMB (CTTB): 0.05,0.05,0.05,0.05,0.05,0.05|0.05,0.05,0.05,0.05,0.05,0.05 ISDB-T : 0.22,0.22,0.22,0.22,0.22,0.22|0.22,0.22,0.22,0.22,0.22,0.22 CMMB : 0.22,0.22,0.22,0.22,0.22,0.22|0.22,0.22,0.22,0.22,0.22,0.22 LTE: 0.22,0.22,0.22,0.22,0.22,0.22|0.22,0.22,0.22,0.22,0.22,0.22 LTETDD: 0.22,0.22,0.22,0.22,0.22,0.22|0.22,0.22,0.22,0.22,0.22,0.22 Digital Cable TV: 0.15, 0.15, 0.15, 0.15, 0.15, 0.15|0.15, 0.15, 0.15, 0.15, 0.15, 0.15
State Saved	Saved in instrument state.
Min	0.01
Max	1.00
Initial S/W Revision	A.03.00

Offset Frequency Define

This key allows you to select “Offset” definition. Each standard defines each “Offset” from Carrier.

3GPP2 requires the “From Carrier Center to MeasBW Closer Edge” definition. And LTE conformance test requires “From Carrier Edge to MeasBW Center” and/or “From Carrier Edge to MeasBW Closer Edge” definition.

- CTOCenter – From the center of the carrier closest to the adjacent channel to the center of the adjacent channel Offset Integ BW
- CTOEdge - From the center of the carrier closest to the adjacent channel to the edge of the closest adjacent channel Offset Integ BW
- ETOCenter – From Center Frequency - Carrier Spacing / 2 (for lower offset), Center Frequency + Carrier Spacing / 2 (for upper offset) of the carrier closest to the adjacent channel's to the center of the adjacent channel Offset Integ BW
- ETOEdge - From Center Frequency - Carrier Spacing / 2 (for lower offset), Center Frequency + Carrier Spacing / 2 (for upper offset) of the carrier closest to the adjacent channel's to the edge of the closest adjacent channel Offset Integ BW

Key Path	**Meas Setup, Offset/Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:TYPE CTOCenter|CTOEdge|ETOCenter|ETOEdge` `[:SENSe]:ACPower:OFFSet[1]|2:TYPE?`
Example	ACP:OFFS:TYPE ETOC ACP:OFFS:TYPE?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	All Except CDMA1xEVDO: CTOCenter CDMA1xEVDO: CTOEdge
State Saved	Saved in instrument state.
Range	Carrier Center To Meas BW Center|Carrier Center To Meas BW Edge|Carrier Edge To Meas BW Center|Carrier Edge To Meas BW Edge
Initial S/W Revision	A.03.00

Carrier Result

Allows you to view and scroll through the carrier power results.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA. 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Couplings	This key will be grayed out if there is only one carrier.
Preset	1
State Saved	No
Min	1
Max	Number of carriers.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

PhNoise Opt

Selects the LO (local oscillator) phase noise behavior for various operating conditions.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

PhNoise Opt Auto

Selects the best LO (local oscillator) phase noise behavior for the ACP measurement.

Auto works as follows:

Looks at all the offsets that are turned on.

Finds the largest and the smallest of the Freq Offset parameters for those offsets.

Takes the mean.

Compares that mean with the crossover frequency for the LO in use (see below).

If the mean is below the crossover frequency, use "best close-in," otherwise use "best wide-offset."

The crossover frequency for PXA is 195 kHz, for MXA and CXA it is 25 kHz.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA. 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:FREQuency:SYNThesis:AUTO[:STATe] OFF|ON|0|1` `[:SENSe]:ACPower:FREQuency:SYNThesis:AUTO[:STATe]?`
Example	ACP:FREQ:SYNT:AUTO 1 ACP:FREQ:SYNT:AUTO?
Preset	ON
State Saved	Saved in instrument state.
Range	Auto|Man
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.04.00

PhNoise Opt State

Selects the LO (local oscillator) phase noise behavior for various operating conditions.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA. 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:FREQuency:SYNThesis[:STATe] 1|2|3` `[:SENSe]:ACPower:FREQuency:SYNThesis[:STATe]?`
Example	ACP:FREQ:SYNT 1 ACP:FREQ:SYNT?

Notes	Parameter key: 1 - optimizes phase noise for close-in from the carrier. 2 - optimizes phase noise for wide-offset from the carrier. 3 - optimizes LO for tuning speed.
Preset	Because this function is in Auto after preset, the state of this function after Preset will be automatically calculated.
State Saved	Saved in instrument state.
Range	Hardware Dependent: PXA: Best Close-in Noise [offset < 140 kHz] | Best Wide-offset Noise [offset > 160 kHz] | Fast Tuning MXA: Best Close-in Noise [offset < 20 kHz] | Best Wide-offset Noise [offset > 30 kHz] | Fast Tuning CXA: NA
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.04.00

Meas Method

Sets the desired method to measure ACP.

Integration BW — one sweep of the trace is taken, and the band power for each offset is computed. Depending on the status of the Meas Type parameter (Total Power Reference or PSD Reference), results are displayed relative to the total power or the power spectral density. The display reflects either the current trace or a bar graph view.

Filtered IBW (max dynamic range) — the ACP Path is used to compute ACP when an ACP path is available. This method increases dynamic range, but increases measurement time as it limits the resolution bandwidth. This method is useful for improving dynamic range on a W-CDMA signal because a sharp cutoff bandpass filter is used. The accuracy of the adjacent channel power ratio is not degraded by this method, but the absolute accuracy of both adjacent channel power and carrier power are degraded by up to about 0.5 dB.

RBW — the algorithm uses zero-span and an appropriate RBW setting to capture all of the power in the carrier channel and the offsets. The zero-span algorithm (RBW method) is slower than the IBW method, but greatly improves repeatability.

Fast (in WCDMA mode or SA mode with 3GPP WCDMA radio standard selected) — this provides the same method as the Integration BW method, but is optimized for speed to measure a W-CDMA signal.

Fast (in CDMA2K mode or SA mode with CDMA2K radio standard selected) – this provides faster measurement using the FFT method with a limited parameter flexibility. When this is selected, CDMA2K preset offsets are given and control of the following are grayed out:
BW menu, Sweep/Control menu except Pause/Resume, Trace/Detector menu, Carrier Setup, Offset Limit, RRC Weighting, Filter Alpha, and Noise Correction softkeys in Meas Setup menu.

In the TD-SCDMA mode, only the Integration BW method is available. Therefore, the Meas Method key is not displayed in the TD-SCDMA mode.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:METHod IBW|IBWRange|FAST|RBW` `[:SENSe]:ACPower:METHod?`
Example	ACP:METH IBW ACP:METH?
Notes	In the TDSCDMA mode, only the IBW method is available to use. Therefore, the measure method key is not displayed in the TD-SCDMA mode. CDMA1xEVDO mode only supports RBW and Integration BW method. C2K mode only supports RBW, Integration BW and FAST method. FAST mode is only supported for WCDMA and C2K signal. You must be in the WCDMA or C2K mode or SA mode with 3GPP WCDMA or CDMA2K radio standard. Otherwise a setting conflict error message will be reported. Supporting FAST mode in C2K is available with the instrument version A.02.00 or later LTETDD mode only supports Integration BW and Filtered IBW method. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	IBW (Range) restricts the Res BW available for making this measurement to 30 kHz. When selected, the Res BW is clipped to this value if required and an error number displayed.
Preset	SA, LTE, LTETDD: IBW WCDMA: IBW C2K: RBW WIMAX OFDMA: IBW 1xEVDO: IBW DVB-T/H: IBW DTMB (CTTB): IBW ISDB-T: IBW CMMB: IBW Digital Cable TV: IBW
State Saved	Saved in instrument state.
Range	Integration BW|Filtered IBW (max dynamic range)|RBW|Fast

Readback Text	IBW|Filtered IBW|RBW|Fast
Backwards Compatibility SCPI	[:SENSe]:ACPR:SWEep:TYPE [:SENSe]:MCPower:METHod (PSA Power Suite)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Meas Type

Changes the reference used for the measurement. This allows you to make absolute and relative power measurements of either total power or the power normalized to the measurement bandwidth.

Total Pwr Ref (TPR) sets the reference to the total carrier power. PSD Ref (PSDR) sets the reference to the power spectral density of the carrier.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:TYPE TPRef|PSDRef` `[:SENSe]:ACPower:TYPE?`
Example	ACP:TYPE PSDR ACP:TYPE?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	TPRef
State Saved	Saved in instrument state.
Range	Total Power Ref|PSD Ref
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

PSD Ref

Sets the unit bandwidth for Power Spectral Density. The available units are dBm/Hz and dBm/MHz.

Key Path	**Meas Setup**
Mode	A, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:UNIT:ACPower:POWer:PSD DBMHZ|DBMMHZ` `:UNIT:ACPower:POWer:PSD?`

Example	UNIT:ACP:POW:PSD DBMMHZ UNIT:ACP:POW:PSD?
Couplings	When the PSD unit is changed, the PSD reference result of the “MEAS|READ|FETCH:ACP[n]?” is also changed by the PSD unit basis (in either dBm/Hz or dBm/MHz).
Preset	DBMHZ
State Saved	Saved in instrument state.
Range	dBm/Hz|dBm/MHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Limit Test

Turns limit checking for each offset On or Off. The limits may be specified within the Offset menu, for each offset, both sides of the carrier. For results that fail the limit, a red F is appended. In the Combined view, the bar turns red.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:ACPower:LIMit:STATe OFF|ON|0|1` `:CALCulate:ACPower:LIMit:STATe?`
Example	CALC:ACP:LIM:STAT OFF CALC:ACP:LIM:STAT?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA: OFF WCDMA: ON C2K: ON WIMAX OFDMA: OFF TD-SCDMA: ON 1xEVDO: ON DVB-T/H: OFF DTMB (CTTB): ON ISDB-T: OFF CMMB: ON LTE, LTETDD: ON Digital Cable TV: OFF
State Saved	Saved in instrument state.
Range	On|Off
Backwards Compatibility SCPI	[:SENSe]:MCPower:LIMit[:STATe] [:SENSe]:ACPower:LIMit[:STATe]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Noise Correction

Sets the measurement noise floor correction function to On or Off. On enables measurement noise correction when the measured power in the reference channel or any offset is close to the noise floor of the analyzer. Off turns these corrections off.

In analyzers with the noise floor extensions option (option NFE) enabled, there are two ways to compensate for the analyzer noise floor: through the NFE and through this noise corrections key. The techniques are results are similar but not identical. NFE uses a model of the analyzer noise floor, adapted to the current conditions such as center frequency, RBW and ambient temperature. The parameters of this model are measured in the factory or field calibration in a highly averaged measurement. So they are consistent. However, because the model is imperfect, the corrections are imperfect. Using NFE is very convenient; the user need not wait for the ACP noise corrections calibration to occur. The ACP NC calibration, though, has advantages of being measured very recently, at the current ambient, and the exact center frequency, with no requirement that the model be perfect. So it will often (but not always) have slightly better dynamic range. If both ACP NC is turned on and NFE is turned on, the analyzer uses only the ACP NC. When ACP NC is turned off but NFE is on, NFE is used and performance should still be excellent.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:CORRection:NOISe[:AUTO] OFF|ON|0|1` `[:SENSe]:ACPower:CORRection:NOISe[:AUTO]?`
Example	ACP:CORR:NOIS OFF ACP:CORR:NOIS?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.04.00

Meas Preset

Restores all the measurement parameters to their default values.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CONFigure:ACPower`
Example	CONF:ACP
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Selecting Meas Preset will restore all measurement parameters to their default values.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Offset RRC Weighting (Backward Compatibility SCPI)

Mode	SA, WCDMA, TD-SCDMA, WIMAX OFDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:FILTer[:RRC][:STATe] OFF|ON|0|1` `[:SENSe]:ACPower:FILTer[:RRC][:STATe]?`
Example	ACP:FILT OFF ACP:FILT?
Notes	This parameter is not available for cdma2000 and 1xEVDO The backwards Compatibility SCPI command, [:SENSe]:ACPR:FILTer[:RRC][:STATe], is provided to support same functionality as [:SENSe]:ACPr:FILTer[:RRC][:STATe] (PSA W-CDMA, PSA cdma2000 and PSA 1xEVDO) due to ACPr node conflicts with ACPower node. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	This command is an alias to [:SENSe]:ACPower:OFFSet[1]|2:LIST:FILTer[:RRC][:STATe] Sending the commands to set values of all offsets for BS and MS, however, sending the query always return a value of BS Offset A.
Preset	SA, WIMAX OFDMA, LTE, LTETDD: OFF WCDMA: ON C2K: NO TD-SCDMA: ON DVB-T/H: OFF DTMB (CTTB):ON ISDB-T: OFF CMMB: OFF Digital Cable TV: ON
State Saved	Saved in instrument state.
Backwards Compatibility SCPI	[:SENSe]:ACPR:FILTer[:RRC][:STATe] [:SENSe]:MCPower:FILTer[:RRC][:STATe]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Offset Filter Alpha (Backward Compatibility SCPI)

Mode	SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:FILTer[:RRC]:ALPHa <real>` `[:SENSe]:ACPower:FILTer[:RRC]:ALPHa?`
Example	ACP:FILT:ALPH 0.5 ACP:FILT:ALPH?
Notes	This parameter is not available for cdma2000 and 1xEVDO The backwards Compatibility SCPI command, [:SENSe]:ACPR:FILTer[:RRC]:ALPHa, is provided to support same functionality as [:SENSe]:ACPr:FILTer[:RRC]:ALPHa (PSA W-CDMA, PSA cdma2000 and PSA 1xEVDO) due to ACPr node conflicts with ACPower node. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	This command is an alias to [:SENSe]:ACPower:OFFSet[1]|2:LIST:FILTer:ALPhHa Sending the commands to set values of all offsets for BS and MS, however, sending the query always return a value of BS Offset A.
Preset	SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DVB-T/H, ISDB-T, CMMB, LTE, LTETDD: 0.22 C2K: NO DTMB (CTTB): 0.05 Digital Cable TV: 0.15
State Saved	Saved in instrument state.
Min	0.01
Max	1.00
Backwards Compatibility SCPI	[:SENSe]:ACPR:FILTer[:RRC]:ALPHa [:SENSe]:MCPower:FILTer[:RRC]:ALPHa
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Method for Carrier (Backward Compatibility SCPI)

Mode	SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:METHod IBW|RRC, …` `[:SENSe]:ACPower:CARRier[1]|2:LIST:METHod?`
Example	ACP:CARR2:LIST:METH RRC ACP:CARR2:LIST:METH?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode. Maximum of Array length depends on the number of carriers.
Couplings	This command is an alias to [:SENSe]:ACPower:CARRier[1]|2:LIST:FILTer[:RRC][:STATe] The enum value translates as follows: RRC Weighted = 1|ON Integ BW = 0|OFF Maximum of Array length depends on the number of carriers.
Preset	SA: IBW WCDMA: RRC WIMAX OFDMA: IBW TD-SCDMA: RRC DVB-T/H: IBW DTMB (CTTB): RRC ISDB-T: IBW CMMB: IBW LTE: IBW LTETDD: IBW Digital Cable TV: RRC
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Mode

See “Mode” on page 1271 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Mode Setup

See “Mode Setup” on page 1291 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Peak Search

Accesses a menu that enables you to control the peak search function.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Peak Search

Places the selected marker on the trace point with the maximum y-axis value.

Key Path	**Peak Search**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`CALC:ACP:MARK2:MAX`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Next Peak

Moves the selected marker to the peak that has the next highest amplitude.

Key Path	**Peak Search**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:NEXT`
Example	CALC:ACP:MARK2:MAX:NEXT
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Next Pk Right

Moves the selected marker to the nearest peak to the right of the current marker that meets all enabled peak criteria.

Key Path	**Peak Search**

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:RIGHt
Example	CALC:ACP:MARK2:MAX:RIGH
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Next Pk Left

Moves the selected marker to the nearest peak to the left of the current marker that meets all enabled peak criteria.

Key Path	**Peak Search**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:LEFT
Example	CALC:ACP:MARK2:MAX:LEFT
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker Delta

Sets the control mode for the selected marker to Delta mode.

See Marker Delta in the "Marker Functions" section for more information.

Key Path	**Peak Search**
Initial S/W Revision	Prior to A.02.00

Pk-Pk Search

Finds and displays the amplitude and frequency (or time, if in zero span) differences between the highest and lowest y-axis value.

Key Path	**Peak Search**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:PTPeak

Example	CALC:ACP:MARK:PTP
Notes	Turns on the Marker Δactive function.
Couplings	This key is not available (key is grayed out) when **Coupled Markers** is on.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Min Search

Moves the selected marker to the minimum y-axis value on the current trace.

Key Path	**Peak Search**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	CALC:ACP:MARK:MIN
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Recall

See “Recall” on page 174 for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Restart

See “Restart” on page 1299 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Save

See “Save” on page 186 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Single

See “Single (Single Measurement/Sweep)” on page 1305 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Source

See “Source” on page 1307 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Span

Changes the frequency range symmetrically about the center frequency.

The default (and minimum) span is calculated using the number of carriers and the carrier width where;

Span = (Upper Carrier Freq + (max offset IBW * (1 + alpha)) / 2) - (Lower Carrier Freq - (max offset IBW * (1 + alpha)) / 2)

The span is increased by a factor of 1 + Filter Alpha if the RRC Filter in on.

Key Path	**SPAN X Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:FREQuency:SPAN <freq>` `[:SENSe]:ACPower:FREQuency:SPAN?`
Example	ACP:FREQ:SPAN 25MHz ACP:FREQ:SPAN?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	The span value is clipped when the carrier settings and/or the offset settings are changed. The value is changed to satisfy following formula: Span = (Upper Carrier Freq + (max offset IBW * (1 + alpha)) / 2) - (Lower Carrier Freq - (max offset IBW * (1 + alpha)) / 2)

Preset	SA: 8 MHz WCDMA: 24.6848 MHz WIMAX OFDMA: 50 MHz C2K: 4.5 MHz TD-SCDMA: 8 MHz 1xEVDO: 4.05 MHz DVB-T/H: 40 MHz DTMB (CTTB): 72 MHz ISDB-T: 30 MHz CMMB: 72 MHz LTE, LTETDD: 15 MHz Digital Cable TV: 40 MHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	Hardware Dependent: Option 503 = 3.7 GHz Option 507 = 7.1 GHz Option 508 = 8.5 GHz Option 513 = 13.8 GHz Option 526 = 27.0 GHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Full Span

Changes the span to show the full frequency range of the spectrum analyzer.

Key Path	**SPAN X Scale**
Mode	SA, WCDMA, C2K, WiMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:FREQuency:SPAN:FULL`
Example	ACP:FREQ:SPAN:FULL
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Last Span

Changes the span to the previous span setting. If no previous span value exists, then the span will remain unchanged.

Key Path	**SPAN X Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:FREQuency:SPAN:PREVious`
Example	ACP:FREQ:SPAN:PREV
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Sweep/Control

Accesses a menu of functions that enable you to set up and control the sweep time, and source.

See “Sweep/Control” on page 1309 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Sweep Time

Selects the length of time in which the spectrum analyzer sweeps the displayed frequency span. In swept spans, the sweep time varies from 1 millisecond to 2000 seconds. Additional overhead time, which impacts the sweep rate, is not calculated as part of the sweep time. In fact:

sweep rate = span/sweep time

update rate = 1/(sweep time + overhead)

sweep cycle time = sweep time + overhead

Sweep time is coupled to RBW and VBW, and is impacted by the number of sweep points, so changing those parameters may change the sweep time.

If you increase the sweep time, you increase the length of the time data captured and the number of points measured. You might need to specify a specific sweep speed to accommodate a specific condition in your transmitter. For example, you may have a burst signal and need to measure an exact portion of the burst.

Selecting a specific sweep time may result in a long measurement time since the resulting number of data points my not be the optimum 2n. Use [:SENSe]:ACP:OFFSet:LIST:SWEep:TIME to set the number of points used for measuring the offset channels for Basic and cdmaOne.

For cdma2000 and W-CDMA, this command sets the sweep time when using the sweep mode. See [:SENSe]:ACP:SWEep:TYPE

Key Path	**Sweep/Control**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:ACPower:SWEep:TIME <time>`
	`[:SENSe]:ACPower:SWEep:TIME?`
	`[:SENSe]:ACPower:SWEep:TIME:AUTO OFF|ON|0|1`
	`[:SENSe]:ACPower:SWEep:TIME:AUTO?`

Example	ACP:SWE:TIME 50ms ACP:SWE:TIME? ACP:SWE:TIME:AUTO OFF ACP:SWE:TIME:AUTO?
Notes	This parameter is preset by Meas Method selection. Preset values are as follows: IBW: 29 ms IBWR: 108 ms FAST (WCDMA): 7.5 ms
Couplings	When you manually change the Sweep Time, this state automatically goes to 'Man'.
Preset	SA, LTE, LTETDD: Automatically calculated WCDMA: 29 ms WIMAX OFDMA: Automatically calculated C2K: Automatically calculated TD-SCDMA: Automatically calculated 1xEVDO: Automatically calculated DVB-T/H: Automatically calculated DTMB (CTTB): Automatically calculated ISDB-T: Automatically calculated CMMB: Automatically calculated Digital Cable TV: Automatically calculated SA, LTE, LTETDD: ON WCDMA: OFF C2K: OFF (mehtod IBW) WIMAX OFDMA: ON TD-SCDMA: ON DVB-T/H: ON DTMB (CTTB): ON ISDB-T: ON CMMB: ON Digital Cable TV: ON
State Saved	Saved in instrument state.
Min	1 ms
Max	4000 s

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Sweep Setup

Accesses the sweep setup menu.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Auto Sweep Time Rules

Switches the analyzer between normal and accuracy sweep states.

Key Path	**Sweep/Control, Sweep Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:SWEep:TIME:AUTO:RULes NORMal|ACCuracy` `[:SENSe]:ACPower:SWEep:TIME:AUTO:RULes?`
Example	ACP:SWE:TIME:AUTO:RUL NORM ACP:SWE:TIME:AUTO:RUL?
Notes	Set to Norm when Auto Couple is pressed or sent remotely.
Preset	SA, WCDMA, C2K, TD-SCDMA, 1xEVDO, DTMB (CTTB), LTE, LTETDD: ACCuracy WIMAX OFDMA, DVB-T/H: NORMal ISDB-T, CMMB: NORMal Digital Cable TV: NORMal
State Saved	Saved in instrument state.
Range	Norm|Accy
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Pause

Pauses a measurement after the current data acquisition is complete. When Paused, the label on the key changes to Resume. Pressing the Resume key resumes the measurement at the point where it was paused. When Paused, pressing **Restart**, **Single**, or **Cont** does a Resume

See "Pause/Resume" on page 1321 in "Common Measurement Functions" for more details.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Gate

Accesses a menu that enables you to control the gating function. The Gate functionality is used to view signals best viewed by qualifying them with other events.

Gate Method that lets you choose one of the three different types of gating is not available in this measurement.

See "Gate " on page 1322 in "Common Measurement Functions" for more details.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Points

Sets the number of points per sweep, from 1 to 20001. The sweep time resolution setting will depend on the number of points selected.

Key Path	**Sweep/Control**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:SWEep:POINts <integer>` `[:SENSe]:ACPower:SWEep:POINts?`
Example	ACP:SWE:POIN 500 ACP:SWE:POIN?
Notes	Whenever the number of sweep points changes: • All trace data is erased • Any traces with Update Off will also go to Display Off (like going from View to Blank in the older analyzers) • Sweep time is re-quantized • Any limit lines that are on will be updated • If averaging/hold is on, averaging/hold starts over
Couplings	Whenever the number of sweep points changes, the sweep time is re-quantized.

Preset	Others: 1001 DVB-T/H:2001 DTMB (CTTB): 2001 ISDB-T: 2001 CMMB: 2001 Digital Cable TV: 2001
State Saved	Saved in instrument state.
Min	1
Max	20001
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Trace/Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Trace (Front-panel Only)

This key selects which trace the other parameters under the Trace/Detector menu will apply to.

Key Path	**Trace/Detector**
Notes	Front-panel only.
Couplings	When Meas Method is RBW or FAST, Select Trace is disabled.
Preset	1
State Saved	Saved in instrument state.
Range	1 | 2 | 3
Initial S/W Revision	Prior to A.02.00

Trace Type

Allows you to select the type of trace for the current measurement. The first page of this menu contains a selection of the trace type (Clear Write, Trace Average, Max Hold, Min Hold) for the selected trace.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:TRACe[1]|2|3:ACPower:TYPE WRITe|AVERage|MAXHold|MINHold` `:TRACe[1]|2|3:ACPower:TYPE?`
Example	TRAC:ACP:TYPE MINH TRAC:ACP:TYPE?
Notes	WRITe = Clear Write AVERage = Average MAXHold = Maximum Hold MINHold = Minimum Hold

Couplings	When Detector setting is “Auto” ([:SENSe]:ACPower:DETector:AUTO?), Detector is set to what the Radio Standard defaults states (see detector section below) for all conditions of Trace Type and for all traces. When set to Manual, all Traces use the same detector type. When Average State = Off then Trace Types AVERage, MaxHold and MinHold will not function, since Averaging is required to be ‘on’ for them to operate. When Meas Method is RBW or FAST, Trace Type is disabled.
Preset	AVERage
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

View / Blank

Enables you to select how to view the displayed trace.

Key Path	**Trace/Detector**
Mode	SA,WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Notes	No . remote control. Front panel only.
Couplings	The four states of this 1-of-N actually set two variables, Update and Display, to their four possible combinations. Trace On: Update and Display both On View: Update Off and Display On (Not implemented) Blank: Update Off and Display Off Background: Update On, Display Off (Not implemented) See tables below for detail on remote commands to control these two variables. Selecting a trace type (Clear Write, Trace Average, Max Hold, Min Hold) for a trace (pressing the key or sending the equivalent remote command) puts the trace in ‘Trace On’ state (**Update On and Display On)**, even if that trace type was already selected. When Meas Method is RBW or FAST, this key is grayed out.
Preset	Trace On
State Saved	Saved in instrument state.
Range	Trace On|Blank
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Key Path	**Trace/Detector**

Mode	WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:TRACe[1]|2|3:ACPower:UPDate[:STATe] ON|OFF|0|1` `:TRACe[1]|2|3:ACPower:UPDate[:STATe]?`
Example	`TRAC:ACP:UPD ON` `TRAC:ACP:UPD?`
Couplings	Whenever you set **Update** to **On** for any trace**,** the **Display** is set to **On** for that trace. When Meas Method is RBW or FAST, Trace Update is disabled.
Preset	1|0|0 (On for Trace 1; Off for 2 &3)
State Saved	Saved in instrument state.
Range	0 1
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Key Path	**Trace/Detector**
Mode	WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:TRACe[1]|2|3:ACPower:DISPlay[:STATe] ON|OFF|0|1` `:TRACe[1]|2|3:ACPower:DISPlay[:STATe]?`
Example	`TRAC:ACP:DISP ON` `TRAC:ACP:DISP?`
Couplings	Whenever you set **Update** to **On** for any trace**,** the **Display** is set to **On** for that trace. When Meas Method is RBW or FAST, Trace Display is disabled.
Preset	1|0|0 (On for Trace 1; Off for 2 &3)
State Saved	Saved in instrument state.
Range	0 1
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Detector

Accesses a menu of functions that enables you to control the detectors for the current measurement. Allows up to three (3) traces, but each use the same detector type choiceThe following choices are available:

- Auto- the detector selected is set to AVERage, unless the Radio Standard defaults state otherwise e.g. it is set to Peak for Radio Standard = PDC when Device = both MS and BTS, and when Radio Standard = NADC and Device = MS.
- Normal-the detector determines the peak of the CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.
- Average-the detector determines the average of the signal within the sweep points. The averaging method is Power (RMS).
- Peak-the detector determines the maximum of the signal within the sweep points.
- Sample-the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- Negative Peak-the detector determines the minimum of the signal within the sweep points.

In swept analysis, the time interval of the data collection for the display sweep points also represents a frequency interval. In FFT analysis, the sweep points represents just a frequency interval. The detector determines the relationship between the spectrum computed by the FFT and the single data point displayed for the sweep points.

Key Path	**Trace/Detector**
Initial S/W Revision	Prior to A.02.00

Auto

Sets the detector for the currently selected trace to auto.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:DETector:AUTO ON|OFF|1|0` `[:SENSe]:ACPower:DETector:AUTO?`
Example	ACP:DET:AUTO 1 ACP:DET?
Couplings	When Detector setting is “Auto” ([:SENSe]:ACPower:DETector:AUTO?), Detector is set to what the Radio Standard defaults states (see detector section) for all conditions of Trace Type and for all traces. When set to Manual, all Traces use the same detector type. When Average State = Off then Trace Types AVERage, MaxHold and MinHold will not function, since Averaging is required to be ‘on’ for them to operate.

Preset	ON
State Saved	Saved in instrument state.
Range	ON|OFF
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Detector Selection

Selects a detector to be used by the analyzer for the current measurement. All traces will use the same detector type, similar to Monitor Spectrum measurement

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:DETector[:FUNCtion] AVERage|NEGative|NORMal|POSitive|SAMPle` `[:SENSe]:ACPower:DETector[:FUNCtion]?`
Example	ACP:DET NORM ACP:DET?
Notes	When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. The detector choices are: • The Normal detector determines the peak of CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection. • The Average detector determines the average of the signal within the data range. The averaging method is Power (RMS). • The Peak detector determines the maximum of the signal within the data range. • The Sample detector indicates the instantaneous level of the signal at the center of the data represented by each display point. • The Negative Peak detector determines the minimum of the signal within the data range. Because they may not find a spectral component's true peak, neither average nor sample detectors measure amplitudes of CW signals as accurately as peak or normal, but they do measure noise without the biases of peak detection. When a detector selection is made, the menu returns to the previous menu.

Couplings	When Detector setting is "Auto" ([:SENSe]:ACPower:DETector:AUTO?), Detector is set to what the Radio Standard defaults states (see detector section) for all conditions of Trace Type and for all traces. When set to Manual, all Traces use the same detector type. When Average State = Off then Trace Types AVERage, MaxHold and MinHold will not function, since Averaging is required to be 'on' for them to operate. Only one detector type for all 3 traces is allowed. When Meas Method is RBW or FAST, Detector is disabled.
Preset	AVERage
State Saved	Saved in instrument state.
Range	Normal|Average|Peak|Sample|Negative Peak
Backwards Compatibility SCPI	[:SENSe]:ACPR:SWEep:DETector[:FUNCtion]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Trigger

Accesses a menu functions that enable you to select and control the trigger source for the current measurement. See “Trigger” on page 1339 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

View/Display

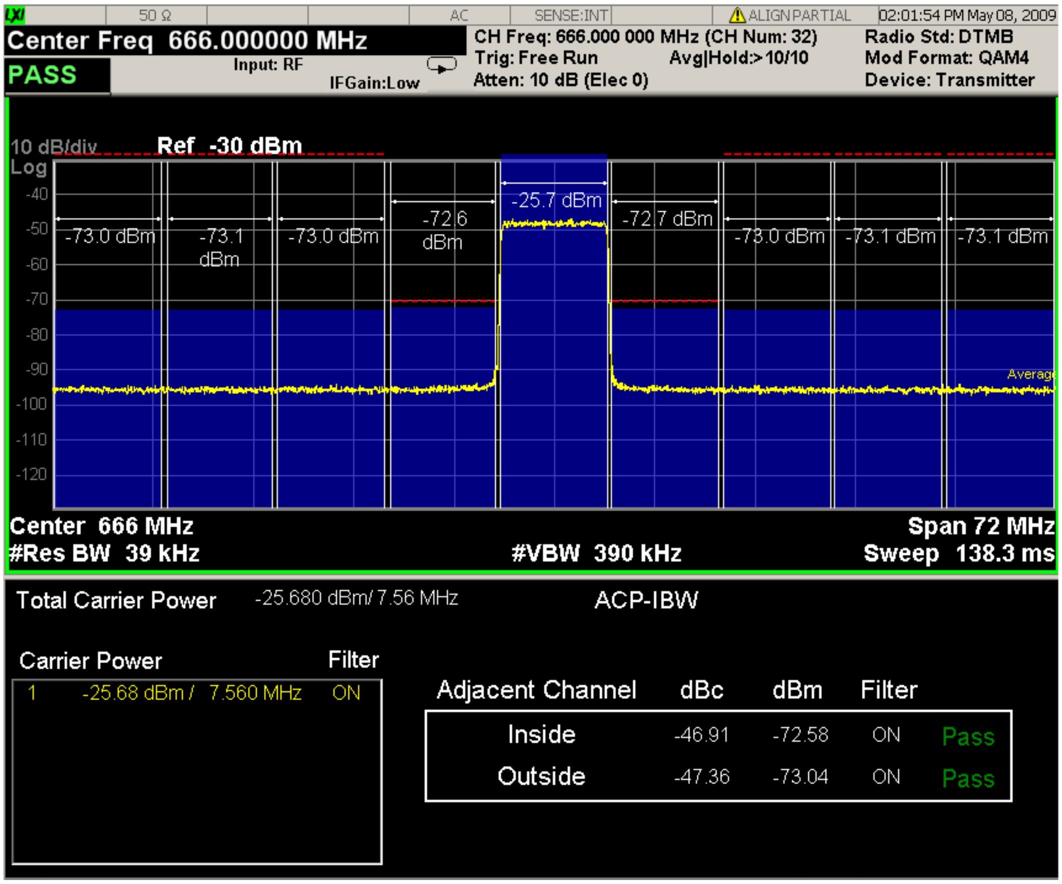
Accesses a menu of functions that enable you to control the instrument display as well as turn the bar graph On and Off.

The display consists of the following two windows:

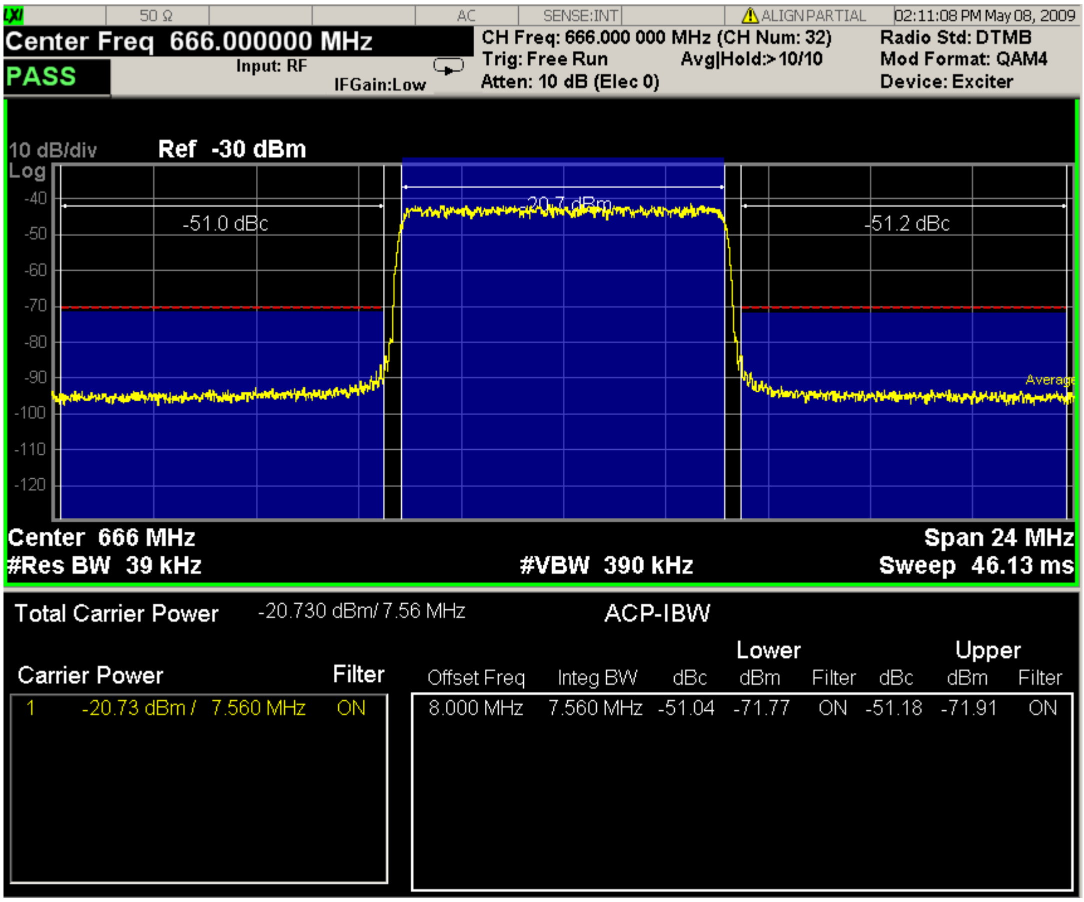
“Spectrum Window” on page 464

“Results Window” on page 465

The following two views are only for DTMB (CTTB) and CMMB:DTMB and CMMB Transmitter:



DTMB and CMMB Exciter:



Spectrum Window

When the Bar Graph is On and Limit Test is On, the color of each bar graph reflects the limit test result. When the limit test fails, the bar color is red, and when limit test passes, the bar color is blue.

When RBW is selected as the measurement method, the spectrum trace is not displayed, only the bar graph is displayed. In addition, the Bar Graph key (under the View/Display front-panel key) is set to ON and is grayed out.

The RRC Filter display item is only displayed when RRC filter is on.

Results Window

The text window displays the following results:

Total Carrier Power

This is the total power of all the carriers with carrier power present set to yes. The power is calculated by integrating across the bandwidth declared by the Carrier Integ Bw parameter for each carrier and then totaling the sums. The total integration bandwidth is shown as part of the result. This will be the total of the Carrier Integ Bw of the carriers used in calculating the total carrier power. If the RRC Filter is on, then the integration bandwidth used is (1 + alpha)/T where T = 1/(Carrier Integ Bw) multiplied by the number of carriers with carrier power present set to yes.

Ref Carrier Power

This is the power in the reference carrier. The power is calculated by integrating across the bandwidth declared by the Carrier Integ Bw parameter for that carrier. The integration bandwidth is shown as part of the result. This is the value of the Carrier Integ Bw for that carrier unless the RRC Filter is on, then the integration bandwidth used is the displayed value, which is (1 + alpha)/T where T = 1/(Carrier Integ Bw).

Carrier Power

This is the power in all the currently defined carriers. If the carrier has carrier power present, the power will be absolute. If the carrier is defined as not having power present, the power will be relative to the reference carrier. The power is calculated by integrating across the bandwidth declared by the Carrier Integ Bw parameter. The integration bandwidth is shown as part of the result. This is the value of the Carrier Integ Bw for the carrier unless the RRC Filter is on, then the integration bandwidth used is the displayed value, which is (1 + alpha)/T where T = 1/(Carrier Integ Bw).

As there are potentially more results than can be easily viewed on the display, a scrollable list is used to display all results. The Carrier Results menu key is used to index the carrier amplitude results. This key isle grayed out unless the measurement is in single mode (as in continual measurement mode). The display is continuously updating and will not need to be accessed. The currently selected Carrier Result is displayed on the last line of the carrier power result list unless:

- The selected Carrier Result is 4 or less in normal multi carrier power results view. In this case the first 4 carrier power results will be displayed.
- The selected Carrier Result is 9 or greater in normal multi carrier power results view. In this case the last 4 carrier power results will be displayed.
- The zoom mode is selected. In this case all carrier power ranges can be displayed.

Offset Relative Power

This is the power in the offsets relative to the reference carrier. The power is calculated by integrating across the bandwidth declared by the Offset Integ Bw parameter. The offset integration bandwidth is shown as part of the result. This is the value on the Offset Integ Bw menu key unless the RRC Filter is on, then the integration bandwidth used is the displayed value, which is (1 + alpha)/T where T = 1/(Offset Integ Bw).

Offset Absolute Power

This is the absolute power in the offsets. The power is calculated by integrating across the bandwidth declared by the Offset Integ Bw parameter. The offset integration bandwidth is shown as part of the result. This is the value on the Offset Integ Bw menu key unless the RRC Filter is on, then the integration bandwidth used is the displayed value, which is (1 + alpha)/T where T = 1/(Offset Integ Bw).

Inside Adjacent Channel Power (DTMB (CTTB) and CMMB only)

This result is only valid for DTMB (CTTB) transmitter and CMMB transmitter. It contains two parts: Relative Power and Absolute Power. The power is calculated by integrating across the bandwidth (Integ BW) at the frequency Offset A.

Inside Absolute Power = MAX ($P_{\text{Lower Offset A}}$, $P_{\text{Upper Offset A}}$);

Inside Relative Power = Inside Absolute Power – Carrier Power;

Outside Adjacent Channel Absolute Power (DTMB (CTTB) and CMMB only)

This result is only valid for DTMB (CTTB) transmitter and CMMB transmitter. It contains two parts: Relative Power and Absolute Power. The power is the Root-Mean-Square of the power calculated by integrating across the bandwidth (Integ Bw) at frequency Offset B, C and D.

$$Outside\ Absolute\ Power = \sqrt{\frac{P^2_{Lower\ OffsetB} + P^2_{Upper\ OffsetB} + P^2_{Lower\ OffsetC} + P^2_{Upper\ OffsetC} + P^2_{Lower\ OffsetD} + P^2_{Upper\ OffsetD}}{6}}$$

Outside Relative Power = Outside Absolute Power – Carrier Power;

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters.

See “Display” on page 1385 in the "Common Measurement Functions" section for more information.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Bar Graph

Turns the Bar Graph On and Off.

Key Path	**View/Display**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:BGRaph OFF|ON|0|1` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:BGRaph?`

Example	DISP:ACP:VIEW:WIND:BGR OFF DISP:ACP:VIEW:WIND:BGR?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	When the method is RBW, this key is always set to On and grayed out.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

8 Spectrum Emission Mask Measurement

The spectrum emission mask measures spurious signal levels in up to six pairs of offset frequencies and relates them to the carrier power. For measurement results and views, see “View/Display” on page 560.

This topic contains the following sections:

Measurement Commands for Spectrum Emission Mask

Offsets that are turned off (inactive) will return –999.0 when their results are queried over SCPI.

```
:CONFigure:SEMask
:CONFigure:SEMask:NDEFault
:INITiate:SEMask
:FETCh:SEMask[n]?
:MEASure:SEMask[n]?
:READ:SEMask[n]?
```

For more measurement related commands, see the SENSe subsystem, and the section “Remote Measurement Functions” on page 1257.

Remote Command Results for Spectrum Emission Mask Measurement

Command		Return Value
FETCh:SEMask[n]? MEASure:SEMask[n]? READ:SEMask[n]?	N=1	In case the Meas Type is: Total Power Reference Returns 82 comma-separated scalar results, in the following order: 1. Reserved for the future use, returns –999.0 2. Absolute power at the center frequency (reference) area (dBm) 3. Reserved for the future use, returns –999.0 4. Reserved for the future use, returns –999.0 5. Peak frequency in the center frequency (reference) area (Hz) 6. Reserved for the future use, returns –999.0 7. Reserved for the future use, returns –999.0 8. Reserved for the future use, returns –999.0 9. Reserved for the future use, returns –999.0 10. Reserved for the future use, returns –999.0 11. Relative integrated power on the negative offset A (dBc) 12. Absolute integrated power on the negative offset A (dBm) 13. Relative peak power on the negative offset A (dBc) 14. Absolute peak power on the negative offset A (dBm) 15. Peak power offset frequency from the center or carrier edge frequency in the negative offset A, depending on Offset Frequency Define settings (Hz) 16. Relative integrated power on the positive offset A (dBc) 17. Absolute integrated power on the positive offset A (dBm) 18. Relative peak power on the positive offset A (dBc) 19. Absolute peak power on the positive offset A (dBm) 20. Peak power offset frequency from the center or carrier edge frequency in the positive offset A, depending on Offset Frequency Define settings (Hz) 21. Relative integrated power on the negative offset B (dBc) … 69. Absolute peak power on the positive offset F (dBm) 70. Peak power offset frequency from the center or carrier edge frequency in the positive offset F, depending on Offset Frequency Define settings (Hz)

Command		Return Value
	N=1	71. Minimum margin from limit line on the negative offset A (dB) 72. Minimum margin from limit line on the positive offset A (dB) 73. Minimum margin from limit line on the negative offset B (dB) 74. Minimum margin from limit line on the positive offset B (dB) 75. Minimum margin from limit line on the negative offset C (dB) 76. Minimum margin from limit line on the positive offset C (dB) 77. Minimum margin from limit line on the negative offset D (dB) 78. Minimum margin from limit line on the positive offset D (dB) 79. Minimum margin from limit line on the negative offset E (dB) 80. Minimum margin from limit line on the positive offset E (dB) 81. Minimum margin from limit line on the negative offset F (dB) 82. Minimum margin from limit line on the positive offset F (dB)

Command		Return Value
	N=1	In case the Meas Type is: Power Spectral Density Reference Returns 82 comma-separated scalar results, in the following order: 1. Reserved for the future use, returns –999.0 2. Absolute power at the center frequency (reference) area (dBm/Hz) 3. Reserved for the future use, returns –999.0 4. Reserved for the future use, returns –999.0 5. Peak frequency in the center frequency (reference) area (Hz) 6. Reserved for the future use, returns –999.0 7. Reserved for the future use, returns –999.0 8. Reserved for the future use, returns –999.0 9. Reserved for the future use, returns –999.0 10. Reserved for the future use, returns –999.0 11. Relative integrated power on the negative offset A (dB). 12. Absolute integrated power on the negative offset A (dBm/Hz). 13. Relative peak power on the negative offset A (dB) 14. Absolute peak power on the negative offset A (dBm/Hz) 15. Peak power offset frequency from the center or carrier edge frequency in the negative offset A, depending on Offset Frequency Define settings (Hz) 16. Relative integrated power on the positive offset A (dB). 17. Absolute integrated power on the positive offset A (dBm/Hz). 18. Relative peak power on the positive offset A (dB) 19. Absolute peak power on the positive offset A (dBm/Hz) 20. Peak power offset frequency from the center or carrier edge frequency in the positive offset A, depending on Offset Frequency Define settings (Hz) 21. Relative integrated power on the negative offset B (dB). … 69. Absolute peak power on the positive offset F (dBm/Hz) 70. Peak power offset frequency from the center or carrier edge frequency in the positive offset F, depending on Offset Frequency Define settings (Hz)

Command		Return Value
	N=1	71. Minimum margin from limit line on the negative offset A (dB) 72. Minimum margin from limit line on the positive offset A (dB) 73. Minimum margin from limit line on the negative offset B (dB) 74. Minimum margin from limit line on the positive offset B (dB) 75. Minimum margin from limit line on the negative offset C (dB) 76. Minimum margin from limit line on the positive offset C (dB) 77. Minimum margin from limit line on the negative offset D (dB) 78. Minimum margin from limit line on the positive offset D (dB) 79. Minimum margin from limit line on the negative offset E (dB) 80. Minimum margin from limit line on the positive offset E (dB) 81. Minimum margin from limit line on the negative offset F (dB) 82. Minimum margin from limit line on the positive offset F (dB)

Command		Return Value
	N=1	In case the Meas Type is: Spectrum Peak Reference Returns 82 comma-separated scalar results, in the following order: 1. Reserved for the future use, returns –999.0 2. Peak power at the center frequency (reference) area (dBm) 3. Reserved for the future use, returns –999.0 4. Reserved for the future use, returns –999.0 5. Peak frequency in the center frequency (reference) area (Hz) 6. Reserved for the future use, returns –999.0 7. Reserved for the future use, returns –999.0 8. Reserved for the future use, returns –999.0 9. Reserved for the future use, returns –999.0 10. Reserved for the future use, returns –999.0 11. Reserved for the future use, returns –999.0 12. Reserved for the future use, returns –999.0 13. Relative peak power on the negative offset A (dB) 14. Absolute peak power on the negative offset A (dBm) 15. Peak power offset frequency from the center or carrier edge frequency in the negative offset A, depending on Offset Frequency Define settings (Hz) 16. Reserved for the future use, returns –999.0 17. Reserved for the future use, returns –999.0 18. Relative peak power on the positive offset A (dB) 19. Absolute peak power on the positive offset A (dBm) 20. Peak power offset frequency from the center or carrier edge frequency in the positive offset A, depending on Offset Frequency Define settings (Hz) 21. Reserved for the future use, returns –999.0 … 69. Absolute peak power on the positive offset F (dBm) 70. Peak power offset frequency from the center or carrier edge frequency in the positive offset F, depending on Offset Frequency Define settings (Hz)

Command		Return Value
	N=1	71. Minimum margin from limit line on the negative offset A (dB) 72. Minimum margin from limit line on the positive offset A (dB) 73. Minimum margin from limit line on the negative offset B (dB) 74. Minimum margin from limit line on the positive offset B (dB) 75. Minimum margin from limit line on the negative offset C (dB) 76. Minimum margin from limit line on the positive offset C (dB) 77. Minimum margin from limit line on the negative offset D (dB) 78. Minimum margin from limit line on the positive offset D (dB) 79. Minimum margin from limit line on the negative offset E (dB) 80. Minimum margin from limit line on the positive offset E (dB) 81. Minimum margin from limit line on the negative offset F (dB) 82. Minimum margin from limit line on the positive offset F (dB)
	N=2	Returns the displayed frequency domain spectrum trace data separated by comma. The number of data is 2001.
	N=3	Returns the displayed frequency domain absolute limit trace data separated by comma. The number of data is determined 2001.
	N=4	Returns the displayed frequency domain relative limit trace data separated by comma. The number of data is 2001.
	N=5	In case the Meas Type is: Total Power Reference Returns 14 comma-separated scalar values (in dBm) of the absolute integrated power of the segment frequencies: 1. Total power reference (dBm) 2. Reserved for the future use, returns –999.0 3. Absolute integrated power at negative offset frequency (A) 4. Absolute integrated power at positive offset frequency (A) … 13. Absolute integrated power at negative offset frequency (F) 14. Absolute integrated power at positive offset frequency (F)

Command		Return Value
	N=5	In case the Meas Type is: Power Spectral Density Reference Returns 14 comma-separated scalar values (in dBm/Hz) of the absolute integrated power of the segment frequencies. Returns –999.0 for the offsets if in WLAN: 1. Power spectral density reference (dBm/Hz) 2. Reserved for the future use, returns –999.0 3. Absolute integrated power at negative offset frequency (A) 4. Absolute integrated power at positive offset frequency (A) … 13. Absolute integrated power at negative offset frequency (F) 14. Absolute integrated power at positive offset frequency (F)
	N=5	In case the Meas Type is: Spectrum Peak Reference Returns 14 comma-separated scalar values (in dBm) of the absolute peak power of the segment frequencies. 1. Spectrum Peak Power reference (dBm) 2. Reserved for the future use, returns –999.0 3. Absolute peak power at negative offset frequency (A) 4. Absolute peak power at positive offset frequency (A) … 13. Absolute peak power at negative offset frequency (F) 14. Absolute peak power at positive offset frequency (F)
	N=6	In case the Meas Type is: Total Power Reference Returns 14 comma-separated scalar values (in dBc) of the integrated power relative to the carrier at the segment frequencies: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. Relative integrated power at negative offset frequency (A) 4. Relative integrated power at positive offset frequency (A) … 13. Relative integrated power at negative offset frequency (F) 14. Relative integrated power at positive offset frequency (F)

Command		Return Value
	N=6	In case the Meas Type is: Power Spectral Density Reference Returns 14 comma-separated scalar values (in dBc/Hz) of the integrated power relative to the carrier at the segment frequencies. Returns –999.0 for the offsets if in WLAN: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. Relative integrated power at negative offset frequency (A) 4. Relative integrated power at positive offset frequency (A) … 13. Relative integrated power at negative offset frequency (F) 14. Relative integrated power at positive offset frequency (F)
	N=6	In case the Meas Type is: Spectrum Peak Reference Returns 14 comma-separated scalar values (in dB) of the integrated power relative to the carrier at the segment frequencies. 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. Relative peak power at negative offset frequency (A) 4. Relative peak power at positive offset frequency (A) … 13. Relative peak power at negative offset frequency (F) 14. Relative peak power at positive offset frequency (F)
	N=7	Returns 14 comma-separated pass/fail test results (0=passed, or 1=failed) determined by testing the minimum margin point from the limit line that is determined each offset's Limits setting. 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. At negative offset frequency (A) 4. At positive offset frequency (A) … 13. At negative offset frequency (F) 14. At positive offset frequency (F)

Command		Return Value
	N=8	Returns 14 comma-separated pass/fail test results (0=passed, or 1=failed) determined by testing the minimum margin point from the limit line that is determined each offset's Limits setting. **NOTE** This results (N=8) are the same as N=7 result. 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. At negative offset frequency (A) 4. At positive offset frequency (A) … 13. At negative offset frequency (F) 14. At positive offset frequency (F)
	N=9	Returns 14 comma-separated scalar values of frequency (in Hz) that have peak power from center or carrier edge frequency in each offset, depending on Offset Frequency Define settings. 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. Negative offset frequency (A) 4. Positive offset frequency (A) … 13. Negative offset frequency (F) 14. Positive offset frequency (F)
	N=10	Returns 14 comma-separated scalar values (in dBm) of the absolute peak power of the segment frequencies: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. At negative offset frequency (A) 4. At positive offset frequency (A) … 13. At negative offset frequency (F) 14. At positive offset frequency (F)

Command		**Return Value**
	N=11	Returns 14 comma-separated scalar values in dBc (dB if MeasType = PSD) of the peak power relative to the carrier at the segment frequencies: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. At negative offset frequency (A) 4. At positive offset frequency (A) … 13. At negative offset frequency (F) 14. At positive offset frequency (F)
	N=12	Returns the power result (the peak power of the signal in the ref channel) when Meas Type is Spectrum Peak reference. Otherwise, the value returned will be –999.0

Key Path	**Meas**
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. The parameter values are measurement independent except all Attenuation values and Internal Preamp selections that are measurement global.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Ref Value

Sets the value for the absolute power reference. However, since Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:SEM:VIEW:WIND:TRAC:Y:RLEV 100 DISP:SEM:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changed to Off.
Preset	10.0 dBm
State Saved	Saved in instrument state.
Min	–250 dBm
Max	250 dBm
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Attenuation

Accesses a menu of functions that enable you to change attenuation settings. This key has read-back text that describes the total attenuator value.

See AMPTD Y Scale, “Attenuation” on page 1120 in the “Common Measurement Functions” section for more information.

Scale/Div

Sets the units-per-division of the vertical scale in the logarithmic display. When Auto Scaling is On, the scale per division value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:SEM:VIEW:WIND:TRAC:Y:PDIV 15dB DISP:SEM:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10 dB
State Saved	Saved in instrument state
Min	0.10 dB
Max	20.00 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Presel Center

See AMPTD Y Scale, “Presel Center” on page 1136 in the “Common Measurement Functions” section for more information.

Presel Adjust

See AMPTD Y Scale, “Preselector Adjust” on page 1137 in the “Common Measurement Functions” section for more information.

Y Axis Unit

Allows you to change the vertical (Y) axis amplitude unit.

See “Y Axis Unit” on page 1138 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	A.04.00

Reference Level Offset

Adds an offset value to the displayed reference level. The reference level is the absolute amplitude represented by the top graticule line on the display.

See “Reference Level Offset” on page 1144 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	A.04.00

mW Path Control

The **µW Path Control** functions include the **µW Preselector Bypass** (Option MPB) and **Low Noise Path** (Option LNP) controls in the High Band path circuits.

See µ“µW Path Control ” on page 1145 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	A.04.00

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See AMPTD Y Scale, “Internal Preamp” on page 1149 in the “Common Measurement Functions” section for more information.

Ref Position

Positions the reference level at the top, center or bottom of the Y scale display. Changing the reference position does not affect the reference level value.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:SEM:VIEW:WIND:TRAC:Y:RPOS BOTT DISP:SEM:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Auto Scaling

Toggles the Auto Scaling function between On and Off.

When Auto Scaling is On and the Restart front-panel key is pressed, the analyzer automatically determines the scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|ON|OFF` `:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`

Example	DISP:SEM:VIEW:WIND:TRAC:Y:COUP OFF DISP:SEM:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Preset	ON
State Saved	Saved in instrument state
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Auto Couple

See “Auto Couple” on page 1153 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

BW

Accesses a menu of functions that enable you to select the type of filter for the measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Filter Type

Selects the type of bandwidth filter that is used in Carrier and Offsets.

When Gaussian or Flattop is selected, selected filter is applied to carriers and all offsets.

When Auto Sense is selected, filter type is automatically selected for each carriers and offsets, so that measurement speed and accuracy is optimized.

Key Path	**BW**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:BANDwidth:SHAPe ASENse|GAUSsian|FLATtop` `[:SENSe]:SEMask:BANDwidth:SHAPe?`
Example	SEM:BAND:SHAP GAUS SEM:BAND:SHAP?
Couplings	See the description above
Preset	ASENse
State Saved	Saved in instrument state
Range	Auto Sense (each offset and carrier)|Gaussian (all offsets and carriers)|Flattop (all offsets and carriers)
Initial S/W Revision	A.03.00

Cont

See “Cont (Continuous Measurement/Sweep)” on page 1155 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

FREQ Channel

See “FREQ Channel” on page 1157 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Input/Output

See “Input/Output” on page 1165 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement. If there are no active markers, **Marker** selects marker 1, sets it to Normal and places it at the center of the display. You can turn on and control up to 12 markers.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode to Normal and Off. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. The marker X axis value entered in the active function area will display the marker value to its full entered precision. If the current control mode for the measurement is Off, there is no active function and the active function is turned off.

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|OFF`
	
	`:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`

Example	CALC:SEM:MARK:MODE POS CALC:SEM:MARK:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker’s current control mode. Note that if the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area will display the marker value to its full entered precision.

Preset	OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF
State Saved	Saved in instrument state
Range	Normal|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is Off, but is the SCPI equivalent of entering an X value if the control mode is **Normal.**

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <freq>` `:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:SEM:MARK3:X 1.0 GHz CALC:SEM:MARK3:X?
Notes	If no suffix is sent it will use the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” will be generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**. The query is returned in the fundamental units for the current marker X Axis scale. If the marker is **Off** the response is not a number. When a Marker is turned on, it is placed center of the screen on the trace. Therefore the default value depends on instrument condition, although the Preset/Default is defined as 1.5 GHz.
Preset	After a preset, all Markers are turned OFF, so a Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal,** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>` `:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:SEM:MARK10:X:POS 1001 CALC:SEM:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points . If the marker is **Off** the response is not a number. When a Marker is turned on, it is placed center of the screen on the trace. Therefore the default value depends on he instrument condition although the Preset/Default is defined as 6507 (this value might be the expected value when all the offsets are on).
Preset	After a preset, all Markers are turned OFF, so a Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:SEM:MARK11:Y 10 dBm CALC:SEM:MARK11:Y?

Notes	Since the result value is always calculated from acquisition data, the default value is arbitrary, although the Preset/Default values is defined.
Preset	Result dependent on markers setup and signal source
State Saved	No
Backwards Compatibility SCPI	:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:RESult?
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Couple Markers

When this function is true, moving any marker causes an equal X Axis movement of every other marker which is not **Off**. By "equal X Axis movement" we mean that we preserve the difference between each marker's X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:SEMask:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:SEMask:MARKer:COUPle[:STATe]?`
Example	CALC:SEM:MARK:COUP ON CALC:SEM:MARK:COUP?
Preset	OFF
State Saved	Saved in instrument state
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

All Markers Off

Turns all active markers off in all views.

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:SEMask:MARKer:AOFF`
Example	CALC:SEM:MARK:AOFF
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.02.00, A.03.00

Marker Function

There are no ‘Marker Functions’ supported in Spectrum Emission Mask so this front-panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Marker To

There is no 'Marker To' functionality supported in Spectrum Emission Mask so this front-panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas

See “Meas” on page 1257 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas Setup

Displays the setup menu for the currently selected measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Avg/Hold Num

Toggles averaging On or Off in addition to enabling you to set the number of measurement averages used to calculate the measurement result. The average will be displayed at the end of each sweep. After the specified number of average counts, the average mode (termination control) setting determines the average action.

In the remote mode, use the Average State command to turn averaging on or off.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:AVERage:COUNt <integer>`
	`[:SENSe]:SEMask:AVERage:COUNt?`
	`[:SENSe]:SEMask:AVERage[:STATe] ON|OFF|1|0`
	`[:SENSe]:SEMask:AVERage[:STATe]?`

Example	SEM:AVER:COUN 100 SEM:AVER:COUN? SEM:AVER ON SEM:AVER?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	10 0FF
State Saved	Saved in instrument state.
Min	1
Max	10000
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Meas Type

Accesses a menu that enables you to select one of the following measurement reference types:

Total Pwr Ref – Sets the reference to the total carrier power and the measured data is shown in dBc and dBm.

PSD Ref – Sets the reference to the mean power spectral density of the carrier and the measured data is shown in dB and dBm/Hz.

Spectrum Peak Ref – Sets the reference to the spectrum peak power of the carrier and the measured data is shown in dB and dBm.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:TYPE PSDRef|TPRef|SPRef` `[:SENSe]:SEMask:TYPE ?`
Example	SEM:TYPE PSDR SEM:TYPE?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA, WCDMA, C2K, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV: TPRef WIMAX OFDMA: SPRef
State Saved	Saved in instrument state.
Range	Total Pwr Ref|PSD Ref|Spectrum Peak Ref
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Ref Channel

Accesses a menu that enables you to set up the measurement parameters used to calculate the power in the reference channel.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

Integ BW

Specifies the integration bandwidth used to calculate the power in the reference channel.

Key Path	**Meas Setup, Ref Channel**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:BANDwidth[1]|2:INTegration <bandwidth>` `[:SENSe]:SEMask:BANDwidth[1]|2:INTegration?`
Example	SEM:BAND:INT 10 MHz SEM:BAND:INT?
Notes	10% . 100% of Channel Span Parameter Value Bandwidth sub op code, 1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode or cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Cannot be higher than the channel Span. If lower than 1/10 of channel Span, then the channel Span is reduced to be 10 times the Integ BW.
Preset	SA: 3.84 MHz WCDMA: 3.84 MHz|3.84 MHz C2K: 1.23 MHz|1.23 MHz WIMAX OFDMA: 10 MHz|10 MHz TD-SCDMA: 1.28 MHz|1.28 MHz 1xEVDO: 1.23MHz DTMB (CTTB): 7.56MHz DVB-T/H: 7.61MHz ISDB-T: 5.6MHz CMMB: 7.512MHz LTE: 4.515MHz|4.5MHz LTETDD: 4.515MHz|4.5MHz Digital Cable TV: 6.9MHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	50 MHz
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.02.00, A.03.00

Span

Specifies the span used to calculate the power in the reference channel.

Key Path	**Meas Setup, Ref Channel**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, LTE, LTETDD, CMMB, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:FREQuency[1]|2:SPAN <freq>` `[:SENSe]:SEMask:FREQuency[1]|2:SPAN?`
Example	SEM:FREQ:SPAN 3MHz SEM:FREQ:SPAN?
Notes	Frequency sub op code, 1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Range 1 kHz to 50 MHz (although restricted by Integ BW). If you set the channel Span lower than channel Integ BW, they will both track each other. As you increase the channel Span, the Integ BW will also increase if it is less then 1/10 of the channel Span.
Preset	SA: 5.0 MHz WCDMA: 5.0 MHz|5.0 MHz C2K: 1.25 MHz|1.25 MHz WIMAX OFDMA: 10 MHz| 10 MHz TD-SCDMA: 1.6 MHz|1.6 MHz 1xEVDO: 1.25 MHz DTMB (CTTB): 10 MHz DVB-T/H: 10 MHz ISDB-T: 8 MHz CMMB: 10 MHz LTE: 5 MHz LTETDD: 5 MHz Digital Cable TV: 10 MHz
State Saved	Saved in instrument state.
Min	1 kHz

Max	50 MHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Sweep Time

Sets the sweep time used to calculate the power in the reference channel. Sweep Time can be set manually or put in auto mode.

Key Path	**Meas Setup, Ref Channel**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:SWEep[1]|2:TIME <time>`
	`[:SENSe]:SEMask:SWEep[1]|2:TIME?`
	`[:SENSe]:SEMask:SWEep[1]|2:TIME:AUTO OFF|0|ON|1`
	`[:SENSe]:SEMask:SWEep[1]|2:TIME:AUTO?`

Example	SEM:SWE:TIME 9ms SEM:SWE:TIME? SEM:SWE:TIME:AUTO OFF SEM:SWE:TIME:AUTO?
Notes	Sweep Time sub op code, 1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode,1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When the Sweep Time is set manually, Auto is set to OFF. Value is coupled with Channel Detector selection, Channel Resolution BW, Channel Video BW if the state is Auto. When set to Auto, the Sweep Time is automatically calculated
Preset	Automatically calculated ON
State Saved	Saved in instrument state.
Min	1 ms
Max	4000 s
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Res BW

Sets the resolution bandwidth used to calculate the power in the reference channel. The Channel Resolution BW can be set manually or put in to auto mode.

Key Path	**Meas Setup, Ref Channel**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:BANDwidth[1]|2[:RESolution] <bandwidth>`
	`[:SENSe]:SEMask:BANDwidth[1]|2[:RESolution]?`
	`[:SENSe]:SEMask:BANDwidth[1]|2[:RESolution]:AUTO OFF|ON|1|0`
	`[:SENSe]:SEMask:BANDwidth[1]|2[:RESolution]:AUTO?`

Example	SEM:BAND 100 kHz SEM:BAND? SEM:BAND:AUTO ON SEM:BAND:AUTO?
Notes	Bandwidth sub op code, 1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode,1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When Res BW is set manually, Channel Resolution BW Mode is set to MANual. Value is coupled with Channel Detector selection, Channel Sweep Time, Channel Video BW. When set to Auto, the resolution bandwidth is automatically calculated.

Preset	SA: 100 kHz WCDMA: 75 kHz C2K: 24 kHz WIMAX OFDMA: 100 kHz TD-SCDMA: 30 kHz 1xEVDO: 30.0 KHz DTMB (CTTB): 3.9 kHz DVB-T/H: 3.9 kHz ISDB-T: 10 kHz CMMB: 3.9 kHz LTE, LTETDD:Auto (47 kHz) Digital Cable TV: 3.9 kHz ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Backwards Compatibility SCPI	[:SENSe]:SEMask:BWIDth[1]|2[:RESolution]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Video BW

Sets the video bandwidth used to calculate the power in the reference channel. The Channel Video BW can be set manually or put in to auto mode.

Key Path	**Meas Setup, Ref Channel**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo <bandwidth>`
	`[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo?`
	`[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo:AUTO OFF|ON|1|0`
	`[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo:AUTO?`

Example	SEM:BAND:VID 100 kHz SEM:BAND:VID? SEM:BAND:VID:AUTO ON SEM:BAND:VID:AUTO?

Notes	Bandwidth sub op code, 1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode,1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When Video BW is set manually, Channel Video BW Mode is set to MANual Value is coupled with Channel Detector selection, Channel Sweep Time, Channel Resolution BW. When set to Auto, the video bandwidth is automatically calculated.
Preset	SA: 100 kHz WCDMA: 75 kHz C2K: 24 kHz WIMAX OFDMA: 30 kHz TD-SCDMA: 300 kHz 1xEVDO: 300.0 kHz DTMB (CTTB): 39 kHz DVB-T/H: 39 kHz ISDB-T: 1 kHz CMMB: 39 kHz LTE: Auto LTETDD: Auto Digital Cable TV: 39 kHz ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Backwards Compatibility SCPI	[:SENSe]:SEMask:BWIDth[1]|2:VIDeo
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

VBW/RBW

Sets the Video BW/Resolution BW Ratio to calculate the Channel Resolution BW and Channel Video BW. The VBW/RBW Ratio can be set manually or put in to auto mode.

Key Path	**Meas Setup, Ref Channel**

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA mode, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo:RATio <real>`
	`[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo:RATio`
	`[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo:RATio:AUTO OFF|ON|1|0`
	`[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo:RATio:AUTO?`

Example	SEM:BAND:VID:RAT 0.1 SEM:BAND:VID:RAT? SEM:BAND:VID:RAT:AUTO ON SEM:BAND:VID:RATIO:AUTO?
Notes	Bandwidth sub op code, 1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When Res BW is set manually, Mode coupling is set to MANual When set to Auto, the VBW/RBW Ratio is automatically calculated.
Preset	SA, WCDMA, C2K: 1.0 WIMAX OFDMA: 0.3 TD-SCDMA: 10 1xEVDO: 10.0 DTMB (CTTB): 10 DVB-T/H: 10 ISDB-T: 0.1 CMMB: 10 LTE: Auto LTETDD: Auto Digital Cable TV: 10 ON
State Saved	Saved in instrument state.
Min	0.00001
Max	3000000
Backwards Compatibility SCPI	[:SENSe]:SEMask:BWIDth[1]|2:VIDeo:RATio

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Power Ref

Sets the power reference in the carrier that will be used to compute the relative values for the offsets.

Key Path	**Meas Setup, Ref Channel**
Initial S/W Revision	Prior to A.02.00

Total Power

Sets the power in the carrier (ref channel) that will be used to compute the relative power values for the offsets. When the state is set to auto, this value is set to the measured carrier reference power. When set to manual, the result takes on the last measured value, or can be manually entered.

Key Path	**Meas Setup, Ref Channel, Power Ref**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:CARRier[:POWer] <real>`
	`[:SENSe]:SEMask:CARRier[:POWer]?`
	`[:SENSe]:SEMask:CARRier:AUTO[:STATe] OFF|ON|1|0`
	`[:SENSe]:SEMask:CARRier:AUTO[:STATe]?`

Example	SEM:CARR 100dBm SEM:CARR? SEM:CARR:AUTO OFF SEM:CARR:AUTO?
Notes	The min and max values given are for Meas Type = Total Pwr Ref. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode. This BAF SCPI command is available in all the Meas Type case.
Dependencies	This "Total Power Ref" parameter is coupled with the "Meas Type" parameter. The softkey would be active if the Meas Type is set to Total Power Ref. Otherwise, it is grayed out.
Preset	Measured carrier reference power
State Saved	Saved in instrument state.
Min	–200 dBm

Max	200 dBm
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

PSD

Sets the power spectral density in the carrier that is used to compute the relative power spectral density values for the offsets when Meas Type is set to PSD Ref. When the state is set to auto, this will be set to the measured carrier power spectral density.

Key Path	**Meas Setup, Ref Chan, Power Ref**
Mode	SA, WCDMA, C2K , WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:CARRier:CPSD <real>` `[:SENSe]:SEMask:CARRier:CPSD?`
Example	SEM:CARR:CPSD –80 SEM:CARR:CPSD?
Notes	Although the default value is defined, the value is recalculated by the measurement result just after completing the measurement. Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	See Couplings
Couplings	This "PSD" parameter is coupled with the "Meas Type" parameter. The key will be active if the Meas Type is set to PSD. Otherwise, it is grayed out.
Preset	Measured carrier PSD reference power
State Saved	Saved in instrument state.
Min	–200
Max	200
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Spectrum Peak

Sets the spectrum peak power in the carrier that is used to compute the relative power spectral density values for the offsets when Meas Type is set to Spectrum Peak. When the state is set to auto, this will be set to the measured carrier spectrum peak power. When set to manual, the result takes on the last measured value, or can be manually entered

Key Path	**Meas Setup, Ref Channel, Power Ref**
Mode	SA, WCDMA, C2K , WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:CARRier:PEAK[:POWer] <real>` `[:SENSe]:SEMask:CARRier:PEAK[:POWer]?`
Example	SEM:CARR:PEAK –80 SEM:CARR:PEAK:POWER?
Notes	Although the default value is defined, the value is recalculated by the measurement result just after completing the measurement. Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode,1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	See Couplings
Couplings	This "Spectrum Peak Ref" parameter is coupled with the "Meas Type" parameter. This softkey would be active if the "Meas Type" is set to "Spectrum Peak Ref". Otherwise, grayout.
Preset	Measured carrier Spectrum Peak reference power
State Saved	Saved in instrument state.
Min	–200
Max	200
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Offsets/Limit

Accesses a menu that enables you to set up the measurement parameters for the offset pairs. For example, you can assign the start and stop frequencies, select the resolution bandwidth, and set the sweep time.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

Select Offset

Selects the offset pairs (upper and lower) that affect the menu keys, and displays the memory selection menu from A to F. The memory selection menu allows you to store up to 5 sets of parameter values for the offset pairs, such as Start Freq, Stop Freq, Sweep Time, Res BW, Meas BW, Abs Start, and Abs Stop. Press Offset until the letter of the desired offset (A, B, C, D, E, or F) is underlined. Only one selection at a time is shown on this menu key label.

Key Path	**Meas Setup, Offsets/Limit**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Preset	A
Range	A|B|C|D|E|F
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Start Freq

Specifies the start frequency for the currently selected offset and enables you to toggle this function On or Off for each offset.

Key Path	**Meas Setup, Offset/Limit**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:FREQuency:STARt <freq>,<freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:FREQuency:STARt?`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:STATe ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0, ON|OFF|1|0`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:STATe?`

Example	SEM:OFFS2:LIST:FREQ:STAR 100 kHz SEM:OFFS2:LIST:FREQ:STAR? SEM:OFFS:LIST:STAT ON SEM:OFFS:LIST:STAT?
Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.

Couplings	Coupled to Stop Freq. Start cannot go above the stop freq less 100Hz. Similarly Stop freq cannot go below Start Freq plus 100Hz. If the current mode is DVB-T/H, this value will be modified automatically according to the limit type and the output power of the transmitter which is less or more than 25W. If the current mode is ISDB-T, this value will be modified automatically according to the limit type.

Preset	SA: 2.515 MHz, 2.715 MHz, 3.515 MHz, 4.00 MHz, 8.00 MHz, 12.50 MHz WCDMA: 2.515 MHz, 2.715 MHz, 3.515 MHz, 4.000 MHz, 8.000 MHz, 12.50 MHz|2.515MHz, 4.000 MHz, 7.500 MHz, 8.500 MHz, 12.5 MHz, 15 MHz C2K: 750.0 kHz, 780.0 kHz, 1.980 MHz, 3.25 MHz, 7.0 MHz, 7.0 MHz|885 kHz, 1.980 MHz, 2.250 MHz, 8.0 MHz, 12.0 MHz, 12.0 MHz WIMAX OFDMA: 4.75 MHz,5.45 MHz,9.75 MHz,14.75 MHz,19.75 MHz,24.75 MHz|4.75 MHz,5.45 MHz,9.75 MHz,14.75 MHz,19.75 MHz,24.75 MHz TD-SCDMA: 81 5kHz,1015 kHz,1815 kHz,2.3 MHz, ,2.3 MHz,,2.3 MHz |815 kHz,1815 kHz,2.9 MHz, 2.9 MHz,2.9 MHz,2.9 MHz 1xEVDO: 750.0 kHz, 780.0 kHz, 1.98 MHz, 3.25 MHz, 7 MHz, 7 MHz|885.0 kHz, 1.98 MHz, 1.98 MHz , 1.98 MHz, 1.98 MHz, 1.98 MHz DTMB (CTTB): 3.8 MHz, 4.2 MHz, 6 MHz, 12 MHz, 12 MHz, 12 MHz DVB-T/H: 3.81 MHz, 4.2 MHz, 6 MHz, 12 MHz, 12 MHz, 12 MHz ISDB-T: 2.79 MHz, 2.86 MHz, 3.0 MHz, 4.36 MHz, 15.0 MHz, 15.0 MHz CMMB: 3.8 MHz, 4.2 MHz, 8.0 MHz, 12.0 MHz,12.0 MHz, 12.0 MHz LTE, LTETDD: 50 kHz, 5.05 MHz, 10.5 MHz, 15.00 MHz, 30 MHz, 40 MHz|15.00 kHz,1.5 MHz,5.5 MHz,6.5 MHz,10 MHz,20MHz Digital Cable TV: 3.8 MHz, 4.2 MHz, 6 MHz, 12 MHz, 12 MHz, 12 MHz SA: ON, ON, ON, ON, ON, OFF WCDMA: ON, ON, ON, ON, ON, OFF|ON, ON, ON, ON, OFF, OFF C2K: ON, ON, ON, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF WIMAX OFDMA: ON, ON, ON, OFF, OFF, OFF|ON, ON, ON, OFF, OFF, OFF TD-SCDMA: ON, ON, ON, ON, OFF, OFF|ON, ON, ON, OFF, OFF, OFF 1xEVDO: ON, ON, ON, OFF, OFF, OFF| ON, ON, OFF, OFF, OFF, OFF DTMB (CTTB): ON, ON, ON, OFF, OFF, OFF DVB-T/H: ON, ON, ON, OFF, OFF, OFF ISDB-T: ON, ON, ON, ON, OFF, OFF CMMB: ON, ON, ON, OFF, OFF, OFF LTE, LTETDD: ON, ON, ON, OFF, OFF, OFF|ON,ON,ON,ON,OFF,OFF Digital Cable TV: ON, ON, ON, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	0 Hz
Max	Stop Freq minus (-) 100 Hz (for that offset)
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.02.00, A.03.00

Stop Freq

Specifies the stop frequency for the currently selected offset.

Key Path	**Meas Setup, Offset/Limit**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:FREQuency:STOP <freq>,<freq>,<freq>,<freq>,<freq>,<freq>` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:FREQuency:STOP?`
Example	SEM:OFFS:LIST:FREQ:STOP 100 kHz SEM:OFFS:LIST:FREQ:STOP?
Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Coupled to Start Freq. Start cannot go above the stop freq less 100Hz. Similarly Stop freq cannot go below Start Freq plus 100Hz. If the current mode is DVB-T/H, this value will be modified automatically according to the limit type and the output power of the transmitter which is less or more than 25W. If the current mode is ISDB-T, this value will be modified automatically according to the limit type.

Preset	SA: 2.715 MHz, 3.515 MHz, 4.00 MHz, 8.00 MHz, 12.50 MHz, 15.0 MHz WCDMA:2.715 MHz, 3.515 MHz, 4.000 MHz, 8.000 MHz, 12.50 MHz, 15.0 MHz|3.485 MHz, 7.500 MHz, 8.500 MHz, 12.00 MHz, 15.00 MHz, 18.0 MHz C2K: 780.0kHz, 1.980 MHz, 4.0 MHz, 4.0 MHz, 12.0 MHz, 12.0 MHz|1.980 MHz4 .0 MHz, 4.0 MHz, 11.5 MHz, 14.5 MHz, 14.5 MHz WIMAX OFDMA: 5.45 MHz, 9.75 MHz,14.75 MHz, 19.75 MHz, 24.75 MHz, 29.75 MHz |5.45 MHz, 9.75 MHz,14.75 MHz, 19.75 MHz, 24.75 MHz,29.75 MHz TD-SCDMA: 1015 kHz,1815kHz, 2.3 MHz, 4 MHz, 4 MHz, 4 MHz |1785 kHz, 2385 kHz, 3.5 MHz, 3.5 MHz , 3.5 MHz , 3.5 MHz 1xEVDO: 780.0 kHz, 1.98 MHz, 4.0 MHz, 4.0 MHz, 12 MHz, 12 MHz|1.98 MHz, 4.0 MHz, 4.0 MHz, 4.0 MHz, 4.0 MHz, 4.0 MHz DTMB (CTTB): 4.2 MHz, 6 MHz, 12 MHz, 12 MHz, 12 MHz, 12 MHz DVB-T/H: 4.2 MHz, 6 MHz, 12 MHz, 12 MHz, 12 MHz, 12 MHz ISDB-T: 2.86 MHz, 3.0 MHz, 4.36 MHz, 15.0 MHz, 15.0 MHz, 15.0 MHz CMMB: 4.2 MHz, 8.0 MHz, 12.0 MHz,12.0 MHz, 12.0 MHz, 12.0 MHz LTE, LTETDD: 5.05 MHz, 10.05 MHz, 15 MHz, 30 MHz, 40 MHz, 50 MHz|985.0 kHz, 4.50 MHz, 5.5001 MHz, 9.50 MHz,20 MHz, 40 MHz Digital Cable TV: 4.2 MHz, 6.0 MHz, 12.0 MHz,12.0 MHz, 12.0 MHz, 12.0 MHz
State Saved	Saved in instrument state.
Min	Start Freq plus (+) 100 Hz (for that offset)
Max	500 MHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Sweep Time

Specifies the sweep time for the currently selected offset and enables you to toggle this function On or Off for each offset.

Key Path	**Meas Setup, Offset/Limit**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:SWEep:TIME <time>,<time>,<time>,<time>,<time>,<time>`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:SWEep:TIME?`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:SWEep:TIME:AUTO ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0, ON|OFF|1|0`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:SWEep:TIME:AUTO?`

Example	SEM:OFFS2:LIST:SWE:TIME 1.0 ms, 3.4 ms, 2.08 ms, 1.0 ms, 1.0 ms, 1.0 ms SEM:OFFS2:LIST:SWE:TIME? SEM:OFFS2:LIST:SWE:TIME:AUTO ON, ON, ON, ON, OFF, OFF SEM:OFFS2:LIST:SWE:TIME:AUTO?
Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When the sweep time is set manually, Mode coupling is set to MANual If the current mode is DVB-T/H, this value will be modified automatically according to the output power of the transmitter which is less or more than 25W. If the current mode is ISDB-T, this value will be modified automatically according to the limit type.
Preset	Automatically calculated ON,ON,ON,ON,ON,ON
State Saved	Saved in instrument state.
Min	1 ms
Max	10 s
Backwards Compatibility SCPI	[:SENSe]:SEMask:OFFSet[1]|2:LIST:SWEep[:TIME]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Offset Side

Specifies which offset side to measure.

You can turn off (not use) specific offsets with [:SENSe]:SEMask:OFFSet[n]:LIST:STATe.

BOTH - both of the negative (lower) and positive (upper) sidebands

NEGative - negative (lower) sideband only

POSitive - positive (upper) sideband only

Key Path	**Meas Setup, Offset/Limit**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:SIDE BOTH|NEGative|POSitive,BOTH|NEGative|POSitive,BOTH|NEGative|POSitive,BOTH|NEGative|POSitive,BOTH|NEGative|POSitive,BOTH|NEGative|POSitive` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:SIDE?`
Example	SEM:OFFS:LIST:SIDE BOTH SEM:OFFS:LIST:SIDE?
Notes	OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Neg|Both|Pos
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Res BW

Specifies which Resolution BW filter to use when measuring the currently selected offset.

Offset Res BW Mode allows the instrument to determine the optimum Resolution BW filter to use when measuring the currently selected offset.. When changing the Meas BW parameter, if the Res BW needs to be changed to adhere to the rule

(N x Res BW) <= (Stop freq of the offset - Start freq of the offset),

where N is the multiplier, this setting will automatically be changed to manual.

Key Path	**Meas Setup, Offset/Limit**

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO modeDTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth[:RESolution] <bandwidth>,<bandwidth>,<bandwidth>,<bandwidth>,<bandwidth>,<bandwidth>`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth[:RESolution]?`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth[:RESolution]:AUTO OFF|ON|1|0,OFF|ON|1|0,OFF|ON|1|0,OFF|ON|1|0,OFF|ON|1|0,OFF|ON|1|0`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth[:RESolution]:AUTO?`

Example	SEM:OFFS2:LIST:BAND 30.0 kHz, 30.0 kHz, 30.0 kHz, 1.00 MHz,1.00 MHz, 1.00 MHz SEM:OFFS2:LIST:BAND? SEM:OFFS:LIST:BAND:AUTO 1,1,1,1,1,1 SEM:OFFS:LIST:BAND:AUTO?
Notes	Comma separated list of 6 values. Sub op code OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Coupled to Start and Stop offset and Meas BW multiplier. This parameter must adhere to the rule (N x Res BW) <= (Stop freq of the offset - Start freq of the offset), where N is the multiplier. If the multiplier is changed, the Res BW will be changed to ensure this. When set manually, Res BW Coupling is set to manual.

Preset	SA: 30.0 kHz, 30.0 kHz, 30.0 kHz, 1.00 MHz,1.00 MHz, 1.00 MHz WCDMA: 30.00 kHz, 30.00 kHz, 30.00 kHz, 100.00 kHz, 1.000 MHz, 1.00 MHz|30.00 kHz, 1.000 MHz, 1.000 MHz, 1.000 MHz, 1.000 MHz, 1.00 MHz C2K: 3.00 kHz, 30.00 kHz, 30.00 kHz, 6.2 kHz, 1.000 MHz, 1.00 MHz|30.00 kHz, 30.00 kHz, 6.2 kHz, 1.000 MHz, 1.000 MHz, 1.00 MHz WIMAX OFDMA: 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz| 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz TD-SCDMA: 30 kHz, 30 kHz, 30 kHz, 50 kHz, 1 MHz, 1 MHz| 30 kHz, 30 kHz, 50 kHz, 1 MHz, 1 MHz, 1 MHz 1xEVDO: 30.00 kHz, 30.00 kHz, 30.00 kHz, 6.2 kHz, 1.000 MHz, 1.000 MHz|30.00 kHz, 30.00 kHz, 30.00 kHz, 30.00 kHz, 30.00 kHz, 30.00 kHz DTMB (CTTB): 3.9 kHz, 3.9 kHz, 3.9 kHz, 3.9 kHz, 3.9 kHz, 3.9 kHz DVB-T/H: 3.9 kHz, 3.9 kHz, 3.9 kHz, 3.9 kHz, 3.9 kHz, 3.9 kHz ISDB-T: 10.0 kHz, 10.0 kHz, 10.0 kHz, 10.0 kHz, 10. kHz, 10.0 kHz CMMB: 3.9 kHz, 3.9 kHz, 3.9 kHz, 3.9 kHz, 3.9 kHz, 3.9 kHz LTE, LTETDD: 51 kHz, 100 kHz, 1.0 MHz, 1.0 MHz,1.0 MHz, 1.0 MHz|15.0 kHz, 510 kHz,1.0 MHz,1.0 MHz,1.0 MHz,1.0 MHz Digital Cable TV: 3.9 kHz, 3.9 kHz, 3.9 kHz, 3.9 kHz, 3.9 kHz, 3.9 kHz OFF, OFF, OFF, OFF, OFF, OFF|OFF, OFF, OFF, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Backwards Compatibility SCPI	[:SENSe]:SEMask:OFFSet[1]|2:LIST:BWIDth[:RESolution]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Meas BW

Allows you to specify a multiplier of Res BW for the measurement integration bandwidth.

Meas BW is multiplier integer number. It shows a ratio between Integration BW and Resolution BW of the measurement result.

Integ BW = Meas BW * Resolution BW

Integration BW is desired resolution bandwidth and Resolution BW is actual bandwidth for sweep. Measurement sweeps with Resolution BW and Meas BW compensates sweep resolution bandwidth to Integration BW.

If you set this parameter greater than 1, you can set Resolution BW narrower to avoid carrier power leakage effect to the offset power integration.

Key Path	**Meas Setup, Offset/Limit**

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/HISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:IMULti <integer>,<integer>,<integer>,<integer>,<integer>,<integer>` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:IMULti?`
Example	SEM:OFFS2:LIST:BAND:IMUL 1,1,1,1,1,1 SEM:OFFS2:LIST:BAND:IMUL?
Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	This parameter must adhere to the rule (N x Res BW) <= (Stop freq of the offset - Start freq of the offset), where N is the multiplier. If the Res Bw is changed, the multiplier will be changed to ensure this.
Preset	SA: 1, 1, 1, 1, 1, 1 WCDMA: 1, 1, 1, 10, 1, 1|1, 1, 1, 1, 1, 1 C2K: 10, 1, 1, 1, 1, 1|1, 1, 1, 1, 1, 1 WIMAX OFDMA: 1, 1, 1, 1, 1, 1|1, 1, 1, 1, 1, 1 TD-SCDMA:1, 1, 1, 20, 1, 1|1, 1, 20, 1, 1, 1 1xEVDO: 1, 1, 1, 1, 1|1, 1, 1, 1, 1 DTMB (CTTB): 1, 1, 1, 1, 1, 1 DVB-T/H: 1, 1, 1, 1, 1, 1 ISDB-T: 1, 1, 1, 1, 1, 1 CMMB: 1, 1, 1, 1, 1, 1 LTE: 2, 1, 1, 1, 1, 1|2, 2, 1, 1, 1,1 LTETDD: 2, 1, 1, 1, 1, 1 |2, 2, 1, 1, 1,1 Digital Cable TV : 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	1
Max	1000
Backwards Compatibility SCPI	[:SENSe]:SEMask:OFFSet[1]|2:LIST:BWIDth:IMULti
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Video BW

Changes the analyzer post–detection filter.

Key Path	**Meas Setup, Offset/Limit**
Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/HISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo <freq>,<freq>,<freq>,<freq>,<freq>,<freq>`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo?`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo:AUTO OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1, OFF|ON|0|1`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo:AUTO?`

Example	SEM:OFFS2:LIST:BAND:VID 3.00 kHz, 3.00 kHz, 3.00 kHz, 100.0 kHz,100.0 kHz, 100.0 kHz SEM:OFFS2:LIST:BAND:VID? SEM:OFFS2:LIST:BAND:VID:AUTO ON, ON, ON, ON, ON, ON SEM:OFFS2:LIST:BAND:VID:AUTO?
Notes	Comma separated list of 6 values. Sub op code OFFSet1is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	ISDB-T: 1.0kHz, 1.0kHz, 1.0kHz, 1.0kHz, 1.0kHz, 1.0kHz Other than ISDB-T: Automatically Calculated ON, ON, ON, ON, ON, ON|ON, ON, ON, ON, ON, ON ISDB-T: OFF, OFF, OFF, OFF, OFF, OFF| OFF, OFF, OFF, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Backwards Compatibility SCPI	[:SENSe]:SEMask:OFFSet[1]|2:LIST:BWIDth:VIDeo
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

VBW/RBW

Selects the ratio between the video and resolution bandwidths.

Key Path	**Meas Setup, Offset/Limit**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo:RATio <real>,<real>,<real>,<real>,<real>,<real>`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo:RATio?`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo:RATio:AUTO OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo:RATio:AUTO?`

Example	SEM:OFFS2:LIST:BAND:VID:RAT 0.1, 0.1, 0.1, 0.1, 0.1, 0.1 SEM:OFFS2:LIST:BAND:VID:RAT? SEM:OFFS2:LIST:BAND:VID:RAT:AUTO ON, ON, ON, ON, ON, ON SEM:OFFS2:LIST:BAND:VID:RAT:AUTO?
Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode,1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA, WCDMA, C2K, LTE, LTETDD: 0.01, 0.01, 0.01, 0.01, 0.01, 0.01|0.01, 0.01, 0.01, 0.01, 0.01, 0.01 WIMAX OFDMA: 0.3, 0.3, 0.3, 0.3, 0.3, 0.3 TD-SCDMA: 10, 10, 10, 10, 1, 1| 10, 10, 10, 1, 1, 1 1xEVDO: 10, 10, 10, 10, 10, 10|10, 10, 10, 10, 10, 10 DTMB (CTTB): 10, 10, 10, 10, 10, 10 DVB-T/H: 10, 10, 10, 10, 10, 10 ISDB-T: 0.1, 0.1, 0.1, 0.1, 0.1, 0.1 CMMB: 10, 10, 10, 10, 10, 10 Digital Cable TV : 10, 10, 10, 10, 10, 10 OFF, OFF, OFF, OFF, OFF, OFF|OFF, OFF, OFF, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	0.00001

Max	3000000
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Limits

Accesses a menu that enables you to set the power limits for start and stop frequencies of the selected offsets.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

Abs Start

Sets the absolute power level limit at the start frequency for the selected offset. The absolute power level limit ranges from –200 to +50 dBm.

The fail condition for each offset channel is set remotely by [:SENSe]:SEMask:OFFSet[n]:LIST:TEST.

You can turn off (not use) specific offset channels remotely with [:SENSe]:SEMask:OFFSet[n]:LIST:STATe.

The SCPI query returns the five (5) sets of real values currently set to the absolute power test limits.

Key Path	**Meas Setup, Offset/Limit, Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:STARt:ABSolute <real>,<real>,<real>,<real>,<real>,<real>` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:STARt:ABSolute?`
Example	SEM:OFFS2:LIST:STAR:ABS –12.50 dBm, –12.50 dBm, –24.50 dBm, –11.50 dBm, –11.50 dBm, –11.50 dBm SEM:OFFS2:LIST:STAR:ABS?
Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.

Couplings	Coupled to Abs Stop if coupling set to "Couple", that is, the Start value is equal to the Stop value. If the current mode is DVB-T/H, this value will be modified automatically according to the limit type and the output power of the transmitter which is less or more than 25W. If the current mode is ISDB-T, this value will be modified automatically according to the limit type.
Preset	SA, WIMAX OFDMA: –14.00 dBm , –14.00 dBm , –26.00 dBm , –13.00 dBm , –13.00 dBm, –13.00 dBm WCDMA: –12.50 dBm, –12.50 dBm, –24.50 dBm, –11.50 dBm, –11.50 dBm, –11.50 dBm|–69.6 dBm, –54.3 dBm, –54.3 dBm, –54.3 dBm, –54.3 dBm, –54.3 dBm C2K: –27.00 dBm, –27.00 dBm, –27.00 dBm, –46.00 dBm, –13.00 dBm, –13.00 dBm|–70.13 dBm, –70.13 dBm, –35.00 dBm, –13.00 dBm, –13.00 dBm, –13.00 dBm TD-SCDMA: –28 dBm, –28 dBm, –36 dBm, –21 dBm, –21 dBm, –21 dBm|–71.3 dBm, –71.3 dBm, –56.07 dBm, –56.07 dBm, –56.07 dBm, –56.07 dBm 1xEVDO: –27.0dBm, –27.00 dBm, –27.00 dBm, –46.00 dBm, –13.00 dBm, –13.00 dBm|–70.13 dBm, –70.13 dBm, –70.13 dBm, –70.13 dBm, –70.13 dBm, –70.13 dBm DTMB (CTTB): –14.0 dBm, –14.0 dBm, –26.0 dBm, –13.0 dBm, –13.0 dBm, –13.0 dBm DVB-T/H: 11.2 dBm, –29 dBm, –41 dBm, –66 dBm, –82 dBm, –82 dBm ISDB-T: 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm CMMB: 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm LTE, LTETDD: –5.5 dBm, –12.5 dBm, –15.0 dBm, –15.0 dBm, –15.0 dBm, –15.0 dBm|–13.5 dBm, –8.5 dBm, –11.5 dBm, –23.5 dBm, –23.5 dBm, –23.5 dBm Digital Cable TV: 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm
State Saved	Saved in instrument state.
Min	–200 dBm
Max	50 dBm
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00. A.03.00

Abs Stop

Sets the absolute power level limit at the stop frequency for the selected offset. The absolute power level limit ranges from –200 to +50 dBm. You can also toggle this function between couple and manual. If set to Couple, the **Abs Stop** power level limit is coupled to **Abs Start** to result in a flat limit line. If set to Man, Abs Start and Abs Stop take different values to result in a sloped limit line.

The SCPI query returns the five (5) sets of real values currently set to the offset stop absolute power limits.

Key Path	**Meas Setup, Offset/Limit, Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	[:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:ABSolute <real>,<real>,<real>,<real>,<real>,<real> [:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:ABSolute? [:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:ABSolute:COUPle ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0, ON|OFF|1|0 [:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:ABSolute:COUPle?
Example	SEM:OFFS:LIST:STOP:ABS –12.50 dBm, –24.50 dBm, –24.50 dBm, –11.50 dBm, –11.50 dBm, –11.50 dBm SEM:OFFS1:LIST:STOP:ABS? SEM:OFFS:LIST:STOP:ABS:COUP ON, OFF, ON, ON, ON, ON SEM:OFFS:LIST:STOP:ABS:COUP?
Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Coupled to Abs Start if coupling set to “Couple”, that is, the Stop value is equal to the Start value. If the current mode is DVB-T/H, this value will be modified automatically according to the limit type and the output power of the transmitter which is less or more than 25W. If the current mode is ISDB-T, this value will be modified automatically according to the limit type.

Preset	SA, WIMAX OFDMA: –14.00 dBm, –26.00 dBm, –26.00 dBm, –13.00 dBm, –13.00 dBm, –13.00 dBm WCDMA: –12.50 dBm, –24.50 dBm, –24.50 dBm, –11.50 dBm, –11.50 dBm, –11.50 dBm|–69.6 dBm, –54.3 dBm, –54.3 dBm, –54.3 dBm, –54.3 dBm, –54.3 dBm C2K: –27.00 dBm, –27.00 dBm, –27.00 dBm, –46.00 dBm, –13.00 dBm, –13.00 dBm|–70.13 dBm, –70.13 dBm, –35.00 dBm, –13.00 dBm, –13.00 dBm, –13.00 dBm TD-SCDMA: –28 dBm, –36 dBm, –36 dBm, –21 dBm, –21 dBm, –21 dBm|–71.3 dBm, –71.3 dBm, –56.07 dBm, –56.07 dBm, –56.07 dBm, –56.07 dBm 1xEVDO: –27dBm, –27.00 dBm, –27.00 dBm, –46.00 dBm, –13.00 dBm, –13.00 dBm|–70.13 dBm, –70.13 dBm, |–70.13 dBm, –70.13 dBm, |–70.13 dBm, –70.13 dBm DTMB (CTTB): –14.0 dBm, –26.0 dBm, –26.0 dBm, –13.0 dBm, –13.0 dBm, –13.0 dBm DVB-T/H: –29 dBm, –41 dBm, –66 dBm, –82 dBm, –82 dBm, –82 dBm ISDB-T: 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm CMMB: 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm LTE, LTETDD:–12.5 dBm, –12.5 dBm, –15.0 dBm, –15.0 dBm, –15.0 dBm, –15.0 dBm| –13.5 dBm, –8.5 dBm, –11.5 dBm, –23.5 dBm, –23.5 dBm, –23.5 dBm Digital Cable TV: 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm, 50.0 dBm SA,WIMAX OFDMA: ON, OFF, ON, ON, ON, ON WCDMA: ON, OFF, ON, ON, ON, ON|ON, ON, ON, ON, ON, ON C2K: ON, ON, ON, ON, ON, OFF|ON, ON, ON, ON, ON, OFF TD-SCDMA: ON, OFF, ON, ON, ON, ON|ON, ON, ON, ON, ON, ON 1xEVDO: ON, ON, ON, ON, ON, OFF| ON, ON, ON, ON, ON, OFF DTMB (CTTB): ON, OFF, ON, ON, ON, ON DVB-T/H: OFF, OFF, OFF, OFF, OFF, OFF ISDB-T: OFF, OFF, OFF, OFF, OFF, OFF CMMB: OFF, OFF, OFF, OFF, OFF, OFF LTE, LTETDD: OFF, ON, ON, ON, ON, ON|ON, ON, ON, ON, ON, ON Digital Cable TV: OFF, OFF, OFF, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	–200 dBm
Max	50 dBm
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.02.00, A.03.00

Rel Start

Sets a relative power level limit at the start frequency for the selected offset. The relative power level limit ranges from –200 to +50 dBc.

The fail condition is set remotely by [:SENSe]:SEMask:OFFSet[n]:LIST:TEST for each offset channel test.

You can turn off (not use) specific offset channels remotely with [:SENSe]:SEMask:OFFSet[n]:LIST:STATe.

The SCPI query returns the five (5) sets of real values currently set to the relative power test limits.

Key Path	**Meas Setup, Offset/Limit, Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:STARt:RCARrier <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:STARt:RCARrier?`
Example	SEM:OFFS:LIST:STAR:RCAR –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB SEM:OFFS:LIST:STAR:RCAR?
Notes	See the following table for the default values for each Radio Standard. Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Coupled to Rel Stop is coupling set to “Couple”, that is, Start is made the same as Stop. If the current mode is DVB-T/H, this value will be modified automatically according to the limit type the output power of the transmitter which is less or more than 25W. If the current mode is ISDB-T, this value will be modified automatically according to the limit type.

Preset	SA: –30.00 dB, –30.00 dB,–30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB WCDMA: –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB|–33.73 dB, –34.00 dB, –37.50 dB, –47.50 dB, –47.50 dB, –47.50 dB C2K: –45.00 dB, –45.00 dB, –55.00 dB, –55.00 dB, –55.00 dB, –55.00 dB|–42.00 dB, –54.00 dB, –54.00 dB, –54.00 dB, –54.00 dB, –54.00 dB WIMAX OFDMA: 0 dB, –25 dB, –32 dB, –50 dB, –50 dB, –50 dB TD-SCDMA: –54.00 dB, –54.00 dB, –62.00 dB, –47.00 dB, –47.00 dB, –47.00 dB|–35.00 dB, –49.00 dB, –49.00 dB, –49.00 dB, –49.00 dB, –49.00 dB 1xEVDO: –45dBc, –45.00 dB, –55.00 dB, –55.00 dB, –55.00 dB, –55.00 dB|–42dBc, –54.00 dB, –54.00 dB, –54.00 dB, –54.00 dB, –54.00 dB DTMB (CTTB): –32.8 dB, –83 dB, –95 dB, –120 dB, –120 dB, –120 dB DVB-T/H: –30 dB, –30 dB, –30 dB, –30 dB, –30 dB, –30 dB ISDB-T: –27.4 dB, –47.4 dB, –54.4 dB, XXX, 50 dB, 50 dB; XXX is coupled with the total power reference, it is –57.4 dB when P<=0.025 W, –67.4 dB when P=0.25W, -(73.4 + 10logP) dB when 0.25 W<P<=2.5 W or 0.025 W<P<0.25 W, –77.4 dB when P > 2.5 W. CMMB: –37 dB, –72 dB, –84 dB, –90 dB, –90 dB, –90 dB LTE, LTETDD: 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB|0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB Digital Cable TV: 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB
State Saved	Saved in instrument state.
Min	–200 dB
Max	50 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Rel Stop

Sets a relative power level limit at the stop frequency for the selected offset. The relative power level limit ranges from –200 to +50 dBc.

The fail condition is set remotely by [:SENSe]:SEMask:OFFSet[n]:LIST:TEST for each offset channel.

You can turn off (not use) specific offset channels remotely with [:SENSe]:SEMask:OFFSet[n]:LIST:STATe.

The SCPI query returns the five (5) sets of real values currently set to the offset stop relative power limits.

Key Path	**Meas Setup, Offset/Limit, Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:RCARrier <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:RCARrier?`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:RCARrier:COUPle ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0,ON|OFF|1|0`
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:RCARrier:COUPle?`

Example	SEM:OFFS:LIST:STOP:RCAR –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB SEM:OFFS:LIST:STOP:RCAR? SEM:OFFS:LIST:STOP:RCAR:COUP ON, ON, ON, ON, ON, ON SEM:OFFS:LIST:STOP:RCAR:COUP?
Notes	See the following table for the default values for each Radio Standard. Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Coupled to Rel Start if coupling set to “Couple”, that is, Start is made the same as Stop. If the current mode is DVB-T/H, this value will be modified automatically according to the limit type and the output power of the transmitter which is less or more than 25W. If the current mode is ISDB-T, this value will be modified automatically according to the limit type.

Preset	SA: –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB WCDMA: –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB|–48.28 dB, –37.50 dB, –47.50 dB, –47.50 dB, –47.50 dB, –47.50 dB C2K: –45.00 dB, –45.00 dB, –55.00 dB, –55.00 dB, –55.00 dB, –55.00 dB|–42.00 dB, –54.00 dB, –54.00 dB, –54.00 dB, –54.00 dB, –54.00 dB WIMAX OFDMA: –25 dB, –32 dB, –50 dB, –50 dB, –50 dB, –50 dB TD-SCDMA: –54.00 dB, –62.00 dB, –62.00 dB, –47.00 dB, –47.00 dB, –47.00 dB| –49.00 dB, –64.00 dB, –49.00 dB, –49.00 dB, –49.00 dB, –49.00 dB 1xEVDO: –45dB, –45.00 dB, –55.00 dB, –55.00 dB, –55.00 dB, –55.00 dB|–42dB, –54.00 dB, –54.00 dB, –54.00 dB, –54.00 dB, –54.00 dB DTMB (CTTB): –83 dB, –95 dB, –120 dB, –120 dB, –120 dB, –120 dB DVB-T/H: –73 dB, –85 dB, –110 dB, –126 dB, –126 dB, –126 dB ISDB-T: –47.4 dB, –54.4 dB, XXX, 50 dB, 50 dB, 50 dB; XXX is coupled with the total power reference P, it is –57.4 dB when P<=0.025 W, –67.4 dB when P=0.25 W, -(73.4 + 10logP) dB when 0.25 W<P<=2.5 W or 0.025 W<P<0.25 W, –77.4 dB when P > 2.5 W. CMMB: –72 dB, –84 dB, –90 dB, –90 dB, –90 dB, –90 dB LTE, LTETDD: –0 dB, –0 dB,–0 dB, –0 dB, –0 dB, –0 dB Digital Cable TV: 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB SA: ON, ON, ON, ON, ON, ON WCDMA: ON, ON, ON, ON, ON, ON|OFF, OFF, OFF, ON, ON, ON C2K: ON, ON, ON, ON, ON, OFF|ON, ON, ON, ON, ON, OFF WIMAX OFDMA: OFF, OFF, OFF, ON, ON, ON| OFF, OFF, OFF, ON, ON, ON TD-SCDMA: ON, OFF, ON, ON, ON,ON|OFF,OFF,ON,ON,ON,ON 1xEVDO: ON, ON, ON, ON, ON, OFF| ON, ON, ON, ON, ON, OFF DTMB (CTTB): OFF, OFF, OFF, OFF, OFF, OFF DVB-T/H: ON, ON, ON, ON, ON, ON ISDB-T: OFF, OFF, OFF, OFF, OFF, OFF CMMB: OFF, OFF, OFF, OFF, OFF, OFF LTE, LTETDD: ON, ON, ON, ON, ON, ON Digital Cable TV: OFF, OFF, OFF, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	–200 dB
Max	50 dB
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.02.00, A.03.00

Fail Mask

Selects one of the logic keys for fail conditions between the measurement results and the test limits:

Absolute and **Relative** both check the results against the respective limit.

OR checks against both limits, failing if either of the limits is broken.

AND will only display a fail if both of the limits are broken.

The absolute or relative power limit value for each offset channel can be set remotely with [:SENSe]:SEMask:OFFSet[n]:LIST:ABSolute or [:SENSe]:SEMask:OFFSet[n]:LIST:RCARrier.

You can turn off (not use) specific offset channels remotely with [:SENSe]:SEMask:OFFSet[n]:LIST:STATe.

Key Path	**Meas Setup, Offset/Limit, Limits**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:TEST ABSolute|AND|OR|RELative,ABSolute|AND|OR|RELative,ABSolute|AND|OR|RELative,ABSolute|AND|OR|RELative,ABSolute|AND|OR|RELative,ABSolute|AND|OR|RELative`
	
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:TEST?`

Example	SEM:OFFS:LIST:TEST ABS, ABS, ABS, ABS, ABS, ABS SEM:OFFS:LIST:TEST?
Notes	See the following table for the default values for each Radio Standard. Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	None If the current mode is DVB-T/H, this value will be modified automatically according to the limit type and the output power of the transmitter which is less or more than 25W.

Preset	SA: ABS, ABS, ABS, ABS, ABS, ABS WCDMA: ABS, ABS, ABS, ABS, ABS, ABS|AND, AND, AND, AND, AND, AND C2K: REL, REL, REL, ABS, REL, REL|AND, AND, ABS, REL, REL, REL WIMAX OFDMA: REL, REL, REL, REL, REL, REL| REL, REL, REL, REL, REL, REL TD-SCDMA: ABS, ABS, ABS, ABS, ABS, ABS|AND, AND, AND, AND, AND, AND 1xEVDO: REL, REL, REL, ABS, REL, REL|AND, AND, AND, OR, AND, AND DTMB (CTTB): REL, REL, REL, REL, REL, REL DVB-T/H: ABS, ABS, ABS, ABS, ABS, ABS ISDB-T: REL, REL, REL, REL, REL, REL CMMB: REL, REL, REL, REL, REL, REL LTE: ABS, ABS, ABS, ABS, ABS, ABS LTETDD: ABS, ABS, ABS, ABS, ABS, ABS Digital Cable TV: REL, REL, REL, REL, REL, REL
State Saved	Saved in instrument state.
Range	Absolute|Relative|Abs AND Rel|Abs OR Rel
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Method

Sets the measurement method

Integ BW-enables you to set the channel integration bandwidth.

RRC Weight-selects Root Raised Cosine (RRC) filtering of the carriers and all adjacent channels. The α value (rolloff) for the filter is set to the value of the Filter Alpha parameter.

Key Path	**Meas Setup**
Mode	SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:FILTer[:RRC][:STATe] OFF|ON|0|1` `[:SENSe]:SEMask:FILTer[:RRC][:STATe]?`
Example	SEM:FILT ON SEM:FILT?

Notes	For the CDMA2K and CDMA1xEVDO mode, this key is not available. 1|ON = RRC Weight, 0|OFF = IntegBW You must be in the Spectrum Analysis mode, DTMB (CTTB) mode, DVB-T/H mode,ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode W-CDMA mode or TD-SCDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA, WIMAX OFDMA, DVB-T/H, ISDB-T, CMMB, LTE, LTETDD: OFF WCDMA, TD-SCDMA, DTMB (CTTB), Digital Cable TV: ON
State Saved	Saved in instrument state.
Range	RRCWeight|IntegBW
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Filter Alpha

Sets the alpha value for the RRC Filter.

Key Path	**Meas Setup**
Mode	SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:FILTer[:RRC]:ALPHa <real>` `[:SENSe]:SEMask:FILTer[:RRC]:ALPHa?`
Example	SEM:FILT:ALPH 0.3 SEM:FILT:ALPH?
Notes	For the CDMA2K and CDMA1xEVDO mode, this key is not available. You must be in the Spectrum Analysis mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode,W-CDMA mode or TD-SCDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	0.22 DTMB (CTTB): 0.05 Digital Cable TV: 0.15
State Saved	Saved in instrument state.
Min	0.01
Max	1.0
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Meas Preset

Restores all the measurement parameters to their default values.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CONFigure:SEMask`
Example	CONF:SEM
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Selecting Meas Preset will restore all measurement parameters to their default values.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Limit State(Only for TD-SCDMA)

The key “Limits State” is only displayed in the TD-SCDMA mode. The mask lines could be drawn in two different ways, according to the 3GPP standard for the base station when the key’s value is “Std”; or by the user-defined specifications listed in the Offset/Limits menu.

Key Path	**Meas Setup**
Mode	TD-SCDMA
Remote Command	`[:SENSe]:SEMask:LIMits STD|MAN` `[:SENSe]:SEMask:LIMits?`
Example	SEM:LIM STD SEM:LIM?
Notes	You must be in the TD-SCDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	See Couplings

Couplings	When the value of the “Limits” key is Std, the parameters displayed on the Offset/Limits panel will be modified depending on the carrier power, which corresponds to the measurement standard of the base station. All the keys except “Offset”, “Relative Atten”, “Offset Side” and “Limits” displayed on the “Offset/Limits” panel will be grayed out. All the keys displayed on the “Limits” panel will be grayed out as well. When the value of the “Limits” key is Man, all of the previous manual specifications will be restored, and the keys that were previously grayed out will be enabled again.
Preset	MAN
State Saved	Saved in instrument state.
Range	STD | MAN
Initial S/W Revision	Prior to A.02.00

Limit Type (Only for DVB-T/H)

This key is only displayed in the DVB-T/H mode. The mask lines could be drawn in three different ways:

1. according to the non-critical case standard in ETSI 302–296 when the key’s value is “Non-Critical”
2. according to the critical case standard in ETSI 302–296 when the key’s value is “Critical”
3. specifications listed in the Offset/Limits menu or by the user-defined when the key’s value is “Manual”.

Key Path	**Meas Setup**
Mode	DVB-T/H

Remote Command	`[:SENSe]:SEMask:LIMits:TYPE MANual|NONCritical|CRITical`
	
	`[:SENSe]:SEMask:LIMits:TYPE?`

Example	SEM:LIM:TYPE NONC SEM:LIM:TYPE?
Notes	You must be in the DVB-T/H mode to use this command. Use :INSTrument:SELect to set the mode.

Couplings	1. When current radio bandwidth is 5 MHz or 6 MHz, this key only has one option: Manual. The "Non-Critical" and "Critical" keys will be grayed out. So the default value is Manual after measurement preset. 2. When current radio bandwidth is 7 MHz or 8 MHz, this key has three options: Manual, Non-Critical and Critical. The default value is Non-Critical after measurement preset. a. When the value of the "Limit Type" key is Non-Critical, the parameters displayed on the Offset/Limits panel will be modified automatically depending on the carrier power, according to the Non-critical case limits definition in ETSI 302–296, and the keys under the Offset/Limit except "Offset", "Offset Side" and "Limits" will be grayed out. Meanwhile all the keys displayed on the "Limits" panel will be grayed out as well. b. When the value of the "Limit Type" key is Critical, the parameters displayed on the Offset/Limits panel will be modified automatically depending on the carrier power, according to the critical case limits definition in ETSI 302–296, and the keys under the Offset/Limit except "Offset", "Offset Side" and "Limits" will be grayed out. Meanwhile all the keys displayed on the "Limits" panel will be grayed out as well. c. When the value of the "Limit Type" key is Manual, all of the previous manual specifications will be restored, and the keys that were previously grayed out will be enabled again.
Preset	NONCritical (if current radio bandwidth is 7 MHz or 8 MHz) Manual (if current radio bandwidth is 5 MHz or 6 MHz)
State Saved	Saved in instrument state.
Range	Manual|Non-Critical|Critical
Initial S/W Revision	A.02.00

Limit Type (Only for ISDB-T)

This key is only displayed in the ISDB-T mode. The mask lines could be drawn in six different ways according to the following:

1. JEITA, Limit Masks defined in ARIB-STD B31 Version 1.7, Transmission System For Digital Terrestrial Television Broadcasting
2. Non-critical case defined in Brazil ABNT NBR15601, Digital terrestrial television – Transmission systems
3. Sub-critical case defined in Brazil ABNT NBR15601
4. Critical case defined in Brazil ABNT NBR15601
5. ISDB-Tsb case defined in ARIB STD-B29, "Transmission System for Digital Terrestrial Sound Broadcasting"
6. User-defined

The mask lines for JEITA are listed in “JEITA” on page 539.

The mask lines for 2 (Non-critical case), 3 (Sub-critical case),4 (Critical case) are listed in the following table.

Separation in relation to the digital signal central carrier	**Minimum attenuation in relation to average power, measured at carrier central frequency**		
	Non-critical mask	**Sub-critical mask**	**Critical mask**
±2.79 MHz	0.0 dB	0.0 dB	0.0 dB
±2.86 MHz	20.0 dB	20.0 dB	20.0 dB
±3.00 MHz	27.0 dB	34.0 dB	34.0 dB
±3.15 MHz	36.0 dB	43.0 dB	50.0 dB
±4.5 MHz	53.0 dB	60.0 dB	67.0 dB
±9.0 MHz	83.0 dB	90.0 dB	97.0 dB
±15.0 MHz	83.0 dB	90.0 dB	97.0 dB

The mask lines for 5 (ISDB-Tsb case) are listed below.

1-Segment

Difference from carrier frequency	**Attenuation from the average power, P**	**Specification**
±220 kHz	–16.3 dB/10 kHz	upper limit
±290 kHz	–36.3 dB/10 kHz	upper limit
±360 kHz	–46.3 dB/10 kHz	upper limit
±1170 kHz	–52.0 dB/10 kHz; (P≤0.5 W) -(53.6 + 5.6logP) dB/10 kHz; (0.5 W<P≤5.0 W) –57.6 dB/10 kHz; (P>5.0 W)	upper limit

3-Segment

Difference from carrier frequency	**Attenuation from the average power, P**	**Specification**
±650 kHz	–21.0 dB/10 kHz	upper limit
±720 kHz	–41.0 dB/10 kHz	upper limit
±790 kHz	–51.0 dB/10 kHz	upper limit

Difference from carrier frequency	**Attenuation from the average power, P**	**Specification**
±2220 kHz	–61.0 dB/10 kHz; (P≤0.5 W) –61.0+10log(P/0.5) dB/10 kHz; (0.5 W<P≤5.0 W) –71.0 dB/10 kHz; (P>5.0 W)	upper limit

Key Path	**Meas Setup**
Mode	ISDB-T
Remote Command	`[:SENSe]:SEMask:LIMits:TYPE MANual|JEITa|ANONcriticalASUBcritical|ACRitical|TSB` `[:SENSe]:SEMask:LIMits:TYPE?`
Example	SEM:LIM:TYPE JEIT SEM:LIM:TYPE?
Notes	You must be in the ISDB-T mode to use this command. Use :INSTrument:SELect to set the mode.

<table>
<tr>
<td>Couplings (to be continued)</td>
<td>
1. When current radio standard is ISDB-T, this key has five options: “Manual”, “JEITA”, “ABNT Non-Critical”, “ABNT Sub-Critical” and “ABNT Critical”. The “ISDB-Tsb” key will be grayed out. The default value is “JEITA” after measurement preset

a. When the value of the “Limit Type” key is “JEITA”, there are four options: “Auto Sense”, “30dB Mask”, “40dB Mask” and “50dB Mask”.

If “Auto Sense” is selected, the parameters displayed on Offset/Limits panel will be modified automatically depending on the total reference power, according to the spectrum mask definition in ARIB-STD B31, Version 1.7, and all the keys under the Offset/Limit except “Select Offset” and “Limits” will be grayed out.

If “30dB Mask” key is selected, the 30dB mask will be applied.

If “40dB Mask” key is selected, the 40dB mask will be applied.

If “50dB Mask” key is selelcted, the 50dB mask will be applied.

b. When the value of the “Limit Type” key is “ABNT Non-Critical”, the parameters displayed on Offset/Limits panel will be modified automatically according to the Non-critical mask definition in Brazil “ABNT NBR 15601, and all keys under the Offset/Limit except “Select Offset” and “Limits” will be grayed out.

c. When the value of the “Limit Type” key is “ABNT Sub-Critical”, the parameters displayed on Offset/Limits panel will be modified automatically according to the Sub-critical mask definition in Brazil “ABNT NBR 15601, and the keys under the Offset/Limit except “Select Offset” and “Limits” will be grayed out.

d. When the value of the “Limit Type” key is “ABNT Critical”, the parameters displayed on Offset/Limits panel will be modified automatically according to the Critical mask definition in Brazil “ABNT NBR 15601, and all keys under the Offset/Limit except “Select Offset” and “Limits” will be grayed out.

e. When the value of the “Limit Type” key is “Manual”, the parameters displayed on the Offset/Limits panel can be modified manually. When changing the “Limit Type” key from “Manual” to others, the current settings will be stored.
</td>
</tr>
</table>

Couplings (continued)	2. When current radio standard is **ISDB-Tsb,** this key has only two options: "Manual" and "ISDB-Tsb". The default value is "ISDB-Tsb" after measurement preset. a. When the value of the "Limit Type" key is "ISDB-Tsb", the parameters displayed on the Offset/Limits panel will be modified automatically depending on the output signal power and the value of "Segment Number" under "Mode Setup" panel, according to the spectrum mask definition in ARIB STD-B29, and all keys under the Offset/Limit except "Select Offset" and "Limits" will be grayed out. b. When the value of the "Limit Type" key is "Manual", the parameters displayed on the Offset/Limits panel can be modified manually. When changing the "Limit Type" key from "Manual" to others, the current settings will be stored.
Preset	JEITa (if current radio standard is ISDB-T) TSB (if current radio standard is ISDB-Tsb)
State Saved	Saved in instrument state.
Range	Manual | ABNT Non-Critical | ABNT Sub-Critical | ABNT Critical| I SDB-Tsb
Initial S/W Revision	A.03.00
Modified at S/W Revision	A.06.00

JEITA

Selects JEITA as limit type, which means the Limit Masks defined in ARIB-STD B31 Version 1.7 will be used. Four options, Auto Sense, 30dB Mask, 40dB Mask, 50dB Mask, are available, which refer to four types of limitations for ±4.36MHz difference from carrier frequency.

Difference from carrier frequency	Attenuation from the average power, P	Specification
±2.79 MHz	–27.4 dB/10 kHz	upper limit
±2.86 MHz	–47.4 dB/10 kHz	upper limit
±3.00 MHz	–54.4 dB/10 kHz	upper limit
±4.36 MHz	P <= 0.025 W, –57.4 dB/10 kHz 0.025 W<P<0.25 W, -(73.4+10*logP) dB/ 10kHz P =0.25W, –67.4 dB/10 kHz 0.25 W<P<=2.5 W, -(73.4+10*logP) dB/10 kHz P>2.5 W, –77.4 dB/10 kHz	upper limit

Auto Sense means the instrument will auto-detect average power P to set the limit for ±4.36 MHz frequency offset.

30dB Mask means the attenuation from the average power at ±4.36 MHz frequency offset is –57.4 dB/10 kHz.

40dB Mask means the attenuation from the average power at ±4.36 MHz frequency offset is –67.4 dB/10 kHz.

50dB Mask means the attenuation from the average power at ±4.36 MHz frequency offset is –77.4 dB/10 kHz.

The following table lists the cases to use the four masks.

Channel Power P	**Is adjacent channel used for analog TV?**	**Is the Analog TV power more than or equal to ten times the channel power?**	**Attenuation at ±4.36 MHz frequency offset**	**Mask to be used**
P≥2.5 W	Yes/No	Yes/No	–77.4 dB/10 kHz	Auto Sense
2.5 W≥P>0.25 W	No	None	-(73.4 + 10logP) dB/10 KHz	Auto Sense
	Yes	Yes	-(73.4 + 10logP) dB/10 KHz	Auto Sense
	Yes	No	–77.4 dB/10 kHz	50dB Mask
0.25 W≥P>0.025 W	No	None	-(73.4 + 10logP) dB/10 KHz	Auto Sense
	Yes	Yes	–67.4 dB/10 kHz	40dB Mask
	Yes	No	–77.4 dB/10 kHz	50dB Mask
0.025 W ≥ P	No	None	–57.4 dB/10 kHz	Auto Sense
	Yes	Yes	–67.4 dB/10 kHz	40dB Mask
	Yes	No	–77.4 dB/10 kHz	50dB Mask

Key Path	**Meas Setup, Limit Type**
Mode	ISDB-T
Remote Command	`[:SENSe]:SEMask:LIMits:TYPE:JEITA ASENse|J30Mask|J40Mask|J50Mask` `[:SENSe]:SEMask:LIMits:TYPE:JEITA?`
Example	SEM:LIM:TYPE:JEIT ASEN SEM:LIM:TYPE:JEIT?
Notes	You must be in the ISDB-T mode to use this command. Use :INSTrument:SELect to set the mode.

Couplings	1. If “Auto Sense” is selected, the parameters displayed on the Offset/Limits panel will be modified automatically depending on the total reference power, according to the spectrum mask definition in ARIB-STD B31, Version 1.7, and the keys under the Offset/Limit except “Select Offset” and “Limits” will be grayed out. 2. If “30 dB Mask” is selected, the 30 dB mask will be applied. 3. If “40 dB Mask” is selected, the 40 dB mask will be applied. 4. If “50 dB Mask” is selected, the 50 dB mask will be applied.
Preset	ASENse
State Saved	Saved in instrument state
Range	Auto Sense | 30dB Mask | 40dB Mask | 50dB Mask
Initial S/W Revision	A.06.00

Offset Freq Define

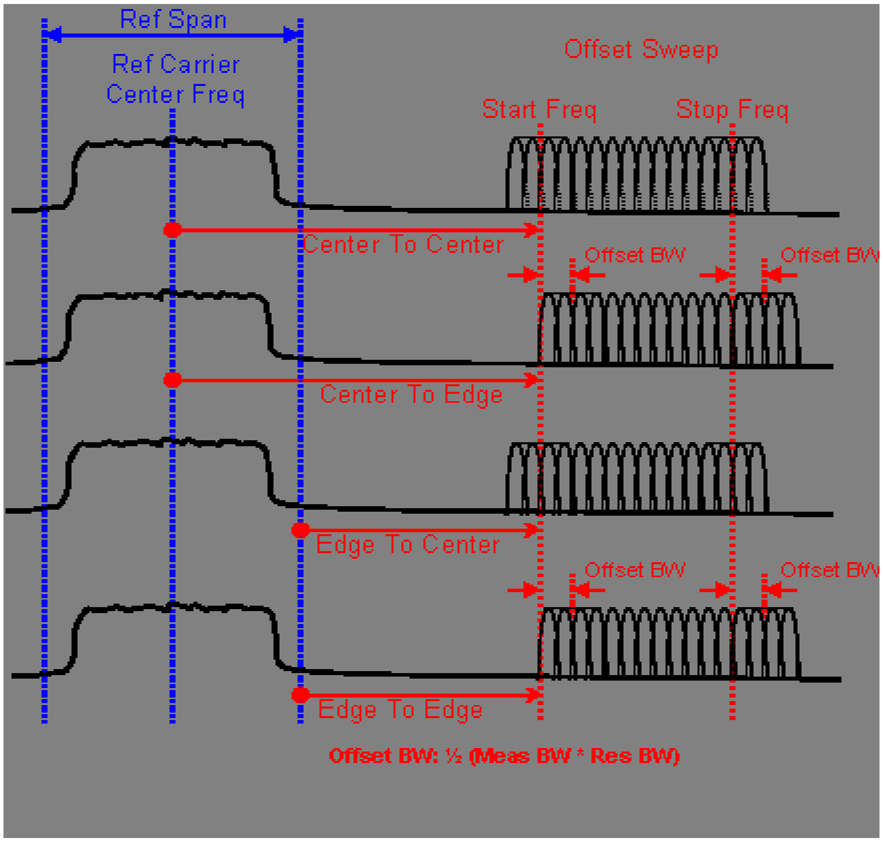
This key allows you to select “Offset” definition. Each standard defines each “Offset” from Carrier.

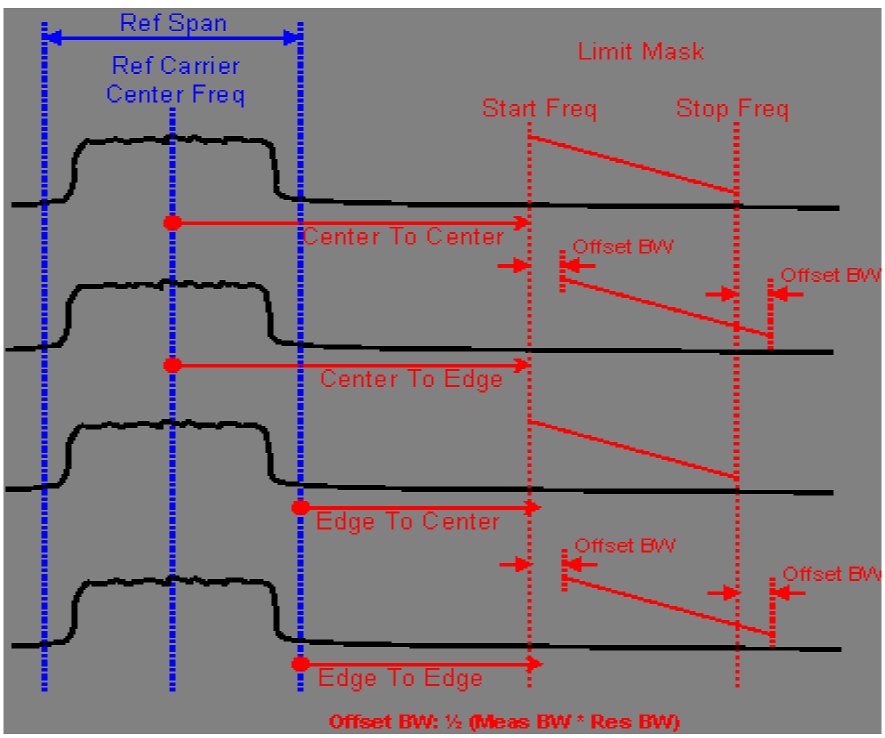
- Meas BW Edge means the edge of resolution band width that is represented by Meas BW and Res BW settings. Actual center frequency of Meas BW and the limit line have ½ Meas BW offset when the Meas BW Edge is selected.

3GPP2 requires the “Carrier Center to Meas BW Edge” definition. And LTE conformance test requires “Carrier Edge to Meas BW Center” and/or “Carrier Edge to Meas BW Edge” definition

- CTOCenter – From carrier center to the center of offset measuring filter*
- CTOEdge - From carrier center to the nominal –3 dB point of the offset measuring filter* closer to the carrier
- ETOCenter – From Center Frequency - Span of Ref Channel / 2 (for lower offset), Center Frequency + Span of Ref Channel / 2 (for upper offset) of the carrier closest to each offset to the center of offset measuring filter*
- ETOEdge - From Center Frequency - Span of Ref Channel / 2 (for lower offset), Center Frequency + Span of Ref Channel / 2 (for upper offset) of the carrier closest to each offset to the nominal –3 dB point of the offset measuring filter* closer to the carrier

*Measuring filter = Meas BW (N x Res BW)





Key Path	**Meas Setup, Offset/Limits**

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:TYPE CTOCenter|CTOEdge|ETOCenter|ETOEdge` `[:SENSe]:SEMask:OFFSet[1]|2:TYPE?`
Example	SEM:OFFS:TYPE ETOC SEM:OFFS:TYPE?
Notes	You must be in the mode that includes SEM measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, Digital Cable TV: CTOC C2K: CTOE 1xEVDO: CTOE LTE: ETOC LTETDD: ETOC
State Saved	Saved in instrument state.
Range	Carrier Center To Meas BW Center|Carrier Center To Meas BW Edge|Carrier Edge To Meas BW Center|Carrier Edge To Meas BW Edge
Initial S/W Revision	A.03.00

Mode

See “Mode” on page 1271 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Mode Setup

See “Mode Setup” on page 1291 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Peak Search

There is no 'Peak Search' supported in Spectrum Emission Mask so this front-panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Recall

See “Recall” on page 174 for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Restart

See “Restart” on page 1299 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Save

See “Save” on page 186 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Single

See “Single (Single Measurement/Sweep)” on page 1305 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Source

Operation of this key is identical across all measurements. For details about this key, see "Source" on page 1307.

Key Path	**Front-panel key**

Span X Scale

Span X Scale functionality is not supported in Spectrum Emission Mask, so this front-panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Sweep/Control

Displays a menu that enables you to set up and control the sweep time, gate method, and source of the current measurement. See “Sweep/Control” on page 1309 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Pause

Pauses a measurement after the current data acquisition is complete. When Paused, the label on the key changes to Resume. Pressing the Resume key resumes the measurement at the point it was at when paused. See “Pause/Resume” on page 1321 in “Common Measurement Functions” for more details.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Gate

Accesses a menu that enables you to control the gating function .

The Gate functionality is used to view signals best viewed by qualifying them with other events. See “Gate ” on page 1322 in “Common Measurement Functions” for more details.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Trace/Detector

Accesses a menu of functions that enable you to control trace and detector for the current measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Trace Type

Allows you to select the type of trace for the current measurement. The menu contains a 1–of–N selection of the trace type (Clear Write, Average, Max Hold, Min Hold).

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:TRACe:SEMask:TYPE WRITe|AVERage|MAXHold|MINHold` `:TRACe:SEMask:TYPE?`
Example	TRAC:SEM:TYPE MINH TRAC:SEM:TYPE?
Notes	WRITe = Clear Write AVERage = Average MAXHold = Maximum Hold MINHold = Minimum Hold
Couplings	When Detector setting is “Auto” ([:SENSe]:SEMask:DETector:AUTO?), Detector ([:SENSe]:SEMask:DETector[:FUNCtion]?) switches aligning with the switch of this parameter: “NORMal” with WRITe (Clear Write), “AVERage” with AVERage, “POSitive (peak)” with MAXHold, and “NEGative (peak)” with MINHold.
Preset	AVERage
State Saved	Saved in instrument state.
Range	`WRITe|AVERage|MAXHold|MINHold`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Chan Detector

Accesses a menu of functions that enable you to control the detectors for reference channel. The following choices are available:

- Auto- the detector selected depends on marker functions, trace functions, average type, and the trace averaging function.
- Normal-the detector determines the peak of the CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.
- Average-the detector determines the average of the signal within the sweep points. The averaging method depends upon the Average Type selection (voltage, power or log scales).
- Peak-the detector determines the maximum of the signal within the sweep points.
- Sample-the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- Negative Peak-the detector determines the minimum of the signal within the sweep points.

Key Path	**Trace/Detector**
Initial S/W Revision	Prior to A.02.00

Chan Detector Selection

Selects the detector mode for the reference channel.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:DETector:CARRier[:FUNCtion] AVERage|NEGative|NORMal|POSitive|SAMPle` `[:SENSe]:SEMask:DETector:CARRier[:FUNCtion]?`
Example	SEM:DET:CARR NEG SEM:DET:CARR?
Notes	When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. This detector setting affects the reference channel. There is not a per trace detector. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	See Couplings in the Trace Type section.
Preset	AVERage

State Saved	Saved in instrument state.
Range	Normal|Average|Peak|Sample|Negative Peak
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Chan Detector Auto

Sets the detector to the default detection mode for the reference channel. This mode is dependent upon the current reference channel conditions.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:DETector:CARRier:AUTO ON|OFF|1|0` `[:SENSe]:SEMask:DETector:CARRier:AUTO?`
Example	SEM:DET:CARR:AUTO OFF SEM:DET:CARR:AUTO?
Notes	See Couplings in the Trace Type section. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Offset Detector

Accesses a menu of functions that enable you to control the detector for offsets. The following choices are available.

- Auto- the detector selected depends on marker functions, trace functions, average type, and the trace averaging function.
- Normal-the detector determines the peak of the CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.
- Average-the detector determines the average of the signal within the sweep points. The averaging method depends upon the Average Type selection (voltage, power or log scales).

- Peak-the detector determines the maximum of the signal within the sweep points.
- Sample-the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- Negative Peak-the detector determines the minimum of the signal within the sweep points.

Key Path	**Trace/Detector**
Initial S/W Revision	Prior to A.02.00

Offset Detector Selection

Selects the detector mode for the offsets.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:DETector:OFFSet[:FUNCtion] AVERage|NEGative|NORMal|POSitive|SAMPle` `[:SENSe]:SEMask:DETector:OFFSet[:FUNCtion]?`
Example	SEM:DET:OFFS AVER SEM:DET:OFFS?
Notes	When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. This detector setting has effects all offsets. There is not a per trace detector. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	See Couplings in the Trace Type section.
Preset	SA, WCDMA, C2K, 1xEVDO, DTMB (CTTB), DVB-T/H, LTE, LTETDD: POSitive WIMAX OFDMA, TD-SCDMA ISDB-T, CMMB, Digital Cable TV: POSitive
State Saved	Saved in instrument state.
Range	Normal|Average|Peak|Sample|Negative Peak
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Offset Detector Auto

Sets the detector to the default detection mode for the offsets. This mode is dependent upon the current signal conditions of the offsets.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:SEMask:DETector:OFFSet:AUTO ON|OFF|1|0` `[:SENSe]:SEMask:DETector:OFFSet:AUTO?`
Example	SEM:DET:OFFS:AUTO OFF SEM:DET:OFFS:AUTO?
Notes	See Couplings in the Trace Type section. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Trigger

Accesses a menu that enables you to select and control the trigger source for the current measurement.

See “Trigger” on page 1339 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

View/Display

Accesses a menu of functions that enable you to control the instrument display.

The following keys select how the results are displayed:

Abs Pwr Freq-displays the absolute power levels in dBm and the corresponding frequencies in the text window.

Rel Pwr Freq-displays the relative power levels in dBc and the corresponding frequencies in the text window.

Integrated Power-displays the absolute and relative power levels integrated throughout the bandwidths between the start and stop frequencies in the text window.

"View Selection by Name (Remote Command Only)" on page 560

"Views Selection by Number (Remote Command only)" on page 561

View Selection by Name (Remote Command Only)

Key Path	**View/Display**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:SEMask:VIEW[:SELect] APFReq|RPFReq|IPOWer` `:DISPlay:SEMask:VIEW[:SELect]?`
Example	DISP:SEM:VIEW IPOW DISP:SEM:VIEW?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	In the SA mode, when "Radio Standard" is set to WLAN, IPOWer is not available and the key is grayed out.
Preset	SA, WCDMA, C2K, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV: APFReq WIMAX OFDMA: RPFReq
State Saved	Saved in instrument state.
Range	Abs Pwr & Freq| Rel Pwr & Freq|Integrated Power
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Views Selection by Number (Remote Command only)

The following numerical selections select how the results are displayed:

1. displays the absolute power levels in dBm and the corresponding frequencies in the text window.
2. displays the relative power levels in dBc and the corresponding frequencies in the text window.
3. displays the absolute and relative power levels integrated throughout the bandwidths between the start and stop frequencies in the text window.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:SEMask:VIEW:NSELect <integer>` `:DISPlay:SEMask:VIEW:NSELect?`
Example	DISP:SEM:VIEW:NSEL 2 DISP:SEM:VIEW:NSEL?
Notes	In the SA mode, when "Radio Standard" is set to WLAN, 3 is not available. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA, WCDMA, C2K, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV: 1 WIMAX OFDMA: 2
State Saved	Saved in instrument state.
Min	1
Max	3
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters.

See “Display” on page 1385 in the "Common Measurement Functions" section for more information.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Abs Pwr Freq

Sets the display to the Absolute Peak Power and Frequency view. The views differ depending on the setting of the measurement type (Meas Type) under the Measurement Setup menu.

"Abs Peak Pwr & Freq (Total Pwr Ref)" on page 562

"Abs Peak Pwr & Freq (PSD Ref)" on page 563

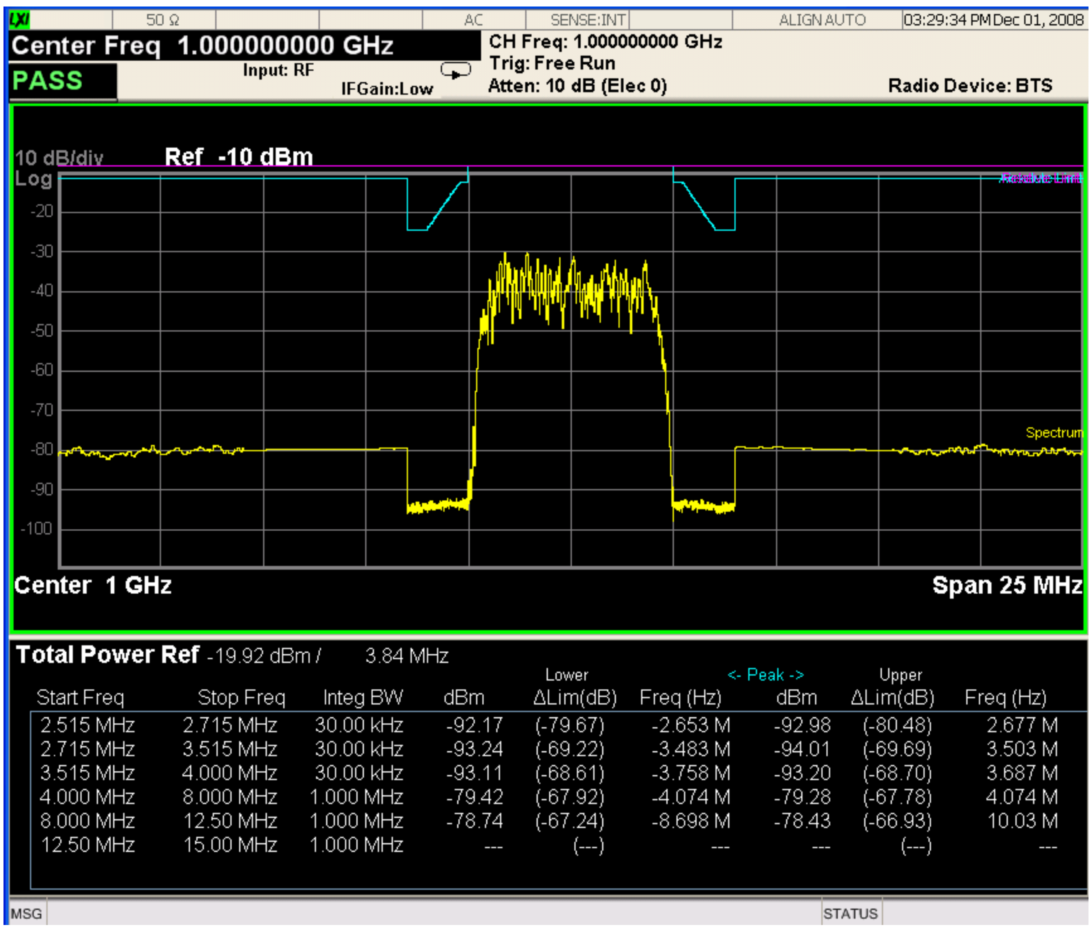
"Abs Peak Pwr & Freq (Spectrum Pk Ref)" on page 565

Abs Peak Pwr & Freq (Total Pwr Ref)

This view consists of the following two windows:

"Trace Window" on page 562

"Results Window" on page 563



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

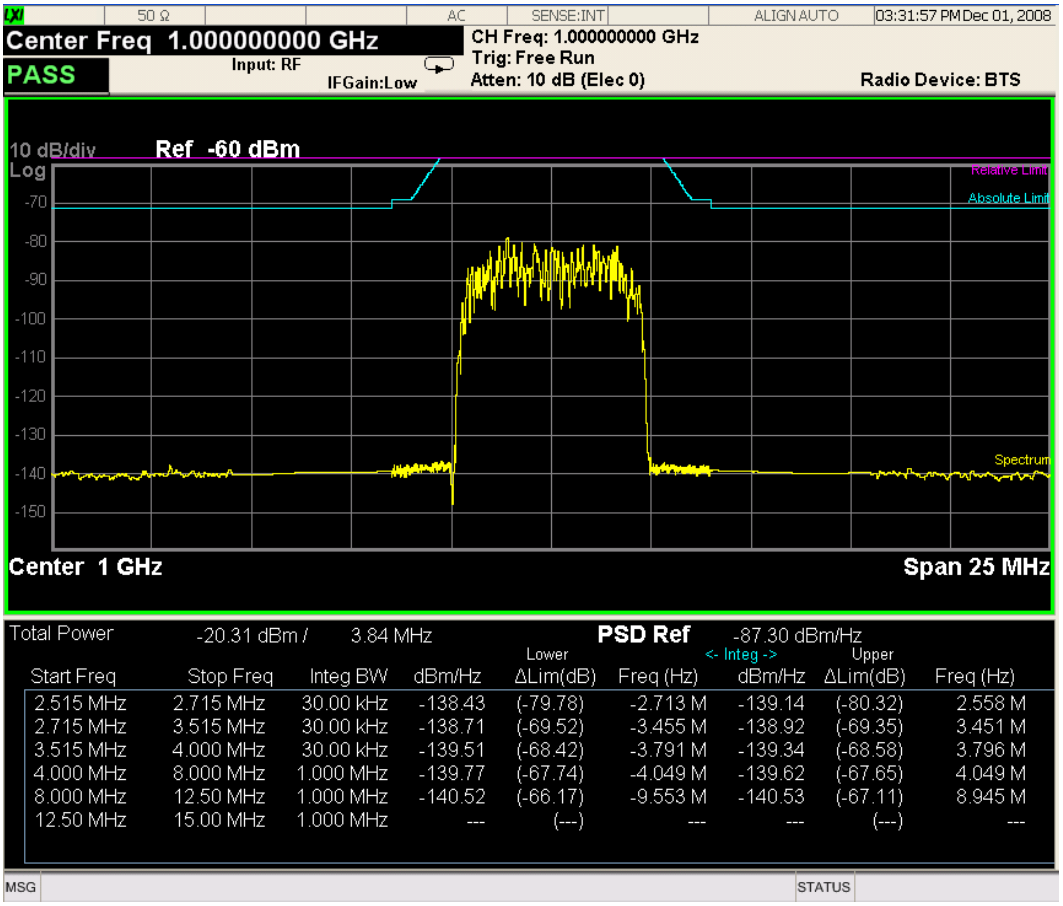
Name	Corresponding Results
Total Pwr Ref	n=1 2nd element Absolute power at the reference area.
	Channel Integration Bandwidth
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset
Lower Peak (dBm)	Absolute peak power on minimum margin point of the negative offset
Lower lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset
Lower Freq (Hz)	Frequency on minimum margin point of the negative offset
Upper Peak (dBm)	Absolute peak power on minimum margin point of the positive offset
Upper lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Freq (Hz)	Frequency on minimum margin point of the positive offset

Abs Peak Pwr & Freq (PSD Ref)

This view consists of the following two windows:

"Trace Window" on page 564

"Results Window" on page 564



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

Name	Corresponding Results
Total Pwr	n=1 2nd element Absolute power at the reference area.
	Channel Integration Bandwidth
PSD Ref	n=5 1st element Power spectral density reference at the reference area
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset
Lower (dBm/Hz)	Absolute power spectrum density of the negative offset

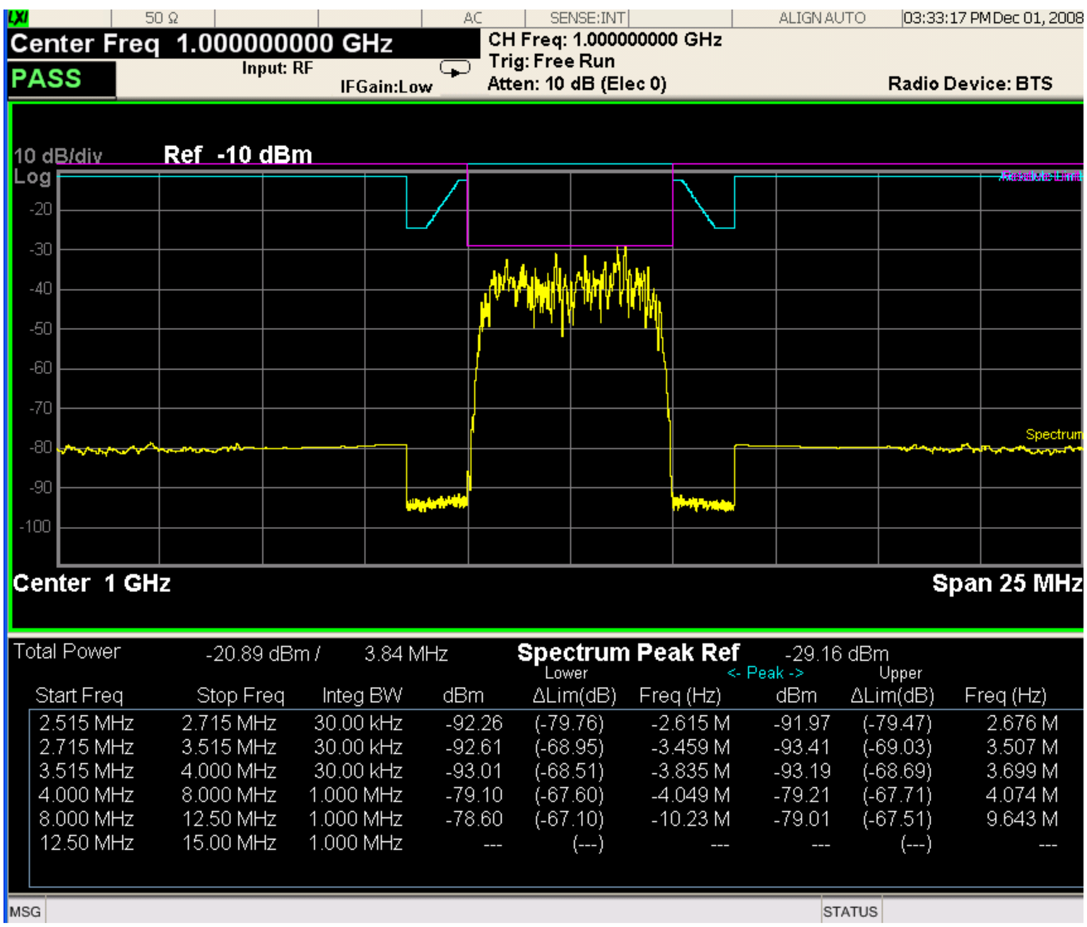
Name	Corresponding Results
Lower lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset
Lower Freq (Hz)	Frequency on minimum margin point of the negative offset
Upper (dBm/Hz)	Absolute power spectrum density of the positive offset
Upper lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Freq (Hz)	Frequency on minimum margin point of the positive offset

Abs Peak Pwr & Freq (Spectrum Pk Ref)

This view consists of the following two windows:

"Trace Window" on page 564

"Results Window" on page 564



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

Name	Corresponding Results
Total Pwr	Absolute power at the reference area.
	Channel Integration Bandwidth
Spectrum Peak Ref	n=5 1st element Spectrum peak power reference at the reference area
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset
Lower(dBm)	Absolute peak power on minimum margin point of the negative offset
Lower lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset
Lower Freq (Hz)	Frequency on minimum margin point of the negative offset
Upper (dBm)	Absolute peak power on minimum margin point of the positive offset
Upper lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Freq (Hz)	Frequency on minimum margin point of the positive offset

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Rel Pwr Freq

Sets the display to the Relative Peak Power and Frequency view. The views differ depending on the setting of the measurement type (Meas Type) under the Measurement Setup menu.

"Rel Peak Pwr & Freq (Total Pwr Ref)" on page 566

"Rel Peak Pwr & Freq (PSD Ref)" on page 568

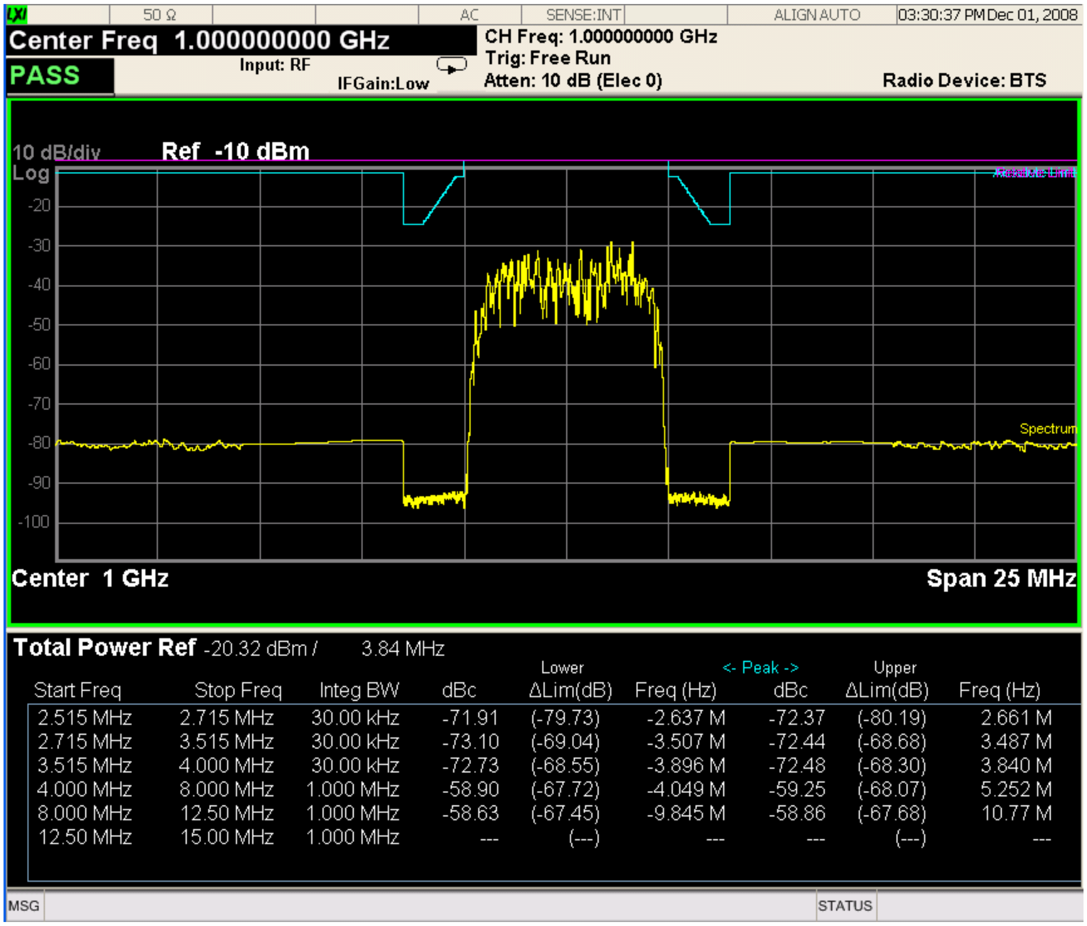
"Rel Peak Pwr & Freq (Spectrum Pk Ref)" on page 569

Rel Peak Pwr & Freq (Total Pwr Ref)

This view consists of the following two windows:

“Trace Window” on page 567

“Results Window” on page 567



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

Name	Corresponding Results
Total Pwr Ref	n=1 2nd element Absolute power at the reference area.
	Channel Integration Bandwidth
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset

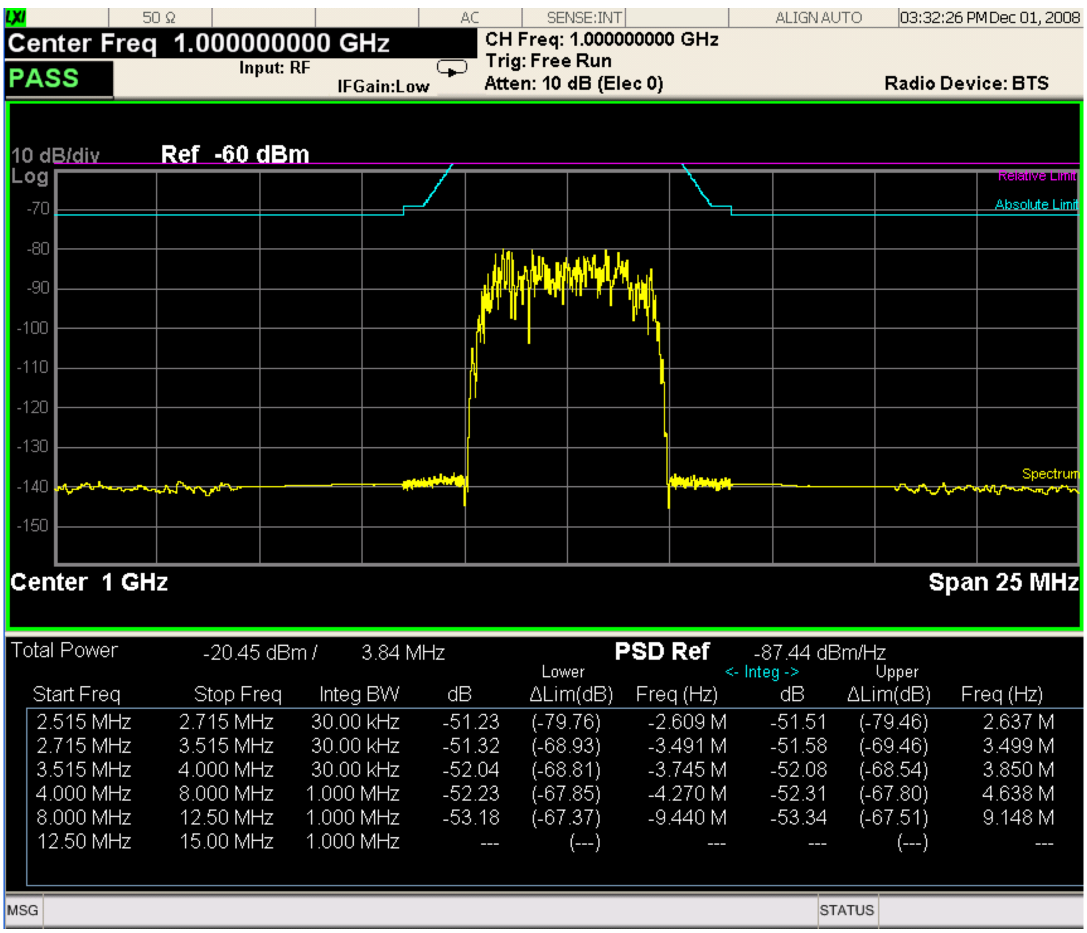
Name	Corresponding Results
Lower Peak (dBc)	Relative peak power on minimum margin point of the negative offset
Lower Lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset
Lower Freq (Hz)	Frequency on minimum margin point of the negative offset
Upper Peak (dBc)	Relative peak power on minimum margin point of the positive offset
Upper Lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Freq (Hz)	Frequency on minimum margin point of the positive offset

Rel Peak Pwr & Freq (PSD Ref)

This view consists of the following two windows:

“Trace Window” on page 569

“Results Window” on page 569



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

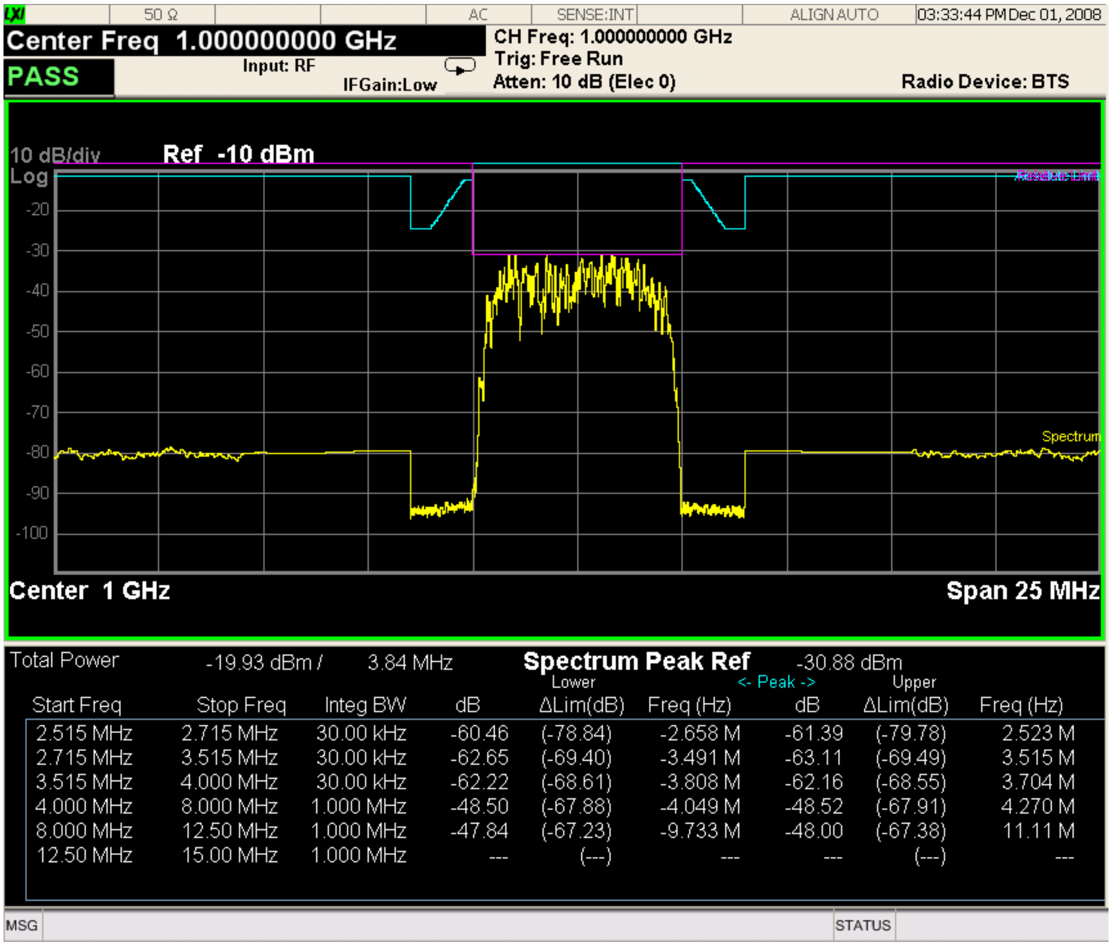
Name	**Corresponding Results**
Total Pwr	n=1 2nd element Absolute power at the reference area.
	Channel Integration Bandwidth
PSD Ref	n=5 1st element Power spectral density reference at the reference area
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset
Lower (dB)	Relative power spectrum density of the negative offset
Lower Lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset
Lower Freq (Hz)	Frequency on minimum margin point of the negative offset
Upper (dB)	Relative power spectrum density of the positive offset
Upper Lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Freq (Hz)	Frequency on minimum margin point of the positive offset

Rel Peak Pwr & Freq (Spectrum Pk Ref)

This view consists of the following two windows:

“Trace Window” on page 567

“Results Window” on page 567



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

Name	Corresponding Results
Total Pwr	Absolute power at the reference area.
	Channel Integration Bandwidth
Spectrum Peak Ref	n=5 1st element Spectrum peak power reference at the reference area
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset

Name	Corresponding Results
Lower Peak (dB)	Relative peak power on minimum margin point of the negative offset
Lower Lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset
Lower Freq (Hz)	Frequency on minimum margin point of the negative offset
Upper Peak (dB)	Relative peak power on minimum margin point of the positive offset
Upper Lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Freq (Hz)	Frequency on minimum margin point of the positive offset

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Integrated Power

Sets the display to the Integrated Power view. The views differ depending on the setting of the measurement type (Meas Type) under the Measurement Setup menu.

"Integrated Power (Total Pwr Ref)" on page 571

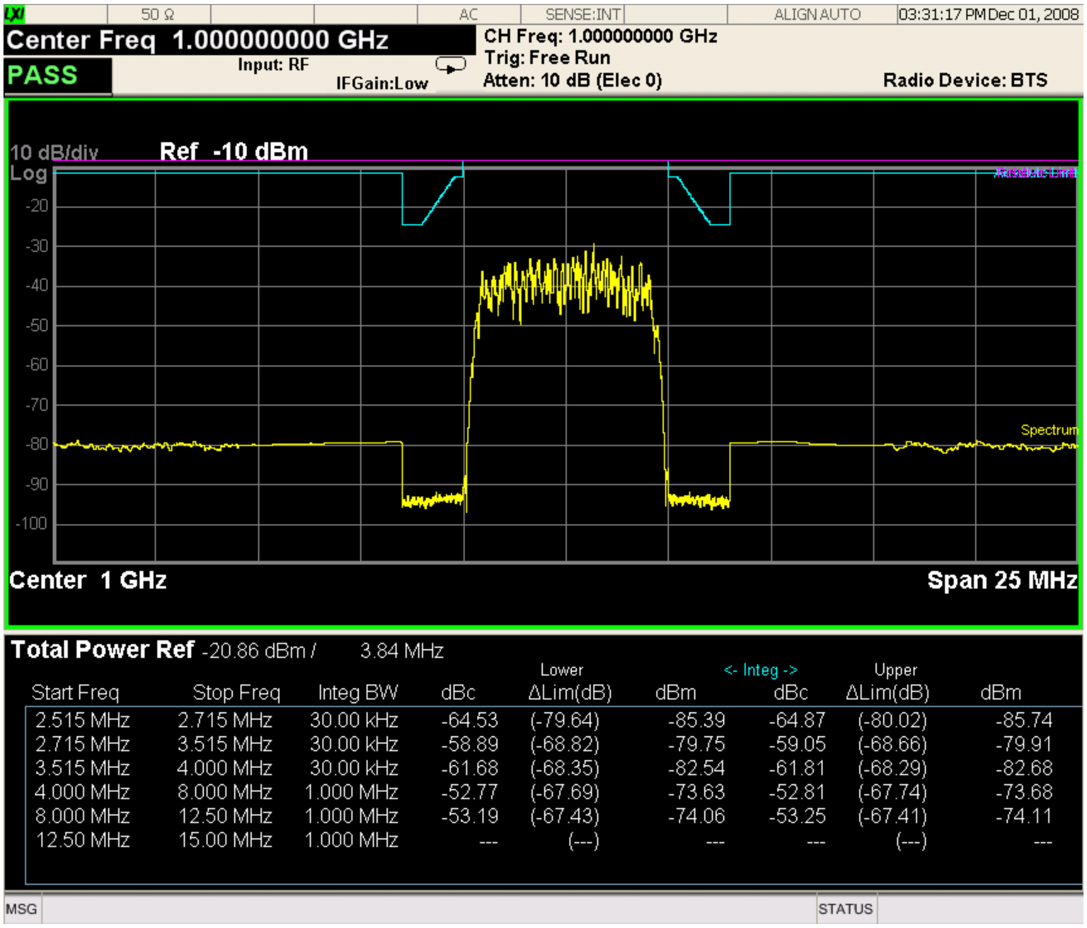
"Integrated Power (PSD Ref)" on page 573

"Integrated Power (Spectrum Pk Ref)" on page 574

Integrated Power (Total Pwr Ref)

"Trace Window" on page 572

"Results Window" on page 572



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

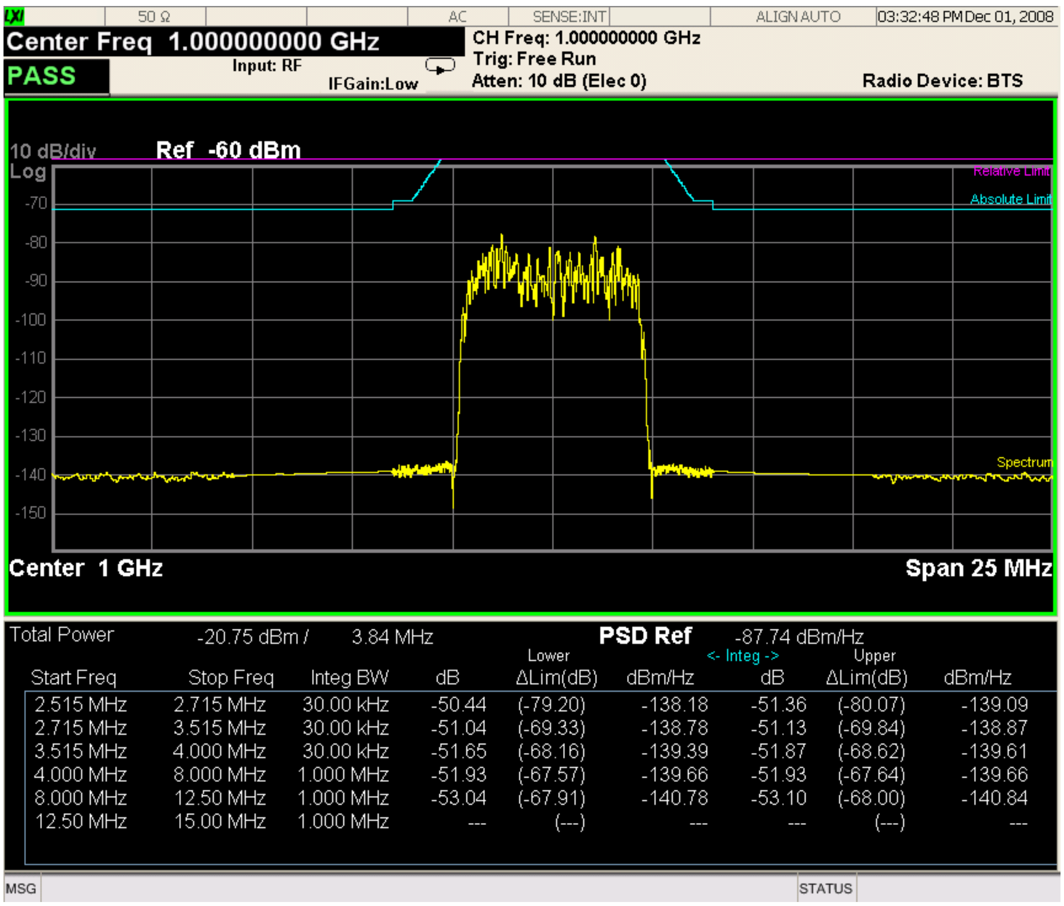
Name	Corresponding Results
Total Pwr Ref	n=1 2nd element Absolute power at the reference area.
	Channel Integration Bandwidth
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset
Lower Integ (dBc)	Relative integrated power on the negative offset
Lower Lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset

Name	Corresponding Results
Lower Integ (dBm)	Absolute integrated power on the negative offset
Upper Integ (dBc)	Relative integrated power on the positive offset
Upper Lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Integ (dBm)	Absolute integrated power on the positive offset

Integrated Power (PSD Ref)

"Trace Window" on page 573

"Results Window" on page 574



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

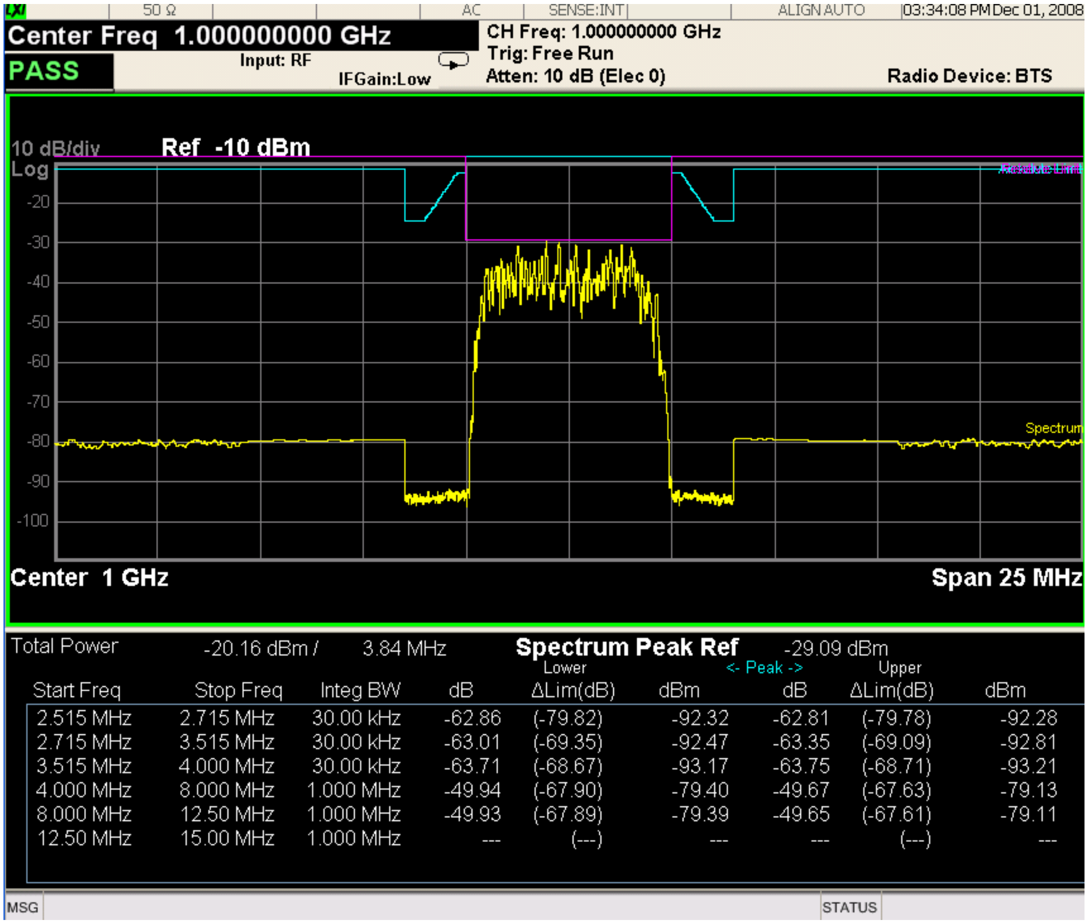
Results Window

Name	Corresponding Results
Total Pwr	n=1 2nd element Absolute power at the reference area.
	Channel Integration Bandwidth
PSD Ref	n=5 1st element Power spectral density reference at the reference area
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset
Lower (dB)	Relative power spectrum density of the negative offset
Lower Lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset
Lower (dBm/Hz)	Absolute power spectrum density of the negative offset
Upper (dB)	Relative power spectrum density of the positive offset
Upper Lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper (dBm/Hz)	Absolute power spectrum density of the negative offset

Integrated Power (Spectrum Pk Ref)

"Trace Window" on page 575

"Results Window" on page 575



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

Name	Corresponding Results
Total Pwr	Absolute power at the reference area.
	Channel Integration Bandwidth
Spectrum Peak Ref	n=5 1st element Peak power at the reference area
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset
Lower Peak (dB)	Relative peak power on minimum margin point of the negative offset

Name	Corresponding Results
Lower lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset
Lower Peak (dBm)	Absolute peak power on minimum margin point of the negative offset
Upper Peak (dB)	Relative peak power on minimum margin point of the positive offset
Upper lim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Peak (dBm)	Absolute peak power on minimum margin point of the positive offset

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Limit Lines

Toggles the limit lines display function for the spectrum emission mask measurements On and Off.

Key Path	**View/Display**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:SEMask:LLINe:STATe ON|OFF|1|0` `:CALCulate:SEMask:LLINe:STATe?`
Example	CALC:SEM:LLIN:STAT OFF CALC:SEM:LLIN:STAT?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

9 Spurious Emissions Measurement

The Spurious Emissions measurement identifies and determines the power level of spurious emissions in certain frequency bands. For measurement results and views, see "View/Display" on page 647.

This topic contains the following sections:

Measurement Commands for Spurious Emissions

The following commands can be used to retrieve the measurement results:

```
:CONFigure:SPURious
:CONFigure:SPURious:NDEFault
:INITiate:SPURious
:FETCh:SPURious[n]?
:READ:SPURious[n]?
:MEASure:SPURious[n]?
```

For more measurement related commands, see the SENSe subsystem, and the section "Remote Measurement Functions" on page 1257.

Remote Command Results for Spurious Emissions Measurement

Command	Return Value
CONFigure:SPURious INITiate:SPURious	N/A
FETCh:SPURious [n]? MEASure:SPURious [n]? READ:SPURious [n]? (Note – these commands are not available when viewing the Range Table)	n = 1 (or not supplied) Returns a variable-length (1+6*Spurs – up to 1201 entries) comma separated list containing detailed information in the following format: Number of spurs in following list (Integer) [Repeat the following for each spur] Spur # Range # Spur was located (Integer) Frequency of Spur (Hz, Float64) Amplitude of Spur (dBm, Float32) Absolute Limit (dBm, Float32) Pass or Fail (1|0, Boolean)

Command	Return Value
	n = 2 – 21 Returns a comma separated list of the trace data for the selected range (where range number = n – 1) using Detector 1. If selected range is not active SCPI_NAN is returned for each trace data element where SCPI_NAN = 9.91E37.
	n = 22 Returns the number of spurs found.
	n = 23 – 42 Returns a comma separated list of the trace data for the selected range (where range number = n – 22) using Detector 2. If selected range is not active or Detector 2 selection is off, SCPI_NAN is returned for each trace data element where SCPI_NAN = 9.91E37.

Key Path	**Meas**
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

AMPTD Y Scale opens a menu of functions that enable you to modify the Amplitude parameters.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Ref Value

Sets the value for the absolute power reference. When Auto Scaling for the Y-axis is off, the measurement uses the current reference level settings. When Auto Scaling for the Y-axis is on, the analyzer will set the reference level such that the absolute limit will be positioned two divisions down from the top of the display.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, WIMAX OFDMA, TD-SCDMA,C2k, 1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel < real>` `:DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:SPUR:VIEW:WIND:TRAC:Y:RLEV –50 dBm DISP:SPUR:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, TD-SCDMA mode, LTE mode, LTETDD mode, or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
Couplings	When the Y Auto Scaling is off, the measurement uses the current reference level settings. When the Y Auto Scaling is on, the analyzer automatically sets the reference level such that the absolute limit is positioned two divisions down from the top of the display. This is the most useful setting when searching for spurs. The algorithm used for determining the ref level is Ref Level = Absolute Limit + (2 * Scale/Div). All other reference level settings are left as the current base instrument settings.
Preset	0.00 dBm
State Saved	Saved in instrument state.
Min	–250.0 dBm
Max	250.0 dBm
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. When in Pre-Adjust for Min Clip mode, this value can change at the start of every measurement.

See "Attenuation" on page 1120 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Scale/Div

Sets the units per division of the vertical scale in the logarithmic display. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, DVB-T/H, LTE, LTETDD
Remote Command	`:DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:SPUR:VIEW:WIND:TRAC:Y:PDIV 10 dB DISP:SPUR:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, TD-SCDMA, LTE mode, LTE TDD mode, or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10.00 dB
State Saved	Saved in instrument state.
Range	0.10 dB to 20.00 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Presel Center

See AMPTD Y Scale, “Presel Center” on page 1136 in the “Common Measurement Functions” section for more information.

Presel Adjust

See AMPTD Y Scale, “Preselector Adjust” on page 1137 in the “Common Measurement Functions” section for more information.

Y Axis Unit

Allows you to change the vertical (Y) axis amplitude unit.

See “Y Axis Unit” on page 1138 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	A.04.00

Ref Lvl Offset

Adds an offset value to the displayed reference level. The reference level is the absolute amplitude represented by the top graticule line on the display.

See “Reference Level Offset” on page 1144 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	A.04.00

µW Path Control

The **µW Path Control** functions include the **µW Preselector Bypass** (Option MPB) and **Low Noise Path** (Option LNP) controls in the High Band path circuits.

See µ“µW Path Control ” on page 1145 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	A.04.00

Internal Preamp

Accesses a menu that enables you to control the internal preamplifiers. Turning Internal Preamp on gives a better noise figure, but a poorer inter-modulation distortion (TOI) to noise floor dynamic range. You can optimize this setting for your particular measurement.

See “Internal Preamp” on page 1149 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Toggles the Auto Scaling function between On and Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, DVB-T/H, LTE, LTETDD
Remote Command	`:DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:SPUR:VIEW:WIND:TRAC:Y:COUP OFF DISP:SPUR:VIEW:WIND:TRAC:Y:COUP?
Couplings	When Auto Scaling is On and the Restart front-panel key is pressed, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. When the Y Auto Scaling is off, the measurement uses the current reference level settings. When the Y Auto Scaling is on, the analyzer automatically sets the reference level such that the absolute limit is positioned two divisions down from the top of the display. This is the most useful setting when searching for spurs. The algorithm used for determining the ref level is Ref Level = Absolute Limit + (2 * Scale/Div). All other reference level settings are left as the current base instrument settings.
Preset	1
State Saved	Saved in instrument state.
Range	On|Off
Backwards Compatibility SCPI	[:SENSe]:SPURious:POWer[:RF]:RANGe:AUTO
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Auto Couple

See “Auto Couple” on page 1153 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

BW

BW is unavailable in the Spurious Emissions measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Cont

See “Cont (Continuous Measurement/Sweep)” on page 1155 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Frequency/Channel

The key accesses a menu allowing you to set Frequency parameters for the Gate functions.

See “FREQ Channel” on page 1157 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Input/Output

See “Input/Output” on page 1165 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Marker

Displays the menu keys that enable you to select, set up and control the markers for the current measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode to **Normal**, **Delta** and **Off**. Normal enables you to activate the selected marker to read the power level and time. Delta enables you to read the differences in the power levels and time scales between the selected marker and the next marker. Off enables you to turn off the selected marker.

All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:SPUR:MARK:MODE POS CALC:SPUR:MARK:MODE?

Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area will display the marker value to its full entered precision. You must be in the cdma2000 mode,1xEV-DO mode, TD-SCDMA mode, W-CDMA mode, DVB-T/H mode, GSM/EDGE mode, LTE mode, LTE TDD mode, or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
Preset	=OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker X Axis Value (Remote Command only)

Sets the Marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, DVB-T/H, LTE, LTETDD

Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <freq>`
	
	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`

Example	CALC:SPUR:MARK2:X 25 kHz CALC:SPUR:MARK3:X?
Notes	If no suffix is sent it will use the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" will be generated. The query returns the absolute X Axis marker value if the control mode is Normal, or the offset from the reference marker if the control mode is Delta. The query is returned in the fundamental units for the current marker X Axis scale: Hz for Frequency and Inverse Time, seconds for Period and Time. If the marker is Off, the response is not a number.
Preset	1 GHz
State Saved	No

Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker X Axis Position (Remote Command only)

Sets the Marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta -** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:SPUR:MARK10:X:POS 300 CALC:SPUR:MARK10:X:POS?
Notes	The query returns the absolute X Axis marker value in trace points if the control mode is **Normal**, or the offset from the reference marker in trace points if the control mode is **Delta**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points . If the marker is **Off** the response is not a number.
Preset	300
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker Y Axis Value (Remote Command only)

Returns the marker Y Axis value in the current marker Y Axis unit.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`

Example	CALC:SPUR:MARK11:Y?
Notes	If no suffix is sent, it will use the current Y Axis unit. If a suffix is sent that does not have units of absolute amplitude, an error “Invalid suffix” will be generated.
Preset	Depends on Y axis range of selected Trace.
State Saved	No
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Properties

Accesses the Properties menu to set certain properties of the selected marker.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Relative To

Selects the marker the selected marker will be relative to (its reference marker).

Every marker has another marker to which it is relative. This marker is referred to as the "reference marker" for that marker. This attribute is set by the **Marker**, **Properties**, **Relative To** key. The marker must be a **Delta** marker to make this attribute relevant. If it is a **Delta** marker, the reference marker determines how the marker is controlled and how its value is displayed. A marker cannot be relative to itself.

Key Path	**Marker, Properties**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:SPUR:MARK3:REF 5 CALC:SPUR:MARK:REF?

Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” When queried a single value will be returned (the specified marker numbers relative marker). You must be in the Spectrum Analysis mode, GSM mode, LTE mode, LTE TDD mode, or WiMAX mode or TD-SCDMA mode to use this command. Use INSTrument:SELect to set the mode.
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Couple Markers

When this function is true, moving any marker causes an equal X Axis movement of every other marker which is not **Off**. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:SPURious:MARKer:COUPle[:STATe]?`
Example	CALC:SPUR:MARK:COUP ON CALC:SPUR:MARK:COUP?
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

All Markers Off

Turns off all markers.

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious:MARKer:AOFF`
Example	CALC:SPUR:MARK:AOFF
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker Function

There are no ‘Marker Functions’ supported in Spurious Emissions so this front-panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Marker To

There is no ‘Marker To’ functionality supported in Spurious Emissions so this front-panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas

See “Meas” on page 1257 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Avg/Hold Num

Specifies the number of measurement averages used to calculate the measurement result. The average is displayed at the end of each sweep.

Average State allows you to turn averaging on or off.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, CDMA1xEVDO, TD-SCDMA, DVB-T/H, LTE, LTETDD

Remote Command	`[:SENSe]:SPURious:AVERage:COUNt <integer>`
	`[:SENSe]:SPURious:AVERage:COUNt?`
	`[:SENSe]:SPURious:AVERage[:STATe] ON|OFF|1|0`
	`[:SENSe]:SPURious:AVERage[:STATe]?`

Example	SPUR:AVER:COUN 2500 SPUR:AVER:COUN? SPUR:AVER ON SPUR:AVER?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, TD-SCDMA mode, LTE mode, LTE TDD mode, or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10 0FF
State Saved	Saved in instrument state.
Min	1
Max	10000
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Avg Mode

Enables you to set the averaging mode.

When set to Exponential (Exp) the measurement averaging continues using the specified number of averages to compute each averaged value. The average will be displayed at the end of each sweep.

When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

Key Path	**Meas Setup**
Mode	SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DVB-T/H, LTE, LTETDD
Remote Command	`[:SENSe]:SPURious:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:SPURious:AVERage:TCONtrol?`
Example	SPUR:AVER:TCON REP SPUR:AVER:TCON?
Notes	You must be in the cdma2000 mode, TD-SCDMA mode, W-CDMA mode, DVB-T/H mode, GSM/EDGE mode, LTE mode, LTE TDD mode, or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp|Repeat
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Range Table

The range table is used to enter the settings for up to twenty ranges.

Upon entering the range table (front panel only) the measurement is stopped and the analyzer is set to a constantly sweeping idle state. The analyzer will be set to the current values of range 1, regardless if it is on or off. If a range is outside the values in the current range table for that range, "---" will appear to indicate this range is currently inactive.

To change a parameter, select the appropriate menu key and enter the value using the numeric keypad, or the knob. The analyzer settings will be updated with the new parameter values. Although no measurements are being made, this allows you to preview the range they will be measuring.

If the range is changed, the analyzer will change its settings to reflect the currently selected range. The selected range will be displayed on the last line of the range table view unless; the selected range is 5 or less in the normal range table view. In this case, the first 5 entries of the range table will be displayed and the zoom mode is selected. In the zoom mode all 20 ranges can be displayed.

Key Path	**Meas Setup**

Initial S/W Revision	Prior to A.02.00

Range

Changing the range will update the values on the other menu keys so that they reflect the settings for the selected range. If Range is turned on, it will be used as part of the measurement. If it is off, it will be excluded. A range is made up of the next eleven parameters. This parameter can send up to 20 values. The location in the list sent corresponds to the range the value is associated with. Missing values are not permitted. In other words, if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Key Path	**Meas Setup, Range Table**
Mode	SA, WCDMA, C2K, 1xEV-DO ,WIMAX OFDMA, TD-SCDMA, DVB-T/H, LTE, LTETDD
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:STATe ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0` `[:SENSe]:SPURious[:RANGe][:LIST]:STATe?`
Example	SPUR:STAT ON SPUR:STAT?
Notes	You must be in cdma2000 mode, TD-SCDMA mode, W-CDMA mode, DVB-T/H mode, GSM/EDGE mode, LTE mode, LTE TDD mode, or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.

Preset	1 SA, WIMAX OFDMA:ON,ON,ON,ON,ON,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF WCDMA:ON,ON,ON,ON,ON,ON,ON,ON,OFF,OFF,OFF,OFF,OFF,OFF,OFF, OFF,OFF,OFF,OFF,OFF C2k ,1xEV-DO: ON,ON,ON,ON, OFF,OFF, OFF,OFF OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, TD-SCDMA: ON, ON, ON, ON, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF DVB-T/H: ON, ON, ON, ON, ON, ON, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF LTE: ON,ON,ON,ON,ON,ON,ON,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF LTETDD: OFF,OFF,ON,ON,ON,ON,ON,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF, OFF,OFF,OFF,OFF
Min	1
Max	20
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Start Freq

Sets the start frequency of the analyzer. This parameter can send up to 20 values. The location where the start frequency occurs in the list sent to the measurement corresponds to the range the value is associated with.

Missing values are not permitted. In other words, if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Key Path	**Meas Setup, Range Table**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:FREQuency:STARt <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:SPURious[:RANGe][:LIST]:FREQuency:STARt?`

Example	SPUR:FREQ:STAR 9 kHz, 150 kHz, 30 MHz, 1GHz, 1.5 GHz, 1.5 GHz, 1.5 GHz, 1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz SPUR:FREQ:STAR?
Notes	You must be in cdma2000 mode, TD-SCDMA mode, W-CDMA mode, DVB-T/H, GSM/EDGE mode, LTE mode, LTE TDD mode, or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SA, WIMAX OFDMA:+1.92000000E+009,+1.89350000E+009,+2.10000000E+009,+2.17500000E+009,+8.00000000E+008,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009,+1.50000000E+009 WCDMA:9kHz,150kHz,30MHz,1GHz,2.1GHz,2.1GHz,2.1774GHz,2.18GHz,1.5GHz,1.5GHz,1.5GHz,1.5GHz,1.5GHz,1.5GHz,1.5GHz, 1.5GHz,1.5GHz,1.5GHz,1.5GHz,1.5GHz C2K,1xEV-DO: 9kHz, 150kHz, 30 MHz, 1GHz, 2.5GHz, 2.5GHz, 2.5GHz , 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz TD-SCDMA: 9 kHz, 150 kHz, 30 MHz, 1GHz, 1.5 GHz, 1.5 GHz, 1.5 GHz, 1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz DVB-T/H: 9kHz, 174MHz, 400MHz, 790MHz, 862MHz, 1GHz, 1.5GHz, 1.5GHz, 1.5GHz, 1.5GHz, 1.5GHz, 1.5GHz, 1.5GHz, 1.5GHz, 1.5GHz, 1.5GHz, 1.5GHz, 1.5GHz, 1.5GHz, 1.5GHz LTE: 9 kHz,150 kHz,30 MHz,1 GHz,1.92GHz,1.98 GHz,2.18 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz LTETDD: 9 kHz,150 kHz,30 MHz,1 GHz,1.90GHz,2.01 GHz,2.025 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz,1.5 GHz
State Saved	Saved in instrument state.
Min	–80 MHz
Max	Hardware Dependent: Option 503: 3699999990 Option 508: 8499999990 Option 513: 13799999990 Option 526: 26999999990
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Stop Freq

Sets the stop frequency of the analyzer. This parameter can send up to 20 values.

The location of where the stop frequency occurs in the list sent to the measurement corresponds to the range the value is associated with.

Missing values are not permitted. If you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Key Path	**Meas Setup, Range Table**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO,DVB-T/H
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:FREQuency:STOP <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:SPURious[:RANGe][:LIST]:FREQuency:STOP?`
Example	SPUR:FREQ:STOP 150kHz,30MHz,1GHz,2.1GHz,2.1GHz,2.1774GHz,2.18GHz,12.75GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz SPUR:FREQ:STOP?
Notes	You must be in cdma2000 mode, TD-SCDMA mode, W-CDMA mode, DVB-T/H, GSM/EDGE mode, LTE mode, LTE TDD mode, or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.

Preset	SA, WIMAX OFDMA:+1.98000000E+009,+1.91960000E+009,+2.10150000E+009,+2.18000000E+009,+1.00000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009,+2.50000000E+009 WCDMA:150kHz,30MHz,1GHz,2.1GHz,2.1GHz,2.1774GHz,2.18GHz,12.75GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz C2K, 1xEV-DO: 150kHz, 30 MHz, 1GHz, 5GHz,2.5GHz, 2.5GHz, 2.5GHz , 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz TD-SCDMA: 150kHz, 30 MHz, 1GHz, 12.75GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz , 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz, 2.5 GHz DVB-T/H: 174MHz, 400MHz, 790MHz, 862MHz, 1GHz, 4.5GHz, 2.5GHz, 2.5GHz, 2.5GHz, 2.5GHz, 2.5GHz, 2.5GHz, 2.5GHz, 2.5GHz, 2.5GHz, 2.5GHz, 2.5GHz, 2.5GHz, 2.5GHz, 2.5GHz LTE: 150kHz,30MHz,1GHz,1.92GHz,1.98GHz,2.1GHz,12.75GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz LTETDD: 150kHz,30MHz,1GHz,1.90GHz,2.01GHz,2.025GHz,12.75GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz,2.5GHz
State Saved	Saved in instrument state.
Min	–79999990
Max	Hardware Dependent: Option 503: 3.7 GHz Option 508: 8.5 GHz Option 513: 13.8 GHz Option 526: 27.0 GHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Res BW

Sets the resolution bandwidth of the analyzer. This parameter can send up to 20 values.

The location of where the resolution bandwidth occurs in the list sent to the measurement corresponds to the range the value is associated with.

Missing values are not permitted. In other words, if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

<table>
<tr><td>Key Path</td><td>Meas Setup, Range Table</td></tr>
<tr><td>Mode</td><td>SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD</td></tr>
<tr><td>Remote Command</td><td>[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth[:RESolution] <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>

[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth[:RESolution]?

[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth[:RESolution]:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1

[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth[:RESolution]:AUTO?</td></tr>
<tr><td>Example</td><td>SPUR:BAND 1kHz,10kHz,100kHz,1MHz,1MHz,1MHz,1MHz, 3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz, 3MHz,3MHz

SPUR:BAND?

SPUR:BWID:AUTO ON, ON, ON, OFF, OFF, OFF, OFF, OFF, ON, ON, ON, ON, OFF, OFF, OFF, OFF, OFF, OFF, ON, ON

SPUR:BWID:AUTO?</td></tr>
<tr><td>Notes</td><td>You must be in cdma2000 mode, TD-SCDMA mode, W-CDMA mode, DVB-T/H, GSM/EDGE mode, LTE mode, LTE TDD mode, or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.</td></tr>
</table>

Preset	SA, WIMAX OFDMA:1.2MHz,0.51MHz,0.1MHz,0.1MHz,4MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz WCDMA:1kHz,10kHz,100kHz,1MHz,1MHz,1MHz,1MHz,1MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz C2k, 1xEV-DO: 1kHz,10kHz,100kHz,1MHz,1MHz,1MHz,1MHz, 3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz, 3MHz,3MHz TD-SCDMA: 1kHz,10kHz,100kHz,1MHz, 3MHz, 3MHz,3MHz, 3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz, 3MHz,3MHz DVB-T/H: 100kHz, 3.9kHz, 100kHz, 3.9kHz, 100kHz, 100kHz, 3MHz, 3MHz, 3MHz, 3MHz, 3MHz, 3MHz, 3MHz, 3MHz, 3MHz, 3MHz, 3MHz, 3MHz, 3MHz, 3MHz LTE: 1kHz,10kHz,100kHz,1MHz,100kHz,1MHz,1MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz LTETDD: 1kHz,10kHz,100kHz,1MHz,1MHz,1MHz,1MHz,3MHz,3MHz,3MHz,3MHz, 3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz SA, WIMAX OFDMA:OFF,OFF,OFF,OFF,OFF,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON, ON,ON,ON,ON,ON WCDMA:OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON C2k, 1xEV-DO:OFF,OFF,OFF,OFF,OFF,OFF,OFF,ON,ON,ON,ON, ON,ON,ON,ON,ON,ON,ON,ON,ON TD-SCDMA: OFF,OFF,OFF,OFF,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON DVB-T/H: OFF, OFF, OFF, OFF, OFF, OFF, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON LTE: OFF,OFF,OFF,OFF,OFF,OFF,OFF,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON, ON,ON,ON LTETDD: OFF,OFF,OFF,OFF,OFF,OFF,OFF,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON, ON,ON,ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz

Backwards Compatibility SCPI	[:SENSe]:SPURious[:RANGe][:LIST]:BWIDth[:RESolution]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Video BW

Sets the Video BW mode of the analyzer. This can be Auto, where the analyzer determines the optimum setting, or Manual, where you determine the setting. This parameter can send up to 20 values. The location in the list sent corresponds to the range the value is associated with. Missing values are not permitted, in other words, if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Key Path	**Meas Setup, Range Table**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:VIDeo <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:VIDeo?` `[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:VIDeo:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1` `[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:VIDeo:AUTO?`
Example	SPUR:BAND:VID 1kHz,10kHz,100kHz,1MHz,1MHz,1MHz,1MHz, 3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz,3MHz, 3MHz,3MHz SPUR:BAND:VID? SPUR:BAND:VID:AUTO ON, ON, OFF, OFF, OFF, ON, ON, ON, OFF, OFF, OFF, OFF, OFF, OFF, OFF, ON, ON, ON, ON, ON SPUR:BAND:VID:AUTO?
Notes	You must be in the cdma2000 mode,1xEV-DO mode, TD-SCDMA mode, W-CDMA mode, DVB-TH mode, GSM/EDGE mode, LTE mode, LTE TDD mode, or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.

Preset	SA, WCDMA, C2K, WIMAX OFDMA,TD-SCDMA, 1xEV-DO, DVB-T/H: Automatically calculated LTE: 4.7kHz,47kHz,470kHz,5MHz,470kHz,5MHz,5MHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz LTETDD: 4.7kHz,47kHz,470kHz,5MHz,470kHz,5MHz,5MHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz,300kHz ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON DVB-T/H: OFF,OFF,OFF,OFF,OFF,OFF,OFF,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON LTE: OFF,OFF,OFF,OFF,OFF,OFF,OFF,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON LTETDD: OFF,OFF,OFF,OFF,OFF,OFF,OFF,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Backwards Compatibility SCPI	[:SENSe]:SPURious[:RANGe][:LIST]:BWIDth:VIDeo
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Filter Type

Besides the Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions. The **Filter Type** menu gives you control over these parameters.

Key Path	**Meas Setup, Range Table**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD

Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:SHAPe GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop`  `[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:SHAPe?`
Example	SPUR:BAND:SHAP GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, FLAT, FLAT, FLAT, FLAT, FLAT, GAUS, GAUS, GAUS, GAUS, GAUS, FLAT, FLAT, GAUS, GAUS SPUR:BAND:SHAP?
Preset	GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, GAUS
State Saved	Saved in instrument state.
Range	Gaussian (Normal)|Flattop
Backwards Compatibility SCPI	[:SENSe]:SPURious[:RANGe][:LIST]:BWIDth:SHAPe
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Abs Start Limit

Determines the limit above which spurs will report a failing. If Abs Stop Limit Mode is set to Auto, this is coupled to Abs Stop Limit to make a flat limit line. If set to Man, Abs Start Limit and Abs Stop Limit can take different values to make a sloped limit line.

If the Limit Line Test parameter is off then any spurs which are found to be above the current ‘Peak Excursion’ will be added to the results table. From these spurs, the amplitude will be checked using the abs limit start and abs limit stop parameters and then calculate the limit. An ‘F’ will be appended to the amplitude value of the spur if the measured amplitude is above the limit. If the Limit Line Test is on, only the spurs whose amplitudes exceed the limit will be reported.

This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted. If you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Key Path	**Meas Setup, Range Table**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD

Remote Command	`:CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA[:STARt] <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>` `:CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA[:STARt]?`
Example	CALC:SPUR:LIM:ABS:DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0 CALC:SPUR:LIM:ABS:DATA?
Preset	SA, WIMAX OFDMA: –5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001 WCDMA: –36dBm,–36dBm,–36dBm,–30dBm,–25dBm,–15dBm,–25dBm,–30dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm C2K, 1xEV-DO: –13 dBm, –13dBm, –13 dBm, –13 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm TD-SCDMA: –13 dBm, –13dBm, –13 dBm, –13 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm DVB-T/H: –36dBm, –82dBm, –36dBm, –76dBm, –36dBm, –30dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm LTE: –36dBm,–36dBm,–36dBm,–30dBm,–96dBm,–30dBm,–30dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm LTETDD: –36dBm,–36dBm,–36dBm,–30dBm,–96dBm,–30dBm,–30dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm
State Saved	Saved in instrument state.
Min	–150.0 dBm
Max	50.0 dBm

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Abs Stop Limit

Abs Stop Limit is used to determine the limit above which spurs will report a failing. If Abs Stop Limit Mode is set to Auto, this is coupled to Abs Start Limit to make a flat limit line. If set to Man, Abs Start Limit and Abs Stop Limit can take different values to make a sloped limit line.

This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted. If you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Abs Stop Limit Mode, when set to Couple, couples Abs Start Limit and Abs Stop Limit to make a flat limit line. If set to Man, Abs Start and Abs Stop can take different values to make a sloped limit line.

This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted, in other words, if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Key Path	**Meas Setup, Range Table**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA:STOP <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>` `:CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA:STOP?` `:CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA:STOP:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1` `:CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA:STOP:AUTO?`

Example	CALC:SPUR:LIM:ABS:DATA:STOP –25,–25,–25,–25,–25,–25,–25,–25,–25,–25,–25,–25,–25,–25,–25,–25,–25,–25,–25,–25 CALC:SPUR:LIM:ABS:DATA:STOP? CALC:SPUR:LIM:ABS:DATA:STOP:AUTO ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON CALC:SPUR:LIM:ABS:DATA:STOP:AUTO?
Preset	SA, WIMAX OFDMA: –5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001,–5.00000000E+001, –5.00000000E+001 WCDMA: –36dBm,–36dBm,–36dBm,–30dBm,–25dBm,–15dBm,–25dBm,–30dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm C2K, 1xEV-DO: –13 dBm, –13dBm, –13 dBm, –13 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm TD-SCDMA: –13 dBm, –13dBm, –13 dBm, –13 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm, –50 dBm DVB-T/H: –36dBm, –82dBm, –36dBm, –76dBm, –36dBm, –30dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm, –50dBm LTE: –36dBm,–36dBm,–36dBm,–30dBm,–96dBm,–30dBm,–30dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm LTETDD: –36dBm,–36dBm,–36dBm,–52dBm,–52dBm,–30dBm,–30dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm,–50dBm ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON
State Saved	Saved in instrument state.
Min	–150.0 dBm
Max	50.0 dBm

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Peak Excursion

Sets the minimum amplitude variation of signals that can be identified as peaks. If a value of 6 dB is selected, peaks that rise and fall more than 6 dB above the peak threshold value are identified. This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted. If you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Key Path	**Meas Setup, Range Table**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	[:SENSe]:SPURious[:RANGe][:LIST]:PEAK:EXCursion <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl> [:SENSe]:SPURious[:RANGe][:LIST]:PEAK:EXCursion?
Example	SPUR:PEAK:EXC 20,20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20 SPUR:PEAK:EXC?
Preset	+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000,+6.00000000E+000
State Saved	Saved in instrument state.
Min	0.0 dB
Max	100.0 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Pk Threshold

Sets the minimum amplitude of signals that can be identified as peaks. For example, if a value of –90 dBm is selected, only peaks that rise and fall more than the peak excursion value which are above –90 dBm are identified. This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted. If you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Key Path	**Meas Setup, Range Table**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:PEAK:THReshold <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>` `[:SENSe]:SPURious[:RANGe][:LIST]:PEAK:THReshold?`
Example	SPUR:PEAK:THR 0,0,0 SPUR:PEAK:THR?
Preset	–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001,–9.00000000E+001
State Saved	Saved in instrument state.
Min	–200
Max	0
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00, A.07.00

Attenutaion

Defines attenuation value for each range. When Auto state is ON, attenuation value under AMPTD Y Scale is used. When Auto state is OFF, this value is used as mechanical attenuation value without electric attenuation.

Key Path	**Meas Setup, Range Table**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD

Remote Command	[:SENSe]:SPURious[:RANGe][:LIST]:ATTenuation <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl> [:SENSe]:SPURious[:RANGe][:LIST]:ATTenuation? [:SENSe]:SPURious[:RANGe][:LIST]:ATTenuation:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1 [:SENSe]:SPURious[:RANGe][:LIST]:ATTenuation:AUTO?
Example	SPUR:ATT 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB SPUR:ATT? SPUR:ATT:AUTO 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0 SPUR:ATT:AUTO?
Notes	You must be in cdma2000 mode, 1xEV-DO mode, TD-SCDMA mode, W-CDMA mode, DVB-T/H, SA mode, LTE mode, LTE TDD mode, or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
Couplings	"---" is displayed as value when Auto state is ON, to indicate attenuation value under AMPTD Y Scale is being used.
Preset	10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB, 10dB ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON
State Saved	Saved in instrument state.
Min	0 dB
Max	70 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Detector 1

Sets the detector to be used by the trace for spur detection and limit line testing.

Key Path	**Meas Setup, Range Table**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD

Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:DETector[1][:FUNCtion] AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS`   `[:SENSe]:SPURious[:RANGe][:LIST]:DETector[1][:FUNCtion]?`
Example	SPUR:DET NORM, NORM SPUR:DET?
Notes	For backward compatibility, “NORMal” is available as a SCPI command parameter. However this is treated the same as “RMS” internally, so the query never returns “NORMal” as its results.
Preset	POS,POS,POS,POS,POS,POS,POS,POS,POS,POS,POS,POS,POS,POS,POS ,POS,POS,POS,POS,POS
State Saved	Saved in instrument state.
Range	Normal|Average|Peak|Sample|Negative Peak
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Detector 2

Sets the detector to be used by the trace for display purposes only.

Key Path	**Meas Setup, Range Table**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD

Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:DETector2[:FUNCtion] OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS` `[:SENSe]:SPURious[:RANGe][:LIST]:DETector2[:FUNCtion]?`
Example	SPUR:DET2 AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER,AVER SPUR:DET2?
Notes	For backward compatibility, “NORMal” is available as a SCPI command parameter. However this is treated same as “RMS” internally, so the query never returns “NORMal” as its results.
Preset	OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF
State Saved	Saved in instrument state.
Range	Off| Normal|Average|Peak|Sample|Negative Peak
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Sweep Time

Sets the sweep time mode of the analyzer. This can be Auto, where the analyzer determines the optimum setting, or Manual, where you determine the setting. This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted. If you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Key Path	**Meas Setup, Range Table**

<table>
<tr><td>Mode</td><td>SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD</td></tr>
<tr><td>Remote Command</td><td>[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:TIME <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>, <time>

[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:TIME?

[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:TIME:AUTO OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1, OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1, OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1, OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1,OFF|ON|0|1

[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:TIME:AUTO?</td></tr>
<tr><td>Example</td><td>SPUR:SWE:TIME 10,10,10,10,10,10,10,10,10,10,10,10,10,10,10,10,10,10,10,10

SPUR:SWE:TIME?

SPUR:SWE:TIME:AUTO ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON

SPUR:SWE:TIME:AUTO?</td></tr>
<tr><td>Notes</td><td>You must be in cdma2000 mode, TD-SCDMA mode, W-CDMA mode, DVB-T/H, SA mode, LTE mode, LTE TDD mode, or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.</td></tr>
<tr><td>Preset</td><td>Automatically calculated</td></tr>
<tr><td>State Saved</td><td>Saved in instrument state.</td></tr>
<tr><td>Min</td><td>1.0E–3</td></tr>
<tr><td>Max</td><td>2.0E+3</td></tr>
<tr><td>Initial S/W Revision</td><td>Prior to A.02.00</td></tr>
<tr><td>Modified at S/W Revision</td><td>A.03.00</td></tr>
</table>

Points

Sets the number of points per sweep for the measurement. This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted. If you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

The Points mode can be manual, where you determine the setting or auto, where the analyzer determines the number of trace points to ensure the sweep points resolution equals RBW/2. This is calculated using the following algorithm:

Points = (Stop Freq – Start Freq) / (ResBW / 2), with the computed values being clipped to a minimum of 601 and a maximum of 20001.

This parameter can send up to 20 values. The location in the list sent corresponds to the range the value is associated with. Missing values are not permitted, in other words, if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

<table>
<tr><td>Key Path</td><td>Meas Setup, Range Table</td></tr>
<tr><td>Mode</td><td>SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD</td></tr>
<tr><td>Remote Command</td><td><code>[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:POINts <integer></code>
<code>[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:POINts?</code>
<code>[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:POINts:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1</code>
<code>[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:POINts:AUTO?</code></td></tr>
<tr><td>Example</td><td>SPUR:SWE:POIN 1001,1001,1001
SPUR:SWE:POIN?
SPUR:SWE:POIN:AUTO ON,ON,ON
SPUR:SWE:POIN:AUTO?</td></tr>
<tr><td>Preset</td><td>SA, WIMAX OFDMA, DVB-T/H: +601,+601,+601,+601,+601,+601,+601,+601,+601,+601,+601,+601,+601,+601,+601,+601,+601,+601,+601,+601
WCDMA: 601,2985,9700,1100,601,601,601,10570,601,601,601,601,601,601,601,601,601,601,601,601
C2K: 601,601,9970,11750,,601,601,601,601,601,601,601,601,601,601,601,601,601,601,601,601
CDMA1xEVDO: 601,601,9970,11750,601,601,601,10570,601,601,601,601,601, 601,601,601,601,601,601,601
TD-SCDMA: 601, 5970, 19400, 20001, 601,601,601,601,601,601,601,601,601,601,601,601, 601,601,601,601
LTE, LTETDD : Automatically calculated.
OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF
LTE, LTETDD: : ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON</td></tr>
<tr><td>State Saved</td><td>Saved in instrument state.</td></tr>
</table>

Min	601
Max	20001
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

IF Gain

Sets the IF Gain function to Auto, On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads. A switched IF amplifier with approximately 10 dB of gain is available. This amplifier takes full advantage of the RF dynamic range of the analyzer. When it can be turned on without an overload, the dynamic range is always better with the amplifier on than off.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the rules for auto IF Gain.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`[:SENSe]:SPURious:IF:GAIN:AUTO[:STATe] OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1` `[:SENSe]:SPURious:IF:GAIN:AUTO[:STATe]?`
Example	`SPUR:IF:GAIN:AUTO ON,ON` `SPUR:IF:GAIN:AUTO?`
Couplings	When the sweep type is Swept, 'Auto' sets IF Gain to High Gain under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings using the swept sweep type, auto sets IF Gain to Low Gain.
Preset	OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

IF Gain State

Selects the range of IF Gain.

Remote Command	[:SENSe]:SPURious:IF:GAIN[:STATe] OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1 [:SENSe]:SPURious:IF:GAIN[:STATe]?
Example	SPUR:IF:GAIN ON,ON SPUR:IF:GAIN?
Preset	OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Initial S/W Revision	Prior to A.02.00

Meas Type

Selects either Examine or Full measurement type. This parameter is coupled to the average mode. Therefore, if the examine measurement type is selected, the measurement sets the average mode to exponential. If the full measurement type is selected, the measurement sets the average mode to repeat. The behavior of each measurement type is described in the table below. When averaging is on, trace averaging is used as each active range is measured. Averaging is not used at any other time.

	Single		**Continuous**	
	No Spurs Found	**Spurs Found**	**No Spurs Found**	**Spurs Found**
Examine	All active ranges are measured. On completion the measurement is set to the idle state and the ‘No Spurs’ happening is displayed.	All active ranges are measured and the spurs found reported. On completion the measurement is set to the idle state and the trace containing the worst spur restored. The spur menu key is enabled. A marker is also added which is set to the frequency of the worst spur.	All active ranges are measured. On completion the SA remains set to last range checked with an active trace and the ‘No Spurs’ happening is displayed.	All active ranges are measured and the spurs found reported. On completion the SA is set to the range containing the worst spur found and continually sweeps this range. The spur menu key is enabled. A marker is also added which is set to the frequency of the worst spur.

	Single		Continuous	
	No Spurs Found	**Spurs Found**	**No Spurs Found**	**Spurs Found**
Full	All active ranges are measured. On completion measurement is set to idle state and the ‘No Spurs’ happening is displayed.	All active ranges are measured and spurs found reported. On completion the measurement is set to the idle state, displaying the trace of the last active range.	Measurement continually cycles through all active ranges.	All active ranges are measured and spurs found reported. On each cycle of the active ranges the spurs found are reset. This ensures any remote queries retrieve the trace data that matches the currently displayed results.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	[:SENSe]:SPURious:TYPE EXAMine|FULL [:SENSe]:SPURious:TYPE?
Example	SPUR:TYPE FULL SPUR:TYPE?
Preset	EXAMine
State Saved	Saved in instrument state.
Range	Examine|Full
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Spur

Displays any spurs found. It is only enabled when the measurement type is set to examine and will turn on upon completion of a measurement. Once the Spur menu key has been enabled, you can view any spur. The measurement sets the analyzer to the range in which the currently selected spur was found. The range settings only changes if the spur selected is in a range which is different from the current range settings. A marker is used to identify the currently selected spur on the trace.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, CDMA1xEVDO, TD-SCDMA, DVB-T/H, LTE, LTETDD
Remote Command	[:SENSe]:SPURious:SPUR <integer> [:SENSe]:SPURious:SPUR?

Example	SPUR:SPUR 55 SPUR:SPUR?
Preset	1
State Saved	No
Min	1
Max	200
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Spurious Report Mode

Sets the spurious report mode to either Limit Line Test Only or All.

Select the Limit Line Test (LIMTest) option to report only spurs above the limit line. Any spurs reported will cause the measurement to fail. See Abs Start Limit for more information.

Select All (ALL) to report all spurs detected by Peak Threshold and Peak Excursion.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`[:SENSe]:SPURious:REPT:MODE ALL|LIMTest` `[:SENSe]:SPURious:REPT:MODE?`
Example	SPUR:REPT:MODE LIMT SPUR:REPT:MODE?
Preset	ALL
State Saved	Saved in instrument state.
Range	All|Limit Test
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Fast Spurious Meas (Remote Command only)

This command is provided as the backward compatibility SCPI command of the Fast Spurious Measurement. Since this command is another representation of Spurious Report Mode, this command is coupled with the command.

When set to ON, only spurs above the limit line will be reported. This is the same as Spurious Report Mode “LIMTest”When set to OFF, all detected spurs will be reported. This is the same as Spurious Report Mode “ALL.”

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H
Remote Command	`[:SENSe]:SPURious:FSMeas ON|OFF|1|0` `[:SENSe]:SPURious:FSMeas?`
Example	SPUR:FSM ON SPUR:FSM?
Couplings	If SPUR:REPT:MODE is ALL, this parameter is OFF. If SPUR:REPT:MODE is LIMTest, this parameter is ON.
Preset	OFF
State Saved	Saved in instrument state.
Initial S/W Revision	A.04.00

Meas Preset

Restores all measurement parameters to their default values.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CONFigure:SPURious`
Example	CONF:SPUR
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Range Preset (TD-SCDMA only)

Sets the specific range parameters to meet the requirement of the BS mandatory limits (Category A), the BS mandatory limits (Category B) and the MS mandatory and optional limits in the TD-SCDMA mode. This key only shows up in the TD-SCDMA mode.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

Category A (TD-SCDMA only)

Sets the range parameters to meet the requirement of the BS mandatory spurious emissions limits (Category A).

BS Mandatory spurious emissions limits, Category A

Band	Maximum level	Measurement bandwidth	Note
9 kHz – 150 kHz	–13 dBm	1 kHz	Bandwidth as in ITU-R SM.329–9, s4.1
150 kHz – 30 MHz		10 kHz	Bandwidth as in ITU-R SM.329–9, s4.1
30 MHz – 1 GHz		100 kHz	Bandwidth as in ITU-R SM.329–9, s4.1
1 GHz – 12,75 GHz		1 MHz	Upper frequency as in ITU-R SM.329–9, s2.5 table 1

(The requirement applies at frequencies within the specified frequency ranges which are more than 4 MHz under the first carrier frequency used or more than 4 MHz above the last carrier frequency used.)

Key Path	**Meas Setup, Range Preset**
Mode	TD-SCDMA
Remote Command	`[:SENSe]:SPURious:CATegory:A`
Example	SPUR:CAT:A
Dependencies	This key is grayed out when the radio device is MS.
Initial S/W Revision	Prior to A.02.00

Category B (TD-SCDMA only)

Sets the range parameters to meet the requirement of the BS mandatory spurious emissions limits (Category B).

BS Mandatory spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9kHz – 150kHz	–36 dBm	1 kHz	Bandwidth as in ITU SM.329–9, s4.1
150kHz – 30MHz	– 36 dBm	10 kHz	Bandwidth as in ITU SM.329–9, s4.1
30MHz – 1GHz	–36 dBm	100 kHz	Bandwidth as in ITU SM.329–9, s4.1
1GHz ´ Fc1–19,2 MHz or Fl –10 MHz whichever is the higher	–30 dBm	1 MHz	Bandwidth as in ITU SM.329–9, s4.1

Band	Maximum Level	Measurement Bandwidth	Note
Fc1 – 19,2 MHz or Fl –10 MHz whichever is the higher ´ Fc1 – 16 MHz or Fl –10 MHz whichever is the higher	–25 dBm	1 MHz	Specification in accordance with ITU-R SM.329–9, s4.1
Fc1 – 16 MHz or Fl –10 MHz whichever is the higher ´ Fc2 + 16 MHz or Fu +10 MHz whichever is the lower	–15 dBm	1 MHz	Specification in accordance with ITU-R SM.329–9, s4.1
Fc2 + 16 MHz or Fu + 10 MHz whichever is the lower ´ Fc2 +19,2 MHz or Fu + 10 MHz whichever is the lower	–25 dBm	1 MHz	Specification in accordance with ITU-R SM.329–9, s4.1
Fc2 + 19,2 MHz or Fu +10 MHz whichever is the lower ´ 12,75 GHz	–30 dBm	1 MHz	Bandwidth as in ITU-R SM.329–9, s4.1. Upper frequency as in ITU-R SM.329–9, s2.5 table 1

(The requirement applies at frequencies within the specified frequency ranges which are more than 4 MHz under the first carrier frequency used or more than 4 MHz above the last carrier frequency used.)

Key Path	**Meas Setup, Range Preset**
Mode	TD-SCDMA
Remote Command	`[:SENSe]:SPURious:CATegory:B`
Example	SPUR:CAT:B
Dependencies	This key is grayed out when the radio device is MS.
Initial S/W Revision	Prior to A.02.00

Mobile (TD-SCDMA only)

Sets the range parameters to meet the requirement of both the MS general and additional spurious emissions limits.

General Spurious emissions requirements

Frequency Bandwidth	Resolution Bandwidth	Minimum requirement
9 kHz ≤ f < 150 kHz	1 kHz	–36 dBm
150 kHz ≤ f < 30 MHz	10 kHz	–36 dBm
30 MHz ≤ f < 1000 MHz	100 kHz	–36 dBm
1 GHz ≤ f < 12.75 GHz	1 MHz	–30 dBm

Additional Spurious emissions requirements

Frequency Bandwidth	**Resolution Bandwidth**	**Minimum requirement**
925 MHz ≤ f ≤ 935 MHz	100 KHz	–67 dBm*
935 MHz < f ≤ 960 MHz	100 KHz	–79 dBm*
1805 MHz ≤ f ≤ 1880 MHz	100 KHz	–71 dBm*

* The measurements are made on frequencies which are integer multiples of 200 kHz.

(These requirements are only applicable for frequencies which are greater than 4 MHz away from the UE center carrier frequency.)

Key Path	**Meas Setup, Range Preset**
Mode	TD-SCDMA
Remote Command	`[:SENSe]:SPURious:CATegory:MS`
Example	SPUR:CAT:MS
Notes	The former command “[:SENSe]:SPURious:CATegory:MOBile” is still supported.
Dependencies	This key is grayed out when the radio device is BTS.
Initial S/W Revision	Prior to A.02.00

Frequency Setup (TD-SCDMA only)

Sets the required frequency parameters for the calculation of the start/stop frequency of the spurious emissions limits in TD-SCDMA mode.

The measurement does not restart when changing the values of the setup parameters. These parameters are used for calculating the range start and stop frequency in the measurement only. If you are going to perform a measurement with the newly-input values,, one of the soft key in the “Range Preset” menu should also be pressed afterwards.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

Center Frequency of the First Carrier (Fc1) (TD-SCDMA only)

Sets the center frequency of emission of the first carrier transmitted by the base station. This parameter is used for calculating the start/stop frequency of the range for base station when the softkey “Category A” or “Category B” under the range preset menu pressed.

Key Path	**Meas Setup, Freq Setup**
Mode	TD-SCDMA
Remote Command	`[:SENSe]:SPURious:CARRier:FREQuency:STARt <freq>` `[:SENSe]:SPURious:CARRier:FREQuency:STARt?`
Example	SPUR:CARR:FREQ:STAR 2GHz SPUR:CARR:FREQ:STAR?
Notes	You must be in the TD-SCDMA mode. Use INSTrument:SELect to set the mode.
Couplings	Coupled with Fc2 and Fl. The value of Fc1 is always not greater than the value of Fc2, and greater than the value of Fl. The following inequation for Fl, Fc1, Fc2 and Fu is satisfied: Fl + 0.8MHz <= Fc1 <= Fc2 <= Fu – 0.8 MHz; This key is grayed-out when the radio device is MS.
Preset	2.0156 GHz
State Saved	Saved in instrument state.
Min	See Coupling
Max	See Coupling
Initial S/W Revision	Prior to A.02.00

Center Frequency of the Last Carrier (Fc2) (TD-SCDMA only)

Sets the center frequency of emission of the last carrier transmitted by the base station. This parameter is used for calculating the start/stop frequency of the range for base station when the softkey “Category A” or “Category B” under the range preset menu pressed.

Key Path	**Meas Setup, Freq Setup**
Mode	TD-SCDMA
Remote Command	`[:SENSe]:SPURious:CARRier:FREQuency:STOP <freq>` `[:SENSe]:SPURious:CARRier:FREQuency:STOP?`
Example	SPUR:CARR:FREQ:STOP 10GHz SPUR:CARR:FREQ:STOP?
Notes	You must be in the TD-SCDMA mode. Use INSTrument:SELect to set the mode.
Dependencies	This key is grayed out when the radio device is MS.
Couplings	Coupled with Fc1 and Fu. The value of Fc2 is always not less than the value of Fc1, and less than the value of Fu. The following inequation for Fl, Fc1, Fc2 and Fu is satisfied: Fl + 0.8MHz <= Fc1 <= Fc2 <= Fu – 0.8 MHz;
Preset	2.0236 GHz
State Saved	Saved in instrument state.
Min	See Coupling
Max	See Coupling
Initial S/W Revision	Prior to A.02.00

TDD Lower Frequency (Fl) (TD-SCDMA only)

Sets the lower frequency of the band in which TDD operates. This parameter is used for calculating the start/stop frequency of the range for base station when the softkey “Category B” under the range preset menu pressed.

Key Path	**Meas Setup, Freq Setup**
Mode	TD-SCDMA
Remote Command	`[:SENSe]:SPURious:TDD:FREQuency:STARt <freq>` `[:SENSe]:SPURious:TDD:FREQuency:STARt?`
Example	SPUR:TDD:FREQ:STAR 1GHz SPUR:TDD:FREQ:STAR?
Notes	You must be in the TD-SCDMA mode. Use INSTrument:SELect to set the mode.
Dependencies	This key is grayed out when the radio device is MS.
Couplings	Coupled with Fc1. The value of Fl is always less than the value of Fc1. The following inequation for Fl, Fc1, Fc2 and Fu is satisfied: Fl + 0.8MHz <= Fc1 <= Fc2 <= Fu – 0.8 MHz;
Preset	2.010 GHz

State Saved	Saved in instrument state.
Min	1.011 GHz
Max	See Coupling
Initial S/W Revision	Prior to A.02.00

TDD Upper Frequency (Fu) (TD-SCDMA only)

Sets the upper frequency of the band in which TDD operates. This parameter is used for calculating the start/stop frequency of the range for base station when the softkey “Category B” under the range preset menu pressed.

Key Path	**Meas Setup, Freq Setup**
Mode	TD-SCDMA
Remote Command	[:SENSe]:SPURious:TDD:FREQuency:STOP <freq> [:SENSe]:SPURious:TDD:FREQuency:STOP?
Example	SPUR:TDD:FREQ:STOP 1GHz SPUR:TDD:FREQ:STOP?
Notes	You must be in the TD-SCDMA mode. Use INSTrument:SELect to set the mode.
Dependencies	This key is grayed out when the radio device is MS.
Couplings	Coupled with Fc2. The value of Fu is always greater than the value of Fc2. The following inequation for Fl, Fc1, Fc2 and Fu is satisfied: Fl + 0.8MHz <= Fc1 <= Fc2 <= Fu – 0.8 MHz;
Preset	2.025 GHz
State Saved	Saved in instrument state.
Min	See Coupling
Max	3.689 GHz
Initial S/W Revision	Prior to A.02.00

Center Frequency for Mobile (TD-SCDMA only)

Sets the center frequency of the mobile. This parameter is used for calculating the start/stop frequency of the range for mobile after the softkey “Mobile” under the range preset menu pressed.

Key Path	**Meas Setup, Freq Setup**
Mode	TD-SCDMA
Remote Command	[:SENSe]:SPURious:CARRier:FREQuency:MS <freq> [:SENSe]:SPURious:CARRier:FREQuency:MS?

Example	SPUR:CARR:FREQ:MS 2GHz SPUR:CARR:FREQ:MS?
Notes	You must be in the TD-SCDMA mode. Use INSTrument:SELect to set the mode. The former SCPI commands "[:SENSe]:SPURious:CARRier:FREQuency:MOBil <freq>" and "[:SENSe]:SPURious:CARRier:FREQuency:MOBil?" are still supported.
Dependencies	This key is grayed out when the radio device is BTS.
Preset	2.0204 GHz
State Saved	Saved in instrument state.
Min	1.005 GHz
Max	3.695 GHz
Initial S/W Revision	Prior to A.02.00

CH Mean Power (DVB-T/H only)

Set the mean power of the signal channel. The enter value is used to calculate the limit parameter which is different according as the different mean power of the transmitter. This key only shows up in the DVB-T/H.

Category A (mean power < 25W)

Freq Range	Limit	RBW	Note
9kHz~174MHz	–36dBm	100kHz	Required by EN302–296 Chapter 4.2.1 for DVB-T transmitter.
174MHz~400MHz	–82dBm	4kHz	
400MHz~790MHz	–36dBm	100kHz	
790MHz~862MHz	–76dBm	4kHz	
862MHz~1GHz	–36dBm	100kHz	
> 1GHz	–30dBm	100kHz	

Category B (25W<mean power<=1000W)

Freq Range	**Limit**	**RBW**	**Note**
9kHz~174MHz	–36dBm	100kHz	Required by EN302–296 Chapter 4.2.1 for DVB-T transmitter.
174MHz~400MHz	–126dBc	4kHz	
400MHz~790MHz	–36dBm	100kHz	
790MHz~862MHz	–120dBc	4kHz	
862MHz~1GHz	–36dBm	100kHz	
> 1GHz	–30dBm	100kHz	

Category C (mean power > 1000W)

Freq Range	**Limit**	**RBW**	**Note**
9kHz~174MHz	–36dBm	100kHz	Required by EN302–296 Chapter 4.2.1 for DVB-T transmitter.
174MHz~400MHz	–66dBm	4kHz	
400MHz~790MHz	–36dBm	100kHz	
790MHz~862MHz	–60dBm	4kHz	
862MHz~1GHz	–36dBm	100kHz	
> 1GHz	–30dBm	100kHz	

Key Path	**Meas Setup**
Mode	DVB-T/H
Remote Command	[:SENSe]:SPURious:CARRier:POWer <real> [:SENSe]:SPURious:CARRier:POWer?
Example	SPUR:CARR:POW –30.00 dBm SPUR:CARR:POW?
Couplings	When the mean power of the signal channel is between 25 watt and 1000 watt, the measurement uses the current enter value as the reference to calculate the limit parameters.
Preset	–30.00 dBm
State Saved	Saved in instrument state.
Min	–250.0 dBm
Max	250.0 dBm
Initial S/W Revision	A.02.00

Mode

See “Mode” on page 1271 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Mode Setup

See "Mode Setup" on page 1291 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Key Path	**Front-panel key**
Mode	SA, WCDMA, C2K, WIMAX OFDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`CALC:SPUR:MARK2:MAX`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Next Peak

Moves the selected marker to the peak that has the next highest amplitude less than the current marker value.

Key Path	**Peak Search**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:NEXT`
Example	CALC:SPUR:MARK2:MAX:NEXT
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Next Pk Right

Moves the selected marker to the nearest peak to the right of the current marker which meets all enabled peak criteria.

Key Path	**Peak Search**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:RIGHt`
Example	CALC:SPUR:MARK2:MAX:RIGH
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.03.00

Next Pk Left

Moves the selected marker to the nearest peak to the left of the current marker which meets all enabled peak criteria.

Key Path	**Peak Search**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:LEFT`
Example	CALC:SPUR:MARK2:MAX:LEFT
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker Delta

Performs the same function as the Delta 1-of-N selection key in the Marker menu. This sets the control mode for the selected marker to Delta mode. See the Marker section for the complete description of this function. The key is duplicated here in the Peak Search Menu to allow you to conveniently perform a peak search and change the control of the Marker mode to Delta without having to access two separate menus.

Key Path	**Peak Search**
Initial S/W Revision	Prior to A.02.00

Pk-Pk Search

Finds and displays the amplitude and frequency (or time, if in zero span) differences between the highest and lowest y-axis value.

Key Path	**Peak Search**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:PTPeak`
Example	CALC:SPUR:MARK:PTP
Notes	Turns on the Marker Δ
Dependencies	This key is not available (key is grayed-out) when **Coupled Markers** is on.
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.03.00

Min Search

Moves the selected marker to the minimum y-axis value on the current trace.

Key Path	**Peak Search**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	CALC:SPUR:MARK:MIN
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Recall

See “Recall” on page 174 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Restart

See “Restart” on page 1299 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Save

See “Save” on page 186 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Single

See “Single (Single Measurement/Sweep)” on page 1305 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Source

See “Source” on page 1307 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Span X Scale

Span X Scale is unavailable in the Spurious Emissions measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Sweep/Control

Accesses the Sweep/Control menu keys used to set up and control the sweep time and source.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Sweep Setup

Sets the sweep functions that control the sweep state and time.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Auto Sweep Time Rules

Switches the analyzer between normal and accuracy sweep states. Setting **Auto Sweep Time** to **Accy** will result in slower sweep times, usually about three times as long, but better amplitude accuracy for CW signals. The instrument amplitude accuracy specifications only apply when **Auto Sweep Time** is set to **Accy**.

Additional amplitude errors which occur when **Auto Sweep Time** is set to **Norm** are usually well under 0.1 dB, though this is not guaranteed. Because of the faster sweep times and still low errors, **Norm** is the preferred setting of **Auto Sweep Time**. **Auto Sweep Time** is set to **Norm** on a **Preset** or **Auto Couple**. This means that in the Preset or Auto Coupled state, instrument amplitude accuracy specifications do not apply.

Key Path	**Sweep/Control, Sweep Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD
Remote Command	`[:SENSe]:SPURious:SWEep:TIME:AUTO:RULes NORMal|ACCuracy` `[:SENSe]:SPURious:SWEep:TIME:AUTO:RULes?`
Example	SPUR:SWE:TIME:AUTO:RUL ACC SPUR:SWE:TIME:AUTO:RUL?
Notes	In Zero Span, this key is irrelevant and inaccessible (because the whole Sweep Setup menu is grayed out), however, Sweep Setup settings can be changed remotely with no error indication.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Norm|Accy
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.03.00

Pause

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing the Resume resumes the measurement at the point it was at when paused.

See “Pause/Resume” on page 1321 in the "Common Measurement Functions" section for more information.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Gate

Accesses a menu that enables you to control the gating function .See Measurement Functions for more details.

The Gate functionality is used to view signals best viewed by qualifying them with other events. See “Gate ” on page 1322 in “common Measurement Functions” for more details.

Key Path	**Sweep/Control**
Initial S/W Revision	A.03.00

Trace/Detector

Trace/Detector is unavailable in the Spurious Emissions measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Trigger

Accesses the Trigger menu which contains keys to control the 1-of-N selection of the Trigger source.

The trigger functions let you select the trigger settings for a sweep or measurement.

See "Trigger" on page 1339 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

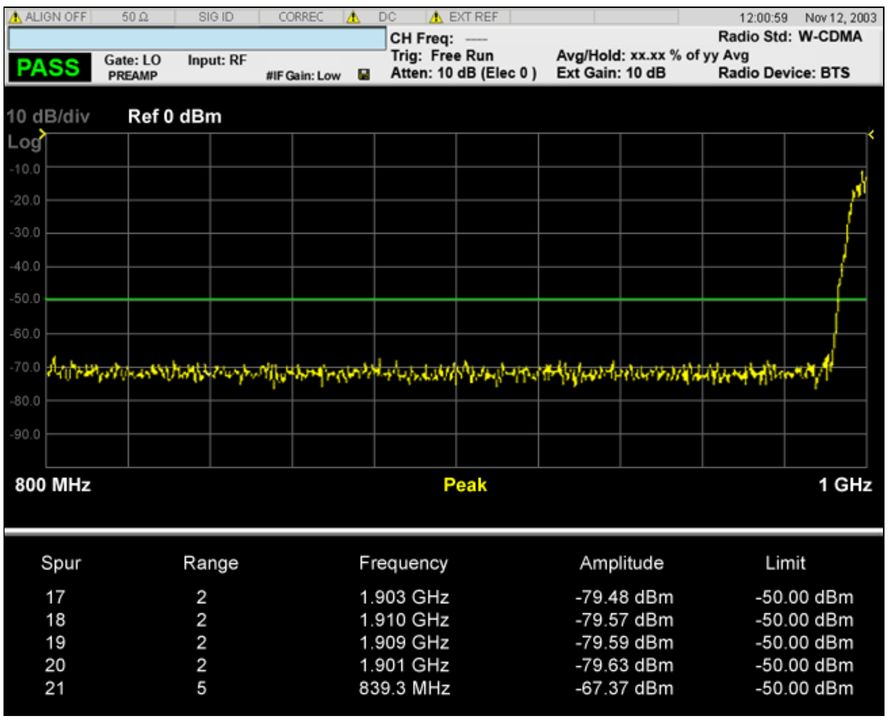
View/Display

Accesses a menu that includes the Display key, which enables you to control the instrument display.

See “Standard Result Screen” on page 647 for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Standard Result Screen



Result	Units	Min	Max
Spur	N/A	0	200
Range	N/A	1	20
Frequency	Hz	Analyzer Min	Analyzer Max
Amplitude	dBm	–150	50
Limit	dBm	–150	50
Initial S/W Revision	Prior to A.02.00		

The spurs listed are within the current value of the Marker Peak Excursion setting of the absolute limit. All of the spurs listed passed. Any spur that has failed the absolute limit will have an ‘F’ beside it.

Display

Accesses a menu of functions that enable you to set the display parameters.

See “Display” on page 1385 in the "Common Measurement Functions" section for more information.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

10 Occupied Bandwidth Measurement

The Occupied Bandwidth measurement computes and displays the bandwidth occupied by a given percentage of the total mean power of a signal. For measurement results and views, see “View/Display” on page 699.

This topic contains the following sections:

“Remote Commands for Occupied Bandwidth ” on page 649

“Remote Command Results for Occupied Bandwidth Measurement” on page 650

Remote Commands for Occupied Bandwidth

```
:CONFigure:OBWidth
:CONFigure:OBWidth:NDEFault
:INITiate:OBWidth
:FETCh:OBWidth [n]?
:MEASure:OBWidth [n]?
:READ:OBWidth [n]?
:FETCh:OBWidth:OBWidth?
:MEASure:OBWidth:OBWidth?
:READ:OBWidth:OBWidth?
:FETCh:OBWidth:FERRor?
:MEASure:OBWidth:FERRor?
:READ:OBWidth:FERRor?
:FETCh:OBWidth:XDB?
:MEASure:OBWidth:XDB?
:READ:OBWidth:XDB?
```

See also the section, “Remote Measurement Functions” on page 1257.

Remote Command Results for Occupied Bandwidth Measurement

n	Results Returned
n=1 (or not specified)	Returns 6 scalar results, in the following order: 1. Occupied bandwidth – Hz 2. Total Power – dBm (Total Power will be obsolete in TD-SCDMA mode, this place will be replaced by NaN) 3. Span - Hz 4. Spectrum Trace Points - points 5. Res BW – Hz 6. Transmit Frequency Error Hz 7. x DB Bandwidth - Hz
2	Returns the frequency-domain spectrum trace (data array) for the entire frequency range being measured.

Key Path	**Meas**
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale (Amplitude/Y Scale)

Activates the Reference Value function and displays the Amplitude menu keys. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis

See "AMPTD Y Scale" on page 1119 for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Ref Value

Sets the absolute power reference value. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:OBW:VIEW:WIND:TRAC:Y:RLEV 125 DISP:OBW:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode,BLUETOOTH mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10.00 dBm
State Saved	Saved in instrument state.
Min	–250.00 dBm
Max	250.00 dBm
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings. This key has read-back text that describes the total attenuator value.

See "Attenuation" on page 1120 for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Scale/Div

Sets the logarithmic units per vertical graticule division on the display. When the Auto Scaling is On, the Scale/Div is automatically determined by the measurement result. When you set a value manually, Auto Scaling is automatically toggled to Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:OBW:VIEW:WIND:TRAC:Y:PDIV 5 DISP:OBW:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode,BLUETOOTH mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10.00 dB
State Saved	Saved in instrument state.
Min	0.10 dB
Max	20.00 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See “Presel Center” on page 1136 for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	Prior to A.02.00

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

See “Preselector Adjust” on page 1137 for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	Prior to A.02.00

Y Axis Unit

Allows you to change the vertical (Y) axis amplitude unit.

See “Y Axis Unit” on page 1138 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	A.04.00

Reference Level Offset

Adds an offset value to the displayed reference level. The reference level is the absolute amplitude represented by the top graticule line on the display.

See “Reference Level Offset” on page 1144 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	A.04.00

µW Path Control

The **µW Path Control** functions include the **µW Preselector Bypass** (Option MPB) and **Low Noise Path** (Option LNP) controls in the High Band path circuits.

See "µW Path Control " on page 1145 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	A.04.00

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See "Internal Preamp" on page 1149 for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Ref Position

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:OBW:VIEW:WIND:TRAC:Y:RPOS BOTT DISP:OBW:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode,ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode,BLUETOOTH mode,1xEVDO mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.03.00

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Key Path	**AMPTD Y Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:OBW:VIEW:WIND:TRAC:Y:COUP ON DISP:OBW:VIEW:WIND:TRAC:Y:COUP?
Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically sets the scale per division to 10 dB and determines reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Preset	1
State Saved	Saved in instrument state.
Range	On | Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Auto Couple

The Auto Couple function is not supported in this measurement.

Key Path	**Front-panel key**

BW

Accesses a menu of functions that enable you to specify and control the video and resolution bandwidths. You can also select the type of filter for the measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Res BW

Sets the resolution bandwidth for the current measurement. If an unavailable bandwidth is entered with the numeric keypad, the closest available bandwidth is selected.

Key Path	**BW**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH

Remote Command	`[:SENSe]:OBWidth:BANDwidth[:RESolution] <bandwidth>`
	`[:SENSe]:OBWidth:BANDwidth[:RESolution]?`
	`[:SENSe]:OBWidth:BANDwidth[:RESolution]:AUTO ON|OFF|1|0`
	`[:SENSe]:OBWidth:BANDwidth[:RESolution]:AUTO?`

Example	OBW:BAND 250000 OBW:BAND? OBW:BAND:AUTO OFF OBW:BAND:AUTO?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode,ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode,BLUETOOTH mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Couplings	Sweep time is coupled to RBW. As the RBW changes, the sweep time (if set to Auto) is changed to maintain amplitude calibration. Video bandwidth (VBW) is coupled to RBW. As the resolution bandwidth changes, the video bandwidth (if set to Auto) changes to maintain the ratio of VBW/RBW (10:1). When Res BW is set to Auto, the resolution bandwidth is auto-coupled to span. The ratio of Span/RBW is approximately 106:1 when auto coupled. When Res BW is set to Man, bandwidths are entered manually, and these bandwidths are used regardless of other analyzer settings.

Preset	SA: Auto WCDMA: 30 kHz CDMA2K: 12 kHz WIMAX OFDMA: 100kHz TD-SCDMA: 30kHz 1xEVDO: 30kHz ISDB-T: 10kHz CMMB: 3kHz LTE: 30 kHz LTETDD: 30 kHz BLUETOOTH 10 kHz SA: ON WCDMA, C2K,TD-SCDMA,WIMAX OFDMA, 1xEVDO ,ISDB-T, CMMB, LTE, LTETDD: OFF
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Backwards Compatibility SCPI	[:SENSe]:OBWidth:BWIDth[:RESolution]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Video BW

Changes the analyzer post–detection filter.

Key Path	**BW**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH

Remote Command	`[:SENSe]:OBWidth:BANDwidth:VIDeo <bandwidth>`
	`[:SENSe]:OBWidth:BANDwidth:VIDeo?`
	`[:SENSe]:OBWidth:BANDwidth:VIDeo:AUTO ON|OFF|1|0`
	`[:SENSe]:OBWidth:BANDwidth:VIDeo:AUTO?`

Example	OBW:BAND:VID 5 MHz OBW:BAND:VID? OBW:BAND:VID:AUTO ON OBW:BAND:VID:AUTO?

Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode,ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode,BLUETOOTH mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Dependencies	When using the average detector with either Sweep Time set to Man, or in zero span, the VBW setting has no effect and is disabled (grayed out).
Couplings	Video bandwidth (VBW) is coupled to RBW. As the resolution bandwidth changes, the video bandwidth (if set to Auto) changes to maintain the ratio set by VBW/RBW. Sweep Time is coupled to Video Bandwidth (VBW). As the VBW is changed, the sweep time (when set to Auto) is changed to maintain amplitude calibration. This occurs because of common hardware between the two circuits, even though the Video BW filter is not actually “in-circuit” when the detector is set to Average. Because the purpose of the average detector and the VBW filter are the same, either can be used to reduce the variance of the result. Although the VBW filter is not “in-circuit” when using the average detector, the Video BW key can have an effect on (Auto) sweep time, and is not disabled. In this case, reducing the VBW setting increases the sweep time, which increases the averaging time, producing a lower-variance trace. When the video bandwidth is AUTO coupled, the video bandwidth value is set to: Resolution Bandwidth * Video Bandwidth to Resolution Bandwidth Ratio
Preset	SA, LTE, LTETDD: Auto WCDMA: 300 kHz CDMA2K:120 kHz WIMAX OFDMA: 1MHz TD-SCDMA: 300kHz 1xEVDO: 300kHz ISDB-T: 300Hz CMMB: 3kHz BLUETOOTH: 30kHz ON ISDB-T, CMMB: OFF
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Backwards Compatibility SCPI	[:SENSe]:OBWidth:BWIDth:VIDeo
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.03.00

Filter Type

Allows you to select the type of filter to be used for the current measurement. Besides the Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

Key Path	**BW**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`[:SENSe]:OBWidth:BANDwidth:SHAPe GAUSsian|FLATtop` `[:SENSe]:OBWidth:BANDwidth:SHAPe?`
Example	OBW:BAND:SHAP GAUS OBW:BAND:SHAP?
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian|Flattop
Backwards Compatibility SCPI	[:SENSe]:OBWidth:BWIDth:SHAPe
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Cont (Continuous)

See “Cont (Continuous Measurement/Sweep)” on page 1155 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

FREQ/Channel (Frequency or Channel)

See “FREQ Channel” on page 1157 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Input/Output

See “Input/Output” on page 1165 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays the menu keys that enable you to select, set up and control the markers for the current measurement

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off.**

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH

Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>`
	
	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X ?`

Example	CALC:OBW:MARK3:X 0 CALC:OBW:MARK3:X?
Notes	The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency**.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off.**

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X :POSition <real>` `:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X :POSition?`
Example	CALC:OBW:MARK10:X:POS 0 CALC:OBW:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker's reference marker in trace points if the control mode is **Delta**.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y ?`
Example	CALC:OBW:MARK11:Y?
Preset	Result dependent on Markers setup and signal source.
State Saved	No
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker Type

Sets the marker control mode to **Normal**, **Delta** or **Off**, If the selected marker is Off, pressing Marker sets it to Normal and places a single marker at the center of the display. At the same time, **Marker X Axis Value** appears on the Active Function area.

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:OBW:MARK:MODE POS CALC:OBW:MARK:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal | Delta | Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Properties

Accesses the marker properties menu.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker, Properties**

Initial S/W Revision	Prior to A.02.00

Relative To

Selects the desired marker. The selected marker will be relative to its reference marker.

Key Path	**Marker, Properties**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:OBW:MARK:REF 2 CALC:OBW:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” When queried a single value is returned (the specified marker numbers relative marker). You must be in the Spectrum Analysis mode, WCDMA mode, TD-SCDMA mode, 1xEVDO mode, WIMAX OFDMA mode ISDB-T mode, CMMB mode, LTE mode, LTETDD mode or BLUETOOTH modeto use this command. Use:INSTrument:SELect to set the mode.
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

All Markers Off

Turns off all markers.

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:CALCulate:OBWidth:MARKer:AOFF`
Example	CALC:OBW:MARK:AOFF

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Backward Compatibility SCPI Commands

Sets or queries the state of a marker. Setting a marker which is OFF to state ON or 1 puts it in Normal mode and places it at the center of the screen.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:STATe OFF|ON|0|1` `:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:STATe?`
Example	CALC:OBW:MARK3:STAT ON CALC:OBW:MARK3:STAT?
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker Function

There are no ‘Marker Functions’ supported in this measurement.

Key Path	**Front panel key**
Initial S/W Revision	Prior to A.02.00

Marker To

There is no ‘Marker To’ functionality supported in this measurement.

Key Path	**Front panel key**
Initial S/W Revision	Prior to A.02.00

Meas

See “Meas” on page 1257 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Meas Setup

Displays the setup menu for the current measurement. The measurement setup parameters include the number of measurement averages used to calculate the measurement result and the averaging mode. The setup menu also includes the option to reset the measurement settings to their factory defaults.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Avg/Hold Num

Specifies the number of measurement averages used when calculating the measurement result. The average is displayed at the end of each sweep.

Initiates an averaging routine that averages the sweep points in a number of successive sweeps, resulting in trace smoothing.

After the specified number of average counts, the average mode (termination control) setting determines the average action.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH

Remote Command	`[:SENSe]:OBWidth:AVERage:COUNt <integer>`
	`[:SENSe]:OBWidth:AVERage:COUNt?`
	`[:SENSe]:OBWidth:AVERage[:STATe] ON|OFF|1|0`
	`[:SENSe]:OBWidth:AVERage[:STATe]?`

Example	OBW:AVER:COUN 1500 OBW:AVER:COUN? OBW:AVER ON OBW:AVER?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode,ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Couplings	None Averaging state is coupled to Max Hold. If Max Hold is changed from Off to On, Averaging state is automatically set to On.
Preset	10 ON

State Saved	Saved in instrument state.
Min	1
Max	10000
Backwards Compatibility SCPI	[:SENSe]:EBWidth:AVERage:COUNt
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Avg Mode

Enables you to set the averaging mode.

When set to Exponential (Exp) the measurement averaging continues using the specified number of averages to compute each averaged value. The average is displayed at the end of each sweep.

When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA , 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`[:SENSe]:OBWidth:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:OBWidth:AVERage:TCONtrol?`
Example	OBW:AVER:TCON REP OBW:AVER:TCON?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	EXP
State Saved	Saved in instrument state.
Range	Exp | Repeat
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Max Hold (Remote Command Only)

When On, Max Hold displays and holds the maximum responses of the current measurement. Turn Max Hold to Off to disable the maximum hold feature.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`[:SENSe]:OBWidth:MAXHold ON|OFF|1|0` `[:SENSe]:OBWidth:MAXHold?`
Example	OBW:MAXH ON OBW:MAXH?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode,ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode,1xEVDO mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Couplings	Max Hold is coupled to Average/Hold state. The Max Hold function is activated only if Average state is On. If Max Hold is changed to On when Average state is Off, Average state is automatically set to On.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	[:SENSe]:EBWidth:MAXHold
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Occ BW % Pwr

Assigns the percentage of the total power that is measured within the Occupied Bandwidth for the current measurement. The resulting Occupied Bandwidth limits are displayed by markers placed on the frequencies of the specified percentage.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`[:SENSe]:OBWidth:PERCent <real>` `[:SENSe]:OBWidth:PERCent?`
Example	OBW:PERC 75 OBW:PERC?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode,ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode. If Mode is BLUETOOTH, the key will be grayed out.
Preset	99.00

State Saved	Saved in instrument state.
Min	10
Max	99.99
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

x dB

Sets the x dB value used for the "x dB bandwidth" result that measures the bandwidth between two points on the signal which is x dB down from the highest signal point within the OBW Span.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	[:SENSe]:OBWidth:XDB <rel_ampl> [:SENSe]:OBWidth:XDB?
Example	OBW:XDB –20 OBW:XDB?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode,ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode,1xEVDO mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	–26.0 dB BLUETOOTH: –20.0 dB.
State Saved	Saved in instrument state.
Min	–100.0 dB
Max	–0.1 dB
Backwards Compatibility SCPI	[:SENSe]:EBWidth:XDB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

IF Gain

The **IF Gain** key can be used to set the IF Gain function to Auto, Low Gain or High Gain. These settings affect sensitivity and IF overloads.

This only applies to the RF input. It does not apply to baseband I/Q input.

Key Path	**Meas Setup, IF Gain**

Initial S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the Auto Rules for IF Gain. When Auto is active, the IF Gain is set to High Gain under and of the following conditions:

— the input attenuator is set to 0 dB

— the preamp is turned On and the frequency range is under 3.6 GHz

For other settings, Auto sets the IF Gain to Low Gain.

Key Path	**Meas Setup, IF Gain**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`[:SENSe]:OBWidth:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:OBWidth:IF:GAIN:AUTO[:STATe]?`
Example	`OBW:IF:GAIN:AUTO OFF` `OBW:IF:GAIN:AUTO?`
Couplings	When the auto attenuation exists (for example, with electrical attenuator), the IF Gain setting is changed as following rule. Auto sets IF Gain to High Gain under any of the following conditions: the input attenuator is set to 0 dB, or the preamp is turned on and the frequency range is less than 3.6 GHz. For other settings, Auto sets IF Gain to Low Gain.
Preset	OFF
State Saved	Saved in instrument state.
Range	Off|On
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

IF Gain State

Selects the range of the IF Gain.

Key Path	**Meas Setup, IF Gain**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`[:SENSe]:OBWidth:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:OBWidth:IF:GAIN[:STATe]?`
Example	`OBW:IF:GAIN ON` `OBW:IF:GAIN?`

Notes	Where ON = high gain OFF = low gain
Couplings	When the auto attenuation exists (for example, with electrical attenuator), the IF Gain setting is changed as following rule. Auto sets IF Gain to High Gain under any of the following conditions: the input attenuator is set to 0 dB, or the preamp is turned on and the frequency range is less than 3.6 GHz. For other settings, Auto sets IF Gain to Low Gain.
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain | High Gain
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Limit

Enables you to turn on or off limit checking at the specified frequency. For results that fail the limit test, a red FAIL appears in the measure bar.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH

Remote Command	`:CALCulate:OBWidth:LIMit:FBLimit <freq>`
	`:CALCulate:OBWidth:LIMit:FBLimit?`
	`:CALCulate:OBWidth:LIMit[:TEST] ON|OFF|1|0`
	`:CALCulate:OBWidth:LIMit[:TEST]?`

Example	CALC:OBW:LIM:FBL 50 kHz CALC:OBW:LIM:FBL? CALC:OBW:LIM OFF CALC:OBW:LIM?
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode,ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.

Preset	SA, WCDMA: 5 MHz C2K: 1.48 MHz WIMAX OFDMA: 10MHz TD-SCDMA: 1.6MHz 1xEVDO: 1.48MHz ISDB-T: 5.7MHz CMMB: 7.512MHz LTE, LTETDD: 5 MHz BLUETOOTH:1 MHz SA: OFF WCDMA, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD: ON
State Saved	Saved in instrument state.
Min	1 kHz
Max	Hardware Dependent: Option 503 = 3.7 GHz Option 507 = 7.1 GHz Option 508 = 8.5 GHz Option 513 = 13.8 GHz Option 526 = 27.0 GHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Meas Preset

Restores all measurement parameters to their default values.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:CONFigure:OBWidth`
Example	CONF:OBW
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Mode

See “Mode” on page 1271 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Mode Setup

See “Mode Setup” on page 1291 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker’s trace. Pressing Peak Search with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.

Key Path	**Front panel key**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:OBW:MARK2:MAX
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Recall

See “Recall” on page 174 for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Restart

See “Restart” on page 1299 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Save

See “Save” on page 186 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Single

See “Single (Single Measurement/Sweep)” on page 1305 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Source

Operation of this key is identical across all measurements. For details about this key, see “Source” on page 1307.

Key Path	**Front-panel key**

Span X Scale

Activates the Span function and displays the menu of span functions. The parameter values are measurement independent.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Span

Set the frequency of the occupied bandwidth span for the current measurement.

Key Path	**Span X Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`[:SENSe]:OBWidth:FREQuency:SPAN <freq>` `[:SENSe]:OBWidth:FREQuency:SPAN?`
Example	OBW:FREQ:SPAN 2.4 MHz OBW:FREQ:SPAN?
Couplings	When changing the Occupied Bandwidth Span, the Resolution Bandwidth and Video Bandwidth are set to AUTO to prevent the span from clipping.
Preset	SA: 3 MHz WCDMA: 10 MHz WIMAX OFDMA: 20MHz CDMA2K:2MHz TD-SCDMA: 4.8MHz 1xEVDO: 3.75MHz ISDB-T: 20MHz CMMB: 10MHz LTE, LTETDD: 20 MHz BLUETOOTH:2 MHz
State Saved	Saved in instrument state.
Min	100 Hz

Max	Hardware Dependent: Option 503 = 3.7 GHz Option 507 = 7.1 GHz Option 508 = 8.5 GHz Option 513 = 13.8 GHz Option 526 = 27.0 GHz
Backwards Compatibility SCPI	[:SENSe]:EBWidth:FREQuency:SPAN
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Full Span

Changes the Occupied Bandwidth Span to show the full frequency range of the analyzer. When using external mixing, it changes the displayed frequency span to the frequency range specified for the selected external mixing band.

Key Path	**Span X Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`[:SENSe]:OBWidth:FREQuency:SPAN:FULL`
Example	OBW:FREQ:SPAN:FULL
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode,ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, cdma2000 mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Couplings	Selecting full span changes the measurement span value.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Last Span

Changes the measurement frequency span to previous measurement span setting. If there is no existing previous span value then the span remains unchanged.

Key Path	**Span X Scale**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`[:SENSe]:OBWidth:FREQuency:SPAN:PREVious`
Example	OBW:FREQ:SPAN:PREV

Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, cdma2000 mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Couplings	Selecting last span changes the measurement span value.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Sweep/Control

Displays a menu of functions that enable you to set up and control the sweep time and source for the current measurement.

For details about this key, see "Sweep/Control" on page 1309.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Sweep Time

Selects the length of time in which the spectrum analyzer sweeps the displayed frequency span. Additional overhead time, which impacts the sweep rate, is not calculated as part of the sweep time. In fact:

sweep rate = span/sweep time

update rate = 1/(sweep time + overhead)

sweep cycle time = sweep time + overhead

Sweep time is coupled to RBW and VBW, and is impacted by the number of sweep points, so changing those parameters may change the sweep time.

This is not available when the selected input is I/Q.

Key Path	**Sweep/Control**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH

Remote Command	`[:SENSe]:OBWidth:SWEep:TIME <time>`
	`[:SENSe]:OBWidth:SWEep:TIME?`
	`[:SENSe]:OBWidth:SWEep:TIME:AUTO OFF|ON|0|1`
	`[:SENSe]:OBWidth:SWEep:TIME:AUTO?`

Example	OBW:SWE:TIME 50 ms OBW:SWE:TIME? OBW:SWE:TIME:AUTO ON OBW:SWE:TIME:AUTO?
Couplings	When you manually change the Sweep Time, this state automatically goes to 'Man'.

Preset	SA,WIMAX OFDMA, C2K, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH: Automatically Calculated WCDMA: 32.6 ms SA, WIMAX OFDMA, C2K, TD-SCDMA, 1xEVDOISDB-T, CMMB, LTE, LTETDD: ON WCDMA: OFF
State Saved	Saved in instrument state.
Min	1 ms
Max	4000 s
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Sweep Setup

Accesses the sweep setup settings for the current measurement.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Auto Sweep Time Rules

Switches the analyzer between normal and accuracy sweep states.

Setting Auto Sweep Time to Accy results in slower sweep times, usually about three times as long, but better amplitude accuracy for CW signals. The instrument amplitude accuracy specifications only apply when Auto Sweep Time is set to Accy.

Additional amplitude errors which occur when Auto Sweep Time is set to Norm are usually well under 0.1 dB, though this is not guaranteed. Because of the faster sweep times and still low errors, Norm is the preferred setting of Auto Sweep Time. Auto Sweep Time is set to Norm on a Preset or Auto Couple. This means that in the Preset or Auto Coupled state, instrument amplitude accuracy specifications do not apply.

Key Path	**Sweep/Control, Sweep Setup**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`[:SENSe]:OBWidth:SWEep:TIME:AUTO:RULes NORMal|ACCuracy` `[:SENSe]:OBWidth:SWEep:TIME:AUTO:RULes?`
Example	OBW:SWE:TIME:AUTO:RUL NORM OBW:SWE:TIME:AUTO:RUL?
Notes	Set to Norm when Auto Couple is pressed or sent remotely.

Preset	NORMal
State Saved	Saved in instrument state.
Range	Norm | Accy
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Pause

Pauses the measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing the Resume key resumes the measurement at the point where it had been paused.

See “Pause/Resume” on page 1321 for more information.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Gate

Accesses a menu that enables you to control the gating function .

The Gate functionality is used to view signals best viewed by qualifying them with other events.

This function is not available when the selected input is I/Q.

See “Gate ” on page 1322 for more information.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Points

Sets the number of points per sweep. The resolution of setting the sweep time depends on the number of points selected. The current value of points is displayed parenthetically, next to the sweep time in the lower-right corner of the display.

Key Path	**Sweep/Control**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`[:SENSe]:OBWidth:SWEep:POINts <integer>` `[:SENSe]:OBWidth:SWEep:POINts?`
Example	OBW:SWE:POIN 1500 OBW:SWE:POIN?

Notes	This function is not available when signal identification is set to On (external mixing). Affected by: log sweep Grayed out in measurements that don't support swept Blanked in modes that do not support swept. Whenever the number of sweep points change: - All trace data is erased - Any traces with Update Off also go to Display Off (like going from View to Blank in the older analyzers) - Sweep time is re-quantized - Any limit lines that are on are updated - If averaging/hold is on, averaging/hold starts over
Couplings	Whenever the number of sweep points change, the sweep time is re-quantized.
Preset	1001
State Saved	Saved in instrument state.
Min	101
Max	20001
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Trace/Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Trace Type

Allows you to select the type of trace you want to you use for the current measurement.

The first page of this menu contains a 1–of–N selection of the trace type (Clear Write, Average, Max Hold, Min Hold) for the selected trace.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`:TRACe:OBWidth:TYPE WRITe|AVERage|MAXHold|MINHold` `:TRACe:OBWidth:TYPE?`
Example	TRAC:OBW:TYPE MINH TRAC:OBW:TYPE?
Notes	WRITe = Clear Write AVERage = Average MAXHold = Maximum Hold MINHold = Minimum Hold
Couplings	When Detector setting is “Auto” ([:SENSe]:OBWidth:DETector:AUTO?), Detector ([:SENSe]:OBWidth:DETector[:FUNCtion]?) switches aligning with the switch of this parameter: “NORMal” with WRITe (Clear Write), “AVERage” with AVERage, “POSitive (peak)” with MAXHold, and “NEGative (peak)” with MINHold.
Preset	AVERage BLUETOOTH: MAX HOLD
State Saved	Saved in instrument state.
Range	`WRITe|AVERage|MAXHold|MINHold`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Detector

Accesses a menu of functions that enables you to control the detectors for the current measurement. The following choices are available:

— Auto- the detector selected depends on marker functions, trace functions, average type, and the trace averaging function.

— Normal-the detector determines the peak of the CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.

— Average-the detector determines the average of the signal within the sweep points. The averaging method depends upon the Average Type selection (voltage, power or log scales).

— Peak (Positive)-the detector determines the maximum of the signal within the sweep points.

— Sample-the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.

— Negative Peak-the detector determines the minimum of the signal within the sweep points.

Key Path	**Detector**
Initial S/W Revision	Prior to A.02.00

Detector Selection

Allows you to select a specific detector for the current measurement. When the detector choice is Auto, the analyzer selects the detector. The selected detector depends on marker functions, trace functions, and trace averaging functions for the current measurement.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH
Remote Command	`[:SENSe]:OBWidth:DETector[:FUNCtion] NORMal|AVERage|POSitive|SAMPle|NEGative` `[:SENSe]:OBWidth:DETector[:FUNCtion]?`
Example	OBW:DET NORM OBW:DET?

Notes	When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. The detector choices are: The Normal detector determines the peak of CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection. The Average detector determines the average of the signal within the sweep points. The averaging method is Power Average (RMS). The Peak detector determines the maximum of the signal within the sweep points. The Sample detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point. The Negative Peak detector determines the minimum of the signal within the sweep points.
Couplings	When Detector setting is “Auto” ([:SENSe]:OBWidth:DETector:AUTO?), Detector ([:SENSe]:OBWidth:DETector[:FUNCtion]?) switches aligning with the switch of this parameter: “NORMal” with Clear Write, “AVERage” with AVERage, “POSitive (peak)” with MAXHold, and “NEGative (peak)” with MINHold.
Preset	AVERage ISDB-T: Peak BLUETOOTH: Peak
State Saved	Saved in instrument state.
Range	Normal | Average | Peak | Sample | Negative Peak
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Auto

When the detector choice is Auto, the analyzer selects the detector. The selected detector depends on marker functions, trace functions, and trace averaging functions for the current measurement.

Key Path	**Trace/Detector**
Remote Command	`[:SENSe]:OBWidth:DETector:AUTO ON|OFF|1|0` `[:SENSe]:OBWidth:DETector:AUTO?`
Example	OBW:DET:AUTO ON OBW:DET:AUTO?

Couplings	When Detector setting is “Auto” ([:SENSe]:OBWidth:DETector:AUTO?), Detector ([:SENSe]:OBWidth:DETector[:FUNCtion]?) switches aligning with the switch of this parameter: “NORMal” with Clear Write, “AVERage” with AVERage, “POSitive (peak)” with MAXHold, and “NEGative (peak)” with MINHold.
Preset	ON ISDB-T: OFF
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Trigger

See “Trigger” on page 1339 in the section "Common Measurement Functions" for information about all keys in this menu.

Key Path	**Front-panel key**

View/Display

Accesses a menu of functions that enable you to set the view and display parameters for the current measurement.

The following result descriptions are available:

Occupied Bandwidth

The occupied bandwidth result is $f_2 - f_1$, where f_1 and f_2 are calculated .

Total Power

The total power is the power integrated in the specified span setting.

Transmit Freq Error

The transmit freq error (transmit frequency error) result is calculated as the difference between $(f_2+f_1)/2$ and the tuned center frequency of the signal, where f_1 and f_2 are calculated.

x dB Bandwidth

The x dB result is a bandwidth measured between two points on the signal which are a certain number of dBs down from the highest signal point within the OBW Span. For example, If the ‘x dB’ parameter is set to –26dB, and the ‘Occupied BW Span’ is set to 10 MHz, then the maximum signal power level is first determined from the 10MHz wide trace sweep. Next, the two furthest frequencies below (xdb_f_1) and above (xdb_f_2) the frequency of the maximum level occurrence are found where the signal level is 26dB below the peak level. This calculation also uses linear interpolation to find the lower and upper carrier boundary point within the width of a sweep point (the span divided by the number of sweep points).

The x dB bandwidth is calclated to be $xdb\_f_2 - xdb\_f_1$.

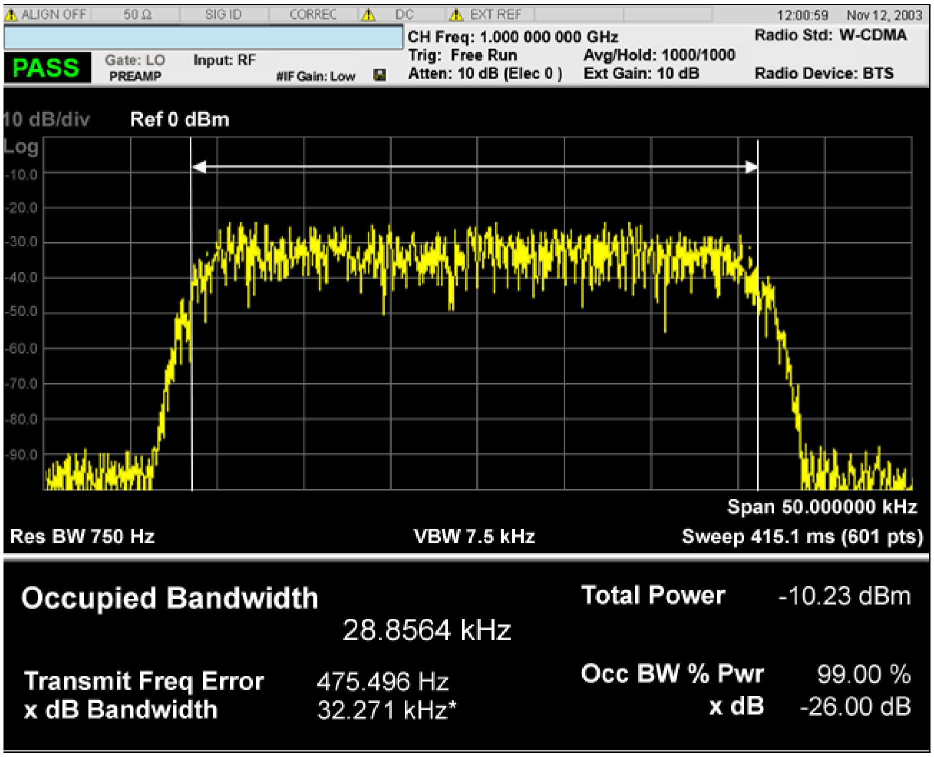
View

There is a single results view available for this measurement.

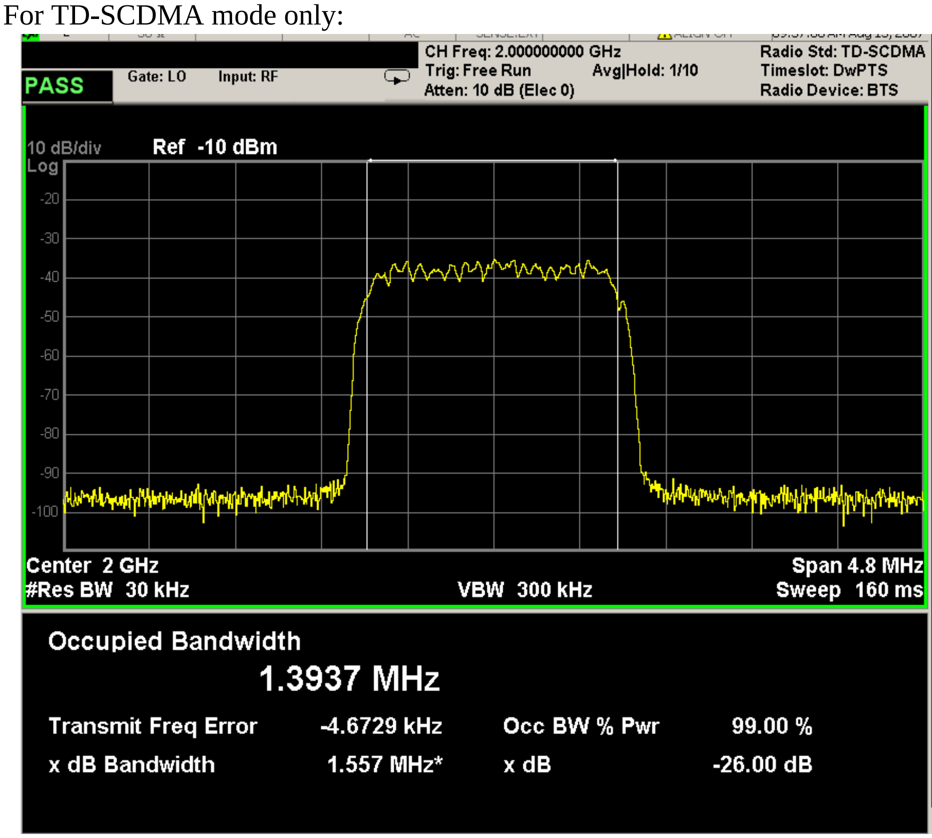
Spectrum View

NOTE	An asterisk next to the x dB bandwidth value indicates the results may not have been determined with optimal analyzer settings. If this result (emission bandwidth) is your primary interest, select Meas Setup, Max Hold, On. Then change the detector mode to peak. Acquiring peak data ensures accuracy of the result.

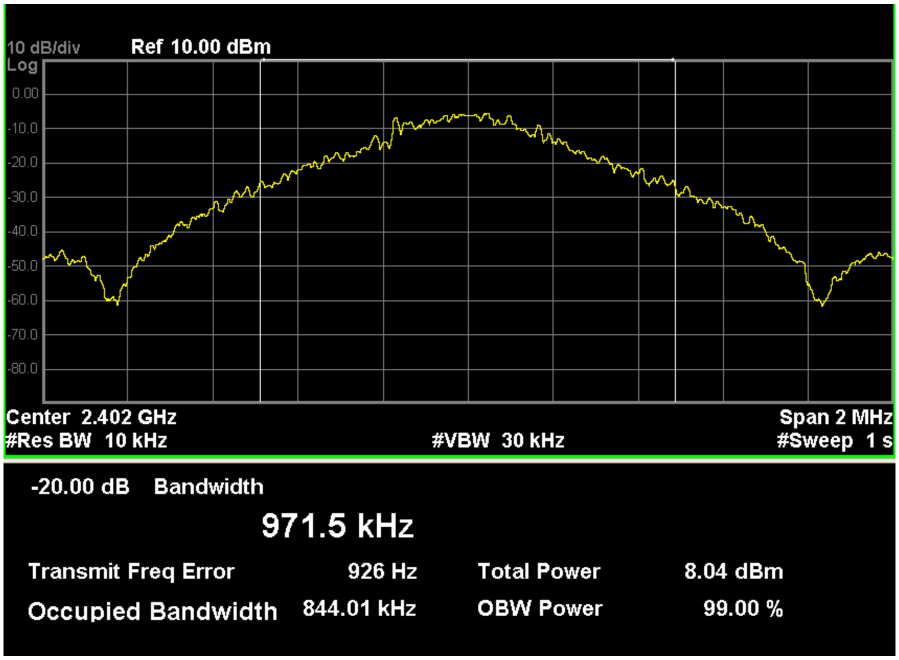
For SA, WCDMA, C2K, 1xEVDO, WIMAX OFDMA mode:



For TD-SCDMA mode only:



For Bluetooth Only:



Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters.

See “Display” on page 1385 in the section "Common Measurement Functions” for more information.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

11 Code Domain Measurement

The code domain measurement displays the power for each of the de-spreaded channels, relative to the total power within the 1.230 MHz channel bandwidth centered at the center frequency. Each de-spreaded channel level is displayed as an individual vertical bar with a different width determined by a spread rate. This allows a comparison of signal levels between the Pilot and Traffic channels. For more details, see "Code Domain Measurement Description" on page 709 below. For measurement results and vies, see "View/Display" on page 786.

This topic contains the following sections:

Measurement Commands for Code Domain

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:CDPower commands for more measurement related commands.

```
:CONFigure:CDPower
```

```
:INITiate:CDPower
```

```
:FETCh:CDPower[n]?
```

```
:READ:CDPower[n]?
```

```
:MEASure:CDPower[n]?
```

For more measurement related commands, see the SENSe subsystem, and the section "Remote Measurement Functions" on page 1257

Remote Command Results for Code Domain Measurement

This measures the power levels of the spread channels in RF channel(s). You must be in the CDMA2000 to use these commands. Use INSTrument:SELect to set the mode.

Index: n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

Index: n	Results Returned
not specified or n = 1	Returns the following 19 comma-separated scalar results: Result Name: (type of number) [unit] <explanation> 1. RMS symbol EVM: (floating) [percent] The dispreading (symbol) RMS EVM of the selected code(Walsh code length and code number) over the selected measurement period by Meas Offset and Meas Interval. 2. Peak symbol EVM: (floating) [percent] The dispreading (symbol) peak EVM of the selected code(Walsh code length and code number) over the selected measurement period by Meas Offset and Meas Interval. 3. Symbol magnitude error: (floating) [percent] The RMS-averaged magnitude error of symbol I/Q Polar Vector of the selected code over the selected measurement period by Meas Offset and Meas Interval. 4. Symbol phase error: (floating) [degree] The RMS-averaged Phase error of symbol I/Q Polar Vector of the selected code over the selected measurement period by Meas Offset and Meas Interval. 5. Total Power: (floating) [dBm] The total RF power over the selected measurement period by Meas Offset and Meas Interval. 6. Channel Power: (floating) [dBc or dBm] The absolute or relative (relative to Total Power) power of the selected code over the measurement period selected by Meas Offset and Meas Interval. 7. Total active power: (floating) [dBc or dBm] The sum of the active code channel powers over one PCG specified by Meas Offset. 8. Pilot power: (floating) [dBc or dBm] The average power of the pilot code (absolute or relative to Total Power) over one PCG specified by Meas Offset. 9. Sync power: (floating) [dBc or dBm] The average power of the pilot code (absolute or relative to Total Power) one PCG specified by Meas Offset. In MS mode, the value returned is –999.0. 10. Maximum active traffic power: (floating) [dBc or dBm] The maximum power of active code (absolute or relative to Total Power) over one PCG specified by Meas Offset. If no active codes are detected, the value returned is –999.0. In MS mode, the value returned is –999.0.

Index: n	Results Returned
	11. Average active traffic power: (floating) [dBc or dBm] The average power of active code (absolute or relative to Total Power) over one PCG specified by Meas Offset. If no active codes are detected, the value returned is –999.0. In MS mode, the value returned is –999.0. 12. Maximum inactive traffic power: (floating) [dBc or dBm] The maximum power of inactive code (absolute or relative to Total Power) over one PCG specified by Meas Offset. In MS mode, the value returned is –999.0. 13. Average inactive traffic power: (floating) [dBc or dBm] The average power of inactive code (absolute or relative to Total Power) over one PCG specified by Meas Offset. In MS mode, the value returned is –999.0. 14. Number of active channels: (integer) [no unit] The total number of active codes. In MS mode, the value returned is –999. 15. I channel average active power: (floating) [dBc or dBm] The average power of the active I channels (absolute or relative to Total Power). If no active codes are detected, the value returned is –999.0. In BTS mode, the value returned is –999.0. 16. I channel maximum inactive power: (floating) [dBc or dBm] The maximum power of the inactive I channels (absolute or relative to Total Power). In BTS mode, the value returned is –999.0 17. Q channel average active power: (floating) [dBc or dBm] The average power of the active Q channels (absolute or relative to Total Power). If no active codes are detected, the value returned is –999.0. In BTS mode, the value returned is –999.0. 18. Q channel maximum inactive : (floating) [dBc or dBm] The maximum power of the inactive Q channels (absolute or relative to Total Power). in BTS mode, the value returned is –999.0 19. Time between trigger to PN offset: (floating) [μs] The time from the trigger point to the PN offset. In the MS mode, the valued returned is –999.0.

Index: n	Results Returned
2 <CDPower>	Code Domain Power: Returns series of floating point numbers (in dB or dBm depend on the Meas Type) that represent all code domain powers. In BTS mode, there are 64 or 128 numbers depending on CALCulate:CDPower:WCODe:BASE 1st number = 1st code power over one PCG specified by Meas Offset. 2nd number = 2nd code power over one PCG specified by Meas Offset. …. Nth number = Nth code power over one PCG specified by Meas Offset In MS Mode, there are total 32 IQ pairs. I and Q results are returned alternatively. If the active channel occupies more than max spreading factor, the power is duplicated. 1st number = 1st In Phase code power over one PCG specified by Meas Offset. 2nd number = 1st Quad Phase code power over one PCG specified by Meas Offset. …. (2xN–1)th number = Nth In Phase code power over one PCG specified by Meas Offset. (2xN)th number = Nth Quad Phase code power over one PCG specified by Meas Offset. N = the number of codes detected. The total number of codes varies because of the different symbol rates of each code.
3	Symbol Rate: Returns series of floating point numbers (in symbol rate) that represent all code domain symbol rate. When In BTS Mode, the total is 64 or 128 depending on CALCulate:CDPower:WCODe:BASE. 1st number = 1st code symbol rate over one PCG specified by Meas Offset. 2nd number = 2nd code symbol rate over one PCG specified by Meas Offset. …. Nth number = Nth code symbol rate over one PCG specified by Meas Offset. In MS Mode, I and Q results are returned alternatively. Total IQ pairs are 32. If the active channel occupies more than max spreading factor, the Symbol rate is duplicated 1st number = 1st In Phase code symbol rate over one PCG specified by Meas Offset. 2nd number = 1st Quad Phase code symbol rate one PCG specified by Meas Offset. …. (2xN–1)th number = Nth In Phase code symbol rate over one PCG specified by Meas Offset. (2xN)th number = Nth Quad Phase code symbol rate over one PCG specified by Meas Offset.

Index: n	Results Returned
4	Active Status: Returns series of floating point numbers that show either active or inactive of each code returned in n=2 and 3. When the code is inactive, the result is 0.0, otherwise more than 0.0 In BTS mode, IQ combined results are returned. 1^{st} number = Active or inactive flag of the 1st code. …. Nth number = Active or inactive flag of the Nth code. In MS mode, I and Q results are returned alternatively. 1^{st} number = 1st In Phase code active flag. 2^{nd} number = 1st Quad Phase code active flag. …. (2xN–1)th number = Nth In Phase code active flag (2xN)th number = Nth Quad Phase code active flag
5 <EVM>	Symbol EVM: Returns series of floating point numbers (in percent) that represent each sample in the EVM trace. The first number is the symbol 0 decision point. There are X points per symbol (X=points/chip). Therefore, the decision points are at 0, 1*X, 2*X, …
6 <MERRor>	Symbol Magnitude error: Returns series of floating point numbers (in percent) that represent each sample in the magnitude error trace. The first number is the symbol 0 decision point. There are X points per symbol (X=points/chip). Therefore, the decision points are at 0, 1*X, 2*X, …
7 <PERRor>	Symbol Phase error: Returns series of floating point numbers (in percent) that represent each sample in the phase error trace. The first number is the symbol 0 decision point. There are X points per symbol (X=points/chip). Therefore, the decision points are at 0, 1*X, 2*X, …

Index: n	Results Returned
8	I/Q Corrected Measured Trace: Returns series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace of the selected code channel. The first number is th in-phase(I) sample of symbol 1 decision point and the second is the quadrature-phase(Q) sample of symbol 1 decision point. As in the EVM, there are X points per symbol, so that: 1st number = I of the 1st symbol decision point 2nd number = Q of the 1st symbol decision point … (2×X)+1 number = I of the 2nd symbol decision point (2×X)+2 number = Q of the 2nd symbol decision point … (2×X) ×(N–1)+1 number = I of the Nth symbol decision point (2×X) ×(N–1)+2 number = Q of the Nth symbol decision point Where X = the number of points per symbol, and N = the number of symbols. **NOTE** The values of "I" and "Q" in the measured trace are normalized by the maximum value of the magnitude (=SQRT(I*I + Q*Q)) of the reference trace. For QPSK modulation, the magnitude of each I/Q pair is scaled to SQRT(2.0), and for BPSK modulation, it is scaled to SQRT(1.0).
9 <SPOWer>	Symbol Power vs. Time: Returns series of floating point number (in dBm) that represent the trace data of the symbol power vs. time of the selected code channel.
10 <CPOWer>	Chip Power vs. Time: Returns series of floating point numbers (in dBm) that represent the entire trace data of Chip Power vs. Time.

Index: n	Results Returned
11	Demod Bits: Returns series of floating point numbers of symbol values for the selected code channel for the entire capture length. If a channel's spreading has been done on only I or Q branch, queried data represents the sequence of corresponding I or Q data. If a channel's spreading has been done on both I and Q branch and its modulation scheme is QPSK, queried data represents alternating I and Q sequences as follows: 1st number = in-phase bit of the 1st I/Q pair 2nd number = quad-phase bit of the 1st I/Q pair 3rd number = in-phase bit of the 2nd I/Q pair 4th number = quad-phase bit of the 2nd I/Q pair …… (2×N–1) th number = in-phase bit of the Nth I/Q pair (2×N) th number = quad-phase bit of the Nth I/Q pair where N is the number of the symbols in the entire capture length.
12	Code Domain Error: Returns a series of floating point numbers (in dB or dBm) that represents all the code domain errors. In BTS mode, there are 64 or 128 numbers depending on Base Code Length. 1st number = 1st code domain error over one PCG specified by Meas Offset 2nd number = 2nd code domain error over one PCG specified by Meas Offset… N th number = N th code domain error over one PCG specified by Meas Offset In MS mode, there are 32 I/Q pairs. 1st number = 1st in-phase code domain error over one PCG specified by Meas Offset 2nd number = 1st quad-phase code domain error over one PCG specified by Meas Offset. … (2×N –1) number = N th in-phase code domain error over one PCG specified by Meas Offset. (2×N) number = N th quad-phase code domain error over one PCG specified by Meas Offset.

Code Domain Measurement Description

If Device is set as MS, the demodulated I and Q signals are individually shown in the code domain power graph window. Depending on the test equipment for MS, it is recommended that you use the trigger output signal from the instrument for synchronization.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the desired vertical scale parameters for the current measurement.

Numbers and default numbers are independent for each window.

Metrics window and I/Q Symbol Polar Vector and Demod Bits window do not have this menu (Blank menu).

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Y Ref Value

Set the value for the absolute power reference. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Power Graph & Metrics View CDP Window Y Ref Value

Sets the absolute power reference value in the CDP window.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:CDP:VIEW:WIND:TRAC:Y:RLEV –10.0 DISP:CDP:VIEW:WIND:TRAC:Y:RLEV?
Notes	Unit is sensitive for Meas Type (Abs/Rel) as follows: Abs: dBm Rel: dB Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.00

State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Initial S/W Revision	PRIOR TO A.02.00

CDP Graph & CDE Graph View CDP Window Y Ref Value

Sets the absolute power reference value for Code Domain Power and Code Domain Error graph views in the CDP window.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel ?`
Example	DISP:CDP:VIEW2:WIND:TRAC:Y:RLEV –10.0 DISP:CDP:VIEW2:WIND:TRAC:Y:RLEV?
Notes	Unit is sensitive for Meas Type (Abs/Rel) as follows: Abs: dBm Rel: dB Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Initial S/W Revision	Prior to A.02.00

CDP Graph & CDE Graph View CDE Window Y Ref Value

Sets the absolute power reference value for the Code Domain Power and Code Domain Error graph views in the CDE window.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000

Remote Command	`:DISPlay:CDPower:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:CDP:VIEW2:WIND2:TRAC:Y:RLEV –10.0 DISP:CDP:VIEW2:WIND2:TRAC:Y:RLEV?
Notes	Unit is sensitive for Meas Type (Abs/Rel) as follows: Abs: dBm Rel: dB Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View Mag Error Window Y Ref Value

Sets the absolute power reference value for the magnitude error window in the I/Q Error view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel ?`
Example	DISP:CDP:VIEW3:WIND:TRAC:Y:RLEV 0.0 DISP:CDP:VIEW3:WIND:TRAC:Y:RLEV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.00
State Saved	Saved in instrument state.

Min	–500
Max	500
Initial S/W Revision	Prior to A.02.00

I/Q Error View Phase Error Window Y Ref Value

Sets the absolute power reference value for the phase error window in the I/Q Error view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow2:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW3:WINDow2:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:CDP:VIEW3:WIND2:TRAC:Y:RLEV 1.0 DISP:CDP:VIEW3:WIND2:TRAC:Y:RLEV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–360
Max	360
Initial S/W Revision	Prior to A.02.00

I/Q Error View EVM Window Y Ref Value

Sets the absolute power reference value for the EVM window in the I/Q Error view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow3:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW3:WINDow3:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:CDP:VIEW3:WIND3:TRAC:Y:RLEV 1.0 DISP:CDP:VIEW3:WIND3:TRAC:Y:RLEV?

Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–500
Max	500
Initial S/W Revision	A.01.60

Code Domain View CDP Window Y Ref Value

Sets the absolute power reference value for the code domain power view in the CDP window.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:RLEVel ?`
Example	DISP:CDP:VIEW4:WIND:TRAC:Y:RLEV 1.0 DISP:CDP:VIEW4:WIND:TRAC:Y:RLEV?
Notes	Unit is sensitive for Meas Type (Abs/Rel) as follows: Abs: dBm Rel: dB Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Initial S/W Revision	Prior to A.02.00

Code Domain View Symb Power Window Y Ref Value

Sets the absolute power reference value for the symbol power window in the CDP view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW4:WINDow2:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW4:WINDow2:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:CDP:VIEW4:WIND2:TRAC:Y:RLEV 1.0 DISP:CDP:VIEW4:WIND2:TRAC:Y:RLEV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Initial S/W Revision	Prior to A.02.00

Demod Bits View CDP Window Y Ref Value

Sets the absolute power reference value for the Demod Bits view in the CDP window.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW5:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW5:WINDow[1]:TRACe:Y[:SCALe]:RLEVel ?`
Example	DISP:CDP:VIEW5:WIND:TRAC:Y:RLEV 1.0 DISP:CDP:VIEW5:WIND:TRAC:Y:RLEV?
Notes	Unit is sensitive for Meas Type (Abs/Rel) as follows: Abs: dBm Rel: dB Target window to control depends on the SubOpCode.

Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Initial S/W Revision	Prior to A.02.00

Demod Bits View Symb Power Window Y Ref Value

Sets the absolute power reference value for the symbol power window of the Demod Bits view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW5:WINDow2:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW5:WINDow2:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:CDP:VIEW5:WIND2:TRAC:Y:RLEV 1.0 DISP:CDP:VIEW5:WIND2:TRAC:Y:RLEV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Initial S/W Revision	Prior to A.02.00

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings. This key has read-back text that describes the total attenuator value.

This is only available when the selected input is RF Input.

See AMPTD Y Scale, "Attenuation" on page 1120 in the section "Common Measurement Functions" for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Range

Accesses the Range menu to change baseband I/Q gain settings. This key has a readback text that describes gain range value.

See AMPTD Y Scale, "Range" on page 1129 in the "Common Measurement Functions" for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Y Scale/Div

Sets the units per division of vertical scale in the logarithmic display. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Power Graph & Metrics View CDP Window Y Scale/Div

Sets the vertical display sensitivity measurement result in the Power Graph & Metrics window of the CDP view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`

Example	DISP:CDP:VIEW:WIND:TRAC:Y:PDIV 5.0 DISP:CDP:VIEW:WIND:TRAC:Y:PDIV?
Notes	Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.10
Max	20.00
Initial S/W Revision	Prior to A.02.00

CDP Graph & CDE Graph View CDP Window Y Scale/Div

Sets the vertical display sensitivity measurement result for Code Domain Power and Code Domain Error graph views in the CDP window.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW2:WIND:TRAC:Y:PDIV 5.0 DISP:CDP:VIEW2:WIND:TRAC:Y:PDIV?
Notes	Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.10
Max	20.00
Initial S/W Revision	Prior to A.02.00

CDP Graph & CDE Graph View CDE Window Y Scale/Div

Sets the vertical display sensitivity measurement result for Code Domain Power and Code Domain Error graph views in the CDE window.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000

Remote Command	`:DISPlay:CDPower:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW2:WIND2:TRAC:Y:PDIV 5.0 DISP:CDP:VIEW2:WIND2:TRAC:Y:PDIV?
Notes	Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.10
Max	20.00
Initial S/W Revision	Prior to A.02.00

I/Q Error View Mag Error Window Y Scale/Div

Sets the sensitivity measurement result for the magnitude error window in the I/Q Error view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW3:WIND:TRAC:Y:PDIV 5.0 DISP:CDP:VIEW3:WIND:TRAC:Y:PDIV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.2
State Saved	Saved in instrument state.
Min	0.100
Max	50.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View Phase Error Window Y Scale/Div

Sets the sensitivity measurement result for the phase error window in the I/Q Error view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow2:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW3:WINDow2:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW3:WIND2:TRAC:Y:PDIV 5.0 DISP:CDP:VIEW3:WIND2:TRAC:Y:PDIV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.1
State Saved	Saved in instrument state.
Min	0.01
Max	360
Initial S/W Revision	Prior to A.02.00

I/Q Error View Evm Window Y Scale/Div

Sets the sensitivity measurement result for the EVM window in the I/Q Error view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow3:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW3:WINDow3:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW3:WIND3:TRAC:Y:PDIV 5.0 DISP:CDP:VIEW3:WIND3:TRAC:Y:PDIV?

Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.1
State Saved	Saved in instrument state.
Min	0.100
Max	50.0
Initial S/W Revision	Prior to A.02.00

Code Domain View CDP Window Y Scale/Div

Sets the sensitivity measurement result for the CDP window in the Code domain view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW4:WIND:TRAC:Y:PDIV 5.0 DISP:CDP:VIEW4:WIND:TRAC:Y:PDIV?
Notes	Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.10
Max	20.00
Initial S/W Revision	Prior to A.02.00

Code Domain View Symbol Power Window Y Scale/Div

Sets the sensitivity measurement result for the symbol power window in the code domain view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000

Remote Command	`:DISPlay:CDPower:VIEW4:WINDow2:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW4:WINDow2:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW4:WIND2:TRAC:Y:PDIV 5.0 DISP:CDP:VIEW4:WIND2:TRAC:Y:PDIV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	5
State Saved	Saved in instrument state.
Min	0.10
Max	20.00
Initial S/W Revision	Prior to A.02.00

Demod Bits View CDP Window Y Scale/Div

Sets the sensitivity measurement result for the CDP window of the Demod Bits view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW5:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW5:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW5:WIND:TRAC:Y:PDIV 5.0 DISP:CDP:VIEW5:WIND:TRAC:Y:PDIV?
Notes	Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.10
Max	20.00
Initial S/W Revision	Prior to A.02.00

Demod Bits View Symbol Power Window Y Scale/Div

Sets the sensitivity measurement result for the symbol power window of demod bits view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW5:WINDow2:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW5:WINDow2:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW5:WIND2:TRAC:Y:PDIV 5.0 DISP:CDP:VIEW5:WIND2:TRAC:Y:PDIV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	5
State Saved	Saved in instrument state.
Min	0.10
Max	20.00
Initial S/W Revision	Prior to A.02.00

Presel Center

See AMPTD Y Scale, “Presel Center” on page 1136 in the “Common Measurement Functions” section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Presel Adjust

See AMPTD Y Scale, “Preselector Adjust” on page 1137 in the “Common Measurement Functions” section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

µW Path Control

The **µW Path Control** functions include the **µW Preselector Bypass** (Option MPB) and **Low Noise Path** (Option LNP) controls in the High Band path circuits.

See µ"µW Path Control " on page 1145 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

This is only available when the selected input is RF Input.

See AMPTD Y Scale, "Internal Preamp" on page 1149in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

YRef Position

Positions the Y-axis scale reference level at the top, center, or bottom of the display. Changing the reference position does not change the reference level value.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View Mag Error Window Y Ref Position

Positions the Y-axis scale reference level at the top, center or bottom of the display in the magnitude error window of the I/Q Error view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:CDP:VIEW3:WIND:TRAC:Y:RPOS CENT DISP:CDP:VIEW3:WIND:TRAC:Y:RPOS?
Notes	Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.

Preset	CENTer
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00

I/Q Error View Phase Error Window Y Ref Position

Positions the Y-axis scale reference level at the top, center or bottom of the display in the phase error window of the I/Q Error view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow2:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:CDPower:VIEW3:WINDow2:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:CDP:VIEW3:WIND2:TRAC:Y:RPOS CENT DISP:CDP:VIEW3:WIND2:TRAC:Y:RPOS?
Notes	Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Preset	CENTer
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00

I/Q Error View Evm Window Y Ref Position

Positions the Y-axis scale reference level at the top, center or bottom of the display in the EVM window of the I/Q Error view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow3:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:CDPower:VIEW3:WINDow3:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:CDP:VIEW3:WIND3:TRAC:Y:RPOS CENT DISP:CDP:VIEW3:WIND3:TRAC:Y:RPOS?
Notes	Target window to control depends on the SubOpCode.

Remote Command Notes	Target window to control depends on the SubOpCode.
Preset	BOTTom
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00

Code Domain View Symbol Power Window Y Ref Position

Positions the Y-axis scale reference level at the top, center, or bottom of the display in the symbol power window of the code domain view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW4:WINDow2:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:CDPower:VIEW4:WINDow2:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:CDP:VIEW4:WIND2:TRAC:Y:RPOS CENT DISP:CDP:VIEW4:WIND2:TRAC:Y:RPOS?
Notes	Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Preset	CENTer
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00

Demod Bits View Symbol Power Window Y Ref Position

Positions the Y-axis scale reference level at the top, center, or bottom of the display in the symbol power window of the Demod Bits view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW5:WINDow2:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:CDPower:VIEW5:WINDow2:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:CDP:VIEW5:WIND2:TRAC:Y:RPOS CENT DISP:CDP:VIEW5:WIND2:TRAC:Y:RPOS?

Notes	Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Preset	CENTer
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Toggles the Auto Scaling function between On and Off. When the **Restart** front panel key or **Restart** menu key under the **Meas Control** menu is pressed, this function automatically determines the scale per division and reference values based on the measurement results.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View Mag Error Window Y Auto Scaling

Toggles the Auto Scaling function between On and Off for the magnitude error window of the I/Q Error view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:COUPle ?`
Example	DISP:CDP:VIEW3:WIND:TRAC:Y:COUP ON DISP:CDP:VIEW3:WIND:TRAC:Y:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	ON
State Saved	Saved in instrument state.

Range	Off|On
Initial S/W Revision	Prior to A.02.00

I/Q Error View Phase Error Window Y Auto Scaling

Toggles the Auto Scaling function between On and Off in the phase error window of the I/Q Error view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow2:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:CDPower:VIEW3:WINDow2:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:CDP:VIEW3:WIND2:TRAC:Y:COUP ON DISP:CDP:VIEW3:WIND2:TRAC:Y:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Initial S/W Revision	Prior to A.02.00

I/Q Error View Evm Window Y Auto Scaling

Toggles the Auto Scaling function between On and Off in the EVM window of the I/Q Error view

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow3:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:CDPower:VIEW3:WINDow3:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:CDP:VIEW3:WIND3:TRAC:Y:COUP ON DISP:CDP:VIEW3:WIND3:TRAC:Y:COUP?

Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Initial S/W Revision	Prior to A.02.00

Code Domain View Symbol Power Window Y Auto Scaling

Toggles the Auto Scaling function between On and Off in the symbol power window of the code domain view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW4:WINDow2:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:CDPower:VIEW4:WINDow2:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:CDP:VIEW4:WIND2:TRAC:Y:COUP ON DISP:CDP:VIEW4:WIND2:TRAC:Y:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Initial S/W Revision	Prior to A.02.00

Demod Bits View Symbol Power Window Y Auto Scaling

Toggles the Auto Scaling function between On and Off in the symbol power window of the Demod Bits function view.

Key Path	**AMPTD Y Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW5:WINDow2:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:CDPower:VIEW5:WINDow2:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:CDP:VIEW5:WIND2:TRAC:Y:COUP ON DISP:CDP:VIEW5:WIND2:TRAC:Y:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Initial S/W Revision	Prior to A.02.00

Auto Couple

See “Auto Couple” on page 1153 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

BW

There is no bandwidth functionality supported in the Code Domain measurement. The front-panel key displays a blank menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Cont

See “Cont (Continuous Measurement/Sweep)” on page 1155 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

FREQ Channel

See “FREQ Channel” on page 1157 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Input/Output

See “Input/Output” on page 1165 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	**Front Panel Key**
Initial S/W Revision	Prior to A.02.00

Marker Symbol Value (Remote Command only)

Sets the marker symbol value in the current marker for the trace of I/Q symbol polar vector. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering an X value if the control mode is **Normal.**

This command is only valid when Marker Trace is ‘POLar’(I/Q symbol polar vector). And, for other Marker Trace, it’s not valid and ignored.

Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:SYMBol <real>` `:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:SYMBol?`
Example	CALC:CDP:MARK:SYMB 1.0 CALC:CDP:MARK:SYMB?
Notes	If no suffix is sent, it uses ‘symbols’. If a suffix is not ‘symbols’, an error “Invalid suffix” is generated. The query returns the marker’s ‘symbol’ value in the trace if the control mode is **Normal**. The query is returned in **‘symbols’**. If the marker is **Off** the response is not a number.
Remote Command Notes	This parameter has different meaning between the cases where the marker trace is set to Symbol I/Q Polar Vector and others. In the Symbol I/Q Polar Vector Graph, X Axis Value is also the measured value, so this parameter is meaningful only when the control mode is set to Normal
Preset	Start point of the trace on the display window
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

This command is not valid when Marker Trace is ‘POLar’(I/Q symbol polar vector) and ignored. For Marker Trace ‘POLar’(I/Q symbol polar vector), Marker Symbol Value is supported instead.

Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:CDP:MARK3:X 0.0 CALC:CDP:MARK3:X?
Notes	If no suffix is sent it uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	ñ9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta -** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X :POSition <real>` `:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X :POSition?`

Example	CALC:CDP:MARK10:X:POS 0.0 CALC:CDP:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker's reference marker in trace points if the control mode is **Delta**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points (see "Fractional Trace Points", above). If the marker is **Off** the response is not a number.
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query does not return a number (NAN).
State Saved	No
Min	ñ9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command only)

Queries the marker Y Axis value in the current marker Y Axis unit.

Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:CDP:MARK11:Y?
Preset	Result dependant on markers setup and signal source
State Saved	No
Backwards Compatibility SCPI	:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:RESult?
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode. If the selected marker is Off, pressing Marker sets it to Normal and places it at the start of the screen on the trace determined by the **Marker Trace** rules. At the same time, reference value of the selected marker appears on the Active Function area.

Active Function Display:

Marker symbol value at I/Q Symbol Polar Vector graph

Marker X-axis value at other graphs

Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off.

The marker X axis value entered in the active function area displays the marker value to its full entered precision.

When Marker Trace is 'POLar'(I/Q Polar), 'Delta' is not supported.

Key Path	**Marker**
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:CDP:MARK:MODE POS CALC:CDP:MARK:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the start of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: Marker symbol value at I/Q Symbol Polar Vector graph Marker X-axis value at other graphs The marker X axis value entered in the active function area displays the marker value to its full entered precision.
Remote Command Notes	NORMal is changed to POSition in the new SA.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Initial S/W Revision	Prior to A.02.00

Properties

Accesses a menu that enables you to select a relative maker and marker trace

Key Path	**Marker**

Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Relative To

Selects the marker the selected marker is relative to (its reference marker).

Key Path	**Marker, Properties**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:CDP:MARK:REF 4 CALC:CDP:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.”
Remote Command Notes	When queried a single value is returned (the specified marker numbers relative marker). A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” You must be in the Spectrum Analysis mode, GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	**Marker, Properties**

Mode	CDMA2000
Remote Command	:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe CDPower|EVM|MERRor|PERRor|SPOWer|CPOWer|CDError|POLar :CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?
Example	CALC:CDP:MARK:TRACE POL CALC:CDP:MARK:TRACE?
Preset	CDPower
State Saved	Saved in instrument state.
Range	Code Domain Power| Code Domain Error|Symbol Power|Chip Power|EVM|Phase Error|Mag Error|Polar
Initial S/W Revision	Prior to A.02.00

Couple Markers

Toggles the state of the markers to be coupled On or Off. When this function is true (On), moving any marker causes an equal X-axis movement of every other marker except those located to the polar trace, and Chip value of the marker located to the polar trace, which is not **Off**, including **Fixed** markers. “Equal X Axis movement” refers to the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units). This may result in markers going off screen

See Couple Marker in the "Marker" section for more information.

Key Path	**Marker**
Mode	CDMA2000
Remote Command	:CALCulate:CDPower:MARKer:COUPle[:STATe] ON|OFF|1|0 :CALCulate:CDPower:MARKer:COUPle[:STATe]?
Example	CALC:CDP:MARK:COUP ON CALC:CDP:MARK:COUP?
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Key Path	**Marker**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer:AOFF`
Example	CALC:CDP:MARK:AOFF
Initial S/W Revision	Prior to A.02.00

Backward Compatibility SCPI Commands

Sets or queries the state of a marker. Setting a marker which is OFF to state ON or 1 puts it in Normal mode and places it at the left of the screen.

Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:STATe OFF|ON|0|1` `:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:STATe?`
Example	CALC:CDP:MARK3:STATe ON CALC:CDP:MARK3:STAT?
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

Marker Function

There are no Marker Function operations supported in the Code Domain measurement. The front-panel key displays a blank menu when pressed.

Key Path	**Front panel key**
Initial S/W Revision	Prior to A.02.00

Marker To

Accesses menu keys that can copy the current marker value into other instrument parameter, for example Despread. If the currently selected marker is not on when the front panel key is pressed, it is turned on at the center of the screen as a normal type marker.

Key Path	**Front panel key**
Initial S/W Revision	Prior to A.02.00

Mkr -> Despread

Executes post process for selected marker.

Key Path	**Marker ->, Mkr->Despread**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12[:SET]:DESPread`
Example	CALC:CDP:MARK4:SET:DESP
Notes	This function is available only when the marker trace is ‘CDPower’
Initial S/W Revision	Prior to A.02.00

Meas

See “Meas” on page 1257 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Meas Setup

Displays the setup menu for the currently selected measurement either BTS or MS.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas Type

Sets the code domain power computation type to either the absolute power or the relative value to the mean power.

Key Path	**Meas Setup**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:TYPE RELative|ABSolute` `:CALCulate:CDPower:TYPE?`
Example	CALC:CDP:TYPE REL CALC:CDP:TYPE?
Preset	RELative
State Saved	Saved in instrument state.
Range	Abs|Rel
Initial S/W Revision	Prior to A.02.00

Walsh Code Length

Sets spread code length.

Key Path	**Meas Setup**
Mode	CDMA2000
Remote Command	`CALCulate:CDPower:WCODe:LENGth <integer>` `CALCulate:CDPower:WCODe:LENGth?`
Example	CALCulate:CDPower:WCODe:LENGth 64 CALCulate:CDPower:WCODe:LENGth?

Notes	Walsh Code Length allows you to change Code Layer and Code Number of the code you select. It is equivalent with Spread Factor (SF). The Default value, Min value and Max value depend on radio device. For BTS, default = 64, max =128, min= 4 For Ms, default = 32, max = 32, min = 2
Remote Command Notes	You must be in the CDMA2000 mode to use this command. Use INSTrument:SELect to set the mode.
Couplings	Walsh Code Length must be power of 2. If the input is not equal to the power of 2, it is clipped to the nearest value available.
Preset	64|32
State Saved	Saved in instrument state.
Min	4|2
Max	128|32
Initial S/W Revision	Prior to A.02.00

Walsh Code Number

Specifies the Walsh code number.

Key Path	**Meas Setup**
Mode	CDMA2000
Remote Command	`CALCulate:CDPower:WCODe[:NUMBer] <integer>` `CALCulate:CDPower:WCODe[:NUMBer]?`
Example	CALCulate:CDPower:WCODe 1 CALCulate:CDPower:WCODe?
Notes	Set the Walsh code number depending on the channel type.
Remote Command Notes	You must be in the CDMA2000 mode to use this command.
Couplings	Walsh Code Number must be smaller than Walsh Code Length
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	Walsh Code Length – 1
Initial S/W Revision	Prior to A.02.00

I/Q Branch (MS only)

Select the I phase or Q phase for the demodulation axis.

Key Path	**Meas Setup**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:AXIS[:MS] IPH|QPH|IQCombined` `:CALCulate:CDPower:AXIS[:MS]?`
Example	CALC:CDP:AXIS IPH CALC:CDP:AXIS?
Notes	IPH – I Phase QPH – Q Phase IQC – Combined I and Q Phase This command is effective when [:SENSe]:RADio:DEVice is set to MS. (This menu label is blank when [:SENSe]:RADio:DEVice is set to BTS.)
Preset	QPH
State Saved	Saved in instrument state.
Range	I|Q|IQC
Initial S/W Revision	Prior to A.02.00

Meas Interval

Sets the length of the measurement interval in PCG (power control group), 1 PCG = 1536chips.

Key Path	**Meas Setup**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:SWEep:TIME <integer>` `:CALCulate:CDPower:SWEep:TIME?`
Example	CALC:CDP:SWE:TIME 2 CALC:CDP:SWE:TIME?
Notes	Set the length of the measurement interval that is used. If summation of Meas Interval and Meas Offset exceeds 32 after changing Meas Interval (or Meas Offset), then Meas Offset (or Meas Interval) decreases automatically to make the summation 32.
Couplings	Max value is dependent on Capture Interval and Meas Offset
Preset	1
State Saved	Saved in instrument state.

Min	1
Max	Capture Interval
Initial S/W Revision	Prior to A.02.00

Meas Offset

Sets the timing offset of measurement interval in PCG (power control group), 1 PCG = 1536chips

Key Path	**Meas Setup**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:SWEep:OFFSet <integer>` `:CALCulate:CDPower:SWEep:OFFSet?`
Example	CALC:CDP:SWE:OFFS 2 CALC:CDP:SWE:OFFS?
Notes	If summation of Meas Interval and Meas Offset exceeds 32 after changing Meas Interval (or Meas Offset), then Meas Offset (or Meas Interval) decreases automatically to make the summation 32.
Couplings	Max value is dependent [:SENSe]:CDPwer:CAPTure:TIME and CALCulate:CDPower:SWEep:TIME
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	Capture Interval – 1
Initial S/W Revision	Prior to A.02.00

PN Offset

Sets value for the pseudo-random noise offset.

Key Path	**Meas Setup**
Remote Command	`:CALCulate:CDPower:PNOFfset <integer>` `:CALCulate:CDPower:PNOFfset?`
Example	CALC:CDP:PNOF 5 CALC:CDP:PNOF?

Notes	Sets value for the pseudo-random noise offset. Different pseudo-random noise offsets are used for different base stations. By setting the pseudo-random noise offset to the value that your specific base station is set to, you get the correct time offset value displayed and returned back to you when you query READ:CDPower? The instrument, by default, assumes an offset of 0. So, if you do not use this command, you have to manually calculate the time offset when the value is other than 0.
Remote Command Notes	You must be in CDMA2000 mode to use this command.
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	511
Initial S/W Revision	Prior to A.02.00

Sync Type(BTS only)

Opens a menu that enables you to set the channel type to be used for synchronization.

Key Path	**Meas Setup**
Mode	CDMA2000
Remote Command	`[:SENSe]:CDPower:SYNC[:BTS] PICH|DPICh` `[:SENSe]:CDPower:SYNC[:BTS]?`
Example	CDP:SYNC DPIC CDP:SYNC?
Notes	This command is effective when [:SENSe]:RADio:DEVice is set to BTS.
Preset	PICH
State Saved	Saved in instrument state.
Range	F-PICH|TxDiv F-PICH
Initial S/W Revision	Prior to A.02.00

Long Code Mask (MS only)

Sets the long code mask.

Key Path	**Meas Setup**
Mode	CDMA2000
Remote Command	`[:SENSe]:CDPower:SYNC:LCMask <integer>` `[:SENSe]:CDPower:SYNC:LCMask?`

Example	CDP:SYNC:LCM 0 CDP:SYNC:LCM ?
Notes	Set the long code mask for MS measurement. By the key only 20000000000(hex) and 0 is available.
Remote Command Notes	You must be in CDMA2000 to use this command
Couplings	Only available when [:SENSe]:RADio:DEVice is MS.
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	4,398,046,511,103 (3FFFFFFFFFF)
Initial S/W Revision	Prior to A.02.00

Capture Interval

Sets the data capture length in PCG (1PCG = 1.25 ms) that is used in the acquisition.

Key Path	**Meas Setup**
Mode	CDMA2000
Remote Command	`[:SENSe]:CDPower:CAPTure:TIME <integer>` `[:SENSe]:CDPower:CAPTure:TIME?`
Example	CDP:CAPT:TIME 32 CDP:CAPT:TIME?
Remote Command Notes	You must be in CDMA2000 to use this command
Preset	5
State Saved	Saved in instrument state.
Min	2
Max	32
Initial S/W Revision	Prior to A.02.00

Spectrum Inversion

Toggles the spectrum function between Normal and Invert.

Invert : This function conjugates the spectrum, which is equivalent to taking the negative of the quadrature component in demodulation. The correct setting (Normal or Invert) depends on whether the signal at the input of the instrument has a high or low side mix.

Key Path	**Meas Setup**
Mode	CDMA2000
Remote Command	`[:SENSe]:CDPower:SPECtrum INVert|NORMal` `[:SENSe]:CDPower:SPECtrum?`
Example	CDP:SPEC INV CDP:SPEC?
Preset	NORMal
State Saved	Saved in instrument state.
Range	Normal|Invert
Initial S/W Revision	Prior to A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Key Path	**Meas Setup**
Mode	CDMA2000
Remote Command	`:CONFigure:CDPower`
Example	CONF:CDP
Couplings	Selecting Restore Measurement Defaults restores all measurement parameters to their default values.
Initial S/W Revision	Prior to A.02.00

Advanced

Accesses a menu of functions that enable you to set up more specific parameters for the measurement.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

Active Threshold

Toggles the active channel identification function between Auto and Man. If set to Auto, the active channels are determined automatically by the internal algorithm. If set to Man, the active channel identification is determined by a user definable threshold ranging from 0.00 to –100.00 dB.

Key Path	**Meas Setup**
Mode	CDMA2000

Remote Command	`:CALCulate:CDPower:ASET:THReshold <real>`
	`:CALCulate:CDPower:ASET:THReshold?`
	`:CALCulate:CDPower:ASET:THReshold:AUTO OFF|ON|0|1`
	`:CALCulate:CDPower:ASET:THReshold:AUTO?`

Example	CALC:CDP:ASET:THR –50.0 CALC:CDP:ASET:THR? CALC:CDP:ASET:THR:AUTO ON CALC:CDP:ASET:THR:AUTO?
Preset	0.0 ON
State Saved	Saved in instrument state.
Min	–100.0
Max	0.0
Initial S/W Revision	Prior to A.02.00

Filter Alpha

Specifies the alpha value of the RX filter.

Key Path	**Meas Setup, Advanced**
Mode	CDMA2000
Remote Command	`[:SENSe]:CDPower:ALPHa <real>` `[:SENSe]:CDPower:ALPHa?`
Example	CDP:ALPH 0.2 CDP:ALPH?
Preset	0.15
State Saved	Saved in instrument state.
Min	0.05
Max	0.20
Initial S/W Revision	Prior to A.02.00

Chip Rate

Allows you to Changes the chip rate.

Key Path	**Meas Setup, Advanced**
Mode	CDMA2000

Remote Command	`[:SENSe]:CDPower:CRATe <freq>` `[:SENSe]:CDPower:CRATe?`
Example	CDP:CRAT 1228800 CDP:CRAT?
Preset	1.2288 MHz
State Saved	Saved in instrument state.
Min	1.105920 MHz
Max	1.351680 MHz
Initial S/W Revision	Prior to A.02.00

Walsh Code QOF (BTS only)

Opens a menu to set the QOF number.

Key Path	**Meas Setup, Advanced**
Remote Command	`[:SENSe]:CDPower:QOF 0|1|2|3` `[:SENSe]:CDPower:QOF?`
Example	CDP:QOF 2 CDP:QOF?
Notes	Choose among QOF = 0, 1, 2, or 3 for the specific Walsh Code that is selected. This key is available only on the BTS Mode. When QOF = 1,2 or 3, only Power Graph & Metrics view is available.
Couplings	Only available when [:SENSe]:RADio:DEVice is BTS. when [:SENSe]:RADio:DEVice is MS, This Menu is grayed out.
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	3
Initial S/W Revision	Prior to A.02.00

IF Gain

Enables you to control an internally switched IF amplifier with approximately 10 dB of gain. When it can be turned on without an overload, the dynamic range is always better with the amplifier on than off. The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

This is only available when the selected input is RF Input.

Key Path	**Meas Setup, Advanced**
Initial S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the auto rules for IF Gain.

Key Path	**Meas Setup, Advanced, IF Gain**
Mode	CDMA2000
Remote Command	`[:SENSe]:CDPower:IF:GAIN:AUTO[:STATe] OFF|ON|0|1` `[:SENSe]:CDPower:IF:GAIN:AUTO[:STATe]?`
Example	CDP:IF:GAIN:AUTO ON CDP:IF:GAIN:AUTO?
Notes	IF Gain menu key is not available when IQ Input is selected.
Couplings	When either the auto attenuation works (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed as following rule. ‘auto’ sets IF Gain ‘High Gain’ under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to ‘Low Gain’.
Preset	OFF
State Saved	Saved in instrument state.
Range	Off|On
Initial S/W Revision	Prior to A.02.00

IF Gain State

Selects the range of IF gain between Low Gain and High Gain.

Key Path	**Meas Setup, Advanced, IF Gain**
Mode	CDMA2000
Remote Command	`[:SENSe]:CDPower:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:CDPower:IF:GAIN[:STATe]?`
Example	CDP:IF:GAIN ON CDP:IF:GAIN?
Notes	IF Gain menu key is not available when IQ Input is selected.
Remote Command Notes	Where ON = high gain OFF = low gain

Couplings	When either the auto attenuation works (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed as following rule. ‘auto’ sets IF Gain ‘High Gain’ under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to ‘Low Gain’.
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Readback Text	Low Gain|High Gain
Initial S/W Revision	Prior to A.02.00

Mode

See “Mode” on page 1271 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Mode Setup

See “Mode Setup” on page 1291 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Key Path	**Front panel key**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:CDP:MARK2:MAX
Initial S/W Revision	Prior to A.02.00

Next Peak

Moves the selected marker to the peak that has the next highest amplitude less than the marker's current value.

Key Path	**Peak Search**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:NEXT`
Example	CALC:CDP:MARK2:MAX:NEXT
Initial S/W Revision	Prior to A.02.00

Next Pk Right

Moves the selected marker to the nearest peak right of the current marker which meets all enabled peak criteria.

Key Path	**Peak Search**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:RIGHt`
Example	CALC:CDP:MARK2:MAX:RIGH
Initial S/W Revision	Prior to A.02.00

Next Pk Left

Moves the selected marker to the nearest peak left of the current marker which meets all enabled peak criteria.

Key Path	**Peak Search**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:LEFT`
Example	CALC:CDP:MARK2:MAX:LEFT
Initial S/W Revision	Prior to A.02.00

Marker Delta

Sets the control mode for the selected marker to **Delta** mode.

Key Path	**Peak Search**
Initial S/W Revision	Prior to A.02.00

Pk-Pk Search

Finds and displays the amplitude and frequency (or time, if in zero span) differences between the highest and lowest y-axis value.

Key Path	**Peak Search**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:PTPeak`
Example	CALC:CDP:MARK:PTP
Notes	Turns on the Marker Δ active function.
Couplings	This key is not available (key is grayed out) when **Coupled Markers** is on.
Initial S/W Revision	Prior to A.02.00

Min Search

Moves the selected marker to the minimum y-axis value on the current trace.

Key Path	**Peak Search**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	CALC:CDP:MARK:MIN
Initial S/W Revision	Prior to A.02.00

Recall

See “Recall” on page 174 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Restart

See “Restart” on page 1299 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Save

See “Save” on page 186 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Single

See “Single (Single Measurement/Sweep)” on page 1305 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Source

See “Source” on page 1307 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

SPAN X Scale

Accesses a menu of functions that enable you to set the desired horizontal scale parameters.

Numbers and default numbers are independent for each window.

Metrics window and I/Q Symbol Polar Vector and Demod Bits window do not have this menu (Blank menu).

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Code Span

Accesses a menu that enables you to set the start and stop values for the code range of the code domain power graph, if the display window is a Power Bar graph or CDE graph.

Key Path:	**Span X Scale**

Start Code Number

Sets the start value of the code range for the code domain power graph (CDP) and CDE graph

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:CDOMain:SPAN:STARt <integer>` `:DISPlay:CDPower:CDOMain:SPAN:STARt?`
Example	DISP:CDP:CDOM:SPAN:STAR 5 DISP:CDP:CDOM:SPAN:STAR?
Couplings	Start Code Number and Stop Code Number are coupled to each other, according to: (A) Stop Code Number > Start Code Number and (B) Stop Code Number – Start Code Number >= 63 When changing the start code number, if it does not satisfy the above conditions, the stop code number is changed to satisfy (A) and (C). (C) Stop Code Number – Start Code Number = 63;
Preset	0
State Saved	Saved in instrument state.
Min	0

Max	64
Initial S/W Revision	Prior to A.02.00
Restriction and Notes	This button is only available when BTS is the selected mode and Base code length equal to 128.

Stop Code Number

Sets the stop value of the code range for the code domain power graph (CDP) and CDE graph.

Key Path	**Span X Scale**
Remote Command	`:DISPlay:CDPower:CDOMain:SPAN:STOP <integer>` `:DISPlay:CDPower:CDOMain:SPAN:STOP?`
Example	DISP:CDP:CDOM:SPAN:STOP 127 DISP:CDP:CDOM:SPAN:STOP?
Notes	Default value is sensitive to the Base Code Length and Radio device. If Base Code Length is set 64, the stop code number is always 63, it can't be changed. If radio device is MS, it is always 31. when base code length equal to 64 or in MS mode, This key is grayed out.
Couplings	1.6.2.1.1 Start Code Number and 1.6.2.1.2 Stop Code Number are coupled to each other, according to: (A) Stop Code Number > Start Code Number and (B) Stop Code Number – Start Code Number >= 63 When changing the stop code number, if it does not satisfy the above, the start code number is changed to satisfy (A) and (C). (C) Stop Code Number – Start Code Number = 63;
Preset	63
State Saved	Saved in instrument state.
Min	63
Max	127
Initial S/W Revision	Prior to A.02.00

X Ref Value

Controls the reference value of the X scale of the current measurement.

Key Path	**Span X Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View Mag Error Window X Ref Value

Sets the symbol reference value on the horizontal axis in the magnitude error window of the I/Q Error view.

Key Path	**Span X Scale**
Mode	CDMA2000

Remote Command	`:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel <real>`
	
	`:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel ?`

Example	DISP:CDP:VIEW3:WIND:TRAC:X:RLEV 10.0 DISP:CDP:VIEW3:WIND:TRAC:X:RLEV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	You must be in the CDMA2000 mode to use this command. Use INSTrument:SELect to set the mode.
Couplings	See Notes
Preset	0.000
State Saved	Saved in instrument state.
Min	0
Max	5000000.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View Phase Error Window X Ref Value

Sets the symbol reference value on the horizontal axis in the phase error window of the I/Q Error view.

Key Path	**Span X Scale**
Mode	CDMA2000

Remote Command	`:DISPlay:CDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel <real>`
	
	`:DISPlay:CDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel?`

Example	DISP:CDP:VIEW3:WIND2:TRAC:X:RLEV 10.0 DISP:CDP:VIEW3:WIND2:TRAC:X:RLEV?

Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	You must be in the CDMA2000 mode to use this command. Use INSTrument:SELect to set the mode.
Couplings	See Notes
Preset	0.000
State Saved	Saved in instrument state.
Min	0
Max	5000000.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View Evm Window X Ref Value

Sets the symbol reference value on the horizontal axis in the EVM window of the I/Q Error view.

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow3:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW3:WINDow3:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:CDP:VIEW3:WIND3:TRAC:X:RLEV 10.0 DISP:CDP:VIEW3:WIND3:TRAC:X:RLEV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Remote Command Notes	You must be in the CDMA2000 mode to use this command. Use INSTrument:SELect to set the mode.
Couplings	See Notes
Preset	0.000
State Saved	Saved in instrument state.
Min	0
Max	5000000.0
Initial S/W Revision	Prior to A.02.00

Code Domain View Symb Power Window X Ref Value

Sets the symbol reference value on the horizontal axis of the symbol power window in the code domain (Quad view)..

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:CDP:VIEW4:WIND2:TRAC:X:RLEV 10.0 DISP:CDP:VIEW4:WIND2:TRAC:X:RLEV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	0.000
State Saved	Saved in instrument state.
Min	0
Max	5000000.0
Initial S/W Revision	Prior to A.02.00

Demod Bits View Symb Power Window X Ref Value

Sets the symbol reference value on the horizontal axis in the symbol power window of the demod bits view.

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW5:WINDow2:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:VIEW5:WINDow2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:CDP:VIEW5:WIND2:TRAC:X:RLEV 10.0 DISP:CDP:VIEW5:WIND2:TRAC:X:RLEV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode.

Couplings	See Notes
Preset	0.000
State Saved	Saved in instrument state.
Min	0
Max	5000000.0
Initial S/W Revision	Prior to A.02.00

X Scale/Div

Sets the horizontal scale by changing a value per division.

Key Path	**Span X Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View Mag Error Window X Scale/Div

Sets the horizontal scale by changing a symbol value per division in the magnitude error window of the I/Q Error view.

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW3:WIND:TRAC:X:PDIV 1.0 DISP:CDP:VIEW3:WIND:TRAC:X:PDIV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode. Default value is Device sensitive as follows: BTS: 2.3 MS: 4.7
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	2.3|4.7
State Saved	Saved in instrument state.
Min	0.1

Max	500000.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View Phase Error Window X Scale/Div

Sets the horizontal scale by changing a symbol value per division in the phase error window of the I/Q Error view.

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW3:WIND2:TRAC:X:PDIV 1.0 DISP:CDP:VIEW3:WIND2:TRAC:X:PDIV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode. Default value is Device sensitive as follows: BTS: 2.3 MS: 4.7
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	2.3|4.7
State Saved	Saved in instrument state.
Min	0.1
Max	500000.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View EVM Window X Scale/Div

Sets the horizontal scale by changing a symbol value per division in the EVM window of the I/Q Error view.

Key Path	**Span X Scale**
Mode	CDMA2000

Remote Command	`:DISPlay:CDPower:VIEW3:WINDow3:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW3:WINDow3:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW3:WIND3:TRAC:X:PDIV 1.0 DISP:CDP:VIEW3:WIND3:TRAC:X:PDIV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Target window to control depends on the SubOpCode. Default value is Device sensitive as follows: BTS: 2.3 MS: 4.7
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	2.3|4.7
State Saved	Saved in instrument state.
Min	0.1
Max	500000.0
Initial S/W Revision	Prior to A.02.00

Code Domain View Symb Power Window X Scale/Div

Sets the horizontal scale by changing a symbol value per division in the symbol power window of the code domain (Quad view).

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW4:WIND2:TRAC:X:PDIV 1.0 DISP:CDP:VIEW4:WIND2:TRAC:X:PDIV?

Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Default value is Device sensitive as follows: BTS: 11.9 MS: 23.9 Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	11.9|23.9
State Saved	Saved in instrument state.
Min	0.1
Max	500000.0
Initial S/W Revision	Prior to A.02.00

Demod Bits View Symb Power Window X Scale/Div

Sets the horizontal scale by changing a symbol value per division in the symbol power window of demod bits view.

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW5:WINDow2:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:VIEW5:WINDow2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:CDP:VIEW5:WIND2:TRAC:X:PDIV 1.0 DISP:CDP:VIEW5:WIND2:TRAC:X:PDIV?
Notes	If the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. Default value is Device sensitive as follows: BTS: 11.9 MS: 23.9 Target window to control depends on the SubOpCode.
Remote Command Notes	Target window to control depends on the SubOpCode.
Couplings	See Notes
Preset	11.9|23.9

State Saved	Saved in instrument state.
Min	0.1
Max	500000.0
Initial S/W Revision	Prior to A.02.00

Ref Position

Sets the reference position of the X axis on the display. The reference position can be set to Left, Ctr (center), or Right.

Key Path	**Span X Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View Mag Error Window Ref Position

Sets the reference position of the X axis in the magnitude error window of the I/Q Error view.

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:CDP:VIEW3:WIND:TRAC:X:RPOS LEFT DISP:CDP:VIEW3:WIND:TRAC:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Initial S/W Revision	Prior to A.02.00

I/Q Error View Phase Error Window Ref Position

Sets the reference position of the X axis in the phase error window of the I/Q Error view.

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:CDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition?`

Example	DISP:CDP:VIEW3:WIND2:TRAC:X:RPOS LEFT DISP:CDP:VIEW3:WIND2:TRAC:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Initial S/W Revision	Prior to A.02.00

I/Q Error View Evm Window Ref Position

Sets the X axis reference position in the EVM window of the I/Q Error view.

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow3:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:CDPower:VIEW3:WINDow3:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:CDP:VIEW3:WIND3:TRAC:X:RPOS LEFT DISP:CDP:VIEW3:WIND3:TRAC:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Initial S/W Revision	Prior to A.02.00

Code Domain View Symb Power Window Ref Position

Sets the X axis reference position in the symbol power window of the code domain (Quad View).

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:CDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:CDP:VIEW4:WIND2:TRAC:X:RPOS LEFT DISP:CDP:VIEW4:WIND2:TRAC:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.

Range	Left|Ctr|Right
Initial S/W Revision	Prior to A.02.00

Demod Bits View Symb Power Window Ref Position

Sets the X axis reference position for the symbol power window of Demod Bits view.

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW5:WINDow2:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:CDPower:VIEW5:WINDow2:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:CDP:VIEW5:WIND2:TRAC:X:RPOS LEFT DISP:CDP:VIEW5:WIND2:TRAC:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Determines the scale per division and reference value for the X axis based on the current measurement results.

Key Path	**Span X Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View Mag Error Window Auto Scaling

When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically displays the scale per division and reference value results in the magnitude error window of the I/Q Error view.

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	`DISP:CDP:VIEW3:WIND1:TRAC:X:COUP ON` `DISP:CDP:VIEW3:WIND1:TRAC:X:COUP?`

Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Couplings	See Notes
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Initial S/W Revision	Prior to A.02.00

I/Q Error View Phase Error Window Auto Scaling

When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically displays the scale per division and reference value results in the phase error window of the I/Q Error view.

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:CDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle?`
Example	DISP:CDP:VIEW3:WIND2:TRAC:X:COUP ON DISP:CDP:VIEW3:WIND2:TRAC:X:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Couplings	See Notes
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Initial S/W Revision	Prior to A.02.00

I/Q Error View Evm Window Auto Scaling

When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically displays the scale per division and reference value results in the EVM window of the I/Q Error window.

Key Path	**Span X Scale**
Mode	CDMA2000

Remote Command	`:DISPlay:CDPower:VIEW3:WINDow3:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:CDPower:VIEW3:WINDow3:TRACe:X[:SCALe]:COUPle?`
Example	DISP:CDP:VIEW3:WIND3:TRAC:X:COUP ON DISP:CDP:VIEW3:WIND3:TRAC:X:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Couplings	See Notes
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Initial S/W Revision	Prior to A.02.00

Code Domain View Symb Power Window Auto Scaling

When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically displays the scale per division and reference value results in the symbol power window of the code domain (quad view).

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:CDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:COUPle?`
Example	DISP:CDP:VIEW4:WIND2:TRAC:X:COUP ON DISP:CDP:VIEW4:WIND2:TRAC:X:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Couplings	See Notes
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Initial S/W Revision	Prior to A.02.00

Demod Bits View Symb Power Window Auto Scaling

When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically displays the scale per division and reference value results for the symbol power window of demod bits view.

Key Path	**Span X Scale**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW5:WINDow2:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:CDPower:VIEW5:WINDow2:TRACe:X[:SCALe]:COUPle?`
Example	DISP:CDP:VIEW5:WIND2:TRAC:X:COUP ON DISP:CDP:VIEW5:WIND2:TRAC:X:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Couplings	See Notes
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Initial S/W Revision	Prior to A.02.00

Sweep/Control

Accesses a menu that enables you to pause and restart the measurement. See “Sweep/Control” on page 1309 in the “Common Measurement Functions” for more information.

Key Path	**Front Panel Key**
Initial S/W Revision	Prior to A.02.00

Pause/Resume

Pauses a measurement after the current data acquisition is complete. When Paused, the label on the key changes to Resume. Pressing the Resume key resumes the measurement at the point it was at when paused. See “Pause/Resume” on page 1321 in the “Common Measurement Functions” section for details.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Trace/Detector

There is no Trace/Detector functionality supported in the Code Domain measurement. The front-panel key displays a blank menu key when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Trigger

Accesses a menu of functions that enable you to select and control the trigger source for the current measurement

.See “Trigger” on page 1339 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

Trigger Source

Selects a trigger source. Trigger settings are mode global. Refer to Measurement Functions Mode functionality section for trigger settings.

Key Path	**Front panel key**
Mode	CDMA2000
Remote Command	`:TRIGger:CDPower[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF` `:TRIGger:CDPower[:SEQuence]:SOURce?`
Example	TRIG:CDP:SOUR RFB TRIG:CDP:SOUR?
Notes	A parameter, IF, is prepared for backwards compatibility. It is an alias for a parameter, VIDeo.
Remote Command Notes	You must be in the CDMA2000 mode to use this command. Use INSTrument:SELect to set the mode.
Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run|Video|IF|Line|External 1|External 2|RF Burst (Wideband)|Periodic Timer(Frame Trigger)
Backwards Compatibility SCPI	[:SENSe]:CDPower:TRIGger:SOURce
Initial S/W Revision	Prior to A.02.00

Trigger Source (Selected Input)

Selects a trigger source. Trigger settings are mode global. Refer to Measurement Functions Mode functionality section for trigger settings.

Key Path	**Front panel key**
Mode	CDMA2000

Remote Command	`:TRIGger:CDPower[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF|IQMag|IDEMod|QDEMod|IINPut|QINPut|AIQMag` `:TRIGger:CDPower[:SEQuence]:SOURce?`
Example	TRIG:CDP:SOUR RFB TRIG:CDP:SOUR?
Notes	1. IF in SCPI selection is the same as VIDeo. IF is kept because of backward compatibility. 2. Video and RF Burst are available only when in RF input and those selection menu keys are blank when in I/Q Input. 3. Baseband I/Q key is available only when in I/Q input, otherwise blank. IQMag, IDEMod, QDEMod, IINPut, QINPut, and AIQMag are valid only when in I/Q input.
Remote Command Notes	You must be in the CDMA2000 mode to use this command. Use INSTrument:SELect to set the mode.
Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run|Video|IF|Line|External 1|External 2|RF Burst (Wideband)| Periodic Timer(Frame Trigger) | I/Q Mag| I (Demodulated) | Q (Demodulated)| Input I| Input Q| Auxiliary Channel I/Q Mag
Backwards Compatibility SCPI	[:SENSe]:CDPower:TRIGger:SOURce
Initial S/W Revision	Prior to A.02.00

RF Trigger Source

SCPI command for specifying the RF Trigger Source. This always accesses the RF value, even when the selected input is not RF.

Key Path	**Front panel key**
Mode	CDMA2000
Remote Command	`:TRIGger:CDPower[:SEQuence]:RF:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF` `:TRIGger:CDPower[:SEQuence]:RF:SOURce?`
Example	TRIG:CDP:RF:SOUR RFB TRIG:CDP:RF:SOUR?
Notes	IF in SCPI selection is the same as VIDeo. IF is kept because of backward compatibility.
Remote Command Notes	You must be in the CDMA2000 mode to use this command. Use INSTrument:SELect to set the mode.

Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run|Video|IF|Line|External 1|External 2|RF Burst (Wideband)| Periodic Timer(Frame Trigger)
Initial S/W Revision	Prior to A.02.00

I/Q Trigger Source

SCPI command for specifying the I/Q Trigger Source. This always accesses the I/Q value, even when the selected input is not I/Q.

Key Path	**Front panel key**
Mode	CDMA2000
Remote Command	`:TRIGger:CDPower[:SEQuence]:IQ:SOURce EXTernal[1]|EXTernal2|IMMediate|IQMag|IDEMod|QDEMod|IINPut|QINPut|AIQMag` `:TRIGger:CDPower[:SEQuence]:IQ:SOURce?`
Example	TRIG:CDP:IQ:SOUR RFB TRIG:CDP:IQ:SOUR?
Remote Command Notes	You must be in the CDMA2000 mode to use this command. Use INSTrument:SELect to set the mode.
Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run|External 1|External 2| I/Q Mag| I (Demodulated) | Q (Demodulated)| Input I| Input Q| Auxiliary Channel I/Q Mag
Initial S/W Revision	Prior to A.02.00

View/Display

Accesses a menu of functions that enable you to control the instrument display.

The topic contains the following sections:

"View Selection by name (SCPI only)" on page 786

"View Selection by number (SCPI only)" on page 787

View Selection by name (SCPI only)

Selects the desired measurement view from the following selections:

- PGRaph(1) – Power Graph & Metrics provides a combination view of the code domain power graph and the summary data.
- CDE(2) – Power Graph & CDE Graph provides a combination view of the code domain power graph and the code domain error. Not available if the [:SENSe]:CDPower:CAPTure:TIME(Capture Interval) is 4.0 or 8.0 or 16.0(Long Mode).
- SEVM(3) – I/Q Error (Quad View) - Symbol EVM provides a combination view of magnitude error, phase error, Symbol EVM, and the summary data.
- QUAD(4) – Code Domain (Quad View) provides a combination view for the code domain power symbol power, I/Q symbol polar vector and the summary data.
- DBITs(5) – Demod Bits provides a combination view of the graphs for the code domain power and symbol power, and the I/Q demodulated bit stream data for the symbol power slots selected by the measurement interval and measurement offset

Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:VIEW[:SELect] PGRaph|CDE|SEVM|QUAD|DBITs` `:DISPlay:CDPower:VIEW[:SELect]?`
Example	DISP:CDP:VIEW PGR DISP:CDP:VIEW?
Remote Command Notes	You must be in the CDMA2000 mode to use this command. Use INSTrument:SELect to set the mode.
Preset	PGRaph
State Saved	Saved in instrument state.
Range	Power Graph & Metrics|CDP Graph & CDE Graph |I/Q Error (Quad View)|Code Domain (Quad View)|Demod Bits|Long Demod
Initial S/W Revision	Prior to A.02.00

View Selection by number (SCPI only)

Displays the numeric values of the measurement results. This function is available by SCPI command only

Remote Command	`:DISPlay:CDPower:VIEW:NSELect <integer>` `:DISPlay:CDPower:VIEW:NSELect?`
Example	DISP:CDP:VIEW:NSEL 2 DISP:CDP:VIEW:NSEL?
Remote Command Notes	You must be in the CDMA2000 mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	5
Initial S/W Revision	Prior to A.02.00

Key Path	**Front panel key**
Initial S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters.

See “Display” on page 1385 in the "Common Measurement Functions" section for more information.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Power Graph & Metrics

Provides a combination view of the code domain power graph and the summary data.

“Radio Device: BTS” on page 787

“Radio Device: MS” on page 789

Radio Device: BTS

There are two windows: Power Bar Graph window (upper) and Metrics window (lower):

“CDP(Code Domain Power) Graph window” on page 788

“Numeric Results window” on page 788

CDP(Code Domain Power) Graph window

Marker Operation	Yes
Corresponding Trace	CDPower (n=2)

Numeric Results window

Name	Corresponding	Description	Unit	Format
Total Power	n=1, 5th	the total RF power over the measurement interval.	dBm	nn.nn dBm
Total active channel power	n=1, 7th	the sum of the active channel power.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm
Pilot power	n=1, 8th	the average of the pilot code.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm
Sync power	n=1, 9th	power of the Sync code. In the MS mode, –999 shall be returned as a value.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm

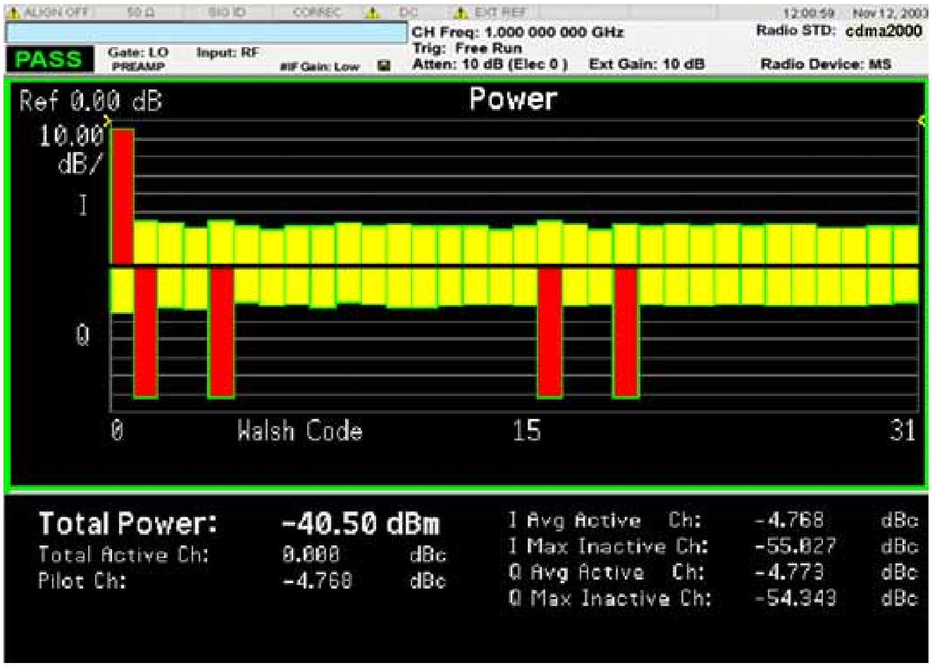
Name	Corresponding	Description	Unit	Format
Maximum active traffic power	n=1, 10th	maximum average power of the active code. If no active codes are detected, the value returned is –999. In the MS mode, –999 shall be returned as a value.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm
Average active traffic power	n=1, 11 th	the average power of all the active code. If no active codes are detected, the value returned is –999. In the MS mode, –999 shall be returned as a value.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm
Maximum inactive traffic power	n=1 12th	the maximum average power of the inactive traffic channels. In the MS mode, –999 shall be returned as a value.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm
Average inactive traffic power	n=1 13th	the average power of all the inactive traffic channels. In the MS mode, –999 shall be returned as a value.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm
Number of active channels	n=1, 14th	active codes. In the MS mode, –999 shall be returned as a value.	None	Integer format
Time between trigger to PN offset	n=1, 19th	The time from the trigger point to the PN offset. In the MS mode, the value return is –999.	us	nn.nnn us

Radio Device: MS

There are two windows: Power Bar Graph window (upper) and Metrics window (lower):

“CDP(Code Domain Power) Graph window” on page 790

“Numeric Results window” on page 790



CDP(Code Domain Power) Graph window

Marker Operation	Yes
Corresponding Trace	CDPower (n=2)

Numeric Results window

Name	Corresponding	Description	Unit	Format
Total Power	n=1, 5th	the total RF power over the measurement interval.	dBm	nn.nn dBm
Total active power	n=1, 7th	the sum of the active power.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm
Pilot power	n=1, 8th	the average of the pilot code.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm

Name	Corresponding	Description	Unit	Format
I channel average active power	n=1, 15th	the average power of the active I channels. If no active codes are detected, the value returned is –999. In the BS mode, –999 shall be returned as a value.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm
I channel maximum inactive power	n=1, 16th	the maximum average power of the active I channels. In the BS mode, the value returned is –999.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm
Q channel average active power	n=1, 17th	the average power of the active Q channels. If no active codes are detected, the value returned is –999. In the BS mode, –999 shall be returned as a value.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm
Q channel maximum inactive power	n=1, 18th	the maximum average power of the active Q channels. In the BS mode, the value returned is –999.	dBc or dBm (depending on the measurement type)	nn.nnn dBc/dBm

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Code Order

Access the selection menu for the Walsh code order function. Set the Walsh code order function to Hadamard or Bit Reverse.

The Code Order key for Power Bar Graph and CDE Graph functions are coupled to each other.

Key Path	**View/Display, Power Graph & Metrics**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:WCODe:ORDer HADMrd|BREVerse` `:CALCulate:CDPower:WCODe:ORDer?`
Example	CALCulate:CDPower:WCODe:ORDer HADMrd CALCulate:CDPower:WCODe:ORDer?
Couplings	This command is effective only when the CDP window is selected.
Preset	HADMrd

State Saved	Saved in instrument state.
Range	Hadamard|Bit Reverse
Initial S/W Revision	Prior to A.02.00

Base Code Length

Toggle the Walsh base code length between 64 and 128.

The Base Code Length for Power Bar Graph and CDE Graph functions are coupled to each other.

Key Path	**View/Display, Power Graph & Metrics**
Mode	CDMA2000
Remote Command	`:CALCulate:CDPower:WCODe:BASE <integer>` `:CALCulate:CDPower:WCODe:BASE?`
Example	CALCulate:CDPower:WCODe:BASE 64 CALCulate:CDPower:WCODe:BASE?
Notes	Set the base code length (64 or 128) This key is grayed out when MS is selected as Radio device
Couplings	This command is effective only when the CDP window is selected.
Preset	64
State Saved	Saved in instrument state.
Range	64, 128
Initial S/W Revision	Prior to A.02.00

Consolidated Marker

Toggle the consolidated marker function between On and Off.

The Consolidated Marker for Power Bar Graph and CDE Graph functions are coupled to each other.

Key Path	**View/Display, Power Graph & Metrics**
Remote Command	`DISPlay:CDPower:MARKer:CONSolidated ON|OFF|1|0` `DISPlay:CDPower:MARKer:CONSolidated?`
Example	DISPlay:CDPower:MARKer:CONSolidated ON DISPlay:CDPower:MARKer:CONSolidated?

Notes	This key is displayed only when the CDP window is selected. This key shall be grayed out when the Code Order Bit Reverse key is selected. If set to On, the corresponding Walsh code channel power is marked in the different color upon placing the marker at the consolidated Walsh code channel power
Remote Command Notes	You must be in the CDMA2000 mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Initial S/W Revision	Prior to A.02.00

CDP Graph & CDE Graph

Provides a combination view of the code domain power graph and the code domain error. These two windows have the same view settings as the Power Graph & Metrics view.

"Radio Device: BTS" on page 793

"Radio Device: MS" on page 794

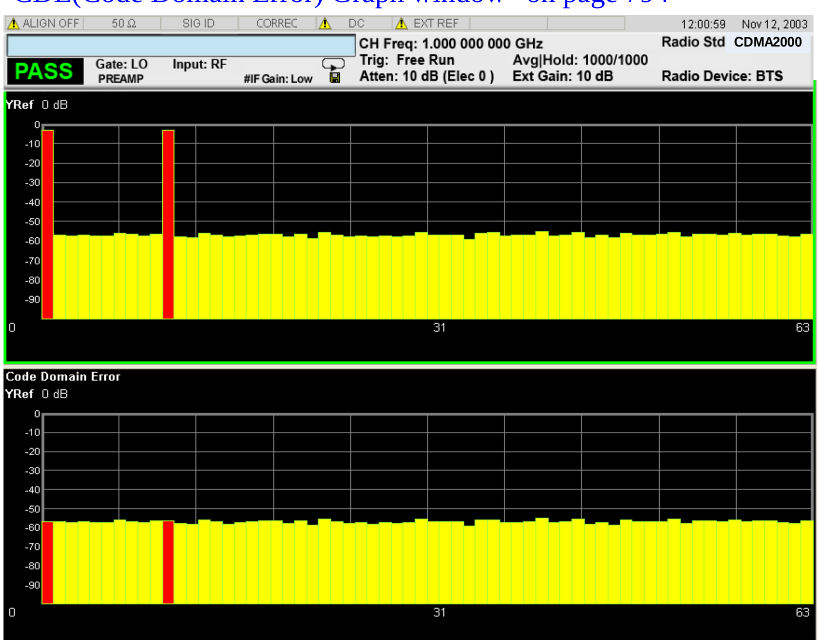
Radio Device: BTS

There are two windows, the two windows of Power Bar Graph and CDE graph are coupled in terms of:

X/Y Scaling, Code order, Base code length and consolidate marker.

"CDP(Code Domain Power) Graph window" on page 794

"CDE(Code Domain Error) Graph window" on page 794



CDP(Code Domain Power) Graph window

Marker Operation	Yes
Corresponding Trace	CDPower (n=2)

NOTE These traces and scalar results are of the slot specified by the Meas Offset. (Not averaged over Meas Interval.)

CDE(Code Domain Error) Graph window

Marker Operation	Yes
Corresponding Trace	CDError (n=13)

NOTE These traces and scalar results are of the slot specified by the Meas Offset. (Not averaged over Meas Interval.)

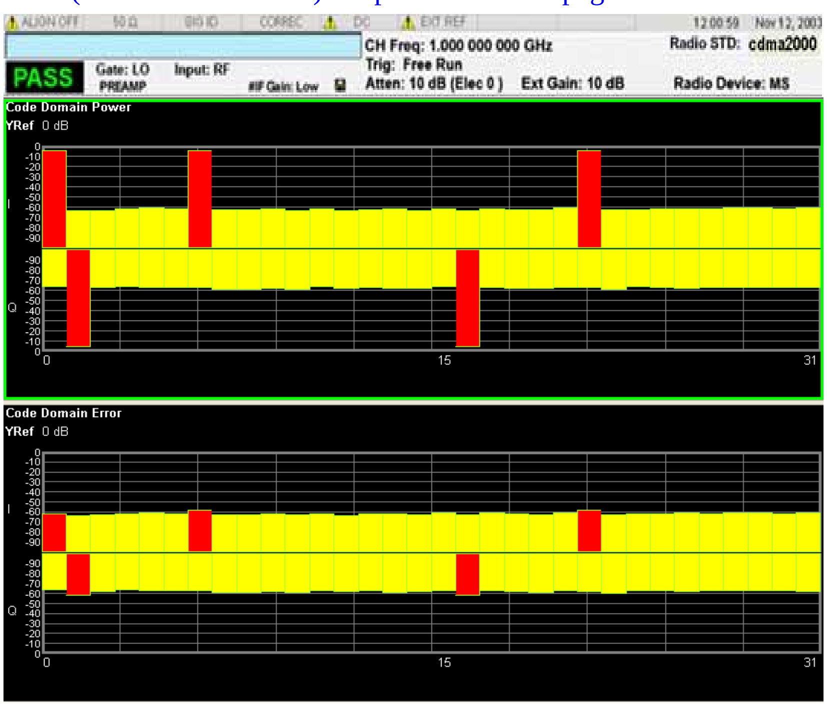
Radio Device: MS

There are two windows, the two windows of Power Bar Graph and CDE graph are coupled in terms of:

X/Y Scaling, Code order, Base code length and consolidate marker.

“CDP(Code Domain Power) Graph window” on page 795

“CDE(Code Domain Error) Graph window” on page 795



CDP(Code Domain Power) Graph window

Marker Operation	Yes
Corresponding Trace	CDPower (n=2)

NOTE These traces and scalar results are of the slot specified by the Meas Offset. (Not averaged over Meas Interval.)

CDE(Code Domain Error) Graph window

Marker Operation	Yes
Corresponding Trace	CDError (n=13)

NOTE These traces and scalar results are of the slot specified by the Meas Offset. (Not averaged over Meas Interval.)

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

I/Q Error (Quad View)

Provides a combination view of magnitude error, phase error, Symbol EVM, and the summary data. There is no view settings for this view.

“Radio Device: BTS” on page 795

“Radio Device: MS” on page 797

Radio Device: BTS

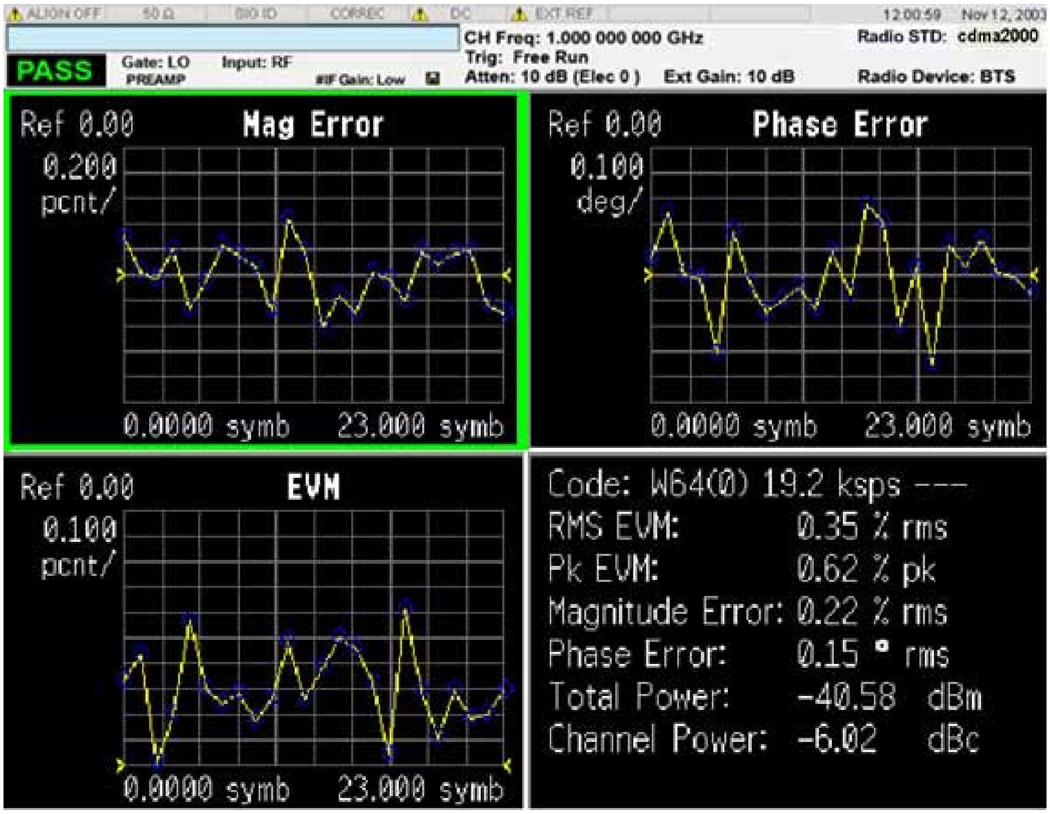
There are four windows:

“Magnitude Error window” on page 796

“Phase Error window” on page 796

“EVM window” on page 796

“Numeric Results window” on page 797



Magnitude Error window

Marker Operation	Yes
Corresponding Trace	MERRor (n=6)

Phase Error window

Marker Operation	Yes
Corresponding Trace	PERRor (n=7)

EVM window

Marker Operation	Yes
Corresponding Trace	EVM (n=5)

Numeric Results window

Name	Corresponding	Description	Unit	Format
Code Number	NA	NA		WX(Y) N ksps X: Walsh code level (2 ,4,8,… 128) Y: Walsh code number (0 … X) N: 9.6, 14.4, 153.6 …, 230.4 ksps
RMS EVM	n=1 1st	RMS symbol EVM	%	nn.nn % rms
Pk EVM	n=1 2nd	Peak symbol EVM	%	nn.nn % pk
Magnitude Error	n=1 3rd	Symbol magnitude error	%	nn.nn % rms
Phase Error	n=1 4th	Symbol phase error	degree	nn.nn °rms
Total Power	n=1 5th	total RF power over measurement interval.	dBm	-nn.nn dBm
Channel Power	n=1 6th	Channel Power	dBc or dBm (depending on the measurement type)	-nn.nn dBc/dBm

Radio Device: MS

"Magnitude Error window Note 1" on page 798

"Phase Error window (Note 1, 2)" on page 798

"EVM window Note 1" on page 798

"Numeric Results window" on page 799

Magnitude Error window Note 1

Marker Operation	Yes
Corresponding Trace	MERRor (n=6)

Phase Error window (Note 1, 2)

Marker Operation	Yes
Corresponding Trace	PERRor(n=7)

EVM window Note 1

Marker Operation	Yes
Corresponding Trace	EVM (n=5)

Numeric Results window

Name	Corresponding	Description	Unit	Format
Code Number	NA	NA		WX(Y) N ksps X: Walsh code level (2 ,4,8,… 128) Y: Walsh code number (0 … X) N: 9.6, 14.4, 153.6 …, 230.4 ksps
RMS EVM	n=1 1st	RMS symbol EVM (Note 1)	%	nn.nn % rms
Pk EVM	n=1 2nd	Peak symbol EVM (Note 1)	%	nn.nn % pk
Magnitude Error	n=1 3rd	Symbol magnitude error (Note 1)	%	nn.nn % rms
Phase Error	n=1 4th	Symbol phase error (Note 2)	degree	nn.nn °rms
Total Power	n=1 5th	Total RF power over measurement interval.	dBm	-nn.nn dBm
Channel Power	n=1 6th	Channel Power	dBc or dBm (depending on the measurement type)	-nn.nn dBc/dBm

Note 1:

When I/Q Branch is either I (-BPSK) or Q (-BPSK):

EVM of single code Channel is calculated independently between I and Q each other.

When I/Q Branch is IQC (-Combined)

EVM is calculated based on combined symbol vector of I and Q decision point.

Note 2:

When I/Q Branch is either I (-BPSK) or Q (-BPSK)

IQ Phase error is no meaning.

When I/Q Branch is IQ (-Combined):

IQ Phase error is calculated based on combined symbol vector of I and Q decision point.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Code Domain (Quad View)

Provides a combination view of magnitude error, phase error, Symbol EVM, and the summary data. There is no view settings for this view.

“Radio Device: BTS” on page 800

“Radio Device: MS” on page 801

Radio Device: BTS

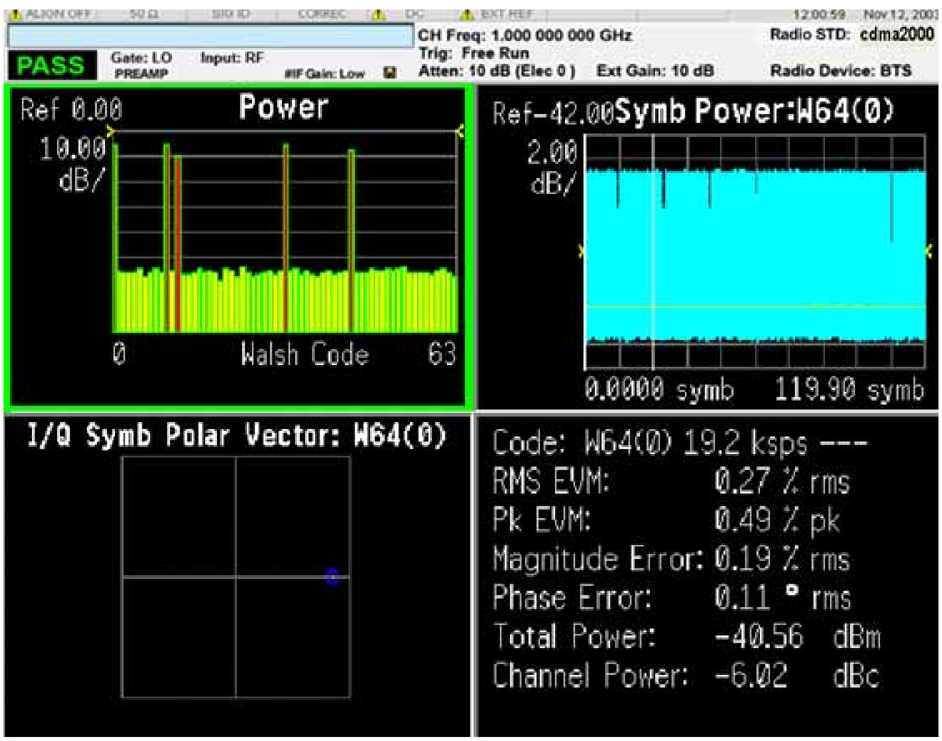
There are four windows:

“Power Bar Graph window” on page 800

“Symbol Power vs Time window” on page 800

“I/Q Symbol Polar Vector window” on page 801

“Numeric Results window” on page 801



Power Bar Graph window

Marker Operation	Yes
Corresponding Trace	CDPower (n=2)

Symbol Power vs Time window

Marker Operation	Yes

Corresponding Trace	SPOWer (n=9), CPOWer (n=10)

I/Q Symbol Polar Vector window

Marker Operation	Yes
Corresponding Trace	(n=8)

Numeric Results window

Name	Corresponding	Description	Unit	Format
Code Number	NA	NA		WX(Y) N ksps X: Walsh code level (2 ,4,8,… 128) Y: Walsh code number (0 … X) N: 9.6, 14.4, 153.6 …, 230.4 ksps
RMS EVM	n=1 1st	RMS symbol EVM	%	nn.nn % rms
Pk EVM	n=1 2nd	Peak symbol EVM	%	nn.nn % pk
Magnitude Error	n=1 3rd	Symbol magnitude error	%	nn.nn % rms
Phase Error	n=1 4th	Symbol phase error	degree	nn.nn °rms
Total Power	n=1 5th	Total RF power over measurement interval.	dBm	-nn.nn dBm
Channel Power	n=1 6th	Channel Power	dBc or dBm (depending on the measurement type)	-nn.nn dBc/dBm

Radio Device: MS

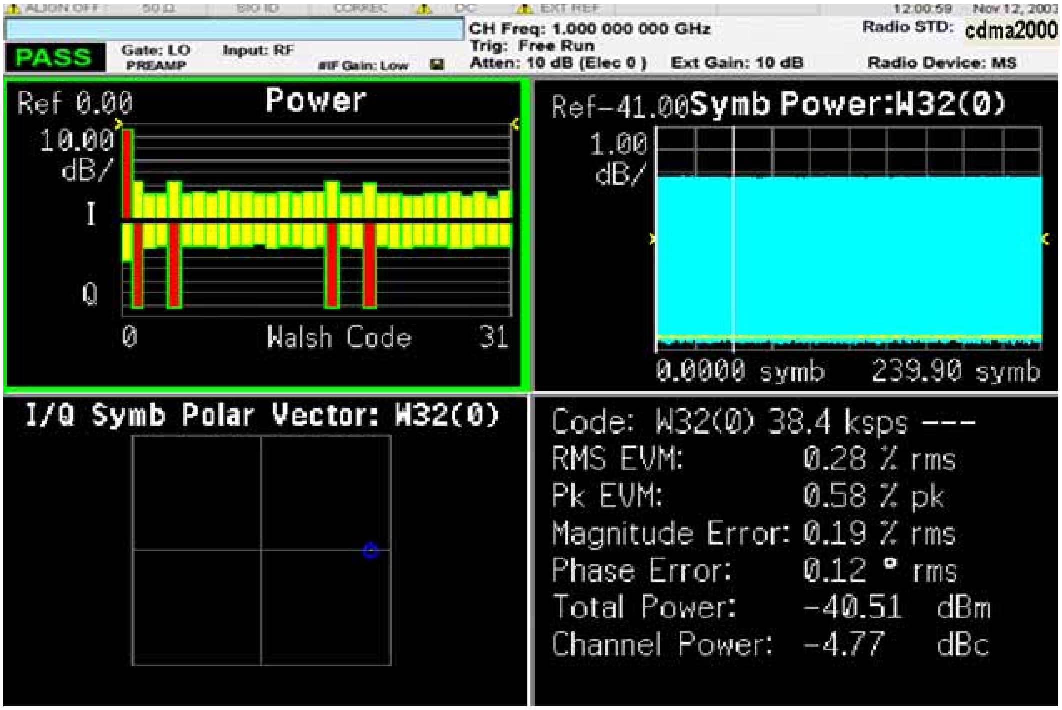
There are four windows:

"Power Bar Graph window" on page 802

"Symbol Power vs Time window" on page 802

"I/Q Symbol Polar Vector window" on page 802

"Numeric Results window" on page 803



Power Bar Graph window

Marker Operation	Yes
Corresponding Trace	CDPower (n=2)

NOTE These traces and scalar results are of the slot specified by the Meas Offset. (Not averaged over Meas Interval.)

Symbol Power vs Time window

Marker Operation	Yes
Corresponding Trace	SPOWer (n=9), CPOWer (n=10)

I/Q Symbol Polar Vector window

Marker Operation	Yes
Corresponding Trace	IQ Corrected Measured Trace (n=8) Note 1

NOTE When I/Q Branch is either I (-BPSK) or Q (-BPSK):

Symbol Vector is independent between I and Q each other.

When I/Q Branch is IQC (-Combined)

Symbol vector is combined between I and Q.

See “HPSK (Hybrid PSK) analysis” in “Measurement Algorithm”.

Numeric Results window

Name	Corresponding	Description	Unit	Format
Code Number	NA	NA		WX(Y) N ksps X: Walsh code level (2 ,4,8,… 128) Y: Walsh code number (0 … X) N: 9.6, 14.4, 153.6 …, 230.4 ksps
RMS EVM	n=1 1st	RMS symbol EVM	%	nn.nn % rms
Pk EVM	n=1 2nd	Peak symbol EVM	%	nn.nn % pk
Magnitude Error	n=1 3rd	Symbol magnitude error	%	nn.nn % rms
Phase Error	n=1 4th	Symbol phase	degree	nn.nn °rms
Total Power	n=1 5th	Total RF power over measurement interval.	dBm	-nn.nn dBm
Channel Power	n=1 6th	Channel Power	dBc or dBm (depending on the measurement type)	-nn.nn dBc/dBm

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Composite Chip Power

Toggles the composite chip power display function between On and Off.

Key Path	**View/Display, Code Domain (Quad View)**
Mode	CDMA2000
Remote Command	`:DISPlay:CDPower:CPOWer[:STATe] 0|1|OFF|ON` `:DISPlay:CDPower:CPOWer[:STATe]?`

Example	DISP:CDP:CPOW ON DISP:CDP:CPOW?
Notes	Only valid for Symbol/Chip Power vs. Time window.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

Demod Bits

There are three windows. The Code Domain Power window has the same view settings as the Power Graph & Metrics. The Symbol Power window has the view setting of Composite Chip Power. The Demod Bits window is to allow the following controls to read the bit stream measurement results:

- Prev Page - Returns one page back to the previous page of the measurement results.
- Next Page - Moves one page forward to the next page of the measurement results.
- Scroll Up - Moves one line upward from the current page of the measurement results by each pressing.
- Scroll Down - Moves one line downward from the current page of the measurement results by each pressing.
- First Page - Moves from the current page to the first page of the measurement results.
- Last Page - Moves from the current page to the last page of the measurement results.

"Radio Device: BTS" on page 804

"Radio Device: MS" on page 805

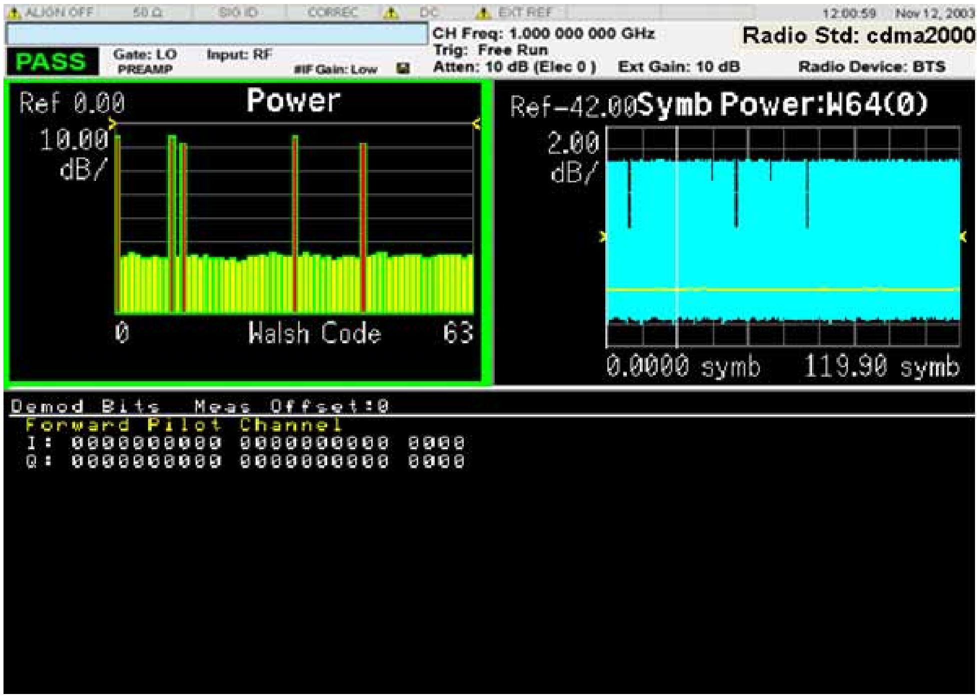
Radio Device: BTS

There are three windows:

"CDP(Code Domain Power) Graph window " on page 805

"Symbol Power vs Time window" on page 805

"Demod Bits window" on page 805



CDP(Code Domain Power) Graph window

Marker Operation	Yes
Corresponding Trace	CDPower (n=2)

Symbol Power vs Time window

Marker Operation	Yes
Corresponding Trace	SPOWer (n=9), CPOWer (n=10)

Demod Bits window

Marker Operation	No
Corresponding Trace	Selected Demod Bits by Meas Offset and Meas Interval (n=12)

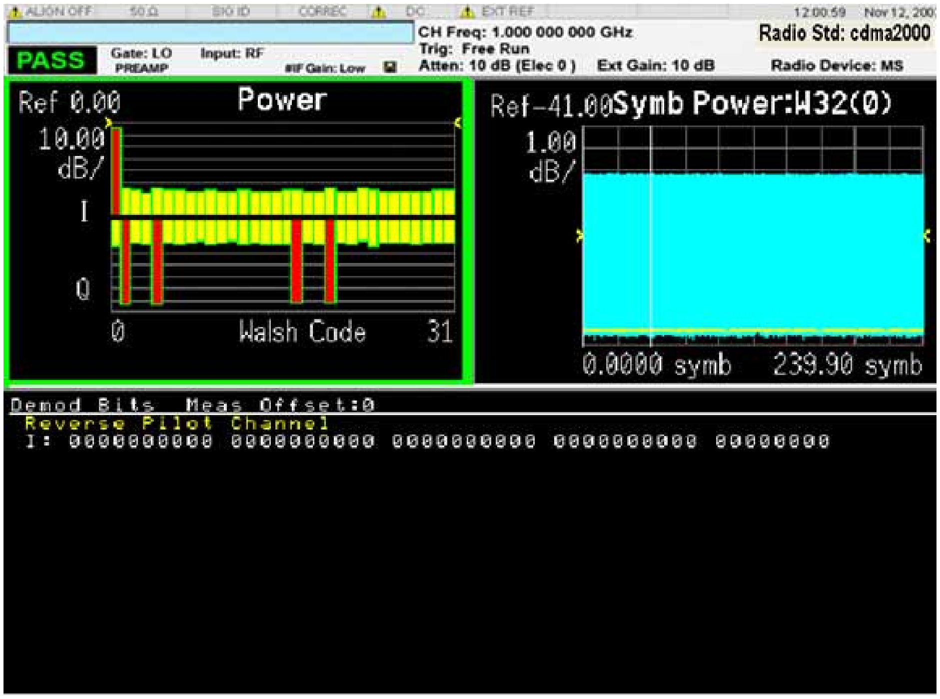
Radio Device: MS

There are three windows:

“CDP(Code Domain Power) Graph window” on page 806

“Symbol Power vs Time window” on page 806

“Demod Bits window ” on page 806



CDP(Code Domain Power) Graph window

Marker Operation	Yes
Corresponding Trace	CDPower (n=2)

Symbol Power vs Time window

Marker Operation	Yes
Corresponding Trace	SPOWer (n=9), CPOWer (n=10)

Demod Bits window

Marker Operation	No
Corresponding Trace	Selected Demod Bits by Meas Offset and Meas Interval (n=12)

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Prev Page

Returns the current page back to the previous page of the measurement results.

Key Path	**View/Display, Demod Bits**

Mode	CDMA2000
Notes	The Demod Bits window must be the focused window.
Remote Command Notes	NO SCPI
Initial S/W Revision	Prior to A.02.00

Next Page

Moves the current page forward to the next page of the measurement results.

Key Path	**View/Display, Demod Bits**
Mode	CDMA2000
Notes	The Demod Bits window must be the focused window.
Remote Command Notes	NO SCPI
Initial S/W Revision	Prior to A.02.00

Scroll Up

Moves one line upward from the current page of the measurement results by each pressing.

Key Path	**View/Display, Demod Bits**
Mode	CDMA2000
Notes	The Demod Bits window must be the focused window.
Remote Command Notes	NO SCPI
Initial S/W Revision	Prior to A.02.00

Scroll Down

Moves one line downward from the current page of the measurement results by each press.

Key Path	**View/Display, Demod Bits**
Mode	CDMA2000
Notes	The Demod Bits window must be the focused window.
Remote Command Notes	NO SCPI
Initial S/W Revision	Prior to A.02.00

First Page

Moves from the current page to the first page of the measurement results.

Key Path	**View/Display, Demod Bits**

Mode	CDMA2000
Notes	The Demod Bits window must be the focused window.
Remote Command Notes	NO SCPI
Initial S/W Revision	Prior to A.02.00

Last Page

Moves from the current page to the last page of the measurement results.

Key Path	**View/Display, Demod Bits**
Mode	CDMA2000
Notes	The Demod Bits window must be the focused window.
Remote Command Notes	NO SCPI
Initial S/W Revision	Prior to A.02.00

12 Modulation Accuracy (Composite Rho) Measurement

Rho is one of the key modulation quality metrics, along with EVM. Rho is the ratio of the correlated power in a multi coded channel to the total signal power. This measurement takes into account all possible error mechanisms in the entire transmission chain including: baseband filtering, I/Q modulation anomalies, filter amplitude and phase non-linearity, and power amplifier distortions.

This provides an overall indication of the performance level of the transmitter of the unit under test (UUT).

For measurements results and views, see “View/Display” on page 873.

This section contains the following topics:

Command Results for Modulation Accuracy Measurement

Measurement Commands for Modulation Accuracy

You must be in the cdma2000 to use these commands. Use INSTrument:SELect to set the mode.

```
:CONFigure:RHO
```

```
:FETCh:RHO[n]?
```

```
:READ:RHO[n]?
```

```
:MEASure:RHO[n]?
```

For more measurement related commands, see the SENSe subsystem, and the section “Remote Measurement Functions” on page 1257.

Remote Command Results for Modulation Accuracy Measurement

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

n	Results Returned
not specified or n = 1	Returns the following 11 scalar results: 1. RMS EVM (Average) is a floating point number (in percent) of EVM over the entire measurement area 2. Peak EVM (Peak Hold) is a floating point number (in percent) of the peak EVM in the measurement area 3. Magnitude error (Average) is a floating point number (in percent) of the average magnitude error over the entire measurement area 4. Phase error (Average) is a floating point number (in degree) of the average phase error over the entire measurement area 5. I/Q origin offset (Average) is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin 6. Frequency error (Average) is a floating point number (in Hz) of the frequency error in the measured signal 7. Rho (Average) is a floating point number of Rho 8. Peak Code Domain Error (Peak Hold) is a floating point number (in dB) of the Peak Code Domain Error relative to the mean reference power 9. Peak Code Domain Error Channel Number (Peak Hold) is the channel number in which the peak code domain error is detected. 10. Number of active channels. 11. Time offset (Average) is a floating point number (in chips) of the pilot phase timing from the acquisition trigger point.
2	EVM trace – returns series of floating point numbers (in percent) that represent each sample in the EVM trace. The first number is the symbol 0 decision point. There are X points per symbol (X=points/chip). Therefore, the decision points are at 0, 1*X, 2*X, …
3	Magnitude error trace – returns series of floating point numbers (in percent) that represent each sample in the magnitude error trace. The first number is the symbol 0 decision point. There are X points per symbol (X=points/chip). Therefore, the decision points are at 0, 1*X, 2*X, …
4	Phase error trace – returns series of floating point numbers (in percent) that represent each sample in the phase error trace. The first number is the symbol 0 decision point. There are X points per symbol (X=points/chip). Therefore, the decision points are at 0, 1*X, 2*X, …

n	Results Returned
5	Corrected measured trace – returns series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. The magnitude of each I and Q pair are normalized to 1.0. The first number is the I sample of symbol 0 decision point and the second number is the Q sample of symbol 0 decision point. There are X points per symbol (X=points/chip). Therefore, the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point … (2*X)+1 number = I of the symbol 1 decision point (2*X)+2 number = Q of the symbol 1 decision point … (2*X)*N+1 th number = I of the symbol N decision point (2*X)*N+2 th number = Q of the symbol N decision point
6	Returns 6 scalar values of the pass/fail (0=passed, or 1=failed) results determined by testing the EVM, the peak EVM, Rho, the peak code domain error, the time offset, and the phase error.
7	Returns series of floating point numbers of code level, code index, power (in dB), time offset (in ns), phase offset (in rad), and code domain error (in dB). The total number of results are six times of “number of active channels”. The number of active channels can be obtained by the 10th result of READ:RHO1 command.

Key Path	**Meas**
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses the AMPTD Y Scale menu that allows you to set the desired vertical scale and associated settings. The menus under this menu are available when in “I/Q Error” view. And only Attenuation is available when in the following views:

“I/Q Measured Polar Graph”

“Power, Timing, and Phase”.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Ref Value

Sets the absolute power reference value ranging from –500.00 to 500.00 dBm with 0.01 dB resolution. However, since Auto Scaling defaults to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View - EVM Window

Sets the absolute power reference value in the EVM window.

Key Path	**AMPTD Y Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:RHO:VIEW2:WIND:TRAC:Y:RLEV 0.0 DISP:RHO:VIEW2:WIND:TRAC:Y:RLEV?
Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off.
Remote Command Notes	WINDow[1]: Evm window on I/Q Error view
Couplings	See Restriction and Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–500.0

Max	500.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View – Mag Error Window

Sets the absolute power reference value in the magnitude error window.

Key Path	**AMPTD Y Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:RHO:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:RHO:VIEW2:WIND2:TRAC:Y:RLEV 0.0 DISP:RHO:VIEW2:WIND2:TRAC:Y:RLEV?
Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off.
Remote Command Notes	WINDow2: Mag Error window on I/Q Error view
Couplings	See Restriction and Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–500.0
Max	500.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View – Phase Error Window

Sets the absolute power reference value in the phase error window.

Key Path	**AMPTD Y Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow3:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:RHO:VIEW2:WINDow3:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:RHO:VIEW2:WIND3:TRAC:Y:RLEV 0.0 DISP:RHO:VIEW2:WIND3:TRAC:Y:RLEV?
Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off.

Remote Command Notes	WINDow3: Phase Error window on I/Q Error view
Couplings	See Restriction and Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–36000.0
Max	36000.0
Initial S/W Revision	Prior to A.02.00

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings. This key has read-back text that describes the total attenuator value.

See AMPTD Y Scale, “Attenuation” on page 1120in the “Common Measurement Functions” section for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Range

Accesses the Range menu to change baseband I/Q gain settings. This key has a readback text that describes gain range value.

See AMPTD Y Scale, “Range” on page 1129 in the “Common Measurement Functions” for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	Prior to A.02.00

Scale/Div

Sets the sensitivity for the vertical axis. The range is 0.10 to 50.00 dB with 0.01 dB resolution. However, since Auto Scaling defaults to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View - EVM Window

Sets the sensitivity measurement result in the EVM window.

Key Path	**AMPTD Y Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:RHO:VIEW2:WIND:TRAC:Y:PDIV 10.0 DISP:RHO:VIEW2:WIND:TRAC:Y:PDIV?
Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off.
Couplings	See Restriction and Notes
Preset	0.5
State Saved	Saved in instrument state.
Min	0.100
Max	50.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View – Mag Error Window

Sets the sensitivity measurement result in the magnitude error window.

Key Path	**AMPTD Y Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:RHO:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:RHO:VIEW2:WIND2:TRAC:Y:PDIV 10.0 DISP:RHO:VIEW2:WIND2:TRAC:Y:PDIV?
Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off.
Couplings	See Restriction and Notes
Preset	1.0
State Saved	Saved in instrument state.

Min	0.100
Max	50.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View – Phase Error Window

Sets the sensitivity measurement result in the phase error window.

Key Path	**AMPTD Y Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow3:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:RHO:VIEW2:WINDow3:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:RHO:VIEW2:WIND3:TRAC:Y:PDIV 10.0 DISP:RHO:VIEW2:WIND3:TRAC:Y:PDIV?
Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off.
Couplings	See Restriction and Notes
Preset	0.5
State Saved	Saved in instrument state.
Min	0.0100
Max	360.0
Initial S/W Revision	Prior to A.02.00

Presel Center

See AMPTD Y Scale, “Presel Center” on page 1136 in the “Common Measurement Functions” section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Presel Adjust

See AMPTD Y Scale, “Preselector Adjust” on page 1137 in the “Common Measurement Functions” section for more information.

Key Path	**AMPTD Y Scale**

Initial S/W Revision	Prior to A.02.00

µW Path Control

The **µW Path Control** functions include the **µW Preselector Bypass** (Option MPB) and **Low Noise Path** (Option LNP) controls in the High Band path circuits.

See µ"µW Path Control " on page 1145 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See AMPTD Y Scale, "Internal Preamp" on page 1149in the "Common Measurement Functions" section for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Ref Position

Positions the Y-axis scale reference level at the top, center or bottom of the display. Changing the reference position does not change the reference level value.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View - EVM Window

Sets the reference position of the vertical axis in the EVM window.

Key Path	**AMPTD Y Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:RHO:VIEW2:WIND:TRAC:Y:RPOS TOP DISP:RHO:VIEW2:WIND:TRAC:Y:RPOS?
Preset	BOTTom

State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00

I/Q Error View – Mag Error Window

Sets the reference position of the vertical axis in the magnitude error window.

Key Path	**AMPTD Y Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow2:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:RHO:VIEW2:WINDow2:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:RHO:VIEW2:WIND2:TRAC:Y:RPOS TOP DISP:RHO:VIEW2:WIND2:TRAC:Y:RPOS?
Preset	CENTer
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00

I/Q Error View – Phase Error Window

Sets the reference position of the vertical axis in the phase error window.

Key Path	**AMPTD Y Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow3:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:RHO:VIEW2:WINDow3:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:RHO:VIEW2:WIND3:TRAC:Y:RPOS TOP DISP:RHO:VIEW2:WIND3:TRAC:Y:RPOS?
Preset	CENTer
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Toggles the Auto Scaling function between On and Off. When Auto Scaling is On, pressing the Restart front-panel key results in automatically determining scale per division and reference values based on the measurement results.

When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View - EVM Window

When Auto Scaling is On, pressing the Restart front-panel key results in automatically displaying the scale per division and reference value results for the vertical axis in the EVM window.

Key Path	**AMPTD Y Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:RHO:VIEW2:WIND:TRAC:Y:COUP ON DISP:RHO:VIEW2:WIND:TRAC:Y:COUP?
Notes	When this parameter is set to On, pressing the front-panel Restart key, or the Restart key in the Meas Control menu, activates the scale coupling function, that automatically determines scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling is automatically set to Off.
Remote Command Notes	WINDow[1]: EVM window on I/Q Error view
Couplings	See Restriction and Notes
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

I/Q Error View – Mag Error Window

When Auto Scaling is On, pressing the Restart front-panel key results in automatically displaying the scale per division and reference value results for the vertical axis in the magnitude error window.

Key Path	**AMPTD Y Scale**

Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow2:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:RHO:VIEW2:WINDow2:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:RHO:VIEW2:WIND2:TRAC:Y:COUP ON DISP:RHO:VIEW2:WIND2:TRAC:Y:COUP?
Notes	When this parameter is set to On, pressing the front-panel Restart key, or the Restart key in the Meas Control menu, based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling is automatically set to Off.
Remote Command Notes	WINDow2: Mag Error window on I/Q Error view
Couplings	See Restriction and Notes
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

I/Q Error View – Phase Error Window

When Auto Scaling is On, pressing the Restart front-panel key will result in automatically displaying the scale per division and reference value results for the vertical axis in the phase error window.

Key Path	**AMPTD Y Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow3:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:RHO:VIEW2:WINDow3:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:RHO:VIEW2:WIND3:TRAC:Y:COUP ON DISP:RHO:VIEW2:WIND3:TRAC:Y:COUP?
Notes	When this parameter is set to On, pressing the front-panel Restart key, or the Restart key in the Meas Control menu, activates the scale coupling function, that automatically determines scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling is automatically set to Off.
Remote Command Notes	WINDow3: Phase Error window on I/Q Error view
Couplings	See Restriction and Notes
Preset	ON
State Saved	Saved in instrument state.

Range	On|Off
Initial S/W Revision	Prior to A.02.00

Auto Couple

See “Auto Couple” on page 1153 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

BW

There is no BW functionality supported in the Mod Accuracy measurement. The front-panel key will display a blank menu when pressed.

Key Path	**BW**
Initial S/W Revision	Prior to A.02.00

Cont

See “Cont (Continuous Measurement/Sweep)” on page 1155 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

FREQ Channel

See “FREQ Channel” on page 1157 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Input/Output

See “Input/Output” on page 1165 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	**Front Panel Key**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, reference value of the selected marker appears on the Active Function area.

Active Function Display:

Marker symbol value at I/Q Symbol Polar Vector graph

Marker X-axis value at other graphs

Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off.

The marker X axis value entered in the active function area will display the marker value to its full entered precision.

Key Path	**Marker**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:RHO:MARK:MODE POS CALC:RHO:MARK:MODE?

Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: The active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: - the marker X axis value for any other graph The value entered in the active function area will display the marker value to its full entered precision.
Preset	=OFF
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal | Delta | Off
Initial S/W Revision	Prior to A.02.00

Marker Chip Value (Remote Command only)

Sets the marker Chip value in the current marker for the I/Q Polar trace. It has no effect if the control mode is **Off**, but if the control mode is Normal, this is the SCPI equivalent of entering a Chip value.

This command is valid only when Marker Trace 'POLar'(I/Q Polar)is active. For any other Marker Trace, the command is ignored.

Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:CHIP <real>` `:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:CHIP?`
Example	CALC:RHO:MARK:CHIP 0 CALC:RHO:MARK:CHIP?
Notes	If no suffix is sent, 'chips' will be used. If a suffix is sent that does not match 'chips', an error "Invalid suffix" will be generated. The query returns the marker's 'chips' value in the trace if the control mode is **Normal** The query is returned in 'chips'. If the marker is **Off** the response is not a number (NAN).
Remote Command Notes	This parameter has different meanings when the marker trace is set to I/Q Polar and others cases. In the case of the I/Q Polar Graph, the X Axis Value is also the measured value, so this parameter is meaningful only when the control mode is set to Normal.
Preset	0

Preset	Start point of the trace in the display window
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Key Path	**NA**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:RHO:MARK3:X 0.0 CALC:RHO:MARK3:X?
Notes	If no suffix is sent, the fundamental units for the current marker X Axis Scale will be used. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” will be generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**,, or the offset from the marker’s reference marker, if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number (NAN).
Preset	0
Preset	After a preset, all Markers are turned OFF, so a Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37.
Initial S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta -** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>` `:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:RHO:MARK10:X:POS 0.0 CALC:RHO:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal,**, or the offset from the marker's reference marker in trace points, if the control mode is **Delta**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points (see "Fractional Trace Points", above). If the marker is **Off** the response is not a number (NAN).
Remote Command Notes	This command is not available when Marker Trace of the selected marker (:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?) is set to POLar. In this case, this command is ignored.
Preset	0
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command only)

Queries the marker Y Axis value in the current unit for the marker Y Axis.

Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:RHO:MARK11:Y?
Notes	If no suffix is sent, the current Y Axis unit will be used. If a suffix is sent that is not expressed in units of absolute amplitude, an "Invalid suffix" error will be generated. The query returns the marker Y-axis result if the control mode is **Normal** or **Delta**. If the marker is **Off** the response is not a number (NAN).
Preset	Result dependent on Markers setup and signal source
State Saved	No
Backwards Compatibility SCPI	:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:RESult?

Initial S/W Revision	Prior to A.02.00

Properties

Accesses a menu that enables you to select a reference marker and marker trace.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Relative To

Selects the marker that the selected marker will be relative to (its reference marker).

Key Path	**Marker, Properties**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:RHO:MARK:REF 3 CALC:RHO:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: "Settings conflict; marker cannot be relative to itself."
Remote Command Notes	When queried a single value will be returned (the specified marker number's relative marker). A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: "Settings conflict; marker cannot be relative to itself."
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	**Marker**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe POLar|EVM|MERRor|PERRor` `CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:RHO:MARK2:TRAC EVM CALC:RHO:MARK2:TRACE?
Preset	EVM
State Saved	Saved in instrument state.
Range	POLar |EVM|MERRor|PERRor|
Initial S/W Revision	Prior to A.02.00

Couple Markers

Toggles the state of the markers to be coupled On or Off. When this function is true (On), moving any marker causes an “equal X Axis movement” of every other marker which is active. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

See Couple Markers in the "Marker" section for more information.

This may result in markers going off screen.

Key Path	**Marker**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:RHO:MARKer:COUPle[:STATe]?`
Example	CALC:RHO:MARK:COUP ON CALC:RHO:MARK:COUP?
Notes	When the marker is assigned to the IQ Measured Polar graph, a Chip value is coupled instead of an X Axis value.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Key Path	**Marker**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer:AOFF`
Example	CALC:RHO:MARK:AOFF
Initial S/W Revision	Prior to A.02.00

Marker Function

There are no ‘Marker Functions’ supported in Mod Accuracy. The front-panel key will display a blank menu when pressed.

Key Path	**Front-panel key**

Marker To

There is no ‘Marker To’ functionality supported in Mod Accuracy. The front-panel key will display a blank menu when pressed.

Key Path	**Front-panel key**

Meas

See “Meas” on page 1257 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	**Front panel key**
Initial S/W Revision	Prior to A.02.00

Avg Number

Sets the number of data acquisitions that will be averaged. After the specified number of average counts is reached, the averaging mode (termination control) setting determines the averaging action.

Key Path	**Meas Setup**
Mode	cdma2000

Remote Command	`[:SENSe]:RHO:AVERage:COUNt <integer>`
	`[:SENSe]:RHO:AVERage:COUNt?`
	`[:SENSe]:RHO:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:RHO:AVERage[:STATe]?`

Example	RHO:AVER:COUN 100 RHO:AVER:COUN? RHO:AVER OFF RHO:AVER?
Preset	10 ON
State Saved	Saved in instrument state.
Min	1
Max	10000
Initial S/W Revision	Prior to A.02.00

Avg Mode

Selects the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached. You can select between the **Exp** (exponential) and **Repeat** averaging modes. This selection only affects the averaging result after the number of N averages is reached. You can use the **Avg Number** key to set N.

KEYExponential averaging SCPIEXPonential	When Measure is set at Cont, data acquisitions will continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals.
KEYRepeat averaging SCPIREPeat	When Measure is set at Cont, data acquisitions will continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.

Key Path	**Meas Setup**
Mode	cdma2000
Remote Command	`[:SENSe]:RHO:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:RHO:AVERage:TCONtrol?`
Example	RHO:AVER:TCON EXP RHO:AVER:TCON?
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp|Repeat
Initial S/W Revision	Prior to A.02.00

Limits

Accesses a menu that allows you to set the following limits:

RMS EVM (Composite)

Peak EVM (Composite)

Rho (Composite)

Peak Code Domain Error

Timing Error

Phase Error

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

RMS EVM (Composite)

Sets the limit for the composite RMS EVM measurement pass/fail test.

Key Path	**Meas Setup, Limits**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:LIMit:RMS <real>` `:CALCulate:RHO:LIMit:RMS?`
Example	CALC:RHO:LIM:RMS 10.0 CALC:RHO:LIM:RMS?
Preset	100.0
State Saved	Saved in instrument state.
Min	0.00
Max	100.00
Initial S/W Revision	Prior to A.02.00

Peak EVM (Composite)

Sets the limit for the composite peak EVM measurement pass/fail test.

Key Path	**Meas Setup, Limits**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:LIMit:PEAK <real>` `:CALCulate:RHO:LIMit:PEAK?`
Example	CALC:RHO:LIM:PEAK 50.0 CALC:RHO:LIM:PEAK?
Preset	200.0
State Saved	Saved in instrument state.
Min	0.0
Max	200.0
Initial S/W Revision	Prior to A.02.00

Rho (Composite)

Sets the limit for the composite Rho measurement pass/fail test.

Key Path	**Meas Setup, Limits**
Mode	cdma2000

Remote Command	`:CALCulate:RHO:LIMit:RHO <real>` `:CALCulate:RHO:LIMit:RHO?`
Example	CALC:RHO:LIM:RHO 0.9 CALC:RHO:LIM:RHO?
Notes	The default value of BTS is 0.912 and MS is 0,944.
Preset	BS: 0.912 MS: 0.944
State Saved	Saved in instrument state.
Min	0
Max	1
Initial S/W Revision	Prior to A.02.00

Peak Code Domain Error

Sets the limit for the composite Peak Code Domain Error measurement pass/fail test.

Key Path	**Meas Setup, Limits**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:LIMit:CDERror <real>` `:CALCulate:RHO:LIMit:CDERror?`
Example	CALC:RHO:LIM:CDER –50.0 CALC:RHO:LIM:CDER?
Preset	0.0
State Saved	Saved in instrument state.
Min	–100
Max	0
Initial S/W Revision	Prior to A.02.00

Timing Error

Sets limit of Timing Offset from Pilot.

Key Path	**Meas Setup, Limits**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:LIMit:TIMing <float>` `:CALCulate:RHO:LIMit:TIMing?`

Example	CALC:RHO:LIM:TIM 0.000000005 CALC:RHO:LIM:TIM?
Notes	Set limits of Timing Offset from Pilot which is used to judge the result of Pilot Time Offset passes or fails. If a measured Timing Offset from Pilot is not larger than limit value, the result is PASS. Otherwise, the result is FAIL. The default value of BTS is 50 ns, and MS is 10 ns.
Preset	BS: 50 ns MS: 10 ns
State Saved	Saved in instrument state.
Min	0.0 s
Max	500 ns
Initial S/W Revision	Prior to A.02.00

Phase Error

Sets the limit of Phase Offset from Pilot.

Key Path	**Meas Setup, Limits**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:LIMit:PHASe <float>` `:CALCulate:RHO:LIMit:PHASe?`
Example	CALC:RHO:LIM:PHAS 0.05 CALC:RHO:LIM:PHAS?
Notes	Set limits of Phase Offset from Pilot which is used to judge the result of Pilot Phase Offset passes or fails. If a measured Timing Offset from Pilot is not larger than limit value, the result is PASS. Otherwise, the result is FAIL.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	3.0
Initial S/W Revision	Prior to A.02.00

PN Offset

Setsthe value for the pseudo-random noise offset.

Key Path	**Meas Setup, More**

Remote Command	`:CALCulate:RHO:PNOFfset <integer>` `:CALCulate:RHO:PNOFfset?`
Example	CALC:RHO:PNOF 5 CALC:RHO:PNOF?
Notes	Sets value for the pseudo-random noise offset. Different pseudo-random noise offsets are used for different base stations. By setting the pseudo-random noise offset to the value that your specific base station is set to, you get the correct time offset value displayed and returned back to you when you query READ:RHO? The instrument, by default, assumes an offset of 0. So, if you do not use this command, you will have to manually calculate the time offset when the value is other than 0.
Remote Command Notes	You must be in cdma2000 mode to use this command.
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	511
Initial S/W Revision	Prior to A.02.00

Sync Type

Accesses a menu that enables you to select the channel to synchronize with.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

Sync Type BTS

Accesses the menu that enables you to select the channel to synchronize with, and to set features, such as Symbol Rate, that may affect synchronization. You can select from the following types of channels and features listed in the menu:

F-PICH: Forward Pilot Channel.

Tx-Div F-PICH: Tx diversity forward Pilot Channel.

Key Path	**Meas Setup, More 1 of 2**
Mode	cdma2000
Remote Command	`[:SENSe]:RHO:SYNC[:BTS] PICH|DPICh` `[:SENSe]:RHO:SYNC[:BTS]?`
Example	RHO:SYNC PICH RHO:SYNC?

Remote Command Notes	This command is effective when [:SENSe]:RADio:DEVice is set to BTS.
Preset	PICH
State Saved	Saved in instrument state.
Range	F-PICH|TxDiv F-PICH
Initial S/W Revision	Prior to A.02.00

Long Code Mask MS

Accesses a menu that enables you to select long code mask for MS. You can select from the following types listed in the menu.

Key Path	**Meas Setup, More 1 of 2**
Mode	cdma2000
Remote Command	`[:SENSe]:RHO:SYNC:LCMask <integer>` `[:SENSe]:RHO:SYNC:LCMask?`
Example	RHO:SYNC:LCM 0 RHO:SYNC:LCM?
Remote Command Notes	This command is effective when [:SENSe]:RADio:DEVice is set to MS.
Preset	0
State Saved	Saved in instrument state.
Range	0 to 4,398,046,511,103 (0h to 3F,FFF,FFF,FFFh)
Initial S/W Revision	Prior to A.02.00

Radio Config

This key is only available when the radio device is MS.

Radio Configuration means a set of Forward Traffic Channel and Reverse Traffic Channel transmission formats that are characterized by physical layer parameters such as data rates, modulation characteristics, and spreading rate, its abbreviation is RC. And the n of RCn means the index of Radio Configuration. Different RCn is coupled to different data rate, spreading rate and modulation format. Currently, there are 9 Radio Configurations defined in the IS–2000 system. cdma2000 only support RC1-RC5 under SR1 mode operation (1.28 MHz chip rate). Both RC1 and RC2 are used for backwards compatible with IS95. RC3, RC4 and RC5 are new Radio Configurations that use the IS–2000 coding scheme in the SR1 mode of operation (1.2288 MHz chip rate). When the Radio Config is set as cdma2000, it means the current Radio Configuration is RC3, RC4, RC5, or their combination. When the Radio Config is set as IS95, it means the current Radio Configuration is RC1, RC2 or their combination.

For the forward link, the cdma2000 can be coexisting with IS95 and the tester supports them automatically. But for reverse link, there is great difference between cdma2000 and IS95 and also they are separate in the test, so the tester has the radio configuration selection.

For IS95, the reverse link cannot support a pilot channel for synchronous demodulation. Due to this limitation, the reverse link has less capacity than the forward link. To aid reverse link performance, the 9600 bps voice data uses a one-third rate convolution coded for more powerful error correction. Then six data bits at a time are taken to point at one of the 64 available Walsh codes, that is 64-ary orthogonal Modulator. And then XOR'ed with the long code to reach the full 1.2288 Mbps data rate.. This unique long code is the channelization code for the reverse link. The modulation is QPSK in the base station, and Offset QPSK in the mobile station.

And For cdma2000, in the reverse link, each mobile now has its own Pilot channel, the reverse link uses I and Q long codes scrambled with I and Q short codes to produce a new modulation format called HPSK (Hybrid Phase Shift Keying). HPSK reduces the dynamic range of the modulation to allow a less expensive output amplifier for mobiles.

Key Path	**Meas Setup, More 1 of 2**
Mode	cdma2000
Remote Command	`[:SENSe]:RHO:RCONfig cdma2000|IS95` `[:SENSe]:RHO:RCONfig?`
Example	:RHO:RCON cdma2000 :RHO:RCON?
Notes	This key is available only if the Radio Device is MS. And if Radio Config is set to IS95, it only supports the case that there is only 1 traffic channel or access channel.
Remote Command Notes	This command is effective when [:SENSe]:RADio:DEVice is set to MS.
Couplings	If Radio Config is toggled to IS95, it will be dashed out for Pk CDE, Pk CDE Position, Time Offset and Active Channels Number will be dashed out, and the view of Power, Timing, and Phase will be grayed out, and the limits of Peak Code Domain Error, Timing Error, and Phase Error will be grayed out also. If Radio Config is toggled to IS95, the trace of view1 and view2 is 4 samples/ chip, which is required by HPSK.
Preset	cdma2000
State Saved	Saved in instrument state.
Range	cdma2000|IS95
Initial S/W Revision	Prior to A.02.00

Spectrum

Sets a spectrum to either normal or inverted for demodulation related measurements. If set to INVert, the upper and lower spectrums are swapped.

The Invert function conjugates the spectrum, which is equivalent to taking the negative of the quadrature component in demodulation. The correct setting (Normal or Invert) depends on whether the signal at the input of the instrument has a high or low side mix.

Key Path	**Meas Setup, More 1 of 2**
Mode	cdma2000
Remote Command	`[:SENSe]:RHO:SPECtrum INVert|NORMal` `[:SENSe]:RHO:SPECtrum?`
Example	RHO:SPEC INV RHO:SPEC?
Preset	NORMal
State Saved	Saved in instrument state.
Range	Normal|Invert
Initial S/W Revision	Prior to A.02.00

Advanced

Accesses the menu that allows you to set the I/Q origin offset function, active channel identification function, alpha value of the Root Raised Cosine (RRC) filter, and chip rate.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

EVM Result I/Q Offset

Toggles the I/Q origin offset function between Include (standard) and Exclude.

Include: The measurement results for EVM, Rho, and Modulation Accuracy (Rho) error take into account the I/Q origin offset.

Exclude: The measurement results for EVM, Rho, and Modulation Accuracy (Rho) error do not take into account the I/Q origin offset, and the message “EVM excludes I/Q Offset” is displayed in the lower right-hand graph display area.

Turns the automatic mode On or Off, for the I/Q origin offset function.

Exclude: OFF – The measurement results for EVM and Rho do not take into account the I/Q origin offset.

Include: ON – The measurement results for EVM and Rho take into account the I/Q origin offset.

Key Path	**Meas Setup, Advanced**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:IQOFfset:INCLude OFF|ON|0|1` `:CALCulate:RHO:IQOFfset:INCLude?`
Example	CALC:RHO:IQOF:INCL ON CALC:RHO:IQOF:INCL?

Preset	ON
State Saved	Saved in instrument state.
Range	Include|Exclude
Initial S/W Revision	Prior to A.02.00

Active Threshold

Toggles the active channel identification function between Auto and Man. If set to Auto, the active channels are determined automatically by the internal algorithm. If set to Man, the active channel identification is determined by a user definable threshold ranging from 0.00 to –100.00 dB.

Key Path	**Meas Setup, Advanced**
Mode	cdma2000

Remote Command	`:CALCulate:RHO:ASET:THReshold <rel_ampl>`
	`:CALCulate:RHO:ASET:THReshold?`
	`CALCulate:RHO:ASET:THReshold:AUTO OFF|ON|0|1`
	`CALCulate:RHO:ASET:THReshold:AUTO?`

Example	CALC:RHO:ASET:THR –20.0 CALC:RHO:ASET:THR? CALC:RHO:ASET:THR:AUTO ON CALC:RHO:ASET:THR:AUTO?
Notes	This command is effective when [:SENSe]:RHO:SBOundary[:BTS] is set to AUTO. (For MS, this command is always effective.)
Preset	0.0 ON
State Saved	Saved in instrument state.
Min	–100.0
Max	0.0
Initial S/W Revision	Prior to A.02.00

Filter Alpha

Specifies the alpha value of the complimentary filter.

Key Path	**Meas Setup, Advanced**
Mode	cdma2000
Remote Command	`[:SENSe]:RHO:ALPHa <real>` `[:SENSe]:RHO:ALPHa?`

Example	RHO:ALPH 0.15 RHO:ALPH?
Preset	0.15
State Saved	Saved in instrument state.
Min	0.05
Max	0.20
Initial S/W Revision	Prior to A.02.00

Chip Rate

Sets the chip rate.

Key Path	**Meas Setup, Advanced**
Mode	cdma2000
Remote Command	`[:SENSe]:RHO:CRATe <freq>` `[:SENSe]:RHO:CRATe?`
Example	RHO:CRAT 1228800 RHO:CRAT?
Preset	1.2288 MHz
State Saved	Saved in instrument state.
Min	1.105925 MHz
Max	1.351680 MHz
Initial S/W Revision	Prior to A.02.00

Multi Channel Estimator

Sets the Multi Channel Estimator On or Off.

Key Path	**Meas Setup, Advanced**
Mode	cdma2000
Remote Command	`[:SENSe]:RHO:MCEStimator OFF|ON|0|1` `[:SENSe]:RHO:MCEStimator?`
Example	RHO: MCES: ON RHO: MCES?
Couplings	Only if Multi Channel Estimator is On, the view of Power, Timing and Phase can work. If Multi Channel Estimator is Off , there will be a message “Press Meas Setup, Advanced and turn Multi Channel Estimation On to see the data” appears on the view of Power, Timing, and Phase.

Preset	Off
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

IF Gain

Enables you to control an internally switched IF amplifier with approximately 10 dB of gain. This amplifier takes full advantage of the RF dynamic range of the analyzer. When it can be turned on without an overload, the dynamic range is always better when the amplifier is set to On, than when it is set to Off. The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

This is only available when the selected input is RF.

Key Path	**Meas Setup, Advanced**
Initial S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the Auto Rules for IF Gain When Auto is active, the IF Gain is set to High Gain under any of the following conditions:

- the input attenuator is set to 0 dB
- the preamp is turned On
- the Max Mixer Level is –20 dBm or lower

For other settings, Auto sets IF Gain to Off. And there are only two choice: Low Gain and High Gain. Low Gain is best for large signals and High Gain is best for small signals.

Key Path	**Meas Setup, Advanced, IF Gain**
Remote Command	`[:SENSe]:RHO:IF:GAIN:AUTO[:STATe] OFF|ON|0|1` `[:SENSe]:RHO:IF:GAIN:AUTO[:STATe]?`
Example	`RHO:IF:GAIN:AUTO OFF` `RHO:IF:GAIN:AUTO?`
Notes	IF Gain menu key is not available when IQ Input is selected.
Couplings	When either the auto attenuation works (for example, with the electrical attenuator) or optimize mechanical attenuator range is requested, the IF Gain setting is changed according to the following rule. ‘Auto’ sets IF Gain to ‘High Gain’ under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is –20 dBm or lower. For other settings, ‘Auto’ sets IF Gain to ‘Low Gain’.

Preset	OFF
State Saved	Saved in instrument state.
Range	Off | On
Initial S/W Revision	Prior to A.02.00

IF Gain State

Selects the range of IF gain. On sets the high gain option, which allows for better noise level measurements and Off sets low gain when measuring large signals.

Key Path	**Meas Setup, Advanced, IF Gain**
Remote Command	`[:SENSe]:RHO:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:RHO:IF:GAIN[:STATe]?`
Example	`RHO:IF:GAIN OFF` `RHO:IF:GAIN?`
Notes	IF Gain menu key is not available when IQ Input is selected.
Remote Command Notes	Where ON = high gain OFF = low gain
Couplings	When either the auto attenuation works (for example, with the electrical attenuator) or optimize mechanical attenuator range is requested, the IF Gain setting is changed according to the following rule. ‘Auto’ sets IF Gain to ‘High Gain’ under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, ‘Auto” sets IF Gain to ‘Low Gain’.
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals) | High Gain (Best Noise Level)
Readback Text	Low Gain | High Gain
Initial S/W Revision	Prior to A.02.00

Meas Preset

Restores all measurement parameters to their default values.

Key Path	**Meas Setup, More 1 of 2**
Mode	cdma2000
Remote Command	`:CONFigure:RHO`

Example	CONF:RHO
Initial S/W Revision	Prior to A.02.00

Mode

See “Mode” on page 1271 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Mode Setup

See “Mode Setup” on page 1291 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Peak Search

Accesses a menu that enables you to control the peak search function and places a marker on the trace point with highest peak.

Key Path	**Front panel key**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:RHO:MARK2:MAX
Initial S/W Revision	Prior to A.02.00

Next Peak

Moves the selected marker to the peak that has the next highest amplitude that is less than the marker's current value.

Key Path	**Peak Search**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:NEXT`
Example	CALC:RHO:MARK2:MAX:NEXT
Initial S/W Revision	Prior to A.02.00

Next Pk Right

Moves the selected marker to the nearest peak to the right of the current marker that meets all enabled peak criteria.

Key Path	**Peak Search**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:RIGHt`
Example	:CALC:RHO:MARK2:MAX:RIGH
Initial S/W Revision	Prior to A.02.00

Next Pk Left

Moves the selected marker to the nearest peak to the left of the current marker that meets all enabled peak criteria.

Key Path	**Peak Search**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:LEFT`
Example	CALC:RHO:MARK2:MAX:LEFT
Initial S/W Revision	Prior to A.02.00

Marker Delta

Sets the control mode for the selected marker to **Delta** mode.

Key Path	**Peak Search**
Initial S/W Revision	Prior to A.02.00

Pk-Pk Search

Finds and displays the amplitude and frequency (or time, if in zero span) differences between the highest and lowest y-axis value.

Key Path	**Peak Search**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:PTPeak`
Example	CALC:RHO:MARK:PTP
Notes	Turns on the Marker Δ active function.
Couplings	This key is not available (key is grayed out) when **Coupled Markers** is on.
Initial S/W Revision	Prior to A.02.00

Min Search

Moves the selected marker to the minimum y-axis value on the current trace.

Key Path	**Peak Search**
Mode	cdma2000
Remote Command	`:CALCulate:RHO:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	CALC:RHO:MARK:MIN
Initial S/W Revision	Prior to A.02.00

Recall

See “Recall” on page 174 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Restart

See “Restart” on page 1299 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Save

See “Save” on page 186 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Single

See “Single (Single Measurement/Sweep)” on page 1305 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Source

See “Source” on page 1307 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

This menu is available when in the "I/Q Error" view. It is not available when in the following views:

"I/Q Measured Polar Graph"

"Power, Timing and Phase"

Key Path	**Front panel key**
Initial S/W Revision	Prior to A.02.00

Ref Value

Sets the chip reference value on the horizontal axis. The default setting is 0.000 chips. When Auto Scaling is set to On, the displayed graphs use a Scale/Div value determined by the analyzer, based on the measurement result.

Key Path	**Span X Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View - EVM Window

Sets the chip reference value on the horizontal axis in the EVM window.

Key Path	**Span X Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:RHO:VIEW2:WIND:TRAC:X:RLEV 0.0 DISP:RHO:VIEW2:WIND:TRAC:X:RLEV?
Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off.
Remote Command Notes	WINDow1: Evm Error window on I/Q Error view
Couplings	See Restriction and Notes
Preset	0.0
State Saved	Saved in instrument state.
Min	0.0

Max	5000000.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View - Mag Error Window

Sets the chip reference value on the horizontal axis in the magnitude error window.

Key Path	**Span X Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow2:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:RHO:VIEW2:WINDow2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:RHO:VIEW2:WIND2:TRAC:X:RLEV 0.0 DISP:RHO:VIEW2:WIND2:TRAC:X:RLEV?
Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off.
Remote Command Notes	WINDow2: Mag Error window on I/Q Error view
Couplings	See Restriction and Notes
Preset	0.0
State Saved	Saved in instrument state.
Min	0.0
Max	5000000.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View - Phase Error Window

Sets the chip reference value on the horizontal axis in the phase error window.

Key Path	**Span X Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow3:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:RHO:VIEW2:WINDow3:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:RHO:VIEW2:WIND3:TRAC:X:RLEV 0.0 DISP:RHO:VIEW2:WIND3:TRAC:X:RLEV?
Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off.

Remote Command Notes	WINDow3: Phase window on I/Q Error view
Couplings	See Restriction and Notes
Preset	0.0
State Saved	Saved in instrument state.
Min	0.0
Max	5000000.0
Initial S/W Revision	Prior to A.02.00

Scale/Div

Sets the horizontal scale by changing a chip value per division. When the Scale Coupling default setting On is active, the displayed plots use a Scale/Div value determined by the analyzer, which is based on the measurement result.

Key Path	**Span X Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View - EVM Window

Sets the horizontal scale by changing a chip value per division in the EVM window.

Key Path	**Span X Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:RHO:VIEW2:WIND:TRAC:X:PDIV 100.0 DISP:RHO:VIEW2:WIND:TRAC:X:PDIV?
Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off.
Remote Command Notes	WINDow1: EVM window on I/Q Error view
Couplings	See Restriction and Notes
Preset	153.5
State Saved	Saved in instrument state.
Min	1.0
Max	500000.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View - Mag Error Window

Sets the horizontal scale by changing a chip value per division in the magnitude error window.

Key Path	**Span X Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow2:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:RHO:VIEW2:WINDow2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:RHO:VIEW2:WIND2:TRAC:X:PDIV 100.0 DISP:RHO:VIEW2:WIND2:TRAC:X:PDIV?
Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off.
Remote Command Notes	WINDow2: Mag Error window on I/Q Error view
Couplings	See Restriction and Notes
Preset	153.5
State Saved	Saved in instrument state.
Min	1.0
Max	500000.0
Initial S/W Revision	Prior to A.02.00

I/Q Error View - Phase Error Window

Sets the horizontal scale by changing a chip value per division in the phase error window.

Key Path	**Span X Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow3:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:RHO:VIEW2:WINDow3:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:RHO:VIEW2:WIND3:TRAC:X:PDIV 100.0 DISP:RHO:VIEW2:WIND3:TRAC:X:PDIV?
Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off.
Remote Command Notes	WINDow3: Phase Error window on I/Q Error view
Couplings	See Restriction and Notes

Preset	153.5
State Saved	Saved in instrument state.
Min	1.0
Max	500000.0
Initial S/W Revision	Prior to A.02.00

Ref Position

Sets the reference position for the X axis to the left, center, or right of the display.

Key Path	**Span X Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View - EVM Window

Sets the X axis reference position in the EVM window.

Key Path	**Span X Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:RHO:VIEW2:WIND:TRAC:X:RPOS LEFT DISP:RHO:VIEW2:WIND:TRAC:X:RPOS?
Remote Command Notes	Any value smaller than 0 will be clipped to 0. Any value larger than 10 will be clipped to 10.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Initial S/W Revision	Prior to A.02.00

I/Q Error View - Mag Error Window

Sets the X axis reference position in the magnitude error window.

Key Path	**Span X Scale**
Mode	cdma2000

Remote Command	`:DISPlay:RHO:VIEW2:WINDow2:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:RHO:VIEW2:WINDow2:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:RHO:VIEW2:WIND2:TRAC:X:RPOS LEFT DISP:RHO:VIEW2:WIND2:TRAC:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Initial S/W Revision	Prior to A.02.00

I/Q Error View - Phase Error Window

Sets the X axis reference position in the phase error window.

Key Path	**Span X Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow3:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:RHO:VIEW2:WINDow3:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:RHO:VIEW2:WIND3:TRAC:X:RPOS LEFT DISP:RHO:VIEW2:WIND3:TRAC:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Toggles the Auto Scaling function between On and Off. When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically determines the scale per division and reference values based on the measurement results.

When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.

Key Path	**Span X Scale**
Initial S/W Revision	Prior to A.02.00

I/Q Error View - EVM Window

When Auto Scaling is On and the Restart front-panel key is pressed, will result in automatically displaying the scale per division and reference value results in the EVM window.

Key Path	**Span X Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:RHO:VIEW2:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:RHO:VIEW2:WIND:TRAC:X:COUP ON DISP:RHO:VIEW2:WIND:TRAC:X:COUP?
Notes	When this parameter is set to On, pressing the front-panel Restart key, or the Restart key in the Meas Control menu, activates the scale coupling function, that automatically determines scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling is automatically set to Off.
Remote Command Notes	WINDow[1]: Evm Error window on I/Q Error view
Couplings	See Restriction and Notes
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

I/Q Error View – Mag Error Window

When Auto Scaling is On and the Restart front-panel key is pressed, will result in automatically displaying the scale per division and reference value results in the magnitude error window.

Key Path	**Span X Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow2:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:RHO:VIEW2:WINDow2:TRACe:X[:SCALe]:COUPle?`
Example	DISP:RHO:VIEW2:WIND2:TRAC:X:COUP ON DISP:RHO:VIEW2:WIND2:TRAC:X:COUP?
Notes	When this parameter is set to On, pressing the front-panel Restart key, or the Restart key in the Meas Control menu, activates the scale coupling function, that automatically determines scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling is automatically set to Off.

Remote Command Notes	WINDow2: Mag Error window on I/Q Error view
Couplings	See Restriction and Notes
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

I/Q Error View – Phase Error Window

When Auto Scaling is On and the Restart front-panel key is pressed, results in automatically displaying the scale per division and reference value results in the phase error window.

Key Path	**Span X Scale**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW2:WINDow3:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:RHO:VIEW2:WINDow3:TRACe:X[:SCALe]:COUPle?`
Example	DISP:RHO:VIEW2:WIND3:TRAC:X:COUP ON DISP:RHO:VIEW2:WIND3:TRAC:X:COUP?
Notes	When this parameter is set to On, pressing the front-panel Restart key, or the Restart key in the Meas Control menu, activates the scale coupling function, that automatically determines scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling is automatically set to Off.
Remote Command Notes	WINDow3: Phase window on I/Q Error view
Couplings	See Restriction and Notes
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

Sweep/Control

Accesses a menu that enables you to pause and restart the measurement.

Key Path	**Front Panel Key**
Initial S/W Revision	Prior to A.02.00

Pause/Resume

Pauses a measurement after the current data acquisition is complete. When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. See “Pause/Resume” on page 1321 in the “Common Measurement Functions” section for details.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Trace/Detector

There is no Trace/Detector functionality supported in the Mod Accuracy measurement. The front-panel key will display a blank menu when pressed.

Key Path	**Trace/Detector**
Initial S/W Revision	Prior to A.02.00

Trigger

Accesses a menu of functions that enable you to select and control the trigger source for the current measurement

.See “Trigger” on page 1339in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**

Trigger Source

Selects a trigger source. Trigger settings are mode global. Refer to Measurement Functions Mode functionality section for trigger settings.

Key Path	**Front panel key**
Mode	cdma2000
Remote Command	`:TRIGger:RHO[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF` `:TRIGger:RHO[:SEQuence]:SOURce?`
Example	TRIG:RHO:SOUR RFB TRIG:RHO:SOUR?
Notes	A parameter, IF, is prepared for backwards compatibility. It is an alias for a parameter, VIDeo.
Remote Command Notes	You must be in the cdma2000 mode to use this command. Use INSTrument:SELect to set the mode.
Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run|Video|IF|Line|External 1|External 2|RF Burst (Wideband)|Periodic Timer(Frame Trigger)
Backwards Compatibility SCPI	[:SENSe]:RHO:TRIGger:SOURce
Initial S/W Revision	Prior to A.02.00

Trigger Source (Selected Input)

Selects a trigger source. Trigger settings are mode global. Refer to Measurement Functions Mode functionality section for trigger settings.

Key Path	**Front panel key**
Mode	cdma2000

Remote Command	`:TRIGger:RHO[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF|IQMag|IDEMod|QDEMod|IINPut|QINPut|AIQMag` `:TRIGger:RHO[:SEQuence]:SOURce?`
Example	TRIG:RHO:SOUR RFB TRIG:RHO:SOUR?
Notes	1. IF in SCPI selection is the same as VIDeo. IF is kept because of backward compatibility. 2. Video and RF Burst are available only when in RF input and those selection menu keys are blank when in I/Q Input. 3. Baseband I/Q key is available only when in I/Q input, otherwise blank. IQMag, IDEMod, QDEMod, IINPut, QINPut, and AIQMag are valid only when in I/Q input.
Remote Command Notes	You must be in the cdma2000 mode to use this command. Use INSTrument:SELect to set the mode.
Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run|Video|IF|Line|External 1|External 2|RF Burst (Wideband)| Periodic Timer(Frame Trigger) | I/Q Mag| I (Demodulated) | Q (Demodulated)| Input I| Input Q| Auxiliary Channel I/Q Mag
Backwards Compatibility SCPI	[:SENSe]:RHO:TRIGger:SOURce
Initial S/W Revision	Prior to A.02.00

RF Trigger Source

SCPI command for specifying the RF Trigger Source. This will always access the RF value, even when the selected input is not RF.

Key Path	**Front panel key**
Mode	cdma2000
Remote Command	`:TRIGger:RHO[:SEQuence]:RF:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF` `:TRIGger:RHO[:SEQuence]:RF:SOURce?`
Example	TRIG:RHO:RF:SOUR RFB TRIG:RHO:RF:SOUR?
Notes	IF in SCPI selection is the same as VIDeo. IF is kept because of backward compatibility.
Remote Command Notes	You must be in the cdma2000 mode to use this command. Use INSTrument:SELect to set the mode.

Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run|Video|IF|Line|External 1|External 2|RF Burst (Wideband)| Periodic Timer(Frame Trigger)
Initial S/W Revision	Prior to A.02.00

I/Q Trigger Source

SCPI command for specifying the I/Q Trigger Source. This will always access the I/Q value, even when the selected input is not I/Q.

Key Path	**Front panel key**
Mode	cdma2000
Remote Command	`:TRIGger:RHO[:SEQuence]:IQ:SOURce EXTernal[1]|EXTernal2|IMMediate|IQMag|IDEMod|QDEMod|IINPut|QINPut|AIQMag` `:TRIGger:RHO[:SEQuence]:IQ:SOURce?`
Example	TRIG:RHO:IQ:SOUR RFB TRIG:RHO:IQ:SOUR?
Remote Command Notes	You must be in the cdma2000 mode to use this command. Use INSTrument:SELect to set the mode.
Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run|External 1|External 2| I/Q Mag| I (Demodulated) | Q (Demodulated)| Input I| Input Q| Auxiliary Channel I/Q Mag
Initial S/W Revision	Prior to A.02.00

View/Display

The Mod Accuracy measurement consists of three views, which are common for both Reverse Link (MS) and Forward Link (BTS) measurements.

NO.	View	Multiple/Single PCG Note 1	NO. of Windows	Window No.	Window
1	VIEW[1] I/Q Measured Polar Graph	Single PCG	Dual (Horizontal)	WINDow[1]	I/Q Measured Polar Vector
				WINDow2	Metrics
2	VIEW2 I/Q Error	Single PCG	Tri (Vertical)	WINDow[1]	EVM
				WINDow2	Magnitude Error
				WINDow3	Phase Error
3	VIEW3 Power, Timing and Phase	Single PCG	One	WINDow[1]	Metrics

Note 1: Single PCG (Power Control Group) means the range to display the trace on view is 1 PCG. When average is on, the measured results are averaged PCG by PCG.

This topic contains the following sections:

"View Selection by name (SCPI only)" on page 873 by name (SCPI only)

"View Selection by number (SCPI only)" on page 874

View Selection by name (SCPI only)

Allows you to select the desired measurement view from the following selections:

POLar(1): I/Q Measured Polar Graph - Provides a combination view of an I/Q measured polar vector graph and the summary data as shown below.

ERRor(2): I/Q Error (Tri View) - Provides a combination view of the EVM, magnitude error, and phase error graphs.

TPHase(3): Power, Timing, and Phase-Provides the power of the code channels, and time/phase of the code channels to pilot channel, and also CDE of each code channel.

XXX…X(n) in the above,

XXX…X: Enum ID for :DISP:RHO:VIEW:SEL

n : Numeric ID for :DISP:RHO:VIEW:NSEL

Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW[:SELect] POLar|ERRor|TPHase` `:DISPlay:RHO:VIEW[:SELect]?`
Example	DISP:RHO:VIEW:SEL POL DISP:RHO:VIEW:SEL?
Couplings	TPHase(3) is available only if Multi Channel Estimator is On.
Preset	POLar
State Saved	Saved in instrument state.
Range	Polar Graph | I/Q Error | Power, Timing and Phase
Initial S/W Revision	Prior to A.02.00

View Selection by number (SCPI only)

Displays the numeric values of the measurement results.

Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW:NSELect <integer>` `:DISPlay:RHO:VIEW:NSELect?`
Example	DISP:RHO:VIEW:NSEL 1 DISP:RHO:VIEW:NSEL?
Remote Command Notes	You must be in cdma2000 mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	3
Initial S/W Revision	Prior to A.02.00

Key Path	**Front panel key**
Initial S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters.

See “Display” on page 1385 in the "Common Measurement Functions" section for more information.

Key Path	**View/Display**

Initial S/W Revision	Prior to A.02.00

I/Q Measured Polar Graph

Provides a combination view of the I/Q polar graph and the Metric Result summary

"I/Q Measured Polar Graph view for Radio Device: BTS" on page 875

"I/Q Measured Polar Graph view for Radio Device: MS" on page 877

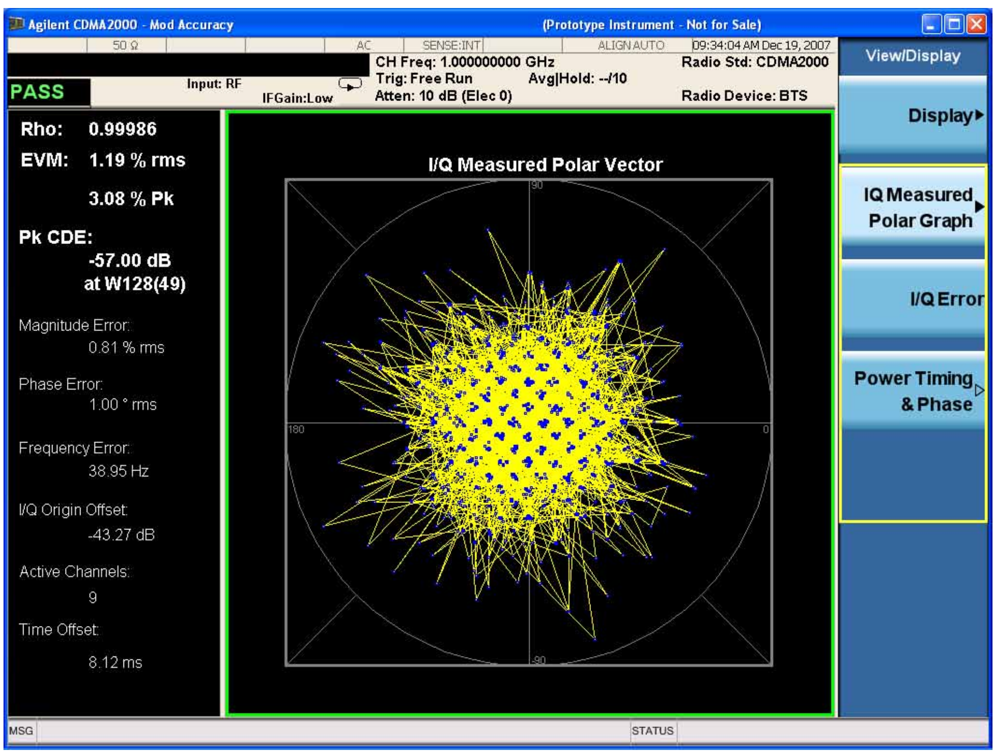
I/Q Measured Polar Graph view for Radio Device: BTS

There are two windows, Metrics (left) and I/Q Measured Polar Vector graph display (right).

The traces and results of this view are only for one PCG. The traces are not averaged, even if the average is on.

"I/Q Measured Polar Vector window (Note 1)" on page 876(Note 1)

"Numeric Results window (Note 1)" on page 876window (Note 1)



I/Q Measured Polar Vector window (Note 1)

Marker Operation	None
Corresponding Trace	Corrected measured trace (n=5)
Active Channels	n=1 10th a Number of Active Channels.

Note 1: These traces and scalar results are of one PCG. If averaged toggled to On, the scalar results are averaged PVG by PCG, but traces aren't averaged.

Numeric Results window (Note 1)

Name	**Corresponding Results**	**Display Format**
Rho	n=1 7th rho	9.99999
EVM (rms)	n=1 1st EVM over the entire measurement area	99.99 % rms
EVM (pk)	n=1 2nd peak EVM in the measurement area	99.99 % pk
Pk CDE (dB)	n=1 8th Peak Code Domain Error relative to the mean reference power	–99.99 dB
Pk CDE Position	n=1 9th Channel number in which the peak code domain error is detected at the max spreading factor.	Wx(Y) x=128 for Forward Link Y: OVSF code number (0 … 127)
Magnitude Error	n=1 3rd Average magnitude error over the entire measurement area	99.99 % rms
Phase Error	n=1 4th Average phase error over the entire measurement area	99.99 °rms
Freq Error	n=1 6th Frequency error in the measured signal	99.99 Hz
I/Q Origin Offset	n=1 5th I and Q error (magnitude squared) offset from the origin.	–99.99 dB

Name	Corresponding Results	Display Format
Active Channels Number	n=1 10th Number of active channels.	10
Time Offset	N=1 11th Pilot phase timing from the acquisition trigger point.	9999.99 us

Note 1: These traces and scalar results are of one PCG. If averaged toggled to On, the scalar results are averaged PVG by PCG, but traces aren’t averaged.

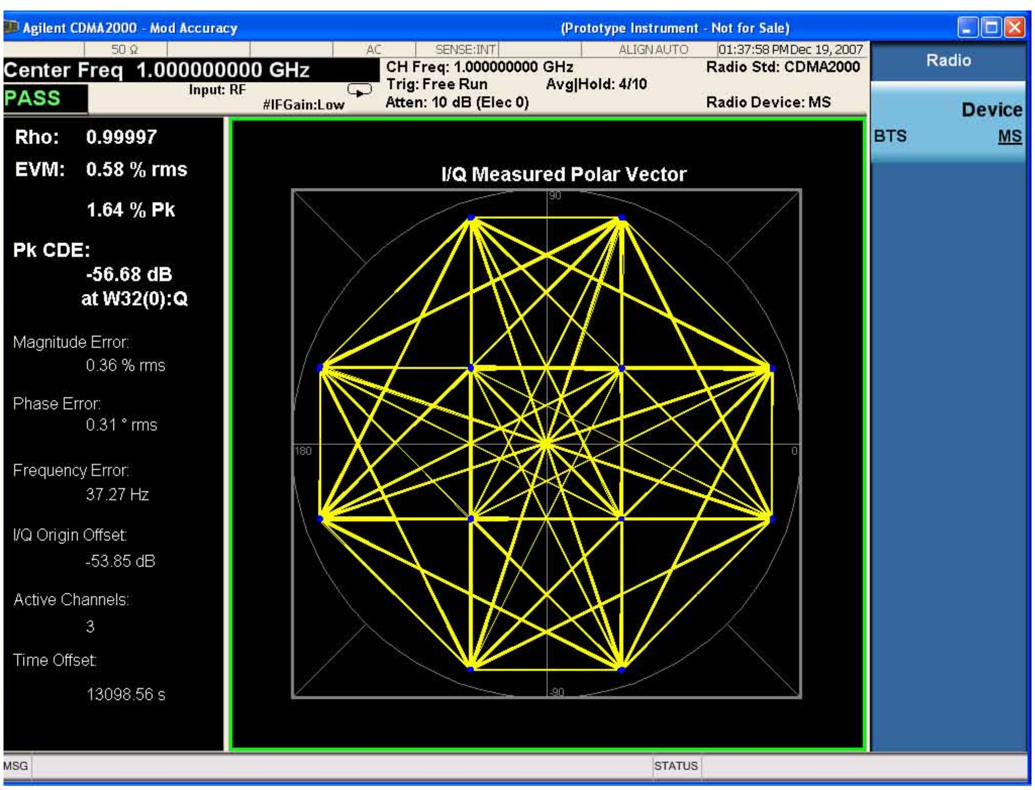
I/Q Measured Polar Graph view for Radio Device: MS

There are two windows, Metrics (left) and I/Q Measured Polar Vector graph display (right).

The traces and results of this view are only for one PCG. The traces are not averaged, even if the average is on.

“I/Q Measured Polar Vector window (Note 1)” on page 878 (Note 1)

“Numeric Results window (Note 1)” on page 878s window (Note 1)



I/Q Measured Polar Vector window (Note 1)

Marker Operation	No
Corresponding Trace	Corrected measured trace (n=5)
Active Channels	n=1 10th a Number of Active Channels.

Note 1: These traces and scalar results are of one PCG. If averaged toggled to On, the scalar results are averaged PVG by PCG, but traces aren't averaged.

Numeric Results window (Note 1)

Name	**Corresponding Results**	**Display Format**
Rho	n=1 7th rho	9.99999
EVM (rms)	n=1 1st EVM over the entire measurement area	99.99 % rms
EVM (pk)	n=1 2nd peak EVM in the measurement area	99.99 % pk
Pk CDE (dB)	n=1 8th Peak Code Domain Error relative to the mean reference power	–99.99 dB
Pk CDE Position	n=1 9th Channel number in which the peak code domain error is detected at the max spreading factor.	Wx(Y) x=128 for Forward Link Y: Walsh code number (0 … 127)
Magnitude Error	n=1 3rd Average magnitude error over the entire measurement area	99.99 % rms
Phase Error	n=1 4th Average phase error over the entire measurement area	99.99 °rms
Freq Error	n=1 6th Frequency error in the measured signal	99.99 Hz
I/Q Origin Offset	n=1 5th I and Q error (magnitude squared) offset from the origin.	–99.99 dB

Name	Corresponding Results	Display Format
Active Channels Number	n=1 10th Number of active channels.	10
Time Offset	n=1 11th Pilot phase timing from the acquisition trigger point.	9999.99 us

Note 1: These traces and scalar results are of one PCG. If averaged toggled to On, the scalar results are averaged PVG by PCG, but traces aren't averaged.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

I/Q Polar Vec/ConstIn

Specifies the format of the Polar Vector graph display. You can select one of the following formats:

Vec Constln (Vector and Constellation)

Vector (Vector only)

Constellation (Constellation only)

Key Path	**View/Display, Display**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW[1]:WINDow[1]:TRACe:POLar VC|VECTor|CONStln` `:DISPlay:RHO:VIEW[1]:WINDow[1]:TRACe:POLar?`
Example	DISP:RHO:VIEW:WIND1:TRAC:POL CONS DISP:RHO:VIEW:WIND1:TRAC:POL?
Preset	VC
State Saved	Saved in instrument state.
Range	Vec & Constln | Vector | Constellation
Initial S/W Revision	Prior to A.02.00

Chip Offset

Specifies the number of chips offset from the first chip in a captured PCG.

Key Path	**View/Display, Display**
Mode	cdma2000

Remote Command	`:DISPlay:RHO:VIEW[1]:WINDow[1]:TRACe:COFFset <integer>` `:DISPlay:RHO:VIEW[1]:WINDow[1]:TRACe:COFFset?`
Example	DISP:RHO:VIEW:WIND1:TRAC:COFF 100 DISP:RHO:VIEW:WIND1:TRAC:COFF?
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	1535 – I/Q chips
Initial S/W Revision	Prior to A.02.00

I/Q Chips

Specifies the number of I/Q chips displayed for the I/Q waveforms.

Key Path	**View/Display, Display**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW[1]:WINDow[1]:TRACe:IQCHips <integer>` `:DISPlay:RHO:VIEW[1]:WINDow[1]:TRACe:IQCHips?`
Example	DISP:RHO:VIEW:WIND1:TRAC:IQCH 10 DISP:RHO:VIEW:WIND1:TRAC:IQCH?
Preset	1536
State Saved	Saved in instrument state.
Min	1
Max	1536
Initial S/W Revision	Prior to A.02.00

+45° Rotation

Toggles the display rotation function between On and Off. If set to On, the I/Q polar vector or I/Q polar constellation graph is rotated by +45° to provide a rectangular display.

Key Path	**View/Display, Display**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW[1]:WINDow[1]:TRACe:ROTQpi[:STATe] 0|1|OFF|ON` `:DISPlay:RHO:VIEW[1]:WINDow[1]:TRACe:ROTQpi[:STATe]?`

Example	DISP:RHO:VIEW:WIND1:TRAC:ROTQ ON DISP:RHO:VIEW:WIND1:TRAC:ROTQ?
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Initial S/W Revision	Prior to A.02.00

Full Vector

Toggles the full vector display function between On and Off. If set to On, the full vector traces, that are shown in gray, are displayed in the background of the polar vector solid traces, which are shown in yellow. Both traces can be interpolated by using the Interpolation key.

Key Path	**View/Display, Display**
Mode	cdma2000
Remote Command	`:DISPlay:RHO:VIEW[1]:WINDow[1]:TRACe:FVECtor[:STATe] 0|1|OFF|ON` `:DISPlay:RHO:VIEW[1]:WINDow[1]:TRACe:FVECtor[:STATe]?`
Example	DISP:RHO:VIEW:WIND1:TRAC:FVEC ON DISP:RHO:VIEW:WIND1:TRAC:FVEC?
Notes	This key is grayed out if the selected view is I/Q Measured Polar Graph and the selected I/Q Polar Vec/Constln is Constellation.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Initial S/W Revision	Prior to A.02.00

I/Q Error

Provides a combination view of magnitude error, phase error, and EVM. There is no view settings for this view.

"I/Q Error view for Radio Device: BTS" on page 881

"I/Q Error view for Radio Device: MS" on page 883

I/Q Error view for Radio Device: BTS

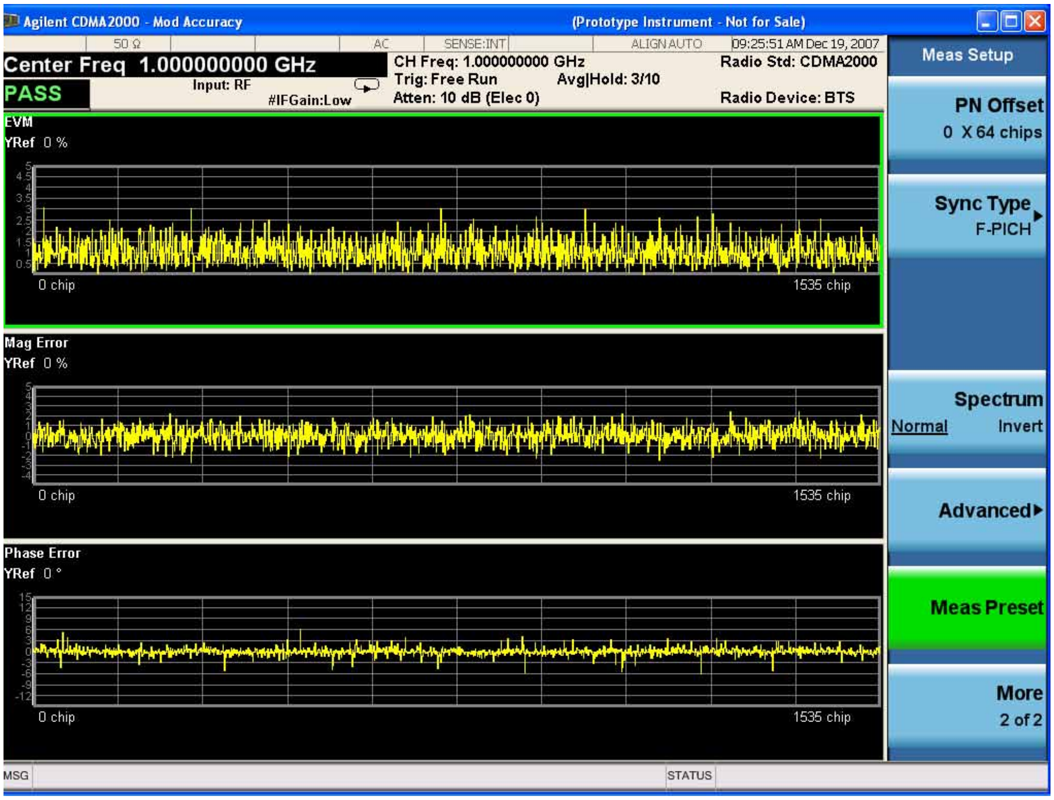
There are three windows, EVM window (upper), Magnitude Error window (middle), Phase Error window (lower),

The traces of this view are not averaged, even if the average function is on.

"EVM window" on page 882

"Magnitude Error window" on page 882

"Phase Error window" on page 882



EVM window

Marker Operation	Yes
Corresponding Trace	EVM trace (n=2)

Magnitude Error window

Marker Operation	Yes
Corresponding Trace	Magnitude error trace (n=3)

Phase Error window

Marker Operation	Yes
Corresponding Trace	Phase error trace (n=4)

I/Q Error view for Radio Device: MS

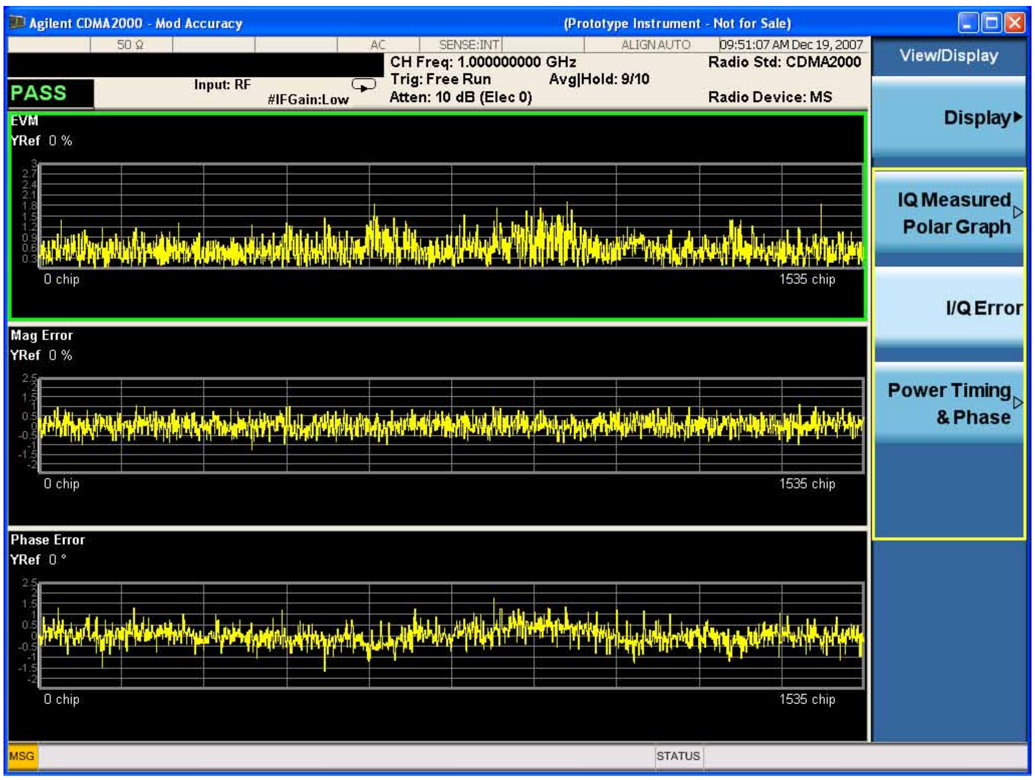
There are three windows, EVM window (upper), Magnitude Error window (middle), Phase Error window (lower),

The traces of this view are not averaged, even if the average function is on.

"EVM window" on page 883

"Magnitude Error window" on page 883

"Phase Error window" on page 884



EVM window

Marker Operation	Yes
Corresponding Trace	EVM trace (n=2)

Magnitude Error window

Marker Operation	Yes
Corresponding Trace	Magnitude error trace (n=3)

Phase Error window

Marker Operation	Yes
Corresponding Trace	Phase error trace (n=4)

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Power Timing & Phase

Power, Timing and Phase view displays the power of the code channels, and time/phase of the code channels to pilot channel, and also CDE of each code channel using the Multi Channel Estimator. The results of this view are not averaged, even if the average function is on. If Multi Channel Estimator is Off, there will be a message “Press Meas Setup, Advanced and turn Multi Channel Estimation On to see the data” appears on the view of Power, Timing, and Phase.

“Power, Timing, and Phase view for Radio Device: BTS” on page 884 view for Radio Device: BTS

“Power, Timing and Phase view for Radio Device: MS” on page 885 view for Radio Device: MS

Power, Timing, and Phase view for Radio Device: BTS

There is only one window in this view. If you need to see the metric result of power, timing and phase in channel level, you need first turn the Multi-Channel Estimator option to “ON”.

- Prev Page - Returns one page back to the previous page of the measurement results.
- Next Page - Moves one page forward to the next page of the measurement results.
- Scroll Up - Moves one line upward from the current page of the measurement results by each pressing.
- Scroll Down - Moves one line downward from the current page of the measurement results by each pressing.
- First Page - Moves from the current page to the first page of the measurement results.
- Last Page - Moves from the current page to the last page of the measurement results.

Power, Timing and Phase view for Radio Device: MS

There is only one window in this view. If you need to see the metric result of power, timing and phase in channel level, you need first turn the Multi-Channel Estimator option to “ON”.

- Prev Page - Returns one page back to the previous page of the measurement results.
- Next Page - Moves one page forward to the next page of the measurement results.
- Scroll Up - Moves one line upward from the current page of the measurement results by each pressing.
- Scroll Down - Moves one line downward from the current page of the measurement results by each pressing.
- First Page - Moves from the current page to the first page of the measurement results.
- Last Page - Moves from the current page to the last page of the measurement results.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Prev Page

Returns the current page back to the previous page of the measurement results.

Key Path	**View/Display, Power Timing & Phase**
Mode	cdma2000
Remote Command Notes	NO SCPI
Initial S/W Revision	Prior to A.02.00

Next Page

Moves the current page forward to the next page of the measurement results.

Key Path	**View/Display, Power Timing & Phase**
Mode	cdma2000
Remote Command Notes	NO SCPI

Initial S/W Revision	Prior to A.02.00

Scroll Up

Moves one line upward from the current page of the measurement results by each pressing.

Key Path	**View/Display, Power Timing & Phase**
Mode	cdma2000
Remote Command Notes	NO SCPI
Initial S/W Revision	Prior to A.02.00

Scroll Down

Moves one line downward from the current page of the measurement results by each press.

Key Path	**View/Display, Power Timing & Phase**
Mode	cdma2000
Remote Command Notes	NO SCPI
Initial S/W Revision	Prior to A.02.00

First Page

Moves from the current page to the first page of the measurement results.

Key Path	**View/Display, Power Timing & Phase**
Mode	cdma2000
Remote Command Notes	NO SCPI
Initial S/W Revision	Prior to A.02.00

Last Page

Moves from the current page to the last page of the measurement results.

Key Path	**View/Display, Power Timing & Phase**
Mode	cdma2000
Remote Command Notes	NO SCPI
Initial S/W Revision	Prior to A.02.00

13 Power Stat CCDF Measurement

Many of the digitally modulated signals now look noise-like in the time and frequency domain. This means that statistical measurements of the signals can be a useful characterization. The Power Complementary Cumulative Distribution Function (CCDF) curves characterize the higher level power statistics of a digitally modulated signal. The curves can be useful in determining design parameters for digital communications systems. For more information, see “Power Stat CCDF Measurement Description” on page 891. For measurement results and views, see “View/Display” on page 928.

This topic contains the following sections:

Measurement Commands for Power Stat CCDF

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:PSTat commands for more measurement related commands.

```
:CONFigure:PSTatistic
```

```
:CONFigure:PSTatistic:NDEFault
```

```
:INITiate:PSTatistic
```

```
:FETCh:PSTatistic[n]?
```

```
:READ:PSTatistic[n]?
```

```
:MEASure:PSTatistic[n]?
```

For more measurement related commands, see the SENSe subsystem, and the section “Remote Measurement Functions” on page 1257.

Remote Command Results for Power Stat CCDF

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of trace point values, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values,

n	Results Returned
not specified or 1	Returns 10 scalar results: 1. Average input power (in dBm) 2. Probability at the average input power level (in %) 3. Power level that has 10% of the power 4. Power level that has 1% of the power 5. Power level that has 0.1% of the power 6. Power level that has 0.01% of the power 7. Power level that has 0.001% of the power 8. Power level that has 0.0001% of the power 9. Peak power (in dB) 10.Count
2	Returns a series of 5001 floating point numbers (in percent) that represent the current measured power stat trace. This is the probability at particular power levels (average power), in the following order: 1. Probability at 0.0 dB power 2. Probability at 0.01 dB power 3. Probability at 0.02 dB power . . . 5000. Probability at 49.9 dB power 5001. Probability at 50.0 dB power
3	Returns a series of 5001 floating point numbers (in percent) that represent the Gaussian trace. This is the probability at particular power levels (average power), in the following order: 1. Probability at 0.0 dB power 2. Probability at 0.01 dB power 3. Probability at 0.02 dB power . . . 5000. Probability at 49.9 dB power 5001. Probability at 50.0 dB power

n	Results Returned
4	Returns a series of 5001 floating point numbers (in percent) that represent the user-definable reference trace. This is the probability at particular power levels (average power), in the following order: 1. Probability at 0.0 dB power 2. Probability at 0.01 dB power 3. Probability at 0.02 dB power . . . 5000. Probability at 49.9 dB power 5001. Probability at 50.0 dB power

Power Stat CCDF Measurement Description

The power statistics CCDF measurement can be affected by many factors. For example, modulation filtering, modulation format, combining the multiple signals at different frequencies, number of active codes, and correlation between symbols on different codes with spread spectrum systems will all affect measurement results. These factors are all related to modulation and signal parameters. External factors such as signal compression and expansion by nonlinear components, group delay distortion from filtering, and power control within the observation interval also affect the measurement.

The power measured in power statistics CCDF curves is actually instantaneous envelope power defined by the equation:

$$P = (I^2 + Q^2) / Zo$$

(Where I&Q are the quadrature voltage components of the waveform and Zo is the characteristic impedance).

A CCDF curve is defined by how much time the waveform spends at or above a given power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For capturing a lower probability down to 0.0001%, this measurement is made in the single mode by pressing Single. To make the power statistics CCDF measurement, the instrument uses digital signal processing (DSP) to sample the input signal in the channel bandwidth. The Gaussian distribution line as the band-limited Gaussian noise CCDF reference line, the user-definable reference trace, and the currently measured trace can be displayed on a semi-log graph. If the currently measured trace is above the user reference trace, it means that the higher peak power levels against the average power are included in the input signal.

Key Path	**Meas**
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. The parameter values are measurement independent except all Attenuation values, and the Internal Preamp selection, which are the same across all measurements.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings. This key has read-back text that describes the total attenuator value.

See AMPTD Y Scale, "Attenuation" on page 1120 in the "Common Measurement Functions" section for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Range

Accesses the Range menu to change baseband I/Q gain settings. This key has a readback text that describes gain range value. Refer to "Range" on page 1129 in the "Common Measurement Functions" for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See AMPTD Y Scale, "Presel Center" on page 1136 in the "Common Measurement Functions" section for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

See AMPTD Y Scale, “Preselector Adjust” on page 1137 in the “Common Measurement Functions” section for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Y Axis Unit

Allows you to change the vertical (Y) axis amplitude unit.

See “Y Axis Unit” on page 1138 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	A.04.00

Reference Level Offset

Adds an offset value to the displayed reference level. The reference level is the absolute amplitude represented by the top graticule line on the display.

See “Reference Level Offset” on page 1144 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	A.04.00

µW Path Control

The **µW Path Control** functions include the **µW Preselector Bypass** (Option MPB) and **Low Noise Path** (Option LNP) controls in the High Band path circuits.

See µ“µW Path Control ” on page 1145 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	A.04.00

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See AMPTD Y Scale, “Internal Preamp” on page 1149 in the “Common Measurement Functions” section for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Auto Couple

See “Auto Couple” on page 1153 in the"Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

BW

Opens the BW menu, which contains keys to control the information bandwidth functions of the instrument.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Info BW

Allows you to enter a frequency value to set the channel bandwidth that will be used for data acquisition.

Key Path	**BW**
Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:PSTatistic:BANDwidth <freq>` `[:SENSe]:PSTatistic:BANDwidth?`
Example	PST:BAND 8 MHz PST:BAND?
Couplings	WiMAX OFDMA: The default value depends on the Radio Standard selection..
Preset	SA, WCDM: 5 MHz C2K:1.5 MHz 1xEV-DO:1.3 MHz WiMAX OFDMA: Hardware Dependent No Option = 10 MHz WB (25 MHz or wider) = 25 MHz TD-SCDMA: 1.3 MHz DVB-T/H, DTMB (CTTB): 8 MHz ISDB-T: 6 MHz CMMB: 8 MHz LTE, LTETDD: 6 MHz Digital Cable TV: 8MHz
State Saved	Saved in instrument state.
Min	10.0 kHz

Max	Hardware Dependent: RF Input: No Option = 10 MHz WB (25MHz or wider) = Hardware Option Limit I/Q Input (for I+jQ): No Option = 20 MHz Option B25 = 50 MHz
Backwards Compatibility SCPI	[:SENSe]:PSTatistic:BWIDth
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.06.00

Cont

See “Cont (Continuous Measurement/Sweep)” on page 1155 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

FREQ Channel

See “FREQ Channel” on page 1157 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Input/Output

See “Input/Output” on page 1165 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Marker

Accesses a menu that allows you to select one of 12 markers for control and function

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode to **Normal**, **Delta**, **Fixed** or **Off**.

If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area.

The Active function for the selected marker's current control mode is the default active function. If the current control mode is Off, there is no active function and the active function is turned off. The active function display is the marker X axis value entered in the active function area will display the marker value to its full entered precision.

All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WiMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:PST:MARK:MODE POS CALC:PST:MARK:MODE?

Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area will display the marker value to its full entered precision.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. This function has no effect if the control mode is **Off,** but is the remote command equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <rel_ampl>`
	
	`:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`

Example	CALC:PST:MARK3:X 0 CALC:PST:MARK3:X?
Notes	If no suffix is sent, it will use the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” will be generated. If the specified marker is Fixed and a Marker Function is on, error –221 “Settings conflict; cannot adjust Fixed marker while Marker Function is on” is generated. The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No

Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker Y Axis Value (Remote Command Only)

Queries the marker Y Axis value in the current marker Y Axis unit.

Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:PST:MARK11:Y?
Notes	The query returns the marker Y-axis result, if the control mode is **Normal,** or **Delta**. If the marker is **Off** the response is not a number.
Preset	0
State Saved	No
Backwards Compatibility SCPI	:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:RESult?
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Properties

Accesses the marker properties menu.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Select Marker

Accesses a menu that allows you to select one of 12 markers for control and function

Key Path	**Marker, Properties**
Initial S/W Revision	Prior to A.02.00

Relative To

Sets the reference marker that the selected marker will be relative to.

Key Path	**Marker, Properties**
Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:PST:MARK:REF 3 CALC:PST:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” When queried a single value will be returned (the specified marker numbers relative marker).
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker Trace

Assigns the specified marker to the designated trace. The trace choices are: Measured, Gaussian, or Reference.

Key Path	**Marker**
Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe MEASured|GAUSsian|REFerence` `:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:PST:MARK3:TRAC MEAS CALC:PST:MARK:TRACE?
Preset	MEASured

State Saved	Saved in instrument state.
Range	Measured|Gaussian|Reference
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Couple Markers

When this function is On, moving any marker causes an equal X axis movement of every other marker which is not **Off**. By "equal X axis movement" we mean that we preserve the difference between each marker's X axis value (in the fundamental x-axis units of the trace that marker is on) and the X axis value of the marker being moved (in the same fundamental x-axis units).

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Key Path	**Marker, More**
Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:PSTatistic:MARKer:AOFF`
Example	CALC:PST:MARK:AOFF
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker Function

There are no ‘Marker Functions” supported in Power Stat CCDF measurement. The front-panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Marker To

There is no ‘Marker To’ functionality supported in Power Stat CCDF measurement. The front-panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas

See “Meas” on page 1257 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas Setup

Accesses the functions that allow you to change the settings for your measurement requirements.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Counts

Sets the accumulated number of sampling points for data acquisition. The range is 1.000 kpt (k point) to 2.00000 Gpt (G point) with 1 kpt resolution. Counts couples to Meas Cycles. When the value for counts is changed, the Meas Cycles value will be (Counts / SamplingFrequency * MeasInterval).

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:PSTatistic:COUNts <integer>` `[:SENSe]:PSTatistic:COUNts?`
Example	PST:COUN 5001 PST:COUN?
Couplings	This value is coupled to Meas Cycles. When Counts is changed, the MeasCycles value will be (Counts / SamplingFrequency * MeasInterval). TD-SCDMA: When Counts is changed, the MeasCycles value will be (Counts / (Sampling Frequency * Time duration of measured time slots / 5 msec)), Time duration of measured time slots is determined by Analysis Time Slot and Measure Interval.
Preset	10000000
State Saved	Saved in instrument state.
Min	1000
Max	2000000000
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00
Default Unit	Kpt

Meas Cycles

Set the number of measurement cycles to calculate power statistic data. This number couples to Counts. The Counts value is (MeasCycles * Sampling Frequency * MeasInterval).

When the counts value cannot be divided by (Sampling Frequency * MeasInterval), this value is displayed as a decimal fraction.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WiMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:PSTatistic:SWEep:CYCLes <integer>` `[:SENSe]:PSTatistic:SWEep:CYCLes?`
Example	PST:SWE:CYCL 1001 PST:SWE:CYCL?
Notes	.
Couplings	The Counts value will be (MeasCycles * Sampling Frequency * MeasInterval). TD-SCDMA: The Counts value will be (MeasCycles * Sampling Frequency * Time duration of measured time slots / 5 msec), Time duration of measured time slots is determined by Analysis Time Slot and Measure Interval.
Preset	Depends on the sampling frequency.
Min	1
Max	Depends on the sampling frequency.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Meas Interval (When the application is NOT CDMA1xEVDO)

Sets the number of data points to be used as the measurement interval. This value couples to Counts. The Counts value is (MeasCycles * Sampling Frequency * MeasInterval).

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WiMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:PSTatistic:SWEep:TIME <time>` `[:SENSe]:PSTatistic:SWEep:TIME?`
Example	PST:SWE:TIME 2 ms PST:SWE:TIME?

Couplings	The Counts value will be (MeasCycles * Sampling Frequency * MeasInterval). WiMAX OFDMA: The default value depends on Radio Device status. TD-SCDMA: The Counts value will be (MeasCycles * Sampling Frequency * Time duration of measured time slots / 5 msec), Time duration of measured time slots is determined by Analysis Time Slot and Measure Interval. When TriggerSource is RFBurst, this button is grayed.
Preset	Others: 1.0 ms TD-SCDMA: 1 slot
Min	Others: 50.0 us TD-SCDMA: 1 slot
Max	Others: 10.0 ms TD-SCDMA: 9 slot
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Meas Interval (CDMA1xEVDO Only)

Sets the value of time to be used as the measurement interval. This value couples to Counts. The Counts value is (MeasCycles * Sampling Frequency * MeasInterval).

Key Path	**Meas Setup**
Mode	1xEV-DO
Remote Command	`[:SENSe]:PSTatistic:SWEep:TIME <time>` `[:SENSe]:PSTatistic:SWEep:TIME?`
Example	PST:SWE:TIME 2 ms PST:SWE:TIME?
Couplings	The Counts value will be (MeasCycles * Sampling Frequency * MeasInterval).
Preset	182.29 us
State Saved	Saved in instrument state.
Min	1.0 us
Max	10.0 ms
Initial S/W Revision	Prior to A.02.00

Meas Offset (CDMA1xEVDO Only)

Sets the value of time to be used as the measurement interval start.

Key Path	**Meas Setup**
Mode	CDMA1xEVDO
Remote Command	`[:SENSe]:PSTatistic:MEAS:OFFSet <time>` `[:SENSe]:PSTatistic:MEAS:OFFSet?`
Example	PST:SWE:OFFS 2 ms PST:SWE:OFFS?
Preset	325.52 us
State Saved	Saved in instrument state.
Min	1.0 us
Max	10.0 ms
Initial S/W Revision	Prior to A.02.00

IF Gain

Sets the IF Gain function to Auto, Low Gain or High Gain. These settings affect sensitivity and IF overloads.

This only applies to the RF input. It does not apply to baseband I/Q input.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the Auto Rules for IF Gain When Auto is active, the IF Gain is set to High Gain under any of the following conditions:

- the input attenuator is set to 0 dB
- the preamp is turned On
- the Max Mixer Level is –20 dBm or lower

For other settings, Auto sets IF Gain to Off.

Key Path	**Meas Setup, IF Gain**
Mode	SA, WCDMA, C2K, WiMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:PSTatistic:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:PSTatistic:IF:GAIN:AUTO[:STATe]?`
Example	PST:IF:GAIN:AUTO ON PST:IF:GAIN:AUTO?
Notes	IF Gain only applies to the RF input. It does not apply to baseband I/Q input.
Couplings	When either the auto attenuation is active (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed using the following rule. The Auto selection sets IF Gain On under any of the following conditions: • the input attenuator is set to 0 dB • the preamp is turned on, • the Max Mixer Level is –20 dBm or lower. For other settings, Auto sets IF Gain to Off.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

IF Gain State

Selects the range of IF gain. On sets the high gain option, which allows for better noise level measurements and Off sets low gain when measuring large signals.

Key Path	**Meas Setup, IF Gain**
Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:PSTatistic:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:PSTatistic:IF:GAIN[:STATe]?`
Example	PST:IF:GAIN ON PST:IF:GAIN?
Notes	IF Gain only applies to the RF input. It does not apply to baseband I/Q input. where ON = high gain OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.

Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Readback Text	Low Gain|High Gain
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Meas Preset

Restores all measurement settings to their default values.

Key Path	**Meas Setup**
Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CONFigure:PSTatistic`
Example	CONF:PST
Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DVB-T/H mode, DTMB (CTTB) modeISDB-T mode, CMMB mode, Digital Cable TV mode or WIMAXOFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Selecting Meas Preset will restore all measurement parameters to their default values.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Mode

See “Mode” on page 1271 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Mode Setup

See "Mode Setup" on page 1291 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Peak Search

There is no ‘Peak Search’ functionality supported in Power Stat CCDF measurement. The front-panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Recall

See “Recall” on page 174 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Restart

See “Restart” on page 1299 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Save

See “Save” on page 186 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Single

See "Single (Single Measurement/Sweep)" on page 1305 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Source

See “Source” on page 1307 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Span X Scale

The SPAN X Scale key accesses the menu to set the desired horizontal scale.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Scale/Div

Enables you to enter a time value to change the horizontal scale.

Key Path	**Span X Scale**
Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:PSTatistic:VIEW[1]:WINDow2:TRACe:X[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:PSTatistic:VIEW[1]:WINDow2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:PST:VIEW:WIND2:TRAC:X:PDIV 10 DISP:PST:VIEW:WIND2:TRAC:X:PDIV?
Notes	CCDF measurement has the trace display only at Window 2.
Couplings	See Notes
Preset	2.00
State Saved	Saved in instrument state.
Min	0.1
Max	20
Backwards Compatibility SCPI	:DISPlay:PSTatistic:XSCale
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Sweep/Control

Enables you to pause the power statistics CCDF measurement after the current data acquisition is complete. When Paused, the label on the menu key changes to Resume. Press the Resume key to resume the measurement where it was when it was paused.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Pause/Resume

Pauses a measurement after the current data acquisition is complete. When Paused, the label on the key changes to Resume. Press the Resume key to resume the measurement where it was when it was paused. See “Pause/Resume” on page 1321 in the “Common Measurement Functions” section for details.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Trace/Detector

Accesses a menu of functions that enable you to control the storage and manipulation of the reference trace, as well as controls the display of the trace data.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Store Ref Trace

Copies the currently measured curve as the user-definable reference trace. The captured data remains until the other mode is chosen. Pressing this key also refreshes the reference trace.

No query command is available.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:PSTatistic:STORe:REFerence`
Example	CALC:PST:STOR:REF
Backwards Compatibility SCPI	[:SENSe]:PSTatistic:SRTRace
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Ref Trace

Toggles the reference trace display between On and Off.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:PSTatistic:RTRace[:STATe] OFF|ON|0|1` `:DISPlay:PSTatistic:RTRace[:STATe]?`
Example	DISP:PST:RTR OFF DISP:PST:RTR?
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off

Backwards Compatibility SCPI	[:SENSe]:PSTatistic:RTRace[:STATe]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.04.00

Gaussian Line

Toggles the Gaussian trace display between On and Off.

Key Path	**Trace/Detector**
Mode	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:PSTatistic:GAUSsian[:STATe] OFF|ON|0|1` `:DISPlay:PSTatistic:GAUSsian[:STATe]?`
Example	DISP:PST:GAUS OFF DISP:PST:GAUS?
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Backwards Compatibility SCPI	[:SENSe]:PSTatistic:GAUSsian[:STATe]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.04.00

Trigger

Accesses a menu of functions that enable you to select and control the trigger source for the current measurement. .See “Trigger” on page 1339 in the "Common Measurement Functions" section for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

View/Display

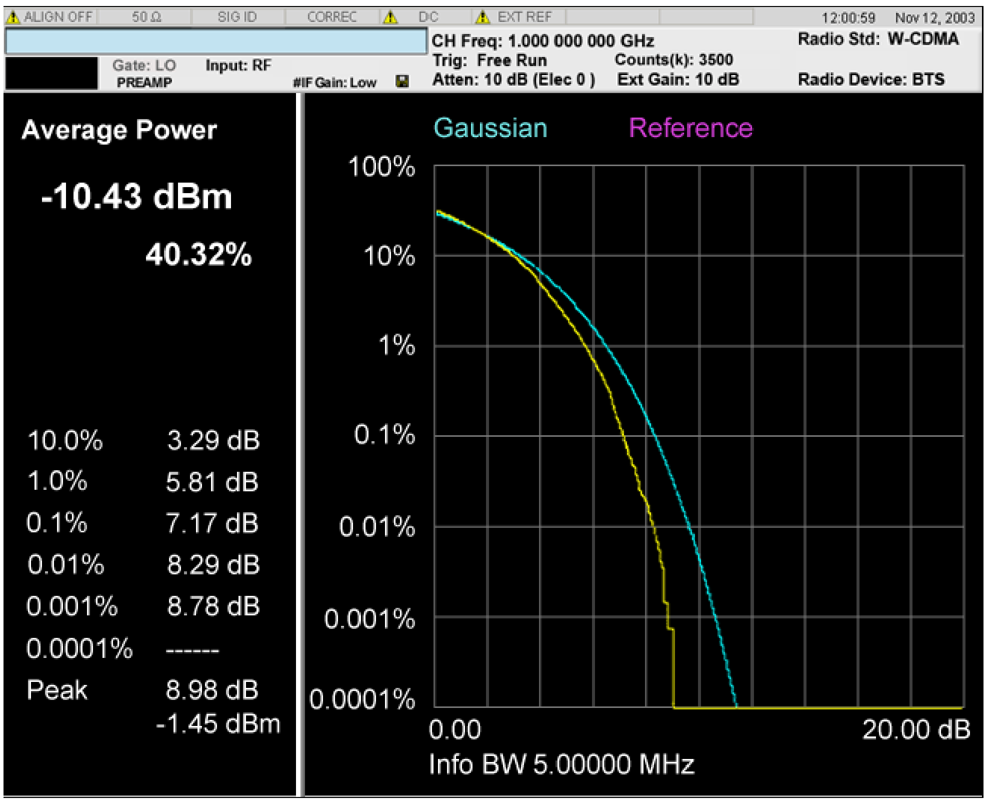
Accesses a menu of functions that enable you to control the instrument display as well as turn the bar graph On and Off.

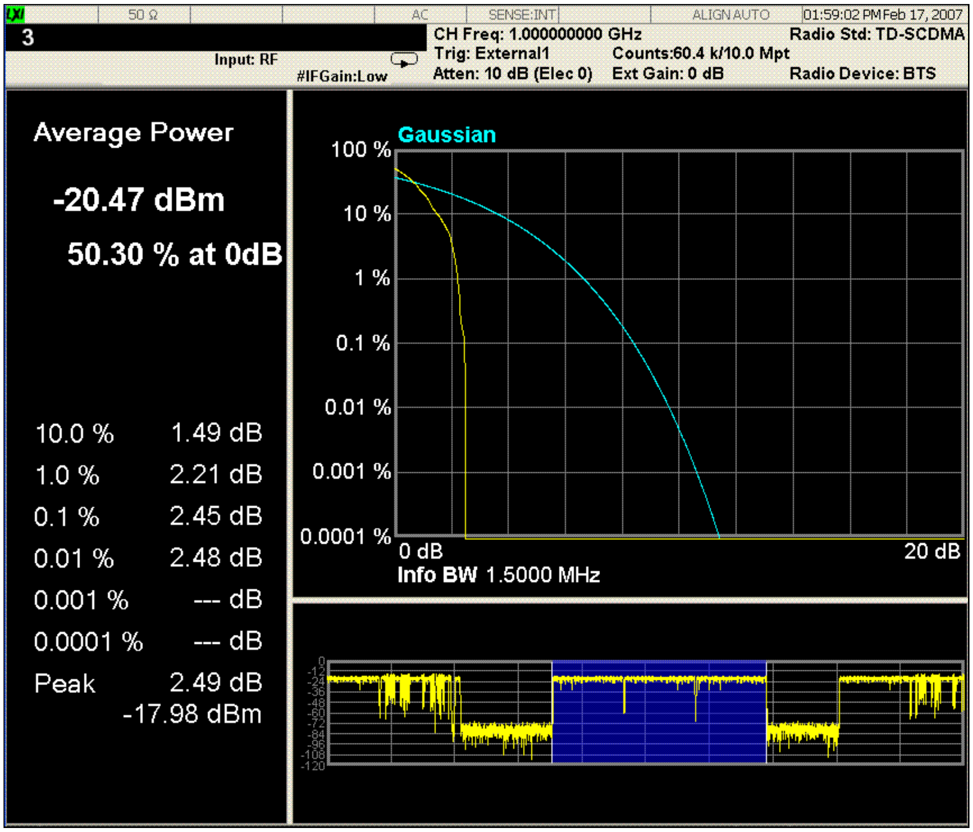
The Power Stat CCDF measurement consists of single view. This is common for both Uplink (MS) and Downlink (BTS). The view consists of the following windows: Metrics (left) and graph display (right).

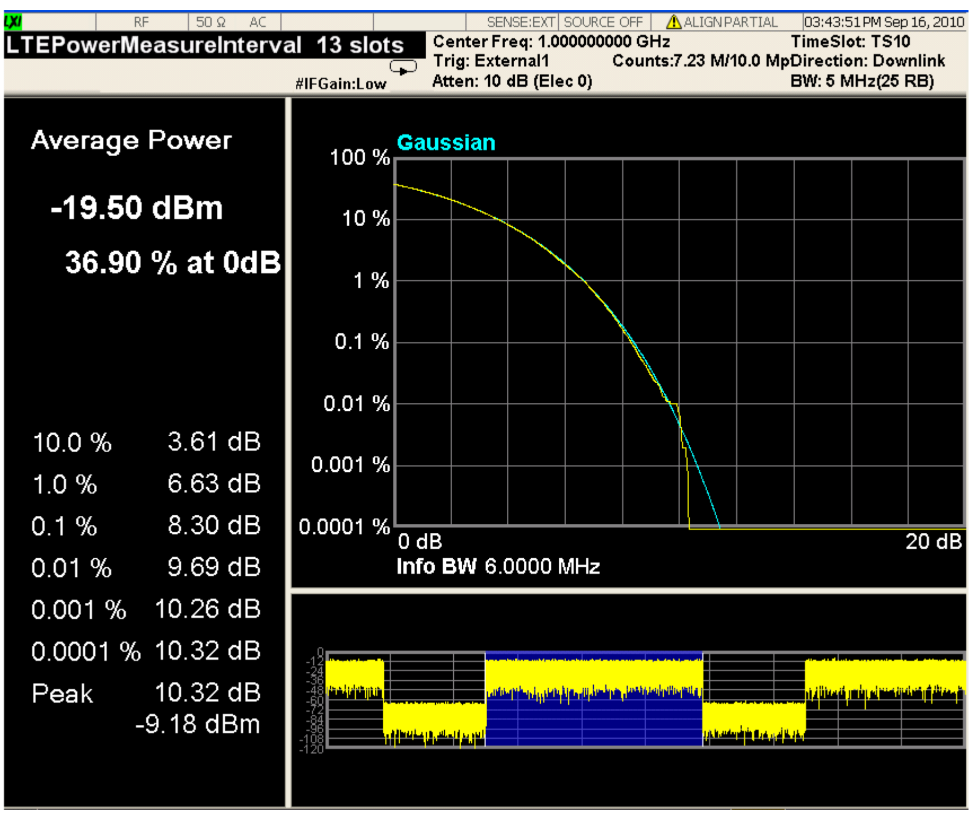
"Metrics window" on page 930

"Graph window" on page 930

"Wave window (TD-SCDMA and LTETDD only)" on page 931




50 Ω
AC
SENSE:INT
ALIGN AUTO
01:59:02 PM Feb 17, 2007
3
CH Freq: 1.000000000 GHz
Radio Std: TD-SCDMA
Input: RF
Trig: External1
Counts:60.4 k/10.0 Mpt
#IFGain:Low
Atten: 10 dB (Elec 0)
Ext Gain: 0 dB
Radio Device: BTS
Average Power
-20.47 dBm
50.30 % at 0dB
10.0 % 1.49 dB
1.0 % 2.21 dB
0.1 % 2.45 dB
0.01 % 2.48 dB
0.001 % --- dB
0.0001 % --- dB
Peak 2.49 dB
-17.98 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 1.5000 MHz


RF
50 Ω
AC
SENSE:EXT
SOURCE OFF
ALIGN PARTIAL
03:43:51 PM Sep 16, 2010
LTEPowerMeasureInterval 13 slots
Center Freq: 1.000000000 GHz
TimeSlot: TS10
Trig: External1
Counts:7.23 M/10.0 Mp
Direction: Downlink
#IFGain:Low
Atten: 10 dB (Elec 0)
BW: 5 MHz(25 RB)
Average Power
-19.50 dBm
36.90 % at 0dB
10.0 % 3.61 dB
1.0 % 6.63 dB
0.1 % 8.30 dB
0.01 % 9.69 dB
0.001 % 10.26 dB
0.0001 % 10.32 dB
Peak 10.32 dB
-9.18 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 6.0000 MHz

Metrics window

Name	Corresponding Results	Explanation
Average Power [dBm]	n=1 1st Average input power	99.99 dBm
Average Power [%]	n=1 2nd Probability at the average input power level	99.99 %
10.0% [dB]	n=1 3rd Power level that has 10% of the power	99.99 dB
1.0% [dB]	n=1 4th Power level that has 1% of the power	99.99 dB
0.1% [dB]	n=1 5th Power level that has 0.1% of the power	99.99 dB
0.01% [dB]	n=1 6th Power level that has 0.01% of the power	99.99 dB
0.001% [dB]	n=1 7th Power level that has 0.001% of the power	99.99 dB
0.0001% [dB]	n=1 8th Power level that has 0.0001% of the power	99.99 dB
Peak [dB]	n=1 9th Peak power	99.99 dB
Peak[dBm]	This is not available using remote commands.	99.99 dBm

Graph window

Marker Operation	Yes
Corresponding Trace	Yellow: Series of 5001 floating the current measured power stat trace. (n=2) Initially all markers refer this trace. Light Blue: Series of 5001 floating point numbers (in percent) that represent the Gaussian trace. (n=3) Violet: series of 5001 floating point numbers (in percent) that represent the user-definable reference trace. (n=4) The Gaussian and Reference trace/line can be removed using the features under the Trace/Detector key

Wave window (TD-SCDMA and LTETDD only)

This window is only available under TD-SCDMA mode and LTETDD mode, and by default this window is closed, it could be turn of/off by soft key "SlotView", refer to section "Slot View (TD-SCDMA only)" on page 931.

Marker Operation	No
Corresponding Trace	Yellow: For TD-SCDMA, Wave form of entire TD-SCDMA frame. If measurement range specified by Analysis Time Slot and Measured Time Slot is out of the first frame, the display range will extend to two TD-SCDMA frames. For LTETDD, Waveform of 2 continuous LTE type2 frames. Blue: Indicate current measurement range

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters...

See "Display" on page 1385 in the "Common Measurement Functions" section for more information.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

Slot View (TD-SCDMA only)

Switch between normal CCDF view and Slot view with additional wave window, this is available only under TD-SCDMA mode.

Key Path	**View/Display**
Mode	TD-SCDMA,LTETDD
Remote Command	`[:SENSe]:PSTatistic:SLTView[:STATe] OFF|ON|0|1` `[:SENSe]:PSTatistic: SLTView[:STATe]?`
Example	PST:SLTV OFF PST:SLTV?
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

14 QPSK EVM Measurement

The quadrature phase shift keying (QPSK) error vector magnitude (EVM) measurement is a measure of phase and amplitude modulation quality that relates the performance of the actual signal compared to an ideal signal as a percentage, as calculated over the course of the ideal constellation. These phase and frequency errors are measures of modulation quality for the W-CDMA (3GPP) system, and can be quantified through QPSK EVM measurements. For measurement results and views, see "View/Display" on page 991.

This topic contains the following sections:

Measurement Commands for QPSK EVM

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:EVMQpsk commands for more measurement related commands.

```
:CONFigure:EVMQpsk
```

```
:CONFigure:EVMQpsk:NDEFault
```

```
:FETCh:EVMQpsk[n]?
```

```
:READ:EVMQpsk[n]?
```

```
:MEASure:EVMQpsk[n]?
```

For more measurement related commands, see the SENSe subsystem, and the section "Remote Measurement Functions" on page 1257.

Remote Command Results for QPSK EVM Measurement

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts.

n	Results Returned
not specified or n = 1	Returns the following 11 scalar results: 1. RMS EVM is a floating point number (in percent) of EVM over the entire measurement area. 2. RMS EVM maximum is the maximum RMS EVM over the average counts. 3. Peak EVM is a floating point number (in percent) of peak EVM in the measurement area. 4. Peak EVM maximum is the maximum peak EVM over the average counts. 5. Magnitude Error is a floating point number (in percent) of averaged magnitude error over the entire measurement area. 6. Magnitude Error maximum is a floating point number over the average counts. 7. Phase Error is a floating point number (in degrees) of the averaged phase error over the entire measurement area. 8. Phase Error maximum is the maximum phase error over the average counts. 9. Frequency Error is a floating point number (in Hz) of the frequency error in the measured signal. 10. Frequency Error maximum is the maximum frequency error over the average counts. 11. I/Q Origin Offset is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin.
2	EVM trace – returns a series of floating point numbers (in percent) that represent each sample in the EVM trace. The first number is the symbol 0 decision point. There are X points per symbol (X=points/chip). Therefore, the decision points are at 0, 1*X, 2*X, and so on.
3	Magnitude error trace – returns a series of floating point numbers (in percent) that represent each sample in the magnitude error trace. The first number is the symbol 0 decision point. There are X points per symbol (X=points/chip). Therefore, the decision points are at 0, 1*X, 2*X, …
4	Phase error trace – returns a series of floating point numbers (in percent) that represent each sample in the phase error trace. The first number is the symbol 0 decision point. There are X points per symbol (X=points/chip). Therefore, the decision points are at 0, 1*X, 2*X, …
5	Corrected measured trace – returns a series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. The magnitude of each I and Q pair are normalized to 1.0. The first number is the I sample of symbol 0 decision point and the second number is the Q sample of symbol 0 decision point. There are X points per symbol (X=points/chip). Therefore, the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point … (2*X)+1 number = I of the symbol 1 decision point (2*X)+2 number = Q of the symbol 1 decision point … (2*X)*N+1 th number = I of the symbol N decision point (2*X)*N+2 th number = Q of the symbol N decision point

Key Path	**Meas**
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses the AMPTD Y Scale menu that allows you to set the desired vertical scale and associated settings for the current measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Ref Value

Enables you to set the absolute power reference value. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Ref Value (Magnitude Error Window)

Sets the absolute power reference value in the magnitude error window.

Key Path	**AMPTD Y Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:EVMQpsk:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel ?`
Example	DISP:EVMQ:VIEW2:WIND:TRAC:Y:RLEV 90 DISP:EVMQ:VIEW2:WIND:TRAC:Y:RLEV?
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When the value is set manually, Auto Scaling automatically changes to Off.
Preset	0.0
State Saved	Saved in instrument state.
Min	–500
Max	500
Initial S/W Revision	Prior to A.02.00

Ref Value (Phase Error Window)

Sets the absolute power reference value in the phase error window.

Key Path	**AMPTD Y Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:EVMQpsk:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:EVMQ:VIEW2:WIND2:TRAC:Y:RLEV 90 DISP:EVMQ:VIEW2:WIND2:TRAC:Y:RLEV?
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When the value is set manually, Auto Scaling automatically changes to Off.
Preset	0.0
State Saved	Saved in instrument state.
Min	–36000
Max	36000
Initial S/W Revision	Prior to A.02.00

Ref Value (EVM Window)

Sets the absolute power reference value in the EVM window.

Key Path	**AMPTD Y Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow3:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:EVMQpsk:VIEW2:WINDow3:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:EVMQ:VIEW2:WIND3:TRAC:Y:RLEV 120 DISP:EVMQ:VIEW2:WIND3:TRAC:Y:RLEV?
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When the value is set manually, Auto Scaling automatically changes to Off.
Preset	0.0
State Saved	Saved in instrument state.
Min	–500
Max	500

Initial S/W Revision	Prior to A.02.00

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings. This key has read-back text that describes the total attenuator value.

See “Attenuation” on page 1120 under the “Common Measurement Functions” section for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Range

Accesses the Range menu to change baseband I/Q gain settings. This key has a readback text that describes gain range value. Refer to “Range” on page 1129 in the “Common Measurement Functions” section for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	A.03.00

Scale/Div

Sets the units per division of vertical scale in the logarithmic display. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Scale/Div (Magnitude Error Window)

Sets the sensitivity measurement result in the magnitude error window.

Key Path	**AMPTD Y Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:EVMQpsk:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`

Example	DISP:EVMQ:VIEW2:WIND:TRAC:Y:PDIV 25 DISP:EVMQ:VIEW2:WIND:TRAC:Y:PDIV?
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets a value manually, Auto Scaling automatically changes to Off.
Preset	1
State Saved	Saved in instrument state.
Min	0.1
Max	50
Initial S/W Revision	Prior to A.02.00

Scale/Div (Phase Error Window)

Sets the sensitivity measurement result in the phase error window.

Key Path	**AMPTD Y Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:EVMQpsk:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:EVMQ:VIEW2:WIND2:TRAC:Y:PDIV 25.5 DISP:EVMQ:VIEW2:WIND2:TRAC:Y:PDIV?
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets a value manually, Auto Scaling automatically changes to Off.
Preset	0.5
State Saved	Saved in instrument state.
Min	0.1
Max	360
Initial S/W Revision	Prior to A.02.00

Scale/Div (Evm Window)

Sets the sensitivity measurement result in the EVM window.

Key Path	**AMPTD Y Scale**

Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow3:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:EVMQpsk:VIEW2:WINDow3:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:EVMQ:VIEW2:WIND3:TRAC:Y:PDIV 20 DISP:EVMQ:VIEW2:WIND3:TRAC:Y:PDIV?
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets a value manually, Auto Scaling automatically changes to Off.
Preset	0.5
State Saved	Saved in instrument state.
Min	0.1
Max	50
Initial S/W Revision	Prior to A.02.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See AMPTD Y Scale, “Presel Center” on page 1136 in the “Common Measurement Functions” section for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	Prior to A.02.00

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

See AMPTD Y Scale, “Preselector Adjust” on page 1137 in the “Common Measurement Functions” section for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	Prior to A.02.00

µW Path Control

The **µW Path Control** functions include the **µW Preselector Bypass** (Option MPB) and **Low Noise Path** (Option LNP) controls in the High Band path circuits.

See µ"µW Path Control " on page 1145 under AMPTD Y Scale in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD/Y Scale**
Initial S/W Revision	A.04.00

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See AMPTD Y Scale, "Internal Preamp" on page 1149 in the "Common Measurement Functions" section for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Ref Position

Positions the Y-axis scale reference level at the top, center or bottom of the display. Changing the reference position does not change the reference level value. This function can be used for all three QPSK EVM measurement results graphs.

Key Path	**AMPTD Y Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow[1]|2|3:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:EVMQpsk:VIEW2:WINDow[1]|2|3:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:EVMQ:VIEW2:WIND3:TRAC:Y:RPOS TOP DISP:EVMQ:VIEW2:WIND3:TRAC:Y:RPOS?
Notes	Subop codes denote: 1: Mag error graph 2: Phase error graph 3: EVM error graph
Couplings	When Auto Scaling is On and this parameter is changed, Ref Value changes to adjust the trace to one that is most suitable for the window.

Preset	CENTer|CENTer|BOTTom
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Toggles the Auto Scaling function between On and Off. Upon pressing the **Restart** front-panel key, this function automatically determines the scale per division and reference values based on the measurement results.

Key Path	**AMPTD Y Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow[1]|2|3:TRACe:Y[:SCALe]:COUPle ON|OFF|1|0` `:DISPlay:EVMQpsk:VIEW2:WINDow[1]|2|3:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:EVMQ:VIEW2:WIND:TRAC:Y:COUP ON DISP:EVMQ:VIEW2:WIND:TRAC:Y:COUP?
Couplings	When Auto Scaling is On and the **Restart** front-panel key is pressed, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

Auto Couple

See “Auto Couple” on page 1153 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

BW

Accesses a menu of functions that enable you to specify and control the Info BW.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Info BW

Activates the **Info BW** function, which enables you to manually set the information bandwidth of the analyzer. This is used to set the hardware filter of the ADC.

Key Path	**BW**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`[:SENSe]:EVMQpsk:BANDwidth[:RESolution] <freq>` `[:SENSe]:EVMQpsk:BANDwidth[:RESolution]?`
Example	EVMQ:BAND 1 kHz EVMQ:BAND?
Notes	The values shown in this table reflect the conditions after a Mode Preset.
Preset	WCDMA: 6 MHz CDMA1xEVDO, C2K: 1.5MHz
State Saved	Saved in instrument state.
Min	1kHz
Max	Hardware Dependent: RF Input: No Option = 10 MHz WB (25 MHz or wider) = Hardware Option Limit I/Q Input (for I+jQ) No Option = 20 MHz OptionB25 = 50 MHz
Backwards Compatibility SCPI	[:SENSe]:EVMQpsk:BWIDth[:RESolution]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

Info BW Control

Accesses a menu that enables you to select either A Gaussian or Flat Top filter.

Key Path	**BW**
Initial S/W Revision	Prior to A.02.00

Filter Type

Selects the type of bandwidth filter that is used. The choices are Gaussian or Flat top.

Key Path	**BW, RBW Control**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`[:SENSe]:EVMQpsk:BANDwidth:SHAPe GAUSsian|FLATtop` `[:SENSe]:EVMQpsk:BANDwidth:SHAPe?`
Example	EVMQ:BAND:SHAP GAUS EVMQ:BAND:SHAP?
Preset	FLATtop
State Saved	Saved in instrument state.
Range	Gaussian|FlatTop
Backwards Compatibility SCPI	[:SENSe]:EVMQpsk:BWIDth:SHAPe
Initial S/W Revision	Prior to A.02.00

Cont

See “Cont (Continuous Measurement/Sweep)” on page 1155 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

FREQ Channel

See “FREQ Channel” on page 1157 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Input/Output

See “Input/Output” on page 1165 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement..

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, reference value of the selected marker appears on the Active Function area. It is:

Marker Chip Value, at I/Q Polar

Marker X Axis Value, at EVM, Phase Error and Mag Error

Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off.

Key Path	**Marker**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:EVMQ:MARK:MODE POS CALC:EVMQ:MARK:MODE?

Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, reference value of the selected marker appears on the Active Function area. It is: **Marker Chip Value**, at I/Q Polar **Marker X Axis Value,** at EVM, Phase Error and Mag Error Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. If the selected marker's trace is I/Q Polar, Delta is not supported. If DELTa is selected on the marker of the I/Q Polar, the command is ignored.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Initial S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

This parameter has different meaning between the cases where the marker trace is set to I/Q Polar and others. In the I/Q Polar Graph, X Axis Value is also the measured value and this command is query only.

Mode	WCDMA, C2K, 1xEVDO

Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>`
	
	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X ?`

Example	CALC:EVMQ:MARK3:X 1280 CALC:EVMQ:MARK3:X?

Notes	If no suffix is sent, it uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" is generated. If the specified marker is Fixed and a Marker Function is on, error –221 "Settings conflict; cannot adjust Fixed marker while Marker Function is on" is generated. The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number. This parameter has different meaning between the cases where the marker trace is set to I/Q Polar and others. In the I/Q Polar Graph, X Axis Value is also the measured value and the command is query only.
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query returns a Not A Number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Marker Chip Value (Remote Command only)

Sets the marker Chip value in the current marker for the trace of I/Q Polar. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an Chip value if the control mode is **Normal** or **Delta**.

In other traces than I/Q Polar, this command is meaningless and ignored.

Mode	WCDMA, C2K, 1xEVDO

Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:CHIP <real>`
	
	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:CHIP?`

Example	CALC:EVMQ:MARK3:X 0 CALC:EVMQ:MARK3:X?

Notes	If no suffix is sent it uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. If the specified marker is Fixed and a Marker Function is on, error –221 “Settings conflict; cannot adjust Fixed marker while Marker Function is on” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is Not A Number. This parameter is only available in the case where the marker trace is set to I/Q Polar.
Preset	0
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

If the Marker Trace is set to I/Q Polar (POLar), this command provides no effects.

Mode	WCDMA, C2K, 1xEVDO

Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X :POSition <real>`
	
	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X :POSition?`

Example	CALC:EVMQ:MARK:X:POS 0.0 CALC:EVMQpsk:MARK10:X:POS?

Notes	If the specified marker is Fixed and a Marker Function is on, error –221 “Settings conflict; cannot adjust Fixed marker while Marker Function is on” is generated. The query returns the marker’s absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker’s reference marker in trace points if the control mode is **Delta**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points (see “Fractional Trace Points”, above). If the marker is **Off** the response is not a number. This command is not available when Marker Trace of the selected marker (:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?) is set to POLar. In this case, this command is ignored.
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query returns a Not A Number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Marker Y Axis Value (Query Only)

Returns the Marker Y Axis value, in the current marker Y Axis unit.

Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:EVMQ:MARK11:Y?
Notes	The query returns the marker Y-axis result, if the control mode is **Normal** or **Delta**. If the marker is **Off**, the response is not a number.
Preset	Result dependant on markers setup and signal source
State Saved	No
Backwards Compatibility SCPI	:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:RESult?
Initial S/W Revision	Prior to A.02.00

Marker Properties

Accesses a menu of functions that enable you to specify and control markers for the current measurement.

Key Path	**Marker**

Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker, Properties**
Initial S/W Revision	Prior to A.02.00

Relative To

Selects the marker the selected marker will be relative to (its reference marker).

Key Path	**Marker, Properties**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:EVMQ:MARK:REF 4 CALC:EVMQ:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” When queried, a single value is returned (the specified marker numbers relative marker).
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	**Marker**
Mode	WCDMA, C2K, 1xEVDO

Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe POLar|EVM|PERRor|MERRor` `:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:EVMQ:MARK:TRAC MERR CALC:EVMQ:MARK:TRAC?
Notes	Assigns the specified marker to the designated trace.
Preset	POLar
State Saved	Saved in instrument state.
Range	I/Q Polar|EVM|Phase Error|Mag Error
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.08.00

Couple Marker

Toggles the state of the markers to be coupled On or Off. When this function is true (On), moving any marker causes an equal X-axis movement of every other marker except those located to the polar trace, and Chip value of the marker located to the polar trace, which is not **Off**, including **Fixed** markers. “Equal X Axis movement” refers to the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units). This may result in markers going off screen

See Couple Marker in the "Marker" section for more information.

Key Path	**Marker**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:EVMQpsk:MARKer:COUPle[:STATe]?`
Example	CALC:EVMQ:MARK:COUP ON CALC:EVMQ:MARK:COUP?
Notes	In QPSK EVM, this marker behaves specially. Coupled values are "Chips" of the markers located to the polar trace, and "X" of the markers located to the other traces than the polar trace.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Key Path	**Marker**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:MARKer:AOFF`
Example	CALC:EVMQ:MARK:AOFF
Initial S/W Revision	Prior to A.02.00

Marker Function

There is no Marker Function functionality supported in QPSK EVM. This front panel key displays a blank menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Marker To

There is no Marker To functionality supported in QPSK EVM. This front panel key displays a blank menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas

See “Meas” on page 1257 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas Setup

Displays the setup menu for the currently selected measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Avg/Hold Number

Specifies the number of N averages that will be used for the measurement. After the specified number (average counts) have been averaged, the averaging mode (termination control) setting determines the averaging action.

Key Path	**Meas Setup**
Mode	WCDMA, C2K, 1xEVDO

Remote Command	`[:SENSe]:EVMQpsk:AVERage:COUNt <integer>`
	`[:SENSe]:EVMQpsk:AVERage:COUNt?`
	`[:SENSe]:EVMQpsk:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:EVMQpsk:AVERage[:STATe]?`

Example	EVMQ:AVER:COUN 1001 EVMQ:AVER:COUN? EVMQ:AVER OFF EVMQ:AVER?
Preset	10 ON
State Saved	Saved in instrument state.
Min	1
Max	10000
Initial S/W Revision	Prior to A.02.00

Avg Mode

Toggles the averaging mode between Exp (exponential) and Repeat. This selection only affects the averaging result after the number of N averages is reached. The N is set using the Avg/Hold Number key.

Exponential	Each successive data acquisition after the average count is reached, is exponentially weighted and then combined with the existing average.

Repeat	After reaching the average count, the averaging is reset and a new average is started.

Key Path	**Meas Setup**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`[:SENSe]:EVMQpsk:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:EVMQpsk:AVERage:TCONtrol?`
Example	EVMQ:AVER:TCON REP EVMQ:AVER:TCON?
Notes	Selects the type of termination control used for averaging. This determines the averaging action after the specified number of frames (average count) is reached. Exponential - Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average. Repeat - After reaching the average count, the averaging is reset and a new average is started.
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp|Repeat
Initial S/W Revision	Prior to A.02.00

Meas Interval

Sets the length of the measurement interval (number of data points) that are used.

Key Path	**Meas Setup**
Mode	WCDMA, C2K
Remote Command	`[:SENSe]:EVMQpsk:SWEep:POINts <integer>` `[:SENSe]:EVMQpsk:SWEep:POINts?`
Example	EVMQ:SWE:POIN 1001 EVMQ:SWE:POIN?
Preset	WCDMA: 2560 C2K: 512
State Saved	Saved in instrument state.
Min	128
Max	WCDMA: 5120 C2K: 1536

Initial S/W Revision	Prior to A.02.00

Limits

Accesses a menu that enables you to change the RMS EVM and Frequency Error limits settings.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

RMS EVM

Sets the limit for the RMS EVM measurement. This value is used to judge whether the measurement passes or fails the RMS EVM limit.

Key Path	**Meas Setup, Limits**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:LIMit:RMS <real>` `:CALCulate:EVMQpsk:LIMit:RMS?`
Example	CALC:EVMQ:LIM:RMS 50 CALC:EVMQ:LIM:RMS?
Notes	Sets the limits of RMS EVM which is used to judge the result of RMS EVM passes or fails. If a measured RMS EVM value is not larger than the limit value, the result is PASS. Otherwise, the result is FAIL. You must be in the W-CDMA mode to use this command. Use INSTrument:SELect to set the mode.
Preset	WCDMA: 17.5 C2K: 100.0 1xEVDO: 100.0
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

Freq Error

Sets the limit, in Hz, for the frequency error measurement. This value is used to judge whether the measurement passes or fails the Frequency Error limit.

Key Path	**Meas Setup, Limits**

Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:LIMit:FERRor <freq>` `:CALCulate:EVMQpsk:LIMit:FERRor?`
Example	CALC:EVMQ:LIM:FERR 100 CALC:EVMQ:LIM:FERR?
Notes	Sets the limits of the Frequency Error, which is used to judge the result of the Frequency Error, whether it passes or fails. If the measured Frequency Error value is not larger than the limit value, the result is PASS. Otherwise, the result is FAIL.
Preset	100.0
State Saved	Saved in instrument state.
Min	0.0
Max	300000
Initial S/W Revision	Prior to A.02.00

Meas Offset & Interval

This key is active only in 1xEVDO mode.

Allows you to measure the signal occupying different time domain respectively, such as the pilot in first half slot.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

Meas Offset

Specifies how long after the data capture the signal is observed.

Key Path	**Meas Setup, Meas Offset & Interval**
Mode	1xEVDO
Remote Command	`[:SENSe]:EVMQpsk:MEAS:OFFSet <integer>` `[:SENSe]:EVMQpsk:MEAS:OFFSet?`
Example	EVMQ:MEAS:OFFS 464 EVMQ:MEAS:OFFS?
Couplings	Coupled with Pre-Defined Ofs/Intvl. Changes according to the selected type. Meas Offset + Meas Interval <=2048
Preset	400 chips
State Saved	Saved in instrument state.

Min	0 chips
Max	2047 chips
Initial S/W Revision	Prior to A.02.00

Meas Interval

Specifies how long the signal is observed.

Key Path	**Meas Setup, Meas Offset & Interval**
Mode	1xEVDO
Remote Command	`[:SENSe]:EVMQpsk:MEAS:LENGth < integer >` `[:SENSe]:EVMQpsk:MEAS:LENGth?`
Example	EVMQ:MEAS:LENG 96 EVMQ:MEAS:LENG?
Couplings	Coupled with Pre-Defined Ofs/Intvl. Changes according to the selected type. Meas Offset + Meas Interval <=2048
Preset	224 chips
State Saved	Saved in instrument state.
Min	1 chips
Max	2048 chips
Initial S/W Revision	Prior to A.02.00

Spectrum

Toggles the spectrum function between Normal and Invert. If set to Invert, this function conjugates the spectrum. It is equivalent to taking the negative of the quadrature component in demodulation.

Key Path	**Meas Setup**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`[:SENSe]:EVMQpsk:SPECtrum NORMal|INVert` `[:SENSe]:EVMQpsk:SPECtrum?`
Example	EVMQ:SPEC NORM EVMQ:SPEC?
Preset	NORMal
State Saved	Saved in instrument state.
Range	Normal|Invert
Initial S/W Revision	Prior to A.02.00

Advanced

Accesses a menu of functions that enable you to set up more specific parameters for the measurement. These parameters include:

EVM Result I/Q Offset

IF Gain

RRC Filter Control

Filter Alpha

Chip Rate

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

EVM Result I/Q Offset

Toggles the I/Q Offset to be included or excluded in the measurement result. When it is set as "Standard" (ON), EVM is calculated without any compensation of I/Q offset. When it is set as "Exclude" (OFF), I/Q offset is compensated.

Key Path	**Meas Setup, Advanced**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:IQOFfset:INCLude OFF|ON|0|1` `:CALCulate:EVMQpsk:IQOFfset:INCLude?`
Example	CALC:EVMQ:IQOF:INCL OFF CALC:EVMQ:IQOF:INCL?
Preset	ON
State Saved	Saved in instrument state.
Range	Std|Exclude
Initial S/W Revision	Prior to A.02.00

RRC Filter Control

Allows you to change the status (ON/OFF) of the Root Raised Cosine (RRC) filter. This ON/OFF state change involve measurement restart.

Key Path	**Meas Setup, Advanced**
Mode	WCDMA
Remote Command	`[:SENSe]:EVMQpsk:FILTer[:RRC][:STATe] OFF|ON|0|1` `[:SENSe]:EVMQpsk:FILTer[:RRC][:STATe]?`

Example	EVMQ:FILT ON EVMQ:FILT?
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

Filter Alpha

Sets the alpha value for the root raised cosine (RRC) filter. This key is available only in WCDMA mode and while employing an RRC filter.

Key Path	**Meas Setup, Advanced**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`[:SENSe]:EVMQpsk:FILTer:ALPHa <real>` `[:SENSe]:EVMQpsk:FILTer:ALPHa?`
Example	EVMQ:FILT:ALPH 0.5 EVMQ:FILT:ALPH?
Notes	This parameter is available only in the WCDMA mode. In other modes, this key is invisible.
Preset	0.22
State Saved	Saved in instrument state.
Min	0.01
Max	0.5
Backwards Compatibility SCPI	[:SENSe]:EVMQpsk:ALPHa
Initial S/W Revision	Prior to A.02.00

Chip Rate

Changes the chip rate for the measurement.

Key Path	**Meas Setup, Advanced**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`[:SENSe]:EVMQpsk:CRATe <freq>` `[:SENSe]:EVMQpsk:CRATe?`
Example	EVMQ:CRAT 2.5 MHz EVMQ:CRAT?

Notes	Enter a frequency value to set the chip rate.
Preset	WCDMA: 3.84 MHz C2K: 1.2288 MHz 1xEVDO: 1.2288 MHz
State Saved	Saved in instrument state.
Min	100 kHz
Max	20 MHz
Initial S/W Revision	Prior to A.02.00

IF Gain

In order to take full advantage of the RF dynamic range of the analyzer, we will offer a switched IF amplifier with approximately 10 dB of gain. When it can be turned on without an overload, the dynamic range is always better with it on than off. The IF Gain key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

Sets the IF Gain function to Auto, Low Gain or High Gain. These settings affect sensitivity and IF overloads.

This only applies to the RF input. It does not apply to baseband I/Q input.

Key Path	**Meas Setup, Advanced**
Initial S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the auto rules for IF Gain

Key Path	**Meas Setup, Advanced, IF Gain**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`[:SENSe]:EVMQpsk:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:EVMQpsk:IF:GAIN:AUTO[:STATe]?`
Example	`EVMQ:IF:GAIN:AUTO OFF` `EVMQ:IF:GAIN:AUTO?`
Notes	This only applies to the RF input. It does not apply to baseband I/Q input.
Couplings	'When either the auto attenuation works (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed as following rule. Auto sets IF Gain to On under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is –20 dBm or lower. For other settings, Auto sets IF Gain to Off.

Preset	ON
State Saved	Saved in instrument state.
Range	Auto|Man
Initial S/W Revision	Prior to A.02.00

IF Gain State

Selects the range of IF gain.

Key Path	**Meas Setup, Advanced, IF Gain**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`[:SENSe]:EVMQpsk:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:EVMQpsk:IF:GAIN[:STATe]?`
Example	EVMQ:IF:GAIN ON EVMQ:IF:GAIN?
Notes	This only applies to the RF input. It does not apply to baseband I/Q input. where ON = high gain OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Readback Text	Low Gain|High Gain
Initial S/W Revision	Prior to A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Key Path	**Meas Setup**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CONFigure:EVMQpsk`
Example	CONF:EVMQ
Notes	Restore all defaults of parameters.
Initial S/W Revision	Prior to A.02.00

Mode

See “Mode” on page 1271 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Mode Setup

See “Mode Setup” on page 1291 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Peak Search

Accesses a menu that enables you to control the peak search function and places a marker on the trace point with highest peak.

Key Path	**Front panel key**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:EVMQ:MARK2:MAX
Notes	This command does not work when the selected marker is located on the polar trace. In this case, the command is ignored.
Initial S/W Revision	Prior to A.02.00

Next Peak

Moves the selected marker to the peak that has the next highest amplitude that is less than the marker's current value.

Key Path	**Peak Search**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:NEXT`
Example	CALC:EVMQ:MARK2:MAX:NEXT
Notes	This command does not work when the selected marker is located on the polar trace. In this case, the command is ignored.
Initial S/W Revision	Prior to A.02.00

Next Pk Right

Moves the selected marker to the nearest peak to the right of the current marker that meets all enabled peak criteria.

Key Path	**Peak Search**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:RIGHt`
Example	CALC:EVMQ:MARK2:MAX:RIGH

Notes	This command does not work when the selected marker is located on the polar trace. In this case, the command is ignored.
Initial S/W Revision	Prior to A.02.00

Next Pk Left

Moves the selected marker to the nearest peak to the left of the current marker that meets all enabled peak criteria.

Key Path	**Peak Search**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:LEFT`
Example	CALC:EVMQ:MARK2:MAX:LEFT
Notes	This command does not work when the selected marker is located on the polar trace. In this case, the command is ignored.
Initial S/W Revision	Prior to A.02.00

Marker Delta

Sets the control mode for the selected marker to **Delta** mode. This menu key performs the same function as the Delta 1-of-N selection key in the Marker menu. It is duplicated in the Peak Search Menu to allow you the convenience to simultaneously perform a peak search and change the marker control mode to Delta without having to access two separate menus.

Key Path	**Peak Search**
Initial S/W Revision	Prior to A.02.00

Pk-Pk Search

Finds and displays the amplitude and frequency (or time, if in zero span) differences between the highest and lowest value on the y-axis.

Key Path	**Peak Search**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:PTPeak`
Example	CALC:EVMQ:MARK:PTP
Notes	This command does not work when the selected marker is located on the polar trace. In this case, the command is ignored.
Couplings	This key is not available (key is grayed out) when **Coupled Markers** is on.

Initial S/W Revision	Prior to A.02.00

Min Search

Moves the selected marker to the minimum value on the y-axis of the current trace.

Key Path	**Peak Search**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:CALCulate:EVMQpsk:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	CALC:EVMQ:MARK:MIN
Notes	This command does not work when the selected marker is located on the polar trace. In this case, the command is ignored.
Initial S/W Revision	Prior to A.02.00

Recall

See “Recall” on page 174 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Restart

See “Restart” on page 1299 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Save

See “Save” on page 186 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Single

See “Single (Single Measurement/Sweep)” on page 1305 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Source

Operation of this key is identical across all measurements. For details about this key, see “Source” on page 1307 in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

This menu is blank if the selected **window** is:

- I/Q Measured Polar Graph or,
- RMS EVM (Numeric Results).

For details of available **views** in this measurement, see "View/Display" on page 991. Within a view, you can change the selected window by pressing the **Next Window** key.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

X Ref Value

Controls the reference value of the X scale of the current measurement

Key Path	**SPAN X Scale**
Initial S/W Revision	Prior to A.02.00

Ref Value (X Scale, Magnitude Error Window)

Sets the chip reference value on the horizontal axis in the magnitude error window.

Key Path	**SPAN X Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:EVMQpsk:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RLEVel ?`
Example	DISP:EVMQ:VIEW2:WIND:TRAC:X:RLEV 1001 DISP:EVMQ:VIEW2:WIND:TRAC:X:RLEV?
Notes	This key is for control of the reference value of the X scale of the focused window of the selected view.
Couplings	When this parameter has been set, XScaleAutoMag turns off.
Preset	0
State Saved	Saved in instrument state.
Min	–5000000
Max	5000000

Initial S/W Revision	Prior to A.02.00

Ref Value (X Scale, Phase Error Window)

Sets the chip reference value on the horizontal axis in the phase error window.

Key Path	**SPAN X Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow2:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:EVMQpsk:VIEW2:WINDow2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EVMQ:VIEW2:WIND2:TRAC:X:RLEV 1001 DISP:EVMQ:VIEW2:WIND2:TRAC:X:RLEV?
Notes	This key is for control of the reference value of the X scale of the focused window of the selected view.
Couplings	When this parameter has been set, XScaleAutoMag turns off.
Preset	0
State Saved	Saved in instrument state.
Min	–5000000
Max	5000000
Initial S/W Revision	Prior to A.02.00

Ref Value (X Scale, EVM Window)

Sets the chip reference value on the horizontal axis in the EVM window.

Key Path	**SPAN X Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow3:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:EVMQpsk:VIEW2:WINDow3:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EVMQ:VIEW2:WIND3:TRAC:X:RLEV 1001 DISP:EVMQ:VIEW2:WIND3:TRAC:X:RLEV?
Notes	This key is for control of the reference value of the X scale of the focused window of the selected view. The mode must be in W-CDMA, 1xEVDO or cdma2000 to use this function. Use INSTrument:SELect to set this mode.
Couplings	When this parameter has been set, XScaleAutoEvm turns off.

Preset	0
State Saved	Saved in instrument state.
Min	–5000000
Max	5000000
Initial S/W Revision	Prior to A.02.00

X Scale/Div

Sets the horizontal scale by changing a value per division.

Key Path	**SPAN X Scale**
Initial S/W Revision	Prior to A.02.00

Scale/Div (X Scale, Magnitude Error Window)

Sets the horizontal scale by changing a chip value per division in the magnitude error window.

Key Path	**SPAN X Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow[1]:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:EVMQpsk:VIEW2:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EVMQ:VIEW2:WIND:TRAC:X:PDIV 1001 DISP:EVMQ:VIEW2:WIND:TRAC:X:PDIV?
Notes	This key is for Scale/Div control.
Couplings	When this parameter has been set, XScaleAutoMag turns off.
Preset	WCDMA : 256 C2K : 51.2 1xEVDO : 22.4
State Saved	Saved in instrument state.
Min	1
Max	500000
Initial S/W Revision	Prior to A.02.00

Scale/Div (X Scale, Phase Error Window)

Sets the horizontal scale by changing a chip value per division in the phase error window.

Key Path	**SPAN X Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow2:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:EVMQpsk:VIEW2:WINDow2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EVMQ:VIEW2:WIND2:TRAC:X:PDIV 1001 DISP:EVMQ:VIEW2:WIND2:TRAC:X:PDIV?
Notes	This key is for Scale/Div control.
Couplings	When this parameter has been set, XScaleAutoPhase turns off.
Preset	WCDMA : 256 C2K : 51.2 1xEVDO : 22.4
State Saved	Saved in instrument state.
Min	1
Max	500000
Initial S/W Revision	Prior to A.02.00

Scale/Div (X Scale, EVM Window)

Sets the horizontal scale by changing a chip value per division in the EVM window.

Key Path	**SPAN X Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow3:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:EVMQpsk:VIEW2:WINDow3:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EVMQ:VIEW2:WIND3:TRAC:X:PDIV 1001 DISP:EVMQ:VIEW2:WIND3:TRAC:X:PDIV?
Notes	This key is for Scale/Div control.
Couplings	When this parameter has been set, XScaleAutoEvm turns off.

Preset	WCDMA : 256 C2K : 51.2 1xEVDO : 22.4
State Saved	Saved in instrument state.
Min	1
Max	500000
Initial S/W Revision	Prior to A.02.00

X Ref Position

Sets the reference position of the X axis on the display. The reference position can be set to Left, Ctr (center) or Right.

Key Path	**SPAN X Scale**
Initial S/W Revision	Prior to A.02.00

Ref Position (X Scale, Magnitude Error Window)

Sets the reference position of the X axis for the magnitude error result on the display.

Key Path	**SPAN X Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EVMQpsk:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:EVMQ:VIEW2:WIND:TRAC:X:RPOS CENT DISP:EVMQ:VIEW2:WIND:TRAC:X:RPOS?
Couplings	If X Scale Auto Mag is On and the parameter is changed, X Scale Ref Mag changes to automatically adjust the trace to one that is most suitable for the window.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Center|Right
Initial S/W Revision	Prior to A.02.00

Ref Position (X Scale, Phase Error Window)

Sets the reference position of the X axis for the phase error result on the display.

Key Path	**SPAN X Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow2:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EVMQpsk:VIEW2:WINDow2:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:EVMQ:VIEW2:WIND2:TRAC:X:RPOS RIGH DISP:EVMQ:VIEW2:WIND2:TRAC:X:RPOS?
Couplings	If X Scale Auto Phase is On and the parameter is changed, X Scale Ref Phase changes to automatically adjust the trace to one that is most suitable for the window.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Center|Right
Initial S/W Revision	Prior to A.02.00

Ref Position (X Scale, EVM Window)

Sets the X axis reference position in the EVM window.

Key Path	**SPAN X Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow3:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EVMQpsk:VIEW2:WINDow3:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:EVMQ:VIEW2:WIND3:TRAC:X:RPOS RIGH DISP:EVMQ:VIEW2:WIND3:TRAC:X:RPOS?
Couplings	If X Scale Auto EVM is On and the parameter is changed, X Scale Ref EVM changes to automatically adjust the trace to one that is most suitable for the window.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Center|Right
Initial S/W Revision	Prior to A.02.00

X Auto Scaling

Determines the scale per division and reference value for the X axis based on the current measurement results.

Key Path	**SPAN X Scale**
Initial S/W Revision	Prior to A.02.00

Auto Scaling (X Scale, Magnitude Error Window)

When Auto Scaling is On and the **Restart** front-panel key is pressed, this function automatically displays the scale per division and reference value results in the magnitude error window.

Key Path	**SPAN X Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW2:WINDow[1]:TRACe:X[:SCALe]:COUPle ON|OFF|0|1` `:DISPlay:EVMQpsk:VIEW2:WINDow[1]:TRACe:X[:SCALe]:COUPle ?`
Example	DISP:EVMQ:VIEW2:WIND:TRAC:X:COUP ON DISP:EVMQ:VIEW2:WIND:TRAC:X:COUP?
Notes	When On, the Scale/Div, Ref Value, and Ref Position are reset to the default values. The mode must be W-CDMA, 1xEVDO or cdma2000 to use this function. Use :INSTrument:SELectto set this mode.
Couplings	Upon pressing the **Restart** front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Scale Coupling automatically changes to Off.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

Auto Scaling (X Scale, Phase Error Window)

When Auto Scaling is On, upon pressing the **Restart** front-panel key, this function automatically displays the scale per division and reference value results in the phase error window.

Key Path	**SPAN X Scale**
Mode	WCDMA, C2K, 1xEVDO

Remote Command	:DISPlay:EVMQpsk:VIEW2:WINDow2:TRACe:X[:SCALe]:COUPle ON|OFF|0|1 :DISPlay:EVMQpsk:VIEW2:WINDow2:TRACe:X[:SCALe]:COUPle?
Example	DISP:EVMQ:VIEW2:WIND2:TRAC:X:COUP OFF DISP:EVMQ:VIEW2:WIND2:TRAC:X:COUP?
Notes	When ON, the Scale/Div, Ref Value, and Ref Position are turned back to the default values. The mode must be in W-CDMA, 1xEVDO or cdma2000 to use this function. Use :INSTrument:SELectto set this mode.
Couplings	Upon pressing the **Restart** front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Scale Coupling automatically changes to Off.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

Auto Scaling (X Scale, Evm Window)

When Auto Scaling is On and the **Restart** front-panel key is pressed, this function automatically displays the scale per division and reference value results in the EVM window.

Key Path	**SPAN X Scale**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	:DISPlay:EVMQpsk:VIEW2:WINDow3:TRACe:X[:SCALe]:COUPle ON|OFF|0|1 :DISPlay:EVMQpsk:VIEW2:WINDow3:TRACe:X[:SCALe]:COUPle?
Example	DISP:EVMQ:VIEW2:WIND3:TRAC:X:COUP ON DISP:EVMQ:VIEW2:WIND3:TRAC:X:COUP?
Notes	When ON, the Scale/Div, Ref Value, and Ref Position are reset to the default values. The mode must be in W-CDMA, 1xEVDO or cdma2000 to use this function. Use :INSTrument:SELectto set this mode.
Couplings	Upon pressing the **Restart** front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Scale Coupling automatically changes to Off.

Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

Sweep/Control

Accesses a menu that enables you to pause and restart the measurement.

Key Path	**Front panel key**
Initial S/W Revision	Prior to A.02.00

Pause

Pauses a measurement after the current data acquisition is complete. When Paused, the label on the key changes to **Resume**. Pressing the **Resume** key resumes the measurement from the point it was at when paused. See "Pause/Resume" on page 1321 in "Common Measurement Functions" section for more details.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Trace/Detector

There is no Trace/Detector functionality supported in QPSK EVM. This front panel key displays a blank menu when pressed.

Key Path	**Front Panel Key**
Initial S/W Revision	Prior to A.02.00

Trigger

Accesses a menu of functions that enable you to select and control the trigger source for the current measurement.

See “Trigger” on page 1339 in the "Common Measurement Functions" section for more information.

Key Path	**Front panel key**
Initial S/W Revision	Prior to A.02.00

View/Display

Accesses a menu of functions that enable you to set up and control the display parameters for the current measurement.

Two views are available in this measurement, as described in the sections:

"I/Q Measured Polar Graph" on page 992

"I/Q Error View" on page 998

This topic contains the following sections:

"View Selection by name (Remote Command Only)" on page 991

"View Selection by number (Remote Command only)" on page 991

View Selection by name (Remote Command Only)

Selects the format for the measurement results view.

Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW[:SELect] POLar|ERRor` `:DISPlay:EVMQpsk:VIEW[:SELect]?`
Example	DISP:EVMQ:VIEW ERR DISP:EVMQ:VIEW?
Couplings	Changing parameter of "ViewNum" (:DISPlay:EVMQpsk:VIEW:NSELect) also changes this parameter.
Preset	POLar
State Saved	Saved in instrument state.
Range	I/Q Measured Polar Vector|I/Q Error
Initial S/W Revision	Prior to A.02.00

View Selection by number (Remote Command only)

Displays the numeric values of the measurement results.

Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW:NSELect <integer>` `:DISPlay:EVMQpsk:VIEW:NSELect?`
Example	DISP:EVMQ:VIEW:NSEL 2 DISP:EVMQ:VIEW:NSEL?

Couplings	Changing parameter of "View" (:DISPlay:EVMQpsk:VIEW[:SELect]) also changes this parameter.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	2
Initial S/W Revision	Prior to A.02.00

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters.

See “Display” on page 1385 in the "Common Measurement Functions" section for more information.

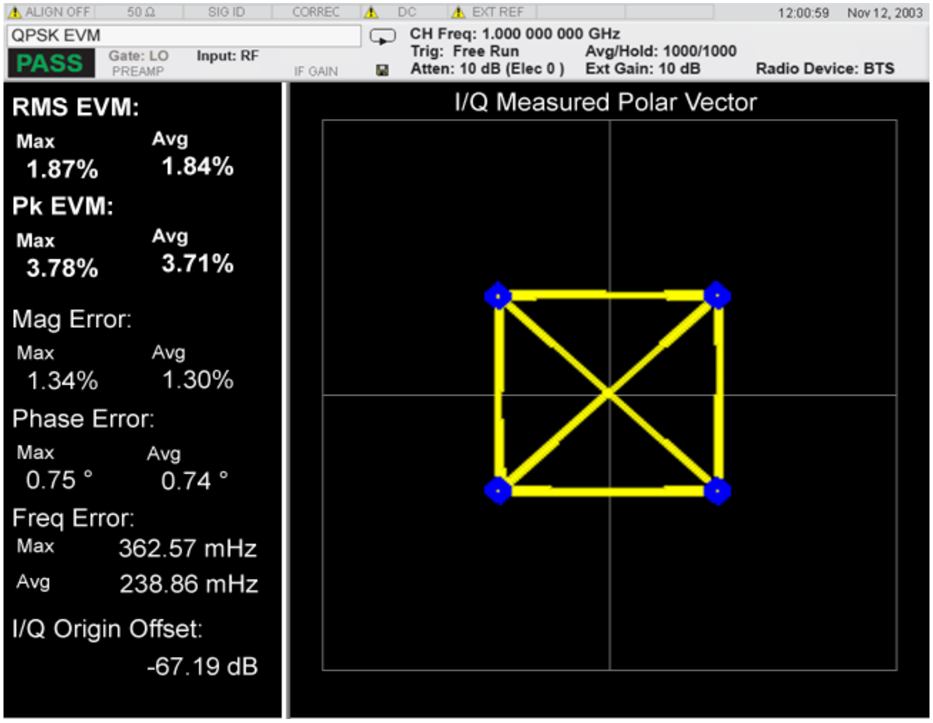
Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

I/Q Measured Polar Graph

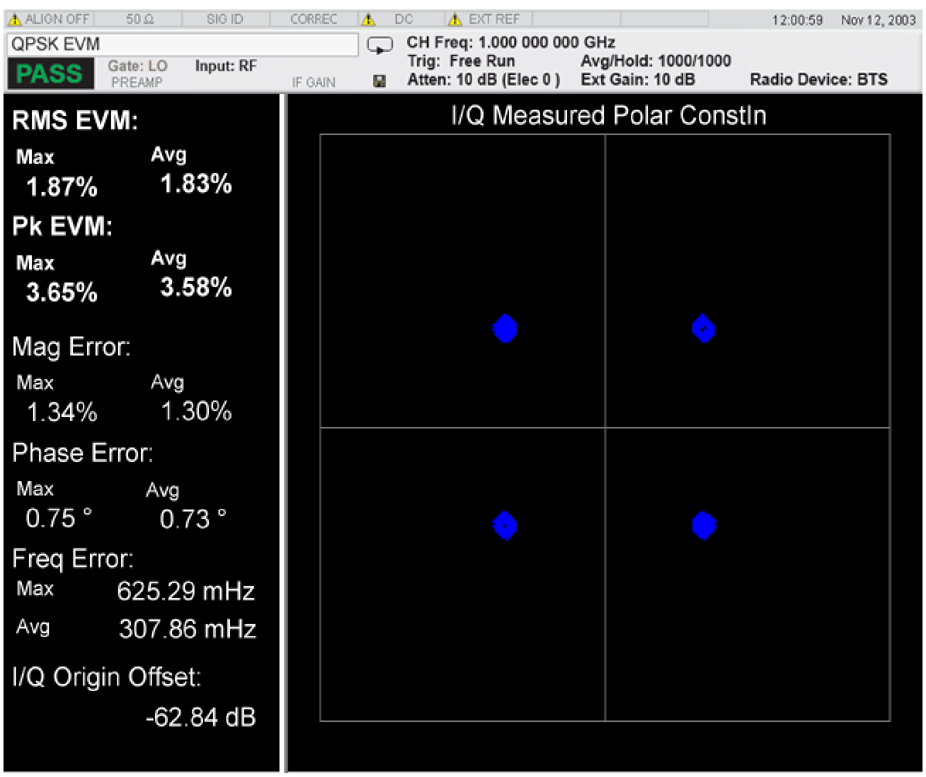
Provides a combination view of the I/Q demodulated signals using vector lines to connect the chip dots. IQ Measured Polar Graph accesses a menu that enables you to select more advanced settings.

- The view consists of the following windows:
- “Polar Graph Window” on page 994
- “Numeric Results Window” on page 994

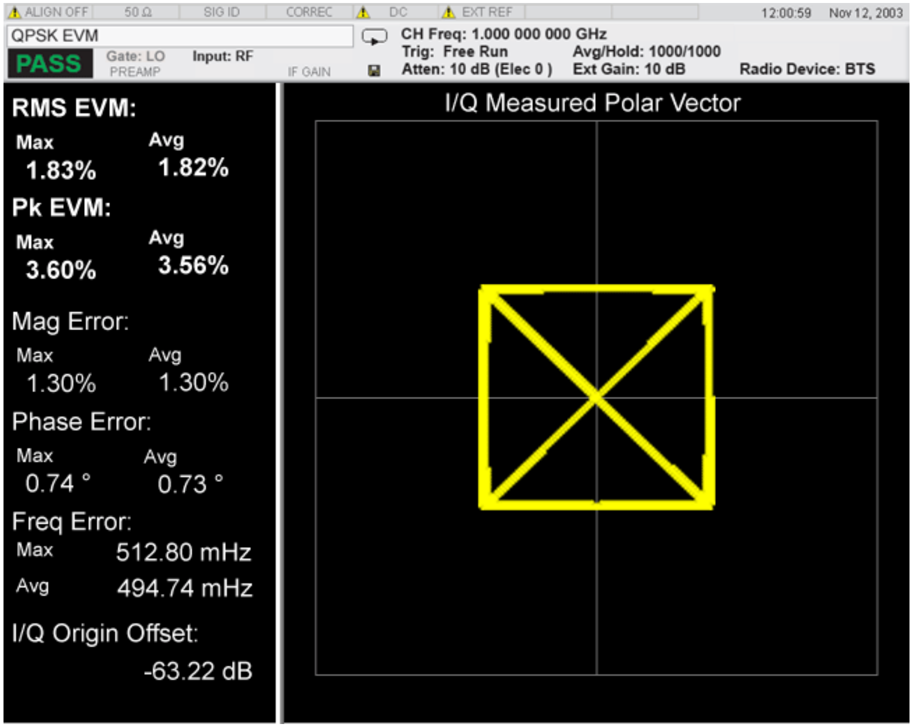
Below: example of IQ Measured Polar Vector & Constln



Below: example of IQ Measured Polar Constln



Below: example of IQ Measured Polar Vector



Polar Graph Window

Polar Graph consists of Constellation points and Vector line.

Marker Trace	Yes
Corresponding Trace	Display I/Q trace (n=5)

Numeric Results Window

Shows numeric results of the I/Q polar graph.

Name		**Type**	**Description**	**Unit**	**Format**
RMS EVM		float64	EVM over the entire measurement area	percent	XX.XX %
Peak EVM		float64	peak EVM in the measurement area.	percent	XX.XX %
Mag Error	Avg	float64	averaged magnitude error over the entire measurement area	percent	XX.XX %
	Max	float64	maximum magnitude error over the entire measurement area	percent	XX.XX %

Name		Type	Description	Unit	Format
Phase Error	Avg	float64	averaged phase error over the entire measurement area	°	XX.XX °
	Max	float64	maximum phase error over the entire measurement area	°	XX.XX °
Freq Error	Avg	float64	averaged frequency error in the measured signal.	Hz	XX.XX Hz
	Max	float64	maximum frequency error in the measured signal	Hz	XX.XX Hz
I/Q Origin Offset		float64	the I and Q error (magnitude squared) offset from the origin.	dB	XX.XX dB

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

I/Q Polar Vec/Constln

Specifies the format of the polar vector graph display. The following display options are available:

Vector and Constellation

Vector Only

Constellation Only

Key Path	**View/Display**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:POLar VC|VECTor|CONStln` `:DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:POLar?`
Example	DISP:EVMQ:VIEW:WIND2:TRAC:POL VECT DISP:EVMQ:VIEW:WIND2:TRAC:POL?
Notes	Allows to specify the format of the polar vector graph display by: Vector and Constellation Vector Only Constellation Only
Preset	VC
State Saved	Saved in instrument state.
Range	Vec & Constln|Vector|Constellation

Readback Text	Vec & Constln|Vector|Constln
Initial S/W Revision	Prior to A.02.00

Chip Offset

Sets the chip offset number from the first chip in a measured signal.

Key Path	**View/Display, Display**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:COFFset <integer>` `:DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:COFFset?`
Example	DISP:EVMQ:VIEW:WIND2:TRAC:COFF 1001 DISP:EVMQ:VIEW:WIND2:TRAC:COFF?
Notes	The number of chip offset from the first chip in a measured signal.
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	Meas Interval – I/Q Chips
Initial S/W Revision	Prior to A.02.00

I/Q Chips

Specifies the number of I/Q chips used to display the I/Q waveforms.

Key Path	**View/Display, Display**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:IQCHips <integer>` `:DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:IQCHips?`
Example	DISP:EVMQ:VIEW:WIND2:TRAC:IQCH 1001 DISP:EVMQ:VIEW:WIND2:TRAC:IQCH?
Couplings	This parameter is dependent on Meas Interval and cannot be set to a value greater than Meas Interval.
Preset	C2K: 512 WCDMA: 2560 1xEVDO: 224
State Saved	Saved in instrument state.

Min	1
Max	WCDMA: 5120 C2K:1536
Initial S/W Revision	Prior to A.02.00

Interpolation

Toggles the interpolation function from On to Off. If set to On, the vector lines between chip dots are converted into smooth curves by the interpolation function.

Key Path	**View/Display, Display**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:INTPolation[:STATe] OFF|ON|0|1` `:DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:INTPolation[:STATe]?`
Example	DISP:EVMQ:VIEW:WIND2:TRAC:INTP ON DISP:EVMQ:VIEW:WIND2:TRAC:INTP?
Notes	If set to ON, the vector lines between chip dots are converted into smoothened curves by the interpolation function.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

+45° Rotation

Toggles the state of the rotation of the I/Q polar trace. If set to On, the I/Q polar trace is rotated by 45 degrees to provide a rectangular display.

Key Path	**View/Display, Display**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:ROTQpi[:STATe] OFF|ON|0|1` `:DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:ROTQpi[:STATe]?`
Example	DISP:EVMQ:VIEW:WIND2:TRAC:ROTQ ON DISP:EVMQ:VIEW:WIND2:TRAC:ROTQ?
Notes	Enables you to toggle whether the I/Q polar trace is rotated by 45 degrees to provide a rectangular display.

Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

Full Vector

Toggles the gray background from On to Off when displaying the full measured trace or the selected vector on the display.

Key Path	**View/Display, Display**
Mode	WCDMA, C2K, 1xEVDO
Remote Command	`:DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:FVECtor[:STATe] OFF|ON|0|1` `:DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:FVECtor[:STATe]?`
Example	DISP:EVMQ:VIEW:WIND2:TRAC:FVEC ON DISP:EVMQ:VIEW:WIND2:TRAC:FVEC?
Notes	This is useful when you want to observe the full vector and the selected vector set by I/Q Chips and Chip Offset simultaneously.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

I/Q Error View

Provides a combination view. This view consists of four windows:

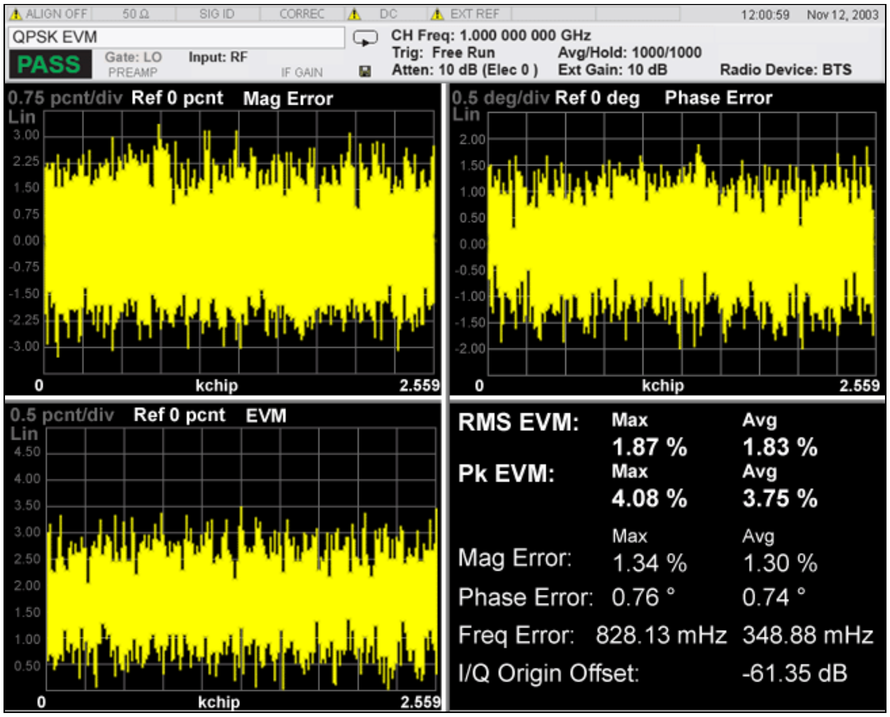
"Mag Error vs. Symbol Window" on page 999

"Phase Error vs. Symbol Window" on page 999

"EVM vs. Symbol Window" on page 999

"Numeric Results Window" on page 1000

Below; example of IQ Error View



Mag Error vs. Symbol Window

Provides Magnitude Error vs. Symbol results.

Marker Trace	Yes
Corresponding Trace	Magnitude Error trace (n=3)

Phase Error vs. Symbol Window

Provides Magnitude Error vs. Symbol results.

Marker Trace	Yes
Corresponding Trace	Phase Error trace (n=4)

EVM vs. Symbol Window

Provides EVM vs. Symbol results.

Marker Trace	Yes
Corresponding Trace	EVM trace (n=2)

Numeric Results Window

Shows numeric results as the same as the numeric results of the I/Q polar graph.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

15 Monitor Spectrum Measurement

The monitor spectrum measurement is used as a quick, convenient means of looking at the entire spectrum. While the look and feel are similar to the Spectrum Analyzer mode, the functionality is greatly reduced for easy operation. The main purpose of the measurement is to show the spectrum. The default span should cover an appropriate frequency range of the application. For measurement results and views, see "View/Display" on page 1047.

This topic contains the following sections:

Measurement Commands for Monitor Spectrum

The following commands can be used to retrieve the measurement results:

```
:CONFigure:MONitor
```

```
:CONFigure:MONitor:NDEFault
```

```
:INITiate:MONitor
```

```
:FETCh:MONitor[n]?
```

```
:READ:MONitor[n]?
```

```
:MEASure:MONitor[n]?
```

For more measurement related commands, see the SENSe subsystem, and the section "Remote Measurement Functions" on page 1257.

Remote Command Results for Monitor Spectrum Measurement

n	Results Returned
n=1 (or not specified)	Returns trace1 data with comma separated floating numbers
n=2	Returns trace2 data with comma separated floating numbers
n=3	Returns trace3 data with comma separated floating numbers

Key Path	Meas
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Ref Value

Sets the absolute power reference value. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Mode	All except SA and BASIC
Remote Command	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:MON:VIEW:WIND:TRAC:Y:RLEV 2.0 DISP:MON:VIEW:WIND:TRAC:Y:RLEV?
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10.00 dBm
State Saved	Saved in instrument state.
Min	–250.00 dBm
Max	250.00 dBm
Initial S/W Revision	Prior to A.02.00

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings.

See AMPTD Y Scale, “Attenuation” on page 1120 for more information.

Key Path	**AMPTD Y Scale**

Initial S/W Revision	Prior to A.02.00

Scale/Div

Sets the logarithmic units per vertical graticule division on the display. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Mode	All except SA and BASIC
Remote Command	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:MON:VIEW:WIND:TRAC:Y:PDIV 5.0 dB DISP:MON:VIEW:WIND:TRAC:Y:PDIV?
Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10.00 dB
State Saved	Saved in instrument state.
Min	0.10 dB
Max	20.00 dB
Initial S/W Revision	Prior to A.02.00

Presel Center

See AMPTD Y Scale, “Presel Center” on page 1136 for more information.

Presel Adjust

See AMPTD Y Scale, “Preselector Adjust” on page 1137 for more information.

µW Path Control

The **µW Path Control** functions include the **µW Preselector Bypass** (Option MPB) and **Low Noise Path** (Option LNP) controls in the High Band path circuits.

See “µW Path Control ” on page 1145 under the AMPTD Y Scale section for more information.

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See AMPTD Y Scale, "Internal Preamp" on page 1149 for more information.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Ref Position

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

Key Path	**AMPTD Y Scale**
Mode	All except SA and BASIC
Remote Command	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:MON:VIEW:WIND:TRAC:Y:RPOS CENT DISP:MON:VIEW:WIND:TRAC:Y:RPOS?
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Toggles the Auto Scaling function between On and Off.

Key Path	**AMPTD Y Scale**
Mode	All except SA and BASIC
Remote Command	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:MON:VIEW:WIND:TRAC:Y:COUP ON DISP:MON:VIEW:WIND:TRAC:Y:COUP?

Couplings	When Auto Scaling is On, and the Restart front–panel key is pressed, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

Auto Couple

See “Auto Couple” on page 1153 for more information.

Key Path	**Front-panel key**

BW

Accesses a menu that enables you to specify the resolution bandwidth functions that control the bandwidth and filter selection.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Res BW

Sets the resolution bandwidth for the current measurement. If an unavailable bandwidth is entered with the numeric keypad, the closest available bandwidth is selected.

Key Path	**BW**
Mode	All except SA and BASIC

Remote Command	`[:SENSe]:MONitor:BANDwidth[:RESolution] <freq>`
	`[:SENSe]:MONitor:BANDwidth[:RESolution]?`
	`[:SENSe]:MONitor:BANDwidth[:RESolution]:AUTO OFF|ON|0|1`
	`[:SENSe]:MONitor:BANDwidth[:RESolution]:AUTO?`

Example	MON:BAND 2.4 MHz MON:BAND? MON:BAND:AUTO ON MON:BAND:AUTO?

Preset	WCDMA: Automatically calculated WIMAX OFDMA: 100kHz C2K: Automatically calculated BLUETOOTH: Automatically calculated PN: Automatically calculated GSM/EDGE: Automatically calculated TD-SCDMA: Automatically calculated 1xEVDO: 30kHz DVB-T/H: 3.9kHz DTMB (CTTB): 3.9kHz ISDB-T: 3.9kHz CMMB: 3.9kHz LTE: 100 kHz LTETDD: 100 kHz Digital Cable TV: 3.9kHz WCDMA: ON WIMAX: OFF C2K: ON BLUETOOTH: ON PN: ON GSM/EDGE: ON TD-SCDMA: ON 1xEVDO: ON DVB-T/H: OFF DTMB (CTTB): OFF ISDB-T: OFF CMMB: OFF LTE:OFF LTETDD: OFF Digital Cable TV: OFF
State Saved	Saved in instrument state.
Min	1.0 Hz
Max	8.0 MHz
Backwards Compatibility SCPI	[:SENSe]:MONitor:BWIDth[:RESolution]

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00
Modified at S/W Revision	A.03.00

Video BW

Changes the analyzer post–detection filter.

Key Path	**BW**
Mode	All except SA and BASIC

Remote Command	`[:SENSe]:MONitor:BANDwidth:VIDeo <bandwidth>`
	`[:SENSe]:MONitor:BANDwidth:VIDeo?`
	`[:SENSe]:MONitor:BANDwidth:VIDeo:AUTO ON|OFF|1|0`
	`[:SENSe]:MONitor:BANDwidth:VIDeo:AUTO?`

Example	MON:BAND:VID 10 MHz MON:BAND:VID? MON:BAND:VID:AUTO OFF MON:BAND:VID:AUTO?

Preset	WCDMA: Automatically calculated WIMAX OFDMA: 1MHz C2K: Automatically calculated BLUETOOTH: Automatically calculated PN: Automatically calculated GSM/EDGE: Automatically calculated TD-SCDMA: Automatically calculated 1xEVDO: 300kHz DVB-T/H: 39kHz DTMB (CTTB): 39kHz ISDB-T: 39kHz CMMB: 39kHz LTE: 1 MHz LTETDD: 1 MHz Digital Cable TV: 39kHz WCDMA: ON WIMAX: OFF C2K: ON BLUETOOTH: ON PN: ON GSM/EDGE: ON TD-SCDMA: ON 1xEVDO: ON DVB-T/H: OFF DTMB (CTTB): OFF ISDB-T: OFF CMMB: OFF LTE:OFF LTETDD:OFF Digital Cable TV: OFF
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Backwards Compatibility SCPI	[:SENSe]:MONitor:BWIDth:VIDeo

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00
Modified at S/W Revision	A.03.00

VBW:3dB RBW

Selects the ratio between the video bandwidth and the equivalent 3 dB resolution bandwidth to be used for setting the VBW when VBW is in Auto.

Key Path	**BW**
Mode	All except SA and BASIC

Remote Command	`[:SENSe]:MONitor:BANDwidth:VIDeo:RATio <real>`
	`[:SENSe]:MONitor:BANDwidth:VIDeo:RATio?`
	`[:SENSe]:MONitor:BANDwidth:VIDeo:RATio:AUTO OFF|ON|0|1`
	`[:SENSe]:MONitor:BANDwidth:VIDeo:RATio:AUTO?`

Example	MON:BAND:VID:RAT 2 MON:BAND:VID:RAT? MON:BAND:VID:RAT:AUTO 0 MON:BAND:VID:RAT:AUTO?
Preset	1 ON
State Saved	Saved in instrument state.
Min	0.00001
Max	3000000
Backwards Compatibility SCPI	[:SENSe]:MONitor:BWIDth:VIDeo:RATio
Initial S/W Revision	Prior to A.02.00

Span:3dB RBW

Selects the ratio between span and resolution bandwidth.

The default setting is Auto with a Span:3 dB RBW ratio of 106:1. You can manually change this ratio by pressing the key, entering a new value, and pressing Enter.

Key Path	**BW**
Mode	All except SA and BASIC

Remote Command	`[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio <integer>`
	`[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio?`
	`[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio:AUTO OFF|ON|0|1`
	`[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio:AUTO?`

Example	MON:FREQ:SPAN:BAND:RAT 200 MON:FREQ:SPAN:BAND:RAT? MON:FREQ:SPAN:BAND:RAT:AUTO ON MON:FREQ:SPAN:BAND:RAT:AUTO?
Preset	106 ON
State Saved	Saved in instrument state.
Min	2
Max	10000
Backwards Compatibility SCPI	[:SENSe]:MONitor:FREQuency:SPAN:BWIDth[:RESolution]:RATio
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

Cont

See “Cont (Continuous Measurement/Sweep)” on page 1155 for more information.

Key Path	**Front-panel key**

FREQ Channel

See "FREQ Channel" on page 1157 for more information.

Key Path	**Front-panel key**

Input/Output

See “Input/Output” on page 1165 for more information.

Key Path	**Front-panel key**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

See the "Marker Functions" section for more information

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode to **Normal**, **Delta** or **Off**. If the selected marker is Off, pressing Marker sets it to Normal and places a single marker at the center of the display. At the same time, **Marker X Axis Value** appears on the Active Function area.

Key Path	**Marker**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:MON:MARK:MODE POS CALC:MON:MARK:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker’s current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision.
Preset	OFF
State Saved	Saved in instrument state.

Range	Normal|Delta|Off
Initial S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is Normal or Delta.

Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <freq>` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:MON:MARK3:X 0 CALC:MON:MARK3:X?
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" is generated. The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** – except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`

Example	CALC:MON:MARK:X:POS 0 CALC:MON:MARK:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker's reference marker in trace points if the control mode is **Delta**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points. If the marker is **Off** the response is not a number.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command only)

Returns the marker Y Axis value in the current marker.

Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:MON:MARK11:Y?
Preset	Result dependant on markers setup and signal source
Backwards Compatibility SCPI	:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:RESult?
Initial S/W Revision	Prior to A.02.00

Properties

Accesses a menu that enables you to select the active marker, the reference marker and the trace for the current measurement.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Relative To

Selects the desired marker. The selected marker is relative to its reference marker

Key Path	**Marker, Properties**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:MON:MARK2:REF 1 CALC:MON:MARK2:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” When queried a single value is returned (the specified marker number’s relative marker).
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	**Marker, Properties**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe <integer>` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:MON:MARK:TRAC 1 CALC:MON:MARK:TRAC?
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	3

Initial S/W Revision	Prior to A.02.00

Couple Markers

When this function is true, moving any marker causes an equal X Axis movement of every other marker which is not **Off**. By "equal X Axis movement" we mean that we preserve the difference between each marker's X Axis value (in the fundamental x–axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x–axis units).

Key Path	**Marker**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:MONitor:MARKer:COUPle[:STATe]?`
Example	CALC:MON:MARK:COUP ON CALC:MON:MARK:COUP?
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers on the current measurement.

Key Path	**Marker**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer:AOFF`
Example	CALC:MON:MARK:AOFF
Initial S/W Revision	Prior to A.02.00

Marker Function

Accesses special marker functions such as marker noise, and power in a specified bandwidth or time interval.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Marker

Selects one of the 12 available markers.

Key Path	**Marker Function**
Initial S/W Revision	Prior to A.02.00

Marker Function Type

Sets the marker control function type to, Marker Noise, Band/Interval Power, Band Interval Density, or Marker Function Off.

Key Path	**Marker Function**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion NOISe|BPOWer|BDENsity|OFF` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion?`
Example	`CALC:MON:MARK:FUNC NOIS` `CALC:MON:MARK:FUNC?`
Preset	OFF
State Saved	Saved in instrument state.
Range	Marker Noise|Band/Interval Power|Band Interval Density|Marker Function Off
Initial S/W Revision	Prior to A.02.00

Band Adjust

Accesses a menu that enables you to set the frequency span width and the left and right edge, or time values, for the band or interval of the selected marker.

Key Path	**Marker Function**

Initial S/W Revision	Prior to A.02.00

Band/Interval Span for Frequency Domain

Sets the width of the frequency span for the selected marker.

Key Path	**Marker Function**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:SPAN <freq>` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:SPAN?`
Example	`CALC:MON:MARK12:FUNC:BAND:SPAN 20 MHz` CALC:MON:MARK12:FUNC:BAND:SPAN?
Couplings	Changing the Band/Interval Span necessarily changes the Band/Interval Left and Band/Interval Right values.
Preset	Depends on X axis range of selected Trace.
State Saved	Saved in instrument state.
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Band/Interval Left for Frequency Domain

Sets the left edge frequency or time value for the band of the selected marker.

Key Path	**Marker Function**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:LEFT <freq>` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:LEFT?`
Example	`CALC:MON:MARK12:FUNC:BAND:LEFT 20 GHz` CALC:MON:MARK12:FUNC:BAND:LEFT?
Couplings	Changing the Band/Interval Left necessarily changes the Band/Interval Span and Band/Interval Right values.
Preset	Depends on X axis range of selected Trace.
State Saved	Saved in instrument state.
Min	–9.9E+37

Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Band/Interval Right for Frequency Domain

Sets the right edge frequency or time value for the band of the selected marker.

Key Path	**Marker Function**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:RIGHt <freq>` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:RIGHt?`
Example	`CALC:MON:MARK12:FUNC:BAND:RIGH 20 GHz` CALC:MON:MARK12:FUNC:BAND:RIGH?
Couplings	Changing the Band/Interval Right necessarily changes the Band/Interval Left and Band/Interval Span values
Preset	Depends on X axis range of selected Trace.
State Saved	Saved in instrument state.
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

Marker To

There is no ‘Marker To’ functionality supported in Monitor Spectrum. The front-panel key displays a blank menu key when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas

See “Meas” on page 1257 for more information.

Key Path	**Front-panel key**

Meas Setup

Displays the setup menu for the current measurement. The measurement setup parameters include the number of measurement averages used to calculate the measurement result and the averaging mode. The setup menu also includes the option to reset the measurement settings to their factory defaults.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Avg/Hold Num

Specifies the number of measurement averages used when calculating the measurement result. The average is displayed at the end of each sweep.

After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

Key Path	**Meas Setup**
Mode	All except SA and BASIC

Remote Command	`[:SENSe]:MONitor:AVERage:COUNt <integer>`
	`[:SENSe]:MONitor:AVERage:COUNt?`
	`[:SENSe]:MONitor:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:MONitor:AVERage[:STATe]?`

Example	MON:AVER:COUN 25 MON:AVER:COUN? MON:AVER ON MON:AVER?
Preset	10 OFF
State Saved	Saved in instrument state.
Min	1
Max	1000
Initial S/W Revision	Prior to A.02.00

Avg Mode

Toggles the average mode between exponential (Exp) and Repeat.

Exp- continues measurement averaging, using the specified number of averages to compute each averaged value. The average is displayed at the end of each sweep.

Repeat- causes the measurement to reset the average counter each time the specified number of averages is reached.

Key Path	**Meas Setup**
Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:MONitor:AVERage:TCONtrol?`
Example	MON:AVER:TCON EXP MON:AVER:TCON?
Preset	EXPonential
State Saved	Saved in instrument state.
Range	ExpRepeat
Initial S/W Revision	Prior to A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Key Path	**Meas Setup**
Mode	All except SA and BASIC
Remote Command	`:CONFigure:MONitor`
Example	CONF:MON
Initial S/W Revision	Prior to A.02.00

Mode

See "Mode" on page 1271 for more information.

Key Path	**Front-panel key**

Mode Setup

See “Mode Setup” on page 1291 for more information.

Key Path	**Front-panel key**

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.ak Search

Key Path	**Front-panel key**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:MON:MARK2:MAX
Initial S/W Revision	Prior to A.02.00

Recall

See “Recall” on page 174 for more information.

Key Path	**Front-panel key**

Restart

See “Restart” on page 1299 for more information.

Key Path	**Front-panel key**

Save

See "Save" on page 186 for more information.

Key Path	**Front-panel key**

Single

See "Single (Single Measurement/Sweep)" on page 1305 for more information.

Key Path	**Front-panel key**

Source

See “Source” on page 1307 for more information.

Key Path	**Front-panel key**

Span X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Span

Changes the frequency range symmetrically about the center frequency.

Key Path	**Span X Scale**
Mode	All except SA, BASIC
Remote Command	`[:SENSe]:MONitor:FREQuency:SPAN <freq>` `[:SENSe]:MONitor:FREQuency:SPAN?`
Example	MON:FREQ:SPAN 1 MHz MON:FREQ:SPAN?
Couplings	Changing the span causes the resolution bandwidth to change automatically, and affects data acquisition time.
Preset	WCDMA: 10.0 MHz WIMAX OFDMA: 50.0 MHz C2K: 2.5MHz PN: 1.0 MHz GSM/EDGE: 1.0 MHz TD-SCDMA: 3.2 MHz 1xEVDO: 2.0MHz DVB-T/H: 10.0MHz DTMB (CTTB): 10.0MHz ISDB-T: 10.0MHz CMMB: 10.0MHz LTE: 50 MHz LTETDD: 50 MHz IDEN: See the table below Digital Cable TV: 10.0MHz
State Saved	Saved in instrument state.
Min	10 Hz

Max	Hardware Dependent: Option 503 = 3.7 GHz Option 507 = 7.1GHz Option 508 = 8.5 GHz Option 513 = 13.8 GHz Option 526 = 27.0 GHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00
Modified at S/W Revision	A.03.00

IDEN Mode Span Preset for Monitor Spectrum

iDEN Slot Format	WiDEN Slot Format 25kHz	WiDEN Slot Format 50kHz	WiDEN Slot Format 75kHz	WiDEN Slot Format 100kHz	WiDEN Slot Format 50kHz Out
60kHz	60kHz	85kHz	110kHz	135kHz	135kHz

Full Span

Changes the Span to show the full frequency range of the analyzer.

Key Path	**Span X Scale**
Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:FREQuency:SPAN:FULL`
Example	MON:FREQ:SPAN:FULL
Couplings	Sets the span to the full frequency range, and adjusts the center frequency accordingly.
Initial S/W Revision	Prior to A.02.00

Last Span

Changes the measurement span to the span setting of the previous measurement. If there is no existing previous span value, then the span remains unchanged.

Key Path	**Span X Scale**
Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:FREQuency:SPAN:PREVious`
Example	MON:FREQ:SPAN:PREV

Couplings	Selecting last span changes the measurement span value.
Initial S/W Revision	Prior to A.02.00

Sweep/Control

Access a menu of functions that enable you to set up and control the sweep time for the current measurement

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Sweep Time

Selects the length of time in which the spectrum analyzer sweeps the displayed frequency span. Additional overhead time is required by the analyzer. It impacts the sweep rate, but is not calculated as part of the sweep time. Reducing the sweep time increases the rate of sweeps.

Key Path	**Sweep/Control**
Mode	All except SA and BASIC

Remote Command	`[:SENSe]:MONitor:SWEep:TIME <time>`
	`[:SENSe]:MONitor:SWEep:TIME?`
	`[:SENSe]:MONitor:SWEep:TIME:AUTO OFF|ON|0|1`
	`[:SENSe]:MONitor:SWEep:TIME:AUTO?`

Example	MON:SWE:TIME 100 ms MON:SWE:TIME? MON:SWE:TIME:AUTO ON MON:SWE:TIME:AUTO?
Preset	Automatically Calculated
State Saved	Saved in instrument state.
Min	1 ms
Max	4000 s
Initial S/W Revision	Prior to A.02.00
MIN/MAX/DEF Support	Yes

Pause

Pauses a measurement after the current data acquisition is complete.
When Paused, the label on the key changes to Resume. Pressing Resume continues the measurement at the point where it had been paused.

See "Pause/Resume" on page 1321 under Sweep/Control for more information.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Gate

Accesses a menu that enables you to control the gating function .

The Gate functionality is used to view signals best viewed by qualifying them with other events.

See "Gate " on page 1322 for more details.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Points

Sets the number of points per sweep. The resolution of setting the sweep time depends on the number of points selected. If Preset is selected, the number of points per sweep defaults to 1001. The current value of points is displayed parenthetically, next to the sweep time in the lower right corner of the display.

Key Path	**Sweep/Control**
Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:SWEep:POINts <integer>` `[:SENSe]:MONitor:SWEep:POINts?`
Example	:MON:SWE:POIN 1000 :MON:SWE:POIN?
Couplings	Whenever the number of sweep points changes, the sweep time is re–quantized.
Preset	1001
State Saved	Saved in instrument state.
Range	1 to 20001
Initial S/W Revision	Prior to A.02.00

Trace/Detector

Accesses a menu that enables you to control the display, storage, detection and manipulation of trace data. Each trace is comprised of a series of data points in which X and Y axis information is stored. The analyzer updates the information for the active trace with each sweep of the current measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Trace

Allows you to select which trace you want to use for the current measurement. You can select one of three traces. Monitor Spectrum supports 3 traces, numbered 1 through 3.

Key Path	**Trace/Detector**
Mode	All except SA and BASIC
Preset	Trace 1
State Saved	The number of the selected trace is saved in Instrument State
Initial S/W Revision	Prior to A.02.00

Trace Type

Allows you to select the type of trace you want to you use for the current measurement. You can assign a trace type to one of the three available traces.

The first page of this menu contains a 1–of–N selection of the trace type (**Clear Write, Average, Max Hold, Min Hold**) for the selected trace.

Key Path	**Trace/Detector**
Mode	All except SA and BASIC
Remote Command	`:TRACe[1]|2|3:MONitor:TYPE WRITe|AVERage|MAXHold|MINHold` `:TRACe[1]|2|3:MONitor:TYPE?`
Example	TRAC:MON:TYPE WRIT TRAC:MON:TYPE?
Notes	`WRITe` = Clear Write `AVERage` = Average `MAXHold` = Maximum Hold `MINHold` = Minimum Hold

Preset	WRITe
State Saved	Saved in instrument state.
Range	WRITe|AVERage|MAXHold|MINHold for traces 1 through 3
Backwards Compatibility SCPI	:DISPlay:MONitor:VIEW:WINDow:TRACe[1]|2|3:TYPE
Initial S/W Revision	Prior to A.02.00

Update

Toggles a trace state between Update and Off. The Off selection makes the trace inactive (or a stored trace). This does not affect whether the trace is visible or not. Use the Display Show/Blank function to change the trace visibility.

Key Path	**Trace/Detector**
Mode	All except SA and BASIC
Remote Command	:TRACe[1]|2|3:MONitor:UPDate[:STATe] ON|OFF|0|1 :TRACe[1]|2|3:MONitor:UPDate[:STATe]?
Example	TRAC3:MON:UPD OFF TRAC3:MON:UPD?
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off(View)
Initial S/W Revision	Prior to A.02.00

Display

Controls the visibility of a trace. In **Blank**, traces do not display nor appear on printouts but are otherwise unaffected. They may be queried and markers may be placed on them

Key Path	**Trace/Detector**
Mode	All except SA and BASIC
Remote Command	:TRACe[1]|2|3:MONitor:DISPlay[:STATe] ON|OFF|0|1 :TRACe[1]|2|3:MONitor:DISPlay[:STATe]?
Example	TRAC:MON:DISP ON TRAC:MON:DISP?
Preset	ON|OFF|OFF
State Saved	Saved in instrument state.
Range	Show|Blank

Initial S/W Revision	Prior to A.02.00

Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement. The following choices are available:

Auto — the detector selected depends on marker functions, trace functions, average type, and the trace averaging function.

- Normal — the detector determines the peak of the CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.
- Average — the detector determines the average of the signal within the sweep points. The averaging method depends upon the Average Type selection (voltage, power or log scales).
- Peak — the detector determines the maximum of the signal within the sweep points.
- Sample — the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- Negative Peak — the detector determines the minimum of the signal within the sweep points.

In swept analysis, the time interval of the data collection for the display sweep points also represents a frequency interval. In FFT analysis, the sweep points represent just a frequency interval. The detector determines the relationship between the spectrum computed by the FFT and the single data point displayed for the sweep points.

Key Path	**Trace/Detector**
Mode	All except SA and BASIC

Remote Command	`[:SENSe]:MONitor:DETector:TRACe AVERage|NEGative|NORMal|POSitive|SAMPle`
	
	`[:SENSe]:MONitor:DETector:TRACe?`

Example	MON:DET:TRAC NORM MON:DET:TRAC?
Notes	The query returns a name that corresponds to the detector type as shown below. String Returned - Definition • NORM - Normal • AVER - Average • POS - Peak • SAMP - Sample • NEG – Negative Peak
Couplings	When the Detector choice is Auto, the detector selected depends on average type.

Preset	NORMal
State Saved	Saved in instrument state.
Range	Normal|Average(RMS)|Peak|Sample|Negative Peak
Backwards Compatibility SCPI	[:SENSe]:MONitor:DETector[:FUNCtion]
Initial S/W Revision	Prior to A.02.00

Auto

Sets the detector for the currently selected trace to Auto. When the detector choice is Auto, the analyzer selects the detector. The selected detector depends on marker functions, trace functions, and trace averaging functions for the current measurement.

Key Path	**Trace/Detector** **Trace/Detector, Detector**
Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:DETector:AUTO ON|OFF|1|0` `[:SENSe]:MONitor:DETector:AUTO?`
Example	MON:DET:AUTO OFF MON:DET:AUTO?
Couplings	When the Detector choice is Auto, the detector selected depends on average state and trace type.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto|Man
Initial S/W Revision	Prior to A.02.00

Clear Trace

Clears the selected trace from the display.

Key Path	**Trace/Detector**
Mode	All except SA and BASIC
Remote Command	`:TRACe:MONitor:CLEar [TRACE1]|TRACE2|TRACE3`
Example	TRAC:MON:CLE
Initial S/W Revision	Prior to A.02.00

Mode	All except SA and BASIC

Remote Command	`:DISPlay:MONitor:VIEW:WINDow:TRACe[1]|2|3:CLEar`
Example	DISP:MON:VIEW:WIND:TRAC:CLE
Initial S/W Revision	Prior to A.02.00

Clear All Traces

Clears all traces from the display.

Key Path	**Trace/Detector**
Mode	All except SA and BASIC
Remote Command	`:TRACe:MONitor:CLEar:ALL`
Example	TRAC:MON:CLE:ALL
Backwards Compatibility SCPI	:DISPlay:MONitor:VIEW:WINDow:TRACe:CLEar:ALL
Initial S/W Revision	Prior to A.02.00

Trigger

Accesses a menu of functions that enable you to select and control the trigger source for the current measurement.

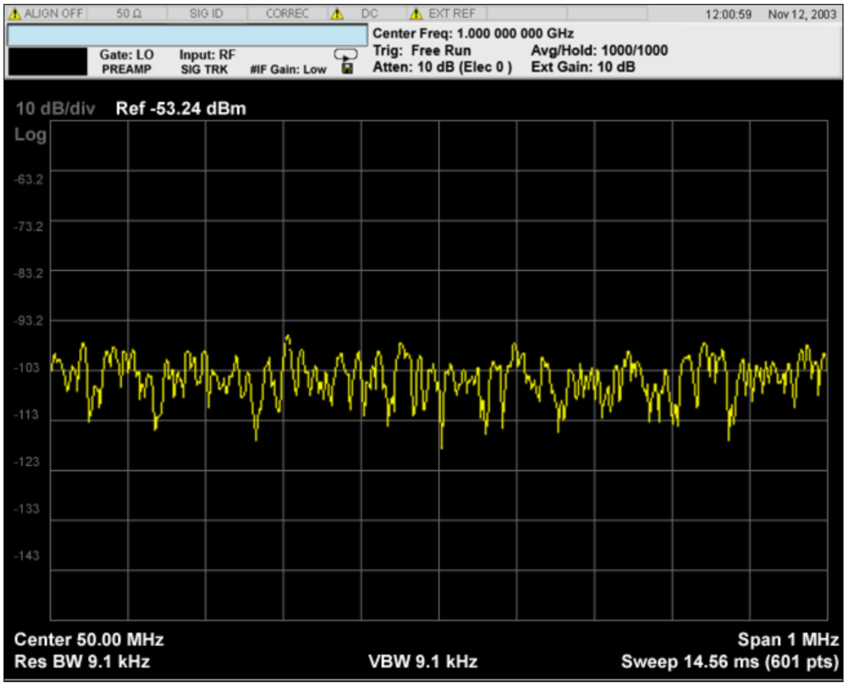
See "Trigger" on page 1339 for more information.

Key Path	**Front-panel key**

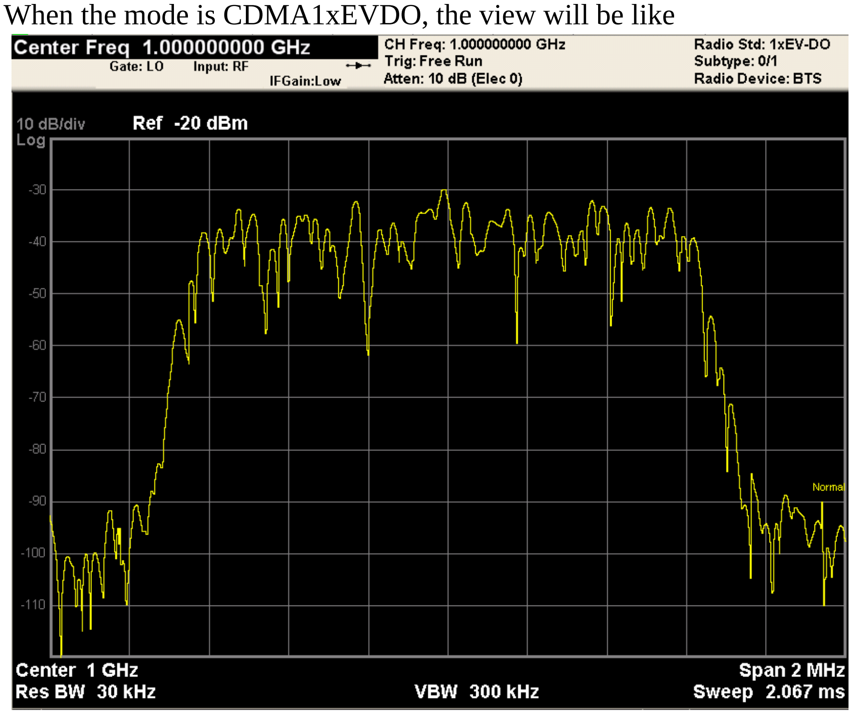
View/Display

Accesses a menu of functions that enable you to control certain functions related to the display of the analyzer.

There is a single trace view for this measurement.



When the mode is CDMA1xEVDO, the view will be like



The measurement has no results, but has a number of features that make it flexible and simple to use.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters.

See "Display" on page 1385 for more information.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

16 Waveform Measurement

The waveform measurement is a generic measurement for viewing the input signal waveforms in the time domain. This measurement represents how the instrument performs the zero span functionality found in traditional spectrum analyzers. For more details, see ""Waveform Measurement Description" on page 1050" below.

This topic contains the following sections:

Measurement Commands for Waveform

The general functionality of CONFigure, INITiate, FETCh, MEASure, and READ are described at this section.

```
:CONFigure:WAVeform
```

```
:CONFigure:WAVeform:NDEFault
```

```
:INITiate:WAVeform
```

```
:FETCh:WAVeform[n]
```

```
:MEASure:WAVeform[n]
```

```
:READ:WAVeform[n]
```

For more measurement related commands, see the SENSe subsystem, and the section "Remote Measurement Functions" on page 1257.

Remote Command Results for the Waveform Measurement

The following table denotes the returned results from the FETCh|MEASure|READ commands:

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of trace point values, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

n	Results Returned
1	Returns the following scalar results: 1. Sample Time is a floating point number representing the time between samples when using the trace queries (n=0, 2, and so forth). 2. Mean Power is the mean power (in dBm). This is the power across the entire trace. If averaging is on, the power is for the latest acquisition. 3. Mean Power Averaged is the power (in dBm) for N averages, if averaging is on. This is the power across the entire trace. If averaging is on, the power is for the latest acquisition. If averaging is off, the value of the mean power averaged is the same as the value of the mean power. 4. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0, 2, etc.). 5. Peak-to-mean ratio has units of dB. This is the ratio of the maximum signal level to the mean power. Valid values are only obtained with averaging turned off. If averaging is on, the peak-to-mean ratio is calculated using the highest peak value, rather than the displayed average peak value. 6. Maximum value is the maximum of the most recently acquired data (in dBm). 7. Minimum value is the minimum of the most recently acquired data (in dBm).
2	Returns trace point values of the entire captured signal envelope trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

Waveform Measurement Description

Also available under the basic Waveform measurement is an I/Q window, which shows the I and Q signal waveforms in parameters of voltage versus time to disclose the voltages that comprise the complex modulated waveform of a digital signal.

The waveform measurement can also be used to perform general purpose power measurements to a high degree of accuracy.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Ref Value

Sets the absolute power reference value. However, since Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Ref Value (RF Envelope View)

Sets the Y Scale reference value (in dBm) when the RF Envelope View is active. By default, the measurement determines the reference value with Auto Scaling. Entering a reference value manually turns Auto Scaling off.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <ampl>` `:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:WAV:VIEW:WIND:TRAC:Y:RLEV –50 dBm DISP:WAV:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10.00 dBm
State Saved	Saved in instrument state.
Range	–250.00 dBm to 250.00 dBm
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Ref Value (I/Q Waveform View)

Sets the Y Scale reference value (in volts) when the I/Q Waveform View is active. By default, the measurement determines the reference value with Auto Scaling. Entering a reference value manually turns Auto Scaling off.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <voltage>` `:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:WAV:VIEW2:WIND:TRAC:Y:RLEV 25 V DISP:WAV:VIEW2:WIND:TRAC:Y:RLEV?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	0 V
State Saved	Saved in instrument state.
Min	–250 V
Max	250 V
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings. This key has a readback text that describes total attenuator value

This is only available when the selected input is RF.

For more information on this key, see “Attenuation” on page 1120 .

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Range

Accesses a menu that enables you to change the baseband I/Q gain settings. This key has a readback text that describes gain range value. For more information, refer to "AMPTD Y Scale" on page 1119.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Scale/Div

Sets the units per division of vertical scale in the logarithmic display. However, since Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Scale/Div (RF Envelope View)

Sets the scale per division for the RF Envelope result waveform (time domain) measurements in the graph window.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:WAV:VIEW:WIND:TRAC:Y:PDIV 5 DISP:WAV:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10.00 dB
State Saved	Saved in instrument state.
Range	0.10 dB to 20.00 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Scale/Div (I/Q Waveform View)

Sets the scale per division for the I/Q signal waveform graph.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <voltage>` `:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:WAV:VIEW2:WIND:TRAC:Y:PDIV 25mV DISP:WAV:VIEW2:WIND:TRAC:Y:PDIV?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Preset	100.0 mV
State Saved	Saved in instrument state.
Min	1.0 nV
Max	20 V
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the center frequency. This key does not appear in model numbers that do not contain an internal preselector (such as option 503 or all versions of the N9000A). Attempts to set via SCPI will be accepted without error. Queries will always return 0.

See “Presel Center” on page 1136 for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

This key does not appear in model numbers which do not contain an internal preselector (such as option 503 or all versions of the N9000A). Attempts to set via SCPI will be accepted without error. Queries will always return 0.

See “Preselector Adjust” on page 1137 for more information.

This key is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Internal Preamp

Accesses keys that control the internal preamps. Turning on the preamp gives a better noise figure, but a reduced TOI to noise floor dynamic range. You can optimize this setting for your particular measurement. The Low Band selection needs to show "(3.0 GHz)" for all versions of N9000A and "(3.6 GHz)" for the other models.

For more information, see “Internal Preamp” on page 1149.

This key is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Initial S/W Revision	Prior to A.02.00

Ref Position

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

Ref Position (RF Envelope View)

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:WAV:VIEW:WIND:TRAC:Y:RPOS CENT DISP:WAV:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Ref Position (I/Q Waveform View)

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:WAV:VIEW2:WIND:TRAC:Y:RPOS CENT DISP:WAV:VIEW2:WIND:TRAC:Y:RPOS?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	CENT
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Auto Scaling

Toggles the Auto Scaling function between On and Off. When the **Restart** front-panel key is pressed, this function automatically determines the scale per division and reference values based on the measurement results.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:WAV:VIEW:WIND:TRAC:Y:COUP OFF DISP:WAV:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically switches the scale per division and reference values into the defaults. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Auto Couple

For details on this key, see "Auto Couple" on page 1153.

Key Path	**Front-panel key**

BW

Accesses a menu that enables you to control the information bandwidth functions of the instrument. You can also select the filter type for the measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Digital IF BW

Enables you to set the Digital IF (formerly Info BW) bandwidth of the instrument.

Key Path	**BW**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:WAVeform:DIF:BANDwidth <freq>` `[:SENSe]:WAVeform:DIF:BANDwidth?`
Example	WAV:DIF:BAND 1kHz WAV:DIF:BAND?
Notes	Max value depends on the IF Path Selection
Remote Command Notes	You must be in a mode that includes the Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Dependencies	For applications that have the IF Path Selection menu such as the BASIC mode, if IF Path Auto is OFF, the maximum value depends on which IF Path is currently selected. If 10 MHz, 25 MHz, 40 MHz, or 140 MHz paths are selected, the maximum value of this parameter will be 10, 25, 40, or 140 MHz, respectively. If IF Path Auto is ON, the maximum value will be the maximum Digital IF BW available in the instrument regardless of the current IF Path Selection. For example, if the instrument had the options B25, B40, and B1X installed, the maximum available Digital IF BW of the instrument is 140 MHz. Thus, if IF Path Auto is ON and IF Path Selection is 25 MHz, the maximum Digital IF BW is not limited to 25 MHz but is 140 MHz.

Preset	All except the following list: 100 kHz Basic: 1 MHz GSM/EDGE: 510 kHz TDSCDMA: 1.3 MHZ 1xEVDO: 1.3 MHz DVB-T/H: 8.0 MHz DTMB (CTTB): 8.0 MHz ISDB-T: 6.0 MHz CMMB: 8.0 MHz Digital Cable TV: 8 MHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	Hardware Dependent: RF Input: No Option = 10 MHz Option B25 = 25 MHz Option B40 = 40 MHz Option B1X = 140 MHz I/Q Input: No Option = 10 MHz per channel (20 MHz for I+jQ) Option B25 = 25 MHz per channel (50 MHz for I+jQ) Option S40 = 40 MHz per channel (80 MHz for I+jQ)
Backwards Compatibility SCPI	`[:SENSe]:WAVeform:BANDwidth[:RESolution]` [:SENSe]:WAVeform:BWIDth[:RESolution]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Filter Type

Selects the type of bandwidth filter that is used.

Besides the Gaussian filter shape, a variety of other filter types are available with variable alpha settings for maximum control over the filter shape..

Key Path	**BW**

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:WAVeform:DIF:FILTer:TYPE GAUSsian|FLATtop`
	`[:SENSe]:WAVeform:DIF:FILTer:TYPE?`
	(With DIF40 and/or WBDIF)
	`[:SENSe]:WAVeform:DIF:FILTer:TYPE GAUSsian|FLATtop|SNYQuist|RSNYquist|RCOSine|RRCosine`
	`[:SENSe]:WAVeform:DIF:FILTer:TYPE?`

Example	WAV:DIF:FILT:TYPE GAUS WAV:DIF:FILT:TYPE?
Remote Command Notes	You must be in a mode that includes the Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Dependencies	Gaussian and Flattop are available in all DIF configurations. For the other filter types, the filters are only available with PXA or when Option B40 is installed.
Preset	BASIC with B40 or B1X: FLATtop All other apps: GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian|FlatTop (With Digital IF and/or Option B40 or B1X) Gaussian|Flattop|Short nyquist|Root Short Nquist|Raised Cosine|Root RaisedCosine
Backwards Compatibility SCPI	[:SENSe]:WAVeform:BANDwidth:SHAPe [:SENSe]:WAVeform:BWIDth:SHAPe [:SENSe]:WAVeform:BANDwidth|BWIDth[:RESolution]:TYPE
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Filter Type Bwcc

This parameter is strictly for Bwcc purposes.

Remote Command	`[:SENSe]:WAVeform:WBIF:FILTer[:TYPE] GAUSsian|NONE|NYQuist|RNYQuist|RCOSine|RRCosine` `[:SENSe]:WAVeform:WBIF:FILTer[:TYPE]?`
Preset	BASIC with B40 or B1X : FLATtop All other apps: GAUSsian

Gaussian

With a PXA or Option B40, the capability for arbitrary Digital IF bandwidths is available. However, for instruments without the Digital IF or the Option B40 or B1X , the selectable Gaussian filter bandwidths are predetermined in the following list. There are 160 Info BWs (RBWs). They are arranged in a 24-per-decade sequence from 1 Hz through 3 MHz, plus the 4, 5, 6 and 8 MHz settings.

The table in the section “Gaussian filters” on page 1062 lists all 160 Gaussian filter types.

Gaussian filters

Normal (–3 dB)	–6 dB	Noise	Impulse
1.0 Hz	1.41 Hz	1.06 Hz	1.49 Hz
1.1 Hz	1.55 Hz	1.16 Hz	1.63 Hz
1.2 Hz	1.69 Hz	1.27 Hz	1.77 Hz
1.3 Hz	1.83 Hz	1.37 Hz	1.92 Hz
1.5 Hz	2.11 Hz	1.59 Hz	2.22 Hz
1.6 Hz	2.25 Hz	1.69 Hz	2.37 Hz
1.8 Hz	2.53 Hz	1.90 Hz	2.66 Hz
2.0 Hz	2.81 Hz	2.12 Hz	2.96 Hz
2.2 Hz	3.09 Hz	2.33 Hz	3.25 Hz
2.4 Hz	3.38 Hz	2.54 Hz	3.55 Hz
2.7 Hz	3.80 Hz	2.86 Hz	3.99 Hz
3.0 Hz	4.22 Hz	3.17 Hz	4.44 Hz
3.3 Hz	4.64 Hz	3.49 Hz	4.88 Hz
3.6 Hz	5.06 Hz	3.81 Hz	5.32 Hz
3.9 Hz	5.49 Hz	4.12 Hz	5.77 Hz
4.3 Hz	6.05 Hz	4.55 Hz	6.36 Hz
4.7 Hz	6.61 Hz	4.97 Hz	6.95 Hz
5.1 Hz	7.17 Hz	5.39 Hz	7.54 Hz
5.6 Hz	7.87 Hz	5.92 Hz	8.27 Hz
6.2 Hz	8.72 Hz	6.56 Hz	9.17 Hz
6.8 Hz	9.55 Hz	7.18 Hz	10.0 Hz
7.5 Hz	10.5 Hz	7.93 Hz	11.1 Hz
8.2 Hz	11.5 Hz	8.66 Hz	12.1 Hz

Normal (–3 dB)	**–6 dB**	**Noise**	**Impulse**
9.1 Hz	12.8 Hz	9.64 Hz	13.5 Hz
10 Hz	14.0 Hz	10.6 Hz	14.8 Hz
11 Hz	15.4 Hz	11.6 Hz	16.2 Hz
12 Hz	16.9 Hz	12.7 Hz	17.7 Hz
13 Hz	18.3 Hz	13.7 Hz	19.2 Hz
15 Hz	21.1 Hz	15.9 Hz	22.2 Hz
16 Hz	22.5 Hz	16.9 Hz	23.7 Hz
18 Hz	25.3 Hz	19.1 Hz	26.6 Hz
20 Hz	28.1 Hz	21.1 Hz	29.5 Hz
22 Hz	30.9 Hz	23.2 Hz	32.5 Hz
24 Hz	33.8 Hz	25.4 Hz	35.5 Hz
27 Hz	38.0 Hz	28.6 Hz	40.0 Hz
30 Hz	42.3 Hz	31.8 Hz	44.5 Hz
33 Hz	46.3 Hz	34.8 Hz	48.7 Hz
36 Hz	50.7 Hz	38.1 Hz	53.3 Hz
39 Hz	54.9 Hz	41.3 Hz	57.7 Hz
43 Hz	60.5 Hz	45.5 Hz	63.6 Hz
47 Hz	66.1 Hz	49.7 Hz	69.5 Hz
51 Hz	71.7 Hz	53.9 Hz	75.3 Hz
56 Hz	78.9 Hz	59.3 Hz	83.0 Hz
62 Hz	87.3 Hz	65.6 Hz	91.7 Hz
68 Hz	95.5 Hz	71.8 Hz	100 Hz
75 Hz	106 Hz	79.4 Hz	111 Hz
82 Hz	115 Hz	86.8 Hz	121 Hz
91 Hz	128 Hz	96.4 Hz	135 Hz
100 Hz	141 Hz	106 Hz	148 Hz
110 Hz	154 Hz	116 Hz	162 Hz
120 Hz	169 Hz	127 Hz	178 Hz
130 Hz	183 Hz	137 Hz	192 Hz
150 Hz	211 Hz	159 Hz	222 Hz

Normal (–3 dB)	**–6 dB**	**Noise**	**Impulse**
160 Hz	225 Hz	169 Hz	237 Hz
180 Hz	253 Hz	190 Hz	266 Hz
200 Hz	281 Hz	211 Hz	295 Hz
220 Hz	309 Hz	232 Hz	325 Hz
240 Hz	337 Hz	254 Hz	355 Hz
270 Hz	380 Hz	286 Hz	400 Hz
300 Hz	422 Hz	317 Hz	444 Hz
330 Hz	463 Hz	348 Hz	487 Hz
360 Hz	507 Hz	381 Hz	533 Hz
390 Hz	550 Hz	413 Hz	578 Hz
430 Hz	605 Hz	455 Hz	636 Hz
470 Hz	662 Hz	498 Hz	696 Hz
510 Hz	718 Hz	540 Hz	755 Hz
560 Hz	789 Hz	593 Hz	829 Hz
620 Hz	872 Hz	655 Hz	916 Hz
680 Hz	958 Hz	720 Hz	1.01 kHz
750 Hz	1.06 kHz	794 Hz	1.11 kHz
820 Hz	1.15 kHz	866 Hz	1.21 kHz
910 Hz	1.28 kHz	964 Hz	1.35 kHz
1.0 kHz	1.41 kHz	1.06 kHz	1.48 kHz
1.1 kHz	1.55 kHz	1.17 kHz	1.63 kHz
1.2 kHz	1.69 kHz	1.27 kHz	1.78 kHz
1.3 kHz	1.83 kHz	1.38 kHz	1.93 kHz
1.5 kHz	2.11 kHz	1.59 kHz	2.22 kHz
1.6 kHz	2.26 kHz	1.70 kHz	2.37 kHz
1.8 kHz	2.54 kHz	1.91 kHz	2.67 kHz
2.0 kHz	2.82 kHz	2.12 kHz	2.96 kHz
2.2 kHz	3.10 kHz	2.33 kHz	3.26 kHz
2.4 kHz	3.38 kHz	2.54 kHz	3.56 kHz
2.7 kHz	3.80 kHz	2.86 kHz	4.00 kHz

Normal (–3 dB)	**–6 dB**	**Noise**	**Impulse**
3.0 kHz	4.23 kHz	3.18 kHz	4.44 kHz
3.3 kHz	4.65 kHz	3.49 kHz	4.89 kHz
3.6 kHz	5.06 kHz	3.81 kHz	5.32 kHz
3.9 kHz	5.48 kHz	4.12 kHz	5.76 kHz
4.3 kHz	6.07 kHz	4.56 kHz	6.38 kHz
4.7 kHz	6.62 kHz	4.98 kHz	6.96 kHz
5.1 kHz	7.16 kHz	5.38 kHz	7.53 kHz
5.6 kHz	7.87 kHz	5.92 kHz	8.27 kHz
6.2 kHz	8.74 kHz	6.57 kHz	9.18 kHz
6.8 kHz	9.58 kHz	7.20 kHz	10.1 kHz
7.5 kHz	10.5 kHz	7.92 kHz	11.1 kHz
8.2 kHz	11.5 kHz	8.66 kHz	12.1 kHz
9.1 kHz	12.8 kHz	9.64 kHz	13.5 kHz
10 kHz	14.1 kHz	10.6 kHz	14.8 kHz
11 kHz	15.4 kHz	11.6 kHz	16.2 kHz
12 kHz	16.9 kHz	12.7 kHz	17.8 kHz
13 kHz	18.3 kHz	13.7 kHz	19.2 kHz
15 kHz	21.2 kHz	15.9 kHz	22.3 kHz
16 kHz	22.4 kHz	16.8 kHz	23.5 kHz
18 kHz	25.2 kHz	19.0 kHz	26.5 kHz
20 kHz	28.4 kHz	21.3 kHz	29.8 kHz
22 kHz	31.2 kHz	23.4 kHz	32.8 kHz
24 kHz	33.8 kHz	25.4 kHz	35.6 kHz
27 kHz	38.1 kHz	28.7 kHz	40.1 kHz
30 kHz	42.1 kHz	31.7 kHz	44.3 kHz
33 kHz	46.8 kHz	35.2 kHz	49.2 kHz
36 kHz	50.1 kHz	37.7 kHz	52.7 kHz
39 kHz	54.8 kHz	41.2 kHz	57.6 kHz
43 kHz	61.1 kHz	46.0 kHz	64.3 kHz
47 kHz	66.2 kHz	49.8 kHz	69.6 kHz

Normal (–3 dB)	–6 dB	Noise	Impulse
51 kHz	72.3 kHz	54.3 kHz	76.0 kHz
56 kHz	79.5 kHz	59.8 kHz	83.6 kHz
62 kHz	86.3 kHz	64.9 kHz	90.8 kHz
68 kHz	96.5 kHz	72.6 kHz	101 kHz
75 kHz	106 kHz	79.7 kHz	111 kHz
82 kHz	114 kHz	86.0 kHz	120 kHz
91 kHz	129 kHz	97.3 kHz	136 kHz
100 kHz	140 kHz	105 kHz	147 kHz
110 kHz	154 kHz	116 kHz	162 kHz
120 kHz	169 kHz	127 kHz	178 kHz
130 kHz	182 kHz	137 kHz	192 kHz
150 kHz	210 kHz	158 kHz	221 kHz
160 kHz	223 kHz	168 kHz	235 kHz
180 kHz	253 kHz	190 kHz	266 kHz
200 kHz	280 kHz	211 kHz	295 kHz
220 kHz	308 kHz	232 kHz	324 kHz
240 kHz	336 kHz	253 kHz	353 kHz
270 kHz	380 kHz	286 kHz	400 kHz
300 kHz	420 kHz	316 kHz	441 kHz
330 kHz	467 kHz	352 kHz	491 kHz
360 kHz	506 kHz	380 kHz	532 kHz
390 kHz	550 kHz	414 kHz	578 kHz
430 kHz	599 kHz	451 kHz	629 kHz
470 kHz	660 kHz	497 kHz	693 kHz
510 kHz	715 kHz	538 kHz	750 kHz
560 kHz	786 kHz	592 kHz	826 kHz
620 kHz	867 kHz	653 kHz	912 kHz
680 kHz	952 kHz	717 kHz	1.00 MHz
750 kHz	1.05 MHz	791 kHz	1.10 MHz
820 kHz	1.14 MHz	859 kHz	1.19 MHz

Normal (–3 dB)	–6 dB	Noise	Impulse
910 kHz	1.27 MHz	960 kHz	1.34 MHz
1.0 MHz	1.40 MHz	1.06 MHz	1.47 MHz
1.1 MHz	1.53 MHz	1.15 MHz	1.61 MHz
1.2 MHz	1.66 MHz	1.26 MHz	1.75 MHz
1.3 MHz	1.80 MHz	1.36 MHz	1.89 MHz
1.5 MHz	2.06 MHz	1.56 MHz	2.17 MHz
1.6 MHz	2.19 MHz	1.66 MHz	2.29 MHz
1.8 MHz	2.51 MHz	1.91 MHz	2.63 MHz
2.0 MHz	2.75 MHz	2.10 MHz	2.88 MHz
2.2 MHz	3.00 MHz	2.30 MHz	3.14 MHz
2.4 MHz	3.30 MHz	2.54 MHz	3.45 MHz
2.7 MHz	3.63 MHz	2.81 MHz	3.78 MHz
3.0 MHz	4.09 MHz	3.18 MHz	4.22 MHz
4 MHz	5.30 MHz	4.23 MHz	5.30 MHz
5 MHz	5.78 MHz	4.81 MHz	5.41 MHz
6 MHz	6.31 MHz	5.50 MHz	5.82 MHz
8 MHz	8.07 MHz	7.21 MHz	6.90 MHz

Flattop

With a PXA or Option B40, the capability for arbitrary Digital IF bandwidths is available. However, for instruments without the Digital IF or the Option B40 or B1X , the selectable Flattop filter bandwidths are predefined in the following table. There are 134 Digital IF BWs (RBWs).

The table in the section “Flattop Filters” on page 1068 lists all 134 Flattop filter types.

Flattop Filters

3.0 Hz	3.3 Hz	3.6 Hz	3.9 Hz
4.3 Hz	4.7 Hz	5.1 Hz	5.6 Hz
6.2 Hz	6.8 Hz	7.5 Hz	8.2 Hz
9.1 Hz	10 Hz	11 Hz	12 Hz
13 Hz	15 Hz	16 Hz	18 Hz
20 Hz	22 Hz	24 Hz	27 Hz
30 Hz	33 Hz	36 Hz	39 Hz
43 Hz	47 Hz	51 Hz	56 Hz
62 Hz	68 Hz	75 Hz	82 Hz
91 Hz	100 Hz	110 Hz	120 Hz
130 Hz	150 Hz	160 Hz	180 Hz
200 Hz	220 Hz	240 Hz	270 Hz
300 Hz	330 Hz	360 Hz	390 Hz
430 Hz	470 Hz	510 Hz	560 Hz
620 Hz	680 Hz	750 Hz	820 Hz
910 Hz	1.0 kHz	1.1 kHz	1.2 kHz
1.3 kHz	1.5 kHz	1.6 kHz	1.8 kHz
2.0 kHz	2.2 kHz	2.4 kHz	2.7 kHz
3.0 kHz	3.3 kHz	3.6 kHz	3.9 kHz
4.3 kHz	4.7 kHz	5.1 kHz	5.6 kHz
6.2 kHz	6.8 kHz	7.5 kHz	8.2 kHz
9.1 kHz	10 kHz	11 kHz	12 kHz
13 kHz	15 kHz	16 kHz	18 kHz
20 kHz	22 kHz	24 kHz	27 kHz
30 kHz	33 kHz	36 kHz	39 kHz
43 kHz	47 kHz	51 kHz	56 kHz
62 kHz	68 kHz	75 kHz	82 kHz
91 kHz	100 kHz	110 kHz	120 kHz
130 kHz	150 kHz	160 kHz	180 kHz
200 kHz	220 kHz	240 kHz	270 kHz

300 kHz	330 kHz	390 kHz	430 kHz
510 kHz	620 kHz	750 kHz	1.0 MHz
1.5 MHz	3.0 MHz	4 MHz	5 MHz
6 MHz	8 MHz		

Filter BW

This feature is only available with PXA or when Option B40 is installed.

Key Path	**BW**
Mode	BASIC

Remote Command	`[:SENSe]:WAVeform:DIF:FILTer:BANDwidth <freq>`
	`[:SENSe]:WAVeform:DIF:FILTer:BANDwidth?`
	`[:SENSe]:WAVeform:DIF:FILTer:BANDwidth:AUTO ON|OFF|1|0`
	`[:SENSe]:WAVeform:DIF:FILTer:BANDwidth:AUTO?`

Example	WAV:DIF:FILT:BAND 1MHz WAV:DIF:FILT:BAND? WAV:DIF:FILT:BAND:AUTO 0 WAV:DIF:FILT:BAND:AUTO?
Notes	You must be in the IQ Analyzer (Basic) mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies	This feature is only available with PXA or when Option B40 is installed.
Couplings	Sets the same value as the current Digital IF BW value upon a preset or when Channel Filter Bandwidth Auto is ON.
Preset	Same value as Digital IF BW ON
State Saved	Saved in instrument state.
Min	10 Hz
Max	Clipped to the current Digital IF BW value.
Initial S/W Revision	A.04.00

Channel Filter Bandwidth Bwcc (Remote Command Only)

This is the backward compatibility command for Channel Filter Bandwidth.

Mode	BASIC

Remote Command	`[:SENSe]:WAVeform:WBIF:FILTer:BANDwidth <real>` `[:SENSe]:WAVeform:WBIF:FILTer:BANDwidth?`
Example	WAV:WBIF:FILT:BAND 0.3 WAV:WBIF:FILT:BAND?
Notes	You must be in the IQ Analyzer (Basic) mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies	This feature is only available with PXA or when Option B40 is installed.
Couplings	The value is determined by the following equation. ChannelFilterBwBwcc = (ChannelFilterBw/(DigitalIFBw*OverSampleRatio))
Preset	0.8
State Saved	Saved in instrument state.
Min	0.01
Max	1.0
Initial S/W Revision	A.04.00

Filter Alpha

Sets the filter alpha for the DIF filter. This feature is only available with PXA or when Option B40 is installed.

Key Path	**BW**
Mode	BASIC
Remote Command	`[:SENSe]:WAVeform:DIF:FILTer:ALPHa <real>` `[:SENSe]:WAVeform:DIF:FILTer:ALPHa?`
Example	WAV:DIF:FILT:ALPH 0.5 WAV:DIF:FILT:ALPH?
Notes	You must be in the IQ Analyzer (Basic) mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies	This feature is only available with PXA or when Option B40 is installed.
Preset	0.2
State Saved	Saved in instrument state.
Min	0.01
Max	1.00
Backwards Compatibility SCPI	[:SENSe]:WAVeform:WBIF:FILTer:ALPHa

Cont

For details on this key, see "Cont (Continuous Measurement/Sweep)" on page 1155.

Key Path	**Front-panel key**

FREQ Channel

For details on this key, see "FREQ Channel" on page 1157.

Key Path	**Front-panel key**

Input/Output

For details on this key, see "Input/Output" on page 1165.

Key Path	**Front-panel key**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Marker Type

Sets the marker control mode to **Normal**, **Delta**, **Fixed** or **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, the Marker X Axis Value appears on the Active Function area.

The default active function is the active function for the currently selected marker control mode. If the current control mode is Off, there is no active function and the active function is turned off.

Key Path	**Marker**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:WAV:MARK:MODE OFF CALC:WAV:MARK:MODE?

Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker’s current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision. You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <time>`
	
	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`

Example	CALC:WAV:MARK:X 50 ms CALC:WAV:MARK:X?
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. If the specified marker is Fixed and a Marker Function is on, error –221 “Settings conflict; cannot adjust Fixed marker while Marker Function is on” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number. You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.

Preset	0
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta**. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:WAV:MARK:X:POS 500 CALC:WAV:MARK:X:POS?
Notes	The query returns the marker’s absolute X Axis value in trace points if the control mode is **Normal** or the offset from the marker’s reference marker in trace points if the control mode is **Delta**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points. You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	0
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker Y Axis Value (Remote Command Only)

Queries the marker Y Axis value in the current marker Y Axis unit.

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:WAV:MARK11:Y?
Notes	When the marker is on, IQ waveform returns I and Q values. Case #1 - Trace RF, I or Q: returns a single double value. >:CALC:WAV:MARK1:Y? –2.402406506109E+001 Case #2 - Trace IQ: returns a double array of two values, the first is I, and the second is Q. >:CALC:WAV:MARK1:Y? –3.006944493834E–003,+9.9870666467354E–004 The IQ selection is for backward compatibility purposes. It is recommended that the users use the I and/or Q selection instead. You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	Result dependant on the marker setup and signal source.
State Saved	No
Backwards Compatibility SCPI	:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:RESult?
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Properties

Accesses the marker properties menu.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**

Initial S/W Revision	Prior to A.02.00

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Key Path	**Marker, Properties**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:WAV:MARK:REF 8 CALC:WAV:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” When queried a single value is returned (the specified marker numbers relative marker). You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	**Marker**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFENvelope|I|Q|IQ` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:WAV:MARK:TRAC RFEN CALC:WAV:MARK:TRAC?
Notes	Assigns the specified marker to the designated trace. The IQ selection is for backward compatibility purposes. It is recommended that the users use the I and/or Q selection instead. You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	RFEN
State Saved	Saved in instrument state.
Range	RF Envelope | I | Q | IQ
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Couple Markers

Toggles the state of the markers to be coupled On or Off. When this function is true (On), moving any marker causes an equal X-axis movement of every other marker which is not **Off**. “Equal X-axis movement” refers to the difference between each marker’s X-Axis value (in the fundamental x-axis units of the trace that marker is on) and the X-Axis value of the marker being moved (in the same fundamental x-axis units) are preserved.

Key Path	**Marker**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:WAVeform:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:WAVeform:MARKer:COUPle[:STATe]?`
Example	CALC:WAV:MARK:COUP ON CALC:WAV:MARK:COUP ON
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

All Markers Off

Turns off all markers.

Key Path	**Marker**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:WAVeform:MARKer:AOFF`
Example	CALC:WAV:MARK:AOFF
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Backward Compatibility SCPI Commands

Sets or queries the state of a marker. Setting a marker which is OFF to state ON or 1 puts it in Normal mode and places it at the center of the screen.

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:STATe OFF|ON|0|1` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:STATe?`
Example	CALC:WAV:MARK:STAT ON CALC:WAV:MARK:STAT?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker Function

Accesses a menu of marker functions that perform post-processing operations on markers based on the measurement specifications. Marker functions are distinct from measurement functions, which automatically perform complex sequences of setup, data acquisition, and display operations in order to measure specified signal characteristics. Marker Functions are specified for each individual marker and may be turned on individually for each marker.

The **Marker Function** menu controls which marker functions are turned on and allows you to adjust the setup parameters for each function. These parameters include the following, but only one parameter can be assigned to a given marker:

- Marker Noise
- Band/Interval Power
- Band/Interval Density
- Marker Function Off

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**
Initial S/W Revision	Prior to A.02.00

Marker Function Type

Sets the marker control function type to, Marker Noise, Band/Interval Power, Band Interval Density, or Marker Function Off

Key Path	**Marker Function**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion BPOWer|BDENsity|OFF` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion?`
Example	`CALC:WAV:MARK:FUNC BPOW` CALC:WAV:MARK:FUNC?

Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Band/Interval Power|Band Interval Density|Marker Function Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Band Adjust

Accesses a menu that enables you to set the frequency span width and the left and right edge, or time values, for the band or interval of the selected marker.

Key Path	**Marker Function**
Initial S/W Revision	Prior to A.02.00

Band/Interval Span for Time Domain

Sets the width of the frequency span for the selected marker.

Key Path	**Marker Function**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:SPAN <time>` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:SPAN?`
Example	CALC:WAV:MARK:FUNC:BAND:SPAN 20 ms CALC:WAV:MARK:FUNC:BAND:SPAN?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Couplings	Changing the Band/Interval Span necessarily changes the Band/Interval Left and Band/Interval Right values
Preset	0
Preset	10% of Meas Time
State Saved	Saved in instrument state.
Min	0
Max	100 s

Backwards Compatibility SCPI	:CALCulate:WAVeform:MARKer[1]|2|3|4:X:SPAN
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Band/Interval Left for Time Domain

Sets the left edge frequency or time value for the band of the selected marker.

Key Path	**Marker Function**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:LEFT <time> :CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:LEFT?
Example	CALC:WAV:MARK12:FUNC:BAND:LEFT 1 s CALC:WAV:MARK12:FUNC:BAND:LEFT?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Couplings	Changing the Band/Interval Left necessarily changes the Band/Interval Span and Band/Interval Right values
Preset	0
Preset	5% of Meas Time
State Saved	Saved in instrument state.
Min	0
Max	100 s
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Band/Interval Right for Time Domain

Sets the right edge frequency or time value for the band of the selected marker.

Key Path	**Marker Function**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:RIGHt <time>` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:RIGHt?`
Example	CALC:WAV:MARK12:FUNC:BAND:RIGH 1 s CALC:WAV:MARK12:FUNC:BAND:RIGH?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Couplings	Changing the Band/Interval Left necessarily changes the Band/Interval Span and Band/Interval Right values
Preset	0
Preset	5% of Meas Time
State Saved	Saved in instrument state.
Min	0
Max	100 s
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Marker To

There is no ‘Marker To’ functionality supported in Waveform measurements. The front-panel key displays a blank menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Meas

For details on this key, see "Meas" on page 1257.

Key Path	**Front-panel key**

Meas Setup

Displays the setup menu keys that enable you to control the parameters for the current measurement.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Average/Hold Num

Sets the number of sweeps (average counts) that are averaged. After the specified number of sweeps, the averaging mode (terminal control) setting determines the averaging action.

Key Path	**Meas Setup**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:WAVeform:AVERage:COUNt <integer>`
	`[:SENSe]:WAVeform:AVERage:COUNt?`
	`[:SENSe]:WAVeform:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:WAVeform:AVERage[:STATe]?`

Example	WAV:AVER:COUN 1001 WAV:AVER:COUN? WAV:AVER ON WAV:AVER?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	10 OFF
State Saved	Saved in instrument state.
Min	1
Max	20001
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Avg Mode

Enables you to set the averaging mode.

When set to Exponential (Exp) the measurement averaging continues using the specified number of averages to compute each averaged value. The average is displayed at the end of each sweep.

When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

Key Path	**Meas Setup**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:WAVeform:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:WAVeform:AVERage:TCONtrol?`
Example	WAV:AVER:TCON REP WAV:AVER:TCON?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp|Repeat
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Avg Type

Selects the type of averaging.

Key Path	**Meas Setup**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:WAVeform:AVERage:TYPE LOG|MAXimum|MINimum|RMS|SCALar` `[:SENSe]:WAVeform:AVERage:TYPE?`
Example	WAV:AVER:TYPE MAX WAV:AVER:TYPE?
Notes	The SCPI selection of MAX and MIN are kept for BWCC, but they are removed from the front panel access because they are not an Average function. You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.

Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg(RMS)|Log-Pwr Avg(Video)|Voltage Avg
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

HW Averaging

Changes the number of time averages is to be made using hardware. This averaging is much faster than the standard averaging done in software. The hardware averaging is done on the complex voltage time trace data before any measurement application averaging is done. Both types of averaging (HW and SW) can be done on the same measurement data.

When time averaging is being done in HW, each trace update represents N fresh data acquisitions averaged together, where N is the number of averages. You cannot access the individual time data. Note that in the spectrum measurement this averaging is done prior to the standard averaging done within the application. Thus the yellow trace in this measurement shows the result of the time averaging. Subsequent averaging is orthogonal to this hardware based time averaging and its result is seen as the blue trace in this and other applications.

So it is possible to turn off the averaging within the application but still have the HW averaging set to a certain number. In other words, turning averaging off within the measurement will not affect HW averaging. If HW averaging needs to be turned off, simply set the HW Averaging parameter to 1.

Since it is time averaging, a trigger source something other than Free Run should be used to avoid cancelling out the signal to be measured. It is most useful for a periodic signal with known periods.

Time Avg Num

Sets the number of HW averages to be executed per each data acquisition.

Key Path	**Meas Setup**
Mode	BASIC
Remote Command	`[:SENSe]:WAVeform:AVERage:TACount <integer>` `[:SENSe]:WAVeform:AVERage:TACount?`
Example	`WAV:AVER:TAC 10` `WAV:AVER:TAC?`
Notes	This feature is only available with PXA or when Option B40 is installed.
Preset	1
State Saved	Saved in instrument state
Min	1
Max	65535

Default Unit	Enter

Sample Rate

Enables you to set an arbitrary sample rate for the acquired data to be processed.

Key Path	**Meas Setup**
Mode	BASIC
Remote Command	`[:SENSe]:WAVeform:SRATe <freq>` `[:SENSe]:WAVeform:SRATe?`
Example	WAV:SRAT 1.3636 MHz
Notes	Command and query available with PXA or when Option B40 is installed. For other configuration, only query is available.
Couplings	The coupling between Sample Rate and IF BW depends on Physics implementation.
Preset	125.0 kHz
Min	12.5 Hz
Max	(For PXA or Option B40) Digital IF 10 MHz path: 12.5 MHz Digital IF 25 MHz path: 31.25 MHz Digital IF 40 MHz path: 50 MHz Option B1X 140 MHz path: 175 MHz (For all other configuration) 10 MHz path: 15 MHz Option B25 25 MHz path: 45 MHz

Sample Period (Aperture) Setting (Remote Command Only)

Returns the time between samples (sample period or aperture).

Mode	BASIC
Remote Command	`[:SENSe]:WAVeform:APERture?`
Example	WAV:APER?
Notes	Query only.
Couplings	Coupled to Sample Rate by the following equation. Sample Period = 1/(Sample Rate)
Preset	1/(Sample Rate Default)

Min	1/(Max Sample Rate)
Max	1/(Min Sample Rate)

Meas Time

Sets how long the measurement is performed. X Scale only changes the representation of the display.

Key Path	**Meas Setup**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	[:SENSe]:WAVeform:SWEep:TIME <time> [:SENSe]:WAVeform:SWEep:TIME?
Example	WAV:SWE:TIME 50 ms WAV:SWE:TIME?
Notes	Specifies and returns how long the measurement is performed. It is the time record length of the measurement waveform. The Max time may be reduced when the sample frequency is high due to the memory limitation. You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	2.000000 ms
State Saved	Saved in instrument state.
Range	1.000 (s to 100.00 s
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

PhNoise Opt

Selects the LO (local oscillator) phase noise behavior for various desired operating conditions.

Key Path	**Meas Setup**
Remote Command	[:SENSe]:WAVeform:FREQuency:SYNThesis[:STATe] 1|2|3 [:SENSe]:WAVeform:FREQuency:SYNThesis[:STATe]?
Example	WAV:FREQ:SYNT 2 Selects optimization for best wide offset phase noise

Notes	Parameter: 1. 1 optimizes phase noise for small frequency offsets from the carrier. 2. 2 optimizes phase noise for wide frequency offsets from the carrier. 3. 3 optimizes LO for tuning speed (In PXA, the local oscillator hardware provides for extra-low phase noise at the expense of some speed.)
Dependencies	Does not appear in all models. The key is blank in those models, but the SCPI command is accepted for compatibility (although no action is taken).
Preset	Because this function is in Auto after preset, and because Digital IF BW after preset < 150 kHz for MXA/EXA and > 400 kHz for PXA the state of this function after Preset will be 1 for MXA/EXA and 2 for PXA.
State Saved	Saved in instrument state.
Min	1
Min	1
Max	3
Initial S/W Revision	Prior to A.07.00
Modified at S/W Revision	A.07.00

Auto

Selects the LO (local oscillator) phase noise behavior to optimize dynamic range and speed for various instrument operating conditions.

The X-Series has two grades of LO; a high performance LO that gives the best phase noise performance; and a medium-performance LO that gives excellent performance.

In models with the high performance LO, Auto will choose:

	Best Close in Phase Noise	**Best Wide-offset Phase Noise**
Filter BW	400 kHz	> 400 kHz

In models with the medium-performance LO, Auto will choose:

	Best Close in Phase Noise	**Best Wide-offset Phase Noise**
Filter BW	150 kHz	>150 kHz

Note that Fast Tuning will not be selected when in Auto.

Key Path	**Meas Setup, PhNoise Opt**
Remote Command	`[:SENSe]:WAVeform:FREQuency:SYNThesis:AUTO[:STATe] OFF|ON|0|1` `[:SENSe]:WAVeform:FREQuency:SYNThesis:AUTO[:STATe]?`
Example	WAV:FREQ:SYNT:AUTO ON
Preset	ON
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.07.00

Best Close-in P Noise

The LO phase noise is optimized for smaller offsets from the carrier, at the expense of phase noise farther out.

Key Path	**Meas Setup, PhNoise Opt**
Example	WAV:FREQ:SYNT 1
Couplings	The frequency below which the phase noise is optimized is model dependent: CXA: n/a EXA: [offset 150 kHz] MXA: [offset 150 kHz] PXA: [offset 400 kHz]
Readback	Close-in. If manually selected, "Man" will be underlined. The actual frequency offset within which noise is optimized is shown with in square brackets, as this can vary depending on the hardware set in use. For example, in some analyzers this annotation appears as [offset <150 kHz]
Initial S/W Revision	Prior to A.07.00

Best Wide-offset P Noise

The LO phase noise is optimized for wider offsets from the carrier. Closer offsets are compromised and the throughput of measurements (especially remote measurements where the center frequency is changing rapidly), is reduced.

Key Path	**Meas Setup, PhNoise Opt**
Example	WAV:FREQ:SYNT 2

Couplings	The frequency below which the phase noise is optimized is model dependent: CXA: n/a EXA: [offset >150 kHz] MXA: [offset >150 kHz] PXA: [offset >400 kHz]
Readback	Wide-offset. If manually selected, "Man" will be underlined. The actual frequency offset beyond which noise is optimized is shown with in square brackets, as this can vary depending on the hardware set in use. For example, in some analyzers this annotation appears as [offset >150 kHz]
Initial S/W Revision	Prior to A.07.00

Advanced

Accesses a menu of advanced functions that are used for specific applications. These settings should not be changed for most measurements.

Key Path	**Meas Setup**
Initial S/W Revision	Prior to A.02.00

ADC Dither

Accesses the ADC Dither control menu.

Key Path	**Meas Setup, Advanced**
Initial S/W Revision	Prior to A.02.00

ADC Dither Auto

Sets ADC dithering to automatically select whether dithering is needed.

Key Path	**Meas Setup, Advanced, ADC Dither**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:WAVeform:ADC:DITHer:AUTO[:STATe] OFF|ON|0|1` `[:SENSe]:WAVeform:ADC:DITHer:AUTO[:STATe]?`
Example	WAV:ADC:DITH:AUTO ON WAV:ADC:DITH:AUTO?

Notes	The dither function improves linearity for low level signals, at the expense of a higher noise floor. You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

ADC Dither

Toggles the dither function On and Off. The dither function improves linearity for low level signals, at the expense of a higher noise floor.

The reduced clipping-to-noise ratio results in higher noise, because the clipping level of the ADC relative to the front terminals remains unchanged with the introduction of dither. The enhanced linearity is mostly improved scale fidelity.

With dither on, the third-order distortions are usually invisible for mixer levels below –35 dBm. With dither off, these distortions can be visible, with typical power levels of –110 dBm referred to the mixer. Detection nonlinearity can reach 1 dB for dither off at mixer levels around –70 dBm and lower, while the specified nonlinearity is many times smaller with dither on.

Key Path	**Meas Setup, Advanced, ADC Dither**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:WAVeform:ADC:DITHer[:STATe] OFF|ON|0|1` `[:SENSe]:WAVeform:ADC:DITHer[:STATe]?`
Example	WAV:ADC:DITH ON WAV:ADC:DITH?
Notes	The dither function improves linearity for low level signals, at the expense of a higher noise floor. . You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Backwards Compatibility SCPI	[:SENSe]:WAVeform:WBIF:ADC:DITHer [:SENSe]:WAVeform:PDITher

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

IF Gain

Sets the IF Gain function to Auto, Low Gain or High Gain. These settings affect sensitivity and IF overloads.

This only applies to the RF input. It does not apply to baseband I/Q input.

Key Path	**Meas Setup, Advanced**
Initial S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the auto rules for IF Gain

Key Path	**Meas Setup, Advanced, IF Gain**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:WAVeform:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:WAVeform:IF:GAIN:AUTO[:STATe]?`
Example	WAV:IF:GAIN:AUTO ON WAV:IF:GAIN:AUTO?
Notes	This only applies to the RF input. It does not apply to baseband I/Q input. You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

IF Gain State

Selects the range of IF gain.

Key Path	**Meas Setup, Advanced, IF Gain**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV

Remote Command	`[:SENSe]:WAVeform:IF:GAIN[:STATe] AUTOrange|LOW|HIGH` `[:SENSe]:WAVeform:IF:GAIN[:STATe]?`
Example	WAV:IF:GAIN HIGH WAV:IF:GAIN?
Notes	This only applies to the RF input and does not apply to baseband I/Q input. You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	AUTO
State Saved	Saved in instrument state.
Range	Autorange (Slower Follows Signals)|Low (Best for Large Signals)|High (Best Noise Level)
Readback Text	Autorange|Low|High
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

IF Gain Offset

Sets the IF Gain offset for the 40 MHz and 140 MHz IF Paths in 2 dB step from –6 dB to +6 dB. Increasing the gain can increase the amplitude of small signals as long as you do not overdrive the hardware. Wideband gain should usually be adjusted after setting the input attenuation.

The IF Gain key is enabled for all IF Path selections, but the IF Gain Offset is not activated when the IF Path Selection is Narrow and IF Path Selection Narrow is either 10 MHz or 25 MHz.

Internally, the IF Gain value will change based on the current configuration of the hardware. If you choose to offset this value, you may do so with this parameter. The value specified is not an absolute value but relative to the current internal IF Gain setting.

For example:

IF Gain Low + IF Gain Offset +4 dB = Total IF Gain of +4 dB (0 + 4 = 4)

IF Gain High + IF Gain Offset +4 dB = Total IF Gain of +14 dB (10 + 4 = 14)

IF Gain Low + IF Gain Offset –6 dB = Total IF Gain of –6 dB (0 – 6 = –6)

IF Gain High + IF Gain Offset –6 dB = Total IF Gain of +6 dB (10 – 6 = 4)

The total IF Gain range when IF Gain Offset is available is a minimum of 0 – 6 = –6 dB and a maximum of 10 + 6 = 16 dB. The available IF Gain depends on the IF Path and center frequency. The maximum IF Gain may not be achievable at all times depending on the configuration.

Key Path	**Meas Setup, Advanced**
Remote Command	`[:SENSe]:WAVeform:IF:GAIN:OFFSet <rel_ampl >` `[:SENSe]:WAVeform:IF:GAIN:OFFSet?`

Example	`WAV:IF:GAIN:OFFS 2` Sets the IF Gain offset to 2
Couplings	If the IF Path Selection is 10 MHz or 25 MHz, then this feature is not available and is grayed out.
Preset	0
State Saved	Saved in instrument state.
Min	–6
Max	+6
Default Unit	dB

Meas Preset

Restores all the measurement parameters to their default values.

Key Path	**Meas Setup**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CONFigure:WAVeform`
Example	CONF:WAV
Notes	Restore default values of all parameters. You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Mode

For details on this key, see “Mode” on page 1271

Key Path	**Front-panel key**

Mode Setup

For details on this key, see “Mode Setup” on page 1291.

Key Path	**Front-panel key**

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker’s trace and accesses a menu that enables you to select to do a next peak or minimum peak search.

Key Path	**Front-panel key**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`CALC:WAV:MARK2:MAX`
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Next Peak

Moves the selected marker to the next highest local maximum with a value less than the current marker's.

Key Path	**Peak Search**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:NEXT`
Example	CALC:WAV:MARK:MAX:NEXT
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Min Search

Moves the selected marker to the minimum y-axis value on the current trace.

Key Path	**Peak Search**

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	CALC:WAV:MARK:MIN
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Recall

For details on this key, see “Recall” on page 174.

Key Path	**Front-panel key**

Restart

For details on this key, see “Restart” on page 1299.

Key Path	**Front-panel key**

Save

For details on this key, see “Save” on page 186 .

Key Path	**Front-panel key**

Single

For details on this key, see "Single (Single Measurement/Sweep)" on page 1305 .

Key Path	**Front-panel key**

Source

Operation of this key is identical across all measurements. For details about this key, see “Source” on page 1307in the section "Common Measurement Functions" for more information.

Key Path	**Front-panel key**

Span X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Ref Value

Sets the reference value for time on the horizontal axis. When Auto Scaling is set to On, the displayed plots use a Scale/Div value determined by the analyzer, based on the measurement result.

Key Path	**SPAN X Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:WAV:VIEW:WIND:TRAC:X:RLEV 10 ms DISP:WAV:VIEW:WIND:TRAC:X:RLEV?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Couplings	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Preset	0.00 s
State Saved	Saved in instrument state.
Min	–1.000 s
Max	10.00 s
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Scale/Div

Sets the horizontal scale by changing a time value per division.

Key Path	**SPAN X Scale**

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>` `:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:WAV:VIEW:WIND:TRAC:X:PDIV 500 us DISP:WAV:VIEW:WIND:TRAC:X:PDIV?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Couplings	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Preset	200.0 us
State Saved	Saved in instrument state.
Min	1.000 ns
Max	1.000 s
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Ref Position

Sets the reference position for the X axis to Left, Center or Right.

Key Path	**SPAN X Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:WAV:VIEW:WIND:TRAC:X:RPOS LEFT DISP:WAV:VIEW:WIND:TRAC:X:RPOS?
Notes	Allows you to set the reference position to Left, Ctr (center) or Right. You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT

State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Auto Scaling

Toggles the scale coupling function between On and Off.

Key Path	**SPAN X Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:WAV:VIEW:WIND:TRAC:X:COUP ON DISP:WAV:VIEW:WIND:TRAC:X:COUP?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Couplings	When Auto Scaling is On and the Restart front-panel key is pressed, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Preset	1
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Sweep/Control

Accesses the Sweep menu that allows you to pause and restart the measurement.

For more information, see "Sweep/Control" on page 1309.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Pause and Resume

Pauses a measurement after the current data acquisition is complete. When Paused, the label on the key changes to Resume. Pressing the Resume key resumes the measurement at the point it was at when paused.

For more information, see "Pause/Resume" on page 1321.

Key Path	**Sweep/Control**
Initial S/W Revision	Prior to A.02.00

Trace/Detector

There is no Trace/Detector functionality supported in the Waveform measurement. The front-panel key displays a blank menu when pressed.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Trigger

Accesses a menu of functions that enable you to select and control the trigger source for the current measurement

For more information, see "Trigger" on page 1339.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

View/Display

Accesses a menu of functions that enable you to set up and control the display parameters for the current measurement.

This topic contains the following sections:

"View Selection by name (Remote Command Only)" on page 1114

"View Selection by number (Remote Command Only)" on page 1114

View Selection by name (Remote Command Only)

Selects the results view.

Key Path	**View/Display**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:WAVeform:VIEW[:SELect] RFENvelope|IQ` `:DISPlay:WAVeform:VIEW[:SELect]?`
Example	DISP:WAV:VIEW RFEN DISP:WAV:VIEW?
Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	RFENveloper
State Saved	Saved in instrument state.
Range	RF Envelope|IQ Waveform
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

View Selection by number (Remote Command Only)

Displays the numeric values of the measurement results.

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`:DISPlay:WAVeform:VIEW:NSELect <integer>` `:DISPlay:WAVeform:VIEW:NSELect?`
Example	DISP:WAV:VIEW:NSEL 1 DISP:WAV:VIEW:NSEL?

Notes	You must be in a mode that includes the Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	2
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Display

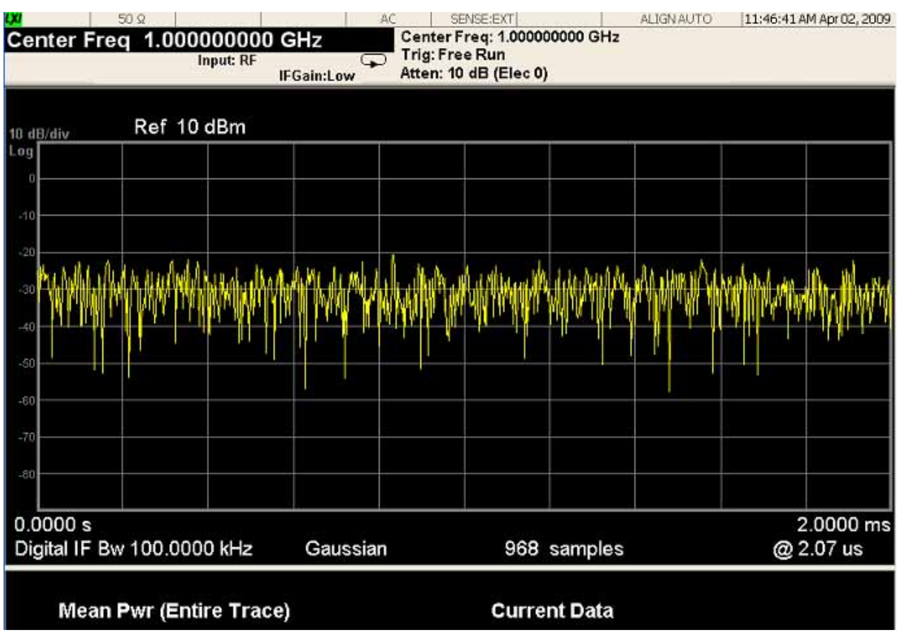
Accesses a menu of functions that enable you to set the display parameters.

For more information, see “Display” on page 1385.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

RF Envelope

This view shows an example of the RF Envelope result for the waveform (time domain) measurements in the graph window. The measured values for the mean power and peak-to-mean power are shown in the text window.



Numeric Results

Name	Type	Description	Unit	Format
Mean Pwr	Float64	The mean power (dBm). This is either the power across the entire trace, or the power between markers if the markers are enabled.	dBm	XX.XX dBm
Pk-to-Mean	Float64	This is the ratio of the maximum signal level to the mean power.	dB	XX.XX dB
Max Pt	Float64	The maximum of the most recently acquired data.	dBm	XX.XX dBm
Min Pt	Float64	The minimum of the most recently acquired data.	dBm	XX.XX dBm

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

I/Q Waveform

This view shows the I and Q signal waveforms in parameters of voltage versus time.

Key Path	**View/Display**
Initial S/W Revision	Prior to A.02.00

17 Common Measurement Functions

The key and command descriptions in this section describe functions that operate the same in multiple measurements and/or modes. This section is a library of functions that is referenced by many measurements and modes

To find the exact description and parameters for functions in a specific measurement, always look in the measurement section of this documentation. Pressing the front-panel key or softkey and then pressing the green Help key also provides the correct information.

NOTE	If you want to print the documentation, be sure to select this section and the measurement of interest to ensure having all the information you need. See “Printing Acrobat Files” on page 119 for further instructions about printing.

AMPTD Y Scale

The Amplitude front-panel key activates the Amplitude menu and selects Reference Level or Reference Value (depending on the measurement) as the active function.

Some features in the Amplitude menu apply to multiple measurements; others apply only to specific measurements. Keys that only apply to some measurements are blanked or grayed out in measurements in which they are not supported.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Reference Level

The Reference Level specifies the amplitude represented by the topmost graticule line.

Changing the reference level does not restart a measurement, because it is a display function only; instead it vertically ‘pans’ all displayed traces and markers to the new value. If a change to the reference level changes the attenuation value (e.g. through an auto coupling), then the measurement will be restarted.

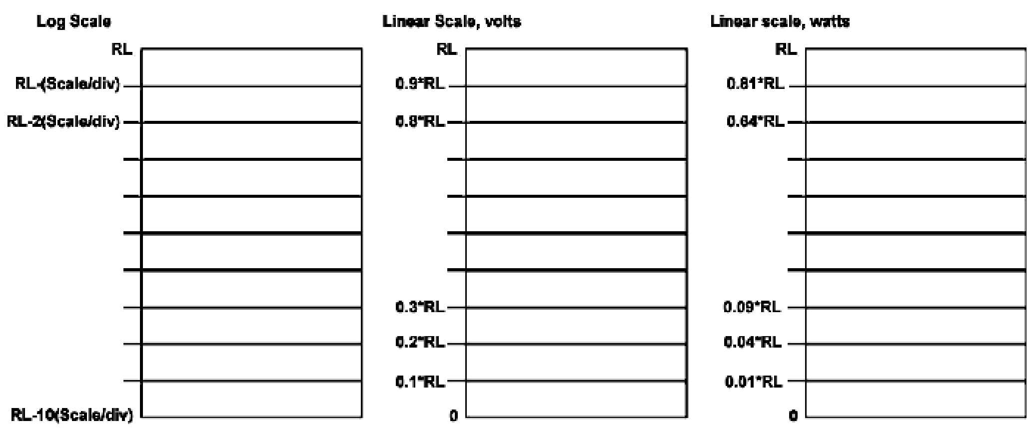
See “Amplitude Representations” on page 1120.

Key Path	**AMPTD Y Scale**
Remote Command	`:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:WIND:TRAC:Y:RLEV 20 dBm Sets the reference level to 20 dBm, which displays in the current Y axis unit. For example, if the Y axis unit is dBµV, then 126.99 dBµV will be displayed.
Couplings	If you reduce the attenuation, the analyzer may have to lower the reference level to keep it below its allowed maximum. This allowed maximum level is specified in the “Max” row, below, along with other variables which affect it. When you increase attenuation, the reference level does not change.
Preset	0 dBm
State Saved	Saved in instrument state
Min	RefLevelMin = –170 dBm + RefLevelOffset - ExtGain.

Max	The maximum Ref Level is typically: +30 dBm + RL Offset – External Gain (for MXA and PXA) +23 dBm + RL Offset – External Gain (for EXA and CXA) This maximum value is determined by the maximum power that can be safely applied to the input circuitry. The actual maximum value at any given time may be even less than this, depending on other values including Mech Atten, Int Preamp Gain, Swept IF Gain, FFT IF Gain, Max Mixer Level, and the total attenuation currently available.
Initial S/W Revision	Prior to A.02.00
Default Unit	Depends on the current selected Y axis unit

Amplitude Representations

The following is an illustration of the reference level and Y Axis scales under various conditions:



Attenuation

This menu controls the attenuator functions and interactions between the attenuation system components.

There are two attenuator configurations in the X-Series. One is a dual attenuator configuration consisting of a mechanical attenuator and an optional electronic attenuator. The other configuration uses a single attenuator with combined mechanical and electronic sections that controls all the attenuation functions. Different models in the X-Series come with different configurations.

See "Dual Attenuator Configuration:" on page 1121.

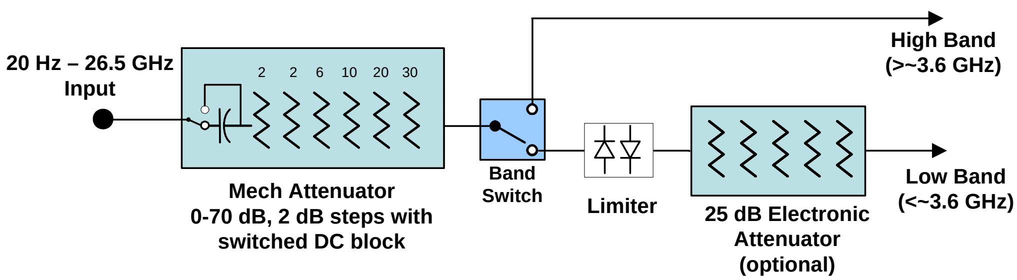
See "Single Attenuator Configuration:" on page 1121

Most Attenuation settings are the same for all measurements – they do not change as you change measurements. Settings like these are called "Meas Global" and are unaffected by Meas Preset.

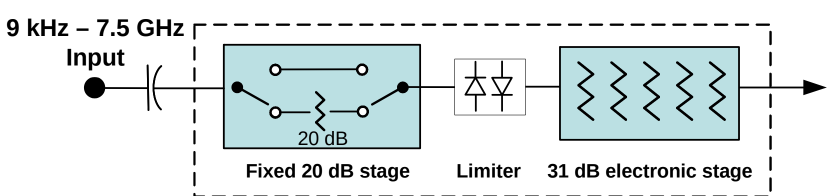
Key Path	**AMPTD Y Scale**
Scope	Meas Global

Dependencies	In measurements which support the I/Q inputs, this key is unavailable when I/Q is the selected input, and is replaced by the Range key in that case.
Readback Line	Contains a summary in [ ] brackets of the current total attenuation. See the descriptions of the "(Mech) Atten " on page 1122, "Enable Elec Atten" on page 1124, and "Elec Atten" on page 1126 keys for more detail on the contributors to the total attenuation. Note that when "Pre-Adjust for Min Clip" is on, this value can change at the start of every measurement.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

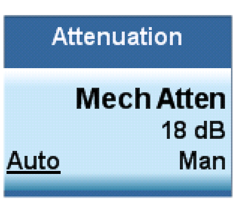
Dual Attenuator Configuration:



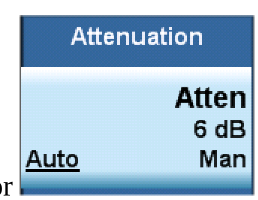
Single Attenuator Configuration:



You can tell which attenuator configuration you have by pressing the Attenuation key, which (in most Modes) opens up the Attenuation menu. If the first key in the Attenuation menu says **Mech Atten** you have the dual attenuator configuration. If the first key says **Atten** you have the single attenuator configuration.



Dual Attenuator

Single Attenuator


In the single attenuator configuration, you control the attenuation with a single control, as the fixed stage has only two states. In the dual attenuator configuration, both stages have significant range so you are given separate control of the mechanical and electronic attenuator stages.

When you have the dual attenuator configuration, you may still have only a single attenuator, because unless you purchase the Electronic Attenuator option you will only have the mechanical attenuator.

(Mech) Atten

This key is labeled **Mech Atten** in dual attenuator models and **Atten** in single attenuator models. In the dual attenuator configuration, this key only affects the mechanical attenuator.

This key lets you modify the attenuation applied to the RF input signal path. This value is normally auto coupled to the Ref Level, the Internal Preamp Gain, any External Gain that is entered, and the Max Mixer Level, as described in the table below.

See “Attenuator Configurations and Auto/Man” on page 1123

Key Path	**AMPTD Y Scale, Attenuation**

Remote Command	`[:SENSe]:POWer[:RF]:ATTenuation <rel_ampl>`
	`[:SENSe]:POWer[:RF]:ATTenuation?`
	`[:SENSe]:POWer[:RF]:ATTenuation:AUTO OFF|ON|0|1`
	`[:SENSe]:POWer[:RF]:ATTenuation:AUTO?`

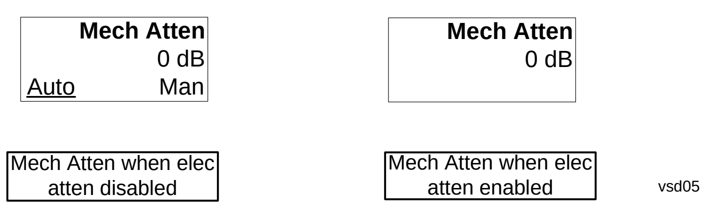
Example	POW:ATT 20 Dual attenuator configuration: sets the mechanical attenuator to 20 dB Single attenuator mode: sets the main attenuation to 20 dB (see below for definition of “main” attenuation). If the attenuator was in Auto, it sets it to Manual.
Dependencies	Some measurements do not support the Auto setting of **(Mech) Atten**. In these measurements, the Auto/Man selection is not available, and the Auto/Man line on the key disappears. In dual attenuator configurations, when the electronic attenuator is enabled, the mechanical attenuator has no auto setting and the Auto/Man line on the key disappears. The state of Auto/Man is remembered and restored when the electronic attenuator is once again disabled. This is described in more detail in the “Enable Elec Atten” on page 1124 key description. See “Attenuator Configurations and Auto/Man” on page 1123 for more information on the Auto/Man functionality of Attenuation.
Couplings	When **(Mech) Atten** is in Auto, it uses the following algorithm to determine a value: Atten = ReferenceLevel + PreAmpGain + ExternalGain – RefLevelOffset - MaxMixerLevel + IF Gain. Limit this value to be between 6 dB and the Max value. No value below 6 dB can ever be chosen by Auto. The resulting value is rounded up to the largest value possible given the attenuation step setting. That is, 50.01 dB would change to 60 dB (for a 10 dB attenuation step). The “IF Gain” term in the equation above is either 0 dB or +10 dB, depending on the settings of FFT IF Gain, Swept IF Gain, max Ref Level and the Auto/Man setting of Mech Atten.

Preset	The preset for Mech Attenuation is “Auto.” The Auto value of attenuation is: CXA, EXA, MXA and PXA: 10 dB
State Saved	Saved in instrument state
Min	0 dB The attenuation set by this key cannot be decreased below 6 dB with the knob or step keys. To get to a value below 6 dB it has to be directly entered from the keypad or via SCPI. This protects from adjusting the attenuation to a dangerously small value which can put the instrument at risk of damage to input circuitry. However, if the current mechanical attenuation is below 6 dB it can be increased with the knob and step keys, but not decreased.
Max	CXA: 50 dB EXA: 60 dB MXA and PXA: 70 dB In the single attenuator configuration, the total of ATT and EATT cannot exceed 50 dB, so if the EATT is set to 24 dB first, the main attenuation cannot be greater than 26 dB and will be reduced accordingly; if the main attenuator is set to 40 dB first, EATT cannot be greater than 10 dB.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Attenuator Configurations and Auto/Man

As described in the Attenuation key description, there are two distinct attenuator configurations available in the X-Series, the single attenuator and dual attenuator configurations. In dual attenuator configurations, we have the mechanical attenuation and the electronic attenuation, and the current total attenuation is the sum of the electronic + mechanical attenuation. In single attenuator configurations, we refer to the attenuation set using the **(Mech) Atten** key (or POW:ATT SCPI) as the “main” attenuation; and the attenuation that is set by the SCPI command POW:EATT as the “soft” attenuation (the POW:EATT command is honored even in the single attenuator configuration, for compatibility purposes). Then the current total attenuation is the sum of the main + soft attenuation. See the **Elec Atten** key description for more on “soft” attenuation.

In the dual attenuator configuration, when the electronic attenuator is enabled, there is no Auto/Man functionality for the mechanical attenuator, and the third line of the key label (the Auto/Man line) disappears:



Enable Elec Atten

Enables the Electronic Attenuator in dual attenuator configurations. This key does not appear in single attenuator configurations, as in the single attenuator configuration there is no “electronic attenuator” there is only a single integrated attenuator (which has both a mechanical and electronic stage).

The electronic attenuator offers finer steps than the mechanical attenuator, has no acoustical noise, is faster, and is less subject to wear. These advantages primarily aid in remote operation and are negligible for front panel use. See “Using the Electronic Attenuator: Pros and Cons” on page 1125 for a detailed discussion of the pros and cons of using the electronic attenuator.

For the single attenuator configuration, for SCPI backwards compatibility, the “soft” attenuation feature replaces the dual attenuator configuration’s electronic attenuator. All the same couplings and limitations apply. See “Attenuator Configurations and Auto/Man” on page 1123.

See “More Information” on page 1125.

Key Path	**AMPTD Y Scale, Attenuation**
Remote Command	`[:SENSe]:POWer[:RF]:EATTenuation:STATe OFF|ON|0|1` `[:SENSe]:POWer[:RF]:EATTenuation:STATe?`
Example	POW:EATT:STAT ON
Dependencies	This key only appears in the dual attenuator configuration. However, in the single attenuator configuration, EATT SCPI commands are accepted for compatibility with other X-series instruments and set a “soft” attenuation as described in “Attenuator Configurations and Auto/Man” on page 1123. The electronic attenuator (and the “soft” attenuation function provided in single attenuator configurations) is unavailable above 3.6 GHz. Therefore, if the Stop Frequency of the analyzer is > 3.6 GHz then the **Enable Elec Atten** key will be OFF and grayed out. If the Internal Preamp is on, meaning it is set to Low Band or Full, the electronic attenuator (and the “soft” attenuation function provided in single attenuator configurations) is unavailable. In this case the **Enable Elec Atten** key will be OFF and grayed out. If either of the above is true, if the SCPI command is sent, an error indicating that the electronic attenuator is unavailable will be sent. If the electronic/soft Attenuator is enabled, then the Stop Freq of the analyzer is limited to 3.6 GHz and the Internal Preamp is unavailable.
Couplings	Enabling and disabling the Electronic Attenuator affects the setting of the Mechanical Attenuator (in dual attenuator configurations). This is described in more detail below this table.
Preset	OFF for Swept SA measurement; ON for all other measurements that support the electronic attenuator
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

More Information

When the Electronic Attenuator is enabled, the Mechanical Attenuator transitions to a state in which it has no Auto function. Here are the rules for transitioning the Mechanical Attenuator:

When the Electronic Attenuation is enabled:

- In the dual attenuator configuration, the Mechanical Attenuator is initialized to 10 dB (this is its optimal performance setting). You can then set it as desired with SCPI, numeric keypad, step keys, or knob, and it behaves as it normally would in manual mode
- The Auto/Man state of (Mech) Atten is saved
- The Auto/Man line on the (Mech) Atten key disappears and the auto rules are disabled
- In the dual attenuator configuration, the Electronic Attenuator is set to 10 dB less than the previous value of the Mechanical Attenuator, within the limitation that it must stay within the range of 0 to 24 dB of attenuation.

Examples in the dual attenuator configuration:

- Mech Atten at 20 dB. Elec Atten enabled, Mech Atten set to 10 dB, and Elec Atten set to 10 dB. New total attenuation equals the value before Elec Atten enabled.
- Mech Atten at 0 dB. Elec Atten enabled, Mech Atten set to 10 dB, and Elec Atten set to 0 dB. New total attenuation does not equal the value before Elec Atten enabled.
- Mech Atten at 40 dB. Elec Atten enabled, Mech Atten set to 10 dB, and Elec Atten set to 24 dB. New total attenuation does not equal the value before Elec Atten enabled.

When the Electronic Attenuation is disabled:

- In the dual attenuator configuration, the Elec Atten key is grayed out (it never displays in the single attenuator configuration)
- The Auto/Man state of (Mech) Atten is restored
- If now in Auto, (Mech) Atten recouples
- If now in Man, (Mech) Atten is set to the value of total attenuation that existed before the Elec Atten was disabled. The resulting value is rounded up to the smallest value possible given the (Mech) Atten Step setting - (That is, 57 dB changes to 58 dB when (Mech) Atten Step is 2 dB.)

Using the Electronic Attenuator: Pros and Cons

The electronic attenuator offers finer steps than the mechanical attenuator, has no acoustical noise, is faster, and is less subject to wear.

The “finer steps” advantage of the electronic attenuator is beneficial in optimizing the alignment of the analyzer dynamic range to the signal power in the front panel as well as remote use. Thus, you can achieve improved relative signal measurement accuracy. Compared to a mechanical attenuator with 2 dB steps, the 1 dB resolution of the electronic attenuator only gives better resolution when the odd-decibel steps are used. Those odd-decibel steps are less accurately calibrated than the even-decibel steps, so one tradeoff for this superior relative accuracy is reduced absolute amplitude accuracy.

Another disadvantage of the electronic attenuator is that the spectrum analyzer loses its “Auto” setting, making operation less convenient.

Also, the relationship between the dynamic range specifications (TOI, SHI, compression and noise) and instrument performance are less well-known with the electrical attenuator. With the mechanical attenuator, TOI, SHI and compression threshold levels increase dB-for-dB with increasing attenuation, and the noise floor does as well. With the electronic attenuator, there is an excess attenuation of about 1 to 3 dB between 0 and 3.6 GHz, making the effective TOI, SHI, and so forth, less well known. Excess attenuation is the actual attenuation relative to stated attenuation. Excess attenuation is accounted for in the analyzer calibration

Elec Atten

Controls the Electronic Attenuator in dual attenuator configurations. This key does not appear in single attenuator configurations, as the control of both the mechanical and electronic stages of the single attenuator is integrated into the single **Atten** key.

Key Path	**AMPTD Y Scale, Attenuation**
Remote Command	`[:SENSe]:POWer[:RF]:EATTenuation <rel_ampl>` `[:SENSe]:POWer[:RF]:EATTenuation?`
Notes	Electronic Attenuation’s spec is defined only when Mechanical Attenuation is 6 dB.
Dependencies	This key only appears in the dual attenuator configuration. However, in the single attenuator configuration, EATT SCPI commands are accepted for compatibility with other X-series instruments and set a “soft” attenuation as described in **“Attenuator Configurations and Auto/Man” on page 1123**. The “soft” attenuation is treated as an addition to the “main” attenuation value set by the Atten softkey or the POW:ATT SCPI command and affects the total attenuation displayed on the Attenuation key and the Meas Bar. When **Enable Elec Atten** is off, the **Elec Atten** key is grayed out.
Preset	0 dB
State Saved	Saved in instrument state
Min	0 dB
Max	Dual attenuator configuration: 24 dB Single attenuator configuration: the total of ATT and EATT cannot exceed 50 dB, so if the EATT is set to 24 dB first, the main attenuation cannot be greater than 26 dB and will be reduced accordingly; if the main attenuator is set to 40 dB first, EATT cannot be greater than 10 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Adjust Atten for Min Clip

Sets the combination of mechanical and electronic attenuation based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality. The spectrum analyzer measurement, Swept SA, does not support this functionality.

Key Path	**AMPTD Y Scale, Attenuation**
Remote Command	`[:SENSe]:POWer[:RF]:RANGe:OPTimize IMMediate`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under "Adjust Atten for Min Clip" on page 1127 each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

In dual attenuator models, you can set **Elec+Mech Atten**, in which case both attenuators participate in the autoranging, or **Elec Atten Only**, in which case the mechanical attenuator does not participate in the autoranging. This latter case results in less wear on the mechanical attenuator and is usually faster.

This key is grayed out in measurements that do not support this functionality. The spectrum analyzer measurement, Swept SA, does not support this functionality.

Key Path	**AMPTD Y Scale, Attenuation**

Remote Command	`[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF|ELECtrical|COMBined`
	
	`[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?`

Notes	The SCPI parameter ELECtrical sets this function to On in single attenuator models. The SCPI parameter COMBined is mapped to ELECtrical in single attenuator models; if you send COMBined, it sets the function to On and returns ELEC to a query.
Preset	OFF for Swept SA measurement; ON for all other measurements that support **Pre-Adjust for Min Clip**
State Saved	Saved in instrument state
Range	Dual attenuator models: Off | Elec Atten Only | Mech + Elec Atten Single attenuator models: Off | On
Initial S/W Revision	Prior to A.02.00

Modified at S/W Revision	A.03.00

Remote Command	`[:SENSe]:POWer[:RF]:RANGe:AUTO ON|OFF|1|0` `[:SENSe]:POWer[:RF]:RANGe:AUTO?`
Notes	ON aliases to "Elec Atten Only" OFF aliases to "Off" The query returns true if not "Off"
Initial S/W Revision	Prior to A.02.00

(Mech) Atten Step

This controls the step size used when making adjustments to the input attenuation.

This key is labeled **Mech Atten Step** in dual attenuator models and **Atten Step** in single attenuator models. In the dual attenuator configuration, this key only affects the step size of the mechanical attenuator.

Key Path	**AMPTD Y Scale, Attenuation**
Remote Command	`[:SENSe]:POWer[:RF]:ATTenuation:STEP[:INCRement] 10 dB | 2 dB` `[:SENSe]:POWer[:RF]:ATTenuation:STEP[:INCRement]?`
Example	POW:ATT:STEP 2
Notes	Note this feature works like a 1-N choice from the front panel, but it takes a specific value (in dB) when used remotely. The only valid values are 2 and 10.
Dependencies	Blanked in CXA and EXA if option FSA (2 dB steps) is not present. If blanked, attempts to set it via SCPI will yield an error.
Couplings	When the attenuation step size changes, the current mechanical attenuation value is adjusted (if necessary) to be quantized to the new step size. That is, if step is set to 10 dB, mech atten is increased if necessary so it is a multiple of 10 dB
Preset	PXA and MXA: 2 dB EXA and CXA: 10 dB (2 dB with option FSA)
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Max Mixer Level

Controls the limitation on the Ref Level for a given attenuation setting, and therefore also interacts with the Auto rules for selecting the attenuation as a coupling from the reference level.

Key Path	**AMPTD Y Scale, Attenuation**
Remote Command	`[:SENSe]:POWer[:RF]:MIXer:RANGe[:UPPer] <real>` `[:SENSe]:POWer[:RF]:MIXer:RANGe[:UPPer]?`
Example	POW:MIX:RANG –15 dBm
Preset	–10 dBm
State Saved	Saved in instrument state
Min	–50 dBm
Max	–10 dBm
Initial S/W Revision	Prior to A.02.00
Default Unit	Depends on the current selected Y axis unit, see Swept SA discussion of Y Axis Unit

Range

This key is only available when I/Q is the selected input. It replaces the Attenuation key in that case.

Each input channel (I and Q) has four internal gain ranges. The maximum allowed voltage in each gain range is slightly more than the nominal value, so the break point between ranges is a couple of millivolts higher than the nominal (setting a peak voltage of 0.502 mV will still map to the 0.5 V Peak range).

Gain Setting	Volts RMS	Volts Peak	Volts Peak - Peak	dBm (50Ω)	Break Point
0 dB	0.7071	1.0	2.0	10	n/a
6 dB	0.3536	0.5	1.0	4	0.502 V Peak
12 dB	0.1768	0.25	0.5	–2	0.252 V Peak
18 dB	0.0884	0.125	0.25	–8	0.127 V Peak

Key Path	**AMPTD Y Scale**
Notes	Visible only when the selected input is I/Q.
State Saved	No
Readback Text	When Range is Auto, "[Auto]" When Range is Man and I & Q are the same, "[<range value>]" When Range is Man and I & Q are different: "[I: <I range value> Q: <Q range value>]" See I Range and Q Range for the <range value> enumeration definition.
Initial S/W Revision	Prior to A.02.00

Range Auto/Man

The Auto setting for Range causes the range to be set based on the Y Scale settings. When Range is "Auto", the I & Q Range are set based on the top of the Y Scale when the Y scale is in dB units (for example, power), or to the max(abs(top), abs(bottom)) when the Y scale reference is not at the top of the screen.

Not all measurements support Range Auto/Man. If Auto is not supported in the current measurement, this key is grayed out and shows "Man" and MAN is returned to a SCPI query; but this does NOT change the Auto/Man setting for Range.When you go to a measurement that supports Auto, it goes back to Auto if it was previously in Auto mode.

Key Path	**AMPTD Y Scale, Range**
Scope	Meas Global
Remote Command	`[:SENSe]:VOLTage:IQ:RANGe:AUTO OFF|ON|0|1` `[:SENSe]:VOLTage:IQ:RANGe:AUTO?`
Example	Put the I Range and Q Range in manual. VOLT:IQ:RANG:AUTO OFF
Dependencies	If Auto is not supported, sending the SCPI command will generate an error.
Couplings	When in Auto, both I Range and Q Range are set to the same value, computed as follows: Maximum absolute value is computed for the Y Scale. The top and bottom of the graph are computed based on Ref Value, Scale/Div, and Ref Position. Formula: YMax = max(abs(top), abs(bottom)). The I Range and Q Range are then set to YMax.
Preset	ON
State Saved	Saved in instrument state
Range	Auto | Man
Initial S/W Revision	Prior to A.02.00

Remote Command	`[:SENSe]:POWer:IQ:RANGe:AUTO OFF|ON|0|1` `[:SENSe]:POWer:IQ:RANGe:AUTO?`
Example	Put the I Range and Q Range in manual. POW:IQ:RANG:AUTO OFF
Notes	The POW:IQ:RANG:AUTO is an alternate form of the VOLT:IQ:RANG:AUTO command. This is to maintain consistency with I Range and Q Range, which support both the POWer and VOLTage forms of the command.
Preset	ON
Range	Auto | Man

Initial S/W Revision	Prior to A.02.00

I Range

This is the internal gain range for the I channel when Input Path is I Only or Ind I/Q, and it is used for both the I and Q channels when the Input Path is I+jQ. See “I/Q Gain Ranges” on page 1134.

Key Path	**AMPTD Y Scale, Range**
Remote Command	`[:SENSe]:VOLTage:IQ[:I]:RANGe[:UPPer] <voltage>` `[:SENSe]:VOLTage:IQ[:I]:RANGe[:UPPer]?`
Example	Set the I Range to 0.5 V Peak VOLT:IQ:RANG 0.5 V
Notes	The numeric entries are mapped to the smallest gain range whose break point is greater than or equal to the value, or 1 V Peak if the value is greater than 1 V.
Couplings	When Q Same as I is On, the I Range value will be copied to the Q Range. Changing the value will also set Range = Man.
Preset	1 V Peak
State Saved	Saved in instrument state
Range	1 V Peak | 0.5 V Peak | 0.25 V Peak | 0.125 V Peak
Initial S/W Revision	Prior to A.02.00

Remote Command	`[:SENSe]:POWer:IQ[:I]:RANGe[:UPPer] <ampl>` `[:SENSe]:POWer:IQ[:I]:RANGe[:UPPer]?`
Example	Set the I Range to 0.5 V Peak when Reference Z is 50Ω, and to 1.0 V Peak when Reference Z is 75Ω. POW:IQ:RANG 4 dBm
Notes	The POWer form of the command is provided for convenience. It maps to the same underlying gain range parameter as the VOLTage form of the command. The Reference Z (not the I channel Input Z) is used to convert the power to peak voltage, which is then used to set the I Range as with the VOLTage form of the command. The power values of the 4 range states (1V Peak, 0.5V Peak, 0.25V Peak, and 0.125V Peak) will vary with Reference Z. Here are some examples: 50Ω: 10, 4, –2, –8 75Ω: 8.2, 2.2, –3.8, –9.8 600Ω: –0.8, –6.8, –12.8, –18.9
Preset	10.0 dBm
Range	–20 dBm to 10 dBm

Min	–20 dBm
Max	10 dBm
Initial S/W Revision	Prior to A.02.00

Q Range

Accesses the Q Range menu.

Key Path	**AMPTD Y Scale, Range**
Readback Text	Q Same as I | 1 V Peak | 0.5 V Peak | 0.25 V Peak | 0.125 V Peak When Q Same as I is On, the readback is "Q Same as I", otherwise it is the Q Range value.
Initial S/W Revision	Prior to A.02.00

Q Same as I

Many, but not all, usages require the I and Q channels to have an identical setup. To simplify channel setup, the Q Same as I will cause the Q channel range to be mirrored from the I channel. That way you only need to set up one channel (the I channel). The I channel values are copied to the Q channel, so at the time Q Same as I is Off, the I and Q channel setups will be identical.

Key Path	**AMPTD Y Scale, Range, Q Range**
Remote Command	`[:SENSe]:VOLTage|POWer:IQ:MIRRored OFF|ON|0|1` `[:SENSe]:VOLTage|POWer:IQ:MIRRored?`
Example	Turn off the mirroring of I Range to Q Range. VOLT:IQ:MIRR OFF POW:IQ:MIRR OFF
Couplings	When On, the I Range value is mirrored (copied) to the Q Range.
Preset	On
State Saved	Saved in instrument state.
Range	On | Off
Readback Text	"Q Same as I" when On, otherwise none.
Initial S/W Revision	Prior to A.02.00

Q Range Value

This is the internal gain range for the Q channel. See "I/Q Gain Ranges" on page 1134. The Q Range only applies to Input Path Q Only and Ind I/Q. For input I+jQ the I Range determines both I and Q channel range settings.

Key Path	**AMPTD Y Scale, Range**

Remote Command	`[:SENSe]:VOLTage:IQ:Q:RANGe[:UPPer] <voltage>` `[:SENSe]:VOLTage:IQ:Q:RANGe[:UPPer]?`
Example	Set the Q Range to 0.5 V Peak VOLT:IQ:Q:RANG 0.5 V
Notes	The numeric entries are mapped to the smallest gain range whose break point is greater than or equal to the value, or 1 V Peak if the value is greater than 1 V. The Q Range is only used for Input Path Q Only and Ind I/Q. For input I+jQ the I Range determines both I and Q channel range settings.
Couplings	When Q Same as I is On, the I Range value will be copied to the Q Range and the range value keys are disabled. Changing the value will also set Range = Man.
Preset	1 V Peak
State Saved	Saved in instrument state
Range	1 V Peak | 0.5 V Peak | 0.25 V Peak | 0.125 V Peak
Initial S/W Revision	Prior to A.02.00

Remote Command	`[:SENSe]:POWer:IQ:Q:RANGe[:UPPer] <ampl>` `[:SENSe]:POWer:IQ:Q:RANGe[:UPPer]?`
Example	Will set the Q Range to 0.5 V Peak when Reference Z is 50Ω, and to 1.0 V Peak when Reference Z is 75Ω. POW:IQ:Q:RANG 4 dBm
Notes	The POWer form of the command is provided for convenience. It maps to the same underlying gain range parameter as the VOLTage form of the command. The Reference Z (not the Q channel Input Z) is used to convert the power to peak voltage, which is then used to set the Q Range as with the VOLTage form of the command. The power values of the 4 range states (1V Peak, 0.5V Peak, 0.25V Peak, and 0.125V Peak) will vary with Reference Z. Here are some examples: 50Ω: 10, 4, –2, –8 75Ω: 8.2, 2.2, –3.8, –9.8 600Ω: –0.8, –6.8, –12.8, –18.9
Preset	10.0 dBm
Range	–20 dBm to 10 dBm
Min	–20 dBm
Max	10 dBm
Initial S/W Revision	Prior to A.02.00

I/Q Gain Ranges

1 V Peak

Set the channel gain state to 1 Volt Peak.

Key Path	**AMPTD Y Scale, I Range | Q Range**
Initial S/W Revision	Prior to A.02.00

0.5 V Peak

Set the channel gain state to 0.5 Volt Peak.

Key Path	**AMPTD Y Scale, I Range | Q Range**
Initial S/W Revision	Prior to A.02.00

0.25 V Peak

Set the channel gain state to 0.25 Volt Peak.

Key Path	**AMPTD Y Scale, I Range | Q Range**
Initial S/W Revision	Prior to A.02.00

0.125 V Peak

Set the channel gain state to 0.125 Volt Peak.

Key Path	**AMPTD Y Scale, I Range | Q Range**
Initial S/W Revision	Prior to A.02.00

Scale / Div

Sets the units per vertical graticule division on the display. This function is only available when Scale Type (Log) is selected and the vertical scale is power. When Scale Type (Lin) is selected, Scale/Div is grayed out.

Key Path	**AMPTD Y Scale**
Remote Command	`:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:WIND:TRAC:Y:PDIV 5 DB
Dependencies	Scale/Div is grayed out in linear Y scale. Sending the equivalent SCPI command does change the Scale/Div, though it has no affect while in Lin.
Preset	10.00 dB / Div
State Saved	Saved in instrument state

Min	0.10 dB
Max	20 dB
Initial S/W Revision	Prior to A.02.00

Scale Type

Chooses a linear or logarithmic vertical scale for the display and for remote data readout.

When Scale Type (Log) is selected, the vertical graticule divisions are scaled in logarithmic units. The top line of the graticule is the Reference Level and uses the scaling per division Scale/Div to assign values to the other locations on the graticule.

When Scale Type (Lin) is selected, the vertical graticule divisions are linearly scaled with the reference level value at the top of the display and zero volts at the bottom. Each vertical division of the graticule represents one-tenth of the Reference Level.

NOTE The Y Axis Unit used for each type of display is set by pressing Y Axis Unit. The analyzer remembers separate Y Axis Unit settings for both Log and Lin.

Key Path	**AMPTD Y Scale**
Remote Command	`:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:SPACing LINear|LOGarithmic` `:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:SPACing?`
Example	DISP:WIND:TRAC:Y:SPAC LOG DISP:WIND:TRAC:Y:SPAC?
Dependencies	If Normalize is on, Scale Type forced to Log and is grayed out.
Couplings	Changing the Scale Type always sets the Y Axis unit to the last unit specified for the current amplitude scale. In other words, we restore the Y Axis unit setting appropriate per log/lin.
Preset	LOG
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker. If the selected marker is not on when Presel Center is pressed, the analyzer will turn on the selected marker, perform a peak search, and then perform centering on the marker's center frequency. If the selected marker is already on and between the start and stop frequencies of the analyzer, the analyzer performs the preselector calibration on that marker's frequency. If the selected marker is already on, but outside the frequency range between Start Freq and Stop Freq, the analyzer will first perform a peak search, and then perform centering on the marker's center frequency.

The value displayed on the **Presel Adjust** key will change to reflect the new preselector tuning (see **Presel Adjust**.

A number of considerations should be observed to ensure proper operation. See "Proper Preselector Operation" on page 1137.

Key Path	**AMPTD Y Scale**
Remote Command	`[:SENSe]:POWer[:RF]:PCENter`
Example	POW:PCEN
Notes	Note that the rules outlined above under the key description apply for the remote command as well as the key. The result of the command is dependent on marker position, and so forth. Any message shown by the key press is also shown in response to the remote command.
Dependencies	• Grayed out if the microwave preselector is off.) • If the selected marker's frequency is below Band 1, advisory message 0.5001 is generated and no action is taken. • Grayed out if entirely in Band 0. • Blank in models that do not include a preselector, such as option 503. If the SCPI is sent in these instruments, it is accepted without error, and the query always returns 0. • Grayed out in the Spectrogram View.
Couplings	The active marker position determines where the centering will be attempted. If the analyzer s in a measurement such as averaging when centering is initiated, the act of centering the preselector will restart averaging but the first average trace will not be taken until the centering is completed.

Status Bits/OPC dependencies	When centering the preselector, *OPC will not return true until the process is complete and a subsequent measurement has completed, nor will results be returned to a READ or MEASure command. The Measuring bit should remain set while this command is operating and should not go false until the subsequent sweep/measurement has completed.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Proper Preselector Operation

A number of considerations should be observed to ensure proper operation:

If the selected marker is off, the analyzer will turn on a marker, perform a peak search, and adjust the preselector using the selected marker's frequency. It uses the "highest peak" peak search method unqualified by threshold or excursion, so that there is no chance of a 'no peak found' error. It continues with that peak, even if it is the peak of just noise. Therefore, for this operation to work properly, there should be a signal on screen in a preselected range for the peak search to find.

If the selected marker is already on, the analyzer will attempt the centering at that marker's frequency. There is no preselector for signals below about 3.6 GHz, therefore if the marker is on a signal below 3.6 GHz, no centering will be attempted and an advisory message generated

In some models, the preselector can be bypassed. If it is bypassed, no centering will be attempted in that range and a message will be generated.

Preselector Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when "Presel Center" on page 1136 is available.

For general purpose signal analysis, using Presel Center is recommended. Centering the filter minimizes the impact of long-term preselector drift. Presel Adjust can be used instead to manually optimize the preselector. One application of manual optimization would be to peak the preselector response, which both optimizes the signal-to-noise ratio and minimizes amplitude variations due to small (short-term) preselector drifting.

Key Path	**AMPTD Y Scale**
Scope	Meas Global
Remote Command	`[:SENSe]:POWer[:RF]:PADJust <freq>` `[:SENSe]:POWer[:RF]:PADJust?`
Example	POW:PADJ 100KHz POW:PADJ?
Notes	The value on the key reads out to 0.1 MHz resolution.

Dependencies	• Grayed out if microwave preselector is off.) • Grayed out if entirely in Band 0. • Blank in models that do not include a preselector, such as option 503. If the SCPI is sent in these instruments, it is accepted without error, and the query always returns 0. • Grayed out in the Spectrogram View.
Preset	0 MHz
State Saved	The **Presel Adjust** value set by **Presel Center**, or by manually adjusting **Presel Adjust**, is not saved in Instrument State, and does not survive a Preset or power cycle.
Min	–500 MHz
Max	500 MHz
Backwards Compatibility SCPI	[:SENSe]:POWer[:RF]:MW:PADJust [:SENSe]:POWer[:RF]:MMW:PADJust (These were undocumented commands for PSA which X-Series will accept)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00
Default Unit	Hz

Remote Command	`[:SENSe]:POWer[:RF]:PADJust:PRESelector MWAVe|MMWave|EXTernal` `[:SENSe]:POWer[:RF]:PADJust:PRESelector?`
Notes	[:SENSe]:POWer[:RF]:PADJust:PRESelector MWAVe|MMWave|EXTernal where: MWAV = 3–26 GHz MMWave = 26–50 GHz EXTernal = External Preselector Selection - PSA had multiple preselectors, and you could select which preselector to center. Since the X-Series will have only one preselector, the preselector selection softkey will no longer be available. However, in order to provide backward compatibility, we will support the remote command. The command form is a NOP The query will return MWAVe
Initial S/W Revision	Prior to A.02.00

Y Axis Unit

Displays the menu keys that enable you to change the vertical (Y) axis amplitude unit. The analyzer retains the entered Y Axis Unit separately for both Log and Lin amplitude scale types. For example, if Scale Type has been set to Log, and you set Y Axis Unit to dBm, pressing Scale Type (Log) sets the Y Axis Unit to dBm. If Scale Type has been set to Lin and you set Y Axis Unit to V, pressing Scale Type (Lin) sets the Y Axis Unit to V. Pressing Scale Type (Log) again sets the Y axis unit back to dBm.

NOTE The units of current (A, dBmA, dBuA) are calculated based on 50 ohms input impedance.

All four of the EMI units (dBμA/m, dBμV/m, dBG, dBpT) are treated by the instrument exactly as though they were dBuV. The user must load an appropriate correction factor using Amplitude Corrections for accurate and meaningful results.

If a SCPI command is sent to the analyzer that uses one of the EMI units as a terminator, the analyzer treats it as though DBUV had been sent as the terminator.

Key Path	**AMPTD Y Scale**
Mode	SA
Scope	Meas Global
Remote Command	`:UNIT:POWer DBM|DBMV|DBMA|V|W|A|DBUV|DBUA|DBUVM|DBUAM|DBPT|DBG` `:UNIT:POWer?`
Example	UNIT:POW dBmV UNIT:POW?
Notes	The Y axis unit has either logarithmic or linear characteristics. The set of units that is logarithmic consists of dBm, dBmV, dBmA, dBμV, dBμA, dBμV/m, dBμA/m, dBpT, and dBG. The set if units that is linear consists of V, W, and A. The chosen unit will determine how the reference level and all the amplitude-related outputs like trace data, marker data, etc. read out.

Notes	The settings of Y Axis Unit and Scale Type, affect how the data is read over the remote interface. When using the remote interface no unit is returned, so you must know what the Y axis unit is to interpret the results: Example 1, set the following: Scale Type (Log) Y Axis Unit, dBm Scale/Div, 1 dB Ref Level, 10 dBm This sets the top line to 10 dBm with each vertical division representing 1 dB. Thus, if a point on trace 1 is on the fifth graticule line from the top, it represents 5 dBm and will read out remotely as 5. Example 2, set the following: Scale Type (Lin) Y Axis Unit, Volts Ref Level, 100 mV (10 mV/div) This sets the top line to 100 mV and the bottom line to 0 V, so each vertical division represents 10 mV. Thus, if a point on trace 1 is on the fifth graticule line from the top, it represents 50 mV and will read out remotely as 50.
Dependencies	If an amplitude correction with an Antenna Unit other than **None** is applied and enabled, then that antenna unit is forced and the key with that unit is the only Y Axis Unit available. All other Y Axis Unit keys are grayed out. If an amplitude correction with an Antenna Unit other than **None** is applied and enabled, and you then turn off that correction or set **Apply Corrections** to **No**, the Y Axis Unit that existed before the Antenna Unit was applied is restored.
Couplings	The analyzer retains the entered Y Axis Unit separately for both Log and Lin amplitude scale types
Preset	dBm for log scale, V for linear. The true ‘preset’ value is dBm, since at preset the Y Scale type is set to logarithmic.
State Saved	Saved in instrument state
Readback line	1-of-N selection
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.04.00

dBm

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBm.

Key Path	**AMPTD Y Scale, Y Axis Unit**
Example	UNIT:POW DBM

Dependencies	Grayed out if an Amplitude Correction with an Antenna Unit is ON.
Readback	dBm
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

dBmV

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBmV.

Key Path	**AMPTD Y Scale, Y Axis Unit**
Example	UNIT:POW DBMV
Dependencies	Grayed out if an Amplitude Correction with an Antenna Unit is ON.
Readback	dBmV
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

dBmA

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBmA.

Key Path	**AMPTD Y Scale, Y Axis Unit**
Example	UNIT:POW DBMA
Dependencies	Grayed out if an Amplitude Correction with an Antenna Unit is ON.
Readback	dBmA
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

W

Sets the amplitude unit for the selected amplitude scale (log/lin) to watt.

Key Path	**AMPTD Y Scale, Y Axis Unit**
Example	UNIT:POW W
Dependencies	Grayed out if an Amplitude Correction with an Antenna Unit is ON.
Readback	W
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

V

Sets the amplitude unit for the selected amplitude scale (log/lin) to volt.

Key Path	**AMPTD Y Scale, Y Axis Unit**
Example	UNIT:POW V
Dependencies	Grayed out if an Amplitude Correction with an Antenna Unit is ON.
Readback	V
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

A

Sets the amplitude unit for the selected amplitude scale (log/lin) to Ampere.

Key Path	**AMPTD Y Scale, Y Axis Unit**
Example	UNIT:POW A
Dependencies	Grayed out if an Amplitude Correction with an Antenna Unit is ON.
Readback	A
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

dBµV

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBµV.

Key Path	**AMPTD Y Scale, Y Axis Unit**
Example	UNIT:POW DBUV
Dependencies	Grayed out if an Amplitude Correction with an Antenna Unit is ON.
Readback	dBµV
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

dBµA

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBµA.

Key Path	**AMPTD Y Scale, Y Axis Unit**
Example	UNIT:POW DBUA
Dependencies	Grayed out if an Amplitude Correction with an Antenna Unit is ON.

Readback	dBμA
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

dBμV/m

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBμV/m. This is an antenna unit, and this key is grayed out unless a Correction with this Antenna Unit selected is ON. If this is the case, all of the other Antenna Units are grayed out.

Key Path	**AMPTD Y Scale, Y Axis Unit**
Example	UNIT:POW DBUVM
Dependencies	Grayed out if no Amplitude Correction with an Antenna Unit is on.
Readback	dBμV/m
Initial S/W Revision	A.02.00

dBμA/m

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBμA/m. This is an antenna unit, and this key is grayed out unless a Correction with this Antenna Unit selected is ON. If this is the case, all of the other Antenna Units are grayed out.

Key Path	**AMPTD Y Scale, Y Axis Unit**
Example	UNIT:POW DBUAM
Dependencies	Grayed out if no Amplitude Correction with an Antenna Unit is on.
Readback	dBμA/m
Initial S/W Revision	A.02.00

dBpT

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBpT. This is an antenna unit, and this key is grayed out unless a Correction with this Antenna Unit selected is ON. If this is the case, all of the other Antenna Units are grayed out.

Key Path	**AMPTD Y Scale, Y Axis Unit**
Example	UNIT:POW DBPT
Dependencies	Grayed out if no Amplitude Correction with an Antenna Unit is on.
Readback	dBpT
Initial S/W Revision	A.02.00

dBG

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBG. This is an antenna unit, and this key is grayed out unless a Correction with this Antenna Unit selected is ON. If this is the case, all of the other Antenna Units are grayed out.

Key Path	**AMPTD Y Scale, Y Axis Unit**
Example	UNIT:POW DBG
Dependencies	Grayed out if no Amplitude Correction with an Antenna Unit is on.
Readback	dBG
Initial S/W Revision	A.02.00

Reference Level Offset

Adds an offset value to the displayed reference level. The reference level is the absolute amplitude represented by the top graticule line on the display.

See “More Information” on page 1144.

Key Path	**AMPTD Y Scale**
Mode	SA
Scope	Meas Global
Remote Command	`:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet <rel_ampl>` `:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet?`
Example	DISP:WIND:TRAC:Y:RLEV:OFFS 12.7 Sets the Ref Level Offset to 12.7 dB. The only valid suffix is dB. If no suffix is sent, dB will be assumed.
Preset	0 dBm
State Saved	Saved in instrument state
Min	The range for Ref Lvl Offset is variable. It is limited to values that keep the reference level within the range of –327.6 dB to 327.6 dB.
Max	327.6 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

More Information

Offsets are used when gain or loss occurs between a device under test and the analyzer input. Thus, the signal level measured by the analyzer may be thought of as the level at the input of an external amplitude conversion device. Entering an offset does not affect the trace position or attenuation value, just the value of the top line of the display and the values represented by the trace data. Thus, the values of exported trace data, queried trace data, marker amplitudes, trace data used in calculations such as N dB points, trace math, peak threshold, and so forth, are all affected by Ref Level Offset.

NOTE	Changing the offset causes the analyzer to immediately stop the current sweep and prepare to begin a new sweep, but the data will not change until the trace data updates, because the offset is applied to the data as it is taken. If a trace is exported with a nonzero Ref Level Offset, the exported data will contain the trace data with the offset applied.

The maximum reference level available is dependent on the reference level offset. That is, Ref Level - Ref Level Offset must be in the range –170 to +30 dBm. For example, the reference level value range can be initially set to values from –170 dBm to 30 dBm with no reference level offset. If the reference level is first set to –20 dBm, then the reference level offset can be set to values of –150 to +50 dB.

If the reference level offset is first set to –30 dB, then the reference level can be set to values of –200 dBm to 0 dBm. In this case, the reference level is “clamped” at 0 dBm because the maximum limit of +30 dBm is reached with a reference level setting of 0 dBm with an offset of –30 dB. If instead, the reference level offset is first set to 30 dB, then the reference level can be set to values of –140 to +60 dBm.

µW Path Control

The **µW Path Control** functions include the **µW Preselector Bypass** (Option MPB) and **Low Noise Path** (Option LNP) controls in the High Band path circuits.

When the µW Preselector is bypassed, the user has better flatness, but will be subject to spurs from out of band interfering signals. When the Low Noise Path is enabled, the analyzer automatically switches around certain circuitry in the high frequency bands which can contribute to noise, when it is appropriate based on other analyzer settings.

For most applications, the preset state is Standard Path, which gives the best remote-control throughput, minimizes acoustic noise from switching and minimizes the risk of wear-out in the hardware switches. For applications that utilize the wideband IF paths, the preset state is the µW Preselector Bypass path, if option MPB is present. This is because, when using a wideband IF such as the 140 MHz IF, the µW Preselector’s bandwidth can be narrower than the available IF bandwidth, causing degraded amplitude flatness and phase linearity, so it is desirable to bypass the preselector in the default case.

Users may choose Low Noise Path Enable. It gives a lower noise floor, especially in the 21–26.5 GHz region, though without improving many measures of dynamic range, and without giving the best possible noise floor. The preamp, if purchased and used, gives better noise floor than does the Low Noise Path, however its compression threshold and third-order intercept are much poorer than that of the non-preamp Low Noise Path. There are some applications, typically for signals around 30 dBm, for which the third-order dynamic range of the standard path is good enough, but the noise floor is not low enough even with 0 dB input attenuation. When the third-order dynamic range of the preamp path is too little and the noise floor of the standard path is too high, the Low Noise Path can provide the best dynamic range.

Key Path	**AMPTD Y Scale**

Mode	SA, BASIC, PNOISE, VSA
Scope	Meas Global
Remote Command	`[:SENSe]:POWer[:RF]:MW:PATH STD|LNPath|MPBypass|FULL` `[:SENSe]:POWer[:RF]:MW:PATH?`
Example	:POW:MW:PATH LNP Enables the Low Noise path
Notes	If a Presel Center is performed, the analyzer will momentarily switch to the Standard Path, regardless of the setting of **µW Path Control** The DC Block will always be switched in when the low noise path is switched in, to protect succeeding circuitry from DC. Note that this does not mean “when the low noise path is enabled” but when, based on the Low Noise Path rules, the path is actually switched in. This can happen when the selection is **Low Noise Path Enable** . In the case where the DC Block is switched in the analyzer is now AC coupled. However, if the user has selected DC coupling, the UI will still behave as though it were DC coupled, including all annunciation, warnings, status bits, and responses to SCPI queries. This is because, based on other settings, the analyzer could switch out the low noise path at any time and hence go back to being DC coupled. Alignment switching ignores the settings in this menu, and restores them when finished.
Dependencies	Blanked in BBIQ
Preset	All modes other than IQ Analyzer mode: STD IQ Analyzer mode: MPB option present and licensed: MPB MPB option not present and licensed: STD
State Saved	Save in instrument state
Readback	Value selected in the submenu
Initial S/W Revision	A.04.00

Standard Path

This path gives the best remote-control throughput, minimizes acoustic noise from switching and minimizes the risk of wear in the hardware switches, particularly in remote test scenarios where both low band and high band setups will follow in rapid succession.

In this path, the bypass of the low band/high band switch and microwave preamp is never activated, which can cause some noise degradation but preserves the life of the bypass switch.

Key Path	**AMPTD Y Scale, µW Path Control**
Example	:POW:MW:PATH STD
Readback Text	Standard Path
Initial S/W Revision	A.04.00

Low Noise Path Enable

You may choose Low Noise Path Enable, which gives a lower noise floor under some circumstances, particularly when operating in the 21–26.5 GHz region. With the Low Noise Path enabled, the low band/high band switch and microwave preamp are bypassed whenever all of the following are true:

- The analyzer is not in the Low Band, meaning:
- the start frequency is above 3.5 GHz and
- the stop frequency is above 3.6 GHz.
- the internal preamp is not installed or (if installed) is set to **Off** or **Low Band**

Note that this means that, when any part of a sweep is done in Low Band, the Low Noise Path is not used, whether or not the **Low Noise Path Enable** is selected in the user interface. Also, if the preamp is turned on, the Low Noise Path is not used, whether or not the **Low Noise Path Enable** is selected in the user interface. The only time the Low Noise Path is used is when **Low Noise Path Enable** is selected, the sweep is completely in High Band (> 3.6 GHz) and no preamp is in use.

See “More Information” on page 1147.

Key Path	**AMPTD Y Scale, μW Path Control**
Measurement	Swept SA
Example	:POW:MW:PATH LNP
Notes	For measurements that use IQ acquisition, the low noise path is used when the Center Frequency is in High Band (> 3.6 GHz) and no preamp is in use. In other words, the rules above are modified to use only the center frequency to qualify which path to switch in. This is not the case for FFT’s in the Swept SA measurement; they use the same rules as swept measurements.
Dependencies	Key is blanked if current mode does not support it. Key is grayed out if mode supports it but current measurement does not support it. Unless Option LNP is present and licensed, key is blank and if SCPI command sent, error –241, "Hardware missing; Option not installed" is generated.
Readback Text	Low Noise Path Enable
Initial S/W Revision	A.04.00

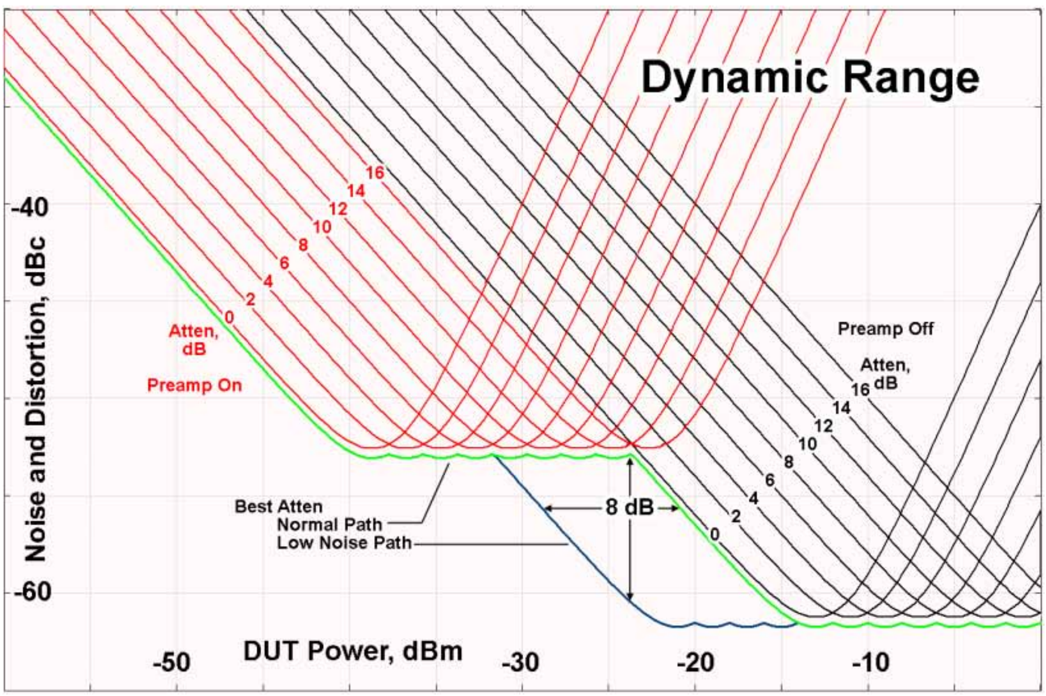
More Information

The user should understand that the Low Noise Path, while giving improved DANL, has the disadvantage of decreased TOI performance and decreased gain compression performance relative to the standard path.

The user should also understand that the bypass switch is a mechanical switch and has finite life; so if the **Low Noise Path** is enabled, it is possible to cause frequent cycling of this switch by frequently changing analyzer settings such that the above conditions hold true only some of the time. A user making tests of this nature should consider opting for the **Standard Path**, which will never throw the bypass switch, at the expense of some degraded noise performance.

The low noise path is useful for situations where the signal level is so low that the analyzer performance is dominated by noise even with 0 dB attenuation, but still high enough that the preamp option would have excessive third-order intermodulation or compression. The preamp, if purchased and used, gives better noise floor than does the “Low Noise Path.” However, its compression threshold and third-order intercept are much poorer than that of the non-preamp path. There are some applications, typically for signals around 30 dBm, for which the third-order dynamic range of the standard path is good enough, but the noise floor is not low enough even with 0 dB input attenuation. When the third-order dynamic range of the preamp path is too little and the noise floor of the standard path is too high, the Low Noise Path can provide the best dynamic range

The graph below illustrates the concept. It shows, in red, the performance of an analyzer at different attenuation settings, both with the preamp on and off, in a measurement that is affected by both analyzer noise and analyzer TOI. The green shows the best available dynamic range, offset by 0.5 dB for clarity. The blue shows how the best available dynamic range improves for moderate signal levels with the low noise path switched in. In this illustration, the preamp improves the noise floor by 15 dB while degrading the third-order intercept by 30 dB, and the low noise path reduces loss by 8 dB. The attenuator step size is 2 dB.



There are other times where selecting the low noise path improves performance, too. Compression-limited measurements such as finding the nulls in a pulsed-RF spectrum can profit from the low noise path in a way similar to the TOI-limited measurement illustrated. Accuracy can be improved when the low noise path allows the optimum attenuation to increase from a small amount like 0, 2 or 4 dB to a larger amount, giving better return loss at the analyzer input. Harmonic measurements, such as second and third harmonic levels, are much improved using the low noise path because of the superiority of that path for harmonic (though not intermodulation) distortion performance.

µW Preselector Bypass

This key toggles the preselector bypass switch for band 1 and higher. When the microwave presel is on, the signal path is preselected. When the microwave preselector is off, the signal path is not preselected. The preselected path is the normal path for the analyzer.

The preselector is a tunable bandpass filter which prevents signals away from the frequency of interest from combining in the mixer to generate in-band spurious signals (images). The consequences of using a preselector filter are its limited bandwidth, the amplitude and phase ripple in its passband, and any amplitude and phase instability due to center frequency drift.

Option MPB or pre-selector bypass provides an unpreselected input mixer path for certain X-Series signal analyzers with frequency ranges above 3.6 GHz. This signal path allows a wider bandwidth and less amplitude variability, which is an advantage when doing modulation analysis and broadband signal analysis. The disadvantage is that, without the preselector, image signals will be displayed. Another disadvantage of bypassing the preselector is increased LO emission levels at the front panel input port.

Key Path	**AMPTD Y Scale, µW Path Control**
Example	:POW:MW:PATH MPB
Dependencies	Key is blanked if current mode does not support it. Key is grayed out if mode supports it but current measurement does not support it. Key is blank unless Option MPB is present and licensed. If SCPI command sent when MPB not present, error –241, "Hardware missing; Option not installed" is generated.
Readback Text	µW Preselector Bypass
Initial S/W Revision	A.04.00

Example	:POW:MW:PRES OFF Bypasses the microwave preselector
Preset	ON
Backwards Compatibility SCPI	[:SENSe]:POWer[:RF]:MW:PRESelector[:STATe] ON|OFF|0|1 [:SENSe]:POWer[:RF]:MW:PRESelector[:STATe]?
Backwards Compatibility Notes	The ON parameter sets the STD path. The OFF parameter sets Path MPB.

Internal Preamp

Accesses a menu of keys that control the internal preamps. Turning on the preamp gives a better noise figure, but a poorer TOI to noise floor dynamic range. You can optimize this setting for your particular measurement.

The instrument takes the preamp gain into account as it sweeps. If you sweep outside of the range of the preamp the instrument will also account for that. The displayed result will always reflect the correct gain.

Key Path	**AMPTD Y Scale**
Scope	Meas Global
Remote Command	`[:SENSe]:POWer[:RF]:GAIN[:STATe] OFF|ON|0|1` `[:SENSe]:POWer[:RF]:GAIN[:STATe]?`
Dependencies	Preamp is not available on all hardware platforms. If the preamp is not present or is unlicensed, the key is not shown. The preamp is not available when the electronic/soft attenuator is enabled.
Preset	OFF
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Key Path	**AMPTD Y Scale, Internal Preamp**
Scope	Meas Global
Remote Command	`[:SENSe]:POWer[:RF]:GAIN:BAND LOW|FULL` `[:SENSe]:POWer[:RF]:GAIN:BAND?`
Dependencies	Preamp is not available on all hardware platforms. If the preamp is not present or is unlicensed, the key is not shown. If a POW:GAIN:BAND FULL command is sent when a low band preamp is available, the preamp band parameter is to LOW instead of FULL, and an "Option not installed" message is generated.
Preset	LOW
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Off

Turns the internal preamp off

Key Path	**AMPTD Y Scale, Internal Preamp**
Example	:POW:GAIN OFF
Readback	Off
Initial S/W Revision	Prior to A.02.00

Low Band

Sets the internal preamp to use only the low band.

The frequency range of the installed (optional) low-band preamp is displayed in square brackets on the **Low Band** key label.

Key Path	**AMPTD Y Scale, Internal Preamp**
Example	:POW:GAIN ON :POW:GAIN:BAND LOW
Readback	Low Band
Initial S/W Revision	Prior to A.02.00

Full Range

Sets the internal preamp to use its full range. The low band (0–3.6 GHz or 0–3GHz, depending on the model) is supplied by the low band preamp and the frequencies above low band are supplied by the high band preamp.

The frequency range of the installed (optional) preamp is displayed in square brackets on the **Full Range** key label. If the high band option is not installed the Full Range key does not appear.

Key Path	**AMPTD Y Scale, Internal Preamp**
Example	:POW:GAIN ON :POW:GAIN:BAND FULL
Readback	Full Range
Initial S/W Revision	Prior to A.02.00

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement which have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, trace attributes, or display attributes.

See “More Information” on page 1153

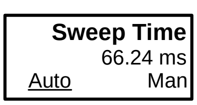
Key Path	**Front-panel key**
Remote Command	`:COUPle ALL|NONE`
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the **Auto Couple** key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements.
Initial S/W Revision	Prior to A.02.00

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between "Auto" (where the parameter is automatically coupled to the other parameters it is dependent upon) and "Man" (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either "Auto" or "Man" underlined as illustrated below.

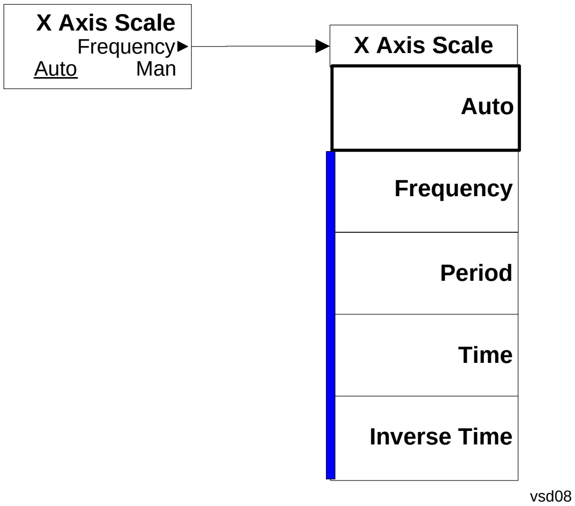


vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in "Auto" in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.

Auto Couple


X Axis Scale
Frequency
Auto
Man
X Axis Scale
Auto
Frequency
Period
Time
Inverse Time
vsd08

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

Key Path	**Front panel key**
Remote Command	`:INITiate:CONTinuous OFF|ON|0|1` `:INITiate:CONTinuous?`
Example	:INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation
Preset	ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hiold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until k = N, at which point the current sequence will stop and the instrument will go to the idle state.

FREQ Channel

Accesses a menu of keys that allow you to control the Frequency and Channel parameters of the instrument.

Some features in the Frequency menu are the same for all measurements – they do not change as you change measurements. Settings like these are called "Meas Global" and are unaffected by Meas Preset. For example, the Center Freq setting is the same for all measurements - it does not change as you change measurements.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See "RF Center Freq" on page 1160

See "Ext Mix Center Freq" on page 1161

See "I/Q Center Freq" on page 1162

See "Center Frequency Presets" on page 1159

Key Path	**FREQ Channel**
Scope	Meas Global
Remote Command	`[:SENSe]:FREQuency:CENTer <freq>` `[:SENSe]:FREQuency:CENTer?`

Example	FREQ:CENT 50 MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT?
Notes	This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependant on Hardware Options (503, 507, 508, 513, 526) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated.
Dependencies	The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop hit their limit.
Couplings	When operating in “swept span”, any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer’s frequency range
Preset	Depends on instrument maximum frequency, mode, measurement, and selected input. See REF T_CF_CFPresets \h *CHARFORMAT - and REF T_RFCF_MoreInformation \h *CHARFORMAT - and HYPERLINK \l "T_ExtMixCF_MoreInformation" - and REF T_IQCF_MoreInformation \h *CHARFORMAT -.
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input. See “Center Frequency Presets” on page 1159 and “RF Center Freq” on page 1160 and “I/Q Center Freq” on page 1162.
Max	Depends on instrument maximum frequency, mode, measurement, and selected input. See “Center Frequency Presets” on page 1159 and “RF Center Freq” on page 1160 and “I/Q Center Freq” on page 1162.
Status Bits/OPC Dependencies	non-overlapped
Initial S/W Revision	Prior to A.02.00
Default Unit	Hz

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

Freq Option	**CFafter Mode Preset**	**Stop Freq after Mode Preset**	**Max Freq(can't tune above)**
503 (all but N9000A)	1.805 GHz	3.6 GHz	3.7 GHz
503 (N9000A)	1.505 GHz	3.0 GHz	3.08 GHz
507 (all but N9000A)	3.505 GHz	7.0 GHz	7.1 GHz
507 (N9000A)	3.755 GHz	7.5 GHz	7.58 GHz
508	4.205 GHz	8.4 GHz	8.5 GHz
513	6.805 GHz	13.6 GHz	13.8 GHz
526	13.255 GHz	26.5 GHz	27.0 GHz
532	16.005 GHz	32.0 GHz	32.5 GHz
540	20.005 GHz	40.0 GHz	40.5 GHz
544	22.005 GHz	44.0 GHz	44.5 GHz
550	25.005 GHz	50.0 GHz	51 GHz

Tracking Generator Frequency Limits (N9000A only):

Tracking Generator Option	**Min Freq (clips to this freq when turn TG on and can't tune below while TG on)**	**If above this Freq, Stop Freq clipped to this Freq when TG turned on**	**Max Freq (can't tune above) while TG on**
T03	9 kHz	3.0 GHz	3.08 GHz
T06	9 kHz	6.0 GHz	6.05 GHz

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

Mode	**CF Preset for RF**
WCDMA	1 GHz
WIMAXOFDMA,	1 GHz

BASIC	1 GHz
ADEMOD	1 GHz
VSA	1 GHz
TDSCDMA	1 GHz
PNOISE	1 GHz
GSM	935.2 MHz
NFIGURE	1.505 GHz

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	`[:SENSe]:FREQuency:RF:CENTer <freq>` `[:SENSe]:FREQuency:RF:CENTer?`
Example	FREQ:RF:CENT 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Dependencies	If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “–221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep. In analyzers with an RF Preselector, such as MXE, you cannot sweep across the band break at 3.6 GHz while the RF Preselector is on in Continuous sweep, as there is a mechanical switch which bypasses the RF Preselector above 3.6 GHz. See the Stop Frequency key description for details of this limitation.
Preset	See table above
State Saved	Saved in instrument state.

Min	–79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source
Max	See table above. Basically instrument maximum frequency – 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global

Remote Command	`[:SENSe]:FREQuency:EMIXer:CENTer <freq>`
	
	`[:SENSe]:FREQuency:EMIXer:CENTer?`

Example	:FREQ:EMIX:CENT 60 GHz :FREQ:EMIX:CENT?
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Couplings	When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup.

Preset	When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz.
State Saved	Saved in instrument state.
Min	The minimum frequency in the currently selected mixer band + 5 Hz
Max	The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	A.08.01

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

Scope	Meas Global

Remote Command	`[:SENSe]:FREQuency:IQ:CENTer <freq>`
	
	`[:SENSe]:FREQuency:IQ:CENTer?`

Example	FREQ:IQ:CENT: 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	0 Hz
State Saved	Saved in instrument state.
Min	–40.049995 MHz
Max	40.049995 MHz
Initial S/W Revision	Prior to A.02.00

CF Step

Changes the step size for the center frequency and start and stop frequency functions. Once a step size has been selected and the center frequency function is active, the step keys (and the UP|DOWN parameters for Center Frequency from remote commands) change the center frequency by the step-size value. The step size function is useful for finding harmonics and sidebands beyond the current frequency span of the analyzer.

Note that the start and stop frequencies also step by the CF Step value.

Key Path	**FREQ Channel**

Remote Command	`[:SENSe]:FREQuency:CENTer:STEP[:INCRement] <freq>`
	`[:SENSe]:FREQuency:CENTer:STEP[:INCRement]?`
	`[:SENSe]:FREQuency:CENTer:STEP:AUTO OFF|ON|0|1`
	`[:SENSe]:FREQuency:CENTer:STEP:AUTO?`

Example	FREQ:CENT:STEP:AUTO ON FREQ:CENT:STEP 500 MHz FREQ:CENT UP increases the current center frequency value by 500 MHz FREQ:CENT:STEP? FREQ:CENT:STEP:AUTO?
Notes	Preset and Max values are dependant on Hardware Options (503, 508, 513, 526)
Dependencies	Span, RBW, Center frequency If the electronic/soft attenuator is enabled, any attempt to change the value of the center frequency >3.6 GHz by pressing the Up-arrow key, fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a "–221, Settings conflict" warning.
Couplings	When auto-coupled in a non-zero span, the center frequency step size is set to 10% of the span. When auto-coupled in zero span, the center frequency step size is set to the equivalent –3 dB RBW value.
Preset	Auto ADEMOD: 1 MHz ON
State Saved	Saved in instrument state
Min	– (the maximum frequency of the instrument). That is, 27 GHz max freq instrument has a CF step range of +/– 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band.

Max	the maximum frequency of the instrument. That is, 27 GHz max freq instrument has a CF step range of +/– 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band.
Status Bits/OPC dependencies	non-overlapped
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00
Default Unit	Hz

Input/Output

The Input/Output features are common across multiple Modes and Measurements. These common features are described in this section. See the Measurement description for information on features that are unique.

The Input/Output key accesses the softkeys that control the Input/Output parameters of the instrument. In general, these are functions associated with external connections to the analyzer, either to the inputs or the outputs. Since these connections tend to be fairly stable within a given setup, in general the input/output settings do not change when you Preset the analyzer.

Other functions related to the input/output connections, but which tend to change on a measurement by measurement basis, can be found under the **Trigger** and **AMPTD Y Scale** keys.In addition, some of the digital I/O bus configurations can be found under the **System** key.

NOTE The functions in the Input/Output menu are "global" (common) to all Modes (applications). But individual Input/Output functions only appear in a Mode if they apply to that Mode. Functions that apply to a Mode but not to all measurements in the Mode may be grayed-out in some measurements.

"Input/Output variables - Preset behavior" on page 1166

The Input Port selection is the first menu under the **Input/Output** key:

Remote Command	`[:SENSe]:FEED RF|AIQ|IQ|IONLy|QONLy|INDependent|AREFerence|EMIXer[:SENSe]:FEED?`
Example	:FEED RF :FEED?
Preset	This setting is unaffected by a Preset or power cycle. It survives a Mode Preset and mode changes. It is set to RF on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state
Backwards Compatibility SCPI	The calibrator was one of the inputs in legacy analyzers but is outside the input selection in the X-Series. The legacy parameter [:SENSe]:FEED AREFerence is aliased to the new command [:SENSe]:FEED:AREF REF50 for backwards compatibility. This causes the input to be switched to the 50 MHz calibrator, but after sending this, the query [:SENSe]:FEED? will NOT return "AREF" but instead the currently selected input.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.08.01

Remote Command	`:INPut:MIXer EXTernal|INTernal` `:INPut:MIXer?`
Example	INP:MIX INT INP:MIX?
Notes	INPut:MIXer EXTernal|INTernal legacy command is mapped as follows: 1. When INPut:MIXer EXTernal is received, SENSe:FEED EMIXer is executed. 2. When INPut:MIXer INTernal is received, SENSe:FEED RF is executed. 3. When INPut:MIXer? is received, the response will be INT if any input other than the external mixer is selected and EXT if the external mixer is selected
Preset	INT
Initial S/W Revision	A.08.01

Input/Output variables - Preset behavior

Virtually all the input/output settings are NOT a part of mode preset. They can be set to their default value by one of the three ways - by using the Restore Input/Output Defaults key on the first page of the input/output menu, by using the System->Restore System Defaults->Input/Output Settings or by using the System -> Restore System Defaults->All. Also, they survive a Preset and a Power cycle.

A very few of the Input/Output settings do respond to a Mode Preset; for example, if the Calibrator is on it turns off on a Preset, and if DC coupling is in effect it switches to AC on a Preset. These exceptions are made in the interest of reliability and usability, which overrides the need for absolute consistency. Exceptions are noted in the SCPI table for the excepted functions.

RF Input

Selects the front-panel RF input port to be the analyzer signal input. If RF is already selected, pressing this key accesses the RF input setup functions.

Key Path	**Input/Output**
Example	[:SENSe]:FEED RF
Readback	The RF input port, RF coupling, and current input impedance settings appear on this key as: "XX, YY, ZZ" where XX is RF, RF2, RFIO1, RFIO2, depending on what input is selected (only appears on analyzers with multiple RF inputs) YY is AC or DC ZZ is 50 or 75
Initial S/W Revision	Prior to A.02.00

Input Z Correction

Sets the input impedance for unit conversions. This affects the results when the y-axis unit is voltage or current units (dBmV, dBµV, dBµA, V, A), but not when it is power units (dBm, W). The impedance you select is for computational purposes only, since the actual impedance is set by internal hardware to 50 ohms. Setting the computational input impedance to 75 ohms is useful when using a 75 ohm to 50 ohm adapter to measure a 75 ohm device on an analyzer with a 50 ohm input impedance.

There are a variety ways to make 50 to 75 ohm transitions, such as impedance transformers or minimum loss pads. The choice of the solution that is best for your measurement situation requires balancing the amount of loss that you can tolerate with the amount of measurement frequency range that you need. If you are using one of these pads/adaptors with the **Input Z Corr** function, you might also want to use the **Ext Gain** key. This function is used to set a correction value to compensate for the gain (loss) through your pad. This correction factor is applied to the displayed measurement values.

Key Path	**Input/Output, RF Input**
Remote Command	`[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude] 50|75` `[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude]?`
Example	CORR:IMP 75 sets the input impedance correction to 75 ohms. CORR:IMP?
Preset	This is unaffected by a Preset but is set to 50 ohms on a "Restore Input/Output Defaults" or "Restore System Defaults->All" Some instruments/options may have 75 ohms available.
State Saved	Saved in instrument state
Readback	50 Ω or 75 Ω. Current setting reads back to the RF key.
Initial S/W Revision	Prior to A.02.00

RF Coupling

Specifies alternating current (AC) or direct current (DC) coupling at the analyzer RF input port. Selecting AC coupling switches in a blocking capacitor that blocks any DC voltage present at the analyzer input. This decreases the input frequency range of the analyzer, but prevents damage to the input circuitry of the analyzer if there is a DC voltage present at the RF input.

In AC coupling mode, you can view signals below the corner frequency of the DC block, but below a certain frequency the amplitude accuracy is not specified. The frequency below which specifications do not apply is:

X-Series Model	Lowest Freq for meeting specs when AC coupled	Lowest Freq for meeting specs when DC coupled
N9000A	9 kHz	n/a

X-Series Model	Lowest Freq for meeting specs when AC coupled	Lowest Freq for meeting specs when DC coupled
N9010A	10 MHz	9 kHz
N9020A	10 MHz	3 Hz
N9030A	10 MHz	3 Hz

Some amplitude specifications apply only when coupling is set to DC. Refer to the appropriate amplitude specifications and characteristics for your analyzer.

When operating in DC coupled mode, ensure protection of the analyzer input circuitry by limiting the DC part of the input level to within 200 mV of 0 Vdc. In AC or DC coupling, limit the input RF power to +30 dBm (1 Watt).

Key Path	**Input/Output, RF Input**
Remote Command	`:INPut:COUPling AC|DC` `:INPut:COUPling?`
Example	INP:COUP DC
Dependencies	This key does not appear in models that are always AC coupled. When the SCPI command to set DC coupling is sent to these models, it results in the error “Illegal parameter value. This model is always AC coupled” In these models, the SCPI query INP:COUP? always returns AC. This key does not appear in models that are always DC coupled.When the SCPI command to set AC coupling is sent to these models, it results in the error “Illegal parameter value. This instrument is always DC coupled” In these models, the SCPI query INP:COUP? always returns DC.
Preset	AC on models that support AC coupling On models that are always DC coupled, such as millimeter wave models (frequency ranges 30 GHz and above), the preset is DC.
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

RF Input Port

Specifies the RF input port used. The RF Input Port key only appears on units with multiple inputs, and lets you switch between the two inputs.

Switching from the RF input port to one of the RFIO ports, on units which have them, changes the receiver performance of the instrument.

Key Path	**Input/Output, RF Input**

Remote Command	`[:SENSe]:FEED:RF:PORT[:INPut] RFIN|RFIN2|RFIO1|RFIO2` `[:SENSe]:FEED:RF:PORT[:INPut]?`
Example	:FEED:RF:PORT RFIN
Dependencies	This key only appears in models that support multiple inputs. If the SCPI command is sent with unsupported parameters in any other model, an error is generated, –221.1900, “Settings conflict;option not installed” It is assumed that all models that support multiple inputs will support all measurements in all modes that ship in those models, unless specifically noted in the individual Mode or Measurement PD. When any input is selected in a measurement that does not support it, the "No result; Meas invalid with this input" error condition occurs, and the measurement should return invalid data when queried, in whatever way that particular measurement returns invalid results: not a number, –1000 dBm, –999, etc. This is the responsibility of each individual measurement.
Preset	This is unaffected by Mode Preset but is set to RF on a "Restore Input/Output Defaults" or "Restore System Defaults -> All"
State Saved	Saved in State
Backwards Compatibility SCPI	INPut<1|2>:TYPE INPUT1 | INPUT2 INPut<1|2>:TYPE?
Initial S/W Revision	A.05.01
Read Back	The current RF Input Port selected is read back to this key
Backwards Compatibility SCPI Notes	The commands above are included for ESU compatibility

RF Input

Specifies using the main RF port for the current measurement

Key Path	**Input/Output, RF Input, RF Input Port**
Example	:FEED:RF:PORT RFIN
ReadBack	RF Input
Initial S/W Revision	A.05.01

RF Input 2

Specifies using the second RF port, if supported, for the current measurement

Key Path	**Input/Output, RF Input, RF Input Port**
Example	:FEED:RF:PORT RFIN2
ReadBack	RF Input 2
Initial S/W Revision	A.05.01

RFIO1

Specifies using the RFIO 1 port, if supported, for the current measurement

Key Path	**Input/Output, RF Input, RF Input Port**
Example	:FEED:RF:PORT RFIO1
Dependencies	Only available in EXT
ReadBack	RFIO 1
Initial S/W Revision	A.05.01

RFIO2

Specifies using the RFIO 2 port, if supported, for the current measurement

Key Path	**Input/Output, RF Input, RF Input Port**
Example	:FEED:RF:PORT RFIO2
Dependencies	Only available in EXT
ReadBack	RFIO 2
Initial S/W Revision	A.05.01

RF Preselector

In models that support the RF Preselector, such as MXE (N9038A), this key allows you to turn the preselector on and off.

Key Path	**Input-Output, RF Setup**
Mode	All
Remote Command	`[:SENSe]:POWer[:RF]: RFPSelector [:STATe] 1|0|ON|OFF` `[:SENSe]:POWer[:RF]: RFPSelector [:STATe]?`
Example	:POW:RFPS 1
Example	:INP:PRES:STAT ON
Notes	[:SENSe]:POWer[:RF]: RFPSelector [:STATe] 1|ON. Sets to full compliance measurement. [:SENSe]:POWer[:RF]: RFPSelector [:STATe] 0|OFF. Sets to pre-compliance measurement.
Dependencies	When the RF Preselector is on, frequencies are limited to keep from sweeping across the 3.6 GHz boundary. See the Stop frequency key description for an explanation of that coupling. This key only appears in models that support the RF Prelselector, in other models, setting or querying the SCPI will generate an error.

Preset	It is set to Off when mode selected is SA. If mode is EMI Receiver, then it will be set to On.
Backwards Compatibility SCPI	INPut<1|2>:PRESelection[:STATe] ON|OFF INPut<1|2>:PRESelection[:STATe]?
Backwards Compatibility SCPI Notes	The commands above are included for ESU compatibility

External Mixer

The **External Mixer** key allows you to choose an External Mixer through which to apply signal input to the analyzer. When **External Mixer** is chosen, the LO/IF port becomes the input to the analyzer.

External Mixing requires option EXM. The External Mixer key will not appear unless option EXM is installed. The presence of the LO/IF connector alone does not indicate that you have Option EXM licensed; you can verify that option EXM is installed by pressing **System, Show, System.**

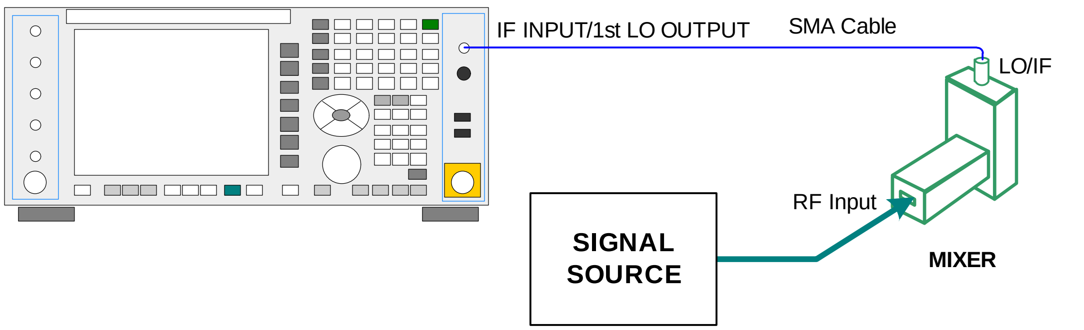
When **External Mixer** is selected, the **Center Freq** key controls the setting of Center Freq in external mixing, which is separate from the settings of **Center Freq** for the RF Input or BBIQ. Each input retains its unique settings for **Center Freq**. A unique SCPI command is provided solely for the external mixing Center Freq (see the **Center Freq** key description) which only affects the External Mixer CF; although sending the generic Center Freq command while External Mixer is selected also controls the External Mixer CF.

See “More Information” on page 1172

Key Path	**Input/Output**
Example	:FEED EMIX
Notes	Not all measurements support the use of the External Mixer input. When External Mixer is selected in a measurement that does not support it, the "No result; Meas invalid with Ext Mixing" error condition occurs.
Dependencies	Unless option EXM is present, the External Mixer key is blanked, and all SCPI commands associated with menus accessed by this key return an error Manual FFT mode is available with external mixing, but not with Signal ID.
Preset	All settings under this key are returned to their default state when **Restore Input/Output Defaults** is pressed.
State Saved	All settings under this key, and all Frequency settings, are remembered when you go out of External Mixer, so that when **External Mixer** is chosen again, all the external mixer functions will retain their previous settings, with the exception of **Signal ID** which is set to OFF (**Signal ID** is also set to Off unless **External Mixer** is the selected Input).
Readback Text	The readback text on this key shows the currently selected mixer, in square brackets.
Initial S/W Revision	A.08.01

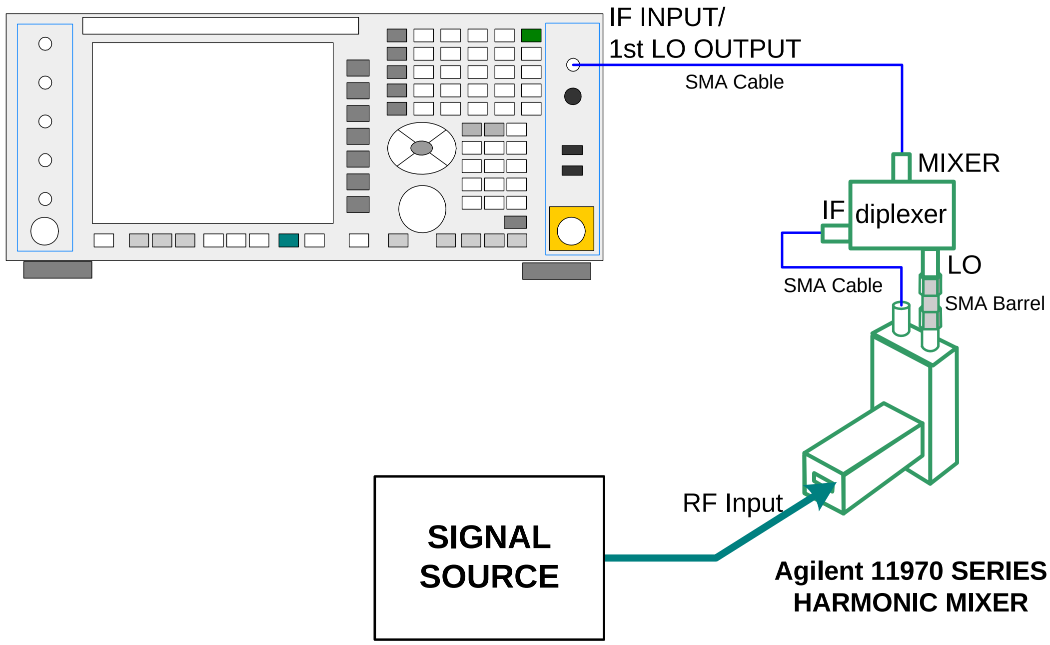
More Information

X-series analyzers have a combined LO Out/IF In connection, whereas earlier analyzers used separate ports for the LO Out and the IF in. Internal diplexers in the analyzer and the mixer simplify the connection for the user – only a single SMA cable is required.



Legacy HP/Agilent and some third party mixers have separate LO In and IF out connections. This requires you to use an external diplexer to connect these mixers. A diplexer can easily be purchased for this purpose (for example, Diplexer Model # DPL.26 or # DPL.313B from OML Inc., Morgan Hill CA)

The connection diagram for such a legacy mixer is:



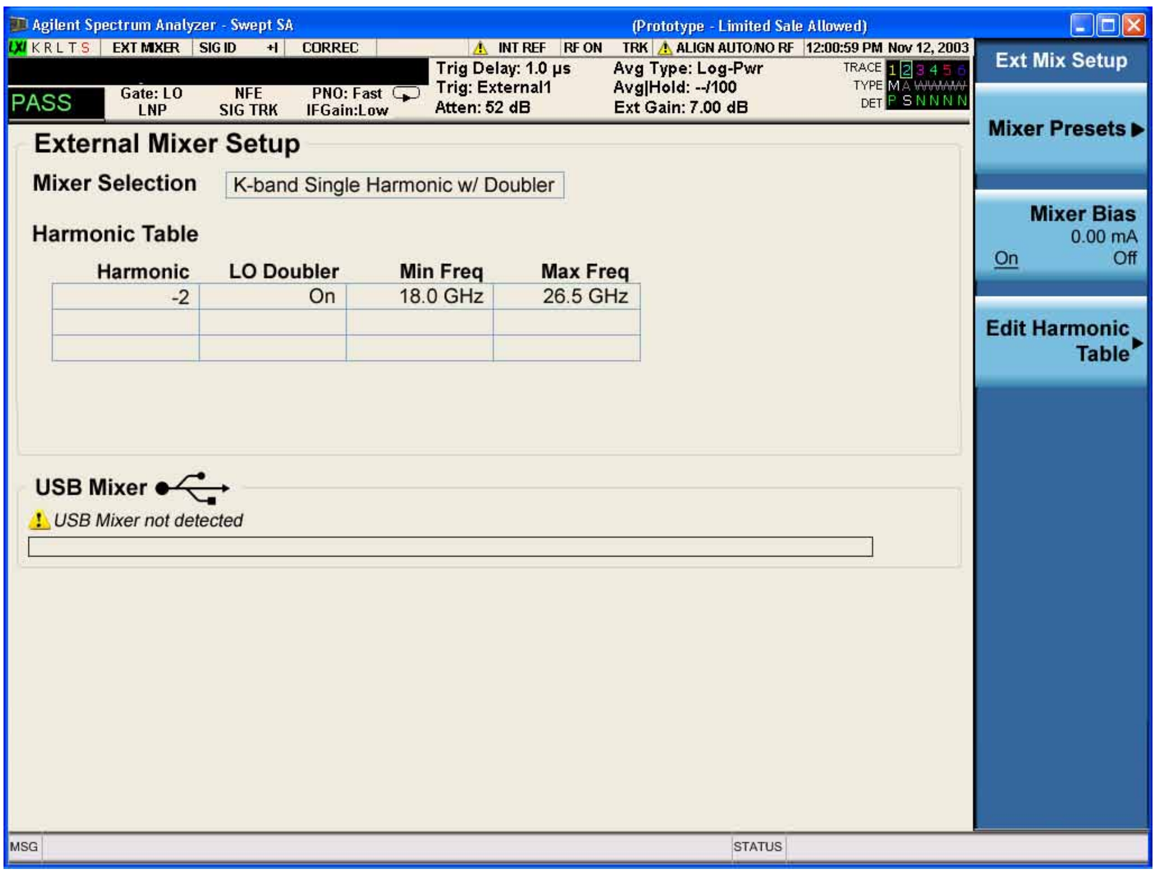
Ext Mix Setup

This menu lets you select the mixer type, and lets you configure your mixer (if necessary). While in this menu, and any of its submenus, the External Mixer Setup screen appears, showing you the current settings for the selected mixer. These settings may be dependent on which IF path is currently in use, whether a + or – harmonic is currently selected, etc.

To apply any amplitude correction factors needed to correct mixer flatness, you enter values into one of the Correction tables (under Input/Output, Corrections). The correction conversion loss values can be extracted from data supplied with the mixer or from manual measurements you make to determine the conversion loss. Note that the correction applied by the Correction tables is global to the analyzer; therefore you should make sure to turn off the External Mixer corrections when you are not using the External Mixer input.

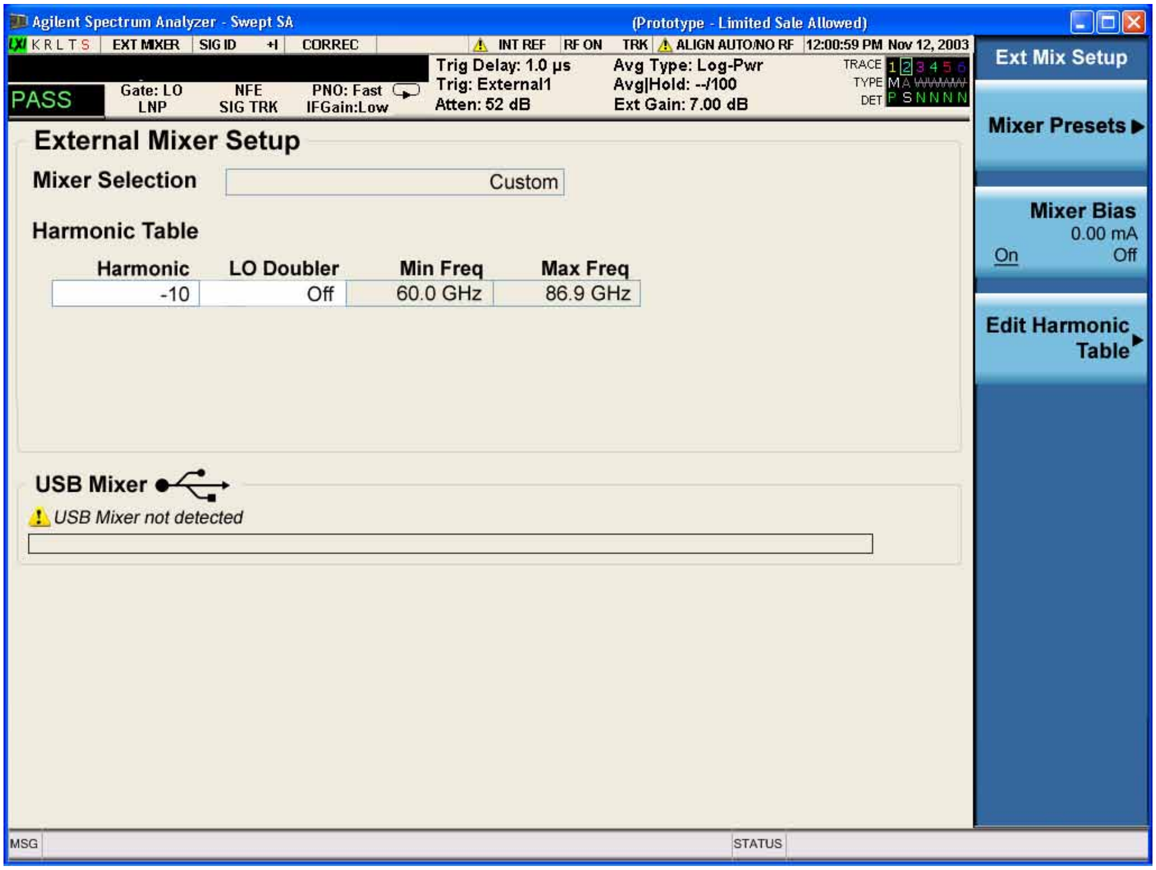
Key Path	**Input/Output, External Mixer**
State Saved	All settings in the Mixer Setup are part of the Input/Output system, and hence are saved whenever State is saved.
Readback Text	The readback line on this key shows the currently selected mixer, in square brackets.
Initial S/W Revision	A.08.01

The External Mixer Setup screen looks like this



The current Mixer selection (the current or most recently connected USB Mixer, or the most recent Mixer Preset, or “Custom” if the user has modified the setup) reads out at the top of this screen.

The Harmonic Table currently being used reads out below the Mixer Selection. It shows each range being used for the current mixer. Note that a band may be made up of up to 3 ranges. Each range represents a choice of mixer harmonic and doubler state. When you select a Mixer Preset, it sets the analyzer Start and Stop frequency to the values shown in the Harmonic Table; Start Freq is set to the Min Freq for the bottom range, and Stop Freq is set to the Max Freq for the top range. In many cases you can exceed these nominal values; the absolute maximum and minimum frequency for each preset are shown in the tables that accompany the key descriptions for the Mixer Presets.



You may customize the Harmonic Table, but when you do this the analyzer goes into “single harmonic” mode. You may enter the harmonic number and whether to use the doubler or not, but now range switching is not supported, so you can only have one harmonic.

When you edit the Harmonic Table, the Mixer Selection changes to “Custom.” To change it back you must go back into the Mixer Presets menu and select a Preset.

When you edit the Harmonic Table, the nominal Min Freq and Max Freq that are available will usually be different than the Preset you were using; and the absolute frequency limits will change as well. This may result in a change to your Start and/or Stop Freq, if the current values fall outside the new range, requiring you to retune your Center Freq to get your signal back in the center.

Mixer Presets

This menu lets you preset the mixer setup for the particular type of mixer that you are using.

These presets are divided into four groups, one for Agilent legacy mixers, and three for general purpose mixers. Note that the IF/LO port provides 3.8–14 GHz LO in two bands: 3.8–8.7 (LO fundamental), and 8.6–14 GHz (doubled LO). The presets that use a single harmonic and no doubling are provided as one group of presets; presets that use a single harmonic but double the LO are another group; and presets that use multiple harmonics are a fourth group.

In most cases, once you have executed the preset, you will not need to adjust any further settings.

Key Path	**Input/Output, External Mixer, Ext Mix Setup**
Remote Command	`[:SENSe]:MIXer:BAND A|Q|U|V|W|NA|ND|NE|NF|NG|NJ|NK|NQ|NU|NV|NW|NY|NEXT|DD|DF|DG|DJ|DK|DQ|DV|DW|DY|DEXT|MA|ME|MU|MCOAX` `[:SENSe]:MIXer:BAND?`
Example	:MIX:BAND A :MIX:BAND?
Notes	A|Q|U|V|W select Agilent 11970 mixer presets NA|ND|NE|NF|NG|NJ|NK|NQ|NU|NV|NW|NY|NEXT select single harmonic, non-doubled LO presets DD|DF|DG|DJ|DK|DQ|DV|DW|DY|DEXT select single harmonic, doubled LO presets MA|ME|MU|MCOAX select multiple harmonic presets All of these presets are detailed in their respective key descriptions The query form of this command returns the most recent preset, UNLESS the harmonic table has been edited after the preset was executed. If the harmonic table has been edited it returns CUSTOM The query form of this command returns the following if an Agilent USB Mixer is plugged into analyzer's USB port: USBV Agilent V-Band USB Mixer USBVEXT Agilent Extended V-Band USB Mixer USBWAgilent W-Band USB Mixer USBCOAXAgilent Coaxial USB Mixer Note that the parameters CUSTOM, USBV, USBVEXT, USBW, and USBCOAX are query responses only, and cannot be sent TO the analyzer. The following cross-reference matches the mixer band designators used by Agilent to the EIA waveguide designations: EIAAgilentFreq Range WR–28 A26.5 – 40 GHz WR–22 Q33 – 50 GHz WR–19 U40 – 60 GHz WR–15 V50 – 75 GHz WR–12 E60 – 90 GHz WR–10 W75 – 110 GHz WR–8 F90 – 140 GHz WR–6 D110 – 170 GHz WR–5 G140 – 220 GHz WR–3 J220 – 325 GHz
Preset	When **Restore Input/Output Defaults** is performed, an "A" mixer preset is also issued (11970A band)

Backwards Compatibility Notes	The [:SENSe]:MIXer:BAND command was used in PSA and ESA to select the mixer band. In the X-Series, only the legacy parameters A, Q, U, V, and W are honored, and they preset the analyzer to match the corresponding Agilent 11970 legacy mixer. Parameters D, E, F, G, J, K, and Y, which were accepted in ESA and PSA, return an error if sent. If you are using a mixer in one of these bands, you should study the tables of presets and choose the appropriate preset to match your application.
Initial S/W Revision	A.08.01

Agilent 11970

This menu allows you to preset for one of the models in the HP/Agilent 11970 series.

Because the X-Series has an LO range of 3.8 – 14 GHz, and older analyzers had an LO range of 3.0 – 6.8 GHz, the harmonic numbers used in the X-Series may differ from those used on older analyzers for the same mixers. Additionally, some of the 11970 mixers cannot be operated over their full range with the X-Series without switching harmonics. Consequently, you will find that some of the bands (A-Band, for example) are broken into two ranges for use with the X-Series.

See “More Information” on page 1176

Key Path	**Input/Output, External Mixer, Ext Mix Setup, Mixer Presets**
Example	MIX:BAND A
Initial S/W Revision	A.08.01

More Information

Below are the 11970A presets. The 11970U and the 11970W use a single harmonic. The other three switch harmonics mid-band. Both harmonic ranges are shown in the table. None of these mixers use LO doubling.

The 11970 K-band mixer and the 11974 preselected mixer series are not supported.

Preset	Readout in setup screen	Readback on softkeys	Range	Harm #	RF start	RF stop
A-band	Agilent 11970A	Agilent 11970A	1	–6	26.5	30.45
			2	–8	30.35	40
Q-band	Agilent 11970Q	Agilent 11970Q	1	–8	33	40.8
			2	–10	39.8	50
U-band	Agilent 11970U	Agilent 11970U	..	–10	40	60
V-band	Agilent 11970V	Agilent 11970V	1	–12	50	66
			2	–14	53	75
W-band	Agilent 11970W	Agilent 11970W	..	–18	75	110

Single Harmonic

These presets choose a setup that uses a single harmonic and no doubling for the LO.

Key Path	**Input/Output, External Mixer, Ext Mix Setup, Mixer Presets**
Example	MIX:BAND NA
Initial S/W Revision	A.08.01

These are the presets for single harmonic operation with no doubler:

Mixer	**Readout in setup screen**	**Readback on softkeys**	**Harm #**	**RF start**	**RF stop**
K-band	K-band Single Harmonic, no doubler	Sngl harm LOx1 K-band	–4	18	26.5
A-band	A-band Single Harmonic, no doubler	Sngl harm LOx1 A-band	–6	26.5	40
D-band	D-band Single Harmonic, no doubler	Sngl harm LOx1 D-band	–20	110	170
E-band	E-band Single Harmonic, no doubler	Sngl harm LOx1 E-band	–12	60	90
F-band	F-band Single Harmonic, no doubler	Sngl harm LOx1 F-band	–18	90	140
Q-band	Q-band Single Harmonic, no doubler	Sngl harm LOx1 Q-band	–6	33	50
U-band	U-band Single Harmonic, no doubler	Sngl harm LOx1 U-band	–8	40	60
V-band	V-band Single Harmonic, no doubler	Sngl harm LOx1 V-band	–10	50	75
W-band	W-band Single Harmonic, no doubler	Sngl harm LOx1 W-band	–14	75	110
G-band	G-band Single Harmonic, no doubler	Sngl harm LOx1 G-band	–26	140	220

Mixer	Readout in setup screen	Readback on softkeys	Harm #	RF start	RF stop
Y-band	Y-band Single Harmonic, no doubler	Sngl harm LOx1 Y-band	–30	170	260
J -band	J-band Single Harmonic, no doubler	Sngl harm LOx1 J-band	–38	220	325
Extended	Extended Single Harmonic, no doubler	Sngl harm LOx1 Extended	–40	155	345

Single Harmonic w/doubler

These presets choose a setup that uses a single harmonic and no doubling for the LO.

Key Path	**Input/Output, External Mixer, Ext Mix Setup, Mixer Presets**
Example	MIX:BAND DW
Initial S/W Revision	A.08.01

These are the presets for single harmonic operation with no doubler:

Mixer	Readout in setup screen	Readback on softkeys	Harm #	RF start	RF stop
D-band	D-band Single Harmonic w/doubler	Sngl harm LOx2 K-band	–14	110	170
F-band	F-band Single Harmonic w/doubler	Sngl harm LOx2 A-band	–10	90	140
G-band	G-band Single Harmonic w/doubler	Sngl harm LOx2 A-band	–16	140	220
J-band	J-band Single Harmonic w/doubler	Sngl harm LOx2 A-band	–24	220	325
K-band	K-band Single Harmonic w/doubler	Sngl harm LOx2 A-band	–2	18	26.5
Q-band	Q-band Single Harmonic w/doubler	Sngl harm LOx2 A-band	–4	33	50

Mixer	Readout in setup screen	Readback on softkeys	Harm #	RF start	RF stop
V-band	V-band Single Harmonic w/doubler	Sngl harm LOx2 A-band	–6	50	75
W-band	W-band Single Harmonic w/doubler	Sngl harm LOx2 A-band	–8	75	110
Y-band	Y-band Single Harmonic w/doubler	Sngl harm LOx2 A-band	–20	170	260
Extended	Extended Single Harmonic w/doubler	Sngl harm LOx2 A-band	–28	245	390

Multiple Harmonics

These presets choose a setup that uses multiple harmonics and may or may not use doubling for the LO.

Key Path	**Input/Output, External Mixer, Ext Mix Setup, Mixer Presets**
Example	MIX:BAND MA
Initial S/W Revision	A.08.01

These are the presets for multiple harmonic operation:

Mixer	Readout in setup screen	Readback on softkeys	Rang e	Harm #	Dbl r?	RF start	RF stop
A-band	A-band Multiple Harmonic	Multi harm A-band	1	–4	N	26.5	34.1
			2	–4	Y	33.1	40
E-band	E-band Multiple Harmonic	Multi harm E-band	1	–6	Y	60	83
			2	–8	Y	65	90
U-band	U-band Multiple Harmonic	Multi harm U-band	1	–6	N	40	51.5
			2	–6	Y	49.5	60
Coaxial	Coaxial Multiple Harmonic	Multi harm Coaxial	1	–4	N	26.5	34
			2	–4	Y	32.5	55
			3	–6	Y	50	70

Mixer Bias

Adjusts an internal bias source for use with external mixers. The bias signal is present on the center conductor of the IF input connector on the front panel. The shunt current range is from –10 mA to 10 mA and it can be set whether Mixer Bias state is On or Off, but it will only be applied if it is On.

The bias remains as set if the user switches to another input (e.g., the RF Input).

Key Path	**Input/Output, External Mixer, Ext Mix Setup**

Remote Command	`[:SENSe]:MIXer:BIAS <real>`
	`[:SENSe]:MIXer:BIAS?`
	`[:SENSe]:MIXer:BIAS:STATe OFF|ON|0|1`
	`[:SENSe]:MIXer:BIAS:STATe?`

Example	:MIX:BIAS 0 :MIX:BIAS? MIX:BIAS:STAT 0 MIX:BIAS:STAT?
Preset	This is unaffected by Preset but is set to OFF and 0 on a "Restore Input/Output Defaults"
State Saved	Saved in state
Min	–10 mA
Max	10 mA
Initial S/W Revision	A.08.01

Edit Harmonic Table

This menu lets you directly configure the Harmonic number and LO Doubler state of your mixer. Whenever you edit the table, you are forced into “single harmonic” mode, and only a single row is displayed in the Harmonic table.

When you press the Edit Harmonic Table softkey, a dialog pops up on the display informing you that only single-range editing is supported, and that to undo your changes you must go to the Mixer Presets menu and choose the preset appropriate for your mixer. You may cancel out of this dialog and not enter the Edit Harmonic Table menu. If you choose to enter the menu, the table collapses to a single row, and the Mixer Selection changes to “Custom”.

In Custom mode, your maximum start and stop frequencies are strictly set by the LO range and the harmonic number you have chosen. The undoubled LO range is 3.8 – 8.7 GHz, and the doubled range is 8.6 – 14 GHz. That range times the harmonic you have selected will determine your tuning range. If your frequency is currently outside that range when you edit the Harmonic Table, your frequency will be changed to fall at the edge of the range. To change it back you must go into the Mixer Presets menu and select a Preset.

Whenever you are in the **Edit Harmonic Table** menu, the Harmonic field in the first row of the table has a white background, indicating that it can be edited. So also does the LO Doubler field.

Key Path	**Input/Output, External Mixer, Ext Mix Setup**
Initial S/W Revision	A.08.01

Harmonic

This lets you enter the Harmonic value with its associated sign (mixing mode).

The harmonic number is a signed integer, where the sign has the meaning of choosing between positive and negative mixing products. Desired mixing products occur at an IF frequency which equals the difference between the RF frequency (f_{RF}) and the LO frequency (Nf_{LO}). When this difference is positive, we can say $f_{IF} = f_{RF} \ \ Nf_{LO}$. When this difference is negative, we can say $f_{IF} = Nf_{LO} \ \ f_{RF}$. Thus, a negative harmonic means the analyzer will be tuned such that the harmonic of the LO is higher than the indicated frequency by the frequency of the first IF. A positive harmonic means the analyzer will be tuned such that the harmonic of the LO is lower than the indicated frequency by the frequency of the first IF.

Key Path	**Input/Output, External Mixer, Ext Mix Setup, Edit Harmonic Table**
Remote Command	[:SENSe]:MIXer:HARMonic <integer> [:SENSe]:MIXer:HARMonic?
Example	:MIX:HARM –28 :MIX:HARM?
Notes	The query returns the harmonic value of the first row of the harmonic table.
Couplings	When you set a value for the Harmonic, the Mixer Selection changes to “Custom”
Preset	This is unaffected by Mode Preset, but on a "Restore Input/Output Defaults" editing is turned off, the Harmonic Table returns to normal, and the Mixer is preset to 11970A, which has –6 in the first row of its Harmonic Table
State Saved	Saved in State
Min	–400
Max	400
Initial S/W Revision	A.08.01

LO Doubler

This lets you enter the LO Doubler setting. The LO Doubler setting controls the choice of the LO doubler state for LO’s which support doubled operation.

In LO’s which support doubling, the fundamental band is 3.8 – 8.7 GHz. The doubled band is 8.6 – 14 GHz. The higher LO frequency can result in a lower mixer harmonic and reduced mixer conversion loss.

Key Path	**Input/Output, External Mixer, Ext Mix Setup, Edit Harmonic Table**
Remote Command	[:SENSe]:MIXer:LODoubler ON|OFF|0|1 [:SENSe]:MIXer:LODoubler?

Example	:MIX:LOD 0 :MIX:LOD?
Notes	The query returns the doubler value of the first row of the harmonic table.
Couplings	When you set a value for the Doubler setting, the Mixer Selection changes to “Custom”
Preset	This is unaffected by Mode Preset, but on a "Restore Input/Output Defaults" editing is turned off, the Harmonic Table returns to normal, and the Mixer is preset to 11970A, which has the double Off in the first row of its Harmonic Table
State Saved	Saved in state
Initial S/W Revision	A.08.01

Signal ID On/Off

Activates or deactivates an algorithm which aids with the identification of multiple responses

Toggles the Signal ID (signal identification) function On or Off. This function lets you identify multiple responses of a single input signal that are generated when using un-preselected external mixers. The use of mixers without pre-selecting filters offers the advantage of improved receiver sensitivity because of the absence of the filter insertion loss, but results in multiple responses due to images and undesired harmonic mixing products.

While in Signal ID, basic spectrum analyzer functions work normally (for example, you can change Span normally) but some functions are disabled (for example, some traces are unavailable).

There are two forms of Signal ID, Image Suppress and Image Shift. Choose the one most appropriate for your application. For Image Shift, an LO-shifted and an unshifted trace are taken in Trace 1 and Trace 2 and displayed together. Any peaks that are not the same in both traces are images. For Image Suppress, image cancellation is performed in the background using two hidden traces, and the result displayed in Trace 1, which shows only the valid signals.

Key Path	**Input/Output, External Mixer**
Remote Command	`[:SENSe]:SIDentify[:STATe] OFF|ON|0|1` `[:SENSe]:SIDentify[:STATe]?`
Example	:SID 0 :SID?
Notes	Signal ID uses data from two successive sweeps. Therefore, if the analyzer is in single sweep mode, two sweep triggers are used to generate the data needed for signal identification.

Dependencies	Signal ID is not available in some measurements. If the Signal ID key does not appear or is grayed out while in your measurement, then it is not available. Because Signal ID uses data from two successive sweeps, several trace and sweep functions are grayed out in Signal ID. See the documentation for your measurement for details on which trace keys are grayed out. Signal ID is not available with Signal Track so Signal ID will be grayed out if in Signal Track. Message: Signal ID will be turned off when External Mixer is turned off. Signal ID cannot be turned on when using internal mixing. Rules for auto coupling of the Sweep and FFT keys are changed with Signal ID on. For both the dynamic range case and the speed case, swept is chosen whenever any form of Signal ID is on. If Manual FFT is selected, the Signal ID key is grayed out. Whenever Signal ID is on, a warning message will be generated If Signal ID is selected in a measurement that does not support it, a warning is generated
Couplings	The Auto Rules for detector selection select Normal for all active traces when Signal ID is turned on.
Preset	This is unaffected by Preset but is set to OFF on a "Restore Input/Output Defaults"
Initial S/W Revision	A.08.01

Signal ID Mode

Lets you set which Signal ID mode you will use, either Image Suppress or Image Shift.

Key Path	**Input/Output, External Mixer**
Remote Command	`[:SENSe]:SIDentify:MODE ISUPpress|ISHift` `[:SENSe]:SIDentify:MODE?`
Example	:SID:MODE ISUP :SID:MODE?
Preset	This is unaffected by Preset but is set to ISUPpress on a "Restore Input/Output Defaults"
State Saved	Saved in state
Initial S/W Revision	A.08.01

Image Suppress

The Image Suppress mode of Signal ID mathematically removes all image and multiple responses of signals present at the mixer input. Two hidden sweeps are taken in succession. The second sweep is offset in LO frequency by 2*IF/N. For each point in each trace, the smaller amplitude from the two traces is taken and placed in that point in Trace 1. Responses of each trace that lie on top of one another will remain and are valid signals, others are images and are suppressed.

NOTE	This function takes control of and uses Trace 1. Any data in this trace prior to activating Image Suppress will be lost.

Key Path	**Input/Output, External Mixer, Signal ID Mode**
Example	:SID:MODE ISUP
Notes	In Image Suppress Mode, synchronization is ensured by first turning off Signal ID, initiating a single sweep, then turning on Signal ID followed by two single sweeps.
Initial S/W Revision	A.08.01

Image Shift

Like the Image Suppress mode, Image Shift is a two sweep sequence. The data from the first sweep is placed in Trace 1 and the data from the second (LO frequency shifted by 2*IF/N) sweep is placed in Trace 2. Signal responses of Trace 1 and Trace 2 that have the same horizontal position are considered to be in the current band and therefore can be analyzed with the amplitude and frequency measurement systems of the SA. All other responses are invalid and should be ignored.

NOTE	This function takes control of and uses Trace 1 and Trace 2. Any data in these traces prior to activating Image Shift will be lost.

Key Path	**Input/Output, External Mixer, Signal ID Mode**
Example	:SID:MODE ISH
Notes	To synchronize in Image Shift Mode, turn off Signal ID and then initiate a single sweep. Then turn on Signal ID and initiate two single sweeps. The results of the first sweep after Signal ID is turned on are available in Trace 1. The next sweep is shifted and the data from that sweep is available in Trace 2. The unshifted and shifted data can then be compared.
Couplings	Trace 2 is turned off when Image Shift is turned Off.
Initial S/W Revision	A.08.01

Cable IF Loss

The loss at the IF in the IF/LO cable can be compensated for with this function, by entering the loss in dB for your cable.

The cable loss will depend on the IF frequency.   The IF frequency varies depending on which IF path your measurement is using. For best accuracy, characterize your cable’s loss for the IF frequency or frequencies you will be using.

IF Frequencies:

10 MHz path: 322.5 MHz
25 MHz path: 322.5 MHz

40 MHz path: 250 MHz
140 MHz path: 300 MHz

Key Path	**Input/Output, External Mixer**
Key Path	**Input/Output, External Mixer, Calibrate Mixer**
Remote Command	`[:SENSe]:MIXer:CIFLoss <rel_ampl>` `[:SENSe]:MIXer:CIFLoss?`
Example	:MIX:CIFL 0.23 DB :MIX:CIFL?
Preset	0.26 dB
State Saved	Saved in state
Min	–1000
Max	1000
Initial S/W Revision	A.08.01

I/Q

This feature is not available unless the “Baseband I/Q (Option BBA)” on page 1186 is installed.

Selects the front-panel I/Q input ports to be the analyzer signal input. If I/Q is already selected, pressing this key accesses the I/Q setup menu.

Key Path	**Input/Output**
Mode	BASIC, CDMA2K, EDGEGSM, TDSCMDA, VSA89601, WIMAXOFDMA
Example	FEED AIQ
Notes	Not all measurements support the use of the I/Q signal input. When I/Q is selected in a measurement that does not support it, the “No Result; Meas invalid with I/Q inputs " error condition message appears. This is error 135

Notes	The parameters IQ|IONLy|QONLy are only supported for backwards compatibility The E44406 SCPI has the following that corresponds to FEED:IQ:TYPE for X-Series. [:SENSe]:FEED IQ|IONLy|QONLy [:SENSe]:FEED? [:SENSe]:FEED IQ will set the I/Q path to IQ [:SENSe]:FEED IONLy will set the I/Q path to I Only [:SENSe]:FEED QONLy will set the I/Q path to QOnly [:SENSe]:FEED? will not be backward compatible. The query [:SENSe]:FEED? will always returns AIQ whatever the type of legacy parameters IQ|IONLy|QONLy has been used.
Initial S/W Revision	Prior to A.02.00

Baseband I/Q (Option BBA)

The Baseband I/Q functionality is a hardware option. It is option BBA. If the option is not installed, none of the I/Q functionality is enabled.

The Baseband I/Q has four input ports and one output port. The input ports are I, I-bar, Q, and Q-bar. The I and I-bar together compose the I channel and the Q and Q-bar together compose the Q channel. Each channel has two modes of operation, Single-Ended (also called "unbalanced") and Differential Input (also called "balanced"). When in Single-Ended operation, only the main port (I or Q) is used and the complementary port (I-bar or Q-bar) is ignored. When in Differential Input mode, both main and complementary ports are used.

The input settings (range, attenuation, skew, impedance, external gain) apply to the channels, not the individual ports.

The system supports a variety of 1 MΩ input passive probes as well as the Agilent 113x Series active differential probes using the Infinimax probe interface.

The Agilent 113x Series active probes can be used for both single ended and differential measurements. In either case a single connection is made for each channel (on either the I or Q input). The input is automatically configured to 50 Ω single ended and the probe power is supplied through the Infinimax interface. The probe can be configured for a variety of input coupling and low frequency rejection modes. In addition, a wide range of offset voltages and probe attenuation accessories are supported at the probe interface. The active probe has the advantage that it does not significantly load the circuit under test, even with unity gain probing.

With passive 1 MΩ probes, the probe will introduce a capacitive load on the circuit, unless higher attenuation is used at the probe interface. Higher attenuation reduces the signal level and degrades the signal-to-noise-ratio of the measurement. Passive probes are available with a variety of attenuation values for a moderate cost. Most Agilent passive probes can be automatically identified by the system, setting the input impedance setting required as well as the nominal attenuation. For single ended measurements a single probe is used for each channel. Other passive probes can by used, with the attenuation and impedance settings configured manually.

For full differential measurements, the system supports probes on each of the four inputs. The attenuation of the probes should be the same for good common mode rejection and channel match.

Both active and passive probes in single ended and differential configurations can be calibrated. This calibration uses the Cal Out BNC connection and a probe connection accessory. The calibration achieves excellent absolute gain flatness in a probed measurement. It matches both the gain and frequency response of the I and Q channels as well as any delay skew, resulting in high accuracy in derived measurements such as Error Vector Magnitude (EVM).

When a probe is connected a status message will be displayed. The message will indicate if calibration data is available or not. Calibration data is saved for each type of probe (including "none") for each port and will be reapplied whenever that type of probe is re-connected to the same port. For probes with EEPROM identification, the calibration data will be stored based on the unique probe identifier and will reapply data for that particular probe if it is available. The data will not follow a probe from one port to another. For probes without EEPROM identification, the instrument cannot distinguish between different probes of the same type and it will use the data from the last calibration for that probe type on that port.

When in differential mode, both the main and complementary probes are expected to be of the same type.

In some situations, the I and Q channels should be configured identically. In other situations it is convenient to control them independently. Some menus have a "Q Same as I" setting that will cause the Q channel configuration to mirror the I channel configuration, avoiding the overhead of double data entry when the channels should be the same.

The output port is for calibrating the I/Q input ports, although it can also be manually controlled.

There are two types of calibrations available: cable calibration and probe calibration. The cable calibration will guide the user through connecting each input port in turn. All ports must be calibrated together. The probe calibration is done for a specific channel (I or Q). If in Single-Ended mode, only the main port is calibrated. When in Differential Input mode, the user is guided through calibrating both main and complementary ports.

The front panel I/Q port LEDs indicate the current state of that port. On (green) indicates it is active, and off (dark) indicates it is not in use. For example, the Cal Out port LED is on if and only if there is signal coming out of that port.

The input is a context and some parameters have separate values for each context. The SCPI for these parameters has an optional "[:RF|IQ]" node. If the specific context is omitted, the command acts on the current input context's value. Here are the parameters that are input context sensitive:

- Center Frequency
- Trigger Source

It is important to distinguish between the I and Q input ports and the displayed I and Q data values. The I and Q input ports feed into a digital receiver that does digital tuning and filtering. The I and Q data seen by the user (either on the display or through SCPI) corresponds to the real ("I") and the imaginary ("Q") output from the digital receiver. When the input path is I+jQ or I Only and the center frequency is 0 Hz the I input ends up in as the real output from the receiver and appears as "I" data. Likewise, when the input path is I+jQ and the center frequency is 0 Hz, the Q input ends up as the imaginary output from the receiver and appears as "Q" data. However, when the input path is Q Only, the Q input is sent to the receiver as Q+j0, so the receiver output has the Q input coming out on the real output, and so in Q Only, the signal from the Q input port appears as the "I" data. Another situation where the I and Q data do not necessarily correspond directly to the I and Q inputs is when the center frequency is non-zero. The digital processing involved in the tuning is a complex operation. This will result in I Only data appearing as both "I" and "Q" data, the same as that signal would appear if seen through the RF input port.

I/Q Path

Selects which I/Q input channels are active. The LED next to each I/Q input port will be on when that port is active.

The analysis bandwidth for each channel is the same as that of the instrument. So, for example, the base N9020A has a bandwidth of 10 MHz. With I/Q input the I and Q channels would each have an analysis bandwidth of 10 MHz, giving 20 MHz of bandwidth when the I/Q Path is I+jQ. With option B25, the available bandwidth becomes 25 MHz, giving 25 MHz each to I and Q and 50 MHz to I+jQ.

I/Q voltage to power conversion processing is dependent on the I/Q Path selected.

- With I+jQ input we know that the input signal may not be symmetrical about 0 Hz, because it has a complex component. Therefore, above 0 Hz only the positive frequency information is displayed, and below 0 Hz only the negative frequency information is displayed.
- With all other Input Path selections, the input signal has no complex component and therefore is always symmetrical about 0 Hz. In this case, by convention, the power conversion shows the combined voltage for both the positive and negative frequencies. The information displayed below 0 Hz is the mirror of the information displayed above 0 Hz. This results in a power reading 6.02 dB higher (for both) than would be seen with only the positive frequency voltage. Note also that, in this case the real signal may have complex modulation embedded in it, but that must be recovered by further signal processing.

Key Path	**Input/Output, I/Q**
Remote Command	`[:SENSe]:FEED:IQ:TYPE IQ|IONLy|QONLy|INDependent` `[:SENSe]:FEED:IQ:TYPE?`
Example	Set the input to be both the I and Q channels, combined as I + j * Q. FEED:IQ:TYPE IQ
Notes	The Independent I and Q selection is only available in GPVSA
Preset	IQ
State Saved	Yes This is unaffected by a Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	I+jQ | I Only | Q Only | Independent I and Q
Readback Text	I+jQ | I Only | Q Only | Ind I/Q
Initial S/W Revision	Prior to A.02.00

Remote Command	`:INPut[1]:IQ:TYPE IQ|I|Q` `:INPut[1]:IQ:TYPE?`

Preset	IQ
Initial S/W Revision	Prior to A.02.00

I+jQ

Sets the signal input to be both the I and Q channels. The I and Q channel data will be combined as I + j * Q.

Key Path	**Input/Output, I/Q, I/Q Path**
Example	Set the input to be both the I and Q channels, combined as I + j * Q. FEED:IQ:TYPE IQ
Initial S/W Revision	Prior to A.02.00

I Only

Sets the signal input to be only the I channel. The Q channel will be ignored. The data collected is still complex. When the center frequency is 0 the imaginary part will always be zero, but for any other center frequency both the real and imaginary parts will be significant.

Key Path	**Input/Output, I/Q, I/Q Path**
Example	Set the input to be only the I channel. FEED:IQ:TYPE IONL
Initial S/W Revision	Prior to A.02.00

Q Only

Sets the signal input to be only the Q channel. The I channel will be ignored. The Q channel will be sent to the digital receiver block as Q+j0. The receiver's output is still complex. When the center frequency is 0 the imaginary part will always be zero, but for any other center frequency both the real and imaginary parts will be significant. Note that since the receiver's real output is displayed as the "I" data, when the center frequency is 0, the Q Only input appears as the "I" data.

Key Path	**Input/Output, I/Q, I/Q Path**
Example	Set the input to be only the Q channel. FEED:IQ:TYPE QONL
Initial S/W Revision	Prior to A.02.00

Independent I and Q

Sets the signal input to be both the I and Q channels, but as independent inputs. It is equivalent to treating I as channel 1 and Q as channel 2 in an oscilloscope. Each channel's data is still complex. When the center frequency is 0 the imaginary part will always be zero, but for any other center frequency both the real and imaginary parts will be significant.

This selection is only available in VXA.

Key Path	**Input/Output, I/Q, I/Q Path**
Example	Turn on both I and Q channels and treat I as channel 1 and Q as channel 2. FEED:IQ:TYPE IND
Notes	The Independent I and Q selection is only available in GPVSA
Readback Text	Ind I/Q
Initial S/W Revision	Prior to A.02.00

I Setup

Access the channel setup parameters for the I channel.

Key Path	**Input/Output, I/Q**
Initial S/W Revision	Prior to A.02.00

I Differential Input

Selects differential input on or off for the I channel. For differential input (also called balanced input), the analyzer uses both main and complementary ports. When differential input is off (also called single-ended or unbalanced input), the analyzer uses only the main port.

Key Path	**Input/Output, I/Q, I Setup**
Remote Command	`:INPut:IQ[:I]:DIFFerential OFF|ON|0|1` `:INPut:IQ[:I]:DIFFerential?`
Example	Put the I channel in Differential Input mode INP:IQ:DIFF ON
Notes	When I Differential Input = On, the analyzer will check for attenuation mismatches between the I and I-bar ports. If the difference in attenuation values exceeds 0.5 dB a Settings Alert error condition, error 159 will be set. When I Differential Input = On, and IQ Path is I+jQ, the Q Differential input must also be On. Similarly, when I Differential Input = Off, and IQ Path is I+jQ, the Q Differential input must also be Off. If the states of the two inputs do not match, an error condition message is generated, 159;Settings Alert;I/Q mismatch:Differential.

Couplings	Some active probes include built-in differential capability. When one of these probes is sensed, this key is disabled. Since the differential capability is handled in the probe, the Analyzer will use only the main port and the key will show that the Analyzer's Differential Input mode is Off (indicating that the complementary port not in use). When Q Same as I is On, the value set for I will also be copied to Q.
Preset	Off
State Saved	Yes This is unaffected by a Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	Off | On
Initial S/W Revision	Prior to A.02.00

Remote Command	`:INPut[1]:IQ:BALanced[:STATe] OFF|ON|0|1` `:INPut[1]:IQ:BALanced[:STATe]?`
Notes	This backwards compatibility SCPI command was for an instrument without independent settings for the I and Q channels. Therefore, it is tied only to the I channel and does not provide an equivalent for the Q channel. For proper operation of the backwards compatibility command Q Same as I should be set to On.
Preset	OFF
Initial S/W Revision	Prior to A.02.00

I Input Z

Selects the input impedance for the I channel. The impedance applies to both the I and I-bar ports.

The input impedance controls the hardware signal path impedance match. It is not used for converting voltage to power. The voltage to power conversion always uses the Reference Z parameter. The Reference Z parameter applies to both I and Q channels.

Key Path	**Input/Output, I/Q, I Setup**
Remote Command	`:INPut[1]:IQ[:I]:IMPedance LOW|HIGH` `:INPut[1]:IQ[:I]:IMPedance?`
Example	Set the I channel input impedance to 1 MΩ INP:IQ:IMP HIGH
Notes	LOW = 50 Ω, HIGH = 1 MΩ When IQ Path is I+jQ, the I Input Z setting must be the same as the Q Input Z setting. If the settings of the two inputs do not match, an error condition message is generated, 159;Settings Alert;I/Q mismatch:Input Z.

Couplings	Input impedance is a built-in characteristic of a probe. Therefore, whenever a probe is sensed, this key is disabled and the value is set to match the probe. When no probe is sensed on Q and Q Same as I is On, the value set for I will also be copied to Q.
Preset	LOW
State Saved	Yes This is unaffected by a Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	50 Ω | 1 MΩ
Initial S/W Revision	Prior to A.02.00

I Skew

Sets the skew factor for the I channel. The skew will shift the channel's data in time. Use this to compensate for differences in the electrical lengths of the input paths due to cabling.

Key Path	**Input/Output, I/Q, I Setup**
Remote Command	`[:SENSe]:CORRection:IQ[:I]:SKEW <seconds>` `[:SENSe]:CORRection:IQ[:I]:SKEW?`
Example	Delay the data for the I channel by 10 ns. CORR:IQ:SKEW 10 ns
Preset	0
State Saved	Yes This is unaffected by Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	0 s to 100 ns
Initial S/W Revision	Prior to A.02.00

I Probe

Access the probe setup parameters for the I channel. See “I/Q Probe Setup” on page 1196.

Key Path	**Input/Output, I/Q, I Setup**
State Saved	No
Readback Text	[<I port probe id>] This is reporting the type of probe sensed on the I port. There is no parameter for overriding what is sensed.
Initial S/W Revision	Prior to A.02.00

Combined Differential/Input Z (Remote Command Only)

This is Remote Command only (no front panel) and is for backwards compatibility only. It combines the Differential Input and Input Z selections into a single SCPI command.

Remote Command	`:INPut:IMPedance:IQ U50|B50|U1M|B1M` `:INPut:IMPedance:IQ?`
Example	:INPut:IMPedance:IQ U50 This is equivalent to the following two SCPI commands: :INP:IQ:DIFF OFF :INP:IQ:IMP 50
Notes	The enum values translate as follows: U50: Differential Input = Off, Input Z = 50Ω B50: Differential Input = On, Input Z = 50Ω U1M: Differential Input = Off, Input Z = 1 MΩ B1M: Differential Input = On, Input Z = 1 MΩ This command is for backwards compatibility. It combines the Input Z (50Ω or 1 MΩ) parameter with the Differential Input (Off = "Unbalanced", On = "Balanced") parameter into a single enumeration. This backwards compatibility SCPI command was for an instrument without independent settings for the I and Q channels. Therefore, it is tied only to the I channel and does not provide an equivalent for the Q channel. For proper operation of the backwards compatibility command Q Same as I should be set to On. Also, note the subtle difference between this SCPI command and the backwards compatibility command for Input Z. The Input Z SCPI has "IQ" before "IMP" while this command has that order reversed.
Couplings	This command does not have an independent parameter, but instead is tied to the Differential Input and Input Z parameters. The coupling for those parameters apply to this command too.
Preset	U50
Initial S/W Revision	Prior to A.02.00

Q Setup

Access the channel setup parameters for the Q channel.

Key Path	**Input/Output, I/Q**
Readback Text	When Q Same as I is On the readback is "Q Same as I".
Initial S/W Revision	Prior to A.02.00

Q Same as I

Many, but not all, usages require the I and Q channels have an identical setup. To simplify channel setup, the Q Same as I will cause the Q channel parameters to be mirrored from the I channel. That way your only need to set up one channel (the I channel). The I channel values are copied to the Q channel, so at the time Q Same as I is turned off the I and Q channel setups will be identical. This does not apply to Probe settings or to parameters that determined by the probe.

Key Path	**Input/Output, I/Q, Q Setup**
Remote Command	`:INPut:IQ:MIRRored OFF|ON|0|1` `:INPut:IQ:MIRRored?`
Example	Turn off the mirroring of parameters from I to Q. INP:IQ:MIRR OFF
Couplings	Only displayed for the Q channel. When Yes, the I channel values for some parameters are mirrored (copied) to the Q channel. However, when a parameter is determined by the type of probe and a probe is sensed, the probe setting is always used and the I channel setting is ignored. The following parameters are mirrored: Differential Input (when not determined by probe) Input Z (when not determined by probe)
Preset	This is unaffected by a Preset but is set to the default value (Q Same as I set to "On") on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state.
Range	On | Off
Readback Text	"Q Same as I" when On, otherwise none.
Initial S/W Revision	Prior to A.02.00

Q Differential Input

Selects differential input on or off for the Q channel. For differential input (also called balanced input), the analyzer uses both the Q and Q-bar ports. When differential input is off (also called single-ended or unbalanced input), the analyzer uses only the Q port.

Key Path	**Input/Output, I/Q, Q Setup**
Remote Command	`:INPut:IQ:Q:DIFFerential OFF|ON|0|1` `:INPut:IQ:Q:DIFFerential?`
Example	Put the Q channel in Differential Input mode INP:IQ:Q:DIFF ON

Notes	When Differential Input = On, the analyzer will check for attenuation mismatches between the Q and Q-bar ports. If the difference in attenuation values exceeds 0.5 dB a Settings Alert error condition, error 159 will be set. When Q Differential Input = On, and IQ Path is I+jQ, the I Differential input must also be On. Similarly, when Q Differential Input = Off, and IQ Path is I+jQ, the I Differential input must also be Off. If the states of the two inputs do not match, an error condition message is generated, 159;Settings Alert;I/Q mismatch:Differential.
Couplings	Some active probes include built-in differential capability. When one of these probes is sensed, this key is disabled. Since the differential capability is handled in the probe, the Analyzer will use only the main port and the key will show that the Analyzer's Differential Input mode is Off (indicating that the complementary port not in use). When a differential probe is not sensed and Q Same as I is On, the value set for I will be copied to Q. This key is disabled when Q Same as I is On.
Preset	Off
State Saved	On This is unaffected by a Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	Off | On
Initial S/W Revision	Prior to A.02.00

Q Input Z

Selects the input impedance for the Q channel. The impedance applies to both the Q and Q-bar ports.

The input impedance controls the hardware signal path impedance match. It is not used for converting voltage to power. The voltage to power conversion always uses the Reference Z parameter. The Reference Z parameter applies to both I and Q channels.

Key Path	**Input/Output, I/Q, Q Setup**

Remote Command	`:INPut[1]:IQ:Q:IMPedance LOW|HIGH`
	
	`:INPut[1]:IQ:Q:IMPedance?`

Example	Set the Q channel input impedance to 1 MΩ INP:IQ:Q:IMP HIGH
Notes	LOW = 50 Ω, HIGH = 1 MΩ When IQ Path is I+jQ, the I Input Z setting must be the same as the Q Input Z setting. If the settings of the two inputs do not match, an error condition message is generated, 159;Settings Alert;I/Q mismatch:Input Z.
Couplings	Input impedance is a built-in characteristic of a probe. Therefore, whenever a probe is sensed, this key is disabled and the value is set to match the probe. When no probe is sensed and Q Same as I is On, the value set for I will also be copied to Q. This key is disabled when Q Same as I is On.

Preset	LOW
State Saved	On This is unaffected by Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	50 Ω | 1 MΩ
Initial S/W Revision	Prior to A.02.00

Q Skew

Sets the skew factor for the Q channel. The skew will shift the channel's data in time. Use this to compensate for differences in the electrical lengths of the input paths due to cabling and probes.

Key Path	**Input/Output, I/Q, Q Setup**
Remote Command	`[:SENSe]:CORRection:IQ:Q:SKEW <seconds>` `[:SENSe]:CORRection:IQ:Q:SKEW?`
Example	Delay the data for the Q channel by 10 ns. CORR:IQ:Q:SKEW 10 ns
Preset	0
State Saved	Yes This is unaffected by a Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	0 s to 100 ns
Initial S/W Revision	Prior to A.02.00

Q Probe

Accesses the probe setup parameters for the Q channel. See"I/Q Probe Setup" on page 1196.

Key Path	**Input/Output, I/Q, Q Setup**
State Saved	No
Readback Text	[<Q port probe id>] This is reporting the type of probe sensed on the Q port. There is no parameter for overriding what is sensed.
Initial S/W Revision	Prior to A.02.00

I/Q Probe Setup

The set of I/Q probe setup parameters will change based on the type of probe that is sensed. All probe types have the Attenuation parameter, and all probe types can be calibrated. The remaining parameters are only available for some probe types and will not be shown when not available. The probe type is determined by and reported for only for the I and Q ports, never the I-bar or Q-bar ports. The menu title will be "<ch>: <probe id>", where "<ch>" is either "I" or "Q" and "<probe id>" is the type of probe. For example, for the I Probe setup with an Agilent 1130A probe connected to the I port, the title will be "I: 1130A".

Probe calibration data is stored for each probe type for each channel. When no probe is sensed, the probe type "Unknown" is used, and this is also treated like a probe type with its own calibration data. When a probe is changed, the calibration data for that probe type for that port is restored. An advisory message will be displayed showing the new probe type and the calibration status. The calibration data is stored permanently (survives a power cycle) and is not affected by a Preset or any of the Restore commands. When the probe has EEPROM identification (most newer Agilent probes have this), the calibration data is stored by probe serial number and port, so if you have two probes of the same type, the correct calibration data will be used for each. For probes that do not have EEPROM identification, the calibration data is stored by probe type and port and the instrument cannot distinguish between different probes of the same type. In all cases (with or without EEPROM identification), the calibration data is port specific, so it will not follow a specific probe from port to port if the probe is moved.

The "Unknown" probe type is used whenever no probe is sensed. When no calibration data exists for "Unknown" the latest cable calibration data is used (see Section “I/Q Guided Calibration” on page 1242).

Attenuation

The attenuation is part of the calibration data stored with the probe type and is initially the value that was returned by the last calibration. You can modify this value and any changes will be stored with the calibration data and will survive power cycles and presets. When a probe calibration is performed the attenuation value will be overwritten by the calibration.

Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe**
Remote Command	`[:SENSe]:CORRection:IQ:I|Q:ATTenuation:RATio <real>` `[:SENSe]:CORRection:IQ:I|Q:ATTenuation:RATio?`
Example	Set the attenuation for the current I probe to 100.00:1. CORR:IQ:I:ATT:RAT 100
Notes	Each probe type has its own attenuation setting. As probes are changed the attenuation value will reflect the new probe's setting. Changing the attenuation affects only the current probe type's setting and leaves all others unchanged. When the IQ Path is I+jQ, the Q probe attenuation setting must match the I Probe attenuation setting within 1 dB. If this is not the case, an error condition message is generated, 159;Settings Alert;I/Q mismatch:Attenuation.
Preset	Each probe type has its own default. The default for the "Unknown" probe type is 1:1.
State Saved	Saved with probe calibration data. It survives a power cycle and is not affected by a Preset or Restore.
Range	0.001 to 10000
Initial S/W Revision	Prior to A.02.00

Remote Command	`[:SENSe]:CORRection:IQ:I|Q:ATTenuation <rel_ampl>` `[:SENSe]:CORRection:IQ:I|Q:ATTenuation?`
Example	Set the attenuation for the current I probe type to 100.00:1. CORR:IQ:I:ATT 20 dB
Range	–60 dB to +80 dB
Initial S/W Revision	Prior to A.02.00

Offset

Some active probes have DC offset capability. When one of these probes is connected this control will be visible. The signal is adjusted for the DC offset before entering the analyzer's port. This allows for removal of a DC offset before hitting the analyzer's input port voltage limits. For example, a signal that varies 1 V peak-to-peak with a DC offset equal to the analyzer's max input voltage would exceed the input limits of the analyzer for half its cycle. Removing the DC offset allows the analyzer to correctly process the entire signal.

Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe**
Remote Command	`:INPut:OFFSet:I|Q <voltage>` `:INPut:OFFSet:I|Q?`
Example	Remove a DC offset of –0.5 V from the I channel input. INP:OFFS:I –0.5
Notes	Only some probe types support Offset. For those that do, each probe type has its own Offset setting. As probes are changed the Offset value will reflect the new probe's setting. Changing the Offset affects only the current probe type's setting and leaves all others unchanged.
Preset	0 V
State Saved	Saved with probe calibration data. It survives power cycle and is not affected by Preset or Restore.
Range	–18 V to +18 V
Initial S/W Revision	Prior to A.02.00

Coupling

Some probe types allow coupling to reject low frequencies. This will filter out the DC component of a signal that is composed of a DC bias plus some AC signal. This control is visible only for probe types that have this capability.

Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe**
Remote Command	`:INPut:COUPling:I|Q DC|LFR1|LFR2` `:INPut:COUPling:I|Q?`

Example	Set the probe to low frequency rejection below 1.7 Hz. INP:COUP:I LFR1
Notes	Only some probe types support Coupling. For those that do, each probe type has its own Coupling setting. As probes are changed the Coupling value will reflect the new probe's setting. Changing the Coupling affects only the current probe type's setting and leaves all others unchanged.
Preset	DC
State Saved	Saved with probe calibration data. It survives a power cycle and is not affected by a Preset or Restore.
Range	DC | AC 1.7 Hz LFR1 | AC 0.14 Hz LFR2
Readback Text	DC | LFR1 | LFR2
Initial S/W Revision	Prior to A.02.00

DC

Turns off low frequency rejection, allowing signals down to DC.

Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe, Coupling**
Example	Turn off low frequency rejection on the I channel INP:COUP:I DC
Initial S/W Revision	Prior to A.02.00

LFR1

Turns on low frequency rejection, rejecting signal component lower than 1.7 Hz.

Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe, Coupling**
Example	Turn on low frequency rejection on the I channel for frequencies lower than 1.7 Hz INP:COUP:I LFR1
Initial S/W Revision	Prior to A.02.00

LFR2

Turns on low frequency rejection, rejecting signal component lower than 0.14 Hz.

Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe, Coupling**
Example	Turn on low frequency rejection on the I channel for frequencies lower than 0.14 Hz INP:COUP:I LFR2
Initial S/W Revision	Prior to A.02.00

Calibrate

Invokes the guided probe calibration. The guided probe calibration is context sensitive and depends on the channel (I or Q) and the Differential Input state. The calibration is only performed on the selected channel. When Differential Input is on, both the probe attached to the main port and the probe attached to the complementary port are calibrated. When Differential Input is off, only the probe attached to the main port is calibrated. See “I/Q Guided Calibration” on page 1242.

Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe, Coupling**
Readback Text	The last calibration date, or if no calibration exists, "(empty)". Last: <cal date> <cal time> Example: Last: 8/22/2007 1:02:49 PM
Initial S/W Revision	Prior to A.02.00

Clear Calibration

Clears the calibration data for the current port and probe. It does not clear the data for other probe types or other ports. If the sensed probe has EEPROM identification, only the data for that specific probe is cleared. After this command has completed, the probe calibration state will be the same as if no probe calibration had ever been performed for the specified channel and probe. The probe attenuation will be the default value for that probe type and the Cable Calibration frequency response corrections will be used. This command is dependent on the Differential Input state. When Differential Input is on, both the data for the probe attached to the main port and the data for the probe attached to the complementary port are cleared. When Differential Input is off, only data for the probe attached to the main port is cleared.

Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe**
Remote Command	`:CALibration:IQ:PROBe:I|Q:CLEar`
Example	Clear the calibration data for the I channel and the current probe (with EEPROM identification) or probe type (without EEPROM identification). :CAL:IQ:PROBe:I:CLE
Initial S/W Revision	Prior to A.02.00

Reference Z

Sets the value of the impedance to be used in converting voltage to power for the I and Q channels. This does not change the hardware's path impedance (see “I Input Z” on page 1191).

Key Path	**Input/Output, I/Q**
Remote Command	`:INPut:IMPedance:REFerence <integer>` `:INPut:IMPedance:REFerence?`

Example	Set the I/Q reference impedance to 50 Ω INP:IMP:REF 50
Preset	50 Ω
State Saved	Yes This is unaffected by a Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	1 Ω to 1 MΩ
Initial S/W Revision	Prior to A.02.00

I/Q Cable Calibrate…

Invokes the guided cable calibration. The guided cable calibration steps the user through a calibration of all ports (I, I-bar, Q, and Q-bar) using just a cable (no probe attached). See "I/Q Cable Calibrate…" on page 1244 for more information.

Key Path	**Input/Output, I/Q**
Initial S/W Revision	Prior to A.02.00

RF Calibrator

Lets you choose a calibrator signal to look at or turns the calibrator "off" (switches back to the selected input). When one of the calibrator signals is selected, the analyzer routes that signal (an internal amplitude reference) to the analyzer, while leaving the main input selection (RF or I/Q) unchanged.

This function presets to OFF on a Mode Preset, which causes the internal circuitry to switch back to the selected input (RF or I/Q).

Key Path	**Input/Output**
Remote Command	`[:SENSe]:FEED:AREFerence REF50|REF4800|OFF` `[:SENSe]:FEED:AREFerence?`
Example	FEED:AREF REF50 selects the 50 MHz amplitude reference as the signal input. FEED:AREF REF4800 selects the 4.8 GHz amplitude reference as the signal input FEED:AREF OFF turns the calibrator "off" (switches back to the selected input – RF or I/Q)
Dependencies	Selecting an input (RF or I/Q) turns the Calibrator OFF. This is true whether the input is selected by the keys or with the [:SENSe]:FEED command. The 4.8 GHz internal reference is only available in some models and frequency range options. If the 4.8 GHz reference is not present, the **4.8 GHz** softkey will be blanked, and if the REF4800 parameter is sent, the analyzer will generate an error.

Preset	OFF
State Saved	Saved in instrument state
Readback	Off, 50 MHz, 4.8 GHz
Backwards Compatibility SCPI	For ESA backwards compatibility, the legacy SCPI command CALibration:SOURce:STATe <boolean> (ESA's Amptd Ref Out SCPI) will still be supported and mapped as follows: When CALibration:SOURce:STATe ON is received [SENSe]:FEED:AREF REF50 will execute When CALibration:SOURce:STATe OFF is received [SENSe]:FEED:AREF OFF will execute When CALibration:SOURce:STATe? is received, 1 will be returned if any of the references is selected and 0 if the Calibrator is "Off"
Initial S/W Revision	Prior to A.02.00

50 MHz

Selects the 50 MHz internal reference as the input signal.

Key Path	**Input/Output, RF Calibrator**
Example	:FEED:AREF REF50
Readback	50 MHz
Initial S/W Revision	Prior to A.02.00

4.8 GHz

Selects the 4.8 GHz internal reference as the input signal.

Key Path	**Input/Output, RF Calibrator**
Example	:FEED:AREF REF4800
Dependencies	The 4.8 GHz internal reference is only available in some models and frequency range options. If the 4.8 GHz reference is not present, the **4.8 GHz** softkey will be blanked, and if the REF4800 parameter is sent, the analyzer will generate an error.
Readback	4.8 GHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Off

Switches the input back to the selected input (RF or I/Q)

Key Path	**Input/Output, RF Calibrator**

Example	:FEED:AREF OFF
Readback	Off
Initial S/W Revision	Prior to A.02.00

External Gain

Compensates for gain or loss in the measurement system outside the spectrum analyzer. The External Gain is subtracted from the amplitude readout (or the loss is added to the amplitude readout). So, the displayed signal level represents the signal level at the output of the device-under-test, which can be the input of an external device that provides gain or loss.

Entering an External Gain value does not affect the Reference Level, therefore the trace position on screen changes, as do all of values represented by the trace data. Thus, the values of exported trace data, queried trace data, marker amplitudes, trace data used in calculations such as N dB points, trace math, peak threshold, etc., are all affected by External Gain. Changing the External Gain, even on a trace which is not updating, will immediately change all of the above, without new data needing to be taken.

NOTE Changing the External Gain causes the analyzer to immediately stop the current sweep and prepare to begin a new sweep. The data will not change until the trace data updates because the offset is applied to the data as it is taken. If a trace is exported with a nonzero External Gain, the exported data will contain the trace data with the offset applied.

In the Spectrum Analyzer mode, a Preamp is the common external device providing gain or loss. In a measurement application mode like GSM or W-CDMA, the gain or loss could be from a BTS (Base Transceiver Station) or an MS (Mobile Station). So in the Spectrum Analyzer mode MS and BTS would be grayed out and the only choice would be Ext Preamp. Similarly in some of the digital communications applications, Ext Preamp will be grayed out and you would have a choice of MS or BTS.

Key Path	**Input/Output**
Couplings	The Ext Preamp, MS, and BS keys may be grayed out depending on which measurement is currently selected. If any of the grayed out keys are pressed, or the equivalent SCPI command is sent, an advisory message is generated.
Readback	1-of-N selection | [variable]
Initial S/W Revision	Prior to A.02.00

Ext Preamp

This function is similar to the reference level offset function. Both affect the displayed signal level. Ref Lvl Offset is a mathematical offset only, no analyzer configuration is affected. Ext Preamp gain is used when determining the auto-coupled value of the Attenuator. The External Gain value and the Maximum Mixer Level settings are both part of the automatic setting equation for the RF attenuation setting. (10 dB of Attenuation is added for every 10 dB of External Gain.)

Note that the Ref Lvl Offset and Maximum Mixer Level are described in the Amplitude section. They are reset by the instrument Preset. The External Preamp Gain is reset by the "Restore Input/Output Defaults" or "Restore System Defaults->All functions.. The External Gain is subtracted from the amplitude readout so that the displayed signal level represents the signal level at the output of the device-under-test, which is the input of the external device that is providing gain or loss.

Key Path	**Input/Output, External Gain**
Remote Command	`[:SENSe]:CORRection:SA[:RF]:GAIN <rel_ampl>` `[:SENSe]:CORRection:SA[:RF]:GAIN?`
Example	CORR:SA:GAIN 10 sets the Ext Gain value to 10 dB CORR:SA:GAIN –10 sets the Ext Gain value to –10 dB (that is, an attenuation of 10 dB)
Notes	Does not auto return.
Dependencies	The reference level limits are determined in part by the External Gain/Atten, Max Mixer Level, and RF Atten. This key is grayed out in Modes that do not support External Gain
Preset	This is unaffected by Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state
Min	–81.90 dB
Max	81.90 dB
Readback	Preamp Gain, <Ext Gain value> dB
Backwards Compatibility SCPI	[:SENSe]:CORRection:OFFSet[:MAGNitude]
Initial S/W Revision	Prior to A.02.00

MS

Sets an external gain/attenuation value for MS (Mobile Station) tests.

Key Path	**Input/Output, External Gain**
Remote Command	`[:SENSe]:CORRection:MS[:RF]:GAIN <rel_ampl>` `[:SENSe]:CORRection:MS[:RF]:GAIN?`
Example	CORR:MS:GAIN 10 sets the Ext Gain value to 10 dB CORR:MS:GAIN –10 sets the Ext Gain value to –10 dB (that is, a loss of 10 dB.)
Notes	Does not auto return.

Dependencies	The reference level limits are determined in part by the External Gain, Max Mixer Level, RF Atten This key is grayed out in modes that do not support MS.
Preset	This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Readback	MS, <Ext Gain value> dB
Backwards Compatibility SCPI	[:SENSe]:CORRection:MS[:RF]:LOSS <rel_ampl> [:SENSe]:CORRection:MS[:RF]:LOSS? Important notes regarding the alias commands: A positive value of <rel_ampl> in the above command means a loss and a negative value indicates a gain. So, for example, sending the command a) CORR:MS:LOSS 10 dB will set the value on the softkey and the active function to –10 dB since the softkey and the active function always show the Gain. The query CORR:MS:LOSS? returns 10 dB The query CORR:MS:GAIN? returns –10 dB b) CORR:MS:LOSS –10 dB will set the value on the softkey and the active function to 10 dB since the softkey and the active function always show the Gain The query CORR:MS:LOSS? returns –10 dB The query CORR:MS:GAIN? returns 10 dB
Initial S/W Revision	Prior to A.02.00

BTS

Sets an external attenuation value for BTS (Base Transceiver Station) tests.

Key Path	**Input/Output, External Gain**
Remote Command	`[:SENSe]:CORRection:BTS[:RF]:GAIN <rel_ampl>` `[:SENSe]:CORRection:BTS[:RF]:GAIN?`
Example	CORR:BTS:GAIN 10 sets the Ext Gain value to 10 dB CORR:BTS:GAIN –10 sets the Ext Gain value to –10 dB (that is, a loss of 10 dB.)
Notes	Does not auto return.

Dependencies	The reference level limits are determined in part by the External Gain, Max Mixer Level, RF Atten This key is grayed out in modes that do not support BTS.
Preset	This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Readback	BTS, <Ext Gain value> dB
Backwards Compatibility SCPI	[:SENSe]:CORRection:BTS[:RF]:LOSS <rel_ampl> [:SENSe]:CORRection:BTS[:RF]:LOSS? Important notes regarding the alias commands: A positive value of <rel_ampl> in the above command means a loss and a negative value indicates a gain. So, for example, sending the command a) CORR:BTS:LOSS 10 dB will set the value on the softkey and the active function to –10 dB since the softkey and the active function always show the Gain. The query CORR:BTS:LOSS? returns 10 dB The query CORR:BTS:GAIN? returns –10 dB b) CORR:BTS:LOSS –10 dB will set the value on the softkey and the active function to 10 dB since the softkey and the active function always show the Gain The query CORR:BTS:LOSS? returns –10 dB The query CORR:BTS:GAIN? returns 10 dB
Initial S/W Revision	Prior to A.02.00

I Ext Gain

This function affects only the I channel input, except when the Input Path is I+jQ. In I+jQ this setting is applied to both I and Q channel inputs. It is not available unless the Baseband I/Q option (BBA) is installed.

Key Path	**Input/Output, External Gain**
Remote Command	`[:SENSe]:CORRection:IQ:I:GAIN <rel_ampl>` `[:SENSe]:CORRection:IQ:I:GAIN?`

Example	Set the I Ext Gain to 10 dB CORR:IQ:I:GAIN 10 Set the I Ext Gain to –10 dB (that is, a loss of 10 dB.) CORR:IQ:I:GAIN –10
Notes	Not available unless option BBA is installed
Preset	0 dB This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Readback Text	I Gain, <I Ext Gain> dB
Initial S/W Revision	Prior to A.02.00

Q Ext Gain

This function affects only the Q channel input and only when the Input Path is not I+jQ. It is not available unless the Baseband I/Q option (BBA) is installed.

Key Path	**Input/Output, External Gain**
Remote Command	`[:SENSe]:CORRection:IQ:Q:GAIN <rel_ampl>` `[:SENSe]:CORRection:IQ:Q:GAIN?`
Example	Set the Q Ext Gain to 10 dB CORR:IQ:Q:GAIN 10 Set the Q Ext Gain to –10 dB (that is, a loss of 10 dB.) CORR:IQ:Q:GAIN –10
Notes	Not available unless option BBA is installed.
Preset	0 dB This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Readback Text	Q Gain, <I Ext Gain> dB
Initial S/W Revision	Prior to A.02.00

Restore Input/Output Defaults

This selection causes the group of settings and data associated with the **Input/Output** key to be a reset to their default values. In addition, when a Source is installed, licensed and selected, Restore Input/Output defaults will initiate a Source Preset.

This level of Restore System Defaults does not affect any other system settings or mode settings and does not cause a mode switch. All the features described in this section are reset using this key, including Input Corrections and Data (described in the Corrections section).

Key Path	**Input/Output**
Example	:SYST:DEF INP presets all the Input/Output variables to their factory default values.
Notes	Refer to the Utility Functions for information about Restore System Defaults and the complete description of the :SYSTem:DEFault INPut: command.
Initial S/W Revision	Prior to A.02.00

Data Source

Gives you the choice of either using a hardware input signal as the input or raw data stored in a data storage buffer from an earlier acquisition. You can also share raw data across certain measurements that support this feature. The measurements must be capable of storing raw data. There are three choices under this menu. You can select "Inputs" which is the same as selecting one of the inputs from the input port, for example RF, AREF, I/Q, or IFALign. Selecting "Capture Buffer" allows you to use data that has been stored earlier in the same measurement or from a previous measurement using the "Current Meas -> Capture Buffer" feature. Selecting "Recorded Data" allows you to playback long data capture records stored in the record buffer.

When you make a recording (see “Record Data Now” on page 1210) or when you recall a recording (see the Recall section) the data source is automatically set to Recorded Data. You can toggle the data source between Inputs and the current Recording (if there is one). That is, the recording remains in memory until it is replaced by a new recording, or the application is closed.

Key Path	**Input/Output**
Remote Command	`[:SENSe]:FEED:DATA INPut|STORed|RECorded` `[:SENSe]:FEED:DATA?`
Example	FEED:DATA REC FEED:DATA?
Notes	INPuts = Inputs STORed = Capture Buffer RECorded = Record Data Buffer
Dependencies	Not all inputs are available in all modes. Unavailable keys are grayed out.

Preset	This is unaffected by Preset but is set to INPut on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state
Readback	Variable
Backwards Compatibility SCPI	[:SENSe]:FEED:SOURce INPut|STORed [:SENSe]:FEED:SOURce?
Initial S/W Revision	Prior to A.02.00

Inputs

Sets the measurement to use the input selections (RF, AREF, I/Q)

Key Path	**Input/Output, Data Source**
Example	FEED:DATA INP causes the measurement to look at the input selection
Notes	Does not auto return.
Readback	Inputs
Initial S/W Revision	Prior to A.02.00

Capture Buffer

Some WCDMA and demod measurements support this feature. This allows sharing of the raw data across certain measurements. If you want to make another measurement on the same signal, you would store that raw data using the "Current Meas -> Capture Buffer" key. Then the data is available for the next measurement to use. You must have raw data stored in the instrument memory before the Capture Buffer choice is available for use.

Key Path	**Input/Output, Data Source**
Example	FEED:DATA STOR causes stored measurement data to be used with a different measurement that supports this.
Notes	Does not auto return. This key is grayed out when you switch to a measurement that does not support this feature.
Dependencies	If you switch to a measurement that does not support this feature, then the instrument switches to use "Inputs" and grays out this key. If the grayed out key is pressed, it generates a message.
Readback	Stored Data
Initial S/W Revision	Prior to A.02.00

Recorded Data

Directs the instrument to get data from the record data buffer in the measurement, rather than from the RF Input Signal.

Key Path	**Input/Output, Data Source**
Example	FEED:DATA REC causes the measurement to extract data from the record data buffer.
Notes	Does not auto return.
Dependencies	Grayed out in the SA measurement.
Readback	Recorded Data
Initial S/W Revision	Prior to A.02.00

Current Meas -> Capture Buffer

Pressing this key stores the raw data of one measurement in the internal memory of the instrument where it can then be used by a different measurement by pressing "Stored Data". When raw data is stored, then the data source selection switch automatically changes to "Stored Data". Stored raw data cannot be directly accessed by a user. There is no save/recall function to save the raw data in an external media. However if you want to get the stored raw data, you must first perform a measurement using the stored raw data. Now you can access the used raw data, which is the same as stored raw data, using the FETch or READ commands.

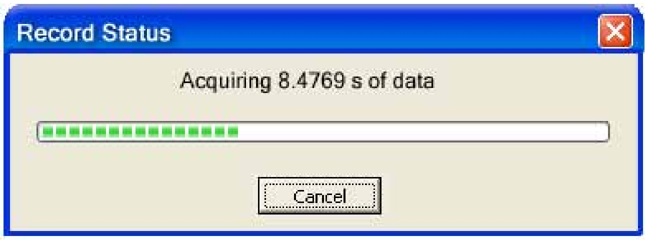
Key Path	**Input/Output, Data Source**
Remote Command	`[:SENSe]:FEED:DATA:STORe`
Example	FEED:DATA:STOR stores recorded data
Notes	This is command only, there is no query
Dependencies	Grayed out in the SA measurement.
Backwards Compatibility SCPI	[:SENSe]:FEED:SOURce:STORe
Initial S/W Revision	Prior to A.02.00

Record Data Now

This causes the data source to change to Inputs (if it is not already set) and a recording is made with the current instrument setup. The length of the recording must be specified in advance.

This key changes to **Abort Recording** once the recording process has started. It changes back when the recording is complete.

The following dialogs show the progress of the recording:



This key is also available in the Sweep/Control menu.

Key Path	**Input/Output, Data Source**
Mode	VSA
Remote Command	`[:SENSe]:RECording:INITiate[:IMMediate]`
Example	REC:INIT
Notes	This is command only, there is no query. See the Recall functionality to access previously saved data.
Dependencies	Grayed out in the SA measurement.
Couplings	Changes Data source to Recorded Data.
Initial S/W Revision	Prior to A.02.00

Key Path	**Input/Output, Data Source**
Remote Command	`[:SENSe]:RECording:ABORt`
Example	REC:ABOR
Notes	This is command only, there is no query. The command does nothing if it is sent when there is no recording in progress.
Initial S/W Revision	Prior to A.02.00

Record Length

This specifies the length of the next recording. (You cannot use this to modify the length of the current recording.) The length defaults to seconds, but you can also specify it in points at the current sample rate, or in time records at the current time record length.

Key Path	**Input/Output, Data Source**
Mode	VSA

Remote Command	`[:SENSe]:RECording:LENGth <real>,SEConds|RECords|POINts`
	`[:SENSe]:RECording:LENGth:STATe MAX|MANual`
	`[:SENSe]:RECording:LENGth:STATe?`

Example	REC:LENG 20,REC REC:LENG 4.1E–4,SEC REC:LENG:STAT MAX REC:LENG:STAT?
Notes	There is no default unit. The unit must be specified. The length command does not have a query form. Length information is queried using the two commands following this table. If set to MAX, all of the available "recording memory" us used.
Preset	50 Records, Manual
State Saved	No
Min	0
Max	Depends on memory available.
Readback	<value><Seconds|Points|Records>
Initial S/W Revision	Prior to A.02.00

Mode	VSA
Remote Command	`[:SENSe]:RECording:LENGth:VALue?`
Example	REC:LENG:VAL?
Notes	Query Only Returns the first (numeric) parameter of the most recent [:SENSe]:RECording:LENGth command.
Preset	50 Records
Initial S/W Revision	Prior to A.02.00

Mode	VSA
Remote Command	`[:SENSe]:RECording:LENGth:UNIT?`
Example	REC:LENG:UNIT?

Notes	Query Only Returns the second parameter of the most recent [:SENSe]:RECording:LENGth command. Possible values are SEC|REC|POIN. If no second parameter was sent, then the return value is SEC.
Preset	RECords
Initial S/W Revision	Prior to A.02.00

Corrections

This key accesses the Amplitude Corrections menu.

Amplitude Corrections arrays can be entered, sent over SCPI, or loaded from a file. They allow you to correct the response of the analyzer for various use cases. The X-series supports four separate Corrections arrays, each of which can contain up to 2000 points. They can be turned on and off individually and any or all can be on at the same time.

Trace data is in absolute units and corrections data is in relative units, but we want to be able to display trace data at the same time as corrections data. Therefore we establish a reference line to be used while building or editing a Corrections table. The reference line is halfway up the display and represents 0 dB of correction. It is labeled “0 dB CORREC”. It is drawn in blue.

Corrections data is always in dB. Whatever dB value appears in the correction table represents the correction to be applied to that trace at that frequency. So if a table entry shows 30 dB that means we ADD 30 dB to each trace to correct it before displaying it.

In zero span, where the frequency is always the center frequency of the analyzer, we apply the (interpolated) correction for the center frequency to all points in the trace. In the event where there are two correction amplitudes at the center frequency, we apply the first one in the table.

Note that the corrections are applied as the data is taken; therefore, a trace in **View** (Update Off) will not be affected by changes made to the corrections table after the trace is put in **View**.

Key Path	**Input/Output, Corrections**
Mode	SA, DVB-T/H, DTMB, SEQAN, TDSCDMA
Dependencies	This key will only appear if you have the proper option installed in your instrument. Amplitude correction may not be available in all modes; if a mode does not support amplitude correction, the Corrections key should be blanked while in that mode. If an application supports corrections but the current measurement does not, then the key should be grayed out in that measurement
Preset	Corrections arrays are reset (deleted) by Restore Input/Output Defaults. They survive shutdown and restarting of the analyzer application, which means they will survive a power cycle.
Initial S/W Revision	A.02.00

Select Correction

Specifies the selected correction. The term "selected correction" is used throughout this document to specify which correction will be affected by the functions.

Key Path	**Input/Output, Corrections**
Mode	SA
Notes	The selected correction is remembered even when not in the correction menu.
Preset	Set to Correction 1 by Restore Input/Output Defaults
Readback	Correction 1|Correction 2|Correction 3|Correction 4|Correction 5|Correction 6
Initial S/W Revision	A.02.00

Correction On/Off

Turning the Selected Correction on allows the values in it to be applied to the data. This also automatically turns on "Apply Corrections" (sets it to ON), otherwise the correction would not take effect.

A new sweep is initiated if an amplitude correction is switched on or off. Note that changing, sending or loading corrections data does NOT directly initiate a sweep, however in general these operations will turn corrections on, which DOES initiate a sweep.

Key Path	**Input/Output, Corrections**
Remote Command	`[:SENSe]:CORRection:CSET[1]|2|3|4|5|6[:STATe] ON|OFF|1|0` `[:SENSe]:CORRection:CSET[1]|2|3|4|5|6[:STATe]?`
Example	SENS:CORR:CSET1 ON
Dependencies	Turning this on automatically turns on "Apply Corrections" Only the first correction array (Correction 1) supports antenna units. When this array is turned on, and it contains an Antenna Unit other than “None”, the Y Axis Unit of the analyzer is forced to that Antenna Unit. All other Y Axis Unit choices are grayed out. Note that this means that a correction file with an Antenna Unit can only be loaded into the Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include.ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated. This command will generate an “Option not available” error unless you have the proper option installed in your instrument.
Preset	Not affected by a Preset. Set to OFF by **Restore Input/Output Defaults**
State Saved	Saved in instrument state.
Initial S/W Revision	A.02.00

Properties

Accesses a menu that lets you set the properties of the selected correction.

Key Path	**Input/Output, Corrections**
Initial S/W Revision	A.02.00

Select Correction

Specifies the selected correction. The term "selected correction" is used throughout this document to specify which correction will be affected by the functions.

Key Path	**Input/Output, Corrections, Properties**
Notes	The selected correction is remembered even when not in the correction menu.
Preset	Set to Correction 1 by Restore Input/Output Defaults.
Readback	Correction 1|Correction 2|Correction 3|Correction 4|Correction 5|Correction 6
Initial S/W Revision	A.02.00

Antenna Unit

For devices (like antennae) which make measurements of field strength or flux density, the correction array should contain within its values the appropriate conversion factors such that, when the data on the analyzer is presented in dBµV, the display is calibrated in the appropriate units. The "Antenna Unit" used for the conversion is contained within the corrections array database. It may be specified by the user or loaded in from an external file or SCPI.

When an array with an Antenna Unit other than "None" is turned on, the Y Axis Unit of the analyzer is forced to that unit. When this array is turned on, and it contains an Antenna Unit other than “None”, the Y Axis Unit of the analyzer is forced to that Antenna Unit., and all other Y Axis Unit choices are grayed out.

Antenna Unit does not appear in all Modes that support Corrections. Only the modes listed in the Mode row of the table below support Antenna Units.

Key Path	**Input/Output, Corrections, Properties**
Mode	SA
Remote Command	`[:SENSe]:CORRection:CSET[1]|2|3|4:ANTenna[:UNIT] GAUSs|PTESla|UVM|UAM|NOConversion` `[:SENSe]:CORRection:CSET[1]|2|3|4:ANTenna[:UNIT]?`
Example	CORR:CSET:ANT GAUS

Dependencies	Only the first correction array (Correction 1) supports antenna units. Note that this means that a correction file with an Antenna Unit can only be loaded into the Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include.ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated.
Preset	Unaffected by Preset. Set to NOC by Restore Input/Output Defaults
State Saved	Saved in State
Initial S/W Revision	A.02.00

dBµV/m

Sets the antenna unit to dBµV/m. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to dBµV/m and all other Y Axis Unit selections will be grayed out.

Key Path	**Input/Output, Corrections, Properties, Antenna Unit**
Example	:CORR:CSET2:ANT UVM
Readback	"dBµV/m"
Initial S/W Revision	A.02.00

dBµA/m

Sets the antenna unit to dBµA/m. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to dBµA/m and all other Y Axis Unit selections will be grayed out.

Key Path	**Input/Output, Corrections, Properties, Antenna Unit**
Example	:CORR:CSET2:ANT UVA
Readback	" dBµA/m"
Initial S/W Revision	A.02.00

dBpT

Sets the antenna unit to dBpT. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to dBpT and all other Y Axis Unit selections will be grayed out.

Key Path	**Input/Output, Corrections, Properties, Antenna Unit**
Example	:CORR:CSET3:ANT PTES
Readback	"dBpT"
Initial S/W Revision	A.02.00

dBG

Sets the antenna unit to dBG. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to dBG and all other Y Axis Unit selections will be grayed out.

Key Path	**Input/Output, Corrections, Properties, Antenna Unit**
Example	:CORR:CSET:ANT GAUS
Readback	" dBG"
Initial S/W Revision	A.02.00

None

Selects no antenna unit for this Correction set. Thus no Y Axis unit will be forced.

Key Path	**Input/Output, Corrections, Properties, Antenna Unit**
Example	:CORR:CSET4:ANT NOC
Readback	"None"
Initial S/W Revision	A.02.00

Frequency Interpolation

This setting controls how the correction values per-bucket are calculated. We interpolate between frequencies in either the logarithmic or linear scale.

This setting is handled and stored individually per correction set.

See "Interpolation" on page 1217

Key Path	**Input/Output, Corrections, Properties**
Remote Command	`[:SENSe]:CORRection:CSET[1]|2|3|4|5|6:X:SPACing LINear|LOGarithmic` `[:SENSe]:CORRection:CSET[1]|2|3|4|5|6:X:SPACing?`
Example	CORR:CSET:X:SPAC LIN
Preset	Unaffected by a Preset. Set to Linear by Restore Input/Output Defaults.
State Saved	Saved in instrument state.
Initial S/W Revision	A.02.00

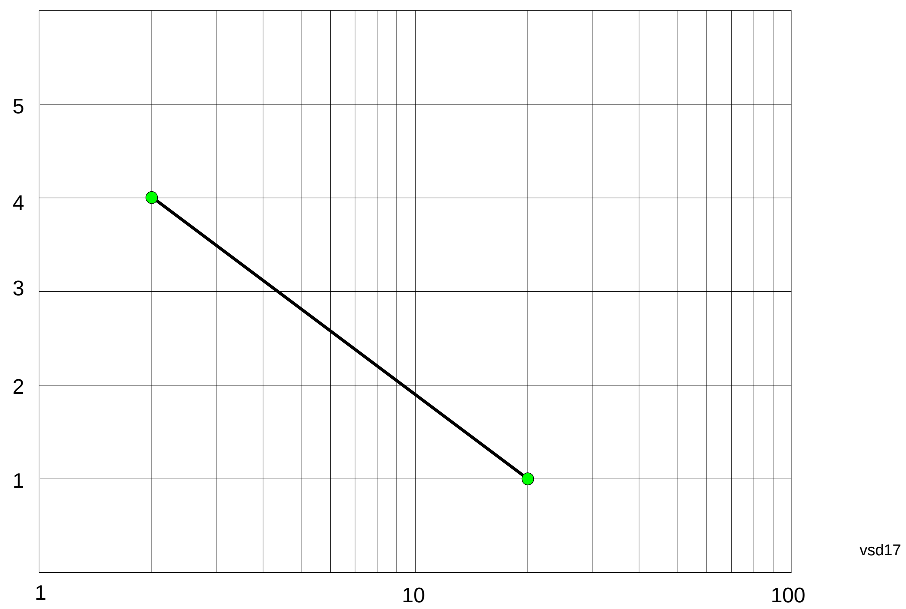
Interpolation

For each bucket processed by the application, all of the correction factors at the frequency of interest (center frequency of each bucket) are summed and added to the amplitude. All trace operations and post processing treat this post-summation value as the true signal to use.

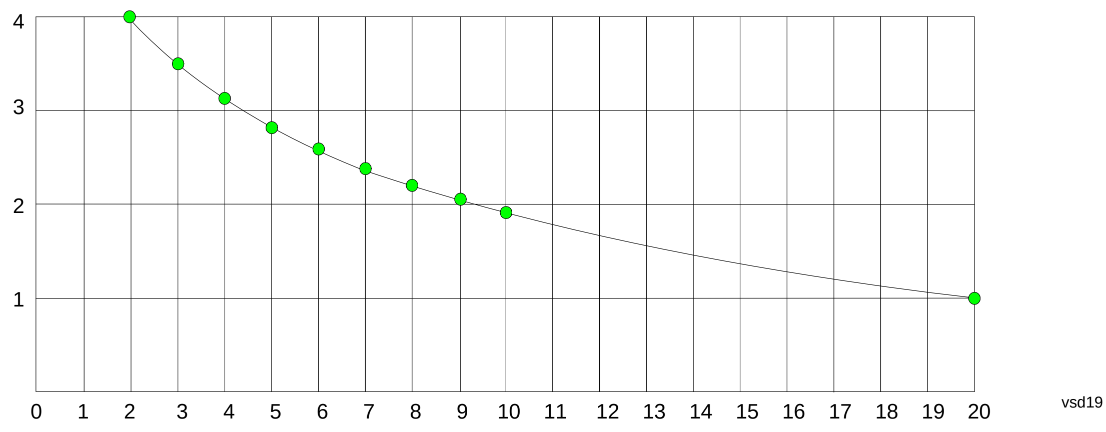
To effect this correction, the goal, for any particular start and stop frequency, is to build a correction trace, whose number of points matches the current Sweep Points setting of the instrument, which will be used to apply corrections on a bucket by bucket basis to the data traces.

For amplitudes that lie between two user specified frequency points, we interpolate to determine the amplitude value. You may select either linear or logarithmic interpolation between the frequencies.

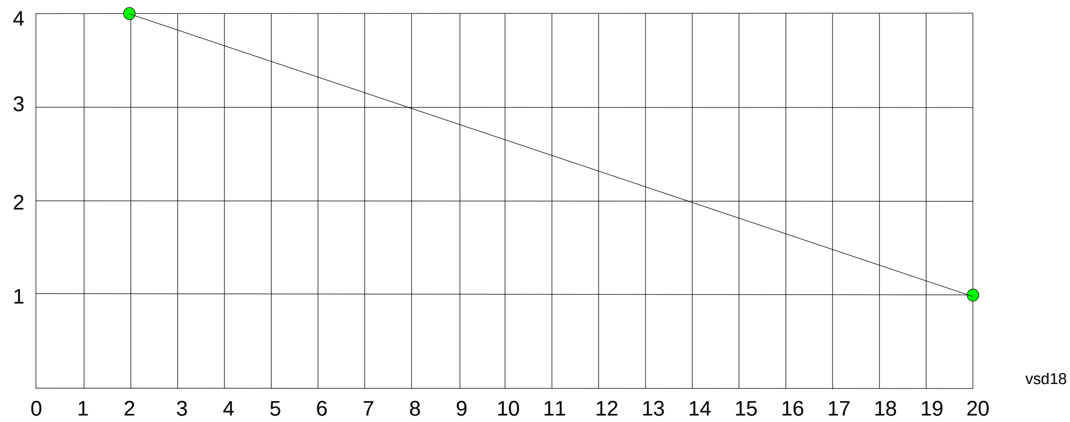
If we interpolate on a log scale, we assume that the line between the two points is a straight line on the log scale. For example, let’s say the two points are (2,4) and (20,1). A straight line between them on a log scale looks like:



On a linear scale (like that of the spectrum analyzer), this translates to:



On the other hand, if we interpolate on a linear scale, we assume that the two points are connected by a straight line on the linear scale, as below:



The correction to be used for each bucket is taken from the interpolated correction curve at the center of the bucket.

Description

Sets an ASCII description field which will be stored in an exported file. Can be displayed in the active function area by selecting as the active function, if desired to be in a screen dump.

Key Path	**Input/Output, Corrections, Properties**
Remote Command	`[:SENSe]:CORRection:CSET[1]|2|3|4|5|6:DESCription "text"` `[:SENSe]:CORRection:CSET[1]|2|3|4|5|6:DESCription?`
Example	:CORR:CSET1:DESC "11941A Antenna correction"
Notes	45 chars max; may not fit on display if max chars used
Preset	Unaffected by a Preset. Set to empty by **Restore Input/Output Defaults**
State Saved	Saved in instrument state.
Initial S/W Revision	A.02.00

Comment

Sets an ASCII comment field which will be stored in an exported file. Can be displayed in the active function area by selecting as the active function, if desired to be in a screen dump.

Key Path	**Input/Output, Corrections, Properties**
Remote Command	`[:SENSe]:CORRection:CSET[1]|2|3|4|5|6:COMMent "text"` `[:SENSe]:CORRection:CSET[1]|2|3|4|5|6:COMMent?`
Example	:CORR:CSET1:COMM "this is a comment"
Notes	45 chars max; may not fit on display if max chars used
Preset	Unaffected by Preset. Set to empty by **Restore Input/Output Defaults**
State Saved	Saved in instrument state

Initial S/W Revision	A.02.00

Edit

Invokes the integrated editing facility for this correction set.

When entering the menu, the editor window turns on, the selected correction is turned **On**, **Apply Corrections** is set to **On**, the amplitude scale is set to **Log**, and the Amplitude Correction ("Ampcor") trace is displayed. The actual, interpolated correction trace is shown in green for the selected correction. Note that since the actual interpolated correction is shown, the correction trace may have some curvature to it.   This trace represents only the correction currently being edited, rather than the total, accumulated amplitude correction for all amplitude corrections which are currently on, although the total, accumulated correction for all corrections which are turned on is still applied to the data traces.

Because corrections data is always in dB, but the Y-axis of the analyzer is in absolute units, it is necessary to establish a reference line for display of the Corrections data.   The reference line is halfway up the display and represents 0 dB of correction. It is labeled "0 dB CORREC". It is drawn in blue.

Corrections data is always in dB. Whatever dB value appears in the correction table represents the correction to be applied to that trace at that frequency. So if a table entry shows 30 dB that means we ADD 30 dB to each trace to correct it before displaying it. By definition all points are connected. If a gap is desired for corrections data, enter 0 dB.

Note that a well-designed Corrections array should start at 0 dB and end at 0 dB. This is because whatever the high end point is will be extended to the top frequency of the instrument, and whatever the low end point is will be extended down to 0 Hz. So for a Corrections array to have no effect outside its range, you should start and end the array at 0 dB.

NOTE	The table editor will only operate properly if the analyzer is sweeping, because its updates are tied to the sweep system. Thus, you should not try to use the editor in single sweep, and it will be sluggish during compute-intensive operations like narrow-span FFT sweeps.

When exiting the edit menu (by using the **Return** key or by pressing an instrument front-panel key), the editor window turns off and the Ampcor trace is no longer displayed; however, **Apply Corrections** remains **On**, any correction that was on while in the editor remains on, and the amplitude scale returns to its previous setting.

Corrections arrays are not affected by a Preset, because they are in the Input/Output system. They also survive shutdown and restarting of the analyzer application, which means they will survive a power cycle.

Key Path	**Input/Output, Corrections**
Initial S/W Revision	A.02.00

Navigate

Lets you move through the table to edit the desired point.

Key Path	**Input/Output, Corrections, Edit**

Notes	There is no value readback on the key
Min	1
Max	2000
Initial S/W Revision	A.02.00

Frequency

Lets you edit the frequency of the current row.

Key Path	**Input/Output, Corrections, Edit**
Notes	There is no value readback on the key.
Min	0
Max	1 THz
Initial S/W Revision	A.02.00

Amplitude

Lets you edit the Amplitude of the current row.

Key Path	**Input/Output, Corrections, Edit**
Notes	There is no value readback on the key.
Min	–1000 dB
Max	1000 dB
Initial S/W Revision	A.02.00

Insert Point Below

Inserts a point below the current point. The new point is a copy of the current point and becomes the current point. The new point is not yet entered into the underlying table, and the data in the row is displayed in light gray.

Key Path	**Input/Output, Corrections, Edit**
Initial S/W Revision	A.02.00

Delete Point

Deletes the currently-selected point, whether or not that point is being edited, and selects the Navigate functionality. The point following the currently-selected point (or the point preceding if there is none) will be selected.

Key Path	**Input/Output, Corrections, Edit**
Initial S/W Revision	A.02.00

Scale X Axis

Matches the X Axis to the selected Correction, as well as possible. Sets the Start and Stop Frequency to contain the minimum and maximum Frequency of the selected Correction. The range between Start Frequency and Stop Frequency is 12.5% above the range between the minimum and maximum Frequency, so that span exceeds this range by one graticule division on either side. If in zero-span, or there is no data in the Ampcor table, or the frequency range represented by the table is zero, no action is taken. Standard clipping rules apply if the value in the table is outside the allowable range for the X axis.

Key Path	**Input/Output, Corrections, Edit**
Initial S/W Revision	A.02.00

Delete Correction

Deletes the correction values for this set. When this key is pressed a prompt is placed on the screen that says “Please press Enter or OK key to delete correction. Press ESC or Cancel to close this dialog.” The deletion is only performed if you press OK or Enter.

Key Path	**Input/Output, Corrections**
Remote Command	`[:SENSe]:CORRection:CSET[1]|2|3|4|5|6:DELete`
Example	CORR:CSET:DEL CORR:CSET1:DEL CORR:CSET4:DEL
Notes	Pressing this key when no corrections are present is accepted without error.
Initial S/W Revision	A.02.00

Apply Corrections

Applies amplitude corrections which are marked as ON to the measured data. If this is set to OFF, then no amplitude correction sets will be used, regardless of their individual on/off settings. If set to ON, the corrections that are marked as ON (see “Correction On/Off” on page 1214) are used.

Key Path	**Input/Output, Corrections**
Remote Command	`[:SENSe]:CORRection:CSET:ALL[:STATe] ON|OFF|1|0` `[:SENSe]:CORRection:CSET:ALL[:STATe]?`
Example	SENS:CORR:CSET:ALL OFF This command makes sure that no amplitude corrections are applied, regardless of their individual on/off settings.
Preset	Not affected by Preset. Set to OFF by Restore Input/Output Defaults
State Saved	Saved in instrument state.
Initial S/W Revision	A.02.00

Delete All Corrections

Erases all correction values for all 4 Amplitude Correction sets.

When this key is pressed a prompt is placed on the screen that says “Please press Enter or OK key to delete all corrections. Press ESC or Cancel to close this dialog.” The deletion is only performed if you press OK or Enter.

Key Path	**Input/Output, Corrections**
Remote Command	`[:SENSe]:CORRection:CSET:ALL:DELete`
Example	CORR:CSET:ALL:DEL
Initial S/W Revision	A.02.00

Remote Correction Data Set Commands

Set (Replace) Data (Remote Command Only)

The command takes an ASCII series of alternating frequency and amplitude points, each value separated by commas.

The values sent in the command will totally replace all existing correction points in the specified set.

An Ampcor array can contain 2000 points maximum.

Remote Command	`[:SENSe]:CORRection:CSET[1]|2|3|4|5|6:DATA <freq>, <ampl>, . . .` `[:SENSe]:CORRection:CSET[1]|2|3|4|5|6:DATA?`
Example	CORR:CSET1:DATA 10000000,–1.0,20000000,1.0 This defines two correction points at (10 MHz, –1.0 dB) and (20 MHz, 1.0 dB) for correction set 1.
Preset	Empty after Restore Input/Output Defaults. Survives a shutdown or restart of analyzer application (including a power cycle).
State Saved	Saved in instrument state.
Min	Freq: 0 Hz Amptd: –1000 dBm
Max	Freq: 1 THz Amptd: +1000 dBm
Initial S/W Revision	A.02.00

Merge Correction Data (Remote Command Only)

The command takes an ASCII series of alternating frequency and amplitude points, each value separated by commas. The difference between this command and Set Data is that this merges new correction points into an existing set.

Any new point with the same frequency as an existing correction point will replace the existing point's amplitude with that of the new point.

An Ampcor array can contain 2000 total points, maximum.

Remote Command	`[:SENSe]:CORRection:CSET[1]|2|3|4|5|6:DATA:MERGe <freq>, <ampl>, ...`
Example	CORR:CSET1:DATA:MERGE 15000000,–5.0,25000000,5.0 This adds two correction points at (15 MHz, –5.0 dB) and (25 MHz, 5.0 dB) to whatever values already exist in correction set 1.
Preset	Empty after Restore Input/Output Defaults. Survives shutdown/restart of analyzer application (including power cycle)
Min	Freq: 0 Hz Amptd: –1000 dBm
Max	Freq: 1 THz Amptd: +1000 dBm
Initial S/W Revision	A.02.00

Freq Ref In

Specifies the frequency reference as being the internal reference, external reference or sensing the presence of an external reference.

When the frequency reference is set to internal, the internal 10 MHz reference is used even if an external reference is connected.

When the frequency reference is set to external, the instrument will use the external reference. However, if there is no external signal present, or it is not within the proper amplitude range, a condition error message is generated. When the external signal becomes valid, the error is cleared.

If Sense is selected, the instrument checks whether a signal is present at the external reference connector and will automatically switch to the external reference when a signal is detected. When no signal is present, it automatically switches to the internal reference. No message is generated as the reference switches between external and internal. The monitoring of the external reference occurs approximately on 1 millisecond intervals, and never occurs in the middle of a measurement acquisition, only at the end of the measurement (end of the request).

If for any reason the instrument's frequency reference is not able to obtain lock, Status bit 2 in the Questionable Frequency register will be true and a condition error message is generated. When lock is regained, Status bit 2 in the Questionable Frequency register will be cleared and the condition error will be cleared.

If an external frequency reference is being used, you must enter the frequency of the external reference if it is not exactly 10 MHz. The External Ref Freq key is provided for this purpose.

Key Path	**Input/Output**

Remote Command	`[:SENSe]:ROSCillator:SOURce:TYPE INTernal|EXTernal|SENSe` `[:SENSe]:ROSCillator:SOURce:TYPE?`
Preset	This is unaffected by a Preset but is set to SENSe on a "Restore Input/Output Defaults" or "Restore System Defaults->All".
State Saved	Saved in instrument state.
Status Bits/OPC dependencies	STATus:QUEStionable:FREQuency bit 2 set if unlocked.
Initial S/W Revision	Prior to A.02.00

Remote Command	`[:SENSe]:ROSCillator:SOURce?`
Notes	The query [SENSe]:ROSCillator:SOURce? returns the current switch setting. This means: 1. If it was set to SENSe but there is no external reference so the instrument is actually using the internal reference, then this query returns INTernal and not SENSe. 2. If it was set to SENSe and there is an external reference present, the query returns EXTernal and not SENSe. 3. If it was set to EXTernal, then the query returns "EXTernal" 4. If it was set to INTernal, then the query returns INTernal
Preset	SENSe
Backwards Compatibility SCPI	The query [:SENSe]:ROSCillator:SOURce? was a query-only command in ESA which always returned whichever reference the instrument was using. The instrument automatically switched to the ext ref if it was present. In PSA (which had no sensing) the command [:SENSe]:ROSCillator:SOURce set the reference (INT or EXT), so again its query returned the actual routing. Thus the query form of this command is 100% backwards compatible with both instruments.
Initial S/W Revision	Prior to A.02.00

Remote Command	`[:SENSe]:ROSCillator:SOURce INTernal|EXTernal`
Notes	([:SENSe]:ROSCillator:SOURce:TYPE INTernal|EXTernal and directly sets the routing to either internal or external.)
Initial S/W Revision	Prior to A.02.00

Sense

The external reference is used if a valid signal is sensed at the Ext Ref input. Otherwise the internal reference is used.

Key Path	**Input/Output, Freq Ref In**
Example	:ROSC:SOUR:TYPE SENS
Readback	Sense
Initial S/W Revision	Prior to A.02.00

Internal

The internal reference is used.

Key Path	**Input/Output, Freq Ref In**
Example	:ROSC:SOUR:TYPE INT
Readback	Internal
Initial S/W Revision	Prior to A.02.00

External

The external reference is used.

Key Path	**Input/Output, Freq Ref In**
Example	:ROSC:SOUR:TYPE EXT
Readback	External
Initial S/W Revision	Prior to A.02.00

Ext Ref Freq

This key tells the analyzer the frequency of the external reference. When the external reference is in use (either because the reference has been switched to External or because the Reference has been switched to Sense and there is a valid external reference present) this information is used by the analyzer to determine the internal settings needed to lock to that particular external reference signal.

For the instrument to stay locked, the value entered must be within 5 ppm of the actual external reference frequency. So it is important to get it close, or you risk an unlock condition.

Note that this value only affects the instrument’s ability to lock. It does not affect any calculations or measurement results. See "Freq Offset" in the Frequency section for information on how to offset frequency values.

Key Path	**Input/Output, Freq Ref In**

Remote Command	`[:SENSe]:ROSCillator:EXTernal:FREQuency <freq>` `[:SENSe]:ROSCillator:EXTernal:FREQuency?`
Example	ROSC:EXT:FREQ 20 MHz sets the external reference frequency to 20 MHz, but does not select the external reference. ROSC:SOUR:TYPE EXT selects the external reference.
Notes	Still available with Internal selected, to allow setup for when External is in use.
Preset	This is unaffected by a Preset but is set to 10 MHz on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Min	CXA: 10 MHz EXA: 10 MHz or 13 MHz, depending on whether N9010A-R13 is licensed MXA: 1 MHz PXA: 1 MHz
Max	CXA: 10 MHz EXA: 10 MHz MXA: 50 MHz PXA: 50 MHz
Default Unit	Hz
Initial S/W Revision	Prior to A.02.00

External Reference Lock BW

This control lets you adjust the External Reference phase lock bandwidth. This control is available in some models of the X-Series.

The PXA variable reference loop bandwidth allows an external reference to be used and have the analyzer close-in phase noise improved to match that of the reference. This could result in an improvement of tens of decibels. The choice of “Wide” or “Narrow” affects the phase noise at low offset frequencies, especially 4 to 400 Hz offset. When using an external reference with superior phase noise, we recommend setting the external reference phase-locked-loop bandwidth to wide (60 Hz), to take advantage of that superior performance. When using an external reference with inferior phase noise performance, we recommend setting that bandwidth to narrow (15 Hz). In these relationships, inferior and superior phase noise are with respect to 134 dBc/Hz at 30 Hz offset from a 10 MHz reference. Because most reference sources have phase noise behavior that falls off at a rate of 30 dB/decade, this is usually equivalent to 120 dBc/Hz at 10 Hz offset.

Key Path	**Input/Output, Freq Ref In**
Scope	Mode Global
Remote Command	`[:SENSe]:ROSCillator:BANDwidth WIDE|NARRow` `[:SENSe]:ROSCillator:BANDwidth?`

Example	ROSC:BAND WIDE
Dependencies	This key only appears in analyzers equipped with the required hardware.
Preset	This is unaffected by a Preset but is set to Narrow on a "Restore Input/Output Defaults" or "Restore System Defaults -> All"
State Saved	Saved in Input/Output state.
Initial S/W Revision	A.04.00

External Ref Coupling

Only appears with option ERC installed and licensed.

This function lets you couple the sweep system of the analyzer to the state of the External Reference. If **Normal** is selected, data acquisition proceeds regardless of the state of the External Reference. When you select **Ext Ref Out Of Range Stops Acquisition**, the data acquisition (sweep or measurement) stops when either the "521, External ref out of range" or the "503, Frequency Reference unlocked" error message is asserted. Note that this will only take place if the **Freq Ref In** selection is **External**.

With the acquisition stopped, the data display will stop updating (even if this occurs in the middle of a sweep or measurement) and no data will be returned to a READ? or MEASure? query; that is, these queries will not complete because the analyzer will not respond to them. Furthermore, no response will be generated to a *WAI? or *OPC? query.

Proper SCPI sequences are shown below, which will always fail to return if the acquisition stops during the requested sweep or measurement. Note that, for predictable operation of this function, it is best to operate the analyzer in single measurement mode (INIT:CONT OFF), because if operating in continuous mode, the analyzer may respond to the above queries even after the acquisition stops, with data left over from the previous acquisition.

:INIT:CONT OFF

:INIT:IMM;*OPC?

--

:INIT:CONT OFF

:INIT:IMM;*WAI?

--

:INIT:CONT OFF

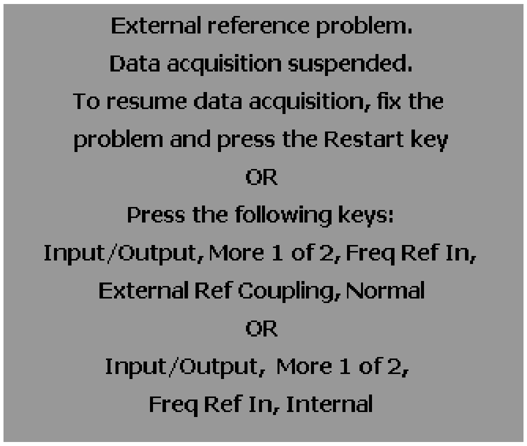
:READ?

--

:INIT:CONT OFF

:MEASure?

When the acquisition ceases, in addition to the error condition(s) described above, a popup error message will be generated informing you that the acquisition has ceased due to an invalid external reference. This message will stay on the screen while the acquisition is suspended.



If you press the Restart key this message will be taken off the screen and a new acquisition will be attempted; if the External Reference problem persists the message will go right back up. You can also take the message down by changing back to the **Normal** setting of Sweep/Ext Ref Coupling, or by pressing **Freq Ref In, Internal**, or **Freq Ref In, Sense**, or **Restore Input/Output Defaults.**

The setting of **External Ref Coupling** is persistent across power-cycling and is not reset with a Preset. It is reset to the default state (**Normal**) when **Restore Input/Output Defaults** is invoked, which will also restart normal data acquisition.

The detection of invalid external reference is under interrupt processing. If the external reference becomes invalid then returns to valid in too short a time, no error condition will be detected or reported and therefore the acquisition will not be stopped.

Key Path	**Input/Output, Freq Ref In**
Mode	All
Remote Command	`[:SENSe]:ROSCillator:COUPling NORMal|NACQuisition` `[:SENSe]:ROSCillator:COUPling?`
Preset	This setting is persistent: it survives power-cycling or a Preset and is reset with Restore Input/Output defaults.
State Saved	Not saved in instrument state
Readback	Normal|Stop Acq
Initial S/W Revision	A.02.00

Output Config

Accesses keys that configure various output settings, like the frequency reference output, trigger output and analog output.

Key Path	**Input/Output**
Initial S/W Revision	Prior to A.02.00

Trig Out (1 and 2)

Select the type of output signal that will be output from the rear panel Trig 1 Out or Trig 2 Out connectors.

Key Path	**Input/Output, Output Config**
Remote Command	`:TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut HSWP|MEASuring|MAIN|GATE|GTRigger|OEVen|SPOint|SSWeep|SSETtled|S1Marker|S2Marker|S3Marker|S4Marker|OFF` `:TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut?`
Example	TRIG:OUTP HSWP TRIG2:OUTP GATE
Dependencies	The second Trigger output (Trig 2 Out) does not appear in all models; in models that do not support it, the Trig 2 Out key is blanked, and sending the SCPI command for this output generates an error, "Hardware missing; Not available for this model number" In models that do not support the Trigger 2 output, this error is returned if trying to set Trig 2 Out and a query of Trig 2 Out returns OFF.
Preset	Trigger 1: Sweeping (HSWP) Trigger 2: Gate This is unaffected by a Preset but is preset to the above values on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Off

Selects no signal to be output to the Trig 1 Out or Trig 2 Out connector.

Key Path	**Input/Output, Output Config, Trig 1/2 Output**
Example	TRIG1:OUTP OFF
Readback	Off
Initial S/W Revision	Prior to A.02.00

Polarity

Sets the output to the Trig 1 Out or Trig 2 Out connector to trigger on either the positive or negative polarity.

Key Path	**Input/Output, Output Config, Trig 1/2 Output**
Remote Command	`:TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut:POLarity POSitive|NEGative` `:TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut:POLarity?`

Example	TRIG1:OUTP:POL POS
Preset	This is unaffected by a Preset but is set to POSitive on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Sweeping (HSWP)

Selects the Sweeping Trigger signal to be output to the Trig 1 Out or Trig 2 Out connector when a measurement is made. This signal has historically been known as "HSWP" (High = Sweeping), and is 5 V TTL level with 50 ohm output impedance."

Key Path	**Input/Output, Output Config, Trig 1/2 Output**
Example	TRIG1:OUTP HSWP
Readback	Sweeping
Initial S/W Revision	Prior to A.02.00

Measuring

Selects the Measuring trigger signal to be output to the Trig 1 Out or Trig 2 Out connector. This signal is true while the Measuring status bit is true.

Key Path	**Input/Output, Output Config, Trig 1/2 Output**
Example	TRIG1:OUTP MEAS
Readback	Measuring
Initial S/W Revision	Prior to A.02.00

Main Trigger

Selects the current instrument trigger signal to be output to the Trig 1 Out or Trig 2 Out connector.

Key Path	**Input/Output, Output Config, Trig 1/2 Output**
Example	TRIG1:OUTP MAIN
Readback	Main Trigger
Initial S/W Revision	Prior to A.02.00

Gate Trigger

Selects the gate trigger signal to be output to the Trig 1 Out or Trig 2 Out connector. This is the source of the gate timing, not the actual gate signal.

Key Path	**Input/Output, Output Config, Trig 1/2 Output**
Example	TRIG1:OUTP GTR
Readback	Gate Trigger
Initial S/W Revision	Prior to A.02.00

Gate

Selects the gate signal to be output to the Trig 1 Out or Trig 2 Out connector. The gate signal has been delayed and its length determined by delay and length settings. When the polarity is positive, a high on the Trig 1 Out or Trig 2 Out represents the time the gate is configured to pass the signal.

Key Path	**Input/Output, Output Config, Trig 1/2 Output**
Example	TRIG1:OUTP GATE
Readback	Gate
Initial S/W Revision	Prior to A.02.00

Odd/Even Trace Point

Selects either the odd or even trace points as the signal to be output to the Trig 1 Out or Trig 2 Out connector when performing swept spectrum analysis. When the polarity is positive, this output goes high during the time the analyzer is sweeping past the first point (Point 0) and every other following trace point. The opposite is true if the polarity is negative.

Key Path	**Input/Output, Output Config, Trig 1/2 Output**
Example	TRIG1:OUTP OEV
Readback	Odd/Even
Initial S/W Revision	Prior to A.02.00

Analog Out

This menu lets you control which signal is fed to the “Analog Out” connector on the analyzer rear panel.

See “More Information” on page 1233

Key Path	**Input/Output, Output Config**
Remote Command	`:OUTPut:ANALog OFF|SVIDeo|LOGVideo|LINVideo|DAUDio` `:OUTPut:ANALog?`
Example	OUTP:ANAL SVIDeo ! causes the analog output type to be Screen Video

Preset	OFF
Preset	This is unaffected by Preset but is set to DAUDio on a "Restore Input/Output Defaults" or "Restore System Defaults->All
State Saved	Saved in Input/Output State
Readback line	1-of-N selection [variable]
Backwards Compatibility Notes	Prior to A.04.00, OFF was the default functionality except when in the Analog Demod application or with Tune and Listen, in which case it was DAUDio, and there was no selection menu. So for backwards compatibility, Auto (:OUTP:ANAL:AUTO ON) will duplicate the prior behavior. The DNWB and SANalyzer parameters, which were legal in PSA but perform no function in the X-Series, are accepted without error.
Initial S/W Revision	A.04.00

More Information

The table below gives the range for each output.

Analog Out	**Nominal Range exc. (10% overrange)**	**Scale Factor**	**Notes**
Off	0 V		
Screen Video	0 – 1 V open circuit	10%/division	8566 compatible
Log Video	0 – 1 V terminated	1/(192.66 dB/V)	dB referenced to mixer level, 1V out for –10 dBm at the mixer.
Linear Video	0 – 1 V terminated	100%/V	Linear referenced to Ref Level, 1 V out for RF envelope at the Ref Level.
Demod Audio	(varies with analyzer setting)		

Auto

Selects the Auto state for the Analog Output menu. In this state, the Analog Output will automatically be set to the most sensible setting for the current mode or measurement.

If you make a selection manually from the Analog Out menu, this selection will remain in force until you change it (or re-select Auto), even if you go to a mode or measurement for which the selected output does not apply.

Key Path	**Input/Output, Output Config, Analog Out**

Remote Command	`OUTPut:ANALog:AUTO OFF|ON|0|1`
	
	`OUTPut:ANALog:AUTO?`

Example	OUTP:ANAL:AUTO ON
Preset	ON
State Saved	Saved in Input/Output State
Initial S/W Revision	A.04.00

Off

Turns off the analog output.

Key Path	**Input/Output, Output Config, Analog Out**
Example	OUTP:ANAL OFF ! causes the analog output to be off
Readback Text	Off
Initial S/W Revision	A.04.00

Screen Video

Selects the analog output to be the screen video signal. In this mode, the pre-detector data is output to the Analog Out connector. The output looks very much like the trace displayed on the analyzer's screen, and depends on the Log/Lin display Scale, Reference Level, and dB per division, but is not influenced by the selected detector or any digital flatness corrections or trace post-processing (like Trace Averaging).

Note that this mode is similar to the Analog Output of the HP 8566 family and the Video Out (opt 124) capability of the Agilent PSA analyzer (E444x), although there are differences in the behavior.

See "Backwards Compatibility:" on page 1235.

Key Path	**Input/Output, Output Config, Analog Out**
Example	OUTP:ANAL SVID

Dependencies	Because the Screen Video output uses one of the two IF processing channels, only one detector is available while Screen Video is selected. All active traces will change to use the same detector as the selected trace when Screen Video is activated. Screen Video output is not available while any EMI Detector is selected (Quasi Peak, RMS Average or EMI Average), because these detectors use both IF processing channels. Consequently, if the user chooses an EMI Detector, there will be no Screen Video output. The output holds at its last value during an alignment and during a marker count. After a sweep: • If a new sweep is to follow (as in Continuous sweep mode), the output holds at its last value during the retrace before the next sweep starts. If the analyzer is in zero-span, there is no retrace, as the analyzer remains tuned to the Center Frequency and does not sweep. Therefore, in zero-span, the output simply remains live between display updates. • If no new sweep is to follow (as in Single sweep mode), the output remains live, and continues to show the pre-detector data This function depends on optional capability; the key will be blanked and the command will generate an “Option not available” error unless you have Option YAV or YAS licensed in your instrument.
Couplings	Screen Video output changes while in FFT Sweeps, so for measurements that use exclusively FFT Sweeps, or if the user manually chooses FFT Sweeps, the Screen Video output will look different than it does in swept mode.
Readback Text	Screen Video
Initial S/W Revision	A.04.00

Backwards Compatibility:

The Screen Video function is intended to be very similar to the 8566 Video Output and the PSA Option 124. However, unlike the PSA, it is not always on; it must be switched on by the Screen Video key. Also, unlike the PSA, there are certain dependencies (detailed above) – for example, the Quasi Peak Detector is unavailable when Screen Video is on.

Futhermore, the PSA Option 124 hardware was unipolar and its large range was padded to be exactly right for use as a Screen Video output. In the X-Series, the hardware is bipolar and has a wider range to accommodate the other output choices. Therefore, the outputs won’t match up exactly and users may have to modify their setup when applying the X-Series in a PSA application.

Log Video (RF Envelope, Ref=Mixer Level)

Selects the analog output to be the log of the video signal. In this mode, the pre-detector data is output to the Analog Out connector with a Log scaling. The output is referenced to the current level at the mixer, does not depend on display settings like Reference Level or dB per division, and it is not influenced by the selected detector or any digital flatness corrections or trace post-processing (like Trace Averaging), but does change with input attenuation.

The output is designed so that full scale (1 V) corresponds to –10 dBm at the mixer. The full range (0–1 V) covers 192.66 dB; thus, 0 V corresponds to –202.66 dBm at the mixer.

Key Path	**Input/Output, Output Config, Analog Out**
Example	OUTP:ANAL LOGV
Dependencies	Because the Log Video output uses one of the two IF processing channels, only one detector is available while Screen Video is selected. All active traces will change to use the same detector as the selected trace when Log Video is activated. Log Video output is not available while any EMI Detector is selected (Quasi Peak, RMS Average or EMI Average), because these detectors use both IF processing channels. Consequently, if the user chooses an EMI Detector, there will be no Log Video output. The output holds at its last value during an alignment, during a marker count, and during retrace (after a sweep and before the next sweep starts). This function depends on optional capability. The key will be blanked and the command will generate an “Option not available” error unless you have Option YAV licensed in your instrument.
Couplings	Log Video output changes while in FFT Sweeps, so for measurements that use exclusively FFT Sweeps, or if the user manually chooses FFT Sweeps, the Log Video output will look different than it does in swept mode.
Readback Text	Log Video
Initial S/W Revision	A.04.00

Linear Video (RF Envelope, Ref=Ref Level)

Selects the analog output to be the envelope signal on a linear (voltage) scale. In this mode, the pre-detector data is output to the Analog Out connector with a Linear scaling. The output is based on the current Reference Level, and is not influenced by the selected detector or any digital flatness corrections or trace post-processing (like Trace Averaging).

The scaling is set so that 1 V output occurs with an instantaneous video level equal to the reference level, and 0 V occurs at the bottom of the graticule. This scaling gives you the ability to control the gain without having another setup control for the key. But it requires you to control the look of the display (the reference level) in order to control the analog output.

This mode is ideal for looking at Amplitude Modulated signals, as the linear envelope effectively demodulates the signal.

Key Path	**Input/Output, Output Config, Analog Out**
Example	OUTP:ANAL LINV

Dependencies	Because the Linear Video output uses one of the two IF processing channels, only one detector is available while Linear Video is selected. All active traces will change to use the same detector as the selected trace when Log Video is activated. Linear Video output is not available while any EMI Detector is selected (Quasi Peak, RMS Average or EMI Average), because these detectors use both IF processing channels. Consequently, if the user chooses an EMI Detector, there will be no Linear Video output. The output holds at its last value during an alignment and during a marker count and during retrace (after a sweep and before the next sweep starts). This function depends on optional capability; the key will be blanked and the command will generate an “Option not available” error unless you have Option YAV licensed in your instrument.
Couplings	Linear Video output changes while in FFT Sweeps, so for measurements that use exclusively FFT Sweeps, or if the user manually chooses FFT Sweeps, the Linear Video output will look different than it does in swept mode.
Readback Text	Linear Video
Initial S/W Revision	A.04.00

Demod Audio

Selects the analog output to be the demodulation of the video signal.

When Demod Audio is selected, the demodulated audio signal appears at this output whenever the Analog Demod application is demodulating a signal or when **Analog Demod Tune and Listen** is operating in the Swept SA measurement.

When Analog Out is in the Auto state, this output is auto-selected when in the Analog Demod mode or when **Analog Demod Tune and Listen** is operating in the Swept SA measurement.

If any other Analog Output is manually selected when in the Analog Demod mode or when **Analog Demod Tune and Listen** is operating in the Swept SA measurement, a condition warning message appears.

Key Path	**Input/Output, Output Config, Analog Out**
Example	OUTP:ANAL DAUD
Dependencies	This key only appears if the Analog Demod application (N9063A), the N6141A or W6141A application, or Option EMC is installed and licensed, otherwise the key will be blanked and the command will generate an “Option not available” error. The output holds at its last value during an alignment and during a marker count. It is not held between sweeps, in order for Tune and Listen to work properly. When Demod Audio is the selected Analog Output: • all active traces are forced to use the same detector. • CISPR detectors (QPD, EMI Avg, RMS Avg) are unavailable

Readback Text	Demod Audio
Initial S/W Revision	Prior to A.02.00 (this was the default functionality, and there was no selection)
Modified at S/W Revision	A.04.00

I/Q Cal Out

The Baseband I/Q "Cal Out" port can be turned on with either a 1 kHz or a 250 kHz square wave. This can be turned on independent of the input selection. A Preset will reset this to Off.

Key Path	**Input/Output, Output Config**
Remote Command	`:OUTPut:IQ:OUTPut IQ1|IQ250|OFF` `:OUTPut:IQ:OUTPut?`
Example	OUTP:IQ:OUTP IQ1
Couplings	An I/Q Cable Calibration or an I/Q Probe Calibration will change the state of the Cal Out port as needed by the calibration routine. When the calibration is finished the I/Q Cal Out is restored to the pre-calibration state.
Preset	Off
State Saved	Saved in instrument state.
Range	1 kHz Square Wave|250 kHz Square Wave|Off
Readback Text	1 kHz|250 kHz|Off
Initial S/W Revision	Prior to A.02.00
Saved State	Saved in instrument state

1 kHz Square Wave

Turns on the 1 kHz square wave signal at the Cal Out port. This choice is only available with option BBA.

Key Path	**Input/Output, Output Config, I/Q Cal Out**
Readback	I/Q 1kHz
Initial S/W Revision	Prior to A.02.00

250 kHz Square Wave

Turns on the 250 kHz square wave signal at the Cal Out port. This choice is only available with option BBA.

Key Path	**Input/Output, Output Config, I/Q Cal Out**
Readback	I/Q 250kHz
Initial S/W Revision	Prior to A.02.00

Off

Turns off the signal at the Cal Out port. This choice is only available with option BBA.

Key Path	**Input/Output, Output Config, I/Q Cal Out**
Readback	Off
Initial S/W Revision	Prior to A.02.00

Digital Bus

This menu allows you to configure the LVDS connector located on the rear panel of the instrument. It is a unidirectional link of real time data at a 90 MSa/s rate. The ADC is sampling a 22.5 MHz IF.

The data that appears on this port is raw, uncorrected ADC samples, unless you have option RTL. With option RTL, you get fully corrected I/Q data.

This connector will only be active when the Narrowband IF Path is currently in use.

Key Path	**Input/Output, Output Config, Digital Out**
Initial S/W Revision	A.04.00

Bus Out On/Off

When Bus Out is on, all acquisitions are streamed to the output port including acquisitions for internal purposes such as Alignment; internal processing and routing of acquisitions continues as usual and is unaffected by the state of Bus Out.

When Bus Out is off, no signal appears on the LVDS port.

Key Path	**Input/Output, Output Config, Digital Out, Digital Bus**
Scope	Mode Global
Remote Command	`:OUTPut:DBUS[1][:STATe] ON|OFF|1|0` `:OUTPut:DBUS[1][:STATe]?`
Example	OUTP:DBUS ON
Preset	This is unaffected by a Preset but is set to Off on a "Restore Input/Output Defaults" or "Restore System Defaults -> All"
State Saved	Saved in Input/Output State
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

Aux IF Out

This menu controls the signals that appear on the SMA output on the rear panel labeled “AUX IF OUT

NOTE	The Aux IF Out functionality is only valid for RF and External Mixer inputs. When using the External Mixing path, the Aux IF Out levels (for all three Options CR3, CRP, and ALV) will be uncalibrated because the factory default Aux IF level was set to accommodate the expected IF levels for the RF path.

Key Path	**Input/Output, Output Config**
Remote Command	`:OUTPut:AUX SIF|AIF|LOGVideo|OFF` `:OUTPut:AUX?`
Dependencies	The softkey does not appear in models that do not support the Aux IF Out.
Preset	This is unaffected by a Preset but is set to OFF on a "Restore Input/Output Defaults" or "Restore System Defaults->All”
State Saved	Saved in Input/Output state
Readback line	1-of-N selection [variable]
Backwards Compatibility Notes	In the PSA, the IF output has functionality equivalent to the "Second IF" function in the X-Series’ Aux IF Out menu. In the X-Series, it is necessary to switch the Aux IF Out to “Second IF” to get this functionality, whereas in PSA it is always on, since there are no other choices. Hence a command to switch this function to “Second IF” will have to be added by customers migrating from PSA who use the IF Output in PSA.
Initial S/W Revision	A.04.00

Second IF

In this mode the 2nd IF output is routed to the rear panel connector. The annotation on the key shows the current 2nd IF frequency in use in the analyzer.

The frequency of the 2nd IF depends on the current IF signal path as shown in the table below:

IF Path Selected	**Frequency of “Second IF” Output**
10 MHz	322.5 MHz
25 MHz	322.5 MHz
40 MHz	250 MHz
140 MHz	300 MHz

The signal quality, such as signal to noise ratio and phase noise, are excellent in this mode.

Key Path	**Input/Output, Output Config, Aux IF Out**
Example	OUTP:AUX SIF causes the aux output type to be Second IF
Dependencies	Does not appear unless Option CR3 is installed.
Readback Text	Second IF
Initial S/W Revision	A.04.00

Arbitrary IF

In this mode the 2nd IF output is mixed with a local oscillator and mixer to produce an arbitrary IF output between 10 MHz and 75 MHz with 500 kHz resolution. The phase noise in this mode will not be as good as in **Second IF** mode.

The IF output frequency is adjustable, through an active function which appears on the Arbitrary IF selection key, from 10 MHz to 75 MHz with 500 kHz resolution.

The bandwidth of this IF output varies with band and center frequency, but is about 40 MHz at the –3 dB width. When the output is centered at lower frequencies in its range, signal frequencies at the bottom of the bandwidth will "fold". For example, with a 40 MHz bandwidth (20 MHz half-bandwidth), and a 15 MHz IF center, a signal –20 MHz relative to the spectrum analyzer center frequency will have a relative response of about –3 dB with a frequency 20 MHz below the 15 MHz IF center. This –5 MHz frequency will fold to become a +5 MHz signal at the IF output. Therefore, lower IF output frequencies are only useful with known band-limited signals.

Key Path	**Input/Output, Output Config, Aux IF Out**
Example	OUTP:AUX AIF causes the aux output type to be the Arbitrary IF
Dependencies	Does not appear unless Option CRP is installed.
Readback Text	Arbitrary IF
Initial S/W Revision	A.04.00

Key Path	**Input/Output, Output Config, Aux IF Out**
Scope	Mode Global
Remote Command	`:OUTPut:AUX:AIF <value>` `:OUTPut:AUX:AIF?`
Example	:OUTP:AUX:AIF 50 MHZ
Preset	This is unaffected by a Preset but is set to 70 MHz on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in Input/Output State

Min	10 MHz
Max	75 MHz
Default Unit	Hz
Initial S/W Revision	A.04.00

Fast Log Video

In this mode the 2nd IF output is passed through a log amp and the log envelope of the IF signal is sent to the rear panel. The open circuit output level varies by about 25 mV per dB, with a top-of-screen signal producing about 1.6 Volts. The output impedance is nominally 50 ohms.

This mode is intended to meet the same needs as Option E4440A-H7L Fast Rise Time Video Output on the Agilent E4440A PSA Series, allowing you to characterize pulses with fast rise times using standard measurement suites on modern digital scopes.

Key Path	**Input/Output, Output Config, Aux IF Out**
Example	OUTP:AUX LOGVideo causes the aux output type to be Fast Log Video
Dependencies	Does not appear unless Option ALV is installed. The output is off during an alignment but not during a marker count, and is not blanked during retrace (after a sweep and before the next sweep starts).
Readback Text	Fast Log Video
Initial S/W Revision	A.04.00

Off

In this mode nothing comes out of the “AUX IF OUT” connector on the rear panel. The connector appears as an open-circuit (that is, it is not terminated in any way).

Key Path	**Input/Output, Output Config, Aux IF Out**
Example	OUTP:AUX OFF causes the aux output type to be off
Readback Text	Off
Initial S/W Revision	A.04.00

I/Q Guided Calibration

Calibrating the Baseband I/Q ports requires several steps and manual connections. The Guided Calibration will interactively step a user through the required steps, displaying diagrams to help with the connections. The steps will vary depending on the setup.

In the Guided Calibration windows, the date and time of the last calibration are displayed. If any of the items listed are displayed in yellow, this indicates that the calibration for that item is inconsistent with the latest calibration, and you should complete the entire calibration process before you exit the calibration.

I/Q Isolation Calibration

The I/Q Isolation Calibration must be run before calibrating any port with either the I/Q Cable Calibration or I/Q Probe Calibration. This calibration is performed with nothing connected to any of the front panel I/Q ports. This is the first step in both the I/Q Cable Calibration and the I/Q Probe Calibration.

Next

Perform the I/Q Isolation calibration.

Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
Remote Command	`:CALibration:IQ:ISOLation`
Example	CAL:IQ:ISOL
Notes	All front panel I/Q ports must not be connected to anything.
Notes	All cables and probes should be disconnected from the I/Q ports before issuing the SCPI command.
State Saved	No.
Initial S/W Revision	Prior to A.02.00

Exit

Exits the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see “Exit Confirmation” on page 1255).
Initial S/W Revision	Prior to A.02.00

I/Q Isolation Calibration Time (Remote Command Only)

Returns the last date and time that the I/Q Isolation Calibration was performed. This is a remote query command only.

Remote Command	`:CALibration:IQ:ISOLation:TIME?`
Example	:CAL:IQ:ISOL:TIME?

Notes	This returns 6 integer values: year, month, day, hour, minute, second. When no calibration has been performed, all values will be 0.
Initial S/W Revision	A.02.00

I/Q Cable Calibrate…

The I/Q cable calibration creates correction data for each of the front panel I/Q ports. This calibration data is used whenever no probe specific calibration data is available. It is important that all ports are calibrated using the same short BNC cable so that the data is comparable from port to port.

The guided calibration (front panel only) will show connection diagrams and guide the user through the isolation calibration and calibrating each port. The calibration data for each port is stored separately, so as soon as a port is calibrated that data is saved and will be used. If a user presses "Exit" to exit the calibration process, the data for the ports already completed will still be used. It is recommended that a calibration be completed once started, or if exited, that it be properly done before the next use of the I/Q ports. The "Next" button will perform the calibration for the current port and then proceed to the next step in the calibration procedure. The "Back" button will return to the prior port in the procedure. Both softkeys and dialog buttons are supplied for ease of use. The dialog buttons are for mouse use and the softkeys for front panel use.

The calibration can also be done via SCPI, but no connection diagrams will be shown. The user will have to make the correct connections before issuing each port calibration command. Again, it is recommended that all ports be calibrated at the same time.

The instrument state remains as it was prior to entering the calibration procedure except while a port is actually being calibrated. Once a port is calibrated it returns to the prior state. A port calibration is in process only from the time the "Next" button is pressed until the next screen is shown. For SCPI, this corresponds to the time from issuing the CAL:IQ:FLAT:I|IB|Q|QB command until the operation is complete.

For example, if the prior instrument state is Cal Out = Off, Input = I+jQ, and Differential = Off, then up until the time the "Next" button is pressed the I Input and Q Input LEDs are on and the Cal Out, I-bar Input and Q-bar Input LEDs are off. Once the "Next" button is pressed for the I port calibration, only the Cal Out and I Input LEDs will be on and the others will be off. When the screen progresses to the next step ("Next" button again enabled), the prior state is restored and only the I Input and Q Input LEDs are on (Cal Out is off again).

The last calibration date and time for each port will be displayed. Any calibrations that are more than a day older than the most recent calibration will be displayed with the color amber.

Key Path	**Input/Output, I/Q**
Initial S/W Revision	Prior to A.02.00

I Port

The I port calibration is performed with the front panel's I port connected via a short BNC cable to the Cal Out port. The guided calibration will show a diagram of the required connections.

Back

Return to the prior step in the calibration procedure.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Initial S/W Revision	Prior to A.02.00

Next

Perform the I port calibration.

Key Path	**Input/Output, I/Q, I/Q Cable Calibrate…**
Remote Command	`:CALibration:IQ:FLATness:I`
Example	CAL:IQ:FLAT:I
Notes	The recommended procedure is to use the same BNC cable to calibrate all I/Q ports. All I/Q ports should be calibrated sequentially during the procedure. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
Notes	The I port must be connected to the Cal Out port before issuing the SCPI command.
State Saved	No.
Initial S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Key Path	**Input/Output, I/Q, I/Q Cable Calibrate…**
Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see “Exit Confirmation” on page 1255).
Initial S/W Revision	Prior to A.02.00

I-bar Port

The I-bar port calibration is performed with the front panel's I-bar port connected via a short BNC cable to the Cal Out port. The guided calibration will show a diagram of the required connections.

Back

Return to the prior step in the calibration procedure.

Key Path	**Input/Output, I/Q, I/Q Cable Calibration**

Notes	Using the Back button will not restore the calibration data to a prior state. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. The Back button allows the user to go back to a prior step to redo that calibration step.
Initial S/W Revision	Prior to A.02.00

Next

Perform the I-bar port calibration.

Key Path	**Input/Output, I/Q, I/Q Cable Calibrate…**
Remote Command	`:CALibration:IQ:FLATness:IBAR`
Example	CAL:IQ:FLAT:IBAR
Notes	The recommended procedure is to use the same BNC cable to calibrate all I/Q ports. All I/Q ports should be calibrated sequentially during the procedure. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
Notes	The I-bar port must be connected to the Cal Out port before issuing the SCPI command.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Key Path	**Input/Output, I/Q, I/Q Cable Calibrate…**
Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see “Exit Confirmation” on page 1255).
Initial S/W Revision	Prior to A.02.00

Q Port

The Q port calibration is performed with the front panel's Q port connected via a short BNC cable to the Cal Out port. The guided calibration will show a diagram of the required connections.

Back

Return to the prior step in the calibration procedure.

Key Path	**Input/Output, I/Q, I/Q Cable Calibrate…**

Notes	Using the Back button will not restore the calibration data to a prior state. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. The Back button allows the user to go back to a prior step to redo that calibration step.
Initial S/W Revision	Prior to A.02.00

Next

Perform the Q port calibration.

Key Path	**Input/Output, I/Q, I/Q Cable Calibrate…**
Remote Command	`:CALibration:IQ:FLATness:Q`
Example	CAL:IQ:FLAT:Q
Notes	The recommended procedure is to use the same BNC cable to calibrate all I/Q ports. All I/Q ports should be calibrated sequentially during the procedure. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
Notes	The Q port must be connected to the Cal Out port before issuing the SCPI command.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Key Path	**Input/Output, I/Q, I/Q Cable Calibrate…**
Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see "Exit Confirmation" on page 1255).
Initial S/W Revision	Prior to A.02.00

Q-bar Port

The Q-bar port calibration is performed with the front panel's Q-bar port connected via a short BNC cable to the Cal Out port. The guided calibration will show a diagram of the required connections.

Back

Return to the prior step in the calibration procedure.

Key Path	**Input/Output, I/Q, I/Q Cable Calibrate…**

Notes	Using the Back button will not restore the calibration data to a prior state. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. The Back button allows the user to go back to a prior step to redo that calibration step.
Initial S/W Revision	Prior to A.02.00

Next

Perform the Q-bar port calibration.

Key Path	**Input/Output, I/Q, I/Q Cable Calibrate…**
Remote Command	`:CALibration:IQ:FLATness:QBAR`
Example	CAL:IQ:FLAT:QBAR
Notes	The recommended procedure is to use the same BNC cable to calibrate all I/Q ports. All I/Q ports should be calibrated sequentially during the procedure. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
Notes	The Q-bar port must be connected to the Cal Out port before issuing the SCPI command.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Key Path	**Input/Output, I/Q, I/Q Cable Calibrate…**
Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see "Exit Confirmation" on page 1255).
Initial S/W Revision	Prior to A.02.00

I/Q Cable Calibration Time (Remote Command Only)

Returns the last date and time that the I/Q Cable Calibration was performed for a specific port. This is a remote query command only.

Remote Command	`:CALibration:IQ:FLATness:I|IBAR|Q|QBAR:TIME?`
Example	:CAL:IQ:FLAT:I:TIME?

Notes	This returns 6 integer values: year, month, day, hour, minute, second. When no calibration has been performed, all values will be 0.
Initial S/W Revision	A.02.00

I/Q Probe Calibration

The I/Q probe calibration creates correction data for one of the front panel I/Q channels. When the probe has EEPROM identification, the data is unique to that specific probe. When the probe does not have EEPROM identification, the data will be used for all probes of the same type. The data is also unique to the channel, so calibration data for the I channel will not be used for the Q channel and vice versa.

The guided calibration (front panel only) will show connection diagrams and guide the user through the I/Q Isolation Calibration and through calibrating each port. The calibration data for each port is stored separately, so as soon as a port is calibrated that data is saved and will be used. If a user presses "Exit" to exit the calibration process, the data for the port already completed will still be used. It is recommended that a calibration be completed once started, or if exited, that it be properly done before the next use of the probe. The "Next" button will perform the calibration for the current port and then proceed to the next step in the calibration procedure. The "Back" button will return to the prior port in the procedure. Both softkeys and dialog buttons are supplied for ease of use. The dialog buttons are for mouse use and the softkeys for front panel use.

The calibration can also be done via SCPI, but no connection diagrams will be shown. The user will have to make the correct connections before issuing each port calibration command. Again, it is recommended that all ports be calibrated at the same time.

For Active probes or when Differential is Off, only the main port is calibrated, otherwise both the main and complementary ports are calibrated.

The instrument state remains as it was prior to entering the calibration procedure except while a port is actually being calibrated. Once a port is calibrated it returns to the prior state. A port calibration is in process only from the time the "Next" button is pressed until the next screen is shown. For SCPI, this corresponds to the time from issuing the CAL:IQ:PROB:I|IB|Q|QB command until the operation is complete.

For example, if the prior instrument state is Cal Out = Off, Input = I+jQ, and Differential = Off, then up until the time the "Next" button is pressed the I Input and Q Input LEDs are on and the Cal Out, I-bar Input and Q-bar Input LEDs are off. Once the "Next" button is pressed for the I port calibration, only the Cal Out and I Input LEDs will be on and the others will be off. When the screen progresses to the next step ("Next" button again enabled), the prior state is restored and only the I Input and Q Input LEDs are on (Cal Out is off again).

The last calibration date and time for each relevant port will be displayed. For passive probes with Differential On, any calibration that is more than a day older than the most recent calibration will be displayed with the color amber.

I Port

The I port calibration is performed with the probe body attached to the front panel's I port and the probe tip connected via an adapter to the Cal Out port. The guided calibration will show a diagram of the required connections.

Show Adapter

Show a connection diagram and instructions for the probe and adapter. See “Show Adapter Screen” on page 1254.

Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
Notes	Either a passive or an active probe adapter diagram will be shown, depending on the type of probe attached.
Initial S/W Revision	Prior to A.02.00

Back

Return to the prior step in the calibration procedure.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Initial S/W Revision	Prior to A.02.00

Next

Perform the I port calibration.

Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
Remote Command	`:CALibration:IQ:PROBe:I`
Example	CAL:IQ:PROB:I
Notes	The I port must be connected to the Cal Out port before issuing the SCPI command. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see “Exit Confirmation” on page 1255).
Initial S/W Revision	Prior to A.02.00

I-bar Port

The I-bar port calibration is performed with the probe body attached to the front panel's I-bar port and the probe tip connected via an adapter to the Cal Out port. The I-bar probe calibration is only available for passive probes with Differential On. The guided calibration will show a diagram of the required connections.

Show Adapter

Show a connection diagram and instructions for the probe and adapter. See “Show Adapter Screen” on page 1254.

Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
Notes	Either a passive or an active probe adapter diagram will be shown, depending on the type of probe attached.
Initial S/W Revision	Prior to A.02.00

Back

Return to the prior step in the calibration procedure.

Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
Notes	Using the Back button will not restore the calibration data to a prior state. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. The Back button allows the user to go back to a prior step to redo that calibration step.
Initial S/W Revision	Prior to A.02.00

Next

Perform the I-bar port calibration.

Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
Remote Command	`:CALibration:IQ:PROBe:IBar`
Example	CAL:IQ:PROB:IB
Notes	The I-bar port must be connected to the Cal Out port before issuing the SCPI command. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see "Exit Confirmation" on page 1255).
Initial S/W Revision	Prior to A.02.00

Q Port

The Q port calibration is performed with the probe body attached to the front panel's Q port and the probe tip connected via an adapter to the Cal Out port. The guided calibration will show a diagram of the required connections.

Show Adapter

Show a connection diagram and instructions for the probe and adapter. See "Show Adapter Screen" on page 1254.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Notes	Either a passive or an active probe adapter diagram will be shown, depending on the type of probe attached.
Initial S/W Revision	Prior to A.02.00

Back

Return to the prior step in the calibration procedure.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Initial S/W Revision	Prior to A.02.00

Next

Perform the Q port calibration.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Remote Command	`:CALibration:IQ:PROBe:Q`
Example	CAL:IQ:PROB:Q
Notes	The Q port must be connected to the Cal Out port before issuing the SCPI command. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.

State Saved	No
Initial S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see “Exit Confirmation” on page 1255).
Initial S/W Revision	Prior to A.02.00

Q-bar Port

The Q-bar port calibration is performed with the probe body attached to the front panel's Q-bar port and the probe tip connected via an adapter to the Cal Out port. The Q-bar probe calibration is only available for passive probes with Differential On. The guided calibration will show a diagram of the required connections.

Show Adapter

Show a connection diagram and instructions for the probe and adapter. See “Show Adapter Screen” on page 1254.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Notes	Either a passive or an active probe adapter diagram will be shown, depending on the type of probe attached.
Initial S/W Revision	Prior to A.02.00

Back

Return to the prior step in the calibration procedure.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Notes	Using the Back button will not restore the calibration data to a prior state. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. The Back button allows the user to go back to a prior step to redo that calibration step.
Initial S/W Revision	Prior to A.02.00

Next

Perform the Q-bar port calibration.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Remote Command	`:CALibration:IQ:PROBe:QBar`
Example	CAL:IQ:PROB:QB
Notes	The Q-bar port must be connected to the Cal Out port before issuing the SCPI command. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see “Exit Confirmation” on page 1255).
Initial S/W Revision	Prior to A.02.00

Show Adapter Screen

When one of the Probe Calibration Show Adapter buttons is pressed, a diagram of the probe with its adapter will be shown. Depending on the type of probe attached, either the Passive Probe Adapter or the Active Probe Adapter diagram will be shown.

I/Q Probe Calibration Time (Remote Command Only)

Return the last date and time that the I/Q Probe Calibration was performed for a specific port. This is a remote query command only.

Remote Command	`:CALibration:IQ:PROBe:I|IBAR|Q|QBAR:TIME?`
Example	:CAL:IQ:PROB:I:TIME?
Notes	This returns 6 integer values: year, month, day, hour, minute, second. When no calibration has been performed, all values will be 0. The value is specific to both the port and probe, so the value will change as probes are connected or disconnected.
Initial S/W Revision	A.02.00

Exit Confirmation

When Exit is pressed during one of the calibration routines, the calibration may be in an inconsistent state with some of the ports having newly measured calibration data and others with old data. If this is the case, a dialog box will appear to confirm that the user really wants to exit. A "Yes" answer will exit the calibration procedure, leaving potentially inconsistent calibration data in place. A "No" answer will return to the calibration procedure.

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Remote Measurement Functions

This section contains the following topics:

"Measurement Group of Commands" on page 1258

"Current Measurement Query (Remote Command Only) " on page 1260

"Limit Test Current Results (Remote Command Only)" on page 1261

"Data Query (Remote Command Only)" on page 1261

"Calculate/Compress Trace Data Query (Remote Command Only)" on page 1261

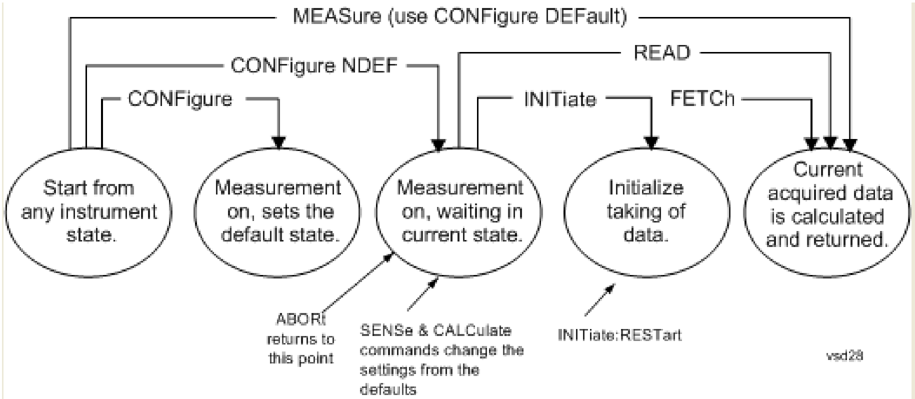
"Calculate Peaks of Trace Data (Remote Command Only)" on page 1267

"Format Data: Numeric Data (Remote Command Only)" on page 1268

"Format Data: Byte Order (Remote Command Only)" on page 1270

Initial S/W Revision	Prior to A.02.00

Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.

  The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.

  ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Measure Commands:
Configure Commands:
:CONFigure:<measurement> This command stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults. In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements. **:CONFigure:NDEFault<measurement>** stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. The **CONFigure?** query returns the current measurement name. The **CONFigure:CATalog?** query returns a quoted string of all measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".
Fetch Commands:
:FETCh:<measurement>[n]? This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified. If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh. The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster then the ASCII format. (FORMat:DATA) FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.
INITiate Commands:

Measure Commands:
:INITiate:<measurement> This command is not available for measurements in all the instrument modes: • Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it. • For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement. • Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run. • If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
READ Commands:
:READ:<measurement>[n]? • Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings. • Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results. For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results. • Blocks other SCPI communication, waiting until the measurement is complete before returning the results If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster then the ASCII format. (FORMat:DATA)

Initial S/W Revision	Prior to A.02.00

Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

Remote Command	`:CONFigure?`

Example	CONF?
Initial S/W Revision	Prior to A.02.00

Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

Remote Command	`:CALCulate:CLIMits:FAIL?`
Example	CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails.
Initial S/W Revision	Prior to A.02.00

Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDer and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

Remote Command	`:CALCulate:DATA[n]?`
Notes	The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCh:<measurement>? query where <measurement> is the current measurement.
Initial S/W Revision	Prior to A.02.00

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

Remote Command	`:CALCulate:DATA<n>:COMPress? BLOCk|CFIT|MAXimum|MINimum|MEAN|DMEan|RMS|RMSCubed|SAMPle|SDEViation|PPHase [,<soffset>[,<length>[,<roffset>[,<rlimit>]]]]`
Example	To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN,24e–6,526e–6 (These parameter values correspond to GSM signals, where 526e–6 is the length of the burst in the slot and you just want 1 burst.)
Notes	The command supports 5 parameters. Note that the last 4 (<soffset>,<length>,<roffset>,<rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data.
Initial S/W Revision	Prior to A.02.00

- BLOCk or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)
- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.

NOTE

MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1
Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{Xi \in \text{region(s)}} Xi$$

vsd27-1

where Xi is a data point value, and n is the number of data points in the specified region(s).

Equation 2
Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{Xi \in \text{region(s)}} |Xi|$$

vsd27-2

where |Xi| is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3
DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10}\left(\frac{1}{n} \sum_{Xi \in \text{region(s)}} 10^{\frac{Xi}{10}}\right)$$

vsd27-3

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE	For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4
RMS Value of Data Points for Specified Region(s)

$$RMS = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} Xi^2}$$

vsd27-4

where Xi is a data point value, and n is the number of data points in the specified region(s).

Equation 5
RMS Value of I/Q Data Pairs for Specified Region(s)

$$RMS = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} Xi\ Xi^*}$$

vsd27-5

where Xi is the complex value representation of an I/Q pair, Xi* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

10 x log[10 x (rms value)^2]

- SAMPle - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.

  For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6
Standard Deviation of Data Point Values for Specified Region(s)

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (Xi - \overline{X})^2}$$

vsd27-7

where Xi is a data point value, X is the arithmetic mean of the data point values for the specified region(s), and n is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{Xi \in \text{region(s)}} (|Xi| - \overline{X})^2}$$

vsd27-8

where |Xi| is the magnitude of an I/Q pair, X is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector (n=0) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

  The rms power of the specified region may be expressed as:

  Power = 10 x log [10 x (RMS I/Q value)] + 10.

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{Xi \in \text{region}} Xi\, Xi^*}$$

vsd27-9

where Xi is the complex value representation of an I/Q pair, Xi* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

$$\frac{1}{n} \sum_{Yi \in \text{region}} Yi$$

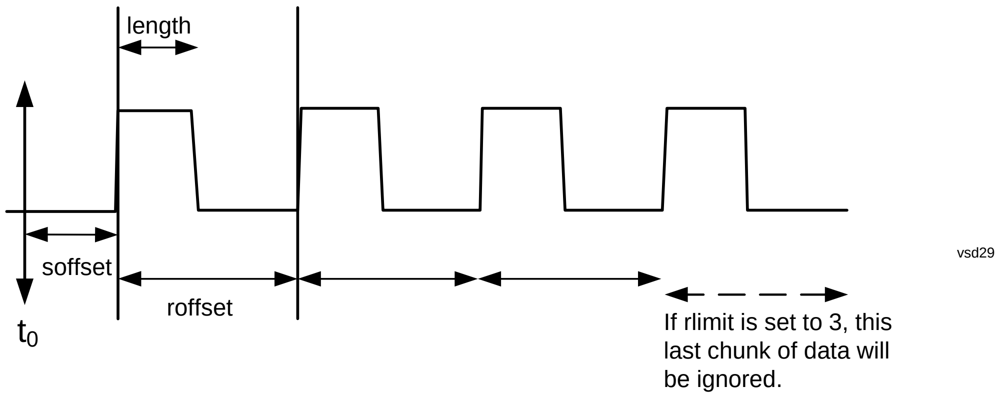
vsd27-10

where Yi is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

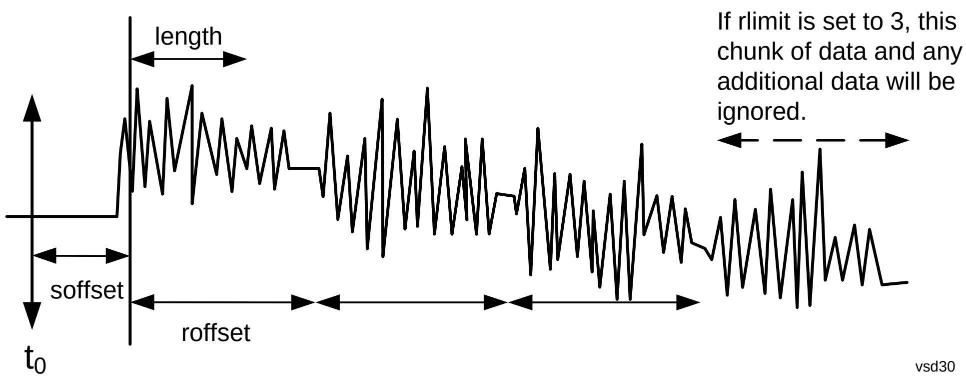
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints – 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints – 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints – 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDer and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

Remote Command	For Swept SA measurement:
	`:CALCulate:DATA[1]|2|3|4|5|6:PEAKs? <threshold>,<excursion>[,AMPLitude|FREQuency|TIME[,ALL|GTDLine|LTDLine]]`
	For most other measurements:
	`:CALCulate:DATA[1]|2|3|4|5|6:PEAKs? <threshold>,<excursion>[,AMPLitude|FREQuency|TIME]`

Example	Example for Swept SA measurement in Spectrum Analyzer Mode: CALC:DATA4:PEAK? –40,10,FREQ,GTDL This will identify the peaks of trace 4 that are above –40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned. Query Results 1: With FORMat:DATA REAL,32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time). If no peaks are found the peak list will consist of only the number of peaks, (0).

Notes	<n> - is the trace that will be used <threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as –200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu. <excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the excursion value stored under the Peak Criteria menu. Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL). Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reportedSorting order: AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent) FREQuency - lists the peaks in order of occurrence, left to right across the x-axis. TIME - lists the peaks in order of occurrence, left to right across the x-axis. Peaks vs. Display Line: ALL - lists all of the peaks found (default if optional parameter not sent). GTDLine (greater than display line) - lists all of the peaks found above the display line. LTDLine (less than display line) - lists all of the peaks found below the display line.
Initial S/W Revision	Prior to A.02.00

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

Remote Command	`:FORMat[:TRACe][:DATA] ASCii|INTeger,32|REAL,32 |REAL,64`
	
	`:FORMat[:TRACe][:DATA]?`

Notes	The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTeger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTeger, data is output in units of m dBm (.001 dBm). Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32. The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block.
Dependencies	Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTeger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message –161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message –121 "Invalid Character in Number".
Preset	ASCii
Initial S/W Revision	Prior to A.02.00

The specs for each output type follow:

ASCii - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

Remote Command	`:FORMat:BORDer NORMal|SWAPped` `:FORMat:BORDer?`
Preset	NORMal
Initial S/W Revision	Prior to A.02.00

Mode

The Mode key allows you to select the available measurement applications or "Modes". Modes are a collection of measurement capabilities packaged together to provide an instrument personality that is specific to your measurement needs. Each application software product is ordered separately by Model Number and must be licensed to be available. Once an instrument mode is selected, only the commands that are valid for that mode can be executed.

NOTE Key operation can be different between modes. The information displayed in Help is about the current mode.

To access Help for a different Mode you must first exit Help (by pressing the Cancel (Esc) key). Then select the desired mode and re-access Help.

For more information on Modes, preloading Modes, and memory requirements for Modes, see "More Information" on page 1272

Key Path	**Front panel key**

Remote Command	`:INSTrument[:SELect] SA|BASIC|WCDMA|CDMA2K|EDGEGSM|PNOISE|CDMA1XEV|CWLAN|WIMAXOFDMA|CWIMAXOFDM|VSA|VSA89601|LTE|IDEN|WIMAXFIXED|LTETDD|TDSCDMA|NFIGURE|ADEMOD|DVB|DTMB|ISDBT|CMMB|RLC|SCPILC|SANalyzer|RECeiver|SEQAN|BT`
	
	`:INSTrument[:SELect]?`

Example	:INST SA
Notes	The available parameters are dependent upon installed and licensed applications resident in the instrument. Parameters given here are an example, specific parameters are in the individual Application. A list of the valid mode choices is returned with the INST:CAT? Query.
Preset	Not affected by Preset. Set to SA following Restore System Defaults, if SA is the default mode.
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Example	:INST 'SA'
Notes	The query is not a quoted string. It is an enumeration as indicated in the Instrument Select table above. The command must be sequential: i.e. continued parsing of commands cannot proceed until the instrument select is complete and the resultant SCPI trees are available.

Backwards Compatibility SCPI	:INSTrument[:SELect] ‘SA’|’PNOISE’|’EDGE’|’GSM’|’BASIC’
Initial S/W Revision	Prior to A.02.00

More Information

The Mode name appears on the banner after the word “Agilent” followed by the Measurement Title. For example, for the Spectrum Analyzer mode with the Swept SA measurement running:

It is possible to specify the order in which the Modes appear in the Mode menu, using the Configure Applications utility (**System, Power On, Configure Applications**). It is also possible, using the same utility, to specify a subset of the available applications to load into memory at startup time, which can significantly decrease the startup time of the analyzer. During runtime, if an application that is not loaded into memory is selected (by either pressing that applications Mode key or sending that applications :INST:SEL command over SCPI), there will be a pause while the Application is loaded. During this pause a message box that says “Loading application, please wait…” is displayed.

Each application (Mode) that runs in the X-Series signal analyzers consumes virtual memory. The various applications consume varying amounts of virtual memory, and as more applications run, the memory consumption increases. Once an application is run, some of its memory remains allocated even when it is not running, and is not released until the analyzer program (xSA.exe) is shut down.

Agilent characterizes each Mode and assigns a memory usage quantity based on a conservative estimate. There is a limited amount of virtual memory available to applications (note that this is virtual memory and is independent of how much physical RAM is in the instrument). The instrument keeps track of how much memory is being used by all loaded applications – which includes those that preloaded at startup, and all of those that have been run since startup.

When you request a Mode that is not currently loaded, the instrument looks up the memory estimate for that Mode, and adds it to the residual total for all currently loaded Modes. If there is not enough virtual memory to load the Mode, a dialog box and menu will appear that gives you four options:

Close and restart the analyzer program without changing your configured preloads. This may free up enough memory to load the requested Mode, depending on your configured preloads

Clear out all preloads and close and restart the analyzer program with only the requested application preloaded, and with that application running. This choice is guaranteed to allow you to run the requested application; but you will lose your previously configured preloads. In addition, there may be little or no room for other applications, depending on the size of the requested application.

Bring up the Configure Applications utility in order to reconfigure the preloaded apps to make room for the applications you want to run (this will then require restarting the analyzer program with your new configuration). This is the recommended choice because it gives you full flexibility to select exactly what you want.

Exit the dialog box without doing anything, which means you will be unable to load the application you requested.

In each case except 4, this will cause the analyzer software to close, and you will lose all unsaved traces and results.

If you attempt to load a mode via SCPI that will exceed memory capacity, the Mode does not load and an error message is returned:

```
-225,"Out of memory;Insufficient resources to load Mode (mode name)"
```

where "mode name" is the SCPI parameter for the Mode in question, for example, SA for Spectrum Analyzer Mode

Application Mode Number Selection (Remote Command Only)

Select the measurement mode by its mode number. The actual available choices depend upon which applications are installed in your instrument. The modes appear in this table by NSEL number, which is not the same as their order in the Mode menu (see "Detailed List of Modes" on page 1277 for the mode order).

Mode	**:INSTrument:NSELect <integer>**	**:INSTrument[:SELect] <parameter>**
Spectrum Analyzer	1	SA
I/Q Analyzer (Basic)	8	BASIC
WCDMA with HSPA+	9	WCDMA
cdma2000	10	CDMA2K
GSM/EDGE/EDGE Evo	13	EDGEGSM
Phase Noise	14	PNOISE
1xEV-DO	15	CDMA1XEV
Combined WLAN	19	CWLAN
802.16 OFDMA (WiMAX/WiBro)	75	WIMAXOFDMA
Combined Fixed WiMAX	81	CWIMAXOFDM
Vector Signal Analyzer (VXA)	100	VSA
89601 VSA	101	VSA89601
LTE	102	LTE
iDEN/WiDEN/MotoTalk	103	IDEN
802.16 OFDM (Fixed WiMAX)	104	WIMAXFIXED
LTE TDD	105	LTETDD
EMI Receiver	141	EMI
TD-SCDMA with HSPA/8PSK	211	TDSCDMA
Noise Figure	219	NFIGURE
Bluetooth	228	BT

Mode	:INSTrument:NSELect <integer>	:INSTrument[:SELect] <parameter>
Analog Demod	234	ADEMOD
DVB-T/H with T2	235	DVB
DTMB (CTTB)	236	DTMB
Digital Cable TV	238	DCATV
ISDB-T	239	ISDBT
CMMB	240	CMMB
Remote Language Compatibility	266	RLC
SCPI Language Compatibility	270	SCPILC
Sequence Analyzer	400	SEQAN

Remote Command	`:INSTrument:NSELect <integer>` `:INSTrument:NSELect?`
Example	:INST:NSEL 1
Notes	SA mode is 1 The command must be sequential: i.e. continued parsing of commands cannot proceed until the instrument select is complete and the resultant SCPI trees are available.
Preset	Not affected by Preset. Set to default mode (1 for SA mode) following Restore System Defaults.
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Application Mode Catalog Query (Remote Command Only)

Returns a string containing a comma separated list of names of all the installed and licensed measurement modes (applications). These names can only be used with the :INSTrument[:SELect] command.

Remote Command	`:INSTrument:CATalog?`
Example	:INST:CAT?
Notes	Query returns a quoted string of the installed and licensed modes separated with a comma. Example: "SA,PNOISE,WCDMA"
Initial S/W Revision	Prior to A.02.00

Application Identification (Remote Commands Only)

Each entry in the Mode Menu will have a Model Number and associated information: Version, and Options.

This information is displayed in the Show System screen. The corresponding SCPI remote commands are defined here.

Current Application Model

Returns a string that is the Model Number of the currently selected application (mode).

Remote Command	`:SYSTem:APPLication[:CURRent][:NAME]?`
Example	:SYST:APPL?
Notes	Query returns a quoted string that is the Model Number of the currently selected application (Mode). Example: "N9060A" String length is 6 characters.
Preset	Not affected by Preset
State Saved	Not saved in state, the value will be the selected application when a Save is done.
Initial S/W Revision	Prior to A.02.00

Current Application Revision

Returns a string that is the Revision of the currently selected application (mode).

Remote Command	`:SYSTem:APPLication[:CURRent]:REVision?`
Example	:SYST:APPL:REV?
Notes	Query returns a quoted string that is the Revision of the currently selected application (Mode). Example: "1.0.0.0" String length is a maximum of 23 characters. (each numeral can be an integer + 3 decimal points)
Preset	Not affected by a Preset
State Saved	Not saved in state, the value will be the selected application when a Save is done.
Initial S/W Revision	Prior to A.02.00

Current Application Options

Returns a string that is the Options list of the currently selected application (Mode).

Remote Command	`:SYSTem:APPLication[:CURRent]:OPTion?`
Example	:SYST:APPL:OPT?
Notes	Query returns a quoted string that is the Option list of the currently selected application (Mode). The format is the name as the *OPT? or SYSTem:OPTion command: a comma separated list of option identifiers. Example: "1FP,2FP" String length is a maximum of 255 characters.
Preset	Not affected by a Preset
State Saved	Not saved in state per se, the value will be the selected application when a Save is invoked.
Initial S/W Revision	Prior to A.02.00

Application Identification Catalog (Remote Commands Only)

A catalog of the installed and licensed applications (Modes) can be queried for their identification.

Application Catalog number of entries

Returns the number of installed and licensed applications (Modes).

Remote Command	`:SYSTem:APPLication:CATalog[:NAME]:COUNt?`
Example	:SYST:APPL:CAT:COUN?
Preset	Not affected by Preset
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Application Catalog Model Numbers

Returns a list of Model Numbers for the installed and licensed applications (Modes).

Remote Command	`:SYSTem:APPLication:CATalog[:NAME]?`
Example	:SYST:APPL:CAT?
Notes	Returned value is a quoted string of a comma separated list of Model Numbers. Example, if SAMS and Phase Noise are installed and licensed: "N9060A,N9068A" String length is COUNt * 7 – 1. (7 = Model Number length + 1 for comma. –1 = no comma for the 1st entry.)

Preset	Not affected by a Preset
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Application Catalog Revision

Returns the Revision of the provided Model Number.

Remote Command	`:SYSTem:APPLication:CATalog:REVision? <model>`
Example	:SYST:APPL:CAT:REV? ‘N9060A’
Notes	Returned value is a quoted string of revision for the provided Model Number. The revision will be a null-string ("") if the provided Model Number is not installed and licensed. Example, if SAMS is installed and licensed: "1.0.0.0"
Preset	Not affected by a Preset.
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Application Catalog Options

Returns a list of Options for the provided Model Number

Remote Command	`:SYSTem:APPLication:CATalog:OPTion? <model>`
Example	:SYST:APPL:CAT:OPT? ‘N9060A’
Notes	Returned value is a quoted string of a comma separated list of Options, in the same format as *OPT? or :SYSTem:OPTion?. If the provided Model Number is not installed and licensed a null-string ("") will be returned. Example, if SAMS is installed and licensed: "2FP" String length is a maximum of 255 characters.
Preset	Not affected by a Preset
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Detailed List of Modes

Spectrum Analyzer

Selects the Spectrum Analyzer mode for general purpose measurements. There are several measurements available in this mode. General spectrum analysis measurements, in swept and zero span, can be done using the first key in the Meas menu, labeled Swept SA. Other measurements in the Meas

Menu are designed to perform specialized measurement tasks, including power and demod measurements.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL SA INST:NSEL 1
Initial S/W Revision	Prior to A.02.00

EMI Receiver

The EMI Receiver Mode makes EMC measurements. Several measurements are provided to aid the user in characterizing EMC performance of their systems, including looking at signals with CISPR–16 compliant detectors, performing scans for interfering signals, and determining and charting interfering signals over time.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL EMI INST:NSEL 141
Initial S/W Revision	A.07.01

IQ Analyzer (Basic)

The IQ Analyzer Mode makes general purpose frequency domain and time domain measurements. These measurements often use alternate hardware signal paths when compared with a similar measurement in the Signal Analysis Mode using the Swept SA measurement. These frequency domain and time domain measurements can be used to output I/Q data results when measuring complex modulated digital signals.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL BASIC INST:NSEL 8
Initial S/W Revision	Prior to A.02.00

W-CDMA with HSPA+

Selects the W-CDMA with HSPA+ mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL WCDMA INST:NSEL 9
Initial S/W Revision	Prior to A.02.00

GSM/EDGE/EDGE Evo

Selects the GSM with EDGE mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL EDGEGSM INST:NSEL 13
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

802.16 OFDMA (WiMAX/WiBro)

Selects the OFDMA mode for general purpose measurements of WiMAX signals. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL WIMAXOFDMA INST:NSEL 75
Initial S/W Revision	Prior to A.02.00

Vector Signal Analyzer (VXA)

The N9064A (formerly 89601X) VXA Vector signal and WLAN modulation analysis application provides solutions for basic vector signal analysis, analog demodulation, digital demodulation and WLAN analysis. The digital demodulation portion of N9064A allows you to perform measurements on standard-based formats such as cellular, wireless networking and digital video as well as general purpose flexible modulation analysis for wide range of digital formats, FSK to 1024QAM, with easy-to-use measurements and display tools such as constellation and eye diagram, EVM traces and up to four simultaneous displays. The WLAN portion of N9064A allows you to make RF transmitter measurements on 802.11a/b/g/p/j WLAN devices. Analog baseband analysis is available using the MXA with option BBA.

N9064A honors existing 89601X licenses with all features and functionalities found on X-Series software versions prior to A.06.00.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL VSA INST:NSEL 100
Initial S/W Revision	Prior to A.02.00

Phase Noise

The Phase Noise mode provides pre-configured measurements for making general purpose measurements of device phase noise.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL PNOISE or INST:NSEL 14
Initial S/W Revision	Prior to A.02.00

Noise Figure

The Noise Figure mode provides pre-configured measurements for making general purpose measurements of device noise figure.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**

Example	INST:SEL NFIGURE Or INST:NSEL 219
Initial S/W Revision	Prior to A.02.00

Analog Demod

Selects the Analog Demod mode for making measurements of AM, FM and phase modulated signals.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL ADEMOD INST:NSEL 234
Initial S/W Revision	Prior to A.02.00

Bluetooth

Selects the Bluetooth mode for Bluetooth specific measurements. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL BT INST:NSEL 228
Initial S/W Revision	A.06.01

TD-SCDMA with HSPA/8PSK

Selects the TD-SCDMA mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL TDSCDMA INST:NSEL 211
Initial S/W Revision	Prior to A.02.00

cdma2000

Selects the cdma2000 mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL CDMA2K INST:NSEL 10
Initial S/W Revision	Prior to A.02.00

1xEV-DO

Selects the 1xEV-DO mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL CDMA1XEV INST:NSEL 15
Initial S/W Revision	Prior to A.02.00

LTE

Selects the LTE mode for general purpose measurements of signals following the LTE FDD standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL LTE INST:NSEL 102
Initial S/W Revision	Prior to A.02.00

LTE TDD

Selects the LTE TDD mode for general purpose measurements of signals following the LTE TDD standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL LTETDD INST:NSEL 105
Initial S/W Revision	A.03.00

DVB-T/H with T2

Selects the DVB-T/H mode for measurements of digital video signals using this format. There are several power and demod measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL DVB INST:NSEL 235
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.07.00

DTMB (CTTB)

Selects the DTMB (CTTB) mode for measurements of digital video signals using this format. There are several power and demod measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL DTMB INST:NSEL 236
Initial S/W Revision	A.02.00

ACATV

Selects the ACATV mode for measurements of analog cable television systems. There are several power and demod measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL ACATV INST:NSEL 237
Initial S/W Revision	A.08.00

Digital Cable TV

Selects the Digital Cable TV mode for measurements of digital cable television systems. There are several power and demod measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL DCATV INST:NSEL 238
Initial S/W Revision	A.07.00

ISDB-T

Selects the ISDB-T mode for measurements of digital video signals using this format. There are several power and demod measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL ISDBT INST:NSEL 239
Initial S/W Revision	A.03.00

CMMB

Selects the CMMB mode for measurements of digital video signals using this format. There are several power and demod measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL CMMB INST:NSEL 240
Initial S/W Revision	A.03.00

Combined WLAN

Selects the CWLAN mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL CWLAN INST:NSEL 19
Initial S/W Revision	A.02.00

Combined Fixed WiMAX

Selects the Combined Fixed WiMAX mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL CWIMAXOFDM INST:NSEL 81
Initial S/W Revision	A.02.00

802.16 OFDM (Fixed WiMAX)

Selects the 802.16 OFDM (Fixed WiMAX) mode. This mode allows modulation quality measurements of signals that comply with IEEE 802.16a–2003 and IEEE 802.16–2004 standards, with flexibility to measure nonstandard OFDM formats. Along with the typical digital demodulation measurement results, several additional 802.16 OFDM unique trace data formats and numeric error data results provide enhanced data analysis.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL WIMAXFIXED INST:NSEL 104
Initial S/W Revision	A.02.00

iDEN/WiDEN/MOTOTalk

Selects the iDEN/WiDEN/MOTOTalk mode for general purpose measurements of iDEN and iDEN-related signals. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL IDEN INST:NSEL 103
Initial S/W Revision	A.02.00

Remote Language Compatibility

The Remote Language Compatibility (RLC) mode provides remote command backwards compatibility for the 8560 series of spectrum analyzers, known as legacy spectrum analyzers.

NOTE After changing into or out of this mode, allow a 1 second delay before sending any subsequent commands.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL RLC Or INST:NSEL 266
Initial S/W Revision	Prior to A.02.00

SCPI Language Compatibility

The SCPI Language Compatibility mode provides remote language compatibility for SCPI-based instruments, such as the Rohde and Schwartz FSP and related series of spectrum analyzers.

NOTE	After changing into or out of this mode, allow a 1 second delay before sending any subsequent commands.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	**Mode**
Example	INST:SEL SCPILC Or INST:NSEL 270
Initial S/W Revision	A.06.00

89601 VSA

Selecting the 89601 VSA mode will start the 89600-Series VSA software application. The 89600 VSA software is powerful, PC-based software, offering the industry's most sophisticated general purpose and standards specific signal evaluation and troubleshooting tools for the R&D engineer. Reach deeper into signals, gather more data on signal problems, and gain greater insight.

- Over 30 general-purpose analog and digital demodulators ranging from 2FSK to 1024QAM
- Standards specific modulation analysis including:
- Cell: GSM, cdma2000, WCDMA, TD-SCDMA and more
- Wireless networking: 802.11a/b/g, 802.11n, 802.16 WiMAX (fixed/mobile), UWB
- RFID
- Digital satellite video and other satellite signals, radar, LMDS
- Up to 400K bin FFT, for the highest resolution spectrum analysis
- A full suite of time domain analysis tools, including signal capture and playback, time gating, and CCDF measurements
- Six simultaneous trace displays and the industry's most complete set of marker functions
- Easy-to-use Microsoft ® Windows ® graphical user interface

For more information see the Agilent 89600 Series VSA web site at www.agilent.com/find/89600

To learn more about how to use the 89600 VSA running in the X-Series, after the 89600 VSA application is running, open the 89600 VSA Help and open the "About Agilent X-Series Signal Analyzers (MXA/EXA) with 89600-Series Software" help topic.

Key Path	**Mode**
Example	INST:SEL VSA89601 INST:NSEL 101

Initial S/W Revision	Prior to A.02.00

EMI Receiver Aliases (Remote Command Only)

The following commands are translated to the specified X-Series instrument commands, in order to emulate EMI Receiver products from other manufacturers

Example	INST:SEL SANalyzer
Notes	When this command is received, the analyzer aliases it to the following: INST:SEL SCPILC This results in the analyzer being placed in SCPI Language Compatibility Mode, in order to emulate the ESU Spectrum Analyzer Mode.
Initial S/W Revision	A.07.00

Example	INST:SEL RECeiver
Notes	When this command is received, the analyzer aliases it to the following: :INST:SEL EMI :CONF FSC This results in the analyzer being placed in the EMI Receiver Mode, running the Frequency Scan measurement, in order to emulate the ESU Receiver Mode.
Initial S/W Revision	A.07.00

Global Settings

Opens a menu that allows you to switch certain Meas Global parameters to a Mode Global state. These switches apply to all Modes that support global settings. No matter what Mode you are in when you set the “Global Center Frequency” switch to on, it applies to all Modes that support Global Settings.

Key Path	**Front Panel Key**
Initial S/W Revision	Prior to A.02.00

Global Center Freq

The software maintains a Mode Global value called “Global Center Freq”.

When the **Global Center Freq** key is switched to **On** in any mode, the current mode’s center frequency is copied into the Global Center Frequency, and from then on all modes which support global settings use the Global Center Frequency. So you can switch between any of these modes and the Center Freq will remain unchanged.

Adjusting the Center Freq of any mode which supports Global Settings, while **Global Center Freq** is **On**, will modify the Global Center Frequency.

When **Global Center Freq** is turned **Off**, the Center Freq of the current mode is unchanged, but now the Center Freq of each mode is once again independent.

When **Mode Preset** is pressed while **Global Center Freq** is **On**, the Global Center Freq is preset to the preset Center Freq of the current mode.

This function is reset to Off when the Restore Defaults key is pressed in the Global Settings menu, or when **System**, **Restore Defaults**, **All Modes** is pressed.

Key Path	**Mode Setup, Global Settings**
Scope	Mode Global
Remote Command	`:INSTrument:COUPle:FREQuency:CENTer ALL|NONE` `:INSTrument:COUPle:FREQuency:CENTer?`
Example	INST:COUP:FREQ:CENT ALL INST:COUP:FREQ:CENT?
Preset	Set to Off on Global Settings, Restore Defaults and System, Restore Defaults, All Modes
Range	On|Off
Initial S/W Revision	Prior to A.02.00

Remote Command	`:GLOBal:FREQuency:CENTer[:STATe] 1|0|ON|OFF` `:GLOBal:FREQuency:CENTer[:STATe]?`
Preset	Off
Initial S/W Revision	Prior to A.02.00

Restore Defaults

This key resets all of the functions in the Global Settings menu to Off. This also occurs when **System**, **Restore Defaults**, **All Modes** is pressed.

Key Path	**Mode Setup, Global Settings**
Remote Command	`:INSTrument:COUPle:DEFault`
Example	INST:COUP:DEF
Backwards Compatibility SCPI	:GLOBal:DEFault
Initial S/W Revision	Prior to A.02.00

Mode Setup

This key accesses a menu to allow you to select mode parameters. These settings will be in effect for all measurements in the current mode.

Key Path	**Front-panel key**

Radio

Accesses a key that enables you to select either a base tranceiiver station (BTS) or a mobile station (MS) as the device under test.

Key Path	**Mode Setup**

Device

Allows you to specify the device to be used.

Key Path	**Mode Setup, Radio**
Mode	CDMA2000
Remote Command	`[:SENSe]:RADio:STANdard:DEVice BTS|MS` `[:SENSe]:RADio:STANdard:DEVice?`
Example	RADio:DEVice BTS RADio:DEVice?
Preset	BTS
State Saved	Saved in instrument state.
Range	BTS | MS

Noise Reduction

Noise Reduction accesses a menu for configuring the noise compensation of the instrument. This menu only appears in models that support Noise Reduction.

Key Path	**Mode Setup**
Initial S/W Revision	A.04.00

Noise Floor Extension

Turns on the **Noise Floor Extension** function. When this function is On, the expected noise power of the analyzer (derived from a factory calibration) is subtracted from the trace data. When **Noise Floor Extension** is On, it will usually reduce the apparent noise level by about 10 dB in low band, and 8 dB in high band (>~3.6 GHz).

Noise Floor Extension works with any RBW, VBW, detector, any setting of Average Type, any amount of trace averaging, and any signal type. It is ineffective when the trace is not smoothed (smoothing processes include narrow VBWs, trace averaging, and long sweep times with the detector set to Average or Peak). It works best with extreme amounts of smoothing. It works best with the average detector, with the Average Type set to Power. (Note: Noise Floor Extensions has no effect unless the RF Input is selected, therefore it does nothing when External Mixing is selected).

In those cases where the cancellation is ineffective, it nonetheless has no undesirable side-effects. There is no significant speed impact to having **Noise Floor Extension** on.

The best accuracy is achieved when substantial smoothing occurs in each point before trace averaging. Thus, when using the average detector, results are better with long sweep times and fewer trace averages. When using the sample detector, the VBW filter should be set narrow with less trace averaging, instead of a wide VBW filter with more trace averaging.

See “More Information” on page 1292

Key Path	**Mode Setup, Noise Reduction**
Scope	Meas Global
Remote Command	`[:SENSe]:CORRection:NOISe:FLOor ON|OFF|1|0` `[:SENSe]:CORRection:NOISe:FLOor?`
Example	CORR:NOIS:FLO ON
Dependencies	In models that do not support Noise Floor Extension, the SCPI command will be accepted without error but will have no effect.
Preset	Unaffected by Mode Preset. Turned off by Restore Mode Defaults.
State Saved	No
Initial S/W Revision	A.04.00

More Information

The analyzer is characterized in the factory (or during a field calibration) with a model of the noise, referred to the input mixer, versus frequency in each band and path combination. Bands are 0 (low band) and 1 through 4 (high band) in a 26.5 GHz instrument, for example. Paths include normal paths, preamp paths, the electronic attenuator, etc.

In most band/path combinations, the noise can be well characterized based on just two parameters and the analyzer frequency response before compensation for frequency-dependent losses.

After the noise density at the input mixer is estimated, the effects of the input attenuator, RBW, detector, etc. are computed to get the estimated input-port-referred noise level.

In the simplest case, the measured power (signal plus analyzer noise) in each display point (bucket) is compensated by subtracting the estimated noise power, leaving just the signal power. This is the operation when the detector is Average and the Average Type is set to Power.

In other cases, operation is often not quite as good but still highly effective. With peak detection, the noise floor is estimated based on the RBW and the duration of the bucket using the same equations used in the noise marker function. The voltage of the noise is subtracted from the voltage of the observed signal-plus-noise measurement to compute the estimated signal voltage. The peak detector is one example of processing that varies with detector to give good estimates of the signal level without the analyzer noise.

For best operation, the average detector and the power scale are recommended, as already stated. Peak detection for pulsed-RF can still give excellent effectiveness. FFT analysis does not work well, and does not do NFE well, with pulsed-RF signals, so this combination is not recommended. Negative peak detection is not very useful, either. Sample detection works well, but is never better than the average detector because it doesn't smooth as well. The Normal detector is a combination of peak and negative peak behaviors, and works about as well as these.

For best operation, extreme smoothing is desirable, as already stated. Using narrow VBWs works well, but using very long bucket durations and the average detector works best. Reducing the number of trace points will make the buckets longer.

For best operation, the power scale (Average Type = Power) is optimum. When making CW measurements in the presence of noise without NFE, averaging on the decibel scale has the advantage of reducing the effect of noise. When using NFE, the NFE does an even better job than using the log scale ever could. Using NFE with the log scale is not synergistic, though; NFE with the power scale works a little better than NFE with log averaging type.

Recall

Most of the functions under this key work the same way in many measurements, so they are documented in the Utility Functions section. For details about this key, see “Recall” on page 174.

The Amplitude Correction Import Data function under Recall is documented here.

Amplitude Correction

This key selects the Amplitude Corrections as the data type to be imported. When pressed a second time, it brings up the Select Menu, which lets you select the Correction into which the data will be imported.

Amplitude Corrections are fully discussed in the documentation of the Input/Output key, under the Corrections softkey.

A set of preloaded Corrections files can be found in the directory

/My Documents/ EMC Limits and Ampcor.

Under this directory, the directory called Ampcor (Legacy Naming) contains a set of legacy corrections files, generally the same files that were supplied with older Agilent EMI analyzers, that use the legacy suffixes .ant, .oth, .usr, and .cbl, and the old 8-character file names. In the directory called Ampcor, the same files can be found, with the same suffixes, but with longer, more descriptive filenames.

When the Amplitude Correction is an Antenna correction and the Antenna Unit in the file is not **None**, the Y Axis Unit setting will change to match the Antenna Unit in the file.

Key Path	**Recall, Data**
Mode	SA|EDGEGSM
Remote Command	`:MMEMory:LOAD:CORRection 1|2|3|4|5|6, <filename>`
Example	:MMEM:LOAD:CORR 2 "myAmpcor.csv" recalls the Amplitude Correction data from the file myAmpcor.csv in the current directory to the 2nd Amplitude Correction table, and turns on Correction 2. The default path is My Documents\amplitudeCorrections.

Dependencies	Only the first correction array (Correction 1) supports antenna units. This means that a correction file with an Antenna Unit can only be loaded into the Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include.ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated. Corrections are not supported by all Measurements. If in a Mode in which some Measurements support it, this key will be grayed out in measurements that do not. The key will not show at all if no measurements in the Mode support it. Errors are reported if the file is empty or missing, or if the file type does not match, or if there is a mismatch between the file type and the destination data type. If any of these occur during manual operation, the analyzer returns to the Import Data menu and the File Open dialog goes away. This key does not appear unless you have the proper option installed in your instrument. This command will generate an “Option not available” error unless you have the proper option installed in your instrument.
Couplings	When a correction file is loaded from mass storage, it is automatically turned on (**Correction** ON) and **Apply Corrections is** set to On. This allows the user to see its effect, thus confirming the load.
Readback	selected Correction
Backwards Compatibility SCPI	For backwards compatibility, the following parameters syntax is supported: :MMEMory:LOAD:CORRection ANTenna|CABLe|OTHer|USER, <filename> ANTenna maps to 1, CABle maps to 2, OTHer maps to 3 and USER maps to 4
Initial S/W Revision	A.02.00

Amplitude Correction 1, 2, 3, 4

These keys let you select which Correction to import the data into. Once selected, the key returns back to the Import Data menu and the selected Correction number is annotated on the key. The next step is to select the Open key in the Import Data menu.

Antenna corrections are a particular kind of Amplitude Corrections – they are distinguished in the corrections file by having the Antenna Unit set to a value other than None. Only Correction 1 supports Antenna Units.

Key Path	**Recall, Data, Amplitude Correction**
Notes	auto return
Dependencies	Only Correction 1 may be used to load a Correction that contains an Antenna Unit other than None
Preset	not part of Preset, but is reset to Correction 1 by Restore Input/Output Defaults; survives shutdown

State Saved	The current Correction number is saved in instrument state
Initial S/W Revision	A.02.00

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMediate
- Sending the remote command INIT:RESTart

Key Path	**Front panel key**
Remote Command	`:INITiate[:IMMediate]`
Example	:INIT:IMM
Notes	:INITiate:RESTart :INITiate:IMMediate Either of the above commands perform exactly the same function.
Couplings	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.
Status Bits/OPC dependencies	This is an Overlapped command. The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUEStionable register bit 9 (INTegrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Initial S/W Revision	Prior to A.02.00

Remote Command	`:INITiate:RESTart`
Example	:INIT:REST
Notes	:INITiate:RESTart :INITiate:IMMediate Either of the above commands perform exactly the same function.
Couplings	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.

Status Bits/OPC dependencies	This is an Overlapped command. The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUEStionable register bit 9 (INTegrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Initial S/W Revision	Prior to A.02.00

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average**, **Max Hold**, or **Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Save

Most of the functions under this key work the same way in many measurements, so they are documented in the Utility Functions section. For details about this key, see "Save" on page 186.

The Amplitude Correction Export Data function under Save is documented here.

Amplitude Correction

Pressing this key selects **Amplitude Corrections** as the data type to be exported. Pressing this key again brings up the Select Menu, which allows the user to select which **Amplitude Correction** to save.

Amplitude Corrections are fully discussed in the documentation of the Input/Output key, under the Corrections softkey.

Key Path	**Save, Data**
Remote Command	`:MMEMory:STORe:CORRection 1|2|3|4|5|6, <filename>`
Example	:MMEM:STOR:CORR 2 "myAmpcor.csv" saves Correction 2 to the file myAmpcor.csv on the current path. The default path is My Documents\amplitudeCorrections.
Notes	If the save is initiated via SCPI, and the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	Corrections are not supported by all Measurements. If in a Mode in which some Measurements support it, this key will be grayed out in measurements that do not. The key will not show at all if no measurements in the Mode support it. This key will not appear unless you have the proper option installed in your instrument.
Readback	Selected Correction
Backwards Compatibility SCPI	For backwards compatibility only, the following parameters syntax is supported: :MMEMory:STORe:CORRection ANTenna|CABLe|OTHer|USER, <filename> ANTenna maps to 1, CABle maps to 2, OTHer maps to 3 and USER maps to 4
Initial S/W Revision	A.02.00

Correction Data File

A Corrections Data File contains a copy of one of the analyzer correction tables. Corrections provide a way to adjust the trace display for predetermined gain curves (such as for cable loss).

The first five lines are system-required header lines, and must be in the correct order.

Amplitude CorrectionData file type name
“Correction Factors for 11966E”File Description
“Class B Radiated”Comment
A.01.00.R0001,N9020AInstrument Version, Model Number
P13 EA3 UK6,01 Option List, File Format Version

Corrections files may include Antenna amplitude units. This amplitude unit in the Antenna Unit field is a conversion factor that is used to adjust the Y Axis Units of the current mode, if the mode supports Antenna Units. For more details on antenna correction data, refer to the Input/Output chapter, Corrections section.

The metadata required to properly import the correction data is:

- Frequency Unit for the x axis data
- Antenna Unit for the y axis data (not required)
- Frequency Interpolation algorithm – either Logarithmic or Linear

The data follows as comma separated X, Y pairs; one pair per line. The keyword “DATA” precedes the data.

For example, suppose you have an Antenna to correct for on an E4445A version A.01.00 R0011 and the correction data is:

- 0 dB at 200 MHz
- 17 dB at 210 MHz
- 14.8 dB at 225 MHz

Then the file will look like:

- Amplitude Correction
- "Correction Factors for 11966E"
- "Class B Radiated"
- A.01.00 R0011,N9020A
- P13 EA3 UK6,01
- Frequency Unit,MHz
- Antenna Unit,dBuV/m
- Frequency Interpolation,Linear
- DATA
- 200.000000,0.00

- 210.000000,17.00
- 225.000000,14.80

The choices for the 1 of N fields in the metadata are as follows:

- Frequency Unit: Hz, kHz, MHz, GHz
- Antenna Unit: dBuv/m, dBuA/m, dBG, dBpT, None
- Frequency Interpolation: Logarithmic, Linear

Amplitude Correction 1, 2, 3, 4

These keys let you pick which Correction to save. Once selected, the key returns back to the Export Data menu and the selected Correction number is annotated on the key.

The next step in the Save process is to select the Save As key in the Export Data menu.

Key Path	**Save, Data, Amplitude Correction**
Preset	Not part of a Preset, but is reset to Correction 1 by Restore Input/Output Defaults. Survives a shutdown.
Readback	1
Initial S/W Revision	A.02.00

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

Key Path	**Front panel key**
Example	:INIT:CONT OFF
Notes	See **Cont** key description.
Initial S/W Revision	Prior to A.02.00

Source

This mode does not have any Source control functionality.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Sweep/Control

Accesses a menu that enables you to configure the Sweep and Control functions of the analyzer, such as Sweep Time and Gating.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Sweep Time

Controls the time the analyzer takes to sweep the current frequency span when the Sweep Type is Swept, and displays the equivalent Sweep Time when the Sweep Type is FFT.

When Sweep Time is in Auto, the analyzer computes a sweep time which will give accurate measurements based on other settings of the analyzer, such as RBW and VBW.

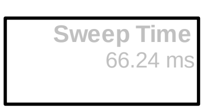
NOTE The Meas Uncal (measurement uncalibrated) warning is given in the Status Bar in the lower right corner of the screen when the manual sweep time entered is faster than the sweep time computed by the analyzer’s sweep time equations, that is, the Auto Sweep Time. The analyzer’s computed sweep time will give accurate measurements; if you sweep faster than this your measurements may be inaccurate. A Meas Uncal condition may be corrected by returning the Sweep Time to Auto; by entering a longer Sweep Time; or by choosing a wider RBW and/or VBW

On occasion other factors such as the Tracking Generator’s maximum sweep rate, the YTF sweep rate (in high band) or the LO’s capability (in low band) can cause a Meas Uncal condition. The most reliable way to correct it is to return the Sweep Time to Auto.

When Sweep Type is FFT, you cannot control the sweep time, it is simply reported by the analyzer to give you an idea of how long the measurement is taking.

Note that although some overhead time is required by the analyzer to complete a sweep cycle, the sweep time reported when Sweep Type is Swept does not include the overhead time, just the time to sweep the LO over the current Span. When Sweep Type is FFT, however, the reported Sweep Time takes into account both the data acquisition time and the processing time, in order to report an equivalent Sweep Time for a meaningful comparison to the Swept case.

Because there is no “Auto Sweep Time” when in zero span, the Auto/Man line on this key disappears when in Zero Span. The Auto/Man line also disappears when in an FFT sweep. In this case the key is grayed out as shown below.



NOTE When using a Tracking Source (**Source**, **Source Mode** set to “**Tracking**”), the sweep time shown includes an estimate of the source’s settling time. This estimate may contain inaccuracies, particularly when software triggering is used for the source. This can result in the reported sweep time being shorter than the actual sweep time.

Key Path	**Sweep/Control**

Remote Command	`[:SENSe]:SWEep:TIME <time>`
	`[:SENSe]:SWEep:TIME?`
	`[:SENSe]:SWEep:TIME:AUTO OFF|ON|0|1`
	`[:SENSe]:SWEep:TIME:AUTO?`

Example	SWE:TIME 500 ms SWE:TIME:AUTO OFF
Notes	The values shown in this table reflect the “swept spans” conditions which are the default settings after a preset. See “Couplings” for values in the zero span domain.
Dependencies	The third line of the softkey (Auto/Man) disappears in Zero Span. The SCPI command SWEep:TIME:AUTO ON if sent in Zero Span generates an error message. Softkey grayed out and third line of the softkey (Auto/Man) disappears in FFT sweeps. Pressing the key or sending the SCPI for sweep time while the instrument is in FFT sweep generates a –221, “Settings Conflict;” error. F The SCPI command :SWEep:TIME:AUTO ON if sent in FFT sweeps generates an error. Grayed out while in Gate View, to avoid confusing those who want to set GATE VIEW Sweep Time. Key is grayed out in Measurements that do not support swept mode. Key is blanked in Modes that do not support swept mode. Set to Auto when Auto Couple is pressed or sent remotely

Couplings	Sweep Time is coupled primarily to Span and RBW. Center Frequency, VBW, and the number of sweep points also can have an effect. So changing these parameters may change the sweep time. The Sweep Time used upon entry to Zero Span is the same as the Sweep Time that was in effect before entering Zero Span. The Sweep Time can be changed while in Zero Span. Upon leaving Zero Span, the Auto/Man state of Sweep Time that existed before entering Zero Span is restored. If Sweep Time was in Auto before entering Zero Span, or if it is set to Auto while in zero span (which can happen via remote command or if **Auto Couple** is pressed) it returns to Auto and recouples when returning to non-zero spans. If Sweep Time was in Man before entering Zero Span, it returns to Man when returning to non-zero spans, and any changes to Sweep Time that were made while in Zero Span are retained in the non-zero span (except where constrained by minimum limits, which are different in and out of zero span).
Preset	The preset Sweep Time value is hardware dependent since Sweep Time presets to “Auto”.
State Saved	Saved in instrument state
Min	in zero span: 1 μs in swept spans: 1 ms in Stepped Tracking (as with option ESC): same as auto sweep time (in Swept Tracking, with Tracking Generator option T03 or T07, the minimum sweep time is 1 ms, but the Meas Uncal indicator is turned on for sweep times faster than 50 ms)
Max	in zero span: 6000 s in swept spans: 4000 s
Status Bits/OPC dependencies	Meas Uncal is Bit 0 in the STATus:QUEStionable:INTegrity:UNCalibrated register
Initial S/W Revision	Prior to A.02.00

Sweep Setup

Lets you set the sweep functions that control features such as sweep type and time.

Key Path	**Sweep/Control**
Dependencies	The whole Sweep Setup menu is grayed out in Zero Span, however, the settings in the menus under Sweep Setup can be changed remotely with no error indication. Grayed out in measurements that do not support swept mode. Blanked in modes that do not support swept mode
Initial S/W Revision	Prior to A.02.00

Sweep Time Rules

Allows the choice of three distinct sets of sweep time rules. These are the rules that are used to set the sweep time when **Sweep Time** is in **Auto mode.** Note that these rules only apply when in the Swept **Sweep Type** (either manually or automatically chosen) and not when in FFT sweeps.

See "More Information" on page 1313.

Key Path	**Sweep/Control, Sweep Setup**
Remote Command	`[:SENSe]:SWEep:TIME:AUTO:RULes NORMal|ACCuracy|SRESponse` `[:SENSe]:SWEep:TIME:AUTO:RULes?`
Example	SWE:TIME:AUTO:RUL ACC
Dependencies	In Zero Span, this key is irrelevant and cannot be accessed (because the whole Sweep Setup menu is grayed out in Zero Span), however its settings can be changed remotely with no error indication. Grayed out in FFT sweeps. Pressing the key while the instrument is in FFT sweep generates an advisory message. The SCPI is acted upon if sent, but has no effect other than to change the readout on the key, as long as the analyzer is in an FFT sweep.
Couplings	Set to Auto on Auto Couple
Preset	AUTO
State Saved	Saved in instrument state
Backwards Compatibility SCPI	The old Auto Sweep Time command was the same [:SENSe]:SWEep:TIME:AUTO:RULes NORMal|ACCuracy so it still works although it now has a third parameter (SRESponse). The old Sweep Coupling command was [:SENSe]:SWEep:TIME:AUTO:MODE SRESponse|SANalyzer and it is aliased as follows: :SWEep:TIME:AUTO:MODE SRESponse is aliased to :SWEep:TIME:AUTO:RULes SRESponse, and :SWEep:TIME:AUTO:MODE SANalyzer is aliased to :SWEep:TIME:AUTO:RULes NORMal The query :SWEep:TIME:AUTO:MODE? is aliased to :SWEep:TIME:RULes? So it will fail to match for SANalyzer
Initial S/W Revision	Prior to A.02.00

More Information

The first set of rules is called **SA – Normal**. **Sweep Time Rules** is set to **SA-Normal** on a **Preset** or **Auto Couple**. These rules give optimal sweep times at a loss of accuracy. Note that this means that in the Preset or Auto Coupled state, instrument amplitude accuracy specifications do not apply.

Setting **Sweep Time Rules** to **SA-Accuracy** will result in slower sweep times than **SA-Normal**, usually about three times as long, but with better amplitude accuracy for CW signals. The instrument absolute amplitude accuracy specifications only apply when **Sweep Time** is set to **Auto**, and **Sweep Time Rules** are set to **SA-Accuracy**. Additional amplitude errors which occur when **Sweep Time Rules** are set to **SA-Normal** are usually well under 0.1 dB, though this is not guaranteed. Because of the faster sweep times and still low errors, **SA-Normal** is the preferred setting of **Sweep Time Rules**.

The third set of sweep time rules is called **Stimulus/Response** and is automatically selected when an integrated source is turned on, such as a Tracking Generator or a synchronized external source. The sweep times for this set of rules are usually much faster for swept-response measurements. Stimulus-response auto-coupled sweep times are typically valid in stimulus-response measurements when the system's frequency span is less than 20 times the bandwidth of the device under test. You can select these rules manually (even if not making Stimulus-Response measurements) which will allow you to sweep faster before the "Meas Uncal" warning comes on, but you are then not protected from the over-sweep condition and may end up with uncalibrated results. However, it is commonplace in measuring non-CW signals such as noise to be able to get excellent measurement accuracy at sweep rates higher than those required for CW signal accuracy, so this is a valid measurement technique.

Auto

Sets the analyzer to automatically choose the Sweep Time Rules for the measurement.

Key Path	**Sweep/Control, Sweep Setup, Sweep Time Rules**
Remote Command	`[:SENSe]:SWEep:TIME:AUTO:RULes:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:SWEep:TIME:AUTO:RULes:AUTO[:STATe]?`
Example	:SWE:TIME:AUTO:RUL:AUTO ON
Couplings	Set on Preset or Auto Couple
Preset	ON
Initial S/W Revision	Prior to A.02.00

SA - Normal

Chooses Sweep Time Auto Rules for optimal speed and generally sufficient accuracy.

Key Path	**Sweep/Control, Sweep Setup, Sweep Time Rules**
Example	:SWE:TIME:AUTO:RUL NORM
Dependencies	Not available (grayed out) when Source Mode=Tracking.
Couplings	Automatically selected unless Source is on If directly selected, sets AUTO to Off

Readback	SA - Normal
Initial S/W Revision	Prior to A.02.00

SA - Accuracy

Chooses Sweep Time Auto Rules for specified absolute amplitude accuracy.

NOTE	For specified accuracy, do not allow sweep time to fall below 20 ms when in SA - Accuracy

Key Path	**Sweep/Control, Sweep Setup, Sweep Time Rules**
Example	:SWE:TIME:AUTO:RUL ACC
Dependencies	Not available (grayed out) when Source Mode=Tracking.
Couplings	If directly selected, sets AUTO to Off
Readback	SA - Accuracy
Initial S/W Revision	Prior to A.02.00

Stimulus/Response

The Stimulus-Response setting for sweep time rules provides different sweep time settings, for the case where the analyzer is sweeping in concert with a source. These modified rules take two forms:

1. Sweeping along with a swept source, which allows faster sweeps than the normal case because the RBW and VBW filters do not directly interact with the Span. We call this “Swept Tracking”

2. Sweeping along with a stepped source, which usually slows the sweep down because it is necessary to wait for the stepped source and the analyzer to settle at each point. We call this “Stepped Tracking”

The analyzer chooses one of these methods based on what kind of a source is connected or installed; it picks Swept Tracking if there is no source in use.

As always, when the X-series analyzer is in Auto Sweep Time, the sweep time is estimated and displayed in the Sweep/Control menu as well as in the annotation at the bottom of the displayed measurement; of course, since this can be dependent on variables outside the analyzer’s control, the actual sweep time may vary slightly from this estimate.

You can always choose a shorter sweep time to improve the measurement throughput, (with some potential unspecified accuracy reduction), but the Meas Uncal indicator will come on if the sweep time you set is less than the calculated Auto Sweep time. You can also select a longer sweep time, which can be useful (for example) for obtaining accurate insertion loss measurements on very narrowband filters. The number of measurement points can also be reduced to speed the measurement (at the expense of frequency resolution).

Key Path	**Sweep/Control, Sweep Setup, Sweep Time Rules**
Example	:SWE:TIME:AUTO:RUL SRES

Couplings	Automatically selected when the Source is on (Source Mode not set to OFF). If directly selected sets AUTO to Off
Readback	SR
Initial S/W Revision	Prior to A.02.00

Sweep Type

Chooses between the FFT and Sweep types of sweep.

Sweep Type refers to whether or not the instrument is in Swept or FFT analysis. When in Auto, the selection of sweep type is governed by two different sets of rules, depending on whether you want to optimize for dynamic range or for speed.

FFT “sweeps” should not be used when making EMI measurements; therefore, when a CISPR detector (Quasi Peak, EMI Average, RMS Average) is selected for any active trace (one for which Update is on), the FFT key in the Sweep Type menu is grayed out, and the Auto Rules only choose Swept. If Sweep Type is manually selected to be FFT, the CISPR detectors are all grayed out.

FFT sweeps will never be auto-selected when Screen Video, Log Video or Linear Video are the selected Analog Output.

Key Path	**Sweep/Control, Sweep Setup**
Remote Command	`[:SENSe]:SWEep:TYPE FFT|SWEep` `[:SENSe]:SWEep:TYPE?`
Notes	For a backward compatibility, the following remote parameters AUTO SWP will be supported by the [:SENSe]:SWEep:TYPE command.
Dependencies	In Zero Span, this key is irrelevant and cannot be accessed (because the whole Sweep Setup menu is grayed out in Zero Span), however its settings can be changed remotely with no error indication. When Gate is on, Gate Method selection affects Sweep Type: **Method FFT&Sweep menu** FFT - Swept grayed out and rules choose FFT Video - FFT grayed out and rules choose Swept LO - FFT grayed out and rules choose Swept
Preset	AUTO
Backwards Compatibility SCPI	[:SENSe]:SWEep:TYPE AUTO sets sweep type Auto to On [:SENSe]:SWEep:TYPE SWP selects sweep type Swept
Initial S/W Revision	Prior to A.02.00

Auto

When in Auto, the selection of sweep type is governed by two different sets of rules, depending on whether you want to optimize for dynamic range or for speed. These rules are chosen under the **Sweep Type Rules** key.

Key Path	**Sweep/Control, Sweep Setup, Sweep Type**
Remote Command	`[:SENSe]:SWEep:TYPE:AUTO OFF|ON|0|1` `[:SENSe]:SWEep:TYPE:AUTO?`
Example	:SWE:TYPE:AUTO ON
Couplings	Pressing Auto Couple always sets Sweep Type to Auto. Swept is always chosen whenever any form of Signal ID is on, or the Source Mode is set to Tracking, or any EMI detector is selected.
Preset	ON
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Swept

Manually selects swept analysis, so it cannot change automatically to FFT.

Key Path	**Sweep/Control, Sweep Setup, Sweep Type**
Example	SWE:TYPE SWE
Dependencies	Grayed out while in Gated FFT (meaning Gate is ON and Gate Method is FFT). If this key is selected, the gate method Gated FFT is grayed out.
Couplings	This selection is chosen automatically if any of the CISPR detectors is chosen for any active trace, in which case the FFT Sweep Type selection is also grayed out.
State Saved	Saved in instrument state
Readback	Swept
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

FFT

Manually selects FFT analysis, so it cannot change automatically to Swept.

Key Path	**Sweep/Control, Sweep Setup, Sweep Type**
Example	SWE:TYPE FFT

Dependencies	When a CISPR detector (Quasi Peak, EMI Average, RMS Average) is selected for any active trace, the FFT key is grayed out. When Source Mode is set to Tracking, Manual FFT is grayed out. When Signal ID is on, Manual FFT is grayed out. Grayed out while in Gated LO (meaning Gate is ON and Gate Method is LO). Grayed out while in Gated Video (meaning Gate is ON and Gate Method is Video).
State Saved	Saved in instrument state
Readback	FFT
Initial S/W Revision	Prior to A.02.00

Sweep Type Rules

Selects which set of rules will be used for automatically choosing the Sweep Type when Sweep Type is in Auto.

Key Path	**Sweep/Control, Sweep Setup**
Remote Command	`[:SENSe]:SWEep:TYPE:AUTO:RULes SPEed|DRANge` `[:SENSe]:SWEep:TYPE:AUTO:RULes?`
Dependencies	In Zero Span, this key is irrelevant and cannot be accessed (because the whole Sweep Setup menu is grayed out in Zero Span), however its settings can be changed remotely with no error indication.
Preset	DRANge
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Auto

This selection is automatically chosen when Auto Couple is pressed. When in Auto, the Sweep Type Rules are set to Best Dynamic Range. It seems like a very simple Auto function but the use of this construct allows a consistent statement about what the Auto Couple key does.

Key Path	**Sweep/Control, Sweep Setup, Sweep Type Rules**
Remote Command	`[:SENSe]:SWEep:TYPE:AUTO:RULes:AUTO[:STATe] OFF|ON|0|1` `[:SENSe]:SWEep:TYPE:AUTO:RULes:AUTO[:STATe]?`
Example	:SWE:TYPE:AUTO:RUL:AUTO ON
Couplings	Pressing Auto Couple always sets Sweep Type Rules to Auto.
Preset	ON
State Saved	Saved in instrument state

Initial S/W Revision	Prior to A.02.00

Best Dynamic Range

This selection tells the analyzer to choose between swept and FFT analysis with the primary goal of optimizing dynamic range. If the dynamic range is very close between swept and FFT, then it chooses the faster one. This auto selection also depends on RBW Type.

In determining the Swept or FFT setting, the auto rules use the following approach:

- If the RBW Filter Type is Gaussian use the RBW for the Normal Filter BW and if that RBW > 210 Hz, use swept; for RBW <= 210 Hz, use FFT
- If the RBW Filter Type is Flat Top, use the same algorithm but use 420 Hz instead of 210 Hz for the transition point between Swept and FFT
- If any of the CISPR detectors is chosen for any active trace, always use Swept.

Key Path	**Sweep/Control, Sweep Setup, Sweep Type Rules**
Example	SWE:TYPE:AUTO:RUL DRAN sets the auto rules to dynamic range.
Couplings	Directly selecting this setting sets AUTO to OFF.
Readback	Dynamic Range
Initial S/W Revision	Prior to A.02.00

Best Speed

This selection tells the analyzer to choose between FFT or swept analysis based on the fastest analyzer speed.

Key Path	**Sweep/Control, Sweep Setup, Sweep Type Rules**
Example	SWE:TYPE:AUTO:RUL SPE sets the rules for the auto mode to speed
Couplings	Directly selecting this setting sets AUTO to OFF.
Readback	Speed.
Initial S/W Revision	Prior to A.02.00

FFT Width

This menu displays and controls the width of the FFT's performed while in FFT mode. The "FFT width" is the range of frequencies being looked at by the FFT, sometimes referred to as the "chunk width" -- it is not the resolution bandwidth used when performing the FFT.

It is important to understand that this function does not directly set the FFT width, it sets the limit on the FFT Width. The actual FFT width used is determined by several other factors including the Span you have set. Usually the instrument picks the optimal FFT Width based on the current setup; but on occasion you may wish to limit the FFT Width to be narrower than that which the instrument would have set.

NOTE	This function does not allow you to widen the FFT Width beyond that which the instrument might have set; it only allows you to narrow it. You might do this to improve the dynamic range of the measurement or eliminate nearby spurs from your measurement.

Note that the **FFT Width** setting will have no effect unless in an FFT sweep.

See "More Information" on page 1320

Key Path	**Sweep/Control, Sweep Setup**
Remote Command	`[:SENSe]:SWEep:FFT:WIDTh <real>` `[:SENSe]:SWEep:FFT:WIDTh?`
Example	SWE:FFT:WIDT 167 kHzsets this function to "<167.4 kHz"
Notes	The parameter is in units of frequency. For values sent from SCPI, the analyzer chooses the smallest value that is at least as great as the requested value. Examples: Parameter 3.99 kHz is sent over SCPI. Analyzer chooses 4.01 kHz Parameter 4.02 kHz is sent over SCPI. Analyzer chooses 28.81 kHz Parameter 8 MHz is sent over SCPI. Analyzer chooses 10 MHz
Dependencies	In some models, the analog prefilters are not provided. In these models the **FFT Width** function is always in **Auto**. The FFT Width key is blanked in these models, and the SCPI commands are accepted without error but have no effect. In Zero Span, this key is irrelevant and cannot be accessed (because the whole Sweep Setup menu is grayed out in Zero Span). However, its settings can be changed remotely with no error indication.
Couplings	The FFT Width affects the **ADC Dither** function (see Meas Setup key) and the point at which the instrument switches from Swept to FFT acquisition.
Preset	The Preset is Auto, but Preset will also pick Best Dynamic Range and hence this function will be set to ~Maximum
State Saved	Saved in instrument state
Min	4.01 kHz
Max	The maximum available FFT width is dependent on the IF Bandwidth option. The maximum available width is: Option B10, 10 MHz; Option B25, 25 MHz, Option B40, 40 MHz.

Backwards Compatibility SCPI	[:SENSe]:SWEep:FFT:SPAN:RATio <integer> [:SENSe]:SWEep:FFT:SPAN:RATio? The behavior of the analyzer when it receives this command is to compute the “intended segment width” by dividing the Span by the FFTs/Span parameter, then converting this intended width to an actual width by using the largest available FFT Width that is still less than the intended segment width. The “Span” used in this computation is whatever the Span is currently set to, whether a sweep has been taken at that Span or not.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

Key Path	**Sweep/Control, Sweep Setup**
Remote Command	`[:SENSe]:SWEep:FFT:WIDTh:AUTO OFF|ON|0|1` `[:SENSe]:SWEep:FFT:WIDTh:AUTO?`
Example	:SWE:FFT:WIDT:AUTO ON
Couplings	Pressing Auto Couple always sets FFT Width to Auto.
Preset	ON
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

More Information

An FFT measurement can only be performed over a limited span known as the “FFT segment”. Several segments may need to be combined to measure the entire span. For advanced FFT control in the X-Series, you have direct control over the segment width using the **FFT Width** control. Generally, in automatic operation, the X-Series sets the segment width to be as wide as possible, as this results in the fastest measurements.

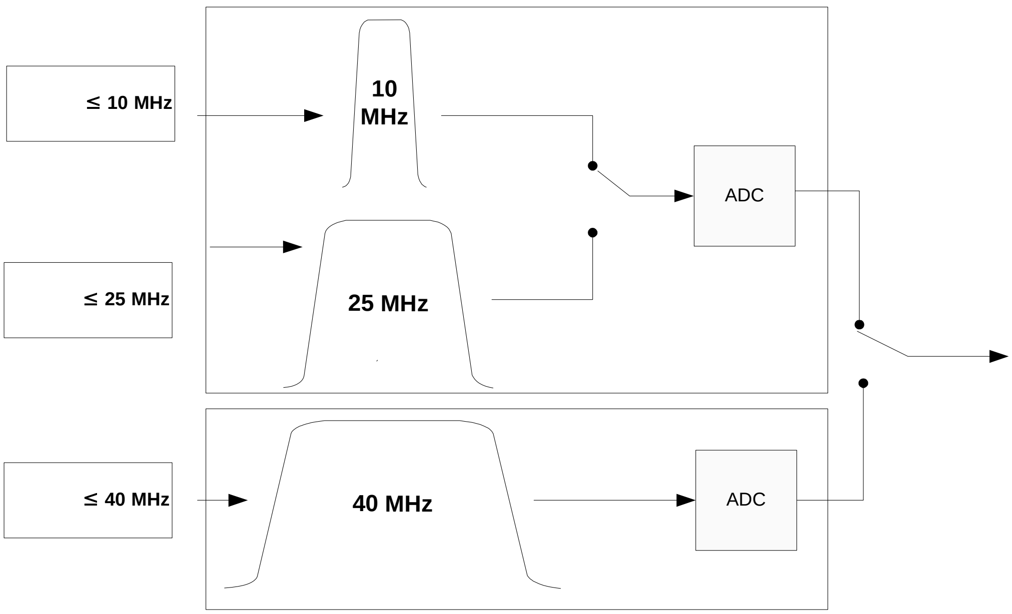
However, in order to increase dynamic range, most X-series models provide a set of analog prefilters that precede the ADC. Unlike swept measurements, which pass the signal through a bandpass before the ADC, FFT measurements present the full signal bandwidth to the ADC, making them more susceptible to overload, and requiring a lower signal level. The prefilters act to alleviate this phenomenon - they allow the signal level at the ADC to be higher while still avoiding an ADC overload, by eliminating signal power outside the bandwidth of interest, which in turn improves dynamic range.

Although narrowing the segment width can allow higher dynamic ranges some cases, this comes at the expense of losing some of the speed advantages of the FFT, because narrower segments require more acquisitions and proportionately more processing overhead.

However, the advantages of narrow segments can be significant. For example, in pulsed-RF measurements such as radar, it is often possible to make high dynamic range measurements with signal levels approaching the compression threshold of the analyzer in swept spans (well over 0 dBm), while resolving the spectral components to levels below the maximum IF drive level (about –8 dBm at the input mixer). But FFT processing experiences overloads at the maximum IF drive level even if the RBW is small enough that no single spectral component exceeds the maximum IF drive level. If you reduce the width of an FFT, an analog filter is placed before the ADC that is about 1.3 times as wide as the FFT segment width. This spreads out the pulsed RF in time and reduces the maximum signal level seen by the ADC. Therefore, the input attenuation can be reduced and the dynamic range increased without overloading the ADC.

Further improvement in dynamic range is possible by changing the **FFT IF Gain** (in the **Meas Setup** menu of many measurements). If the segments are reduced in width, **FFT IF Gain** can be set to High, improving dynamic range.

Depending on what IF Bandwidth option you have ordered, there can be up to three different IF paths available in FFT sweeps, as seen in the diagram below:



The 10 MHz path is always used for Swept sweeps. It is always used for FFT sweeps as well, unless the user specifies ~25 MHz in which case the 25 MHz path will be used for FFT sweeps, or ~40 MHz, in which case the 40 MHz path will be used for FFT sweeps. Note that, although each of these keys picks the specified path, the analyzer may choose an FFT width less than the full IF width, in order to optimize speed, trading off acquisition time versus processing time.

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

Key Path	**Sweep/Control**
Remote Command	`:INITiate:PAUSe`
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.

Initial S/W Revision	Prior to A.02.00

Key Path	**Sweep/Control**
Remote Command	`:INITiate:RESume`
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Gate

Accesses a menu that enables you to control the gating function. The Gate functionality is used to view signals best viewed by qualifying them with other events.

Gate setup parameters are the same for all measurements – they do not change as you change measurements.   Settings like these are called “Meas Global” and are unaffected by Meas Preset.

Note that Sweep Time autocoupling rules and annotation are changed by Gate being on.

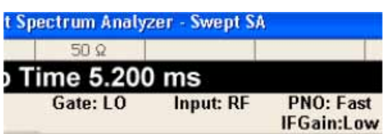
Key Path	**Sweep/Control**
Scope	Meas Global
Readback	The state and method of Gate, as [Off, LO] or [On, Video]. Note that for measurements that only support gated LO, the method is nonetheless read back, but always as LO.
Initial S/W Revision	Prior to A.02.00

Gate On/Off

Turns the gate function on and off.

When the Gate Function is on, the selected Gate Method is used along with the gate settings and the signal at the gate source to control the sweep and video system with the gate signal. Not all measurements allow every type of Gate Methods.

When Gate is on, the annunciation in the measurement bar reflects that it is on and what method is used, as seen in the following "Gate: LO" annunciator graphic.



Key Path	**Sweep/Control, Gate**
Remote Command	`[:SENSe]:SWEep:EGATe[:STATe] OFF|ON|0|1` `[:SENSe]:SWEep:EGATe[:STATe]?`

Example	SWE:EGAT ON SWE:EGAT?
Dependencies	The function is unavailable (grayed out) and Off when: • Gate Method is LO or Video and FFT Sweep Type is manually selected. • Gate Method is FFT and Swept Sweep Type is manually selected. • Marker Count is ON. The following are unavailable whenever Gate is on: • FFT under Sweep Type when Method=LO or Video or Swept under Sweep Type when Method=FFT • **Marker Count** While Gate is on, the Auto Rules for Sweep Type are modified so that the choice agrees with the Gate Method: i.e., FFT for Method = FFT and Swept for Method = LO or Video. The Gate softkey and all SCPI under the [:SENSe]:SWEep:EGATe SCPI node are grayed out when Source Mode is Tracking with an external source. This is because the Gate circuitry is used to sync the external source. If the Tracking Source is turned on, the Gate is turned off.
Couplings	When Meas Method is RBW or FAST, this function is unavailable and the key is grayed out. Whenever Gate is on, Meas Method, RBW or FAST is unavailable and keys for those are grayed out. When Gate is on, Offset Res BW and Offset Video BW are ignored (if you set these values) and the measurement works as if all Offset Res BW and all Offset Video BW are coupled with the Res BW and the Video BW under the BW menu. When Gate is on, the Offset BW key in the Offset/Limit menu is grayed out.
Preset	Off
State Saved	Saved in instrument state
Range	On|Off
Backwards Compatibility SCPI	[:SENSe]:SWEep:TIME:GATE[:STATe]
Initial S/W Revision	Prior to A.02.00

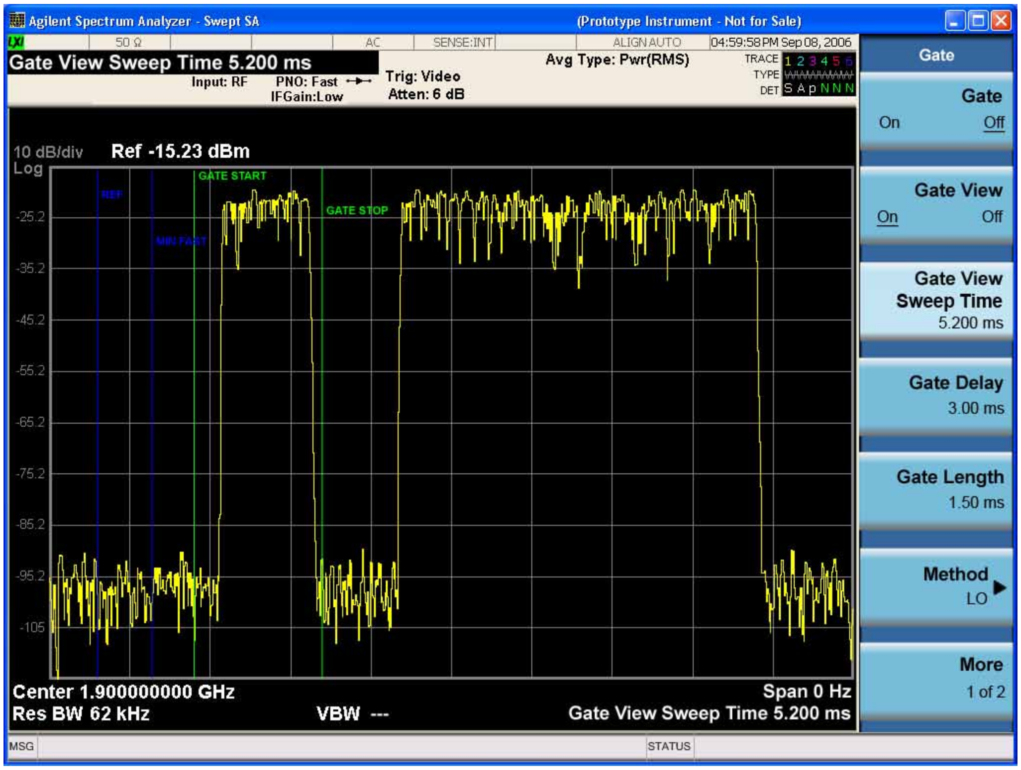
Gate View On/Off

Turning on Gate View in the Swept SA measurement provides a single-window gate view display.

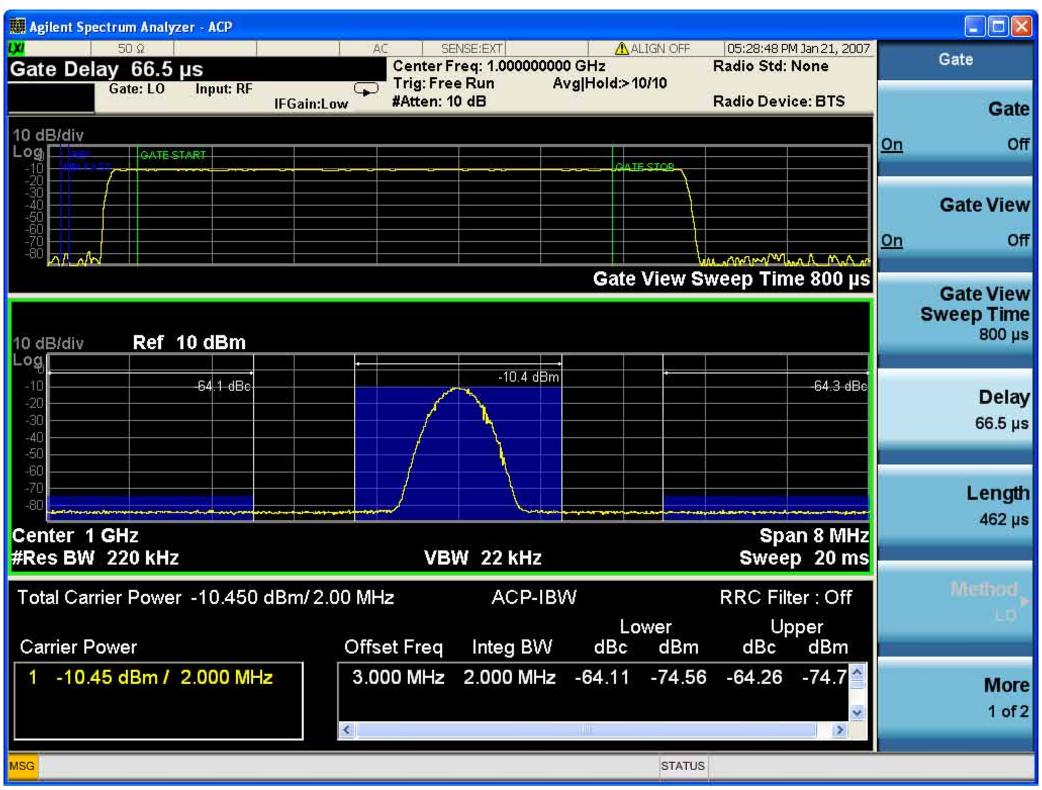
Turning on Gate View in other measurements shows the split-screen Gate View. In these measurements, when the Gate View is on, the regular view of the current measurement traces and results are reduced vertically to about 70% of the regular height. The Zero Span window, showing the positions of the Gate, is shown between the Measurement Bar and the reduced measurement window. By reducing the height of the measurement window, some of the annotation on the Data Display may not fit and is not shown.

Key Path	**Sweep/Control, Gate**
Remote Command	`[:SENSe]:SWEep:EGATe:VIEW ON|OFF|1|0` `[:SENSe]:SWEep:EGATe:VIEW?`
Example	SWE:EGAT:VIEW ON turns on the gate view.
Dependencies	In the Swept SA measurement: In Gate View, the regular Sweep Time key is grayed out. When pressed, the grayed out key puts up the informational message "Use Gate View Sweep Time in the Gate menu." In the other measurements: When you turn Gate View on, the lower window takes on the current state of the instrument. Upon leaving Gate View, the instrument takes on the state of the lower window. When you turn Gate View on, the upper window Sweep Time is set to the gate view sweep time.
Couplings	These couplings apply to the Swept SA measurement: • When Gate View is turned on, the instrument is set to Zero Span. • Gate View automatically turns off whenever a Span other than Zero is selected. • Gate View automatically turns off if you press the Last Span key while in Gate View, and the instrument returns to the Span it was in before entering Gate View (even if that is Zero Span). When Gate View is turned on, the sweep time used is the gate view sweep time. This is set according to the rules in “Gate View Sweep Time” on page 1326. • When Gate View is turned off, Sweep Time is set to the normal Swept SA measurement sweep time. • If Gate View is on and Gate is off, then turning on Gate turns off Gate View.
Preset	OFF
State Saved	Saved in instrument state
Range	On|Off
Initial S/W Revision	Prior to A.02.00

A sample of the Gate View screen in the Swept SA measurement is shown in the following graphic:



A sample of the Gate View screen in other measurements is shown in the following graphic. This example is for the ACP measurement:



Turning Gate View off returns the analyzer to the Normal measurement view.

In the Swept SA, the normal measurement view is the single-window Swept SA view. When returning to this view, the Swept SA measurement returns to the Span it was in before entering **Gate View** (even if that is Zero Span).

The **Gate View** window is triggered from the Gate Source, with zero trigger delay. Also, when updating the **Gate View** window, the Gate itself must not operate. So it is internally shut off while the gate view window is being updated. For the Swept SA measurement, this means that the Gate is internally shut off whenever the gate view window is displayed. The measurement bar and softkeys continue to show the Trigger source for the main sweep window and give no indication that the Gate is shut off or that the Gate View window is triggered from the Gate Source.

When in **Gate View**, vertical lines are displayed in the Gate View window as follows:

- Green lines are displayed at the gate edges as follows: in Edge Gate, a line is shown for Delay and one for the end of the Gate period (defined by Length, even in FFT. In Level Gate a line is shown only for Delay. You can adjust the position of the green lines by adjusting the gate length and the gate delay. These lines update in the Gate View window as the active function changes, even if the window is not being updated. In Gated LO and Gated Video, these lines are positioned relative to the delay reference line (not relative to 0 time). In Gated FFT, their location is relative to the left edge of the screen.
- A blue line is displayed showing the delay reference, that is, the reference point for the Gate Delay within the Zero Span window. The blue line represents where (in time) the effective location of the gate start would be if the gate were programmed to zero delay.
- The second blue line is labeled "MIN FAST" as shown in the figure above because it represents the minimum Gate Delay for fast Gated LO operation. This line is only displayed in Gated LO. You cannot scroll (knob) or decrement (down key) the Gate Delay to less than that represented by the position of this line, it can only be set below this position manually, although once there it can be moved freely with the knob while below the line.
- A yellow line in the Gated Video case only, is displayed at B_{length}, where B_{length} is the display point (bucket) length for the swept trace, which is given by the sweep time for that trace divided by number of Points – 1. So it is referenced to 0 time, not to the delay reference. This line is labeled NEXT PT (it is not shown in the figure above because the figure above is for Gated LO). The yellow line represents the edge of a display point (bucket). Normally in Gated Video, the bucket length must be selected so that it exceeds the off time of the burst. There is another way to use the analyzer in Gated Video measurements, and that is to set the bucket width much shorter than the off time of the burst. Then use the Max Hold trace function to fill in "missing" buckets more slowly. This allows you to see some of the patterns of the Gated Video results earlier, though seeing a completely filled-in spectrum later.

Gate View Sweep Time

Controls the sweep time in the Gate View window. To provide an optimal view of the gate signal, the analyzer initializes Gate View Sweep Time based on the current settings of Gate Delay and Gate Length.

Key Path	**Sweep/Control, Gate**

Remote Command	`[:SENSe]:SWEep:EGATe:TIME <time>` `[:SENSe]:SWEep:EGATe:TIME?`
Example	SWE:EGAT:TIME 500 ms
Dependencies	Gate View Sweep Time is initialized: On Preset (after initializing delay and length). Every time the Gate Method is set/changed. Additionally, in the Swept SA measurement, whenever you do a Preset, or leave Gate View, the analyzer remembers the Gate Delay and Gate Length settings. Then, when returning to Gate View, if the current Gate Delay and/or Gate Length do not match the remembered values Gate View Sweep Time is re-initialized. 1. Compute the location of the "gate stop" line, which you know is at time t = t_{min} + GateDelay + GateLength.
Preset	519.3 µs WiMAX OFDMA: 5 ms GSM/EDGE: 1 ms
State Saved	Saved in instrument state
Min	1 µs
Max	6000 s
Initial S/W Revision	Prior to A.02.00

Gate Delay

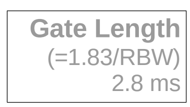
Controls the length of time from the time the gate condition goes True until the gate is turned on.

Key Path	**Sweep/Control, Gate**
Remote Command	`[:SENSe]:SWEep:EGATe:DELay <time>` `[:SENSe]:SWEep:EGATe:DELay?`
Example	SWE:EGAT:DELay 500ms SWE:EGAT:DELay?
Notes	Units of time are required or no units; otherwise an invalid suffix error message will be generated. See error –131.
Preset	57.7 us WiMAX OFDMA: 71 us GSM/EDGE: 600 us
State Saved	Saved in instrument state
Min	0.0 us

Max	100 s
Backwards Compatibility SCPI	[:SENSe]:SWEep:TIME:GATE:DELay
Initial S/W Revision	Prior to A.02.00

Gate Length

Controls the length of time that the gate is on after it opens.

Key Path	**Sweep/Control, Gate**
Remote Command	`[:SENSe]:SWEep:EGATe:LENGth <time>` `[:SENSe]:SWEep:EGATe:LENGth?`
Example	SWE:EGAT:LENG 1 SWE:EGAT:LENG?
Notes	Units of time are required or no units; otherwise an invalid suffix error message will be generated.
Dependencies	Grayed out when Gate Method is set to FFT in which case the label changes to that shown below.  vsd 39-1 The key is also grayed out if Gate Control = Level.
Preset	461.6 us WiMAX OFDMA: 50 us GSM/EDGE: 200 us
State Saved	Saved in instrument state
Min	100 ns
Max	5 s
Backwards Compatibility SCPI	[:SENSe]:SWEep:TIME:GATE:LENGth
Initial S/W Revision	Prior to A.02.00

Method

This lets you choose one of the three different types of gating.

Not all types of gating are available for all measurements.

Key Path	**Sweep/Control, Gate**
Remote Command	`[:SENSe]:SWEep:EGATe:METHod LO|VIDeo|FFT` `[:SENSe]:SWEep:EGATe:METHod?`

Example	SWE:EGAT:METH FFT
Preset	LO
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

LO

When Gate is set to On, the LO sweeps whenever the gate conditions as specified in the Gate menu are satisfied by the signal at the Gate Source.

This form of gating is more sophisticated, and results in faster measurements. With Gated LO, the analyzer only sweeps while the gate conditions are satisfied. This means that a sweep could take place over several gate events. It would start when the gate signal goes true and stop when it goes false, and then continue when it goes true again. But since the LO is sweeping as long as the gate conditions are satisfied, the sweep typically finishes much more quickly than with Gated Video.

When in zero span, there is no actual sweep performed. But data is only taken while the gate conditions are satisfied. So even though there is no sweep, the gate settings will impact when data is acquired.

Key Path	**Sweep/Control, Gate, Method**
Dependencies	Key is unavailable when Gate is On and FFT Sweep Type manually selected. When selected, Sweep Type is forced to Swept and the FFT key in Sweep Type is grayed out.
Readback	LO
Initial S/W Revision	Prior to A.02.00

Video

When Gate is set to On, the video signal is allowed to pass through whenever the gate conditions as specified in the Gate menu are satisfied by the signal at the Gate Source.

This form of gating may be thought of as a simple switch, which connects the signal to the input of the spectrum analyzer. When the gate conditions are satisfied, the switch is closed, and when the gate conditions are not satisfied, the switch is open. So we only look at the signal while the gate conditions are satisfied.

With this type of gating, you usually set the analyzer to sweep very slowly. In fact, a general rule is to sweep slowly enough that the gate is guaranteed to be closed at least once per data measurement interval (bucket). Then if the peak detector is used, each bucket will represent the peak signal as it looks with the gate closed.

Key Path	**Sweep/Control, Gate, Method**
Dependencies	Key is unavailable when Gate is On and FFT Sweep Type manually selected. When selected, Sweep Type is forced to Swept and the FFT key in Sweep Type is grayed out
Readback	Video

Initial S/W Revision	Prior to A.02.00

FFT

When Gate is set to On, an FFT is performed whenever the gate conditions as specified in the Gate menu are satisfied by the signal at the Gate Source. This is an FFT measurement which begins when the gate conditions are satisfied. Since the time period of an FFT is approximately 1.83/RBW, you get a measurement that starts under predefined conditions and takes place over a predefined period. So, in essence, this is a gated measurement. You have limited control over the gate length but it works in FFT sweeps, which the other two methods do not.

Gated FFT cannot be done in zero span since the instrument is not sweeping. So in zero span the Gated LO method is used. Data is still only taken while the gate conditions are satisfied, so the gate settings do impact when data is acquired.

The Gate Length will be 1.83/RBW.

This is a convenient way to make a triggered FFT measurement under control of an external gating signal.

Key Path	**Sweep/Control, Gate**
Dependencies	Key is unavailable when Gate is On and Swept Sweep Type manually selected. Key is unavailable when gate Control is set to Level. When selected, Sweep Type is forced to FFT and the Swept key in Sweep Type is grayed out Forces Gate Length to 1.83/RBW
Readback	FFT
Initial S/W Revision	Prior to A.02.00

Gate Source

The menus under the **Gate Source** key follow the same pattern as those under the **Trigger key**, with the exception that neither **Free Run** nor **Video** are available as Gate Source selections. Any changes to the settings in the setup menus under each Gate Source selection key (for example: **Trigger Level**) also affect the settings under the Trigger menu keys. Note that the selected Trigger Source does not have to match the Gate Source.

Key Path	**Sweep/Control, Gate**
Remote Command	`[:SENSe]:SWEep:EGATe:SOURce EXTernal1|EXTernal2 |LINE|FRAMe|RFBurst` `[:SENSe]:SWEep:EGATe:SOURce?`
Dependencies	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a “Hardware missing; Not available for this model number” error.

Preset	EXTernal 1 GSM/EDGE: FRAMe
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Control Edge/Level

Sets the method of controlling the gating function from the gating signal.

Edge

In Edge triggering, the gate opens (after the Delay) on the selected edge (for example, positive) of the gate signal and closes on the alternate edge (for example, negative).

Level

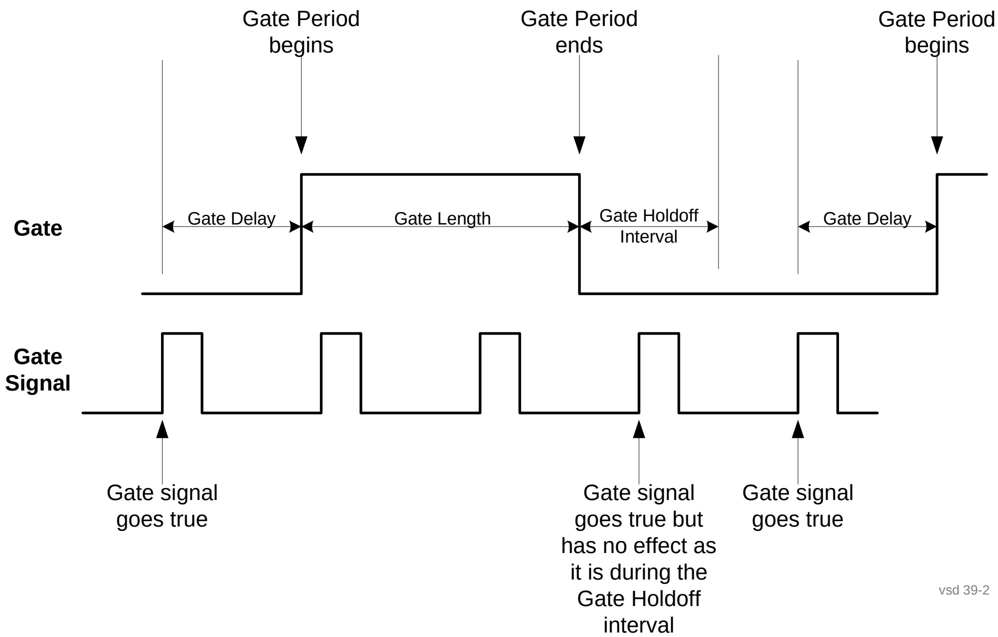
In Level triggering, the gate opens (after the Delay) when the gate signal has achieved a certain level and stays open as long as that level is maintained.

Key Path	**Sweep/Control, Gate**
Remote Command	`[:SENSe]:SWEep:EGATe:CONTrol EDGE|LEVel` `[:SENSe]:SWEep:EGATe:CONTrol?`
Example	SWE:EGAT:CONT EDGE
Dependencies	If the Gate Method is FFT the Control key is grayed out and Edge is selected. If the Gate Source is TV, Frame or Line, the Control key is grayed out and Edge is selected.
Preset	EDGE
State Saved	Saved in instrument state
Backwards Compatibility SCPI	[:SENSe]:SWEep:TIME:GATE:TYPE
Initial S/W Revision	Prior to A.02.00

Gate Holdoff

Lets you increase or decrease the wait time after a gate event ends before the analyzer will respond to the next gate signal.

After any Gate event finishes, the analyzer must wait for the sweep system to settle before it can respond to another Gate signal. The analyzer calculates a "wait time," taking into account a number of factors, including RBW and Phase Noise Optimization settings. The goal is to achieve the same accuracy when gated as in ungated operation. The figure below illustrates this concept:



When Gate Holdoff is in Auto, the wait time calculated by the analyzer is used. When Gate Time is in Manual, the user may adjust the wait time, usually decreasing it in order to achieve greater speed, but at the risk of decreasing accuracy.

When the **Method** key is set to **Video** or **FFT**, the **Gate Holdoff** function has no effect.

In measurements that do not support Auto, the value shown when Auto is selected is "---"and the manually set holdoff is returned to a query.

Key Path	**Sweep/Control, Gate**

Remote Command	`[:SENSe]:SWEep:EGATe:HOLDoff <time>`
	`[:SENSe]:SWEep:EGATe:HOLDoff?`
	`[:SENSe]:SWEep:EGATe:HOLDoff:AUTO OFF|ON|0|1`
	`[:SENSe]:SWEep:EGATe:HOLDoff:AUTO?`

Example	SWE:EGAT:HOLD 0.0002 SWE:EGAT:HOLD? SWE:EGAT:HOLD:AUTO ON SWE:EGAT:HOLD:AUTO?

Couplings	When **Gate Holdoff** is **Auto**, the **Gate Holdoff** key shows the value calculated by the analyzer for the wait time. Pressing the **Gate Holdoff** key while it is in **Auto** and not selected, causes the key to become selected and allows the user to adjust the value. If the value is adjusted, the setting changes to **Man**. Pressing the **Gate Holdoff** key, while it is in **Auto** and selected, does not change the value of **Gate Holdoff**, but causes the setting to change to **Man.** Now the user can adjust the value. Pressing the key while it is in **Man** and selected, cause the value to change back to **Auto**. Pressing the key while it is in **Man** and not selected, causes the key to become selected and allows the user to adjust the value. When **Method** is set to **Video** or **FFT**, the **Gate Holdoff** function has no effect.
Preset	Auto Auto/On
State Saved	Saved in instrument state
Min	1 µsec
Max	1 sec
Initial S/W Revision	Prior to A.02.00

Gate Delay Compensation

This function allows you to select an RBW-dependent value by which to adjust the gate delay, to compensate for changes in the delay caused by RBW effects.

You can select between uncompensated operation and two types of compensation, **Delay Until RBW Settled** and **Compensate for RBW Group Delay**.

See “More Information” on page 1334

Key Path	**Sweep/Control, Gate**
Scope	Meas Global
Remote Command	`[:SENSe]:SWEep:EGATe:DELay:COMPensation:TYPE OFF|SETTled|GDELay` `[:SENSe]:SWEep:EGATe:DELay:COMPensation:TYPE?`
Example	SWE:EGAT:DEL:COMP:TYPE SETT SWE:EGAT:DEL:COMP:TYPE?

Notes	Although this function is Meas Global, there are some measurements that do not support this function. In those measurements the operation will be Uncompensated. Going into one of those measurements will not change the Meas Global selection; it will simply display the grayed-out menu key with “Uncompensated” showing as the selection. This is a non-forceful grayout, so the SCPI command is still accepted. If Gate Delay Compensation is not supported at all within a particular mode, the key is not displayed, and if the SCPI command is sent while in a measurement within that mode, an “Undefined Header” message is generated. Measurements that do not support this function include: Swept SA
Preset	TD-SCDMA mode: Compensate for RBW Group Delay All other modes: Delay Until RBW Settled
State Saved	Saved in instrument state
Range	Uncompensated|Delay Until RBW Settled|Compensate for RBW Group Delay
Readback text	Uncompensated|Settled|Group Delay
Initial S/W Revision	Prior to A.02.00

More Information

Selecting **Uncompensated** means that the actual gate delay is as you sets it.

Selecting **Delay Until RBW Settled** causes the gate delay to be increased above the user setting by an amount equal to 3.06/RBW. This compensated delay causes the GATE START and GATE STOP lines on the display to move by the compensation amount, and the actual hardware gate delay to be increased by the same amount. All the other gate lines (for example, MIN FAST) are unaffected. If the RBW subsequently changes, the compensation is readjusted for the new RBW. The value shown on the **Gate Delay** key does NOT change.

Delay Until RBW Settled allows excellent measurements of gated signals, by allowing the IF to settle following any transient that affects the burst. Excellent measurements also require that the analysis region not extend into the region affected by the falling edge of the burst. Thus, excellent measurements can only be made over a width that declines with narrowing RBWs. Therefore, for general purpose compensation, you will still want to change the gate length with changes in RBW even if the gate delay is compensated.

Selecting **Compensate for RBW Group Delay** causes the gate delay to be increased above the user setting by an amount equal to 1.81/RBW. This compensated delay causes the GATE START, GATE STOP lines on the display to move by the compensation amount, and the actual hardware gate delay to be increased by the same amount. All the other gate lines (for example, MIN FAST) are unaffected. If the RBW subsequently changes, the compensation is readjusted for the new RBW. The value shown on the **Gate Delay** key does NOT change. **Compensate for RBW Group Delay** also includes gate length compensation; the gate length itself is adjusted as necessary to attempt to compensate for delay effects imposed by the RBW.

Compensate for RBW Group Delay is similar to **Delay Until RBW Settled**, but compensates for the group delay of the RBW filter, rather than the filter settling time. As the RBW gets narrow, this can allow the settling tail of the RBW to affect the beginning part of the gated measurement, and allow the beginning of the RBW settling transient to affect the end of the gated measurement. These two effects are symmetric because the RBW response is symmetric. Because the gate length is not automatically compensated, some users might find this compensation to be more intuitive than compensation for RBW settling.

Min Fast Position Query (Remote Command Only)

This command queries the position of the MIN FAST line, relative to the delay reference (REF) line. See section "Gate View On/Off" on page 1323. If this query is sent while not in gate view, the MinFast calculation is performed based on the current values of the appropriate parameters and the result is returned. Knowing this value lets you set an optimal gate delay value for the current measurement setup.

Remote Command	`[:SENSe]:SWEep:EGATe:MINFast?`
Example	SWE:EGAT:MIN?
Initial S/W Revision	Prior to A.02.00

Points

Sets the number of points taken per sweep, and displayed in the traces.   The current value of points is displayed parenthetically, next to the sweep time in the lower-right corner of the display. Using more points provides greater resolution; using fewer points compacts the data and decreases the time required to access a trace over the remote interface.

Increasing the number of points does not increase the sweep time; however, it can slightly impact the trace processing time and therefore the overall measurement speed. Decreasing the number of points does not decrease the sweep time, but it may speed up the measurement, depending on the other sweep settings (for example, in FFT sweeps). Fewer points will always speed up the I/O.

Due to minimum sweep rate limitations of the hardware, the minimum sweep time available to the user will increase above its normal value of 1 ms as the number of sweep points increases above 15001.

Changing the number of sweep points has several effects on the analyzer. The sweep time resolution will change. Trace data for all the traces will be cleared and, if Sweep is in Cont, a new trace taken. If any trace is in average or hold, the averaging starts over.

When in a split screen display each window may have its own value for points.

When sweep points is changed, an informational message is displayed, "Sweep points changed, all traces cleared."

Key Path	**Sweep/Control**
Remote Command	`[:SENSe]:SWEep:POINts <integer>` `[:SENSe]:SWEep:POINts?`
Example	SWE:POIN 5001 SWE:POIN?

Dependencies	• Neither the knob nor the step keys can be used to change this value. If it is tried, a warning is given. • Grayed out in measurements that do not support swept • Blanked in modes that do not support swept. • Grayed out if Normalize is on; you can't change the number of sweep points with Normalize on, as it will erase the reference trace.
Couplings	• When Source Mode is set to Tracking, and Stepped Tracking is used (as with option ESC), 201 source steps are used to achieve optimal speed. The number of sweep points in the analyzer is then set to match the number of steps in the source. When Source Mode is set to Off, the previous number of points (the value that existed when Source Mode was Off previously) is restored, even if the user has changed the Points value while the Source Mode was set to Tracking. • Whenever the number of sweep points change: — All trace data is erased — Any traces with Update Off will also go to Display Off (like going from View to Blank in the older analyzers) — Sweep time is re-quantized — Any limit lines that are on will be updated — If averaging/hold is on, averaging/hold starts over
Preset	1001
State Saved	Saved in instrument state
Min	Normally the minimum is 1, but in Tracking Source Mode, the minimum value of Points is 101. If you go into Tracking Source Mode with fewer points than 101, it sets Points to 101.
Max	40001, or the maximum number of points supported by the source in Tracking Source mode, whichever is less
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Zoom Points

In the Trace Zoom View of the Swept SA measurement, the Points key changes to Zoom Points whenever the focus (thick green border) is on the bottom window. Zoom Points controls how many points are displayed in the Zoom Window and hence indirectly controls the Zoom Span.

Key Path	**Sweep**
Remote Command	`[:SENSe]:SWEep:TZOom:POINts <integer>` `[:SENSe]:SWEep:TZOom:POINts?`
Example	SWE:TZO:POIN 5001

Dependencies	Only appears in the **Trace Zoom** View of the Swept SA measurement. If the SCPI command is sent in other Views, gives an error.
Couplings	Zoom Points is coupled to Zoom Span and Sweep Points; if Zoom Span changes, Zoom Points will change but Sweep Points will not; if Sweep Points changes, Zoom Points will change but Zoom Span will not. Zoom Span is directly coupled to Zoom Points; if Zoom Points changes, Zoom Span will change but Sweep Points will not.
Preset	On entry to Trace Zoom, 10% of the number of points in the upper window.
State Saved	Saved in instrument state
Min	1
Max	Number of points in top window
Initial S/W Revision	A.07.01

Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORt is sent, the alignment finishes before the abort function is performed. So ABORt does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

Remote Command	`:ABORt`
Example	:ABOR
Notes	If :INITiate:CONTinuous is ON, then a new continuous measurement will start immediately; with sweep (data acquisition) occurring once the trigger condition has been met. If :INITiate:CONTinuous is OFF, then :INITiate:IMMediate is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.
Dependencies	For continuous measurement, ABORt is equivalent to the Restart key. Not all measurements support the abort command.
Status Bits/OPC dependencies	The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUEStionable register bit 9 (INTegrity sum) is cleared. Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.
Initial S/W Revision	Prior to A.02.00

Trigger

Accesses a menu of keys to control the selection of the trigger source and the setup of each of the trigger sources. The analyzer is designed to allow triggering from a number of different sources, for example, Free Run, Video, External, RF Burst, and so forth.

The TRIG:SOURCe command (below) will specify the trigger source for the currently selected input (RF or I/Q). If you change inputs, the new input remembers the trigger source it was last programmed to for the current measurement, and uses that trigger source. You can directly set the trigger source for each input using the TRIGger:RF:SOURce and TRIGger:IQ:SOURce commands (later in this section). When in External Mixing, the analyzer uses the RF trigger soutrce.

Note the inclusion of the <measurement> parameter in the command below. Because each measurement remembers its own Trigger Source, the command must be qualified with the measurement name. Note that for the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when setting the Trigger Source for the Swept SA measurement.

See “Trigger Source Presets” on page 1341

See “RF Trigger Source” on page 1344

See “I/Q Trigger Source” on page 1345

See “More Information” on page 1347

Key Path	**Front-panel key**
Remote Command	`:TRIGger:<measurement>[:SEQuence]:SOURce EXTernal1|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF|ALARm|LAN|IQMag|IDEMod|QDEMod|IINPut|QINPut|AIQMag` `:TRIGger:<measurement>[:SEQuence]:SOURce?`
Example	TRIG:ACP:SOUR EXT1 Selects the external 1 trigger input for the ACP measurement and the selected input TRIG:SOUR VID Selects video triggering for the SANalyzer measurement in the Spectrum Analyzer mode. For SAN, do not use the <measurement> keyword.

Notes	Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available. Not all trigger sources are available for each input. See the "RF Trigger Source" on page 1344 and "I/Q Trigger Source" on page 1345 commands for detailed information on which trigger sources are available for each input. Other trigger-related commands are found in the INITiate and ABORt SCPI command subsystems. *OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned. Available ranges and presets can vary from mode to mode.
Dependencies	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message.
Preset	See table below
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Backwards Compatibility SCPI	`[:SENSe]:<measurement>:TRIGger:SOURce` This backwards compatibility command does not apply to the Swept SA measurement, for that just use :TRIGger:SOURCe This backwards compatibility command does not apply to the monitor spectrum, log plot and spot frequency measurements at all. The backwards Compatibility SCPI command, [:SENSe]:ACPR:TRIGger:SOURce, is provided to support the same functionality as [:SENSe]:ACPr:TRIGger:SOURce (PSA W-CDMA, PSA cdma2000 and PSA 1xEVDO) due to the fact that the ACPr node conflicts with the ACPower node. In earlier instruments, the parameter IF was used by apps for the video trigger, so using the IF enum selects video triggering. Sending IF in the command causes VID to be returned to a query.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Trigger Source Presets

Here are the Trigger Source Presets for the various measurements:

Meas	Mode	Preset for RF	Preset for IQ	Notes
Swept SA	SA	IMM	IQ not supported	
CHP	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV	IMM	IQ not supported	
OBW	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, LTE, LTETDD, CMMB, ISDB-T	1xEVDO: EXT1 others: IMM	IQ not supported	For 1xEVDO mode, the trigger source is coupled with the gate state, as well as the gate source. When the trigger source changes to RFBurst, External1 or External2, the gate state is set to on, and the gate source is set identically with the trigger source. When the trigger source changes to IMMediate, VIDeo, LINE, FRAMe or IF, the gate state is set to off.
CCDF	SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV	WIMAXOFDMA: RFBurst LTETDD: BTS: External 1 MS: Periodic Timer TD-SCDMA and 1xEV-DO: BTS: External 1 MS: RFBurst SA, WCDMA, C2K, LTE, CMMB, ISDB-T, DVB-T/H, DTMB, Digital Cable TV: IMMediate	TD-SCDMA and 1xEV-DO: BTS: External 1 MS: IQMag LTETDD: BTS: External 1 MS: Periodic Timer Others: IMM	For TD-SCDMA: Trigger source is coupled with radio device. When radio device changes to BTS, trigger source will be changed to EXTernal1. When radio device changes to MS, trigger source will be set as RFBurst for RF or IQ Mag for BBIQ. When TriggerSource is RFBurst or IQ Mag, Measure Interval is grayed out.

Trigger

Meas	Mode	Preset for RF	Preset for IQ	Notes
ACP	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV	IMM	IQ not supported	
Tx Power	SA, GSM, TD-SCDMA	SA, GSM: RFBurst TD-SCDMA: EXTernal	IMM	TD-SCDMA doesn't support the Line and Periodic Timer parameters. When the mode is TD-SCDMA, if the Radio Device is switched to BTS, the value will be changed to External 1 and if the Radio device is switched to MS, the value will be changed to RFBurst
SPUR	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H, LTE, LTETDD	IMM	IQ not supported	
SEM	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV	1xEVDO(BTS): EXTernal1 All others: IMMediate	IQ not supported	
CDP	WCDMA	IMM	IMM	
RHO	WCDMA	IMM	IMM	
PCON	WCDMA	IMM	IMM	
QPSK	WCDMA, C2K, 1xEVDO	All except CDMA1xEVDO: IMMediate CDMA1xEVDO: EXT1	IMM	

Meas	Mode	Preset for RF	Preset for IQ	Notes
MON	All except SA and BASIC	IMM	IQ not supported	
WAV		LTETDD: BTS: External 1 MS: Periodic Timer GSM/EDGE: RFBurst All others: IMMediate	LTETDD: BTS: External 1 MS: Periodic Timer GSM/EDGE: IQMag All others: IMMMediate	
PVT	WIMAXOFDMA	RFB	IMM	
EVM	WIMAXOFDMA, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV	All but CMMB: IMM CMMB: Periodic Timer	All but CMMB: IMM CMMB: External 1	LTE, LTETDD supports Free Run, Video and External 1 only.
SPEC	BASIC	IMM	IMM	
LOG Plot	PN	IMM	IQ not supported	
Spot Freq	PN	IMM	IQ not supported	
GMSK PVT	EDGE/GSM	RFB	IMM	
GMSK PFER	EDGE/GSM	RFB	IQMag	
GMSK ORFS	EDGE/GSM	RF Burst	IQ not supported	
EDGE PVT	EDGE/GSM	RFB	IMM	
EDGE EVM	EDGE/GSM	RFB	IQMag	
EDGE ORFS	EDGE/GSM	Periodic Timer	IQ not supported	
Combine d WCDMA	WCDMA	IMM	IQ not supported	
Combine d GSM	EDGE/GSM	RFB	IQ not supported	

Meas	Mode	Preset for RF	Preset for IQ	Notes
List Power Step	WCDMA, EDGE/GSM	IMM	IQ not supported	
Transmit On/Off Power	LTETDD	LTETDD: BTS: External 1 MS: Periodic Timer	LTETDD: BTS: External 1 MS: Periodic Timer	
Transmit Analysis	BLUETOOTH	RFB	IQ not supported	
Adjacent Channel Power	BLUETOOTH	IMM	IQ not supported	
LE In-band Emissions	BLUETOOTH	IMM	IQ not supported	
EDR In-band Spurious Emissions	BLUETOOTH	Periodic Timer	IQ not supported	

RF Trigger Source

The **RF Trigger Source** command selects the trigger to be used for the specified measurement when RF is the selected input. The RF trigger source can be queried and changed even while another input is selected, but it is inactive until RF becomes the selected input.

Note the inclusion of the <measurement> parameter in the command below. Because each measurement remembers its own Trigger Source, the command must be qualified with the measurement name. Note that for the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when setting the Trigger Source for the Swept SA measurement.

Remote Command	`:TRIGger:<measurement>[:SEQuence]:RF:SOURce EXTernal1|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF|ALARm|LAN` `:TRIGger:<measurement>[:SEQuence]:RF:SOURce?`
Example	TRIG:ACP:RF:SOUR EXT1 Selects the external 1 trigger input for the ACP measurement and the RF input TRIG:RF:SOUR VID Selects video triggering for the SANalyzer measurement and the RF input. For SAN, do not use the <measurement> keyword.

Notes	Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available. Not all trigger sources are available for each input. For the **RF Trigger Source,** the following trigger sources are available: — IMMediate - free run triggering — VIDeo - triggers on the video signal level — LINE - triggers on the power line signal — EXTernal1 - triggers on an externally connected trigger source marked “Trigger 1 In” on the rear panel — EXTernal2 - triggers on an externally connected trigger source marked “Trigger 2 In” on the front panel. In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a “Hardware missing; Not available for this model number” message — RFBurst - triggers on the bursted frame — FRAMe - triggers on the periodic timer — IF (video) - same as video, for backwards compatibility only — ALARm – LXI Alarm — LAN – LXI LAN event *OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned. Available ranges, and presets can vary from mode to mode.
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Backwards Compatibility SCPI	In earlier instruments, the parameter IF was used by apps for the video trigger, so using the IF enum selects video triggering. Sending IF in the query returns the VID enum.
Initial S/W Revision	Prior to A.02.00

I/Q Trigger Source

This command selects the trigger to be used for the specified measurement when I/Q (which requires option BBA) is the selected input. The I/Q trigger source can be queried and changed even while another input is selected, but it is inactive until I/Q becomes the selected input.

Remote Command	:TRIGger:<measurement>[:SEQuence]:IQ:SOURce EXTernal1|EXTernal2|IMMediate|IQMag|IDEMod|QDEMod|IINPut|QINPut|AIQMag :TRIGger:<measurement>[:SEQuence]:IQ:SOURce?
Example	TRIG:WAVeform:SOUR IQM Selects I/Q magnitude triggering for the IQ Waveform measurement and the I/Q input
Notes	Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available. Not all trigger sources are available for each input. For the **I/Q Trigger Source,** the following trigger sources are available: — IMMediate - free run triggering — EXTernal1 - triggers on an externally connected trigger source on the rear panel — EXTernal2 - triggers on an externally connected trigger source on the front panel — IQMag - triggers on the magnitude of the I/Q signal — IDEMod - triggers on the I/Q signal's demodulated I voltage — QDEMod - triggers on the I/Q signal's demodulated Q voltage — IINPut - triggers on the I channel's ADC voltage — QINPut - triggers on the Q channel's ADC voltage — AIQMag - triggers on the magnitude of the auxiliary receiver channel I/Q signal *OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned. Available ranges, an from mode to mode.d presets can vary
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

More Information

The trigger menus let you select the trigger source and trigger settings for a sweep or measurement. In triggered operation (basically, any trigger source other than Free Run), the analyzer will begin a sweep or measurement only with the selected trigger conditions are met, generally when your trigger source signal meets the specified trigger level and polarity requirements. (In FFT measurements, the trigger controls when the data acquisition begins for FFT conversion.)

For each of the trigger sources, you may define a set of operational parameters or settings which will be applied when that source is selected as the current trigger source. Examples of these settings are Trigger Level, Trigger Delay, and Trigger Slope. You may apply different settings for each source; so, for example, you could have a Trigger Level of 1v for External 1 trigger and –10 dBm for Video trigger.

Once you have established the settings for a given trigger source, they generally will remain unchanged for that trigger source as you go from measurement to measurement within a Mode (although the settings do change as you go from Mode to Mode). Furthermore, the trigger settings within a Mode are the same for the **Trigger** menu, the **Gate Source** menu, and the **Sync Source** menu that is part of the **Periodic Timer Trigger Setup** menu. That is, if **Ext1** trigger level is set to 1v in the **Trigger** menu, it will appear as 1v in both the **Gate Source** and the **Sync Source** menus. For these reasons the trigger settings commands are not qualified with the measurement name, the way the trigger source commands are.

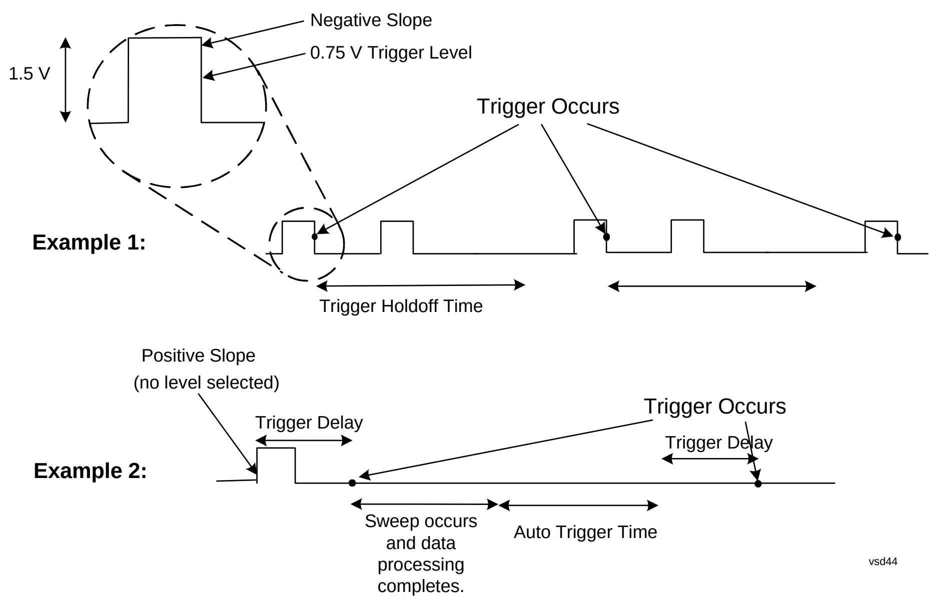
The settings setup menu can be accessed by pressing the key for the current trigger source a second time. For example, one press of Video selects the Video trigger as the source. The Video key becomes highlighted and the hollow arrow on the key turns black. Now a second press of the key takes you into the Video Trigger Setup menu.

Trigger Setup Parameters:

The following examples show trigger setup parameters using an external trigger source.

Example 1 illustrates the trigger conditions with negative slope and no trigger occurs during trigger Holdoff time.

Example 2 illustrates the trigger conditions with positive slope, trigger delay, and auto trigger time.



Free Run

Pressing this key, when it is not selected, selects free-run triggering. Free run triggering occurs immediately after the sweep/measurement is initiated.

Key Path	**Trigger**
Example	TRIG:SOUR IMM Swept SA measurement TRIG:<meas>:SOUR IMM Measurements other than Swept SA
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

Video (IF Envelope)

Pressing this key, when it is not selected, selects the video signal as the trigger. The Video trigger condition is met when the video signal (the filtered and detected version of the input signal, including both RBW and VBW filtering) crosses the video trigger level.

NOTE When the detector selected for all active traces is the average detector, the video signal for triggering does not include any VBW filtering.

The video trigger level is shown as a labeled line on the display. The line is displayed as long as video is the selected trigger source.

Pressing this key, when it is already selected, accesses the video trigger setup functions.

Key Path	**Trigger**
Example	TRIG:SOUR VID Swept SA measurement TRIG:<meas>:SOUR VID Measurements other than Swept SA
Notes	Log Plot and Spot Frequency measurements do not support Video Trigger
Dependencies	Video trigger is allowed in average detector mode.
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.

Initial S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the video signal trigger. When the video signal crosses this level, with the chosen slope, the trigger occurs. This level is displayed with a horizontal line only if **Video** is the selected trigger source.

Key Path	**Trigger, Video**
Remote Command	`:TRIGger[:SEQuence]:VIDeo:LEVel <ampl>` `:TRIGger[:SEQuence]:VIDeo:LEVel?`
Example	TRIG:VID:LEV –40 dBm
Notes	When sweep type = FFT, the video trigger uses the amplitude envelope in a bandwidth wider than the FFT width as a trigger source. This might often be useful, but does not have the same relationship between the displayed trace and the trigger level as in swept triggering. Amplitude Corrections are not taken into account by the Video Trig Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Video Trigger will not fire until you have dropped the trigger line that far below the displayed signal level, rather than simply dropping it down to the displayed signal level. Note that other corrections, specifically External Gain and Ref Level Offset, modify the actual trace data as it is taken and therefore ARE taken into account by Trig Level.
Couplings	This same level is used for the Video trigger source in the Trigger menu and for the Video selection in the Gate Source menu.
Preset	Set the Video Trigger Level –25 dBm on Preset. When the Video Trigger Level becomes the active function, if the value is off screen, set it to either the top or bottom of screen, depending on which direction off screen it was.
State Saved	Saved in instrument state
Min	–170 dBm
Max	+30 dBm
Default Unit	depends on the current selected Y axis unit
Backwards Compatibility SCPI	:TRIGger[:SEQuence]:IF:LEVel :TRIGger[:SEQuence]:IF:LEVel?
Backwards Compatibility SCPI	For backward compatibility with VSA/PSA comms apps, we need this alias.
Initial S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	**Trigger, Video**
Remote Command	`:TRIGger[:SEQuence]:VIDeo:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:VIDeo:SLOPe?`
Example	TRIG:VID:SLOP NEG
Preset	POSitive
State Saved	Saved in instrument state
Backwards Compatibility SCPI	:TRIGger[:SEQuence]:SLOPe :TRIGger[:SEQuence]:IF:SLOPe
Backwards Compatibility SCPI	For backward compatibility, the following commands should update all instances of trigger slope (video/external/line). The query returns the trigger slope setting of the selected trigger source. :TRIGger[:SEQuence]:SLOPe POSitive|NEGative :TRIGger[:SEQuence]:SLOPe? For backward compatibility with VSA/PSA comms apps, we need to alias :TRIGger[:SEQuence]:IF:SLOPe NEGative|POSitive :TRIGger[:SEQuence]:IF:SLOPe?
Initial S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during that the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in the time domain or FFT, but not in swept spans.

Key Path	**Trigger, Video**

Remote Command	`:TRIGger[:SEQuence]:VIDeo:DELay <time>`
	`:TRIGger[:SEQuence]:VIDeo:DELay?`
	`:TRIGger[:SEQuence]:VIDeo:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:VIDeo:DELay:STATe?`

Example	TRIG:VID:DEL:STAT ON TRIG:VID:DEL 100 ms

Notes	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset	Off, 1 us
State Saved	Saved in instrument state
Min	–150 ms
Max	+500 ms
Default Unit	s
Backwards Compatibility SCPI	:TRIGger[:SEQuence]:IF:DELay :TRIGger[:SEQuence]:DELay
Backwards Compatibility SCPI	For backward compatibility with VSA/PSA comms apps, we need to alias Video trigger to :TRIGger[:SEQuence]:IF:DELay <time> :TRIGger[:SEQuence]:IF:DELay? For backward compatibility, the following commands should update all instances of trigger delay (not including RF Burst). The query returns the video trigger delay settings of the selected trigger source. :TRIGger[:SEQuence]:DELay <time> :TRIGger[:SEQuence]:DELay? :TRIGger[:SEQuence]:DELay:STATe OFF|ON|0|1 :TRIGger[:SEQuence]:DELay:STATe? Also, the legacy ESA command for trigger offset, TRIGger[:SEQuence]:OFFSet, is supported (see section “Trigger Offset (Remote Command Only)” on page 1384). The offset specified by this commands is remembered by the analyzer and added to the video trigger delay whenever the value is sent to the hardware, when in zero span and in a Res BW >= 1 kHz.
Initial S/W Revision	Prior to A.02.00

Line

Pressing this key, when it is not selected, selects the line signal as the trigger. A new sweep/measurement will start synchronized with the next cycle of the line voltage. Pressing this key, when it is already selected, access the line trigger setup menu.

Key Path	**Trigger**

Example	TRIG:SOUR LINE Swept SA measurement TRIG:<meas>:SOUR LINE Measurements other than Swept SA
Dependencies	Line trigger is not available when operating from a "dc power source", for example, when the instrument is powered from batteries.
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	**Trigger, Line**
Remote Command	`:TRIGger[:SEQuence]:LINE:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:LINE:SLOPe?`
Example	TRIG:LINE:SLOP NEG
Preset	POSitive
State Saved	Saved in instrument state
Backwards Compatibility SCPI	:TRIGger[:SEQuence]:SLOPe (There are SLOPe backward compatibility commands.)
Initial S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

Key Path	**Trigger, Line**

Remote Command	`:TRIGger[:SEQuence]:LINE:DELay <time>`
	`:TRIGger[:SEQuence]:LINE:DELay?`
	`:TRIGger[:SEQuence]:LINE:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:LINE:DELay:STATe?`

Example	TRIG:LINE:DEL:STAT ON TRIG:LINE:DEL 100 ms
Notes	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset	Off, 1.000 us
State Saved	Saved in instrument state
Min	–150 ms
Max	500 ms
Default Unit	s
Backwards Compatibility SCPI	There are DELay backward compatibility commands described in video, Section “Trig Delay ” on page 1350) :TRIGger[:SEQuence]:DELay (Also, the legacy ESA command for trigger offset, TRIGger[:SEQuence]:OFFSet, is supported. See section “Trigger Offset (Remote Command Only)” on page 1384. The offset specified by this commands is remembered by the analyzer and added to the line trigger delay whenever the value is sent to the hardware, when in zero span and in a Res BW >= 1 kHz.)
Initial S/W Revision	Prior to A.02.00

External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

Key Path	**Trigger**
Example	TRIG:SOUR EXT1 Swept SA measurement TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA

Dependencies	Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1.
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

Key Path	**Trigger, External 1**
Remote Command	`:TRIGger[:SEQuence]:EXTernal1:LEVel <level>` `:TRIGger[:SEQuence]:EXTernal1:LEVel?`
Example	TRIG:EXT1:LEV 0.4 V
Couplings	This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 selection in the Gate Source menu.
Preset	1.2 V
State Saved	Saved in instrument state
Min	–5 V
Max	5 V
Default Unit	V
Backwards Compatibility SCPI	:TRIGger[:SEQuence]:EXTernal:LEVel (For backward compatibility, EXTernal should also work.)
Initial S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	**Trigger, External 1**
Remote Command	`:TRIGger[:SEQuence]:EXTernal1:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:EXTernal1:SLOPe?`

Example	TRIG:EXT1:SLOP NEG
Couplings	This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).
Preset	POSitive
State Saved	Saved in instrument state
Backwards Compatibility SCPI	For backward compatibility, EXTernal should also work. Also, there are SLOPe backward compatibility cmds described in Video section "Trig Slope " on page 1350 :TRIGger[:SEQuence]:SLOPe
Initial S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

Key Path	**Trigger, External 1**

Remote Command	`:TRIGger[:SEQuence]:EXTernal1:DELay <time>`
	
	`:TRIGger[:SEQuence]:EXTernal1:DELay?`
	
	`:TRIGger[:SEQuence]:EXTernal1:DELay:STATe OFF|ON|0|1`
	
	`:TRIGger[:SEQuence]:EXTernal1:DELay:STATe?`

Example	TRIG:EXT1:DEL:STAT ON TRIG:EXT1:DEL 100 ms
Notes	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset	Off, 1.000 us
State Saved	Saved in instrument state
Min	–150 ms
Max	+500 ms
Default Unit	s

Backwards Compatibility SCPI	For backward compatibility, EXTernal should also work. Also, there are DELay backward compatibility commands described in video section "Trig Delay " on page 1350 :TRIGger[:SEQuence]:DELay Also, the legacy ESA command for trigger offset, TRIGger[:SEQuence]:OFFSet, is supported (see section "Trigger Offset (Remote Command Only)" on page 1384). The offset specified by this commands is remembered by the analyzer and added to the external1 trigger delay whenever the value is sent to the hardware, when in zero span and in a Res BW >= 1 kHz.
Initial S/W Revision	Prior to A.02.00

External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

Key Path	**Trigger**
Example	TRIG:SOUR EXT2 Swept SA measurement TRIG:<meas>:SOUR EXT2 Measurements other than Swept SA
Dependencies	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2.
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

Key Path	**Trigger, External 2**

Remote Command	`:TRIGger[:SEQuence]:EXTernal2:LEVel` `:TRIGger[:SEQuence]:EXTernal2:LEVel?`
Example	TRIG:EXT2:LEV 1.1 V
Couplings	This same level is used for the Ext2 trigger source in the Trigger menu, for the Ext2 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu.
Preset	1.2 V
State Saved	Saved in instrument state
Min	–5 V
Max	5 V
Default Unit	V
Initial S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	**Trigger, External 2**
Remote Command	`:TRIGger[:SEQuence]:EXTernal2:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:EXTernal2:SLOPe?`
Example	TRIG:EXT2:SLOP NEG
Couplings	This same slope is used in the Ext2 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).
Preset	POSitive
State Saved	Saved in instrument state
Backwards Compatibility SCPI	Also, there are SLOPe backward compatibility commands described in Video, section :TRIGger[:SEQuence]:SLOPe
Initial S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

Key Path	**Trigger, External 2**

Remote Command	`:TRIGger[:SEQuence]:EXTernal2:DELay <time>`
	`:TRIGger[:SEQuence]:EXTernal2:DELay?`
	`:TRIGger[:SEQuence]:EXTernal2:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:EXTernal2:DELay:STATe?`

Example	TRIG:EXT2:DEL:STAT ON TRIG:EXT2:DEL 100 ms
Notes	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset	Off, 1.000 us
State Saved	Saved in instrument state
Min	–150 ms
Max	500 ms
Default Unit	s
Backwards Compatibility SCPI	Also, there are DELay backward compatibility commands described in video section “Trig Delay ” on page 1350. :TRIGger[:SEQuence]:DELay Also, the legacy ESA command for trigger offset, TRIGger[:SEQuence]:OFFSet, is supported (see section “Trigger Offset (Remote Command Only)” on page 1384). The offset specified by this commands is remembered by the analyzer and added to the external2 trigger delay whenever the value is sent to the hardware, when in zero span and in a Res BW >= 1 kHz.
Initial S/W Revision	Prior to A.02.00

RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

Key Path	**Trigger**

Example	TRIG:SOUR RFB Swept SA measurement TRIG:<meas>:SOUR RFB Measurements other than Swept SA
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

Absolute Trigger Level

Sets the absolute trigger level for the RF burst envelope.

When using the External Mixing path, the Absolute Trigger Level is uncalibrated because the factory default was set to accommodate the expected IF levels for the RF path.

Key Path	**Trigger, RF Burst**
Scope	Meas Global
Remote Command	`:TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute <ampl>` `:TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute?`
Example	TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm
Notes	Sending this command does not switch the setting from relative to absolute; to switch it you need to send the :TRIGger[:SEQuence]:RFBurst:LEVel:TYPE command, below. Amplitude Corrections are not taken into account by the Absolute Trigger Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Absolute Trigger will not fire until you have set the trigger level that far below the displayed signal level, rather than simply to the displayed signal level. This is only true for Amplitude Corrections, not External Gain or Ref Level Offset functions. If mode is Bluetooth, the default value is –50 dBm.
Couplings	This same level is used for the RF Burst trigger source in the Trigger menu, for the RF Burst selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the RF Burst selection in the Gate Source menu
Preset	–20 dBm
State Saved	Saved in state

Min	–200 dBm
Max	100 dBm
Default Unit	depends on the current selected Y-Axis unit
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

Key Path	**Trigger, RF Burst**
Remote Command	`:TRIGger[:SEQuence]:RFBurst:LEVel:TYPE ABSolute|RELative` `:TRIGger[:SEQuence]:RFBurst:LEVel:TYPE?`
Example	TRIG:RFB:LEV:TYPE REL sets the trigger level type of the RF burst trigger to Relative.
Preset	ABSolute
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

Relative Trigger

Sets the relative trigger level for the RF burst envelope.

In some models, the relative burst trigger function is implemented in hardware. In other models, without the advanced triggering hardware required, the relative burst trigger function is implemented in software in some measurements, and is unavailable in other measurements.

When implemented in software, the relative RF Burst trigger function is implemented as follows:

The measurement starts with the absolute RF Burst trigger setting. If it can not get a trigger with that level, auto trigger fires and the acquisition starts anyway. After the acquisition, the measurement searches for the peak in the acquired waveform and saves it.

Now, in the next cycle of the measurement, the measurement determines a new absolute RF Burst level based on the peak value from the first measurement and the Relative RF Burst Trigger Level (always 0 or negative dB) set by the user. The following formula is used:

absolute RF Burst level = peak level of the previous acquisition + relative RF Burst level

If the new absolute RF Burst level differs from the previous by more than 0.5 dB, the new level is sent to the hardware; otherwise it is not updated (to avoid slowing down the acquisition)

Steps 2 and 3 repeat for subsequent measurements.

Key Path	**Trigger, RF Burst**
Scope	Meas Global

Remote Command	:TRIGger[:SEQuence]:RFBurst:LEVel:RELative <rel_ampl> :TRIGger[:SEQuence]:RFBurst:LEVel:RELative?
Example	TRIG:RFB:LEV:REL –10 dB sets the trigger level of the RF burst envelope signal to the relative level of –10 dB
Notes	Sending this command does not switch the setting from absolute to relative; to switch it you need to send the :TRIGger[:SEQuence]:RFBurst:LEVel:TYPE command, above. The relative trigger level is not available in some measurements. In those measurements the RELative parameter, and the :TRIGger[:SEQuence]:RFBurst:LEVel:TYPE command (above), will generate an error if sent.
Dependencies	This key is grayed out and Absolute Trigger Level selected if the required hardware is not present in your analyzer and the current measurement does not support Relative triggering.
Preset	–6 dB GSM: –25 dB
State Saved	Saved in instrument state
Min	–45 dB
Max	0 dB
Default Unit	dB or dBc
Backwards Compatibility SCPI	:TRIGger[:SEQuence]:RFBurst:LEVel Is aliased to: :TRIGger[:SEQuence]:RFBurst:LEVel:RELative because the PSA had ONLY relative burst triggering
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	**Trigger, RF Burst**
Remote Command	:TRIGger[:SEQuence]:RFBurst:SLOPe POSitive|NEGative :TRIGger[:SEQuence]:RFBurst:SLOPe?
Example	TRIG:RFB:SLOP NEG
Couplings	This same slope is used in the RF Burst selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).

Preset	POSitive
State Saved	Saved in instrument state
Backwards Compatibility SCPI	Also, there are SLOPe backward compatibility commands described in Video section "Trig Slope " on page 1350 :TRIGger[:SEQuence]:SLOPe
Initial S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

Key Path	**Trigger, RF Burst**

Remote Command	`:TRIGger[:SEQuence]:RFBurst:DELay <time>`
	`:TRIGger[:SEQuence]:RFBurst:DELay?`
	`:TRIGger[:SEQuence]:RFBurst:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:RFBurst:DELay:STATe?`

Example	TRIG:RFB:DEL:STAT ON TRIG:RFB:DEL 100 ms
Notes	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset	Off, 1.000 us
State Saved	Saved in instrument state
Min	–150 ms
Max	500 ms
Default Unit	s
Backwards Compatibility SCPI	Also, there are DELay backward compatibility commands described in video section"Trig Delay " on page 1350. :TRIGger[:SEQuence]:DELay
Initial S/W Revision	Prior to A.02.00

Periodic Timer (Frame Trigger)

Pressing this key, when it is not selected, selects the internal periodic timer signal as the trigger. Triggering occurrences are set by the **Period** parameter, which is modified by the **Sync Source** and **Offset**. Pressing this key, when it is already selected, accesses the periodic timer trigger setup functions.

If you do not have a sync source selected (it is Off), then the internal timer will not be synchronized with any external timing events.

Key Path	**Trigger**
Example	TRIG:SOUR FRAM Swept SA measurement TRIG:<meas>:SOUR FRAM Measurements other than Swept SA
State Saved	Saved in instrument state
Readback	[Sync: <value of Sync Source>], for example, [Sync: External 1]
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

Periodic Timer Triggering:

This feature selects the internal periodic timer signal as the trigger. Trigger occurrences are set by the **Periodic Timer** parameter, which is modified by the **Sync Source** and **Offset**.

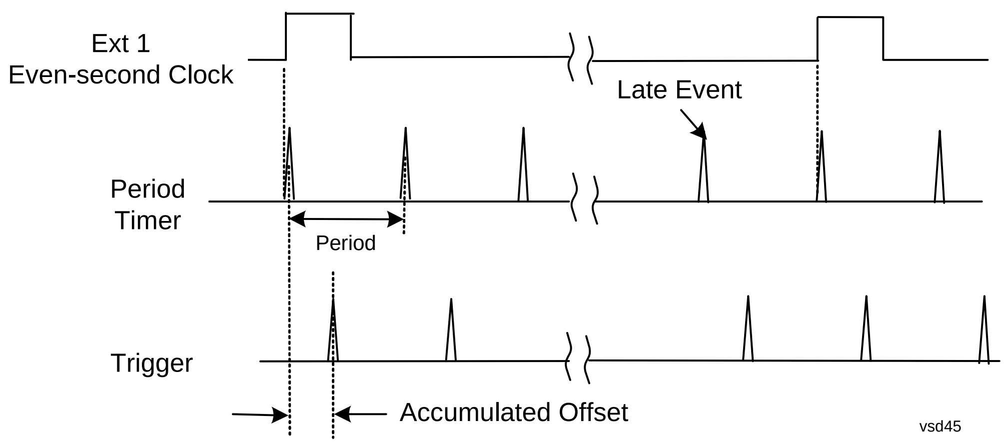
The figure below shows the action of the periodic timer trigger. Before reviewing the figure, we'll explain some uses for the periodic trigger.

A common application is measuring periodic burst RF signals for which a trigger signal is not easily available. For example, we might be measuring a TDMA radio which bursts every 20 ms. Let's assume that the 20 ms period is very consistent. Let's also assume that we do not have an external trigger source available that is synchronized with the period, and that the signal-to-noise ratio of the signal is not high enough to provide a clean RF burst trigger at all of the analysis frequencies. For example, we might want to measure spurious transmissions at an offset from the carrier that is larger than the bandwidth of the RF burst trigger. In this application, we can set the Periodic Timer to a 20.00 ms period and adjust the offset from that timer to position our trigger just where we want it. If we find that the 20.00 ms is not exactly right, we can adjust the period slightly to minimize the drift between the period timer and the signal to be measured.

A second way to use this feature would be to use **Sync Source** temporarily, instead of **Offset**. In this case, we might tune to the signal in a narrow span and use the RF Burst trigger to synchronize the periodic timer. Then we would turn the sync source off so that it would not mis-trigger. Mis-triggering can occur when we are tuned so far away from the RF burst trigger that it is no longer reliable.

A third example would be to synchronize to a signal that has a reference time element of much longer period than the period of interest. In some CDMA applications, it is useful to look at signals with a short periodicity, by synchronizing that periodicity to the "even-second clock" edge that happens every two seconds. Thus, we could connect the even-second clock trigger to Ext1 and use then Ext1 as the sync source for the periodic timer.

The figure below illustrates this third example. The top trace represents the even-second clock. It causes the periodic timer to synchronize with the leading edge shown. The analyzer trigger occurs at a time delayed by the accumulated offset from the period trigger event. The periodic timer continues to run, and triggers continue to occur, with a periodicity determined by the analyzer time base. The timer output (labeled "late event") will drift away from its ideal time due to imperfect matching between the time base of the signal being measured and the time base of the analyzer, and also because of imperfect setting of the period parameter. But the synchronization is restored on the next even-second clock event. ("Accumulated offset" is described in the in the **Offset** function section.)



Period

Sets the period of the internal periodic timer clock. For digital communications signals, this is usually set to the frame period of your current input signal. In the case that sync source is not set to OFF, and the external sync source rate is changed for some reason, the periodic timer is synchronized at the every external synchronization pulse by resetting the internal state of the timer circuit.

Key Path	**Trigger, Periodic Timer**
Remote Command	`:TRIGger[:SEQuence]:FRAMe:PERiod <time>` `:TRIGger[:SEQuence]:FRAMe:PERiod?`
Example	TRIG:FRAM:PER 100 ms
Dependencies	The invalid data indicator turns on when the period is changed, until the next sweep/measurement completes.
Couplings	The same period is used in the Gate Source selection of the period timer.
Preset	20 ms GSM: 4.615383

State Saved	Saved in instrument state
Min	100.000 ns
Max	559.0000 ms
Default Unit	S
Initial S/W Revision	Prior to A.02.00

Offset

Adjusts the accumulated offset between the periodic timer events and the trigger event. Adjusting the accumulated offset is different than setting an offset, and requires explanation.

The periodic timer is usually not synchronized with any external events, so the timing of its output events has no absolute meaning. Since the timing relative to external events (RF signals) is important, you need to be able to adjust (offset) it. However, you have no direct way to see when the periodic timer events occur. All that you can see is the trigger timing. When you want to adjust the trigger timing, you will be changing the internal offset between the periodic timer events and the trigger event. Because the absolute value of that internal offset is unknown, we will just call that the accumulated offset. Whenever the Offset parameter is changed, you are changing that accumulated offset. You can reset the displayed offset using Reset Offset Display. Changing the display does not change the value of the accumulated offset, and you can still make additional changes to accumulated offset.

To avoid ambiguity, we define that an increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.

Key Path	**Trigger, Periodic Timer**
Remote Command	`:TRIGger[:SEQuence]:FRAMe:OFFSet <time>` `:TRIGger[:SEQuence]:FRAMe:OFFSet?`
Example	TRIG:FRAM:OFFS 1.2 ms
Notes	The front panel interface (for example, the knob), and this command, adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware each time the offset is updated is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value. Note that the accumulated offset value is essentially arbitrary; it represents the accumulated offset from the last time the offset was zeroed (with the Reset Offset Display key). Note that this command does not change the period of the trigger waveform. Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section “Trig Delay” on page 1370. An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.

Notes	When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated with the new value. However, the actual amount sent to the hardware is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value. The SCPI query simply returns the value currently showing on the key.
Dependencies	The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes.
Couplings	The same offset is used in the Gate Source selection of the period timer.
Preset	0 s
State Saved	Saved in instrument state
Min	–10.000 s
Max	10.000 s
Default Unit	S
Initial S/W Revision	Prior to A.02.00

Offset Adjust (Remote Command Only)

This remote command does not work at all like the related front panel keys. This command lets you advance the phase of the frame trigger by the amount you specify.

It does not change the period of the trigger waveform. If the command is sent multiple times, it advances the phase of the frame trigger an additional amount each time it is sent. Negative numbers are permitted.

Remote Command	`:TRIGger[:SEQuence]:FRAMe:ADJust <time>`
Example	TRIG:FRAM:ADJ 1.2 ms
Notes	Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section “Trig Delay” on page 1370 An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.
Notes	The front panel interface (for example, the knob) and the :TRIG:FRAM:OFFS command adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware is the delta value, that is, the current offset value minus the previous offset value. When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated by increasing it (or decreasing it if the value sent is negative) by the amount specified in the SCPI command. This is a "command only" SCPI command, with no query.
Dependencies	The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes.
Couplings	The same offset is used in the Gate Source selection of the period timer.

Preset	0 s
State Saved	Saved in instrument state
Min	–10.000 s
Max	10.000 s
Default Unit	S
Initial S/W Revision	Prior to A.02.00

Reset Offset Display

Resets the value of the periodic trigger offset display setting to 0.0 seconds. The current displayed trigger location may include an offset value defined with the **Offset** key. Pressing this key redefines the currently displayed trigger location as the new trigger point that is 0.0 s offset. The **Offset** key can then be used to add offset relative to this new timing.

Key Path	**Trigger, Periodic Timer**
Remote Command	`:TRIGger[:SEQuence]:FRAMe:OFFSet:DISPlay:RESet`
Example	TRIG:FRAM:OFFS:DISP:RES
Initial S/W Revision	Prior to A.02.00

Sync Source

Selects a signal source for you to synchronize your periodic timer trigger to, otherwise you are triggering at some arbitrary location in the frame. Synchronization reduces the precision requirements on the setting of the period.

For convenience you may adjust the level and slope of the selected sync source in a conditional branch setup menu accessed from the Sync Source menu. Note that these settings match those in the **Trigger** and **Gate Source** menus; that is, each trigger source has only one value of level and slope, regardless of which menu it is accessed from.

Key Path	**Trigger, Periodic Timer**
Remote Command	`:TRIGger[:SEQuence]:FRAMe:SYNC EXTernal1|EXTernal2|RFBurst|OFF` `:TRIGger[:SEQuence]:FRAMe:SYNC?`
Example	TRIG:FRAM:SYNC EXT2
Dependencies	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a “Hardware missing; Not available for this model number” message.
Preset	Off GSM/EDGE: RFBurst
State Saved	Saved in instrument state

Readback	The current setting is read back to this key and it is also Readback to the previous **Periodic Timer** trigger key.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Off

Turns off the sync source for your periodic trigger. With the sync source off, the timing will drift unless the signal source frequency is locked to the analyzer frequency reference.

Key Path	**Trigger, Periodic Timer, Sync Source**
Example	TRIG:FRAM:SYNC OFF
Readback	Off
Initial S/W Revision	Prior to A.02.00

External 1

Pressing this key, when it is not selected, selects the external input port that you will use for the periodic trigger synchronization. Pressing this key, when it is already selected, accesses the external 1 sync source setup menu.

Key Path	**Trigger, Periodic Timer, Sync Source**
Example	TRIG:FRAM:SYNC EXT
Couplings	Same as External 1 trigger source.
Readback	External 1
Initial S/W Revision	Prior to A.02.00

Trigger Level

Sets the value where the signal at the external 1 trigger input will synchronize with the periodic timer trigger. This same level is used in the Ext1 trigger source in the Trigger menu. See section "Trigger Level " on page 1354 for information on this key and the SCPI command.

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge. This same value is used in the Ext1 trigger source in the Trigger menu. See section "Trig Slope " on page 1354 for information on this key and the SCPI command

External 2

Pressing this key, when it is not selected, selects the external input port that you will use for the periodic frame trigger synchronization.

Pressing this key, when it is already selected, accesses the external 2 sync source setup menu.

Key Path	**Trigger, Periodic Timer, Sync Source**

Example	TRIG:FRAM:SYNC EXT2
Dependencies	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a “Hardware missing; Not available for this model number” message.
Couplings	Same as External 2 trigger source.
Readback	External 2
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Trigger Level

Sets the value where the signal at the external 2 trigger input will synchronize with the periodic timer trigger. This same level is used in the Ext2 trigger source in the Trigger menu. See section “Trigger Level ” on page 1356 for information on this key and the SCPI command.

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge. This same value is used in the Ext2 trigger source in the Trigger menu. See section “Trig Slope ” on page 1357 for information on this key and the SCPI command

RF Burst

Pressing the key once selects the RF burst envelope signal to be used for the periodic timer trigger synchronization.

Press the key a second time to access the RF burst sync source setup menu.

Key Path	**Trigger, Periodic Timer, Sync Source**
Example	TRIG:FRAM:SYNC RFB
Couplings	Same as RF Burst trigger source.
Readback	RF Burst
Initial S/W Revision	Prior to A.02.00

Trigger Level

Sets the trigger level to be used for the RF Burst trigger. This same level is used in the RF Burst trigger source in the Trigger menu. See section “Absolute Trigger Level” on page 1359for information on this key and the SCPI command.

Trig Slope

Controls the RF Burst trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge. This same value is used in the RF Burst trigger source in the Trigger menu. See section “Trigger Slope ” on page 1361 for information on this key and the SCPI command

Trig Delay

This setting delays the measurement timing relative to the Periodic Timer.

<table>
<tr><td>Key Path</td><td>Trigger, Periodic Timer</td></tr>
<tr><td>Remote Command</td><td><code>:TRIGger[:SEQuence]:FRAMe:DELay <time></code>
<code>:TRIGger[:SEQuence]:FRAMe:DELay?</code>
<code>:TRIGger[:SEQuence]:FRAMe:DELay:STATe OFF|ON|0|1</code>
<code>:TRIGger[:SEQuence]:FRAMe:DELay:STATe?</code></td></tr>
<tr><td>Notes</td><td>Note that delay is used when the sync source is not set to OFF. If the sync source is set to OFF, offset is used.</td></tr>
<tr><td>Preset</td><td>Off, 1.000 us</td></tr>
<tr><td>State Saved</td><td>Saved in instrument state</td></tr>
<tr><td>Min</td><td>–150 ms</td></tr>
<tr><td>Max</td><td>+500 ms</td></tr>
<tr><td>Default Unit</td><td>s</td></tr>
<tr><td>Initial S/W Revision</td><td>Prior to A.02.00</td></tr>
</table>

Sync Holdoff

Sync Holdoff specifies the duration that the sync source signal must be kept false before the transition to true to be recognized as the sync timing. The periodic timer phase is aligned when the sync source signal becomes true, after the Holdoff time is satisfied.

A holdoff of 2 ms will work with most WiMAX signals, but there may be cases where the burst off duration is less than 1 ms and this value will need to be changed.

<table>
<tr><td>Key Path</td><td>Trigger, Periodic Timer</td></tr>
<tr><td>Remote Command</td><td><code>:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff <time></code>
<code>:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff?</code>
<code>:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff:STATe OFF|ON|0|1</code>
<code>:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff:STATe?</code></td></tr>
<tr><td>Preset</td><td>On, 1.000 ms</td></tr>
<tr><td>State Saved</td><td>Saved in instrument state</td></tr>
<tr><td>Min</td><td>0 ms</td></tr>
<tr><td>Max</td><td>+500 ms</td></tr>
<tr><td>Default Unit</td><td>s</td></tr>
<tr><td>Initial S/W Revision</td><td>Prior to A.02.00</td></tr>
</table>

Baseband I/Q

Pressing this key when it is not selected selects Baseband I/Q as the trigger. Pressing the key when it is already selected accesses the Baseband I/Q trigger type selection menu. The key is annotated to display which of the Baseband I/Q trigger types is currently selected.

Key Path	**Trigger**
State Saved	Saved in instrument state
Readback	The Baseband I/Q trigger source that becomes active when this key is selected is displayed. The possible values are "I/Q Mag", "I", "Q", "Input I", "Input Q", and "Aux I/Q Mag".
Initial S/W Revision	Prior to A.02.00

I/Q Mag

Pressing this key, when it is not selected, selects the I/Q magnitude signal as the trigger. The I/Q Magnitude trigger condition is met when the I/Q magnitude crosses the I/Q magnitude trigger level. The magnitude is measured at the output of the main I/Q digital receiver.

Key Path	**Trigger, Baseband I/Q**
Example	TRIG:<meas>:SOUR IQM
Readback Text	I/Q Mag
Initial S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the I/Q magnitude trigger. When the signal crosses this level, with the chosen slope, the trigger occurs. If the specific Measurement displays the signal from the chosen sampling point a green line will be displayed to indicate the trigger level.

Key Path	**Trigger, Baseband I/Q, I/Q Mag**
Remote Command	`:TRIGger[:SEQuence]:IQMag:LEVel <ampl >` `:TRIGger[:SEQuence]:IQMag:LEVel?`
Example	TRIG:IQM:LEV –30 dBm
Notes	The I/Q reference impedance is used for converting between power and voltage.
Preset	–25 dBm
State Saved	Saved in instrument state
Range	–200 dBm to 100 dBm
Readback Text	<level> dBm
Initial S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	**Trigger, Baseband I/Q, I/Q Mag**
Remote Command	`:TRIGger[:SEQuence]:IQMag:SLOPe POSitive | NEGative` `:TRIGger[:SEQuence]:IQMag:SLOPe?`
Example	TRIG:IQM:SLOP POS
Preset	POSitive
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Key Path	**Trigger, Baseband I/Q, I/Q Mag**

Remote Command	`:TRIGger[:SEQuence]:IQMag:DELay <time>`
	`:TRIGger[:SEQuence]:IQMag:DELay?`
	`:TRIGger[:SEQuence]:IQMag:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:IQMag:DELay:STATe?`

Example	TRIG:IQM:DEL 10 ms TRIG:IQM:DEL:STAT ON
Preset	1 us OFF
State Saved	Saved in instrument state
Range	–2.5 s to +10 s
Initial S/W Revision	Prior to A.02.00

I (Demodulated)

Pressing this key, when it is not selected, selects the main receiver's output I voltage as the trigger. The I (Demodulated) trigger condition is met when the I voltage crosses the I voltage trigger level.

Key Path	**Trigger, Baseband I/Q**
Example	TRIG:<meas>:SOUR IDEM
Readback Text	I

Initial S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the I (Demodulated) trigger. When the signal crosses this level, with the chosen slope, the trigger occurs. If the specific Measurement displays the signal from the chosen sampling point a green line will be displayed to indicate the trigger level.

Key Path	**Trigger, Baseband I/Q, I (Demodulated)**
Remote Command	`:TRIGger[:SEQuence]:IDEMod:LEVel <voltage>` `:TRIGger[:SEQuence]:IDEMod:LEVel?`
Example	TRIG:IDEM:LEV 0.5 V
Preset	0.25 V
State Saved	Saved in instrument state
Range	–1 to 1 V
Readback Text	0.1 of displayed unit (V, mV, etc.)
Initial S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	**Trigger, Baseband I/Q, I (Demodulated)**
Remote Command	`:TRIGger[:SEQuence]:IDEMod:SLOPe POSitive | NEGative` `:TRIGger[:SEQuence]:IDEMod:SLOPe?`
Example	TRIG:IDEM:SLOP POS
Preset	POSitive
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Key Path	**Trigger, Baseband I/Q, I (Demodulated)**

Remote Command	`:TRIGger[:SEQuence]:IDEMod:DELay <time>`
	`:TRIGger[:SEQuence]:IDEMod:DELay?`
	`:TRIGger[:SEQuence]:IDEMod:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:IDEMod:DELay:STATe?`

Example	TRIG:IDEM:DEL 10 ms TRIG:IDEM:DEL:STAT ON
Preset	1 us OFF
State Saved	Saved in instrument state
Range	–2.5 s to +10 s
Initial S/W Revision	Prior to A.02.00

Q (Demodulated)

Pressing this key, when it is not selected, selects the main receiver's output Q voltage as the trigger. The Q (Demodulated) trigger condition is met when the Q voltage crosses the Q voltage trigger level.

Key Path	**Trigger, Baseband I/Q**
Example	TRIG:<meas>:SOUR QDEM
Readback Text	Q
Initial S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the Q (Demodulated) trigger. When the signal crosses this level, with the chosen slope, the trigger occurs. If the specific Measurement displays the signal from the chosen sampling point a green line will be displayed to indicate the trigger level.

Key Path	**Trigger, Baseband I/Q, Q (Demodulated)**
Remote Command	`:TRIGger[:SEQuence]:QDEMod:LEVel <voltage>` `:TRIGger[:SEQuence]:QDEMod:LEVel?`
Example	TRIG:QDEM:LEV 0.5 V
Preset	0.25 V
State Saved	Saved in instrument state
Range	–1 to 1 V
Readback Text	0.1 of displayed unit (V, mV, etc.)
Initial S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	**Trigger, Baseband I/Q, Q (Demodulated)**
Remote Command	`:TRIGger[:SEQuence]:QDEMod:SLOPe POSitive | NEGative` `:TRIGger[:SEQuence]:QDEMod:SLOPe?`
Example	TRIG:QDEM:SLOP POS
Preset	POSitive
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Key Path	**Trigger, Baseband I/Q, Q (Demodulated)**

Remote Command	`:TRIGger[:SEQuence]:QDEMod:DELay <time>`
	`:TRIGger[:SEQuence]:QDEMod:DELay?`
	`:TRIGger[:SEQuence]:QDEMod:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:QDEMod:DELay:STATe?`

Example	TRIG:QDEM:DEL 10 ms TRIG:QDEM:DEL:STAT ON
Preset	1 us OFF
State Saved	Saved in instrument state
Range	–2.5 s to +10 s
Initial S/W Revision	Prior to A.02.00

Input I

Pressing this key, when it is not selected, selects the I channel's ADC voltage as the trigger. The Input I trigger condition is met when the voltage crosses the trigger level.

Key Path	**Trigger, Baseband I/Q**
Example	TRIG:<meas>:SOUR IINP
Readback Text	Input I

Initial S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the Input I trigger. When the signal crosses this level, with the chosen slope, the trigger occurs.

Key Path	**Trigger, Baseband I/Q, Input I**
Remote Command	`:TRIGger[:SEQuence]:IINPut:LEVel <voltage>` `:TRIGger[:SEQuence]:IINPut:LEVel?`
Example	TRIG:IINP:LEV 0.5 V
Preset	0.25 V
State Saved	Saved in instrument state
Range	–1 to 1 V
Readback Text	0.1 of displayed unit (V, mV, etc.)
Initial S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	**Trigger, Baseband I/Q, Input I**
Remote Command	`:TRIGger[:SEQuence]:IINPut:SLOPe POSitive | NEGative` `:TRIGger[:SEQuence]:IINPut:SLOPe?`
Example	TRIG:IINP:SLOP POS
Preset	POSitive
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Key Path	**Trigger, Baseband I/Q, Input I**

Remote Command	`:TRIGger[:SEQuence]:IINPut:DELay <time>`
	`:TRIGger[:SEQuence]:IINPut:DELay?`
	`:TRIGger[:SEQuence]:IINPut:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:IINPut:DELay:STATe?`

Example	TRIG:IINP:DEL 10 ms TRIG:IINP:DEL:STAT ON
Preset	1 us OFF
State Saved	Saved in instrument state
Range	–2.5 s to +10 s
Initial S/W Revision	Prior to A.02.00

Input Q

Pressing this key, when it is not selected, selects the Q channel's ADC voltage as the trigger. The Input Q trigger condition is met when the voltage crosses the trigger level.

Key Path	**Trigger, Baseband I/Q**
Example	TRIG:<meas>:SOUR QINP
Readback Text	Input Q
Initial S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the Input Q trigger. When the signal crosses this level, with the chosen slope, the trigger occurs.

Key Path	**Trigger, Baseband I/Q, Input Q**
Remote Command	`:TRIGger[:SEQuence]:QINPut:LEVel <voltage>` `:TRIGger[:SEQuence]:QINPut:LEVel?`
Example	TRIG:QINP:LEV 0.5 V
Preset	0.25 V
State Saved	Saved in instrument state
Range	–1 to 1 V
Readback Text	0.1 of displayed unit (V, mV, etc.)
Initial S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	**Trigger, Baseband I/Q, Input Q**

Remote Command	`:TRIGger[:SEQuence]:QINPut:SLOPe POSitive | NEGative` `:TRIGger[:SEQuence]:QINPut:SLOPe?`
Example	TRIG:QINP:SLOP POS
Preset	POSitive
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Key Path	**Trigger, Baseband I/Q, Input Q**

Remote Command	`:TRIGger[:SEQuence]:QINPut:DELay <time>`
	`:TRIGger[:SEQuence]:QINPut:DELay?`
	`:TRIGger[:SEQuence]:QINPut:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:QINPut:DELay:STATe?`

Example	TRIG:QINP:DEL 10 ms TRIG:QINP:DEL:STAT ON
Preset	1 us OFF
State Saved	Saved in instrument state
Range	–2.5 s to +10 s
Initial S/W Revision	Prior to A.02.00

Auxiliary Channel I/Q Mag

Pressing this key, when it is not selected, selects the Auxiliary Channel I/Q magnitude signal as the trigger. The Auxiliary Channel I/Q Magnitude trigger condition is met when the auxiliary receiver's I/Q magnitude output crosses the Auxiliary I/Q magnitude trigger level.

Key Path	**Trigger, Baseband I/Q**
Example	TRIG:<meas>:SOUR AIQM
Readback Text	Aux I/Q Mag
Initial S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the I/Q magnitude trigger. When the signal crosses this level, with the chosen slope, the trigger occurs.

Key Path	**Trigger, Baseband I/Q, Aux Channel I/Q Mag**
Remote Command	`:TRIGger[:SEQuence]:AIQMag:LEVel <ampl >` `:TRIGger[:SEQuence]:AIQMag:LEVel?`
Example	TRIG:AIQM:LEV –30 dBm
Notes	The I/Q reference impedance is used for converting between power and voltage.
Preset	–25 dBm
State Saved	Saved in instrument state
Range	–200 dBm to 100 dBm
Readback Text	<level> dBm
Initial S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	**Trigger, Baseband I/Q, Aux Channel I/Q Mag**
Remote Command	`:TRIGger[:SEQuence]:AIQMag:SLOPe POSitive | NEGative` `:TRIGger[:SEQuence]:AIQMag:SLOPe?`
Example	TRIG:AIQM:SLOP POS
Preset	POSitive
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Key Path	**Trigger, Baseband I/Q, Aux Channel I/Q Mag**

Remote Command	`:TRIGger[:SEQuence]:AIQMag:DELay <time>`
	`:TRIGger[:SEQuence]:AIQMag:DELay?`
	`:TRIGger[:SEQuence]:AIQMag:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:AIQMag:DELay:STATe?`

Example	TRIG:AIQM:DEL 10 ms TRIG:AIQM:DEL:STAT ON
Preset	1 us OFF
State Saved	Saved in instrument state
Range	–2.5 s to +10 s
Initial S/W Revision	Prior to A.02.00

Trigger Center Frequency

This key sets the center frequency to be used by the auxiliary receiver.

Key Path	**Trigger, Baseband I/Q, Aux Channel I/Q Mag**
Remote Command	`:TRIGger[:SEQuence]:AIQMag:CENTer <freq>` `:TRIGger[:SEQuence]:AIQMag:CENTer?`
Example	:TRIG:AIQM:CENT 10 MHz
Notes	Trigger CF + 1/2 Trigger BW < Max Trigger CF – 1/2 Trigger BW > Min
Preset	0 Hz
State Saved	Saved in instrument state
Range	–40 MHz to 40 MHz
Initial S/W Revision	Prior to A.02.00

Trigger Bandwidth

This key sets the information bandwidth used by the auxiliary receiver for the Auxiliary Channel I/Q Magnitude trigger.

Key Path	**Trigger, Baseband I/Q, Aux Channel I/Q Mag**
Remote Command	`:TRIGger[:SEQuence]:AIQMag:BANDwidth <freq>` `:TRIGger[:SEQuence]:AIQMag:BANDwidth?`
Example	:TRIG:AIQM:BAND 8 MHz

Notes	The combined sample rate for the main and auxiliary receivers cannot exceed 100 MSa/sec. The bandwidth available to the Trigger BW is limited to what is available after the main receiver's bandwidth (Info BW, sometimes pre-FFT BW) is set. Because of this limitation, the Max is not always achievable. The combination of Trigger Center Freq and Trigger BW is also limited: Trigger CF + 1/2 Trigger BW < Max Trigger CF – 1/2 Trigger BW > Min
Preset	Bandwidth option dependent: No Opt: 10 MHz Opt B25: 25 MHz Opt S40: 40 MHz
State Saved	Saved in instrument state
Range	10 Hz to Maximum
Initial S/W Revision	Prior to A.02.00

Auto/Holdoff

Opens up a menu that lets you adjust Auto Trigger and Trigger Holdoff parameters

Key Path	**Trigger**
Readback line	Displays a summary of the Auto Trig and Holdoff settings, in square brackets First line: Auto Off or Auto On Second Line: “Hldf” followed by: • If Holdoff is Off, readback Off • If Holdoff On and Type = Normal, readback value • If Holdoff On and Type = Above, readback value followed by AL • If Holdoff On and Type = Below, readback value followed by BL • If Holdoff Type selection is not supported by the current measurement, Holdoff Type is always Normal
Initial S/W Revision	A.02.00

Auto Trig

Sets the time that the analyzer will wait for the trigger conditions to be met. If they are not met after that much time, then the analyzer is triggered anyway.

Key Path	**Trigger, Auto/Holdoff**

Remote Command	`:TRIGger[:SEQuence]:ATRigger <time>`
	`:TRIGger[:SEQuence]:ATRigger?`
	`:TRIGger[:SEQuence]:ATRigger:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:ATRigger:STATe?`

Example	TRIG:ATR:STAT ON TRIG:ATR 100 ms
Notes	The "time that the analyzer will wait" starts when the analyzer is ready for a trigger, which may be hundreds of ms after the data acquisition for a sweep is done. The "time" ends when the trigger condition is satisfied, not when the delay ends.
Preset	Off, 100 ms
State Saved	Saved in instrument state
Min	1 ms
Max	100 s
Default Unit	s
Initial S/W Revision	Prior to A.02.00

Trig Holdoff

Sets the holdoff time between triggers. When the trigger condition is satisfied, the trigger occurs, the delay begins, and the holdoff time begins. New trigger conditions will be ignored until the holdoff time expires. For a free-running trigger, the holdoff value is the minimum time between triggers.

Key Path	**Trigger, Auto/Holdoff**

Remote Command	`:TRIGger[:SEQuence]:HOLDoff <time>`
	`:TRIGger[:SEQuence]:HOLDoff?`
	`:TRIGger[:SEQuence]:HOLDoff:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:HOLDoff:STATe?`

Example	TRIG:HOLD:STAT ON TRIG:HOLD 100 ms
Preset	Off, 100 ms
State Saved	Saved in instrument state
Min	0 s
Max	0.5 s
Default Unit	s
Initial S/W Revision	Prior to A.02.00

Holdoff Type

Lets you set the Trigger Holdoff Type.

NOTE	Holdoff Type is not supported by all measurements. If the current measurement does not support it, this key will be blank and the Holdoff Type will be Normal. If the Holdoff Type SCPI is sent while in such a measurement, the SCPI will be accepted and the setting remembered, but it will have no effect until a measurement is in force that supports Holdoff Type.

Trigger Holdoff Type functionality:

- NORMal
  This is the "oscilloscope" type of trigger holdoff, and is the setting when the Holdoff Type key does not appear. In this type of holdoff, no new trigger will be accepted until the holdoff interval has expired after the previous trigger.
- ABOVe
  If the trigger slope is positive, a trigger event is generated only if the signal characteristic of interest crosses the trigger threshold (with positive slope) and then remains above the threshold for at least the holdoff time. For negative slope, the trigger event is generated if the signal characteristic crosses the threshold (with negative slope) after having been above the threshold for at least the holdoff time. In either case, the trigger event is associated with the time the level was crossed.
- BELow
  If the trigger slope is positive, a trigger event is generated only if the signal characteristic of interest crosses the trigger threshold (with positive slope) after having been below the threshold for at least the holdoff time. For negative slope, the trigger event is generated if the signal characteristic crosses the threshold (with negative slope) and then remains below the threshold for at least the holdoff time. In either case, the trigger event is associated with the time the level was crossed.

Key Path	**Trigger, Auto/Holdoff**
Remote Command	`:TRIGger[:SEQuence]:HOLDoff:TYPE NORMal|ABOVe|BELow` `:TRIGger[:SEQuence]:HOLDoff:TYPE?`
Example	TRIG:HOLD:TYPE NORM
Preset	All modes but GSM/EDGE: Normal GSM/EDGE: Below
State Saved	Saved in instrument state
Initial S/W Revision	A.02.00

Trigger Offset (Remote Command Only)

ESA Backwards Compatibility command

Remote Command	:TRIGger[:SEQuence]:OFFSet <time> :TRIGger[:SEQuence]:OFFSet? :TRIGger[:SEQuence]:OFFSet:STATe OFF|ON|0|1 :TRIGger[:SEQuence]:OFFSet:STATe?
Example	TRIG:OFFS ON TRIG:OFFS –100 ms
Notes	These are ESA commands for trigger offset that allowed you to use a positive or negative delay when in zero span and in a Res BW >= 1 kHz. For ESA compatibility, X-series analyzers keep track of this offset and add it to the Trigger Delay for line, video or external whenever the value is sent to the hardware, if in Zero Span and RBW >= 1 kHz.
Preset	Off, 0 s
State Saved	Saved in instrument state
Min	–11 s
Max	+11 s
Initial S/W Revision	Prior to A.02.00

View/Display

The View/Display key opens up the Display Menu (common to most measurments) and the View menu for the current measurement.

Some measurements have simple View menus, or even no View menu, others provide many different Views.

Views are different ways of looking at data, usually different ways of looking at the same data, especially when the data represents a time record that is being digitally processed with an FFT and/or other digital signal processing algorithms.

Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Display

The **Display** menu is common to most measurements, and is used for configuring items on the display. Some **Display** menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

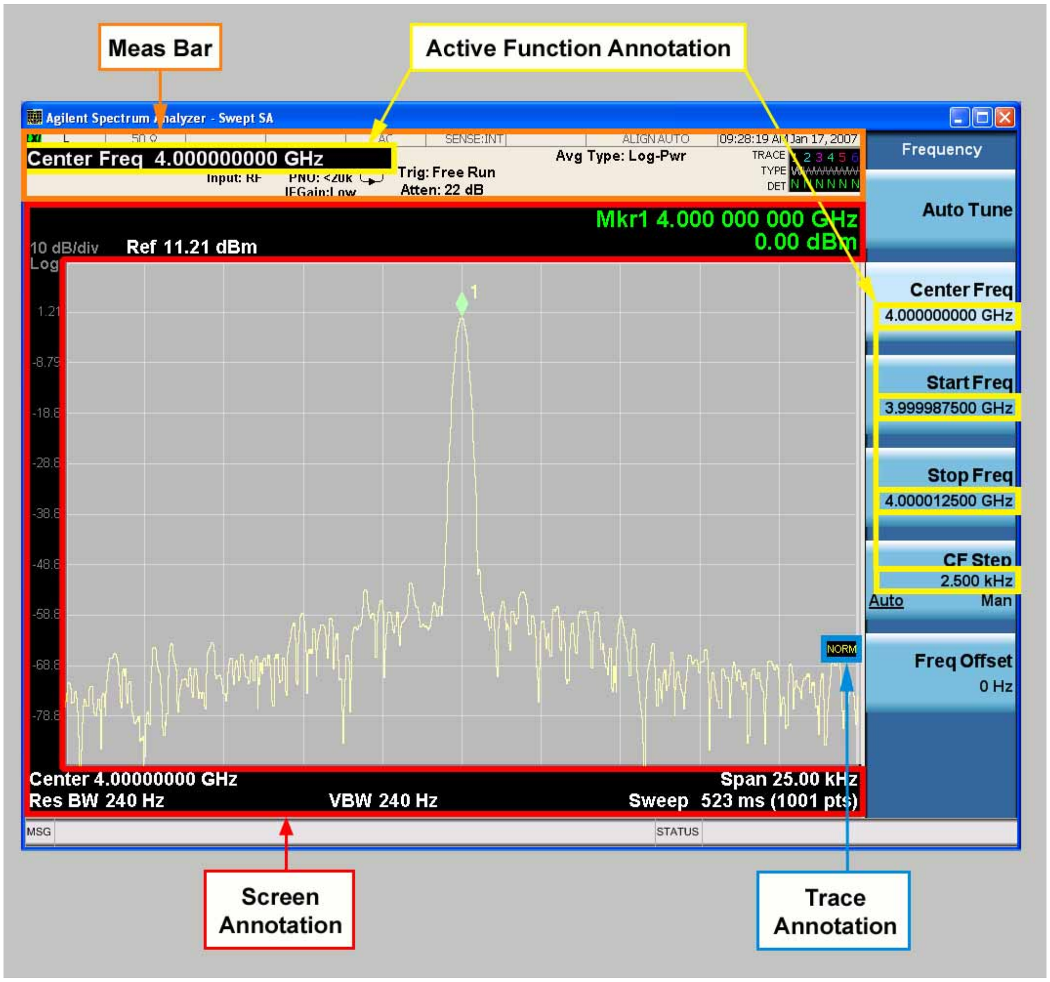
Key Path	**Display**
Key Path	**Front-panel key**
Initial S/W Revision	Prior to A.02.00

Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



Key Path	**View/Display, Display**
Initial S/W Revision	Prior to A.02.00

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

Key Path	**View/Display, Display, Annotation**
Remote Command	`:DISPlay:ANNotation:MBAR[:STATe] OFF|ON|0|1` `:DISPlay:ANNotation:MBAR[:STATe]?`
Example	DISP:ANN:MBAR OFF
Dependencies	Grayed out and forced to OFF when **System Display Settings**, **Annotation** is set to Off.

Preset	On This should remain Off through a Preset when **System Display Settings**, **Annotation** is set to Off.
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Screen

This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

Key Path	**View/Display, Display, Annotation**
Remote Command	`:DISPlay:ANNotation:SCReen[:STATe] OFF|ON|0|1` `:DISPlay:ANNotation:SCReen[:STATe]?`
Example	DISP:ANN:SCR OFF
Dependencies	Grayed out and forced to OFF when **System Display Settings**, **Annotation** is set to Off.
Preset	On This should remain Off through a Preset when **System Display Settings**, **Annotation** is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Trace

Turns on and off the labels on the traces, showing their detector (or their math mode) as described in the Trace/Detector section.

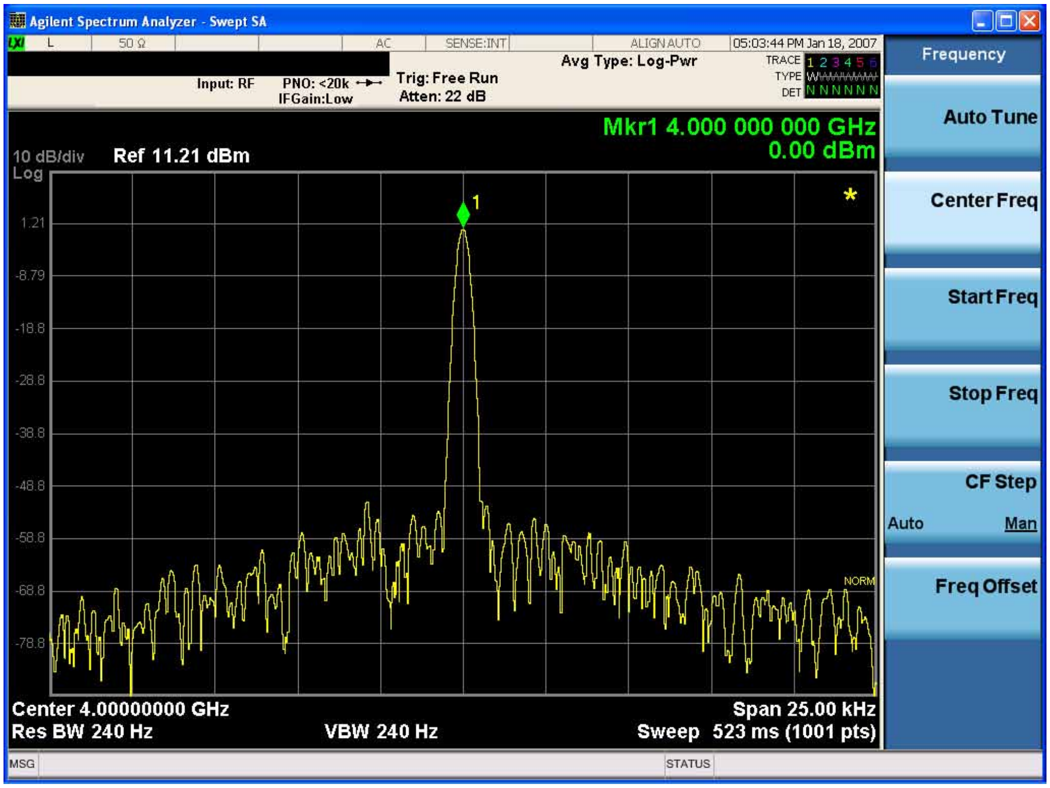
If trace math is being performed with a trace, then the trace math annotation will replace the detector annotation.

Key Path	**View/Display, Display, Annotation**
Remote Command	`:DISPlay:ANNotation:TRACe[:STATe] ON|OFF|1|0` `:DISPlay:ANNotation:TRACe[:STATe]?`
Example	DISP:ANN:TRAC OFF
Preset	Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature.



Key Path	**View/Display, Display, Annotation**
Remote Command	`:DISPlay:ACTivefunc[:STATe] ON|OFF|1|0` `:DISPlay:ACTivefunc[:STATe]?`
Example	DISP:ACT OFF
Dependencies	Grayed out and forced to OFF when **System Display Settings**, **Annotation** is set to Off.
Preset	On This should remain Off through a Preset when **System Display Settings**, **Annotation** is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Title

Displays menu keys that enable you to change or clear a title on your display.

Key Path	**View/Display, Display**
Initial S/W Revision	Prior to A.02.00

Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title**, **Clear Title**.

NOTE Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

Key Path	**View/Display, Display, Title**
Mode	All
Remote Command	`:DISPlay:<measurement>:ANNotation:TITLe:DATA <string>` `:DISPlay:<measurement>:ANNotation:TITLe:DATA?`
Example	DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title
Notes	Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters.
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

Key Path	**View/Display, Display, Title**
Example	DISP:ANN:TITL:DATA "" clears any existing title characters.
Notes	Use the :DISPlay:ANNotation:TITLe:DATA <string> command with an empty string.
Preset	Performed on Preset.
Initial S/W Revision	Prior to A.02.00

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

Key Path	**View/Display, Display**
Remote Command	`:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF|ON|0|1` `:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe?`
Example	DISP:WIND:TRAC:GRAT:GRID OFF
Notes	The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis.
Preset	On
State Saved	saved in instrument state
Initial S/W Revision	Prior to A.02.00

Display Line

Activates an adjustable horizontal line that is used as a visual reference line. The line's vertical position corresponds to its amplitude value. The value of the display line (for example, "–20.3 dBm") appears above the line itself on the right side of the display in the appropriate font.

The display line can be adjusted using the step keys, knob, or numeric keypad. The unit of the Display Line is determined by the **Y axis unit** setting under **Amplitude**. If more than one window has a display line, the display line of the selected window is controlled.

If the display line is off the screen, it shows as a line at the top/bottom of the screen with an arrow pointing up or down. As with all such lines (Pk Thresh, Trigger Level, etc.) it is drawn on top of all traces.

The display line is unaffected by Auto Couple.

Key Path	**View/Display, Display**

Remote Command	`:DISPlay:WINDow[1]:TRACe:Y:DLINe <ampl>`
	`:DISPlay:WINDow[1]:TRACe:Y:DLINe?`
	`:DISPlay:WINDow[1]:TRACe:Y:DLINe:STATe OFF|ON|0|1`
	`:DISPlay:WINDow[1]:TRACe:Y:DLINe:STATe?`

Example	DISP:WIND:TRAC:Y:DLIN:STAT ON DISP:WIND:TRAC:Y:DLIN:STAT –32 dBm
Preset	Set the Display Line to Off and –25 dBm on Preset. When the Display Line goes from Off to On, if it is off screen, set it to either the top or bottom of screen, depending on which direction off screen it was. The Display Line's value does not change when it is turned off.
State Saved	Saved in instrument state.
Min	–∞ (minus infinity) in current units
Max	+∞ (plus infinity) in current units
Initial S/W Revision	Prior to A.02.00
Default Unit	Depends on the current selected Y axis unit

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

Key Path	**View/Display, Display**
Initial S/W Revision	Prior to A.02.00

Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **Screen Annotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is **All Off,** the **Screen, Meas Bar, Trace,** and **Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

Key Path	**View/Display, Display, System Display Settings**
Remote Command	`:DISPlay:WINDow[1]:ANNotation[:ALL] OFF|ON|0|1` `:DISPlay:WINDow[1]:ANNotation[:ALL]?`
Example	:DISP:WIND:ANN OFF
Preset	On (Set by Restore Misc Defaults)

State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Theme

This key allows you to change the Display theme. This is similar to the Themes selection under Page Setup and Save Screen Image. The four themes are detailed below.

Key Path	**View/Display, Display, System Display Settings**
Remote Command	`:DISPlay:THEMe TDColor|TDMonochrome|FCOLor|FMONochrome` `:DISPlay:THEMe?`
Example	DISP:THEM TDM sets the display theme to 3D Monochrome.
Notes	TDColor – 3D is the standard color theme with filling and shading TDMonochrome – is similar to 3D color, but only black is used FCOLor – flat color is intended for inkjet printers to conserve ink. It uses a white background instead of black. FMONochrome – is like flat color, but only black is used
Preset	TDColor (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Backlight

Accesses the display backlight on/off keys. This setting may interact with settings under the Windows "Power" menu.

When the backlight is off, pressing ESC, TAB, SPACE, ENTER, UP, DOWN, LEFT, RIGHT, DEL, BKSP, CTRL, or ALT turns the backlight on without affecting the application. Pressing any other key will turn backlight on and could potentially perform the action as well.

Key Path	**View/Display, Display, System Display Settings**
Remote Command	`:DISPlay:BACKlight ON|OFF` `:DISPlay:BACKlight?`
Preset	ON (Set by Restore Misc Defaults)
Initial S/W Revision	Prior to A.02.00

On

Turns the display backlight on.

Key Path	**View/Display, Display, System Display Settings, Backlight**
Example	DISP:BACK ON

Readback	On
Initial S/W Revision	Prior to A.02.00

Off

Turns the display backlight off.

Key Path	**View/Display, Display, System Display Settings, Backlight**
Example	DISP:BACK OFF
Readback	Off
Initial S/W Revision	Prior to A.02.00

Backlight Intensity

An active function used to set the backlight intensity. It goes from 0 to 100 where 100 is full on and 0 is off. This value is independent of the values set under the Backlight on/off key.

Key Path	**View/Display, Display, System Display Settings**
Remote Command	`:DISPlay:BACKlight:INTensity <integer>` `:DISPlay:BACKlight:INTensity?`
Example	DISP:BACK:INT 50
Preset	100 (Set by Restore Misc Defaults)
Min	0
Max	100
Initial S/W Revision	Prior to A.02.00

Full Screen

When **Full Screen** is pressed the measurement window expands horizontally over the entire instrument display. The screen graticule area expands to fill the available display area.

It turns off the display of the softkey labels, however the menus and active functions still work. (Though it would obviously be very hard to navigate without the key labels displayed.) Pressing **Full Screen** again while Full Screen is in effect cancels Full Screen.

Note that the banner and status lines are unaffected. You can get even more screen area for your data display by turning off the Meas Bar (in the Display menu) which also turns off the settings panel.

Full Screen is a Meas Global function. Therefore it is cancelled by the **Preset** key.

Key Path	**Display**
Remote Command	`:DISPlay:FSCReen[:STATe] OFF|ON|0|1` `:DISPlay:FSCReen[:STATe]?`

Preset	Off
State Saved	Not saved in instrument state.
Backwards Compatibility SCPI	:DISPlay:MENU[:STATe] OFF|ON|0|1
Backwards Compatibility SCPI	DISPlay:MENU[:STATe] emulates ESA full screen functionality, which is the same as the FSCReen command in PSA except that the sense of on/off is reversed (that is, OFF means the menus are OFF) and the default is ON.
Initial S/W Revision	Prior to A.02.00

Display Enable (Remote Command Only)

Turns the display on/off, including the display drive circuitry. The backlight stays lit so you can tell that the instrument is on. The display enable setting is mode global.The reasons for turning the display off are three:

- To increase speed as much as possible by freeing the instrument from having to update the display
- To reduce emissions from the display, drive circuitry
- For security purposes

If you have turned off the display:

- and you are in local operation, the display can be turned back on by pressing any key or by sending the SYSTem:DEFaults MISC command or the DISPlay:ENABle ON (neither *RST nor SYSTem:PRESet enable the display.)
- and you are in remote operation, the display can be turned back on by pressing the **Local** or **Esc** keys or by sending the SYSTem:DEFaults MISC command or the DISPlay:ENABle ON (neither *RST nor SYSTem:PRESet enable the display.)

and you are using either the SYSTem:KLOCk command or GPIB local lockout, then no front-panel key press will turn the display back on. You must turn it back on remotely.

Remote Command	`:DISPlay:ENABle OFF|ON|0|1` `:DISPlay:ENABle?`
Example	DISP:ENAB OFF
Couplings	DISP:ENAB OFF turns Backlight OFF and DISP:ENAB ON turns Backlight ON. However, settings of Backlight do not change the state of DISP:ENAB
Preset	On Set by SYST:DEF MISC, but Not affected by *RST or SYSTem:PRESet.
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00