User's Guide

Agilent Technologies
ESA-E Series Spectrum Analyzers
cdmaOne Measurement Personality

This manual provides documentation for the following instruments:

ESA-E Series

E4402B (9 kHz - 3.0 GHz)
E4404B (9 kHz - 6.7 GHz)
E4405B (9 kHz - 13.2 GHz)
E4407B (9 kHz - 26.5 GHz)

Manufacturing Part Number: E4402-90006
Printed in USA
August 2000

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Safety Information

The following safety notes are used throughout this manual. Familiarize yourself with these notes before operating this instrument.

WARNING **Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.**

CAUTION Caution denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.

WARNING **This is a Safety Class 1 Product (provided with a protective earth ground incorporated in the power cord). The mains plug shall be inserted only in a socket outlet provided with a protected earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.**

WARNING **No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.**

CAUTION Always use the three-prong AC power cord supplied with this product. Failure to ensure adequate grounding may cause product damage.

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1 Understanding cdmaOne

This chapter introduces you to basics of cdmaOne technology and the general functionality of the ESA with the cdmaOne measurement personality installed. Sources for additional information on digital communications are also listed.

cdmaOne Standards

The cdmaOne communication system personality is defined in the following Electronics Industry Association (EIA), Telecommunications Industry Association (TIA), American National Standards Institute (ANSI), Association of Radio Industries and Businesses (ARIB) (Japan), and Korean standards documents:

IS-95-A:

TIA/EIA-IS-95-A	Mobile Station-Base Station Compatibility Standard for Dual-Mode Wideband Spread Spectrum Cellular System. May 1995
TIA/EIA-IS-97-A	Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations. July 1996
TIA/EIA-IS-98-A	Recommended Minimum Performance Standards for Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations. July 1996

TIA/EIA-95-B Cell and TIA/EIA-95-B PCS:

TIA/EIA-95-B	Mobile Station-Base Station Compatibility Standard for Dual-Mode Spread Spectrum Systems. (SP-3693-1) July 17, 1998
TIA/EIA-97-B	Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Spread Spectrum Cellular Mobile Stations. August 1998
TIA/EIA-98-B	Recommended Minimum Performance Standards for Dual-Mode Spread Spectrum Cellular Mobile Stations. August 1998

95-C Cell and 95-C PCS:

TIA/EIA-95-B	Mobile Station-Base Station Compatibility Standard for Dual-Mode Spread Spectrum Systems. (SP-3693-1) July 17, 1998
TIA/EIA-97-C	Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Spread Spectrum Mobile Stations. (SP-4384) Ballot Version: Nov. 20, 1998
TIA/EIA-98-C	Recommended Minimum Performance Standards for Dual-Mode Spread Spectrum Mobile Stations. (SP-4383) Ballot Version: March. 19, 1999

ANSI JSTD-008:

ANSI J-STD-008	Personal Station-Base Station Compatibility Requirements for 1.8 to 2.0 GHz Code Division Multiple Access (CDMA) Personal Communications Systems. August 29, 1995.
ANSI J-STD-018	Recommended Minimum Performance Requirements for 1.8 to 2.0 GHz Code Division Multiple Access (CDMA) Personal Stations. (SP-3385) January 16, 1996
ANSI J-STD-019	Recommended Minimum Performance Requirements for Base Stations Supporting 1.8 to 2.0 GHz Code Division Multiple Access (CDMA) Personal Stations. (SP-3383) January 12, 1996

Korea Cell

TTA.KO-06.0003	Air Interface for CDMA Cellular System in the band 800 MHz. Edition 1.0 July 3, 1997.

Korea PCS

TTA.KO-06.0013	Air Interface between Personal Station and Base Station for 1.7 GHz to 1.9 GHz CDMA PCS System. Edition 1.0 July 30, 1997.

ARIB-T53 (Japan Cell)

ARIB STD-T53 Ver. 1.2	CDMA Cellular System Part I. Mobile Station-Base Station Compatibility Standard. January 1998.
ARIB STD-T53 Ver. 1.2	CDMA Cellular System Part II. Minimum Performance Standard for Base Stations. January 1998.
ARIB STD-T53 Ver. 1.2	CDMA Cellular System Part III. Minimum Performance Standard for Mobile Stations. January 1998.

Tuning Plan Channel and Band Parameters

The cdmaOne standards use various tuning plans. The channel and frequency parameters of the various tuning plans are shown in the following table. To look at the entire frequency range for a standard and tuning plan, block can be set to “Full”. For example, Block = Full for J-STD-008 would tune the analyzer from Block A 1930 MHZ (lower edge) to Block C 1990 MHz (upper edge).

Table 1-1 Tuning Plan Channel and Band Parameters

Standard and Tuning Plan	Block ID	BS Band Frequency Range (MHz)	Channel Range	BS First Channel CF (MHz)	BS Last Channel CF (MHz)	Channel Spacing (MHz)	Duplex Offset (MHz)
IS-95-A TIA/EIA-95-B Cell 95-C Cell TTA.KO-06.0003 (Korea Cell)	A	870.015 - 880.005	1 - 333	870.030	879.990	0.03	–45
	B	880.005 - 889.995	334 - 666	880.020	889.980	0.03	–45
	A’	889.995 - 891.495	667 - 716	890.010	891.480	0.03	–45
	B’	891.495 - 893.985	717 - 799	891.510	893.970	0.03	–45
	A”	869.025 - 870.015	991 - 1023	869.040	870.000	0.03	–45
ANSI J-STD-008 TIA/EIA-95-B PCS 95-C PCS	A	1930.000 - 1945.000	0 - 299	1930.000	1944.950	0.050	–80.0
	D	1945.000 - 1950.000	300 - 399	1945.000	1949.950	0.050	–80.0
	B	1950.000 - 1965.000	400 - 699	1950.000	1964.950	0.050	–80.0
	E	1965.000 - 1970.000	700 - 799	1965.000	1969.950	0.050	–80.0
	F	1970.000 - 1975.000	800 - 899	1970.000	1974.950	0.050	–80.0
	C	1975.000 - 1990.000	900 - 1199	1975.000	1989.950	0.050	–80.0
ARIB-T53	A	860.000 - 870.000	1 - 799	860.0125	869.9875	0.0125	55.0
	B	843.000 - 846.000	801 - 1039	843.0125	845.9875	0.0125	55.0
	C	832.000 - 834.000	1041 - 1199	832.0125	833.9875	0.0125	55.0
TTA.KO-06.0013 (Korea PCS)	A	1840.000 - 1850.000	0 - 199	1840.000	1849.950	0.050	–90.0
	B	1850.000 - 1860.000	200 - 399	1850.000	1859.950	0.050	–90.0
	C	1860.000 - 1870.000	400 - 599	1860.000	1869.950	0.050	–90.0

What Does the cdmaOne Measurement Personality and Hardware Do?

The Agilent ESA-E Series Spectrum Analyzer with cdmaOne measurement personality and hardware can help determine if a cdmaOne transmitter is working correctly. When configured for cdmaOne, you can use the instrument to test a cdmaOne transmitter, according to a variety of industry standards. These documents define complex, multi-part measurements used to maintain an interference-free environment. For example, the documents include methods for measuring the power in a channel. Refer to "cdmaOne Standards" on page 1-2, for more information on the standards supported by the measurement personality.

When you select a standard format, the ESA-E Series Spectrum Analyzer is configured for one-button measurements based on the measurement methods and limits defined in the standards. The instrument displays detailed results of the measurements allowing you to analyze cdmaOne base station system transmitter performance.

The standards specify the test method and settings. However, you can customize measurements for analyses by changing limits and measurement parameters.

For cellular and PCS infrastructure tests, the instrument will test base-station transmitters in a non-interfering manner with of a coupler or power splitter.

This ESA with the cdmaOne personality includes these measurements:

- ❏ Adjacent Channel Power Ratio
- ❏ Channel Power
- ❏ Code Domain Power
- ❏ Modulation Accuracy (Rho)
- ❏ Monitor Channel/Band
- ❏ Occupied Bandwidth
- ❏ Out of Band Spurious
- ❏ Receive Channel Power
- ❏ Receiver Spurious
- ❏ Spur Close (In Band Spurious)
- ❏ Spurs at Harmonics

In addition to the measurements listed above, the cdmaOne mode provides or uses the following supplemental functions:

- ❏ Selection between format specifications
- ❏ External attenuation and gain compensation
- ❏ Automatic frequency/channel determination based on user-entered channel number or channel frequency
- ❏ Automatic signal level detection and analyzer setup
- ❏ External reference configuration and control
- ❏ Save and recall mode state (Mode is the operation mode of the instrument. For example SA = Spectrum Analyzer or cdmaOne = cdmaOne measurement personality.)
- ❏ Storing/printing of results internally or directly to a floppy disk in spreadsheet (.csv) format

Other Sources of Measurement Information

Additional measurement application information is available through your local Agilent Technologies sales and service office. The following application notes provide more detail on digital communications and measurements.

- Application Note 1298
  Digital Modulation in Communications Systems - An Introduction
  HP/Agilent part number 5965-7160E
- Application Note 1311
  Understanding CDMA Measurements for Base Stations and Their Components
  HP/Agilent part number 5968-0953E
- Application Note 1313
  Testing and Troubleshooting Digital RF Communications Transmitter Designs
  HP/Agilent part number 5968-3578E
- Application Note 1314
  Testing and Troubleshooting Digital RF Communications Receiver Designs
  HP/Agilent part number 5968-3579E
- Application Note 150
  Spectrum Analyzer Basics
  HP/Agilent part number 5952-0292

2 Getting Started

This chapter introduces you to basic features of the instrument, including the front panel keys, rear panel connections, and display annotation. You will also find equipment required for cdmaOne functions, available documentation, and processes for installing and uninstalling applications.

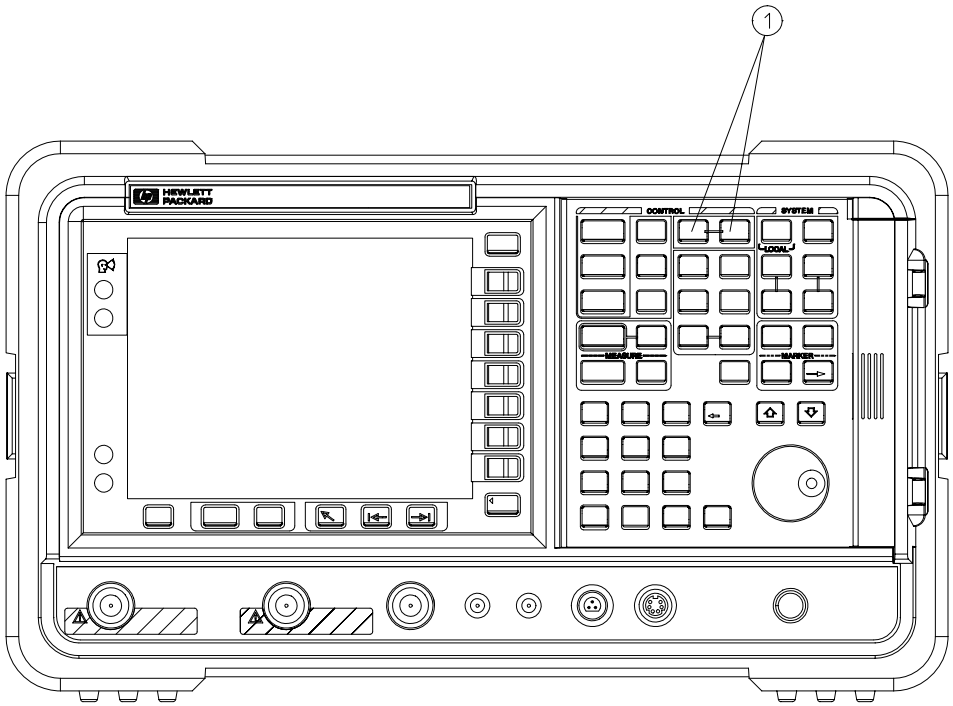
Instrument Overview

This section provides information on only cdmaOne mode features. For those features not described here, refer to the *Agilent ESA Spectrum Analyzers User's Guide.*

Front-Panel Features

For additional information on those features that are described here, refer to Chapter 5 , "Front-Panel Key Reference."

Figure 2-1 Front-Panel Feature Overview



pl728b

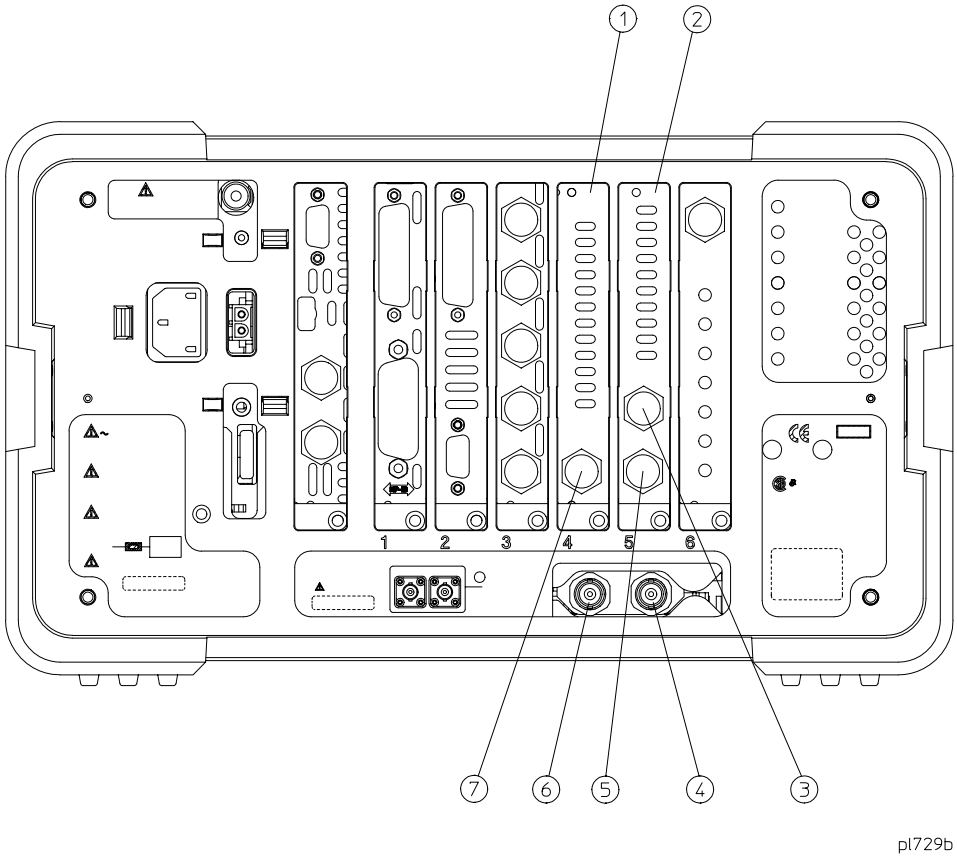
1 Mode keys These keys allow you to select the measurement mode and mode parameters such as input and trigger settings.

- **MODE** accesses menu keys to select the instrument mode. Each mode is independent of all other modes.
- **Mode Setup** accesses menu keys that allow you to configure the parameters specific to the current mode and affect all measurements within that mode.

Rear-Panel Features

This section provides information on only cdmaOne mode features. For those features not described here, refer to the *Agilent ESA Spectrum Analyzers User's Guide.*

Figure 2-2 Rear-Panel Feature Overview



1	**DSP and Fast ADC**	DSP and Fast ADC (*Option B7D*) provides digital signal processing and fast ADC required for many of the digital demodulation measurements in the GSM and cdmaOne measurement personalities. It must be ordered with Option B7E and Option 1D5.
2	**RF Comms Hardware**	RF Communications Hardware (*Option B7E*) provides the RF down convertor hardware required for digital demodulation measurements. It must be ordered with Option B7D and Option 1D5.
3	**Ext Ref In**	Accepts an external 1 MHz to 30 MHz reference frequency source.
4	**10 MHz REF IN**	Accepts an external frequency source to provide the 10 MHz, –15 to +10 dBm frequency reference used by the analyzer.

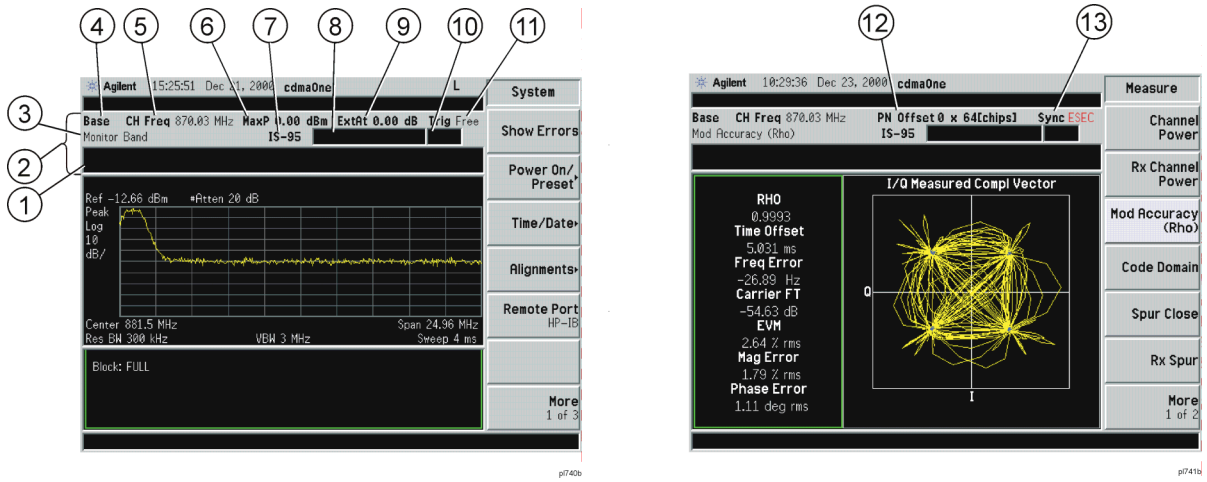
5	**10 MHz Out**	Provides a 10 MHz, 0 dBm minimum, timebase reference signal phase locked to the Ext Ref In.
6	**10 MHz REF OUT**	Provides a 10 MHz, 0 dBm minimum, timebase reference signal.
7	**Ext Frame Sync**	Accepts an external 0 to 5 V TTL Even Second Clock (ESEC) to provide the synchronization signal for the frame timer.

Display Annotation

For the screen annotations not described here, refer to the *Agilent ESA Spectrum Analyzers User's Guide.*

Below is an example of the annotation that may appear on an analyzer display. The display annotation is referenced by numbers which are listed below.

For examples of particular measurement displays, refer to the results section for that measurement in the cdmaOne measurement guide.



1	**Active Function Area**	Displays parameter entries. If you press a key which activates a function, the parameter description and value will appear in the active function area.
2	**Measurement Bar**	Displays information about measurements including some mode setup parameters.
3	**Current Measurement**	Displays the name of the current measurement.
4	**Base/Mobile**	Indicates which digital communications system platform you are testing, base station systems or a mobile unit.
5	**CH Frequency**	Indicates the frequency of the channel you have selected for measurements.
6	**MaxP**	Indicates the maximum RF input power you have indicated will be applied to the analyzer.
7	**Standard**	Indicates which digital communications standard measurements are being tested to.
8	**Averaging Indicator**	Indicates the number of the current average (averaging progress) when averaging is turned on.
9	**Ext Att/Ext Gain**	Indicates the user input value for external attenuation or preamplifier gain at the RF input.
10	**Pass/Fail Status**	Indicates the status of the measurement limit pass/fail test when one or more limit test function is turned on.
11	**Trig**	Indicates external triggering mode you have selected for your measurement: External, Free, RF Burst, or Frame Timer.
12	**PN Offset**	Indicates PN offset value you have set for demod measurements.
13	**Sync ESEC**	Indicates you have set the Time Reference Sync to ESEC (even second clock) for demod measurements. If ESEC is displayed in *red*, the even second clock signal has not been connected to the Ext Frame Sync rear panel connector on the DSP and Fast ADC module. If ESEC is displayed in *black*, the even second clock signal is correctly connected.

Options Required

One of the following Agilent ESA-E Series Spectrum Analyzers with an options combination is required to make specific measurements.

Table 2-1 lists the spectrum analyzer models that are compatible and the upper frequency range of each. You must have one of these instruments to use the cdmaOne option.

Table 2-1 Compatible Agilent ESA-E Series Spectrum Analyzers

Model Number	Upper Frequency Range
E4402B	3 GHz
E4404B	6.7 GHz
E4405B	13.2 GHz
E4407B	26.5 GHz

The cdmaOne measurement personality will have partial functionality in the ESA without the installation of all additional hardware options listed. In addition, some measurements require certain options and other measurements are enhanced by certain options.

Table 2-2 lists the measurements provided by the BAC option and the options required or recommended for the measurements. For optimum performance of cdmaOne measurements, Option B74 should be installed in your Agilent ESA-E Series Spectrum Analyzer.

Not all of the options can be installed by the user. Some of the options require that the instrument be returned to the factory or an Agilent Technologies service center. In addition, some of the options require Performance Verification and Adjustments to be performed after installation. Refer to Table 2-2 for option specific information.

NOTE When transporting the instrument, use the original packaging or comparable packaging. If the shipping container is damaged or any part is missing, notify Agilent Technologies. For the location of sales and service offices, refer to Table 6-1 on page 6-6.

Table 2-2 cdmaOne Hardware and Software Options

Measurements	Required or Recommended Options	Option	Remarks
Adjacent Channel Power Ratio Channel Power Spurs at Harmonics Occupied Bandwidth Modulation Quality (Rho) Code Domain Receive Channel Power Monitor Band/Channel Spur Close Out of Band Spurious Rx Spur	cdmaOne Measurement Personality	BAC	Required options for any cdmaOne measurements.
	Memory Extension	B72	
Adjacent Channel Power Ratio Channel Power Spurs at Harmonics Occupied Bandwidth Modulation Quality (Rho) Code Domain Receive Channel Power Monitor Band/Channel Spur Close Out of Band Spurious Rx Spur	RF and Digital Communication Hardware Option bundle[a] Includes the following options: 1D6 B72 1D5 B7D B7E 1DS 1DR	B74	This is the preferred option to install with Option BAC. It contains all hardware necessary to perform all measurements and bundle packaging makes it easy to order.
Modulation Quality (Rho) Code Domain	DSP and Fast ADC[a]	B7D	These options enable digital demodulation measurements and must be ordered together.
	RF Communications Hardware[a]	B7E	
	High Stability Frequency Reference[b]	1D5	
Receive Channel Power Monitor Band/Channel Spur Close Out of Band Spurious Rx Spur	Preamplifier[b]	1DS	These options enhance the sensitivity for these measurements and can be ordered together with Option 1D5 as the Performance Option Bundle B75.
	10 Hz Narrow Resolution Bandwidth Option[b]	1DR	

Table 2-2 cdmaOne Hardware and Software Options

Measurements	Required or Recommended Options	Option	Remarks
Distance to Fault	50 Ohm Tracking Generator[b]	1DN	These options allow Distance to Fault measurement. Option 1DN gives you the ability to measure SWR and Flatness.
	Distance to Fault	HDF	

a. Factory or Service Center installation, calibration required.
b. Factory installation only.

When you select the cdmaOne mode, the spectrum analyzer performs a hardware check. The available hardware is compared to the cdmaOne measurement personality hardware requirements. For example, if Option B7D and Option B7E hardware is not present, the **Mod Accuracy (Rho)** and **Code Domain Power** keys will be grayed out on the **MEASURE** menu and will not be available for use.

cdmaOne Documentation for the ESA-E Series Spectrum Analyzers

Spectrum Analyzers with cdmaOne Installed

When you purchase your instrument with the cdmaOne measurement personality, you receive the following materials:

Table 2-3 Personality Documentation

Part Number	Part Description	Notes
Refer to the ESA WEB site for the current part number.	*User's Guide* *ESA-E Series Spectrum Analyzers* *cdmaOne Measurement Personality*	BAC Option manuals
	Quick Reference Card *ESA-E Series Spectrum Analyzers* *cdmaOne Measurement Personality*	BAC Option manuals
	Measurement Guide *ESA-E Series Spectrum Analyzers* *cdmaOne Measurement Personality*	BAC Option manuals
	Programming Commands *ESA-E Series Spectrum Analyzers* *cdmaOne Measurement Personality*	BAC Option manuals
	Agilent ESA Spectrum Analyzers Specifications Guide	Includes specifications for all optional measurement personalities
	Agilent ESA Spectrum Analyzers Documentation and Instrument Driver CD-ROM	Does not include service documentation or software

Spectrum Analyzers without cdmaOne Installed

If your instrument is ordered without measurement personalties installed, you can order the cdmaOne measurement personality Option BAC and Option B74[1] instrument upgrade package. With the purchase of a personality option upgrade, you receive the documents listed in Table 2-3 and the documents shown below in Table 2-4.

Table 2-4 Personality Documentation

Part Number	Part Description	Notes
Refer to the ESA WEB site for the current part number	*RF and Digital Communications Hardware Installation Note*	B74 Option manual

Understanding Digital Communications Measurements

Additional measurement application information is available through your local Agilent Technologies sales and service office. Refer to "Other Sources of Measurement Information" on page 1-7 for application notes.

ESA Spectrum Analyzers Update

For the latest information about this instrument, including software upgrades, application information, and product information, please visit the URL listed below.

Updating the Firmware and Software

Updated versions of the Agilent ESA Spectrum Analyzers firmware and software will be available via several sources. Information on the latest firmware and software revision can be accessed through the following URL.

URL to Obtain Update Information

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

1. Refer to Table 2-2 for option details.

Installing Optional Measurement Personalities

Active License Key

The measurement personality software you have purchased with your instrument has been installed and the license key has been enabled at the factory. With any future purchase of a new personality software, you will receive a certificate that displays the unique license key number. The license key enables you to install, or reinstall, any measurement personality you have purchased.

You will want to keep a copy of your license key number in a secure location. Please enter your license key numbers in the box provided below for future reference. If you should lose your license key number, get in touch with your local Agilent Technologies service or sales office for assistance. For the location of these offices, refer to Table 6-1 on page 6-6.

Active License Key Numbers for Instrument with Serial # _____
For Option_____ the license number is _____
For Option_____ the license number is _____
For Option_____ the license number is _____

You will need to use a license key number only under the following conditions:

- If you purchase an additional measurement software package.
- If the controller board is repaired or replaced.

Installing the Licensing Key

If you are installing a new option, follow these steps to install the unique license key number for the measurement personality software that you want to install in your instrument:

1. Press **System**, **More**, **Licensing**, **Option**.

   When you press **Option** the alpha editor will be activated. For instructions on using the alpha editor, refer to the *ESA Spectrum Analyzers User's Guide*.

2. Use the alpha editor to enter the three letter designation for the software option that you wish to install in the instrument.

3. Press **Done** on the alpha editor menu.

4. Press **License Key**.

   When you press **Licensing Key** the alpha editor will be activated. For instructions on using the alpha editor, refer to the *ESA Spectrum Analyzers User's Guide.*

5. Use the alpha editor to enter the 12 character licensing key number for the software option that you wish to install in the instrument.

6. Press **Done** on the alpha editor menu.

7. Press **Activate** to turn on the licensing key. You may now install the measurement personality option software.

Using Install Key

You may want to install a software revision, install new measurement software, reinstall measurement software that you have previously uninstalled, or uninstall measurement software. Before you can install software, you will need a set of installation diskettes.

If you have ordered a measurement personality, you will receive the installation disk set in the option upgrade package. If you are updating an existing, previously installed measurement option, you may order the diskettes from Agilent Technologies or create a set from the Agilent internet site shown in "ESA Spectrum Analyzers Update" on page 2-10. When you order the updated software disk set, you will need to order Option UE2 with an cdmaOne revision update. (Option UE2 is a firmware update and is needed to ensure that the firmware and the software are compatible.) To order a set of diskettes, get in touch with your local Agilent Technologies service or sales office. For the location of these offices, refer to Table 6-1 on page 6-6. To create a disk set refer to "Creating Software Installation Disks" below.

Creating Software Installation Disks

To create the installation disks on-line, visit the Agilent internet site shown under "ESA Spectrum Analyzers Update" on page 2-10. Follow the instructions provided on the internet site for downloading the current measurement personalty software and creating the installation disk set. The instructions for creating the disk set will step you through the process to create a firmware disk set when you create the measurement personalty software disk set. (A firmware update may be needed to ensure that the firmware and the software are compatible.) After you have created the disk set, follow the on-line instructions to install the firmware. After successfully installing the firmware update, proceed with the following instructions for installing the measurement personalty software in your instrument.

Installing Personality/Software Options

This procedure gives steps to install a new software option in an ESA-E Series Spectrum Analyzer using the internal floppy drive of the instrument. Screen messages display the update progress and give directions. The instrument will not need to be re-calibrated after this procedure since no changes are made to calibration or adjustment files.

If you have a problem with the installation process, refer to "Troubleshooting the Installer" on page 2-14.

NOTE When the installer starts up, it examines the instrument to ensure that all the required software and hardware options are present. If they are not, the installer will generate and error and you will not be able to install the personality.

1. If this is the installation of new personality option software, you must enter the License Key for the new option. For instructions on entering the License Key, refer to the "Installing the Licensing Key" on page 2-11.

   When you have completed entering the license key number, continue with the next step.

2. Insert disk one of the installation disk set into the disk drive located on the right side of the ESA front panel.

3. Press **System**, **More**, **Personalities**, and **Install**. The instrument will then load the installer off of the floppy drive. If there is no floppy in the drive, the incorrect disk is inserted, or there is no installer on the disk, the error "No install disk present in disk drive" will be shown.

   Once the instrument has loaded the installer, the screen will change to the installer screen and the **Install Pers.** menu will be shown. For more information on the installer screen and menu, refer to "Installer Screen and Menu" on page 2-15.

4. When the installer first starts up, it will show a popup message. Select **Verify Disks**.

NOTE Once the installer has begun installing a personality, any error will cause the whole personality (including a previously installed version) to be removed from the instrument. Because of this, it is very important that you verify the disks prior to installing them. If any of the disks or files are bad, you will not be able to use the personality until you obtain a new installation disk set and run the install using them.

5. When prompted, insert the next disk and press **Verify Disks** again.

   When Verify Disks is running, the **Install Now** and **Exit Install** keys will be grayed out.

6. When the verification is complete, press **Install Now** and the installation of the personality will begin. Some of the disks may take only a short time to load or be skipped entirely, while others can take up to about 30 minutes to load.

   When the installer is running, the **Verify Disks** and **Exit Install** keys will be grayed out.

7. When prompted, insert the next disk and press **Install Now** again.

8. Once the installation is complete, press **Exit Install**.

Troubleshooting the Installer

If the installation process stalls or fails in another way, follow these steps to resolve your problem.

1. If the instrument stops the update process before all the disks are loaded proceed as follows:

   a. Press **Exit Install** to abort the process.

   b. Return to step 2 on the previous page and start the installation process again.

2. If the instrument fails after repeating the installation procedure, get in touch with your nearest Agilent sales and service office listed in Table 6-1 on page 6-6 for assistance. Please provide the following information:

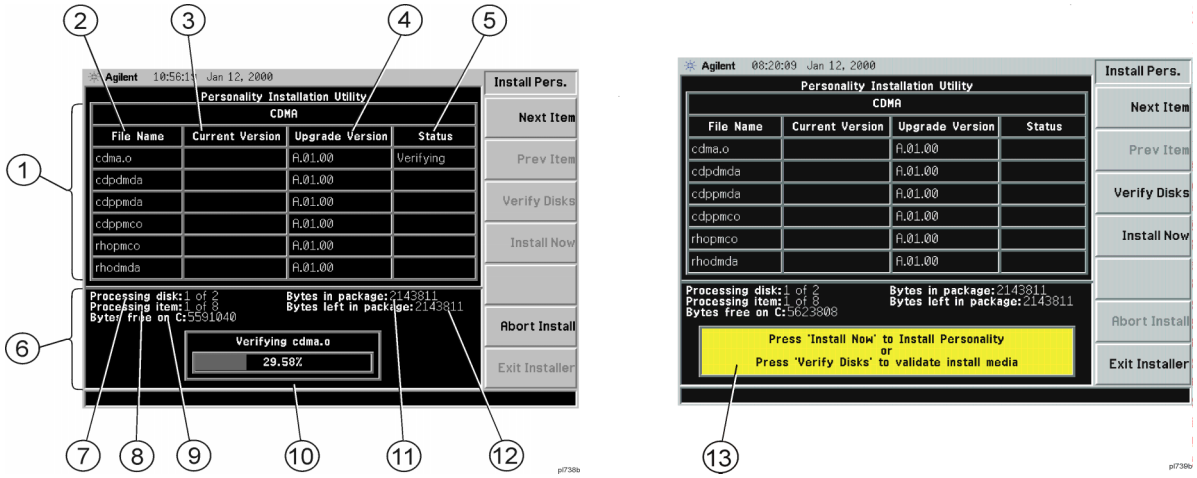
   Model Number:

   Serial Number:

   State that you are having trouble installing a software option update.

Installer Screen and Menu

The top portion of the install screen is a table in which the files that are about to be installed are listed. The bottom portion of the screen contains information needed to track the progress of the install.



1 **File Table** displays the files to be installed and various file information. If there are more then six files, **Next Item** and **Prev Item** allow you to scroll the table to view additional items.

2 **File Name** displays the name of the files on the installation disk.

3 **Current Version** displays the version of the file that is currently installed in the instrument. (This field will be blank if this file is not currently installed in the instrument or if the file is a data file that has no version.)

4 **Upgrade Version** shows the version of the file on the install disk. This is the version of the file that will replace the currently installed version.

5 **Status** is updated to reflect what the installer is doing to the current file as the install progress. The valid messages seen in this column are listed in Table 2-5 on page 2-16.

6 **Data Field** contains a status bar and various status information.

7 **Processing disk** shows the disk that is currently being read.

8 **Processing item** shows the file that is being processes by item number.

9 **Bytes free on C** is the number of bytes currently free on the instrument C: drive.

10 **Status Bar** contains a status bar that runs from 0 to 100% and tracks the progress of the current step and a message line displays the step that is currently being executed.

11 **Bytes in package** lists the number of bytes in the install package/ fill.

12 **Bytes left in package** lists the number of bytes left to be read.

13 Message and error popup window that displays over the status bar. Information in this box will prompt you for action required to proceed to the next phase of the installation. It may also inform you of errors in the installation process and may prompt you for action required to correct the problem.

Table 2-5 Installer Status Messages

`Failed`	This means that something has gone wrong while processing this item. It is a fatal error and the installation can not be completed. The installer will try to get the system back to a good state which may entail completely removing the currently installed personality.
`Loading`	The file is currently being copied from the install media to the instrument's file system.
`Verifying`	This may mean one of two things: 1. If "Verify Disks" was pressed then Verifying means that the installer is currently reading the install media and comparing the known checksums to ensure the data is good. 2. If "Install Now" was pressed, then Verifying means that the installer is reading what was just loaded to ensure the checksum is correct.
`Loaded`	This means that the data has been placed on the instrument disk but has not yet been registered with the firmware.
`Installed`	This means that the data has been loaded into the instrument and registered. The install for this file is complete.
`Skipping`	This means that the installer has determined that this file does not need to be loaded into the instrument.

3 Setting Up the cdmaOne Mode

This chapter introduces you to the basic measurement process.

Preparing to Make Measurements

At initial power up, the analyzer will be in spectrum analyzer (SA) mode and the **FREQUENCY Channel** menu displayed. To access the cdmaOne measurement personality, press the **Mode** key and select the **cdmaOne** key.

Initial Settings

Before making a measurement, make sure the mode setup and frequency channel parameters are set to the desired settings. Refer to sections Chapter 4 , "Menu Maps," and Chapter 5 , "Front-Panel Key Reference." for additional information to guide you in changing parameter settings.

If you want to set the instrument (including the cdmaOne mode settings) to a known, factory default state, press **Preset**. This will preset the mode setup and all of the measurement setup parameters to the factory default parameters. Note that **Preset** will switch modes, returning the ESA to the SA mode. You must re-access the cdmaOne mode after the preset operation is completed.

You can set the instrument to use **User** preset or **Factory** preset under the **System** front panel key. If you set the preset to **User**, the instrument displays a **Preset** menu when you press **Preset**. The **Preset** menu allows you to select the **User** defaults or the **Factory** defaults. For more information on setting, saving, and using user defaults, refer to the *ESA Spectrum Analyzers User's Guide*.

If you want to set only the cdmaOne mode to a known, factory default state, press **Mode Setup** and **Restore Mode Defaults**. This will reset only the cdmaOne parameters to the factory defaults without affecting the SA mode, and the instrument will not exit the cdmaOne mode.

To preset only the settings that are specific to the selected measurement, press **Restore Meas Defaults** under **Meas Setup**. This will set the measurement setups parameters, for the currently selected measurement only, to the factory defaults.

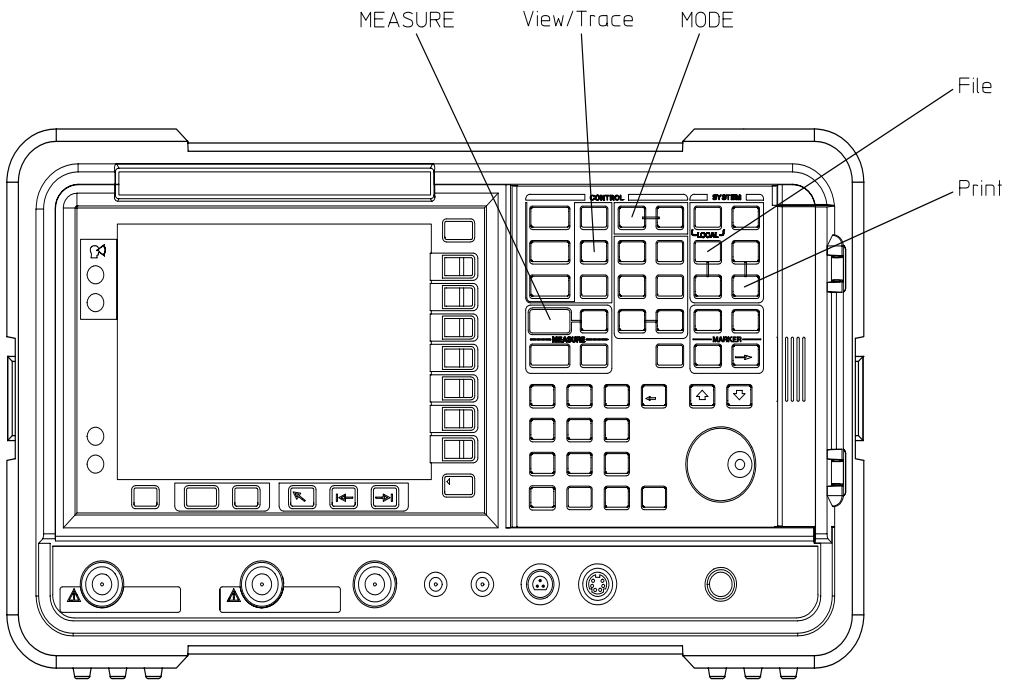
How to Make a Measurement

The cdmaOne measurements are set up and are intended to be used as "one-button" measurements. After you have properly connected the instrument to the digital communications system equipment and selected the measurement, the measurement is made using the default parameters defined by the selected standard and the tuning plan.

Even though the measurements are designed as one-button measurements, you may change the default settings using various setup keys. However, changing the default settings may produce measurement results that are outside of the parameters of the selected standard and tuning plan requirements.

Most measurements can be performed using the simple four-step procedure outlined in the table below. Most measurements are performed using only the primary keys listed in conjunction with a minimum of setup keys. Measurement setup keys (**Meas Setup**) can be used for non-standards compliant testing. For more information see "Initial Settings" above.

Step	Primary Key	Setup Keys	Related Keys
1. Select and setup mode	**MODE**	**Mode Setup**	**System**
2. Select and setup measurement	**MEASURE**	**Meas Setup**, **Restore Meas Defaults**, **FREQUENCY Channel**	**Meas Control**, **Restart**
3. Select and setup view	**View/Trace**	**Span X Scale**, **Amplitude Y Scale**, **Display**	**Marker**, **Search**
4. Saving and printing results	**File** **Print**	**Print Setup**	**Save**



rl71b

How to Save Measurement Results

To save measurement results, follow the process shown below. For additional information on file management in the spectrum analyzer, refer to the *ESA Spectrum Analyzers User's Guide*.

1. Press **File**, **Save**, **Type**, **More**, **Measurement Results**.
2. If you want to change the file name, press **Return**, **Name**, and use the Alpha Editor the enter the new name. For more information on using the Alpha Editor, refer to the *ESA Spectrum Analyzers User's Guide*.
3. Press **Save Now** to complete the file saving process.
4. If you have used the default file name and wish to save additional measurement results, press **Save**. The current measurement result will be saved with the next default file name.
5. If you have not used the default file name and wish to save additional measurement results, repeat steps 1 through 3.

4 Menu Maps

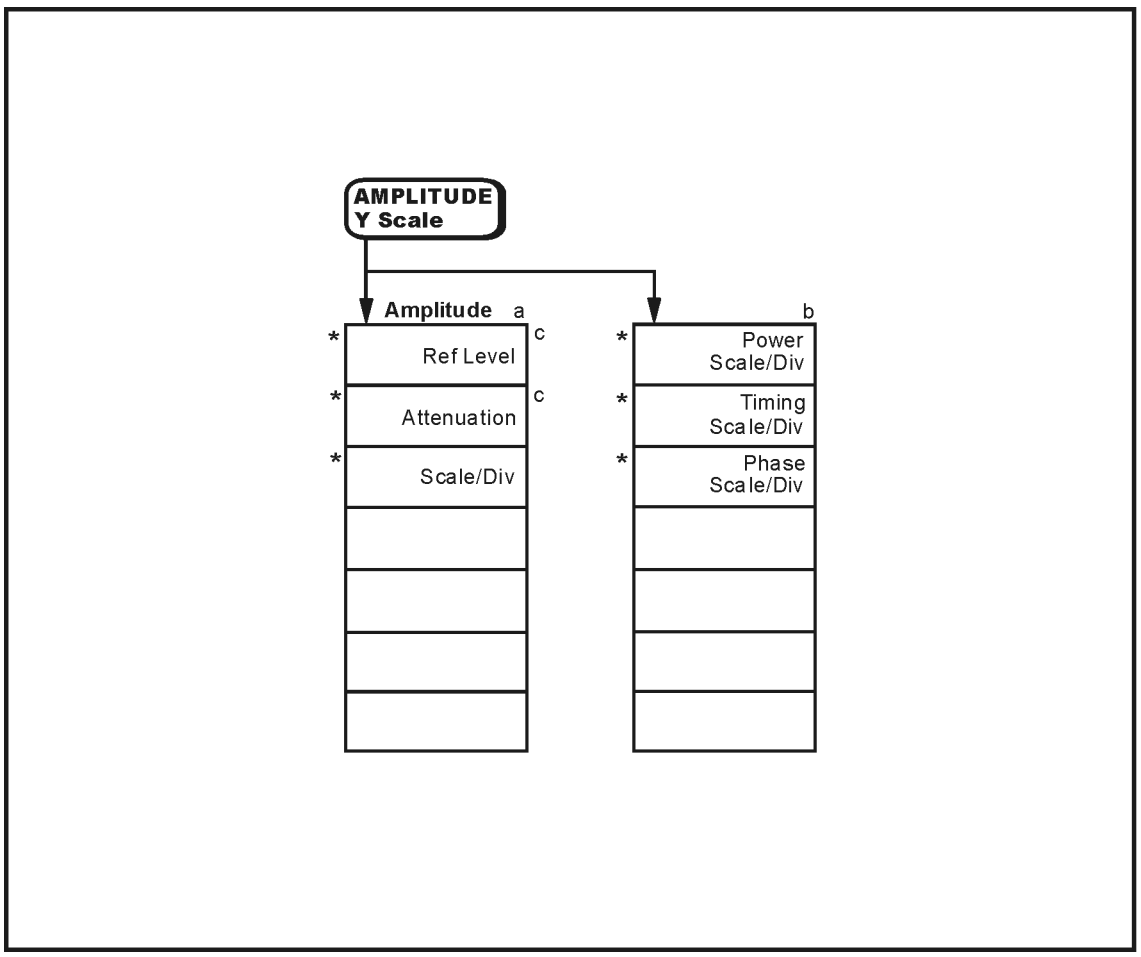
This chapter provides a visual representation of the front-panel keys and their associated menu keys. Refer to Chapter 5 , “Front-Panel Key Reference.” for key function descriptions.

What You Will Find in This Chapter

This chapter provides menu maps for the front panel keys having associated menus. The key menus appear in alphabetical order as follows:

Menus

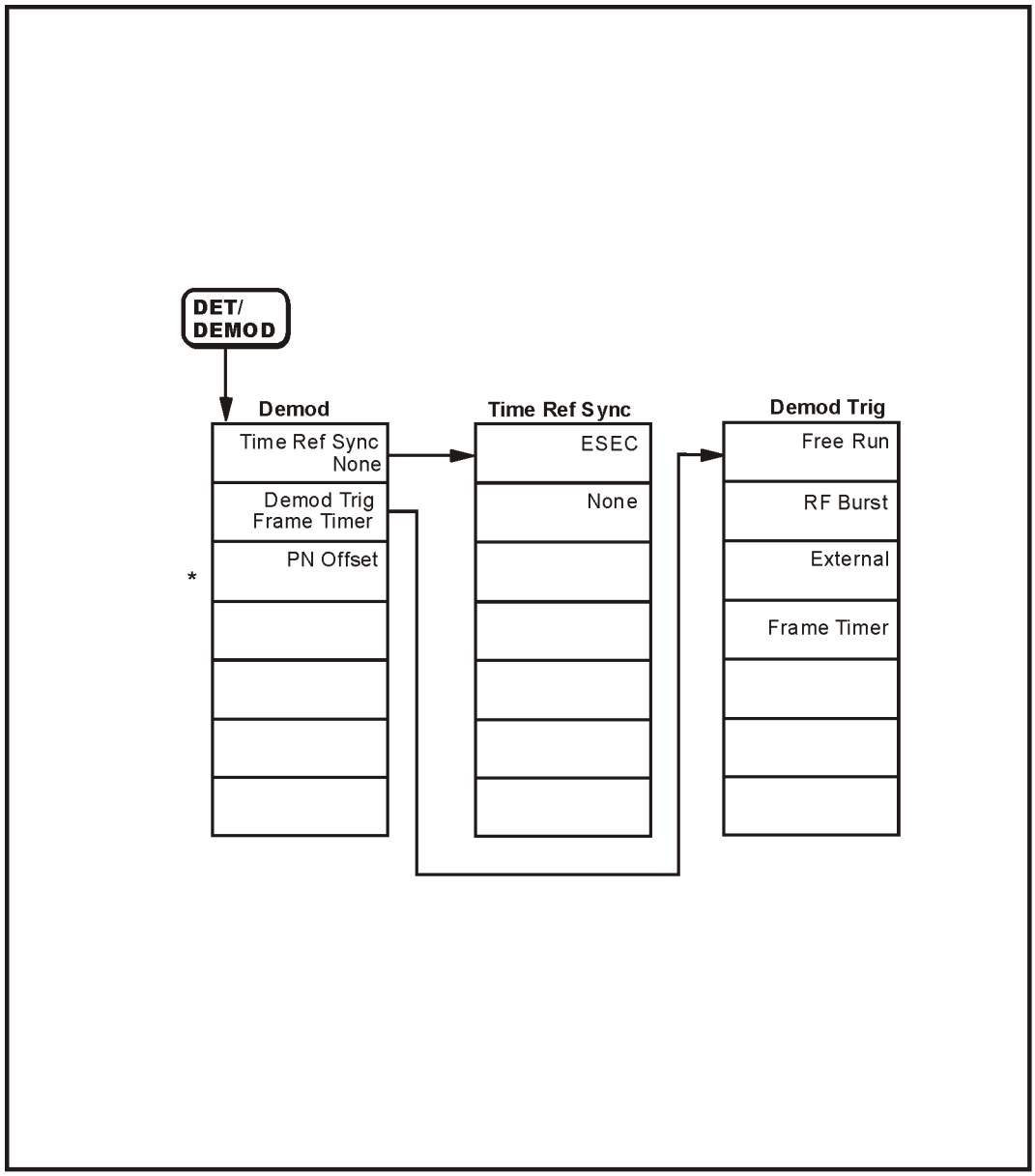
Amplitude Menu



a. This menu is available only when **APCR, Channel Power, Rx Channel Power, Rx Spur, Out of Band Spurious, Spurs at Harmonics, Spur Close, Occupied BW, Monitor Band/Channel** is selected in the **MEASURE** menu.
b. This menu is available only when **Code Domain Power** is selected in the **MEASURE** menu.
c. This key is grayed out and not available when **RF Input Range** is set to **Auto** on the **Input** data form.
***** An active function that allows data entry.

ph816b

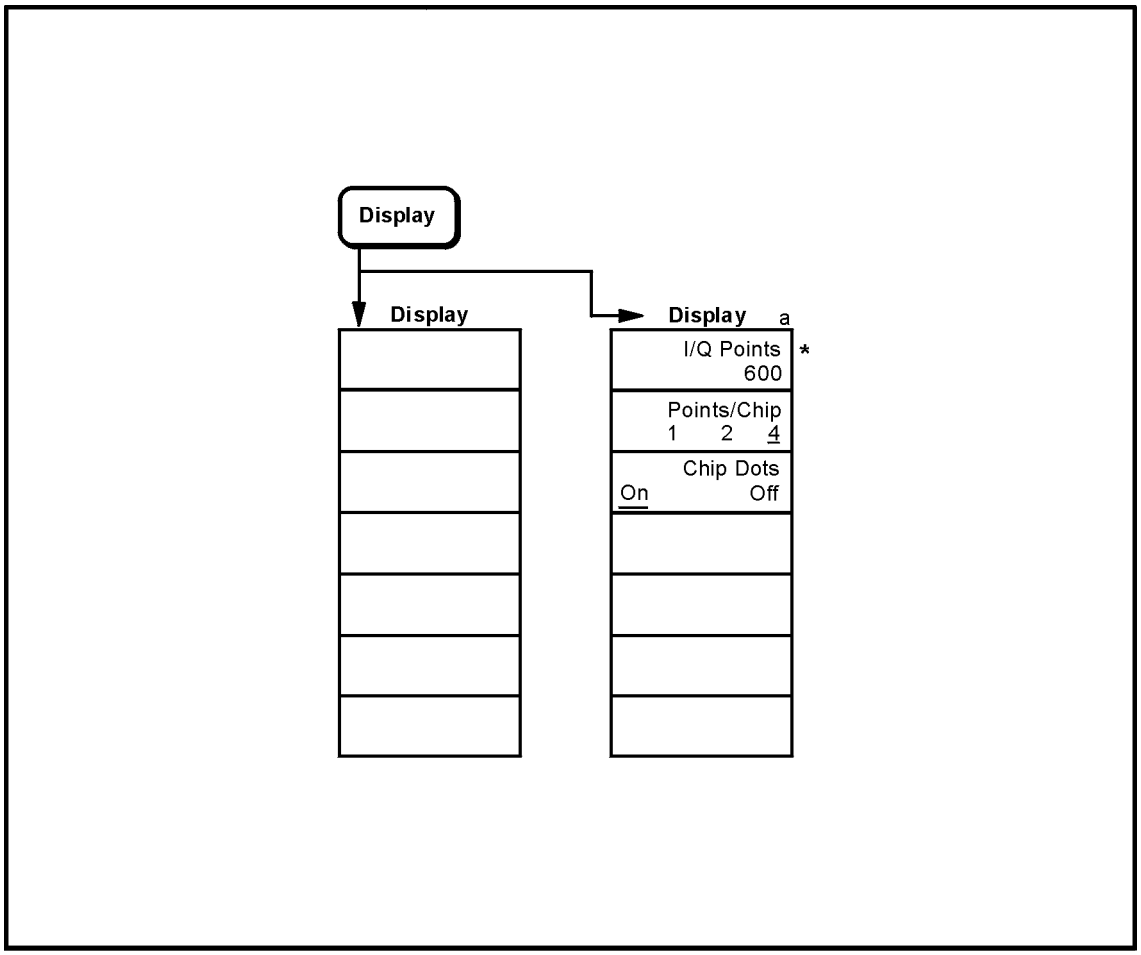
Det/Demod Menus



* An active function that allows data entry.

ph821b

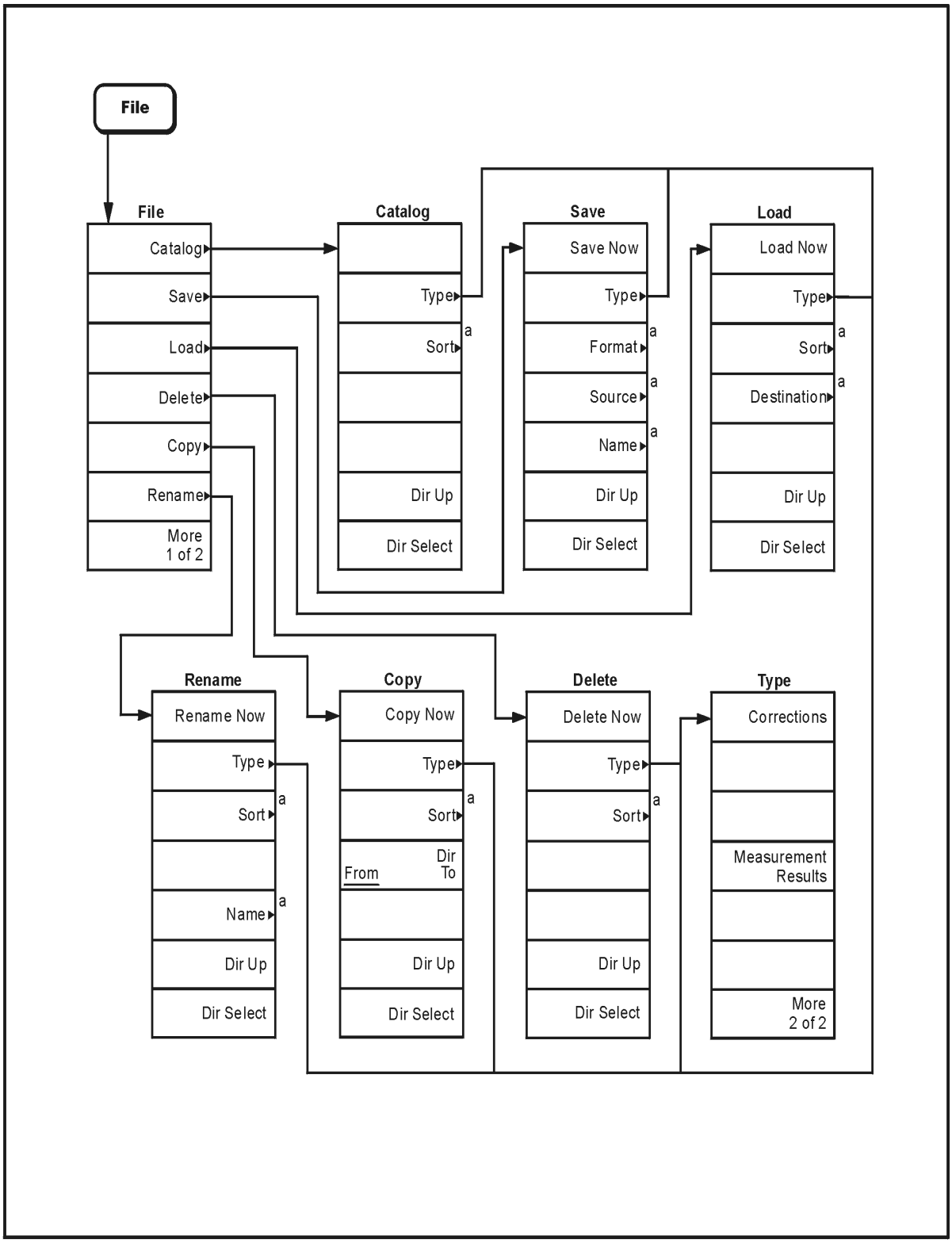
Display Menus



a. Appears only when **Mod Accuracy (Rho)** is selected in the **MEASURE** menu.
***** An active function which allows data entry.

pl74b

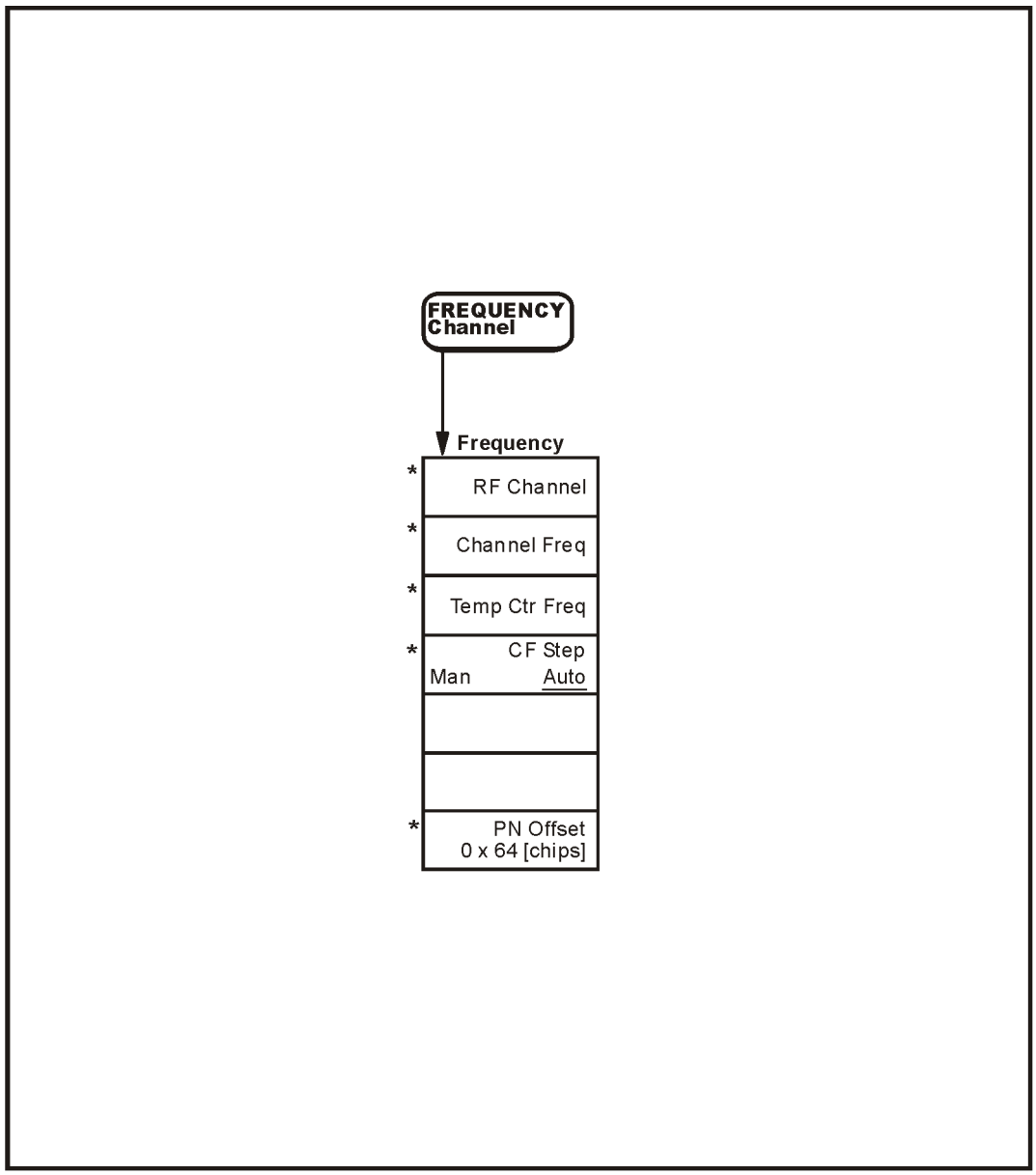
File Menus



a. For information on the menu accessed by this key, refer to the ESA Spectrum Analyzers User's Guide.

pl736b

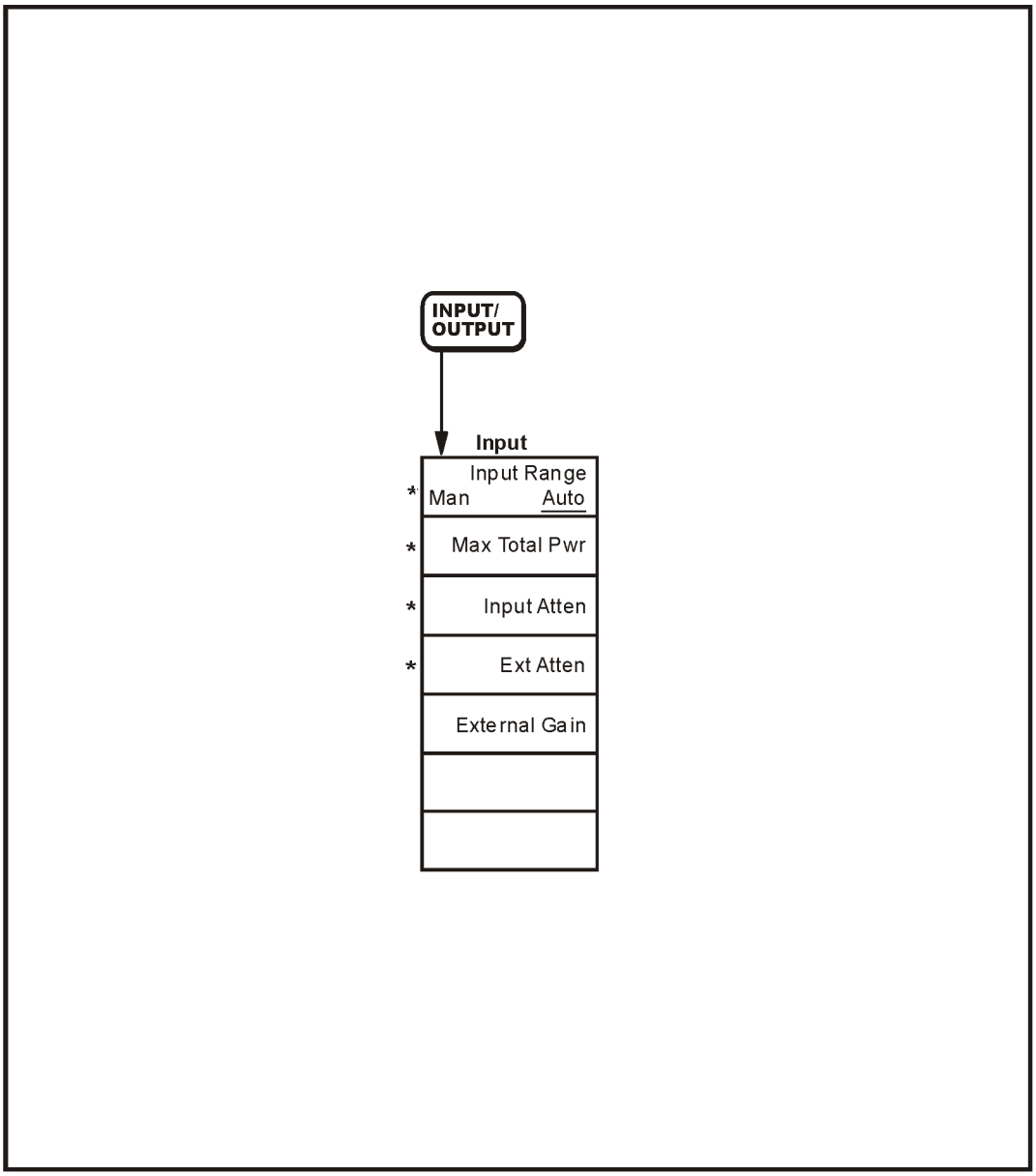
Frequency/Channel Menu



* An active function that allows data entry

ph817b

Input/Output Menu

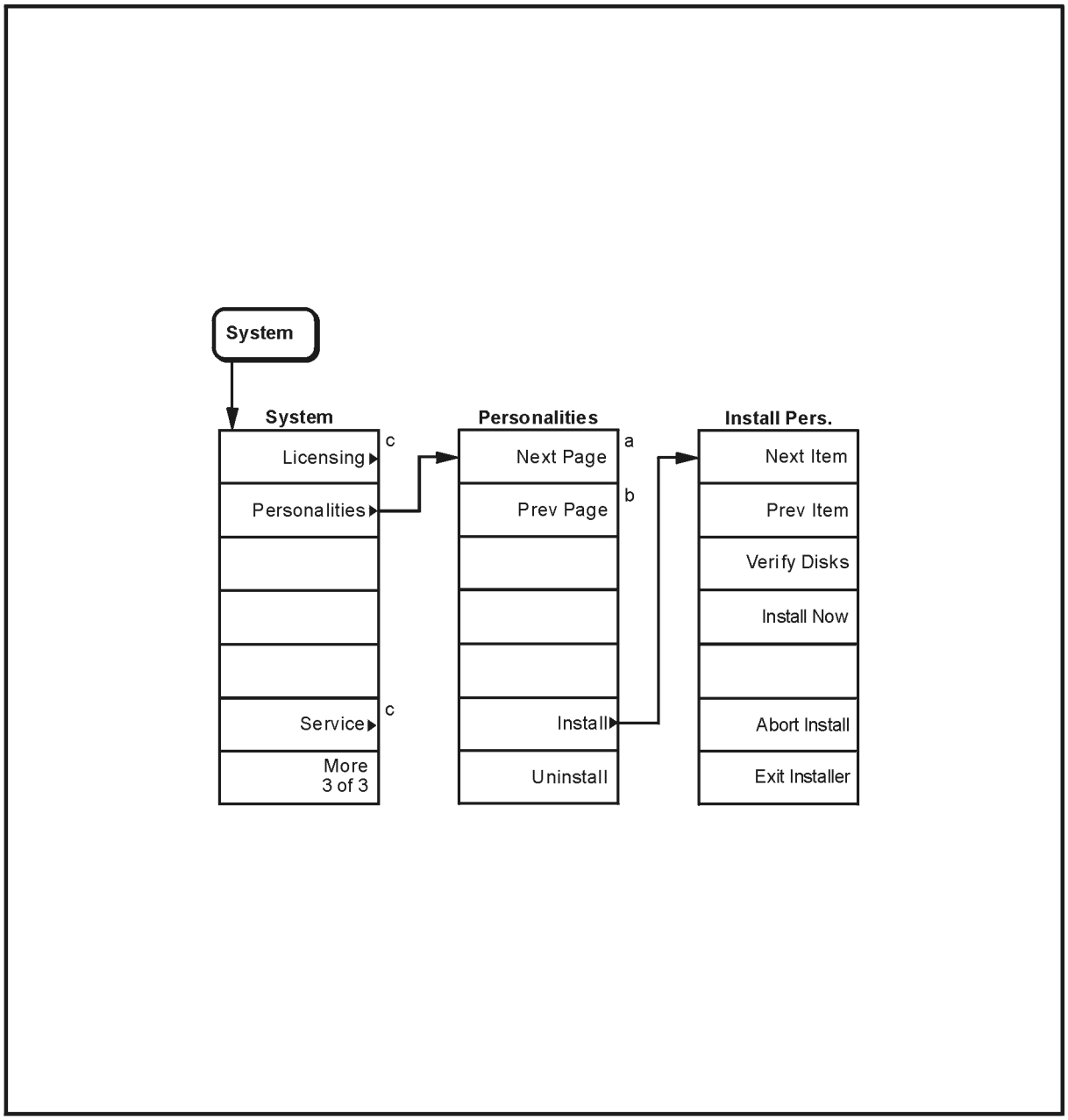


* An active function that allows data entry

ph822b

Installer Menus

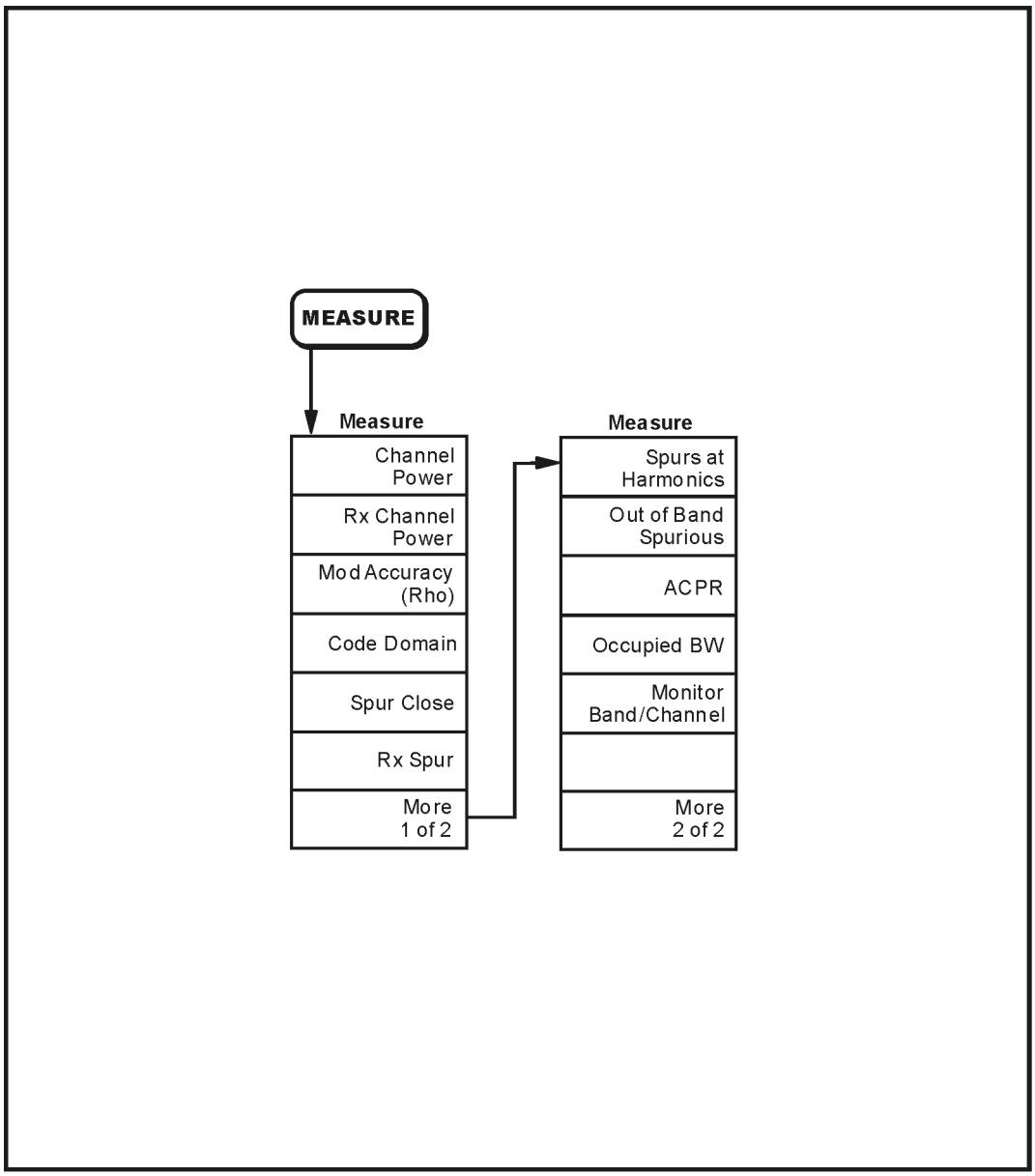
For more information on the System and Personalities menus, refer to the *ESA Spectrum Analyzers User's Guide.*



a . Grayed out when on the last page or if there is only one page
b. Grayed out when on the first page or if there is only one page
c. For information on the menu accessed by this key, refer to the ESA Spectrum Analyzers User's Guide.

pl737b

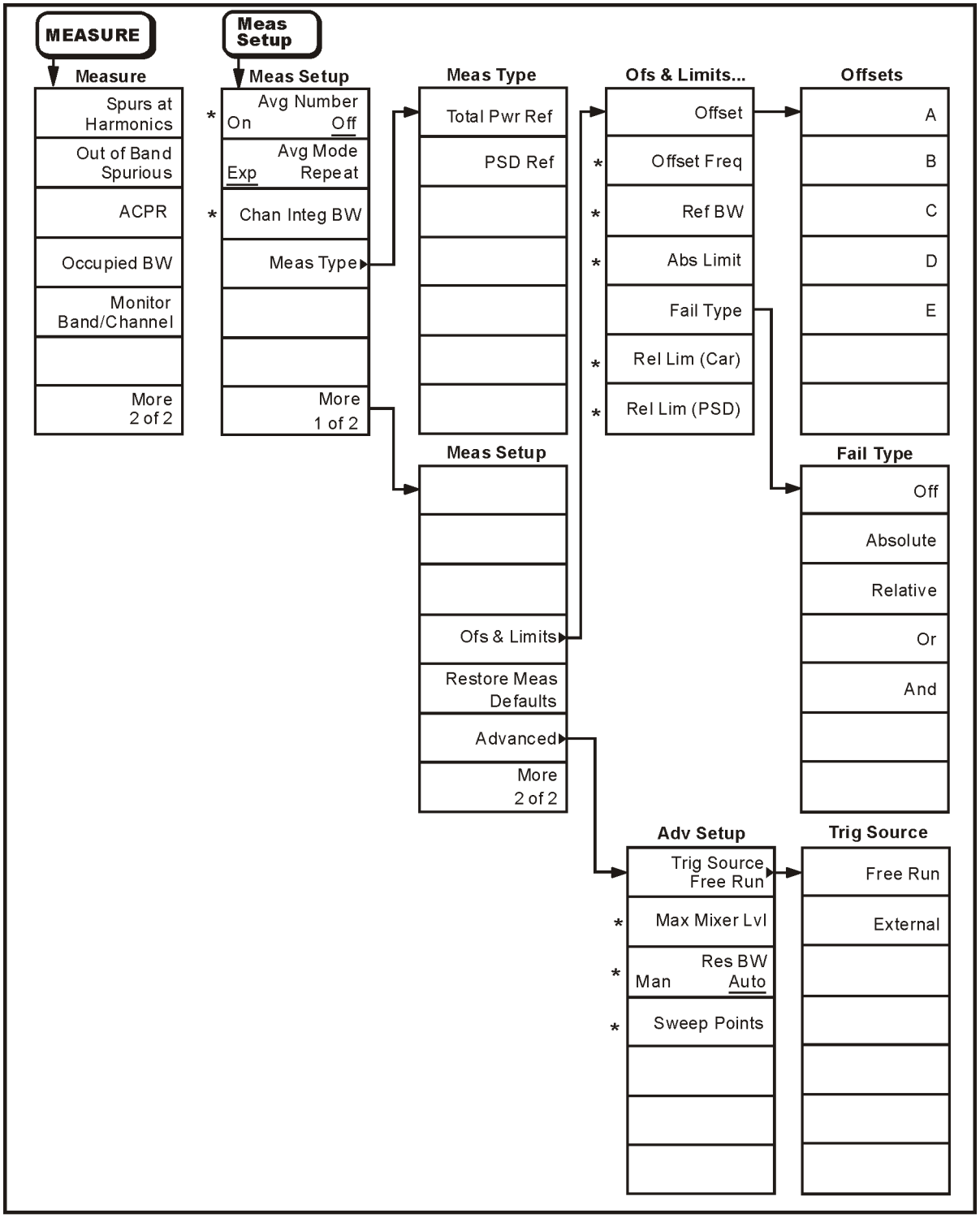
Measure Menu



ph81b

Measurement Setup Menus

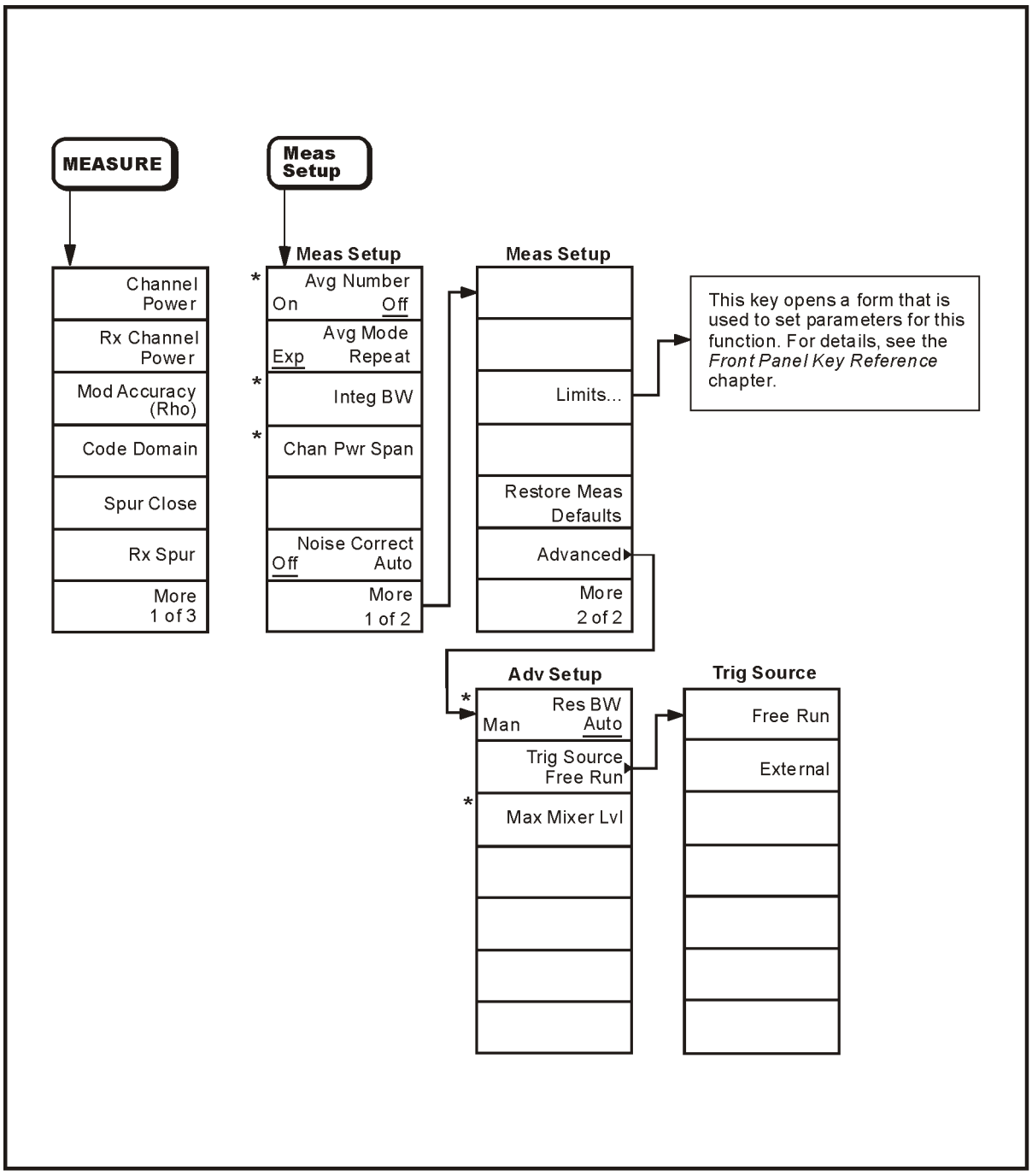
Adjacent Channel Power Ratio Measurement Setup Menus



* An active function that allows data entry.

ph83b

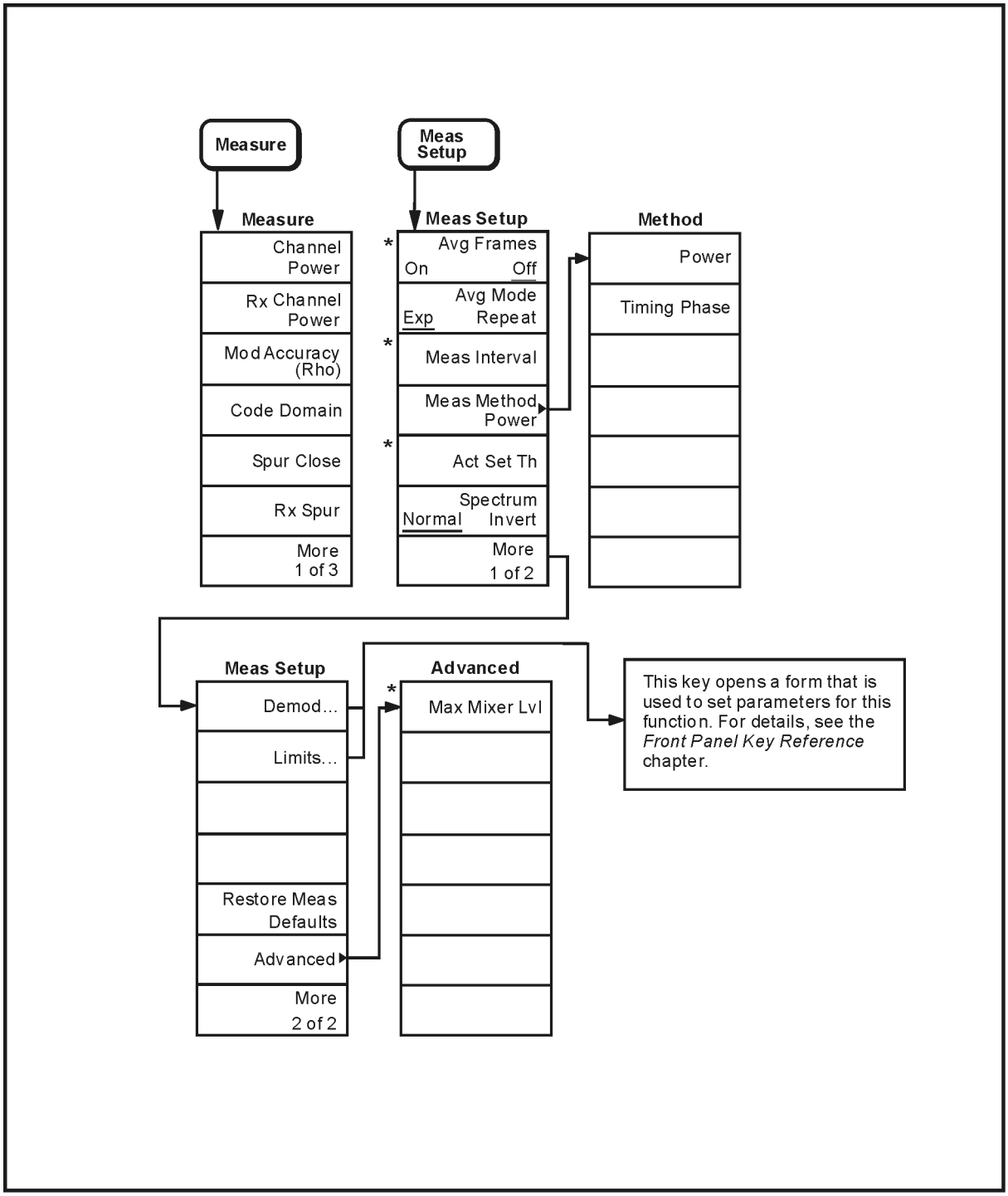
Channel Power Measurement Setup Menus



* An active function that allows data entry.

ph818b

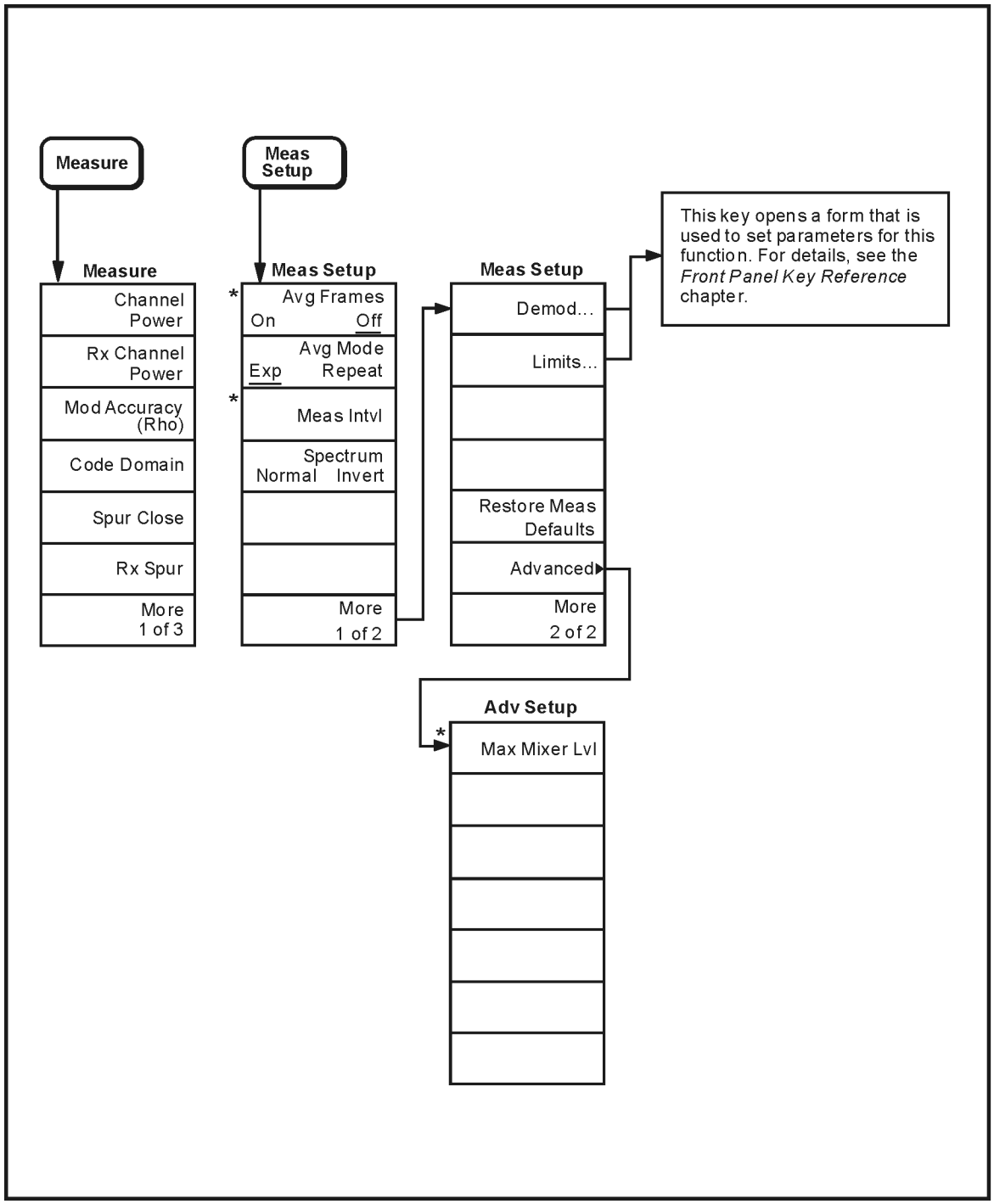
Code Domain Measurement Setup Menus



* An active function that allows data entry.

ph815b

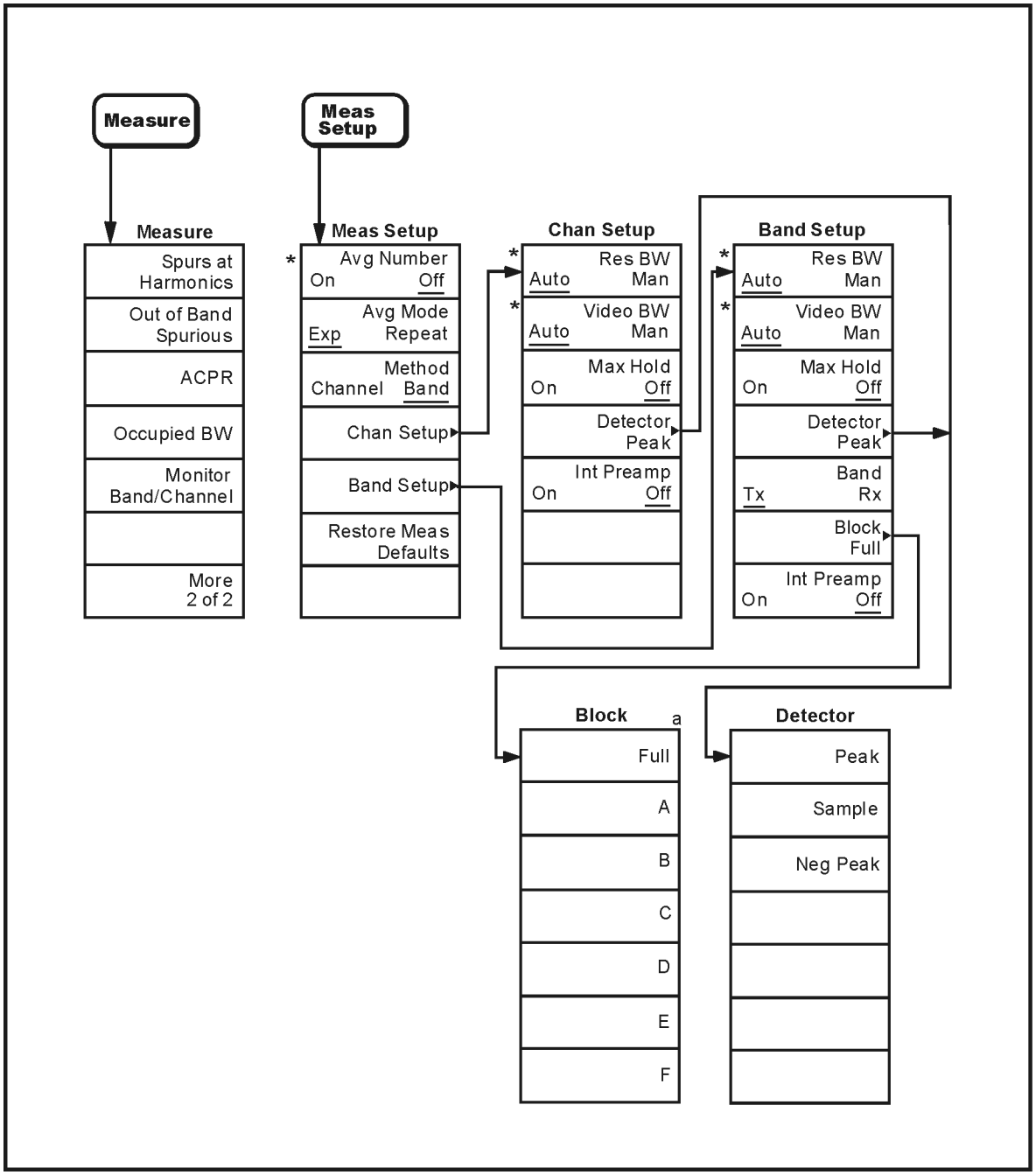
Modulation Accuracy (Rho) Measurement Setup Menus



* An active function that allows data entry.

ph814b

Monitor Band/Channel Measurement Setup Menus

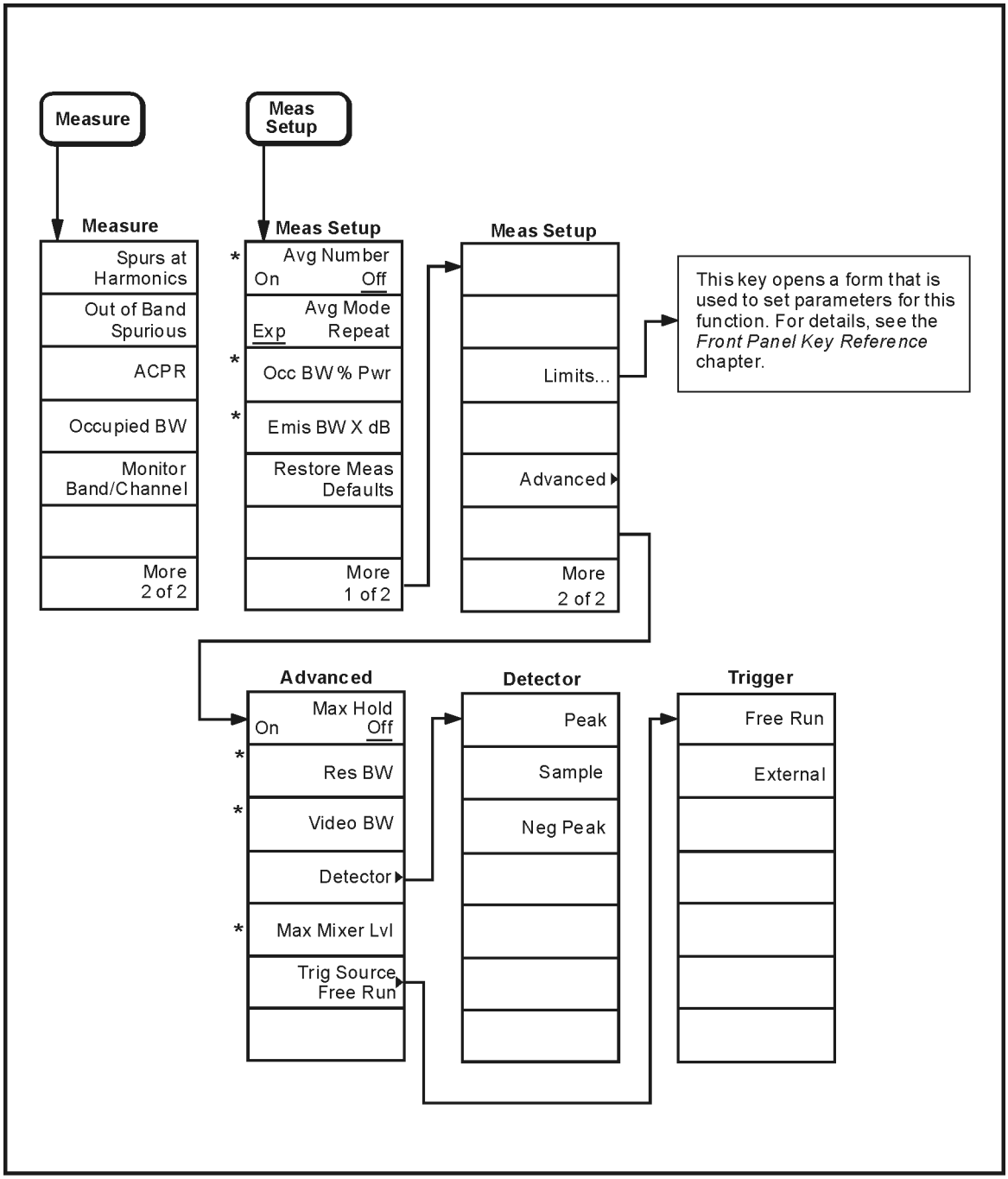


a. The keys shown on this menu are dependent on the standard selected on the **Std/Band** menu under **Mode Setup**, **Radio...** Keys.

* An active function that allows data entry.

ph813b

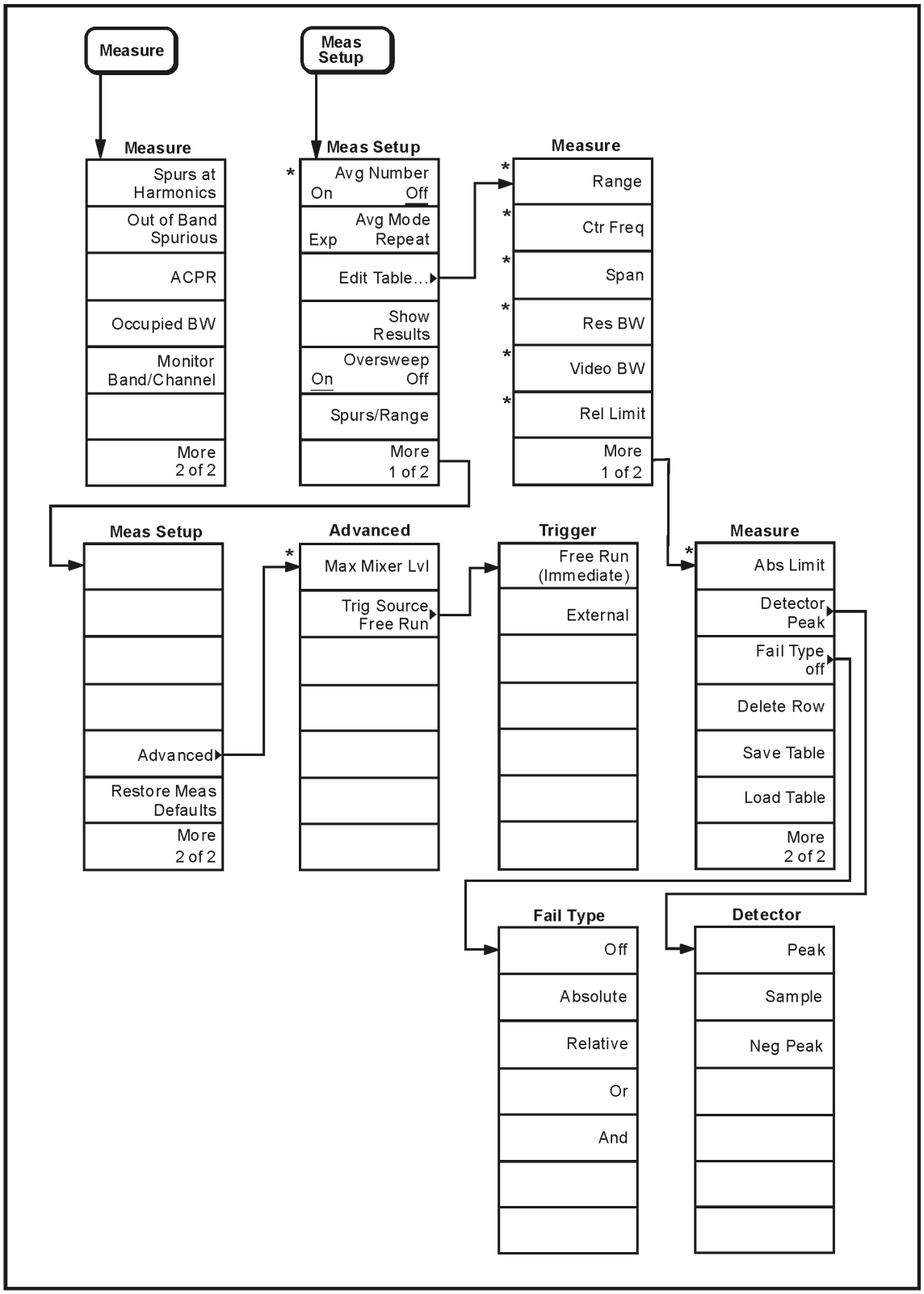
Occupied Bandwidth Measurement Setup Menus



* An active function that allows data entry.

ph812b

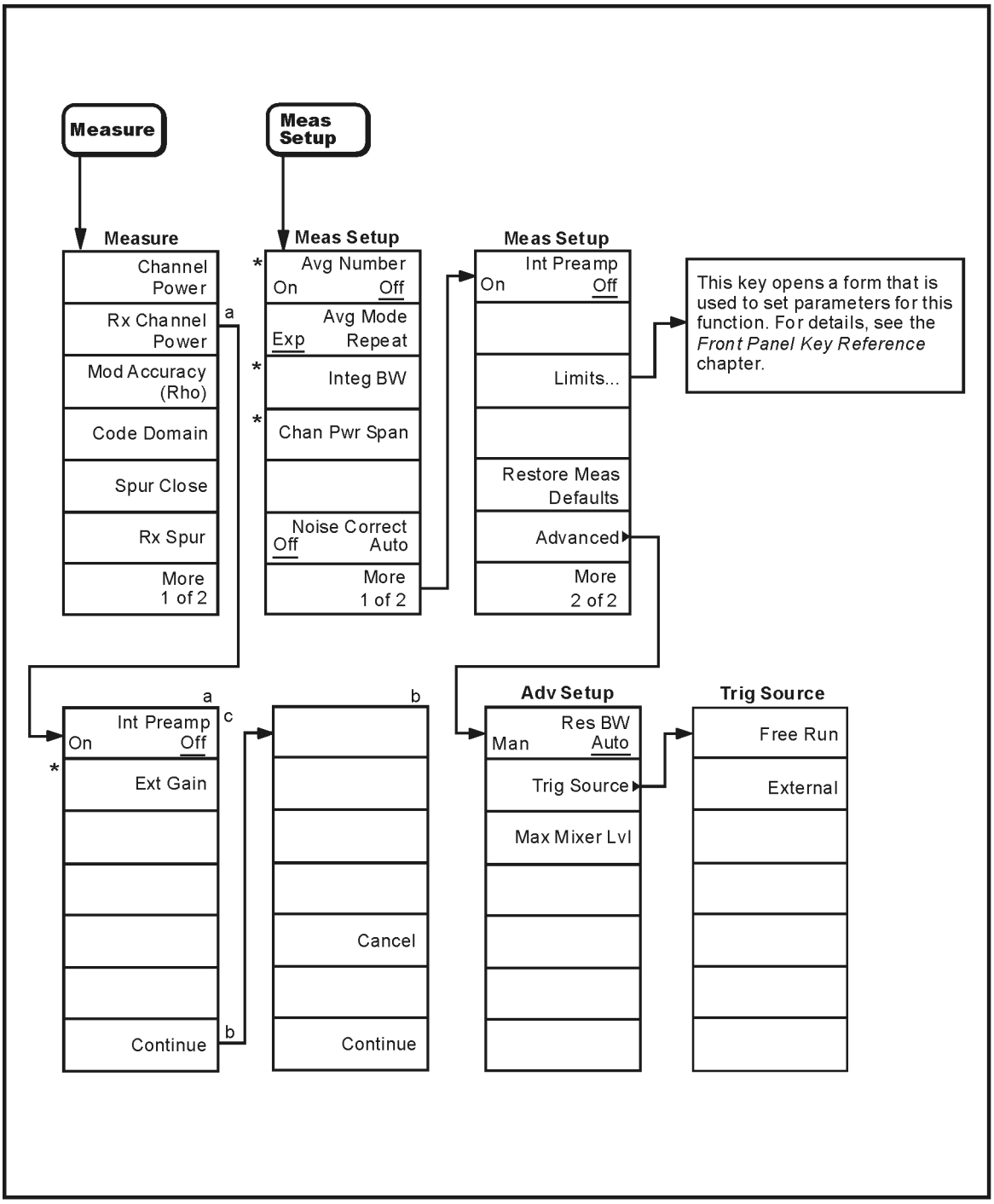
Out of Band Spurious Measurement Setup Menus



* An active function that allows data entry.

ph811b

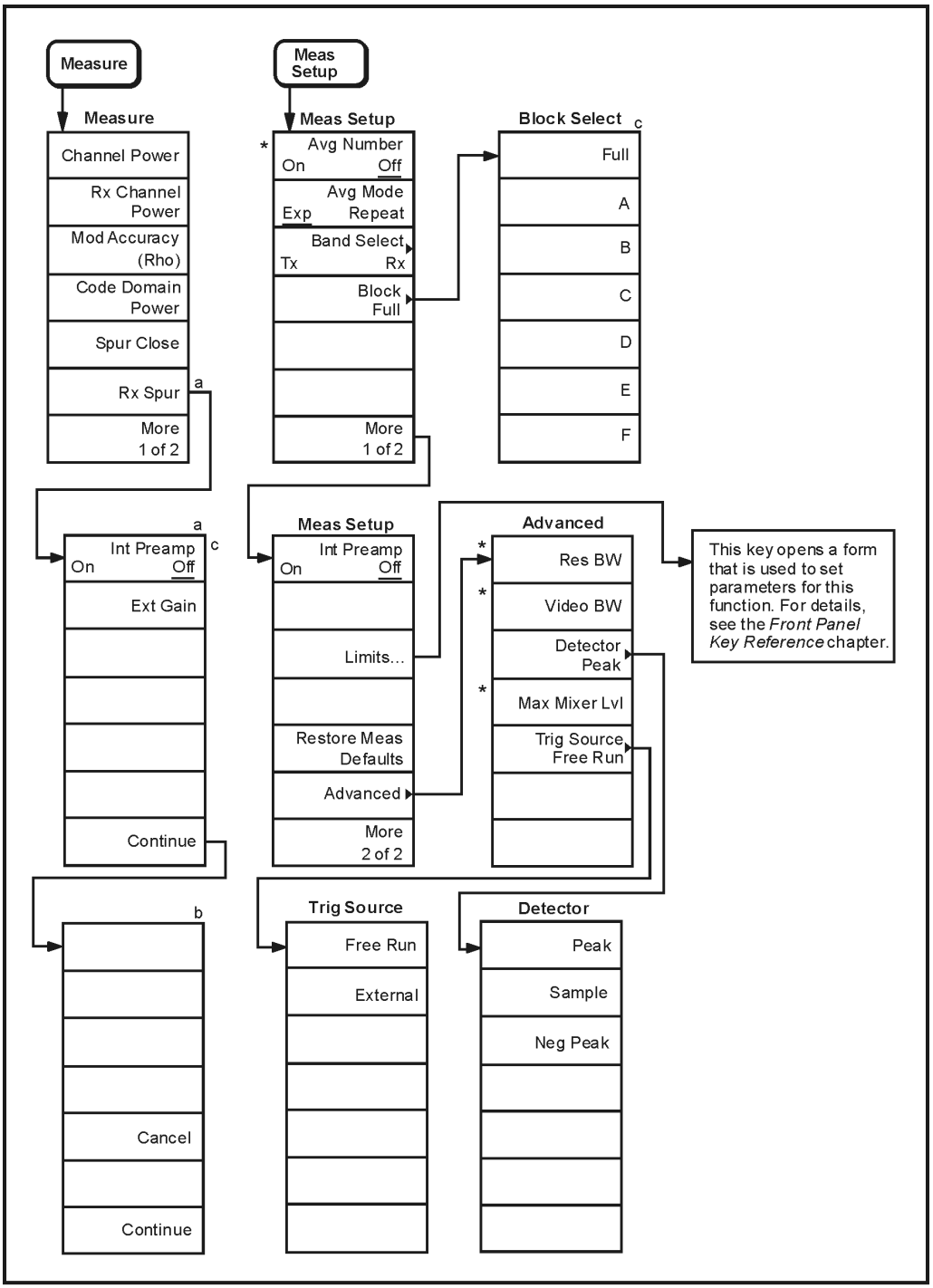
Receive Channel Power Measurement Setup Menus



a. When **Rx Chan Power** is selected a dialog box and a menu are displayed unless Preamp Dialogs are set to Off. These allow you to set up a preamplifier.
b. When Continue is pressed a dialog box and a menu are displayed unless Preamp Dialogs are set to Off. This allows you to continue or cancel the measurement.
c. This menu item may change if no internal preamplifier is installed.
* An active function that allows data entry.

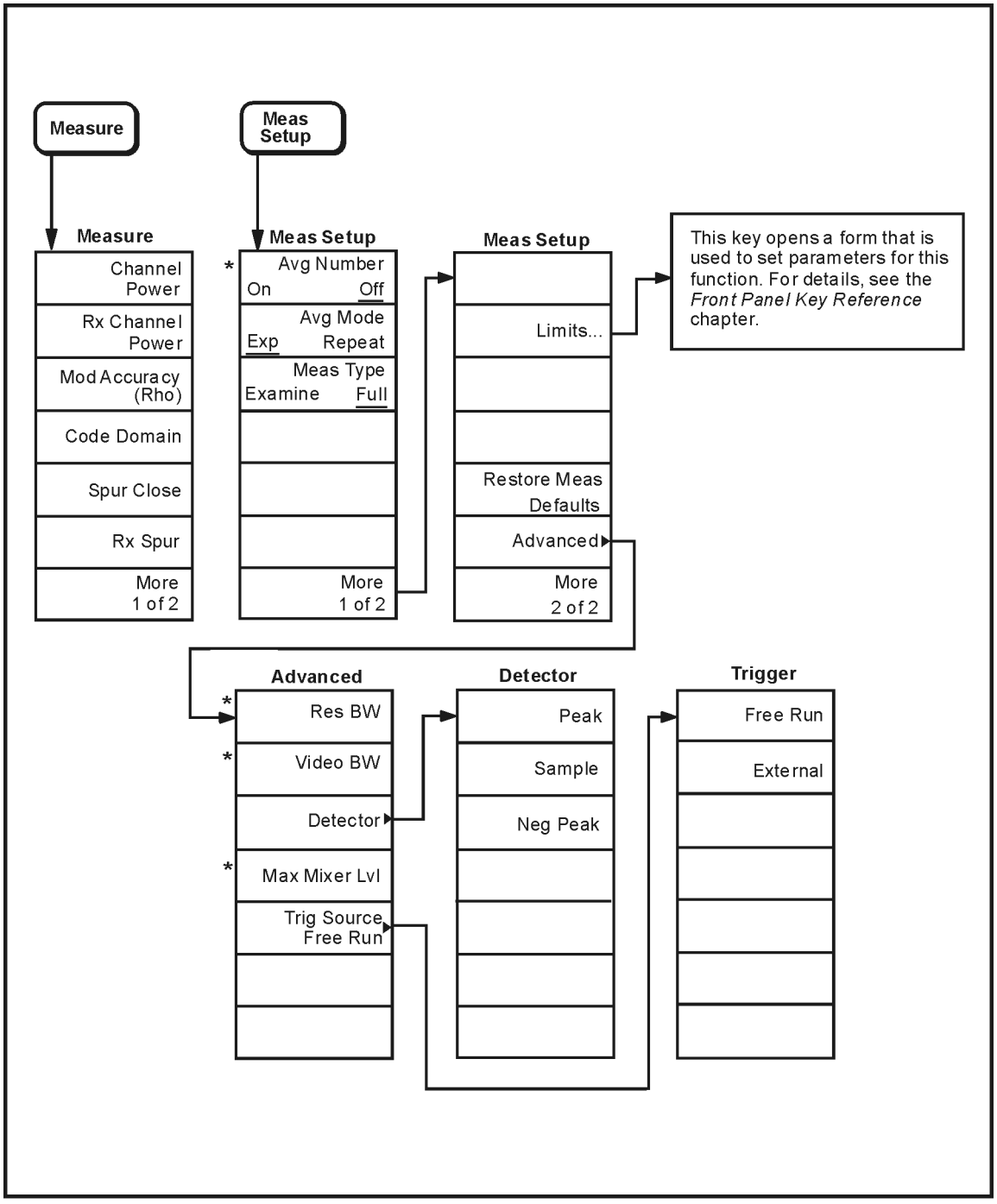
ph810b

Receiver Spurious Measurement Setup Menus



a. When **Rx Spur** is selected a dialog box and a menu are displayed unless Preamp Dialogs are set to Off. This allows you to set a preamplifer.
b. When Continue is pressed a dialog box and a menu are displayed allowing you to continue or cancel (halt) the measurement.
c. The keys displayed will depend on the standard and tuning plan selected under the **Mode Setup** and **Radio** menu.
d. This menu item may change if no internal preamplifier is installed. ph89b
***** An active function that allows data entry.

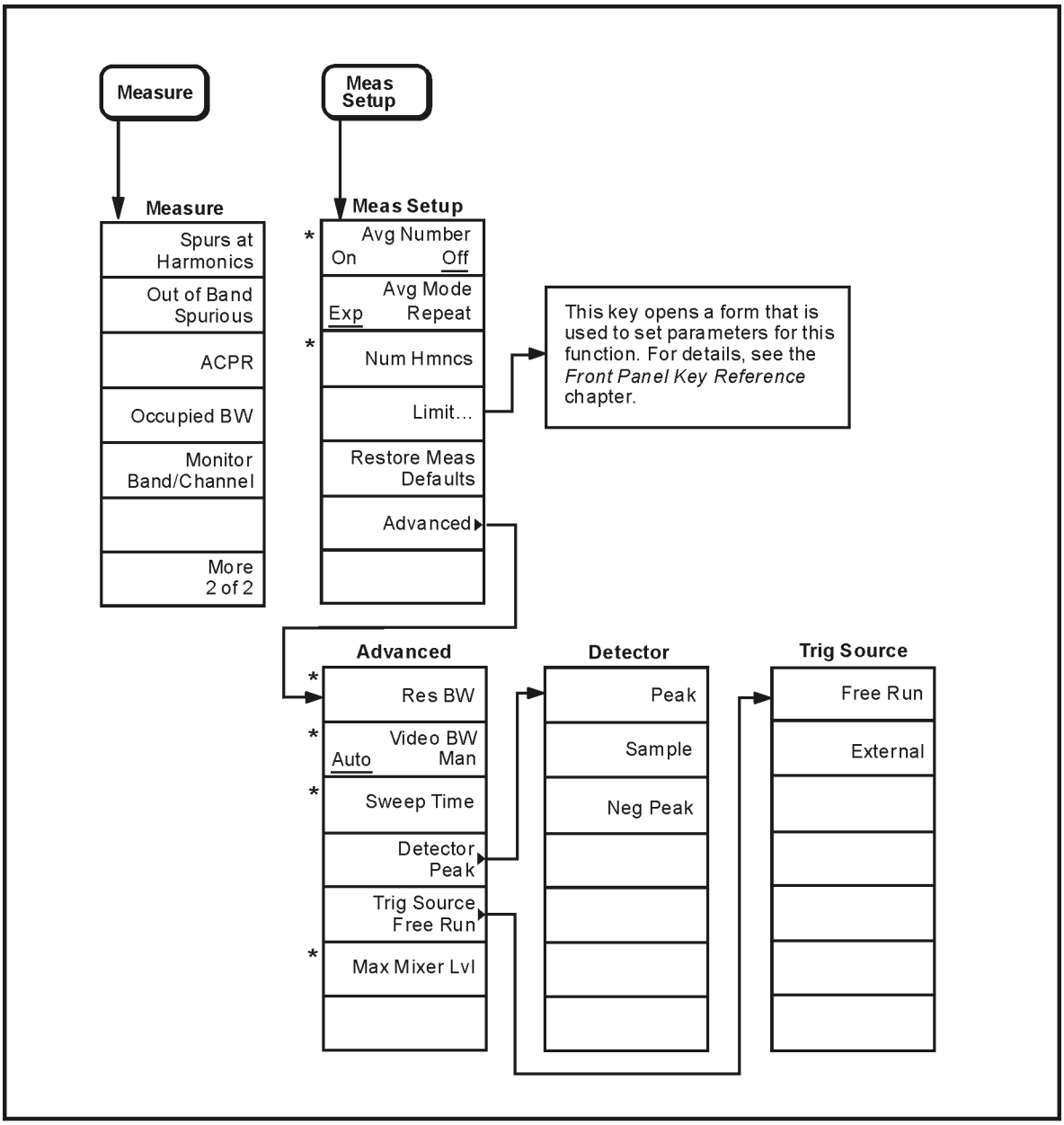
Spur Close (In Band Spurious) Measurement Setup Menus



* An active function that allows data entry.

ph88b

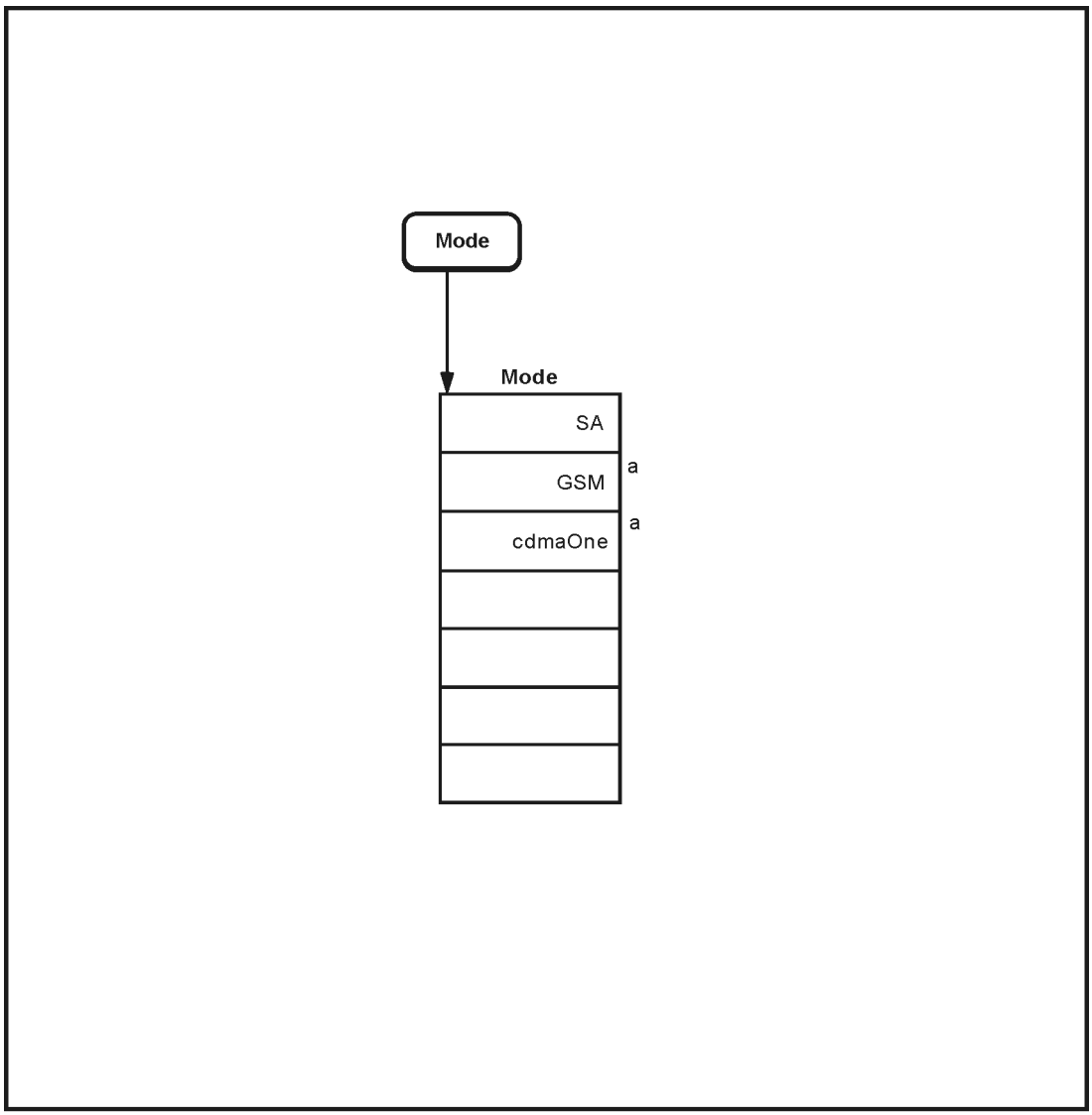
Spurs at Harmonics Measurement Setup Menus



* An active function that allows data entry.

ph87b

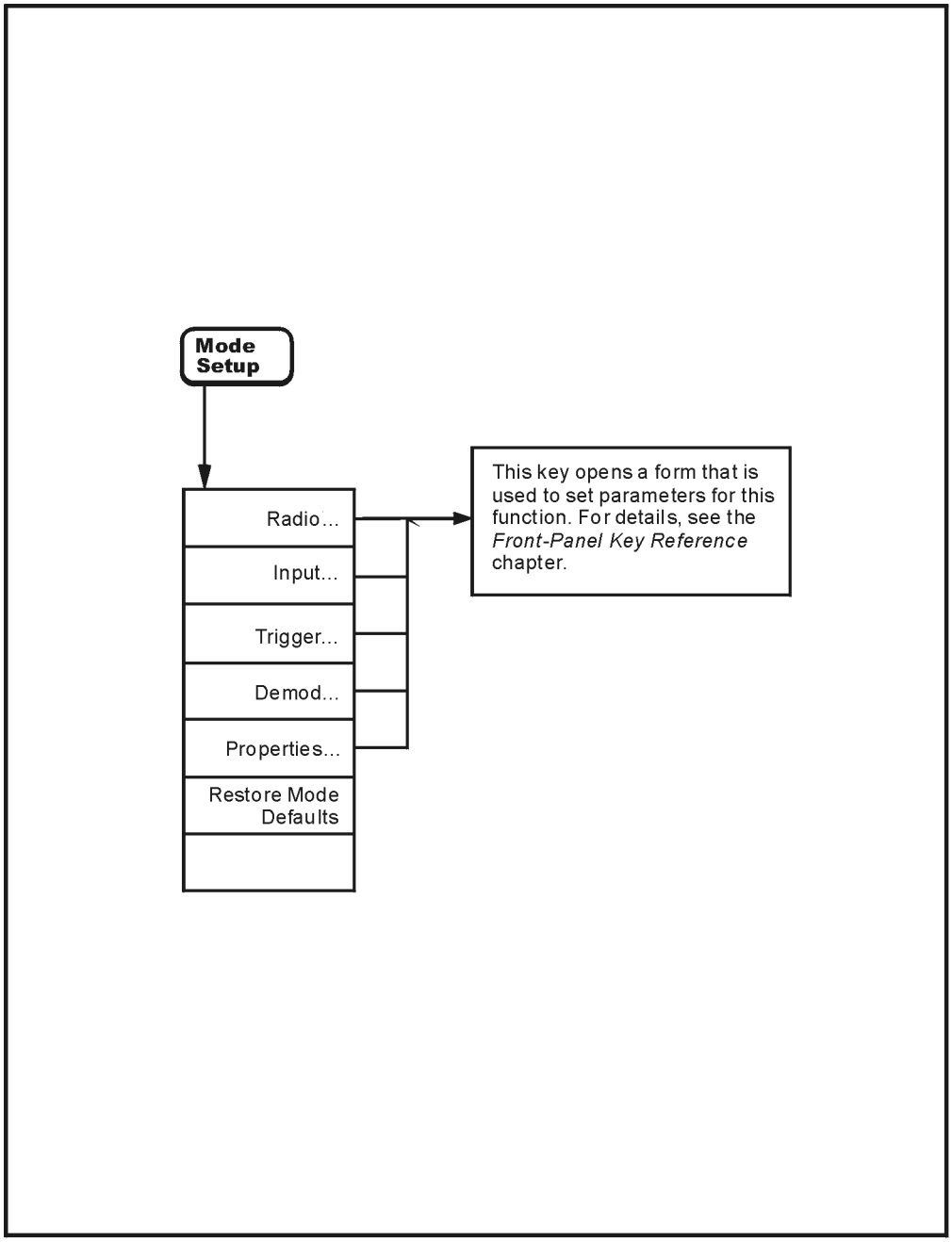
Mode Menu



a. These menu items will appear only when the measurement personality option has been installed, and the license key has been activated. They may appear in any order.

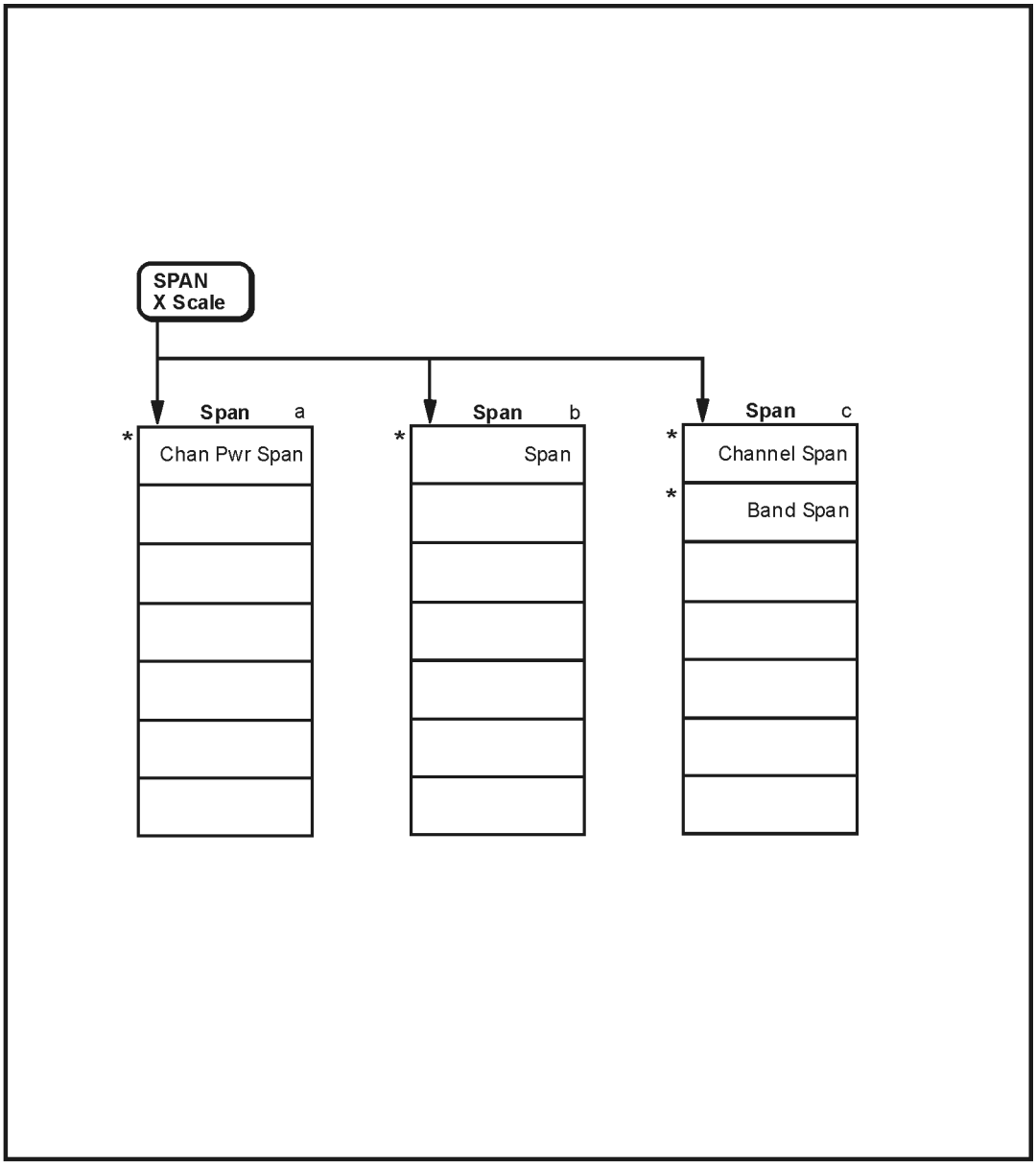
ph84b

Mode Setup Menus



pl720b

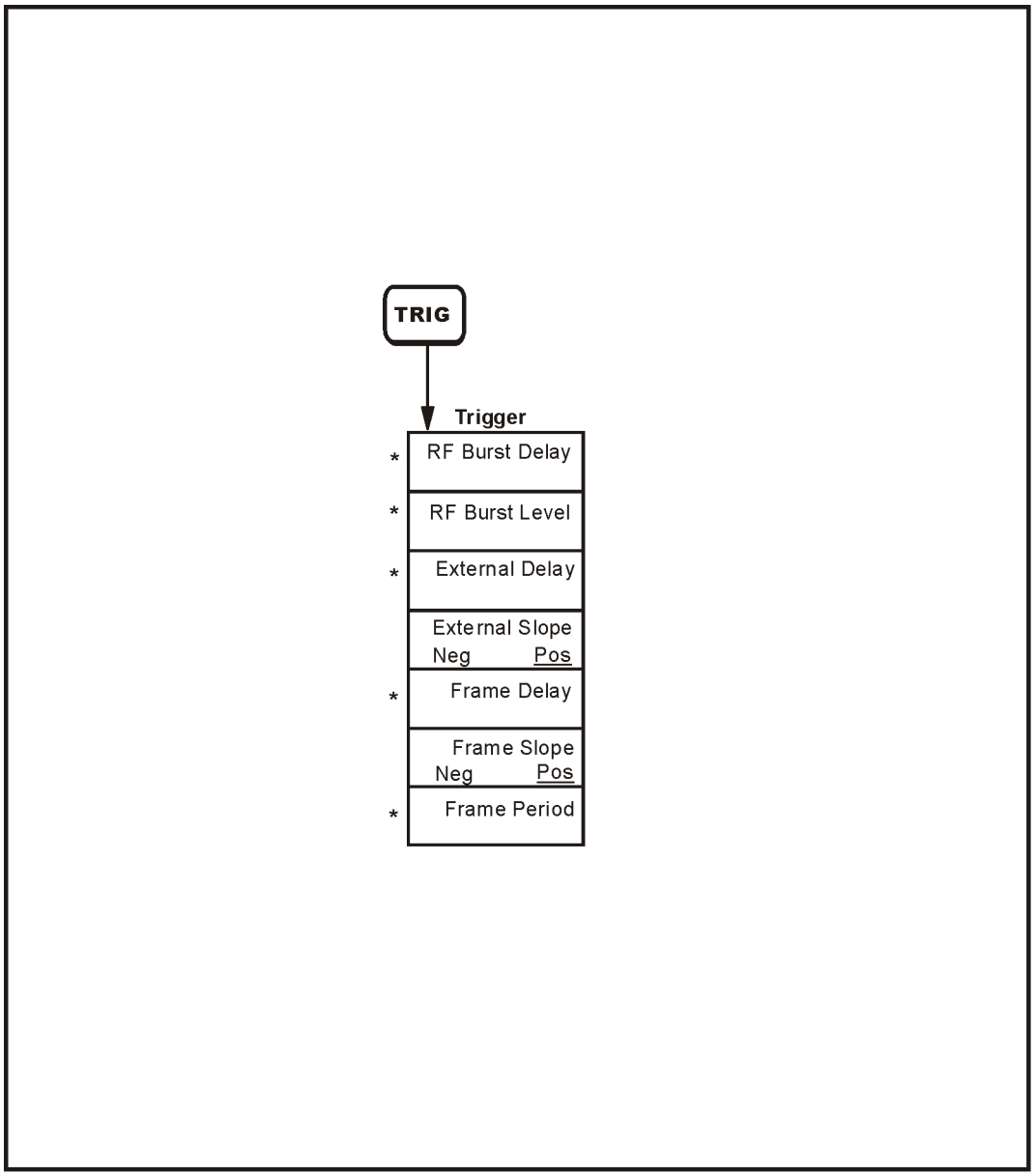
Span (X Scale) Menu



a. Appears only when **Channel Power** or **Rx Channel Power** is selected in the **Measure** menu.
b. Appears only when **Rx Spur**, **Out of Band Spurious**, **Spurs at Harmonics**, or **Occupied BW** or **Rx Channel Power** is selected in the **Measure** menu.
c. Appears only when **Monitor Band/Channel** is selected in the **Measure** menu.
***** An active function that allows data entry

ph86b

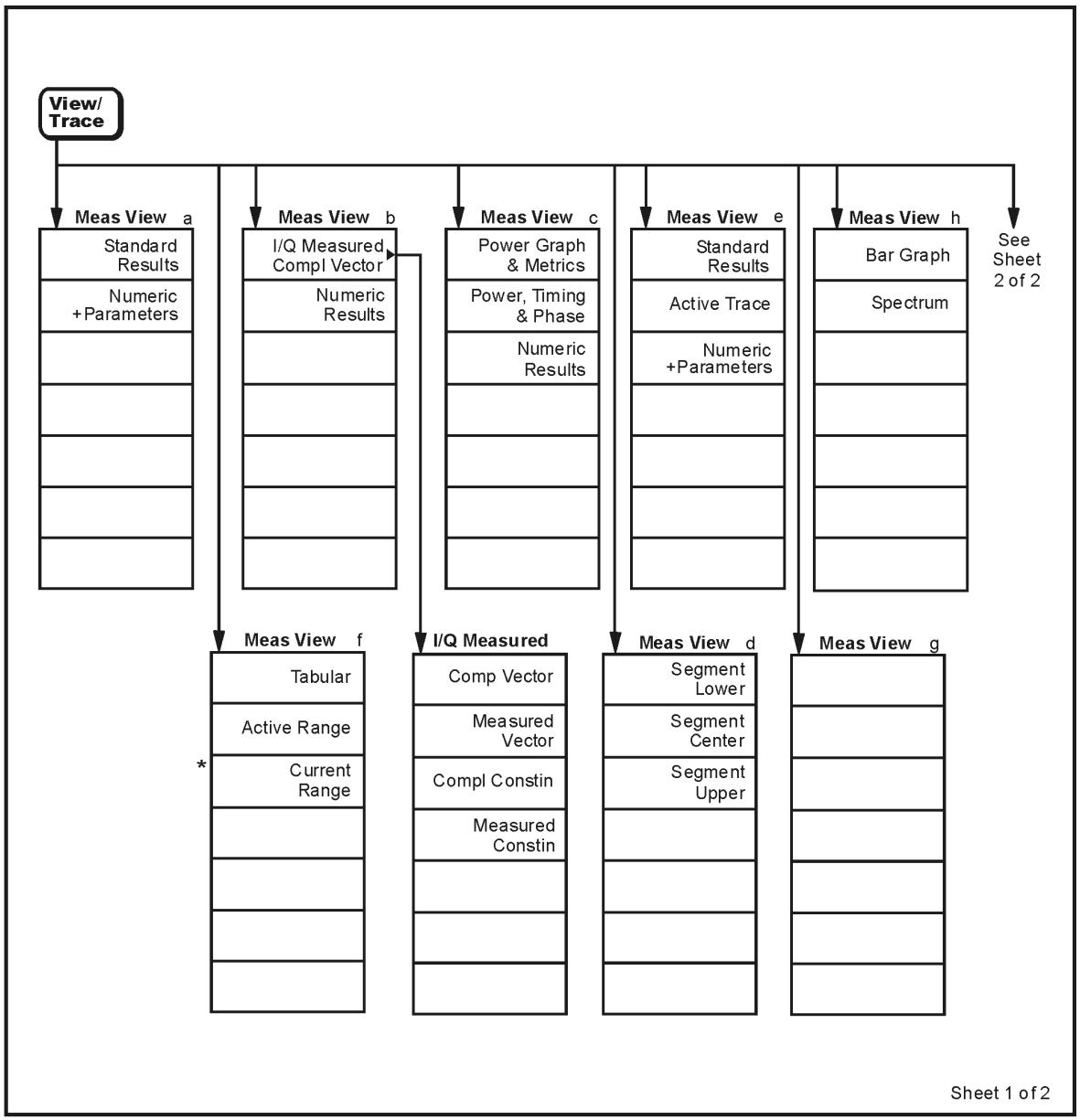
Trigger Menu



* An active function that allows data entry.

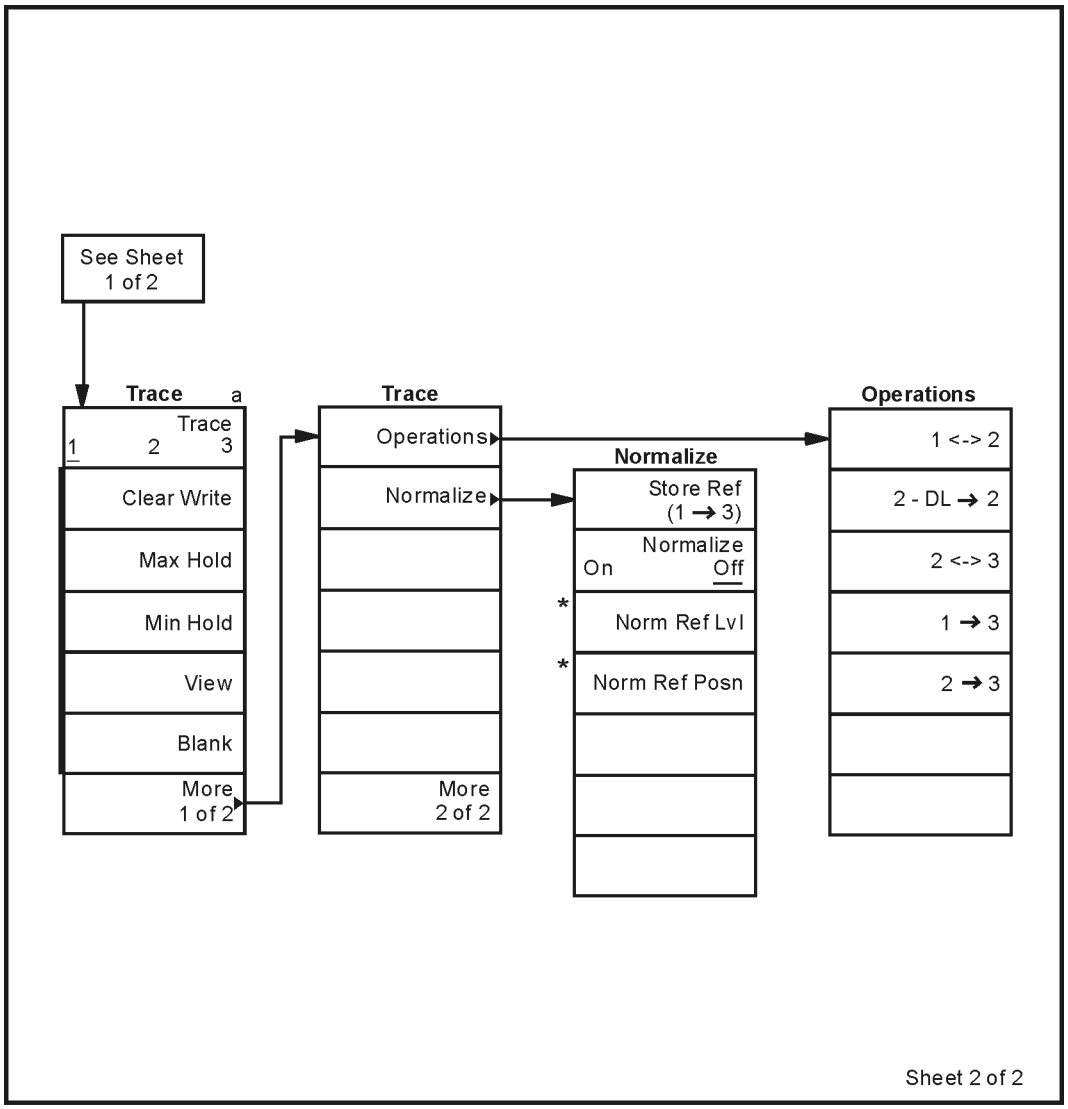
ph819b

View and Trace Menus



a. Appears only when **Channel Power, Rx Channel Power**, or **Occupied BW** is selected in the **MEASURE** menu.
b. Appears only when **Mode Accuracy (Rho)** is selected in the **MEASURE** menu.
c. Appears only when **Code Domain Power** is selected in the **MEASURE** menu.
d. Appears only when **Spur Close** is selected in the **MEASURE** menu.
e. Appears only when **Receiver Spurious** is selected in the **MEASURE** menu.
f. Appears only when **Out of Band Spurious** is selected in the **MEASURE** menu.
g. Appears only when **Spurs at Harmonics** is selected in the **MEASURE** menu.
h. Appears only when **ACPR** is selected in the **MEASURE** menu.
***** An active function that allows data entry.

ph82b



a. Appears only when **Monitor Band/Channel** is selected in the **MEASURE** menu.

***** An active function that allows data entry.

ph85b

5 Front-Panel Key Reference

This chapter details the front-panel keys and menu keys that appear on the menu-maps presented in the previous chapter. The front-panel keys are listed alphabetically and are described with their associated menu keys. The menu keys are arranged as they appear in your analyzer menus.

Key Descriptions and Locations

This chapter provides information on only cdmaOne mode functions. The keys that are described are not available in the SA mode. In addition, keys that provide functions in cdmaOne mode that differ from the functions provided by that same key in the SA mode are described. Some keys provide less functions in cdmaOne mode than in the SA mode. However, the functions that are provided are identical to those provided in the SA mode. For those keys not described here, refer to the *ESA Spectrum Analyzers User's Guide*.

AMPLITUDE Y Scale

Activates the reference level function, if it is available, and accesses the amplitude menu keys. Amplitude menu keys are used for setting functions that affect the way data on the vertical axis is displayed or corrected.

Ref Level

If RF Input Range is set to manual, this key allows the reference level to be changed. This function is activated when **AMPLITUDE Y Scale** is pressed. The reference level is the amplitude power or voltage represented by the top graticule line on the display. Changing the value of the reference level changes the absolute amplitude level (in the selected amplitude units) of the top graticule line. The reference level can be changed using the step keys, the knob, or the numeric keypad. Pressing any digit, 0 through 9, on the numeric keypad brings up the terminator menu.

This key is grayed out and not available when **RF Input Range** is set to **Auto** on the **Input** form.

Attenuation

Sets the input attenuation in 5 dB increments. The analyzer input attenuator, which is normally coupled to the reference level control, reduces the power level of the analyzer input signal at the input mixer. Attenuation can be changed using the step keys, the knob, or the numeric keypad.

This key is grayed out and not available when **RF Input Range** is set to **Auto** on the **Input** form.

NOTE Step keys and knob can not be used to set Atten = 0. To set the attenuator to 0 dB you must use the keypad.

CAUTION To prevent damage to the input mixer, do not exceed a power level of +30 dBm at the input. To prevent signal compression, keep the power at the input mixer below 0 dBm. With the attenuator set to Auto, a signal at or below the reference level will result in a mixer level at or below –10 dBm.

Scale/Div

Sets the logarithmic units per vertical graticule division on the display. Scale/Div values may range from 0.1 to 20 dB per division.

Power Scale/Div

When the Code Domain measurement has been selected, this key allows you to set the logarithmic units per vertical graticule division on the Power Graphic display. Scale/Div values may range from 0.1 to 20 dB per division.

Timing Scale/Div When the Code Domain measurement has been selected, this key allows you to set the units per vertical graticule division on the Timing Graphic display. Scale/Div values may range from 1 ns to 1 s per division.

Phase Scale/Div When the Code Domain measurement has been selected, this key allows you to set the logarithmic units per vertical graticule division on the Phase Graphic display. Scale/Div values may range from 1 mrad to 62.8 rad per division.

Det/Demod

This front panel key accesses the Demod set of menu keys controlling parameters to demodulation functions. These parameters can be accessed and set using the **Mode Setup**, **Demod**... data form and menus, refer to Demodº on page 5-64.

Det/Demod Accesses the demodulation menu keys allowing you to set the type of **Time Ref Sync**, **Demod Trig**, and **PN Offset**.

Time Ref Sync Provides the menu keys that allow you to select the source for the time reference synchronization.

- **ESEC** Sets the synchronization to the even second clock of the base transceiver station. For synchronization to occur, an ESEC signal must be connected to the Ext Frame Sync input on the rear panel and the Demod Trigger source must be set to Frame Timer.
- **None** Disables synchronization.

Demod Trig Provides the menu keys that allow you to select the source for the demodulation synchronization trigger.

- **Free Run** The next measurement is immediately taken, capturing the signal asynchronously (also called immediate).
- **RF Burst** Sets the measurement trigger to the leading edge of a RF Burst signal. No measurement will be made unless a bursted signal is being measured.
- **External** Sets the trigger directly to an external signal connected to the rear-panel TRIGGER IN connector. No measurement will be made unless a signal is connected to the Trigger In connector on the rear panel.
- **Frame Timer** Sets the trigger to the internal frame timer that can be synchronized to an even second clock input. The frame timer has a default of 26.6667 ms period. This input ESEC signal is connected to the rear-panel Ext Frame Sync connector.

PN Offset

Activates the PN offset function allowing you to enter the PN Offset (also called Time Offset) of the base station being tested. This enables the instrument to determine the correct time offset values.

Time Offset indicates how well your transmitter signal is time-aligned to system time. The displayed measurement results value takes into account the PN Sequence Offset Index of your transmitter that you entered using the **PN Offset** key. The range is 0 to 511 × 64[chips]. The **PN Offset** key is duplicated in the Demod form under various measurements.

Display

This front panel key accesses the menu key that allows you to see and setup different measurement displays. For cdmaOne, it is used for the Modulation Accuracy (Rho) measurement.

I/Q Points Allows you to set the number of I/Q points used in the display.

Points/Chip Allows you to select the number of points for the trace to be interpolated to 1, 2, or 4 points/chip.

1 = only the decision points
2 = the decision points with one point between them
4 = the decision points with three points between them

NOTE With **Points/Chip** set to 1, only chip dots are displayed; no transition points are seen.

Chip Dots Allows you to set the chip dot function to **On** or **Off**.

On Enables the chip dots and they are shown on the display.

Off Disables the chip dots and they are not shown on the display.

NOTE With **Points/Chip** set to 1, chip dots are always displayed independent of the **Chip Dots** setting.

FREQUENCY Channel

This front panel key activates the RF Channel Number function, and accesses the menu of frequency functions. The center frequency values appear below the graticule on the display.

NOTE When changing both the center frequency and the span, change the frequency first since the span can be limited by the frequency value.

RF Channel Activates the RF channel number function allowing you to tune the analyzer frequency by channel number.

Channel Freq Activates the channel frequency function allowing you to enter the center frequency of the channel of interest.

Temp Ctr Freq Activates the temporary center frequency function allowing you to enter a frequency to temporarily change the channel frequency. The temporary center frequency will only be effective for the current measurement when selected. If the measurement is restarted or reselected, the center frequency is reset based on the channel frequency. The measurements affected by this key are Channel Power, Receive Channel Power, Rho, Code Domain, Monitor Band/Channel, and Occupied Bandwidth.

CF Step Auto Man Changes the step size for the Channel Frequency and Temp. Center Freq. function. Once a step size has been selected and the channel frequency or temporary frequency function is activated, the step keys change the 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. When auto-coupled, the center frequency step size is set to one channel width as defined by the selected Standard and tuning plan.

PN Offset Activates the PN offset function allowing you to enter the PN Offset (also called Time Offset) of the base station being tested. This enables the instrument to determine the correct time offset values.

Time Offset indicates how well your transmitter signal is time-aligned to system time. The displayed measurement results value takes into account the PN Sequence Offset Index of your transmitter that you entered using the **PN Offset** key. The range is 0 to 511 × 64[chips]. The **PN Offset** key is duplicated in the Demod form under various measurements and under Mode Setup.

Input/Output

This front panel key accesses the menu keys that allow you to set various input parameters affecting all measurements. These settings will not change if you leave and return to the cdmaOne mode.

Input Range

Accesses menu keys for you to select **Auto** or **Manual** function for the RF input range. If **Auto** is chosen, the instrument automatically sets the internal input attenuator and reference level based on the power level of the tuned carrier. If there are multiple carriers present, the total power might overdrive the front end. In this case you need to set the **Input Range** to **Manual** and enter the expected **Max Total Pwr**. **Manual** is also used if you want to hold the input attenuation constant (for the best relative power accuracy). For single carriers it is generally recommended to set the **Input Range** to **Auto**.

Auto — Allows auto ranging based on input signal power automatically setting the reference level and attenuation.

Manual — Sets the instrument to use the custom values for the input range that you enter by accessing the **Max Total Pwr** and **Input Atten** parameter fields described below.

NOTE For Mod Accuracy (Rho) and Code Domain, Auto is always used and any user entered parameters are ignored.

NOTE If **Noise Correction** *and* **Input Range** are both set to **Auto**, the internal input attenuator and reference level will only be set one time and not automatically update. A change in the input signal level may require an update of the internal input attenuator and reference level. In that case, you will need to press **Restart** to take a new measurement and reset the input attenuator and reference level. This will invalidate the noise floor calibration. You will then be prompted to perform another Noise Floor Calibration or to set **Noise Correction** to **Off** before proceeding with the measurement.

Max Total Pwr

Allows you to set the maximum total power at the UUT (Unit Under Test). This is the maximum expected value of the mean carrier power referenced to the output of the UUT (may include multiple carriers). The Max Total Pwr setting is coupled to the **Input Atten** setting. Changing **Max Total Power** will set the **Input Range** to **Manual**.

Input Atten

Allows you to set the input attenuator setting. The Input Atten setting is coupled to the Max Total Pwr setting. The **Input Atten** key displays the actual internal input attenuator value. Changing the input attenuation will set the **Input Range** to Manual.

NOTE

The **Max Total Pwr** and **Input Atten** settings are coupled together, so for a given measurement, changing the input **Max Total Pwr** by *n* dB changes the **Input Atten** by *n* dB, and vice-versa. Thus, you can directly set the analyzer input attenuation, or you can set it indirectly by specifying the maximum expected power at the UUT (**Max Total Pwr** setting).

Ext Atten

Allows you to enter the value for any attenuators used between the UUT and the analyzer. This will allow the instrument to display the measurement results referenced to the output of the UUT. This attenuation value is used by all measurements except **Rx Spur** and **Rx Channel Power**.

External Gain

Allows you to enter the external gain value of any amplifiers between the UUT and the analyzer. This will allow the instrument to display the measurement results referenced to the output of the UUT. This amplification value is used by only the **Rx Spur** and **Rx Channel Power** measurements.

Installer

This menu key, under the **System** and **Personalities** keys, accesses the Installer menu keys that allow you to install optional measurement personality software.

Next Item This allows you to scroll down the table of files being installed. This key will be grayed out if the last item is currently being shown.

Prev Item This allows you to scroll up the table of files being installed. This key will be grayed out if the first item is currently being shown.

Verify Disks This initiates the disk validation process causing the installer to read the install disks and validate the checksums for all the files. Once the installer has read a complete disk, a prompt pop-up will be shown which will request you to insert the next disk and press **Verify Disks** again. When the disk verification is running, **Install Now** and **Exit Install** will be grayed out.

Install Now This initiates the installation process causing the installer to begin the installation of the personality. It will begin reading the first disk. Its progress can be tracked in the status bar and the file table Status field. Once the current disk has been read, a popup will be shown requesting you to insert the next disk and press **Install Now** again. When installation is running, **Verify Disks** and **Exit Installation** will be grayed out.

Abort Install This key is active when **Install Now** or **Verify Disks** has been pressed. It allows you to interrupt the current install. When pressed, it will put up a pop-up message which asks if the user really wants to abort. Depending on how far the installer got, aborting the install may cause the installer to completely remove the currently installed personality. Before aborting the process and removing the installed personality, the installer will display a warning message.

Exit Install This causes the installer to exit the installation program and returns you to the SA mode.

Meas Setup

Displays a menu that allows the user to enter custom setup parameters for a measurement. The setup menu displayed depends on the measurement selected in the **MEASURE** menu. Refer to individual measurements to see specific parameters that can be accessed.

ACPR Meas Setup Menu Keys

To access the following keys for setting up an adjacent channel power measurement, press **MEASURE**, **ACPR** and then the front panel **Meas Setup** key.

Meas Setup

Displays a menu that allows the user to enter custom setup parameters for a measurement. The setup menu displayed depends on the measurement selected in the **MEASURE** menu.

Avg Number
On Off

Allows you to specify the number of measurements that will be averaged. After the specified number of averaged measurements, the **Avg Mode** setting determines the averaging action. You can also set the averaging function to **On** or **Off**.

On Enables the measurement averaging.

Off Disables the measurement averaging.

NOTE Trace values are not averaged. Measurement result values are averaged.

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 measurements (average count) is reached.

Exp 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.

Chan Integ BW

Allows you to specify the channel integration bandwidth used in calculating the power in the channel. The range is 1.0000 kHz to 20 MHz and is normally set to 1.23 MHz.

Meas Type

Allows you to access the menu to select one of the measurement reference types.

Total Pwr Ref Sets the reference to the total carrier power.

PSD Ref Sets the reference to the averaged power spectral density of the carrier.

Ofs & Limits Access menus allowing you to select the **Offset** and set the **Offset Freq**, **Ref BW**, **ABS Limit**, **Fail Type**, **Rel Lim (Car)**, and **Rel Lim (PSD)**.

Offset Allows you to select one of five offsets (**A** through **E**). Only one selection at a time (A, B, C, D, or E) is shown on this key label. The remaining softkeys on the **Ofs & Limits** menu then apply to the selected offset.

Offset Freq Allows you to enter an offset frequency value. The range is 0.0 Hz to 45.000 MHz. While this key is activated, enter an offset value from the numeric keypad by terminating with one of the frequency unit keys shown. Offsets are defaulted according to the selected standard.

One offset frequency value corresponding to the **Offset** key selection is shown on this key label. This key also allows you to set the function mode to **On** or **Off**.

On Enables the offset corresponding to the selection shown on the **Offset** key label.

Off Disables the offset corresponding to the selection shown on the **Offset** key label. The offset bandwidth lines are removed from the graph display and the offset information is removed from the data display.

Ref BW Allows you to enter a reference bandwidth ranging from 300 Hz to 20.0000 MHz. When this parameter is changed, the integration bandwidth `Ref BW` in the results display summary data window changes to that value.

ABS Limit Allows you to enter an absolute limit value ranging from -200.00 to 50.00 dBm.

Fail Type Allows you to access the following menu to select one of the logic keys for fail conditions between the measurement results and the test limits:

AND Fail is shown if one of the relative ACPR measurement results is larger than **Rel Lim (Car)** or **Rel Lim (PSD)** AND one of the absolute ACPR measurement results is larger than **Abs Limit**.

OR Fail is shown if one of the relative ACPR measurement results is larger than **Rel Lim (Car)** or **Rel Lim (PSD)** OR one of the absolute ACPR measurement results is larger than **Abs Limit**.

Absolute Fail is shown if one of the absolute ACPR measurement results is larger than the absolute limit.

Relative Fail is shown if one of the relative ACPR measurement results is larger than **Rel Lim (Car)** or **Rel (PSD)**.

Off No test of the measurement results is made.

Rel Lim (Car) Allows you to enter a relative limit value of the carrier level ranging from –200.00 to 50.00 dBc..

Rel Lim (PSD) Allows you to enter a relative limit value of the power spectral density level ranging from –200.00 to 50.00 dB.

Advanced Accesses an advanced function menu allowing you to set Adjacent Channel Power Ratio measurement parameters for **Trig Source**, **Max Mixer Lvl**, **Res BW**, and **Sweep Points**.

Trig Source Accesses the trigger source menu allowing you to set the source that will be used for the measurement.

Free Run The next measurement is immediately taken, capturing the signal asynchronously (also called immediate).

External Uses the rear panel external trigger input signal to trigger the measurement.

Max Mixer Lvl Allows you to set the maximum power level at the input of the mixer for the measurement. The instrument uses this value to automatically set the required input attenuation to maintain the mixer input power below this level.

Res BW Allows you to set the resolution bandwidth used for the measurement and to set the function mode to **Auto** or **Man**. If span is set to a value greater than 5 MHz, minimum resolution bandwidth is limited to 1 kHz.

Auto Sets the resolution bandwidth mode to automatic using the calculated default bandwidth value.

Man Sets the resolution bandwidth mode to manual using the user-defined bandwidth.

Sweep Points Allows you to set the number of trace points taken with each sweep. The range is 101 to 8192.

Channel Power Measurement Setup

To access the following keys for setting up a Channel Power measurement, press **MEASURE**, **Channel Power** and then the front panel **Meas Setup** key.

Meas Setup

Displays a menu that allows the user to enter custom setup parameters for a measurement. The setup menu displayed depends on the measurement selected in the **MEASURE** menu.

Avg Number
On Off

Allows you to specify the number of measurements that will be averaged. After the specified number of average counts, the **Avg Mode** setting determines the averaging action. You can also set the averaging function to **On** or **Off**.

On Enables the measurement averaging.

Off Disables the measurement averaging.

NOTE Trace values are not averaged. Measurement result values averaged.

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 measurements (average count) is reached.

Exp 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.

Integ BW

Allows you to specify the channel integration bandwidth used in calculating the power in the channel. This bandwidth is normally 1.23 MHz.

Chan Pwr Span

Allows you to set the analyzer span for the Channel Power measurement.

Noise Correction

Allows you to set the noise floor correction function to **Auto** or **Off**.

Noise floor correction removes the effects of analyzer noise, improving accuracy when necessary. The correction is applied when channel power is less than the noise correction threshold (set on the **Properties**... form under **Mode Setup**) above the measured analyzer noise floor. `Noise Corrected` appears in the lower left corner of the measurement results area to indicate that noise correction is being applied.

When channel power is less than the analyzer noise floor, the error message `CH Power < SA Noise Pwr, Pwr Accuracy Degraded` is displayed. When channel power is below this level, the measurement uncertainty is too large to make a reliable measurement. The minimum displayable noise-corrected channel power is 6 dB below the analyzer noise floor.

On Enables the measurement noise correction, when needed.

Off Disables the measurement noise correction.

NOTE The current Noise Floor Calibration will be invalid if any of the following are changed: resolution bandwidth (**Res BW**), video bandwidth (**Video BW**), **Channel Freq**, **Ref Level**, or **Span**.

NOTE If **Noise Correction** *and* **RF Input Range** are both set to **Auto**, the internal input attenuator and reference level will only be set one time and not automatically update. A change in the input signal level may require an update of the internal input attenuator and reference level. In that case, you will need to press **Restart** to take a new measurement and reset the input attenuator and reference level. This will invalidate the noise floor calibration. You will then be prompted to perform another Noise Floor Calibration or to set **Noise Correction** to **Off** before proceeding with the measurement.

Limits... Accesses the limits data form and associated limit menus allowing you to set the upper and lower pass/fail limits for the Channel Power measurement.

Chan Pow Allows you to set the value for the pass/fail limit test. The upper and lower limits are set and enabled separately.

On Enables the pass/fail test.

Off Disables the pass/fail test.

Restore Meas Defaults Sets up the instrument parameters for the measurement using the factory default instrument settings. (This only affects measurement parameters for this measurement and does not affect any mode parameters.) If you have made any manual changes to the measurement parameters, restoring the measurement defaults will ensure standard compliant measurements.

Advanced

Accesses an advanced function menu allowing you to set Channel Power measurement parameters for **Res BW**, **Trigger**, and **Max Mixer Lvl**. If span is set to a value greater then 5 MHz, minimum resolution bandwidth is limited to 1 kHz.

Res BW

Allows you to set the resolution bandwidth used for the measurement and to set the function mode to **Auto** or **Man**.

Auto

Sets the resolution bandwidth mode to automatic using the calculated default bandwidth value.

Man

Sets the resolution bandwidth mode to manual using the user-defined bandwidth.

Trigger

Accesses the trigger source menu allowing you to set the source that will be used for the measurement.

Free Run

The next measurement is immediately taken, capturing the signal asynchronously (also called immediate).

External

Uses the rear panel external trigger input signal to trigger the measurement.

Max Mixer Lvl

Allows you to set the maximum power level at the input of the mixer for the measurement. The instrument uses this value to automatically set the required input attenuation to maintain the mixer input power below this level.

Code Domain Measurement Setup

To access the following keys for setting up a Code Domain measurement, press **MEASURE**, **Code Domain** and then the front panel **Meas Setup** key.

Meas Setup

Displays a menu that allows the user to enter custom setup parameters for a measurement. The setup menu displayed depends on the measurement selected in the **MEASURE** menu.

Avg Frames On Off

Accesses the averaging function allowing you to specify the number of measurements that will be averaged. After the specified number of average counts, the averaging mode (termination control) setting determines the averaging action. You can also set the averaging function to **On** or **Off**.

On	Enables the measurement averaging.
Off	Disables the measurement averaging.

NOTE The scalar results values are averaged–not trace values–when **Avg Frames** is set to **On**.

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 measurements (average count) is reached.

Exp	After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.
Repeat	After the average count is reached, the averaging is reset and a new average is started.

Meas Interval

Allows you to set the length of the measurement interval.

Method

Accesses menu keys allowing you to set the measurement method to **Power** or **Timing and Phase**.

Power	Measures the code domain power of all 64 Walsh channels.
Timing and Phase	Measures the code domain power, code domain timing, and code domain phase of all active Walsh channels.

Act Set Th Allows you to set the active code channel threshold value. Walsh channels with power less than this value, will be treated as Inactive traffic channels.

Spectrum Allows you to set the measurement demodulation spectrum to **Normal** or **Invert**.

- **Normal** The normal spectrum is used
- **Invert** Specifies phase inversion where the sign of 'Q' is reversed.

Demod... Accesses the demod setup form and menu keys. Refer to Demod° on page 5-64 for additional information.

Limits... Accesses the limits data form and associated menus allowing you to set the upper or lower pass/fail limits for the measurement.

- **Est. Rho** Estimated Rho allows you to set the value for the pass/fail limit test.
  - **On** Enables the pass/fail test.
  - **Off** Disables the pass/fail test.
- **Relative Time** Allows you to set the value for the pass/fail limit test when method is set to Timing Phase. When this test is enabled, each Walsh code channel is tested against this limit.
  - **On** Enables the pass/fail test.
  - **Off** Disables the pass/fail test.
- **Relative Phase** Allows you to set the value for the pass/fail limit test when method is set to Timing Phase. When this test is enabled, each Walsh code channel is tested against this limit.
  - **On** Enables the pass/fail test.
  - **Off** Disables the pass/fail test.

Restore Meas Defaults Sets up the instrument parameters for the measurement using the factory default instrument settings. (This only affects measurement parameters for this measurement and does not affect any mode parameters.) If you have made any manual changes to the measurement parameters, restoring the measurement defaults will ensure standard compliant measurements.

Advanced Accesses advanced function menus allowing you to set channel power measurement parameters for **Max Mixer Lvl**.

Max Mixer Lvl Allows you to set the maximum power level at the input of the mixer for the measurement. The instrument uses this value to automatically set the required input attenuation to maintain the mixer input power below this level.

Modulation Accuracy (Rho) Measurement Setup

To access the following keys for setting up a Modulation Accuracy measurement, press **MEASURE**, **Mod Accuracy (Rho)** and then the front panel **Meas Setup** key.

Meas Setup

Displays a menu that allows the user to enter custom setup parameters for a measurement. The setup menu displayed depends on the measurement selected in the **MEASURE** menu.

Avg Frames On Off

Accesses the averaging function allowing you to specify the number of measurements that will be averaged. After the specified number of average counts, the averaging mode (termination control) setting determines the averaging action. You can also set the averaging function to **On** or **Off**.

On Enables the measurement averaging.

Off Disables the measurement averaging.

NOTE The scalar results values are averaged–not trace values–when **Avg Frames** is set to **On**.

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 measurements (average count) is reached.

Exp After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.

Repeat After the average count is reached, the averaging is reset and a new average is started.

Meas Interval

Allows you to set the length of the measurement interval. This is the length of the time record.

Spectrum

Allows you to set the measurement demodulation spectrum to **Normal** or **Invert**.

Normal The normal spectrum is used

Invert Specifies phase inversion where the sign of 'Q' is reversed.

Demod...

Accesses the demod setup form and menu keys. Refer to Demodº on page 5-64 for additional information.

Limits...

Accesses the limits data form and associated limit menus allowing you to set the upper or lower pass/fail limits for the measurement.

Rho Allows you to set the value for the pass/fail limit test.

- **On** Enables the pass/fail test.
- **Off** Disables the pass/fail test.

Time Offset Allows you to set the value for the pass/fail limit test.

- **On** Enables the pass/fail test.
- **Off** Disables the pass/fail test.

Freq Error Allows you to set the value for the pass/fail limit test.

- **On** Enables the pass/fail test.
- **Off** Disables the pass/fail test.

Carrier FT Allows you to set the value for the pass/fail limit test.

- **On** Enables the pass/fail test.
- **Off** Disables the pass/fail test.

EVM Allows you to set the value for the pass/fail limit test.

- **On** Enables the pass/fail test.
- **Off** Disables the pass/fail test.

Mag Error Allows you to set the value for the pass/fail limit test.

- **On** Enables the pass/fail test.
- **Off** Disables the pass/fail test.

Phase Error Allows you to set the value for the pass/fail limit test.

- **On** Enables the pass/fail test.
- **Off** Disables the pass/fail test.

Restore Meas Defaults

Sets up the instrument parameters for the measurement using the factory default instrument settings. (This only affects measurement parameters for this measurement and does not affect any mode parameters.) If you have made any manual changes to the measurement parameters, restoring the measurement defaults will ensure standard compliant measurements.

Advanced Accesses advanced function menus allowing you to adjust **Max Mixer Lvl** for Modulation Accuracy measurement.

Max Mixer Lvl Allows you to set the maximum power level at the input of the mixer for the measurement. The instrument uses this value to automatically set the required input attenuation to maintain the mixer input power below this level.

Monitor Band/Channel Measurement Setup

To access the following keys for setting up a Monitor Band/Channel measurement, press **MEASURE**, **Monitor Band/Channel** and then the front panel **Meas Setup** key.

Meas Setup

Displays a menu that allows the user to enter custom setup parameters for a measurement. The setup menu displayed depends on the measurement selected in the **MEASURE** menu.

Avg Number
On Off

Allows you to specify the number of measurements that will be averaged. After the specified number of average counts, the **Avg Mode** setting determines the averaging action. You can also set the averaging function to **On** or **Off**.

On Enables the measurement averaging.

Off Disables the measurement averaging.

NOTE Trace values are averaged. Measurement results values are taken from the averaged trace values.

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 measurements (average count) is reached.

Exp After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.

Repeat After the average count is reached, the averaging is reset and a new average is started.

Method

Allows you to select the monitoring method, **Band** or **Channel**. This sets the measurement to sweep the frequency-domain spectrum of the transmit or receive channel or band. The frequency for the channels or bands are standard and tuning plan specific. For more information on the tuning plan frequencies, refer to Table 1-1 on page 1-4.

Band Sets the method to Band and displays the frequency spectrum of the selected block.

Channel Sets the method to Channel and displays the frequency spectrum of the selected channel.

Channel Setup Accesses menu keys allowing you to set the channel parameters of **Res BW**, **Video BW**, **Max Hold**, and **Detector** for the measurement. If span is set to a value greater then 5 MHz, minimum resolution bandwidth is limited to 1 kHz.

Res BW Allows you to enter the resolution bandwidth value used for the measurement and to set the function mode to **Auto** or **Man**.

- **Auto** Sets the resolution bandwidth mode to automatic using the optimum calculated default bandwidth value.
- **Man** Sets the resolution bandwidth mode to manual using the user-defined bandwidth value.

Video BW Allows you to enter the video bandwidth value used for the measurement and to set the function mode to **Auto** or **Man**.

- **Auto** Sets the video bandwidth mode to automatic using the optimum calculated default bandwidth value.
- **Man** Sets the video bandwidth mode to manual using the user-defined bandwidth value.

Max Hold Allows you to turn maximum hold trace average feature **On** or **Off** for the measurement. Maximum hold displays and holds the maximum responses of a signal. When maximum hold is turned on, trace averaging is turned off.

- **On** Enables the maximum hold function.
- **Off** Disables the maximum hold function.

Detector Accesses menu keys allowing you to set the detector mode type to **Peak**, **Sample**, or **Neg Peak**.

- **Peak** Sets the detector mode to positive peak.
- **Sample** Sets the detector mode to sample.
- **Neg Peak** Sets the detector mode to negative peak.

Int Preamp Accesses menu keys allowing you to set the internal preamplifier **On** or **Off**.

- **On** Enables the internal preamplifier.
- **Off** Disables the internal preamplifier.

Band Setup Accesses menu keys allowing you to set the band parameters **Res BW**, **Video BW**, **Max Hold**, **Detector**, **Band**, and **Block** for the measurement. If span is set to a value greater then 5 MHz, minimum resolution bandwidth is limited to 1 kHz.

Res BW Allows you to enter the resolution bandwidth value used for the measurement and to set the function mode to **Auto** or **Man**.

- **Auto** Sets the resolution bandwidth mode to automatic using the optimum calculated default bandwidth value.
- **Man** Sets the resolution bandwidth mode to manual using the user-defined bandwidth value.

Video BW Allows you to enter the video bandwidth value used for the measurement and to set the function mode to **Auto** or **Man**.

- **Auto** Sets the video bandwidth mode to automatic using the optimum calculated default bandwidth value.
- **Man** Sets the video bandwidth mode to manual using the user-defined bandwidth value.

Max Hold Allows you to turn maximum hold trace average feature **On** or **Off** for the measurement. Maximum hold displays and holds the maximum responses of a signal. When maximum hold is turned on, trace averaging is turned off.

- **On** Enables the maximum hold function.
- **Off** Disables the maximum hold function.

Detector Accesses menu keys allowing you to set the detector mode type to **Peak**, **Sample**, or **Neg Peak**.

- **Peak** Sets the detector mode to positive peak.
- **Sample** Sets the detector mode to sample.
- **Neg Peak** Sets the detector mode to negative peak.

Band Allows you to select the band monitoring method to **Tx** or **Rx**.

- **Tx** Sets the instrument to monitor the transmit band of the selected device (mobile or base station).

Rx Sets the instrument to monitor the receive band of the selected device (mobile or base station).

Block Accesses the block options menu keys allowing you to set the band monitor measurement to monitor all of the tuning bands or one of the tuning plan frequency blocks. The tuning plans allow the following block options:

IS-95A—Full, A", A, B, A', or B'

J-STD-008—Full, A, B, C, D, E, or F

ARIB STD-T53—Full, A, B, or C

TTA.KO-06.0003 (Korea Cell)—Full, A", A, B, A', or B'

TTA.KO-06.0013 (Korea PCS)—Full, A, B, or C

Refer to Table 1-1 on page 1-4 for more information on tuning plans and band parameters.

Int Preamp Accesses menu keys allowing you to set the internal preamplifier **On** or **Off**.

On Enables the internal preamplifier.

Off Disables the internal preamplifier.

Restore Meas Defaults Sets up the instrument parameters for the measurement using the factory default instrument settings. (This only affects measurement parameters for this measurement and does not affect any mode parameters.) If you have made any manual changes to the measurement parameters, restoring the measurement defaults will ensure standard compliant measurements.

Occupied Bandwidth Measurement Setup

To access the following keys for setting up an occupied bandwidth measurement, press **MEASURE**, **Occupied BW** and then the front panel **Meas Setup** key.

Meas Setup

Displays a menu that allows the user to enter custom setup parameters for a measurement. The setup menu displayed depends on the measurement selected in the **MEASURE** menu.

Avg Number
On Off

Allows you to specify the number of measurements that will be averaged. After the specified number of average counts, the **Avg Mode** setting determines the averaging action. You can also set the averaging function to **On** or **Off**.

On Enables the measurement averaging.

Off Disables the measurement averaging.

NOTE Trace values are not averaged. Measurement result values averaged.

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 measurements (average count) is reached.

Exp After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.

Repeat After the average count is reached, the averaging is reset and a new average is started.

Occ BW % Pwr

Allows you to change the percentage of the total input signal power used to determine the occupied bandwidth.

Emiss BW X dB

X dB sets the number of decibels below the highest point in the signal at which to measure the emission bandwidth.

Restore Meas Defaults

Sets up the instrument parameters for the measurement using the factory default instrument settings. (This only affects measurement parameters for this measurement and does not affect any mode parameters.) If you have made any manual changes to the measurement parameters, restoring the measurement defaults will ensure standard compliant measurements.

Limits...

Accesses the limits data form and associated limit menus allowing you to set the upper and lower pass/fail limits for the occupied bandwidth measurement.

Occupied BW

Allows you to set the value for the pass/fail limit test. The upper and lower limits are set and enabled separately.

On Enables the pass/fail test.

Off Disables the pass/fail test.

Emission BW

Allows you to set the value for the pass/fail limit test. The upper and lower limits are set and enabled separately.

On Enables the pass/fail test.

Off Disables the pass/fail test.

Advanced

Accesses advanced function menus allowing you to set occupied bandwidth measurement parameters for **Max Hold**, **Res BW**, **Video BW**, **Detector**, **Max Mixer Lvl**, and **Trigger**.

Max Hold

Allows you to turn maximum hold trace feature **On** or **Off** for the measurement. Maximum hold displays and holds the maximum responses of a signal.

On Enables the maximum hold function.

Off Disables the maximum hold function.

Res BW

Allows you to enter the resolution bandwidth value used for the measurement.

Video BW

Allows you to enter the video bandwidth value used for the measurement.

Detector

Accesses menu keys allowing you to set the detector mode type to **Peak**, **Sample**, or **Neg Peak**.

Peak Sets the detector mode to positive peak.

Sample Sets the detector mode to sample.

Neg Peak Sets the detector mode to negative peak.

Trigger

Accesses the trigger source menu allowing you to set the source that will be used for the measurement.

Free Run The next measurement is immediately taken, capturing the signal asynchronously (also called immediate).

	External	Uses the rear panel external trigger input signal to trigger the measurement.

Max Mixer Lvl Allows you to set the maximum power level at the input of the mixer for the measurement. The instrument uses this value to automatically set the required input attenuation to maintain the mixer input power below this level.

Out of Band Spurious Measurement Setup

To access the following keys for setting up an occupied bandwidth measurement, press **MEASURE**, **Out of Band Spurs** and then the front panel **Meas Setup** key.

Meas Setup

Displays a menu that allows the user to enter custom setup parameters for a measurement. The setup menu displayed depends on the measurement selected in the **MEASURE** menu.

Avg Number
On Off

Allows you to specify the number of measurements that will be averaged. After the specified number of average counts, the **Avg Mode** setting determines the averaging action. You can also set the averaging function to **On** or **Off**.

On Enables the measurement averaging.

Off Disables the measurement averaging.

NOTE Trace values are averaged. Measurement results values are taken from the averaged trace values.

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 measurements (average count) is reached. This key is only available when the view mode is set to **Active Range**.

Exp After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.

Repeat After the average count is reached, the averaging is reset and a new average is started.

Edit Table...

Accesses the edit table menu keys and the data table allowing you to set the **Range**, **CF**, **Span**, **RBW**, **VBW**, **ABS Limit**, **REL Limit**, **Fail Type**, and **Detector**.

Range Allows you to set the number of ranges to measure, from 1 to 20.

Ctr Freq Allows you to enter the center frequency for the range you will measure.

Span Allows you to enter the frequency span for the range you will measure.

Res BW Allows you to enter the resolution bandwidth value used for the measurement.

Video BW Allows you to enter the video bandwidth value used for the measurement.

Rel Limit Allows you to enter the relative limit value for the range you will measure.

Abs Limit Allows you to enter the absolute limit value for the range you will measure.

Fail Type Accesses the limit test type menu allowing you to set the test type to **Off**, **ABS**, **REL**, **ABS AND REL**, or **ABS OR REL**.

- **Off** Disables the limits test.
- **Absolute** Sets the limits test to use the absolute limit.
- **Relative** Sets the limits test to use the relative limit.
- **OR** Sets the limits test to use the absolute or relative limit. If the test fails either limit, the range fails the test.
- **AND** Sets the limits test to use the absolute and relative limit. The test must fail both limits for the range to fail the test.

Detector Accesses menu keys allowing you to set the detector mode type to **Peak**, **Sample**, or **Neg Peak**.

- **Peak** Sets the detector mode to positive peak.
- **Sample** Sets the detector mode to sample.
- **Neg Peak** Sets the detector mode to negative peak.

Delete Row Allows you to delete the current row from the table. You can not delete a row if it is the only row in the table.

Save Table Allows you to save the current spurs table to disk.

Load Table Allows you to load the last saved spurs table to disk.

Show Results Returns you to the results menu allowing you to view results data of more than one page.

Oversweep Allows you to set the oversweep factor and set the oversweep function **On** or **Off**. Oversweep allows you to sweep faster than normal auto coupled time with degraded amplitude accuracy.

- **On** Enables the oversweep function.
- **Off** Disables the oversweep function.

Spurs/Range Allows you to set the number of spurs that will be measured in each range.

Advanced Accesses advanced function menus allowing you to set out of band spurious measurement parameters for **Trigger**, and **Max Mixer Lvl**.

Max Mixer Lvl Allows you to set the maximum power level at the input of the mixer for the measurement. The instrument uses this value to automatically set the required input attenuation to maintain the mixer input power below this level.

Trigger Accesses the trigger source menu allowing you to set the source that will be used for the measurement.

Free Run The next measurement is immediately taken, capturing the signal asynchronously (also called immediate).

External Uses the rear panel external trigger input signal to trigger the measurement.

Restore Meas Defaults Sets up the instrument parameters for the measurement using the factory default instrument settings. (This only affects measurement parameters for this measurement and does not affect any mode parameters.) If you have made any manual changes to the measurement parameters, restoring the measurement defaults will ensure standard compliant measurements.

Receive Channel Power Measurement Setup

To access the following keys for setting up a Receive Channel Power measurement, press **MEASURE**, **Rx Channel Power** and then the front panel **Meas Setup** key.

Meas Setup

Displays a menu that allows the user to enter custom setup parameters for a measurement. The setup menu displayed depends on the measurement selected in the **MEASURE** menu.

Avg Number
On Off

Allows you to specify the number of measurements that will be averaged. After the specified number of average counts, the **Avg Mode** setting determines the averaging action. You can also set the averaging function to **On** or **Off**.

On Enables the measurement averaging.

Off Disables the measurement averaging.

NOTE Trace values are not averaged. Measurement result values are averaged.

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 measurements (average count) is reached.

Exp After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.

Repeat After the average count is reached, the averaging is reset and a new average is started.

Integ BW

Allows you to specify the range of integration used in calculating the power in the receiver channel. This is the bandwidth where the power is measured, normally 1.23 MHz.

Chan Pwr Span

Allows you to set the analyzer span for the channel power measurement.

Noise Correction Allows you to set the noise floor correction function to **On** or **Off**.

Noise floor correction removes the effects of analyzer noise, when necessary. The correction is applied when channel power is less than the noise correction threshold (set on the **Properties**... form under **Mode Setup**) above the measured analyzer noise floor. `Noise Corrected` appears in the lower left corner of the measurement results area to indicate that noise correction is being applied.

When channel power is less than the analyzer noise floor, the error message `CH Power < SA Noise Pwr, Pwr Accuracy Degraded` is displayed. When channel power is below this level, the measurement uncertainty is too large to make a reliable measurement. The minimum displayable noise-corrected channel power is 6 dB below the analyzer noise floor.

On Enables the measurement noise correction, when needed.

Off Disables the measurement noise correction.

NOTE The current Noise Floor Calibration will be invalid if any of the following are changed: resolution bandwidth (**Res BW**), video bandwidth (**Video BW**), **Channel Freq**, **Ref Level**, or **Span**.

NOTE If **Noise Correction** *and* **RF Input Range** are both set to **Auto**, the internal input attenuator and reference level will only be set one time and not automatically update. A change in the input signal level may require an update of the internal input attenuator and reference level. In that case, you will need to press **Restart** to take a new measurement and reset the input attenuator and reference level. This will invalidate the noise floor calibration. You will then be prompted to perform another Noise Floor Calibration or to set **Noise Correction** to **Off** before proceeding with the measurement.

Int Preamp Allows you to set the internal preamplifier function to **On** or **Off**.

On Enables the preamplifier.

Off Disables the preamplifier.

Limits... Accesses the limits data form and associated limit menus allowing you to set the upper and lower pass/fail limits for the channel power measurement.

RX Chan Pow Allows you to set the value for the pass/fail limit test. The upper and lower limits are set and enabled separately.

On Enables the pass/fail test.

Off Disables the pass/fail test.

Restore Meas Defaults

Sets up the instrument parameters for the measurement using the factory default instrument settings. (This only affects measurement parameters for this measurement and does not affect any mode parameters.) If you have made any manual changes to the measurement parameters, restoring the measurement defaults will ensure standard compliant measurements.

Advanced

Accesses an advanced function menu allowing you to set Receive Channel Power measurement parameters for **Res BW**, **Trig Source**, and **Max Mixer Lvl**.

Res BW

Allows you to set the resolution bandwidth used for the measurement and to set the function mode to **Auto** or **Man.**

Auto

Sets the resolution bandwidth mode to automatic using the calculated default bandwidth value.

Man

Sets the resolution bandwidth mode to manual using the user-defined bandwidth value.

Trig Source

Accesses the trigger source menu allowing you to set the source that will be used for the measurement.

Free Run

The next measurement is immediately taken, capturing the signal asynchronously (also called immediate).

External

Uses the rear panel external trigger input signal to trigger the measurement.

Max Mixer Lvl

Allows you to set the maximum power level at the input of the mixer for the measurement. The instrument uses this value to automatically set the required input attenuation to maintain the mixer input power below this level.

Receiver Spurious Measurement Setup

To access the following keys for setting up a receiver spurious measurement, press **MEASURE**, **Rx Spur**, and then the front panel **Meas Setup** key.

Meas Setup

Displays a menu that allows the user to enter custom setup parameters for a measurement. The setup menu displayed depends on the measurement selected in the **MEASURE** menu.

Avg Number
On Off

Allows you to specify the number of measurements that will be averaged. After the specified number of average counts, the **Avg Mode** setting determines the averaging action. You can also set the averaging function to **On** or **Off**.

On Enables the measurement averaging.

Off Disables the measurement averaging.

NOTE Trace values are averaged. Measurement results values are taken from the averaged trace values.

Avg Mode

This key is always grayed out and set to **Repeat**. After reaching the average count, the trace is repeat averaged. This means that the averaging is reset and a new average is started for each measurement.

Exp After the average count is reached, the trace is exponentially averaged. This means that each successive measurement is exponentially weighted and combined with the existing average.

Repeat After reaching the average count, the trace is repeat averaged. This means that the averaging is reset and a new average is started for each measurement.

Band Select

Accesses menu keys allowing you to set the **Transmit** or **Receive** band for the measurement.

Tx Sets the instrument to measure spurs in the transmit band of the input signal.

Rx Sets the instrument to measure spurs in the receive band of the input signal.

Block

Accesses the block options menu keys allowing you to set the instrument to measurement spurs in all of the tuning bands or one of the tuning plan frequency blocks. The tuning plans allow the following block options:

IS-95A—Full, A", A, B, A', or B'

J-STD-008—Full, A, B, C, D, E, or F

ARIB STD-T53—Full, A, B, or C

TTA.KO-06.0003 (Korea Cell)—Full, A", A, B, A', or B'

TTA.KO-06.0013 (Korea PCS)—Full, A, B, or C

Refer to Table 1-1 on page 1-4 for more information on tuning plans and band parameters.

Int Preamp

Allows you to set the internal preamplifier function to **On** or **Off**.

On Enables the preamplifier.

Off Disables the preamplifier.

Limits...

Accesses the limits data form and associated limit menus allowing you to set the upper pass/fail limits for the transmit and receive band.

Tx Band Allows you to set the value for the transmit band pass/fail limit test.

On Enables the pass/fail test.

Off Disables the pass/fail test.

Rx Band Allows you to set the value for the receive band pass/fail limit test.

On Enables the pass/fail test.

Off Disables the pass/fail test.

Restore Meas Defaults

Sets up the instrument parameters for the measurement using the factory default instrument settings. (This only affects measurement parameters for this measurement and does not affect any mode parameters.) If you have made any manual changes to the measurement parameters, restoring the measurement defaults will ensure standard compliant measurements.

Advanced

Accesses advanced function menus allowing you to set receiver spurious measurement parameters for **Res BW**, **Video BW**, **Detector**, **Max Mixer Lvl**, and **Trigger**.

Res BW Allows you to enter the resolution bandwidth value used for the measurement.

Video BW Allows you to enter the video bandwidth value used for the measurement.

Detector Accesses menu keys allowing you to set the detector mode type to **Peak**, **Sample**, or **Neg Peak**.

- **Peak** Sets the detector mode to positive peak.
- **Sample** Sets the detector mode to sample.
- **Neg Peak** Sets the detector mode to negative peak.

Trig Source Accesses the trigger source menu allowing you to set the source that will be used for the measurement.

- **Free Run** The next measurement is immediately taken, capturing the signal asynchronously (also called immediate).
- **External** Uses the rear panel external trigger input signal to trigger the measurement.

Max Mixer Lvl Allows you to set the maximum power level at the input of the mixer for the measurement. The instrument uses this value to automatically set the required input attenuation to maintain the mixer input power below this level.

Spur Close (In Band Spurs) Measurement Setup

To access the following keys for setting up a Spur Close measurement, press **MEASURE**, **Spur Close** and then the front panel **Meas Setup** key.

Meas Setup

Displays a menu that allows the user to enter custom setup parameters for a measurement. The setup menu displayed depends on the measurement selected in the **MEASURE** menu.

Avg Number
On Off

Allows you to specify the number of measurements that will be averaged. After the specified number of average counts, the **Avg Mode** setting determines the averaging action. You can also set the averaging function to **On** or **Off**.

On Enables the measurement averaging.

Off Disables the measurement averaging.

NOTE Trace values are averaged. Measurement results values are taken from the averaged trace values.

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 measurements (average count) is reached. This menu key is only available when **Examine** is selected under the **Meas Type** key.

Exp After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.

Repeat After the average count is reached, the averaging is reset and a new average is started.

Meas Type

Allows you to select the type of in band spurs measurement you will conduct. This determines which portion of the spectrum will be measured and displayed on the screen.

Examine In single sweep mode—measures spurs in the upper, lower, and center segments and then displays the segment with the highest power spur. You can select other segments for display using the **View** key.

In the continuous mode—measures spurs in the upper, lower, and center segment. It then continuously measures the segment with the highest power spur. You can select other segments for display using the **View** key. The initial spur values are held and the marker value is updated with the current spur value found on each sweep.

Full In single sweep mode—measures the spurs in the upper, lower, and center segments and then displays the segment with the highest power spur. You can select other segments for display using the **View** key.

In continuous mode—measures spurs in the upper, lower, and center segment. It then continuously cycles through segments. Unlike **Examine**, all results values are updated with the current spur values found on each sweep.

Limits... Accesses the limits data form and the associated menus allowing you to set the pass/fail limit On or Off, and select the limits source for the spur close measurement.

State Allows you to set the state of the pass/fail limit test.

On Enables the pass/fail test.

Off Disables the pass/fail test.

Limits From Allows you to select the source for the pass/fail limit test values.

Standard Sets the limit test value source to the tuning plan default values.

File Sets the limit test value source to a file containing a set of user defined values.

Restore Meas Defaults Sets up the instrument parameters for the measurement using the factory default instrument settings. (This only affects measurement parameters for this measurement and does not affect any mode parameters.) If you have made any manual changes to the measurement parameters, restoring the measurement defaults will ensure standard compliant measurements.

Advanced Accesses advanced function menus allowing you to set Spur Close measurement parameters for **Res BW**, **Video BW, Detector, Trigger**, and **Max Mixer Lvl**.

Res BW Allows you to enter the resolution bandwidth value used for the measurement.

Video BW Allows you to enter the video bandwidth value that will be used for the measurement.

Detector Accesses menu keys allowing you to set the detector mode type to **Peak**, **Sample**, or **Neg Peak**.

- **Peak** Sets the detector mode to positive peak.
- **Sample** Sets the detector mode to sample.
- **Neg Peak** Sets the detector mode to negative peak.

Max Mixer Lvl Allows you to set the maximum power level at the input of the mixer for the measurement. The instrument uses this value to automatically set the required input attenuation to maintain the mixer input power below this level.

Trigger Accesses the trigger source menu allowing you to set the source that will be used for the measurement.

- **Free Run** The next measurement is immediately taken, capturing the signal asynchronously (also called immediate).
- **External** Uses the rear panel external trigger input signal to trigger the measurement.

Spurs at Harmonics Measurement Setup

To access the following keys for measuring spurs at the harmonics of the channel frequency, press **MEASURE**, **Spurs at Harmonics** and then the front panel **Meas Setup** key.

Meas Setup

Displays a menu that allows the user to enter custom setup parameters for a measurement. The setup menu displayed depends on the measurement selected in the **MEASURE** menu.

Avg Number
On Off

Allows you to specify the number of measurements that will be averaged. After the specified number of average counts, the **Avg Mode** setting determines the averaging action. You can also set the averaging function to **On** or **Off**.

On Enables the measurement averaging.

Off Disables the measurement averaging.

NOTE Trace values are averaged. Measurement results values are taken from the averaged trace values.

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 measurements (average count) is reached.

Exp After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.

Repeat After the average count is reached, the averaging is reset and a new average is started.

Num Hmncs

Allows you to set the number of harmonics to measure before computing the total harmonic distortion. The minimum number is 2 (only the fundamental and second harmonic will be measured). The maximum number is 10 or the maximum number of harmonics measurable within the frequency range of the spectrum analyzer, which ever is less.

Limits...

Accesses the limits data form and associated limit menus allowing you to set the upper absolute and relative pass/fail limits for the harmonics measurement.

Absolute Allows you to set the value for the upper pass/fail limit test for the maximum (absolute) amplitude of the spurs.

On Enables the pass/fail test.

Off Disables the pass/fail test.

Relative Allows you to set the value for the upper pass/fail limit test for the relative (difference from the fundamental frequency level) spur level in dBc.

On Enables the pass/fail test.

Off Disables the pass/fail test.

Restore Meas Defaults Sets up the instrument parameters for the measurement using the factory default instrument settings. (This only affects measurement parameters for this measurement and does not affect any mode parameters.) If you have made any manual changes to the measurement parameters, restoring the measurement defaults will ensure standard compliant measurements.

Advanced Accesses advanced function menus allowing you to set Spurs at Harmonics measurement parameters for **Res BW**, **Video BW**, **Detector**, **Max Mixer Lvl**, and **Trigger**.

Res BW Allows you to enter the resolution bandwidth value used for the measurement.

Video BW Allows you to enter the video bandwidth value that will be used for the measurement and to set the function mode to **Auto** or **Man**.

Auto Sets the video bandwidth mode to automatic using the optimum calculated default bandwidth value.

Man Sets the video bandwidth mode to manual using the user-defined bandwidth value.

Sweep Time Allows you to set the sweep time that will be used for the measurement.

Detector Accesses menu keys allowing you to set the detector mode type to **Peak**, **Sample**, or **Neg Peak**.

Peak Sets the detector mode to positive peak.

Sample Sets the detector mode to sample.

Neg Peak Sets the detector mode to negative peak.

Trigger Accesses the trigger source menu allowing you to set the source that will be used for the measurement.

- **Free Run** The next measurement is immediately taken, capturing the signal asynchronously (also called immediate).
- **External** Uses the rear panel external trigger input signal to trigger the measurement.

Max Mixer Lvl Allows you to set the maximum power level at the input of the mixer for the measurement. The instrument uses this value to automatically set the required input attenuation to maintain the mixer input power below this level.

MEASURE

Accesses menu keys that allow you to make Adjacent Channel Power Ratio, Channel Power, Spur Close, Code Domain, Spurs at Harmonics, Modulation Accuracy (Rho), Monitor Band/Channel, Occupied Bandwidth (including emission bandwidth), Out of Band Spurious, Receive Channel Power, and Receiver Spurious measurements.

Channel Power

Channel Power

Measure the total RMS power in the Integration Bandwidth set by **Integ BW**. The default integration bandwidth is1.23 MHz, the standard cdmaOne channel bandwidth.

The result variance can be reduced by increasing the number of power averaged measurements.

The average power spectral density per hertz over the integration bandwidth is also displayed. For spans greater than the integration bandwidth, the bandwidth edges are indicated by two vertical lines.

Pressing **Meas Setup** after **Channel Power** has been selected will access the Channel Power measurement setup menu. Pressing **Meas Control** after **Channel Power** has been selected will access the Channel Power measurement control menu allowing you to pause or restart your measurement, or toggle between continuous and single measurement.

Refer to Table 5-3 for standard specific default limits.

Table 5-1 Standard Specific Default Limits for Channel Power

Plan	Upper Limit	Lower Limit
TIA/EIA-IS-95-A (**IS-95-A**), TIA/EIA-95-B Cell (**TIA-95-B Cell**), TIA/EIA-95-C Cell (**TIA-95-C Cell**), TTA.KO-06.0003 (**Korea Cell**), ANSI-J-STD-008 (**J-STD-008**), TIA/EIA-95-B PCS (**TIA-95-B PCS**), TIA/EIA-95-C PCS (**TIA-95-C PCS**), TTA.KO-06.0013 (**Korea PCS**), ARIB STD-T53 (**ARIB 53**)	50 dBm	–50 dBm

Receive Channel Power

Rx Channel Power

Measure the total RMS power at the receive frequency corresponding to the current Channel Number. For more details, see the explanation for **Channel Power on page 5-48**.

For best Receive Channel Power sensitivity, an external low noise preamplifier should be used.

Int Preamp Allows you to set the internal preamplifier function to **On** or **Off**.

- **On** Enables the preamplifier.
- **Off** Disables the preamplifier.

Ext. Gain Allows you to enter the gain value of an external preamplifier so the measurement results will be referenced to the signal source, not the RF Input level.

Pressing **Meas Setup** after **RX Channel Power** has been selected will access the Receive Channel Power measurement setup menu. Pressing **Meas Control** after **RX Channel Power** has been selected will access the Receive Channel Power measurement control menu allowing you to pause or restart your measurement, or toggle between continuous and single measurement.

Refer to Table 5-3 for standard specific default limits.

Table 5-2 Standard Specific Default Limits for Receive Channel Power

Plan	Upper Limit	Lower Limit
TIA/EIA-IS-95-A (**IS-95-A**), TIA/EIA-95-B Cell (**TIA-95-B Cell**), TIA/EIA-95-C Cell (**TIA-95-C Cell**), TTA.KO-06.0003 (**Korea Cell**) ANSI-J-STD-008 (**J-STD-008**), TIA/EIA-95-B PCS (**TIA-95-B PCS**), TIA/EIA-95-C PCS (**TIA-95-C PCS**), TTA.KO-06.0013 (**Korea PCS**), and ARIB STD-T53 (**ARIB 53**)	50 dBm	–50 dBm

Modulation Accuracy (Rho)

Mod Accuracy (Rho) The transmitter's modulated signal is compared to an ideal reference waveform. Rho values are in the range of 0 to 1. A value of 1 indicates perfect correlation to the reference (high modulation quality). The cdmaOne base station standards require that transmitters have a Rho performance of 0.912 or greater.

Rho measurement requires that the transmit signal have only the pilot channel active.

With the Rho measurement, the following data is provided:

- Rho - modulation quality
- Time Offset - how well your transmitter's signal is time-aligned to system time

- Frequency Error - the frequency difference between your transmitter's actual center frequency and the frequency (or channel) that you entered
- Carrier Feedthrough - measures the performance of the I/Q modulator of your transmitter
- EVM - rms Error Vector Magnitude
- Mag Error - rms Magnitude Error
- Phase Error - rms Phase Error

Refer to Table 5-3 for standard specific default limits.

Table 5-3 Standard Specific Default Limits for Modulation Accuracy

Plan	Rho Frequency Error	Rho	Time Offset	Carrier FT	EVM	Mag Error	Phase Error
TIA/EIA-IS-95-A (**IS-95-A**), TIA/EIA-95-B Cell (**TIA-95-B Cell**), TIA/EIA-95-C Cell (**TIA-95-C Cell**), TTA.KO-06.0003 (**Korea Cell**), and ARIB STD-T53 (**ARIB 53**)	43.5 Hz	0.912	10 µs	–40 dB	25%	25%	20 deg
ANSI-J-STD-008 (**J-STD-008**), TIA/EIA-95-B PCS (**TIA-95-B PCS**), and TIA/EIA-95-C PCS (**TIA-95-C PCS**)	99.5 Hz						
TTA.KO-06.0013 (**Korea PCS**)	93.5 Hz						

Code Domain

Code Domain

Measures the power, timing, and phase of the 64 Walsh channels in a single RF channel. The measurement method can be selected to either measure just code domain power, or to measure code domain power, timing, and phase. The measurement runs faster when measuring only code domain power.

Code Domain Phase displays the phase error for each of the 64 Walsh channels relative to the Pilot channel. Displays above the zero reference in the center of the screen indicate that the Walsh channel leads the Pilot channel; displays below the zero reference in the center of the screen indicate that the Walsh channel lags the Pilot channel.

Code Domain Timing displays the time offset for each of the 64 Walsh channels relative to the Pilot channel which is Walsh code zero. Displays above the reference indicate that the Walsh channel leads the Pilot channel; displays below the zero reference indicate that the Walsh channel lags the Pilot channel.

Rho (est) Estimated Modulation Accuracy (Rho), this provides an estimation of Rho when channels other than the pilot channel are active.

Time Ofs Time Offset indicates how well your transmitter signal is time-aligned to system time. The displayed value takes into account the PN Sequence Offset Index of your transmitter that you enter using the **PN Offset** key.

Freq Error Frequency Error is the frequency difference between your transmitter's actual center frequency and the frequency (or channel) that you entered.

Carrier FT Carrier Feedthrough is used to measure the performance of the I/Q modulator of your transmitter. Extremely low values indicate a very good I/Q modulator. Higher values indicate potential problems with the I/Q modulator. If Carrier Feedthrough measures higher than approximately –20 dBc, there may be problems with the base station.

Pilot Power in the Pilot channel, channel 0.

Paging Power in the Paging channel, channel 1.

Sync Power in the Sync channel, channel 32.

Avg AT Average Active Traffic Power (of all active Walsh channels). A Walsh channel is considered active if its power is above the value set by the **Active Set Th** key.

Max IT Maximum Inactive Traffic power (of all inactive Walsh channels).

Avg IT Average Inactive Traffic power (of any inactive Walsh channel) as set by **Act Set Th**.

Refer to Table 5-4 for standard specific default limits.

Table 5-4 Standard Specific Default Limits for Code Domain

Plan	Relative Phase	Estimated Rho	Relative Time
TIA/EIA-IS-95-A (**IS-95-A**), ANSI-J-STD-008 (**J-STD-008**), TTA.KO-06.0013 (**Korea PCS**), and TTA.KO-06.0003 (**Korea Cell**)	0.05 mRad	0.912	50 ms
TIA/EIA-95-B Cell (**TIA-95-B Cell**), TIA/EIA-95-C Cell (**TIA-95-C Cell**), TIA/EIA-95-B PCS (**TIA-95-B PCS**), TIA/EIA-95-C PCS (**TIA-95-C PCS**), and ARIB STD-T53 (**ARIB 53**)	0.15 mRad		

Spur Close (In Band Spurs)

Spur Close The transmit band spectrum is measured in several frequency segments using a 30 kHz resolution bandwidth. The channel power (integrated power in a 1.23 MHz bandwidth) is measured first, and then used as a reference for the measurement limit lines. The spectrum, centered around the carrier as well as above and below the carrier, is then measured. For each spectrum segment, the measurement looks for the largest spectrum peaks closest to the limit and reports them. The amplitude difference from peak to the limit line (Δ from Limit), the frequency difference from the peak to the center of the channel (Offset Freq), and the amplitude difference from the peak to the channel power (Δ from Carrier) are displayed. If the peak goes above the limit line and the limit state is set to On, the display will indicate FAIL. If **Marker** is on, the active marker is placed at the worst spur of the displayed segment.

The total CDMA channel power is measured using the power integration method. The reference level is set to the measured channel power.

The spectrum is measured in three frequency segments using a 30 kHz resolution bandwidth to achieve sufficient selectivity. The spectrum is then compared to the limit mask. The limit mask is based on the selected Standard and tuning plan or are read from a user entered file. Refer to Table 5-5 for an example of a user entered limit file based on the IS-95-A Standard. For the default spurious emissions limits and the related standards, refer to Table 5-6.

Table 5-5 Custom Limit File Example

File Content	Content Description (Based on Standard IS-95-A)
869.0e6	Effective band low edge frequency in Hz.
894.0e6	Effective band high edge frequency in Hz.
7500e3,1.98e6,0	Offset frequencies, a, b, c. Enter 0 if not using a frequency.
1,1,0,1,1	Indicates which offsets are to be used. Offsets are presented in the following sequence: A,B,C, blockedge, bandedge 0 = Don't use that offset 1 = Use that offset If a limit is indicated as used on this line, it must have values given in the following lines. The values must be in the same order as the offset sequence shown above. Each value must be presented in the following format: number of ranges used; 1,2 or 3 chanper1,chanpwr2; 0,0 when using 1 range <value>,0; when using 2 ranges <value>,<value>; when using 3 ranges <value> is a number either in dB or dBm: ABS = dB and REL = dBm failure type; ABS = absolute limit, REL = relative limit, AND = must fail both ABS and REL, OR = must fail either ABS or REL (This line must be repeated to each range used.)
1 0,–45,REL	Limit A is used from "offset a" to "offset b"
1 0,–60,REL	Limit B is used from "offset b" to "offset c"
	Limit C is used from "offset c" to "blockedge". Not used here.
1 –13,–60,OR	Limit D is used from "blockedge" to "bandedge"
1 –18.2,0,ABS	Limit E is used from "bandedge" to the limit of the measurement

Table 5-6 Spurious Emission Limits When Transmitting

Plan	Device Type	Frequency Offset	Channel Power Conditions	Limit[a]
TIA/EIA-IS-95-A (**IS-95-A**)	Base	> 750 kHz		–45 dBc@30 kHz
		> 1.98 MHz		–60 dBc@30 kHz
		In Tx band, out of block		Smaller of –13 dBm@30 kHz or –60 dBc@30 kHz
		Out of Tx band		–18.2 dBm@30 kHz
	Mobile	> 885 kHz		–42 dBc/30kHz
		> 1.98 MHz		–54 dBc/30kHz
		Out of band		–18.2 dBm@30 kHz
TTA.KO-06.0003 (**Korea Cell**)	Base	> 750 kHz		–45 dBc@30 kHz
		> 1.97 MHz		–60 dBc@30 kHz
		In Tx band, out of block		Smaller of –13 dBm@30 kHz or –60 dBc@30 kHz
		Out of Tx band		–18.2 dBm@30 kHz
	Mobile	> 885 kHz		–42 dBc/30kHz
		> 1.97 MHz		–54 dBc/30kHz
		In band, Out of block		–54 dBm@30 kHz
		Out of band		–18.2 dBm@30 kHz
TIA/EIA-95-B Cell (**TIA-95-B Cell**) and TIA/EIA-95-C Cell (**TIA-95-C Cell**)	Base	> 750 kHz		–45 dBc@30 kHz
		> 1.98 MHz	CHP < 28 dBm	–55 dBc@30 kHz
			28 dBm ≤ CHP < 33 dBm	–27 dBm@30 kHz
			CHP ≥ 33 dBm	–60 dBc@30 kHz
		> 3.125 MHz		–18.23 dBm@30 kHz
		Out of Tx band		–18.2 dBm@30 kHz
	Mobile	> 885 kHz		Larger of –42 dBc@30 kHz or –70.13 dBm@30 kHz
		> 1.98 MHz		–54 dBc/30kHz
		Out of band		–18.2 dBm@30 kHz

Table 5-6 Spurious Emission Limits When Transmitting (Continued)

Plan	Device Type	Frequency Offset	Channel Power Conditions	Limit[a]
TIA/EIA-95-B PCS (**TIA-95-B PCS**) and TIA/EIA-95-C PCS (**TIA-95-C PCS**)	Base	> 885 kHz		–45 dBc@30 kHz
		> 1.98 MHz	CHP < 28 dBm	–50 dBc@30 kHz
			28 dBm ≤ CHP < 33 dBm	–22 dBm@30 kHz
			CHP ≥ 33 dBm	–55 dBc@30 kHz
		> 2.25 MHz		–28.23 dBm@30 kHz
		Out of Tx band		–18.2 dBm@30 kHz
	Mobile	> 1.25 MHz		Larger of –42 dBc@30 kHz or –70.13 dBm@30 kHz
		> 1.98 MHz		Larger of –50 dBc@30 kHz or –70.13 dBm@30 kHz
		> 2.25 MHz		–28.23 dBm@30 kHz
		Out of band		–18.2 dBm@30 kHz
ARIB STD-T53 (**ARIB 53**)	Base	> 750 kHz		–45 dBc@30 kHz
		> 1.98 MHz		–60 dBc@30 kHz
		In Tx band, out of block		Smaller of –16 dBm@30 kHz or –60 dBc@30 kHz
		Out of Tx band	CHP ≤ 44 dBm	–31.23 dBm@30 kHz
			CHP > 44 dBm	Smaller of –2.23 dBm@30 kHz or –75.23 dBc@30 kHz
	Mobile	> 900 kHz		–42 dBc@30 kHz
		> 1.98 MHz		–54 dBc@30 kHz
		In Tx band, out of block	CHP < 30 dBm	–16 dBm@30 kHz
			CHP ≥ 30 dBm	Smaller of –26 dBm@30 kHz or –60 dBc@30 kHz
		Out of band	CHP ≤ 44 dBm	–31.23 dBm@30 kHz
			CHP > 44 dBm	Smaller of –2.23 dBm@30 kHz or –75.23 dBc@30 kHz

Table 5-6 Spurious Emission Limits When Transmitting (Continued)

Plan	Device Type	Frequency Offset	Channel Power Conditions	Limit[a]
ANSI-J-STD-008 (**J-STD-008**) and TTA.KO-06.0013 (**Korea PCS**)	Base	> 885 kHz		–45 dBc@30 kHz
		In Tx band, out of block		Larger of –28.23 dBm@30 kHz or –95.23 dBc@30 kHz
		Out of Tx band		–18.2 dBm@30 kHz
	Mobile	> 1.265 MHz		–42 dBc@30 kHz
		In Tx band, out of block		–28.23 dBm@30 kHz
		Out of Tx band		–18.2 dBm@30 kHz

a. To meet the limits in this table, all measurements must be made with 30 kHz resolution bandwidth.

Receiver Spurious

Rx Spur

Measure the receive or transmit band frequency spectrum. For best sensitivity, use the built-in preamplifier or an external low noise preamplifier.

The amplitude difference from a spurious signal to the limit line (ΔLim) and the absolute level are displayed for the three highest spurious signals.

Refer to Table 5-3 for standard specific default limits.

Table 5-7 Standard Specific Default Limits for Receiver Spurious

Plan	Tx Band Upper Limit	Rx Band Upper Limit
TIA/EIA-IS-95-A (**IS-95-A**), TIA/EIA-95-B Cell (**TIA-95-B Cell**), TIA/EIA-95-C Cell (**TIA-95-C Cell**), TTA.KO-06.0003 (**Korea Cell**), ANSI-J-STD-008 (**J-STD-008**), TIA/EIA-95-B PCS (**TIA-95-B PCS**), TIA/EIA-95-C PCS (**TIA-95-C PCS**), TTA.KO-06.0013 (**Korea PCS**) ARIB STD-T53 (**ARIB 53**)	–60 dBm	–80 dBm

Spurs at Harmonics

Spurs at Harmonics

Measures the power of the spurious emissions at the selected harmonic frequencies of the current channel using the selected resolution bandwidth filter. You can set the number of spurs to be measured. The attenuation is set to limit the carrier (fundamental) power at the spectrum analyzer input mixer to the value determined by **Max Mixer Lvl**.

Note that if the resolution bandwidth is much wider than the spectral width of each of the harmonics, the Spurs at Harmonics measurement is the same as a harmonics measurement. But, the spurious energy allowed at each harmonic is typically defined to be the power with a bandwidth that is narrower than the spectral width of each harmonic.

The average power level within the resolution bandwidth is the result for the harmonic. The results are displayed in tabular form. Both absolute and relative amplitude results are displayed, along with the amplitude difference from spur to the limit set for each amplitude result.

Note that this measurement assumes the carrier and any spurs are continuous (non-burst) signals.

Pressing **Meas Setup** after **Spurs at Harmonics** has been selected will access the measurement setup menu. Pressing **Meas Control** after **Spurs at Harmonics** has been selected will access the control menu allowing you to pause or restart your measurement, or toggle between continuous and single measurement.

Out of Band Spurious

Out of Band Spurious

Measure out of band spurious emissions in the user-specified ranges.

The attenuation is set to limit the carrier power at the spectrum analyzer input mixer to the value determined by **Max Mixer Lvl**.

The average power level within the resolution bandwidth is the result for the spur. The results are displayed in tabular form. Both absolute and relative amplitude results are displayed, along with the amplitude difference from spur to the limit set for each amplitude result.

Note that this measurement assumes the carrier and any spurs are continuous (non-burst) signals.

The results are displayed in an alpha numeric data table. If there is more than one page of data, a **Top Page**, **Last Page**, **Prev Page**, and **Next Page** key will be available.

Top Page Sets the display to the first page of results data. This key is grayed out and unavailable if the first page of results is currently displayed.

Last Page Sets the display to the last page of results data. This key is grayed out and unavailable if the last page of results is currently displayed.

Prev Page Sets the display to the previous page of results data. This key is grayed out and unavailable if the first page of results is currently displayed.

Next Page Sets the display to the next page of results data. This key is grayed out and unavailable if the last page of results is currently displayed.

Adjacent Channel Power Ratio

ACPR

Adjacent Channel Power Ratio (ACPR) is the power contained in a specified frequency channel bandwidth relative to the total carrier power. It may also be expressed as a ratio of power spectral densities between the carrier and the specified offset frequency. The absolute power at the specified offset is also provided in dBm or dBm/Hz.

It uses an integration bandwidth (IBW) method to get a frequency domain trace. In this process, the channel integration bandwidth is analyzed using the automatically selected resolution bandwidth (RBW), which is much narrower than the channel bandwidth. The measurement computes an average power of the channel over a specified number of data acquisitions, automatically compensating for resolution bandwidth and noise bandwidth.

This measurement requires the user to specify measurement bandwidths of the carrier channel and each of the offset frequency pairs up to 5. Each pair may be defined with unique measurement bandwidths. If **Total Pwr Ref** is selected as the measurement type, the results are displayed as relative power in dBc and as absolute power in dBm. If **PSD** (Power Spectral Density reference) is selected, the results are displayed as relative power in dB, and as absolute power in dBm/Hz.

Pressing **Meas Setup** after **ACPR** has been selected will access the Adjacent Channel Power Ratio measurement setup menu. Pressing **Meas Control** after **ACPR** has been selected will access the Adjacent Channel Power Ratio measurement control menu allowing you to pause or restart your measurement, or toggle between continuous and single measurement.

Occupied Bandwidth

Occupied BW

Integrates the power of the displayed spectrum and puts markers at the frequencies between which a selected percentage of the power is contained. The measurement defaults to 99.0% of the occupied bandwidth power. First the combined power of all signal responses contained in the trace is computed. For 99.0% occupied power bandwidth, markers are placed at the frequencies on either side of 99.0% of the power such that 1.0% of the power is evenly distributed outside the markers. The difference between the marker frequencies is the 99.0% power bandwidth and is the frequency value displayed.

The occupied bandwidth function also indicates the difference between the analyzer center frequency and the center frequency of the channel (Transmit Freq Error), the **Emissions BW**, and the level where the emissions BW measurement is taken. The measurement can be made in single or continuous sweep mode. The center frequency, reference level, and channel spacing must be set by the user.

Emission BW

Measures the bandwidth between 2 points on a signal which are a specified number of decibels below the highest point within the occupied bandwidth span.

For example: If the Emission BW X dB is set to – 26 dB, and the Occupied BW Span is set to 10 MHz, the peak signal power level is first determined from the 10 MHz wide trace sweep. Next, the spectrum is scanned to determine the two frequencies at the points below (f1) and above (f2) the channel frequency where the power level drops 26 dB below the peak power level. The emission bandwidth = f2 – f1.

Pressing **Meas Setup** after **Occupied BW** has been selected will access the occupied bandwidth power measurement setup menu. Pressing **Meas Control** after **Occupied BW** has been selected will access the occupied bandwidth measurement control menu allowing you to pause or restart your measurement, or toggle between continuous and single measurement.

Refer to Table 5-3 for standard specific default limits.

Table 5-8 Standard Specific Default Limits for Occupied Bandwidth

Plan	Occupied Bandwidth Upper Limit	Occupied Bandwidth Lower Limit	Emissions Bandwidth Upper Limit	Emissions Bandwidth Lower Limit
TIA/EIA-IS-95-A (**IS-95-A**), TIA/EIA-95-B Cell (**TIA-95-B Cell**), TIA/EIA-95-C Cell (**TIA-95-C Cell**), TTA.KO-06.0003 (**Korea Cell**) ANSI-J-STD-008 (**J-STD-008**), TIA/EIA-95-B PCS (**TIA-95-B PCS**), TIA/EIA-95-C PCS (**TIA-95-C PCS**), and TTA.KO-06.0013 (**Korea PCS**)	1.5 MHz	1.0 MHz	1.5 MHz	1.0 MHz
ARIB STD-T53 (**ARIB 53**)	1.485 MHz			

Monitor Band/Channel

Monitor Band/Channel

Display the frequency-domain spectrum of the transmit or receive channel or band for the selected device (mobile or base station). The channels and bands are standard specific. For more information on the tuning plan frequencies, refer to Table 1-1 on page 1-4.

MODE

Accesses menu keys allowing you to select the measurement mode of your analyzer. The basic spectrum analyzer comes with only the SA mode installed. Additional measurement personality software must be installed and activated in the instrument for other mode soft keys to be labeled and functional.

SA Accesses the spectrum analyzer menu keys and associated functions.

cdmaOne Accesses the cdmaOne measurement personality menu keys and associated functions. This allows you to setup and make the standards compliant cdmaOne measurements.

NOTE This menu will have additional entries if other personalities have been installed, for example GSM Option BAH.

Mode Setup

Accesses menu keys that allow you to set various parameters for the selected operational mode. Mode settings are persistent, and they will remain as set if you leave and return to the cdmaOne mode you previously set up.

To access the following keys for setting up the measurement mode, press **Mode**, select a mode, and then the front panel **Mode Setup** key.

Radio...

Accesses the radio data form and the associated menu keys allowing you to set **Std/Band**, **Device**, and **Channel Bandwidth**.

Std/Band

Provides the menu keys that allow you to select the standard used as a basis for the digital wireless communications cdmaOne measurements. For more information on the standards, refer to "cdmaOne Standards" on page 1-2.

IS-95A

The measurements are based on the TIA/EIA-IS-95-A, TIA/EIA-IS-97-A, and TIA/EIA-IS-98-A standards.

J-STD-008

The measurements are based on the ANSI JSTD-008, ANSI JSTD-018, and ANSI JSTD-019 standards.

TIA-95B Cell

The measurements are based on the TIA/EIA-95-B, TIA/EIA-97-B, and TIA/EIA-98-B standards.

TIA-95B PCS

The measurements are based on the TIA/EIA-95-B PCS standards.

Korea Cell

The measurements are based on the TTA.KO-06.0003 (Korea Cell) standard.

Korea PCS

The measurements are based on the TTA.KO-06.0013 (Korea PCS) standard.

TIA-95C PCS

The measurements are based on the TIA/EIA-95-B, TIA/EIA-97-C, and TIA/EIA-98-C standards.

TIA-95C Cell

The measurements are based on the TIA/EIA-95-B, TIA/EIA-97-C, and TIA/EIA-98-C standards.

ARIB T53 The measurements are based on the ARIB STD-T53 standard Version 1.2 parts I, II, and III.

Device Accesses menu keys allowing you to set the **Device** or system type to be tested, **Base** or **Mobile**.

Base Sets the instrument to measure base transceiver station equipment.

Mobile Sets the instrument to measure mobile equipment.

Channel BW Allows you to set the channel bandwidth for all available measurements.

Input... Accesses the same input form and menu keys as the front panel **Input** key. Refer to "Input/Output" on page 5-10 for additional information.

Trigger... Accesses the trigger and frame timer configuration form and menu keys allowing you to set various parameters. For the trigger configuration you can set **External Delay** and **External Slope**; **RF Burst Delay**, **RF Burst Level**, and **RF Envelope Slope**. For the frame timer configuration you can set **Period**, **Frame Delay**, and **Sync Source**.

Trigger Configuration

External Delay Allows you to set the trigger delay when using the rear panel external trigger source.

External Slope Allows you to set the triggering to occur on a positive-going edge or a negative-going edge of the trigger when using the rear panel external trigger source.

RF Burst Delay Allows you to set the trigger delay when using the RF burst trigger source.

RF Burst Level Allows you to set the trigger level when using the RF burst trigger source.

RF Burst Slope Allows you to set the triggering to occur on a positive-going edge or a negative-going edge of the trigger when using the RF burst trigger source.

Frame Timer Configuration

Period Allows you to set the frame period that you want when using the frame timer.

Frame Delay Allows you to set the frame timer delay when using the frame timer as a trigger source.

Frame Slope Accesses menu keys allowing you to set the synchronization of the frame timer to occur on a positive-going edge or a negative-going edge of the even second clock when the ESEC is connected to the Ext Frame Sync input on the rear panel.

- **Pos** Sets the synchronization to occur on a positive-going edge of the ESEC signal.
- **Neg** Sets the synchronization to occur on a negative-going edge of the ESEC signal.

Demod... Accesses the demodulation form and menu keys allowing you to set the type of **Time Reference Sync**, **Demod Trigger Source** and **PN Offset**.

Time Reference Sync Provides the menu keys that allow you to select the source for the time reference synchronization.

- **ESEC** Sets the synchronization to the even second clock of the base transceiver station. For synchronization to occur, an ESEC signal must be connected to the Ext Frame Sync input on the rear panel and the Demod Trigger source must be set to Frame Timer.
- **None** Disables synchronization.

Demod Trigger Source Provides the menu keys that allow you to select the source for the demodulation synchronization trigger.

- **Free Run** The next measurement is immediately taken, capturing the signal asynchronously (also called immediate).
- **RF Burst** Sets the measurement trigger to the leading edge of a RF Burst signal. No measurement will be made unless a bursted signal is being measured.
- **External** Sets the trigger directly to an external signal connected to the rear-panel TRIGGER IN connector. No measurement will be made unless a signal is connected to the Trigger In connector on the rear panel.

Frame Timer Sets the trigger to the internal frame timer that can be synchronized to an even second clock input. The frame timer has a default of 26.6667 ms period. This input ESEC signal is connected to the rear-panel Ext Frame Sync connector.

PN Offset Activates the PN offset function allowing you to enter the PN Offset (also called Time Offset) of the base station being tested. This enables the instrument to determine the correct time offset values.

Time Offset indicates how well your transmitter signal is time-aligned to system time. The displayed measurement results value takes into account the PN Sequence Offset Index of your transmitter that you entered using the **PN Offset** key. The range is 0 to 511 × 64[chips]. The **PN Offset** key is duplicated in the Demod form under various measurements.

Properties... Accesses the properties form and associated menu keys allowing you to set various parameters including **Carrier Check**, **Carrier Threshold**, **Minimum Signal Level**, **Preamp Dialogs**, and options for **Option Reference Setup**. In addition, the form displays the current installed software versions of the cdmaOne application and the DSP Bootrom.

Carrier Check Allows you to set the carrier power check function to **On** or **Off**. This verifies that a carrier is present or provides an indication if no carrier is found, depending on the measurement.

On Enables carrier power check.

Off Disables carrier power check.

Carrier Threshold Allows you to set the minimum detectable signal level used for the Carrier Check. This is the peak power of the signal bandwidth.

Minimum Signal Level Allows you to set the minimum detectable marker peak search level.

Preamp Dialogs Allows you to set the preamplifier dialog box enabling to **On** or **Off**.

On Enables the dialog box and the box is displayed when the Receive Channel Power and the Rx Spur measurements are selected.

Off — *No dialog box is displayed* when the Receive Channel Power and the receive spurious measurements are selected. However, you must still set the instrument up in accordance with the instructions normally given in the dialog box.

NC Threshold Allows you to set the noise correction threshold. Noise correction is applied when channel power is less than the noise correction threshold above the measured analyzer noise floor and **Noise Correction** is set to **Auto**.

CDMA Freq Ref Allows you to set **Source**, **Frequency**, and **10MHz Out**. The reference system will work in a 1 to 30 MHz external reference source range.

Source Allows you to set the reference to the demod hardware to **Int** or **Ext**.

Int

Sets DSP subsystem to use the internal 10 MHz reference oscillator. The internal reference could be locked to an external 10 MHZ reference connected to the 10 MHz REF IN jack.

Ext

Sets DSP subsystem to use a 1 to 30 MHz external reference connected to the EXT REF IN jack. The instrument can be locked to the external reference by connecting the 10 MHz OUT jack to the 10 MHz REF IN Jack.

Frequency Allows you to enter the frequency of the external reference source.

10 MHz Out Allows you to set the 10 MHz Ref Out jack to **On** or **Off**. This is automatically set to **Off** when the **Opt Ref Freq** is set to **Int**.

On

Enables the 10 MHz Out.

Off

Disables the 10 MHz Out.

Restore Mode Defaults Sets up the instrument parameters for the mode using the factory default mode settings.

Preset

Sets the instrument parameters, including the cdmaOne mode parameters, to the selected default parameters and resets the measurement mode to SA. You can set the default parameters to the factory defaults or to a file of user entered defaults. For information on selecting default parameters and saving user defaults, refer to the *ESA Spectrum Analyzers User's Guide*.

SPAN X Scale

Activates the **Span** function and accesses the menu of span functions. The menu options will vary depending on the measurement that is selected under the **MEASURE** menu. Pressing **SPAN X Scale** allows the user to change the frequency range symmetrically about the center frequency. The frequency-span readout describes the total displayed frequency range; to determine frequency span per horizontal graticule division, divide the frequency span by 10. If resolution bandwidth is set to a value less then 1 kHz, maximum span is limited to 5 MHz.

Channel Power, Receive Channel Power

Chan Pwr Span Allows you to set the span for the channel power measurements. This does not affect the span settings for any other measurements.

Receiver Spurious

Span Allows you to set the span for the receiver spurious measurement. This does not affect the span settings for any other measurements.

Monitor Band/Channel

Channel Span Allows you to set the span for the monitor channel measurement. This does not affect the span settings for any other measurements.

Band Span Allows you to set the span for the monitor band measurement. This does not affect the span settings for any other measurements.

NOTE Span values set here may be overridden by changing the following mode and measurement parameters.

1. Selecting a new **Block** for **Monitor Band** under **Meas Setup** will override any band span settings.
2. Changing the standard (radio band) under the **Mode Setup**, **Radio** menu keys may override any previous channel or band span settings.
3. Restoring parameter defaults under the **Mode Setup**, **Meas Setup**, or **Preset** may override any previous channel or band span settings.
4. Exiting and reentering the measurement will override any previous channel or band span settings.

Trig

Accesses the trigger and frame timer menu keys allowing you to set various parameters. These parameters can be accessed and set using the **Mode Setup**, **Trigger**... data form and menus, refer to Trigger° on page 5-63.

Trigger

Accesses the trigger and frame timer menu keys allowing you to set various parameters. For the trigger configuration you can set **RF Burst Delay**, **RF Burst Level**, **External Delay** and **External Slope**. For the frame timer configuration you can set **Frame Delay**, **Frame Slope**, and **Frame Period**.

Trigger Configuration

RF Burst Delay Allows you to set the trigger delay when using the RF burst trigger source.

RF Burst Level Allows you to set the trigger level when using the RF burst trigger source.

External Delay Allows you to set the trigger delay when using the rear panel external trigger source.

External Slope Allows you to set the triggering to occur on a positive-going edge or a negative-going edge of the trigger when using the rear panel external trigger source.

Frame Timer Configuration

Frame Delay Allows you to set the frame timer delay when using the frame timer as a trigger source.

Frame Slope Accesses menu keys allowing you to set the synchronization of the frame timer to occur on a positive-going edge or a negative-going edge of the even second clock when the ESEC is connected to the Ext Frame Sync input on the rear panel.

- **Pos** Sets the synchronization to occur on a positive-going edge of the ESEC signal.
- **Neg** Sets the synchronization to occur on a negative-going edge of the ESEC signal.

Frame Period Allows you to set the frame period that you want when using the frame timer.

View/Trace

Accesses the view menu keys that allow you to set the way measurement result information is displayed. The menu options will vary depending on the measurement that is selected under the **Measure** menu.

Adjacent Channel Power Ratio

Bar Graph

Sets the view to display measurement results as a bar graph, indicating the power measured in each adjacent channel, and as alpha-numeric results data.

In the factory default condition, 5 of the total integration power levels, centered at the carrier frequency and ±750.0 kHz and ±1.98 MHz offset frequencies, for example, are shown in the graph window. The corresponding measured data is shown in the text window. Depending on the **Meas Type** setting, one of the two following displays is obtained:

`Bar Graph (Total Pwr Ref)` - A histogram of powers referenced to the total power

`Bar Graph (PSD Ref)` - A histogram of powers referenced to the mean power spectral density of the carrier in dBm/Hz

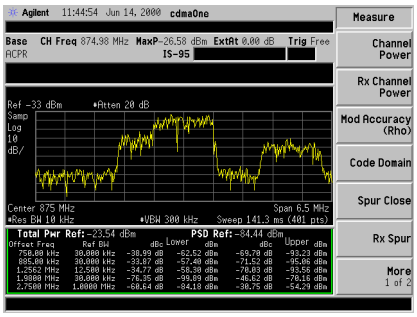
Spectrum

Sets the view to display a measurement results signal trace and alpha-numeric results data.

In the factory default condition, the frequency spectrum is displayed with the bandwidth marker lines in the graph window. The corresponding measured data in the text window is the total integration power levels, in dBc and dBm, within the defined bandwidth as shown in the figure below. Depending on the **Meas Type** setting, one of the two following displays is obtained (the both graphs will look the same):

`Spectrum (Total Pwr Ref)` - A spectrum display referenced to the total power

`Spectrum (PSD Ref)` - A spectrum display referenced to the mean power spectral density of the carrier in dBm/Hz



Channel Power, Receive Channel Power, Occupied Bandwidth

Standard Results Sets the view to display a measurement results signal trace and alpha numeric results data.

Numeric + Parameters Sets the view to display alpha numeric results data and measurement parameters information.

Modulation Accuracy (Rho)

I/Q Measured Compl Vector Sets the view to display an I/Q graph and numeric results.

Numeric Results Sets the view to display alpha numeric results data.

Code Domain

Power Graph and Metrics Sets the view to display a measurement results bar graph representative of the power in each of the 64 Walsh channels and alpha numeric results data.

Power, Timing and Phase Sets the view to display three measurement results bar graphs. The first is representative of the power in each of the 64 Walsh channels. The second is representative of timing error of each Walsh channel relative to the Pilot channel which is Walsh code zero. The third is representative of the phase error of each Walsh channel relative to the Pilot channel.

NOTE The timing and phase graphs contain information only when the measurement method is set to **Timing Phase**.

Numeric Results Sets the view to display alpha numeric results data.

Spur Close

Segment All Sets the view to display a measurement results signal trace that includes all three of the measurement span segments and alpha numeric results data. The display cycles through views of each of the three measurement segments and displays the largest spur from each segment. This key is inactive (grayed out) when the selected measurement type is **Examine**.

Segment Lower Sets the view to display a measurement results signal trace that includes the lower of the three measurement span segments with the three largest spurs in that segment and alpha numeric results data.

Segment Center Sets the view to display a measurement results signal trace that includes the center of the three measurement span segments with the three largest spurs in that segment and alpha numeric results data.

Segment Upper Sets the view to display a measurement results signal trace that includes the upper of the three measurement span segments with the three largest spurs in that segment and alpha numeric results data.

Receiver Spurious

Standard Results Sets the view to display a measurement results signal trace and alpha numeric results data. Three spurs are shown on the trace. In addition, data is shown for the frequency, amplitude, and the distance, in decibels, from the limit for each of the three spurs.

Active Trace Sets the view to display a measurement results signal trace and alpha numeric results data. The worst spur and the active marker are shown.

Numeric + Parameters Sets the view to display alpha numeric results data and measurement parameters information.

Out of Band Spurious

Tabular Sets the view to display an alpha numeric table of results measurement data. If there are more then one page of results data, a **Top Page**, **Last Page**, **Prev Page**, and **Next Page** key will be available. Refer to "Out of Band Spurious" on page 5-57.

Active Range Sets the view to display a measurement results signal trace and alpha numeric results data. Only the spurs in the range selected by the **Current Range** are shown.

Current Range Sets the range that will be viewed when **Active Range** is selected.

Monitor Band/Channel

Provides the same view options as the SA mode. For more information, refer to the *ESA Spectrum Analyzers User's Guide.*

6 If You Have a Problem

This chapter includes information on how to check for a problem with your ESA spectrum analyzer, and how to return it for service. It also includes descriptions of all of the analyzer built-in messages.

If you have a Problem

Your analyzer is built to provide dependable service. However, if you experience a problem, or if you desire additional information or wish to order parts, options, or accessories, the Agilent Technologies worldwide sales and service organization is ready to provide the support you need.

In general, a problem can be caused by a hardware failure, a software error, or a user error. Follow these general steps to determine the cause and to resolve the problem.

1. Perform the quick checks listed in “Check the Basics” in this chapter. It is possible that a quick check may eliminate your problem altogether.
2. If the problem is a hardware problem, you have two options:
   - Repair it yourself; see the “Service Options” section in this chapter.

WARNING **No operator serviceable parts inside the analyzer. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.**

   - Return the analyzer to Agilent Technologies for repair; if the analyzer is still under warranty or is covered by an Agilent Technologies maintenance contract, it will be repaired under the terms of the warranty or plan (the warranty is at the front of this manual).

     If the analyzer is no longer under warranty or is not covered by an Agilent Technologies maintenance plan, Agilent Technologies will notify you of the cost of the repair after examining the instrument. See “How to Get in Touch With Agilent Technologies” and “How to Return Your Analyzer for Service” for more information.
3. If the problem is a software problem, you have two options:
   - Reinstall the firmware and or the measurement personality DLP.
   - Return the analyzer to Agilent Technologies for repair; if the analyzer is still under warranty or is covered by an Agilent Technologies maintenance contract, it will be repaired under the terms of the warranty or plan (the warranty is at the front of this manual).

If the analyzer is no longer under warranty or is not covered by an Agilent Technologies maintenance plan, Agilent Technologies will notify you of the cost of the repair after examining the instrument. See “How to Get in Touch With Agilent Technologies” and “How to Return Your Analyzer for Service” for more information.

Before You Call Agilent Technologies

Check the Basics

A problem can often be resolved by repeating the procedure you were following when the problem occurred. Before calling Agilent Technologies or returning the analyzer for service, please make the following checks:

- Check the line fuse.
- Is there power at the receptacle?
- Is the analyzer turned on? Make sure the fan is running, this indicates that the power supply is on.
- If the display is dark or dim, press the upper **Viewing Angle** key in the upper-left corner of the front panel. If the display is too bright, adjust the lower **Viewing Angle** key in the upper-left corner of the front panel.
- If other equipment, cables, and connectors are being used with your ESA spectrum analyzer, make sure they are connected properly and operating correctly.
- Review the procedure for the measurement being performed when the problem appeared. Are all the settings correct?
- If the analyzer is not functioning as expected, return the analyzer to a known state by pressing the **Preset** key.

  Some analyzer settings are not affected by a Preset. If you wish to reset the analyzer configuration to the state it was in when it was originally sent from the factory, press **System**, **Power On/Preset**, **Preset (Factory)**.

- Is the measurement being performed and the results that are expected, within the specifications and capabilities of the analyzer? Refer to the "Specifications" chapters in the *ESA Spectrum Analyzers Specification Guide* for analyzer specifications.
- In order to meet specifications, the analyzer must be aligned. Either Auto Align All must be selected (press **System**, **Alignments**, **Auto Align**, **All**), or the analyzer must be manually aligned at least once per hour, or whenever the temperature changes more than 3 degrees centigrade. When **Auto Align**, **All** is selected, AA appears on the left edge of the display (in SA mode only).
- Is the analyzer displaying an error message? If so, refer to Error Messages in the *Agilent ESA Spectrum Analyzers User's Guide.*
- If the necessary test equipment is available, perform the performance verification tests in the *ESA Spectrum Analyzers Calibration Guide*. Record all results on a Performance Verification Test Record form located after the test descriptions.

- If the equipment to perform the performance verification tests is not available, you may still be able to perform the functional checks in the *ESA Spectrum Analyzers User's Guide*.

Read the Warranty

The warranty for your analyzer is at the front of this manual. Please read it and become familiar with its terms.

If your analyzer is covered by a separate maintenance agreement, please be familiar with its terms.

Service Options

Agilent Technologies offers several optional maintenance plans to service your analyzer after the warranty has expired. Call your Agilent Technologies sales and service office for full details.

If you want to service the analyzer yourself after the warranty expires, you can purchase the service documentation that provides all necessary test and maintenance information.

You can order the service documentation, **Option OBW** (assembly level troubleshooting and adjustment procedures) and **Option OBV** (component level information including parts lists, component location diagrams and schematic diagrams), through your Agilent Technologies sales and service office. Service documentation is described under "Service Documentation and Adjustment Software (Option OBW)" and "Component Level Service Documentation (Option OBV)" in *ESA Spectrum Analyzers User's Guide*.

How to Get in Touch With Agilent Technologies

Agilent Technologies has sales and service offices around the world to provide you with complete support for your analyzer. To obtain servicing information or to order replacement parts, get in touch with the nearest Agilent Technologies sales and service office listed in Table 6-1. In any correspondence or telephone conversations, refer to your analyzer by its product number, full serial number, and firmware revision. (Press **System**, **More**, **Show System**, and the product number, serial number, and firmware revision information will be displayed on your analyzer screen.) A serial number label is also attached to the rear panel of the analyzer.

Table 6-1 Agilent Technologies Sales and Service Offices

UNITED STATES		
Instrument Support Center Agilent Technologies (800) 403-0801		
EUROPEAN FIELD OPERATIONS		
Headquarters Agilent Technologies S.A. 150, Route du Nant-d'Avril 1217 Meyrin 2/ Geneva Switzerland (41 22) 780.8111	France Agilent Technologies France 1 Avenue Du Canada Zone D'Activite De Courtaboeuf F-91947 Les Ulis Cedex France (33 1) 69 82 60 60	Germany Agilent Technologies GmbH Agilent Technologies Strasse 61352 Bad Homburg v.d.H Germany (49 6172) 16-0
Great Britain Agilent Technologies Eskdale Road, Winnersh Triangle Wokingham, Berkshire RG41 5DZ England (44 118) 9696622		
INTERCON FIELD OPERATIONS		
Headquarters Agilent Technologies 3495 Deer Creek Rd. Palo Alto, CA 94304-1316 USA (415) 857-5027	Australia Agilent Technologies Australia Ltd. 31-41 Joseph Street Blackburn, Victoria 3130 (61 3) 895-2895	Canada Agilent Technologies (Canada) Ltd. 17500 South Service Road Trans-Canada Highway Kirkland, Quebec H9J 2X8 Canada (514) 697-4232
Japan Agilent Technologies Japan, Ltd. Measurement Assistance Center 9-1, Takakura-Cho, Hachioji-Shi, Tokyo 192-8510, Japan TEL (81) -426-56-7832 FAX (81) -426-56-7840	Singapore Agilent Technologies Singapore (Pte.) Ltd. 150 Beach Road #29-00 Gateway West Singapore 0718 (65) 291-9088	Taiwan Agilent Technologies Taiwan 8th Floor, H-P Building 337 Fu Hsing North Road Taipei, Taiwan (886 2) 712-0404
China China Agilent Technologies 38 Bei San Huan X1 Road Shuang Yu Shu Hai Dian District Beijing, China (86 1) 256-6888		

How to Return Your Analyzer for Service

Service Tag

If you are returning your analyzer to Agilent Technologies for servicing, fill in and attach a blue service tag. Several service tags are supplied at the end of this chapter. Please be as specific as possible about the nature of the problem. If you have recorded any error messages that appeared on the display, or have completed a Performance Test Record, or have any other specific data on the performance of your analyzer, please send a copy of this information with your analyzer.

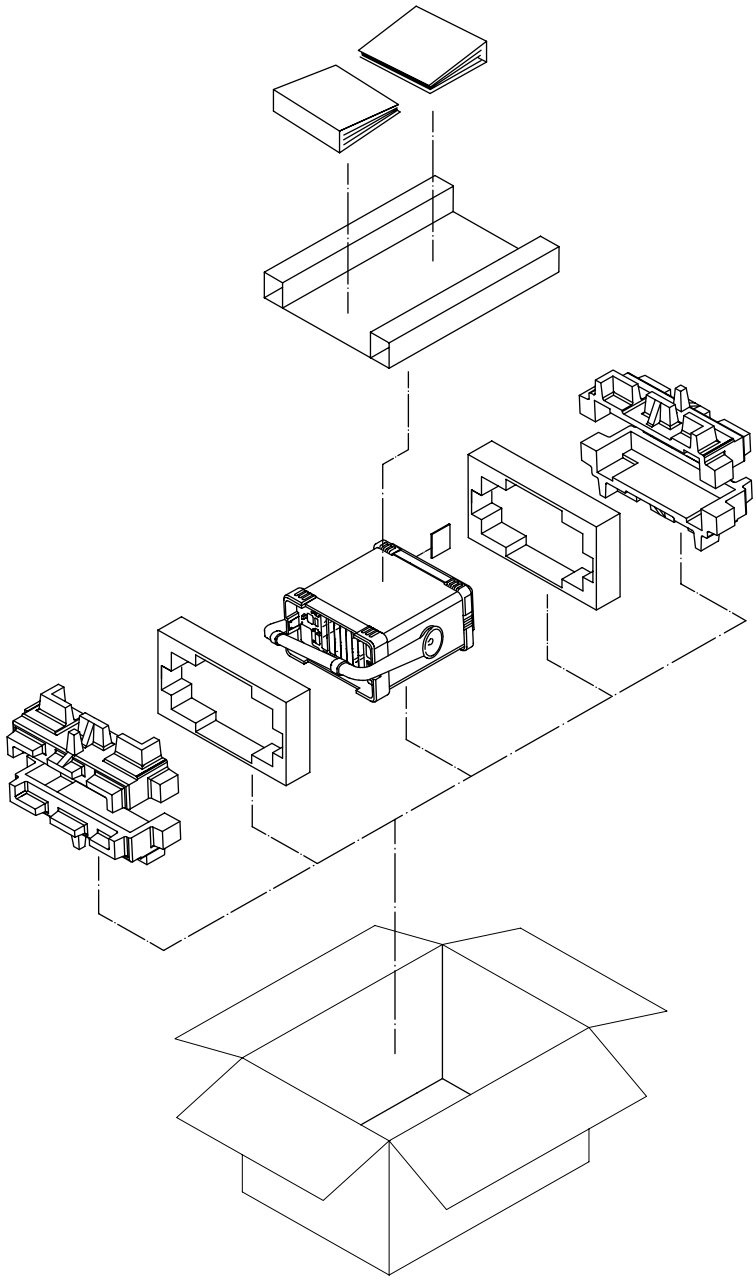
Original Packaging

Before shipping, pack the unit in the original factory packaging materials if they are available. If the original materials were not retained, see "Other Packaging".

NOTE Ensure that the instrument handle is in the rear-facing position in order to reduce the possibility of damage during shipping. Refer to Figure 6-1.

NOTE Install the transportation disk into the floppy drive to reduce the possibility of damage during shipping. If the original transportation disk is not available, a blank floppy may be substituted.

Figure 6-1



formt122

Other Packaging

CAUTION Analyzer damage can result from using packaging materials other than those specified. Never use styrene pellets in any shape as packaging materials. They do not adequately cushion the equipment or prevent it from shifting in the carton. They cause equipment damage by generating static electricity and by lodging in the analyzer louvers, blocking airflow.

You can repackage the instrument with commercially available materials, as follows:

1. Attach a completed service tag to the instrument.
2. Install the transportation disk or a blank floppy disk into the disk drive.
3. If you have a front-panel cover, install it on the instrument. If you do not have a front panel cover, make sure the instrument handle is in the forward-facing position to protect the control panel.
4. Wrap the instrument in antistatic plastic to reduce the possibility of damage caused by electrostatic discharge.
5. Use a strong shipping container. The carton must be both large enough and strong enough to accommodate the analyzer. A double-walled, corrugated cardboard carton with 159 kg (350 lb) bursting strength is adequate. Allow at least 3 to 4 inches on all sides of the analyzer for packing material.
6. Surround the equipment with three to four inches of packing material and prevent the equipment from moving in the carton. If packing foam is not available, the best alternative is S.D.-240 Air Cap™ from Sealed Air Corporation (Hayward, California, 94545). Air Cap looks like a plastic sheet filled with 1-1/4 inch air bubbles. Use the pink-colored Air Cap to reduce static electricity. Wrapping the equipment several times in this material should both protect the equipment and prevent it from moving in the carton.
7. Seal the shipping container securely with strong nylon adhesive tape.
8. Mark the shipping container “FRAGILE, HANDLE WITH CARE” to assure careful handling.
9. Retain copies of all shipping papers.

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