

Measurement Guide

Power Meter

for Anritsu RF and Microwave Handheld Instruments

BTS Master™

Site Master™

Spectrum Master™

Cell Master™

PIM Master™

LMR Master™

VNA Master™

Power Meter

Option 29

High Accuracy Power Meter

Option 19

The Anritsu logo is displayed in a stylized, blue, sans-serif font. The letter 'A' is particularly large and features a unique, angular design.

TRADEMARK ACKNOWLEDGMENTS

Windows is a registered trademark of Microsoft Corporation.
BTS Master, Site Master, Cell Master, Spectrum Master, VNA Master, LMR Master, and PIM Master are trademarks of Anritsu Company.

NOTICE

Anritsu Company has prepared this manual for use by Anritsu Company personnel and customers as a guide for the proper installation, operation and maintenance of Anritsu Company equipment and computer programs. The drawings, specifications, and information contained herein are the property of Anritsu Company, and any unauthorized use or disclosure of these drawings, specifications, and information is prohibited; they shall not be reproduced, copied, or used in whole or in part as the basis for manufacture or sale of the equipment or software programs without the prior written consent of Anritsu Company.

UPDATES

Updates, if any, can be downloaded from the Anritsu Website at:
<http://www.anritsu.com>

For the latest service and sales contact information in your area, please visit:
<http://www.anritsu.com/contact-us>

Table of Contents

Chapter 1—General Information

- 1-1 Introduction 1-1
- 1-2 Contacting Anritsu 1-1
- 1-3 Power Meter 1-1
- 1-4 High Accuracy Power Meter 1-2

Chapter 2—Power Meter

- 2-1 Introduction 2-1
- 2-2 General Measurement Setup 2-1
 - Setting Frequency Span 2-1
 - Setting the Amplitude 2-2
 - Changing the Display Units 2-2
 - Displaying Relative Power 2-2
 - Setting Pass Fail Limits 2-2
- 2-3 Power Meter Menus 2-4
- 2-4 Freq (Frequency) Menu 2-5
- 2-5 Frequency Menu with Offset Function 2-6
 - Freq 2/2 Menu 2-7
- 2-6 Span Menu 2-9
- 2-7 Amplitude Menu 2-10
 - Units Menu 2-11
- 2-8 Average Menu 2-11
- 2-9 Limits Menu 2-12
- 2-10 Sweep Menu 2-12
- 2-11 Measure Menu 2-12
- 2-12 Trace Menu 2-12
- 2-13 Other Menus 2-12

Table of Contents (Continued)

Chapter 3—High Accuracy Power Meter

3-1	Introduction	3-1
3-2	Required Equipment	3-1
3-3	General Measurement Setup	3-2
	Changing the Display Units	3-2
	Zero and Cal	3-3
	Changing the Scale of the Analog Display	3-4
	Using Attenuators	3-4
	Displaying Relative Power	3-4
	Averaging/Max Hold/Run Hold	3-5
	Limits	3-6
3-4	High Accuracy Power Meter Menus	3-7
3-5	Amplitude Menu	3-8
3-6	Average Menu.	3-9
3-7	Zero/Cal Menu	3-9
3-8	Limit Menu	3-10
3-9	Sweep Menu.	3-10
3-10	Measure Menu	3-10
3-11	Trace Menu.	3-10
3-12	Other Menus.	3-10

Table of Contents (Continued)

Chapter 4—Inline Peak Power Sensor MA24105A

4-1	Introduction	4-1
4-2	Required Equipment	4-1
4-3	Sensor Power Meter Interface	4-3
	Main Menu Keys	4-3
4-4	Connection Setup	4-5
4-5	General Measurement Setup	4-6
	Changing the Display Units	4-6
	Zero and Calibrate	4-6
	Changing the Scale of the Analog Display	4-6
	Using Attenuators	4-6
	Selecting Measurements	4-7
4-6	Menus	4-7
4-7	MA24105A Menu Group	4-8
4-8	Display Menu	4-9
4-9	Forward Menu	4-10
4-10	Reverse Menu	4-12
4-11	Summary Menu	4-12
4-12	Amplitude Menu	4-13
	External Amplitude Units Menu	4-13
4-13	Units Menu	4-14
4-14	Averages Menu	4-14
4-15	Zero/Cal Menu	4-15
4-16	Cal Factor Menu	4-15
4-17	Limits Menu	4-16
4-18	Video BW Menu	4-17
4-19	Additional Menus	4-17
	Instrument Mode Selector	4-17
	System Menu	4-17
	File Menu	4-17
	Limits Menu (Instrument)	4-18
	Trace Menu	4-18
	Measure Menu	4-18
	Sweep Menu	4-18
	Calibrate Menu	4-18
	Preset Menu	4-18

Table of Contents (Continued)

Appendix A—Error Messages

A-1	Introduction	A-1
A-2	High Accuracy Power Meter Messages	A-1

Index

Chapter 1 — General Information

1-1 Introduction

This Measurement Guide documents the Power Meter and the High Accuracy Power Meter for the following Anritsu instruments:

- BTS Master™
- Site Master™
- Spectrum Master™
- Cell Master™
- PIM Master™
- LMR Master™
- VNA Master™

Note

Read the Handheld Instruments Product Information, Compliance, and Safety Guide (PN: 10100-00065) for important safety, legal, and regulatory notices before operating the equipment. For additional information and literature covering your product, visit the product page of your instrument on <http://www.anritsu.com/> and select the Library tab.

Not all instrument models offer every option. Please refer to the Technical Data Sheet of your instrument for available options.

1-2 Contacting Anritsu

To contact Anritsu, please visit:

<http://www.anritsu.com/contact-us>

From here, you can select the latest sales, select service and support contact information in your country or region, provide feedback, complete a “Talk to Anritsu” form to have your questions answered, or obtain other services offered by Anritsu.

Updated product information can be found on the Anritsu web site:

<http://www.anritsu.com/>

Search for the product model number. The latest documentation is on the product page under the Library tab.

1-3 Power Meter

Instruments equipped with the Power Meter measurement mode can be used to make channelized power meter measurements. No external sensor is required.

1-4 High Accuracy Power Meter

Instruments with Option 19 and an appropriate Anritsu power sensor can be used to make High Accuracy Power Measurements. This option provides true RMS measurements with accurate measurements for both CW and complex digitally modulated signals. [Table 1-1](#) lists the Option 19 compatible Anritsu sensors.

Note The Anritsu sensor is not included with Option 19. A high accuracy power sensor must be purchased separately and the instrument must have compatible firmware that supports your sensor installed. Visit www.anritsu.com for details.

Table 1-1. Option 19 USB Power Sensors

Model	Description	Frequency Range	Connector (50 Ω)	Data Sheet (for complete specifications)
PSN50	High Accuracy RF Power Sensor	50 MHz to 6 GHz	Type N(m)	11410-00414
MA24104A ^a	Inline High Power Sensor	600 MHz to 4 GHz	Type N(f)	11410-00483
MA24105A ^b	Inline Peak Power Sensor	350 MHz to 4 GHz	Type N(f)	11410-00621
MA24106A	High Accuracy RF Power Sensor	50 MHz to 6 GHz	Type N(m)	11410-00424
MA24108A	Microwave USB Power Sensor	10 MHz to 8 GHz	Type N(m)	11410-00504
MA24118A	Microwave USB Power Sensor	10 MHz to 18 GHz	Type N(m)	11410-00504
MA24126A	Microwave USB Power Sensor	10 MHz to 26 GHz	Type K(m)	11410-00504
MA24208A	Universal USB Power Sensor	10 MHz to 8 GHz	Type N(m)	11410-00841
MA24218A	Universal USB Power Sensor	10 MHz to 18 GHz	Type N(m)	11410-00841
MA24330A	Microwave CW USB Power Sensor	10 MHz to 33 GHz	Type K(m)	11410-00906
MA24340A	Microwave CW USB Power Sensor	10 MHz to 40 GHz	Type K(m)	11410-00906
MA24350A	Microwave CW USB Power Sensor	10 MHz to 50 GHz	Type V(m)	11410-00906

a. The MA24104A sensor is discontinued and is replaced by the MA24105A.

b. The MA24105A provides additional measurement capabilities. Refer to [Chapter 4](#) when using the MA24105A.

Note Screen captured images are provided as examples. The image and measurement details shown on your instrument may differ from the examples in this measurement guide.

Chapter 2 — Power Meter

2-1 Introduction

This chapter describes the instrument setup for general power meter measurements.

The Power Meter can display measured power in dBm, dBV, dBmV, dB μ V, Volts, or Watts. No external sensor is required. The Power Meter frequency span can be set from 1 kHz to 100 MHz. The Full Band submenu key conveniently sets the frequency range to 100 MHz on the current center frequency in order to simulate a broadband measurement.

The maximum and minimum values of the analog display can be set in the Amplitude menu. The scale of the analog display reflects the Unit selection. Relative Power is a useful feature to obtain the power reading with respect to a specific power level.

Note	Screen captured images are provided as examples. The image and measurement details shown on your instrument may differ from the examples in this measurement guide.
-------------	---

2-2 General Measurement Setup

Please refer to the User Guide for your instrument for directions about selecting the Power Meter mode and file management.

Setting Frequency Span

Press the **Freq** main menu key to set the desired frequency. Choose whether to set frequency parameters manually or to select a signal standard.

Select Manually

Choose the appropriate submenu keys and enter the start and stop frequency, the center frequency, and the span.

Select a Signal Standard

Press the Signal Standard submenu key and select the channel (and Uplink or Downlink) or select the full band.

Select a Frequency Offset

A user defined frequency offset feature can be enabled on supported Anritsu models to offset the frequency displayed on the instrument from the actual swept frequency range. When enabled, the Center Freq, Start Freq, and Stop Freq keys will indicate that a frequency offset has been set (Figure 2-7 on page 2-8). To create a frequency offset, press the Step Size & Offset submenu key and select Freq Offset.

Setting the Amplitude

1. Press the **Amplitude** main menu key.
2. Press the **Max** submenu key and set the upper scale value. Press the **Min** submenu key and set the lower scale value.

or

Press the **Auto Scale** submenu key to adjust the range automatically.

Changing the Display Units

The power reading can be displayed in dBm, dBV, dBmV, dB μ V, Volt, or Watt. Use the following procedure to change the displayed units:

1. Press the **Amplitude** main menu key.
2. Press the **Units** submenu key and select the display units.
3. Press the **Back** submenu key to return to the **Amplitude** menu.

Displaying Relative Power

Use the following procedure to select Relative Power through the Amplitude menu.

1. With the desired base power (reference) level connected to the input of your instrument, press the **Amplitude** main menu key.
2. Press the **Relative** submenu key.

Note Relative power is displayed in dB.
--

Setting Pass Fail Limits

Maximum and minimum limits can be set as follows:

1. On your instrument, press the **Limits** main menu key, or press the **Shift** key, then the **Limit (6)** key.
2. Press the **Upper Limit** submenu key and use the directional arrow keys, the key pad, or the rotary knob to set the desired upper limit. Then press **Enter**.
3. Press the **Lower Limit** submenu key and use the directional arrow keys, the key pad, or the rotary knob to set the desired lower limit. Then press **Enter**.
4. Set the **Limit** submenu key to **On** to activate the Limit features.

If the measured power is between the limits, then the measurement is displayed in green.

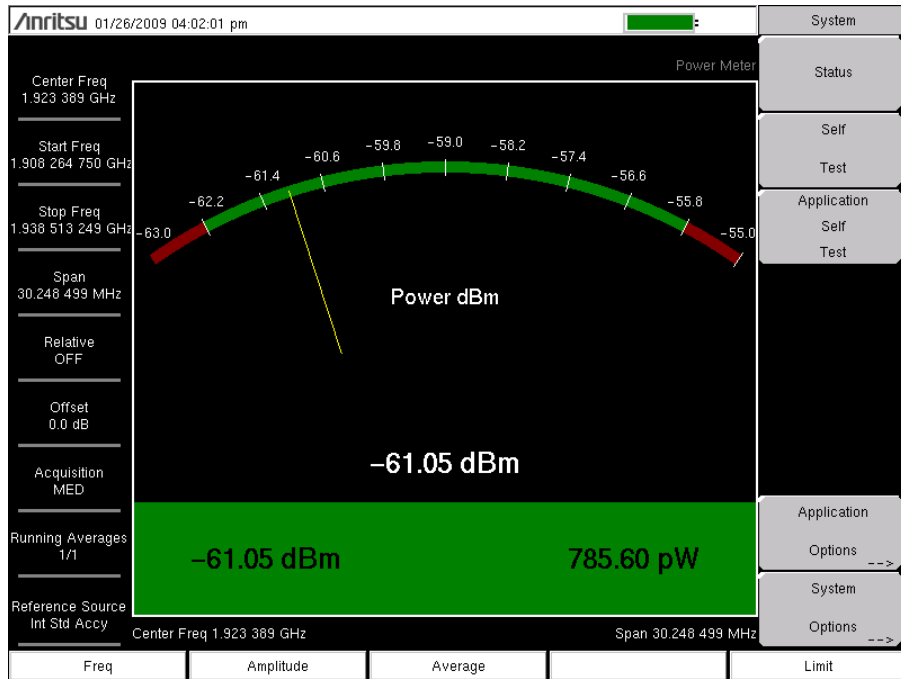


Figure 2-1. Power Meter Display, Passed

If the measured power is not between the limits, then the measurement is displayed in red.

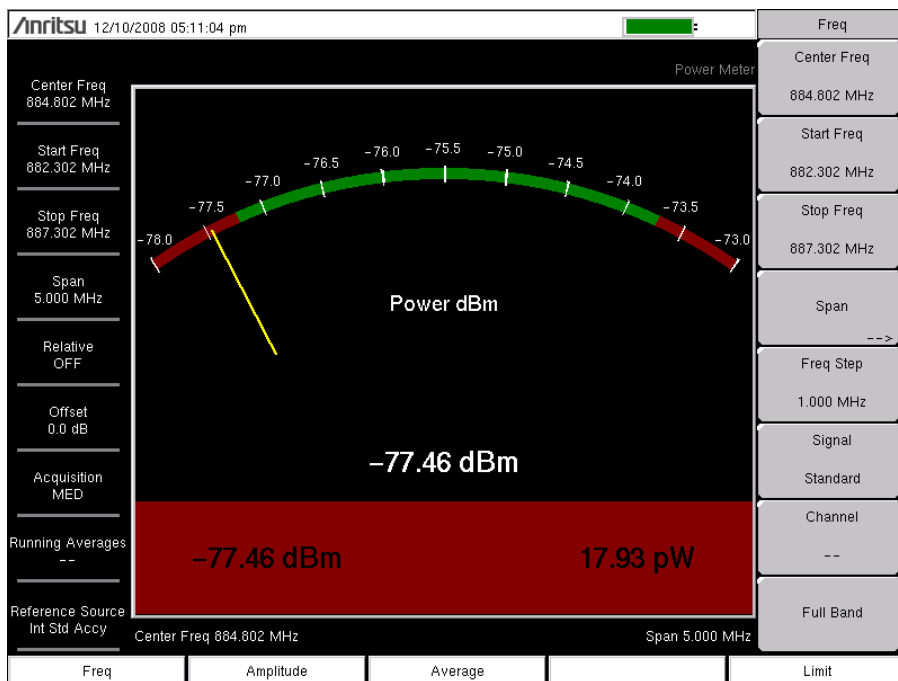


Figure 2-2. Power Meter Display, Failed

2-3 Power Meter Menus

Figure 2-3 shows the map of the Power Meter menus. The following sections describe main menu and associated submenus. Menu maps show all possible submenu keys. Refer to individual menu descriptions for display circumstances.

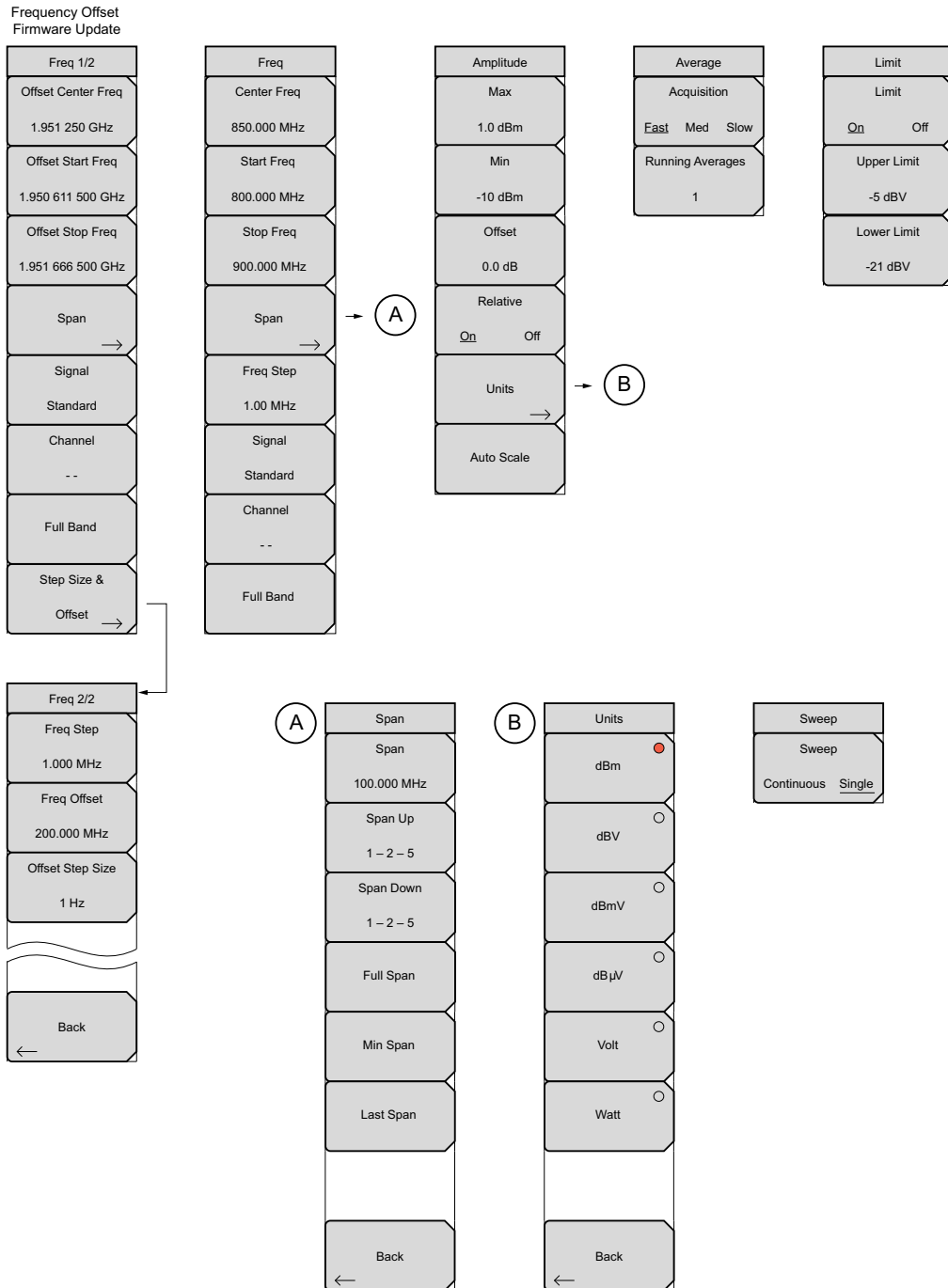


Figure 2-3. Power Meter Menus

2-4 Freq (Frequency) Menu

Key Sequence: **Frequency**

Note

Refer to [“Frequency Menu with Offset Function”](#) on page 2-6 if your instrument firmware supports frequency offset (bottom submenu is Step Size & Offset).

Freq	Center Freq: Sets the frequency at the center of the measurement. Frequencies can be entered in units of GHz, MHz, kHz, or Hz. Enter the frequency by using the keypad, the rotary knob, or the arrow keys. When the center frequency is entered, the labeling below the analog display shows the center frequency and the span in the most appropriate units based upon the value.
Center Freq 850.000 MHz	
Start Freq 800.000 MHz	Start Freq: Enter a start frequency by using the keypad, the rotary knob, or the arrow keys. If the entered start frequency is greater than the current stop frequency, then the stop frequency is automatically adjusted to be 1 kHz greater than the start frequency (Min Span).
Stop Freq 900.000 MHz	Stop Freq: Enter a stop frequency by using the keypad, the rotary knob, or the arrow keys. If the entered stop frequency is lower than the current start frequency, then the start frequency is automatically adjusted to be 1 kHz less than the stop frequency (Min Span).
Span →	Span: Opens the “Span Menu” on page 2-9.
Freq Step 1.00 MHz	Freq Step: Sets the interval that is used by the arrow keys. Enter the step amount by using the keypad, the rotary knob, or the arrow keys.
Signal Standard	Signal Standard: Opens the signal standard menu, showing the currently selected signal standard and a complete list of signal standards to choose from.
Channel --	Channel: Sets the channel information for the selected standard. If the particular standard has not been used before, then the channel number defaults to the lowest legal channel number for that standard. If that standard has been used before, then the last used channel will be the default.
Full Band	Full Band: Sets the frequency of the unit to a 100 MHz span on the current center frequency.

Figure 2-4. Power Meter Freq Menu

2-5 Frequency Menu with Offset Function

Key Sequence: **Frequency**

A user defined frequency offset can be entered to adjust the frequency displayed on the instrument from the actual swept frequency. When enabled **Offset** will be displayed at the bottom of the screen ([Figure 2-7](#)) and the **Center Freq**, **Start Freq**, and **Stop Freq** keys will indicate that a frequency offset has been turned on.

Set the **Freq Offset** to 0 Hz to remove the frequency offset.

Note

The **Freq Offset** will affect the displayed values of **Frequencies** and **Limits**. The currently frequency offset value is displayed in the **"Freq 2/2 Menu"**.

Freq 1/2	<p>(Offset) Center Freq : Sets the frequency at the center of the measurement. Frequencies can be entered in units of GHz, MHz, kHz, or Hz. Enter the frequency by using the keypad, the rotary knob, or the arrow keys. When the center frequency is entered, the labeling below the analog display shows the center frequency and the span in the most appropriate units based upon the value.</p> <p>(Offset) Start Freq: Enter a start frequency by using the keypad, the rotary knob, or the arrow keys. If the entered start frequency is greater than the current stop frequency, then the stop frequency is automatically adjusted to be 1 kHz greater than the start frequency (Min Span).</p> <p>(Offset) Stop Freq: Enter a stop frequency by using the keypad, the rotary knob, or the arrow keys. If the entered stop frequency is lower than the current start frequency, then the start frequency is automatically adjusted to be 1 kHz less than the stop frequency (Min Span).</p> <p>Span: Opens the "Span Menu" on page 2-9.</p> <p>Signal Standard: Opens the signal standard menu, showing the currently selected signal standard and a complete list of signal standards to choose from.</p> <p>Channel #: Sets the channel information for the selected standard. If the particular standard has not been used before, then the channel number defaults to the lowest legal channel number for that standard. If that standard has been used before, then the last used channel will be the default.</p> <p>Full Band: Sets the frequency of the unit to a 100 MHz span on the current center frequency.</p> <p>Step Size & Offset: Opens the "Freq 2/2 Menu" on page 2-7.</p>
Offset Center Freq	
1.951 250 GHz	
Offset Start Freq	
1.950 611 500 GHz	
Offset Stop Freq	
1.951 666 500 GHz	
Span	
→	
Signal	
Standard	
Channel	
--	
Full Band	
Step Size &	
Offset →	

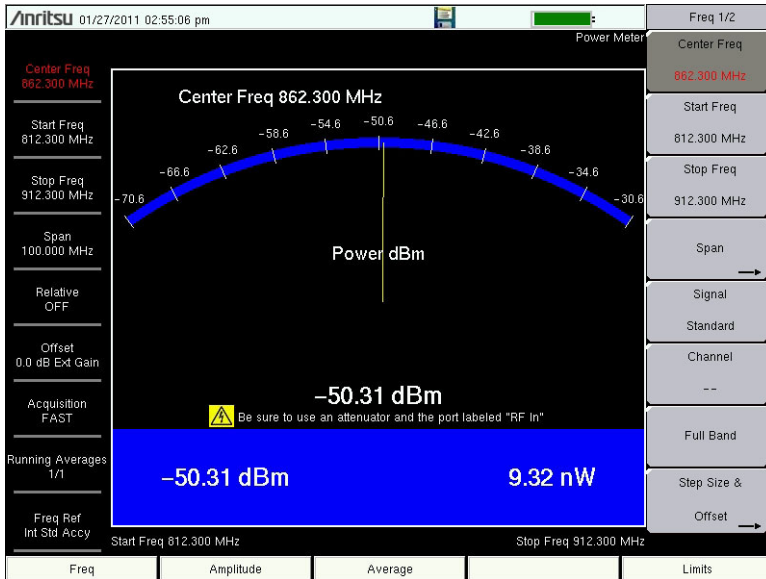
Figure 2-5. Power Meter Freq 1/2 with Offset Function Menu

Freq 2/2 Menu

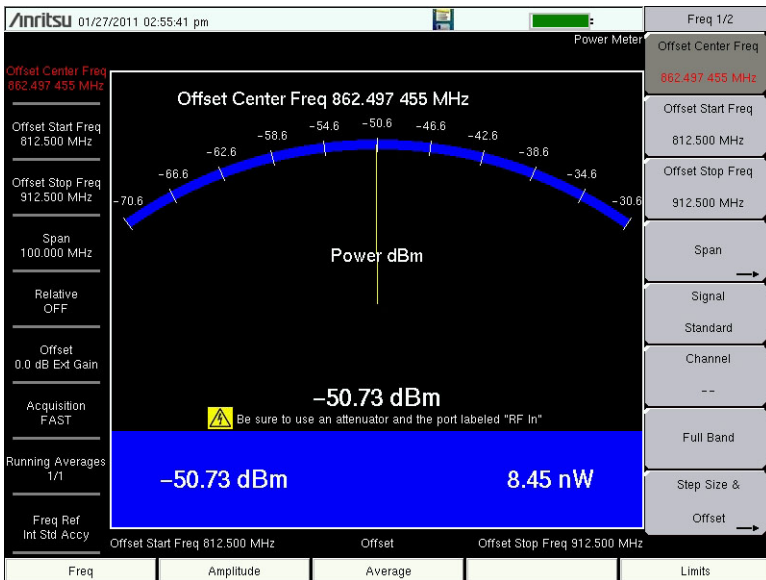
Key Sequence: **Freq** > Step Size & Offset

Freq 2/2	<p>Freq Step: Sets the interval that is used by the arrow keys. Enter the step amount by using the keypad, the rotary knob, or the arrow keys.</p> <p>Freq Offset: Enter the desired offset (positive or negative) using the keypad, the arrow keys, or the rotary knob. If entering a frequency using the keypad, the submenu key labels change to GHz, MHz, kHz, and Hz. Press the appropriate units key. Pressing the Enter key has the same affect as the MHz submenu key.</p> <p>Offset Step Size: Enter the desired frequency offset step size. The offset frequency step specifies the amount by which the offset frequency will change when the Up/Down arrow keys are pressed.</p> <p>Use the keypad or the rotary knob to change the Offset Step Size.</p> <p>Back: Returns to the “Frequency Menu with Offset Function” on page 2-6.</p>
Freq Step 1.000 MHz	
Freq Offset 200.000 MHz	
Offset Step Size 1 Hz	
Back ←	

Figure 2-6. Power Meter Freq 2/2 with Offset Function Menu



No Offset



+200 MHz Frequency Offset
(Freq > Step Size & Offset > Freq Offset)

Figure 2-7. 200 MHz Frequency Offset Example

2-6 Span Menu

Key Sequence: **Frequency** > Span

Span	Span: Sets the width of the measurement window in GHz, MHz, kHz, or Hz. The center frequency and span are displayed in the message area at the bottom of the status window. The span can be entered with the keypad and then selecting a units (GHz, MHz, kHz, or Hz) submenu key, or by using the arrow keys to change an already selected frequency. Press Enter to set the span, or press Esc to restore the previous span setting.
Span 100.000 MHz	
Span Up 1 – 2 – 5	Span Up 1 – 2 – 5: Increases the span to the next multiple of 1, 2, or 5.
Span Down 1 – 2 – 5	Span Down 1 – 2 – 5: Decreases the span to the next multiple of 1, 2, or 5.
Full Span	Full Span: Sets the span to 100 MHz on the current center frequency. Adjusts the center frequency if it is at the edge of the limit of the instrument.
Min Span	Min Span: Changes the span to 1 kHz.
Last Span	Last Span: Returns the span to the previous value.
Back ←	Back: Returns to the “Freq (Frequency) Menu” on page 2-5.

Figure 2-8. Power Meter Span Menu

2-7 Amplitude Menu

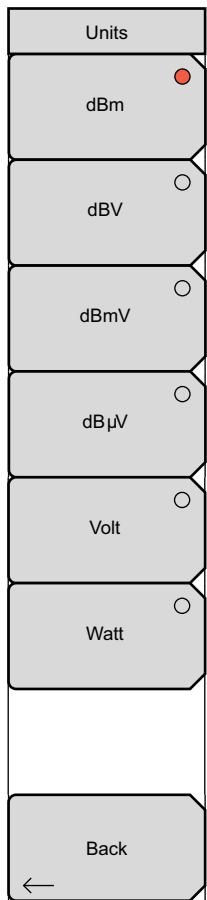
Key Sequence: **Amplitude**

Amplitude	Max: Sets the maximum value on the display.
Max	Min: Sets the minimum value on the display.
1.0 dBm	Offset: Used to set the division offset. When active, each division value is increased or decreased by the offset entered. A value up to ± 100 dB can be entered.
Min	Relative
-10 dBm	On Off: Press this submenu key to toggle relative power On or Off. This measurement shows the relative level of the desired base power level input to your instrument. When ON, the message Relative: On nnn dB (where nnn dB is the current relative value) shows in the message area. The units will be automatically reverted to dBm if necessary.
Offset	Units: Opens the "Units Menu" on page 2-11 . Note that changing the units sets Relative to Off.
0.0 dB	Autoscale: Adjusts the Top and Bottom values so that the power meter needle will be shown in the middle of the analog display.
Relative	
On Off	
Units	
→	
Auto Scale	

Figure 2-9. Power Meter Amplitude Menu

Units Menu

Key Sequence: **Amplitude** > Units



Units: Select a unit of measure for the power meter.

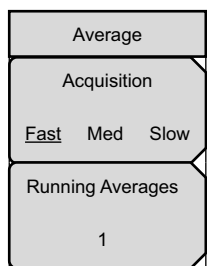
dBm, dBV, dBmV, dB μ V, Volt, or Watt. The selected unit is indicated by the red circle.

Back: Returns to the [“Amplitude Menu”](#) on page 2-10.

Figure 2-10. Power Meter Units Menu

2-8 Average Menu

Key Sequence: **Average**



Acquisition: Sets the measurement speed:

Fast, processes the power value quickly but with some inaccuracy.

Slow, processes the power value with the most accuracy.

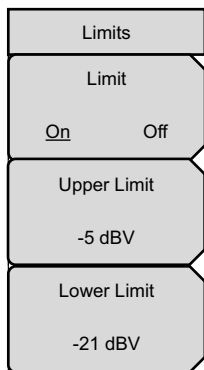
Med, process the power value with greater accuracy than the Fast setting and the process time is faster than the Slow setting. Press the submenu key to toggle through the choices. The selected speed is underlined.

Running Averages: Sets the number of traces used in calculating the average. Enter the desired number by using the keypad, the rotary knob, or the arrow keys. Press **Enter** to set, or press **Esc** to restore the previous setting.

Figure 2-11. Power Meter Average Menu

2-9 Limits Menu

Key Sequence: **Limit**



Limit: Turns the limits On or Off.

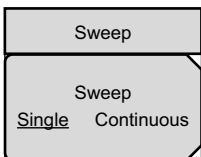
Upper Limit: Sets the upper limit. Enter the desired number by using the keypad, the rotary knob, or the arrow keys. If the keypad was used to enter new values, press the **Esc** button to restore the previous setting, or press **Enter** to set the new setting.

Lower Limit: Sets the lower limit. Enter the desired number by using the keypad, the rotary knob, or the arrow keys. If the keypad was used to enter new values, press the **Esc** button to restore the previous setting, or press **Enter** to set the new setting.

Figure 2-12. Power Meter Limit Menu

2-10 Sweep Menu

Key Sequence: **Shift > Sweep** (3) key



Sweep Single/Continuous: This submenu key toggles between continuous sweep and single sweep. In single sweep mode, the results of a sweep are displayed on the screen while the instrument awaits a trigger event to start a new sweep.

Figure 2-13. Power Meter Sweep Menu

2-11 Measure Menu

This menu is not available in Power Meter measurement mode.

2-12 Trace Menu

This menu is not available in Power Meter measurement mode.

2-13 Other Menus

Preset, **File**, **Mode** and **System** are described in the User Guide.

Chapter 3 — High Accuracy Power Meter

3-1 Introduction

When the High Accuracy Power Meter (Option 19) is installed in your instrument, an Anritsu sensor can be used to make high accuracy power measurements. This high performance option provides true RMS measurements and accurate measurements for both CW and complex digitally modulated signals. [Table 1-1](#) lists the Option 19 compatible Anritsu sensors.

Note	The Anritsu sensor is not included with Option 19. A high accuracy power sensor must be purchased separately and the instrument must have compatible firmware installed.
-------------	--

3-2 Required Equipment

One or more of the following USB Power Sensors:

- PSN50
- MA24104A
- MA24106A
- MA24108A
- MA24118A
- MA24126A
- MA24208A
- MA24218A
- MA24330A
- MA24340A
- MA24350A

3-3 General Measurement Setup

Power values are displayed in both dBm and Watts. The Relative Power feature allows the display of power changes with respect to a desired reference value in both dB and % (percent). Limit values can be turned on as needed to indicate if a measurement is within or outside specified limits. Running Averages and a Max/Hold feature are also available.

The High Accuracy Power Sensor attaches to your instrument with the supplied cable.

The zeroing feature improves accuracy by removing measured system noise. Refer to [Table 3-1](#) for the power range in which accuracy is improved. Calibration factors can be used to correct both efficiency and mismatch loss.

Table 3-1. Power Range for Improving Accuracy via Zeroing to Remove Noise

Sensor	Power Range
PSN50	-20 dBm to -30 dBm
MA24104A	+3 dBm to +13 dBm
MA24106A, MA24108A, MA24118A, MA24126A	-30 dBm to -40 dBm
MA24208A, MA24218A	-45 dBm to -60 dBm
MA24330A, MA24340A, MA24350A	-50 dBm to -70 dBm

Additional attenuators can be used to ensure that the power does not exceed the specified measurement range. The Enter Offset feature allows entering offset values for any cables and attenuators.

This measurement example uses an Anritsu PSN50 sensor and an attenuator for the high power measurement.

1. Connect the USB A/mini-B cable between the sensor and your instrument.
2. Press the **On/Off** key to turn on your instrument.
3. Press the **Shift** key, then the **Mode** (9) key. Use the **Up/Down** arrow keys or rotary knob to select High Accuracy Power Meter mode and press **Enter**.

Changing the Display Units

The power reading can be displayed in dBm or Watts. Use the following procedure to change the displayed units:

1. Press the **Amplitude** main menu key.
2. Press the **Units** submenu key and select the display units.
3. Press the **Back** submenu key to return to the Power Meter menu.

Zero and Cal

1. Press the **Zero/Cal** main menu key and press the **Cal Factor** submenu key. Enter the Center Frequency, or press the **Signal Standard** key and the **Up/Down** arrow keys to select a particular standard. The calibration factors are derived for the corresponding center frequency. The channel number is not required because the calibration factor frequencies are rounded to the nearest 500 MHz. The Cal Factor message in the display window shows **Cal Factor ON** if the Cal Factor command has been properly sent to the sensor.
2. With no power applied to the sensor, press the **Zero** submenu key to zero the sensor. This step is recommended when making power measurements below -20 dBm.

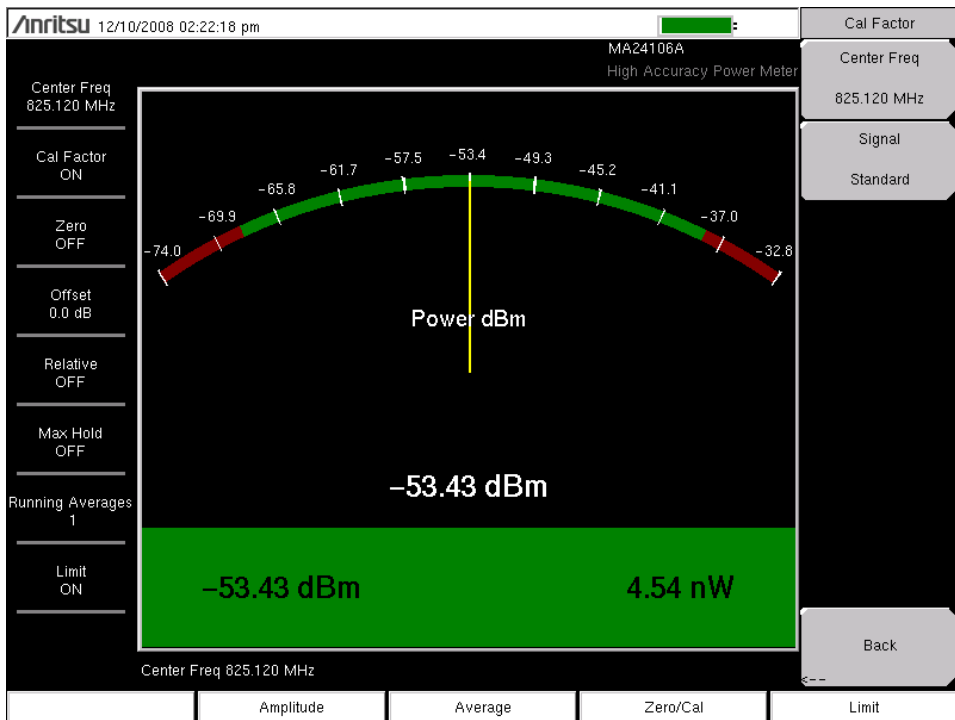


Figure 3-1. Cal Factor Menu on the High Accuracy Power Meter

Changing the Scale of the Analog Display

1. Press the **Amplitude** main menu key.
2. Press the **Auto Scale** submenu key to align the power meter needle in the middle of the analog display. The maximum and minimum values align accordingly.
3. Press the **Max** submenu key and use the arrow keys, rotary knob, or numeric key pad to manually set the maximum value of the analog display.
4. Press the **Min** submenu key and use the arrow keys, rotary knob, or numeric key pad to manually set the minimum value of the analog display.

Note

With no offset, the maximum value for the display is the upper measurement range, which is +20 dBm. With an offset, such as with 10 dB of attenuation, the upper value can be set to +30 dBm. With an offset of xx dB, the upper value can be set to +20 dBm plus xx dB.

Using Attenuators

1. Press the **Amplitude** main menu key, and press the **Enter Offset** submenu key.
2. Enter the offset value for the attenuator at the frequency of operation.

Displaying Relative Power

1. Press the **Amplitude** main menu key.
2. With the desired base power level being available at the sensor, press the **Relative** submenu key. The power reading shows 0 dB and 100%. If you are measuring a 10 dBm signal, and if the **Relative** key is pressed, then a drop to 7 dBm will show as -3 dB and 50%.

Averaging/Max Hold/Run Hold

1. Press the **Average** main menu key.
2. Press the Running Averages submenu key. Use the arrow keys, rotary knob, or numeric keypad to enter the desired number of averages.
3. Press the Max Hold submenu key to toggle between Max Hold On and Max Hold Off. If averaging is selected, then Max Hold displays the maximum value of the non-averaged data.

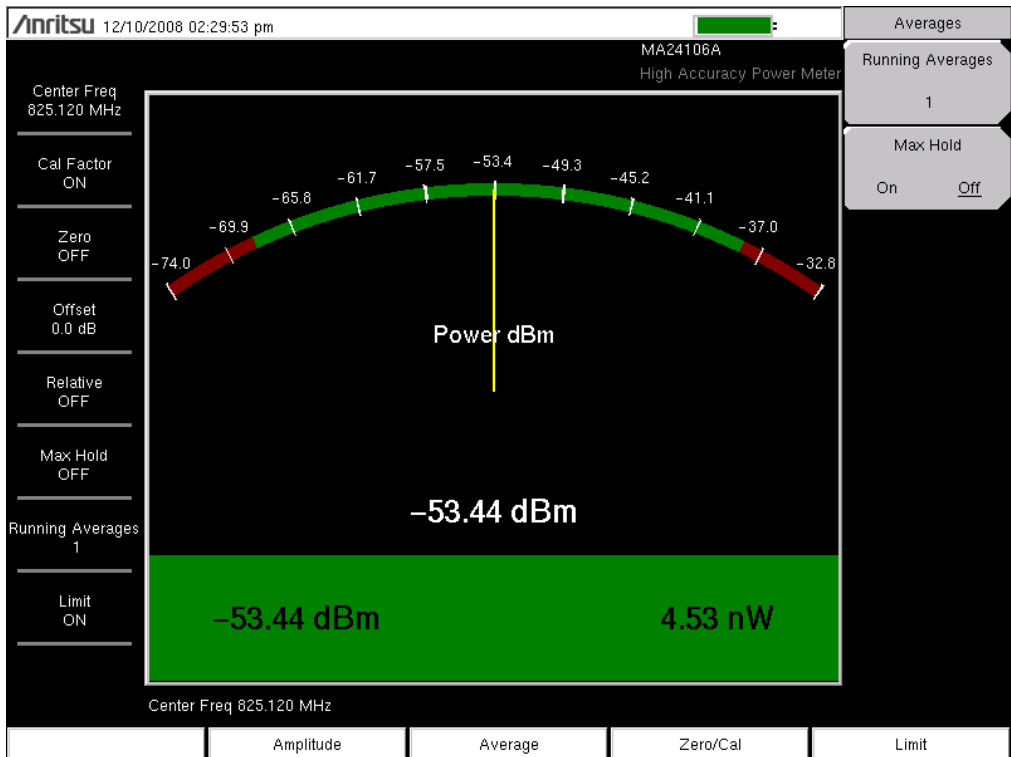


Figure 3-2. Averages Menu on the High Accuracy Power Meter

Limits

1. Press the **Limit** main menu key.
2. Press the Lower Limit submenu key. Enter the lower limit value in dBm or in Watts.
3. Press the Upper Limit submenu key. Enter the upper limit value in dBm or in Watts.
4. Press the Limit On/Off submenu key to turn the limits On and Off. The number display turns green (if the measurement is passing) or red (if the measurement is failing).
5. Press the **Amplitude** main menu key, and press the Units submenu key to change between dBm and Watts.

Note Screen images are provided as examples. The images and measurement details that are shown on your instrument may differ from the examples in this measurement guide.

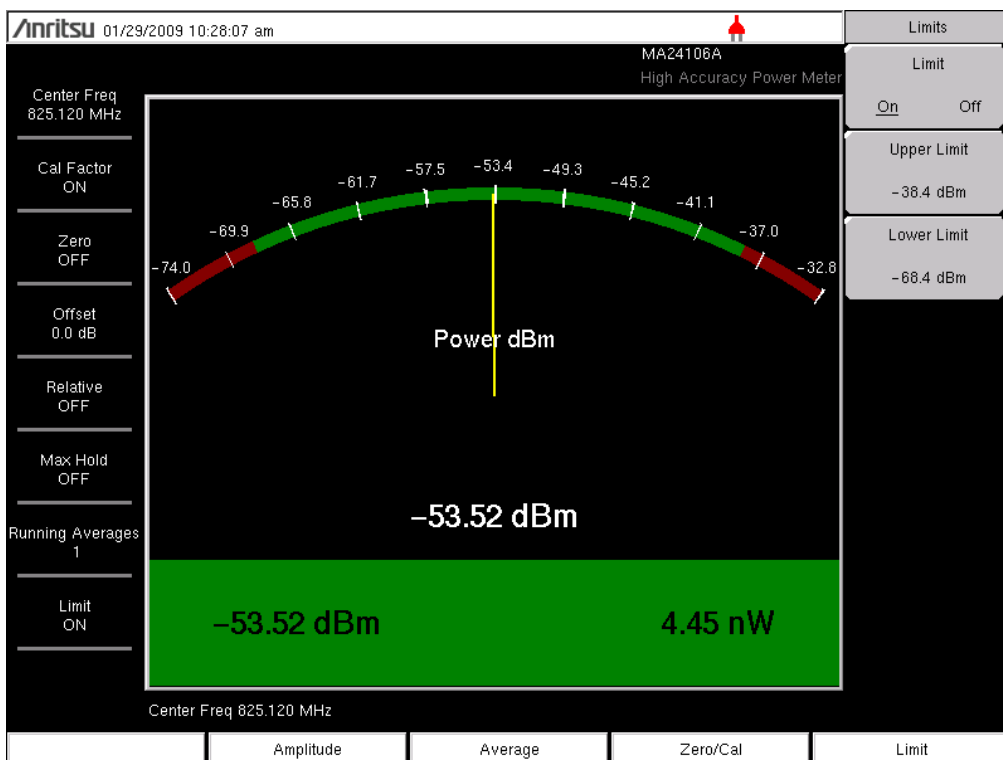


Figure 3-3. Limits Menu on the High Accuracy Power Meter

3-4 High Accuracy Power Meter Menus

Figure 3-4 shows the map of the High Accuracy Power Meter menus. The following sections describe main menus and associated submenus. Menu maps show all possible submenu keys. Refer to individual menu descriptions for display circumstances.

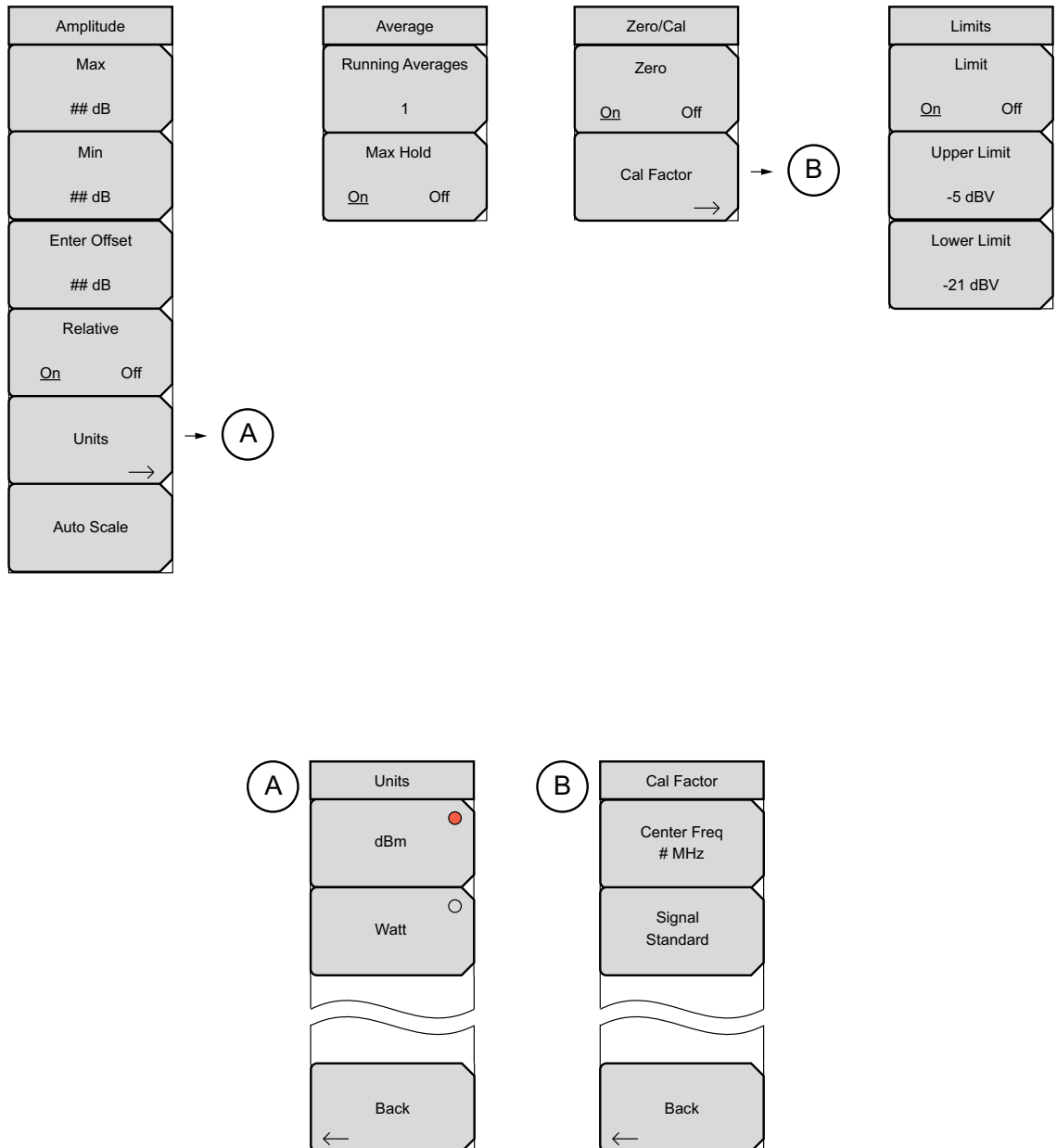


Figure 3-4. High Accuracy Power Meter Menus

3-5 Amplitude Menu

Key Sequence: **Amplitude**

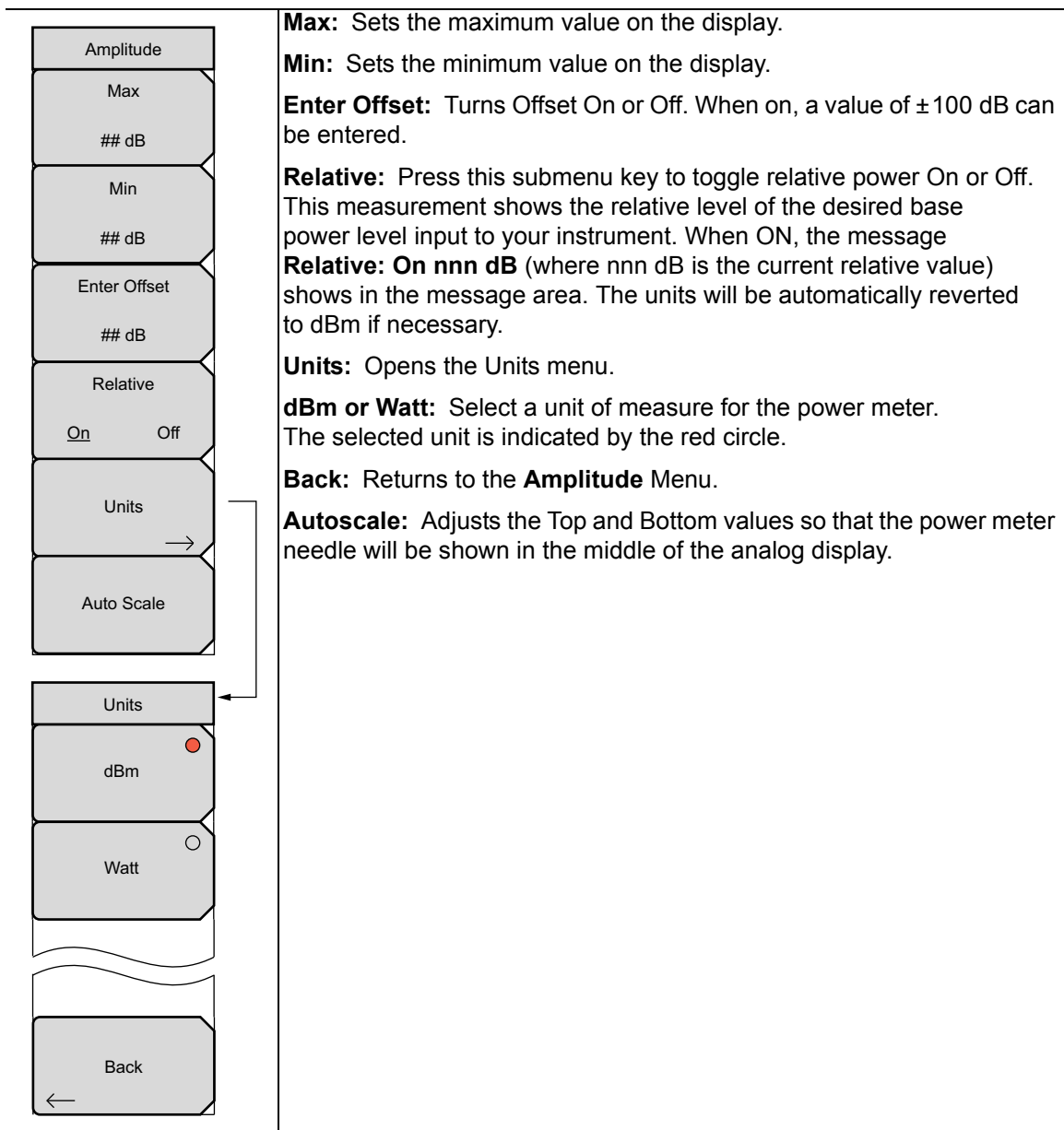


Figure 3-5. High Accuracy Power Meter Amplitude Menu

3-6 Average Menu

Key Sequence: **Average**

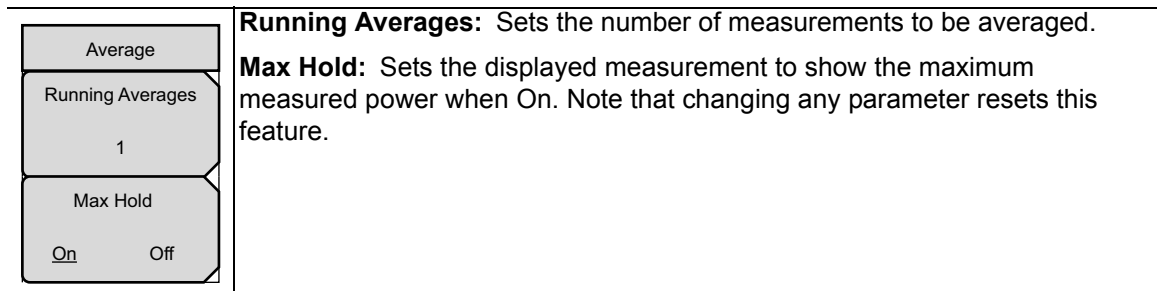


Figure 3-6. High Accuracy Power Meter Average Menu

3-7 Zero/Cal Menu

Key Sequence: **Zero/Cal**

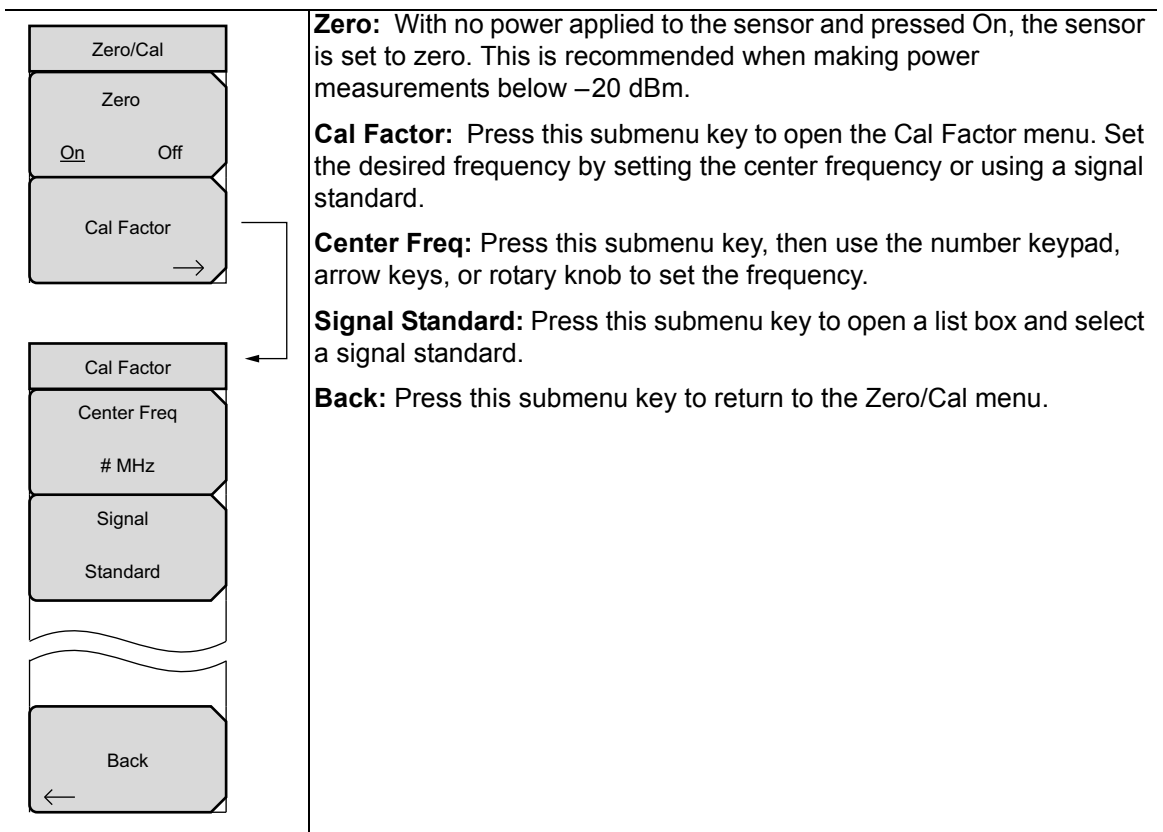


Figure 3-7. High Accuracy Power Meter Zero/Cal Menu

3-8 Limit Menu

Key Sequence: **Limit**

Limits	<p>Limit: Turns the limits On or Off.</p> <p>Upper Limit: Sets the upper limit. Enter the desired number by using the keypad, the rotary knob, or the arrow keys. If the keypad was used to enter new values, press the Esc button to restore the previous setting, or press Enter to set the new setting.</p> <p>Lower Limit: Sets the lower limit. Enter the desired number by using the keypad, the rotary knob, or the arrow keys. If the keypad was used to enter new values, press the Esc button to restore the previous setting, or press Enter to set the new setting.</p>
Limit	
On Off	
Upper Limit	
-5 dBV	
Lower Limit	
-21 dBV	

Figure 3-8. High Accuracy Power Meter Limit Menu

3-9 Sweep Menu

This menu is not available in High Accuracy Power Meter measurement mode.

3-10 Measure Menu

This menu is not available in High Accuracy Power Meter measurement mode.

3-11 Trace Menu

This menu is not available in High Accuracy Power Meter measurement mode.

3-12 Other Menus

Preset, **File**, **Mode** and **System** are described in the User Guide.

Chapter 4 — Inline Peak Power Sensor MA24105A

4-1 Introduction

This chapter describes the setup and use of the model MA24105A Inline Peak Power Sensor for high accuracy power meter measurements.

The MA24105A is an in-line type of power sensor module that can acquire forward and reverse measurements when connected to an Anritsu Handheld instrument with High Accuracy Power Meter (Option 19) installed. Forward measurements include Average Power, Crest Factor, Peak Envelope Power (PEP), Burst Average Power, and CCDF. Reverse measurements include Average Power, Reflection Coefficient, Return Loss, and VSWR. The frequency range is 350 MHz to 4000 MHz, and the power range is from 2 mW to 300 W, depending upon measurement function.

In the analog meter view, as shown in [Figure 4-2](#), forward measurements are displayed in the dial portion of the meter. The reverse measurement is displayed below the dial in a rectangular box. To view all of the forward and reverse measurements in table format, use the Summary display (as shown in [Figure 4-3](#)). Figures showing measurement screens may differ from any actual screen on your instrument.

4-2 Required Equipment

In order to use the MA24105A Inline Peak Power Sensor, your Anritsu handheld instrument must have all of the following:

- The High Accuracy Power Meter (Option 19) installed
- Up-to-date firmware
- A USB Interface
- A USB cable assembly (supplied with the MA24105A), Type USB-A / MICRO-B Latch



Figure 4-1. MA24105A Inline Peak Power Sensor

4-3 Sensor Power Meter Interface

Sensor and High Accuracy Power Meter Interface

Firmware in both the MA24105A Inline Peak Power Sensor and in Option 19 interact to provide additional functions in the connected Anritsu handheld instrument. The firmware for the High Accuracy Power Meter (Option 19) and the firmware of your instrument must be up-to-date versions. Refer to [Section 4-2 “Required Equipment”](#) on page 4-1.

Main Menu Keys

When the MA24105A is connected to your Anritsu handheld instrument with Option 19 installed, the following five main menu keys are displayed at the bottom of the measurement display:

Display Amplitude Average Zero/Cal Limit

These main menu keys and the Display menu with its submenu keys are shown in [Figure 4-2](#). The screen that is displayed in [Figure 4-2](#) is an example and may not match any actual screen on your instrument.

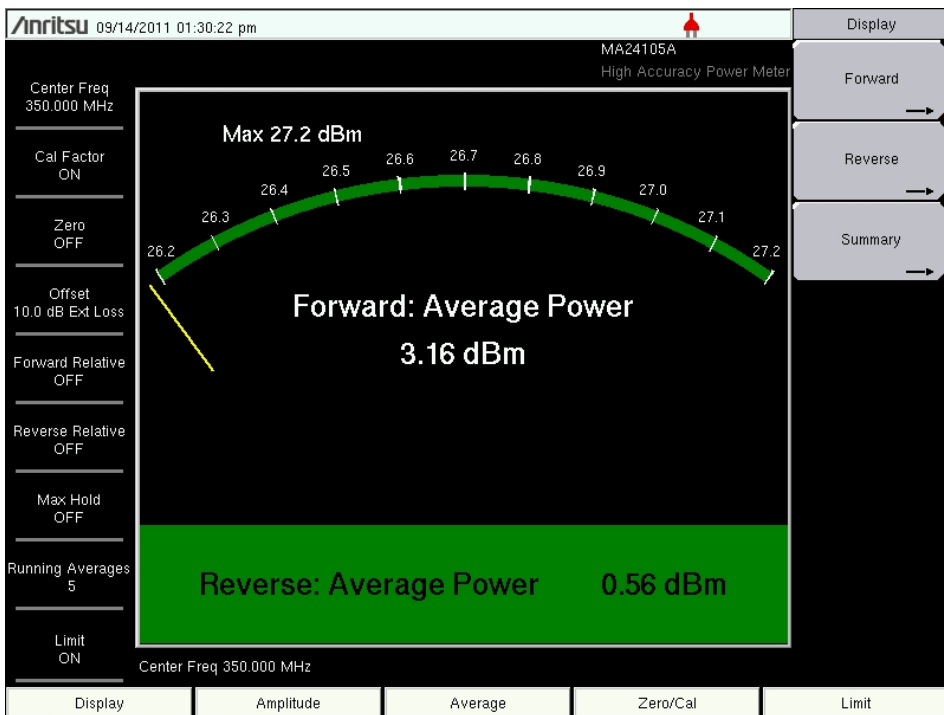


Figure 4-2. Forward and Reverse Average Power

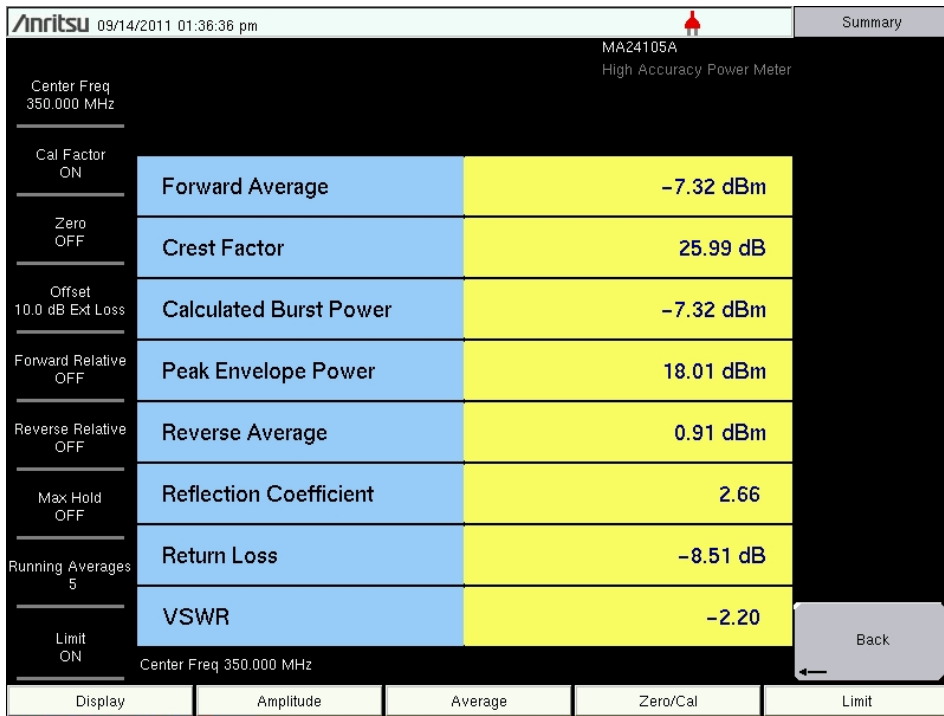


Figure 4-3. Power Meter Summary Display

4-4 Connection Setup

Connect the MA24105A to the Anritsu handheld instrument with Option 19.

1. Connect the USB cable between the sensor and your instrument. The MA24105A green power light is illuminated when power is available via the USB cable (refer to [Figure 4-1 on page 4-2](#)).
2. Press the **On/Off** key to turn on your instrument.
3. If the instrument is already On when the sensor USB cable is connected, an Attention message is displayed. Refer to [Figure 4-4](#).

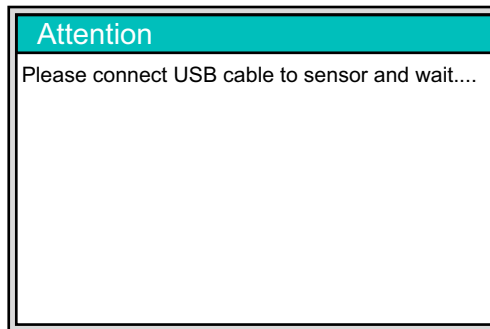


Figure 4-4. USB Connection Message

4. When the Attention message box is no longer displayed, the connection is enabled.

4-5 General Measurement Setup

Please refer to the User Guide for your instrument for directions about selecting the High Accuracy Power Meter mode and about file management.

Changing the Display Units

The power reading can be displayed in dBm or Watts. Use the following procedure to change the displayed units:

1. Press the **Amplitude** main menu key.
2. Press the **Units** submenu key and select the display units (press either dBm or Watt).
3. Press the **Back** submenu key to return to the Amplitude menu.

Zero and Calibrate

The zeroing feature improves accuracy by removing measured system noise. The power range in which accuracy is improved is from + 3 dBm to + 13 dBm. Calibration factors can be used to correct both efficiency and mismatch loss.

1. Press the **Zero/Cal** main menu key and then press the **Cal Factor** submenu key. Enter the Center Frequency. The calibration factors are derived for the center frequency.

Alternatively, press the **Signal Standard** submenu key and then the **Up/Down** arrow keys to select a particular standard and band. Because most standard bands are less than 500 MHz wide, and because calibration factor frequencies are rounded to the nearest 500 MHz, a specific channel number is not required. The calibration factors are derived for the corresponding signal standard frequency.

The Cal Factor message in the Instrument Settings Summary of the display window shows **Cal Factor ON** if the Cal Factor command has been successfully sent to the sensor.

2. With no power applied to the sensor, press the **Zero** submenu key to zero the sensor. This step is recommended when making power measurements below +13 dBm.

Changing the Scale of the Analog Display

1. Press the **Amplitude** main menu key.
2. Press the **Auto Scale** submenu key to align the power meter needle in the middle of the analog display. The maximum and minimum values align accordingly.
3. Press the **Max** submenu key and use the arrow keys, rotary knob, or numeric keypad to manually set the maximum value of the analog display.
4. Press the **Min** submenu key and use the arrow keys, rotary knob, or numeric keypad to manually set the minimum value of the analog display.

Using Attenuators

1. Press the **Amplitude** main menu key, and then press the **Enter Offset** submenu key.
2. Enter an offset value from +100 dB to 0 to -100 dB (gain or loss) for the attenuator at the frequency of operation.

Selecting Measurements

1. Press the **Display** main menu key, and then press Forward, Reverse, or Summary. Refer to [Figure 4-2 on page 4-3](#). Summary displays both forward and reverse measurements in table format, as shown in [Figure 4-3 on page 4-4](#).
2. When selecting Forward or Reverse, refer to [Section 4-6 “Menus” on page 4-7](#) for additional information regarding the submenu measurement keys for Forward and Reverse measurements.

4-6 Menus

[Figure 4-5](#) shows the menu group of High Accuracy Power Meter menus for the MA24105A Inline Peak Power Sensor. The sections that follow [Figure 4-5](#) describe main menus and associated submenus. The submenus are listed in the order that they appear on the display from top to bottom under each main menu.

4-7 MA24105A Menu Group

Menu maps show all possible submenu keys. Refer to individual menu descriptions for display circumstances.

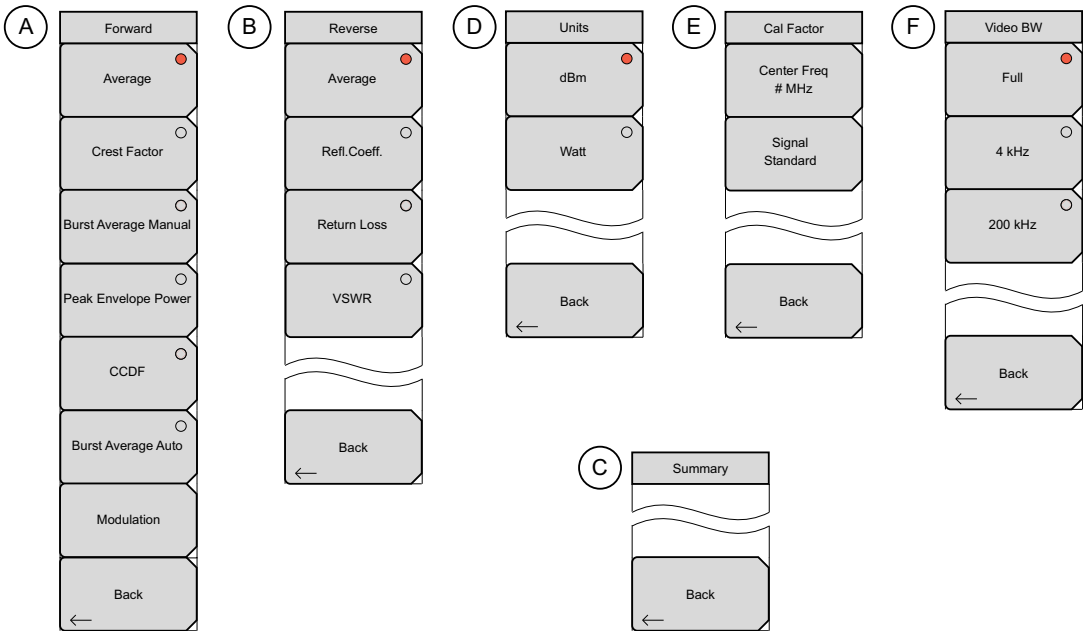
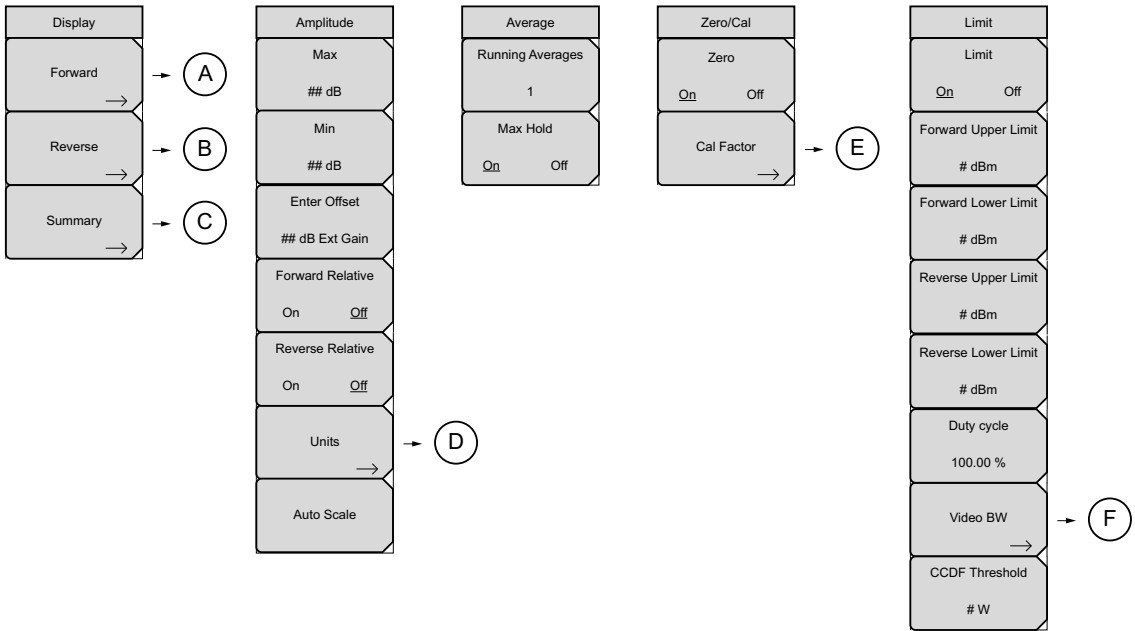


Figure 4-5. MA24105A Menu Group for High Accuracy Power Meter

4-8 Display Menu

Key Sequence: **Display**

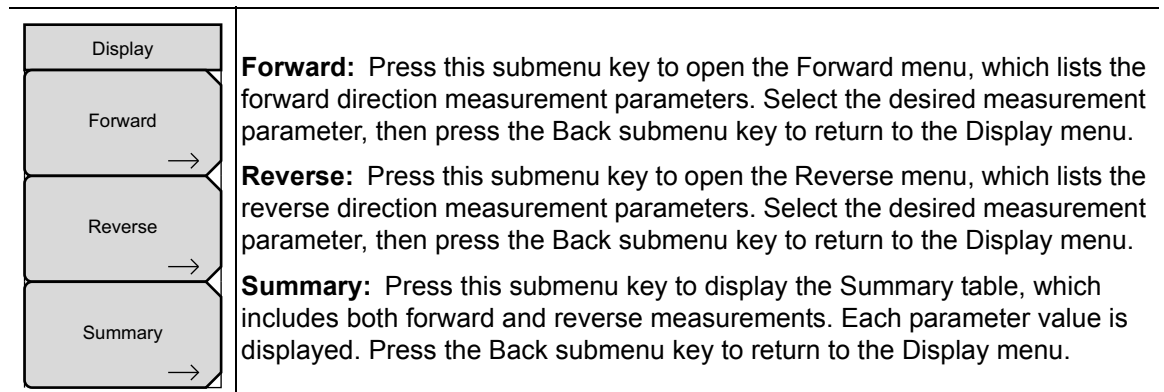


Figure 4-6. Display Menu

4-9 Forward Menu

Key Sequence: **Display** > Forward








Forward	Press the submenu key for the desired measurement parameter. Then press the Back submenu key.
Average 	Average: Press this submenu key to have the sensor measure the average power in the forward direction.
Crest Factor 	Crest Factor: Press this submenu key to have the sensor measure the Crest Factor in the forward direction. Crest Factor is a ratio of peak power to average power.
Burst Average Manual 	Burst Average Manual: Press this submenu key to have the sensor measure the average power within the signal bursts (in the forward direction). In manual, you must define the duty cycle of the bursts in order to complete the averaging calculation. Refer to the “Duty Cycle” submenu key in the “Limits Menu” on page 4-16.
Peak Envelope Power 	Peak Envelope Power: Press this submenu key to have the sensor measure the peak power in the forward direction.
CCDF 	CCDF: Press this submenu key to have the sensor measure the value of the Complementary Cumulative Distribution Function (CCDF). A Cumulative Distribution Function (CDF) describes the probability that the signal power is less than or equal to a threshold value. The Complementary Cumulative Distribution Function (CCDF) describes the probability that the signal power is greater than a threshold value. For directions to set the threshold, refer to the “CCDF Threshold” submenu key in the “Limits Menu” on page 4-16.
Burst Average Auto 	Burst Average Auto: Press this submenu key to have the sensor measure the average power within the signal bursts (in the forward direction). In auto, the sensor determines the duty cycle of the bursts in order to complete the averaging calculation.
Modulation	Modulation: Press this submenu key to select the modulation type for Peak Envelope Power (PEP) measurement only. First press the Peak Envelope Power submenu key (or check to ensure that the circle on its key face is red). Then press Modulation. The Select Modulation type list box is displayed. Use the arrow keys or the rotary knob to highlight the desired modulation type, and then press Enter to select. The selection of a specific modulation type provides a correction factor to refine the PEP calculation. Refer to Figure 4-8 on page 4-11.
Back 	Back: Press this submenu key to return to the Display menu.

Figure 4-7. Forward Menu

The Select Modulation Type list box contains modulation types that are used to apply a correction factor that refines the Peak Envelope Power (PEP) calculation. The list shown in [Figure 4-8](#) is a sample and may not match the list that is displayed on your instrument.

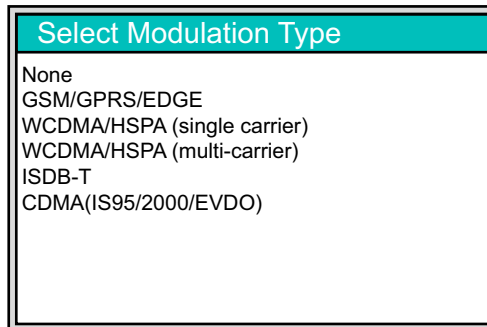


Figure 4-8. Example Modulation Types for Peak Envelope Power (PEP)

4-10 Reverse Menu

Key Sequence: **Display** > Reverse

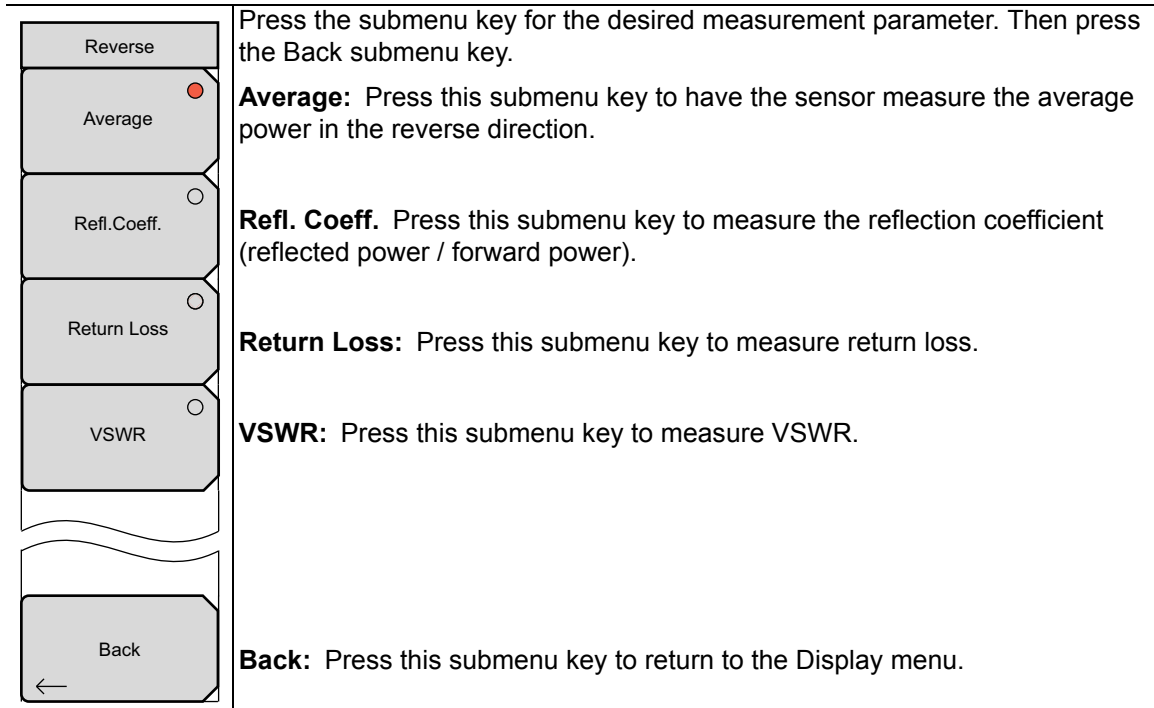


Figure 4-9. Reverse Menu

4-11 Summary Menu

Key Sequence: **Display** > Summary

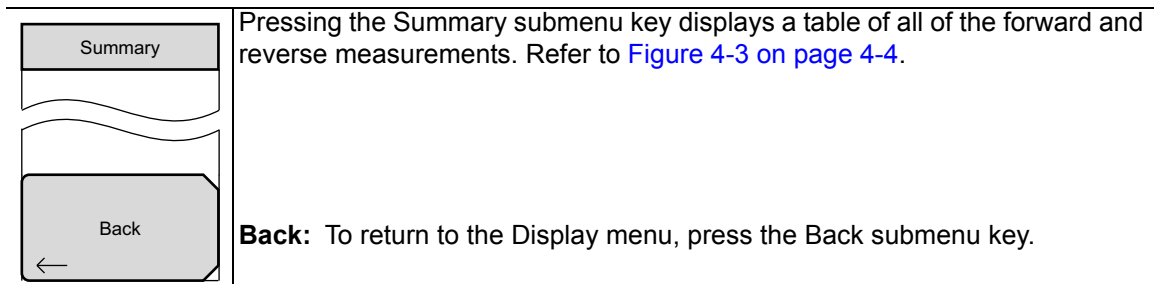


Figure 4-10. Summary Menu

4-12 Amplitude Menu

Key Sequence: **Amplitude**

Amplitude	
Max ## dB	Max: Press this submenu key to set the maximum value on the display.
Min ## dB	Min: Press this submenu key to set the minimum value on the display.
Enter Offset ## dB Ext Gain	Enter Offset: Press this submenu key and then use the numeric keypad to enter a value. A Units menu is displayed to allow you to select the value as Gain or Loss. Pressing Enter sets the value to Gain by default.
Forward Relative On <u>Off</u>	Forward Relative On Off: Press this submenu key to toggle relative forward power On or Off. This measurement displays the relative level of the desired base power level input to the instrument.
Reverse Relative On <u>Off</u>	Reverse Relative On Off: Press this submenu key to toggle relative reverse power On or Off. This measurement displays the relative level of the desired base power level input to the instrument.
Units →	Units: Press this submenu key to display the Units menu, which allows a choice of dBm or Watt.
Auto Scale	Auto Scale: Press this submenu key to adjust the top and bottom values so that the power meter needle is displayed near the middle of the analog scale.

Figure 4-11. Amplitude Menu

External Amplitude Units Menu

Key Sequence: **Amplitude > Enter Offset > Number Entry**

Units	In the Amplitude menu, press the Enter Offset submenu key, and then enter a value from the numeric keypad. This Units menu is displayed.
dB External Gain	dB External Gain: Press this submenu key to set the entered value as Gain.
dB External Loss	dB External Loss: Press this submenu key to set the entered value as Loss. Pressing Enter rather than a submenu key selects Gain as the default.

Figure 4-12. Units Menu (External Amplitude)

4-13 Units Menu

Key Sequence: **Amplitude** > Units

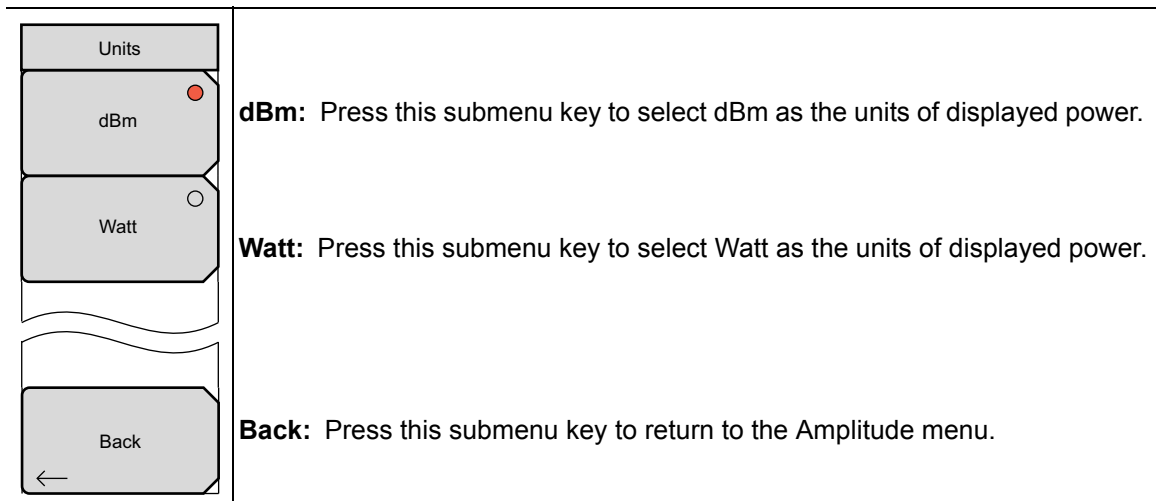


Figure 4-13. Units Menu (Amplitude)

4-14 Averages Menu

Key Sequence: **Average**

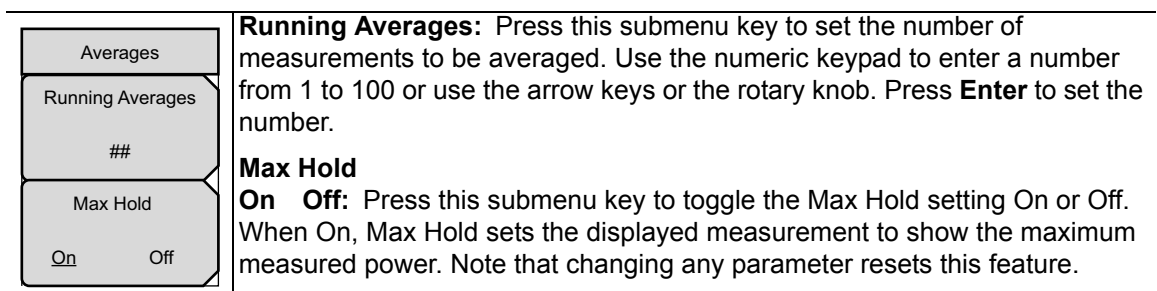


Figure 4-14. Averages Menu

4-15 Zero/Cal Menu

Key Sequence: **Zero/Cal**

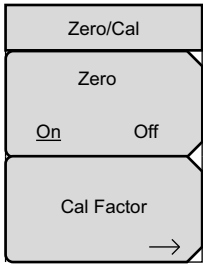
 <p>The diagram shows a vertical stack of menu items: 'Zero/Cal' at the top, followed by 'Zero' with 'On' and 'Off' options, and 'Cal Factor' at the bottom with a right-pointing arrow.</p>	<p>Zero On Off: With no power applied to the sensor, press this submenu key to toggle the setting to On. A message is displayed: Please remove RF input power and press ENTER. When Enter is pressed, another message is displayed: Zeroing... Please wait at least 1 minute and 20 seconds. When the message is no longer displayed, the zeroing is complete.</p> <p>Cal Factor: Press this submenu key to display the Cal Factor menu.</p>
---	---

Figure 4-15. Zero/Cal Menu

Please connect USB cable to sensor and wait...

4-16 Cal Factor Menu

Key Sequence: **Zero/Cal** > Cal Factor

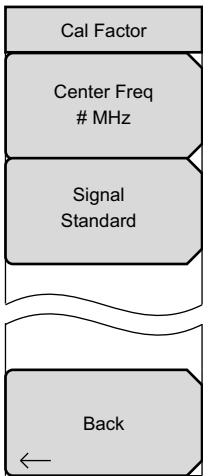
 <p>The diagram shows a vertical stack of menu items: 'Cal Factor' at the top, followed by 'Center Freq # MHz', 'Signal Standard', a wavy line indicating a scrollable list, and 'Back' at the bottom with a left-pointing arrow.</p>	<p>Center Freq: Press this submenu key to set the center frequency. Use the arrow keys or the rotary knob to change the value and then press Enter. Or use the numeric keypad, and then press a Units submenu key for GHz, MHz, kHz, or Hz. Pressing Enter is the same as pressing MHz.</p> <p>Signal Standard: Press this submenu key to display a list box of signal standards. Highlight a standard with the arrow keys or rotary knob and then press Enter.</p> <p>Back: Press this submenu key to return to the Zero/Cal menu.</p>
---	---

Figure 4-16. Cal Factor Menu

4-17 Limits Menu

Key Sequence: **Limit**

Limits	Limit On Off: Press this submenu key to toggle limit settings On or Off.
Limit On Off	Forward Upper Limit: Press this submenu key to set the Forward Upper Limit. Enter the desired number by using the keypad, the rotary knob, or the arrow keys. If the keypad was used to enter new values, press the Esc button to restore the previous setting, or press Enter (or the dB submenu key) to set the new value.
Forward Upper Limit # dBm	Forward Lower Limit: Press this submenu key to set the Forward Lower Limit. Enter the desired number by using the keypad, the rotary knob, or the arrow keys.
Forward Lower Limit # dBm	Reverse Upper Limit: Press this submenu key to set the Reverse Upper Limit. Enter the desired number by using the keypad, the rotary knob, or the arrow keys.
Reverse Upper Limit # dBm	Reverse Lower Limit: Press this submenu key to set the Reverse Lower Limit. Enter the desired number by using the keypad, the rotary knob, or the arrow keys.
Reverse Lower Limit # dBm	Duty Cycle: Press this submenu key to set the Duty Cycle that is used only in calculating the Burst Average Manual measurements. Refer to the “Burst Average Manual” submenu key in the “Forward Menu” on page 4-10. Enter the duty cycle of the burst signal by using the keypad, the rotary knob, or the arrow keys. Set the new value by pressing Enter or the % submenu key.
Duty cycle 100.00 %	Video BW: Press this submenu key to display the Video BW menu.
Video BW →	CCDF Threshold: Press this submenu key to set the CCDF Threshold power. Use the numeric keypad to enter the power value. Press a submenu key in the Units menu that is displayed for the power units: W, mW, μ W, nW, pW, or fW. Pressing Enter is the same as pressing W. Refer to the “CCDF” submenu key in the “Forward Menu” on page 4-10.
CCDF Threshold # W	

Figure 4-17. Limits Menu

4-18 Video BW Menu

Key Sequence: **Limit** > Video BW

<p>The screenshot shows a vertical menu with the following items from top to bottom: 'Video BW' (header), 'Full' (with a red dot), '4 kHz' (with a white circle), '200 kHz' (with a white circle), and 'Back' (with a left-pointing arrow). A wavy line separates the top three items from the 'Back' item.</p>	<p>Refer to the “Peak Envelope Power” submenu key in the “Forward Menu” on page 4-10.</p> <p>Full: Press this submenu key to set Full as the video bandwidth of the PEP (Peak Envelope Power) circuit^a of the MA24105A Inline Peak Power Sensor.</p> <p>4 kHz: Press this submenu key to set 4 kHz as the video bandwidth of the PEP (Peak Envelope Power) circuit^a of the MA24105A Inline Peak Power Sensor.</p> <p>200 kHz: Press this submenu key to set 200 kHz as the video bandwidth of the PEP (Peak Envelope Power) circuit^a of the MA24105A Inline Peak Power Sensor.</p> <p>Back: Press this submenu key to return to the Limits menu.</p>
---	--

Figure 4-18. Video BW Menu

a. PEP circuits are used on the following measurements: Peak Envelope Power, Crest Factor, CCDF, and Burst Average Power (Auto Mode).

4-19 Additional Menus

Additional Menus Opened with Keypad Menu Keys

Additional menus are available in some instrument modes by pressing the **Shift** key and a number key from **1** through **9** on the numeric keypad,

Instrument Mode Selector

Key Sequence: **Shift** > **Mode** (9) key

System Menu

Key Sequence: **Shift** > **System** (8) key

Refer to the User Guide for your instrument for a description of the System menu.

File Menu

Key Sequence: **Shift** > **File** (7) key

Refer to the User Guide for your instrument for a description of the File menu.

Limits Menu (Instrument)

Key Sequence: **Shift > Limit** (6) key

Do not use this menu with the MA24105A Inline Peak Power Sensor. Use the **Limits** main menu key to display the appropriate Limits menu.

Trace Menu

Key Sequence: **Shift > Trace** (5) key

This menu is not available when using the MA24105A Inline Peak Power Sensor.

Measure Menu

Key Sequence: **Shift > Measure** (4) key

This menu is not available when using the MA24105A Inline Peak Power Sensor.

Sweep Menu

Key Sequence: **Shift > Sweep** (3) key

This menu is not available when using the MA24105A Inline Peak Power Sensor.

Calibrate Menu

Key Sequence: **Shift > Calibrate** (2) key

This key combination displays the Zero/Cal menu. Refer to [“Zero/Cal Menu” on page 4-15](#).

Preset Menu

Key Sequence: **Shift > Preset** (1) key

Refer to the User Guide for your instrument for a description of the Preset menu.

Appendix A — Error Messages

A-1 Introduction

This chapter provides a list of information and error messages that could be displayed on your instrument. If any error condition persists, contact your local [Anritsu Service Center](http://www.anritsu.com/Contact.asp) (<http://www.anritsu.com/Contact.asp>).

A-2 High Accuracy Power Meter Messages

Warning! Power Supply Error.

Verify that the supply is connected properly.

Warning! RF Power Level is too high.

The specified upper measurement range is +20 dBm. Do not exceed this.

Warning! Sensor not zeroed properly.

The sensor should be zeroed with nothing connected to it.

Warning! Specified temperature range (0 to 50C) exceeded.

The sensor is only specified from 0 to 50C.

Warning! Temperature has changed. Zero sensor again.

Temperature changed more than allowable limit after zeroing sensor.

Index

- A**
- accuracy of sensors 3-2
 - acquisition, measurement speed 2-11
 - amplitude menu 2-10, 3-8, 4-13
 - amplitude, setting 2-2, 3-4, 4-6
 - Anritsu, contact 1-1
 - attention message, MA24105A 4-5
 - attenuators
 - and offset 3-2
 - and offset calculations 3-4
 - and power, HI_PM 3-2
 - example setup 3-2
 - using, with HI_PM 3-4
 - using, with MA24105A 4-6
 - average menu 2-11, 3-9
 - averages menu, MA24105A 4-14
- B**
- burst average power, MA24105A 4-10
 - burst average submenu key 4-10
- C**
- cal factor
 - MA24105A 4-6
 - menu, MA24105A 4-15
 - power meter 3-3
 - calibration
 - correcting efficiency 3-2, 4-6
 - correcting mismatch loss 3-2, 4-6
 - MA24105A 4-6
 - zero/cal 4-6
 - CCDF
 - MA24105A 4-10
 - submenu key 4-10
 - threshold submenu key 4-16
 - connection setup, MA24105A 4-5
 - contacting Anritsu 1-1
 - crest factor, MA24105A 4-10
- D**
- display menu, MA24105A 4-9
 - display units, setting 2-2, 3-2, 4-6
 - duty cycle submenu key 4-16
- E**
- efficiency, calibration correction .. 3-2, 4-6
 - equipment, required, sensors 3-1
 - error messages
 - High Accuracy Power Meter A-1
- F**
- firmware
 - for MA24105A 4-1, 4-3
 - forward menu, MA24105A 4-10
 - Freq 2/2 Menu 2-7
 - frequency menu 2-5, 2-6
 - frequency, setting span 2-1
- H**
- High Accuracy Power Meter
 - attenuators and power 3-2
 - error messages A-1
 - main menu keys, MA24105A 4-3
 - menu group 3-7
 - sensors list 3-1
 - http, contacting Anritsu 1-1
- L**
- limit
 - menu 3-10
 - limits
 - menu 2-12, 4-16
 - pass/fail, setting 2-2
 - procedure 3-6
 - links
 - contacting Anritsu 1-1
 - loss, mismatch, calibration correction . 3-2, 4-6

M

MA24105A

- attention message 4-5
- burst average power 4-10
- cal factor 4-6
- calibration 3-2, 4-6
- CCDF 4-10
- CCDF threshold 4-16
- crest factor 4-10
- firmware 4-1
- general measurement setup 4-6
- image, front 4-2
- image, summary display 4-4
- main menu keys 4-3
- menu group 4-8
- peak envelope power (PEP) 4-10
- reflection coefficient 4-12
- required equipment 4-1
- return loss 4-12
- USB cable message 4-5
- USB cable type 4-1
- using attenuators for offset 4-6
- VSWR 4-12
- zero/cal 4-6
- zeroing to remove noise 3-2

main menu keys

- HI_PM for MA24105A 4-3

measurements

- HI_PM
 - averaging 3-5
 - limits 3-6
 - Max Hold 3-5
 - rel power 3-4
 - scale change 3-4
 - setup 3-2
 - zero/cal 3-3

MA24105A

- burst average power 4-10
- CCDF 4-10
- crest factor 4-10
- peak envelope power (PEP) 4-10
- reflection coefficient 4-12
- return loss 4-12
- setup 4-6
- VSWR 4-12

PM

- limits 2-2
- rel power 2-2
- setup 2-1
- span 2-1

speed of measurement 2-11

menu

- amplitude 2-10, 3-8, 4-13
- average 2-11, 3-9
- averages 4-14
- cal factor 4-15
- display 4-9
- forward 4-10
- frequency 2-5, 2-6
- limit 2-12, 3-10
- limits 4-16
- reverse 4-12
- span 2-9
- summary 4-12
- sweep 2-12
- units 2-11, 3-8
- Video BW 4-17
- Zero/Cal 3-9, 4-15

menu group

- HI_PM 3-7
- MA24105A 4-8
- Power Meter 2-4

mismatch loss, calibration correction 3-2, 4-6

N

noise, removing by zeroing 3-2, 4-6

O

offset

- amplitude menu 2-10, 3-8
- calculations with attenuator 3-4
- division offset, amplitude 2-10
- Enter Offset submenu key 3-8, 4-13
- entering value for attenuator 3-4
- external gain or loss 4-13
- Freq Offset submenu key 2-7
- frequency selection 2-1, 2-6
- function, frequency menu 2-6
- Step Size submenu key 2-7
- submenu key 2-6
- using attenuators, HI_PM 3-2
- using attenuators, MA24105A 4-6

P

- pass/fail limits, setting 2-2
- peak envelope power (PEP), MA24105A 4-10
- Power Meter menu group 2-4
- power sensors, refer to sensors

R

- reflection coefficient, MA24105A 4-12
- relative forward power 4-13

relative power		span freq, setting	2-1
described	3-2	span menu	2-9
setting	2-2, 3-4	standard, list of signal standards	2-5
relative reverse power	4-13	summary display, MA24105A	4-4
required equipment	3-1, 4-1	summary menu, MA24105A	4-12
return loss, MA24105A	4-12	sweep menu	2-12
reverse menu, MA24105A	4-12		
	S		
scale change	3-4, 4-6	units	
selecting measurements		menu	2-11, 3-8
MA24105A	4-7	setting display units	2-2, 3-2
sensors		URL contacting Anritsu	1-1
for HI_PM	3-1	USB cable	
MA24105A Inline Peak Power	4-3	for MA24105A	4-1
option19	1-2	setup for MA24105A	4-5
zeroing	3-2	USB sensors for HI_PM	3-1
setting			
display units	2-2, 3-2, 4-6	V	
limits	3-6	Video BW menu, MA24105A	4-17
max and min display values	3-4	VSWR, MA24105A	4-12
pass/fail limits	2-2		
relative power	2-2	W	
running averages	3-5	Web site, contacting Anritsu	1-1
span freq	2-1		
signal standard		Z	
during calibration	3-3	Zero/Cal menu	
selecting, Internal Power Meter	2-1	HI_PM	3-9
submenu key	2-5	MA24105A	4-15
sweep freq	2-1	zeroing to remove noise	3-2, 4-6

Anritsu



Anritsu utilizes recycled paper and environmentally conscious inks and toner.

Anritsu Company
490 Jarvis Drive
Morgan Hill, CA 95037-2809
USA
<http://www.anritsu.com>