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HP References in this Manual

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User's Guide

HP 85725C

CDMA Measurements Personality

HEWLETT PACKARD

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Warranty Service

Warranty service may be obtained from the nearest Hewlett-Packard sales office or other location indicated in the owner's manual or service booklet.

Safety Notes

The following safety notes are used throughout this manual. Familiarize yourself with each of the notes and its meaning before operating this instrument.

Caution Caution denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, would 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 **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.**

General Safety Considerations

Warning ***Before the spectrum analyzer is switched on,*** **make sure it has been properly grounded through the protective conductor of the ac power cable to a socket outlet provided with protective earth contact.**

Any interruption of the protective (grounding) conductor, inside or outside the instrument, or disconnection of the protective earth terminal can result in personal injury.

Caution ***Before the spectrum analyzer is switched on,*** make sure its primary power circuitry has been adapted to the voltage of the ac power source.

Failure to set the ac power input to the correct voltage could cause damage to the instrument when the ac power cable is plugged in.

What Is the IS-95 CDMA Communication System?

Code Division Multiple Access (CDMA) is a direct sequence spread-spectrum digital communications technique that was originally designed for military applications. The main advantages of CDMA over other types of communications schemes are:

- greater capacity than with other techniques
- immunity to signal loss and degradation in the presence of high broadband interference
- immunity to signal loss and degradation due to multipath, scatter, and fading
- power consumption of mobile stations is strictly minimized (by base station control)
- supports full 9600 baud capability for voice and data communications
- provides increased security

CDMA uses correlative codes to distinguish one user from another. Frequency division is still used, as is done with Frequency Division Multiple Access (FDMA) and Time Division Multiple Access (TDMA), but in a much larger bandwidth (1.25 MHz). CDMA uses a direct sequence spread spectrum technique that realizes increased capacity from 1:1 frequency reuse and sectored cells. The capacity limit is soft. That is, capacity can be increased with some degradation of the error rate or voice quality.

In CDMA, a single user's channel consists of a specific frequency combined with a unique code. Correlative codes allow each user to operate in the presence of substantial interference. The interference is the sum of all other users on the same CDMA frequency, both from within and without the home cell, and from delayed versions of these signals. It also includes the usual thermal noise and atmospheric disturbances. Delayed signals caused by multipath are separately received and combined in CDMA. One of the major differences in access is that any CDMA frequency can be used in all sectors of all cells. This is possible because CDMA is designed to decode the proper signal in the presence of high interference.

The CDMA communication system is defined in the following Electronics Industry Association (EIA) and Telecommunications Industry Association (TIA) interim standard (IS) documents:

IS-95-A Mobile Station - Base Station Compatibility Standard for Dual-Mode Wideband Spread Spectrum Cellular System

IS-97-A Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations

IS-98-A Recommended Minimum Performance Standards for Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations

And the following American National Standards Institute (ANSI) documents:

J-STD-008 System Compatibility Requirements for CDMA (IS-95 based) Radio Standards

J-STD-018 Recommended Minimum Performance Requirements for 1.8 to 2.0 GHz Code Division Multiple Access (CDMA) Personal Stations

J-STD-019 Recommended Minimum Performance Requirements for base stations supporting 1.8 to 2.0 GHz Code Division Multiple Access (CDMA) Personal Stations

What Does the HP 85725C CDMA Measurements Personality Do?

The HP 85725C CDMA Measurements Personality can help determine if a CDMA transmitter is working correctly. The HP 85725C CDMA Measurements Personality adapts HP 8590 Series spectrum analyzer hardware for the testing of a CDMA transmitter or receiver, according to the Electronics Industry Association (EIA) and Telecommunications Industry Association (TIA) IS-95, IS-97, and IS-98 documents and American National Standards Institute (ANSI) documents: J-STD-008, J-STD-018 and J-STD-019. These documents define complex, multi-part measurements used to maintain an interference-free environment. For example, the documents include measuring the power of a carrier. The HP 85725C CDMA Measurements Personality automatically makes these measurements using the measurement methods and limits defined in the standards. The detailed results displayed by the measurements allow you analyze CDMA system performance. You may alter the measurement parameters for specialized analysis.

The HP 85725C CDMA Measurements Personality was primarily developed for making measurements on digital transmitter carriers. The HP 85725C CDMA Measurements Personality is capable of making measurements on both the continuous carrier of a base station transmitter, and the continuous or gated carrier of a mobile station transmitter.

For infrastructure test, the CDMA spectrum analyzer will test base station transmitters in a non-interfering manner by means of a coupler or power splitter.

For subscriber unit test, mobiles may be measured by way of a splitter or coupler when the mobile is actively linked to a base station or base station simulator. An alternate method of mobile measurement requires that the mobile be placed in a special test mode.

The CDMA measurements personality capabilities are:

- Frequency domain measurements
- Time domain measurements
- General frequency domain and time domain modes

These measurements are further explained on the following page.

To help the user understand the softkeys and the measurements, on-screen context-driven help messages can be displayed.

Frequency Domain Measurements

- RF channel power measures the true average (RMS) power in user-definable bandwidth, such as 1.23 MHz. Near-noise correction is made for low signal-to-analyzer-noise conditions.
- Receive RF channel power measures the residual power present in the receive channel. This power level is indicative of the effective ambient noise and interference environment. The addition of a preamplifier adds greater sensitivity to this measurement. Near-noise correction is made for low signal-to-analyzer-noise conditions.
- In-band Spurious measures spurious emissions of a transmitter or receiver in either the transmit or receive bands. RF channel power and detectable spurious emissions are measured and compared to test limits specified in the standards.
- Out-of-Band and Harmonic Spurious measures the spurious emissions in an arbitrary frequency range. These measurements are controlled by entering parameters in a set of six user-definable tables. Zero-span measurements may be selected.
- Standby output power of mobiles assesses the residual transmit power in the transmit band while the mobile RF power is turned off.
- Spectral regrowth measures the power spectral distribution of a transmitter for a specific power level and can display net regrowth of the spectrum relative to a measured reference transmitter power level. This measurement is useful for evaluating power amplifiers, digital modulators, and filters.
- Occupied bandwidth measures the % power bandwidth of the transmitted RF signal. The percentage is user-definable.
- Adjacient Channel Power Ratio (ACPR) measures the total RMS power in the specified channel and at 3 pairs of offsets then ratios the power.

Time Domain Measurements

- Gated output power of mobiles measures both gated-on and on/off ratio of a mobile when set at less than full rate transmit mode.
- Gated power timing measures the time required for the mobile transmitter to change from the gated-off state to the gated-on state, and from the gated-on state to the gated-off state. It also measures the burst width. The results are compared to the specified limits.
- Time response of open loop power control measures the time response of the mobile transmitter to a step change in receive power and compares it to the specified limits.

General Frequency Domain and Time Domain Mode Settings

- Frequency domain

  Channel spectrum
  Monitor channel
  Monitor band

- Time domain

  Time domain waveform (amplitude versus time)
  Amplitude histogram
  Mean power and peak-to-mean power ratio

In This Guide

The first two chapters of this guide provide all the information needed to install the CDMA measurements personality and start making measurements. This helps you be productive as quickly as possible. The remaining chapters provide key descriptions, programming reference, troubleshooting, and verification.

To use this guide:

1. Perform the procedures in Chapter 1, "Getting Started." These procedures explain how to load the measurements personality, and prepare the spectrum analyzer for making CDMA measurements.
2. See Chapter 2, "Making Measurements," for short, straightforward examples of making different types of measurements. This chapter will help you start making measurements right away, without long explanations or details about the key functions.
3. Refer to the remaining chapters of this guide as needed.

The remaining chapters are as follows:

- Chapter 3, "Menu Map and Softkey Descriptions," explains all softkeys in the CDMA measurements personality. This chapter also provides menu maps showing all softkeys to help you navigate between functions.

Note The CDMA measurements personality provides a Help Mode for CDMA softkeys, which gives you equivalent information to that in Chapter 3. To use Help Mode from the CDMA main menu, press the (MODE) hardkey and then the **CDMA HELP** softkey. The analyzer displays information on the last CDMA softkey pressed before entering the CDMA Help Mode, as well as any future keys pressed. Give it a try!

- Chapter 4, "Error Messages and Troubleshooting," contains information about what to do if you have a problem with the CDMA measurements personality.
- Chapter 5, "Programming Commands," is a reference chapter for details about the CDMA personality remote programming commands, including default values of setup and limit variables.
- Chapter 6, "Programming Examples," contains information about how to use a computer to operate and customize the CDMA measurements personality.

- Chapter 7, “Specifications,” contains all specifications and characteristics for the HP 85725C CDMA Measurements Personality.
- Chapter 8, “Verifying Operation,” contains test procedures that verify the electrical performance of the improved amplitude accuracy for CDMA Option 053). HP recommends that these verification tests be performed at least once per year.
- The “Glossary” contains descriptions of words and terms specific to CDMA, and digital communications in general.

Key Conventions

The following key conventions are used in this guide:

Front-panel key	Text shown like this represents a key physically located on the spectrum analyzer.
Softkey or **SOFTKEY**	Text shown like this represents a **softkey**. (The **softkeys** are located next to the **softkey** labels, and the **softkey** labels are the annotation on the right side of the spectrum analyzer display.) If the **softkey** label contains upper and lowercase letters, pressing the **softkey** will access more softkeys. If the **softkey** label contains all uppercase letters, pressing the **softkey** will perform an immediate action.
`Screen Text`	Text printed in this typeface indicates text displayed on the spectrum analyzer display.

Spectrum Analyzer Operation

If you are not familiar with your HP 8590 Series spectrum analyzer, refer to the manuals for the spectrum analyzer. These manuals describe spectrum analyzer preparation and verification, and tell you what to do if something goes wrong. Also, they describe spectrum analyzer features and tell you how to make spectrum analyzer measurements. Consult these manuals whenever you have a question about standard spectrum analyzer use.

Contents

Figures

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1

Getting Started

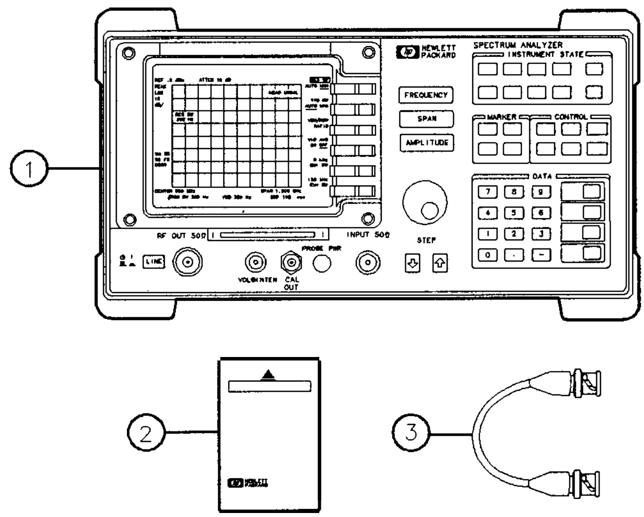
This chapter helps acquaint you with the spectrum analyzer features that you will be using, and also contains the procedures for preparing the spectrum analyzer to measure a Code Division Multiple Access (CDMA) transmission. This chapter contains the following information:

- descriptions of the equipment needed
- descriptions of the HP 8590 E-Series spectrum analyzer features that you will be using
- procedures for accessing the CDMA analyzer mode
- procedures for accessing the spectrum analyzer functions
- information about the changes to the spectrum analyzer operation caused by the HP 85725C CDMA Measurements Personality
- lists of the recommended accessories and spectrum analyzer options for use with the HP 85725C CDMA Measurements Personality

Complete all the steps in "Preparing to Make a Measurement" later in this chapter before actually making measurements. This procedure will help you avoid errors in loading and configuring the CDMA personality.

Equipment Needed

‘lb prepare the spectrum analyzer to measure a signal from a CDMA transmitter, you need the following equipment:



pg715a

Figure l-l. Required Equipment

1 An HP 85913, 85933, HP 85943, HP 85953, or HP 85963 spectrum analyzer. The spectrum analyzer firmware must be dated 950308 or later. Also, the analyzer must have at least 237590 bytes of internal memory. To see if your spectrum analyzer has enough available memory, press (RECALL), set INTERNAL **CARD** to INTERNAL. Press Catalog **Internal** , then CATALOG ALL . The top line of the display will be similar to I NTERNAL: 167559 237590. The second number is the amount of available internal memory. If you do not have at least this amount of internal memory, contact your HP sales office for information. The options described in Table l-l are required or recommended, and should be installed in the spectrum analyzer.

2 The HP 85725C CDMA Measurements Personality read-only memory (ROM) card. The CDMA measurements personality is a program contained in this ROM card.

3 Short BNC cable for calibrating the spectrum analyzer using the front panel CAL OUT connector.

Table 1-1. Required and Recommended Options

Option	Description
Option 004	The precision frequency reference provides increased frequency accuracy. If Option 004 is not installed in the spectrum analyzer, you must use an external 10 MHz precision frequency reference when performing a CDMA measurement.
Option 041	(HP-IB), an external keyboard interface, and a parallel printer interface. This option is recommended but not required.
Option 053	The improved amplitude accuracy is recommended for use with the HP 85725C, but not required. This option improves the spectrum analyzer amplitude accuracy specifications for CDMA measurements made in the CDMA Cellular and PCS frequency ranges. This option is available for the HP 85913, HP 85933, HP 85943, HP 85953, or HP 85963 spectrum analyzer. **Note:** Earlier versions of Improved Amplitude Option 053 (CDMA) provided improved amplitude accuracy only in the 800MHz cellular bands. In order to meet the improved amplitude accuracy specifications in the PCS bands, your HP 8590 E-Series spectrum analyzer must have Option 053 installed or calibrated after 21 February, 1997. The analyzer will meet the improved amplitude accuracy specifications if either: 1. This Option was installed after 21 February, 1997 or 2. The analyzer was last calibrated after 21 February, 1997 If neither of these is true, then the verification procedure must be performed. If the instrument does not validate, you must have it serviced to guarantee the improved amplitude performance in all applicable frequency ranges.
Option 101	The fast time domain sweeps option card provides 20 μs to 200 ms sweep times in zero span. Option 101 is required for time domain measurements. Option 101 is not required if Option 151 is installed.
Option 130	This option provides additional narrow resolution bandwidths of 30 Hz, 100 Hz and 300 Hz. These bandwidths improve the spectrum analyzer sensitivity and allow you to resolve closely spaced signals.
Options 151 and 160	The digital demodulator RF card and digital demodulator digital signal processor (DSP) card (Option 151), and a set of three PDC/PHS/NADC/CDMA ROMs (Option 160). Options 151 and 160 are recommended for faster power measurements. This option pair also provides 40 μs to 399 ms sweep times in zero span. Option 101 is not required if Option 151 is installed.

All options are available as retrofit kits after the purchase of your spectrum analyzer. Contact your nearest Hewlett-Packard Sales and Service Office for more information. These offices are listed at the end of Chapter 4, "Error Messages and Troubleshooting."

Refer to "Spectrum Analyzer Options Used with the CDMA Measurements Personality," later in this chapter for more information about these, and other options.

List spectrum analyzer options and firmware revision

HP 8590 Series spectrum analyzers can display the numbers and descriptions of most installed spectrum analyzer options, including other information about your spectrum analyzer. To do this, press (CONFIG) MORE 1 of 3 SHOW OPTIONS . Option 053 will not be shown. To confirm that Option 053 is installed, look at the serial number plate attached to the rear panel of the spectrum analyzer.

For more information about SHOW OPTIONS , see Chapter 6, "Key Descriptions," in the ***HP 8590 E-Series and L-Series Spectrum Analyzers User's Guide.***

Note The HP 85725C CDMA Measurements Personality automatically displays an error message if you access a measurement that requires an option that is not installed.

The HP 8590 Series Spectrum Analyzer Front Panel Features

Familiarize yourself with the following features before using the CDMA measurements personality.

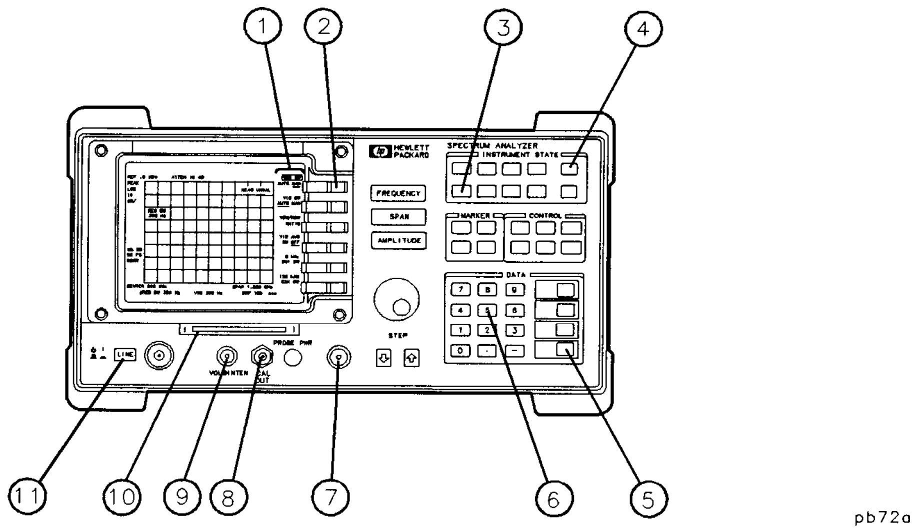


Figure 1-2. Front Panel Features

1 The annotations on the right side of the spectrum analyzer display are the **softkey** labels. The **softkey** labels display the functions that you can select. In this guide, the **softkey** labels are shown as text in shaded boxes (for example, **CDMA ANALYZER**).

2 The dark gray keys next to the spectrum analyzer display are softkeys. To select a function, press the **softkey** that is next to the **softkey** label.

3 (MODE) accesses the spectrum analyzer mode or the CDMA analyzer mode. In this guide, the front panel keys are shown in text as boxes (for example, (MODE)).

4 (COPY) prints the screen display on a printer or plots the screen display on a plotter.

5 (ENTER) is often used to terminate entries made with the data keys. (ENTER) is used to terminate **unitless** entries, or entries that use the Hz, μ**V**, and μ**s** units. For entries that have units other than Hz, μ**V** or μ**s**, you need to terminate the entry with one of the keys that are directly above (ENTER).

6 The data keys are used to enter numbers.

7 The INPUT 50 Ω connector is where the signal to be measured is input.

8 The CAL OUT connector provides a 300 MHz, -20 **dBm** calibration signal. The calibration signal is used by the spectrum analyzer to perform the spectrum analyzer amplitude and frequency self-calibration routines.

9 The outer knob controls the volume of the speaker, and the inner knob controls intensity of the spectrum analyzer display.

10 The card reader is where a RAM (random-access memory) or ROM (read-only memory) card is inserted.

11 (LINE) turns the spectrum analyzer on or off.

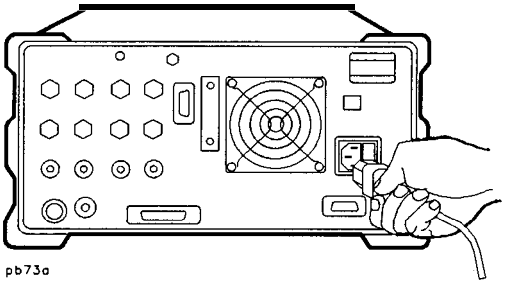
Preparing to Make a Measurement

This section explains the steps that are necessary to prepare the spectrum analyzer for making CDMA measurements. The steps are:

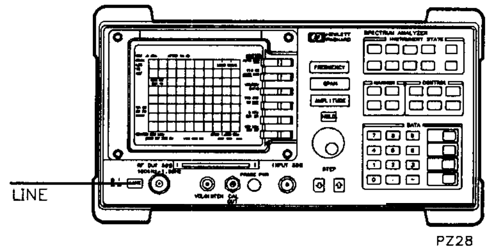
1. Load the CDMA measurements personality into the spectrum analyzer memory.
2. Perform the spectrum analyzer self-calibration routines.
3. Make the cable connections for triggering the spectrum analyzer (mobile station only).
4. Connect the external precision frequency reference (if Option 004 is *not* installed).
5. Access the CDMA analyzer mode.

Step 1. Load the CDMA measurements personality

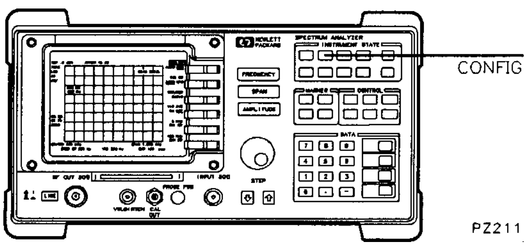
1. Plug the spectrum analyzer into an ac power supply.



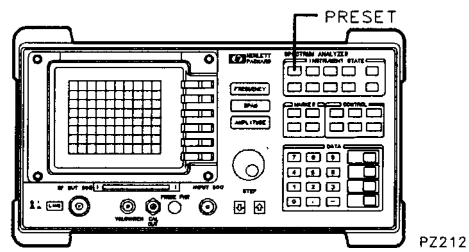
2. Press the LINE key and wait for the power-on routine to finish.



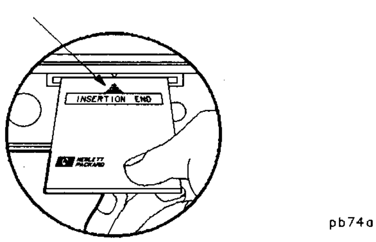
3. Press CONFIG More 1 of 3 Dispose User **Mem** ERASE **DLP MEM** ERASE **DLP MEM** to erase any previously-installed program. Wait for the dispose routine to finish.



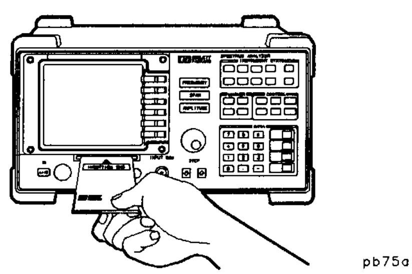
4. Press PRESET.



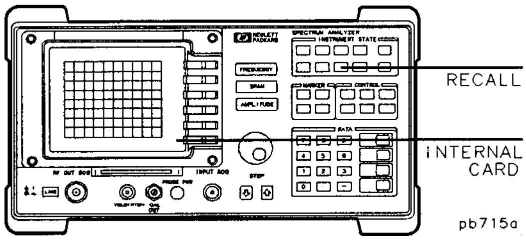
5. Locate the arrow printed on the CDMA measurements personality card label.



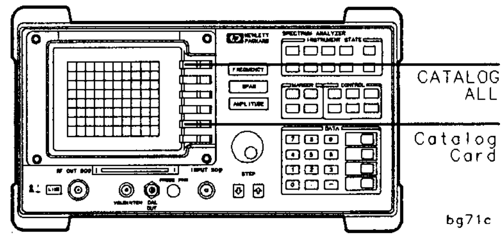
6. Insert the card into the spectrum analyzer with the card arrow matching the raised arrow on the bezel around the card-insertion slot.



7. Press (RECALL). Press the INTERNAL CARD **softkey** so that CARD is underlined.



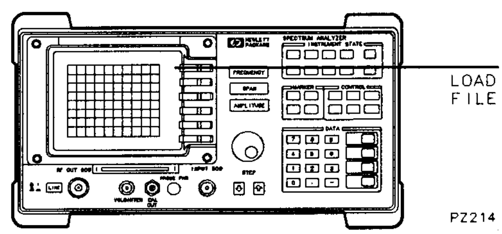
8. Press **Catalog** Card CATALOG ALL.



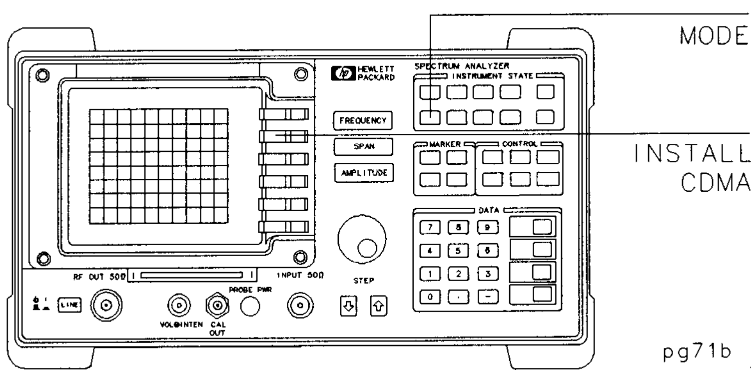
9. Make sure that dCDMA is highlighted on the spectrum analyzer display. If necessary, use the large knob on the spectrum analyzer front panel so that dCDMA is highlighted.

CDMA	1024
dCDMA	DLP
dA	DLP
dCID	DLP

10. Press LOAD FILE . When the spectrum analyzer has finished loading the dCDMA file, the catalog entries are blanked from the display.



11. Press (MODE) INSTALL CDMA to access the CDMA installation mode.



12. The message "Please wait, Loading CDMA . . . " will appear on the screen if enough spectrum analyzer memory is available to load the CDMA main file. It takes several minutes to load the CDMA main file. "CDMA Loaded" will appear when done.* In this case, continue with the procedure "Step 2. Perform the spectrum analyzer self-calibration routines."

The CDMA personality will only run on spectrum analyzers with firmware datecoded 950308 or later. There must be at least 237590 bytes of available DLP memory.† If the spectrum analyzer does not have a correct firmware datecode, a firmware message appears as shown below:

CDMA INSTALLATION

The HP 85726C Personality requires spectrum analyzer firmware 9503'38 or later and at least 237690 bytes of free memory.

Contact your local HP Sales and Service Office for information about updating firmware and hardware in your spectrum analyzer.

Press STOP to return to spectrum analyzer mode.

STOP

RT

If there is not enough allocated free spectrum analyzer memory to load the CDMA main file, a memory usage message appears as shown below.

CONTINUE

COMA INSTALLATION

The HP 85726C Personality require, more than the current amount of available spectrum analyzer memory.

This pro ram will automatically increase the amount o3 available memory by decreasing the number of trace registers from 91 to 53. Any traces stored in trace registers [illegible] will be lost.

Press STOP and see the HP 85725C Users's Guide for information on how to save trace registers.

-OR-

Press CONTINUE to decrease the number of trace registers.

STOP

RT

f you need to save any previously-stored traces which are in the highlighted range of trace 'egisters to be lost, make a note of this range, press STOP , and continue with number 13 on he next page.

If you don't need to save any traces in the highlighted range, press CONTINUE to delete the listed trace registers and make room in memory for the main CDMA file.†† The message "Please wait, Loading CDMA . . . " appears. It takes several minutes to load the main CDMA file, at which time the message "CDMA Loaded" appears.* Continue with the procedure "Step 2. Perform the spectrum analyzer self-calibration routines".

* Once the main CDMA file has been loaded, the CDMA measurements personality will remain in spectrum analyzer memory, even if the instrument is preset or turned off. The personality will remain in memory until it is deleted with ERASE DLP MEM .

† Contact your local HP sales and service office for information regarding updating firmware or the factory upgrade to increase memory size.

†† Spectrum analyzers with firmware revisions 930506 or 930923 require an extra step after pressing CONTINUE. In this case, follow the additional on-screen instructions.

13. *The following procedure is necessary* only *if you want to save previously-stored traces.*

There are two different ways to save a desired trace:

- You can save the trace to one of the trace registers which won't be lost. For example, if trace registers 0 through 32 will be lost, and you want to save the trace in trace register 1, you can save it to trace register 33.
- You can save the trace to a RAM card such as the HP 85700A RAM card.

Either of these methods require that you first recall the trace that you want to save.

To Recall a Trace from a Trace Register

1. Press (RECALL). If CARD is underlined, press INTERNAL CARD to select INTERNAL.
2. Press Internal → Trace. This accesses a menu displaying TRACE A , TRACE B , TRACE C , LIMIT LINES, and AMP COR .
3. Press TRACE A, TRACE B , or TRACE C to select the trace in which you want to place the trace data.
4. Enter the register number of the trace you want to save.
5. Press (ENTER). The recalled trace is placed in the view mode and the spectrum analyzer state is changed to the state that was saved. Next, follow either of the next two procedures "'lb Save a Trace to a Trace Register," or "To Save a Trace to a RAM card."

To Save a Trace to a Trace Register

1. Press (SAVE). If CARD is underlined, press INTERNAL CARD to select INTERNAL.
2. Press Trace → Intrnl . This accesses a menu displaying TRACE A , TRACE B , and TRACE C.
3. Press the softkey for the trace that you want to save: TRACE A , TRACE B , or TRACE C . REGISTER # and MAX REG # after MAX REG # = indicates the maximum register number that can be entered for trace storage in spectrum analyzer memory.
4. Use the numeric keypad to enter the number of a trace register outside the range of trace registers which will be lost, and then press (ENTER).

'Ib Save a Trace to a **RAM Card**

1. Press (DISPLAY) or (CONFIG), and then Change Prefix to enter a new prefix or change the existing prefix.

   If you do not specify a prefix, the trace will be saved with a file name consisting of t_(register number).

2. Press (SAVE). If INTERNAL is underlined, press INTERNAL CARD to select CARD. Press Trace ⇒ Card to access the menu that displays TRACE A , TRACE B , and TRACE C .

3. Press the softkey label of the trace that you want to save: TRACE A , TRACE B , or TRACE C. REGISTER #and PREFIX= are displayed on the spectrum analyzer display.

4. Use the numeric keypad to enter a register number and then press (ENTER).

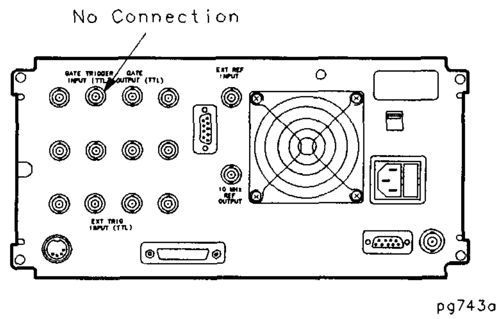
   The trace data is saved with a file name consisting of a "t," the current prefix, an underscore (-), and the register number. The "t" denotes that the file contains trace data. See "Save and recall data from the memory card" in Chapter 5, "Using Analyzer Features," of the ***HP 8590 E-Series and L-Series Spectrum Analyzers*** User's *Guide* for additional information about using memory cards.

Return to number 11 of Step 1. "Load the CDMA measurements personality."

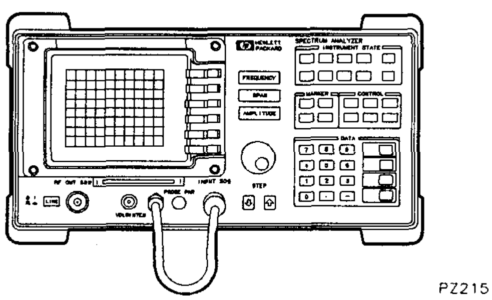
Step 2. Perform the spectrum analyzer self-calibration routines

Leave the spectrum analyzer turned on for at least 30 minutes before performing this procedure. (‘lb meet specifications, the spectrum analyzer must be allowed to warm up for 30 minutes before performing the self-calibration routines.)

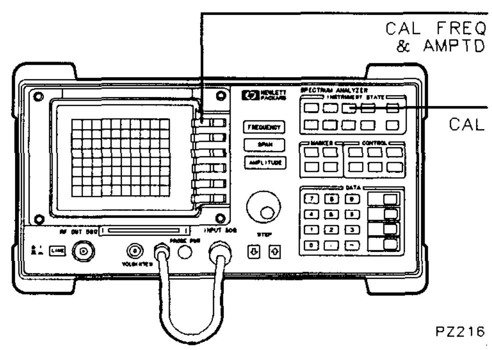
1. If the analyzer contains Option 105, then make sure nothing is connected to the GATE TRIGGER INPUT connector on the spectrum analyzer rear panel.



2. Attach the calibration cable from the CAL OUT connector to the INPUT connector with the appropriate adapters.

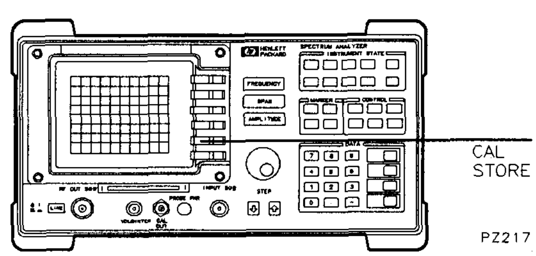


3. Press (CAL), then CAL FREQ & AMPTD .



The frequency and amplitude self-calibration routines are completed in 3 to 9 minutes. The time required for the self-calibration routines depends on the options installed in the spectrum analyzer, and the spectrum analyzer model.) A message is displayed when the self-calibration routines are finished. If an error message is displayed, refer to the spectrum analyzer service documentation for troubleshooting.

4. Press CAL STORE.



For the spectrum analyzer to meet its specifications, the self-calibration routines should be performed periodically or whenever the ambient temperature changes. For practical advice on when and how often the self-calibration routines should be performed, refer to the spectrum analyzer calibration guide.

Performing the YTF Self-Calibration Routine (HP 85933, HP 85953, or HP 85963 Spectrum Analyzers Only)

For HP 85933, HP 85953, and HP 85963 spectrum analyzers only, the YTF self-calibration routine should also be performed.

1. For the HP 85933 and 85963, connect a low-loss cable (such as HP part number 8120-5148) from 100 MHz COMB OUT connector to the spectrum analyzer input. For the HP 85953 connect the cable from the CAL OUT connector to the spectrum analyzer input.
2. Press [CAL] CAL YTF . The YTF self-calibration routine takes approximately 7 minutes for the HP 85933, 3 minutes for the HP 85953, and 5 minutes for the HP 85963.
3. Press (CAL) CAL STORE to save the calibration factors in memory.
4. Press (PRESET) to return to normal operation.

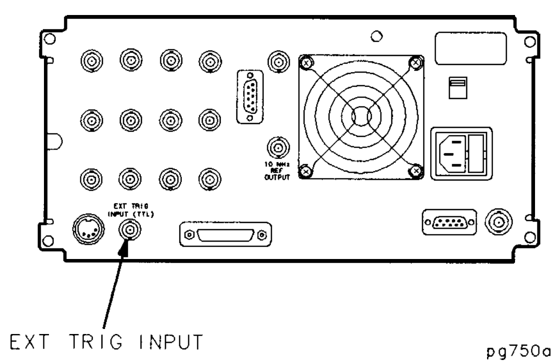
Step 3. Make the cable connections for triggering the spectrum analyzer

Perform this procedure only if the following two things are true:

- Option 101 or 151 is installed in your analyzer. See “List spectrum analyzer options and firmware revision” in the beginning part of this chapter to quickly determine the options installed in your analyzer.
- You want to perform time response to open loop power control on a mobile station, use external trigger for gated output power timing on a mobile station, or use external trigger for time domain measurements. An external trigger is usually not necessary for gated output power timing because video triggering is normally used.

If these things are not true, then continue with the procedure “Step 4. Connect the external precision frequency reference.”

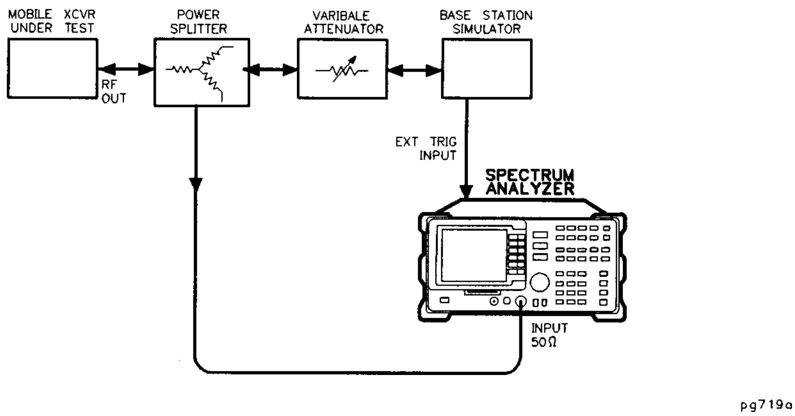
Connect a transistor-transistor logic (TTL) trigger signal to the EXT TRIG INPUT connector on the rear panel of the spectrum analyzer.



This TTL trigger signal provides an external trigger for the spectrum analyzer. The trigger signal should be a TTL pulse at least 1 μs wide that occurs once for each CDMA burst or once for each step change in receive power level.

The TTL trigger signal can be supplied directly by the unit under test or by an associated piece of test equipment, or indirectly, by converting the RF carrier into a TTL signal. A burst carrier trigger device such as the HP 85902A Burst Carrier Trigger can be used for this conversion. (See examples on the following pages.)

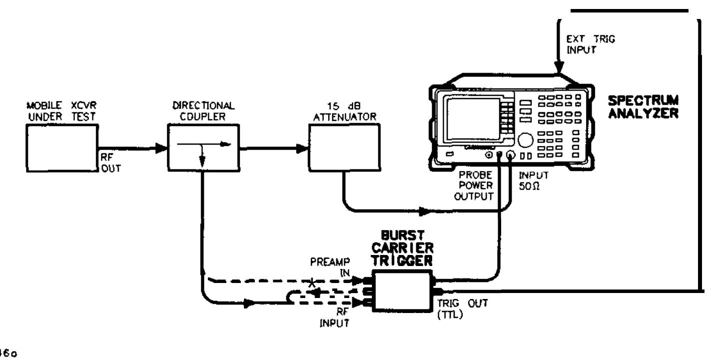
Example setup for the time response to open loop power control measurement



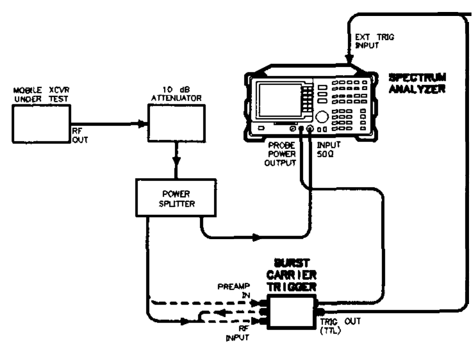
Mobile Station with a Base Station or Base Station Simulator

Example setups for using the HP 85902A Burst Carrier Trigger

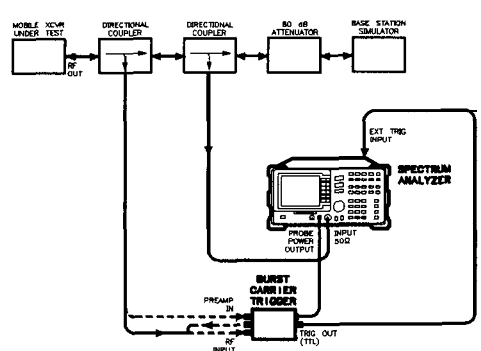
Below are some examples of connecting the HP 85902A Burst Carrier Trigger to a spectrum analyzer to use an external signal for triggering the gated output power timing or time domain measurements.



Mobile Station in Self-Test Mode, Using a Directional Coupler



Mobile Station in Self-Test Mode, Using a Power Splitter

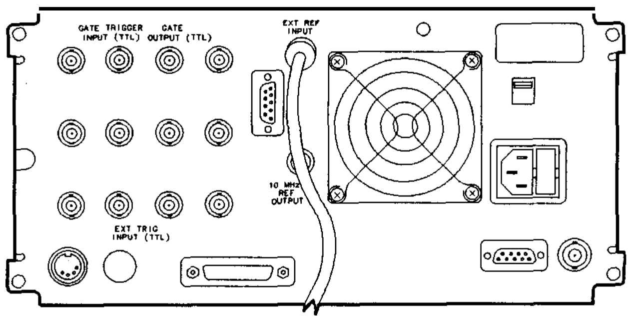


Mobile Station with a Base Station or Base Station Simulator

Step 4. Connect the external precision frequency reference

Perform this procedure if Option 004 is ***not installed in your spectrum analyzer.***

1. Disconnect the connector from the 10 MHz REF OUTPUT and EXT REF IN connectors on the rear panel.
2. Connect the 10 MHz signal from a precision external frequency reference to the EXT REF IN connector.



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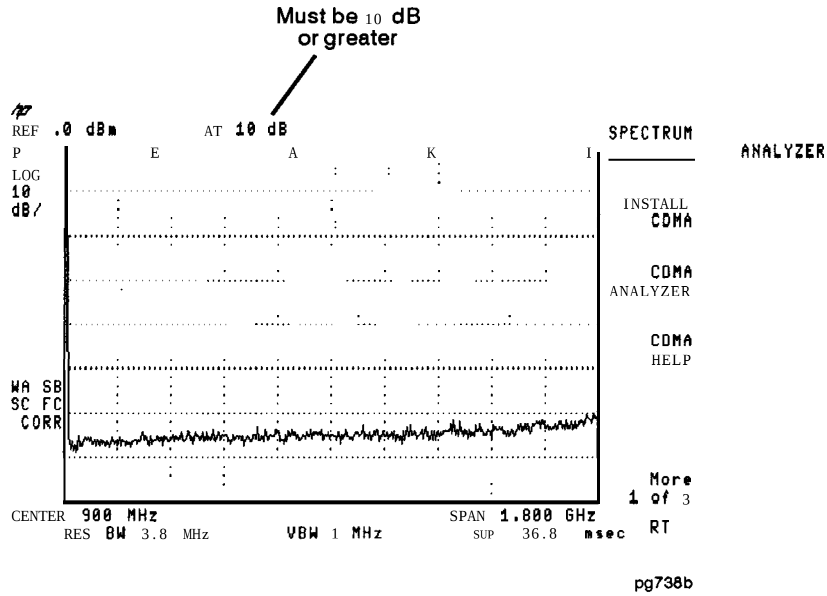
Step 5. Access the CDMA Analyzer Mode

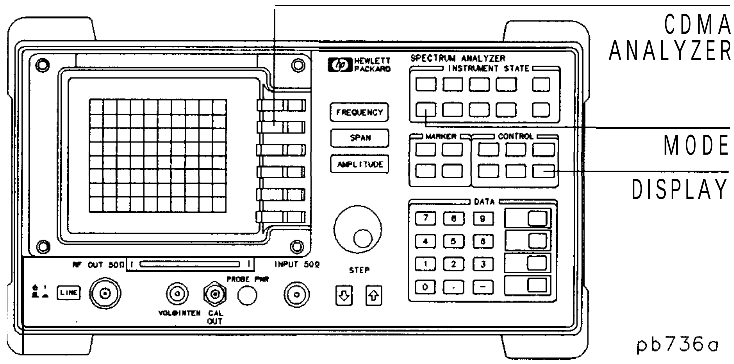
Caution

If you select 0 dB internal input attenuation manually while the instrument is in spectrum analyzer mode, then access the CDMA mode, this attenuation value will be recalled automatically when you exit CDMA mode and enter spectrum analyzer mode using the (MODE) key. Instrument damage may occur if total input power at the spectrum analyzer front panel is greater than + 20 dBm with 0 dB internal input attenuation.

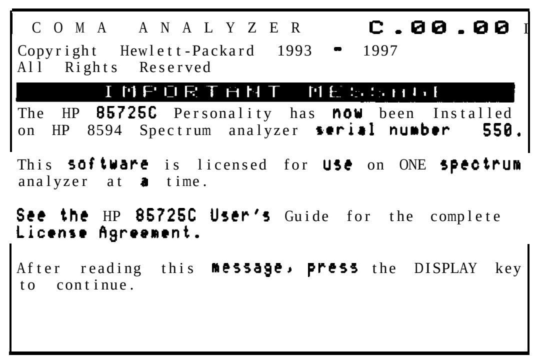
To avoid accidentally recalling 0 dB internal attenuation, always verify 10 dB or greater internal input attenuation is selected in spectrum analyzer mode, ***before you*** access the CDMA mode. Pressing (PRESET) will guarantee that at least 10 dB internal attenuation will be used.



1. Press (MODE) **CDMA ANALYZER** to access the CDMA analyzer mode. You will see the copyright message for the HP 85725C CDMA Measurements Personality. This message is only displayed the first time you access the CDMA analyzer mode.



2. After reading the copyright message, press (DISPLAY) to erase this message.



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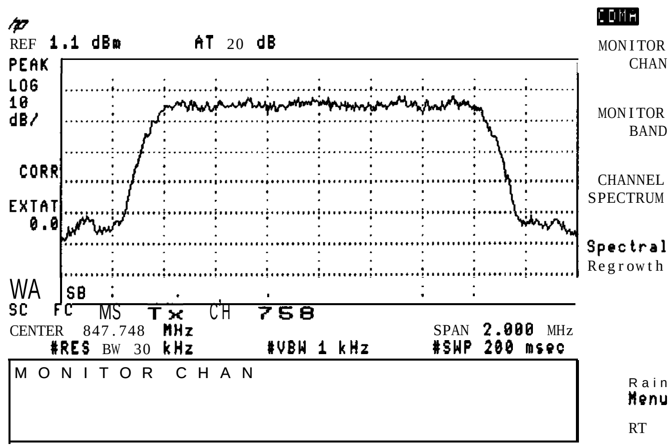
3. When the spectrum analyzer is using the CDMA analyzer mode, `CDMA` appears in the upper right corner of the spectrum analyzer display.



The CDMA Measurements Personality Main Menu

4. If Option 004 is not installed in your spectrum analyzer, the message `Ext precision freq reference required` will be displayed. This message is a reminder that you must use an external frequency reference when using the CDMA measurements personality. See the previous procedure, "Step 4. Connect the external precision frequency reference" for information about connecting an external frequency reference to the spectrum analyzer.

If any other messages are displayed, see Chapter 4, "Error Messages and Troubleshooting."

CDMA Measurements Personality Screen Annotations

The CDMA personality displays additional annotations that supplies information related to CDMA measurements settings. Refer to Figure 1-3 to identify CDMA measurements personality screen annotations.

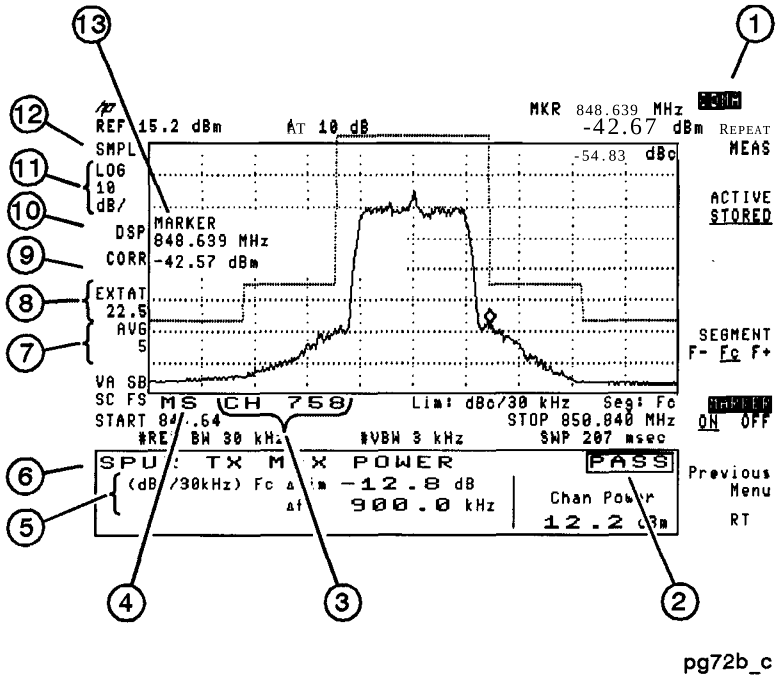


Figure 1-3. CDMA Screen Annotations

Item	Display Annotations	Description
1	CDMA	Indicates the spectrum analyzer is using the CDMA measurements personality (also referred to as the CDMA analyzer mode).
2	Pass/fail message	Indicates if the base or mobile station passed or failed the measurement (if PASSFAIL is set to ON).
3	CH	Displays the channel number.
4	MS or BS	Indicates the current setting of BASE MOBILE .
5	Measurement results	The measurement results or help message.
6	Measurement	The current CDMA measurement.
7	P AVG or AVG	Displays the number of sweeps that were used for the measurement.
8	EXTAT	Displays the external attenuation in dB.
9	Total power	When BAX PWR AUTO MAN is set to manual, the total power in dBm is displayed.
10	DSP	Indicates measurement is DSP assisted (requires Options 151 and 160).
11	LOG	Displays the amplitude scale.
12	SMPL, PEAK	Detector mode for measurement. The detectors are: sample mode (SMPL), and peak mode (PEAK).
13	Active function or error message	Indicates either the active function that has been selected or an error message.

Accessing the CDMA Help Mode

Provided with the HP 85725C CDMA Measurements Personality are on-screen help messages and an in-depth, context-sensitive help mode that describes the functions of CDMA softkeys.

To enter CDMA Help mode, press the (MODE) hardkey and then the CDMA HELP softkey. The analyzer displays information on the last CDMA softkey pressed before entering the CDMA Help mode.

To exit CDMA Help mode, press the (DISPLAY) hardkey or press CDMA HELP again. On exiting CDMA Help mode, the analyzer restores the previous CDMA analyzer state.

In CDMA Help mode, menus remain active so softkeys can be accessed, but key-presses do not change the analyzer setup.

In the CDMA analyzer mode, pressing a softkey in the Conf ig or Setup menus displays a short help message for that key. These messages are not displayed if there is an active measurement or if HELP MSG ON OFF is set to OFF'.

Accessing the Spectrum Analyzer Functions

The menus of the CDMA measurements personality provide the softkeys that are normally needed for making CDMA measurements. You may want to use some spectrum analyzer functions without leaving the CDMA analyzer mode, or you may want to exit the CDMA analyzer mode. This section contains the procedures for accessing the spectrum analyzer functions. The section contains the following procedures:

- Access the spectrum analyzer functions while you are using the CDMA analyzer mode.
- Exit CDMA analyzer mode and access the spectrum analyzer mode.

To access the spectrum analyzer functions while using the CDMA analyzer mode

1. lb use a spectrum analyzer function without leaving the CDMA analyzer mode, just press the front panel key, and then the softkey. For example, to use the marker normal function, press (MKR), then press **MARKER NORMAL** . You can also use (COPY) to print or plot the screen display (you need to connect a printer or plotter to the spectrum analyzer and then configure the spectrum analyzer). Refer to the spectrum analyzer user's guide for more information.
2. To return to a CDMA analyzer menu, do ***any*** of the following:
   - To return to the CDMA measurements personality menu that was displayed before the spectrum analyzer front panel key was pressed, press the (MODE) key twice.
   - To return to the CDMA measurements personality menu that was displayed before the spectrum analyzer front panel key was pressed, press the **CDMA** Menu softkey; displayed after pressing certain hardkeys such as (FREQ), (SPAN), and (AMPL).
   - To return to the Main Menu of the CDMA measurements personality, press (MODE) **CDMA** ANALYZER.

Some spectrum analyzer front panel keys can provide useful, supplemental functions for CDMA measurements, and most spectrum analyzer functions can be used while using the CDMA analyzer mode. See "Changes to the Spectrum Analyzer Functions with the Measurements Personality Loaded" later in this chapter for the list of functions that cannot be used while in the CDMA analyzer mode.

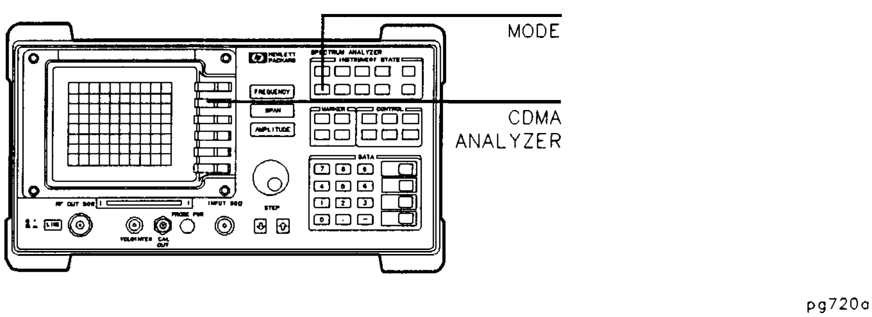


Figure 1-4. CDMA Analyzer Mode Functions

To exit CDMA mode and access the spectrum analyzer mode

There are two ways to access spectrum analyzer mode:

1. Press (PRESET). (PRESET) changes all of the CDMA measurements personality functions back to their default values, except for channel number and the functions in the configuration menu. Channel number and the functions in the configuration menu keep their current values even if (PRESET) is pressed or the analyzer power is turned off.

2. Press (MODE), then SPECTRUM ANALYZER. Unlike (PRESET), SPECTRUM ANALYZER does not change any of the CDMA measurements personality softkey settings.

When SPECTRUM ANALYZER or (PRESET) is pressed, the spectrum analyzer will exit the CDMA measurements personality and use the spectrum analyzer mode instead. When the spectrum analyzer is in the spectrum analyzer mode, CDMA no longer appears in the upper right corner of the spectrum analyzer display.

The CDMA analyzer mode can be reaccessed by pressing (MODE) CDMA ANALYZER .

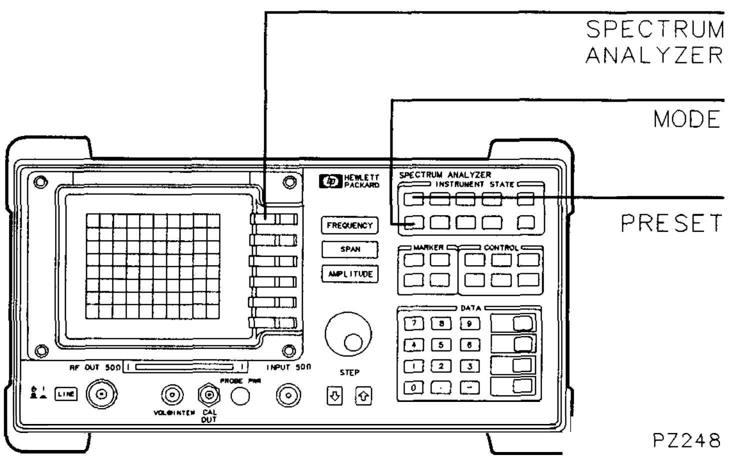


Figure 1-5. Accessing spectrum analyzer mode

Now that the spectrum analyzer is set up to make a measurement, refer to Chapter 2, "Making Measurements," for examples of various measurement tasks. As you perform those measurements, be aware that the way the spectrum analyzer performs base station measurements is different than the way it performs measurements for a mobile station. This is true even though the measurements for base and mobile stations are similar.

Changes to the Spectrum Analyzer Functions with the Measurements Personality Loaded

Most of the spectrum analyzer functions perform the same function regardless of whether the spectrum analyzer is using the CDMA analyzer mode or the spectrum analyzer mode. Some spectrum analyzer functions either are not available or are changed when using the CDMA analyzer mode.

The following spectrum analyzer functions are NOT available when using the CDMA analyzer mode:

- **Amptd Units** The CDMA measurements personality provides only dBm units.
- **REF** LVL OFFSET The CDMA measurements personality offsets the reference level whenever a value is entered into the EXT ATTEN function.
- VID AVG ON OFF The CDMA measurements personality uses its own power averaging function for most measurements. Video averaging (VID AVG) can be used for time domain, monitor channel, monitor band, and channel spectrum measurements.

The following spectrum analyzer functions are changed when using the CDMA analyzer mode:

SCALE **LOG/LIN**	This **softkey** becomes SCALE LOG (linear scale is incompatible with most measurements in the CDMA analyzer mode).
(FREQUENCY)	( ) the spectrum analyzer frequency functions, or the CDMA physical channel menu. ■ Press FREQUENCY to access the **softkeys** provided the current CDMA measurement is for power, adjacent channel transmit channel. ■ Press (FREQUENCY) to access the spectrum analyzer frequency functions if the current CDMA function is a system or spurious function.
(ZOOM)	Toggles the display between a full-size graphic display, and a combination graphic and numeric display.
(ON)	Performs the Hold function (turns off any active function).
(NEXT)	Performs the Hold function.
PEAK ZOOM	Not available from the front panel.
MAX **MXR LVL**	The CDMA personality provides this function when measuring out-of-band harmonic spurious emissions.
EXTERNAL **PREAMPG**	The CDMA personality provides this function when measuring receive channel power and receiver RX band spurious emissions.
INPUT **50Ω 75Ω**	Not available from the front panel.
TV TRIG	Not available from the front panel.
EMI BW	The keys in this entire menu are not available from the front panel.

Spectrum Analyzer Options Used with the CDMA Measurements Personality

Precision Frequency Reference (Option 004)

Option 004 provides increased absolute frequency-reference accuracy by using an ovenized reference oscillator.

Option 004 installed in your spectrum analyzer, or an external 10 MHz precision frequency reference, is required for accurate measurements with the CDMA measurements personality.

Option 004 is also available as a retrofit kit (Option R04) after the purchase of your spectrum analyzer, or as a kit HP part number 5062-6459.

Front Panel Protective Cover (Option 040)

The impact cover assembly snaps onto the front of your spectrum analyzer to protect the front panel during travel and when the unit is not in use.

Option 040 is also available as a kit (Impact Cover Assembly, HP part number 5062-4805).

HP-IB and Parallel Interface (Option 041)

Option 041 allows you to control your spectrum analyzer from a computer that uses a Hewlett-Packard interface bus (HP-IB). Such computers include the HP 9000 Series 300, and the HP Vectra PC. Option 041 includes a connector for an external keyboard, an HP-IB connector, a parallel interface connector for printers, and the HP 8590 ***D-Series and E-Series Spectrum Analyzers and HP 8591C Cable TV Analyzer Programmer's Guide.***

Option 041 allows the spectrum analyzer to copy its screen to a printer or plotter and includes a separate connector that accepts programming commands from an external keyboard.

Option 041 is also available as a retrofit kit (Option R41) after the purchase of your spectrum analyzer, or as a kit HP part number 08590-60380.

Note Option 041 can be converted to an Option 043 by ordering the RS-232 and parallel interface connector assembly HP part number 08590- 60369.

Protective Soft Carrying Case/Back Pack (Option 042)

A soft carrying case/backpack with a pouch for accessories. Option 042 can be used to provide additional protection during travel. (Cannot operate instrument while installed in case.)

RS-232 and Parallel Interface (Option 043)

Option 043 allows you to control your spectrum analyzer from a computer that uses an RS-232 interface bus. Such computers include the HP Vectra PC, the IBM PC, the AT, and compatibles. It includes a connector for an external keyboard, an RS-232 9-pin connector, a parallel interface connector for printers, and the ***HP 8590 D-Series and E-Series Spectrum Analyzers and HP 8591 C Cable TV Analyzer Programmer's Guide.***

Option 043 allows the spectrum analyzer to copy its screen to a printer or plotter and includes a separate connector that accepts programming commands from an external keyboard.

Option 043 is also available as a retrofit kit (Option R43) after the purchase of your spectrum analyzer, or as a kit HP part number 08590-60381.

Note Option 043 can be converted to an Option 041 by ordering the HP-IB and parallel interface connector assembly HP part number 08590- 60368.

Improved Amplitude Accuracy for CDMA Cellular and PCS Bands (Option 053)

Option 053 is an HP 85913 HP 85933, HP 85943, HP 85953, or HP 85963 with improved amplitude accuracy specifications over the CDMA measurements personality default frequency range and is recommended for CDMA measurements. Refer to "Specifications for Option 053" in Chapter 7, "Specifications," for information about the specifications for Option 053.

Improved amplitude accuracy is available to retrofit spectrum analyzers without Option 053. Contact your HP sales and service office for more information about Option R53, the improved amplitude accuracy upgrade for CDMA.

Fast Time Domain Sweeps (Option 101)

This option provides fast time domain measurements. Option 101 allows sweep times down to 20 μs in zero span. In fast sweep times (sweep times less than 20 ms), time domain sweeps are digitized. All trace functions are available for these fast zero-span sweeps.

Option 101 also adds the analog+ display mode and negative peak detection. The analog+ display mode provides traditional analog display operation combined with the advantages of digital display features like markers, screen titles, and hard copy output. The negative peak detector capability is useful for video modulator balance adjustments and intermodulation distortion measurements.

If Option 151 is not installed in your spectrum analyzer, you must have Option 101 installed to use the CDMA measurements personality to perform time domain measurements. If Option 151 is installed, Option 101 is not required for the HP 85725B CDMA measurements personality and should *not* be installed.

Option 101 is also available as a retrofit kit (Option R01) after the purchase of your spectrum analyzer, or as a kit HP part number 5062-6458.

Time-Gated Spectrum Analysis (Option 105)

Option 105 allows you to select and measure the spectrum of signals that may overlap in the frequency domain, but can be separated in the time domain. By adjusting a time gate based on a external trigger signal, you can significantly increase the diagnostic capability of your spectrum analyzer for time-interleaved signals.

This option provides additional general purpose capability in Spectrum Analyzer mode, but is *not* required in CDMA mode.

Option 105 is also available as a retrofit kit (Option R15) after the purchase of your spectrum analyzer, or as a kit 5062-8218.

Narrow resolution bandwidths (Option 130)

The narrow resolution bandwidths option provides additional narrow resolution bandwidths of 30 Hz, 100 Hz, and 300 Hz. These bandwidths improve the spectrum analyzer sensitivity and allow resolution of closely-spaced signals.

Option 130 is also available as a retrofit kit (Option R30) after the purchase of your spectrum analyzer, or as a kit (HP part number 5063-0246).

Narrow resolution bandwidths and precision frequency reference (Option 140)

The narrow resolution bandwidths and precision frequency reference option is a combination of Option 130 and Option 004. Option 140 provides additional narrow resolution bandwidths of 30 Hz, 100 Hz, and 300 Hz. These bandwidths improve the spectrum analyzer sensitivity and allow resolution of closely-spaced signals. The option also includes an internal precision frequency reference that improves stability and provides increased absolute frequency accuracy. The precision frequency reference makes the narrow resolution bandwidths more effective and easier to use.

DSP, Fast ADC and Digital Demodulator (Option 151)

Option 151 supplies the hardware required for fast time domain sweeps, digital demodulation measurements, and digital signal processor-assisted (DSP) measurements.

Option 151 provides a subset of Option 101 fast time domain functions. Option 101 allows zero span sweep times as short as 20μs with a step resolution of 20 μs (20 μs, 40 μs, 60 μs, and so forth). Option 151 allows zero span sweep times as short as 40 μs with a sequence of 40 μs, 80 μs, 160 μs, 320 μs, and 160 μs step size thereafter. Ail trace functions are available for these fast zero-span sweeps.

Since the sweep times offered by Option 151 are a subset of those offered by Option 101, the analog+ display mode is not supported for Option 151.

Option 101 or Option 151 supports negative peak detection. The negative peak detector capability is useful for video modulator balance adjustments and intermodulation distortion measurements. Option 101 allows negative peak detection with sweep times as long as 200 msec. Option 151 allows negative peak detection with sweep times as long as 800 ms.

Option 151 with 160 allows CDMA DSP-assisted measurements for an HP 85913, 85933, HP 85943, HP 85953, and HP 85963.

With Options 151 and 160 installed, the HP 85725B CDMA measurements personality will automatically make power measurements using the DSP Measurement time is significantly decreased using the DSP instead of the analyzer firmware routines for trace anti-logging and averaging.

For analyzers that do not have Option 151 installed, a retrofit kit (Option R70) is available to provide both options 151 and 160.

Note The HP 85913 analyzer with Options 151 and 160 is offered and supported only for use with the HP 85725B CDMA Measurements Personality.

PDC/PHS/NADC/CDMA Firmware for Option 151 (Option 160)

Option 160 provides the digital signal processing (DSP) firmware ROMs necessary to perform PDC, PHS, or NADC-TDMA digital demodulation-based measurements. It implements a coherent downconversion, and calculates the minimum RMS error vector magnitude of a timeslot. Carrier frequency error and I-Q origin offset are also extracted from sampled data. Option 160 also includes DSP-assisted measurements for CDMA.

Option 151 with Option 160 and the HP 85718B NADC-TDMA measurements personality provide a complete NADC-TDMA transmitter RF measurement solution, including modulation metrics.

Option 151 with Option 160 and the HP 85720C PDC measurements personality provide a complete PDC transmitter RF measurement solution, including modulation metrics.

Option 151 with Option 160 and the HP 85725B CDMA measurements personality provide a CDMA transmitter measurement solution with fast DSP-assisted measurements.

Option 151 with Option 160 and the HP 85725C CDMA Measurements Personality provide a complete CDMA transmitter RF measurement solution, including modulation metrics.

Option 160 is also available as a retrofit kit (Option R60) for spectrum analyzers that already have Option 151 installed. For analyzers that do not have Option 151 installed, a retrofit kit (Option R70) is available to provide both options 151 and 160.

Accessories for the CDMA Measurements Personality

AC Power Source

The HP 85901A provides 200 watts of continuous power for field and mobile application. The self-contained ac power source has outputs for either 115 V or 230 V, and runs on its own internal battery, an external battery, or on another 12 Vdc source. Typical operating time exceeds 1 hour for 100 watt continuous use at room temperature.

AC Probe

The HP 85024A high frequency probe performs in-circuit measurements without adversely loading the circuit under test. The probe has an input capacitance of 0.7 pF shunted by 1 MΩ of resistance and operates over a frequency range of 300 kHz to 3 GHz. High probe sensitivity and low distortion levels allow measurements to be made while taking advantage of the full dynamic range of the spectrum analyzer.

Caution Do not use dc-coupled probes on an HP 85933 spectrum analyzer; they may

When using a dc-coupled probe with an HP 85943, HP 85953, or HP 85963, the spectrum analyzer must be set to ac coupling. To set the analyzer to ac coupling, press (AMPLITUDE) More 1 of 3 More 2 of 3 COUPLE AC DC so that ac is underlined.

Broadband Preamplifiers and Power Amplifiers

Preamplifiers and power amplifiers can be used with your spectrum analyzer to enhance measurements of very low-level signals.

- The HP 10855A preamplifier provides a minimum of 22 dB gain from 2 MHz to 1300 MHz.
- The HP 8449B preamplifier provides a minimum of 30 dB gain from 1 GHz to 26.5 GHz.
- The HP 8447D preamplifier provides a minimum of 25 dB gain from 100 kHz to 1.3 GHz.
- The HP 84473 power amplifier provides a minimum of 22 dB gain from 0.1 GHz to 1.3 GHz.
- The HP 87405A preamplifier provides a minimum of 22 dB gain from 10 MHz to 3 GHz.

Burst Carrier Trigger/RF Preamplifier

The HP 85902A Burst Carrier Trigger and RF Preamplifier unit samples a burst TDMA (Time Division Multiple Access), TDD (Time Division Duplex), or CDMA (Code Division Multiple Access) RF carrier signal and provides a TTL output trigger to synchronize a spectrum analyzer. This triggering function is useful for making time-dependent measurements that are synchronized to the rising edge of an RF burst. Typical dynamic range is 60 dB without need for adjustment.

The HP 85902A can be used to make mobile station gated input power timing or time domain measurements with an external trigger when an external TTL trigger signal from the device under test is not available.

Separate from the triggering circuitry but included inside the HP 85902A is a 10 MHz to 2 GHz preamplifier. It provides a typical 10 to 18 dB gain for added triggering sensitivity, if required. DC power for the unit is supplied through the probe power connector located on the front panel of the HP 8590-series and HP 8560-series spectrum analyzers. The HP 8560-series spectrum analyzers are also well suited to use the HP 85902A.

Close Field Probes

The HP 11945A close field probe set contains the HP 11940A and HP 11941A close-field probes. These are small, hand-held, electromagnetic-field sensors that provide repeatable, absolute, magnetic-field measurements over a wide frequency range. The HP 11941A operates from 9 kHz to 30 MHz. The HP 11940A from 30 MHz to 1 GHz. When attached to a source, the probes generate a localized magnetic field for electromagnetic interference (EMI) susceptibility testing.

The HP 11945A Option E51 also includes the HP 8447F Option H64 preamplifier and a convenient carrying bag.

External Keyboard

For use with Option 041 or 043. The HP C1405B keyboard is an IBM AT compatible keyboard that can be connected to the external keyboard connector, using a C1405-60015 cable adapter, on the rear panel of the spectrum analyzer. Any IBM AT compatible keyboard with a small DIN connector will work. Screen titles and remote programming commands can be entered easily with the external keyboard.

Memory Cards

Blank random access memory (RAM) cards are available for the storage and transfer of data and programs. Several different sizes of cards are available for use with the memory card reader. See Table 1-2. The memory card reader is standard for the HP 85913, HP 8593E, HP 85943, HP 85953, and HP 85963.

Table 1-2. Memory Card Model Numbers

Model Number	Size of Memory Card
HP 85700A	32 kilobytes
HP 85702A	128 kilobytes
HP 85704A	256 kilobytes
HP 85705A	512 kilobytes

Plotter

Fbr use with Option 041 or 043. The HP ColorPro 7440A graphics plotter adds a color plot capability to the spectrum analyzer for permanent records of important measurements. The eight-pen HP ColorPro plotter produces color plots with 0.025 mm (0.001 inch) resolution on either 8.5 by 11 inch paper or transparency film. The plotter can be ordered with HP-IB or RS-232 interfaces to correspond to the interface option installed on the spectrum analyzer.

Printers

fir use with Option 041 or 043. The DeskJet personal printers provide black and white or color printing for another form of permanent records of your test results. The HP LaserJet series printers are also compatible. The printers can be ordered with RS-232 or parallel interfaces to correspond to the interface option installed on the spectrum analyzer. Figure 1-6 shows the methods of connecting different types of printers to the spectrum analyzer using the various analyzer interface options.

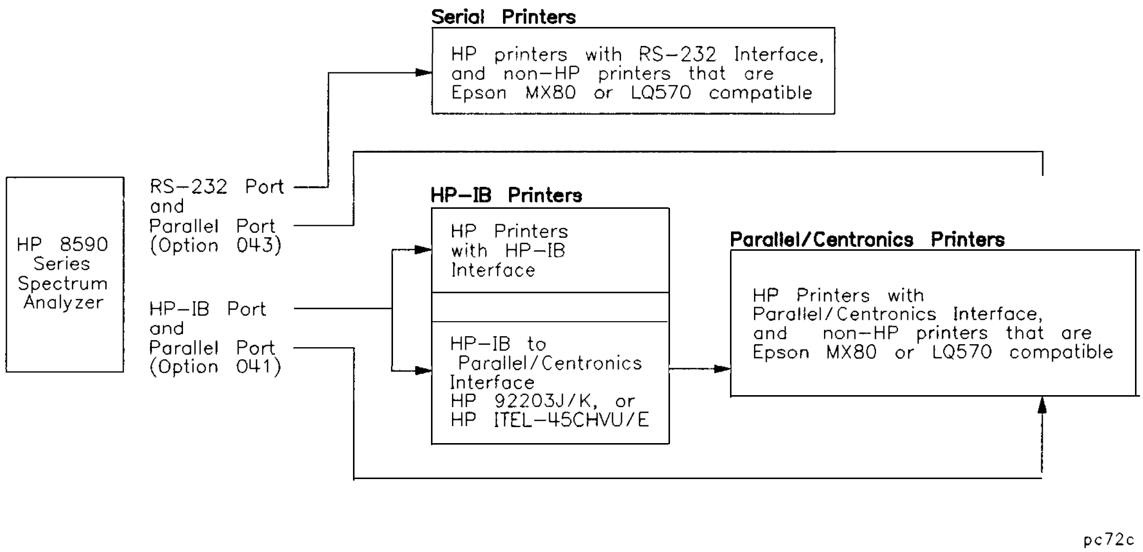


Figure 1-6. Connecting Printers Using Various Interface Options

Transit Case

The transit case (HP part number 9211-5604) provides extra protection for your spectrum analyzer for frequent travel situations. The HP transit case protects your instrument from hostile environments, shock, vibration, moisture, and impact while providing a secure enclosure for shipping.

2

Making Measurements

This chapter demonstrates how to make various common measurements with the HP 85725A CDMA measurements personality.

Note Before you begin any of the following measurements, do the following:

1. Perform "Preparing to Make a Measurement" in Chapter 1, "Getting Started."
2. Connect the RF signal from the transmitter to the spectrum analyzer RF input.
3. Start with the CDMA Main menu by pressing **CDMA** ANALYZER.

Many measurements access the "post-measurement" menu upon completion. The post-measurement menu contains functions which allow you to repeat the previous measurement or change various testing parameters. For more information about the post-measurement softkeys, see "The Post-Measurement Menu" in Chapter 3, "Menu Map and Softkey Descriptions."

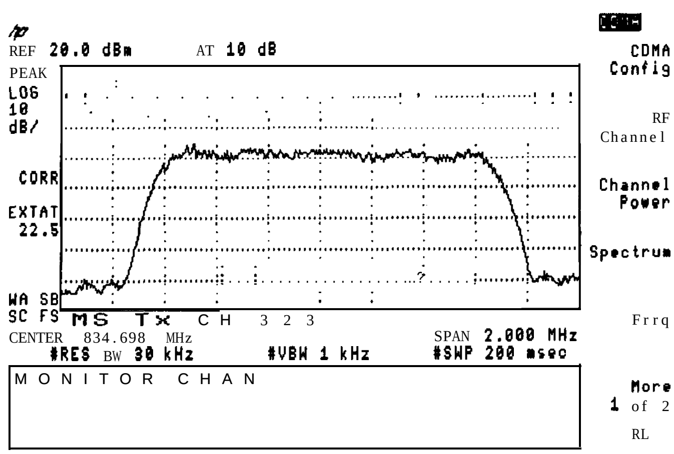


Figure 2-1. The CDMA Main Menu

To Configure the CDMA Analyzer

This procedure configures the analyzer for the unit under test, as well as the test setup.

The settings in the **CDMA Config** menu are saved through instrument preset, and turning ac power off and on.

1. CDMA Config	Go to the CDMA Configuration menu.
2. BASE MOBILE	Select either base or mobile station to test.
3. MS EXT **ATTEN**	Enter the amount of path loss (in a positive dB value) from the output of the transmitter to the spectrum analyzer RF input.
or	
BS EXT **ATTEN**	See the section entitled, "The CDMA Config Softkeys" in Chapter 3, "Menu Map and Softkey Descriptions, " for important information regarding the external attenuation.
4. MAX **PWR** AUTO MAN	Select **AUTO** for most measurements.
5. **VID TRG** MARGIN	For mobile timing measurements, select the relative level below the signal peak where video triggering will occur.
6. Main Menu	Return to the Main Menu.

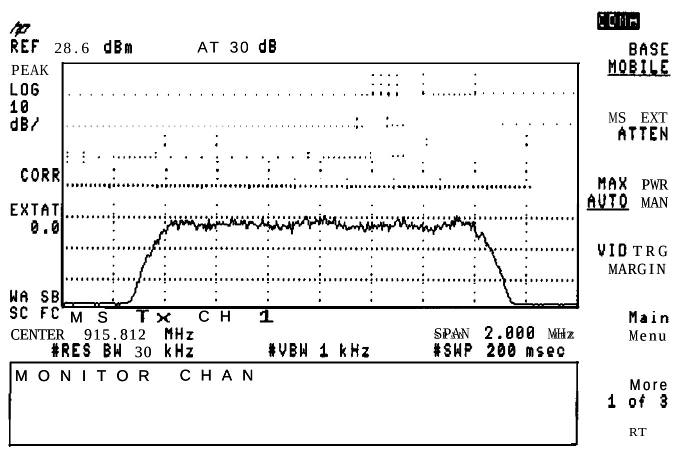


Figure 2-2. The Configuration Menu

To Select the Standard and Tuning Plan

This procedure selects the standard and tuning plan. The setting is saved through instrument preset and turning ac power off and on.

1. **Config** Enter the **Config** menu.
2. **More 1 of 2** Select the second page.
3. More 2 **of** 3 Select the third page.
4. **Standard** Band Select the Standard\Band menu.
5. Select the appropriate standard.

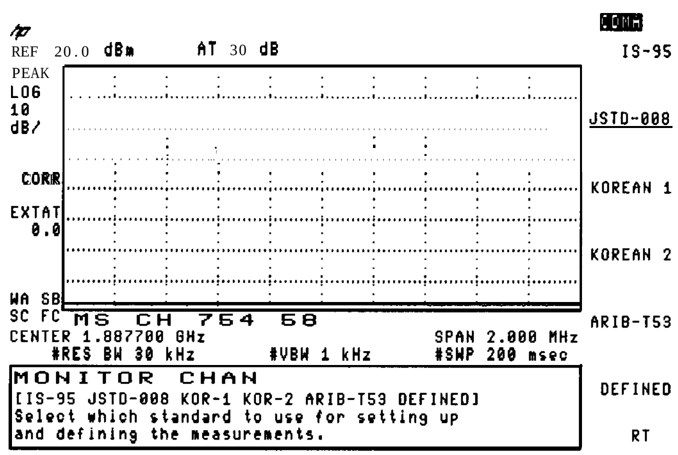


Figure 2-3. The Standard/Band menu

To Set the RF Channel

This procedure sets the analyzer measurement frequency. The channel setting is saved through instrument preset and turning ac power off and on.

1. RF Channel	Enter the RF Channel menu.
2. CHANNEL NUMBER	Select a channel number which is defined by the Std/Band selection in the Config menu.
	or
3. CBA?? X CTR FREQ	Define a Channel X (user-selectable) frequency.
	or
4. CENTER FREQ	Center frequency selection is available here as a convenience to temporarily change the frequency.
5. Main Menu	Return to the Main Menu.

Figure 2-4 illustrates the RF Channel menu.

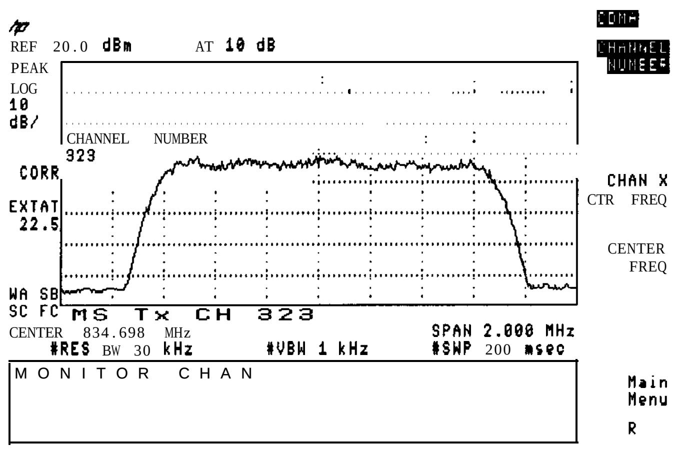


Figure 2-4. The RF Channel Menu

To Measure Channel Power

This procedure measures the total RMS power in the specified integration bandwidth.

1. Channel Power	Go to the Channel Power menu.
2. CH Pwr Setup*	Set up the measurement conditions.
3. INTEG BW	Integration bandwidth is preset to 1.23 MHz; change this value now, if desired.
4. CH PWR SPAN	Enter the viewing span desired (for example, 2 MHz).
5. CAL SA NOISE	Calibrate analyzer noise floor for noise correction. Spectrum analyzer noise floor correction is useful when measuring low-level signals.
6.	Disconnect the input signal and connect a 500 load.
7. CONTINUE	Start the analyzer noise floor calibration.
8. Previous Menu	Return to the Setup menu.
9. NUMBER AVERAGES	Enter the desired number of averages for making power measurements.
10. Previous Menu	Return to the Channel Power menu.
11.	Remove the 50Ω load and reconnect the input signal.
12. CHAN POWER	Make the transmit channel power measurement.

* Additional measurement parameters and limit variables may be set by using remote programming. See Table 5-2 in Chapter 5, "Programming Commands."

If Options 151 and 160 are installed, the displayed trace represents the true averaged (RMS) power. Without these options, the trace represents the video average of the log of the power. However, in both cases, the displayed numerical results are for the RMS power. With Options 151 and 160, the P AVG annotation and averaged trace is only updated every 10 sweeps, and on the nth sweep. The main advantage of Options 151 and 160 is faster measurements.

Figure 2-5 shows an example of an SA Noise Power Calibration (following step 5).

Figure 2-6 illustrates the results of performing a channel power measurement (following step 12). Figure 2-7 shows a channel power measurement using a low-level signal, where noise correction is automatically applied. For more information on how and when spectrum analyzer noise correction is applied, see the N CORR ON OFF key description in Chapter 3, "Menu Map and Softkey Descriptions."

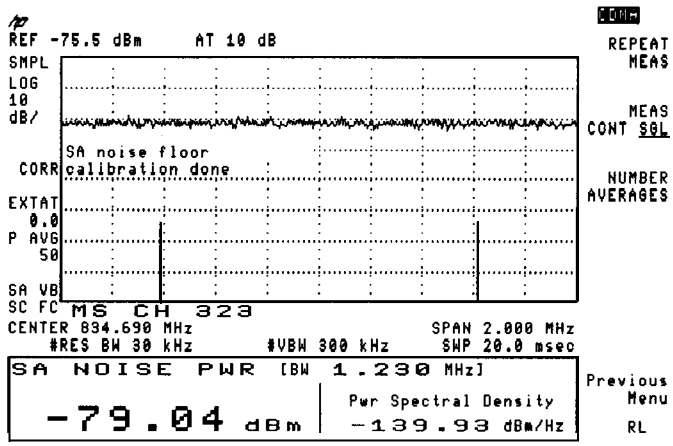


Figure 2-5. SA Noise Power Calibration

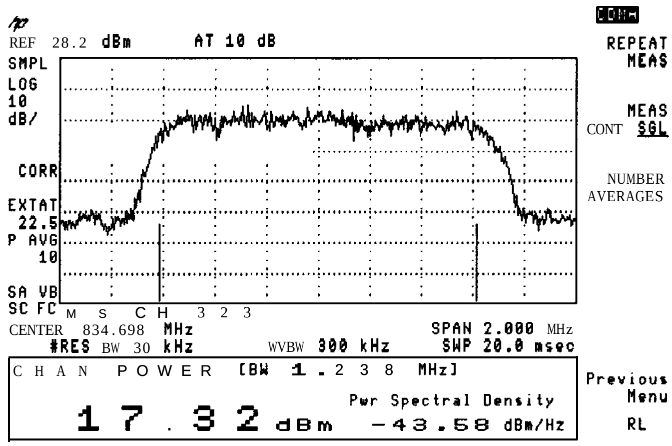


Figure 2-6. Channel Power Measurement

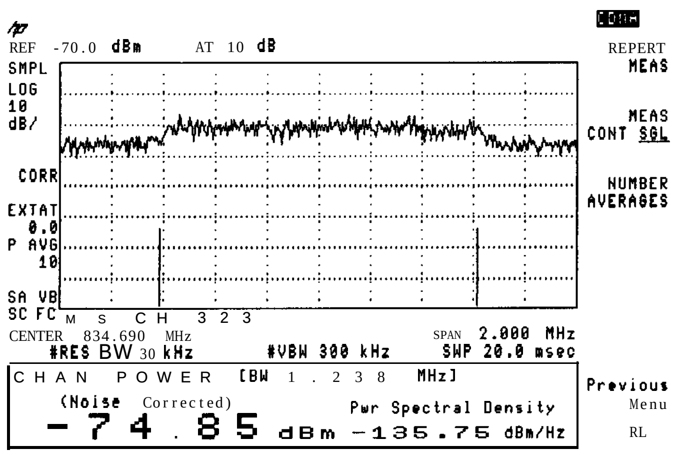


Figure 2-7.
Channel Power Measurement of a Low-level Signal with Noise Correction Applied

To Measure the Receive Channel Power of a Base Station

This procedure measures the power present in a receive channel of a base station. For best sensitivity, connect a low-noise amplifier between the base station and the analyzer. Proper care should be taken to either turn off any transmissions or apply filtering to limit the power applied to the spectrum analyzer input. (This procedure may also be applied to a mobile.)

1.	Channel Power	Go to the Channel Power menu.
2.	CH Pwr Setup *	Set up the measurement conditions.
3.	INTEG BW	Integration bandwidth is preset to 1.23 MHz; change this value now, if desired.
4.	CH PWR SPAN	Enter the viewing span desired (for example, 2 MHz).
5.	Previous Menu	Return to the Channel Power menu.
6.	Rx Chan Pawer	Enter the Rx Chan Power menu.
7.	EXTERNAL PREAMPG	Enter the value of the preamplifier gain. Allow for cable losses by entering the equivalent total gain (preamplifier gain – cable loss). You must allow for cable losses here because the external attenuation value (EXT ATTEN) is set to 0 for this measurement. If no preamplifier is used, enter 0, or a negative value for cable loss.
8.		Connect the output of the base station low noise floor amplifier, or other external preamplifier to the spectrum analyzer input.
9.		Terminate the input to the low noise amplifier at the antenna input with a 50Ω load.
10.	CAL RX SA NOISE	Calibrate the system noise floor for noise correction.
11.	NUMBER AVERAGES	Enter the desired number of averages (50, for example).
12.	CONTINUE	Start the system noise floor calibration.
13.	Previous Menu	Return to the Channel Power menu.
14.	RX CHAN POWER	Disconnect the 500 load and connect the signal to the low noise amplifier input.
15.	NUMBER AVERAGES	Change the number of averages, if desired.
16.	CONTINUE	Make the Receive Channel Power measurement.

* Additional measurement parameters and limit variables may be set by using remote programming. See Table 5-2 in Chapter 5, "Programming Commands."

Figure 2-8 shows an example of a Receive Channel Power measurement.

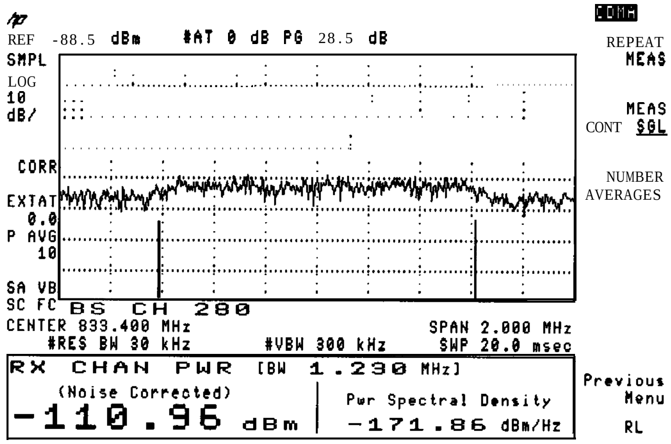


Figure 2-8. Receive Channel Power Measurement

To View the Channel Spectrum of a Transmitter

This procedure allows for frequency-domain waveform analysis in a 2 dB/division scale.

1. **Spectrum**	Enter the Spectrum menu.
2. CHANNEL **SPECTRUM**	View the Channel Spectrum.
3. **STOR REF TRACE**	Stores the current active trace into a reference trace. Any signal changes can then be compared to this reference trace.
4. **RES BW**	Enter the desired resolution bandwidth for viewing.
5. YID **BW**	Enter the desired video bandwidth for viewing.
6. VID **AVG** ON OFF	Select **ON** to add additional trace smoothing. Video filtering and trace smoothing both influence measurement speed.

Figure 2-9 shows an example of viewing the channel spectrum of a transmitter.

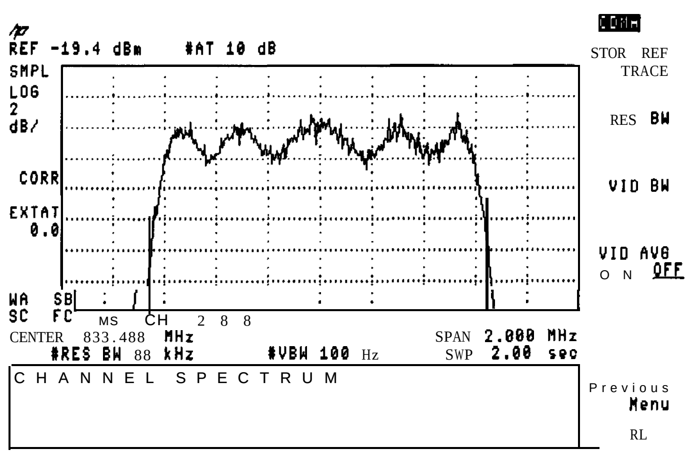


Figure 2-9. Channel Spectrum Measurement

To Measure Gated Output Power (Mobile Station Only)

This procedure measures the carrier envelope power characteristics in the time domain. The gate-on mean power is the average power above a threshold (20 dB below the maximum level).

The on/off ratio is the ratio of average gate-on power to the gate-off mean power in dB. This measurement can be made for any combination of power control groups; hence, the unit under test can be set to any data rate, including variable rate.

Note Choose MOBILE to test a mobile station. See “To Configure the CDMA Analyzer” earlier in this chapter for details.

1. More 1 of 2	Go to the second tier of the Main Menu.
2. Gated Power	Enter the Gated Power menu.
3. Gtd Pwr Setup *	Set up the measurement conditions.
4. NUMBER AVERAGES	Enter the desired number of averages (for example, 10).
5. Previous Menu	Return to the Gated Power menu.
6.	Put the mobile under test in 1/8, 1/4, 1/2, or variable-rate mode.
7. GATED POWER	Make the gated output power measurement.
8. RATIO TOTAL	Select RATIO to view the on-off ratio (shown below), or TOTAL to view total output power, which is the average power for all measured samples.

* Additional measurement parameters and limit variables may be set by using remote programming. See Table 5-2 in Chapter 5, “Programming Commands.”

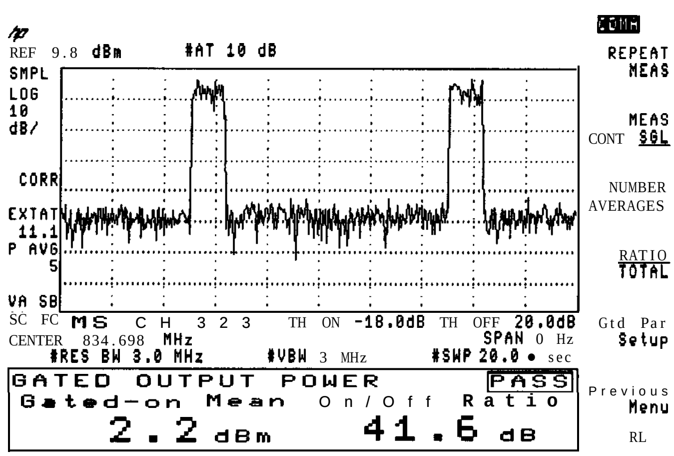


Figure 2-10. Gated Power Measurement

To Measure Gated Output Power Timing (Mobile Station Only)

This procedure measures the time characteristics of the mean output power for isolated gated-on power control groups (separated 1.25 ms bursts). The mean is computed for the number of isolated gated-on power control groups set by **NUMBER AVERAGES** .

Note Choose MOBILE to test a mobile station. See "'lb Configure the CDMA Analyzer" earlier in this chapter for details.

1.	**More** 1 of 2	Go to the second tier of the Main Menu.
2.	Gated **Power**	Enter the Gated Power menu.
3.	**Gtd Pwr Setup**	Set up the measurement conditions.
4.	**CHK PCG ON** OFF	Select ON to check for and ignore non-isolated power control groups.
5.	**NUMBER AVERAGES**	Enter the desired number of averages (for example, 10).
6.	Previous **Menu**	Return to the Gated Power menu.
7.		Put the mobile under test in l/B-rate mode.
8.	**GTD PWR** TIMING	Make the gated output power timing measurement.
9.	DISPLAY **R BRST** F	Select to view the rising edge **R** , the burst BRST , or the falling edge F (falling edge is shown below).

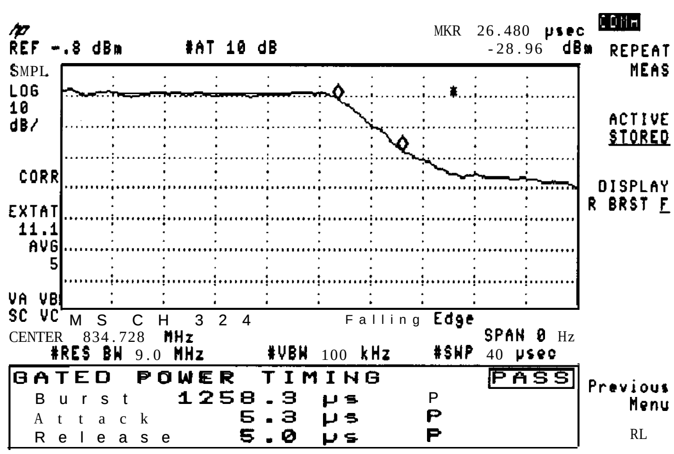


Figure 2-11. Gated Output Power Timing Measurement

To Measure Transmitter In-Band Spurious Emissions for Maximum Output Power Conditions

This procedure measures the spurious emissions in the transmit band relative to channel power in the selected channel, with the unit under test at maximum output power. The transmit band spectrum is measured in three frequency segments (two if at a band edge) using a 30 kHz resolution bandwidth. The amplitude difference from spur to the limit line (ΔLim) is displayed for the worst spurious signal. A marker identifies this signal.

1.	Mare I of 2	Go to the second tier of the Main Menu.
2.	Xmtr Spurious	Enter the Xmtr Spurious menu.
3.	In Band	Go to the in-band spurious measurements.
4.	spur Setup *	Set up the measurement conditions.
5.	NUMBER AVERAGES	Enter the desired number of averages (for example, 10).
6.	DET NM PK SP	Select the desired detector mode per frequency segment scheme.
7.	Previous Menu	Return to the Xmtr Spurious menu.
8.		Set the output power of the transmitter under test to maximum.
9.	SPUR TX MAX PWR	Make the spurious emissions measurement.
10.	SEGMENT F- Fc F+	View the lower frequency segment F- , the middle segment Fc , or the upper segment F+ (middle segment is shown below).

* Additional measurement parameters and limit variables may be set by using remote programming. See Table 5-2 in Chapter 5, "Programming Commands."

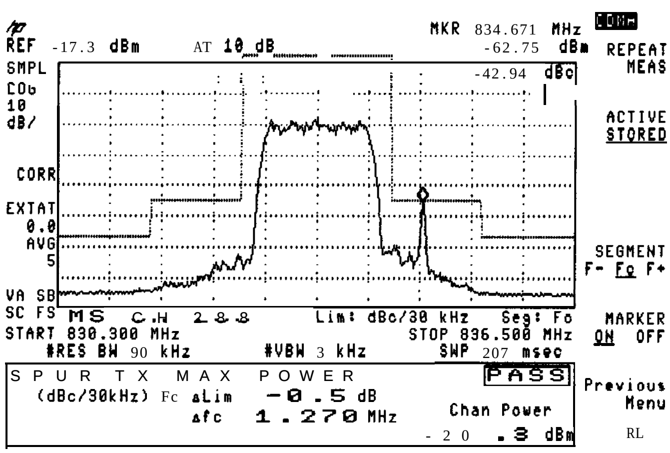


Figure 2-12. Maximum Spurious Emissions Measurement

To Measure Transmitter In-Band Close-in Spurious Emissions (Mobile Station Only)

This procedure measures the spurious emissions within 25 MHz of the selected channel relative to the channel power in that channel (dBc).

In the IS-95 and ARIB-T53 channel plans the spectrum is measured in three frequency segments using a 30 kHz resolution bandwidth to achieve sufficient selectivity. The spectrum for a 1 MHz bandwidth is then computed. The two spectrums are compared to these three limit line masks:

(a) relative limit (dBc), 30 kHz resolution bandwidth
(b) absolute limit (dBm), 30 kHz resolution bandwidth
(c) absolute limit (dBm), 1 MHz integration bandwidth

In J-Standard 008, Korean 1 and 2 channel plans, the spectrum is measured in three frequency segments using a 30 kHz resolution bandwidth to achieve sufficient selectivity. The spectrum for a 1 MHz bandwidth is then computed. The two spectrums are compared to these three limit line masks:

(a) relative limit (dBc), 30 kHz resolution bandwidth
(b) absolute limit (dBm), 30 kHz resolution bandwidth
(c) absolute limit (dBm), 1 MHz integration bandwidth

To pass, the spurious emission levels must be less than either limit a, or both limits b and c.

The amplitude difference from spur to limit line (ΔLim) is displayed for each limit line condition. A marker identifies the worst spur for the optimum limit line test conditions, and this limit is shown by the highlighted letter a, b, or c, on the display.

The trace for limit c has been corrected to be most accurate for noise-like spurious signals. It is assumed that limit c is for measuring broadband noise-like spurs and limit b is for narrow band (cw) spurs. Narrow band or cw signals will appear 2.5 dB too high on the limit c trace.

Note Choose MOBILE to test a mobile station. See "To Configure the CDMA Analyzer" earlier in this chapter for details.

1. **More 1 of 2**	Go to the second tier of the Main Menu.
2. **Xmtr Spurious**	Enter the Xmtr Spurious menu.
3. **In Band**	Go to the in-band spurious measurements.
4. **Spur Setup** *	Set up the measurement conditions.
5. **NUMBER AVERAGES**	Enter the desired number of averages (for example, 10).
6. **CLOSE** FAST ALL	Select ALL to test to all limits (a, b, and c).
7. TX MODE **CONT GTD**	Select **CONT** if the transmitter is set to full rate (the usual case). Select **GTD** if the transmitter is set to 1/8, 1/4, 1/2, or variable rate to measure the full amplitude of burst spurious signals. Gated (**GTD**) mode measurements are much slower than continuous (**CONT**) mode measurements.

* Additional measurement parameters and limit variables may be set by using remote programming. See Table 5-2 in Chapter 5, "Programming Commands."

8. **DET NM PK SP** — Select the desired detector mode or frequency segment scheme.

9. Previous **Menu** — Return to the Xmtr Spurious menu.

10. Set the output power of the transmitter under test to the desired value (– 13 dBm is typical).

11. SPUR CLOSE — Make the spurious emissions measurement.

12. SEGMENT F- **Fc F+** — View the lower frequency segment F- , the middle segment **Fc** , or the upper segment **F+** (middle segment is shown below).

13. ***LIMIT*** **a** b c — Select the condition limit to view with the results segment.

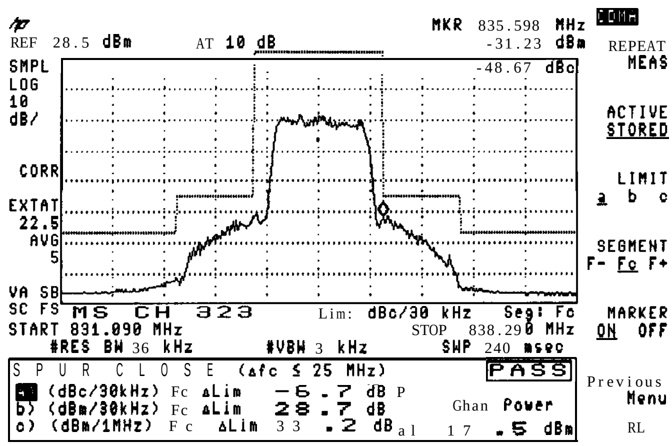


Figure 2-13. Close-in Spurious Emissions Measurement

To Measure Receiver Spurious Emissions in the Transmit Band

This procedure measures spurious emissions of a receiver in the transmit band with the transmitter turned off.

1.	Turn off the base or mobile station transmitter.
2. **Config**	Enter the configuration menu.
3. **EXT ATTEN**	Remove any unnecessary external attenuation and enter the new external attenuation value. This will provide the best sensitivity for the measurement.
4. Main **Menu**	Return to the Main Menu.
5. More **1** of 2	Go to the second tier of the Main Menu.
6. **Rcvr** Spurious	Enter the Rcvr Spurious menu.
7. TX **&** RX **Setup** *	Set up the measurement conditions.
8. NUMBER**AVERAGES**	Enter the desired number of averages.
9. Previous **Menu**	Return to the Rcvr Spurious menu.
10. TX BAND	Make the TX Band spurious measurement.
11. MARKER ON OFF	Press **MARKER ON** to activate a marker to measure a specific spurious signal.
12. ACTIVE STORED	Select ACTIVE to view the signal in real time. Select STORED to view the measured trace.

* Additional measurement parameters and limit variables may be set by using remote programming. See Table 5-2 in Chapter 5, "Programming Commands."

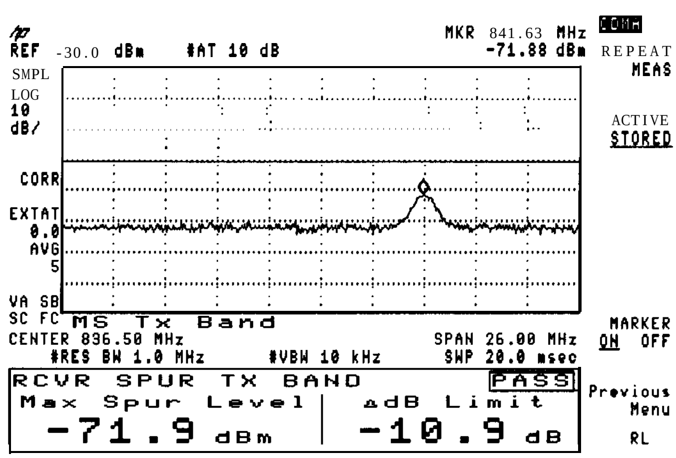


Figure 2-14. Receiver Spurious Emissions in the Transmit Band

To Measure Receiver Spurious Emissions in the Receive Band

This procedure measures spurious emissions of a receiver in the receive band with the transmitter turned off.

1.		Turn off the base or mobile station transmitter.
2.	More 1 of 2	Go to the second tier of the Main Menu.
3.	Rcvr Spurious	Enter the Rcvr Spurious menu.
4.	TX & RX Setup *	Set up the measurement conditions.
5.	NUMBER AVERAGES	Enter the desired number of averages (for example, 10).
6.	Previous Menu	Return to the Rcvr Spurious menu.
7.	RX BAND	Prepare to make the measurement in the receive band.
8.	EXTERNAL PREAMP G	Enter the value of the preamplifier gain. Allow for cable losses by entering the equivalent total gain (preamplifier gain – cable loss). You must allow for cable losses here because the external attenuator (EXT ATTEN) is set to 0 for this measurement. If no preamplifier is used, enter 0, or a negative value for cable loss.
9.		Connect the preamplifier output to the spectrum analyzer input, and then press CONTINUE.
10.		Connect the signal to the preamplifier input, and then press CONTINUE.
11.	MARKER ON OFF	Press MARKER ON to activate a marker to measure a specific spurious signal.
12.	ACTIVE STORED	Select ACTIVE to view the signal in real time. Select STORED to view the measured trace.

* Additional measurement parameters and limit variables may be set by using remote programming. See Table 5-2 in Chapter 5, "Programming Commands."

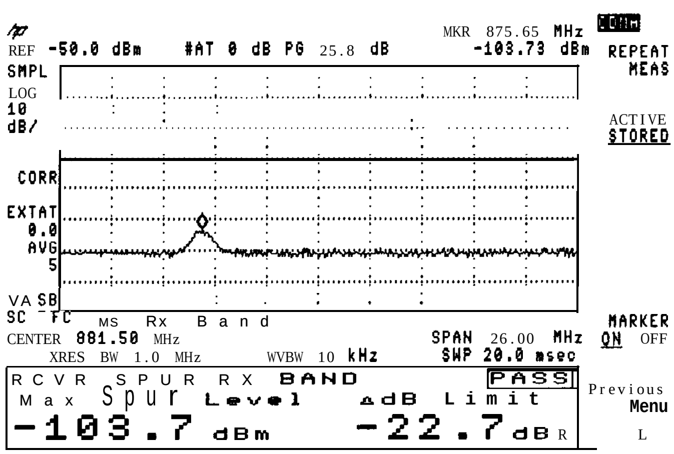


Figure 2-15. Receiver Spurious Emissions in the Receive Band

To Measure Transmitter In-Band Spurious Emission Standby Output Power

This procedure measures the transmit band spectrum with the transmitter power turned off.

1.		Set the transmitter under test to standby mode.
2.	**Config**	Enter the configuration menu.
3.	**EXT ATTEN**	Remove any unnecessary external attenuation and enter the new external attenuation value. This will provide the best sensitivity for the measurement.
4.	Main Menu	Return to the Main Menu.
5.	More 1 of 2	Go to the second tier of the Main Menu.
6.	**Xmtr** Spurious	Enter the Xmtr Spurious menu.
7.	In Band	Go to the in-band spurious measurements.
8.	**Spur Setup** *	Set up the measurement conditions.
9.	NUMBER AVERAGES	Enter the desired number of averages (for example, 10).
10.	Previous **Menu**	Return to the Tx Spurious Emission menu.
11.	STANDBY **OUT** PWR	Perform the standby output power measurement.
12.	**Previous Menu**	Return to the Tx Spurious Emission menu.

* Additional measurement parameters and limit variables may be set by using remote programming. See Table 5-2 in Chapter 5, "Programming Commands."

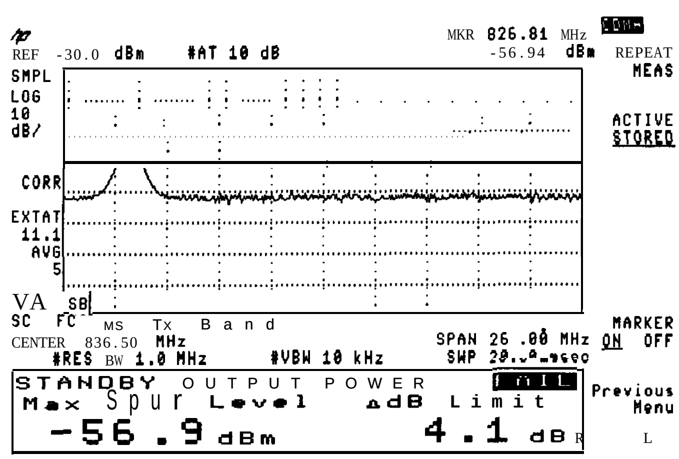


Figure 2-16. Standby Output Power Measurement

To Measure Transmitter Out-of-Band Spurious Emissions

This procedure measures spurious emissions using the frequency ranges and measurement conditions defined by the selected table. Measurement results are displayed in tabular format. Both absolute and relative spurious amplitude results are displayed along with the amplitude difference from spur to limit line (ALIM) for each. When the measurement has finished, individual frequency ranges can be selected for viewing.

The J-STD-008 specifications for out of band spurious within 1 MHz of the band edge is loaded into Tables 4 and 5 by default. Specifications for other standards may be loaded into the tables.

1.	More 1 of 2	Go to the second tier of the Main Menu.
2.	Xmtr Spurious	Enter the Xmtr Spurious menu.
3.	out Band	Go to the out-of-band spurious measurement menu.
4.	TABLE NUMBER	Enter the desired (previously defined) table. To edit tables, see the procedure "lb Edit an Out-of-Band Spurious Emission Table," in this chapter.
5.	MEASURE OUT BAND	Make the spurious emissions measurement.
6.	SELECT RANGE	Enter the desired frequency range to view.
7.	VIEW RANGE	View the selected frequency range.
8.	SELECT RANGE	Enter another frequency range to view.
9.	VIEW DONE	Return to the tabular display of measurement results.

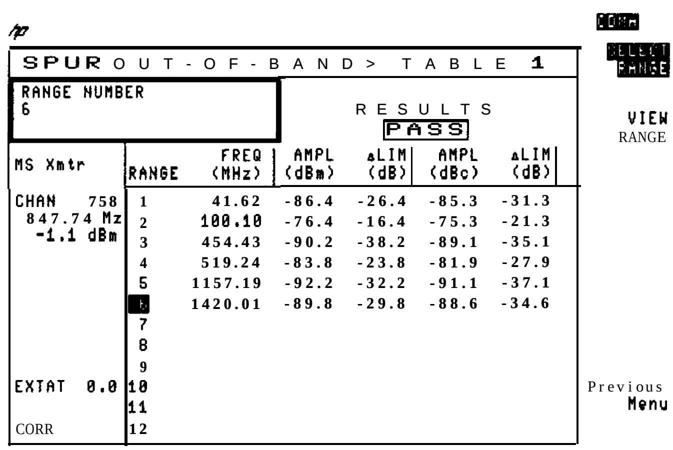


Figure 2-17. Out-of-Rand Spurious Emissions Measurement Results

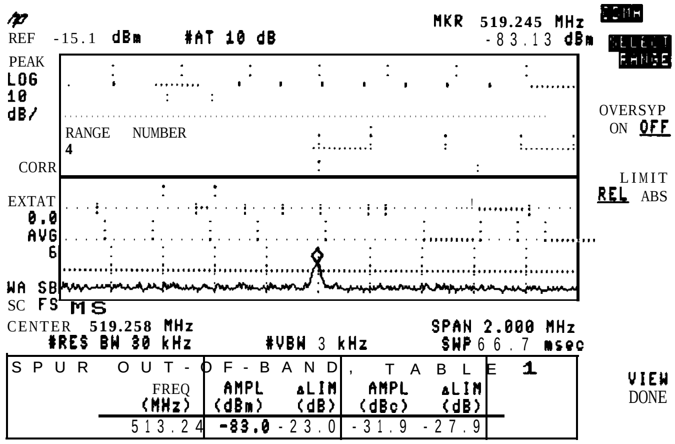


Figure 2-18. Viewing a Range of an Out-of-Band Spurious Emissions Measurement

To Edit an Out-of-Band Spurious Emissions Table

This procedure shows how to edit an out-of-band spurious emissions table. Out-of-Band spurious emissions measurements use the setups determined by the selected table. *

1. More 1 of 2	Go to the second tier of the Main Menu.
2. Xmtr Spurious	Enter the Xmtr Spurious menu.
3. Out Band	Go to the out-of-band spurious measurement menu.
4. TABLE NUMBER	Enter the desired table number.
5. EDIT TABLE	Edit the selected table. The current contents of the selected table will be displayed and a new menu will appear. See Figure 2-19.
6. SELECT RANGE	Enter the desired frequency range to edit (or clear).
7. CF/SPAN STRT/STP	Select either center frequency/span or start/stop for data entry and table format. The procedure below uses CF/SPAN.
8. EDIT RANGE	Edit the selected frequency range. A new menu will appear which contains keys allowing entry for each of the parameters of the range. The analyzer sweeptime for the current set of parameters is also displayed. See Figure 2-20. The sweeptime value as well as parameter values displayed in the table are updated only when a new parameter key is pressed. If a blank range is edited, the parameter keys will still be set to the previously-edited range parameters, or to a set of default parameters.
9. CENTER FREQ	Enter the desired center frequency.
10. SPAN	Enter the desired span.
11. RES BW	Enter the desired resolution bandwidth.
12. VID BW	Enter the desired video bandwidth.
13. More 1 of 2	Go to the second tier of the Edit Range menu.
14. LIM REL ON OFF	Press the key to underline ON to enable Pass/Fail checking on the relative amplitude limit value. Enter the desired relative limit value.
15. LIM ABS ON OFF	Press the key to underline ON to enable Pass/Fail checking on the absolute amplitude limit value. Enter the desired absolute limit value.

* Additional measurement parameters and limit variables may be set by using remote programming. See Table 5-2 in Chapter 5, "Programming Commands."

16. FAIL OR AND	If both relative and absolute limit Pass/Fail checking is enabled, select the desired overall Pass/Fail logic. If OF is selected, the range will fail if the spurious emission exceeds either the relative *or* absolute limit. If AND is selected, the range will only fail if the spurious emission exceeds both the relative ***and*** absolute limits.
17. DETECTOR PK SHPL	Select either the peak or sample detector mode.
18. **NUMBER** AVERAGES	If the detector mode is sample, enter the desired number of averages.
19. **More** 2 **of** 2	Return to the first tier of the Edit Range menu.
20. EDIT **RNG DONE**	Return to the Edit Table menu when done editing the range.
21. EDIT **TABLE DONE**	Return to the Out-of-Band Spurious Measurement menu when done editing ranges.

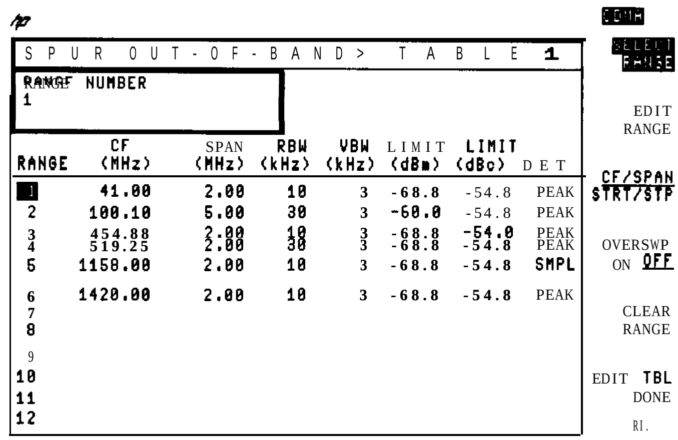


Figure 2-19. Out-of-Band Spurious Emissions Measurement Setup Table

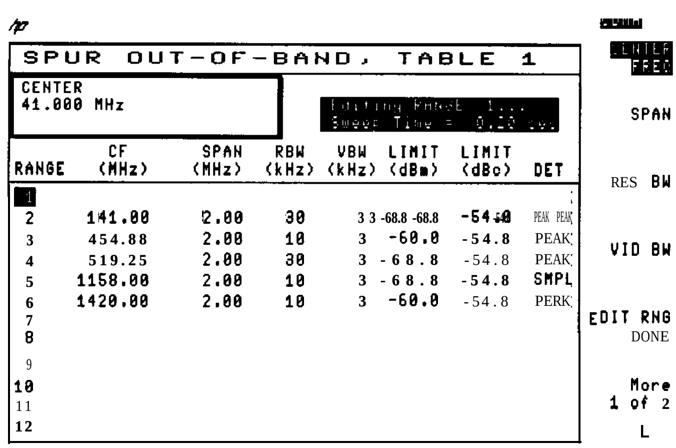


Figure 2-20.
Editing a Range of an Out-of-Band Spurious Emissions Measurement Setup Table

To Measure Time Response to Open Loop Power Control (Mobile Station Only)

This procedure measures the open loop power control time characteristics of a mobile station.

Note Choose MOBILE to test a mobile station. See "To Configure the CDMA Analyzer" earlier in this chapter for details.

1.	More 1 of 2	Go to the second tier of the Main Menu.
2.	Time Response	Enter the Time Response menu.
3.	Open Setup	Set up the measurement conditions.
4.	DELTA PWR	Enter the power step in mobile power to be measured if a value other than the default 20 dB is desired.
5.	COMPUTE LIMITS	Computes the TIA IS-97 limits based on the delta power value entered. This is necessary if DELTA PWR or SWP TIME is changed.
6.	Previous Menu	Return to the Time Response menu.
7.		Connect an external TTL trigger signal to the EXTERNAL TRIGGER connector on the analyzer rear panel. The positive edge of this signal must be synchronous with the step change in receive power by the mobile station.
8.	OPEN LOOP	Make the time response measurement.

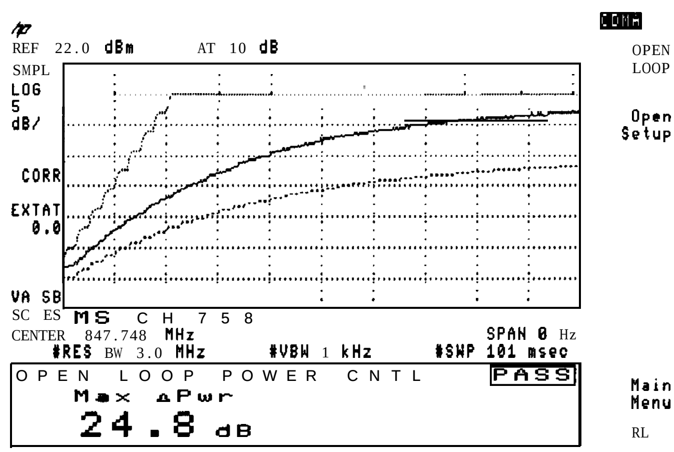


Figure 2-21. Time Response Open Loop Power Control Measurement

To View the Time Domain Characteristics of a Signal

This procedure provides general purpose time domain waveform analysis.

1. More 1 of 2	Go to the second tier of the Main Menu.
2. TIME DOMAIN	Enter the Time Domain menu.
3. SWEEP STD DLY	Select DLY to enable the use of a time delay on the displayed waveform.
4. SWP TIME	Enter the desired sweep time (for example, 3 ms).
5. DELAY	Enter the desired time delay (for example -1 ms).
6. (SGL SWP)	Press the (SGL SWP) **hardkey** to store a time record.
	Then change SWP TIME **and** DELAY to view different portions of the stored time record.

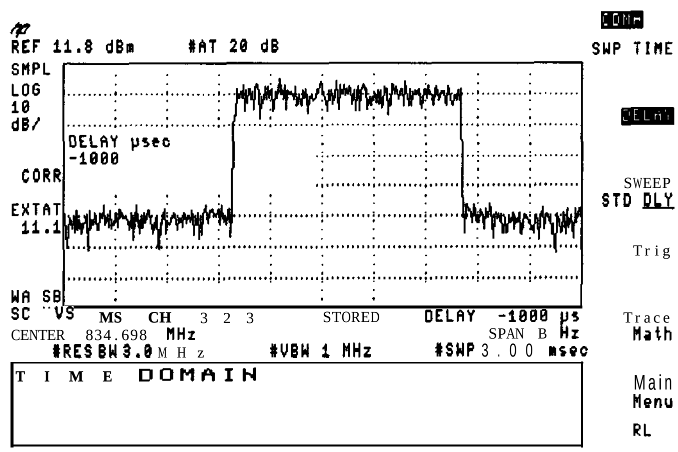


Figure 2-22. Time Domain Measurement

To Measure Peak-to-Mean Power Ratio and the Histogram of Power Distribution of a Time Domain Signal

This procedure applies math operations on the active time domain waveform.

1.	More 1 of 2	Go to the second tier of the Main Menu.
2.	TIME DOMAIN	Enter the Time Domain menu.
3.	SWP TIME	Enter the desired sweep time (for example, 3 ms).
4.	Trace Math	Enter the Trace Math menu.
5.	VID AVG ON OFF	Select ON and press enter 100 to set 100 video averages.
		or
6.	PK/MEAN ON OFF	Select ON to perform a peak-to-mean power ratio measurement.
		or
7.	HISTOGRM ON OFF	Select ON to display a histogram of the power distribution.

Figure 2-23 illustrates a typical result of performing a peak-to-mean power ratio measurement (following step 6). Figure 2-24 shows an example of a histogram display (following step 7).

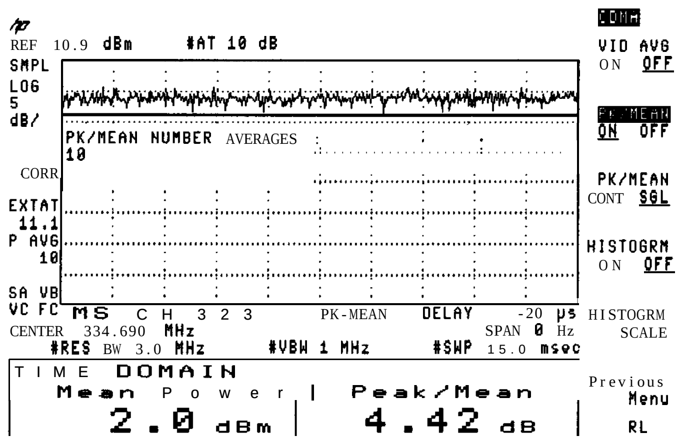


Figure 2-23. Peak/Mean Display

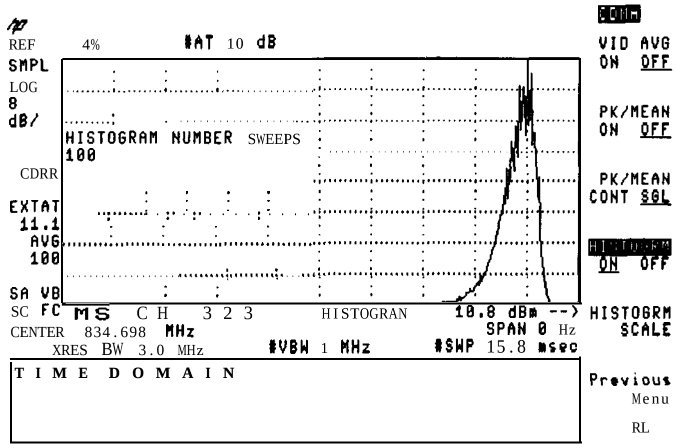


Figure 2-24. Histogram Display

To Measure Occupied Bandwidth

This procedure measures the bandwidth containing the specified percentage of the total integrated power of the displayed spectrum.

1.	Freq	Enter the Frequency menu.
2.	Occ BW Setup	Set up the measurement conditions.
3.	NUMBER AVERAGES	Enter the desired number of averages for making occupied bandwidth measurements.
4.	OCC BW % POWER	Enter the % power to use to calculate the occupied bandwidth (for example, 99%).
5.	Previous Menu	Return to the Frequency menu.
6.	OCCUPIED BANDWDTH	Make the occupied bandwidth measurement.

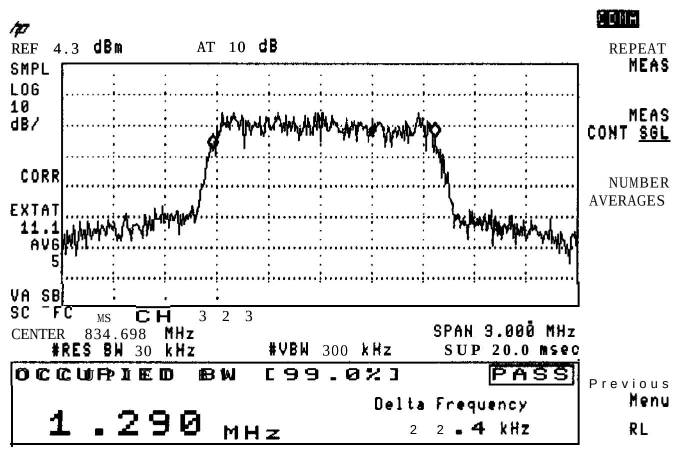


Figure 2-25. Occupied Bandwidth Measurement

To Measure Spectral Regrowth on a Power Amplifier

This procedure measures the net spectral regrowth of a power amplifier between two known power output levels. A lower level signal is measured and stored as a reference trace. Next, a higher level signal is input and spectral regrowth is measured.

1.	Spectrum	Select Spectrum measurements.
2.	Spectral **Regrowth**	Select the spectral regrowth menus.
3.		Set the power level of the test signal to a setting with low expected regrowth distortion. Note: the signal must be visible on the screen. If it is visible, skip to step 6; if the signal is not visible, continue with step 4.
4.	**AMPLITUDE**	Adjust the reference level until the signal is visible on the screen.
5.	**CDMA** Menu	Return to the CDMA Spectral Regrowth menus (or press (MODE) (MODE)).
6.	**NUMBER AVERAGES**	Change the number of averages to the desired number (50, for example).
7.	**MEAS** REF SPECTRUM	Make the spectrum measurement. The trace will be automatically stored in the reference trace the first time this measurement is made after entering the Spectral Regrowth menus.
8.		Set the power level of the test signal to a higher level with expected regrowth distortion. Note: the signal must be visible on the screen. If it is visible, skip to step 11. If it is not visible, continue with step 9.
9.	**AMPLITUDE**	Adjust the reference level until the signal is visible on the screen.
10.	**CDMA** Menu	Return to the CDMA Spectral Regrowth menus (or press (MODE) (MODE))
11.	**MEAS** SPECTRUM	Make the spectrum measurement.
12.	Display **Modes**	Enter the menu to select the measurement viewing format.
13.	**REGROWTH**	Display the net spectral regrowth between the active trace and the stored reference trace.
14.	**MARKER ON**	Activate the marker to measure specific regrowth amplitudes.

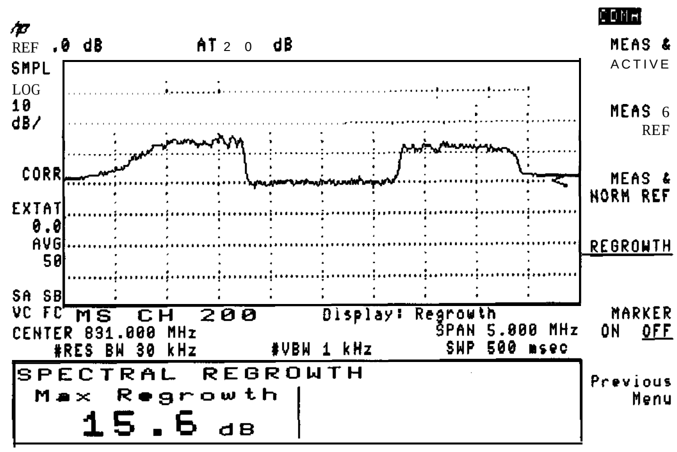


Figure 2-26. Spectral Regrowth Measurement

To Measure Adjacent Channel Power Ratio

This procedure measures the total RMS power in the specified channel and six offsets and ratios the power.

1.	ACPR Menu	Go to ACPR menu.
2.	Method IBW RBW	Select Integration Bandwidth Method.
3.	Channel Setup	Set up the channel measurement conditions.
4.	CHANNEL NUM AVGS	Enter the desired number of averages for making channel power measurements.
5.	CHANNEL INTEG BW	Channel integration bandwidth is preset to 1.4 MHz; change this value now, if desired.
6.	CHANNEL SPAN	The channel viewing span is preset to 2.8 MHz; change this value now, if desired.
7.	REF PWR TOT PSD	Select Total power as the channel reference power in ACP ratio.
8.	Previous Menu	Return to ACPR menu.
9.	Off sets Setup	Set up the offset measurement conditions.
10.	OFFSET NUN AVGS	Enter the desired number of averages for making offset power measurements.
11.	Define Off sets	Define offset parameters.
12.	OFFSET A B C	Specify Offset A, B, or C.
13.	OFFSET FREQ	Specify offset frequencies.
14.	OFFSET LIMIT	Specify offset limits. These limits are relative to the channel reference power.
15.	OFFSET INTEG BW	Specify offset Integration Bandwidths.
16.	OFFSET SPAN	Specify offset Span.
17.	Previous Menu	Return to Offsets Setup.
18.	Previous Menu	Return to ACPR menu.
19.	ACPR MEAS	Make the ACPR measurement.
20.	OFFSET - CH +	View the negative offset, center channel, and positive offset frequencies.
21.	OFS FREQ A B C	Select the offset frequency A, B, or C to view at the negative and positive offsets.

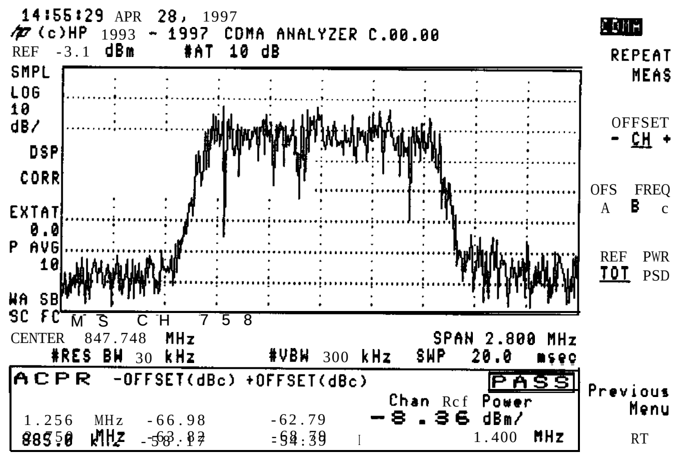


Figure 2-27. Adjacent Channel Power Ratio

Adjacent Channel Power Ratio

Adjacent channel power ratio (ACPR), as it applies to CDMA, 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. While ACPR is a specified measurement in many other communication standards, ACPR is not specified in the EA/TIA, ANSI or ARIB standards for CDMA. Instead, spurious emissions outside the transmit channel are covered under the Spur Close and Spur Max measurements under the In-band Spurious menu within the personality. Several recommended setups are given at the end of this description. As a composite measurement of out-of-channel (frequency) emissions, ACPR combines both in-band and out-of-band specifications to provide useful figures-of-merit for spectral regrowth and emissions produced by components and circuit blocks without the rigor of performing a full spectrum emissions mask measurement.

The ACPR measurement, as implemented in the HP85725C measurement personality, measures up to three pairs of offset channels and relates them to the carrier power. The measurement result is a ratio. ACPR measurement always measures the carrier channel power using an integration bandwidth method (IBW), while the offset powers are measured using either an IBW method or a resolution bandwidth (RBW) method. The two methods are described as follows:

ACPR Integration Bandwidth Method

IBW method performs a frequency sweep through the bandwidth of integration (set up by the user) using a resolution bandwidth (automatically set) much narrower than the channel bandwidth (e.g. 30 kHz RBW for a channel bandwidth of 1.23 MHz). The measurement computes an average power of the channel over a specified number of sweeps, automatically compensating for noise and scaling.

This measurement option requires the user to specify measurement bandwidths of the carrier channel and each of the offset pairs. Each pair may be defined with unique measurement bandwidths. For example:

Table 2-1. ACPR Offset Pair Examples for ANSI J-STD-008 Base Station

Channel	Offset	Measurement Bandwidth
Carrier		1.4 MHz
Offset pair A	±885 kHz	30 kHz
Offset pair B	±1.25625 MHz	12.5 kHz
Offset pair C	±2.75 MHz	1 MHz

ACPR Resolution Bandwidth Method

RBW method performs a channel power measurement on the carrier-the same as for the IBW method, but measures each offset as a frequency point in a specified resolution bandwidth. The method employs the tuned receiver (zero span) setup and computes average power from the acquired time record.

This method is valid when the following conditions are met:

- the signal is relatively flat within the passband of the resolution bandwidth selected and
- there are no CW spurious signals present in the same passband.

Either of these conditions not being met may skew power readings.

ACPR results display

When the ACPR measurement returns the results as a ratio to total carrier power, the Channel Reference Power is reported in dBm/IBW and the offset powers as ratios in dBc. When the results are returned as PSD ratios, the channel reference power is given in dBm in the specified bandwidth and the offset powers as PSD ratios in dB.

Recommended offsets for power amplifier measurements:

While the user sets the specific offsets, there are some common setups. They are stated below in a table.

Table 2-2. ACPR Offsets

Band	Unit Under Test (UUT)	Offsets	Results referenced to:
Cellular	Mobile	±900 kHz	PSD
800 MHz		±1.98 MHz	
	Base	±750 kHz	PSD
		±1.98 MHz	
PCS	Mobile/Base	±885 kHz	Total Power
1900 MHz		±1.25625 MHz	
		±2.75 MHz	

3

Menu Map and Softkey Descriptions

This chapter contains menu maps and key definitions of the softkeys for both base and mobile station testing. The definitions for the softkeys are listed as they appear within a menu, with text indented according to key hierarchy.

The Complete CDMA Menu Map

Note 1	This softkey text changes to BS EXT ATTEN when BASE is selected.
Note 2	This softkey text changes to MEAS SPECTRUM after the first measurement.
Note 3	This softkey appears only after the first spectrum measurement.
Note 4	Appears when IS-95 mode is selected.
Note 5	Appears when J-STD-008 mode is selected.
Note 6	Appears when ARIB-T53 mode is selected.
Note 7	Appears when ACPR Integrated Bandwidth Method is selected.
Note 8	Appears when ACPR Resolution Bandwidth Method is selected.
Note 9	This softkey text appears only if both LIM REL and LIM ABS are on for the selected range or harmonic.
Note 10	This softkey text appears only if DETECTOR SMPL is enabled for the selected range or harmonic.
Note 11	This softkey text changes to START FREQ if STRT/STP is selected.
Note 12	This softkey text changes to STOP FREQ if STRT/STP is selected.
Note 13	This softkey text appears only if DETECTOR SMPL is selected.

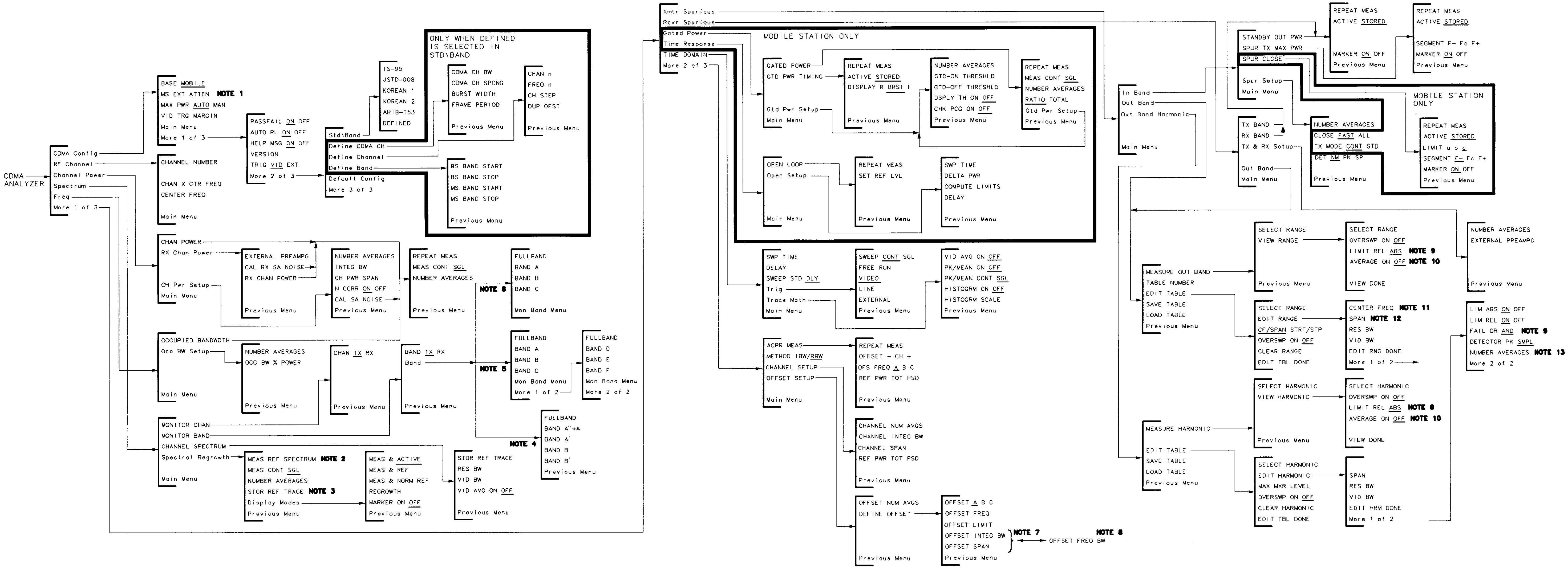


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Figure 3-1. The Complete CDMA Menu Map.

CDMA Help Softkeys and Multiple Function Hardkeys

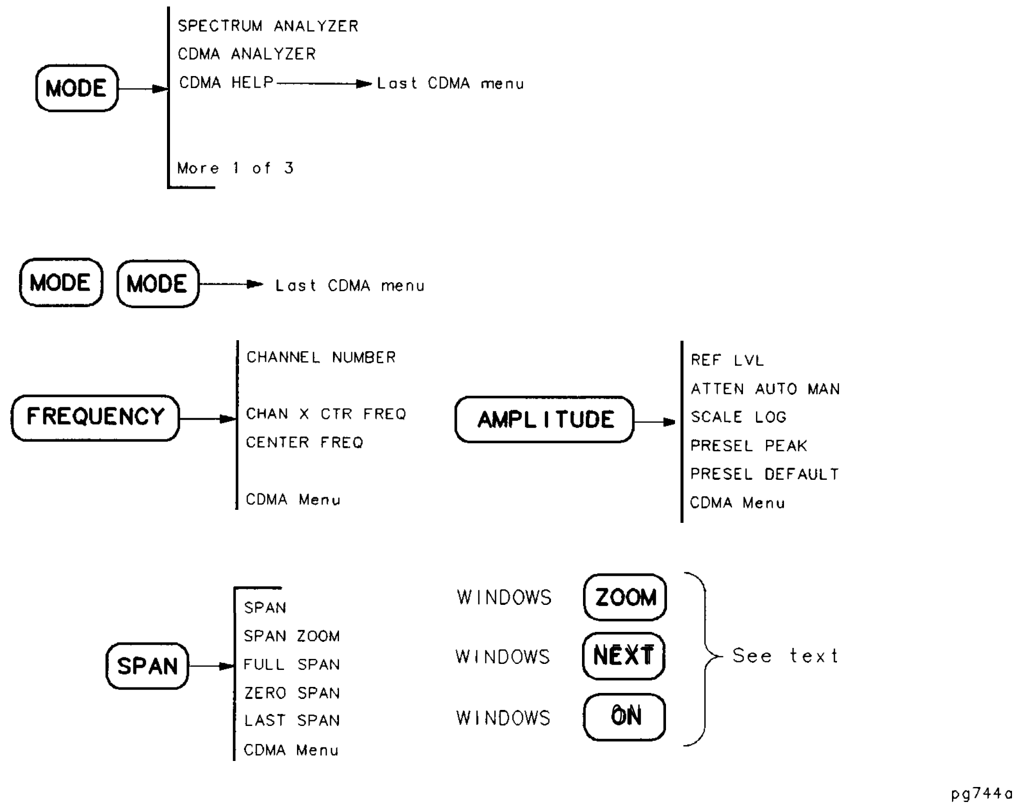

Figure 3-2. CDMA Help Softkeys and Multiple Function Hardkeys

CDMA HELP To enter CDMA Help mode, press the (MODE) **hardkey** and then the **CDMA HELP softkey.** The analyzer displays information on the last CDMA **softkey** pressed before entering the CDMA Help mode.

To exit CDMA Help mode, press the (DISPLAY) **hardkey** or press **CDMA HELP** again. On exiting CDMA Help mode, the analyzer restores the previous CDMA Analyzer state.

In the CDMA Help mode, pressing a CDMA **softkey** displays information on that key, except for a few **softkeys** without descriptions.

Menus remain active so you can access softkeys, but key-presses do not change the analyzer setup.

Help Messages in CDMA Analyzer Mode

In the CDMA Analyzer mode, pressing a **Conf ig** or Setup **softkey** in the CDMA Analyzer menus displays a short help message for that key.

These messages are not displayed if there is an active measurement or if **HELP** MSC ON OFF is set to OFF'.

Multiple Function Hardkeys

While in the CDMA Analyzer mode, you still have access to the menus under the hardkeys. The most useful are: (FREQUENCY), (SPAN), and (AMPLITUDE). Press **CDMA** Menu to easily return to the last CDMA menu.

(FREQUENCY) Press the (FREQUENCY) **hardkey** once to display the RF Channel menu, and twice to display the Frequency menu.

(SPAN) Activate the (SPAN) function and the frequency span functions. Press this key 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.

(AMPLITUDE) Activate the reference level function and access the Amplitude menu. The **softkeys** accessed when (AMPLITUDE) is pressed change reference level, input attenuation, and vertical scale. For the HP 85933, HP 85953, and HP 85963, pressing (AMPLITUDE) accesses the preselector peaking and preselector default functions also.

(MODE) Press the (MODE) **hardkey** once to display the Mode menu, and twice to recall the last CDMA menu. From any **hardkey** menu, press the (MODE) **hardkey** twice to return to the last CDMA menu.

(ZOOM) Toggles the display between a full-size graphic display and a combination of graphic and numeric display.

(NEXT) Performs the Hold function (turns off any active function).

(ON) Performs the Hold function.

The CDMA Config Softkeys

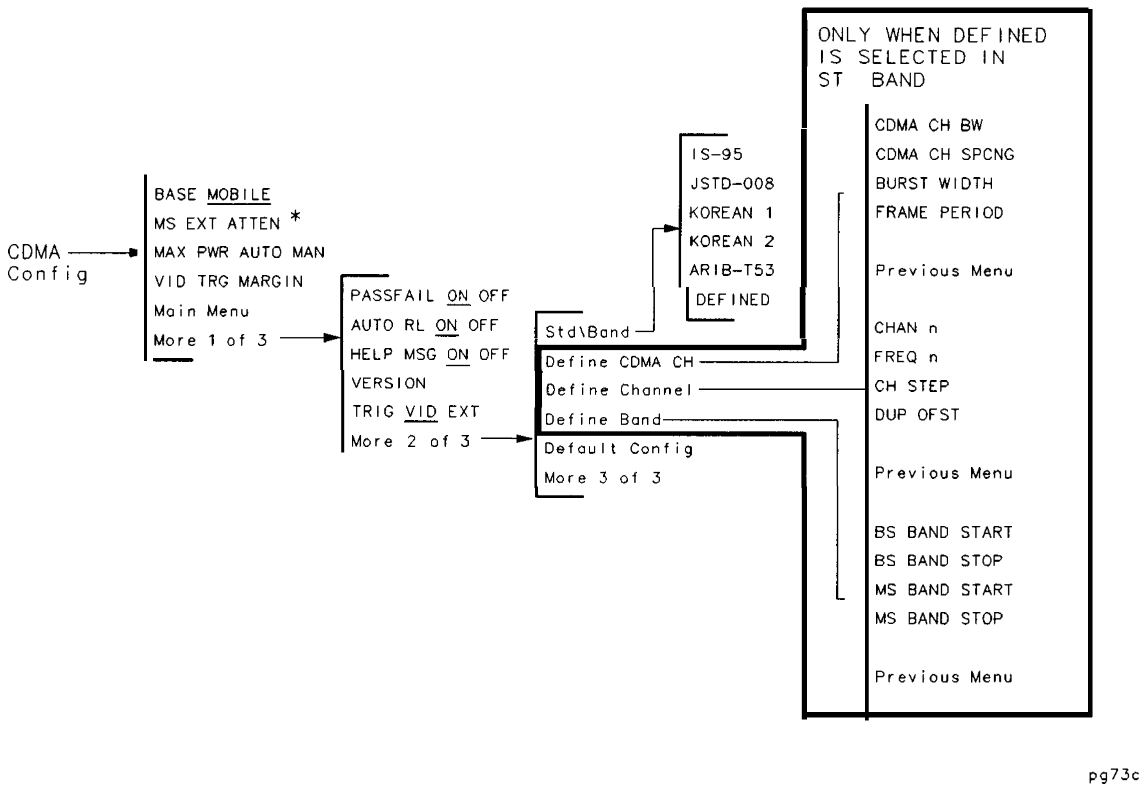

Figure 3-3. The CDMA Config Softkeys

* **This key changes to BS EXT ATTEN when BASE is selected.**

CDMA Conf ig — Configure the CDMA Analyzer mode for your test setup and user preferences. All configuration parameter values are saved in non-volatile memory.

EASE **MOBILE** — Select either BASE station (BS) or MOBILE station (MS) as the Unit Under Test.

MS EXT **ATTEN** — Enter the total external loss between the Mobile Station transmitter output and the analyzer RF input to remove effects of external loss in measurement results.

Caution Incorrect setting this value can result in damage to the spectrum analyzer.

See the explanation and caution message given for ES EXT **ATTEN** .

BS EXT **ATTEN** — Enter the total external loss between the Base Station transmitter output and the analyzer RF input to remove effects of external loss in measurement results.

The following text about external attenuation applies equally to the MS EXT **ATTEN** softkey.

To Select the Optimum External Attenuation Value

The amount of external attenuation selected affects the accuracy and dynamic range of the test measurement. For best absolute amplitude accuracy, the entered value must equal the actual total external loss of all attenuators, couplers, and cables connected between the Unit Under Test and the spectrum analyzer input.

Caution Sufficient external attenuation must be provided so that the actual power at the spectrum analyzer input is less than the analyzer absolute maximum input power of +30 dBm (1 watt). Hewlett-Packard recommends that enough external attenuation is used so that there is a "margin" of at least 3 dBm below the maximum allowable input power (+ 27 dBm maximum at the spectrum analyzer input connector).

For Option 053

- For specified amplitude accuracy with Option 053, use enough external attenuation so that the internal input attenuation of the spectrum analyzer is between 10 dB and 40 dB.
- For best amplitude accuracy with Option 053, use enough external attenuation so that the internal input attenuation of the spectrum analyzer is between 10 dB and 30 dB.

For the standby output power measurement or the receiver spurious emissions measurement (no carrier present)

- For the best sensitivity, select the lowest possible value of external attenuation without exceeding the spectrum analyzer maximum input power.

For power measurements

For the best sensitivity for power measurements, select the external attenuation to minimize the total attenuation. The total attenuation is the sum of the external attenuation and the internal input attenuation of the spectrum analyzer. The internal input attenuation of the spectrum analyzer is set automatically, in 10 dB increments. By choosing the proper amount of external attenuation, the internal input attenuation of the spectrum analyzer can be set one 10 dB step lower, thus reducing total attenuation and improving sensitivity.

- For the best sensitivity for any power measurement, set the external attenuation at or slightly greater than the value given by the following equation:

$$\textit{external attenuation } (dB) = \textit{mean signal power } (dBm) - \textit{input attenuation } (dB) + 13\ dB$$

where the input attenuation is 10, 20, 30, or 40 dB.

MAX PWR AUTO **MAN** Select AUTO to allow measurements to automatically set the analyzer internal input attenuation, based on measured in-channel carrier power. Select MAN to manually enter the maximum total power at the Unit Under Test.

Use AUTO when only a single carrier is present and the analyzer is tuned to that frequency. **AUTO** can be used with multiple carriers, provided:

(Total Power at the Unit Under Test) < (0 dBm + EXT Atten), where:

EXT Atten = **BS** EXT **ATTEN** when testing a base station, or,

EXT Atten = MS **EXT ATTEN** when testing a mobile station.

Use NAN if a carrier is present at a frequency other than the analyzer frequency, if the analyzer input attenuation is to be held constant, or if 0 dB input attenuation is desired for maximum analyzer sensitivity.

Caution The spectrum analyzer is vulnerable to damage if excessive power is applied to the input connector.

The default minimum input attenuation for the spectrum analyzer is 10 dB. For 0 dB, set the minimum attenuation variable _ATMIN to 0 using a remote command. (Refer to the spectrum analyzer programmer's guide for more information.)

Damage can occur because the input attenuator is set to 0 dB, and the external attenuator is the only component limiting the output power from the Unit Under Test. The total power applied to the spectrum analyzer INPUT 50Ω connector ***cannot*** exceed *+20 dBm*. Spectrum analyzer damage is likely if the input power exceeds this amount.

VID TRG MARGIN Set the video trigger margin used for Gated Power Timimg and Time Domain measurements. Trigger level is set "VID TRG MARGIN" below the signal peak.

PASSFAIL ON OFF Select **ON** to display a Pass/Fail message in the Results Window when measurements are complete.

AUTO RL ON OFF Select ON to perform Automatic Reference Level function at the beginning of measurements that use this function.

HELP MSG ON OFF Select ON to display Help Messages when configuration or setup keys are pressed; these are not displayed during active measurements.

VERSION This key displays the version of the CDMA measurements personality, and the version of the standards documents that were used to derive the CDMA measurement routines and test limits.

TRIG **VID** EXT Select **TRIG VID** (video trigger) or TRIG **EXT** (external trigger) for the Gated Power Timing measurement trigger source.

The Standard Band Parameter Softkeys

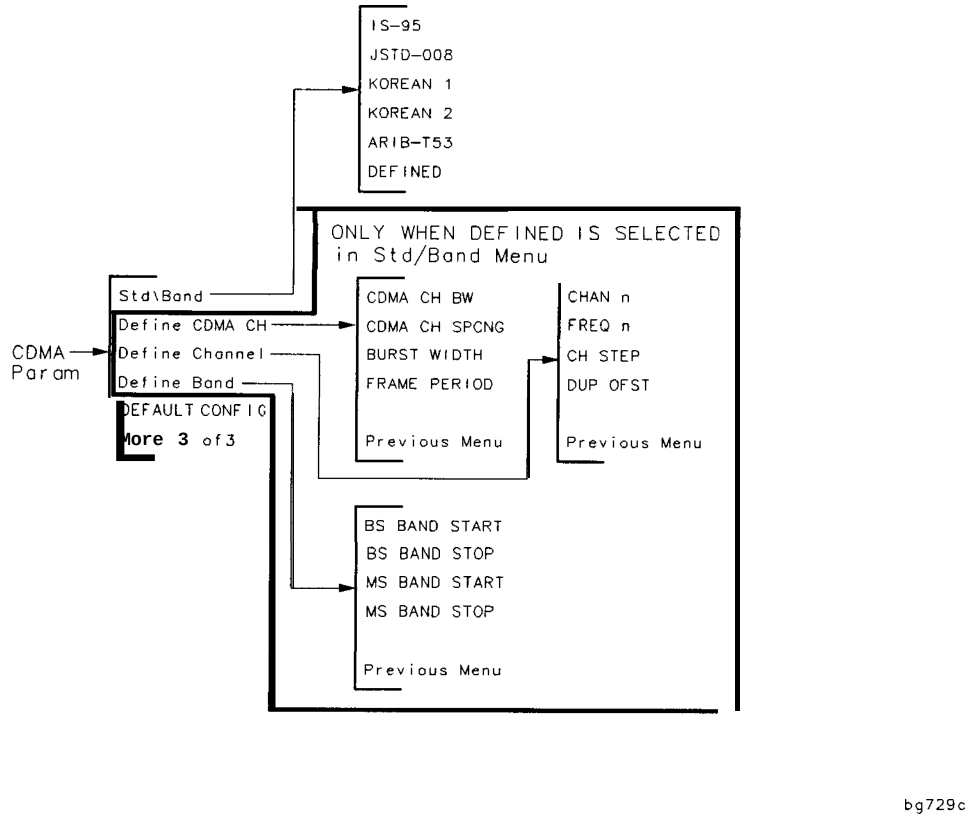

Figure 3-4. The Standard Band Parameter Softkeys

Std/Band This key displays the standard and frequency band selection menu. The following are the standards and frequency bands available:

IS-95 EIA/TIA IS-95 standard in 800 MHz band.

J-STD-008 ANSI J-STD-008 standard in 1900 MHz band.

KOREAN 1 Korean standard in 1800 MHz band.

KOREAN 2 Korean standard in 1800 MHz band with band discontinuity.

ARIB-T53 Japanese standard in 800 MHz band.

DEFINED User defined channel plan and frequency plan.

Define **CDMA CH** Use softkeys in this menu to set user-defined values for CDMA frequency and time parameters, as follows:

CDMA CH BW Set the CDMA Channel Bandwidth, which is the default value used for **INTEG BW** .

CDWA CH SPCNG Set the CDMA Channel Spacing, which is used for center frequency step size.

BURST WIDTH Set the Burst Width value, which sets the sweep times used in gated power timing.

FRAME PERIOD Set the Frame Period value, which sets the sweep time used by the auto reference level function at the start of time domain measurements.

Define Channel

Use softkeys in this menu to define a channel tuning configuration as follows:

Base Sttn Xmit Freq = **FREQ n** + (CHANNEL **NUMBER** – CHAR a) x (CH **STEP**)

Mobile Sttn Xmit Freq = (Base Station Transmit Frequency) + (**DUP OFST**)

CHAR n Set the transmit channel number corresponding to the base station frequency value entered for **FREQ n**.

FREQ n Set the base station transmit channel frequency corresponding to the value entered for **CHAN** IL.

CH STEP Set the Channel Step frequency between successive channel numbers.

DUP OFST Set the Duplex Offset frequency of the mobile station transmitter channel relative to the corresponding base station transmitter channel.

Define Band

Use softkeys in this menu to set user-defined values for the band edge frequency parameters, used in spurious and monitor band measurements, as follows:

BS BAND START Set the Base Station Band Start frequency.

BS BARD STOP Set the Base Station Band Stop frequency.

MS BARD START Set the Mobile Station Band Start frequency.

MS BAND STOP Set the Mobile Station Band Stop frequency.

DEFAULT CONFIG Press this key twice to set all configuration parameters to their default values.

The RF Channel Softkeys

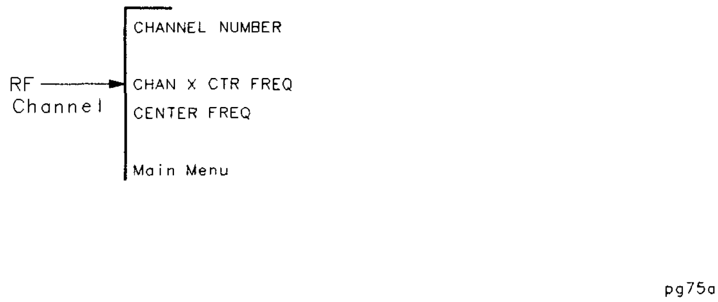

Figure 3-5. The RF Channel Softkeys

RF Channel	Set the measurement frequency using the channel number or frequency value. To quickly access this menu, press the (FREQUENCY) **hardkey** once.
CHANNEL **NUMBER**	Enter the Channel Number for the RF channel to be measured. If **CHAN** X **CTR FREQ** was previously selected, pressing this key recalls the last Channel Number.
CHAN X **CTR FREQ**	Enter the frequency of the RF Channel to be measured. If **CHANNEL NUMBER** was previously selected, pressing this key recalls the last value of **CHAN** X CTR FREQ .
CENTER **FREQ**	Enter a temporary analyzer center frequency. At the start of a new measurement, the center frequency returns to either the frequency corresponding to **CHANNEL NUMBER** , or to CHAN X **CTR FREQ** .

The Channel Power Softkeys

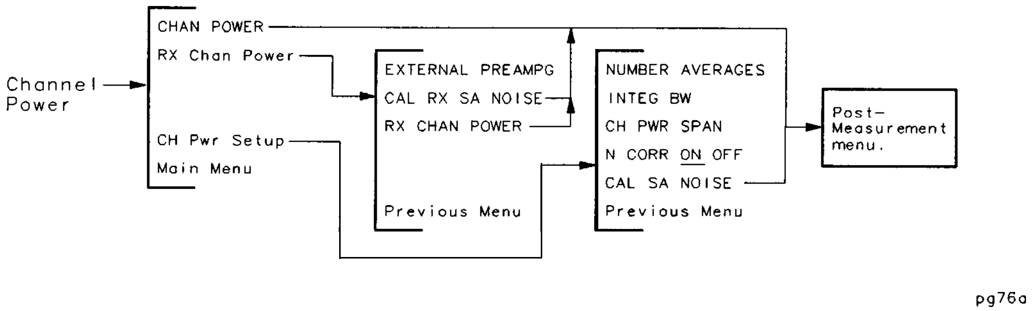

Figure 3-6. The Channel Power Softkeys

Channel Power Access the Channel Power softkeys.

CHAN POWER Measure the total RMS power in the Integration Bandwidth set by **INTEG BW** . The default **INTEG BW** = CDMA CH **BW** = 1.23 MHz.

The result variance can be reduced by increasing the number of power averaged sweeps. (See **NUMBER AVERAGES** in the Post-Measurement Softkeys menu at the end of this chapter.)

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.

RX Ghan Power Access the Receive Channel Power softkeys.

EXTERNAL **PREAMPG** Enter the gain of an external low noise preamplifier at the receive frequency corresponding to the current Channel Number.

CAL RX SA NOISE Measure the total RMS power in the integrated bandwidth set by INTEG **BW** due to spectrum analyzer and preamplifier noise. An external low noise preamplifier is typically connected to the analyzer input for this measurement.

The calibration result is used to remove effects of analyzer (and preamplifier) noise on receiver Channel Power measurements.

The Rx Channel Power noise floor calibration will remain valid until the integration or resolution bandwidths used during the calibration differ from the current measurement values, or the value of preamplifier gain differs, or the ac power is turned off and on.

RX CHAN **POWER** Measure the total RMS power at the receive frequency corresponding to the current Channel Number. For more details, see the explanation for **CHAN** POWER , earlier in this menu group.

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

CH Par Setup Access the Channel Power Setup softkeys to set various parameters specific to channel power, prior to making channel power measurements.

NUMBER AVERAGES See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

INTEG BW Change the Integration Bandwidth used to compute Channel Power. The default value = CDMA CHAN BW = 1.23 MHz.

CH PWR SPAN Change the Span used for Channel Power with a current INTEG BW setting. The Span/Integration Bandwidth ratio of the measurement is kept constant when changing INTEG BW .

N CORR ON OFF Select ON to enable spectrum analyzer Noise Floor Correction for Channel Power measurements.

Noise Floor Correction removes the effects of analyzer noise. The correction is applied when channel power is less than 15 dB above the measured analyzer noise floor. Noise Corrected appears above the measurement results area, under the lower left corner of the graticule, 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, Par 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.

CAL SA NOISE Measure the total RMS power in the integrated bandwidth set by INTEG BW due to spectrum analyzer noise. The input signal is disconnected for this measurement.

The calibration result is used to remove effects of analyzer noise on Channel Power measurements when Noise Floor Correction N CORR is set to ON.

The Channel Power noise floor calibration will remain valid until the integration or resolution bandwidths used during the calibration differ from the current measurement values, or the ac power is turned off and on.

The Spectrum Softkeys

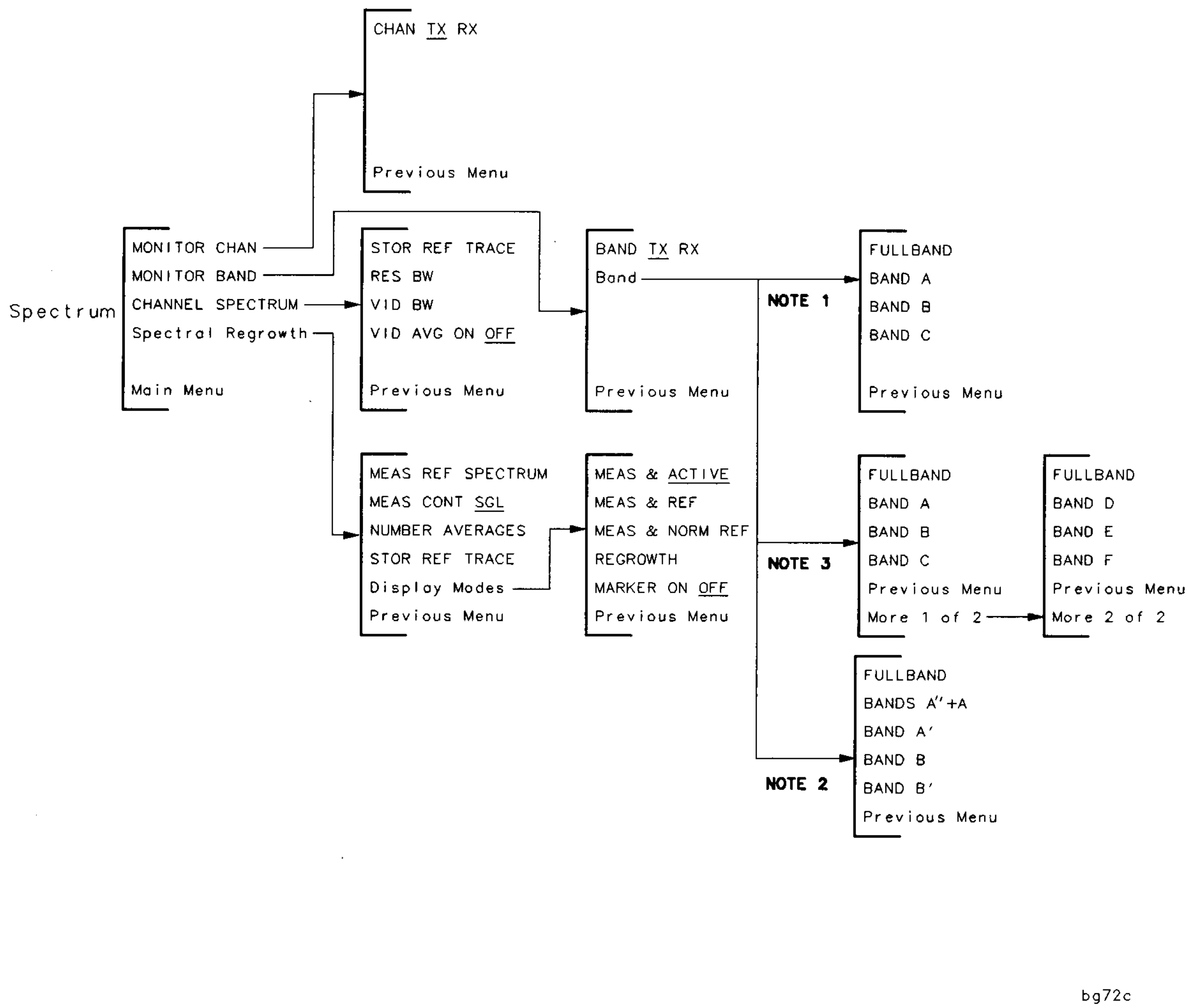

Figure 3-7. The Spectrum Softkeys

Note 1 Appears when ARIB-T53 mode is selected.

Note 2 Appears when IS-95 mode is selected.

Note 3 Appears when J-STD-008 mode is selected.

Spectrum Access the Spectrum softkeys.

MONITOR CHAN Display the frequency-domain spectrum of the transmit or receive channel.

CHAN TX RX Allows selection of either Transmit or Receive Channel.

This is a useful starting point for making general in-channel frequency-domain measurements. Change spectrum analyzer settings by accessing menus under these hardkeys: (FREQUENCY), (SPAN), (AMPLITUDE), (SWEEP), (BW), and (TRIG).

MONITOR BAND Display the frequency-domain spectrum of the transmit or receive band.

BAND TX RX Allows selection of either Transmit or Receive Band. This is a useful starting point for making general in-band or out-of-band frequency-domain measurements. Change spectrum analyzer settings by accessing menus under these hardkeys: (FREQUENCY), (SPAN), (AMPLITUDE), (SWEEP), (BW), and (TRIG).

Band Accesses defined Band softkeys of selected Standard/Band tuning plan to allow selection of all bands, or a particular band. In IS-95 mode, Band accesses softkeys **FULLBAND**, BAWDS A" + A, **BAND** A', BAND **B**, and **BAND B'**. See Table 3-1 for the frequency ranges given for the different band softkey selections.

Table 3-1.
Analyzer Frequency Range for IS-95 Mode (in MHz)

Band Selection	Base Station TX BAND or Mobile Station RX BAND	Base Station RX BAND or Mobile Station TX BAND
FULLBAND	868.800 to 894.200	823.800 to 849.200
BANDS A" + A	868.800 to 880.200	823.800 to 835.200
BAND A'	889.800 to 891.700	844.800 to 846.700
BAND B	879.800 to 890.200	834.800 to 845.200
BAND B'	891.300 to 894.200	846.300 to 849.200

In J-STD-008 mode, Band accesses softkeys **FULLBAND**, **BAND** A, BAND **B**, BAND **C**, BAND **D**, **BAND E**, and BAND F. See Table 3-2 for the frequency ranges given for the different band softkey selections.

Table 3-2.
Analyzer Frequency Range for J-STD-008 Mode (in MHz)

Band Selection	Base Station TX BAND or Mobile Station RX BAND	Base Station RX BAND or Mobile Station TX BAND
FULLBAND	1928.800 to 1991.150	1848.800 to 1911.150
BAND A	1929.700 to 1945.250	1849.700 to 1865.250
BAND B	1949.700 to 1965.250	1869.700 to 1885.250
BAND C	1974.700 to 1990.250	1894.700 to 1910.250
BAND D	1944.900 to 1950.050	1864.900 to 1870.050
BAND E	1964.900 to 1970.050	1884.900 to 1890.050
BAND F	1969.900 to 1975.050	1889.900 to 1895.050

In ARIB-T53 mode, Band accesses softkeys **FULLBAND**, BAND A, BAND **B** and BAND **C**. See Table 3-3 for the frequency ranges given for the different band softkey selections.

Table 3-3. Analyzer Frequency Range for ARIB-T53 Mode (in MHz)

Band Selection	Base Station TX BAND or Mobile Station RX BAND	Base Station RX BAND or Mobile Station TX BAND
FULLBAND	830.80 to 871.20	885.80 to 926.20
BAND A	859.81 to 870.19	919.81 to 925.19
BAND B	842.952 to 845.927	897.952 to 900.927
BAND C	831.992 to 833.967	886.992 to 888.967

CHANNEL SPECTRUM Display the upper amplitude region of the in-channel CDMA spectrum choosing from several different video parameters as follows (the vertical scale is set to 2 dB per division).

STOR REF TRACE Store the current active trace into the Reference Trace.

RES BW Change the spectrum analyzer 3 dB resolution bandwidth. As the resolution bandwidth is decreased, the sweep time is increased to maintain amplitude calibration.

VID **BW** Reduce the value of Video Bandwidth to provide more trace smoothing. This key changes the spectrum analyzer post-detection filter. As the video bandwidth is decreased, the sweep time is increased to maintain amplitude calibration.

BID **AVG** ON OFF Select **ON** to provide additional trace smoothing. When turned on, this function initiates a digital averaging routine that averages displayed signals and noise. This function does not affect the sweep time, bandwidth, or other analog characteristics of the spectrum analyzer. The annotation on the left side of the screen indicates the current number of sweeps averaged. Increasing the number of sweeps smooth the trace. The maximum allowable number of video averages is 100.

Spectral Regrowth

Access the spectral regrowth measurement softkeys to configure and carry out the spectral regrowth measurement procedure. For an example of the spectral regrowth measurement procedure, see "To Measure Spectral Regrowth on a Power Amplifier" in Chapter 2, "Making Measurements."

Upon entering this menu, the spectrum of the current CDMA channel and upper and lower adjacent channels is displayed.

Spectral Regrowth is the net spectral distortion that results as the output power of the Unit Under Test is increased (primarily caused by intermodulation distortion).

The measurement procedure is to make an initial measurement with the Unit Under Test at reduced output power (typically 10 to 20 dB below maximum), and store it as the reference trace. Then increase the output power of the Unit Under Test to measure the magnitude of spectral regrowth. The maximum spectral regrowth value is computed and displayed.

MEAS REF SPECTRUM The current channel and upper and lower adjacent channels are measured and brought to the top of the screen. N trace averages are taken and the maximum spectral regrowth value is computed and displayed. The trace is automatically stored in the reference trace the first time this measurement is made after entering the spectral regrowth menus. The softkey text changes to **MEAS SPECTRUM** after the first measurement.

MEAS CONT SGL See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

NUMBER AVERAGES See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

STOR REP TRACE Store the current active trace into the Reference Trace. This key appears only after the first spectrum measurement.

Display Modes Choose among various display modes for comparing measurement and reference spectrums. The following trace spectrums can be displayed.

- **MEAS & ACTIVE** Measured average trace and active sweep trace.
- **MEAS % REF** Measured average trace and stored reference trace.
- **MEAS & NORM REF** Measured average trace and stored reference trace normalized to measured carrier power.
- **REGROWTH** Regrowth trace = (measured average trace) – (stored reference trace normalized to measured carrier power).
- **MARKER ON OFF** Enable or disable the spectral regrowth marker.

The Freq Softkeys

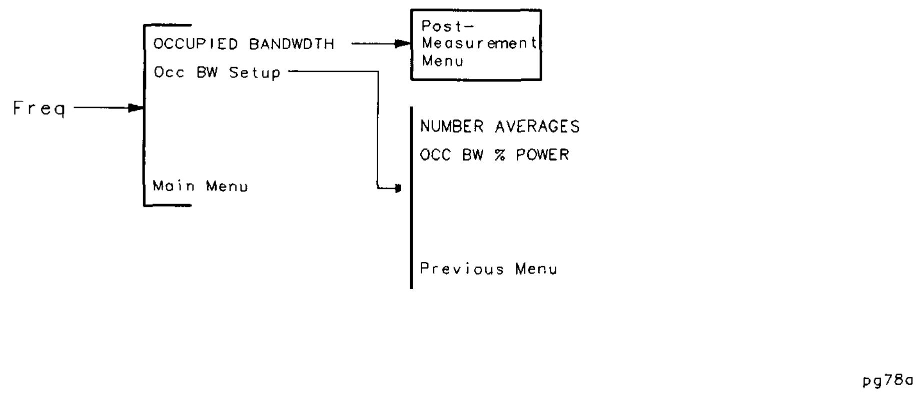

Figure 3-8. The Freq Softkeys

Freq Access the Frequency softkeys.

OCCUPIED BANDWDTH Measure the bandwidth containing the specified percentage of the total integrated power of the displayed spectrum (the default percentage is 99%).

Markers are placed at bandwidth edges. For 99% power bandwidth, 0.5% of the power is below the lower frequency marker and 0.5% of the power is above the upper frequency marker.

Occ BW Setup Access the Occupied Bandwidth Setup menu to set various parameters specific to occupied bandwidth, prior to making occupied bandwidth measurements.

NUMBER AVERAGES See the Post-Measurement **softkeys** at the end of this chapter for an explanation of this key.

OCC BW % POWER Change the percentage of the total power contained in the measured occupied bandwidth. The value is saved through instrument preset.

Note: The value displayed in the numeric entry area is rounded to the nearest whole percent. The value stored and used by the measurement is rounded to the nearest hundredth percent (for instance 99.54%).

The Xmtr In-Band Spurious Softkeys

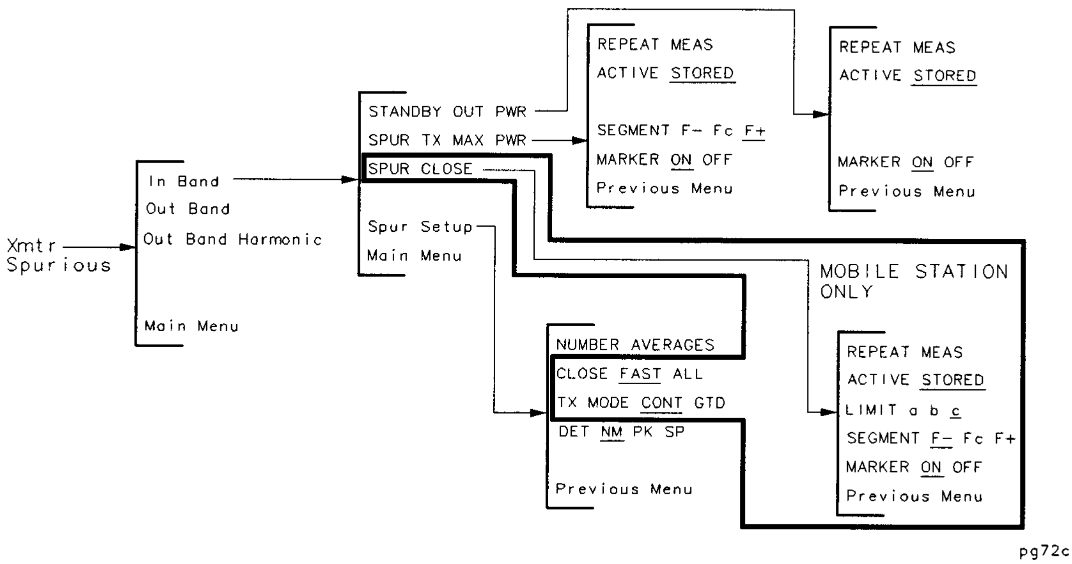

Figure 3-9. The Xmtr In-Band Spurious Softkeys

Xmtr Spurious Access the Transmitter Spurious Emission softkeys.

In Band Access the In-Band Spurious Emission softkeys.

STANDBY OUT PWR Measure the transmit band spectrum with the Unit Under Test transmit power turned off.

The amplitude difference from spur to the limit line (ΔLim) and the absolute level are displayed for the highest spurious signal. A marker identifies this signal.

REPEAT MEAS See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

ACTIVE STORED Select either the current Active trace or the previously Stored measurement trace to be displayed. Selecting **ACTIVE** will *not* erase the stored trace.

MARKER ON OFF Enable or disable the spurious emission marker. This displays an absolute amplitude and frequency readout.

SPUR TX MAX PWR — Measure the spurious emissions in the transmit band relative to channel power in the selected channel, with the Unit Under Test at maximum output power.

The total CDMA channel power is measured using the power integration method. The Ref Level is set 3 dB higher than this power to correctly position the spectrum within the dBc/30 kHz limit line mask.

The transmit band spectrum is measured in three frequency segments (two if at a band edge) using a 30 kHz resolution bandwidth.

The amplitude difference from spur to the limit line (ΔLim) is displayed for the worst spurious signal. A marker identifies this signal.

REPEAT MEAS — See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

ACTIVE STORED — Select either the current Active trace or the previously Stored measurement trace to be displayed. Selecting ACTIVE will *not* erase the stored trace.

SEGMENT F- Fc F+ — Select the frequency segment:

- **F–** frequency segment below carrier
- **Fc** frequency segment including carrier
- **F+** frequency segment above carrier

MARKER ON OFF — Enable or disable the spurious emission marker. This displays a relative-to-carrier readout in dBc as well as the absolute amplitude and frequency readouts.

SPUR CLOSE — Measure the spurious emissions within 25 MHz of the selected channel relative to the channel power in that channel (dBc). Also, in certain cases measure the absolute spurious emission levels (dBm).

The total CDMA channel power is measured using the power integration method. The reference level is set 3 dB higher than this power to correctly position the spectrum within the limit line masks.

The spectrum is measured in three frequency segments using a 30 kHz resolution bandwidth to achieve sufficient selectivity. The spectrum for a 1 MHz bandwidth is then computed. The two spectrums are compared to these three limit line masks:

(a) relative limit (dBc), 30 kHz resolution bandwidth
(b) absolute limit (dBm), 30 kHz resolution bandwidth
(c) absolute limit (dBm), 1 MHz integration bandwidth

To pass, the spurious emission levels must be less than either limit a, or both limits b and c.

The amplitude difference from spur to limit line (ΔLim) is displayed for each limit line condition. A marker identifies the worst spur for the optimum limit line test conditions, and this limit is shown by the highlighted letter a, b, or c, on the display.

REPEAT MEAS See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

ACTIVE STORED Select either the current Active trace or the previously Stored measurement trace to be displayed. Selecting ACTIVE will *not* erase the stored trace.

LIMIT a b c Select the trace and limit line condition:

a relative limit (dBc), 30 kHz resolution bandwidth

b absolute limit (dBm), 30 kHz resolution bandwidth

c absolute limit (dBm), 1 MHz integration bandwidth

SEGMENT F- Fc F+ Select the frequency segment:

F- frequency segment below carrier

Fc frequency segment including carrier

F+ frequency segment above carrier

MARKER ON OFF Enable or disable the spurious emission marker. This displays a relative-to-carrier readout in dBc as well as the absolute amplitude and frequency readouts.

Spur Setup Access the Spur Setup menu to set various parameters specific to spurious emissions, prior to making in-band transmitter spurious emissions measurements.

NUMBER AVERAGES See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

CLOSE FAST ALL Select ALL to test and display results for limits a, b, and c. (See SPUR CLOSE.) Select FAST to stop the test after it has passed or failed.

TX MODE CONT GTD Select GTD to capture both gated and continuous spurs. Select CONT for a faster test which measures only continuous spurs.

If the Unit Under Test is in a gated transmission mode, gated (burst) spurious signals may occur. A much slower sweep time is required to measure the full amplitude of these spurs. The reference channel power measurement for the burst carrier is made with peak instead of sample detection. A correction is applied that equals the nominal ratio of peak-to-mean channel power for a CDMA signal.

DET
NM PK SP

Select NM (normal) for sample detection on Fc segment and peak detection on F- and F+ segments.

Select PK for peak detection on all frequency segments.

Select SP for sample detection on all frequency segments. lb maintain amplitude accuracy, the span is reduced for F- and F+ segments when sample detection is used.

For frequency segments using peak detection, 1 sweep is taken. For frequency segments using sample detection, multiple sweeps are video-averaged as set by **NUMBER AVERAGES** .

This key only affects SPUR TX **MAX** PWR and SPUR CLOSE.

The Xmtr Out-of-Band Spurious Softkeys

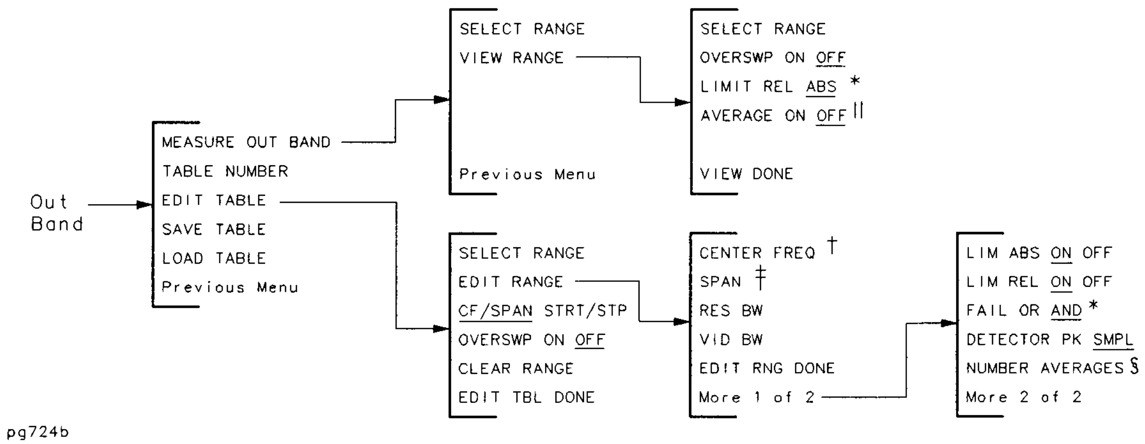

Figure 3-10. The Xmtr Out-of-Band Spurious Softkeys

* This softkey text appears only if both LIM REL and LIM ABS are on for the selected range.

† This softkey text changes to START FREQ if STRT/STP is selected.

‡ This softkey text changes to STOP FREQ if STRT/STP is selected.

§ This softkey text appears only if DETECTOR SMPL is selected.

|| This softkey text appears only if DETECTOR SMPL is enabled for the selected range.

Xmtr Spurious Access the Transmitter Spurious Emission softkeys.

Out Band Access the out-of-band spurious emission softkeys.

MEASURE OUT BAND Measure the out-of-band spurious emissions using the selected table.

For each frequency range, the reference level is set 40 dB above the largest amplitude limit with input attenuation held constant. The attenuation is set to limit the carrier power at the spectrum analyzer input mixer to −10 dBm.

The maximum spectrum level is the result for the range. The results are displayed in tabular form. Both absolute and relative amplitude results are displayed, along with the amplitude difference from spur to limit (ΔLIM) for each amplitude result.

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

SELECT RANGE Select the range to be viewed.

VIEW RANGE View the spectrum in the frequency range selected by SELECT RANGE.

SELECT RANGE Select the range to be viewed.

OVERSWP ON OFF
Select ON and enter a value to enable oversweep. Oversweep allows the spectrum analyzer to sweep faster than the normal, auto-coupled sweep time. An oversweep value of 10 forces sweeps 10 times faster than normal.

Oversweep causes signals to display lower in amplitude and higher in frequency. An oversweep value of 10 causes an approximate 3 dB amplitude drop and a 1% of span positive frequency shift for CW (unmodulated) signals when the video bandwidth is equal to the resolution bandwidth.

Note that this key is only present if the span for the selected range is greater than 0.

LIMIT REL ABS
Display the relative (**REL**) or absolute (**ABS**) amplitude limit if both relative and absolute amplitude pass/fail limits are enabled for this range.

AVERAGE **ON** OFF
If sample detection is selected for this range, select ON to enable averaging.

VIEW DONE
Return to the tabular display of measurement results.

TABLE NUMBER
Select the table to use in measuring out-of-band spurious emissions. A table defines a set of measurement frequency ranges and conditions. By default, tables 4 and 5 contain the out-of-band spurious emissions limits for within 1 MHz of the band edge for the J-STD-008 specification. These are for mobile and base respectively. Out of band limits for other standards may be entered into the tables.

EDIT **TABLE**
Edit the frequency ranges and conditions defined in the selected table. Each row in the table displays the conditions for a given range.

SELECT RANGE
Select the range to edit or clear.

EDIT RANGE
Edit the range selected by SELECT **RANGE**.

CENTER FREQ
Enter the desired center frequency.

-OR-

START **FREQ**
Enter the desired start frequency.

SPAN
Enter the desired span.

-OR-

STOP **FREQ**
Enter the desired stop frequency.

RES BW
Enter the desired resolution bandwidth.

VID **BW**
Enter the desired video bandwidth.

LIM ABS ON OFF — Press the key to underline ON to enable pass/fail checking on the absolute amplitude limit value. Enter the desired absolute limit value.

When editing an empty range (and no previous edits have been done), the default value is set to a limit value based on the following table:

	Mobile Station	Base Station
Xmtr	_SETXBV (default = – 60 dBm)	_SETXEV (default = – 13 dBm)
Rcvr	_SERXC (default = – 47 dBm)	_SERXF (default = – 47 dBm)

See Chapter 5, "Programming Commands," for information on limit variables.

LIM REL ON OFF — Press the key to underline ON to enable pass/fail checking on the relative amplitude limit value. Enter the desired relative limit value.

When editing an empty range (and no previous edits have been done), the default value is set to a limit value based on the following table:

	Mobile Station	Base Station
Xmtr	_SETXAV (default = – 54 dB)	_SETXEU (default = – 60 dB)

Note that for receiver spurious, **LIM REL** will default to OFF.

FAIL OR AND — If both relative and absolute limit pass/fail checking is enabled, select the desired overall pass/fail logic If OR is selected, the range will fail if the spurious emission exceeds either the relative *or* absolute limit. If AND is selected, the range will only fail if the spurious emission exceeds both the relative ***and*** absolute limits.

When editing an empty range (and no previous edits have been done), the default value is AND for mobile stations, and OR for base stations.

DETECTOR PK SMPL — Select either the peak or sample detector mode.

NUMBER AVERAGES — If the detector mode is sample, enter the desired number of averages.

EDIT RNC DONE — Return to the edit table menu.

CF/SPAN STRT/STP — Select either center frequency/span, or start frequency/stop frequency for annotation format and data entry.

OVERSWP ON OFF — Select ON and enter a value to enable oversweep. Oversweep allows the spectrum analyzer to sweep faster than the normal, auto-coupled sweep time. An oversweep value of 10 forces sweeps 10 times faster than normal.

Oversweep causes signals to display lower in amplitude and higher in frequency. An oversweep value of 10 causes an approximate 3 dB amplitude drop and a 1% of span positive frequency shift for CW (unmodulated) signals when the video bandwidth is equal to the resolution bandwidth.

CLEAR RANGE — Clear (deactivate) the range selected by SELECT RANGE .

EDIT TBL DONE — Return to the out-of-band spurious emission menu.

SAVE TABLE — Save table n to a RAM memory card as file "tTBL_n", where n is an integer 1 through 5. Make sure the card is formatted and its switch is set to write enable.

LOAD TABLE — Load table n from the memory card file "tTBL_n", where n is an integer 1 through 5.

The Xmtr Out-of-Band Harmonic Spurious Softkeys

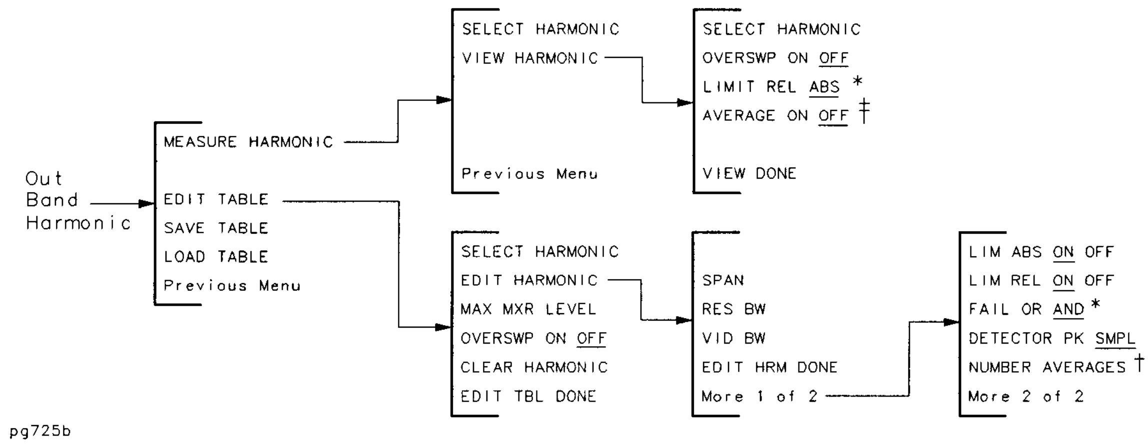

Figure 3-11. Xmtr Out-of-Band Harmonic Spurious Softkeys

- * This softkey text appears only if both LIM REL and LIM ABS are on for the selected harmonic.
- † This softkey text appears only if DETECTOR SMPL is selected.
- ‡ This softkey text appears only if DETECTOR SMPL is enabled for the selected harmonic.

Xmtr Spurious Access the Transmitter Spurious Emission softkeys.

Out Band Harmonic Access the out-of-band harmonic spurious emission softkeys.

MEASURE HARMONIC Measure the harmonic spurious emissions using the harmonic table.

For each harmonic, the reference level is set 40 dB above the largest amplitude limit with input attenuation held constant. The attenuation is set to limit the carrier (fundamental) power at the spectrum analyzer input mixer to the value determined by MAX MXR LEVEL.

The maximum spectrum level 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 limit (ΔLIM) for each amplitude result.

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

SELECT HARMONIC Select the harmonic to be viewed.

VIEW HARMONIC View the spectrum around the harmonic frequency selected by SELECT HARMONIC.

SELECT HARMONIC Select the harmonic to be viewed.

OVERSWP ON OFF — Select ON and enter a value to enable oversweep. Oversweep allows the spectrum analyzer to sweep faster than the normal, auto-coupled sweep time. An oversweep value of 10 forces sweeps 10 times faster than normal.

Oversweep causes signals to display lower in amplitude and higher in frequency. An oversweep value of 10 causes an approximate 3 dB amplitude drop and a 1% of span positive frequency shift for CW (unmodulated) signals when the video bandwidth is equal to the resolution bandwidth.

Note that this key is only present if the span for the selected harmonic is greater than 0.

LIMIT **REL ABS** — Display the relative (**REL**) or absolute (**ABS**) amplitude limit if both relative and absolute amplitude pass/fail limits are enabled for this harmonic.

AVERAGE ON OFF — If sample detection is selected for this harmonic, select ON to enable averaging.

VIEW **DONE** — Return to the tabular display of measurement results.

EDIT **TABLE** — Edit the frequency ranges and conditions defined in the harmonics table. Each row in the table displays the conditions for the indicated harmonic number.

SELECT **HARMONIC** — Select the harmonic to edit or clear.

EDIT HARMONIC — Edit the harmonic selected by SELECT **HARMONIC**.

SPAN — Enter the desired span.

RES BW — Enter the desired resolution bandwidth.

VID **BW** — Enter the desired video bandwidth.

LIM ABS ON OFF — Press the key to underline ON to enable pass/fail checking on the absolute amplitude limit value. Enter the desired absolute limit value.

When editing an empty harmonic (and no previous edits have been done), the default value is set to a limit value based on the following table:

	Mobile Station	Base Station
Xmtr	**_SETXBV** (default = – 60 **dBm**)	**_SETXEV** (default = – 13 **dBm**)
Rcvr	**_SERXC** (default = – 47 **dBm**)	**_SERXF** (default = – 47 **dBm**)

See Chapter 5, "Programming Commands," for information on limit variables.

LIM REL ON OFF — Press the key to underline ON to enable pass/fail checking on the relative amplitude limit value. Enter the desired relative limit value.

When editing an empty harmonic (and no previous edits have been done), the default value is set to a limit value based on the following table:

	Mobile Station	Base Station
Xmtr	_SETXAV (default = – 54 dB)	_SETXEU (default = – 60 dB)

Note that for receiver spurious, LIM REL will default to OFF.

FAIL OR AND — If both relative and absolute limit pass/fail checking is enabled, select the desired overall pass/fail logic. If OR is selected, the range will fail if the spurious emission exceeds either the relative *or* absolute limit. If AND is selected, the range will only fail if the spurious emission exceeds both the relative ***and*** absolute limits.

When editing an empty harmonic (and no previous edits have been done), the default value is AND for mobile stations, and OR for base stations.

DETECTOR PK SMPL — Select either the peak or sample detector mode.

NUMBER AVERAGES — If the detector mode is sample, enter the desired number of averages.

EDIT HRM DONE — Return to the edit harmonic menu.

WAX MXR LEVEL — Select the maximum carrier (fundamental) power at the spectrum analyzer input mixer. The default value is -30 dBm. This value is used to set the amount of input attenuation used for the harmonics measurement. Spectrum analyzer-generated harmonics can be decreased by decreasing this value; however, the displayed noise floor will increase.

OVERSWP ON OFF — Select ON and enter a value to enable oversweep. Oversweep allows the spectrum analyzer to sweep faster than the normal, auto-coupled sweep time. An oversweep value of 10 forces sweeps 10 times faster than normal.

Oversweep causes signals to display lower in amplitude and higher in frequency. An oversweep value of 10 causes an approximate 3 dB amplitude drop and a 1% of span positive frequency shift for CW (unmodulated) signals when the video bandwidth is equal to the resolution bandwidth.

CLEAR HARMONIC
: Clear (deactivate) the harmonic selected by **SELECT** HARMONIC .

EDIT TBL DONE
: Return to the out-of-band harmonic spurious emission menu.

SAVE TABLE
: Save the harmonics table to a RAM memory card as file **"tTBL_0"**. Make sure the card is formatted and its switch is set to write enable.

LOAD TABLE
: Load the harmonics table from the memory card file **"tTBL_0"**.

The Rcvr Spurious Softkeys

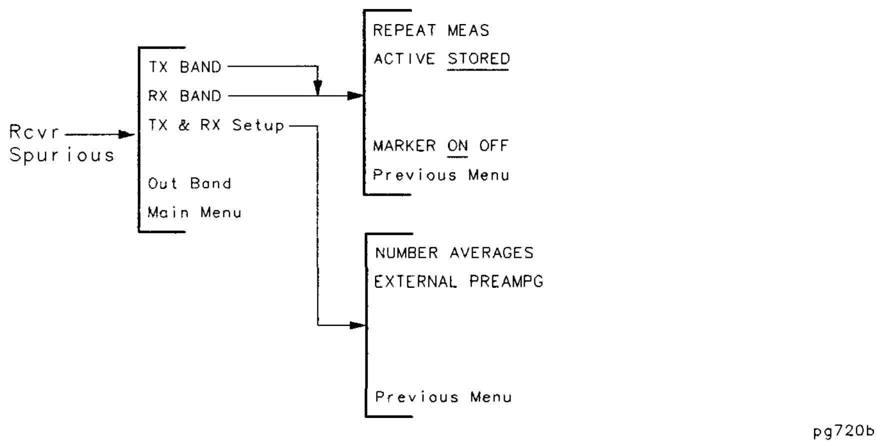

Figure 3-12. The Rcvr Spurious Softkeys

* **See the Xmtr Out-of-Band Spurious Softkeys descriptions.**

Rcvr Spurious Access the Receiver Spurious Emission softkeys.

TX BAND Measure the transmit band spectrum of the receiver.

The amplitude difference from a spurious signal to the limit line (ΔLim) and the absolute level are displayed for the highest spurious signal. A marker shows this signal.

REPEAT **MEAS** See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

ACTIVE *STORED* Select either the current Active trace or the previously Stored measurement trace to be displayed. Selecting ACTIVE will *not* erase the stored trace.

MARKER ON OFF Enable or disable the spurious emission marker. This displays an absolute amplitude and frequency readout.

RX BAND Measure the receive band spectrum of the receiver. For best sensitivity, use 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 highest spurious signal. A marker shows this signal.

REPEAT MEAS See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

ACTIVE STORED Select either the current Active trace or the previously Stored measurement trace to be displayed. Selecting ACTIVE will ***not*** erase the stored trace.

MARKER ON OFF Enable or disable the spurious emission marker. This displays an absolute amplitude and frequency readout.

TX & RX Setup Access the Spur Setup menu to set various parameters specific to spurious emissions, prior to making receiver spurious emissions measurements.

NUMBER AVERAGES See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

EXTERNAL PREAMPG Enter the mean gain of an external low noise preamplifier in the receive band. The value is saved through instrument preset.

Out Band See "The Xmtr Out-of-band Spurious Softkeys" in this chapter. Receiver Out-of-band spurious emissions can be made using any of the five available tables. Unlike transmitter Out-of-band spurious emission measurements, receiver out-of-band spurious emission measurements do not measure carrier power, and do not display relative amplitude results.

The Gated Power Softkeys

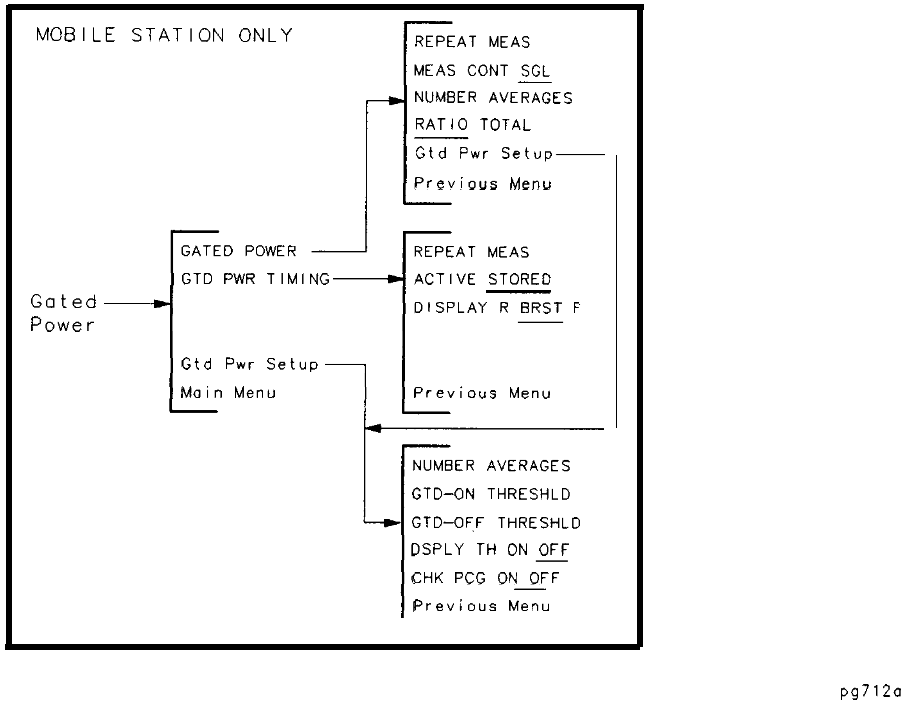

Figure 3-13. The Gated Power Softkeys

Gated Power Access the Gated Power softkeys.

GATED POWER Measure the carrier envelope power characteristics in the time domain. The Gate-on Mean Power is the average power above the gated-on threshold level. This measurement can be made for any combination of power control groups; hence, the Unit Under Test can be set to any data rate, including variable rate.

REPEAT MEAS — See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

MEAS CONT SGL — See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

NUMBER AVERAGES — See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

RATIO TOTAL — Select RATIO to display the on/off ratio. This is the ratio of average Gate-off power to the Gate-on mean power in dB. Select TOTAL to display the total mean power, which is the average power for all measured samples.

	Gtd Pwr Setup	**GTD PWR TIMING** group.

GTD PWR TIMING Measure the time characteristics of the mean output power for isolated gated-on power control groups (separate 1.25 ms bursts).

The mean is computed for the number of isolated gated-on power control groups set by **NUMBER AVERAGES** .

REPEAT MEAS See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

ACTIVE STORED View either the active or the stored trace.

DISPLAY R BRST F Select Rising edge, Burst, or Falling edge for display.

Gtd Pwr Setup Access the Gated Power Setup menu to set various parameters specific to gated power, prior to making Gated Power measurements.

NUMBER AVERAGES See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

GTD-ON THRESHLD Change the threshold level used for computing Gated-on Mean Power. The threshold is relative to the measured waveform peak level.

In computing Gated-on Mean Power, all waveform sample points below the threshold are ignored. The absolute threshold position is re-calculated for each measurement. The Gated Power Timing measurement also computes gated-on mean power, which is used to position the markers.

GTD-OFF THRESHLD Change the Gated-off threshold level used for computing on/off ratio. The threshold is relative to the measured waveform minimum level.

In computing Gated-off Mean Power, all waveform sample points above the threshold are ignored. The on/off ratio is then computed by taking a power ratio of the gated-on to gated-off mean powers. The absolute threshold position is re-calculated for each measurement.

DSPLY TH ON OFF Select ON to display threshold lines at the end of each measurement, which show the absolute levels of Gated-on and Gated-off thresholds.

CHK PCG ON OFF Select ON to check for and ignore non-isolated Power Control Groups (PCG) during the gated power timing measurement. Select OFF if only isolated groups will occur.

The Time Response Softkeys

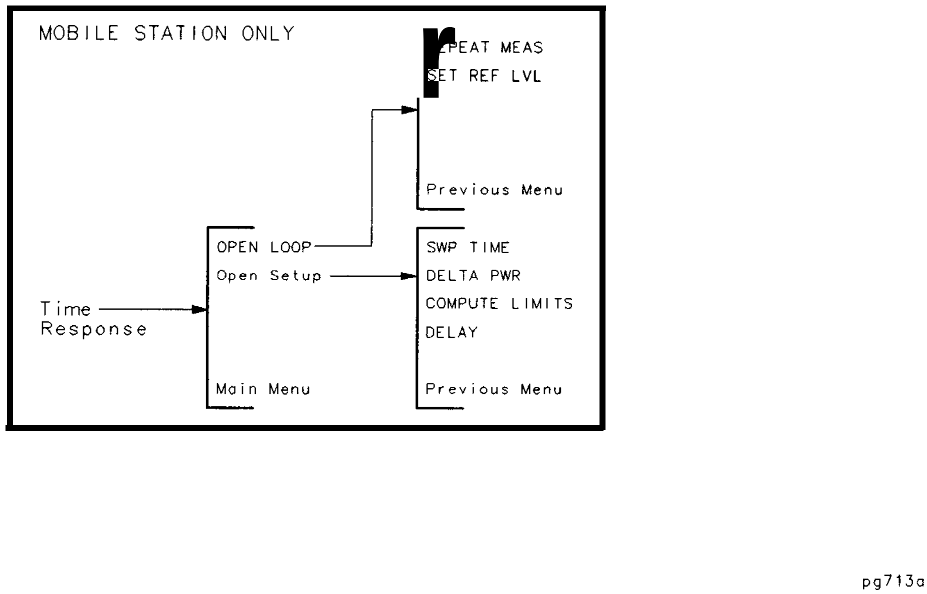

Figure 3-14. The Time Response Softkeys

Time Response — Access the Time Response softkeys.

OPEN LOOP — Measure the time response of the Open Loop Power Control. This requires an external trigger signal, with the positive edge synchronous with the step change in receive power at the mobile station. Use DELAY in the **Open Setup** menu to compensate for positive or negative time delays. The time-response waveform is automatically positioned within either positive or negative step limit lines.

- REPEAT **MEAS** — See the Post-Measurement **softkeys** at the end of this chapter for an explanation of this key.
- SET **REF LVL** — Change the reference level. This **softkey** puts the analyzer into free run trigger mode.

Open Setup — Access the Open Loop Setup menu to set various parameters specific to time response, prior to making time response measurements.

- **SWP** TIME — Change the Sweep Time used to compute the Open Loop Power Control limit lines and set the measurement Sweep Time.
- **DELTA PWR** — Change the expected Delta Power (an absolute value) used to compute the Open Loop Power Control limit lines.

Note — If **SWP TIME** or DELTA **PWR** have been changed, and you want limit lines to be displayed during the measurement, press **COMPUTE** LIMITS . It will take approximately 5 seconds to compute.

COMPUTE LIMITS Compute new limit lines based on the entered values for SWP TIME and DELTA PWR .

DELAY Enter a positive or negative time delay to compensate for the delay between the external trigger edge and the step change in RF power. This value is saved through instrument preset.

The Time Domain Softkeys

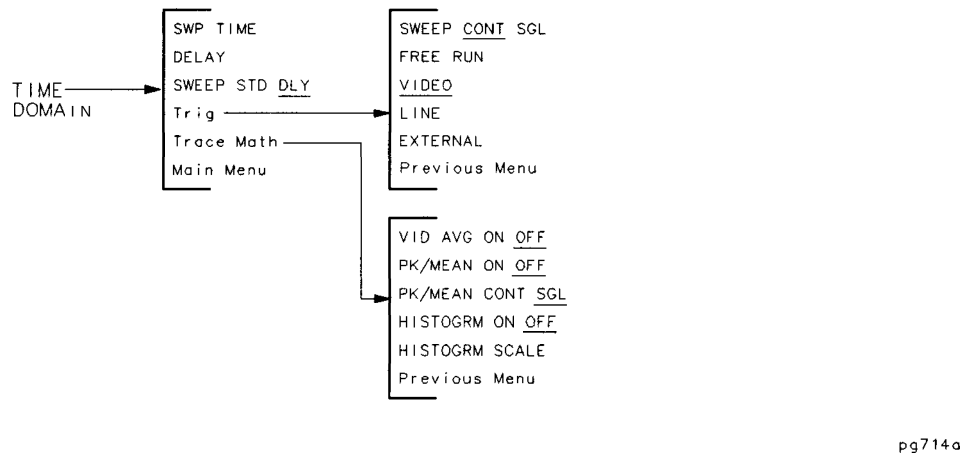

Figure 3-15. The Time Domain Softkeys

TIME DOMAIN Provides flexible, general time domain waveform analysis.

SWP TIME Set the Sweep Time for the displayed trace. With **SWEEP** DLY selected, a time record is saved for each sweep having a 200 ms maximum length for Option 101, and a 399 ms maximum length for Option 151.

Other parts of the time record can be viewed on a stored trace; select SWEEP **SGL** and change **SWP** TIME and DELAY.

DELAY Set the Delay time in relation to the selected trigger signal (video or external).

If DELAY is positive (post-trigger delay), the analyzer takes data after it receives a valid trigger signal ***and*** after the set amount of delay has elapsed.

If DELAY is negative (pre-trigger delay), the analyzer takes data at the set amount of delay prior to the trigger signal.

A capture RAM provides the pre-trigger delay. The memory allocated to pre-trigger versus post-trigger delay is automatically determined by the DELAY setting chosen when the trace is active.

SWEEP **STD** DLY Select **DLY** (delay) to use DELAY on an active or stored trace, and to allow changing SWP TIME on a stored trace.

Select STD (standard) to select sweep times greater than 200 ms for Option 101, and 399 ms for Option 151.

Trig Use the softkeys in this menu to select the trigger source, and to select Continuous or Single Sweep. The [TRIG] hardkey menu is identical.

SWEEP CONT SGL — Switch the spectrum analyzer between the Continuous Sweep mode and the Single Sweep mode. If the spectrum analyzer is in a Single Sweep mode, **SGL** is underlined. Press (SGL SWP) to take a sweep when in Single Sweep mode. When Continuous Sweep mode is active, one sweep follows another as soon as it is triggered.

FREE RUN — Activate the trigger condition that allows the next sweep to start as soon as possible after the last sweep.

VIDEO — This activates the trigger condition that allows the next sweep to start if the detected RF envelope voltage rises to a level set by the display line. When **VIDEO** is pressed, the display line appears on the screen.

LIKE — Activate the trigger condition that allows the next sweep to be synchronized with the next cycle of the line voltage.

EXTERNAL — Activate the trigger condition that allows the next sweep to start when an External Voltage is applied to the EXT TRIG INPUT on the rear panel. The external trigger must be a TTL signal between 0 and +5 volts.

Trace Math — Use the **softkeys** in this menu to apply a math operation to the active time domain waveform.

VID AVG ON OFF — Select ON to compute the point-by-point video average of the trace data over the set number of sweeps. Change the number of sweeps by entering the value.

PK/MEAN ON OFF — Select **ON** to compute the digital Peak/Mean Power ratio of the waveform over the set number of averages. Change the number of averages by entering the value. The log trace data is converted to linear power to provide correct power computations.

PK/MEAN CONT SGL — Select SGL (single) to stop the test after N averages. Select **CONT** (continuous) to run the test continuously. (See **PK/MEAN** ON OFF .)

HISTOGRM ON OFF — Select **ON** to compute the histogram (probability density function) of the waveform amplitude over the set number of sweeps. Change the number of sweeps by entering the value.

The histogram x-axis represents the amplitude intervals of the time domain waveform, with the right end equal to the reference level, and the left end equal to the bottom graticule line.

The histogram y-axis shows the number of occurrences at each amplitude interval. At the end of the test, it is auto-scaled to %-of-total occurrences, with maximum placed at the top graticule line.

HISTOGRM SCALE — Change the y-axis scale after the test is done to examine the histogram with a scale other than the auto-scale value.

The Adjacent Channel Power Ratio Softkeys

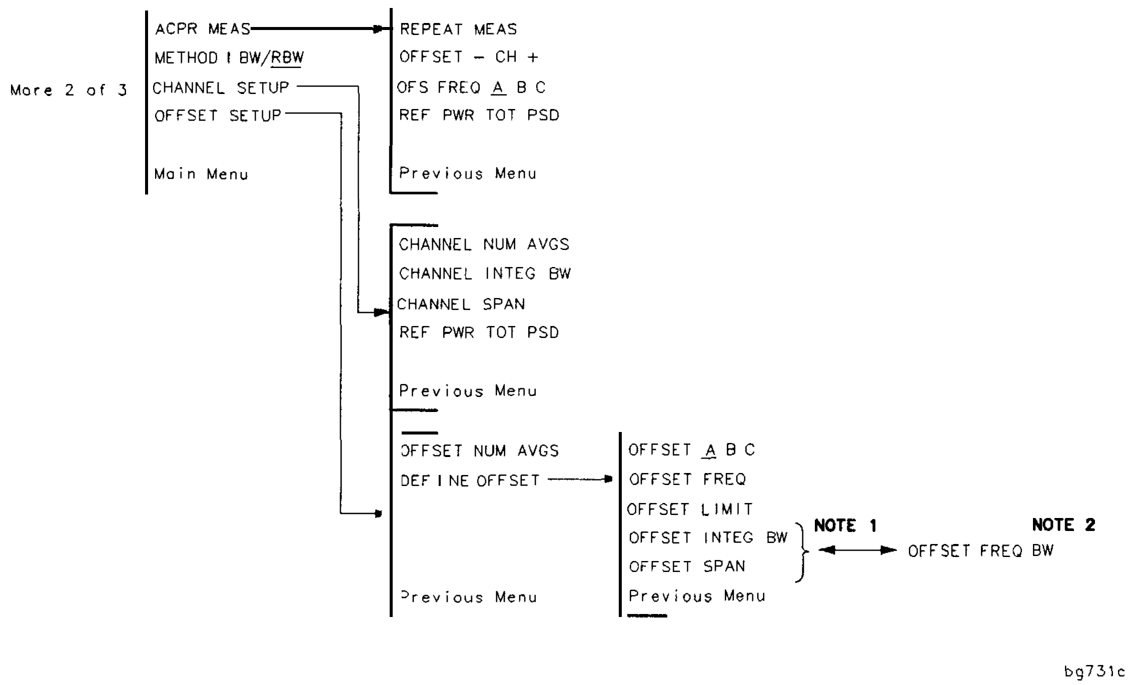

Figure 3-16. The Adjacent Channel Power Ratio Softkeys

Note 1 Appears when ACPR Integrated Bandwidth is selected.

Note 2 Appears when ACPR Resolution Bandwidth is selected.

ACPR Menu Access the Adjacent Channel Power Ratio (ACPR) softkeys.

ACPR MEAS Calculate the ratio of the measured RMS powers: Channel Bandwidth using and Integrated method and Offset Bandwidth using either an Integrated method or a Resolution Bandwidth.

Improve measurement repeatability by increasing the number of power averaged sweeps for both the channel and the off-sets.

The result may be displayed in either average total power, or average power spectral density format. These are selected by the **REF PWR** TOT PSD softkey in the ACPR **Channel** Setup menu.

REPEAT **MEAS** See the Post-Measurement softkeys at the end of this chapter for an explanation of this key.

OFFSET – ch + Select the frequency offset:

– negative offset
ch center channel
\+ positive offset

OFS FREQ A B C	Select offset frequency A Offset frequency A B Offset frequency B C Offset frequency C

METHOD IBW/RBW Select the offset measurement method used by the ACPR measurement Integration Bandwidth method or Resolution Bandwidth method.

Channel Setup Set various ACPR Channel power parameters using the ACPR Channel Setup softkeys.

CHANNEL NUM AVGS	Change the number of averages for the channel power component of the ACPR measurement.
CHANNEL INTEG BW	Change the Integration Bandwidth used for the channel power component of the ACPR measurement. The default value is 1.4 MHz.
CHANNEL SPAN	Change the Span used for channel power component of the ACPR measurement with a current CHANNEL **INTEG BW** setting. The **Span/Integ** BW ratio of the measurement is kept constant when changing **CHANNEL INTEG BW** .
REF PWR TOT PSD	Select the normalization for the channel power units, either in **dBm/Integration** BW or **dBm/Specified** BW.

Off sets setup Access the ACPR Offsets Setup **softkeys** to set various parameters specific to ACPR offset power.

OFFSET **NUM AVGS**	Change the number of averages for the offset component part of the ACPR measurement.
Define **Off** sets	Use **softkeys** in this menu to define IBW or RBW parameters for all three offsets.

OFFSET A B C	Select the Offset to setup A, B, or C. If less than 3 offsets are desired, set the unused offset frequencies to 0 Hz. For the offsets which are used, A < B < C.
OFFSET **FREQ**	Set the Offset Frequency for the selected offset.
OFFSET LIMIT	Set the Offset Limit for the selected offset. Default values are set for reference only. Actual values should be set by the user according to test specification requirements.
OFFSET **FREQ BW**	Set the resolution bandwidth for all offsets in preparation for making an ACPR measurement.
OFFSET **INTEG BW**	Set the offset integration bandwidth for the selected offset in preparation for an ACPR measurement.
OFFSET SPAN	Set the frequency span for the selected offset in preparation for making an ACPR measurement.

The Post-Measurement Softkeys

REPEAT MEAS
MEAS CONT SGL
NUMBER AVERAGES
*

Previous Menu

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Figure 3-17. The Post-Measurement Softkeys

* **Additional keys specific to individual measurements are sometimes used in this area of the menu. These keys are described in this chapter, whenever they are used.**

REPEAT MEAS

Press REPEAT MEAS to perform the measurement again. The repeated measurement will be faster than the first time, as the analyzer parameter setup is not repeated. You can change some analyzer parameter values from their default settings prior to repeating a measurement.

Note Changing these settings may affect the validity of the measurement.

MEAS CONT SGL

Select SGL (single) to stop the test after N averages. Select CONT (continuous) to run the test continuously. (See NUMBER AVERAGES in the Post-Measurement Softkeys menu at the end of this chapter.)

Note The selection of CONT or SGL affects all measurements that provide this selection.

NUMBER AVERAGES

Press **NUMBER** AVERAGES to change the number of trace averages N used to compute the measurement results.

Normal Averaging: Normal (linear) averaging occurs until the specified number of N averages is reached. When **MEAS SGL** is selected before starting a test, the test stops after N averages to display a normal average result.

Exponential Averaging: After N averages, exponential averaging occurs with a weighting factor of N. When **MEAS CONT** is selected, the test continues past N averages to display exponential average results (displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set by **NUMBER** AVERAGES . See the exponential averaging formula below.

Exponential Averaging Formula:

$$\text{Exp Avg} = \underbrace{\left(\frac{N-1}{N}\right) \text{X (Old Average)}}_{\text{Weighted Old Average}} + \underbrace{\left(\frac{1}{N}\right) \text{X (New Data)}}_{\text{Weighted New Data}}$$

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Note Each measurement has an independent Number of Averages setting. Default values are listed in Chapter 5, “Programming Commands.”

4

Error Messages and Troubleshooting

Use this chapter to troubleshoot problems indicated by error messages on the spectrum analyzer screen. This chapter begins with a list of the common problems that may or may not show an error message. Then, all error messages are listed alphabetically, along with troubleshooting information. If the problem is related to the spectrum analyzer, see the spectrum analyzer service guide.

How to Use This Chapter

1. Follow the procedure listed in "Before Troubleshooting." Most issues involving setup and common errors not identified with an error message are discussed there.
2. If an error message is displayed, locate the message in "Error Messages" in this chapter and follow the directions given for that message.
3. If required, contact your nearest HP Sales and Service Office, listed at the end of this chapter.

Troubleshooting

If an error message appears, or if you suspect a problem, check the system setup first. Make sure the CDMA measurements personality settings match the signal type under test.

If the CDMA measurements personality does not make a measurement

If you press one of the measurement functions and the personality does not make the measurement, it could be caused by one of the following:

- The channel number is not correct.

  Make sure that the channel number corresponds to the transmitted carrier frequency.

- The personality is configured for the wrong transmitter type.

  Make sure that BASE is underlined in the BASE MOBILE softkey (in the Configuration menu), if a base station is being tested. Likewise, make sure that MOBILE is underlined in the BASE MOBILE softkey, if a mobile station is being tested.

- The trigger signal is missing.

  Make sure that a trigger is input to the spectrum analyzer, when required. Triggering is used for time response, gated power timing, and time domain (with external trigger selected), on a mobile station. See the end of "Step 3. Make the cable connections for triggering the spectrum analyzer" in Chapter 1, "Getting Started," for more information.

If the test results are not what you expected

If the test results are incorrect or not what you expected, it could be caused by one of the following conditions:

- The Continuous/Gated Transmission mode is set incorrectly when measuring a mobile station.

  Make sure the Mobile Station Transmission mode is appropriate for the measurement selected. Gated Power, Time Response and TIME DOMAIN measurements are made on bursted carriers. All other measurements are typically made on continuous carriers.

  Make sure that TX MODE is set to CONT in the Spur Setup menu if a continuous spurious emissions carrier is being tested. Continuous is the normal condition for spurious emission measurements. Likewise, make sure that TX MODE GTD is set to GTD in the Spur Setup menu if a burst carrier is being tested. See "To configure the personality" in Chapter 2, "Making Measurements," for more information.

- The external attenuation value is incorrect.

  If measuring a mobile station, make sure that MS EXT ATTEN has been set correctly. If measuring a base station, make sure that BS EXT ATTEN has been set correctly. The external attenuation settings for either base or mobile stations are two independent values. The base or mobile station EXT ATTEN softkey is in the Configuration menu. A symptom of this problem is incorrect power measurement results. For more information, see "The CDMA Config Softkeys," in Chapter 3, "Menu Map and Softkey Descriptions."

- The total power setting is incorrect.

  Make sure that MAX **PWR AUTO** MAN has been set correctly. Select **AUTO** to allow measurements to automatically set the analyzer internal input attenuation, based on measured in-channel carrier power. Select MAN to manually enter the maximum total power at the Unit Under Test.

  Use **AUTO** when only a single carrier is present and the spectrum analyzer is tuned to that frequency. AUTO can be used with multiple carriers, provided:

  (Total Power at the Unit Under Test) < (0 dBm + EXT Atten), where:

  EXT Atten = BS **EXT ATTEN** when testing a base station, or,

  EXT Atten = MS **EXT ATTEN** when testing a mobile station.

  Use MAN if a carrier is present at a frequency other than the analyzer frequency, if the spectrum analyzer input attenuation is to be held constant, or if 0 dB input attenuation is desired for maximum spectrum analyzer sensitivity.

Caution The spectrum analyzer is vulnerable to damage if excessive power is applied to the input connector.

The default minimum input attenuation for the spectrum analyzer is 10 dB. For 0 dB, set the minimum attenuation variable _ATMIN to 0 using a remote command (refer to the spectrum analyzer programmer's guide for more information).

Damage can occur because the input attenuator is set to 0 dB, and the external attenuator is the only component limiting the output power from the Unit Under Test. The total power applied to the spectrum analyzer INPUT 50Ω connector *cannot* exceed *+20 dBm*. Spectrum analyzer damage is likely if the input power exceeds this amount.

- The self-calibration routines need to be performed as described under "Step 2. Perform the spectrum analyzer self-calibration routines" in Chapter 1, "Getting Started."

  Perform the self-calibration routines periodically to make accurate measurements. When performing the spectrum analyzer self-calibration routines on instruments having Option 105, nothing should be connected to the GATE TRIGGER INPUT connector on the spectrum analyzer rear panel. If there is anything connected to the GATE TRIGGER INPUT connector during the self-calibration routines, the calibration data can be invalid.

- Excess frequency drift is interrupting the measurement.

  The spectrum analyzer center frequency has not yet stabilized to internal operating temperature. Wait a few minutes after turning on the spectrum analyzer before beginning measurements.

Error Messages

All error messages are listed alphabetically by the first word in the message.

Card must be a RAM card

This indicates that a RAM memory card must be present in the spectrum analyzer card reader to save the spurious emission out-of-band table.

Card must be write enabled

This indicates that the RAM memory card present in the spectrum analyzer card reader must not be write protected to save the spurious emission out-of-band table.

Carrier power too high, Measurement Stopped

This indicates that the measured level of the carrier is too large to make a valid measurement and the measurement has been stopped. This message will only appear if the maximum power function in the Configuration menu is set to manual (MAX **PWR MAN**), and the amplitude of the measured carrier is greater than the value of the maximum power.

To solve this problem:

- Confirm that the transmitter output is correctly connected to the spectrum analyzer input.
- Confirm that the total CDMA measurements personality maximum power function (**MAX PWR**) has been set correctly. For more information, see "The CDMA Config Softkeys," in Chapter 3, "Menu Map and Softkey Descriptions."
- Confirm that the CDMA measurements personality external attenuator function (EXT **ATTEN**) has been set correctly. For more information, see "The CDMA Config Softkeys," in Chapter 3, "Menu Map and Softkey Descriptions."

Carrier present, Measurement Stopped

This indicates that the spectrum analyzer has found a carrier greater than -20 dBm before an RX channel power or RX band receiver spurious emission measurement. These low level measurements require the analyzer input attenuator to be set to 0 dB and thus check for high level signals before switching the input attenuator to 0 dB.

To solve this problem:

- Make sure no carriers greater than -20 dBm are present for these test setups.

CH Pwr < SA noise Pwr, Pwr Accuracy Degraded

This indicates that the channel power automatic noise correction limit has been reached. Channel power values displayed while this message is present will have excessive measurement variation.

To solve this problem:

- Increase the channel power.
- Decrease the noise floor by decreasing external attenuation, or use a low noise preamplifier when making a receive channel power measurement. Re-run the noise floor calibration.

File not found

This indicates that the spurious emission out-of-band table file is not present on the memory card.

Function Not Available in CDMA Analyzer Mode

This indicates the function is not accessible since it is incompatible with the CDMA mode.

Access the function by exiting the CDMA mode by using the (MODE) key (press (MODE) and SPECTRUM ANALYZER).

Function Not Available in Current Measurement

This indicates the function is not accessible since it is incompatible with the current measurement.

INVALID SYMTAB ENTRY: SYMTAB OVERFLOW

This indicates that there was not enough available memory in the spectrum analyzer to hold the CDMA measurements personality.

To solve this problem:

- Make sure that no other downloadable programs are resident in spectrum analyzer memory:
  1. Press (PRESET).
  2. Press (CONFIG) **More 1 of 3** **Dispose** User **Mem** ERASE **DLP MEM** ERASE **DLP** MEM (PRESET).
  3. Reload the CDMA measurements personality using the procedure under 'Step 1. Load the CDMA measurements personality," in Chapter 1, "Getting Started."

Newer Opt 160 Firmware Required: REV xxxxxx or later

This message indicates that newer Option 160 firmware is required for the CDMA measurements personality.

To solve this problem:

- Contact your local HP sales and service office for information about obtaining the latest Option 160 ROMs.

No card found

This indicates that a memory card must be present in the spectrum analyzer card reader to load or save spurious emission out-of-band tables.

No Harmonics Defined, Measurement Stopped

For out-of-band, harmonics spurious emission measurements, this message indicates that no harmonics are defined in the harmonics table.

No Ranges Defined, Measurement Stopped

For out-of-band spurious emission measurements, this message indicates that no ranges are defined in the currently-selected table.

No Valid Freq Segments, Measurement Stopped

For the transmitter in-band, close spurious emission measurement (SPUR CLOSE), this indicates that no segments are specified. For the transmitter in-band maximum power spurious emission measurement (SPUR TX MAX PWR), this indicates that no segments are specified, or only F- or F+ specified, and that segment is excluded because it is beyond the band edge. See remote programming command **_SETFS** in Chapter 5, "Programming Commands" for more information.

Non-Isolated Power Control Group

This indicates that a non-isolated power control group was detected and ignored. Non-isolated means that two or more bursts are occurring without an intervening space.

Opt 004 or External Precision Freq Ref Required

This indicates that the spectrum analyzer does not have Option 004, the precision frequency reference, installed. If the spectrum analyzer does not have Option 004 installed, you must use

measurements personality.

To use an external precision frequency reference:

- Disconnect the connector from the 10 MHz REF OUTPUT and EXT REF IN connectors on the rear panel. Connect the 10 MHz signal from a precision external frequency reference to the EXT REF IN connector. Note that the message will still be present when an external 10 MHz reference is correctly connected.

Opt 021 or 041 Required for SRQ Measurement done indication

This indicates that the spectrum analyzer does not have an HP-IB/IEEE-488 interface option installed. Option 021 or 041 is required for SRQ measurement done indication.

Opt 101 or 151 Required for Time Domain'

This indicates that the spectrum analyzer does not have a fast time domain measurements option installed. Option 101 or Option 151 is required for gated power, time response, and time domain measurements.

Opt 151 and Opt 160 Required for DSP assisted measurements

This indicates that the spectrum analyzer does not have Option 151 installed, which is the DSP, fast ADC, and digital demodulator option. This option provides time domain and DSP-assisted measurements. Options 151 and 160 are required for DSP-assisted measurement mode.

Opt 160 Required for DSP assisted measurements

This indicates that the spectrum analyzer has Option 151 installed, but does not have Option 160 firmware ROMs installed. Option 160 is required for DSP-assisted measurements.

SA noise cal needed, Measurement Stopped Press [CAL SA NOISE]

This indicates that the measured channel power is too low to make a measurement without a valid noise floor calibration. An existing noise floor calibration is made invalid if:

- AC power is turned off and on.
- Integration bandwidth or resolution bandwidth has changed since the calibration was done.
- Preamp gain has changed since the RX channel power calibration was done.

To solve this problem:

- Perform the SA noise floor calibration.

SPAN clipped to (RBW * 200) for sample detector

This message can occur while editing an out-of-band spurious emission measurement setup table. It indicates that the span has been truncated to 200 times the current resolution bandwidth for the current range (or harmonic). This truncation is necessary to avoid excessive amplitude error when using the sample detector.

Sweep Stopped, Number of Occurrences Equals Limit

This indicates that a "bucket" value for the Histogram measurement exceeded 32,000.

How to Contact Hewlett-Packard

In the event something goes wrong with your spectrum analyzer, refer to the spectrum analyzer service guide about returning it for service. If you need to contact Hewlett-Packard about a problem with the CDMA measurements personality, you can call your nearest Hewlett-Packard Sales and Service Office, listed in the table on the following page.

Table 4-1. Hewlett-Packard Sales and Service Offices

US FIELD OPERATIONS		
Headquarters Hewlett-Packard Co. 19320 Pruneridge Avenue Cupertino, CA 95014 (800) 752-0900	**California, Northern** Hewlett-Packard Co. 301 E. Evelyn Mountain View, CA 94041 (415) 694-2000	**California, Southern** Hewlett-Packard Co. 1421 South Manhattan Ave. Fullerton, CA 92631 (714) 999-6700
Colorado Hewlett-Packard Co. 24 Inverness Place, East Englewood, CO 80112 (303) 649-5512	**Atlanta Annex** Hewlett-Packard Co. 2124 Barrett Park Drive Kennesaw, GA 30144 (404) 6480000	**Illinois** Hewlett-Packard Co. 545 E. Algonquin Rd. Arlington Heights, IL 60005 (847) 342-2000
New Jersey Hewlett-Packard Co. 150 Green Pond Rd. Rockaway, NJ 07866 (201) 586-5400	**Texas** Hewlett-Packard Co. 930 E. Campbell Rd. Richardson, TX 75081 (214) 231-6101	
EUROPEAN FIELD OPERATIONS		
Headquarters Hewlett-Packard S.A. 150, Route du Nant-d'Avril 12 17 Meyrin 2/Geneva Switzerland (41 22) 780.8111	**France** Hewlett-Packard France 1 Avenue Du Canada Zone D'Activite De Courtaboeuf F-91947 Les Ulis Cedex France (33 1) 69 82 60 60	**Germany** Hewlett-Packard GmbH Hewlett-Packard Strasse 61352 Bad Homburg v.d.H Germany (49 6172) 16-0
Great Britain Hewlett-Packard Ltd. Eskdale Road, Winnersh Triangle Wokingham, Berkshire RG41 5DZ England (44 734) 696622		
INTERCON FIELD OPERATIONS		
Headquarters Hewlett-Packard Company 3495 Deer Creek Road Palo Alto, California, USA 34304-1316 (415) 857-5027	**Australia** Hewlett-Packard Australia Ltd. 31-41 Joseph Street Blackbum, Victoria 3130 (61 3) 895-2895	**Canada** Hewlett-Packard (Canada) Ltd. 17500 South Service Road Trans-Canada Highway Kirkland, Quebec H9J 2X8 Canada (514) 697-4232
China China Hewlett-Packard Company 38 Bei San Huan Xl Road Shuang Yu Shu Hai Dian District Beijing, China (86 1) 256-6888	**Japan** Hewlett-Packard Japan, Ltd. 9-1 Takakura-Cho, Hachioji Tokyo 192, Japan (81 426) 60-2111	**Singapore** Hewlett-Packard Singapore (Pte.) Ltd. 150 Beach Road #29-00 Gateway West Singapore 0718 (65) 291-9088
Taiwan Hewlett-Packard Taiwan 8th Floor, H-P Building 337 Fu Hsing North Road Mpei, Taiwan (886 2) 712-0404		

5

Programming Commands

This chapter contains complete information for the programming commands available to operate the CDMA measurements personality. The topics covered in this chapter are:

- A functional index of the CDMA measurements remote programming commands with the corresponding description and softkey equivalent for each command.
- A table containing the CDMA setup and limit variables with the corresponding measurement, description, and default value for each command.
- Descriptions of all programming commands for the CDMA measurements personality in alphabetical order.

This chapter contains reference information about the CDMA programming commands. For more information about programming the CDMA personality, refer to Chapter 6, "Programming Examples." For more information about programming the spectrum analyzer, see the spectrum analyzer programmer's guide.

Functional Index

The following index table lists each CDMA measurements personality remote command description, the remote command, and the corresponding softkey equivalent.

Note Not all remote commands have corresponding softkeys. Remote commands which do not have corresponding softkeys are listed as having no softkey equivalent.

Table 5-1. Functional Index

Measurement and Command Description	Remote Command	Softkey Equivalent
General		
DLP Identification	-DID	No softkey equivalent
DSP Assisted Measurements	-DSP	No softkey equivalent
SRQ Measurement Done Indication	_SRQ	No softkey equivalent
Help Mode	-HLP	CDMA HELP
Window Zoom (has equivalent hardkey)	_WINZOOM	(ZOOM)
Configuration Menu		
Auto Reference Level	-ARL	AUTO RL ON OFF
Default Configuration	-DEFAULT	DEFAULT CONFIG
Display Pass/Fail Message	-DPF	PASSFAIL ON OFF
External Attenuation Base	_EXTATB	BS EXT ATTN
External Attenuation Mobile	-EXTATM	MS EXT ATTN
Help Message	_HMSG	HLP MSG ON OFF
Mobile Station/Base Station	_MS	BASE MOBILE
Total Max Power Mode	_TOTPM	MAX PWR AUTO MAN
Total Max Power	-TOTPWR	MAX PWR AUTO NAN
Trigger Mode	_TRIGM	TRIG VID EXT
Video Trigger Margin	-VTM	VID TRIG MARGIN
CDMA Defined Parameter Menu		
Defined Burst Width	-DBW	BURST WIDTH
Defined CDMA Channel Bandwidth	-DCHBW	CDMA CH NW
Defined Channel Number	-DCHN	CH n
Defined CDMA Channel Spacing	-DCHSP	CDMA CH SPCNG
Defined Channel Step	-DCHSTP	CH STEP
Defined Duplex Spacing	-DDUP	DUP OFST
Defined Frequency Start Base Station Band	_DFABS	BS BAND START
Defined Frequency Start Mobile Station Band	_DFAMS	MS NAND START
Defined Frequency Stop Base Station Band	_DFBBS	BS BAND STOP
Defined Frequency Stop Mobile Station Band	-DFBMS	MS BAND STOP
Defined Frame Period	-DFP	FRAME PERIOD
Defined Frequency n	_DFRN	FREQ n
Standard/Tuning Plan	_DPAR	STANDARD BAND

Table 5-1. Functional Index (continued)

Measurement and Command Description	Remote Command	Softkey Equivalent
RF Channel Menu		
Center Frequency for Channel X	-CFX	CHAN X CTR FREQ
Channel Number	_CH	CHANNEL NUMBER
Channel Power Menu		
Calibrate Analyzer Noise Floor	-CALNZ	CAL SA NOISE
Calibrate Analyzer RX Noise Floor	-CALRXNZ	CAL RX SA NOISE
Channel Power Measurement	_CHPM	No softkey equivalent
Channel Power Number of Averages	_CHPNA	NUMBER AVERAGES
Channel Power Setup	_CHPS	No softkey equivalent
Channel Power Span	-CHPSP	CH PWR SPAN
Channel Power	-CHPWR	CHAN POWER
Integration Bandwidth	_IBW	INTEG BW
Noise Calibration Number of Averages	-NZCALNA	NUMBER AVERAGES
Noise Floor Correction	_NZCORR	N CORR ON OFF
Preamp Gain	-PREAMPG	EXTERNAL PREAMPG
Rx Channel Power Setup	-RXCHPS	No softkey equivalent
Rx Channel Power	-RXCHPWR	RX CHAN POWER
Post Measurement Menu		
Continuous Measure	.CON	MEAS CONT SGL
Repeat (measurement)	_RPT	REPEAT MEAS
Frequency Menu		
Occupied Bandwidth Number of Averages	_OBNA	NUMBER AVERAGES
Occupied Bandwidth Percent Power	_OBPCT	OCC BW % POWER
Occupied Bandwidth	_OBW	OCCUPIED BANDWIDTH
Occupied Bandwidth Measurement	_OBWM	No softkey equivalent
Occupied Bandwidth Setup	_OBWS	No softkey equivalent

Table 5-1. Functional Index (continued)

Measurement and Command Description	Remote Command	Softkey Equivalent
Spectrum Menu		
Select Band	-BAND	Band
Channel Spectrum	_CHS	CHANNEL SPECTRUM
Channel Spectrum Measurement	_CHSM	No softkey equivalent
Channel Spectrum Setup	_CHSS	No softkey equivalent
Monitor Band Measurement	-MBM	No softkey equivalent
Monitor Band	_MBND	MONITOR BAND
Monitor Band Setup	-MBS	No softkey equivalent
Monitor Channel	-MCH	MONITOR CHAN
Monitor Channel Measurement	-MCM	No softkey equivalent
Monitor Channel Setup	_MCS	No softkey equivalent
Monitor Tx Rx	_MTX	CHAN TX RX
Spectral Regrowth	_SR	No softkey equivalent
Spectral Regrowth Display mode	_SRD	MEAS & ACTIVE MEAS & REF MEAS & NORM REF REGROWTH
Spectral Regrowth Measurement	_SRM	MEAS REF SPECTRUM and MEAS SPECTRUM
Spectral Regrowth Marker	SRMK	MARKER ON OFF
Spectral Regrowth Number of Averages	SRNA	NUMBER AVERAGES
Spectral Regrowth Setup	_SRS	Spectral Regrowth
Spectral Regrowth Store Reference	SRSR	STORE REF TRACE

Table 5-1. Functional Index (continued)

Measurement and Command Description	Remote Command	Softkey Equivalent
kansmitter In-Rand Spurious Menu		
Continuous Transmission	-CTX	TX MODE CONT GTD
Limit (for spurious emission measurement)	-LIM	LIMIT a b c
Segment (of spurious relative to carrier)	-SEG	SEGMENT F- Fc F+
Spurious Emission Marker	_SEMK	MARKER ON OFF
Spurious Emission Number of Averages	_SENA	NUMBER AVERAGES
Spurious Emission Transmitter Close	_SETC	SPUR CLOSE
Spurious Emission Transmitter Close Fast	-SETCF	CLOSE FAST ALL
Spurious Emission Transmitter Close Measurement	-SETCM	No softkey equivalent
Spurious Emission Transmitter Close Setup	_SETCS	No softkey equivalent
Spurious Emission Transmitter Detector	_SETDET	DET MM PK SP
Spurious Emission Transmitter Frequency Segment	_SETFS	No softkey equivalent
Spurious Emission Transmitter Max Tx Power	_SETM	SPUR TX MAX PWR
Spurious Emission Transmitter Max Tx Power Measurement	-SETMM	No softkey equivalent
Spurious Emission Transmitter Max Tx Power Setup	_SETMS	No softkey equivalent
Spurious Emission Transmitter Standby Output Power	_SETSP	STANDBY OUT POWER
Spurious Emission Transmitter Standby Output Power Measurement	_SETSPM	No softkey equivalent
Spurious Emission Transmitter Standby Output Power Setup	_SETSPS	No softkey equivalent
Trace Active	-TA	ACTIVE STORED
Transmitter Out-of-Rand Spurious Menu		
Out-of-Band Measurement	-SEOMT	MEASURE OUT BAND
Table Number	-SEOTBLN	TABLE NUMBER
Out-of-Band Harmonic Measurement	_SEOMTH	MEASURE HARMONIC

Table 5-1. Functional Index (continued)

Measurement and Command Description	Remote Command	Softkey Equivalent
Dut-of-Band Spurious Edit ‘Ihble Menu		
Clear Table	_SEOCLRTBL	No softkey equivalent
Table to Edit Buffer	_SEOTBLTOB	No softkey equivalent
Range/Harmonic Number	_SEORHN	RANGE NUMBER
Absolute Amplitude Limit	-SEOLIMA	LIM ABS
Relative Amplitude Limit	_SEOLIMR	LIM REL
Absolute Amplitude Limit Pass/Fail Check	SEOLIMAF	LIM ABS ON OFF
Relative Amplitude Limit Pass/Fail Check	SEOLIMRF	LIM REL ON OFF
Both Limits ON Fail Logic	-SEOBLOFL	FAIL OR AND
Detector Mode	-SEODETF	DET PK SMPL
Number Averages	_SENA	NUMBER AVERAGES
Save Range/Harmonic	SEOSAVRH	No softkey equivalent
Maximum Mixer Level	_SEOMML	MAX MXR LEVEL
Oversweep	_SEOOSF	OVERSWP ON OFF
Oversweep Value	_SEOOS	OVERSWP
Clear Range/Harmonic	_SEOCLRRH	CLEAR RANGE
Save ‘Ihble Global Parameters	-SEOSAVTBL	No softkey equivalent
Edit Buffer to Table	SEOBTOTBL	No softkey equivalent
deceiver Spurious Menu		
Preamp Gain	-PREAMPG	EXTERNAL PREAMPG
Spurious Emission Marker	_SEMK	MARKER ON OFF
Spurious Emission Number of Averages	_SENA	NUMBER AVERAGES
Spurious Emission Receiver for Rx Band	_SERRX	RX BAND
Spurious Emission Receiver for Rx Band Measurement	_SERRXM	No softkey equivalent
Spurious Emission Receiver for Rx Band Setup	-SERRXS	No softkey equivalent
Spurious Emission Receiver for Tx Band	-SERTX	TX BAND
Spurious Emission Receiver for Tx Band Measurement	-SERTXM	No softkey equivalent
Spurious Emission Receiver for Tx Band Setup	_SERTXS	No softkey equivalent
Trace Active	-TA	ACTIVE STORED
deceiver Out-of-Rand Spurious Menu		
Out-of-Band Measurement	-SEOMR	MEASURE OUT BAND
Table Number	-SEOTBLN	TABLE NUMBER

Table 5-1. Functional Index (continued)

Measurement and Command Description	Remote Command	Softkey Equivalent
Gated Power Menu		
Gated Power Display	-GPD	RATIO TOTAL
Gated Power Measurement	-GPM	No softkey equivalent
Gated Power Number of Averages	_GPNA	NUMBER AVERAGES
Gated Power Setup	-GPS	No softkey equivalent
Gated Power Timing Display Mode	-GPTD	DISPLAY R BRST F
Gated Power Threshold Display	-GPTHD	DSPLYTH ON OFF
Gated Power Threshold Gated-Off	-GPTHGOFF	GTD OFF THRESHLD
Gated Power Threshold Gated-On	_GPTHGON	GTD ON THRESHLD
Gated Power Timing Measurement	-GPTM	No softkey equivalent
Gated Power Timing Check Power Control Group	_GPTPCG	CHK PCG ON OFF
Gated Power Timing Setup	_GPTS	No softkey equivalent
Gated Power	_GPWR	GATED POWER
Gated Power Timing	-GPWRT	GTD PWR TIMING
Time Response Menu		
Time Response Open Loop Power Control	-TOL	OPEN LOOP
Time Response Open Loop Power Compute Limits	_TOLCLIM	COMPUTE LIMITS
Time Response Open Loop Delay	-TOLDELAY	DELAY
Time Response Open Loop Delta Power	_TOLDP	DELTA PWR
Time Response Open Loop Power Control Measurement	_TOLM	No softkey equivalent
Time Response Open Loop Power Control Setup	_TOLS	No softkey equivalent
Time Response Open Loop Sweep Time	_TOLST	SWP TIME
Time Domain Menu		
Delay (in time domain)	-DELAY	DELAY
Time Domain Peak Mean Function	_PKMNF	PK/MEAN ON OFF
Time Domain Peak Mean Number Averages	_PKMNNA	PK/MEAN ON OFF
Time Domain Sweep Mode	-SWPSTD	SWEEP STD DLY
Time Domain	-TDM	TIME DOMAIN
Time Domain Measurement	-TDMM	No softkey equivalent
Time Domain Setup	_TDMS	No softkey equivalent
Time Domain Histogram Function	-THF	HISTOGRM ON OFF
Time Domain Histogram Number Averages	_THNA	HISTOGRM ON OFF
Time Domain Histogram Percent	-THPCT	HISTOGRM SCALE

Table 5-1. Functional Index (continued)

Measurement and Command Description	Remote Command	Softkey Equivalent
ACPR Menu		
ACPR Measurement	-ACPR	ACPR MEAS
Select IBW/RBW Method	-ACPRI	METHOD IBW RBW
ACPR Channel Power Number of Averages	-ACPRNA	CHANNEL NUM AVGS
ACPR Channel Power Integration BW	-ACPRIBW	CHANNEL INTEG BW
ACPR Channel Power Span	-ACPRSP	CHANNEL SPAN
ACPR Reference Total Power/Power Spectral Density	-ACPRV	REF PWR TOT PSD
ACPR Offset Power Number of Averages	-ACPRONA	OFFSET NUM AVGS
ACPR Offset A, B, C selection		OFFSET A B C
ACPR Offset Frequencies	-ACPRFA	OFFSET FREQ
	-ACPRFB	OFFSET FREQ
	-ACPRFC	OFFSET FREQ
ACPR Offset Limits	-ACPRLA	OFFSET LIMIT
	-ACPRLB	OFFSET LIMIT
	-ACPRLC	OFFSET LIMIT
ACPR Offset Integration BW	-ACPRIBWA	OFFSET INTEG BW
	-ACPRIBWB	OFFSET INTEG BW
	-ACPRIBWC	OFFSET INTEG BW
ACPR Offset Resolution BW	-ACPRARBW	OFFSET FREQ BW
ACPR Offset Span	-ACPRSPA	OFFSET SPAN
	-ACPRSPB	OFFSET SPAN
	-ACPRSPC	DFFSET SPAN

CDMA Setup and Limit Variables

The CDMA measurements personality uses setup and limit variables to perform the measurement tests. A limit variable is used to determine if a measurement results failed or passed (as displayed by the pass/fail message). A setup variable is used to determine the spectrum analyzer settings for a measurement. Table 5-2 lists all the limit variables and setup variables available for the CDMA analyzer mode. For more information about using setup and limit variables, see Chapter 6, "Programming Examples."

The default value for setup and limit variables is the value these variables take when the CDMA personality is loaded into the analyzer. Setup and limit variables are reset back to these default values upon instrument preset, or when the ac power is turned off and on. If the CDMA personality is customized using the VARDEF command, the current values of limit and setup variables can be retained and thus not reset back to their default values. See "Customizing the CDMA Personality" in Chapter 6, "Programming Examples," for more information.

Table 5-2. CDMA Setup and Limit Variables

Measurement	Description	Variable Name	Default Value	Units
General	Carrier Min (for set RL in Gated Pwr)	_CMIN	-90 dBm	dBm
	Burst Min Delta Amplitude (for burst detection)	_BMIN	-20 dBc	dBc
	Displayed Avg Noise Level	_DANL	-110 dBm	dBm
	Input Attenuation Min	-ATMIN	10 dB	dB†
	Trigger Delay Correction External	-TDCE	-5 μs	μs
	Trigger Delay Correction Video	-TDCV	0 μs	μs
	Rx Channel/Band, Max Carrier Level	_RXCARM	-20 dBm	dBm
Channel Plan Parameters	CDMA Channel Bandwidth	_CHBW	1.23 MHz	Hz
	CDMA Channel Spacing	_CHSP	1.25 MHz	Hz
	CDMA Burst Width	-BW	1.25 ms	s
	CDMA Frame Period	-FP	10 ms	s
	CDMA MS Band Start Frequency	_FAMS	823.5 MHz	Hz
	CDMA MS Band Stop Frequency	-FBMS	849.5 MHz	Hz
	CDMA BS Band Start Frequency	_FABS	868.5 MHz	Hz
	CDMA BS Band Stop Frequency	_FBBS	894.5 MHz	Hz
Note: Default channel plan parameters are set to IS-95. Values change when other channel plans are selected.				
J-Standard-008 Parameters	J-Standard Burst Width	-JBW	1.25 ms	s
	J-Standard Frame Period	-JFP	10 ms	s
	J-Standard Channel Bandwidth	-JCHBW	1.23 MHz	Hz
	J-Standard Channel Spacing	_JCHSP	1.25 MHz	Hz
	J-Standard MS Band Start Frequency	_JFAMS	1.85 GHz	Hz
	J-Standard MS Band Stop Frequency	-JFBMS	1.90995 GHz	Hz
	J-Standard BS Band Start Frequency	_JFABS	1.93 GHz	Hz
	J-Standard BS Band Stop Frequency	_JFBBS	1.98995 GHz	Hz
	J-Standard BS TX Frequency	_JFRN	1.93005 GHz	Hz
	J-Standard MS BS Offset	_JDUP	-80 MHz	Hz
	J-Standard Channel Step	_JCHSTP	50 kHz	Hz
	J-Standard Default Channel Number	_JCHN	1	–

† **CAUTION:** Damage can occur when the input attenuator is set to 0 dB, if the external attenuator is the only component limiting the output power from the Unit Under Test. The total power applied to the spectrum analyzer INPUT 50Ω connector, with 0 dB input attenuator setting, ***cannot exceed +20 dBm.*** Spectrum analyzer damage is likely if the input power exceeds this amount.

Table 5-2. CDMA Setup and Limit Variables (continued)

Measurement	Description	Variable Name	Default Value	Units
Korean Plan 1	Burst Width	-KABW	1.25 ms	s
Parameters	Frame Period	-KAFP	10 ms	s
	Channel Bandwidth	-KACHBW	1.23 MHz	Hz
	Channel Spacing	-KACHSP	1.25 MHz	Hz
	MS Band Start Frequency	_KAFAMS	1.715 GHz	Hz
	MS Band Stop Frequency	-KAFBMS	1.78 GHz	Hz
	BS Band Start Frequency	-KAFABS	1.805 GHz	Hz
	BS Band Stop Frequency	-KAFBBS	1.870 GHz	Hz
	BS TX Frequency	-KAFRN	1.71505 GHz	Hz
	MS BS Offset	-KADUP	-90 MHz	Hz
	Channel Step	-KACHSTP	50 kHz	Hz
	Default Channel Number	_KACHN		–
Korean Plan 2	Burst Width Parameters	-KBBW	1.25 ms	s
	Frame Period	-KBFP	10 ms	s
	Channel Bandwidth	-KBCHBW	1.23 MHz	Hz
	Channel Spacing	-KBCHSP	1.25 MHz	Hz
	MS Band Start Frequency	-KBFAMS	1.715 GHz	Hz
	MS Band Stop Frequency	-KBFBMS	1.78 GHz	Hz
	BS Band Start Frequency	-KBFABS	1.805 GHz	Hz
	BS Band Stop Frequency	-KBFBBS	1.87 GHz	Hz
	BS TX Frequency	-KBFRN	1.75005 GHz	Hz
	MS BS Offset	_KBDUP	-90 MHz	Hz
	Channel Step	-KBCHSTP	50 kHz	Hz
	Default Channel Number	-KBCHN	1	–
	Break Frequency in Channel Plan	_KBFM	1.84 GHz	Hz

Table 5-2. CDMA Setup and Limit Variables (continued)

Measurement	Description	Variable Name	Default Value	Units
Channel Power	Noise Margin Upper (dB above noise floor, for uncorrected channel power. Below this level, noise correction is applied.)	_NZMU	15 dB	dB
	Noise Margin Lower (dB above noise floor, for uncorrected channel power. Below this level, CH Power < SA noise Pwr, Pwr Accuracy Degraded message is displayed. CH Power equals noise floor power when uncorrected channel power = noise floor power +3 dB.)	_NZML	3 dB	dB
	Noise Margin Lower Hard (dB above noise floor, for uncorrected channel power. Below this level, corrected channel power displayed is limited. CH power is 6 dB below noise floor when uncorrected channel power = noise floor power + 1 dB.)	_NZMLH	1 dB	dB

Table 5-2. CDMA Setup and Limit Variables (continued)

Measurement	Description	Variable Name	Default Value	Units
Occupied Bandwidth	BW Limit	_OBBWX	1.35 MHz	Hz
Spectral Regrowth	Spectral Regrowth Reference Level	SRRL	+36 dBm	dBm
	Spectral Regrowth Auto Reference Level Setting Flag. Indicates whether or not the _SRM function should automatically set the reference level. 0=No, l=Yes	SRARLF	0	none
	Spectral Regrowth Live Sweep Flag. Indicates whether or not there will be a live sweep after exiting function _SRM. Live sweep can be enabled even if single measurement mode is on. O=Off, 1=On	SRARLF	0	none
	Spectral Regrowth Store Reference Flag. If this flag is set to 0, then the _SRM measurement will automatically store the resulting trace as the reference trace. If it is set to 1, it will not.	-SRF	0	none
	Spectral Regrowth Reference Level Margin. This variable is added to the reference level setting in command -SRM when -SRARLF is set to 1.	-SRRLM	+5	dB
Monitor Band	Monitor Band Reference Level	_MBRL	+20 dBm	dBm
Monitor Channel	Monitor Channel Reference Level	_MCRL	+20 dBm	dBm

Table 5-2. CDMA Setup and Limit Variables (continued)

Measurement	Description	Variable Name	Default Value	Units
Spurious Emission – Transmitter				
Max Pwr Spur IS-95	Delta Freq Range F-, F+ segments for sample detection	-SETDFS	10 MHz	Hz*
	Span for Fc segment	_SETFCSP	6.2 MHz	Hz*
	Resolution BW	_SETRB	30 kHz	Hz*
	Video BW	-SETVB	3 kHz	Hz*
	Mobile Limit Line 30 kHz/dBc			
	900 kHz <|Δf| 1.98 MHz	_SETXAU	-42 dBc	dBc*
	|Δf| >1.98 MHz	-SETXAV	-54 dBc	dBc*
	Base Limit Line 30 kHz/dBc			
	750 kHz <|Δf| 1.98 MHz	-SETXDU	-45 dBc	dBc
	|Δf|> 1.98 MHz	-SETXDV	-60 dBc	dBc
	1st break point Af	_SETXDFU	750 kHz	Hz
	2nd break point Af	_SETXDFV	1.98 MHz	Hz
	Base Limit Line Other Operator			
	30 kHz/dBc	-SETXEU	-60 dBc	dBc*
	30 kHz/dBm	-SETXEV	-13 dBm	dBm*
	Include Other Operator Limits 0 = disable, 1 = enable	-SETXE	1	none
ARIB-T53	Mobile Limit Line 30 kHz/dBc			
	900 kHz|Δf| < 1.98 MHz	-ALIMAAU	-42	dBc
	|Δf| > 1.98 MHz	-ALIMAAV	-54	dBc
	1st break point Af	-ALIMAFU	900	kHz
	2nd break point Af	-ALIMAFV	1.98	MHz
	In Cellular Band Edge	-ALIMAIV	-60	dBc
		-ALIMAIU	-26	dBm
		-ALIMAIW	-16	dBm
	Base Limit Line 30 kHz/dBc			
	750 kHz|Δf| < 1.98 MHz	-ALIMDAU	-45	dBc
	1.98 MHz |Δf | < band edge	-ALIMDAV	-60	dBc
	|Δf| > band edge	-ALIMADU	-60	dBc
		-ALIMADV	-16	dBm
		-ALIMADW	-13	dBm
	1st break point Af	_ALIMDFU	750	kHz
	2nd break point Af	-ALIMDFV	1.98	MHz

Variable shared by other spurious emission measurements.

Table 5-2. CDMA Setup and Limit Variables (continued)

Measurement	Description	Variable Name	Default Value	Units
J-STD-008	Mobile Limit Line 30 kHz/dBc			
	$|\Delta f|$ > 1.25 MHz	_JLIMAP	-42	dBc
	break point Af	_JLIMAF	1.25	MHz
	Base Limit Line 30 kHz/dBc			
	885 kHz $|\Delta f|$ < band edge(BE)	_JLIMDP	-45	dBc
	BE < $|\Delta f|$ < BE + 1 MHz	_JLIMDOPA	-9.1979 dBm	
	$|\Delta f|$ > BE + 1 MHz	_JLIMDOPB	−28.2288dBm	
	break point Af	-JLIMDF	885	kHz
Korean 1	Mobile Limit Line 30 kHz/dBc			
	$|\Delta f|$ > 1.25 MHz	_JLIMAP	-42	dBc
	break point Af	_JLIMAF	1.25	MHz
	Base Limit Line 30 kHz/dBc			
	885 kHz $|\Delta f|$ < band edge(BE)	_JLIMDP	-45	dBc
	BE < $|\Delta f|$ < BE + 1 MHz	_JLIMDOPA	-9.1979 dBm	
	$|\Delta f|$ > BE + 1 MHz	_JLIMDOPB	−28.2288dBm	
	break point Af	-JLIMDF	885	kHz
Korean 2	Mobile Limit Line 30 kHz/dBc			
	$|\Delta f|$ > 1.25 MHz	-JLIMAP	-42	dBc
	break point Af	-JLIMAF	1.25	MHz
	Base Limit Line 30 kHz/dBc			
	885 kHz < $|\Delta f|$ < band edge(BE)	_JLIMDP	-45	dBc
	BE < $|\Delta f|$ < BE + 1 MHz	_JLIMDOPA	-9.1979 dBm	
	$|\Delta f|$ > BE + 1 MHz	_JLIMDOPB	−28.2288dBm	
	break point Af	_JLIMDF	885	kHz

Table 5-2. CDMA Setup and Limit Variables (continued)

Measurement	Description	Variable Name	Default Value	Units
	Spurious Emission – Transmitter (cont.)			
Close Spur	Integration BW	-SEIBW	1 MHz	Hz
[S-95	Noise Correction for integrated 1 MHz BW trace	-SETCNC	2.5 dB	dB
	Delta Freq Range F-, F+ segments for peak detection	_SETDFP	25 MHz	Hz
	Delta Freq Range F-, F+ segments for sample detection	_SETDFS	10 MHz	Hz*
	Span for Fc segment (usable)†	SETFCSP	6.2 MHz	Hz*
	Resolution BW	_SETRB	30 kHz	Hz*
	Video BW	-SETVB	3 kHz	Hz
	Mobile Limit Line (a) 30 kHz/dBc			
	900 kHz <|Δf|1.98 MHz	_SETXAU	-42 dBc	dBc
	|Δf|> 1.98 MHz	_SETXAV	-54 dBc	dBc*
	Mobile Limit Line (b) 30 kHz/dBm			
	900 kHz <|Δf| 1.98 MHz	_SETXBU	-60 dBm	dBm
	|Δf|> 1.98 MHz	-SETXBV	-60 dBm	dBm*
	Mobile Limit Line (c) 1 MHz/dBm			
	1.385 MHz <|Δf| 2.465 MHz	_SETXCU	-55 dBm	dBm
	|Δf| 2.465 MHz	-SETXCV	-55 dBm	dBm
ARIB-T53	Mobile Limit Line (a) 30 kHz/dBc			
	900 kHz < |Δf| < 1.98 MHz	-ALIMAAU	-42	dBc
	|Δf| > 1.98 MHz	-ALIMAAV	-54	dBc
	1st break point Af	_ALIMAFU	900	kHz
	2nd break point Af	-ALIMAFV	1.98	MHz

Variable shared by other spurious emission measurements.
The actual span = -SETFCSP + _SEIBW, which provides enough extra span for the ntegrated 1 MHz BW trace to be valid across a span equal to SETFCSP.

Table 5-2. CDMA Setup and Limit Variables (continued)

Measurement	Description	Variable Name	Default Value	Units
J-STD-008	Mobile Limit Line (a) 30 kHz/dBc			
	|Δf| > 1.25 MHz	-JLIMAP	-42	dBc
	break point Af	-JLIMAF	1.25	MHz
	Mobile Limit Line (b) 30 kHz/dBm			
	|Δf| > 1.25 MHz	-JLIMBP	-60	dBm
	break point Af	-JLIMBF	1.25	MHz
	Mobile Limit Line (c) 1 MHz/dBm			
	|Δf| > 1.25 MHz	-JLIMBP	-55	dBm
	break point Af	-JLIMBF	1.25	MHz
Korean 1	Mobile Limit Line (a) 30 kHz/dBc			
	|Δf| > 1.25 MHz	-JLIMAP	-42	dBc
	break point Af	-JLIMAF	1.25	MHz
	Mobile Limit Line (b) 30 kHz/dBm			
	|Δf| > 1.25 MHz	-JLIMBP	-60	dBm
	break point Af	-JLIMBF	1.25	MHz
	Mobile Limit Line (c) 1 MHz/dBm			
	|Δf| > 1.25 MHz	-JLIMBP	-55	dBm
	break point Af	-JLIMBF	1.25	MH
Korean 2	Mobile Limit Line (a) 30 kHz/dBc			
	|Δf| > 1.25 MHz	-JLIMAP	-42	dBc
	break point Af	-JLIMAF	1.25	MHz
	Mobile Limit Line (b) 30 kHz/dBm			
	|Δf| > 1.25 MHz	-JLIMBP	-60	dBm
	break point Af	-JLIMBF	1.25	MHz
	Mobile Limit Line (c) 1 MHz/dBm			
	|Δf| > 1.25 MHz	-JLIMBP	-55	dBm
	break point Af	-JLIMBF	1.25	MH

Table 5-2. CDMA Setup and Limit Variables (continued)

Measurement	Description	Variable Name	Default Value	Units
Out-of-Rand Spur	Reference Level Margin (dB above highest amplitude limit to set Ref. level to)	-SEORLM	40 dB	dB
	Empty Range/Harmonic Center Frequency	SEOCF	1.2 GHz	Hz
	Empty Range/Harmonic Span	-SEOSP	6 MHz	Hz
	Empty Range/Harmonic Resolution Bandwidth	_SEORB	30 kHz	Hz
	Empty Range/Harmonic Video Bandwidth	_SEOVB	3 kHz	Hz
	Empty Range/Harmonic Detector Mode	SEODF	0	none
	Empty Range/Harmonic Number Averages	-SEONA	5	none
Standby Output Power	Mobile Res BW	_SERMRB	1 MHz	Hz*
	Mobile Video BW	-SERMVB	10 kHz	Hz*
	Base Res BW	_SERBRB	30 kHz	Hz*
	Base Video BW	-SERBVB	3 kHz	Hz*
	Mobile Limit Line	-SETXF	-61 dBm	dBm
	Base Limit Line	-SETXG	-61 dBm	dBm
ACPR	Power Spectral Density Normalization BW (specified SW)	_ORRBW	30 kHz	Hz
	Narrow Bandwidth Flag - When set to 1 and Option 130 (Narrow Bandwidth) is present, allows resolution bandwidths < 1 kHz to be used in ACPR measurements.	_NBWF	1	none

Variable shared by other spurious emission measurements.

Table 5-2. CDMA Setup and Limit Variables

Measurement	Description	Variable Name	Default Value	Units
	Spurious Emission - Receiver			
Spur Tx Band	Mobile Res BW	-SERMRB	1 MHz	Hz*
	Mobile Video BW	_SERMVB	10 kHz	Hz*
	Base Res BW	SERBRB	30 kHz	Hz*
	Base Video BW	-SERBVB	3 kHz	Hz*
	Mobile Limit Line 824 MHz <f< 849 MHz	_SERXA	−61dBm	dBm
	Base Limit Line 869 MHz <f< 894 MHz	-SERXD	-60 dBm	dBm
Spur Rx Band	Mobile Res BW	-SERMRB	1 MHz	Hz*
	Mobile Video BW	-SERMVB	10 kHz	Hz*
	Base Res BW	SERBRB	30 kHz	Hz*
	Base Video BW	-SERBVB	3 kHz	Hz*
	Mobile Limit Line 869 MHz <f< 894 MHz	_SERXB	−81dBm	dBm
	Base Limit Line 824 MHz <f< 849 MHz	_SERXE	-80 dBm	dBm
Gated Power	Gated Power Ratio Limit Lower	_GPRXL	20 dB	dB
Gated Power Timing	Burst Meas Point	_TBMP	-12 dB	dB
(all amplitude values	Attack Time Meas Point Upper	_TAMPU	-3 dB	dB
relative to gated-on	Attack Time Meas Point Lower	_TAMPL	-20 dB	dB
mean power)	Release Time Meas Point Upper	-TRMPU	-3 dB	dB
	Release Time Meas Point Lower	_TRMPL	-20 dB	dB
	Burst Time Limit Upper	-TBXU	1.262 ms	µs
	Burst Time Limit Lower	-TBXL	1.25 ms	µs
	Attack Time Limit Upper	_TAXU	6 µs	µs
	Attack Time Limit Lower	_TAXL	0 µs	µs
	Release Time Limit Upper	_TRXU	6 µs	µs
	Release Time Limit Lower	-TRXL	0 µs	µs
Open Loop Time Response	Time Open Loop Number Points (20-401)	-TOLNP	40	none

* Variable shared by other spurious emission measurements.

Table 5-3. Limit-Line Function Names

Measurement	Function Name Default
Close and Max Pwr Spur MS Limit Line (a) 30 kHz/dBc	**-SELIMA**
Close Spur MS Limit Line (b) 30 kHz/dBm	**-SELIMB**
Close Spur MS Limit Line (c) 1 MHz/dBm	**-SELIMC**
Max Pwr Spur BS Limit Line 30 kHz/dBc	-SELIMD

Descriptions of the Programming Commands

This section contains the descriptions of the CDMA measurement personality programming commands. The commands are listed alphabetically.

See Chapter 6, “Programming Examples,” for more information about how to make a remote measurement, and how to extract the measurement results from a variable, array, or trace.

For programming commands with input values, the default value is the value taken when the CDMA personality is loaded into the analyzer. Upon instrument preset or when ac power is turned off and on, these values are set back to their preset state. For many commands, the preset state is the default value. However, for configuration commands, the preset state is the last value; that is, the last value entered into the command. To reset these configuration commands back their default values, use the -DEFAULT command.

How to Interpret the Programming Command Syntax

Programming commands can be characterized by several different items, according to their function. For instance, some commands set up the analyzer for a measurement, and others make a measurement and put output data in a variable or trace.

A short description of the various items given with the programming commands is presented here to clarify the syntax used.

Description	This is a brief explanation of the command function.
Softkey Equivalent	This gives instrument front panel **softkey** (and its menu) that produces the same result as the remote programming command. Some programming commands have no such equivalent.
Example	This gives the syntax of how the programming command might be used in a program.
Valid Values	For those commands having discrete input values, the various **values** of the command are listed here with the equivalent meaning for each value.
Default Value	This is the value given to the command by the personality before being changed.
Units	This gives the type of units used by the command (Hz, seconds, and so forth).
Range	This is the valid range of input values allowed for the command.
See Also	Other places in documentation that helps explain the remote command function are mentioned here. Mostly, references are made to Chapter 6, “Programming Examples,” that show the command used in a Basic program.
Preset State	This is the input value given to the command after an instrument preset. The term “last value” is given for commands that are not affected by an instrument preset, but retain the last value assigned to them before the preset.

Measurement State/Results

Measurement results are the variables and traces which contain output data for a command. The measurement state is a special output value which serves two purposes:

1. If _SRQ is disabled (the default), measurement state automatically signals the completion of a command when returned by the spectrum analyzer. Measurement results are valid only after command completion.

   If _SRQ is enabled, the spectrum analyzer generates an SRQ on the HP-IB/IEEE 488 bus to signal the completion of a command. Measurement state is *not* automatically returned, but must be queried (this is similar to a measurement result). See the description for the -SRQ command for complete information.

2. The specific value returned denotes the state of the measurement at completion. A value of "1" means successful completion, other values indicate the measurement encountered a problem.

In some cases, the tabular measurement results units column indicates TDF, which represents Trace Data Format. The actual units are determined by the TDF command. For more information, see "TDF Command and Different Formats for Trace Data Transfer" in the ***HP 8590 Series Spectrum Analyzer Programmer's Guide.***

In some cases, the tabular units column indicates an internal binary representation. This internal binary data represents 16-bit amplitude values. The values range from -32,768 to 32,767. Use the following equation to change the trace data in measurement units to dBm:

$$dBm = \text{reference level} - (8000 - \text{trace value}) \times 0.01$$

Related Commands

Other commands that interact with the command are noted here.

Alternate Commands

Commands that perform the same or very similar function are listed here, usually in terms of how they relate to the command. The alternate command order is given when more than one command is needed to perform the same function as a single command.

_ACPR
Adjacent Channel Power Ratio

bg78c

Description

This command measures the channel power and six offsets powers, and returns the total power ratio or power spectral density ratio in traces when measurements are completed.

Softkey Equivalent: ACPR MEAS in ACPR Menu menu

Example: -ACPR;

Related Commands: -ACPRARBW, -ACPRFA, -ACPRFB, _ACPRFC, -ACPRI, _ACPRIBW, _ACPRIBWA, _ACPRIBWB, -ACPRIBWC, -ACPRLA, -ACPRLB, -ACPRLC, -ACPRNA, _ACPRONA, _ACPRSP, _ACPRSPA, _ACPRSPB, _ACPRSPC, -ACPRV

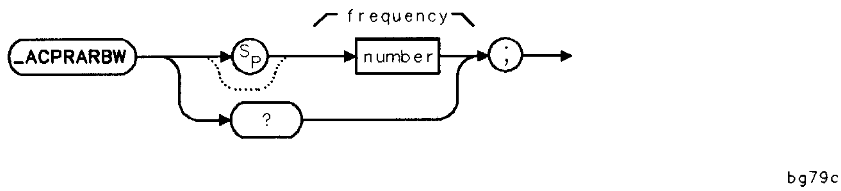
NUMERIC RESULTS

Note: The ACPR results have units on hundredths of dB.

Example: For _ACPRDP [5] = 123, the negative Offset B PSD is 1.23 dB.

Results	Contents Description
-FAIL	0 = Pass, 1 = Fail limit
_ACPRDP[2]	Channel Power Spectral Density
_ACPRDP[3]	Negative Offset A PSD ratio
_ACPRDP[4]	Positive Offset A PSD ratio
_ACPRDP[5]	Negative Offset B PSD ratio
_ACPRDP[6]	Negative Offset B PSD ratio
_ACPRDP[7]	Positive Offset C PSD ratio
_ACPRDP[8]	Positive Offset C PSD ratio
_ACPRTP[1]	Total Channel Power
_ACPRTP[3]	Negative Offset A Power ratio
_ACPRTP[4]	Positive Offset A Power ratio
_ACPRTP[5]	Negative Offset B Power ratio
_ACPRTP[6]	Positive Offset B Power ratio
_ACPRTP[7]	Negative Offset C Power ratio
_ACPRTP[8]	Positive Offset C Power ratio

-ACPRARBW
ACPR Offset Frequency Resolution Bandwidth



Description

This command sets the resolution bandwidth in preparation for making ACPR offset measurements. If ACPR measurement is using the integration BW method, then this command becomes inactive.

Softkey Equivalent: OFFSET FREQ BW in Off set Setup menu in ACPR Menu menu

Example: _ACPRARBW 30E3;

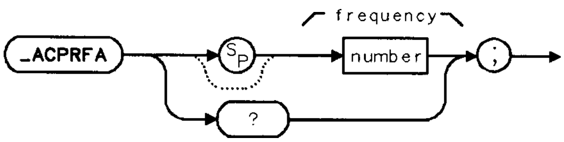
Units: Hz

Default Value: 30 kHz

Preset State: default value

Related Commands: -ACPR, _ACPRI

_ACPRFA
ACPR Frequency Offset A



bg710c

Description

This command sets the frequency of offset A for the offset part of ACPR measurement.

Softkey Equivalent: OFFSET FREQ in Off set Setup menu in ACPR Menu menu

Example: -ACPRFA 88533;

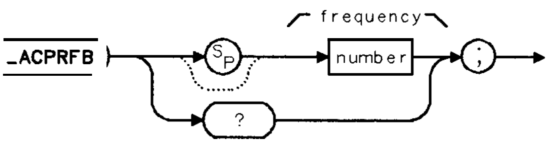
Units: Hz

Default Value: 885 kHz

Preset State: default value

Related Commands: _ACPR

-ACPRFB
ACPR Frequency Offset B



bg711c

Description

This command sets the frequency of offset B for the offset part of ACPR measurement.

Softkey Equivalent: OFFSET **FREQ** in Offset Setup menu in **ACPR** Menu menu

Example: -ACPRFB 1.2562536;

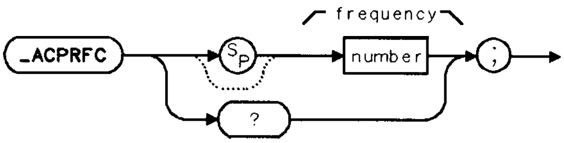
Units: Hz

Default Value: 1.25625 MHz

Preset State: default value

Related Commands:-ACPR

_ACPRFC
ACPR Frequency Offset C



bg712c

Description

This command sets the frequency of offset C for the offset part of ACPR measurement.

Softkey Equivalent: OFFSET FREQ in Off set Setup menu in ACPR Menu menu

Example: -ACPRFC 2.7536;

Units: Hz

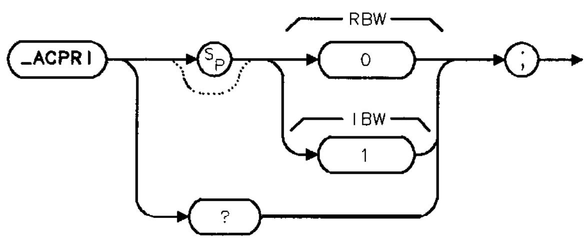
Default Value: 2.75 MHz

Preset State: default value

Related Commands: _ACPR

-ACPRI

ACPR Offset Integration BW Method/Resolution BW Method Selection



Description

This command selects one of the two measurement method: Integration BW Method and Resolution BW Method. Integration BW Method has the advantage of valid results in all conditions. Resolution BW Method is a faster measurement but it is only valid in the following conditions:

The signal of interest is relatively flat within the passband of the resolution bandwidth selected, (±6dB/Resolution BW).

The signal of interest is noise-like signal without CW spurs.

Resolution BW is selected such that it doesn't violate the above criterion.

Softkey Equivalent: METHOD IBW RBW in ACPR Menu menu

Example: _ACPRI 1;

Range: Any integer from 0 to 1

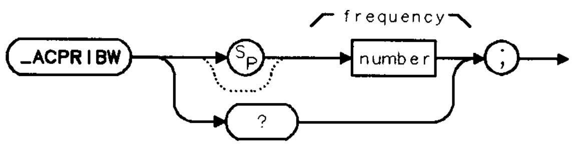
Units: none

Default Value: 1

Preset State: default value

Related Commands: _ACPR

_ACPRIBW
ACPR Channel Integration Bandwidth



bg714c

Description

This command sets the value of channel integration bandwidth in preparation for an ACPR measurement.

Softkey Equivalent: CHANNEL INTEG BW in Channel Setup menu in ACPR Menu menu

Example: -ACPRIBW 2.536;

Range: Any real value from 10 kHz to 300 MHz

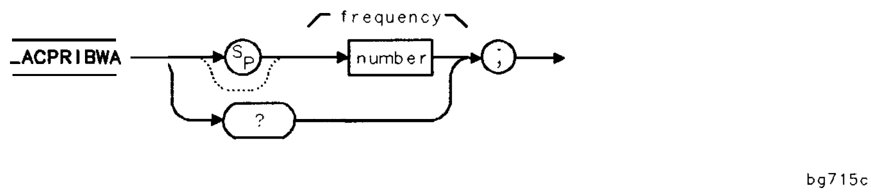
Units: Hz

Default Value: 1.4 MHz

Preset State: default value

Related Commands: _ACPR, _ACPRSP

_ACPRIBWA
ACPR Offset A Integration Bandwidth



Description

This command sets the value of offset A integration bandwidth in preparation for an ACPR measurement. If ACPR measurement is using the resolution BW method, then this command becomes inactive.

Softkey Equivalent: OFFSET INTEG BW in Channel Setup menu in ACPR Menu menu

Example: -ACPRIBWA 30E3;

Range: Any real value from 10 kHz to 300 MHz

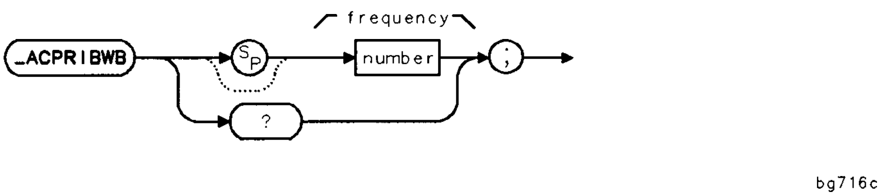
Units: Hz

Default Value: 30 kHz

Preset State: default value

Related Commands: _ACPR, _ACPRSPA, -ACPRI

-ACPRIBWB
ACPR Offset B Integration Bandwidth



Description

This command sets the value of offset B integration bandwidth in preparation for an ACPR measurement. If ACPR measurement is using the resolution BW method, then this command becomes inactive.

Softkey Equivalent: OFFSET INTEG BW in Channel Setup menu in ACPR Menu menu

Example: -ACPRIBWB 12.533;

Range: Any real value from 10 kHz to 300 MHz

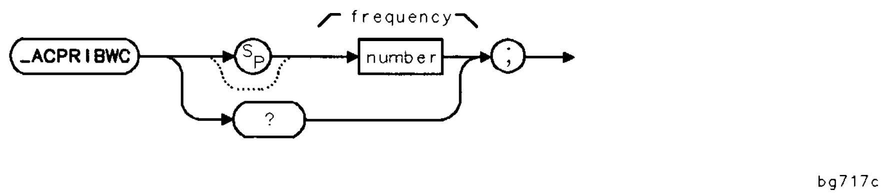
Units: Hz

Default Value: 12.5 kHz

Preset State: default value

Related Commands: -ACPR, -ACPRSPB, _ACPRI

-ACPRIBWC
ACPR Offset C Integration Bandwidth



Description

This command sets the frequency of offset C for the offset part of ACPR measurement.

Softkey Equivalent: OFFSET FREQ in Offset Setup menu in ACPR Menu menu

Example: -ACPRIBWC 1 .00E6;

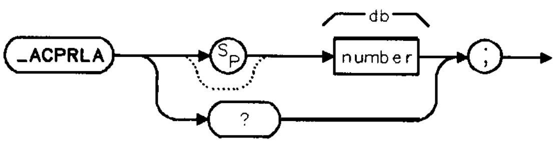
Units: Hz

Default Value: 1 MHz

Preset State: default value

Related Commands: _ACPR

-ACPRLA
ACPR Offset A Limit



bg718c

Description

This command sets the limit of offset A for the offset part of ACPR measurement. The value is negative **dB** because it represents how much lower the power at the offset compared to channel power.

Softkey Equivalent: OFFSET LIMIT in Off set Setup menu in ACPR Menu menu

Example: -ACPRLA -15;

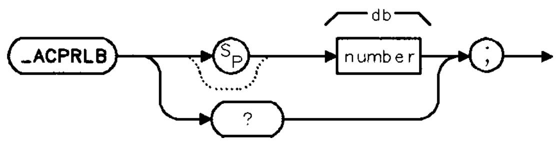
Units: dB

Default Value: -15 dB

Preset State: default value

Related Commands: _ACPR

-ACPRLB
ACPR Offset B Limit



bg719c

Description

This command sets the limit of offset B for the offset part of ACPR measurement. The value is negative dB because it represents how much lower the power at the offset compared to channel power.

Softkey Equivalent: OFFSET LIMIT in Off set Setup menu in ACPR Menu menu

Example: -ACPRLB – 15;

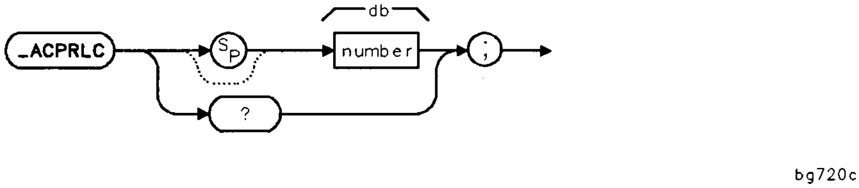
Units: dB

Default Value: **-20** dB

Preset State: default value

Related Commands: _ACPR

_ACPRLC
ACPR Offset C Limit



Description

This command sets the limit of offset C for the offset part of ACPR measurement. The value is negative dB because it represents how much lower the power at the offset compared to channel power.

Softkey Equivalent: OFFSET LIMIT in Off set **Setup** menu in ACPR Menu menu

Example: -ACPRLC – 15;

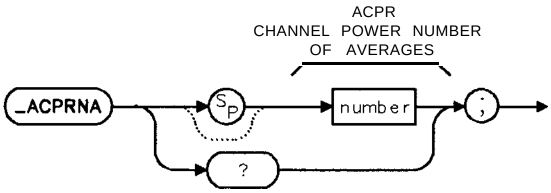
Units: dB

Default Value: **-30** dB

Preset State: default value

Related Commands: _ACPR

-ACPRNA
ACPR Channel Number Averages



bg721c

Description

This command sets the number of averages for the channel part of the ACPR measurement.

Softkey Equivalent: CHANNEL NUM AVGS in CHANNEL Setup menu in ACPR Menu menu

Example: -ACPRNA 15;

Range: Any integer from 1 to 99999

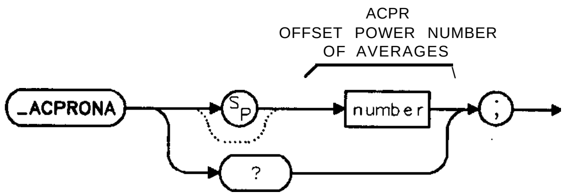
Units: none

Default Value: 10

Preset State: default value

Related Commands: _ACPR

-ACPRONA
ACPR Offset Number Averages



bg722c

Description

This command sets the number of averages for the offset part of ACPR measurement.

Softkey Equivalent: **OFFSET NUM** AVGS in **Off** sat **Setup** menu in ACPR **Menu** menu

Example: -ACPRONA 15;

Range: Any integer from 1 to 99999

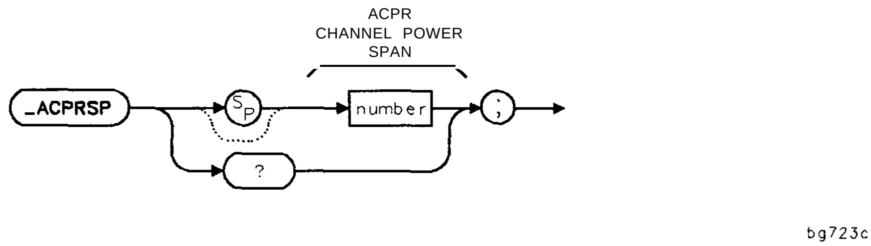
Units: none

Default Value: 10

Preset State: default value

Related Commands: -ACPR

_ACPRSP
ACPR Channel Span



Description

This command sets the frequency span in preparation for making ACPR channel measurements.

Softkey Equivalent: CHANNEL SPAN in Channel Setup menu in **ACPR** Menu menu

Example: -ACPRSP 2.836;

Range: Any real value from _ACPRIBW to 10 x -ACPRIBW

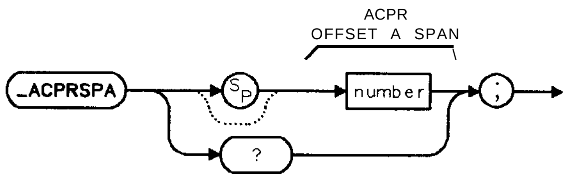
Units: Hz

Default Value: 2.8 MHz

Preset State: default value

Related Commands: _ACPR, -ACPRIBW

_ACPRSPA
ACPR Offset A Span



bg724c

Description

This command sets the frequency span in preparation for making ACPR offset measurements. If ACPR measurement is using the resolution BW method, then this command becomes inactive.

Softkey Equivalent: OFFSET SPAN in Off set Setup menu in **ACPR Menu** menu

Example: _ACPRSPA 2.836;

Range: Any real value from _ACPRIBWA to 10 x _ACPRIBWA

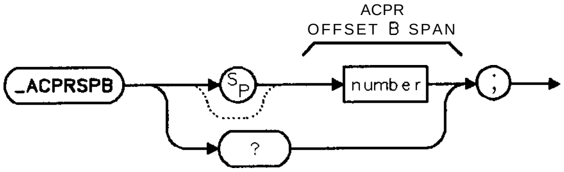
Units: Hz

Default Value: 60 kHz

Preset State: default value

Related Commands: _ACPR, _ACPRIBWA, _ACPRI

-ACPRSPB
ACPR Offset B Span



bg725c

Description

This command sets the frequency span in preparation for making ACPR offset measurements. If ACPR measurement is using the resolution BW method, then this command becomes inactive.

Softkey Equivalent: OFFSET SPAN in Off set Setup menu in ACPR **Menu** menu

Example: -ACPRSPB 2.836;

Range: Any real value from -ACPRIBWB to 10 x -ACPRIBWB

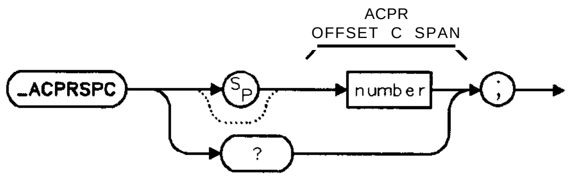
Units: Hz

Default Value: 25 kHz

Preset State: default value

Related Commands: _ACPR, -ACPRIBWB, -ACPRI

_ACPRSPC
ACPR Offset C Span



bg726c

Description

This command sets the frequency span in preparation for making ACPR offset measurements. If ACPR measurement is using the resolution BW method, then this command becomes inactive.

Softkey Equivalent: OFFSET SPAN in Offset Setup menu in ACPR Menu menu

Example: _ACPRSPC 2.836;

Range: Any real value from -ACPRIBWC to 10 x -ACPRIBWC

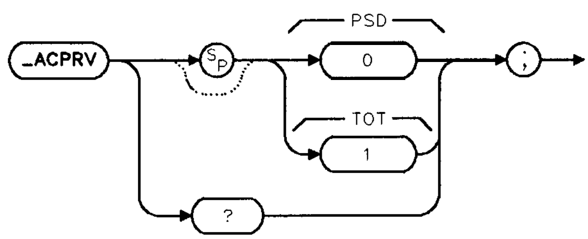
Units: Hz

Default Value: 2 MHz

Preset State: default value

Related Commands: -ACPR, _ACPRIBWC, _ACPRI

-ACPRV
ACPR Total Power
Power Spectral Density Reference Selection



bg727c

Description

This command selects the channel power units, either in dBm/Integration BW or dBm/Specified BW. Because ACPR measurement takes the ratio of the power measured within the channel and the offsets, the units used to specify the power of the channel determines the final ratio. In component measurement, power spectral density in dBm/30kHz is normally used as the reference channel power. In system measurement, total power in dBm/Integration BW is normally used as the reference channel power.

Softkey Equivalent: REF PWR TOT PSD in Channel Setup menu in ACPR Menu menu

Example: -ACPRV 0;

Range: **0** to 1

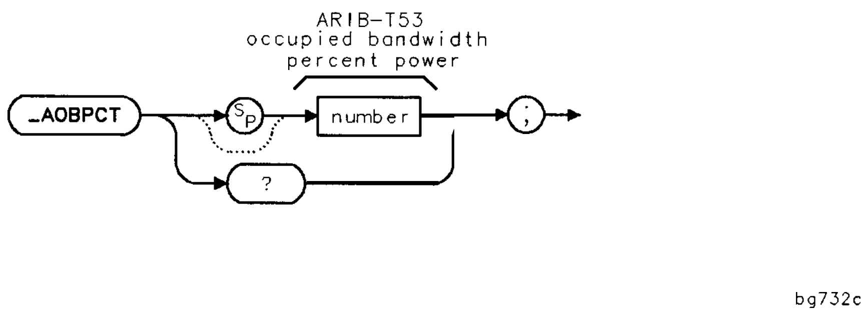
Units: none

Default Value: 1

Preset State: default value

Related Commands: _ACPR

-AOBPCT
ARIB-T53 Occupied Bandwidth Percent Power



Description

This command sets the maximum measured % of power used in the occupied bandwidth of a ARIB-T53 channel in preparation for making a frewuency measurement.

Softkey Equivalent: OCC BW % POWER in Occ BW Setup menu

Example: -AOBPCT 85;

Range: Any real value from 1 to 99.99

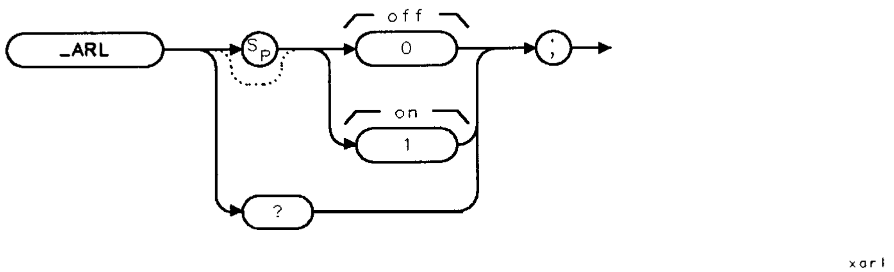
Units: percentage

Default Value: 99.5%

Preset State: last value

Related Commands: _OBW, _OBPCT

-ARL
AUTO Reference Level



Description

This command selects whether or not the personality automatically changes the reference level.

Softkey Equivalent: AUTO RL ON OFF in second **CDMA Config** menu

Example: -ARL 0;

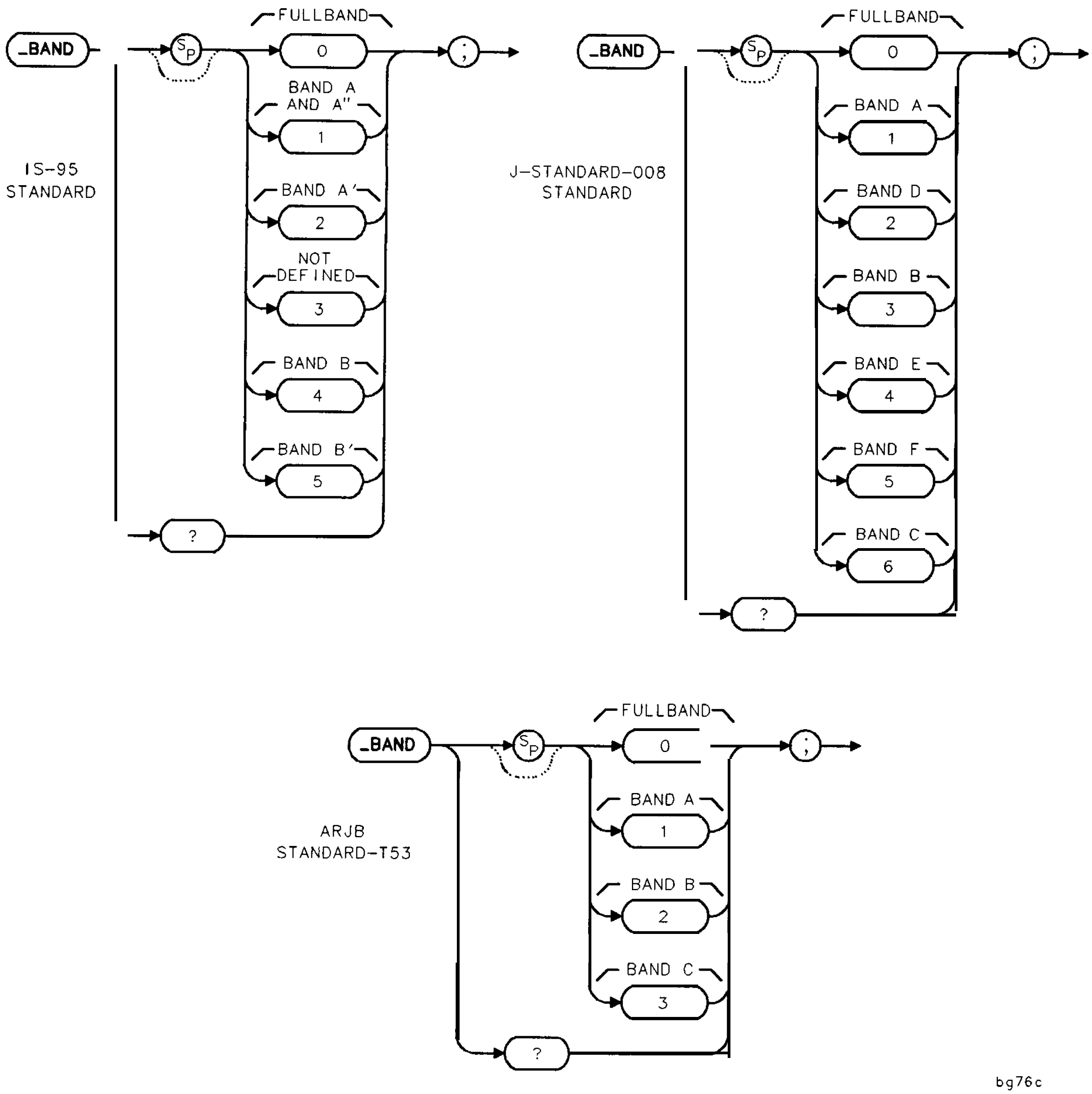
Valid Values: 0 = Auto RL Off
1 = Auto RL On

Units: none

Default Value: 1

Preset State: last value

-BAND
Select Band



Description

This command specifies the band to be viewed in Monitor Band (-MBND). The frequency range selected by -BAND depends on whether _MS is set to a base station or a mobile station, and if IS-95 or J-Standard 008 standard is selected with _DPAR.

Softkey Equivalent: softkeys in Band menu

Example: -Band 0;

Valid Values: **IS-95 standard**
0 = FULLBAND
1 = BANDS A" + A
2 = BAND A'
3 = not defined
4 = BAND B
5 = BAND B'

J-Standard 008 standard
0 = FULLBAND
1 = BAND A
2 = BAND D
3 = BANDB
4 = BAND E
5 = BAND F
6 = BAND C

ARIB-T53 standard
0 = FULLBAND
1 = BAND A
2 = BAND B
3 = BAND C

Units: none

Default Value: 0

Preset State: default value

Related Commands: _MBND

-CALNZ
Calibrate Analyzer Noise Floor

xcalnz

Description

This command calibrates the analyzer noise floor. Channel power measurements use the results of this measurement to correct for near-noise errors. This command automatically sets _NZCORR to 1.

Softkey Equivalent: CAL SA NOISE in CH Pwr Setup menu

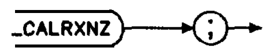
Example: -CALNZ;

Related Commands: _NZCALNA, _NZCORR

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	None
Numeric Results (Variables or Arrays)		
-CHPNZ	Channel Power Noise Floor Amplitude	dBm
Graphic Results		
TRA	RF spectrum (last sweep)	TDF
TRB	RF spectrum (video avg of N sweeps)	TDF

-CALRXNZ
Calibrate Analyzer RX Noise Floor



pg726a

Description

This command calibrates the noise floor of the analyzer and the optional preamplifier. Receive channel power measurements use the results of this measurement to correct for near-noise errors. The measurement stops if a carrier greater than -RXCARM is found (the default is -20 dBm). This command automatically sets -NZCORR to 1.

Softkey Equivalent: CAL RX SA NOISE in Rx Chan Power menu

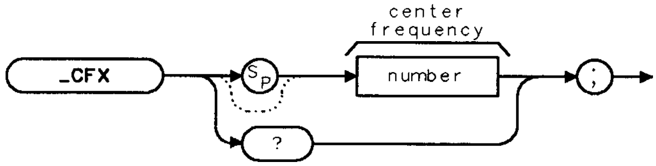
Example: -CALRXNZ;

Related Commands: -NZCALNA, -NZCORR, -PREAMPG

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	None
6	Measurement stopped, carrier present	None
Numeric Results		
(Variables or Arrays)		
-CHPRXNZ	Channel Power Noise Floor Amplitude	dBm
Graphic Results		
TRA	RF spectrum (last sweep)	TDF
TRB	RF spectrum (video avg of N sweeps)	TDF

_CFX
Center Frequency for Channel X



Description

This command enters the center frequency of the channel to be measured.

Softkey Equivalent: CHAN X CTR FREQ in RF Channel and (FREQUENCY) menus

Example: _CFX 8.538;

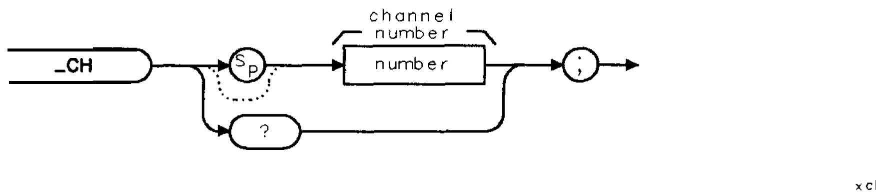
Range: Any real value within the frequency range of the analyzer

Units: Hz

Default Value: 300 MHz

Preset State: last value

_CH
Channel Number



Description

This command enters the channel number for the RF channel to be measured.

Softkey Equivalent: CHANNEL NUMBER in RF Channel , and (FREQUENCY) menus

Example: _CH 15;

Range: IS-95 defined: any integer from 1 to 799, and 990 to 1023
User-defined: any integer from -9999 to 30000

Units: none

Default Value: 758 for IS-95 defined, 30 for user-defined

Preset State: last value

Related Commands: _DPAR

_CHPM
Channel Power Measurement

xchpm

Description

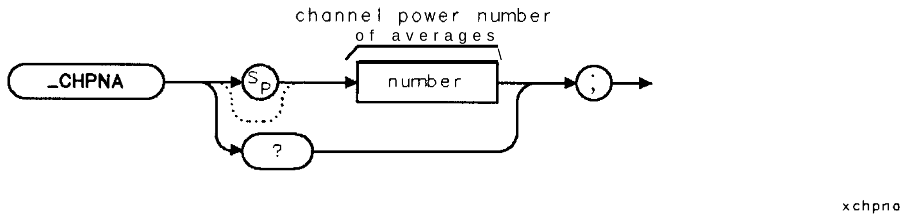
This command performs a channel power measurement after the Setup command (-CHPS) has been done.

Softkey Equivalent: none

Example: _CHPM;

Alternate Commands: The _CHPWR command is equivalent to _CHPS followed by _CHPM

_CHPNA
Channel Power Number of Averages



Description

This command sets the number of averages in preparation for making channel power measurements.

Softkey Equivalent: NUMBER AVERAGES in CH Pwr Setup menu

Example: _CHPNA 20;

Range: Any integer from 1 to 99999

Units: none

Default Value: 10

Preset State: default value

Related Commands: _CHPWR

_CHPS
Channel Power Setup

xchps

Description

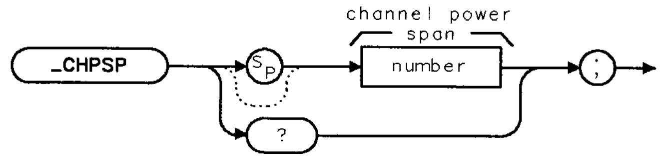
This command sets up the analyzer in preparation for making transmitter channel power measurements.

Softkey Equivalent: none

Example: _CHPS;

Alternate Commands: The -CHPWR command is equivalent to _CHPS followed by _CHPM.

_CHPSP
Channel Power Span



xchpsp

Description

This command sets the frequency span in preparation for making channel power measurements.

Softkey Equivalent: CH PWR SPAN in CH Pwr Setup menu

Example: -CHPSP 3E6;

Range: any real value from _IBW to 10 x _IBW
User-defined: any real value from _DCHBW to 10 x -DCHBW

Units: Hz

Default Value: IS-95 defined: 2 MHz
User-defined: -DCHBW x 2/1.23

Preset State: default value

Related Commands: _CHPWR, _DPAR

-CHPWR
Channel Power

xchpwr

Description

This command measures the channel power, returns the measurement state, and puts measurement results in variables and in traces when measurements are completed.

Softkey Equivalent: CHAN POWER in Channel Power menu

Example: _CHPWR;

Related Commands: _CHPNA, _NZCORR, _CHPSP, _IBW

Alternate Commands: _CHPS followed by _CHPM

See also: "To Perform a Channel Power Measurement of the Channel Power Command" in Chapter 6, "Programming Examples."

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement complete, no errors	None
3	Measurement stopped, carrier power too high	None
4	Measurement stopped, SA noise cal needed*	None
5	Chan power < SA noise pwr, Pwr Accuracy Degraded†	None
Numeric Results (Variables or Arrays)		
_CHPA	Channel Power Amplitude	dBm
_CHPSD	Channel Power Average Spectral Density	dBm/Hz
Graphic Results (401–element traces)		
TRA	RF spectrum (last sweep)	TDF
TRB	RF spectrum (video average of N sweeps)	TDF

* If the noise correction is enabled and the uncorrected channel power is less than the noise floor + -NZMU (the default is 15 dB). Also, if _IBW or RB was changed between the last SA noise calibration and the present measurement.

† If the noise correction is enabled and the uncorrected channel power is less than the noise floor + _NZML (the default is 3 dB). In other words, measurement state 5 occurs if the corrected channel power is less than the noise floor.

-CHS
Channel Spectrum

Description

This command displays the channel spectrum.

Softkey Equivalent: CHANNEL SPECTRUM in Spectrum menu

Example: -CHS;

Alternate Commands: _CHSS followed by _CHSM

Measurement State/Results:

State/Results	Contents Description	Units
Graphic Results (401–element traces) TRA	CDMA channel spectrum	TDF

_CHSM
Channel Spectrum Measurement

xchsm

Description

This command performs the channel spectrum measurement after the Setup command (_CHSS) has been done.

Softkey Equivalent: none

Example: _CHSM;

Alternate Commands: The -CHS command is equivalent to _CHSS followed by _CHSM.

_CHSS
Channel Spectrum Measurement

xchss

Description

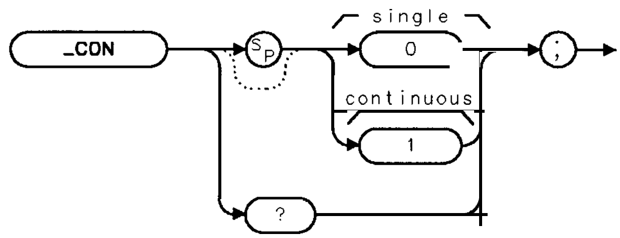
This command sets up the analyzer in preparation for making channel spectrum measurements.

Softkey Equivalent: none

Example: _CHSS;

Alternate Commands: The _CHS command is equivalent to _CHSS followed by _CHSM.

_CON
Continuous Measure



xcon

Description

This command selects the continuous or single measurement mode, and is used for various measurements.

Softkey Equivalent: **MEAS CONT** SGL in various post-measurement menus

Example: -CON 1;

Valid Values: 0 = Single measure
1 = Continuous measure

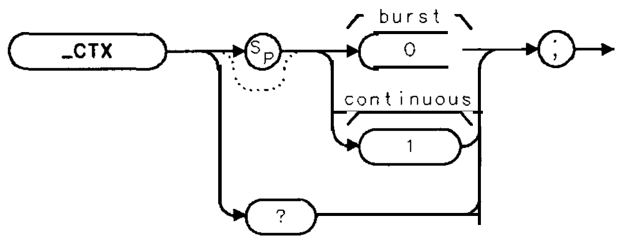
Units: none

Default Value: 0

Preset State: default value

Related Commands: _CHPWR, _OBW, _GPWR, _SR, _RXCHPWR

_CTX
Continuous Transmission



xctx

Description

This command specifies continuous or burst for the measured carrier.

Softkey Equivalent: TX MODE CONT GTD in Spur Setup menu

Example: -CTX 0;

Valid Values: 0 = Burst transmission
1 = Continuous transmission

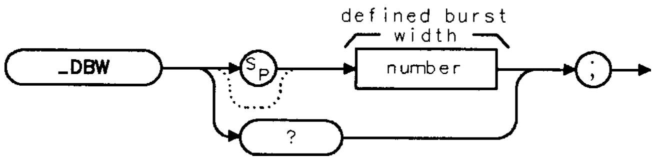
Units: none

Default Value: 1

Preset State: last value

Related Commands: _SETM, _SETC

-DBW
Defined Burst Width



Description

This command sets the defined CDMA burst width in preparation for making measurements with user-defined parameters.

Softkey Equivalent: BURST WIDTH in Define CDMA GH menu

Example: -DBW 2.53-3;

Range: Any real value from 100 μs to 100 ms

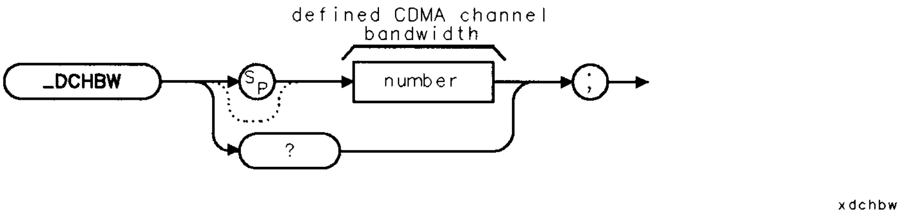
Units: seconds

Default Value: **1.25** ms

Preset State: last value

Related Commands: _DPAR

-DCHBW
Defined CDMA Channel Bandwidth



Description

This command sets the defined CDMA channel bandwidth in preparation for making measurements with user-defined parameters.

Softkey Equivalent: CDMA CH BW in Define GDMA CH menu

Example: -DCHBW 3.536;

Range: Any real value from 10 kHz to 300 MHz

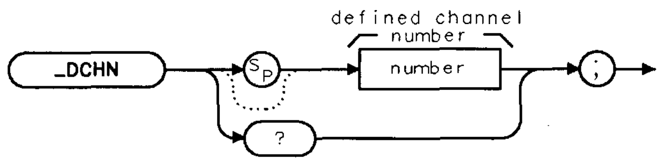
Units: Hz

Default Value: 1.23 MHz

Preset State: last value

Related Commands: _DPAR

-DCHN
Defined Channel n



xdchn

Description

This command sets the defined CDMA channel number in preparation for making measurements with user-defined parameters.

Softkey Equivalent: CHAN n in Define Channel menu

Example: _DCHN 20;

Range: Any integer from -9999 to 30000

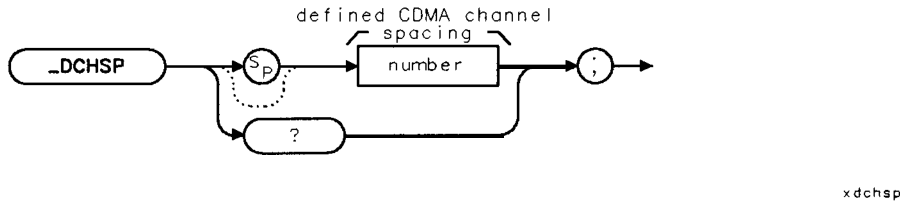
Units: none

Default Value: 0

Preset State: last value

Related Commands: _DPAR

-DCHSP
Defined CDMA Channel Spacing



Description

This command sets the defined CDMA channel spacing in preparation for making measurements with user-defined parameters.

Softkey Equivalent: **CDMA CH SPCNG** in **Define CDMA CH** menu

Example: -DCHSP 2.236;

Range: Any real value from 1 kHz to 100 MHz

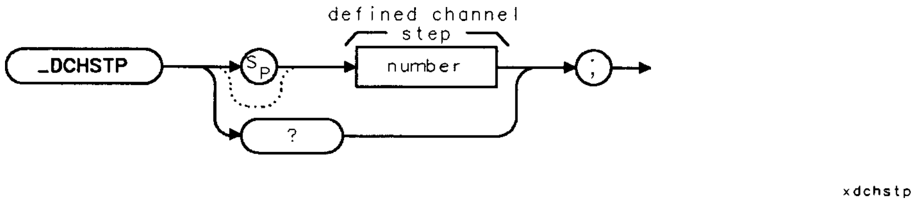
Units: Hz

Default Value: 1.25 MHz

Preset State: last value

Related Commands: _DPAR

-DCHSTP
Defined Channel Step



Description

This command sets the defined CDMA channel frequency step in preparation for making measurements with user-defined parameters.

Softkey Equivalent: CH STEP in Define Channel menu

Example: -DCHSTP 50E4;

Range: Any real value from -100 MHz to 100 MHz

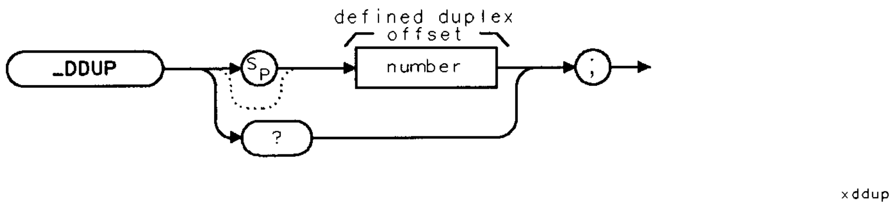
Units: Hz

Default Value: 25 kHz

Preset State: last value

Related Commands: _DPAR

-DDUP
Defined Duplex Offset



Description

This command sets the defined CDMA channel duplex offset frequency in preparation for making measurements with user-defined parameters.

Softkey Equivalent: DUP OFST in Define Channel menu

Example: _DDUP – 120E6;

Range: Any real value from -1 GHz to 1 GHz

Units: Hz

Default Value: **-80** MHz

Preset State: last value

Related Commands: _DPAR

-DEFAULT
Default Configuration

xdefault

Description

This command replaces the values and selections for the configuration functions to their default values.

Softkey Equivalent: DEFAULT **CONFIG** in the third **CDMA Config** menu

Example: -DEFAULT;

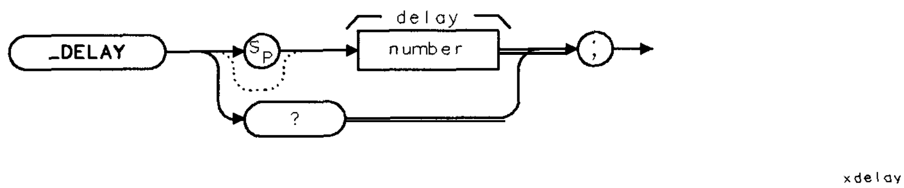
Related Commands: none

Note

The -DEFAULT command only sets selected configuration commands back to their default values. Its function is to reset all command values whose values are *not* reset upon instrument preset; that is, those commands whose preset state is the last value.

Use the spectrum analyzer IP command followed by the CDMA -DEFAULT command to reset all command values (as well as setup and limit variables) back to their default values.

-DELAY
Delay



Description

This command sets the amount of sweep delay for a time domain measurement.

Softkey Equivalent: DELAY in TIME DOMAIN menu

Example: -DELAY 150;

Range: -100 ms to 100 ms. The actual limits depend on the sweep time and delay of the last active trace.

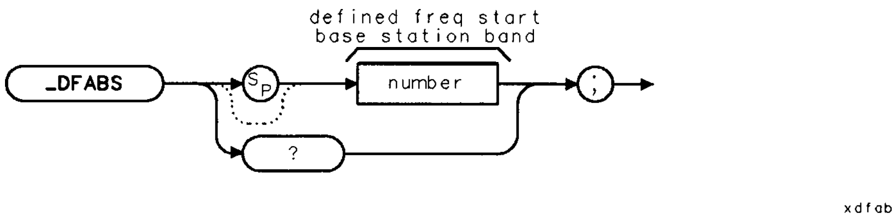
Units: μs

Default Value: -20 μ**s**

Preset State: default value

Related Commands: _TDM, ST

_DFABS
Defined Frequency Start Base Station Band



Description

This command sets the start frequency for the defined CDMA base station band in preparation for making measurements with user-defined parameters.

Softkey Equivalent: BS BAND START in Define Band menu

Example: _DFABS 2.539;

Range: Any real value within the frequency range of the analyzer

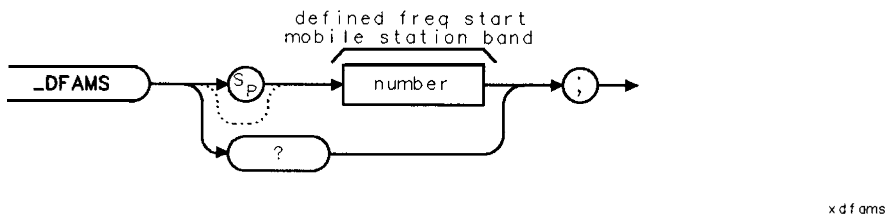
Units: Hz

Default Value: 1929 MHz

Preset State: last value

Related Commands: _DPAR

_DFAMS
Defined Frequency Start Mobile Station Band



Description

This command sets the start frequency for the defined CDMA mobile station band in preparation for making measurements with user-defined parameters.

Softkey Equivalent: **MS** BAND **START** in **Define Band** menu

Example: _DFAMS 2.539;

Range: Any real value within the frequency range of the analyzer

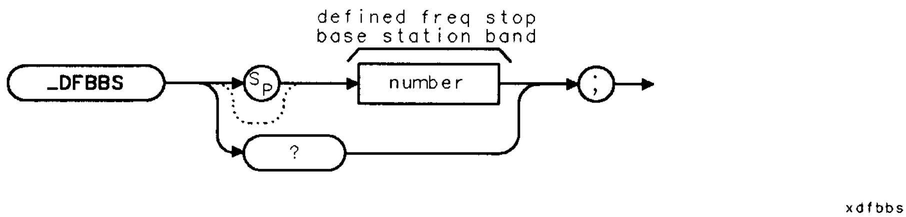
Units: Hz

Default Value: 1849 MHz

Preset State: last value

Related Commands: _DPAR

_DFBBS
Defined Frequency Stop Base Station Band



Description

This command sets the stop frequency for the defined CDMA base station band in preparation for making measurements with user-defined parameters.

Softkey Equivalent: BS BAND STOP in Define Band menu

Example: _DFBBS 2.639;

Range: Any real value within the frequency range of the analyzer

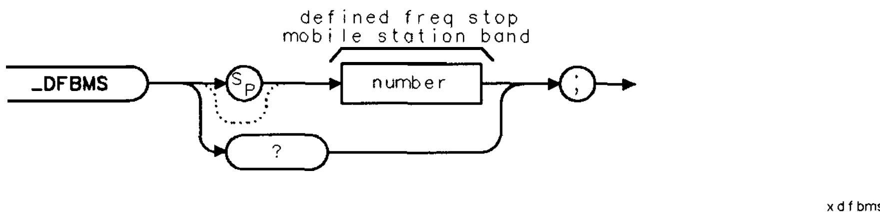
Units: Hz

Default Value: 1971 MHz

Preset State: last value

Related Commands: _DPAR

_DFBMS
Defined Frequency Stop Mobile Station Band



Description

This command sets the stop frequency for the defined CDMA mobile station band in preparation for making measurements with user-defined parameters.

Softkey Equivalent: MS **BAND STOP** in **Define Band** menu

Example: _DFBMS 2.639;

Range: Any real value within the frequency range of the analyzer

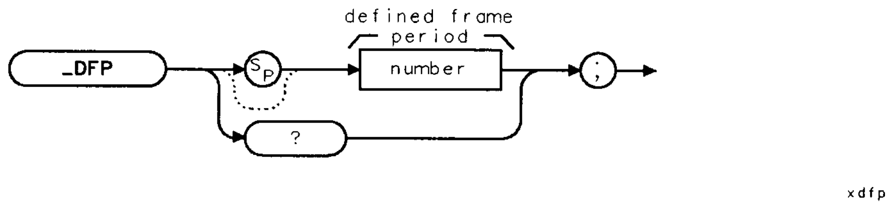
Units: Hz

Default Value: 1891 MHz

Preset State: last value

Related Commands: _DPAR

-DFP
Defined Frame Period



Description

This command sets the defined CDMA frame period in preparation for making measurements with user-defined parameters.

Softkey Equivalent: FUME PERIOD in Define CDMA CH menu

Example: -DFP 40E−3;

Range: Any real value from 100 μs to 100 ms

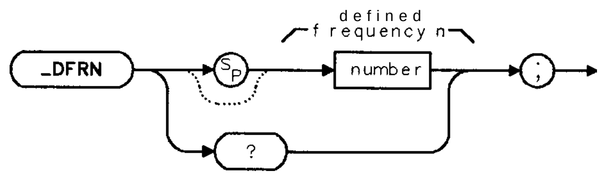
Units: seconds

Default Value: 10 ms

Preset State: last value

Related Commands: _DPAR

_DFRN
Defined Frequency n



bg75c

Description

This command sets the defined CDMA channel frequency in preparation for making measurements with user-defined parameters.

Softkey Equivalent: CH **FREQ** in Define **Channel** menu

Example: _DFRN 2.839;

Range: Any real value within the frequency range of the analyzer

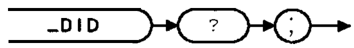
Units: Hz

Default Value: 1850 MHz

Preset State: last value

Related Commands: _DPAR

-DID
DLP Identification



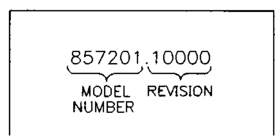
xdid

Description

This commands queries the downloadable program (DLP) personality model number and revision.

Query Example: -DID?;

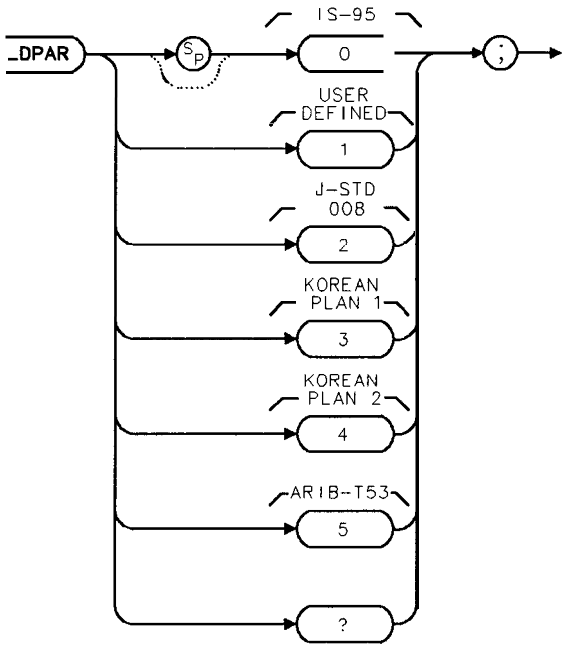
Measurement State/Results: The query response will be in the following form:



pc722b

The last digit in the model number sequence and the first digit in the revision sequence represent a letter where 0= A, 1 =B, and so forth.

_DPAR
Defined Parameter



bg77c

Description

This command selects IS-95, J-Standard 008, Korean Plan 1, Korean Plan 2, ARIB Standard-T53, or user-defined parameter values. The J-Standard 008 parameters start with -J including commands such as -JCHBW. The Korean Plan 1 parameters start with -KA commands such as -KACHBW. The Korean Plan 2 parameters start with -KB commands such as -KBCHBW. The user-defined parameters include commands such as -DCHBW (Defined CDMA Channel Bandwidth).

Softkey Equivalent: Standard **Band** in **CDMA Config** menu

Example: _DPAR 0;

Valid Values: 0 = IS-95 parameter values
1 = user-defined parameter values
2 = J-Standard 008 parameter values
3 = Korean Plan 1 parameter values
4 = Korean Plan 2 parameter values
5 = ARIB-Standard- T53 parameter values

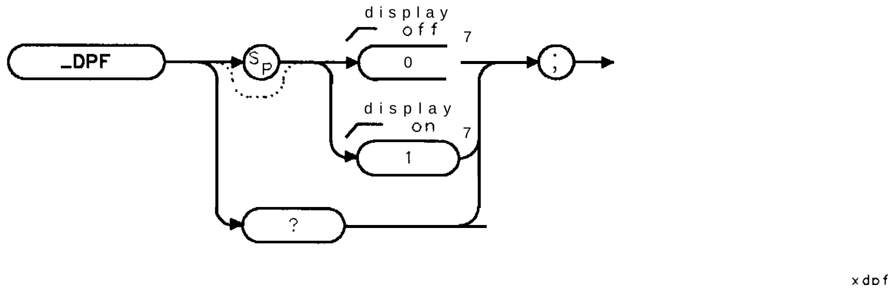
Units: none

Default Value: 0

Preset State: last value

Related Commands: _DFRN, _DCHN, _DCHBW, _DCHSP, _DCHSTP, -DDUP, _DFABS, _DFAMS, _DFBBS, -DFBMS, -DBW, -DFP

-DPF
Display Pass/Fail Message



Description

This command specifies whether or not a pass/fail message is displayed after a measurement.

Softkey Equivalent: **PASSFAIL** ON OFF in the second **CDMA Config** menu

Example: -DPF 0;

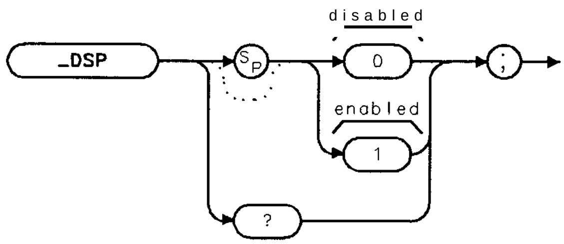
Valid Values: 0 = Pass/Fail annotation not displayed
1 = Pass/Fail annotation displayed

Units: none

Default Value: 1

Preset State: last value

-DSP
DSP Assisted Measurements



Description

This command selects whether measurements will be digital signal processor (DSP) assisted or not. Option 151 and Option 160 are required for DSP assisted measurements. DSP assisted measurements are faster since the measurement uses the DSP for trace anti-logging, and averaging instead of the analyzer firmware routines.

Although the default for DSP mode is 1, -DSP will be set to 0 if Option 160 is not present upon entering the CDMA Measurements Personality. If Option 160 is not present, setting -DSP to a 1 will not be allowed. The variable -DF may be subsequently queried for complete information. See the table at the end of the explanation of this command.

Softkey Equivalent: none

Example: _DSP 0;

Valid Values: 0 = DSP assisted measurement mode disabled
1 = DSP assisted measurement mode enabled

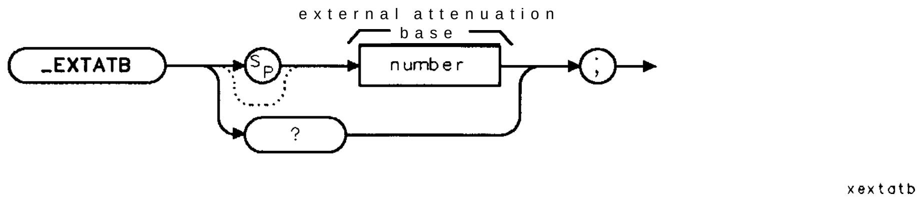
Units: none

Default Value: 1

Preset State: last value

-DSP	-DF	Description
1	1	DSP enabled, no errors
0	2	DSP not enabled, Option 151 not present
0	3	DSP not enabled, Option 160 not present
0	4	DSP not enabled, Newer Option 160 required

-EXTATB
External Attenuation Base



Description

This command allows the analyzer to compensate measurement values according to the amount of external attenuation used in a base station setup.

Softkey Equivalent: BS EXT ATTEN in the first CDMA Config menu

Example: -EXTATB 25;

Range: Any real value from -90 to 90 dB (negative values are for amplification)

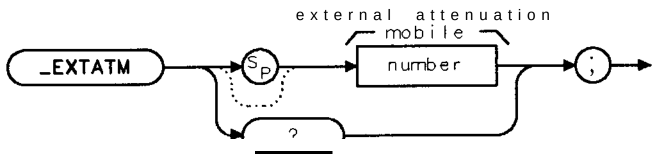
Units: dB

Default Value: 0 dB

Preset State: last value

Related Commands: _EXTATM, _MS

_EXTATM
External Attenuation Mobile



Description

This command allows the analyzer to compensate measurement values according to the amount of external attenuation used in a mobile station setup.

Softkey Equivalent: **MS** EXT **ATTEN** in the first **CDMA Config** menu

Example: _EXTATM 25;

Range: Any real value from -90 to 90 dB (negative values are for amplification)

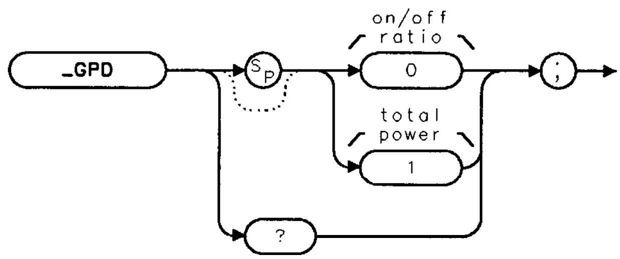
Units: dB

Default Value: **0** dB

Preset State: last value

Related Commands: -EXTATB, _MS

-GPD
Gated Power Display



xgpd

Description

This command selects the type of numeric results to display for a gated power measurement.

Softkey Equivalent: RATIO TOTAL in GATED POWER Past-Measurement menu

Example: -GPD 1;

Valid Values: 0 = display on/off ratio numeric results
1 = display total power numeric results

Units: none

Default Value: 0

Preset State: default value

Related Commands: _GPWR

-GPM
Gated Power Measurement

Description

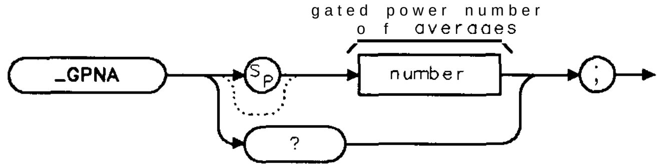
This command makes a gated power measurement after the Setup command (_GPS) has been done.

Softkey Equivalent: none

Example: -GPM;

Alternate Commands: The -GPWR command is equivalent to _GPS followed by _GPM.

_GPNA
Gated Power Number of Averages



xgpna

Description

This command sets the number of averages in preparation for making a gated power measurement.

Softkey Equivalent: NUMBER AVERAGES in Gtd Par Setup menu

Example: _GPNA 15;

Range: Any integer from 1 to 99999

Units: none

Default Value: 5

Preset State: default value

Related Commands: _GPWR

-GPS
Gated Power Setup

xgps

Description

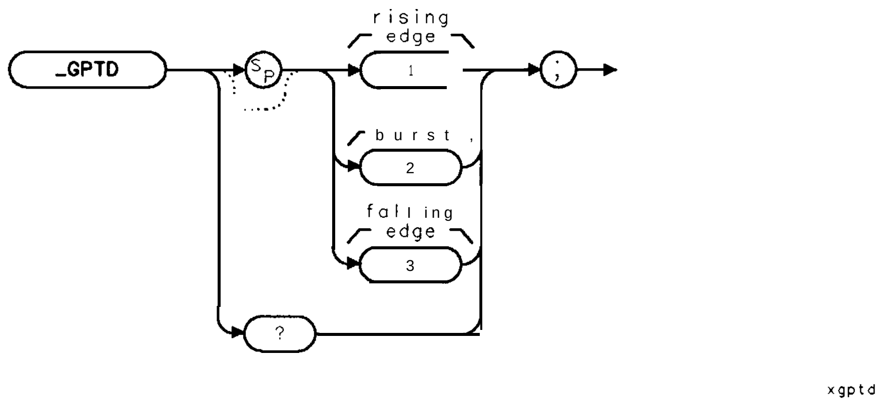
This command is used to set up the analyzer before making a gated power measurement.

Softkey Equivalent: none

Example: -GPS;

Alternate Commands: The _GPWR command is equivalent to -GPS followed by _GPM.

-GPTD
Gated Power Timing Display Mode



Description

This command selects the graphic display mode for a gated power timing measurement.

Softkey Equivalent: DISPLAY R BRST F in GTD PWR TIMING Post-Measurement menu

Example: -GPTD 3;

Valid Values: 1 = display rising edge graphic results
2 = display burst graphic results
3 = display falling edge graphic results

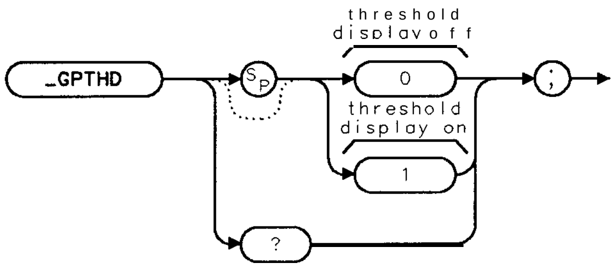
Units: none

Default Value: 2

Preset State: default value

Related Commands: _GPWRT

_GPTHD
Gated Power Threshold Display



xgpthd

Description

This command selects whether or not the threshold lines are displayed at the completion of the gated power measurement.

Softkey Equivalent: **DSPLY TH ON** OFF in **Gtd Pwr Setup** menu

Example: -GPTHD 1;

Valid Values: 0 = Threshold line display off
1 = Threshold line display on

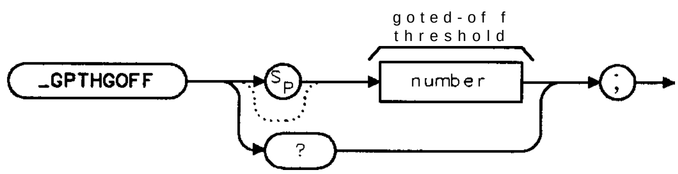
Units: none

Default Value: 0

Preset State: default value

Related Commands: -GPWR, _GPTHGON, -GPTHGOFF

-GPTHGOFF
Gated Power Threshold Gated-Off



xgpthgoff

Description

This command sets the gated-off threshold level in preparation for making a gated power measurement.

Softkey Equivalent: GTD-OFF THRESHLD in Gtd Pwr Setup menu

Example: -GPTHGOFF 15;

Range: Any value from 1 to 25 dB

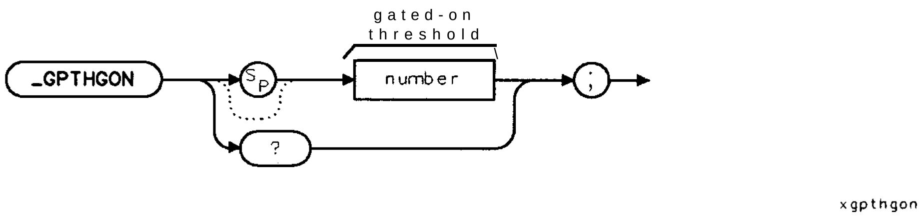
Units: dB

Default Value: 20 dB

Preset State: default value

Related Commands: -GPWR, _GPTHGON, -GPTHD

_GPTHGON
Gated Power Threshold Gated-On



Description

This command sets the gated-on threshold level in preparation for making a gated power measurement.

Softkey Equivalent: GTD-ON THRESHLD in Gtd Pwr Setup menu

Example: -GPTHGON – 15;

Range: Any value from -0.01 to -35 dB

Units: dB

Default Value: -18 dB

Preset State: default value

Related Commands: -GPWR, _GPTHGOFF, -GPTHD

_GPTM
Gated Power Timing Measurement

xgptm

Description

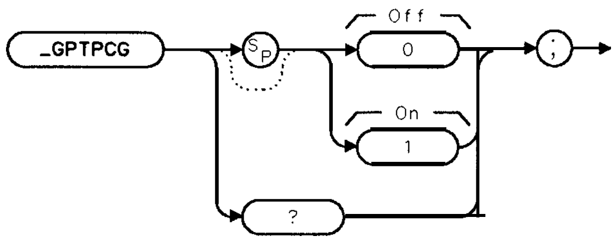
This command makes a gated power timing measurement after the Setup command (-GPS) has been done.

Softkey Equivalent: none

Example: _GPTM;

Alternate Commands: The _GPWRT command is equivalent to _GPTS followed by -GPTM.

_GPTPCG
Gated Power Timing Check Power Control Group



xgptpcg

Description

This command selects whether or not to check for non-isolated power control groups when making a gated power timing measurement.

Softkey Equivalent: CHK PCG ON OFF in Gated Setup menu

Example: _GPTPCG 1;

Valid Values: 0 = non-isolated power control group check off
1 = non-isolated power control group check on

Units: none

Default Value: 0

Preset State: default value

Related Commands: _GPWRT

_GPTS
Gated Power Timing Setup

xgpts

Description

This command is used to set up the analyzer in preparation for making a gated power timing measurement.

Softkey Equivalent: none

Example: _GPTS;

Alternate Commands: The -GPWRT command is equivalent to _GPTS followed by -GPTM.

_GPWR
Gated Power

xgpwr

Description

This command makes a gated power measurement.

Softkey Equivalent: GATED POWER in Gated Power menu

Example: _GPWR;

Related Commands: -GPD, _GPNA, -GPTHGON, _GPTHGOFF, -GPTHD

Alternate Commands: _GPS followed by _GPM

See **also:** "To Make a Gated Power Measurement" in Chapter 6, "Programming Examples."

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	None
3	Measurement stopped, carrier power too high	None
Numeric Results		
(Variables or Arrays)		
-FAIL	0 = Pass, 1 = Fail high limit On/Off Ratio	None
-GPBA	Gated-on Burst Mean Amplitude	dBm
_GPOA	Gated Power Off Amplitude	dBm
_GPTA	Gated Power Total Mean Amplitude	dBm
_GPRA	Gated Power On/Off Ratio Amplitude	dB
-GPBW	Gated-on Burst Mean Power	watts
-GPTW	Gated Power Total Mean Power	watts
Graphic Results		
(401-element traces)		
TRA	RF envelope waveform (last sweep)	TDF

-GPWRT
Gated Power Timing

xgpwrt

Description

This command makes a gated power timing measurement.

Softkey Equivalent: GTD PWR TIMING in Gated Power menu

Example: -GPWRT;

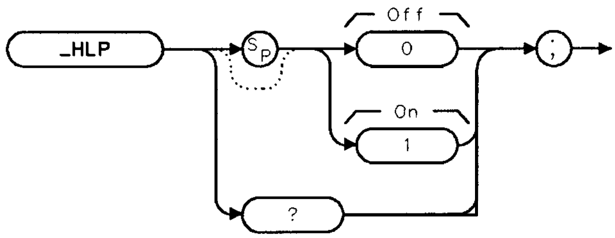
Related Commands: _GPTD, _GPTPCG

Alternate Commands: _GPTS followed by _GPTM

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	None
5	Attack Time over-range	None
6	Release Time over-range	None
7	Attack and Release Time over-range	None
Numeric Results		
Variables or Arrays)		
-FAIL	Bit 0 = 1, Fail Burst Width	None
	Bit 1 = 1, Fail Attack Time	
	Bit 2 = 1, Fail Release Time	
-TBT	Burst Time	μs
_TATT	Attack Time	μs
_TRET	Release Time	μs
Graphic Results		
(401-element traces)		
TRA	Displayed waveform (as selected by _GPTD)	TDF
-TRW	Rising Edge average waveform	*
-TRX	Burst average waveform	*
-TRY	Falling Edge average waveform	*
* The measurement units indicated here are the internal binary representation of measured results and are described at the beginning of this chapter.		

-HLP
Help Mode



xhlp

Description

This command turns the Help mode on or off. In this mode, full-screen help messages about various keys are explained.

Softkey Equivalent: CDMA HELP in MODE menu

Example: -HLP 1;

Valid Values: 0 = help mode off
1 = help mode on

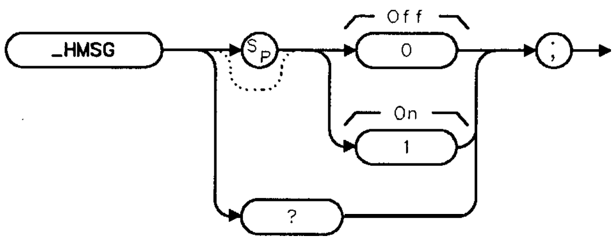
Units: none

Default Value: 0

Preset State: default value

Related Commands: _HMSG

_HMSG
Help Message



Description

This command turns the help messages on or off. In this mode, partial-screen help messages are displayed when various configuration or setup keys are pressed.

Softkey Equivalent: HELP MSG ON OFF in the second CDMA Config menu

Example: _HMSG 0;

Valid Values: 0 = help messages off
1 = help messages on

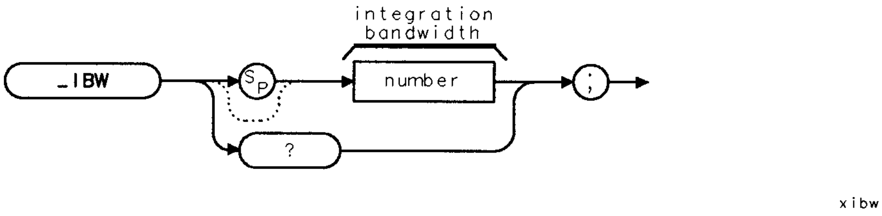
Units: none

Default Value: 1

Preset State: last value

Related Commands: -HLP

_IBW
Integration Bandwidth



Description

This command sets the value of integration bandwidth in preparation for a channel power measurement.

Softkey Equivalent: INTEG BW in CH Pwr Setup menu

Example: _IBW 2.536;

Range: any real value from 10 kHz to 300 MHz

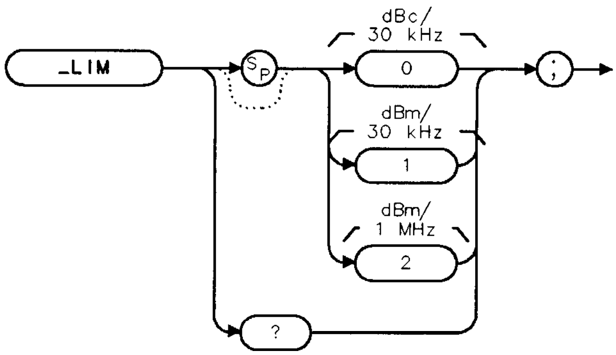
Units: Hz

Default Value: IS-95 defined: 1.23 MHz
User-defined: -DCHBW

Preset State: default value

Related Commands: -CHPWR, _RXCHPWR, -DCHBW, _DPAR

-LIM
Limit



xl im

Description

This command selects the test limit conditions displayed at the completion of the spur emission close measurement. The test limit with the worst-case measured spur is automatically displayed at the completion of the measurement.

Softkey Equivalent: LIMIT a b c in SPUR CLOSE post-measurement menu

Example: -LIM 1;

Valid Values: 0 = dBc/30 kHz test conditions
1 = dBm/30 kHz test conditions
2 = dBm/1 MHz test conditions

Units: none

Default Value: 0

Preset State: default value

Related Commands: _SEC

-MBM
Monitor Band Measurement

xmbm

Description

This command performs the monitor band measurement after the Setup command (-MBS) has been done.

Softkey Equivalent: none

Example: -MBM;

Alternate Commands: The _MBND command is equivalent to _MBS followed by _MBM.

_MBND
Monitor Band

xmbnd

Description

This command displays either the transmit or receive frequency band.

Softkey Equivalent: MONITOR BAND in Spectrum menu

Example: _MBND;

Related Commands: _MTX, -BAND

Alternate Commands: _MBS followed by -MBM

Measurement State/Results:

State/Results	Contents Description	Units
Graphic Results (401-element traces)		
TRA	CDMA band spectrum	TDF

-MBS
Monitor Band Setup

Description

This command sets up the analyzer in preparation for making monitor band measurements.

Softkey Equivalent: none

Example: _MBS;

Alternate Commands: The _MBND command is equivalent to _MBS followed by _MBM.

-MCH
Monitor Channel

Description

This command displays the spectrum for the channel that is specified by _CH.

Softkey Equivalent: **MONITOR CHAN** in Spectrum menu

Example: _MCH;

Alternate Commands: _MCS followed by _MCM

Measurement State/Results:

State/Results	Contents Description	Units
Graphic Results (401-element traces) TRA	CDMA channel spectrum	TDF

-MCM
Monitor Channel Measurement

Description

This command performs the monitor channel measurement after the Setup command (_MCS) has been done.

Softkey Equivalent: none

Example: -MCM;

Alternate Commands: The -MCH command is equivalent to _MCS followed by _MCM.

_MCS
Monitor Channel Setup

Description

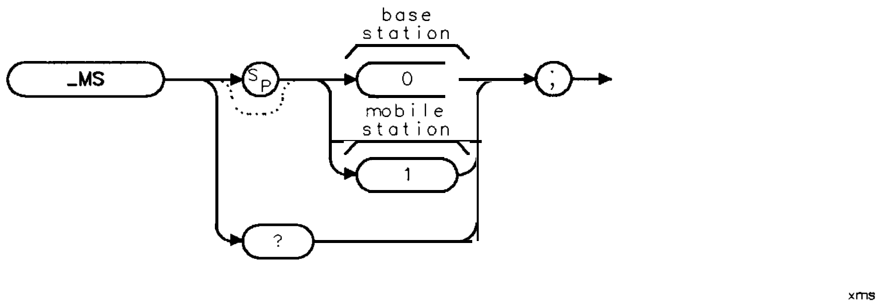
This command sets up the analyzer in preparation for making a monitor channel measurement.

Softkey Equivalent: none

Example: _MCS;

Alternate Commands: The _MCH command is equivalent to _MCS followed by _MCM.

_MS
Mobile Station/Base Station



Description

This command sets either the base station (BS) or mobile station (MS) as the transmitter under test.

Softkey Equivalent: MOBILE in the first CDMA Config menu

Example: _MS 0;

Valid Values: 0 = base station
1 = mobile station

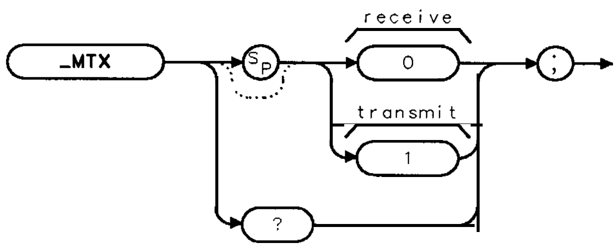
Units: none

Default Value: 1

Preset State: last value

Related Commands: -EXTATM, -EXTATB

-MTX
Monitor TX/RX



xmtx

Description

This command selects either the transmit or receive frequency bands in preparation for making monitor band or monitor channel measurements.

Softkey Equivalent: CHAN TX RX and BAND TX RX in post-measurement menus

Example: _MTX 0;

Valid Values: **0** = Receive (Rx)
1 = Transmit (Tx)

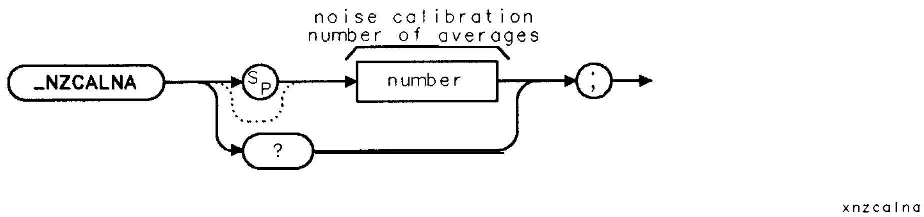
Units: none

Default Value: 1

Preset State: default value

Related Commands: _MBND, -MCH

-NZCALNA
Noise Calibration Number of Averages



Description

This command sets the number of averages in preparation for making analyzer noise floor calibration measurements.

Softkey Equivalent: NUMBER AVERAGES in the menus following CAL SA NOISE and CAL RX SA NOISE

Example: _NZCALNA 20;

Range:

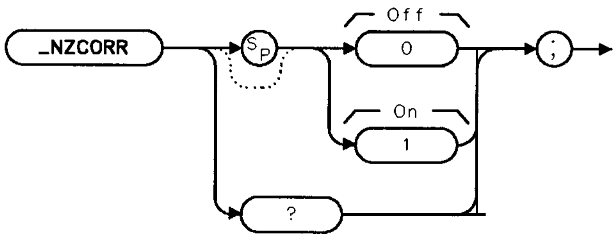
Units:

Default Value: 50

Preset State: default value

Related Commands: -CALNZ, _CALRXNZ

-NZCORR
Noise Floor Correction



xnzcorr

Description

This command enables near-the-noise-floor correction for channel power measurements.

Softkey Equivalent: N CORR ON OFF in CH Pwr Setup menu

Example: _NZCORR 0;

Valid Values: 0 = near noise correction off
1 = near noise correction on

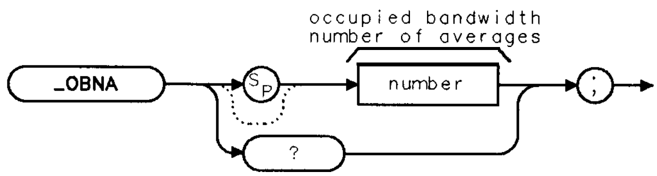
Units: none

Default Value: 1

Preset State: default value

Related Commands: -CHPWR, -RXCHPWR

_OBNA
Occupied Bandwidth Number of Averages



Description

This command sets the number of averages for the occupied bandwidth in preparation for making occupied bandwidth measurements.

Softkey Equivalent: NUMBER AVERAGES in **Occ BW Setup** menu

Example: _OBNA 10;

Range: Any integer from 1 to 99999

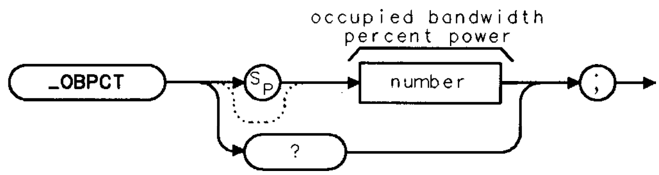
Units: none

Default Value: 5

Preset State: default value

Related Commands: _OBW

_OBPCT
Occupied Bandwidth Percent Power



Description

This command sets the maximum measured % of power used in the occupied bandwidth of a channel in preparation for making a frequency measurement. For ARIB-T53 standard, use _AOBPCT instead.

Softkey Equivalent: OCC BW % POWER in Occ BW Setup menu

Example: _OBPCT 85;

Range: Any real value from 1 to 99.99

Units: percentage

Default Value: 99%

Preset State: last value

Related Commands: _OBW, -AOBPCT

_OBW
Occupied Bandwidth

xobw

Description

This command performs the occupied bandwidth measurement.

Softkey Equivalent: OCCUPIED BANDWDTH in Freq menu

Example: _OBW;

Related Commands: -OBNA, _OBPCT, -AOBPCT

Alternate Commands: _OBWS followed by _OBWM

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	None
3	Measurement stopped, carrier power too high	None
Numeric Results		
(Variables or Arrays)		
-FAIL	0 = Pass, 1 = Fail high limit Occupied BW	None
_OBBW	Occupied Bandwidth	Hz
_OBFE	Occupied BW Delta Freq	Hz
_OBULF	Occupied BW Upper Limit Freq relative to CF	Hz
_OBLLF	Occupied BW Lower Limit freq relative to CF	Hz
Graphic Results		
(401-element traces)		
TRA	Swept RF spectrum (video avg)	TDF
TRB	Swept RF spectrum (last sweep)	TDF

_OBWM
Occupied Bandwidth Measurement

xobwm

Description

This command performs the occupied bandwidth measurement after the Setup command (_OBWS) has been done.

Softkey Equivalent: none

Example: _OBWM;

Alternate Commands: The _OBW command is equivalent to _OBWS followed by _OBWM

_OBWS
Occupied Bandwidth Setup

Description

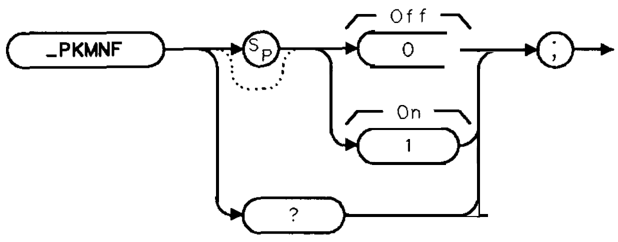
This command sets up the analyzer in preparation for making occupied bandwidth measurements.

Softkey Equivalent: none

Example: _OBWS;

Alternate Commands: The _OBW command is equivalent to _OBWS followed by _OBWM.

_PKMNF
Time Domain Peak/Mean Function



Description

This command controls the peak/mean (power) trace math after a time domain measurement. Use this command after -TDM has been done.

Softkey Equivalent: PK/MEAN ON OFF in Trace Math menu

Example: _PKMNF 1;

Valid Values: 0 = peak/mean function off
1 = peak/mean function on

Units: none

Default Value: 0

Preset State: default value

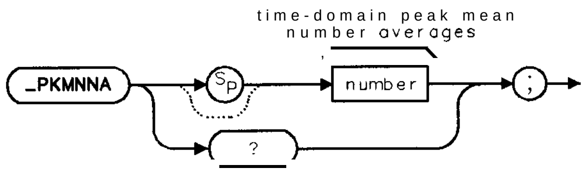
Related Commands: -TDM, _PKMNNA

See **also:** "To Perform a Time Domain, Peak/Mean Measurement" in Chapter 6, "Programming Examples."

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	None
Numeric Results (Variables or Arrays)		
-MNA	Mean Amplitude	dBm
-PKMNA	Peak/Mean Amplitude	dB
Graphic Results (401-element traces)		
TRA	Time Domain Waveform	TDF

_PKMNNA
Time Domain Peak/Mean Number Averages



pg736a

Description

This command sets the peak/mean trace math number of averages in preparation for a time domain measurement.

Softkey Equivalent: **PK/MEAN** ON OFF in Trace Math menu

Example: -PKMNNA 25;

Range: Any integer from 1 to 1000

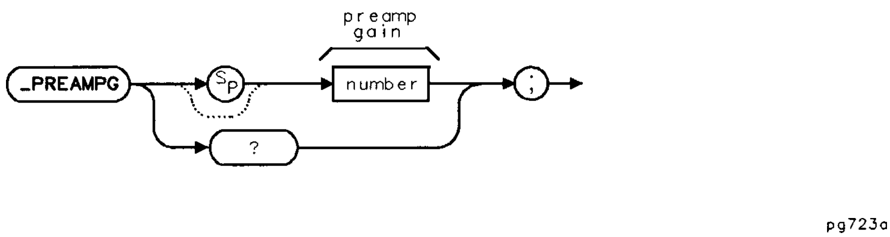
Units: none

Default Value: 10

Preset State: default value

Related Commands: -TDM, -PKMNF

-PREAMPG
Preamp Gain



Description

This command allows the analyzer to compensate measurement values according to the amount of external preamp gain used in receive channel power and receiver RX band measurements.

Softkey Equivalent: **EXTERNAL PREAMPG** in Rx **Chan Power** and Spur Setup menus

Example: _PREAMPG 22;

Range: Any real value from -80 to + 80 dB (negative values are for loss)

Units: dB

Default Value: 0 dB

Preset State: last value

Related Commands: -RXCHPWR, _CALRXNZ, -SERRX

-RPT
Repeat

xrpt

Description

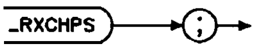
This command repeats a measurement of channel power, gated power, spectral regrowth, occupied bandwidth, open loop time response, standby output power, spurious emission maximum transmitter power, or spurious emission close.

Softkey Equivalent: REPEAT MEAS in various post-measurement menus

Example: -RPT;

Related Commands: -CHPWR, _GPWR, _SR, -OBW, -TOL, _SOPWR, _SEM, SEC

_RXCHPS
Rx Channel Power Setup



pg725a

Description

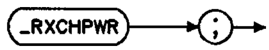
This command sets up the analyzer in preparation for making transmitter Rx channel power measurements.

Softkey Equivalent: none

Example: _RXCHPS;

Alternate Commands: The -RXCHPWR command is equivalent to _RXCHPS followed by _CHPM.

-RXCHPWR
Rx Channel Power



pg727a

Description

This command measures the channel power in the receive channel corresponding to the current transmitter channel number. The measurement state is returned, and the measurement results are put in variables and in traces when measurements are completed. The measurement stops if a carrier greater than _RXCARM is found (the default is -20 dBm).

Softkey Equivalent: RX CHAN POWER in RX Chan Power menu

Example: -RXCHPWR;

Related Commands: _CHPNA, -NZCORR, _PREAMPG, _CHPSP, _IBW

Alternate Commands: -RXCHPS followed by _CHPM

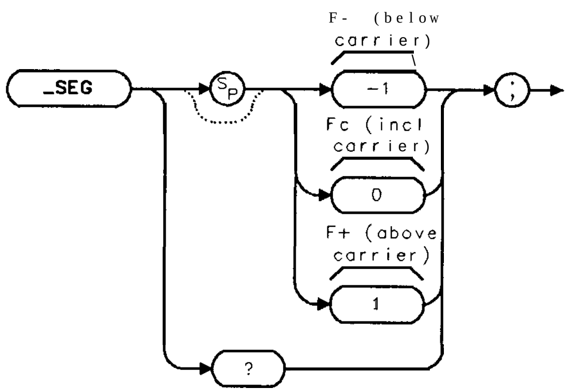
Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement complete, no errors	None
3	Measurement stopped, carrier power too high	None
4	Measurement stopped, RX SA noise cal needed*	None
5	Chan power < SA noise pwr, Pwr Accuracy Degraded†	None
6	Measurement stopped, carrier present	None
Numeric Results (Variables or Arrays)		
-CHPA	Channel Power Amplitude	dBm
-CHPSD	Channel Power Average Spectral Density	dBm/Hz
Graphic Results (401-element traces)		
TRA	RF spectrum (last sweep)	TDF
TRB	RF spectrum (video average of N sweeps)	TDF

* If the noise correction is enabled and the uncorrected channel power is less than the noise floor + -NZMU (the default is 15 dB). Also, if -IBW, -PREAMPG, or RB was changed between the last SA noise calibration and the present measurement.

† If the noise correction is enabled and the uncorrected channel power is less than the noise floor + _NZML (the default is 3 dB). In other words, measurement state 5 occurs if the corrected channel power is less than the noise floor.

_SEG
Segment



pg741a

Description

This command selects a particular frequency segment respective of the carrier, to display after a transmitter spurious emission measurement.

Softkey Equivalent: **SEGMENT** F- Fc **F+** in the SPUR TX MAX PWR , and SPUR **CLOSE** post-measurement menus

Example: _SEG 0;

Valid Values: -1 = F- (frequency segment below carrier)
0 = Fc (frequency segment including carrier)
1 = F+ (frequency segment above carrier)

TRA contains the 30 kHz RF spectrum for the chosen segment. TRC contains the 1 MHz RF spectrum for the chosen segment.

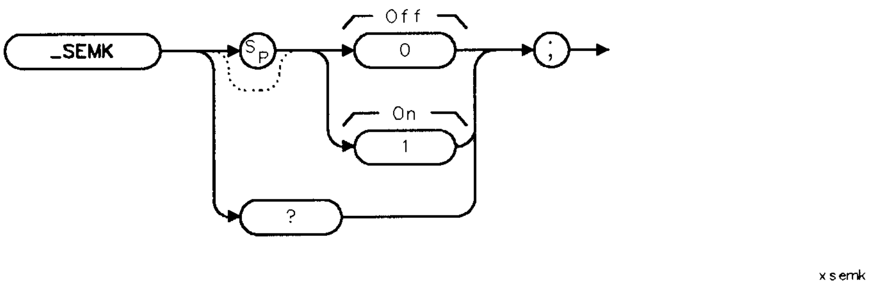
Units: none

Default Value: Segment with worst-case measured spur

Preset State: default value

Related Commands: _SETM, _SETC

_SEMK
Spurious Emission Marker



Description

This command enables or disables a marker when making transmitter or receiver spurious emission, or standby output power measurements.

Softkey Equivalent: MARKER ON OFF in various spurious emission post-measurement menus

Example: _SEMK 1;

Valid Values: 0 = marker off
1 = marker on

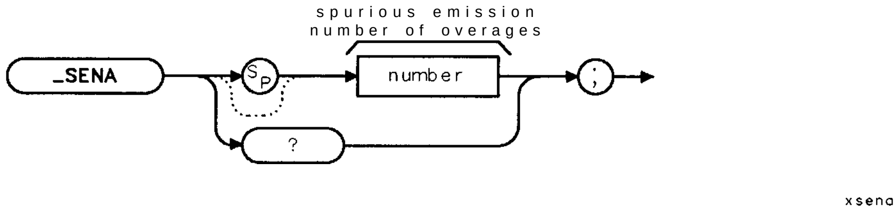
Units: none

Default Value: 0

Preset State: default value

Related Commands: _SETC, _SETM, _SETSP, _SERRX, _SERTX

_SENA
Spurious Emission Number of Averages



Description

This command sets the number of averages in preparation for making transmitter or receiver spurious emission measurements.

Softkey Equivalent: NUMBER AVERAGES in Spur Setup menu

Example: _SENA 20;

Range: Any integer from 1 to 9999

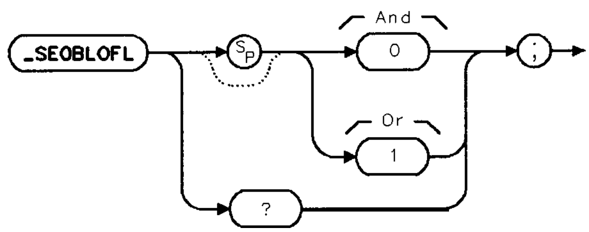
Units: none

Default Value: 5

Preset State: default value

Related Commands: _SETSP, _SETM, _SETC, -SERRX, -SERTX

_SEOBLOFL
Spurious Emission Out-of-Band Both Limits On Fail Logic



Description

For a selected range **or** harmonic, this command controls the overall pass/fail logic if a range or harmonic has both absolute and relative limit pass/fail checking enabled (SEOLIMAF and -SEOLIMRF set to 1). If OR is selected, the range or harmonic will fail if the spurious emission exceeds either the absolute ***or*** relative amplitude limits. If AND is selected, the range or harmonic will only fail if the spurious emissions exceeds both the absolute ***and*** relative amplitude limits.

Softkey Equivalent: FAIL OR AND in the spurious emission out-of-band edit range menu

Example: _SEOBLOFL 1;

Valid Values: 0 = Fail if spur > LIM ABS ***and*** spur > LIM REL
1 = Fail if spur > LIM ABS or spur > LIM REL

Units: none

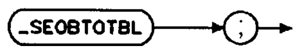
Default Value: 0

Preset State: default value

Related Commands: _SEOLIMAF, -SEOLIMRF

See also: "To Edit a Spur Table" in Chapter 6, "Programming Examples."

-SEOBTOTBL
Spurious Emission Out-of-Band Buffer to Table



pg736b

Description

This command copies the table edit buffer into the currently selected table. This is used after table edits are done.

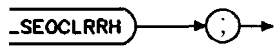
Softkey Equivalent: none

Example: -SEOBTOTBL;

Related Commands: _SEOTBLN

See **also:** "To Edit a Spur Table" in Chapter 6, "Programming Examples."

-SEOCLRRH
Spurious Emission Out-of-Band Clear Range or Harmonic



pg735b

Description

This command clears the currently-selected range or harmonic while editing an out-of-band table.

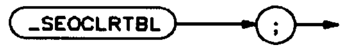
Softkey Equivalent: CLEAR RANGE in the spurious emission out-of-band edit table menu

Example: -SEOCLRRH;

Related Commands: _SEORHN

See **also:** "To Edit a Spur Table" in Chapter 6, "Programming Examples."

_SEOCLRTBL
Spurious Emission Out-of-Band Clear Table



pg75b

Description

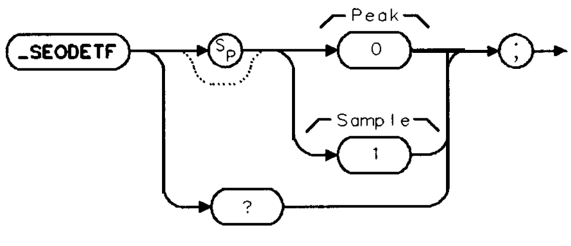
This command clears the currently selected table as well as the table edit buffer. This may be used prior to editing a table.

Softkey Equivalent: none

Example: -SEOCLRTBL;

Related Commands: _SEOTBLN

-SEODETF
Spurious Emission Out-of-Band Detector Flag



Description

This command selects the detector mode for the selected range or harmonic. If sample detector is selected, an average of _SENA samples is taken.

Softkey Equivalent: DET PK SMPL in the spurious emission out-of-band edit range menu

Example: _SEODETF 1;

Valid Values: 0 = peak detector
1 = sample detector

Units: none

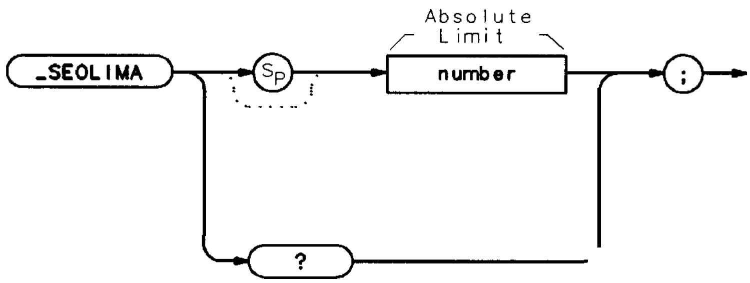
Default Value: 0

Preset State: default value

Related Commands: _SENA

See **also:** "To Edit a Spur Table" in Chapter 6, "Programming Examples."

_SEOLIMA
Spurious Emission Out-of-Band Limit Absolute



Description

This command sets the absolute limit value for the current range or harmonic.

Softkey Equivalent: LIM ABS ON OFF in the spurious emission out-of-band edit range menu

Example: -SEOLIMA -56;

Range: Any real value from – 174 to + 60

Units: dBm

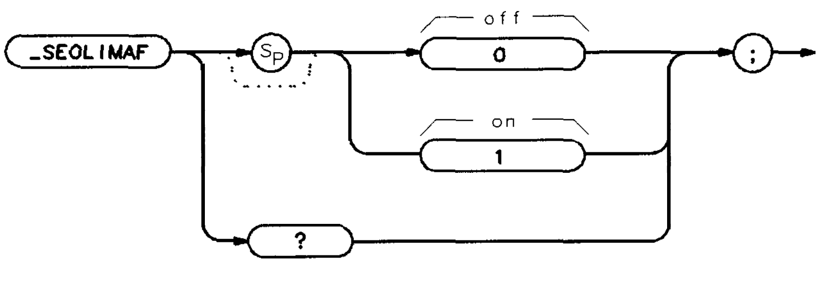
Default Value: -60 dBm

Preset State: default value

Related Commands: -SEOLIMAF

See **also:** "lb Edit a Spur Table" in Chapter 6, "Programming Examples."

-SEOLIMAF
Spurious Emission Out-of-Band Limit Absolute Flag



Description

This command selects whether or not the absolute limit value for the current range or harmonic will be used by the measurement for pass/fail checking.

Softkey Equivalent: LIM ABS ON OFF in the spurious emission out-of-band edit range menu

Example: -SEOLIMAF 0;

Valid Values: 0 = Do not use the absolute limit value
1 = Use absolute limit value

Units: none

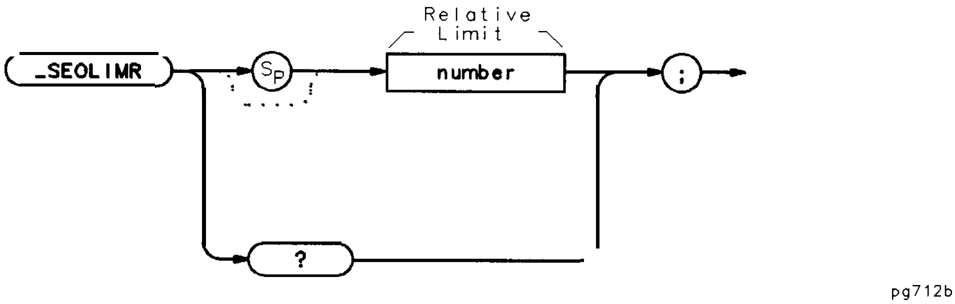
Default Value: 1

Preset State: default value

Related Commands: _SEOLIMA

See **also:** "To Edit a Spur Table" in Chapter 6, "Programming Examples."

-SEOLIMR
Spurious Emission Out-of-Band Limit Relative



Description

This command sets the relative limit value for the current range or harmonic.

Softkey Equivalent: LIM REL ON OFF in the spurious emission out-of-band edit range menu

Example: -SEOLIMR -50;

Range: Any real value from 0 to -200

Units: dB

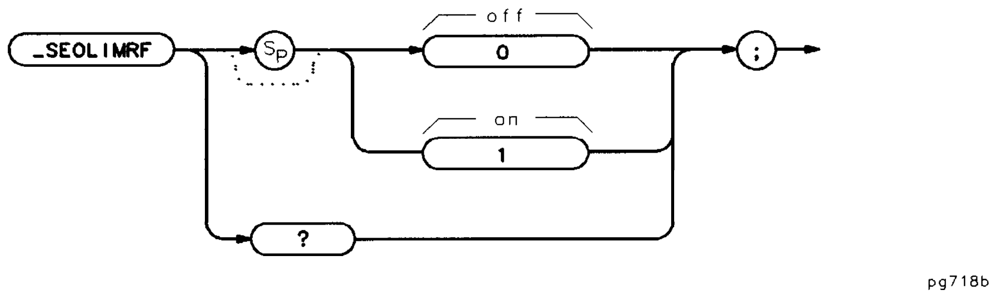
Default Value: -54 dB

Preset State: default value

Related Commands: _SEOLIMRF

See **also:** "To Edit a Spur Table" in Chapter 6, "Programming Examples."

-SEOLIMRF
Spurious Emission Out-of-Band Limit Relative Flag



Description

This command selects whether or not the relative limit value for the current range or harmonic will be used by the measurement for pass/fail checking.

Softkey Equivalent: LIM REL ON OFF in the spurious emission out-of-band edit range menu

Example: -SEOLIMRF 0;

Valid Values: 0 = Do not use the relative limit value

Units:

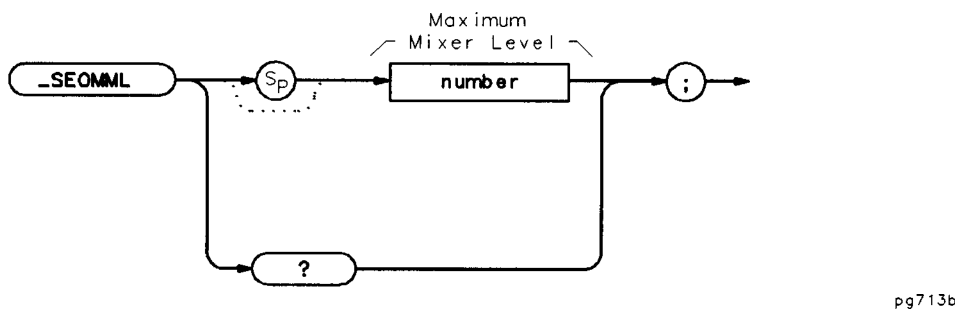
Default Value:

Preset State:

Related Commands: _SEOLIMR

See **also:** "To Edit a Spur Table" in Chapter 6, "Programming Examples."

-SEOMML
Spurious Emission Out-of-Band Maximum Mixer Level



Description

For the spurious emission harmonic table, this command selects the maximum mixer level to use during the spurious emission out-of-band harmonic measurement.

Softkey Equivalent: MAX **MXR LEVEL** in the spurious emission out-of-band harmonics edit table menu

Example: -SEOMML -40;

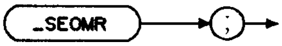
Range: Any real value from -10 to -60

Units: dBm

Default Value: -30 dBm

Preset State: default value

-SEOMR
Spurious Emission Out-of-Band Measurement, Receiver



pg733b

Description

This command measures receiver spurious emissions using the selected out-of-band table. Refer to the description for the _SEOMT command. Receiver spurious emissions are measured slightly differently in that no carrier is measured and relative amplitude results are not displayed.

Softkey Equivalent: MEASURE OUT BAND in the rcvr, spurious emission, out-of-band menu

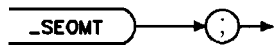
Example: -SEOMR;

Related Command: _SEOTBLN

Measurement State/Results See the table for the _SEOMT command

See **also:** "To Make an Out-of-Band Spurious Emission Measurement" in Chapter 6, "Programming Examples."

-SEOMT
Spurious Emission Out-of-Band Measurement, Transmitter



pg732b

Description

This command measures transmitter spurious emissions using the selected out-of-band table.

Softkey Equivalent: MEASURE OUT BAND in the xmtr, spurious emission, out-of-band menu

Example: _SEOMT;

Related Command: _SEOTBLN

See **also:** "To Make an Out-of-Band Spurious Emission Measurement" in Chapter 6, "Programming Examples."

Measurement State/Results:

-SEOMT Spurious Emission Out-of-Rand Measurement, Transmitter

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	None
3	Measurement stopped, carrier power too high	None
4	Measurement stopped, no ranges defined	None
Numeric Results (Variables)		
_CHPA	Channel Power	dBm
_CHPF	Channel Frequency	HZ
-FAIL	0= Pass, 1 = Fail high limit	None
Numeric Results (arrays)		
_SEOR [1]	Range 1, Spur frequency (MHz part)	MHz
_SEOR [2]	Range 1, Spur frequency (kHz part)	kHz
_SEOR [3]	Range 1, Frequency clipped flag	none
_SEOR [4]	Range 1, Spur amplitude, absolute	0.1 dB
_SEOR [5]	Range 1, Delta to limit for above	0.1 dB
_SEOR [6]	Range 1, Spur amplitude absolute fail flag	none
_SEOR [7]	Range 1, Spur amplitude, relative	0.1 dB
_SEOR [8]	Range 1, Delta to limit for above	0.1 dB
_SEOR [9]	Range 1, Spur amplitude relative fail flag	none
_SEOR [11]	Range 1, Both limits on fail flag	none
_SEOR [20]	Range 1, Data present flag	none
_SEOR [21]	Range 2, Spur frequency (MHz part)	Mhz
_SEOR [22] thru [239]	Range 2 through Range 12*	*
_SEOR [240]	Range 12, data present flag	none
_SEOR [245]	0 if SEOOSF is 0, _SEOOS if SEOOSF is 1	none
_SEOR [246]	-SEOMML if Harmonics	0.1 dBm
_SEOR [247]	Carrier amplitude	0.1 dBm
_SEOR [248]	Spur frequency (MHz part)	MHz
_SEOR [249]	Spur' frequency (kHz part)	kHz
_SEOR [250]	Global pass/fail flag	none
'Sequential arrays in groups of 20 have the same range descriptions and units as arrays 1 through 20.		

-SEOMTH Spurious Emission Out-of-Band Measurement, Transmitter Harmonics

pg731b

Description

This command measures transmitter harmonic spurious emissions using the harmonics table. Refer to the description for the _SEOMT command. Harmonic spurious emissions are measured similarly with only ranges (harmonics) 2 through 10 displayed.

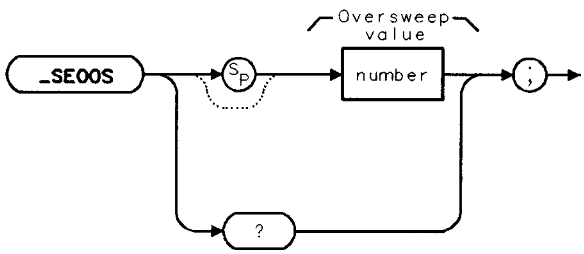
Softkey Equivalent: **MEASURE HARMONIC** in the xmtr, spurious emission, out-of-band menu

Example: -SEOMTH

Measurement State/Results See the table for the _SEOMT command

See **also:** "To Make an Out-of-Band Spurious Emission Measurement" in Chapter 6, "Programming Examples."

_SEOOS
Spurious Emission Out-of-Band Over Sweep Value



Description

For the spurious emission table, this command sets the oversweep value to use during the spurious emission out-of-band measurement, if SEOOSF is set to 1. An oversweep value of 10 forces the spectrum analyzer to sweep 10 times faster than normal. Oversweeping causes signals to display lower in amplitude and higher in frequency. A factor of 10 causes an approximate 3 dB amplitude drop and a 1% of span positive frequency shift for CW (unmodulated) signals when the video bandwidth is equal to the resolution bandwidth.

Softkey Equivalent: OVERSWP in the spurious emission out-of-band edit table

Example: _SEOOS 7;

Range: Any integer from 2 to 25

Units: none

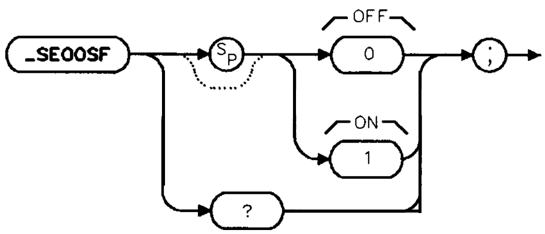
Default Value: 5

Preset State: default value

Related Commands: SEOOSF

See **also:** "To Edit a Spur Table" in Chapter 6, "Programming Examples."

_SEOOSF
Spurious Emission Out-of-Band Over Sweep Flag



pg729b

Description

For the spurious emission table, this command enables oversweeping using the factor determined by the _SEOOS command. Oversweeping allows the analyzer to sweep faster than the normal auto-coupled sweeptime.

Softkey Equivalent: OVERSWP ON OFF in the spurious emission out-of-band edit table Menu

Example: _SEOOSF 1;

Valid Values: 0 = oversweep Off
1 = oversweep On

Units: none

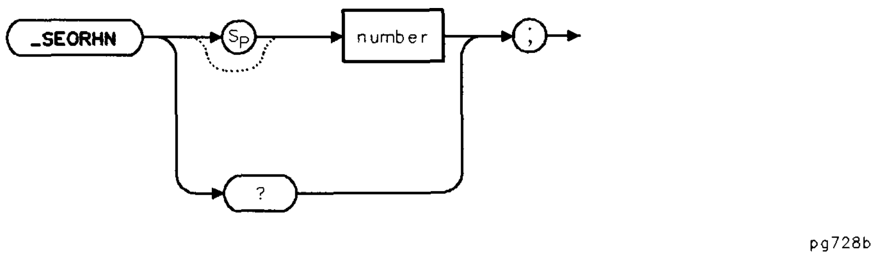
Default Value: 0

Preset State: default value

Related Commands: _SEOOS

See **also:** "To Edit a Spur Table" in Chapter 6, "Programming Examples."

-SEORHN
Spurious Emission Out-of-Band Range or Harmonic Number



Description

This command selects a range or harmonic while editing an out-of-band table.

Softkey Equivalent: SELECT RANGE in the spurious emission out-of-band edit table menu

Example: -SEORHN 9;

Range: Any integer from 1 to 12

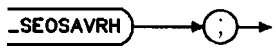
Units: none

Default Value: 2

Preset State: default value

See also: "To Edit a Spur Table" in Chapter 6, "Programming Examples."

_SEOSAVRH
Spurious Emission Out-of-Band Save Range or Harmonic



pg727b

Description

For the currently-selected range or harmonic, this command saves the range or harmonic parameters in the table edit buffer.

Softkey Equivalent: none

Example: -SEOSAVRH;

Related Commands: _SEORHN

See also: "To Edit a Spur Table" in Chapter 6, "Programming Examples."

-SEOSAVTBL
Spurious Emission Out-of-Band Save Table

pg78b

Description

For the spurious emission table, this command saves the global parameters (_SEOOS, _SEOOSF, _SEOMML) to the edit table buffer.

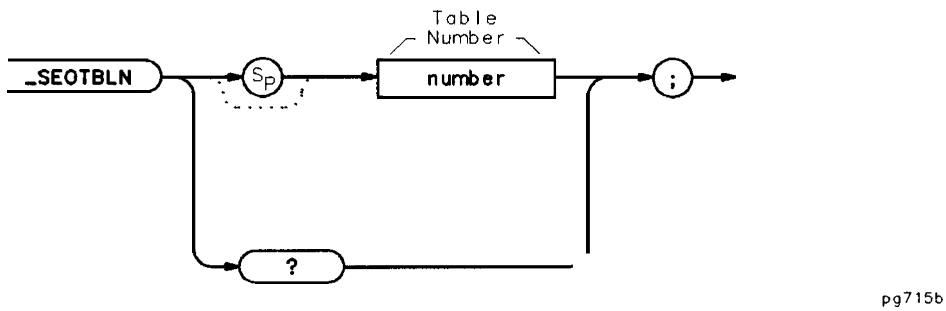
Softkey Equivalent: none

Example: -SEOSAVTBL;

Related Commands: -SEOBTOTBL

See **also:** “To Edit a Spur Table” in Chapter 6, “Programming Examples.”

-SEOTBLN
Spurious Emission Out-of-Band Table Number



Description

This command selects the table to use for spurious emission out-of-band operations. A table number of 0 allows editing of the harmonics table.

Softkey Equivalent: TABLE NUMBER in the spurious emission out-of-band menu

Example: -SEOTBLN 3;

Range: Any integer from 0 to 5

Units: none

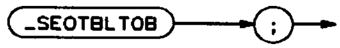
Default Value: 1

Preset State: default value

Related Commands: -SEOMR, _SEOMT, _SEOMTH, SEOCLRTBL, _SEOBTOTBL, -SEOTBLTOB

See **also:** "To Edit a Spur Table" in Chapter 6, "Programming Examples."

_SEOTBLTOB
Spurious Emission Out-of-Band Table to Buffer



pg79b

Description

This command copies the selected table into the table edit buffer. This is used to edit a table.

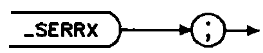
Softkey Equivalent: none

Example: -SEOTBLTOB;

Related Commands: _SEOTBLN

also: Table”

_SERRX
Spurious Emission Receiver for Rx Band



pg728a

Description

This command makes the receiver spurious emission measurement in the receive band. The measurement stops if a carrier greater than **_RXCARM** is found (the default is -20 dBm).

Softkey Equivalent: RX BAND in Rcvr Spurious menu

Example: _SERRX;

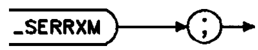
Related Commands: _SENA, _SEMK, _PREAMPG

Alternate Commands: _SERRXS followed by _SERRXM

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	None
6	Measurement stopped, carrier present	None
Numeric Results (Variables or Arrays)		
-FAIL	0= Pass, 1 = Fail high limit	none
_SEDA	Delta-to-limit amplitude for max spur	dB
-SEA	Absolute amplitude level of max spur	dBm
Graphic Results (401-element traces)		
TRA	RF spectrum (Rx band)	TDF

_SERRXM
Spurious Emission Receiver for Rx Band Measurement



pg730a

Description

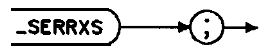
This command performs the receiver spurious emission for Rx band measurement after the Setup command (-SERRXS) has been done.

Softkey Equivalent: none

Example: _SERRXM;

Alternate Commands: The _SERRX command is equivalent to _SERRXS followed by -SERRXM.

_SERRXS
Spurious Emission Receiver for Rx Band Setup



pg732a

Description

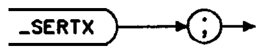
This command sets up the analyzer in preparation for making the receiver spurious emission for Rx band measurement.

Softkey Equivalent: none

Example: _SERRXS;

Alternate Commands: The _SERRX command is equivalent to -SERRXS followed by _SERRXM.

-SERTX
Spurious Emission Receiver for Tx Band



pg729a

Description

This command makes the receiver spurious emission measurement in the transmit band.

Softkey Equivalent: TX BAND in Rcvr Spurious menu

Example: -SERTX;

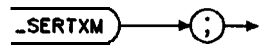
Related Commands: _SENA, _SEMK

Alternate Commands: _SERTXS followed by -SERTXM

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State 1	Measurement completed, no errors	None
Numeric Results (Variables or Arrays) -FAIL _SEDA -SEA	 0 = Pass, 1 = Fail high limit Delta-to-limit amplitude for max spur Absolute amplitude level of max spur	 none dB dBm
Graphic Results (401-element traces) TRA	 RF spectrum (Tx band)	 TDF

-SERTXM
Spurious Emission Receiver for Tx Band Measurement



pg731a

Description

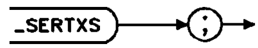
This command performs the receiver spurious emission for Tx band measurement after the Setup command (_SERTXS) has been done.

Softkey Equivalent: none

Example: _SERTXM;

Alternate Commands: The _SERTX command is equivalent to _SERTXS followed by _SERTXM.

-SERTXS
Spurious Emission Receiver for Tx Band Setup



pg733a

Description

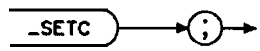
This command sets up the analyzer in preparation for making the receiver spurious emission for Tx band measurement.

Softkey Equivalent: none

Example: -SERTXS;

Alternate Commands: The -SERTX command is equivalent to _SERTXS followed by -SERTXM.

_SETC
Spurious Emission Transmitter Close



pg737a

Description

This command measures close spurious emissions.

Softkey Equivalent: SPUR CLOSE in Xmtr Spurious In Band menu

Example: _SETC;

Related Commands: -SEG, -LIM, _SEMK, _SENA, _SETCF, _SETFS, _SETDET

Alternate Commands: _SETCS followed by -SETCM

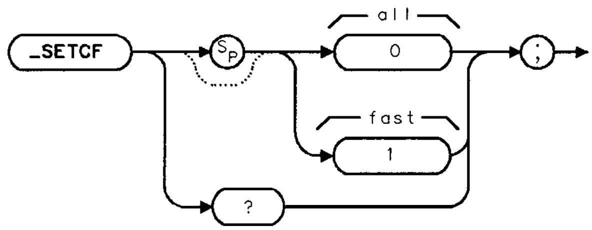
Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	None
3	Measurement stopped, carrier power too high	None
4	Measurement stopped, no valid segments	None
Variables or Arrays		
-FAIL	0 = Pass, 1 = Fail high limit	none
-CHPA	Channel Power	dBm
Numeric Results (overall worst-case spurious signal)		
-SERM[1]	Delta amplitude from limit line	1/10 dB
_SERM[2]	Delta frequency from carrier	10 kHz
_SERM[3]	0 = Pass, 1 = Fail	none
_SERM[4]	Segment: -1 = F-, 0 = Fc, 1=F+	none
_SERM[5]	Screen position	none
_SERM[6]	Lim: 0 = dBc/30 kHz, 1 = dBm/30 kHz, 2 = dBm/1 MHz	none
Numeric Results (worst-case spurious signal for given limits) (elements n defined are the same as for _SERM[n])		
-SERA[n]	Limit condition a	
_SERB[n]	Limit condition b	
_SERC[n]	Limit condition c	

_SETC Spurious Emission Transmitter Close

State/Results	Contents Description	Units
Graphic Results		
(401-element traces)		
TRA	RF spectrum (as selected by -SEG and -LIM)	TDF
-TRW	RF spectrum, F- segment, 30 kHz RBW	*
-TRX	RF spectrum, Fc segment, 30 kHz RBW	*
-TRY	RF spectrum, F+ segment, 30 kHz RBW	*
(_TRZ, 2047-element trace)		
-TRZ[1-401]	RF spectrum, F- segment, 1 MHz RBW	*
_TRZ[402-802]	spectrum, Fc segment, 1 MHz RBW	*
_TRZ[803-1203]	RF spectrum, F+ segment, 1 MHz RBW	*
* The measurement units indicated here are the internal binary representation of measured results and are described at the beginning of this chapter.		

-SETCF
Spurious Emission Transmitter Close Fast



pg738a

Description

This command selects Fast or All in preparation for making close spurious emission measurements on a mobile station.

Softkey Equivalent: CLOSE FAST ALL in Spur Setup menu

Example: _SETCF 0;

Valid Values: 0 = measure All
1 = measure Fast

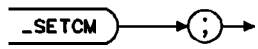
Units: none

Default Value: 1

Preset State: default value

Related Commands: _SETC

-SETCM
Spurious Emission Transmitter Close Measurement



pg739a

Description

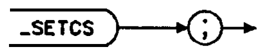
This command performs the close spurious emission measurements on a mobile station after the Setup command (_SETCS) has been done.

Softkey Equivalent: none

Example: -SETCM;

Alternate Commands: The _SETC command is equivalent to _SETCS followed by _SETCM.

_SETCS
Spurious Emission Transmitter Close Setup



pg740a

Description

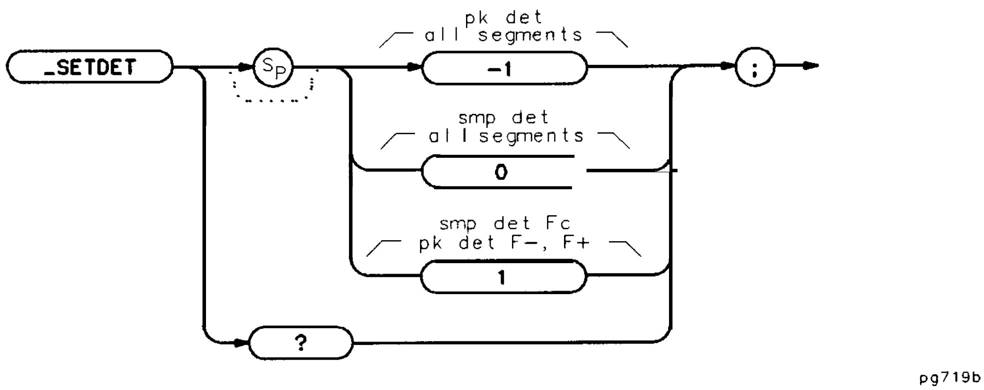
This command sets up the analyzer in preparation for making close spurious emission measurements on a mobile station.

Softkey Equivalent: none

Example: _SETCS;

Alternate Commands: The _SETC command is equivalent to _SETCS followed by _SETCM.

-SETDET
Spurious Emission Transmitter Detector



Description

This command selects the detectors that will be used when making a transmitter close or max power spurious emission measurement.

Softkey Equivalent: DET MM PK SP in the `Spur Setup` menu

Example: -SETDET 0;

Valid Values: -1 = Peak detection for all frequency segments
0 = Sample detection for all frequency segments
1 = Sample detection for Fc segment, and Peak detection for F- and Ft segments

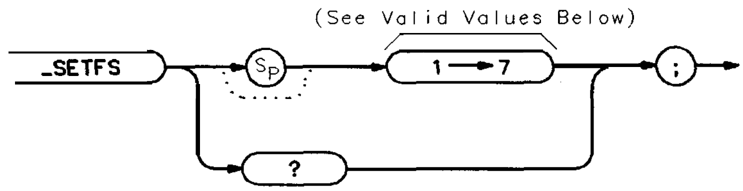
Units: none

Default Value: 1

Preset State: default value

Related Commands: _SETM, _SETC

_SETFS
Spurious Emission Transmitter Frequency Segments



pg716b

Description

This command selects the frequency segments that will be measured when making a transmitter close or max power spurious emission measurement.

Softkey Equivalent: none

Example: _SETFS 7;

Valid Values:
1 = F- segment
2 = Fc segment
3 = F- and Fc segments
4 = F+ segment
5 = F- and F+ segments
6 = Fc and F+ segments
7 = F-, Fc, and F+ segments

Units: none

Default Value: 7

Preset State: default value

Related Commands: _SETC, _SETM

_SETM
Spurious Emission Transmitter Max Power

xsetm

Description

This command makes a spurious emission transmitter measurement at maximum power.

Softkey Equivalent: SPUR TX MAX PWR in Xmtr Spurious In Band menu

Example: _SETM;

Related Commands: _SEG, _SEMK, _SENA

Alternate Commands: _SETMS followed by -SETMM, _SETFS, -SETDET

See **also:** "To Perform a Maximum Power Spurious Emission Measurement" in Chapter 6, "Programming Examples."

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	none
3	Measurement stopped, carrier power too high	none
4	Measurement stopped, no valid segments	none
Numeric Results		
(Variables or Arrays)		
-CHPA	Channel Power	dBm
-FAIL	0= Pass, 1 = Fail high limit	none
Overall Worst-case		
Spurious Signal)		
-SERM[1]	Delta amplitude from limit line	1/10 dB
_SERM[2]	Delta frequency from carrier	10 kHz
_SERM[3]	0 = Pass, 1 = Fail high limit	none
_SERM[4]	Segment: -1 = F-, 0=Fc, 1=F+	none
_SERM[5]	Trace element index	none
Graphic Results		
(401-element traces)		
TRA	RF spectrum (as selected by _SEG)	TDF
-TRW	RF spectrum, F- segment	*
-TRX	RF spectrum, Fc segment	*
-TRY	RF spectrum, F+ segment	*
* The measurement units indicated here are the internal binary representation of measured results and are described at the beginning of this chapter.		

-SETMM
Spurious Emission Transmitter Max Power Measurement

xsetmm

Description

This command makes a spurious emission transmitter power measurement at maximum power after the Setup command (**_SETMS**) has been done.

Softkey Equivalent: none

Example: -SETMM;

Alternate Commands: The **_SETM** command is equivalent to **_SETMS** followed by -SETMM.

_SETMS
Spurious Emission Transmitter Max Power Setup

xsetms

Description

This command sets up the analyzer in preparation for making a spurious emission transmitter measurement at maximum power.

Softkey Equivalent: none

Example: _SETMS;

Alternate Commands: The _SETM command is equivalent to _SETMS followed by _SETMM.

_SETSP
Spurious Emission Transmitter Standby Output Power

xsetsp

Description

This command makes the transmitter spurious emission measurement in the transmitter band for the standby output power condition.

Softkey Equivalent: STANDBY OUT POWER in Xmtr Spurious In Band menu

Example: _SETSP;

Related Commands: _SENA, _SEMK

Alternate Commands: _SETSPS followed by _SETSPM

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	None
Numeric Results		
(Variables or Arrays)		
-FAIL	0 = Pass, 2 = Fail high limit	none
_SEDA	Delta-to-limit amplitude for max spur	dB
-SEA	Absolute amplitude level of max spur	dBm
Graphic Results		
(401-element traces)		
TRA	RF spectrum (Tx band)	TDF

_SETSPM
Spurious Emission Transmitter Standby Output Power Measurement

xsetspm

Description

This command performs the spurious emission standby output power measurement after the Setup command (-SETSPS) has been done.

Softkey Equivalent: none

Example: _SETSPM;

Alternate Commands: The _SETSPM command is equivalent to _SETSPS followed by -SETSPM.

SETSPS
Spurious Emission Transmitter Standby Output Power Setup

xsetsps

Description

This command sets up the analyzer in preparation for making the spurious emission standby output power measurement.

Softkey Equivalent: none

Example: _SETSPS;

Alternate Commands: The _SETSP command is equivalent to _SETSPS followed by _SETSPM.

_SR
Spectral Regrowth

xsr

Description

This command measures the reference trace as paft of the spectral regrowth measurement procedure for a CDMA signal.

Softkey Equivalent: none

Example: -SR;

Related Commands: _SRNA, -SRD, SRMK, -SRSR

Related Flags: _SRARLF, -SRLSF, _SRF, _SRRLM

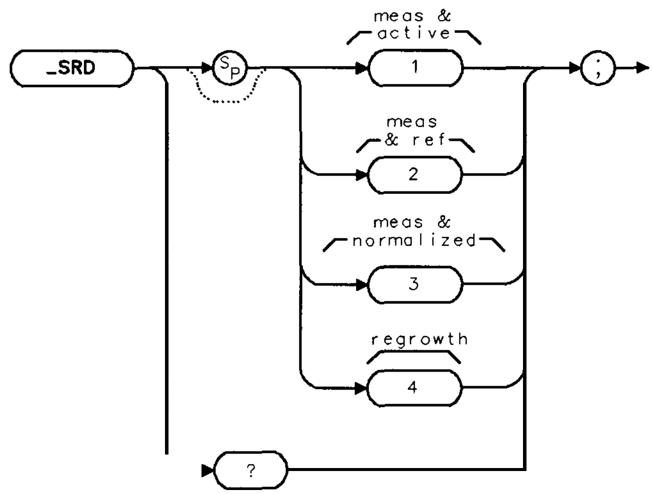
Alternate Commands: _SRS followed by _SRM

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	None
3	Measurement stopped, carrier power too high	None
Numeric Results		
(Variables or Arrays)		
_SRA	Max Spectral Regrowth	dB
Graphic Results		
(401-element traces)		
TRA	Current trace	TDF
TRB	Average measured trace	TDF
TRC	Normalized reference (_SRD=3)*	TDF
TRC	Spectral regrowth (_SRD = 4)*	TDF
-TRY	Normalized reference	t
-TRP	Spectral regrowth	†

* Set after sending _SR
† The measurement units indicated here are the internal binary representation of measured results and are described at the beginning of this chapter.

-SRD
Spectral Regrowth Display Mode



Description

This command selects the graphic display mode for a spectral regrowth measurement of the CDMA signal. Use this command after _SR.

Softkey Equivalent: **MEAS & ACTIVE**, **MEAS & REF**, **MEAS & NORM REF**, and **REGROWTH** keys in **Display Modes** menu

Example: _SRD 2;

Valid Values: 1 = measured and active
2 = measured and reference
3 = measured and normalized reference
4 = regrowth

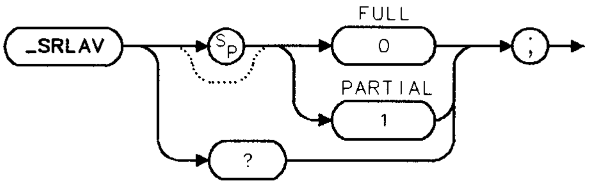
Units: none

Default Value: 1

Preset State: default value

Related Commands: _SRM

_SRLAV
ACPR Partial/Full Set Reference Level



bg733c

Description

This command sets the ACPR auto reference level function to full or partial mode.

Setting _SRLAV to **Full** forces reference levels for the center channel and each offset to be calculated and used in the ACPR measurement.

Setting _SRLAV to Partial causes the measurement to first check whether the center channel power has changed by more than 3 dB since the last reference level setting. If it has, then reference levels at the offsets are calculated and used. If not, then the reference level setting us bypassed and the previous reference level values are used.

Example: _SRLAV;

Range: Any integer from 0 to 1

Units: none

Default Value: 0

Preset State: default value

Related Commands: _ACPR, _ARL

_SRM
Spectral Regrowth Measurement

xsrm

Description

This command performs the spectral regrowth measurement as part of the spectral regrowth measurement procedure. The spectral regrowth procedure requires that two signals be measured: a reference signal and a test signal. This measurement is used to measure both of these signals.

The settings of the related flags and variables called out below will cause the command behavior to change. If **_SRARLF** is set to 1, the signal will automatically be shifted near the top of the screen by a reference level change prior to the measurement. The actual reference level is calculated as a function of the total channel power, which is derived from the channel bandwidth, the measurement resolution bandwidth, and the peak of the measured signal. The user can input additional margin through a variable, -SRRLM. If SRLSF is set to 1, the on-screen trace will be sweeping after the measurement is completed, after which -SRLSF is set to 0. If **_SRF** is set to 0, the measured trace will automatically be stored in the reference trace when the measurement is completed, after which **_SRF** will be set to 1.

Softkey Equivalent: **MEAS REF SPECTRUM** and **MEAS SPECTRUM**

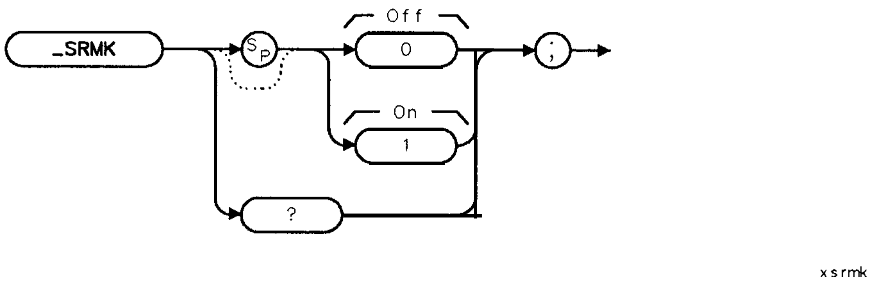
Related Commands: _SRNA, _SRD, _SRMK, -SRSR

Related Variables: -SRARLF, SRLSF, _SRF, -SRRLM

Example:

```
SRS;
CLRW TRA;
MOV -SRARLF, 1;
MOV SRLSF, 1;
MOV _SRF, 0;
_SRNA 50;
<SET SIGNAL TO REFERENCE POWER LEVEL>
_SRM;
<SET SIGNAL TO MEASUREMENT POWER LEVEL>
MOV -SRLSF, 1;
SRM;
SRA;
```

SRMK
Spectral Regrowth Marker



Description

This command enables or disables a marker when making a spectral regrowth measurement.

Softkey Equivalent: **MARKER ON** OFF in **Display Modes** menu

Example: -SRMK 1;

Valid Values: 0 = marker off
1 = marker on

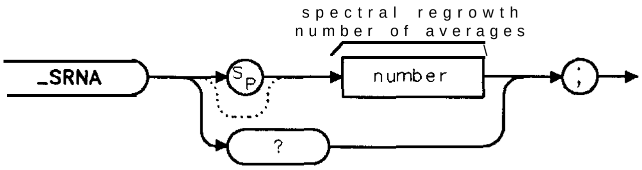
Units: none

Default Value: 0

Preset State: default value

Related Commands: -SRM

-SRNA
Spectral Regrowth Number of Averages



xsrna

Description

This command sets the number of averages in preparation to make a spectral regrowth measurement.

Softkey Equivalent: NUMBER AVERAGES in Spectral Regrowth measurement menu

Example: -SRNA 15;

Range: Any integer from 1 to 99999

Units: none

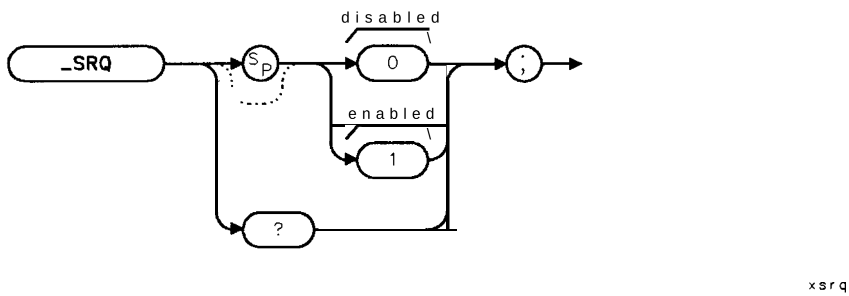
Default Value: 5

Preset State: default value

Related Commands: _SRM

_SRQ
SRQ Measurement Done Indication

Syntax



Description

This command selects the mode for the synchronized completion of a CDMA measurement. SRQ means "HP-IB/IEEE 488 service request." If -SRQ is set to 1, all CDMA measurements will generate an SRQ to tell an external controller that the measurement command is complete. If -SRQ is set to 0, all measurements return a measurement state value in the spectrum analyzer output buffer to tell an external controller that the command is complete.

If -SRQ is set to 1, the measurement state must be returned by querying the value of _DF. The SRQ measurement done indication is valid only with an HP-IB interface (Options 021 or 041).

At the completion of a measurement command with _SRQ enabled, bits 6 and 4 of the status byte are set. The decimal value of the status byte is then 80. $80_{10} = 64_{10}$ (binary bit location 6) + 16_{10} (binary bit location 4).

Softkey Equivalent: none

Example: _SRQ 1;

Valid Values: 0 = SRQ measurement done indication disabled
1 = SRQ measurement done indication enabled

Units: none

Default Value: 0

Preset State: last value

See **also:** "lb determine when a measurement is done" in Chapter 6, "Programming Examples."

Note If -SRQ is enabled, subsequent front panel operation of the personality will generate service request (SRQ) messages on the spectrum analyzer screen. These messages can only be disabled by disabling _SRQ.

_SRS
Spectral Regrowth Setup

xsrs

Description

This command sets up the analyzer in preparation for making a spectral regrowth measurement.

Softkey Equivalent: Spectral Regrowth in the Spectrum menu

Example: _SRS;

Alternate Commands: The _SR command is equivalent to _SRS followed by -SRM.

SRSR
Spectral Regrowth Store Reference

xsrsr

Description

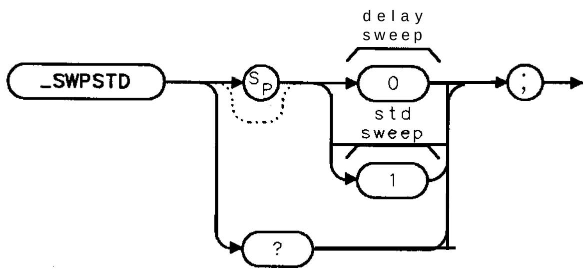
This command stores the reference trace for the spectral regrowth measurement.

Softkey Equivalent: STORE REF TRACE in the Spectral Regrowth measurement menu

Example: _SRSR;

Related Commands: -SRM

-SWPSTD
Sweep Mode for Time Domain



xswpstd

Description

This command specifies the sweep mode for time domain measurements.

Softkey Equivalent: SWEEP STD DLY in TIME DOMAIN menu

Example: _SWPSTD 1;

Valid Values: 0 = delay sweep
1 = standard sweep

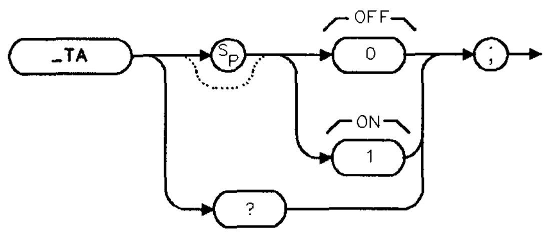
Units: none

Default Value: 0

Preset State: default value

Related Commands: -TDM

-TA
Trace Active



pg734a

Description

This command allows you to select either an active or stored trace to view on the spectrum analyzer display after a measurement has been completed.

Softkey Equivalent: ACTIVE STORED in various post-measurement menus

Example: _TA 1;

Valid Values: 0 = view stored trace
1 = view active trace

Units: none

Default Value: 0

Preset State: default value

Related Commands: _SOPWR, _SEM, -SEC, -GPWRT

-TDM
Time Domain

xtdm

Description

This command makes a time domain measurement.

Softkey Equivalent: TIME DOMAIN in the second Main menu

Example: -TDM;

Related Commands: -PKMNNA, _PKMNF, -THF, _THNA, -THPCT

Alternate Commands: _TDMS followed by -TDMM

See **also:** "To Perform a Time Domain, Peak/Mean Measurement" in Chapter 6, "Programming Examples."

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1	Measurement completed, no errors	None
3	Measurement stopped, carrier power too high	None
Graphic Results (401-element traces)		
TRA	Time domain Waveform	TDF

-TDMM
Time Domain Measurement

xtdmm

Description

This command makes a time domain measurement after the Setup command (-TDMS) has been done.

Softkey Equivalent: none

Example: -TDMM;

Alternate Commands: The **_TDM** command is equivalent to **_TDMS** followed by **_TDMM.**

_TDMS
Time Domain Setup

xtdms

Description

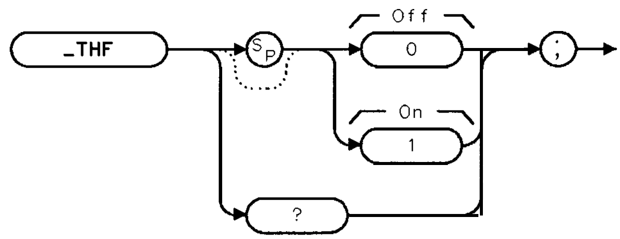
This command sets up the analyzer in preparation to make a time domain measurement.

Softkey Equivalent: none

Example: _TDMS;

Alternate Commands: The -TDM command is equivalent to _TDMS followed by _TDMM.

-THF
Time Domain Histogram Function



xthf

Description

This command controls a histogram function after a time domain measurement.

Use this command after -TDM has been done.

Softkey Equivalent: HISTOGRM ON OFF in Trace Math menu

Example: -THF 1;

Valid Values: 0 = histogram function off
1 = histogram function on

Units: none

Default Value: 0

Preset State: default value

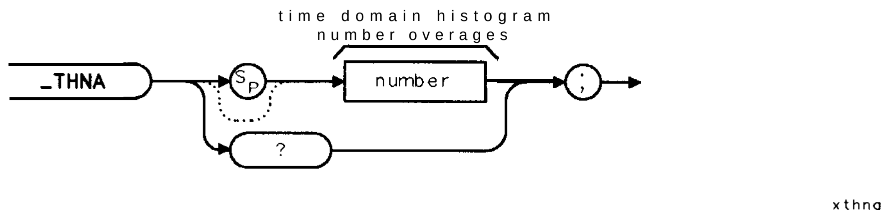
Related Commands: _THNA, _THPCT, TDM

See **also:** "To Perform a Time Domain, Histogram Measurement" in Chapter 6, "Programming Examples. "

Measurement State/Results:

State/Results	Contents Description	Units
Measurement State		
1 .	Measurement completed, no errors	None
2	Measurement stopped, number of occurrences equals limit	None
Graphic Results (401-element traces)		
TRA	Time domain Waveform	TDF
TRB	Histogram	TDF

_THNA
Time Domain Histogram Number Averages



Description

This command sets the number of averages for the histogram function in the time domain measurement.

Softkey Equivalent: HISTOGRM ON Math

Example: _THNA 250;

Range: Any integer from 1 to 1000

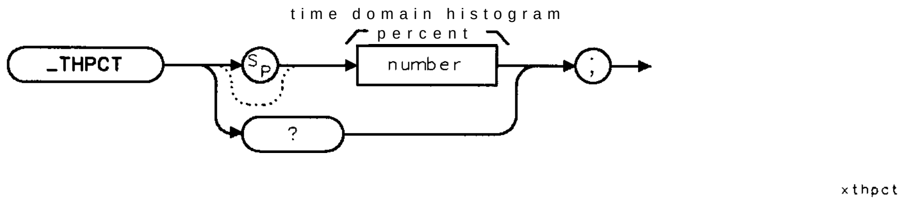
Units: none

Default Value: 100

Preset State: default value

Related Commands: -THF, -THPCT, -TDM

_THPCT
Time Domain Histogram Percent



Description

This command specifies the histogram scale value in terms of a percentage when displaying a time domain measurement histogram.

Softkey Equivalent: HISTOGRM SCALE in Trace Math menu

Example: _THPCT 78;

Range: Any integer from 1 to 100

Units: percentage

Default Value: 100

Preset State: default value

Related Commands: _THF, _TDM, _THNA

-TOL
Time Response Open Loop Power Control

xtol

Description

This command makes a time response open loop power control measurement.

Softkey Equivalent: **OPEN** LOOP in **Time Response** menu

Example: -TOL;

Related Commands: -TOLDP, _TOLST, -TOLCLIM

Alternate Commands: _TOLS followed by _TOLM

Measurement State/Results:

Table . State/Results	Contents Description	Units
Measurement State		
Measurement State		
1	Measurement completed, no errors	None
3	Measurement stopped, carrier power too high	None
Numeric Results (Variables or Arrays)		
-FAIL	0= Pass, 1 = fail lower limit 2 = fail upper limit, 3 = fail upper and lower limits	none
_TOLDPA	Delta Power Amplitude	dB
Graphic Results (401-element traces)		
TRA	Waveform	TDF

_TOLCLIM
Time Response Open Loop Power Compute Limits

xtolclim

Description

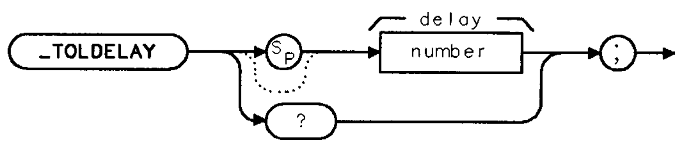
This command computes the limits for a time response open loop power measurement.

Softkey Equivalent: COMPUTE LIMITS in Open Setup menu

Example: -TOLCLIM;

Related Commands: -TOL, _TOLDP, _TOLST

-TOLDELAY
Time Response Open Loop Delay



xtoldelay

Description

This command sets the amount of sweep delay referenced to an external trigger signal.

Softkey Equivalent: DELAY in the Open Setup menu

Example: -TOLDELAY 28;

Range: -100 ms to 100 ms. The actual limits depend on the sweep time and delay of the last active trace.

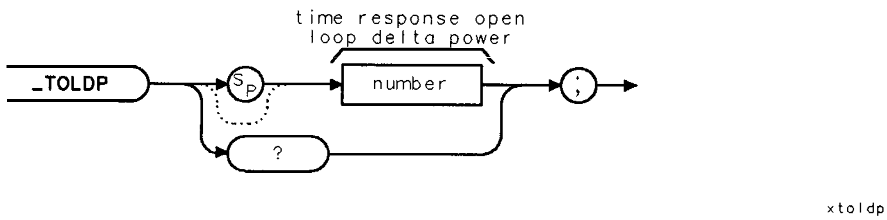
Units: μs

Default Value: 0

Preset State: last value

Related Commands: -TOL

_TOLDP
Time Response Open Loop Delta Power



Description

This command sets the delta power in preparation for making a time response open loop measurement.

Softkey Equivalent: DELTA PWR in Open Setup menu

Example: _TOLDP 25;

Range: Any real value from 3 to 50

Units: dB

Default Value: 20 dB

Preset State: default value

Related Commands: _TOL, _TOLS, _TOLST, _TOLCLIM

_TOLM
Time Response Open Loop Power Control Measurement

xtolm

Description

This command makes a time response open loop power control measurement. Use this command after the setup command (_TOLS) has been done.

Softkey Equivalent: none

Example: _TOLM;

Alternate Commands: The -TOL command is equivalent to _TOLS followed by _TOLM.

_TOLS
Time Response Open Loop Power Control Setup

Description

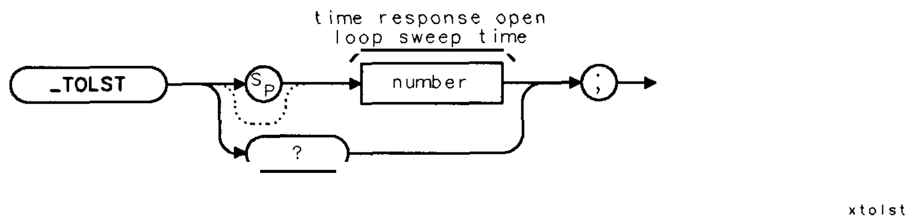
This command sets up the analyzer in preparation for making a time response open loop power control measurement.

Softkey Equivalent: none

Example: _TOLS;

Alternate Commands: The _TOL command is equivalent to _TOLS followed by _TOLM.

_TOLST
Time Response Open Loop Sweep Time



Description

This command sets the sweep time in preparation for making a time response open loop measurement.

Softkey Equivalent: SWP TIME in Open Setup menu

Example: _TOLST 50E−3;

Range: Any real value from 5 ms to 200 ms

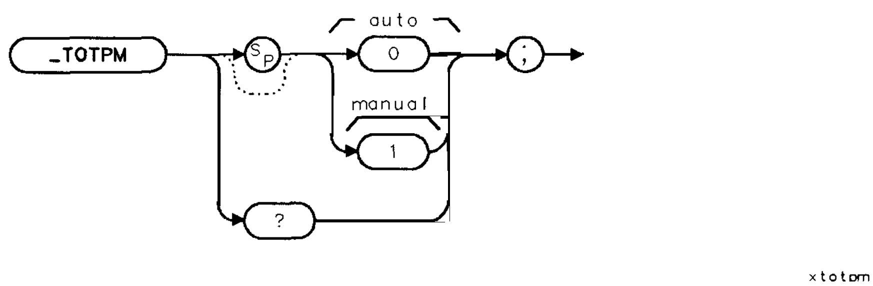
Units: seconds

Default Value: 100 ms

Preset State: default value

Related Commands: _TOL, _TOLDP, -TOLCLIM

_TOTPM
Total Max Power Mode



Description

This command selects the total power mode.

Softkey Equivalent: MAX PWR AUTO MAN in the first **CDMA Config** menu

Example: _TOTPM 1;

Valid Values: 0 = total max power auto
1 = total max power manual

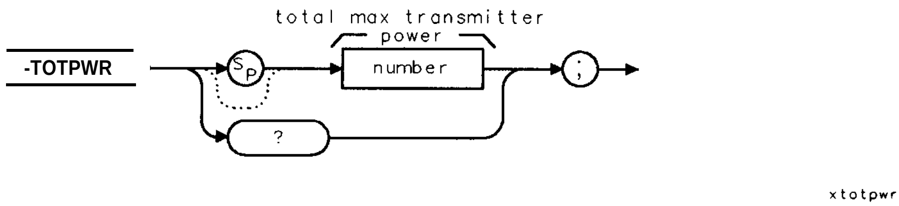
Units: none

Default Value: 0

Preset State: last value

Related Commands: -TOTPWR

-TOTPWR
Total Max Power



Description

This command sets the maximum total RF power expected into the spectrum analyzer input when MAX PWR MAN is selected.

Softkey Equivalent: MAX PWR AUTO MAN in the first CDMA Config menu

Example: -TOTPWR 20;

Range: Any real value from -40 to 60

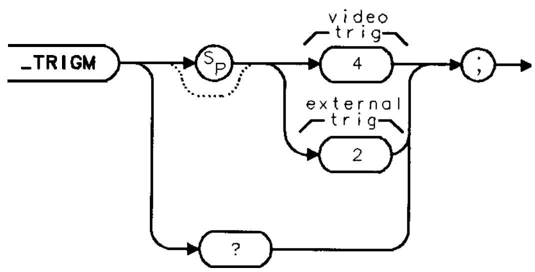
Units: dBm

Default Value: 35 dBm

Preset State: **last** value

Related Commands: _TOTPM

_TRIGM
Trigger Mode



pg749a

Description

This command sets the gated power timing trigger mode.

Softkey Equivalent: TRIG VID EXT in the second CDMA Config menu

Example: _TRIGM 4;

Valid Values: 4 = video trigger
2 = external trigger

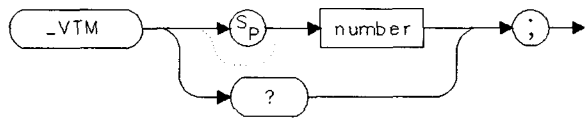
Units: none

Default Value: 4

Preset State: last value

Related Commands: _TDM, -GPWRT

_VTM
Video Trigger Margin



pg74c

Description

Set the video trigger margin used for Gated Power Timing and Time Domain measurements. Trigger level is set below the signal peak by the value given to **_VTM.**

Softkey Equivalent: VID TRG MARGIN in the first CDMA Config menu

Example: -VTM 15;

Range: Any real value from 0 to + 100 dB

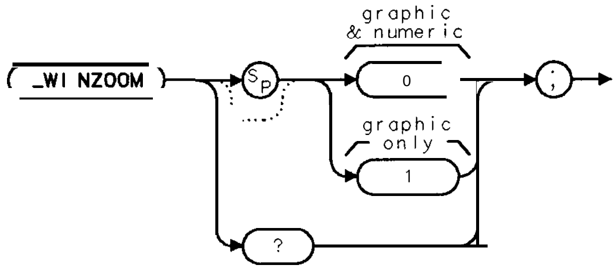
Units: dB

Default Value: 25 dB

Preset State: Value remains through preset.

Related Commands: _GPWRT, _GPTS, _TDM, _TDMS

_WINZOOM
Window Zoom



xwinzoom

Description

This command controls the display format. Do not confuse this with the spectrum analyzer WINZOOM command.

Hardkey Equivalent: (ZOOM)

Example: _WINZOOM 1;

Valid Values: 0 = graphic plus numeric windows
1 = graphic window only (zoomed large)

Units: none

Default Value: 0

Preset State: default value

6

Programming Examples

This chapter explains how the CDMA measurements personality functions can be executed by using programming commands. When you use programming commands to operate the CDMA measurements personality, you send instructions to the spectrum analyzer instead of pressing the softkeys. The instructions (also called programming commands) are usually sent to the spectrum analyzer with a computer. However, you can also execute instructions without a computer, as explained in this chapter.

Before you can program the spectrum analyzer, you must connect the spectrum analyzer to the computer. See the spectrum analyzer programmer's guide for more information.

All the examples in this chapter that use a computer (that is, contain line numbers or use `OUTPUT 718` or `OUTPUT @Sa`) are written in HP BASIC.

Accessing the CDMA Analyzer Mode for Remote Operation

To use the CDMA programming commands, the CDMA measurements personality must be loaded into spectrum analyzer memory, and CDMA Analyzer mode must be selected.

To select the CDMA Analyzer mode remotely

1. Prepare the spectrum analyzer for the DONE command by doing an instrument preset and placing the spectrum analyzer into a single sweep mode.
2. Change to the CDMA Analyzer mode by setting the value of the MODE command to 10.
3. Perform a take sweep. You must do a take sweep before executing the DONE command.
4. Execute the DONE command.
5. Wait until the DONE command returns a `1`.

The spectrum analyzer must be using the CDMA Analyzer mode before you can send any CDMA programming commands to the spectrum analyzer. You need to execute the DONE command to ensure that the spectrum analyzer has finished executing the MODE command.

Example

`OUTPUT 718;"IP;SNGLS;"`	***Does an instrument preset and places the spectrum analyzer in the single sweep mode.***
`OUTPUT 718;"MODE 10;"`	***Changes to the CDMA mode.***
`OUTPUT 718;"TS;"`	***Performs a take sweep.***
`OUTPUT 718;"DONE?;"`	***DONE? returns a "1" when the MODE command and the take sweep command are completed.***
`ENTER 718;Done`	***Waits until a "1" is returned.***

Programming Basics for CDMA Remote Operation

This section contains information about how to use the CDMA programming commands. For more information about a specific command, refer to the description for the command in Chapter 5, "Programming Commands."

This section contains the following procedures:

- Use the MOV command.
- Use the CDMA setup and measurement commands.
- Use the _RPT command.
- Determine when a measurement is done.
- Use an external keyboard to enter programming commands.
- 'lb use the **EXECUTE** TITLE **softkey** to enter commands.

Note The CDMA programming commands and variables begin with an underscore (_), and spectrum analyzer programming commands do not. For example, -CH is a CDMA programming command, and MOV is a spectrum analyzer programming command.

This guide contains information about the CDMA programming commands. See the spectrum analyzer programmer's guide for information about the spectrum analyzer programming commands.

To use the spectrum analyzer MOV command

- Use the MOV command to move a value into a CDMA command that can accept a value.

You are encouraged to use the MOV command when you need to move a value into a CDMA programming command. Using MOV allows the spectrum analyzer to process the command faster because no text is displayed in the active function area during command execution.

Example

This example shows how to move a number into the _CH command. The _CH command allows you to enter the channel number to be measured.

`OUTPUT 718;"MOV _CH,4;"`	***Changes the channel number to 4.***

To use the CDMA setup and measurement commands

1. Execute the measurement's setup command.
2. Change the spectrum analyzer setting, as desired.
3. Execute the measurement's "measure" command.

Most of the CDMA measurements can be done two ways:

Method 1: By executing the command that automatically performs both the setup and measurement. For example, -CHPWR sets up the measurement and also performs the channel power measurement

or,

Method 2: By executing the command that sets up the measurement, a command that changes a spectrum analyzer setting, and then the command that actually performs the measurement. This method allows you to change parameters (for example, resolution bandwidth) for a measurement. For example, the two commands needed to perform the channel power measurement are _CHPS (sets up the measurement) and _CHPM (actually performs the measurement).

This procedure demonstrates how you can perform a measurement by the second method.

Example

`OUTPUT 718;"_CHPS;"`	***Sets up the spectrum analyzer settings for the channel power measurement. After _CHPS is executed, the resolution bandwidth is set to 30 kHz.***
`OUTPUT 718;"RB 10KHZ;"`	***Changes the resolution bandwidth to 10 kHz.***
`OUTPUT 718;"_CHPM;"`	***Performs the channel power measurement.***

To use the repeat command

- Execute the _RPT command to repeat a measurement.

Use the _RPT command to repeat a measurement. Some CDMA measurements personality parameters, such as channel number and trace status, can be changed prior to executing _RPT.

Example

`OUTPUT 718;"MOV _CH,1;"`	***Changes the channel number to channel 1. _CH is the command for the channel number***
`OUTPUT 718;"_RPT;"`	***Repeats the previous measurement.***

To determine when a measurement is done

Two methods are available to determine when a measurement is done. The command _SRQ controls which of the two is used.

Method 1, **_SRQ** disabled

If _SRQ is disabled (the default), the analyzer automatically returns the measurement state value in the output buffer when the command is completed. This method is detailed below.

1. Execute the desired measurement command. When the measurement is finished, the command will return a number. This number is called the measurement state.
2. Use a REPEAT UNTIL loop to enter the numbers from the spectrum analyzer output buffer into the computer.

   Because there may be other numbers in the spectrum analyzer output buffer, you need to use a loop to determine if the measurement state has been received. See the description for the command in Chapter 5, "Programming Commands," to determine what numbers are valid measurement state values.
3. Examine the value of the measurement state.

   If the number is 1, the spectrum analyzer has successfully completed the command. If the number is greater than 1, an error has occurred. See the description for the measurement command in Chapter 5, "Programming Commands," for more information about error conditions and measurement state values.

You must check the measurement state to make sure that the results of a measurement are not queried before the measurement is completed. The measurement state is also useful for checking for error conditions (for example, if the carrier level is too high to make the measurement).

Example

`OUTPUT 718;"_CHPWR;"`	***Performs the channel power routine***
`REPEAT`	***Repeats the ENTER statement until a valid number for the measurement state is found.***
`  ENTER 718;Meas_state`	***Enters the values from the analyzer buffer.***
`UNTIL Meas_state>0 AND Meas_state<6`	***Ignores numbers that are not valid numbers for the _CHPWR measurement state. fir _CHPWR, the only valid measurement state values are 1, 3, 4, and 5.***

Method 2, _SRQ enabled

If _SRQ is enabled, the analyzer generates an HPIB/IEEE488 service request (SRQ), and sets a value in its status byte. Many different ways of using the SRQ and status byte exist. One way (using HP BASIC) is shown below.

For other examples that use HP BASIC, see "How an Instrument Summons Service" in Chapter 16, of the HP 82302A Using ***HP BASIC for Instrument Control, A Self-Study Course.*** For examples using the Quickbasic or C programming languages, see the file "HP-RMBCNV.TXT, " on the disk included with the HP 82335B HP-IB Interface. HP VEE users can use the WAIT SPOLL direct I/O transaction.

1. Enable SRQ measurement done indication. This need only be done once; all subsequent measurements will be made with SRQ measurement done indication.
2. Execute the desired measurement command. When the measurement is finished, the command will issue an SRQ and set the instrument status byte to the decimal value 80.
3. Use a REPEAT/UNTIL loop to enter values from the spectrum analyzer status byte into the computer using the HP BASIC SPOLL command.
4. Note the status byte value. If the number is greater than zero, the measurement has completed.
5. Test the status byte value. If the value is 80, the measurement has completed normally with bits 6 and 4 set. $80_{10} = 64_{10}$ (binary bit location 6) + 16_{10} (binary bit location 4). Other values indicate other bits are set (for example, bit 5, which is an illegal command).
6. If the command completed normally, query and note the measurement state value.

   If the number is 1, the spectrum analyzer has successfully completed the command. If the number is greater than 1, an error has occurred. See the description for the measurement command in Chapter 5, "Programming Commands," for more information about error conditions and measurement state values.

   The measurement results can be queried only after the measurement is complete. The measurement state value is useful for checking error conditions. For example, it can detect that the carrier level is too low for a measurement to be made.

Note This method requires that Option 021 (HP-IB Interface), or Option 041 (HP-IB and Parallel Interface), is installed.

Example

`OUTPUT 718;"MOV _SRQ,1;"`	***Enables SRQ measurement done indication.***
`OUTPUT718;"_CHPWR;"`	***Performs the channel power routine.***
`REPEAT`	***Repeats the SPOIL command until the.***
`  Status-byte = SPOLL (718)`	***status byte is greater than 0.***
`UNTIL Status_byte>0`	
`If Status-byte = 80 THEN`	***Command completed normally.***
`  Output 718; "_DF?;"`	***Query measurement state using Dl?***
`  ENTER 718; Meas_state`	***Enter value.***
`ELSE`	***Other bits also set.***
`  DISP "Abnormal command complete"`	
`ENDIF`	

To use an external keyboard to enter commands

1. Turn off the spectrum analyzer.

Caution Do not connect the keyboard to the spectrum analyzer while the spectrum analyzer is turned on.

---

2. Connect an HP C1405B Option 2 cable from the spectrum analyzer rear panel connection (marked EXT KEYBOARD) to the HP C1405B Option ABA keyboard.
3. Press (LINE) to turn on the spectrum analyzer, then press (MODE) **CDMA ANALYZER** .
4. Press (F8) on the external keyboard to enter the "keyboard to command" mode.
5. Type in the command syntax. The characters that you type are shown at the top of the spectrum analyzer display. You can enter more than one command per line by separating the commands with a semicolon (for example, IP ; SNGLS ;).
6. Press (ENTER).

You can enter the programming commands into the spectrum analyzer by using a keyboard that is connected to the spectrum analyzer external keyboard connector. The external keyboard connector is included with analyzers having Option 021, 023, 024, 041, or 043. Refer to the spectrum analyzer programmer's guide for more information about the different external keyboard functions.

Because you are not using an external computer, the CDMA personality and spectrum analyzer commands are entered without an OUTPUT or PRINT statement preceding them.

Example

Type in following programming line. Press [ENTER) after the programming line has been entered.

MOV_CH,2; ***Changes the channel number to 2. -CH is the command for the channel number.***

To use the EXECUTE TITLE softkey to enter commands

If an external keyboard is not available or your analyzer does not have Option 021, 023, 024, 041, or 043 installed, you can enter commands using the analyzer **EXECUTE** TITLE softkey.

1. Press **DISPLAY**, Change Title. Use the softkeys to select characters for the command to be entered. You can also use the **RPG TITLE** softkey to select characters from a list on the screen. When using the **RPG** TITLE softkey, use the knob or arrow keys to place the cursor under the desired character. Press ENTER to select the character for the title. Press Windows (NEXT) to exit the RPG title mode.
2. Press (CAL), **More** 1 of 4, More 2 of 4 , Service Cal , **EXECUTE** TITLE to execute the commands entered into the title area.

The HP 85725C CDMA Measurements Personality and spectrum analyzer commands are entered without an OUTPUT or PRINT statement preceding them because you are not using an external computer.

Example

Enter the following programming line into the title area:

`MOV _CH,3;` ***Changes the channel number to 3.***

Execute the title using the EXECUTE TITLE softkey.

Customizing the CDMA Personality

The CDMA personality uses limits, parameters, and limit lines when performing the measurements. You can change the values of the limits, parameters, and limit lines so that the CDMA personality performs the measurements according to your particular test situation. For your convenience, you can store the limits and parameters that you have changed on a RAM memory card so the values can be easily loaded into the spectrum analyzer memory, whenever needed. This section contains the following procedures:

- Change the value of limit variables.
- Change the value of parameter variables.
- Save the revised limit variables, parameter variables, or limit-line functions on a RAM card, using an external keyboard.
- Save the revised limit variables, parameter variables, or limit-line functions on a RAM card, using a computer.

To change the value of limit variables

- Use the MOV command to move the new value for a limit into the variable for the limit.

  or,

- Use the VARDEF command to move the new value for a limit into the variable for the limit. Using VARDEF to move the value for a limit redefines the instrument preset (IP) value of that limit.

The CDMA measurements personality uses a "limit" to decide if the measurement results failed or passed. For example, if a signal is above the standby output power limit, the unit under test will fail the standby output power measurement. You can change a limit by changing the value of the limit variable. See Chapter 5, "Programming Commands," for a list of all the limit variables.

If you use the MOV command:

The limit variable will be reset to the default value for the limit variable if an instrument preset (IP) is executed or the spectrum analyzer is turned off.

Example of the MOV command

`OUTPUT 718;"MOV _SETXF,-50;"` ***Changes the limit for standby output power from its current value to -50 dBm.***

If you use the VARDEF command:

The new value for the limit variable is retained even if an instrument preset (IP) is executed or the spectrum analyzer is turned off.

Example for the VARDEF command

`OUTPUT 718;"VARDEF _SETXF,-50;"` ***Changes the limit for standby output power from its current value to -50 dBm.***

The VARDEF command changes the CDMA measurements personality that is currently in spectrum analyzer memory; the VARDEF command does not change the program on the HP 85725C CDMA Measurements Personality memory card. If you reload the CDMA measurements personality from the HP 85725C CDMA Measurements Personality memory card, all the limit variables are set to their default values.

To change the value of parameter (setup) variables

- Use the MOV command to move the new value for a parameter into the variable for the parameter

  or,

- Use the VARDEF command to move the new value for a parameter into the variable for the parameter. Using VARDEF to move the value for a parameter redefines the instrument preset (IP) value of that parameter.

Many of the CDMA programming commands use one or more parameters when making a measurement. A parameter is a variable that specifies a spectrum analyzer setting. For example, the spurious emission measurement uses the parameter -SEIBW for the integration bandwidth used for the spurious emission measurement. You can change the parameter for a measurement by moving the new value into the parameter variable. See Chapter 5, "Programming Commands," for a list of all parameter variables.

If you use the MOV command:

The parameter variable will be reset to the default value for the parameter variable if an instrument preset (IP) is executed or the spectrum analyzer is turned off.

Example of the MOV command

`OUTPUT 718;"MOV _SEIBW,300E3;"`	***Sets the spurious mission integration bandwidth to 300 kHz.***

If you use the VABDEF command:

The new value for the parameter variable is retained even if an instrument preset (IP) is executed or the spectrum analyzer is turned off.

Example for the VARDEF command

`OUTPUT 718;"VARDEF _SEIBW,300E3;"`	***Sets the spurious emission integration bandwidth to 300 kHz.***

The VARDEF command changes the CDMA measurements personality that is currently in spectrum analyzer memory; the VARDEF command does not change the program on the HP 85725C CDMA Measurements Personality memory card. If you reload the CDMA measurements personality from the HP 85725C CDMA Measurements Personality memory card, all the parameter variables are set to their default values.

To save limit variables and parameter variables on a RAM card, using an external keyboard

1. Refer to "To use an external keyboard to enter commands," earlier in this chapter for information about connecting an external keyboard to the spectrum analyzer.
2. Delete the current version of the CDMA personality and any other downloadable programs from analyzer memory by pressing (CONFIG) **More 1** of 3 Dispose User **Mem** **ERASE** DLP **MEM**, ERASE DLP **MEM** .
3. Insert a RAM card into the analyzer front panel memory card reader. Ensure that the RAM card is not write-protected. (The switch on the RAM card should be set to the read/write (↔) position.) The card must have previously been initialized using the analyzer **FORMAT** CARD softkey in the (CONFIG) menu.
4. Type in the programming statements that define the limit variable, parameter variable, or limit-line function.
   - For a limit or parameter variable, type "VARDEF", the name of the variable, a comma, and the value desired for the limit or parameter. See Chapter 5, "Programming Commands," for a complete list of limit and parameter variables. Repeat this step for each variable or limit to be defined.
5. Type in "STOR d, 'dLIMITS', * ; " to store all the newly defined limits, parameters, and limit-line functions on the memory card. The limits, parameters, and limit-line functions will be stored in a file called "dLIMITS."
6. Load the personality into spectrum analyzer memory. (See Chapter 1, "Getting Started," for more information.)
7. Remove the CDMA memory card from the memory card reader and insert the RAM card (with the dLIMITS file on it) into the memory card reader.
8. Load the dLIMITS file into spectrum analyzer memory by pressing (RECALL). If CARD is not underlined, then press **INTERNAL** CARD , Catalog Card, CATALOG ALL . If necessary, turn the large knob on the spectrum analyzer front panel until "dLIMITS" is highlighted. Press **LOAD** FILE.

When you load the CDMA measurements personality, the measurements personality uses default values for the limits, parameters, and limit-line functions. If you then load the dLIMITS file into spectrum analyzer memory, the personality will use the revised limit values, variable value, or limit-line function. The revised values and limit-line functions will remain in spectrum analyzer memory until the analyzer memory is erased, the personality is reloaded from the memory card, or the values are changed by using the MOV or VARDEF command.

Example

Use an external keyboard to enter in the following command example lines. Press ENTER after each line:

```
VARDEF _SETXF, -50 ;
STORd,'dLIMITS',*;
```

_SETXF,-50; changes the limit for standby output power from its current value to -50 dBm. The last line stores these limits on a RAM card with the file name "dLIMITS."

To save limit variables and parameter variables on a RAM card, using a computer

1. Insert a RAM card into the analyzer front panel memory card reader. Ensure that the RAM card is not write-protected. (The switch on the RAM card should be set to the read/write (↔) position.) The card must have previously been initialized using the analyzer **FORMAT CARD softkey** in the **Config** menu.
2. Delete the current version of the CDMA personality and any other downloadable programs from analyzer memory with the DISPOSE ALL command.
3. Type in the programming statements that define the limit, parameter, or limit-line function.
   - For a limit or parameter variable, use an OUTPUT or PRINT command to send the spectrum analyzer command VARDEF (defines the limit or parameter variable) and the limit or parameter variable name. See Chapter 5, "Programming Commands, " for a complete list of limits and parameter variables. Repeat this step for each variable to be defined.
4. Use an OUTPUT or PRINT command to send the STOR spectrum analyzer command. Use "STOR d, **'dLIMITS'**, * ; " to store the newly defined variables or limit-line functions on the memory card. The variables and limit-line function will be stored in a file called "**dLIMITS.**"
5. Load the personality into spectrum analyzer memory. See Chapter 1, "Getting Started, " for more information.
6. Remove the CDMA memory card from the memory card reader and insert the RAM card (with the **dLIMITS** file on it) into the memory card reader.
7. Load the **dLIMITS** file into spectrum analyzer memory by pressing (RECALL). If CARD is not underlined, then press **INTERNAL** CARD , **Catalog** Card, CATALOG ALL . If necessary, turn the large knob on the spectrum analyzer front panel until "**dLIMITS**" is highlighted. Press **LOAD** FILE.

   or,

   Use the LOAD command to load the **dLIMITS** file. For example, execute `OUTPUT 718;"LOAD %dLIMITS%;"`.

When you load the CDMA measurements personality, the measurements personality uses default values for the limit and parameter variables and the limit-line functions. If you then load the **dLIMITS** file into spectrum analyzer memory, the personality will use the revised limit or parameter values or limit-line functions. The revised values or limit-line functions will remain in spectrum analyzer memory until the analyzer memory is erased, or the personality is reloaded from the memory card.

Any number of custom limit files may be created and stored on a memory card as long as each file has a unique file name, and there is enough space on the RAM card to store the files.

Example

```
10     !re-store"LIMITS_EX"
20     !Shows how to save custom measurement limits to a card
30     !for the CDMA DLP. This card file can then be loaded after
40     !loading CDMA.
50     !
60     ASSIGN @Sa TO 718                   !i/o path to spectrum analyzer
70     !
80     !
90     OUTPUT @Sa;"IP;SNGLS;"
100    OUTPUT @Sa;"TS;DONE?"
110    ENTER @Sa;Done
120    OUTPUT @Sa;"DISPOSE ALL;"   !make sure all DLPs erased.
130    WAIT 12                         !wait for dispose all to finish.
140    OUTPUT @Sa;"VARDEF -SETXF, -50;"   ! change the limit for
       standby output power from its current value to -50 dBm
150    !
160    OUTPUT @Sa;"STOR d,'dLIMITS',*;" ! store to RAM memory card
170    OUTPUT @Sa;"CONTS;"   ! continuous sweep
180    DISP "DONE"
190    !
200    END
```

Remote Measurements

This section contains programming examples that show you how to do the following measurements remotely:

- Make an adjacent channel power ratio measurement.
- Make an in-band maximum power spurious emission measurement.
- Make a channel power measurement.
- Make a gated power measurement.
- Make a time domain, peak/mean measurement.
- Make a time domain, histogram measurement.
- Make an out-of-band, spurious emission measurement.
- Edit an out-of-band spurious emission table.

To make an adjacent channel power ratio measurement

This example shows how to perform a transmitter adjacent channel power ratio measurement using the setup commands and the _ACPR measurement command. The measurement is performed using the resolution bandwidth method.

```
  !re-store"ACPR_EX"
  !Show how to use the _ACPR command in the CDMA DLP

  !
REAL Meas_state
REAL Chpr                          ! Channel Power amplitude
REAL Chpsd                         ! Ch par spectral density
!
REAL Noff_a_pwr                    ! Negative Offset A Power amplitude
REAL Noff_b_pwr                    ! Negative Offset B Power amplitude
REAL Noff_c_pwr                    ! Negative Offset C Power amplitude
!
REAL Poff_a_pwr                    ! Positive Offset A Power amplitude
REAL Poff_b_pwr                    ! Positive Offset B Power amplitude
REAL Poff,c-par                    ! Positive Offset C Power amplitude
!
REAL Noff_a_psd                    ! Negative Offset A Power Spectral Density
REAL Noff_b_psd                    ! Negative Offset B Power Spectral Density
REAL Noff_c_psd                    ! Negative Offset C Power Spectral Density
!
REAL Poff,a,psd                    ! Positive Offset A Power Spectral Density
REAL Poff_b_psd                    ! Positive Offset B Power Spectral Density
REAL Poff_c_psd                    ! Positive Offset C Power Spectral Density
!
REAL Off-a-f                       ! Offset A Frequency
REAL Off_b_f                       ! Offset B Frequency
REAL Off_c_f                       ! Offset C Frequency
  !
ASSIGN @Sa TO 718                  ! I/O path to spectrum analyzer
  !
  !
OUTPUT @Sa;"_ACPR;"                ! execute ACPR measurement
REPEAT
    ENTER @Sa;Meas_state           ! enter measurement state
UNTIL Meas_state>0 AND Meas_state<6
  !
IF Meas_state=1 THEN               ! measurement complete
    !
    OUTPUT @Sa;"_ACPRTP[1]?;"     ! query channel power amplitude
    ENTER @Sa;Chpr                 ! enter value
    OUTPUT @Sa;"_ACPRTP[2]?;"     ! query ch pwr spectral density
    ENTER @Sa;Chpsd                ! enter value
    OUTPUT @Sa;"_ACPRTP[3]?;"     ! query neg offset A power
    ENTER @Sa;Noff_a_pwr           ! enter value
    OUTPUT @Sa;"_ACPRTP[4]?;"     ! query pos offset A power
    ENTER @Sa;Poff_a_pwr           ! enter value
    OUTPUT @Sa;"_ACPRTP[5]?;"     ! query neg offset B power
    ENTER @Sa;Noff_b_pwr           ! enter value
    OUTPUT @Sa;"_ACPRTP[6]?;"     ! query pos offset B power
```

```
50       ENTER @Sa;Poff_b_pwr           ! enter value
51       OUTPUT @Sa;"_ACPRTP[7]?;"      ! query neg offset C power
52       ENTER @Sa;Noff_c_pwr           ! enter value
53       OUTPUT @Sa;"_ACPRTP[8]?;"      ! query pos offset C power
54       ENTER @Sa;Poff_c_pwr           ! enter value
55       !
56       OUTPUT @Sa;"_ACPRDP[3]?;"      ! query neg offset A psd
57       ENTER @Sa;Noff_a_psd           ! enter value
58       OUTPUT @Sa;"_ACPRDP[4]?;"      ! query pos offset A psd
59       ENTER @Sa;Poff_a_psd           ! enter value
60       OUTPUT @Sa;"_ACPRDP[5]?;"      ! query neg offset B psd
61       ENTER @Sa;Noff_b_psd           ! enter value
62       OUTPUT @Sa;"_ACPRDP[6]?;"      ! query pos offset B psd
63       ENTER @Sa;Poff_b_psd           ! enter value
64       OUTPUT @Sa;"_ACPRDP[7]?;"      ! query neg offset C psd
65       ENTER @Sa;Noff_c_psd           ! enter value
66       OUTPUT @Sa;"_ACPRDP[8]?;"      ! query pos offset C psd
67       ENTER @Sa;Poff_c_psd           ! enter value
68       !
69       OUTPUT @Sa;"_ACPRFA?;"         ! query Offset A frequency
70       ENTER @Sa;Off_a_f              ! enter value
71       OUTPUT @Sa;"_ACPRFB?;"         ! query Offset B frequency
72       ENTER @Sa;Off_b_f              ! enter value
73       OUTPUT @Sa;"_ACPRFC?;"         ! query Offset C freqeuncy
74       ENTER @Sa;Off_c_f              ! enter value
75       OUTPUT @Sa;"_FAIL?;"           ! query fail flag
76       ENTER @Sa;Failflag             ! enter value
77       !
78 Fmt1:IMAGE "ACPR          -OFFSET(dB)      +OFFSET(dB)                 PASS"
79 Fmt2:IMAGE "ACPR          -OFFSET(dB)      +OFFSET(dB)                 FAIL"
80 Fmt5:IMAGE "ACPR          -OFFSET(dBc)     +OFFSET(dBc)                PASS"
81 Fmt6:IMAGE "ACPR          -OFFSET(dBc)     +OFFSET(dBc)                FAIL"
82 Fmt3:IMAGE X,DDD.D," kHz",4X,SDDD.DD,10X,SDDD.DD,4X," |      Chan Ref Power"
83 Fmt4:IMAGE X,D.DDD," MHz",4X,SDDD.DD,10X,SDDD.DD,4X," |         /30  kHz "
84 Fmt8:IMAGE X,D.DDD," MHz",4X,SDDD.DD,10X,SDDD.DD,4X," |         /1.400 MHz"
85 Fmt7:IMAGE X,D.DDD," MHz",4X,SDDD.DD,10X,SDDD.DD,4X," |",8X,SDDD.DD," dBm"
86       !
87       ! ACPR Total Power Ratio
88       !
89       IF NOT Failflag THEN           ! If the ACPR test passed
90          PRINT USING Fmt5            ! Use the format given in Fmt5
91       ELSE
92          PRINT USING Fmt6            ! Use the format given in Fmt6
93       END IF
94       PRINT USING Fmt3;Off_a_f/1000,Noff_a_pwr/100,Poff_a_pwr/100
95       PRINT USING Fmt7;Off_b_f/1000000,Noff_b_pwr/100,Poff_b_pwr/100,Chpr/100
96       PRINT USING Fmt8;Off_c_f/1000000,Noff_c_pwr/100,Poff_c_pwr/100
97       PRINT
98       PRINT
99       PRINT
100      !
101      ! ACPR PSD Power Ratio
102      !
103      IF NOT Failflag THEN           ! If the ACPR test passed
104         PRINT USING Fmt1            ! Use the format given in Fmt1
```

```
105     ELSE
106         PRINT USING Fmt2          ! Use the format given in Fmt2
107     END IF
108     PRINT USING Fmt3;Off_a_f/1000,Noff_a_psd/100,Poff_a_psd/100
109     PRINT USING Fmt7;Off_b_f/1000000,Noff_b_psd/100,Poff_b_psd/100,Chpsd/100
110     PRINT USING Fmt4;Off_c_f/1000000,Noff_c_psd/100,Poff_c_psd/100
111     PRINT
112 ELSE
113     DISP "Measurement aborted"
114 END IF
115 END
```

To make an in-band, maximum power spurious emission measurement

This example shows how to perform a maximum power spurious emission measurement using the **_SETM** programming command.

```
10    !re-store"SETM_EX"
20    !Shows how to use the ,SETM command in the CDMA DLP
30    !
40    !
50    REAL Meas_state              ! measurement state variable
60    REAL Chan,pwr                ! channel power amplitude
70    REAL Fail-flag               ! flag=1 if fails
80    REAL Delta-amp               ! delta amplitude from limit line
90    REAL Delta-freq              ! delta frequency from carrier
100   REAL Segment-flag            ! -1 if F-, 0 if Fc, 1 if F+
110   REAL Trace-index             ! marker trace position index value
120   REAL Trace_array(1:401)      ! array to hold analyzer trace
130   REAL Trace_array_fm(1:401)   ! array to hold analyzer trace, F-
140   REAL Trace_array_fc(1:401)   ! array to hold analyzer trace, Fc
150   REAL Trace_array_fp(1:401)   ! array to hold analyzer trace, F+
160   !
170   ASSIGN @Sa TO 718            ! i/o path to spectrum analyzer
180   !
190   !
200   OUTPUT @Sa;"MOV _SEMK,1;"    ! enable spur emission markers
210   !
220   OUTPUT @Sa;"_SETM;"          ! execute spur emission max pwr measurement
230   REPEAT
240     ENTER @Sa;Meas_state       ! enter measurement state
250   UNTIL Meas_state>0 AND Meas_state<4
260
270   IF Meas_state=1 THEN         ! measurement completed
280     OUTPUT @Sa;"_CHPA?;"       ! channel power amplitude
290     ENTER @Sa;Chan_pwr         ! enter value
300     OUTPUT @Sa;"_FAIL?;";      ! query fail flag
310     ENTER @Sa;Fail_flag        ! enter value
320     PRINT "Spurious emission maximum power:";
330     IF Fail-flag THEN
340       PRINT " FAILED"
350     ELSE
360       PRINT " PASSED"
370     END IF
380     OUTPUT @Sa;"_CHPA?;"       ! query channel power
390     ENTER @Sa;Chan_pwr         ! enter value
400     PRINT "Channel power= ";Chan_pwr;"dBm"
410     OUTPUT @Sa;"_SERM[1]?;"    ! query amplitude delta
420     ENTER @Sa;Delta_amp        ! enter value
430     Delta_amp=Delta_amp/10     ! convert to dB
440     PRINT "Delta amplitude from limit line= ";Delta_amp;"dB"
450     OUTPUT @Sa;"_SERM[2]?;"    ! query frequency delta
460     ENTER @Sa;Delta_freq       ! enter value
470     Delta_freq=Delta_freq*10   ! convert to KHz
480     PRINT "Delta frequency from carrier= ";Delta_freq;"KHz"
490     OUTPUT @Sa;"_SERM[4]?;"    ! query segment flag
500     ENTER @Sa;Segment_flag     ! enter value
```

```
510     IF Segment-flag=-1 THEN PRINT "Segment= F-"
520     IF Segment_flag=0 THEN PRINT "Segment= Fc"
530     IF Segment_flag=1 THEN PRINT "Segment= F+"
540     OUTPUT @Sa;"TDF P;"          ! set analyzer trace data format
550     OUTPUT @Sa;"TRA?;"           ! query trace A
560     ENTER @Sa;Trace_array(*)     ! enter trace
570     OUTPUT@Sa;"_SERM[5]?;"       ! query marker trace position index
580     ENTER @Sa;Trace_index
590     PRINT "Worst case spur value= ";Trace_array(Trace_index);"dBm"
600     PRINT
610     OUTPUT @Sa;"MOV _SEG,-1;"    ! set for F- segment
620     OUTPUT @Sa;"TRA?;"           ! query trace A
630     ENTER @Sa;Trace_array_fm(*) ! enter trace
640     OUTPUT @Sa;"MKP?;"           ! query marker position
650     ENTER @Sa;Trace_index
660     PRINT "F- trace marker value= ";Trace_array_fm(Trace_index);"dBm"
670     OUTPUT @Sa;"MOV _SEG,0;"     ! set for Fc segment
680     OUTPUT @Sa;"TRA?;"           ! query trace A
690     ENTER @Sa;Trace_array_fc(*) ! enter trace
700     OUTPUT @Sa;"MKP?;"           ! query marker position
710     ENTER @Sa;Trace_index
720     PRINT "Fc trace marker value= ";Trace_array_fc(Trace_index);"dBm"
730     OUTPUT @Sa;"MOV _SEG,1;"     ! set for F+ segment
740     OUTPUT @Sa;"TRA?;"           ! query trace A
750     ENTER @Sa;Trace_array_fp(*) ! enter trace
760     OUTPUT @Sa;"MKP?;"           ! query marker position
770     ENTER @Sa;Trace_index
780     PRINT "F+ trace marker value= ";Trace_array_fp(Trace_index);"dBm"
790     OUTPUT @Sa;"MOV_SEG ";Segment_flag;";" ! set back to worst case seg
800   ELSE
810     DISP "Measurement aborted"
820   END IF
830   !
840   END
```

To make a channel power measurement

This example shows how to perform a channel power measurement using the _CHPWR programming command.

```
10   !re-store"CHPWR_EX"
20   !Shows how to use the _CHPWR command in the CDMA DLP
30   !
40   !
50   REAL Meas_state                  ! measurement state variable
60   REAL Chan,power                  ! channel power amplitude
70   REAL Chpwr_spec_dens             ! ch pwr spectral density
80   !
90   ASSIGN @Sa TO 718                ! i/o path to spectrum analyzer
100  !
110  !
120  OUTPUT @Sa;"_CHPWR;"             ! execute Channel Power measurement
130  REPEAT
140    ENTER @Sa;Meas_state           ! enter measurement state
150  UNTIL Meas_state>0 AND Meas_state<6
160  !
170  IF Meas_state=1 THEN             ! measurement completed
190    OUTPUT @Sa;"_CHPA?;"           ! query channel power amplitude
200    ENTER @Sa;Chan_power           ! enter value
210    OUTPUT @Sa;"_CHPSD?;"          ! query ch pwr spectral density
220    ENTER @Sa;Chpwr_spec_dens      ! enter value
221    PRINT "Channel Power:"
230    PRINT "Amplitude=";Chan_power;"dBm"
240    PRINT "Spectral density=";Chpwr_spec_dens;"dBm/Hz"
250  ELSE
260    DISP "Measurement aborted"
270  END IF
280  !
290  END
```

To make a gated power measurement

This example shows how to make a gated power measurement using the _GPWR programming command.

```
10   !re-store"GPWR_EX"
20   !Shows how to use the _GPWR command in the CDMA DLP
30
40
50   REAL Meas_state                  ! measurement state variable
60   REAL Gtd_on_pwr                  ! gated pwr, ON pwr, mean amplitude
70   REAL Gtd_onoff_ratio             ! gated pwr, ON/OFF ratio amplitude
80   !
90   ASSIGN @Sa TO 718                ! i/o path to spectrum analyzer
100  !
110
120  OUTPUT @Sa;"_GPWR;"              ! execute Gated Power measurement
130  REPEAT
140    ENTER @Sa;Meas_state           ! enter measurement state
150  UNTIL Meas_state>0 AND Meas_state<4
160  !
170  IF Meas_state=1 THEN             ! measurement completed
180    OUTPUT @Sa;"_GPBA?;"           ! query gated pwr, burst amplitude
190    ENTER @Sa;Gtd_on_pwr           ! enter value
200    OUTPUT @Sa;"_GPRA?;"           ! query gated pwr, on/off ratio amplitude
210    ENTER @Sa;Gtd_onoff_ratio ! enter value
220    PRINT "Gated Power:"
230    PRINT "Mean burst amplitude= ";Gtd_on_pwr;"dBm"
240    PRINT "On/off ratio amplitude= ";Gtd_onoff_ratio;"dB"
250  ELSE
260    DISP "Measurement aborted"
270  END IF
280  !
290  END
```

To make a time domain, peak/mean measurement

This example shows how to make a time domain, peak/mean measurement using the **_PKMNF** programming command.

```
10    !re-store"PKMNF_EX"
20    !Shows how to use the _PKMNF command in the CDMA DLP
30    !
40    !
50    REAL Meas_state                  ! measurement state variable
60    REAL Mean-pwr                    ! mean power amplitude
70    REAL Pk,mean-ratio               ! peak pwr / mean pwr ratio
80    !
90    ASSIGN @Sa TO 718                ! i/o path to spectrum analyzer
100   !
110   !
120   OUTPUT @Sa;"_TDM;"               ! execute Time Domain measurement
130   REPEAT
140     ENTER @Sa;Meas_state           ! enter measurement state
150   UNTIL Meas_state>0 AND Meas_state<4
160   !
170   IF Meas_state=1 THEN             ! measurement completed
180     OUTPUT @Sa;"MOV _PKMNF,1;"     ! turn on peak/mean function
190     REPEAT
200       ENTER @Sa;Meas_state         ! enter measurement state
210     UNTIL Meas_state>0 AND Meas_state<2
220     OUTPUT @Sa;"_MNA?;"            ! query mean pwr amplitude
230     ENTER @Sa;Mean_pwr             ! enter value
        OUTPUT@Sa;"_PKMNA?;"           ! query peak/mean ratio
250     ENTER @Sa;Pk_mean_ratio        ! enter value
260     PRINT "Peak Power to Mean Power Ratio:"
        PRINT "Mean Power amplitude= ";Mean_pwr;"dBm"
280     PRINT "Peak Power / Mean Power ratio= ";Pk_mean_ratio;"dB"
290   ELSE
300     DISP "Measurement aborted"
      END IF
320   !
330   END
```

To make a time domain, histogram measurement

This example shows how to make a time domain, histogram measurement using the -THF programming command.

```
10   !re-store"THF_EX"
20   !Shows how to use the _THF command in the CDMA DLP
30   !
40   !
50   REAL Meas_state                  ! measurement state variable
60   REAL Trace_array(1:401)          ! array to hold analyzer trace
70   REAL Mkr_peak_y_val              ! y value of peak # of occurences (dBm)
80   REAL Rl                          ! reference level (dBm)
90   REAL Y_max                       ! y-axis scale max (%)
100  REAL Peak-occur                  ! peak # of occurences (%)
110  REAL Mkr,peak-x-val              ! x value of peak # of occurences (pts)
120  REAL Lg                          ! log scale (dB)
130  REAL X,min                       ! x-axis scale min (dBm)
140  REAL X_db_per_pt                 ! x-axis dB per trace element (dB/pt)
150  REAL X_db_above_min              ! x-axis dB above min (dB)
160  REAL Peak_ampl                   ! amplitude of peak # of occurences (dBm)
170  !
180  ASSIGN @Sa TO 718                ! i/o path to spectrum analyzer
190  !
200  !
210  OUTPUT @Sa;"_TDM;"               ! execute Time Domain measurement
220  REPEAT
230    ENTER @Sa;Meas_state           ! enter measurement state
240  UNTIL Meas_state>0 AND Meas_state<4
250  !
260  IF Meas_state=1 THEN             ! measurement completed
270    OUTPUT @Sa;"MOV _THF,1;"       ! turn on histogram function
280    REPEAT
290      ENTER @Sa;Meas_state         ! enter measurement state
300    UNTIL Meas_state>0 AND Meas_state<3
310    OUTPUT @Sa;"TDF P;"            ! set analyzer trace data format
320    OUTPUT @Sa;"TRB?;"             ! query trace B
330    ENTER @Sa;Trace_array(*)       ! enter trace
340    OUTPUT @Sa;"MKPK HI;"          ! marker to peak # of occurances
350    OUTPUT  @Sa;"MKA?;"            ! query y value of marker (dBm)
360    ENTER @Sa;Mkr_peak_y_val       ! enter value
370    OUTPUT @Sa;"RL?;"              ! query reference level (dBm)
380    ENTER @Sa;Rl                   ! enter value
390    OUTPUT @Sa;"_THPCT?;"          ! query y-axis full scale (%)
400    ENTER @Sa;Y_max                ! enter value
410    Peak_occur=(Mkr_peak_y_val/Rl)*Y_max  ! calculate peak # occurences (%)
420    PRINT "Peak # occurences (";Peak_occur;"% of total occurences )"
430    OUTPUT @Sa;"MKP?;"             ! query x value of marker (points)
440    ENTER @Sa;Mkr_peak_x_val       ! enter value
450    OUTPUT @Sa;"LG?"               ! query log scale (dB)
460    ENTER @Sa;Lg                   ! enter value
470    X_min=Rl-(8*Lg)                ! calculate min x-axis value (dBm)
480    X_db_per_pt=(8*Lg)/400         ! calculate x-axis dB/point
490    X_db_above_min=Mkr_peak_x_val*X_db_per_pt ! calc. dB above x-axis min
500    Peak_ampl=X_min+X_db_above_min ! calc. amplitude of peak # of occurences
```

```
510     PRINT "at ";Peak_ampl;"dBm"
520   ELSE
530     DISP "Measurement aborted"
540   END IF
550   !
560   END
```

To make an out-of-band, spurious emission measurement

This example shows how to perform a transmitter, out-of-band spurious emission measurement using the _SEOMT programming command. Receiver out-of-band spurious emission measurements (using the -SEOMR command) are identical except no carrier is measured and relative results are not displayed. Harmonic spurious emission measurements are made using the _SEOMTH command and only display ranges (harmonics) 2 through 10.

```
10   !re-store"SEOMT_EX"
20   !shows how to use the _SEOMT command in the CDMA DLP
30   !
40   !
50   REAL Meas_state                 ! measurement state variable
60   REAL Result_array(1:250)        ! array to hold measurement results
70   REAL Carrier-freq               ! carrier frequency (Hz)
80   REAL Carrier_ampl               ! carrier amplitude (dBm)
90   REAL Fail-flag                  ! flag=1 if fails
100  REAL Freq                       ! spur frequency (MHz)
110  REAL Ampl_abs                   ! spur amplitude (dBm)
120  REAL Del-abs,lim                ! spur dB from absolute amplitude limit
130  REAL Ampl,rel                   ! spur amplitude (dB from carrier)
140  REAL Del_rel_lim                ! spur dB from relative amplitude limit
150  !
160  INTEGER Chan_num                ! channel number
170  INTEGER I,J                     ! index vars
180  !
190  ASSIGN @Sa TO 718               ! i/o path to spectrum analyzer
200  !
210  OUTPUT @Sa;"MOV _SEOTBLN,1;"    ! select table 1
220  OUTPUT @Sa;"_SEOMT;"            ! execute Xmtr, Out-of-Band Spur Em. meas
230  REPEAT
240    ENTER @Sa;Meas_state          ! enter measurement state
250  UNTIL Meas_state>0 AND Meas_state<5
260  !
270  IF Meas_state=1 THEN            ! measurement completed
280    FOR I=1 TO 250
290      OUTPUT @Sa;"_SEOR[";I;"]?;" ! query result array
300      ENTER @Sa;Result_array(I)
310    NEXT I
320    OUTPUT @Sa;"_FAIL?;"          ! query fail flag
330    ENTER @Sa;Fail_flag           ! enter value
340    OUTPUT @Sa;"_CH?;"            ! query channel number
350    ENTER @Sa;Chan_num            ! enter value
360    OUTPUT @Sa;"_CHPF?;"          ! query carrier frequency
370    ENTER @Sa;Carrier_freq        ! enter value
380    OUTPUT @Sa;"_CHPA?;"          ! query carrier amplitude
390    ENTER @Sa;Carrier_ampl        ! enter value
400    PRINT "Xmtr Out-of-Band Spurious Emission, Table 1 Results:"
410    PRINT "-----------------------------------------------------"
420    IF Fail-flag THEN
430      PRINT "FAILED"
440    ELSE
450      PRINT "PASSED"
460    END IF
470    PRINT
```

```
480 Fmt_1: IMAGE "Carrier:    Channel ",4D,",",5D.2D," MHz,",4D.D," dBm"
490     PRINT USING Fmt_1;Chan_num,Carrier_freq/1.E+6,Carrier_ampl
500     PRINT
510     IF Result_array(245)>0 THEN            ! oversweep on?
520       PRINT "Oversweep value: ";Result_array(245)
530     END IF
540     PRINT "                              DELTA           DELTA"
550     PRINT "                 FREQ  I   AMPL  LIMIT |   AMPL  LIMIT"
560     PRINT "RANGE           (MHz)  I  (dBm)   (dB)  I  (dBc)   (dB)"
570     PRINT "-------------------------------------------------------"
580     FOR I=1 TO 12                          ! 12 ranges
590       J=(I*20)-20                          ! one before start of range data
600                                            ! (20 elements/range)
610       IF Result_array(J+20)=1 THEN         ! data present in range?
620         IF Result_array(J+3)>1 THEN        ! frequency clipped?
630           PRINT "FREQUENCY OUT OF RANGE"
640         ELSE
650           Freq=Result_array(J+1)+Result_array(J+2)/1.E+3
660           Ampl_abs=Result_array(J+4)/10
670           Del_abs_lim=Result_array(J+5)/10
680           Ampl_rel=Result_array(J+7)/10
690           Del_rel_lim=Result_array(J+8)/10
700 Fmt_2: IMAGE 2D,9X,5D.2D,5X,3D.D,2X,3D.D,5X,3D.D,2X,3D.D
710           PRINT USING Fmt_2;I,Freq,Ampl_abs,Del_abs_lim,Ampl_rel,Del_rel_lim
720         END IF
730       ELSE                                 ! range empty
740         PRINT I
750       END IF
760     NEXT I
770   ELSE
780     DISP "Measurement aborted"
790   END IF
800
810   END
```

To edit an out-of-band, spurious emission table

This example shows how to edit a spurious emission table. New values are put into range 9, then range 1 is cleared. The harmonic spurious emission table can be edited by selecting table 0 and only manipulating ranges (harmonics) 2 through 10.

Note that you can copy between tables by changing the table number before the call to SEOBTOTBL. For example, by inserting "MOV _SEOTBLN,3;" immediately before line 390, the program will save the (edited) copy of table 1 to table 3.

```
10   !RE-STORE"TBL_EDIT_EX"
20   !Shows how to edit a Spur Table in the CDMA DLP.
30   !
40   !
50   ASSIGN @Sa TO 718                    ! i/o path to spectrum analyzer
60   !
70   OUTPUT@Sa;"SNGLS;TS;DONE?;"          ! set for single sweep
80   ENTER @Sa;Done                       ! enter DONE
90   !
100  !
110  OUTPUT @Sa;"MOV _SEOTBLN,1;"         ! select table 1
120  OUTPUT@Sa;"_SEOTBLTOB;"              ! copy table 1 into edit buffer
130  !
140  OUTPUT @Sa;"MOV _SEOOSF,1;"          ! enable oversweep
150  OUTPUT @Sa;"MOV _SEOOS,7;"           ! set oversweep value
160  !
170  OUTPUT @Sa;"MOV _SEORHN,9;"          ! select range 9
180  OUTPUT @Sa;"CF 1420 MZ;"             ! set Center Frequency
190  OUTPUT @Sa;"SP 2 MZ;"                ! set Span
200  OUTPUT @Sa;"RB 10 KZ;"               ! set Resolution Bandwidth
210  OUTPUT @Sa;"VB 10 KZ;"               ! set Video Bandwidth
220  OUTPUT @Sa;"MOV _SEOLIMA,-55;"       ! set absolute amplitude limit
230  OUTPUT @Sa;"MOV _SEOLIMAF,1;"        ! enable Pass/Fail check on SEOLIMA
240  OUTPUT @Sa;"MOV _SEOLIMR,-49;"       ! set relative amplitude limit
250  OUTPUT @Sa;"MOV _SEOLIMRF,1;"        ! enable Pass/Fail check on SEOLIMR
260  OUTPUT @Sa;"MOV _SEOBLOFL,0;"        ! set Both Limits On Fail Logic: AND
270  OUTPUT @Sa;"MOV _SEODETF,1;"         ! set Detector mode to sample
280  OUTPUT @Sa;"MOV _SENA,15;"           ! set Number of Averages
290  OUTPUT@Sa;"TS;DONE?;"                ! make sure all parms set
300  ENTER @Sa;Done
310  !
320  OUTPUT@Sa;"_SEOSAVRH;"               ! save range
330  !
340  OUTPUT @Sa;"MOV _SEORHN,1;"          ! select range 1
350  OUTPUT@Sa;"_SEOCLRRH;"               ! clear range
360  !
370  OUTPUT@Sa;"_SEOSAVTBL;"              ! save table global parms
380  !
390  OUTPUT@Sa;"_SEOBTOTBL;"              ! copy edit buffer into table 1
400  !
410  END
```

7

Specifications

Specifications

This chapter contains information about the specifications and characteristics for Option 053 and the HP 85725C CDMA Measurements Personality.

Note	For the HP 85725C CDMA Measurements Personality or Option 053 to meet the specifications and characteristics, the spectrum analyzer self-calibration routines must be performed periodically. For practical advice on when and how often the self-calibration routines should be performed, see "Improving Accuracy with Self-Calibration Routines" and "When is Self-Calibration Needed" in the spectrum analyzer documentation.

Specifications for Option 053 (Available for HP 8591E, HP 8593E, HP 8594E, HP 8595E, or HP 8596E Spectrum Analyzer)

This section contains the specifications for Option 053, the improved amplitude accuracy for the CDMA spectrum analyzer. Specifications describe warranted performance. Option 053 is available only for an HP 85913, HP 85933, HP 85943, HP 85953, or HP 85963 spectrum analyzer.

The specifications for Option 053 apply only if the following conditions are met:

- The spectrum analyzer is operated within the temperature range of 0 °C to + 55 ° C (unless otherwise noted).
- The spectrum analyzer temperature has been stabilized. The instrument temperature is considered to be stabilized if the spectrum analyzer has been stored at a constant temperature between 0 ° C and + 55 °C for 2 hours, ***and*** after the spectrum analyzer has been turned on for at least 30 minutes.
- The amplitude CAL AMPTD and frequency CAL FREQ self-calibration routines have been performed after the instrument temperature is stabilized.
- The maximum safe input level is not exceeded. Total input power to the spectrum analyzer must not exceed +30 dBm (1 watt).

Option 053 Specifications		
Frequency range	CDMA Cellular bands, 824 to 870 MHz and 869 to 925 MHz. CDMA PCS bands, 1850 to 1910 MHz, 1930 to 1990 MHz, 1715 to 1780 MHz, and 1805 to 1870 MHz.	
Absolute amplitude accuracy: Cellular Bands*		
	0° C to 55° C	**20° C to 30° C**
Input attenuation set to 10, 20, or 30 dB (equivalent to a ref level of – 10 to + 20 dBm with no ext atten correction)†	fl.O dB	±0.6 dB
Input attenuation set to 40 dB (equivalent to a ref level of + 20 to + 30 dBm with no ext atten correction)†	±1.3 dB	fl.O dB
Absolute amplitude accuracy: PCS Bands*		
	0° C to 55° C	**20° C to 30° C**
Input attenuation set to 10, 20, or 30 dB (equivalent to a ref level of – 10 to + 20 dBm with no ext atten correction)†	±1.3 dB	±0.9 dB
Input attenuation set to 40 dB (equivalent to a ref level of + 20 to + 30 dBm with no ext atten correction)†	±1.6 dB	±1.3 dB
Relative amplitude accuracy		
Input level change from reference:	**20° C to 30° C**	
0 to -40 dB input level change	±0.4 dB, (±0.2 dB typical)	
0 to -60 dB input level change	±0.5 dB, (±0.2 dB typical)	
0 to -90 dB input level change	±0.8 dB	

* With RBW ≈ 30 kHz, VBW = 300 kHz, signal level at 0 to -30 dB from the reference level.
† With the input attenuation set to AUTO.

Specifications and Characteristics for the HP 85725C CDMA Measurements Personality

This section contains the specifications and characteristics for the HP 85725C CDMA Measurements Personality. The specifications apply to both mobile and base station testing, unless otherwise indicated. The specifications and characteristics for HP 85725C CDMA Measurements Personality apply only if the following conditions are met:

- The HP 85725C CDMA Measurements Personality is used with an HP 85913, HP 85933, HP 85943, HP 85953, or HP 85963 spectrum analyzer with firmware dated 930506 or later. The HP 85725C CDMA Measurements Personality is *not* compatible with HP 8590 A-Series analyzers.
- The necessary options are installed in the spectrum analyzer. See "The Equipment You Will Need" in Chapter 1, "Getting Started," for a list of the necessary options and acceptable option substitutions.
- The spectrum analyzer is operated within the temperature range of 0 °C to +55 °C, except where a restricted temperature range is noted.
- The spectrum analyzer temperature has been stabilized. The instrument temperature is considered to be stabilized if the spectrum analyzer has been stored at a constant temperature between 0 °C and + 55 °C for 2 hours, ***and*** after the spectrum analyzer has been turned on for at least 30 minutes.
- The instrument temperature is stabilized, and the amplitude **CAL** AMPTD and frequency CAL **FREQ** self-calibration routines have been performed.
- The measurements are performed on CDMA transmitter signals. The carrier frequencies must be within the following band limits for those specifications stating "with Option 053" to apply:

  Cellular Bands: 824 to 925 MHz

  PCS Bands: 1715 to 1780 MHz, 1805 to 1910 MHz or 1930 to 1990 MHz
- The spectrum analyzer settings have been set automatically by each measurement routine in the personality.
- The maximum safe input level is not exceeded. Total input power to the spectrum analyzer must not exceed +30 dBm (1 watt).
- The optimum amount of external attenuation is used for the specific carrier power level. See "The CDMA Config Softkeys," in Chapter 3, "Menu Map and Softkey Descriptions."
- **MAX PWR** AUTO #AN is set to AUTO (single carrier).

Table Notation

The following terms and abbreviations are used in the table of specifications and characteristics for the HP 85725C CDMA Measurements Personality:

Specifications Describe warranted performance over the temperature range 0 °C to +55 °C (unless otherwise noted).

Characteristics Provide useful, but nonwarranted, information about the functions and performance of the instrument. Characteristics are identified by the label "characteristic."

Typical Many of the specifications have more than one value associated with them. The first value gives the specification as the sum of the measurement uncertainties. The second value gives you an idea of the typical value for the specification. Typical performance, where listed, is not warranted, but indicates performance that most spectrum analyzers will exhibit. Typical values are shown with "typical" next to them.

Abbreviations The following abbreviations are used: RBW (resolution bandwidth), VBW (video bandwidth), ref level (reference level), and ext atten (external attenuation).

Standards Many measurements are based upon the EIA/TIA Interim Standards: IS-95, IS-97, IS-98 and varients of those standards. The sections that apply are cited with each measurement. The full titles of the standards are given below:

IS-95 ***Mobile Station - &se Station Compatibility Standard for Dual-Mode Wideband Spread Spectrum Cellular System***

IS-97 ***Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations***

IS-98 ***Recommended Minimum Performance Standards for Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations***

J-STD-008 ***System Compatibility Requirements CDMA (IS-95-based) Radio Standards***

J-STD-018 ***Recommended Minimum Performance Requirements for 1.8 to 2.0 GHz Code Division Multiple Access (CDMA) Personal Stations***

J-STD-019 ***Recommended Minimum Performance Requirements for Bose Stations supporting 1.8 to 2.0 GHz Code Division Multiple Access (CDMA) Personal Stations***

General Specifications	
Maximum safe input level	Total power must not exceed + 30 dBm (1 W)
Precision frequency reference (Option 004)	
Aging	$\pm 1 \times 10^{-7}$/year
Temperature stability	$\pm 1 \times 10^{-8}$
External attenuation correction	-90 to + 90 dB in 0.01 dB steps
Channel number tuning	
IS-95 designation	Channel 1 to 1023
User-defined designation	-9999 to 30000
Defined channel X frequency	1 MHz to the upper frequency range of the spectrum analyzer

Channel Power (integrated 1.23 MHz bandwidth)		
he channel power measurement measures the total RMS power in the channel bandwidth using the spectrum nalyzer integration method. The default channel bandwidth is 1.23 MHz.		
hannel power range	+ 40 dBm (10 W) to (-70 + ext atten) dBm*	
bsolute channel power accuracy: Cellular Bands		
With Option 053, for mean channel power range	0 °C to 55 °C	20 °C to 30 °C
(25 dBm + ext atten) to (15 dBm + ext atten)	±1.3 dB	fl.O dB
(15 dBm + ext atten) to (-45 dBm + ext atten)	fl.O dB	±0.6 dB
(-45 dBm + ext atten) to (-70 dBm + ext atten)	±1.3 dB	±0.75 dB
Without Option 053, for mean channel power range	0 °C to 55 °C	
(25 dBm + ext atten) to (-70 dBm + ext atten)	±4.3 dB, (±2.0 dB typical)	
Absolute channel power accuracy: PCS Bands		
With Option 053, for mean channel power range	0 °C to 55 °C	20 °C to 30 °C
(25 dBm + ext atten) to (15 dBm + ext atten)	±1.6 dB	±1.3 dB
(15 dBm + ext atten) to (-45 dBm + ext atten)	±1.3 dB	±0.9 dB
(-45 dBm + ext atten) to (-70 dBm + ext atten)	±1.6 dB	±1.05 dB
Without Option 053, for mean channel power range	0 °C to 55 °C	
(25 dBm + ext atten) to (-70 dBm + ext atten)	±4.3 dB, (±2.0 dB typical)	
elative channel power accuracy		
Input signal level change	20 °C to 30 °C	
0 to -40 dB	±0.4 dB, (±0.2 dB typical)	
0 to -60 dB	±0.5 dB, (±0.2 dB typical)	
0 to −90 dB	±0.8 dB	
hannel power resolution	0.1 dB	

IS-95
6.1.2.1 Maximum Output Power
6.1.2.2.1 Minimum Controlled Output Power
6.1.2.3 Controlled Output Power
7.1.2 Power Output Characteristics

J-STD-008
2.1.2.1 Maximum Output Power
2.1.2.2.1 Minimum Controlled Output Power
2.1.2.3 Controlled Output Power
3.1.2 Power Output Characteristics

IS-97
10.4 RF Output Power Requirements

IS-98
10.4.1 Range of Open Loop Output Power
10.4.4 Range of Closed Loop Power Control
10.4.6 Minimum Controlled Output Power
10.4 RF Output Power Requirements

J-STD-019
4.4 RF Output Power Requirements

J-STD-018
4.4.1 Range of Open Loop Output Power
4.4.4 Range of Closed Loop Power Control
4.4.6 Minimum Controlled Output Power
4.4 RF Output Power Requirements

CAUTION: Use sufficient external attenuation to limit power at spectrum analyzer input to an absolute maximum f + 30 dBm (1 W).

Receive Channel Power (integrated 1.23 MHz bandwidth)		
The receive channel power measurement is the same as the channel power measurement, except that the receive band is used and there is 0 dB input attenuation.		
Receive Channel Power Range		
Without external preamplifier	-20 dBm to -80 dBm, (-90 dBm typical)	
With external preamplifier	(-20 dBm – preamp gain) to (-80 dBm – preamp gain + preamp NF)	
Receive Channel Power Accuracy: Cellular Bands		
(preamp VSWR ≤1.25:1)		
With Option 053	0 °C to 55 °C	20 °C to 30 °C
-20 dBm to -45 dBm	±1.15 dB	±0.75 dB
-45 dBm to -80 dBm	±1.45 dB	±0.90 dB
Without Option 053	0 °C to 55 °C	
-20 dBm to -80 dBm	±4.3 dB, (±2.0 dB typical)	
Receive Channel Power Accuracy: PCS Bands		
(preamp VSWR ≤1.25:1)		
With Option 053	0 °C to 55 °C	20 °C to 30 °C
-20 dBm to -45 dBm	±1.45 dB	±1.05 dB
-45 dBm to -80 dBm	±1.75 dB	±1.20 dB
Without Option 053	0 °C to 55 °C	
-20 dBm to -80 dBm	±4.3 dB, (±2.0 dB typical)	

Standby Output Power	
The standby output power measures residual spurious signals in the transmit band with the mobile station or base station transmit power turned off.	
Standby output power range	
Mobile station, 1 MHz	-30 dBm to (-72 + ext atten) dBm
Standby output power accuracy: Cellular Bands	
For carrier off levels > 10 dB above the average noise level	
With Option 053	±1.8 dB
Without Option 053	±3.6 dB, (±1.9 dB typical)
Standby output power accuracy: PCS Bands	
For carrier off levels > 10 dB above the average noise level	
With Option 053	±2.1 dB
Without Option 053	±3.6 dB, (±1.9 dB typical)
Standby output power resolution	0.1 dB
IS-95 6.1.2.2.3 Standby Output Power **J-STD-008** 2.1.2.2.3 Standby Output Power	**IS-98** 10.4.7 Standby Output Power and Gated Output Power **J-STD-018** 4.4.7 Standby Output Power and Gated Output Power

Occupied Bandwidth	
The occupied bandwidth measurement measures the 99 percent power bandwidth of the carrier. Two markers are positioned so that 0.5 percent of the total power is to the left and 0.5 percent is to the right of these limit frequencies. The carrier frequency error is also determined (defined as the difference between the analyzer center frequency and the mid point of the two limit frequencies).	
Carrier power range	+40 dBm to (-67 + ext. atten.) dBm*
Frequency resolution of occupied bandwidth	1.88 kHz
Frequency accuracy of occupied bandwidth (1.23 MHz channel bandwidth)	±15 kHz (characteristic)
Frequency resolution of delta frequency	3.75 kHz
Frequency accuracy of delta frequency	±[35 kHz + (freq. reference error x carrier freq.)] (characteristic)
* CAUTION: Use sufficient external attenuation to limit power at spectrum analyzer input to an absolute maximum of + 30 dBm (1 W).	

Gated Output Power (mobile station: 20 ms sweep time, 3 MHz RBW, and zero span)		
The gated output power measurement measures the gate-on mean power, gate on/off ratio, and the total mean power of the time domain waveform.		
Gated Output Power: Cellular Bands		
Range	+ 40 dBm to (-67 + ext atten) dBm*	
Accuracy		
With Option 053	0 °C to 55 °C	20 °C to 30 °C
+25 dBm to +15 dBm	±1.6 dB	±1.0 dB
+ 15 dBm to -50 dBm	±1.3 dB	±0.6 dB
Without Option 053		
+ 25 dBm to -50 dBm	±4.3 dB, (±2.0 dB typical)	
Gated Output Power: PCS Bands		
Range	+ 40 dBm to (-67 + ext atten) dBm*	
Accuracy		
With Option 053	0 °C to 65 °C	20 °C to 30 °C
+ 25 dBm to + 15 dBm	±1.9 dB	±1.3 dB
+ 15 dBm to -50 dBm	±1.6 dB	±0.9 dB
Without Option 053		
+25 dBm to -50 dBm	±4.3 dB, (±2.0 dB typical)	
On/Off Power Ratio Accuracy	20 °C to 30 °C	
0 to 40 dB	±0.4 dB	
IS-95 6.1.2.2.2 Gated Output Power **J-STD-008** 2.1.2.2.2 Gated Output Power	**IS-98** 10.4.7 Standby Output Power and Gated Output Power **J-STD-018** 4.4.7 Standby Output Power and Gated Output Power	
* CAUTION: Use sufficient external attenuation to limit power at spectrum analyzer input to an absolute maximum of +30 dBm (1 W).		

Gated Output Power Time Response (mobile station: 40 μs sweep time, 3 MHz RBW, and zero span)	
The gated output power time response measurement measures the time response characteristics (burst width, attack time, and release time) for an average of isolated gated-on power control groups.	
Carrier Power Range	+40 dBm to (-67 + ext atten) dBm*
Time resolution	100 ns
Time accuracy	
Attack and release	± 150 ns (characteristic)
IS-95 6.1.2.2.2 Gated Output Power **J-STD-008** 2.1.2.2.2 Gated Output Power	**IS-98** 10.4.7 Standby Output Power and Gated Output Power **J-STD-018** 4.4.7 Standby Output Power and Gated Output Power
* CAUTION: Use sufficient external attenuation to limit power at spectrum analyzer input to an absolute maximum of +30 dBm (1 W).	

Time Response of Open Loop Power Control (mobile station: 100 ms sweep time, 3 MHz RBW, and zero span)	
The time response of open loop power control measurement measures the amplitude versus time response of the mobile station open loop power control function.	
Carrier Power Range	+40 dBm to (-67 + ext atten) dBm*
Time resolution	250 μs
Time accuracy	±250 μs (characteristic)
IS-95 6.1.2.4.1 Open Loop Estimation **J-STD-008** 2.1.2.4.1 Open Loop Estimation	**IS-98** 10.4.2 Time Response of Open Loop Power Control **J-STD-018** 4.4.2 Time Response of Open Loop Power Control
* CAUTION: Use sufficient external attenuation to limit power at spectrum analyzer input to an absolute maximum of + 30 dBm (1 W).	

Time Domain Characteristics	
The time domain measurement provides general time domain waveform analysis. In delayed sweep mode, pre-trigger and post-trigger delays are available, and the sweep time and delay can be changed on a stored trace as well as an active trace. A peak-minus-mean function and an amplitude histogram function are also provided [delayed sweep mode requires Option 101 or 151).	
Sweep Time Range	
Active Traces	15 ms to 100 s
Delayed Active Traces (Option 101)	20 μs to 200 ms
Delayed Active Traces (Option 151)	40 μs to 399 ms
Delayed Stored Traces	Dependent on sweep time and delay of the last active trace.
Time Resolution	0.25% of sweep time
Sweep Trigger Delay Range	
Option 101	
Active Traces with sweep time $\leq$ 100 ms	$\pm$39 x sweep time to $\pm$100 ms
Active Traces with sweep time > 100 ms	$\pm$(200 ms – sweep tune)
Stored Traces	Dependent on sweep time and delay of the last active trace
Option 151	
Active Traces with sweep time $\leq$ 399 ms	+(79 x sweep time to 400 ms), – (.64 x sweep time) / N where $1 \leq N \leq 39$, and N depends on the sweep time
Stored Traces	Dependent on sweep time and delay of the last active trace
Time Record Length (Option 101)	40 x sweep time, but $\leq$200 ms
Time Record Length (Option 151)	80 x sweep time, but $\leq$399 ms

Transmitter Spurious Emissions (span TX max power and spur close measurements)	
The transmitter spurious emissions measurements measure the spurious emissions in the transmit band relative to the channel power, and in certain cases, also measures the absolute level of the spurious emissions.	
Tx Carrier power range	+40 **dBm** to (-70 + ext. **atten.**) dBm*
Minimum spurious emission power sensitivity with RBW = 30 **kHz,** **and** carrier to CW signal frequency difference (spacing) > 100 **kHz**	(-75 + **ext atten) dBm** †
Emission Power	(-60 + ext **atten) dBm** (1 MHz RBW)
Absolute transmitter spurious emission power accuracy: **Cellular** Bands	
For product power levels > 10 **dB** above the average noise level:	
With Option 053	**±1.8 dB**
Without Option 053	**±4.4 dB, (±2.0 dB** typical)
Absolute transmitter spurious emission power accuracy: PCS Bands	
For product power levels > 10 **dB** above the average noise level:	
With Option 053	**±2.1 dB**
Without Option 053	**±4.4 dB, (±2.0 dB** typical)
Relative transmitter spurious emission power accuracy	
For product power levels > 10 **dB** above the average noise level	
With Option 053	± 1.4 **dB, (± 1**.O **dB** typical)
Without Option 053	**±2.8 dB, (±** 1.8 **dB** typical)
IS-95 6.1.2.1 Maximum Output Power 6.1.4 Limitations on Emissions 7.1.4 Limitations on Emissions **J-STD-008** 2.1.2.1 Maximum Output Power 2.1.4 Limitations on Emissions 3.1.4 Limitations on Emissions	**1597** 10.5 Limitations on Emissions **1598** 10.4.5 Maximum RF Output Power 10.5.1 Conducted Spurious Emissions **J-STD-019** 4.5 Limitations on Emissions **J-STD-018** 4.4.5 Maximum RF Output Power 4.5.1 Conducted Spurious Emissions
* CAUTION: Use sufficient external attenuation to limit power at spectrum analyzer input to an absolute maximum of + 30 **dBm** (1 W). † The minimum spurious emission is equivalent to the displayed average noise level of the spectrum analyzer.	

Transmitter Spurious Emissions (out-of-band)	
Jser Defined Tables	
spurious	5 **Tables** with ≤ 12 frequency ranges each
Harmonics	1 Table with ≤**10** harmonics
‘arameters Defined in Table	Frequency range (CF and Span or Start and Stop)*
	Resolution BW
	Video BW
	Detector type (peak or sample)
	Amplitude test limits (**dBm** and **dB** relative to channel power)
	Fail on “OR” or “AND” of **dB** and **dBc** results
lesults Displayed	Channel number and frequency
	Channel power
	For each frequency range or harmonic
	Frequency of maximum amplitude
	Maximum amplitude in **dBm**
	Delta to limit for **dBm** result
	Maximum amplitude in **dB**
	Delta to limit for **dB** result
	Fail indication
'iew Range and View Harmonic	Provides viewing of active spectrum using the parameters defined in the Table for a given range or harmonic
ımplitude Accuracy and Sensitivity	These specifications are determined by the HP 8590 E-Series Spectrum Analyzer used for these tests.

For spurious and harmonic, span can be set to zero.
‘or harmonic table, CF, Start Freq, and Stop Freq are not available

Receiver Spurious Emissions (in 1596 Bands, 1 MHz RBW, 0 dB attenuation)	
The receiver spurious emissions measurements measure the spurious emissions in the transmit and receive bands with the mobile station or **base** station **transmitter** turned off.	
Ix Carrier power range	
Minimum spurious emission power	
Without external preamplifier	-20 **dBm** to -80 **dBm**, (-90 **dBm** typical)
With external preamplifier	-20 **dBm –** preamp gain) to (-80 **dBm –** preamp gain + preamp NF)
Absolute spurious emission power accuracy preamp VSWR ≤ **1.25:1)**: Cellular Bands	
For spurious levels > 10 **dB** above the average noise level:	
With Option 053	**±2.0 dB**
Without Option 053	**±3.8 dB, (±2.0 dB** typical)
Absolute spurious emission power accuracy preamp VSWR ≤ **1.25:1)**: PCS Bands	
For spurious levels > 10 **dB** above the average noise level:	
With Option 053	**±2.3 dB**
Without Option 053	**±3.8 dB, (±2.0 dB** typical)
1596 6.2.3 Limitations on Emissions 7.2.3 Limitations on Emissions **J-STD-008** 2.2.3 Limitations on Emissions 3.2.3 Limitations on Emissions	**1597** 9.5 Limitations on Emissions 1598 9.5 Limitations on Emissions **J-STD-019** 3.5 Limitations on Emissions **J-STD-018** 3.5 Limitations on Emissions

Adjacent Channel Power Ratio (ACPR)		
The adjacent channel power ratio measurement measures the ratio of the power in the carrier to the power at the selected offsets. Two methods for measuring the offsets are provided, an integrated bandwidth (IBW) method and a resolution bandwidth (RBW) method.		
Tx Carrier power range	+ 40 dBm to -20 dBm*	
Adjacent Channel Power sensitivity†		
Tx Carrier Power		
-10 dBm	-82 dBc	
– 15 dBm	-77 dBc	
-20 dBm	-72 dBc	
Power Result Resolution	0.1 dB	
Absolute Channel Power Accuracy		
Cellular Bands		
With Option 053, for mean channel power range	**0°C to 55°C**	**20°C to 30°C**
(25 dBm + ext atten) to (15 dBm + ext atten)	±1.3 dB	±1.0 dB
(15 dBm + ext atten) to (-45 dBm + ext atten)	±1.0 dB	±0.6 dB
(-45 dBm + ext atten) to (- 70 dBm + ext atten)	±1.3 dB	±0.75 dB
Without Option 053, for mean channel power range		
(25 dBm + ext atten) to (15 dBm + ext atten)	±4.3 dB	±2.0 dB
PCS Bands		
With Option 053, for mean channel power range	**0°C to 55°C**	**20°C to 30°C**
(25 dBm + ext atten) to (15 dBm + ext atten)	±1.6 dB	±1.3 dB
(15 dBm + ext atten) to (-45 dBm + ext atten)	±1.3 dB	±0.9 dB
(-45 dBm + ext atten) to (- 70 dBm + ext atten)	±1.6 dB	±1.05 dB
Without Option 053, for mean channel power range		
(25 dBm + ext atten) to (15 dBm + ext atten)	±4.3 dB	±2.0 dB
Adjacent Channel Power Ratio Accuracy		
Cellular and PCS Bands		
Integration Bandwidth Method‡		
With Option 053	**20°C to 30°C**	
-40 dB to -70 dB	±1.8 dB	
Without Option 053	**20°C to 30°C**	
-40 dB to -70 dB	±3.2 dB	
Resolution Bandwidth Method§		
With Option 053	**20°C to 30°C**	
-40 dB to -70 dB	±1.4 dB	
Without Option 053	**20°C to 30°C**	
-40 dB to -70 dB	±2.8 dB	

CAUTION: Use sufficient external attenuation to limit power at spectrum analyzer input to an absolute maximum of +30 dBm (1 W).

IBW Method, Offset spacing > 100 kHz, Attenuation 10 dB, Total power readout.

For PSD readout.

For PSD readout and both Channel Power and Adjacent Channel Power normalized to 30 kHz.

8

Verifying Operation

This chapter contains test procedures that verify the electrical performance of the improved amplitude accuracy for CDMA (Option 053).

This chapter contains:

- preparation for verification tests
- the absolute amplitude accuracy performance test
- the relative amplitude accuracy performance test
- the performance verification test record

Preparing for the Verification Tests

Do these four things before beginning a verification test:

1. Turn on the spectrum analyzer and allow it to warm up for at least 30 minutes.
2. Familiarize yourself with basic HP 8590 Series spectrum analyzer operation.
3. Perform the spectrum analyzer self-calibration routines. Refer to the spectrum analyzer user's guide for instructions. (Before performing the self-calibration routines, make sure that nothing is connected to the GATE TRIGGER INPUT connector. Otherwise, the self-calibration routine's results may not be valid.)
4. Read the rest of this section before you start any of the tests, and make a copy of the performance verification test record as described in "To record the test results."

The test equipment you will need

Table 8-1 lists the recommended test equipment for the performance tests Any equipment that meets the critical specifications given in the table can be substituted for the recommended model or models.

To record the test results

Within the verification procedure, there are places to enter the test results. In addition, the performance verification test record has been provided at the end of the chapter. (See Table 8-8.) We recommend that you make a copy of the table, record the test results on the copy, and keep the copy for your calibration test records. This record could prove valuable in tracking gradual changes in test results over long periods of time.

Periodically verifying operation

The spectrum analyzer requires periodic verification of operation. Under most conditions of use, you should perform these verification tests once a year to make sure that the spectrum analyzer meets the specifications.

If the spectrum analyzer does not meet its specifications

1. Make sure that there is nothing connected to the spectrum analyzer GATE TRIGGER INPUT connector.
2. Rerun the spectrum analyzer frequency and amplitude self-calibration routines. See the spectrum analyzer user's guide for more information.
3. Repeat the verification test.

If the spectrum analyzer continues to fail one or more of its specifications, complete any remaining tests and record the results on a copy of the performance verification test record, then return the spectrum analyzer with a copy of the completed test record to a Hewlett-Packard Sales and Service Office. Refer to the spectrum analyzer service guide for addresses and shipping instructions.

Recommended test equipment

Table 8-1.
Recommended Test Equipment for Performing Verification Tests

Instrument	Critical Specifications for Equipment Substitution	Recommended Model	Use*
Synthesized signal generator	Frequency range: 836 MHz to 2 GHz Phase noise: -108 dBc/Hz at 100 Hz offset -119 dBc/Hz at 1 kHz offset − 130 dBc/Hz at 10 kHz offset Power level range: -35 dBm to + 16 dBm	HP 8662A or HP 8663A	P
Synthesized sweeper	Frequency range: 836 MHz to 2 GHz Frequency accy. (CW): ±0.02% Power level range: -35 dBm to + 16 dBm	HP 8340A/B	P,A,T
Synthesizer/level generator	Frequency range: 200 Hz - 81 MHz Power level range: + 10 dBm to -80 dBm Power level accuracy: ±0.05 dB	HP 3335A	P,A,T
Spectrum analyzer	Phase noise: -80 dBc/Hz at 320 Hz offset -85 dBc/Hz at 1 kHz offset	HP 8566B	P
Measuring receiver	Compatible with power sensors Resolution: 0.01 dB Reference accuracy: ± 1.2 %	HP 8902A	P,A,T
Power sensor	Frequency range: 836 MHz to 2 GHz Maximum SWR: 1.1 (at stated range)	HP 8482A	P,A,T
Oscilloscope	No substitute	HP 54501A	P,T
Microwave frequency counter	Frequency range: 21.4 MHz Aging rate: 5 x 10^{-10} Hz/day	HP 5343A	P
Universal counter	Time interval: 100 ns to 100 ms	HP 5316A	P
Pulse/function generator	Frequency: 100 Hz Duty cycle: 50% Output: TTL square wave	HP 8116A	P
Power splitter	Frequency range: 836 MHz to 2 GHz Insertion loss: 7 dB (nominal) Output tracking: <0.25 dB Equivalent output SWR: < 1.22:1	HP 11667A	P,A
Step attenuator	Range: 0 dB to 12 dB Step size: 1 dB steps Includes calibration data	HP 8814A Option 890	P
Step attenuator	Range: 0 dB to 120 dB Step size: 10 dB steps Includes calibration data	HP 8815A Option 890	P

* P = Performance Test, A = Adjustment, T = Troubleshooting

Absolute Amplitude Accuracy (Option 053 Only)

Specifications

Refer to Chapter 7, "Specifications," for specific values.

Note The verification limits used in this procedure for log fidelity and frequency response using 10, 20, 30, and 40 dB attenuation are 0.1 dB better than as noted in Chapter 7, "Specifications." This is because the specification takes into account additional errors involved in measuring a noise-like signal (CDMA); this verification procedure uses a CW signal.

Related Adjustments

Frequency Response

Description

To measure the absolute amplitude accuracy of the spectrum analyzer, a signal from a synthesized sweeper is output to both the spectrum analyzer and a measuring receiver. lb determine the absolute amplitude accuracy:

1. The amplitude of the sweeper signal is adjusted until the spectrum analyzer marker reads out a known amplitude.
2. The amplitude of the sweeper signal is measured by the measuring receiver. (The measuring receiver is used as a power meter.)
3. The difference between the marker readout and the measuring receiver measurement is determined. This difference is the absolute amplitude accuracy.

Equipment

Synthesized sweeper .... HP 8340A/B
Synthesizer/Level generator .... HP 3335A
Measuring receiver .... HP 8902A
Power splitter .... HP 11667A
Power sensor .... HP 8482A

Adapters
Type-N (f) to APC 3.5 (m) 1250-1750
APC 3.5 (f) to APC 3.5 (f) 5061-5311
Type-N (m) to Type-N (m) 1250-0778
Type-N (m) to BNC (f) 1250-0780

Cables
Type-N, 183 cm (72 in) .... HP 11500A
BNC, 122 cm (48 in) .... HP 10503A

To set up the equipment

1. Zero and calibrate the HP 8902A and the HP 8482A in log mode as described in the HP 8902A Operation Manual.

Note The absolute amplitude accuracy test should only be performed if the ambient temperature is between 20 °C and 30 °C. Refer to the specifications for Option 053 in Chapter 7, “Specifications,” for more information about the temperature and the specification limits.

2. Connect the equipment as shown in Figure 8-1. Connect the power splitter to the spectrum analyzer using an adapter.

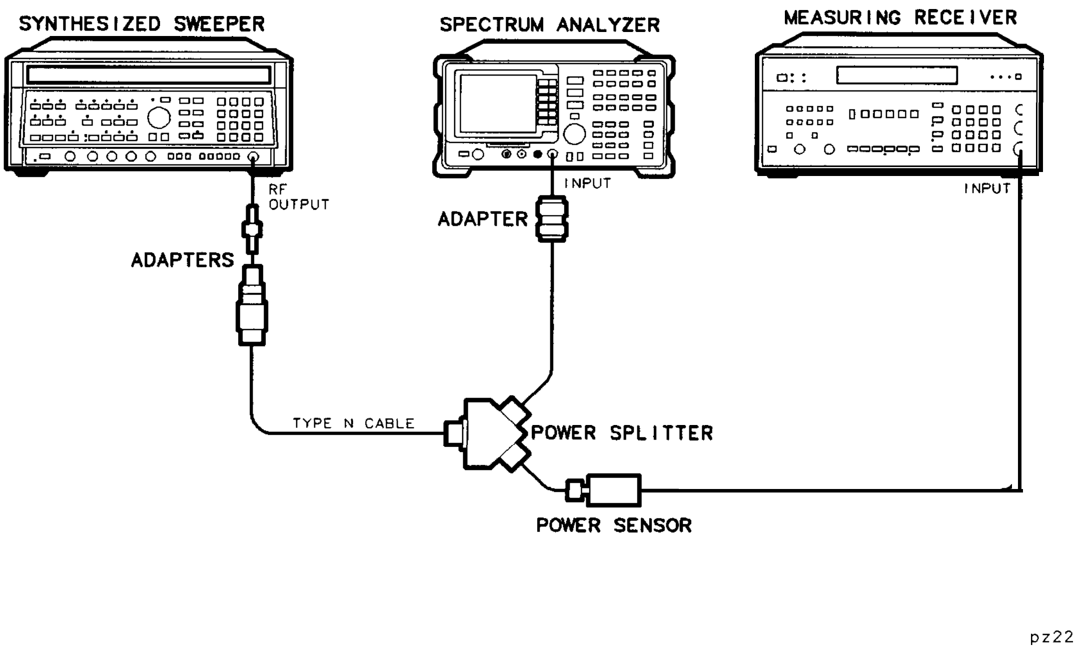


Figure 8-1. Absolute Amplitude Accuracy Verification

3. Press (INSTR PRESET) on the HP 8340A/B. Set the controls as follows:

CW . . . . 836 MHz
POWERLEVEL . . . . -2 dBm

4. Press (PRESET) on the spectrum analyzer and wait for the preset to finish, then press the following spectrum analyzer keys:

(FREQUENCY) 836 (MHz)
(SPAN) 400 (kHz)
(BW) 30 (kHz)
VID BW AUTO MAN 30 (kHz)
((+dBm)UDE) 1 ____
ATTEN AUTO MAN 10 (dB)
(PEAK SEARCH)

Log Fidelity

1. Set the power sensor cal factor for 836 MHz on the measuring receiver.
2. On the synthesized sweeper, press (POWER LEVEL) and adjust the output amplitude so that the analyzer marker amplitude reads -9 dBm ±0.05 dB.
3. Record the measuring receiver power reading in Table 8-2.
4. Adjust the output amplitude of the sweeper for analyzer marker amplitude readings of -14 dBm and -19 dBm.
5. Record the measuring receiver power readings in Table 8-2. The readings should be within the limits shown.

Table 8-2. Log Fidelity

Analyzer Marker Reading (dBm)	Measuring Receiver		
	Min (dBm)	Reading (dBm)	Max (dBm)
-9	-9.5	______	-8.5
-14	-14.5	______	-13.5
-19	-21.5	______	-19.5

Frequency Response (Input Attenuator 10 dB)

1. Set the analyzer (FREQUENCY) to the first measurement frequency shown in Table 8-3.
2. On the synthesized sweeper, press (CW) and set the frequency to the same measurement frequency as the analyzer is set in the previous step.
3. On the analyzer, press (PEAK SEARCH).
4. On the synthesized sweeper, press (POWER LEVEL) and adjust the output amplitude so the analyzer marker amplitude reads -9 dBm ±0.05 dB.
5. Set the power sensor cal factor (for frequency being measured) on the measuring receiver and record the measuring receiver power reading in Table 8-3.
6. Repeat steps 1 through 5 for the other frequencies listed. Record the results in Table 8-3. The results should be within the limits shown.

Table 8-3. Frequency Response (Input Attenuator 10 dB)

Synthesized Sweeper Frequency (MHz)	Measuring Receiver		
	Min (dBm)	Reading (dBm)	Max (dBm)
836	-9.5		-8.5
881	-9.5		-8.5
920	-9.5		-8.5
1715	-9.8		-8.2
1740	-9.8		-8.2
1760	-9.8		-8.2
1780	-9.8		-8.2
1805	-9.8		-8.2
1830	-9.8		-8.2
1850	-9.8		-8.2
1870	-9.8		-8.2
1890	-9.8		-8.2
1910	-9.8		-8.2
1930	-9.8		-8.2
1950	-9.8		-8.2
1970	-9.8		-8.2
1990	-9.8		-8.2

Frequency Response (Input Attenuator 20 dB)

1. On the analyzer, press the following keys:

   (AMPLITUDE) ATTEN AUTO MAN 20 dB
   (AMPLITUDE) 11 (+dBm)

2. Set the analyzer (FREQUENCY) to the measurement frequency shown in Table 8-4.
3. On the synthesized sweeper, press (CW) and set the frequency to the same measurement frequency as the analyzer is set in the previous step.
4. On the analyzer, press (PEAK SEARCH).
5. On the synthesized sweeper, press (POWER LEVEL) and adjust the amplitude so the analyzer marker amplitude reads + 1 dBm ±0.05 dB.
6. Set the power sensor cal factor (for frequency being measured) on the measuring receiver and record the measuring receiver power reading in Table 8-4.
7. Repeat steps 1 through 6 for the other frequencies listed. Record the results in Table 8-4. The results should be within the limits shown.

Table 8-4. Frequency Response (Input Attenuator 20 dB)

Synthesized Sweeper Frequency (MHz)	Measuring Receiver Min (dBm)	Reading (dBm)	Max (dBm)
836	+0.5		+1.5
881	+ 0.5		+1.5
920	+ 0.5		+1.5
1715	+0.2		+1.8
1740	+ 0.2		+1.8
1760	+0.2		+1.8
1780	+0.2		+ 1.8
1805	+ 0.2		+1.8
1830	+ 0.2		+1.8
1850	+0.2		+1.8
1870	+ 0.2		+1.8
1890	+ 0.2		+1.8
1910	+0.2		+1.8
1930	+0.2		+1.8
1950	+ 0.2		+1.8
1970	+0.2		+1.8
1990	+0.2		+1.8

Frequency Response (Input Attenuator 30 dB)

1. On the analyzer, press the following keys:

   (AMPLITUDE) **ATTEN AUTO** MAN 30 dB
   (AMPLITUDE) 15 (+dBm)

2. Set the analyzer (FREQUENCY] to the measurement frequency shown in Table 8-5.
3. On the synthesized sweeper, press (CW) and set the frequency to the same measurement frequency as the analyzer is set in the previous step.
4. On the analyzer, press [PEAK SEARCH].
5. On the synthesized sweeper, press [POWER LEVEL) and adjust the amplitude so the analyzer marker amplitude reads +5 dBm ±0.05 dB.
6. Set the power sensor cal factor (for frequency being measured) on the measuring receiver and record the measuring receiver power reading in Table 8-5.
7. Repeat steps 1 through 6 for the other frequencies listed. Record the results in Table 8-5. The results should be within the limits shown.

Table 8-5. Frequency Response (Input Attenuator 30 dB)

Synthesized Sweeper Frequency (MHz)	Measuring Receiver		
	Min (dBm)	Reading (dBm)	Max (dBm)
836	+ 4.5		+5.5
881	+4.5		+ 5.5
920	+4.5		+ 5.5
1715	+ 4.2		+5.8
1740	+4.2		t5.8
1760	+ 4.2		+5.8
1780	+4.2		+5.8
1805	+4.2		+5.8
1830	+4.2		+5.8
1850	+4.2		+ 5.8
1870	+4.2		t 5.8
1890	+4.2		+5.8
1910	+ 4.2		+ 5.8
1930	+4.2		+ 5.8
1950	+ 4.2		+5.8
1970	t 4.2		+5.8
1990	+ 4.2		+5.8

Frequency Response (Input Attenuator 40 dB)

1. On the analyzer, press the following keys:

   (AMPLITUDE) ATTEN AUTO MAN 40 dB
   (AMPLITUDE) 15 (+dBm)

2. Set the analyzer (FREQUENCY) to the measurement frequency shown in Table 8-6.
3. On the synthesized sweeper, press (CW) and set the frequency to the same measurement frequency as the analyzer is set in the previous step.
4. On the analyzer, press (PEAK SEARCH).
5. On the synthesized sweeper, press (POWER LEVEL) and adjust the amplitude so the analyzer marker amplitude reads +5 dBm ±0.05 dB.
6. Set the power sensor cal factor (for frequency being measured) on the measuring receiver and record the measuring receiver power reading in Table 8-6.
7. Repeat steps 1 through 6 for the other frequencies listed. Record the results in Table 8-6. The results should be within the limits shown.

Table 8-6. Frequency Response (Input Attenuator 40 dB)

Synthesized Sweeper Frequency (MHz)	Measuring Receiver		
	Min (dBm)	Reading (dBm)	Max (dBm)
836	+4.2		+5.8
881	+4.2		t 5.8
920	+4.2		+ 5.8
1715	+ 3.8		+6.2
1740	t 3.8		t 6.2
1760	+3.8		+6.2
1780	+3.8		+ 6.2
1805	+3.8		+ 6.2
1830	+ 3.8		t 6.2
1850	t 3.8		+6.2
1870	+ 3.8		t 6.2
1890	+3.8		+ 6.2
1910	+3.8		+ 6.2
1930	t 3.8		+6.2
1950	+ 3.8		t 6.2
1970	t 3.8		+ 6.2
1990	+3.8		t 6.2

Verifying Relative Amplitude Accuracy

1. Connect the equipment as shown in Figure 8-2.

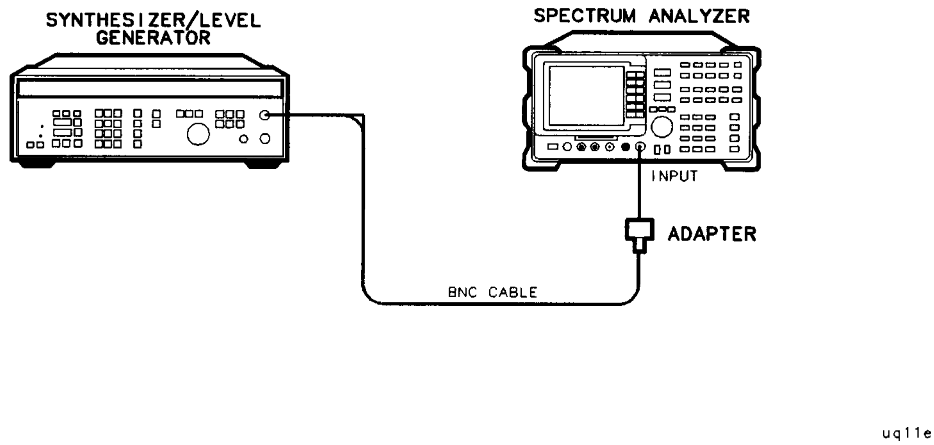


Figure 8-2. Relative Amplitude Accuracy Verification Test Setup

2. On the analyzer, press the following keys:

   (Inst Preset)
   (Frequency) (50) (MHz)
   (SPAN) (100) (kHz)

3. On the synthesizer/level generator, press:

   (frequency) (50) (MHz)
   (Amplitude) (−5) (dBm)

4. On the analyzer, press:

   (Peak Search)
   (Mkr → CF)
   (SPAN) (0) (Hz)
   (BW) (30) (kHz)
   (Vid BW) (100) (Hz)
   (Mkr Δ)

5. Change the synthesizer/level generator amplitude to -45 dBm and record the marker reading for -40 dB relative amplitude in Table 8-7.

Table 8-7. Relative Amplitude Accuracy

Relative Amplitude	Analyzer Marker Reading		
	Min.	Measured	Max.
−40 dB	−40.4	________ dB	−39.6
−60 dB	−60.5	________ dB	−59.5
−90 dB	−0.8	________ dB	+0.8

6. Set the synthesizer/level generator amplitude to -65 dBm and record the marker reading for -60 dB relative amplitude in Table 8-7.

7. Set the analyzer Reference Level to + 15 dBm.

8. Set the synthesizer/level generator amplitude to + 10 dBm and press (Marker Δ) twice.
9. Set the synthesizer/level generator amplitude to -80 dBm.
10. Set the analyzer (Reference Level) to -75 dBm and record the marker reading for -90 dB relative amplitude in Table 8-7.

If the relative amplitude accuracy verification test fails, repeat the spectrum analyzer self calibration routines. If the verification test fails again, record the results on a copy of the performance verification test record, then return the spectrum analyzer with a copy of the completed test record to a Hewlett-Packard Sales and Service Office. Refer to the spectrum analyzer service guide for addresses and shipping instructions.

Performance Verification Test Record (Option 053 only)

The performance verification test record lists test specifications and acceptable limits. We recommend that you make a copy of this table, record the complete test results on the copy of the performance verification test record, and keep the copy for your calibration test records. You may find that keeping a record of the calibration test records is helpful for tracking gradual changes in test results over long periods of time.

Table 8-8. Performance Verification Test Record

Hewlett-Packard Company

Address: ____________________ Report No. ____________________

____

____________________ Date ____________________

____________________ (e.g. 15 JUL 1994)

Model HP 8590 Series spectrum analyzer with HP 85725C CDMA Measurements Personality

Serial No. ____________________

Options ____________________

Firmware revision ____________________

Customer ____________________ Tested by ____________________

Ambient temperature ____________ °C Relative humidity ____________ %

Power mains line frequency ____________ Hz (nominal)

Test Equipment Used:

Description	Model No.	Trace No.	Cal Due Date
Synthesized signal generator			
Synthesized sweeper			
Synthesizer/level generator			
Spectrum analyzer			
Measuring receiver			
Power sensor			
Oscilloscope			
Microwave frequency counter			
Universal counter			
Pulse/function generator			
Power splitter			
1 dB step attenuator			
10 dB step attenuator			

Table 8-8. Performance Verification Test Record

Hewlett-Packard Company Model HP 8590 Series spectrum analyzer with HP 85725C CDMA Measurements Personality	Report No. ______________
Serial No. ______________	Date ______________

Test No.	Test Description	Results Min	Results Measured	Results Max	Measurement Uncertainty
1	**Absolute amplitude accuracy**				
	10 dB attenuation				
	Amp accuracy at 836 MHz	-9.5 dBm	______	-8.5 dBm	+0.24/−0.25 dB
	Amp accuracy at 881 MHz	-9.5 dBm	______	-8.5 dBm	+0.24/−0.25 dB
	Amp accuracy at 920 MHz	-9.5 dBm	______	-8.5 dBm	+0.24/−0.25 dB
	Amp accuracy at 1715 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1740 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1760 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1780 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1805 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1830 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1850 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1870 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1890 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1910 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1930 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1950 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1970 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1990 MHz	-9.8 dBm	______	-8.2 dBm	+0.24/−0.25 dB
	20 dB attenuation				
	Amp accuracy at 836 MHz	+0.5 dBm	______	+ 1.5 dBm	+0.24/−0.25 dB
	Amp accuracy at 881 MHz	+0.5 dBm	______	+ 1.5 dBm	+0.24/−0.25 dB
	Amp accuracy at 920 MHz	+0.5 dBm	______	+ 1.5 dBm	+0.24/−0.25 dB
	Amp accuracy at 1715 MHz	+0.2 dBm	______	+ 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1740 MHz	+0.2 dBm	______	+ 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1760 MHz	+0.2 dBm	______	+ 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1780 MHz	+0.2 dBm	______	+ 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1805 MHz	+0.2 dBm	______	+ 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1830 MHz	+0.2 dBm	______	+ 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1850 MHz	+0.2 dBm	______	+ 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1870 MHz	+0.2 dBm	______	+ 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1890 MHz	+0.2 dBm	______	+ 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1910 MHz	+0.2 dBm	______	t 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1930 MHz	+0.2 dBm	______	+ 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1950 MHz	+0.2 dBm	______	t 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1970 MHz	+0.2 dBm	______	+ 1.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1990 MHz	+0.2 dBm	______	+ 1.8 dBm	+0.24/−0.25 dB

Test No.	Test Description	Results Min	Measured	Max	Measurement Uncertainty
	30 dB attenuation				
	Amp accuracy at 836 MHz	+4.5 dBm		+5.5 dBm	+0.24/−0.25 dB
	Amp accuracy at 881 MHz	+4.5 dBm		+5.5 dBm	+0.24/−0.25 dB
	Amp accuracy at 920 MHz	+4.5 dBm		+5.5 dBm	+0.24/−0.25 dB
	Amp accuracy at 1715 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1740 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1760 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1780 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1805 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1830 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1850 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1870 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1890 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1910 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1930 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1950 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1970 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1990 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	40 dB attenuation				
	Amp accuracy at 836 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 881 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 920 MHz	+4.2 dBm		+5.8 dBm	+0.24/−0.25 dB
	Amp accuracy at 1715 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1740 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1760 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1780 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1805 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1830 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1850 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1870 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1890 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1910 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1930 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1950 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1970 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
	Amp accuracy at 1990 MHz	+3.8 dBm		+6.2 dBm	+0.24/−0.25 dB
2	**Relative amplitude accuracy**				
	-40 dB	-40.4 dB		-39.6 dB	±0.038 dB
	-60 dB	-60.5 dB		-59.5 dB	±0.038 dB
	-90 dB	-0.8 dB		+0.8 dB	±0.094 dB

Glossary

absolute amplitude accuracy
The degree of correctness or uncertainty (expressed either in volts or dB power). It includes relative uncertainties plus calibrator uncertainty. For improved accuracy, some spectrum analyzers specify frequency response relative to the calibrator as well as relative to the midpoint between peak-to-peak extremes. Refer also to "relative amplitude accuracy."

access channel
A reverse CDMA channel used by mobile stations for communicating to the base station. The access channel is used for short signaling message exchanges such as call originations, responses to pages, and registrations. The access channel is a slotted random access channel.

ACPR integration bandwidth method
A method used to measure power across specific bandwidth used in the ACPR Measurement. The spectrum analyzer sweeps through the specified integration bandwidth with a narrow resolution bandwidth and averages the RMS power. This method is accurate across all integration bandwidths greater than the power spectral density normalization bandwidth. However, because it takes time to sweep across the integration bandwidth, the method is relatively slow.

ACPR resolution bandwidth method
A faster alternative method used to measure power in a specific bandwidth used in the ACPR Measurement. The spectrum analyzer goes to zero span and averages the power within the time record at the specified resolution bandwidth. This method is only valid if the following conditions are satisfied:

1. The signal of interest is relatively flat, (±6dB/Resolution SW).
2. The signal of interest is noise-like signal without CW spurs.
3. Resolution BW is selected such that it doesn't violate the above critera.

A correction factor is added to convert the Gaussian filter resolution filter to a rectangular filter thus giving the correct power measurement.

active function readout
The area of a display screen where the active function and its state are displayed. The active function is the one that was completed by the last key selection or remote programming command.

active marker
The marker on a trace that can be repositioned either by front panel controls or by programming commands.

active trace
The trace (commonly A, B, or C) that is being swept (updated) with incoming signal information.

amplitude accuracy
The general uncertainty of a spectrum analyzer amplitude measurement, whether relative or absolute.

attenuation
A general term used to denote a decrease of signal magnitude in transmission from one point to another. Attenuation may be expressed as a scalar ratio of the input to the output magnitude in decibels.

bandwidth selectivity
This is a measure of the spectrum analyzer's ability to resolve signals unequal in amplitude. It is the ratio of the 60 dB bandwidth to the 3 dB bandwidth for a given resolution filter (IF). Bandwidth selectivity tells us how steep the filter skirts are. Bandwidth selectivity is sometimes called shape factor.

base station (BS)
A controlling transceiver that provides service to cellular mobile stations. Also called a cell site.

battery-backed RAM
Random access memory (RAM) data retained by a battery. RAM memory cards can contain data that is maintained with a battery. Refer also to "nonvolatile memory."

bit sequence
The sequence of ones and zeros detected when demodulating the signal for a given digital modulation format.

burst carrier
A carrier that is periodically turned off and on. A burst carrier may or may not be modulated.

carrier
A signal used to convey information through modulation of signal characteristics. The amplitude of a carrier signal is usually higher than other types of signals.

carrier frequency error
This is the difference between the expected carrier frequency and the measured carrier frequency. The units are Hz.

CDMA channel
The set of channels transmitted from the base station and the mobile stations on a given frequency. See also "forward CDMA channel" and "reverse CDMA channel."

CDMA frequency assignment
A 1.23 MHz segment of spectrum centered on one of the 30 kHz channels of the existing analog system.

channel
A transmission path between two points. It is usually the smallest subdivision of a particular transmission system by means of which a single type of communication service is provided.

channel number
A number assigned to a carrier frequency.

clear-write mode
This is a spectrum analyzer function that clears the specified trace (A, B, or C) from the display, then sweeps (updates) the trace each time trigger conditions are met. When trigger conditions are met, the new input signal data is displayed, then cleared, and the process begins again.

code channel
A subchannel of a forward CDMA channel. A forward CDMA channel contains 64 code channels. Code channel zero is assigned to the pilot channel. Code channels 1 through 7 may be assigned to either the paging channels or the traffic channels. Code channel 32 may be assigned to either a sync channel or a traffic channel. The remaining code channels may be assigned to traffic channels.

code division multiple access (CDMA)
A technique for spread-spectrum, multiple-access digital communications that creates channels through the use of unique code sequences.

codec
Refers to a coder and decoder. A codec performs analog to digital and digital to analog conversions on voice signals. It is also used to compress and expand data for more efficient transmission.

command
A set of instructions that are translated into instrument actions. The actions are usually made up of individual steps that together can execute an operation. Generally, for spectrum analyzers it is a sequence of code that controls some operation of a spectrum analyzer. These codes can be keyed in via a controller, or computer. Refer also to "function."

continuous carrier
A carrier that is always on. A continuous carrier may or may not be modulated.

continuous sweep mode
The spectrum analyzer condition where traces are automatically updated each time trigger conditions are met.

dBm/Hz
A measure of power spectral density. dBm/Hz is the power in one Hertz of bandwidth, where power is expressed in units of dBm.

default
The factory-defined conditions, options, or parameters of an instrument. The default state may be changed by choosing key selections or writing programming commands to use other conditions.

digital demodulation
This describes a technique of extracting the information used to modulate a signal. Digital signal processing algorithms are used on the signal after it has been converted from an analog to a digital form (digitized).

display detector mode
The manner in which video information is processed prior to being stored in memory.

DLP
The abbreviation for downloadable program. A single programming command or a sequence of programming commands used to perform specific operations. DLPs can be made up of several functions, variables, and traces defined by the program creator. The DLP can

be downloaded from one electronic storage medium into another and executed without a controller.

drift

The slow (relative to sweep time) change of signal position on the display as a result of a change in local oscillator frequency versus sweep voltage. While spectrum analyzer drift may require periodic retuning, it does not impair frequency resolution.

dynamic range

The power ratio (dB) between the smallest and largest signals simultaneously present at the input of a spectrum analyzer that can be measured with some degree of accuracy. Dynamic range generally refers to measurement of distortion or intermodulation products.

E_b

The energy in an information bit.

E_b/N_0

The ratio between the energy of each information bit (E_b) and the noise spectral density (N_0). This ratio is usually expressed in dB.

envelope detector

A detector circuit whose output follows the envelope, but not the instantaneous variation of its input signal. This detector is sometimes called a peak detector. In superheterodyne spectrum analyzers, the input to the envelope detector comes from the final IF, and the output is a video signal. When the spectrum analyzer is in zero span, the envelope detector demodulates the input signal, and you can observe the modulating signal as a function of time on the display.

error message

A message on the spectrum analyzer display that indicates an error condition. An error condition can be caused by missing or failed hardware, improper user operation, or other conditions that require additional attention. Generally, the requested action or operation cannot be completed until the condition is resolved.

external trigger signal

The external trigger signal initiates a sweep of the spectrum analyzer. For gated power timing measurements on a mobile station in 1/8 rate mode, the external trigger signal makes the measurements synchronous with the frame rate of the burst RF input signal.

firmware

An assembly made up of hardware and instruction code. The hardware and instruction code is integrated and forms a functional set that cannot be altered during normal operation. The instruction code, permanently installed in the circuitry of the instrument, is classified as ROM (read only memory). The firmware determines the operating characteristics of the instrument or equipment. Each firmware version is identified by a revision code number, or date code.

forward CDMA channel

A CDMA channel from a base station to mobile stations. The forward CDMA channel contains one or more code channels that are transmitted on a CDMA frequency assignment using a particular pilot PN offset. The code channels are associated with the pilot channel, sync channel, paging channels, and traffic channels. The forward CDMA channel always carries a pilot channel and may carry up to 1 sync channel, up to 7 paging channels, and up to 63 traffic channels, as long as the total number of channels, including the pilot channel, is no greater than 64.

forward link
The link direction from the base station to the mobile station. Also referred to in satellite communications technology as the downlink.

forward traffic channel
A code channel used to transport primary traffic, secondary traffic, and signaling traffic from the base station to the mobile station.

frame
A basic timing interval in the system. For the Access channel, paging channel, and traffic channel, a frame is 20 ms long. For the sync channel, a frame is 26.666 ms long. For the vocoder used for Service Option 1, a frame is 20 ms long.

frequency accuracy
The uncertainty with which the frequency of a signal or spectral component is indicated, either in an absolute sense or relative to another signal or spectral component. Absolute and relative frequency accuracies are specified independently.

frequency range
The range of frequencies over which the spectrum analyzer performance is specified. The maximum frequency range of many microwave spectrum analyzers can be extended with the application of external mixers.

frequency resolution
The ability of a spectrum analyzer to separate closely spaced spectral components and display them individually. Resolution of equal amplitude components is determined by resolution bandwidth. Resolution of unequal amplitude signals is determined by resolution bandwidth and bandwidth selectivity.

frequency response
The peak-to-peak variation in the displayed signal amplitude over a specified center frequency range. Frequency response is typically specified in terms of ±dB relative to the value midway between the extremes. It also may be specified relative to the calibrator signal.

frequency span
The frequency difference between the highest frequency and lowest frequency displayed. Span is represented by the horizontal axis of the display. Generally, frequency span is given as the total span across the full display. Some spectrum analyzers represent frequency span (scan width) as a per-division value.

frequency stability
The ability of a frequency component to remain unchanged in frequency over short and long-term periods of time. Stability refers to the local oscillator's ability to remain fixed at a particular frequency over time. The sweep ramp that tunes the local oscillator influences where a signal appears on the display. Any long-term variation in local oscillator frequency (drift) with respect to the sweep ramp causes a signal to shift its horizontal position on the display slowly. Shorter-term local oscillator instability can appear as random FM or phase noise on an otherwise stable signal.

front panel key
Keys that are located on the front panel of an instrument. The key labels identify the function the key activities. Numeric keys and step keys are two examples of front panel keys.

function

The action or purpose that a specific item is intended to perform or serve. The spectrum analyzer contains functions that can be executed via front panel key selections, or through programming commands. The characteristics of these functions are determined by the firmware in the instrument. In some cases, a DLP (downloadable program) execution of a function allows you to execute the function from front panel key selections.

harmonic distortion

Undesired frequency components added to signals because of nonlinear behavior of the device (for example, a mixer or an amplifier) through which signals pass. These unwanted components are harmonically related to the original signal.

HP-IB

The abbreviation for Hewlett-Packard Interface Bus. It is a parallel interface that allows you to “daisy chain” more than one device to a port on a computer or instrument. Interface protocol is defined in IEEE 488.2. It is equivalent to the industry standard GPIB.

input attenuator

An attenuator between the input connector and the first mixer of a spectrum analyzer (also called an RF attenuator). The input attenuator is used to adjust the signal level incident to the first mixer, and to prevent gain compression due to high-level or broadband signals. It is also used to set the dynamic range by controlling the degree of internally-generated distortion. For some spectrum analyzers, changing the input attenuator settings changes the vertical position of the signal on the display, which then changes the reference level accordingly. In Hewlett-Packard microprocessor-controlled spectrum analyzers, the IF gain is changed to compensate for changes in input attenuator settings. Because of this, the signals remain stationary on the display, and the reference level is not changed.

intermodulation distortion

Undesired frequency components resulting from the interaction of two or more spectral components passing through a device having nonlinear behavior, such as a mixer or an amplifier. The undesired components are related to the fundamental components by sums and differences of the fundamentals and various harmonics. The algorithm is:

$$f_1 \pm f_2, 2 \times f_1 \pm f_2, 2 \times f_2 \pm f_1, 3 \times f_1 \pm 2 \times f_2, \textit{ and so on}$$

limit line

A test limit made up of a series of line segments, positioned according to frequency or time, and amplitude, within the spectrum analyzer’s measurement range. Two defined limit lines may be displayed simultaneously. One sets an upper test limit, the other sets a lower test limit. Trace data can be compared with the limit lines as the spectrum analyzer sweeps. If the trace data exceeds either the upper or lower limits, the spectrum analyzer displays a message or sounds a warning, indicating that the trace failed the test limits.

limit line file

The user-memory file that contains the limit line table entries. Limit lines are composed of frequency and amplitude components that make up a trace array and this data is stored in the file. The limit line file feature is available on spectrum analyzers that are capable of limit line operation. Refer also to “limit line.”

limit line table

The line segments of a limit line are stored in the limit line table. The table can be recalled to edit the line segments, then restored in the limit line file. Refer also to “limit line.”

LO

The abbreviation for local oscillator. The local oscillator output in a superheterodyne system is mixed with the received signal to produce a sum or difference equal to the intermediate frequency (IF) of the receiver.

LO feedthrough

The response that occurs on a spectrum analyzer's CRT when the first local oscillator frequency is equal to the first IF. The LO feedthrough appears as a signal at 0 Hz.

log display

The display mode in which vertical deflection is a logarithmic function of the input signal voltage. Log display is also called logarithmic display. The display calibration is set by selecting the value of the top graticule line (reference level), and scale factor in dB per division. On Hewlett-Packard spectrum analyzers, the bottom graticule line represents zero volts for scale factors of 10 dB/division or more. The bottom division, therefore, is not calibrated for those spectrum analyzers. Spectrum analyzers with microprocessors allow reference level and marker values to be indicated in dBm, dBmV, dBμV, volts, and occasionally in watts. Spectrum analyzers not based upon microprocessors usually offer only one kind of unit (typically dBm).

marker

A visual indicator we can place anywhere along the displayed trace. A marker readout indicates the absolute value of the trace frequency and amplitude at the marked point. The amplitude value is displayed with the currently selected units.

maximum input level

The maximum signal power that may be safely applied to the input of a spectrum analyzer. The maximum input level is typically 1 W (30 dBm) for Hewlett-Packard spectrum analyzers.

memory

A storage medium, device, or recording medium into which data can be stored and held until some later time, and from which the entire original data may be retrieved.

memory card

A small memory device shaped like a credit card that can store data or programs. The programs are sometimes called personalities and give additional capabilities to your instrument. Typically, there is only one personality per memory card. Refer also to "personality."

menu

The spectrum analyzer functions that appear on the display and are selected by pressing front panel keys. These selections may evoke a series of other related functions that establish groups called menus.

mobile station (MS)

A transceiver unit operating as part of a cellular system. Also called the subscriber unit. This includes vehicle-mounted handheld units.

nonvolatile memory

Memory data that is retained in the absence of an ac power source. This memory is typically retained with a battery. Refer also to "battery-backed RAM."

open-loop power control
Rapid adjustments that the mobile station makes in transmit power according to changes in received power from a cell site.

paging channel
A code channel on the forward channel used for paging mobile stations. Of the 64 Walsh functions used for channelization on the forward link, one through seven (inclusive) are used for paging channels.

parameter units
Standard units of measure, which include the following:

Measured Parameter	Unit Name	Unit Abbreviation
frequency	hertz	Hz
power level	decibel relative to milliwatts	dBm
power ratio	decibel	dB
voltage	volt	V
time	second	s
electrical current	ampere	A
impedance (resistance)	ohm	Ω

peak detection mode
The spectrum analyzer state where circuits calculate the peak value of a displayed signal. This value is determined by evaluating a series of measured values from an active trace.

peak detector
A detector that follows the peak or envelope of the signal applied to it. The standard detector in a spectrum analyzer is typically a peak detector. MIL-STD EMI measurements usually call for peak detection.

personality
Applications available on a memory card or other electronic media that extends the capability of an instrument for specific uses. Examples include the HP 85725C CDMA Measurements Personality measurements personality, the digital radio personality, and the cable TV personality.

pilot channel
An unmodulated, direct-sequence, spread-spectrum signal transmitted continuously by each CDMA base station. The Pilot channel allows a mobile station to acquire the timing of the forward CDMA channel, provides a phase reference for coherent demodulation, and provides a means for signal strength comparisons between base stations for determining when to handoff.

positive peak
The maximum, instantaneous value of an incoming signal. On digital displays, each displayed point of the signal indicates the maximum value of the signal for that part of the frequency span or time interval represented by the point.

power control group
A 1.25 ms interval on the CDMA channel. During this interval, the mobile station either transmits six Walsh symbols or transmits nothing. Nothing is transmitted when the data burst randomizer specifies that the power control group is not to be transmitted (this can only occur at data rates lower than 9600 bps). The base station estimates the received

power in a power control group in order to determine the value of a corresponding power control bit.

query
Any spectrum analyzer programming command having the distinct function of returning a response. These commands may end with a question mark (?). Queried commands return information to the computer.

random-access memory
RAM (random-access memory) or read-write memory, is a storage area allowing access to any of its storage locations. Data can be written to or retrieved from RAM, but data storage is only temporary. When the power is removed, the information disappears. User-generated information appearing on a display is RAM data.

read-only memory
ROM (read-only memory) that is encoded into the spectrum analyzer's firmware. The data can be read only; it cannot be written to or altered by the user.

reference level
The calibrated vertical position on the display used as a reference for amplitude measurement in which the amplitude of one signal is compared with the amplitude of another regardless of the absolute amplitude of either.

relative amplitude accuracy
The uncertainty of an amplitude measurement in which the amplitude of one signal is compared with the amplitude of another, regardless of the absolute amplitude of either. Distortion measurements are relative measurements. Contributors to uncertainty include frequency response and display fidelity and changes of input attenuation, IF gain, scale factor, and resolution bandwidth.

resolution bandwidth
The ability of a spectrum analyzer to display adjacent responses discretely. This term is used to identify the width of the resolution bandwidth filter of a spectrum analyzer at some level below the minimum insertion loss point (maximum deflection point on the display). Typically, it is the 3 dB resolution bandwidth that is specified, but in some cases the 6 dB resolution bandwidth is specified.

reverse CDMA channel
The CDMA channel from the mobile station to the base station. From the base station's perspective, the reverse CDMA channel is the sum of all mobile station transmissions on a CDMA frequency assignment.

reverse link
The link direction from the mobile station to the base station. Also referred to in satellite communications technology as the **uplink**.

reverse traffic channel
A reverse CDMA channel used to transport primary traffic, secondary traffic, and signaling traffic from a single mobile station to one or more base stations.

RX (receive) band
The frequency range over which a base station or mobile station can receive carrier signals.

scale factor
The display vertical axis calibration in terms of single division units.

sensitivity
The level of the smallest sinusoid that can be observed on a spectrum analyzer, usually under optimized conditions of minimum resolution bandwidth, 0 dB input attenuation, and minimum video bandwidth. Hewlett-Packard defines sensitivity as the displayed average noise level. A sinusoid at that level appears to be about 2 dB above the noise.

serial prefix
Serial numbers that identify an instrument begin with a five-character prefix. The prefix in this case represents the version of firmware that particular instrument was shipped with.

single sweep mode
The spectrum analyzer sweeps once when trigger conditions are met. Each sweep is initiated by pressing an appropriate front panel key, or by sending a programming command.

softkey
Key labels displayed on a screen or monitor that are activated by mechanical keys surrounding the display, or located on a keyboard. Softkey selections usually evoke menus that are written into the program software. Front panel key selections determine the menu (set of softkeys) appears on the display.

span
Span equals the stop frequency minus the start frequency. The span setting determines the horizontal-axis scale of the spectrum analyzer display.

span accuracy
The uncertainty of the indicated frequency separation of any two signals on the display.

spectral component
One of the sine waves comprising a spectrum.

spectral regrowth
The distortion spectrum generated in the adjacent channels from nonlinear characteristics of CDMA components.

spectrum
An array of sine waves differing in frequency and amplitude. They are properly related with respect to phase and, taken as a whole, form a particular time domain signal.

spectrum analyzer
A device that effectively performs a Fourier transform and displays the individual spectral components (sine waves) that form a time domain signal.

step
The increment of change that results when you press the front panel step keys, ▲ and ▼, or by program commands.

stop/start frequency
Terms used in association with the stop and start points of the frequency measurement range. Together they determine the span of the measurement range.

syntax
The grammar rules that specify how commands must be structured for an operating system, programming language, or application.

test limit
The acceptable results levels for any given measurement. The levels vary from country to country, and depend on the equipment being tested.

trace
A trace is made up of a series of data points containing frequency and amplitude information. The series of data points is often called an array. Traces A, B, and C are the typical names of traces that the spectrum analyzer displays. The number of traces is specific to the instrument.

traffic channel
A communication path between a mobile station and a base station, used primarily for communicating service-option related traffic. The term traffic channel implies a forward traffic channel and reverse traffic channel pair. See also "forward traffic channel" and "reverse traffic channel."

transmission intermodulation spurious
A measure of the capability of the transmitter to inhibit the generation of intermodulation distortion products. Intermodulation spurious is sometimes called intermodulation attenuation.

TX (transmit) band
The frequency range over which a base station or mobile station can transmit carrier signals.

units
Dimensions on the measured quantities. Units usually refer to amplitude quantities because they can be changed. In spectrum analyzers with microprocessors, available units are dBm (dB relative to 1 mW dissipated in the nominal input impedance of the spectrum analyzer), dBmV (dB relative to 1 mV), dBμV (dB relative to 1 μV), V (volts), and, in some spectrum analyzers, W (watts).

update
To make existing information current; to bring information up to date.

video
A term describing the output of a spectrum analyzer's envelope detector. The frequency range extends from 0 Hz to a frequency that is typically well beyond the widest resolution bandwidth available in the spectrum analyzer. However, the ultimate bandwidth of the video chain is determined by the setting of the video filter.

video bandwidth
The cutoff frequency (3 dB point) of an adjustable low-pass filter in the video circuit. When the video bandwidth is equal to or less than the resolution bandwidth, the video circuit cannot fully respond to the more rapid fluctuations of the output of the envelope detector. The result is a smoothing of the trace, or a reduction in the peak-to-peak excursion, of broadband signals such as noise and pulsed RF when viewed in broadband mode. The degree of averaging or smoothing is a function of the ratio of the video bandwidth to the resolution bandwidth.

video filter
A post-detection, low-pass filter that determines the bandwidth of the video amplifier. It is used to average or smooth a trace. Refer also to "video bandwidth."

zero span

The case in which a spectrum analyzer's local oscillator remains fixed at a given frequency so that the spectrum analyzer becomes a fixed-tuned receiver. In this state, the bandwidth is equal to the resolution bandwidth. Signal amplitude variations are displayed as a function of time. To avoid loss of signal information, the resolution bandwidth must be as wide as the signal bandwidth. To avoid any smoothing, the video bandwidth must be set wider than the resolution bandwidth.

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