

Measurement Guide

Channel Scanner

MS2090A Field Master Pro™

MS2080A Field Master™

MS2070A Field Master™

MS27201A Remote Spectrum Monitor

MS2089A Site Master™

Channel Scanner

Option 27

Notes

Not all instrument models offer every option or every measurement within a given option. Refer to the Technical Data Sheet of your instrument for available options and supported measurements.

The Anritsu logo is displayed in a bold, blue, sans-serif font.

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Table of Contents

Chapter 1—General Information

1-1	Introduction	1-1
	Related Manuals	1-1
1-2	Option Description	1-2
	Channel Scanner (Option 27)	1-2
1-3	Document Conventions	1-2
	User Interface Navigation	1-2
	Illustrations	1-2
1-4	Calibration and Verification	1-2
1-5	Contacting Anritsu for Sales and Service	1-2

Chapter 2—Channel Scanner (Option 27) Overview

2-1	Introduction	2-1
2-2	Selecting the Analyzer	2-1
	Bar Chart View	2-2
	Strip Chart View	2-3
2-3	Main Menu	2-4
	Using Menus	2-4
2-4	Status Panel (Bar Chart View)	2-5

Chapter 3—Channel Scanner Measurements

3-1	Introduction	3-1
3-2	Setting Amplitude Parameters	3-2
	Setting Amplitude Units	3-2
	Setting Amplitude Reference Level	3-3
	Setting Amplitude Range and Scale	3-3
	Reference Level Offset for External Loss or External Gain	3-3
	Preamplifier	3-4
	Indications of Excessive Signal Level	3-5
	Overpower Warning	3-5
3-3	Field Strength	3-6
	AMPLITUDE FIELD STRENGTH Menu	3-7
	Example User Antenna Data	3-8
	Antenna Calculations	3-9
3-4	AMPLITUDE Menu	3-10
3-5	SCAN Menu	3-11
3-6	MEASURE Menu	3-11
3-7	SETUP Menu	3-11
	ADD CHANNELS	3-11
3-8	PRESET Menu	3-16
3-9	FILE Menu	3-16
	CSV LOGGING Menu	3-17

3-10	Saving and Recalling Measurements	3-18
	Saving a Measurement	3-18
	Recalling a Measurement	3-19

Chapter 1 — General Information

1-1 Introduction

This measurement guide covers Channel Scanner (Option 27) measurement setup and channel scanning functions for the Anritsu Field Master series, Site Master series and Remote Spectrum Monitor instruments. The measurement setup mainly includes selecting the analyzer, setting up amplitude and adding channels. The measurement consists of two views in which the channels are represented as either a horizontal bar chart or a strip chart. The maximum number of channels that can be added is 60. The channels can be added by either using the preexisting signal standards, setting a frequency range or creating custom channels.

Related Manuals

For additional information and literature covering your product, visit the product page of your instrument and select the Library tab:

<https://www.anritsu.com/en-us/test-measurement/products/ms2090a>

<https://www.anritsu.com/en-us/test-measurement/products/ms2080a>

<https://www.anritsu.com/en-us/test-measurement/products/ms2070a>

<https://www.anritsu.com/en-us/test-measurement/products/ms2720xa>

<https://www.anritsu.com/en-us/test-measurement/products/ms208xa>

Product Information, Compliance, and Safety

Read the Product Information, Compliance, and Safety Guide for important safety, legal, and regulatory notices before operating the equipment:

- Field Master Series and Site Master Series – PN: 10100-00069
- Remote Spectrum Monitor – PN: 10100-00064

User Guide

For a complete overview of the instrument hardware and system functions, refer to your instrument user guide. The user guide provides information on the following topics:

- Listing of all related documentation such as measurement guides, programming and maintenance manuals.
- Instrument Care, maintenance and calibration.
- External Connections to the top and side panels.
- Power Requirements and Battery Information.
- System settings such as Wi-Fi, GNSS/GPS, date/time, language settings, etc.
- Other advanced settings and tools such as file management, screenshot settings, port setup, and option configuration.
- Diagnostics and software updates.

1-2 Option Description

This section provides a brief overview of the available options covered in this guide.

Note

Not all instrument models offer every option. Some options are available as a time-limited trial. For example, Channel Scanner is offered as a 90-day time-limited option by ordering Option 9027. The option start time begins when the user first activates the option. Please refer to the Technical Data Sheet of your instrument for information on purchasing and activating time-limited options.

Channel Scanner (Option 27)

The Channel Scanner measurement displays the channel power of multiple transmitted signals either in a form of bar chart or strip chart. The measurement currently displays up to 60 channels.

Refer to [Chapter 3, “Channel Scanner Measurements”](#) for more information.

1-3 Document Conventions

The following conventions are used throughout the instrument documentation set.

User Interface Navigation

The instrument user interface consists of menus, buttons, toolbars, and dialog boxes. Elements in navigation paths are separated as follows: AMPLITUDE > FIELD STRENGTH > ANTENNA.

Illustrations

Screen-captured images contained in this document are provided as examples. The chapters included in this measurement guide provide information on advanced measurement features, instrument settings and menu overviews, for a featured option. The actual displays, screen menus, and measurement details may differ based on the instrument, model, firmware version, installed options, and current instrument settings.

1-4 Calibration and Verification

The instrument comes fully calibrated from the factory and there are no field-adjustable components. Anritsu recommends annual calibration and performance verification by local Anritsu service centers. Accredited calibration to ISO17025 and ANSI/NCSL Z540-1 are available and can include a calibration certificate, test report, and uncertainty data. Contact Anritsu sales and service centers for more information.

1-5 Contacting Anritsu for Sales and Service

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Chapter 2 — Channel Scanner (Option 27) Overview

2-1 Introduction

This chapter provides an overview of the channel scanner user interface and describes the main graphical displays and menus presented in the spectrum analyzer measurement mode.

2-2 Selecting the Analyzer

The instrument analyzers are selected from the 9-dot icon or the current measurement icon. To select an analyzer, press the 9-dot icon in the title bar or the current measurement icon to display the available analyzers, illustrated in [Figure 2-1](#). Simply touch the desired icon to load the new analyzer. The analyzers available for selection depend on the options that are installed and activated on your instrument. Some measurements and views are accessed via other measurement setup menus.

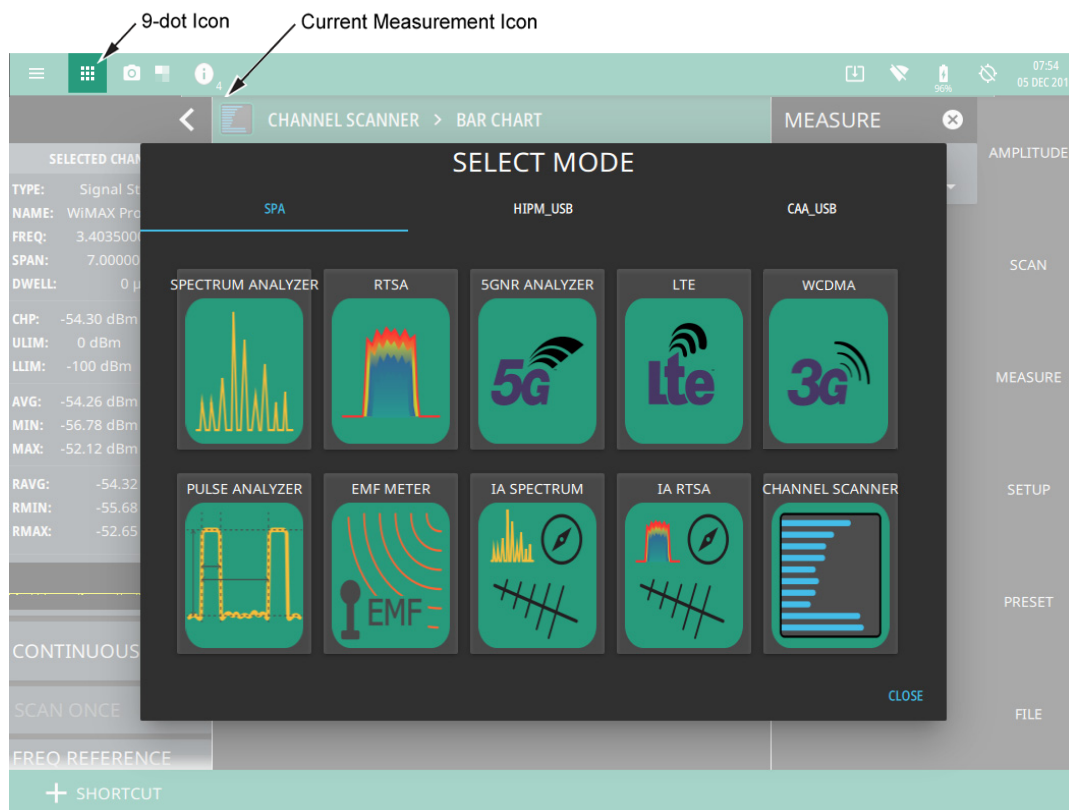
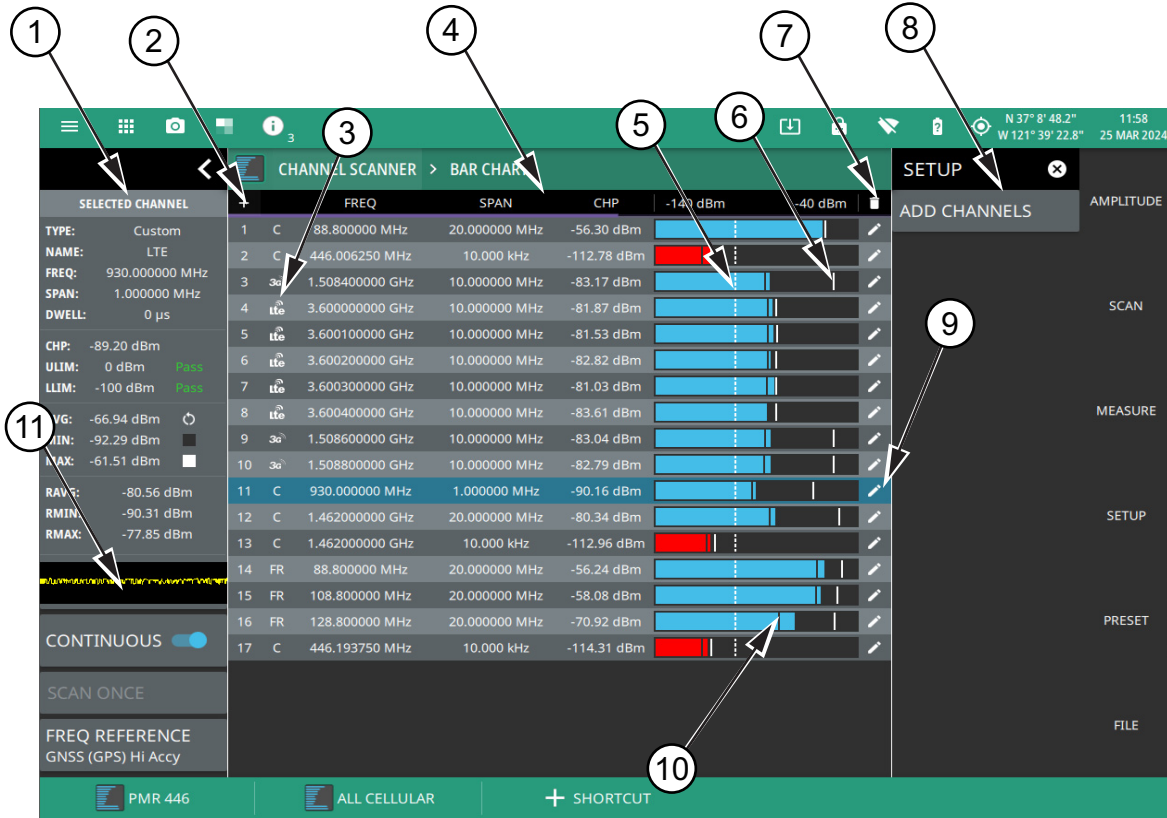


Figure 2-1. Example Analyzers

Bar Chart View

Bar chart view is default view of the channel scanner measurement.

Select bar chart view from MEASURE >VIEW > Bar Chart. For a general overview of the instrument and its user interface, refer to “Instrument Overview” chapter of your product’s user guide.

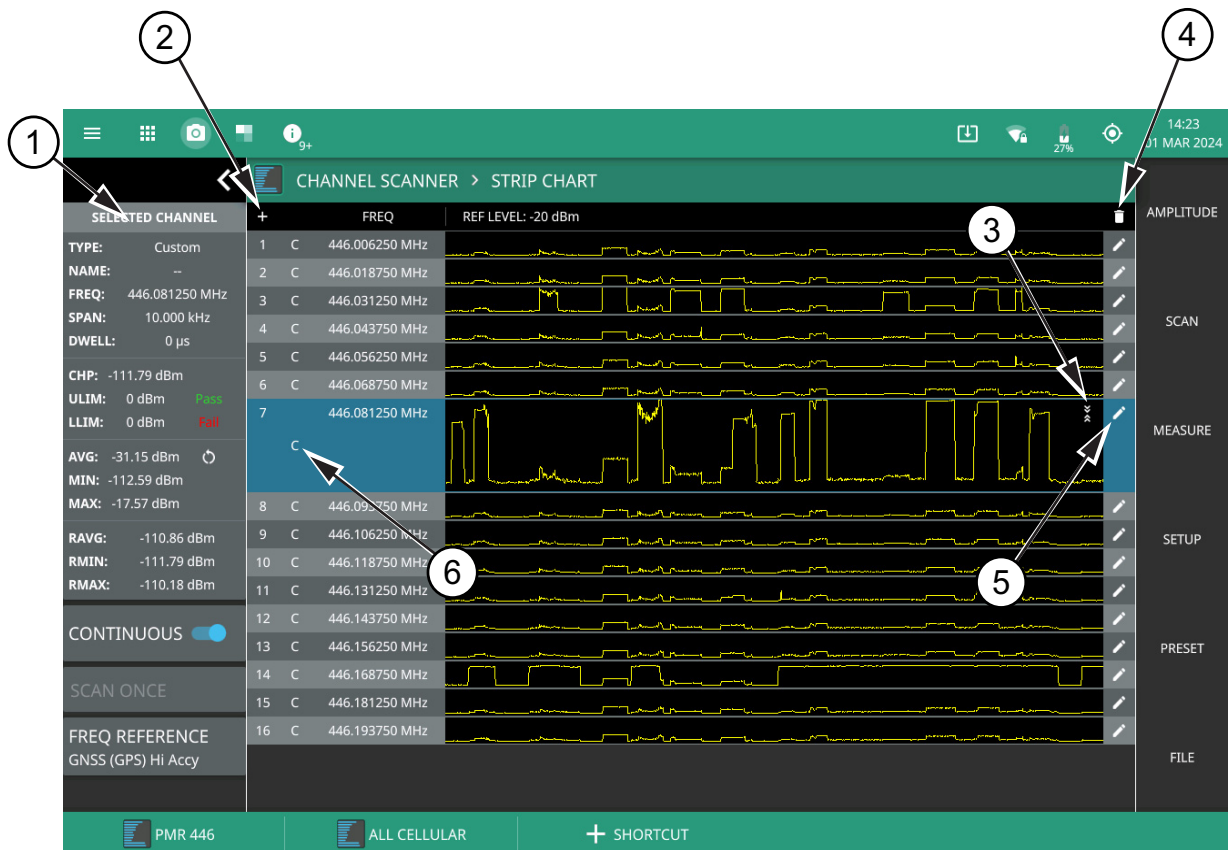


- Status Panel:** This menu provides a quick access to common settings used for power meter measurements. Refer to “Status Panel (Bar Chart View)” on page 2-5.
- Plus Icon:** Press this icon to add channels. Alternatively, press SETUP menu and select ADD CHANNELS.
- Technology Icon:** This icon shows the mini icon of the selected frequency band.
- Bar Chart View:** Displays the list of channel indicated in horizontal bars. The channel parameters such as frequency, span, channel power and reference level are included at the top of the bar chart view. The blue bar indicates that the channel power value is within the set upper or lower limit range. The red bar indicates that the channel power value exceeds the upper/lower limit range.
- Limit Line:** The white dashed line is the limit line.
- Maximum Limit Line:** The solid white line on the horizontal bar is the maximum channel power value measured for any given channel.
- Trash Can Icon:** Press this icon to delete all the channels.
- Setup Menu:** Opens “SETUP Menu” on page 3-11.
- Edit Icon:** Select this icon to edit the channel parameters. Using the edit icon you can delete a single channel, or apply any changes made to the listed parameters.
- Minimum Limit Line:** The solid black line on the horizontal bar represents the minimum channel power value measured for any given channel.
- Strip Chart:** Displays the strip chart view of the selected measurement channel. Refer to “Strip Chart View” on page 2-3.

Figure 2-2. Channel Scanner Bar Chart View

Strip Chart View

Select bar chart view from MEASURE >VIEW > Strip Chart. The strip chart view illustrates the line graph of the given channel (s) added in a given frequency band or spectrum.



- Status Panel:** This menu provides quick access to common settings used for power meter measurements. Refer to “Strip Chart View” on page 2-3.
- Plus Icon:** This icon acts like a quick shortcut to add channels.
- Expand/Collapse Icon:** This icon allows to either expand or collapse the horizontal strip of a given channel.
- Trash Can Icon:** Select this icon to delete all the channels.
- Edit Icon:** Select this icon to edit the channel parameters..
- Technology Icon:** This icon represents official frequency band or custom band name.

Figure 2-3. Channel Scanner Strip Chart View

2-3 Main Menu

The main menu is the primary access point for all instrument controls and measurement selections. The main function for each main menu button is described below. Main menu is located on the right side of the display window of the instrument.

AMPLITUDE	<p>AMPLITUDE: Provides access to all amplitude-related settings including reference level, graticule scale, and attenuator/preamp settings. Refer to Section 3-4 “AMPLITUDE Menu” on page 3-10. Refer to Spectrum Analyzer measurement guide (10580-00447) for detailed information on setting amplitude parameters.</p>
SCAN	<p>SCAN: Facilitates either continuous or single scanning of all the measurement channels. Toggle the HOLD button to hold channel scanning. Refer to Section 3-5 “SCAN Menu” on page 3-11.</p>
MEASURE	<p>MEASURE: Allows to choose the measurement display of channels in either bar chart view or strip chart view. Refer to Section 3-6 “MEASURE Menu” on page 3-11.</p>
SETUP	<p>SETUP: Opens the SETUP menu with an option to add channels. Refer to Section 3-7 “SETUP Menu” on page 3-11.</p>
PRESET	<p>PRESET: Opens the PRESET menu with selective channels, mode and setup parameters. Refer to Section 3-8 “PRESET Menu” on page 3-16.</p>
FILE	<p>FILE: Used to save and recall instrument setups and measurements. Refer to Section 3-9 “FILE Menu” on page 3-16.</p>

Figure 2-4. Main Menu

Using Menus

Instrument setup, control, and measurement functions are performed through the use of menus. Menu behaviors are summarized below:

- Pressing a main menu button opens an associated menu.
- The name of the button pressed in the main menu is reflected in the title bar of the resulting menu.
- Menu buttons can change for various measurement settings, instrument setup parameters, and measurement views.
- Pressing the corresponding main menu button for a menu closes the menu.
- Touching status data, a parameter field, or label in the display area opens the corresponding menu and the associated keypad for editing that parameter setting.
- Pressing Accept, Cancel, or the X in the upper right corner closes the menu or keypad.

2-4 Status Panel (Bar Chart View)

The status panel and features illustrated in this section are unique to the Channel Scanner and to the particular measurement and view that is selected.

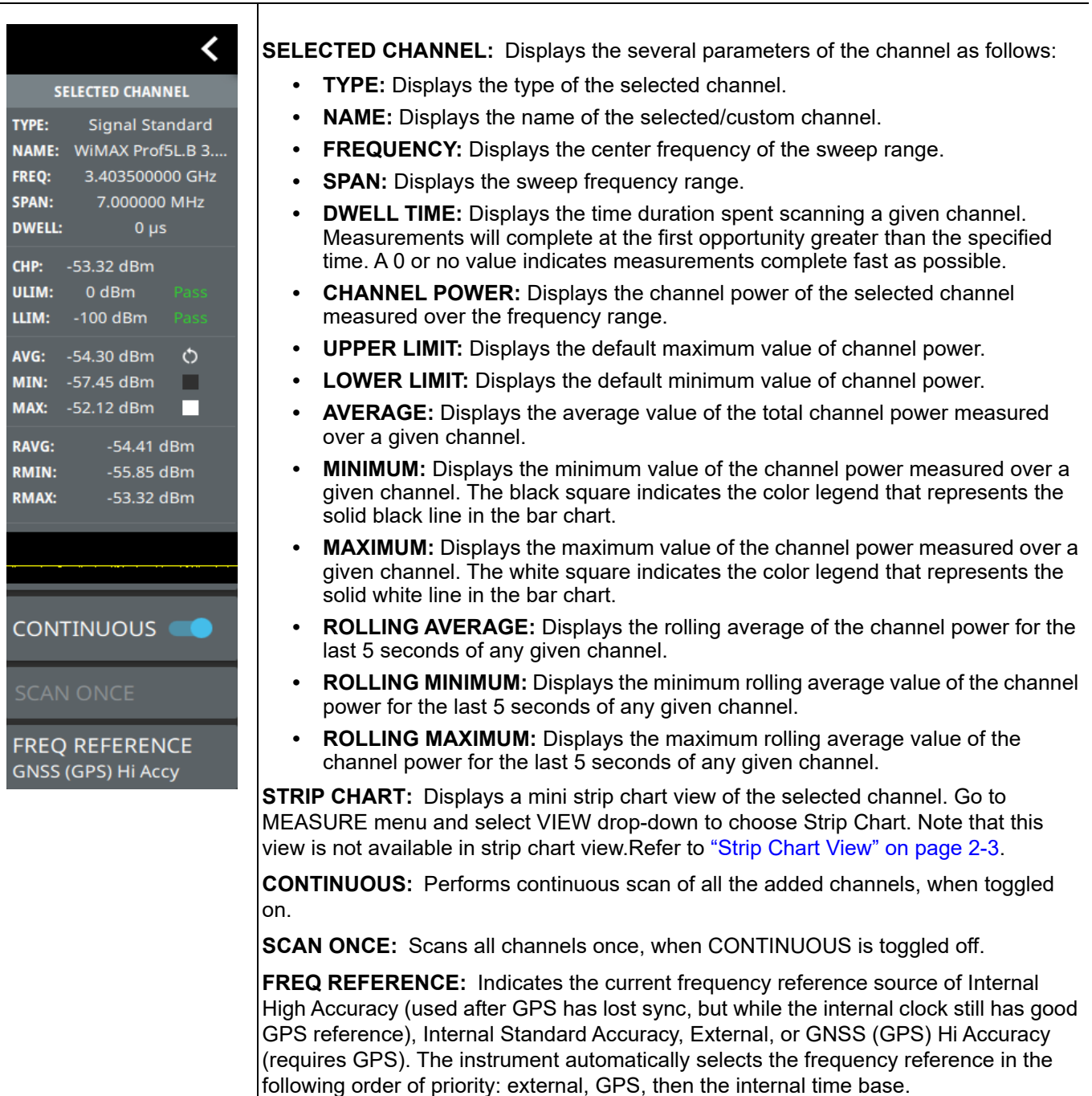


Figure 2-5. Channel Scanner Status Panel

Chapter 3 — Channel Scanner Measurements

3-1 Introduction

This chapter presents the Channel Scanner (Option 27) measurements for in use with Field Master Series, Remote Spectrum Monitors and Site Master instruments. The Channel Scanner measures the signal power of multiple transmitted signals. The power can be displayed as either a bar chart or a strip chart showing the channel power of selected channels for a given air interface standard, or the manually entered channels. Up to 60 channels can be measured simultaneously.

The operating frequency range for Channel Scanner mode can either be set manually, or the desired air interface standard can be selected from the Signal Standard and channel list in the instrument. When the channels are selected from the Signal Standard list, all frequency related parameters for the standard are automatically set to the appropriate values. The frequency and bandwidth settings can be manually entered using the Frequency Range selection if none of the available air interface standards meet the measurement need. A custom channel list can also be created to allow up to 60 independent channels to be defined.

A basic understanding of the measurement concepts presented in Spectrum Analyzer measurement guide (10580-00447) is recommended before performing the procedures in this chapter.

3-2 Setting Amplitude Parameters

The amplitude scale corresponds to the y-axis display. The instrument supports both log units (such as dBm and dBV) and linear units of scale (such as volts or watts). Amplitude-related parameters are set using the “AMPLITUDE Menu” on page 3-10.

Setting Amplitude Units

This setting allows you to set the y-axis graticule units and applies to most of the spectrum analyzer measurements, including markers, traces, and limit lines. To change the amplitude units:

1. Select AMPLITUDE > Y AXIS UNIT.
2. Select the desired y-axis amplitude units from the following:
 - Logarithmic:
 - Spectrum analyzer measurements: dBm (default), dBV, dBmV, dB μ V, or dBA
 - Field strength and EMF measurements (Option 444): dBm/m², dBW/m², dBV/m, dBmV/m, dB μ V/m
 - Linear:
 - Spectrum analyzer measurements: Volt (scalable to V, mV, μ V, nV), Watt (scalable to W, mW, μ W, nW, pW, fW), and A (scalable to A, mA, μ A, nA)
 - Field strength and EMF measurements (Option 444): V/m, W/m², W/cm², A/m

When switching amplitude units, the following parameters are affected as described below:

- Reference level is converted directly from the current unit into the new unit and scaled appropriately. For example, if the current units are dBm and ref level is set to -30 dBm, when changing the units to volts, the ref level is converted to 0.00707 V and scaled to 7.07 mV.
- The reference level offset is always entered in dB. When linear units are selected, the dB offset is converted to an offset to match the selected units and applied to the measurement displays.
- When changing from log units to log units, scaling (dB/div) remains unchanged. When changing from log units to linear units, scaling is not applicable in linear units.
- When a linear unit is selected, the top graticule line is set to the value of the converted reference level and the bottom line of the graticule is set to zero. The remaining graticule lines are calculated by dividing the reference level into 10 equal parts. For example, if the ref level is 5 mv, the graticule lines will be labeled as follows (from top to bottom): 5.00, 4.50, 4.00, 3.50, 3.00, 2.50, 2.00, 1.50, 1.00, 0.00.
- Trace in a “HOLD / VIEW” mode will be scaled to match the newly selected units.
- Marker amplitudes will be scaled to match the newly selected units.
- Limit line points will be directly converted and displayed in the newly selected amplitude units.
- Trigger levels will be converted to the newly selected units.
- Measurements and setups will be converted to the newly selected units.
- Save and recall will retain the units configuration.
- Power cycle will retain the current units configuration.

Setting Amplitude Reference Level

The amplitude reference level is typically an absolute reference level set at the top of the graticule for the power level being measured. Signal levels above this set value will be outside of the display range and may overdrive and saturate the input circuit (refer to “[Indications of Excessive Signal Level](#)” on page 3-5). To set the current amplitude reference level:

1. To automatically set an optimum reference level, press AMPLITUDE > AUTO REF LEVEL.
2. To manually set the reference level, press AMPLITUDE > REF LEVEL, then enter the desired reference level.

Note

Select AUTO ATTEN coupling of the attenuator setting and AUTO REF LEVEL to help ensure that harmonics and spurs are not introduced into the measurements.

Setting Amplitude Range and Scale

This setting applies to most analyzer modes of operation and allows you to set the y-axis graticule scale for log-based units only.

1. Select AMPLITUDE > SCALE/DIV.
2. Enter the desired number of units per division.

Reference Level Offset for External Loss or External Gain

To obtain accurate measurements, you can compensate for any external attenuation or gain by using a reference level offset. The compensation factor is always in dB, even if linear amplitude units are selected. External attenuation can be created by using an external cable or an external high power attenuator. External gain is typically from an amplifier.

To adjust the reference or amplitude level for either gain or loss:

1. Select AMPLITUDE > REF LEVEL OFFSET.
2. Enter a positive dB value to account for gain or enter a negative dB value to account for loss.
3. The new reference level offset value will be displayed on the instrument and the y-axis and trace amplitude is adjusted accordingly.

Preamplifier

The preamplifier can be turned on and off by toggling PRE AMP via the status panel or the AMPLITUDE menu. Figure 3-1 shows the noise floor with the preamplifier off (1) and on (2). Note that when the preamplifier is turned on, the noise floor drops significantly and a low-level signal is exposed. In order to use the preamplifier, the attenuation must be lower than 20 dB. If the preamplifier is turned on when the attenuation is greater than or equal to 20 dB, the attenuation will automatically drop to 10 dB. When AUTO ATTEN is toggled on, the REF LEVEL must be set to -40 dBm or lower to enable the preamplifier.

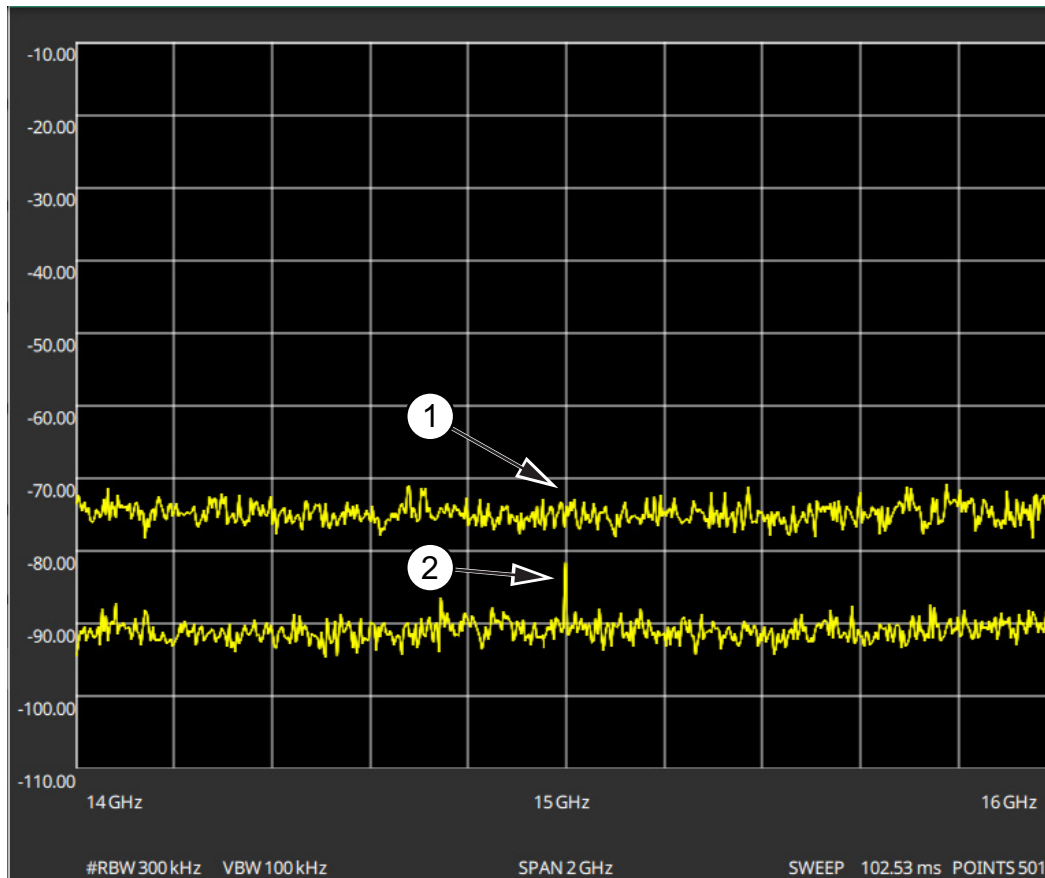


Figure 3-1. 1. Preamplifier Off
2. Preamplifier On

Indications of Excessive Signal Level

The Field Master Series has built-in features to help prevent input overload. These include auto attenuation and reference level. The instrument will also indicate when a received signal is too high for the current setup by displaying an “ADC Overrange” notification in the title bar (Figure 3-2). Before proceeding with the measurements, adjust the reference level, the attenuation level, and disable the preamplifier if necessary. Adjusting the resolution bandwidth and frequency range may also help when measuring small signals that are near large signals.



Figure 3-2. ADC Overrange

Overpower Warning

The Field Master Series MS2080A/MS2070A and Site Master MS2089A instruments are equipped with an in-built overpower protection hardware in order to manage considerably high range of input power. If the input power range exceeds beyond 5 watts, the protection relay gets activated and a notification alert is displayed as shown in the Figure 3-3. Proceed by removing the high power input source to avoid to damaging the RF circuitry.

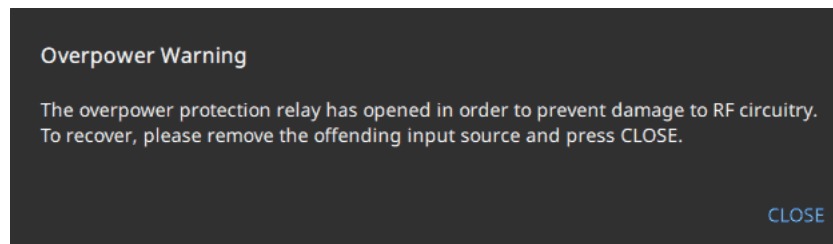


Figure 3-3. Overpower Warning

3-3 Field Strength

The field strength measurement is selected using the RF Spectrum mode. The field strength measurement is used in conjunction with an Anritsu antenna that has known antenna factors. Users can also import custom antenna factors for antennas not listed in the standard antenna selection list. When the field strength measurement is enabled, an additional plot is shown at the bottom of the display, indicating the selected antenna factor over the currently set frequency span. The field strength measurement is a measure of the RF power density that automatically compensates for the selected antenna factor. If an antenna is not selected, then the antenna gain is assumed to be 0 dB over the entire measurement range and the measurement can be manually compensated for using the “Antenna Calculations” on page 3-9, or to otherwise convert from one unit of measure to another.

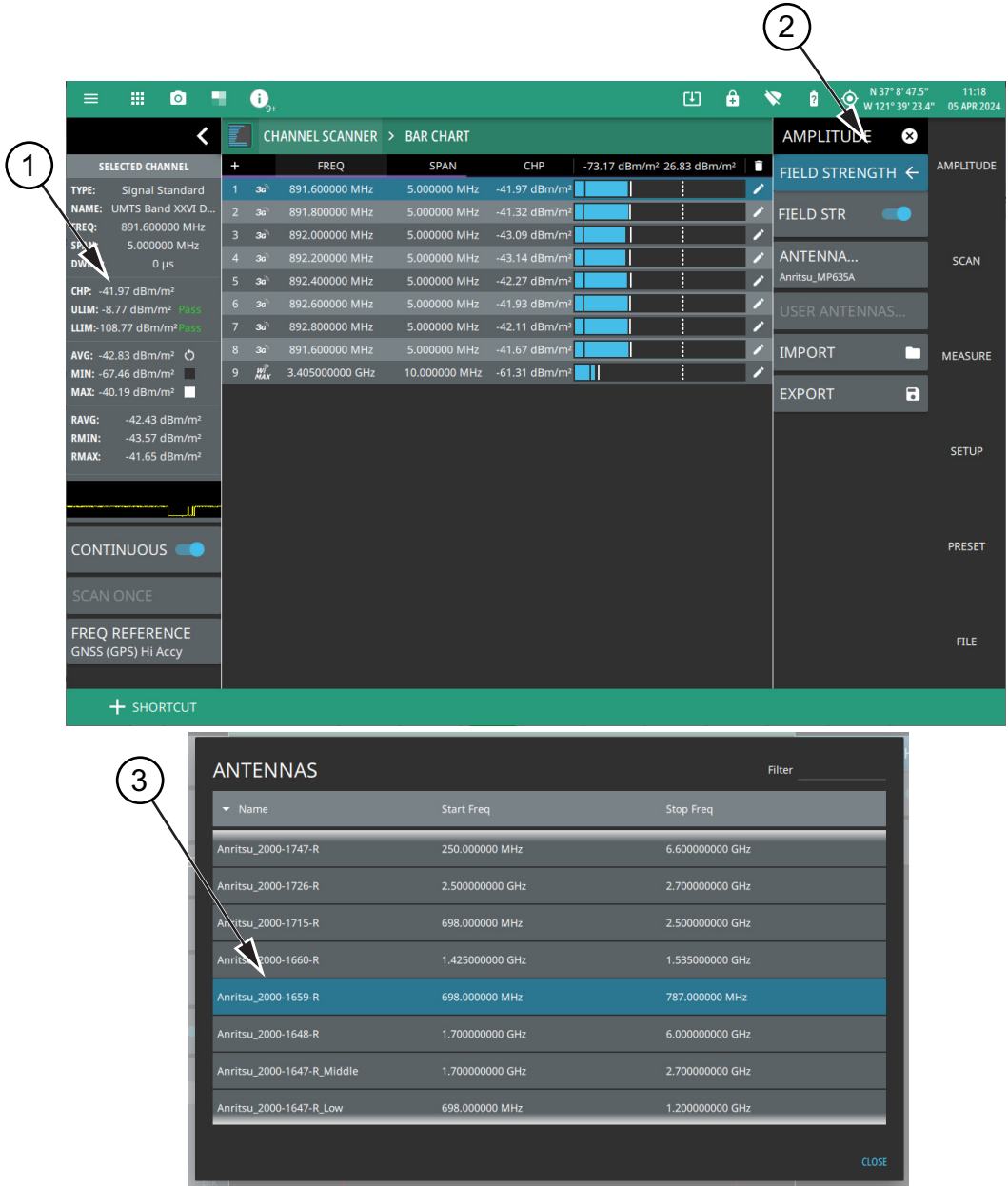


Figure 3-4. Field Strength Measurement (1 of 2)

1. When the field strength measurement is enabled (2), all amplitude units are converted to display field strength in the selected units.
2. The field strength measurement and antenna is selected from the AMPLITUDE menu.
3. The ANTENNAS dialog is displayed when ANTENNA is selected from the FIELD STRENGTH menu (2).

Figure 3-4. Field Strength Measurement (2 of 2)

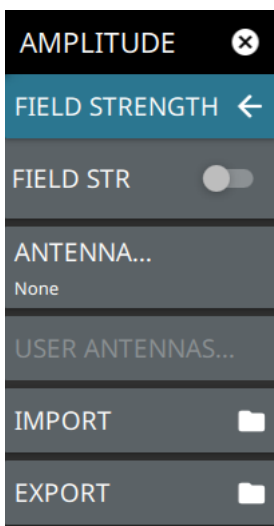
Frequency and level settings for many interfering signals can be set as follows:

1. Set up the measurement frequency and bandwidth.
2. Select the AMPLITUDE and set up the amplitude parameters.
3. Select the FIELD STRENGTH button and enable FIELD STR.
4. Select the ANTENNA button and select the antenna being used for the measurement.

Field strength is a constant measurement; after it is turned on, it remains on until FIELD STR is toggled off.

AMPLITUDE FIELD STRENGTH Menu

The FIELD STRENGTH menu is available in AMPLITUDE > FIELD STRENGTH. Once the field strength measurement is enabled, the FIELD STRENGTH menu can be quickly accessed by tapping on the Antenna factor display area below the spectrum window.



FIELD STR: Toggles the field strength measurement on or off. When toggled on, the trace detector type is set to RMS/Avg and the antenna factor profile is displayed.

ANTENNA: Displays the antenna selection dialog (see [Figure 3-4 on page 3-6](#)).

USER ANTENNAS...: Displays a list of user antennas. User antenna files are imported as comma separated value files. The file can contain multiple antennas and must conform to the following:

- Each antenna name must be unique, contain alpha-numeric characters only, and must be on a single line.
- Frequency must be in MHz.
- Antenna factors must be in dB.

IMPORT: Imports a user antenna file (.csv).

EXPORT: Exports a user antenna data file (.csv). If none exist, exports an example user antenna data file with instructions on how to create a usable antenna data file.

Figure 3-5. FIELD STRENGTH Menu

Example User Antenna Data

To create a list of custom antenna factors, use the following steps:

1. Export the existing USER ANTENNAS csv file by pressing the EXPORT button in the FIELD STRENGTH menu.
2. From the FILES menu, move the exported file to a USB memory device and then to a computer for editing.
3. If this is the first time exporting the file, read the instructions at the top of the file, then delete those rows:

**

This is an EXAMPLE. Make sure to REPLACE and DELETE all existing content in this file, including these instructions.

Accepted criteria:

Each Antenna name must be unique, contain alpha-numeric characters only, and must be on a single line

Frequency must be in MHz

Factors must be in dB

Please use the following examples as a guide:

**

4. Name each custom antenna and add cal factors below, per the instructions in the header:

Antenna_Example1

1920 35.886

1930 35.931

1940 35.976

1950 36.021

1960 36.065

1970 36.109

1980 36.153

Antenna_Example2

2110 36.706

2120 36.747

2130 36.788

2140 36.828

2150 36.869

2160 36.909

2170 36.949

5. Save the file to a USB memory device and insert it into the instrument.
6. Select the IMPORT button in the FIELD STRENGTH menu and select the new file from the USB drive.
7. Select USER ANTENNAS... button to view the list of imported antennas.

Antenna Calculations

This section provides a list of various antenna calculations to convert from one unit of measure to another.

Definitions

P = power in watts

V = voltage level in volts

R = resistance in ohms

Note that $1 \text{ mW} = 10^{-3} \text{ W}$ and $1 \text{ } \mu\text{V} = 10^{-6} \text{ V}$

E = field strength in V/m

H = magnetic field strength in A/m

Z_0 = characteristic impedance of vacuum, $120\pi \text{ ohm} \sim 377 \text{ ohm}$

P_d = Power density in W/m^2

r = distance from antenna in meters

AF = antenna factor, ratio of incident electromagnetic field to the output voltage

A_e = antenna equivalent area

g = antenna gain as power ratio

G = antenna gain in dBi

C_0 = speed of light in vacuum, $299,792,458 \text{ m/s}$

Equations

$$P = V^2/R$$

$$V_{\text{dB}\mu\text{V}} = P_{\text{dBm}} + 107 \text{ dB}$$

$$A_e = g(\lambda^2/4\pi)$$

$$G = 10 \cdot \log(g)$$

$$g = 10^{G/10} = (9.73/\lambda 10^{AF/20})^2$$

$$f = C_0/\lambda$$

$$P_r = A_e P_d$$

$$P_d = P_t G_t / (4\pi r^2) \text{ (Power density at a point)}$$

$$P_d = E^2/Z_0 = E^2/120\pi = Z_0 H^2$$

$$E = Z_0 H = \sqrt{P_d 120\pi}$$

$$AF = 20 \cdot \log(9.73/\lambda \sqrt{g})$$

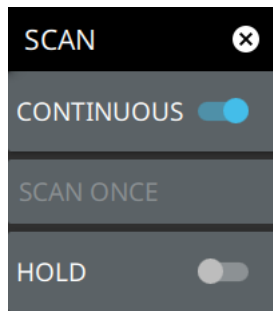
The field strength equations are only valid in the far field, where electric and magnetic fields are related by the characteristic impedance of free space.

3-4 AMPLITUDE Menu

<p>AMPLITUDE ✕</p>	<p>REF LEVEL: The reference level is the top graticule line on the measurement display. If the reference level offset is not zero, the offset reference level is displayed at this location. Selecting the plus (+) or minus (–) control increments the value by 10. The plus/minus (+/-) button on the keypad toggles between positive and negative values.</p>
<p>REF LEVEL 10 dBm</p>	<p>AUTO REF LEVEL: Auto reference level automatically adjusts the reference level to place the highest signal amplitude at about two graticule lines from the top based on the position of the trace at the time the button is pressed.</p>
<p>AUTO REF LEVEL</p>	<p>SCALE/DIV: The scale can be set from 1 dB per division to 15 dB per division. The default setting is 10 dB. Selecting the plus (+) or minus (–) control changes the value by 1. SCALE/DIV is not available when linear y-axis amplitude units are selected.</p>
<p>SCALE / DIV 10 dB</p>	<p>Y AXIS UNIT: Selects the y-axis amplitude units. Available units are:</p>
<p>Y AXIS UNIT dBm</p>	<p>Logarithmic:</p>
<p>REF LEVEL OFFSET 0 dB</p>	<ul style="list-style-type: none"> • Channel Scanner measurements: dBm (default), dBW, dBV, dBmV, dBμV, or dBA • Field strength measurements: dBm/m², dBW/m², dBV/m, dBmV/m, dBμV/m
<p>PRE AMP <input type="checkbox"/></p>	<p>Linear:</p>
<p>AUTO ATTEN <input checked="" type="checkbox"/></p>	<ul style="list-style-type: none"> • Channel Scanner measurements: Volt (scalable to V, mV, μV, nV), Watt (scalable to W, mW, μW, nW, pW, fW), and A (scalable to A, mA, μA, nA) • Field strength measurements: V/m, W/m², W/cm², A/m
<p>ATTEN LEVEL 30 dB</p>	<p>REF LEVEL OFFSET: Reference level offset compensates for the presence of external input attenuation or gain. The offset is applied to all amplitude related parameters and to measurements such as the y-axis scale and marker measurements. The default offset value is 0 dB and will always be presented in dB units. Selecting the plus (+) or minus (–) control increments the value by 10. The plus/minus (+/-) button on the keypad toggles between positive and negative values.</p>
<p>FIELD STRENGTH ←</p>	<p>PRE AMP: Turns the low-noise front-end preamplifier on or off. To ensure accurate measurement results, the largest signal into the instrument input when the preamplifier is turned on should be less than –40 dBm. The preamplifier cannot be turned on if auto attenuation is on and the reference level is above –40 dBm.</p>
<p>IMPEDANCE 50 Ω</p>	<p>AUTO ATTEN: Input attenuation can be either tied to the reference level (on) or manually selected (off). When input attenuation is tied to the reference level, attenuation is increased as higher reference levels are selected to make sure the instrument input circuits are not saturated by large signals that are likely to be present when high reference levels are required.</p>
<p>CUSTOM IMP LOSS 0 dB</p>	<p>ATTEN LEVEL: When auto attenuation is off, the attenuation value can be set manually to a resolution of 5 dB. Selecting the plus (+) or minus (–) control increments the value by 5.</p>
	<p>FIELD STRENGTH: Refer to SPA measurement guide (10580-00447) for a description of the measurement.</p>
	<p>IMPEDANCE: This functionality is not applicable to channel scanner measurements.</p>
	<p>CUSTOM IMP LOSS: This functionality is not applicable to channel scanner measurements.</p>

Figure 3-6. AMPLITUDE Menu

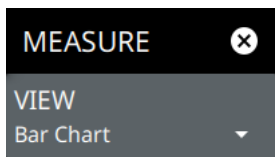
3-5 SCAN Menu



CONTINUOUS: Turn this toggle on to enable continuous scanning of all the channels.
SCAN ONCE: Selects the measurement view as either bar chart or strip chart.
HOLD: Selects the measurement view as either bar chart or strip chart.

Figure 3-7. SCAN Menu

3-6 MEASURE Menu

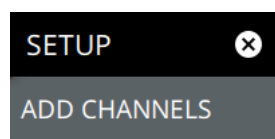


VIEW: Selects the measurement view as either bar chart or strip chart.

- **Bar Chart:** This view displays the list of channel (s) represented in horizontal bars. Each channel is represented with unique setup parameters such as frequency, span, channel power and reference level. See [“Bar Chart View” on page 2-2.](#)
- **Strip Chart:** This view displays the list of channel (s) represented in horizontal strips. Each channel is represented with unique setup parameters such as frequency and reference level. See [“Strip Chart View” on page 2-3.](#)

Figure 3-8. MEASURE Menu

3-7 SETUP Menu



ADD CHANNELS: Adds a signal standard or a custom frequency measurement channels.

Figure 3-9. SETUP Menu

ADD CHANNELS

Allows you to create custom frequency measurement channels or choose from the list of signal standard options. Select ADD CHANNELS to start adding channels. The add channels window consists of three tabs as explained below:

- **SIGNAL STANDARD:** Adds new channel (s) in the channel scanner measurement, copied from a user selected signal standard band.
- **FREQUENCY RANGE:** Adds new channel (s) in the channel scanner measurement, created from a user specified frequency range.
- **CUSTOM:** Adds new channel (s) in the channel scanner measurement, created from a user specified Center Frequency and Channel Span.

SIGNAL STANDARD

The SIGNAL STANDARD tab consists of a list of preset standards of various frequency bands such as WiMax, UMTS and so on. Enter the name of a specific band for e.g. LTE in FILTER field on the top to view all the frequency bands included in that standard. Select the number of channels by entering a value in CHANNEL COUNT field.

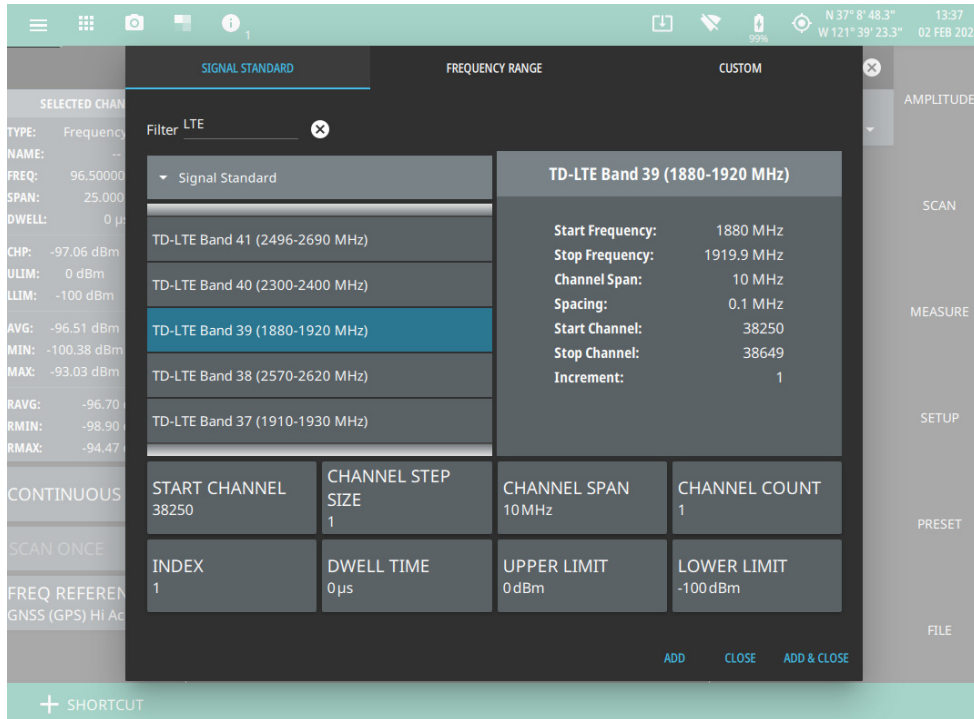


Figure 3-10. Add Channels - Signal Standard

- **SIGNAL STANDARD:** The list of signal standards included in various frequency bands.
- **START CHANNEL:** The index of the first channel to be copied from the signal standard (with successive channels increasing sequentially).
- **CHANNEL STEP SIZE:** The number of indexes skipped between channels copied. Example: if the Start Channel is 1, and the Signal Standard's increment is 1, channels in the standard are 1, 2, 3, 4, 5 and so on. If the user specifies a Step Size of 3, channels copied are 1, 4, 7, and so on. If the increment was 2, channels in the Standard would be 1, 3, 5, 7, 9, 11, 13, 15, 17 and so on.
- **CHANNEL SPAN:** The distance between a given channel's start and stop frequency. Enter a specific value to override the signal standard span, otherwise the default signal standard value will be used.
- **CHANNEL COUNT:** The number of channels intended to be copied from the signal standard.
- **INDEX:** Position in the channel scanner list to place the new channels.
- **DWELL TIME:** The time duration spent scanning a given channel. An estimate for time spent in scanning the whole channel list is equal to number of channels times dwell time. The measurement will be completed at the first opportunity greater than the specified time. A 0 or no value indicates that the measurement will be completed fast as possible.
- **UPPER LIMIT:** Channel power upper limit (in dBm), specified for all channels copied. In absence of a user specified limit, infinite power will be used, and the limit will always pass.
- **LOWER LIMIT:** Channel power lower limit (in dBm), specified for all channels copied. In absence of a user specified limit, zero power will be used, and the limit will always pass.

Signal Standard Channel Creation Limits

Channels may only be generated from a Start Channel valid for the named Signal Standard band. If the user supplied Start Channel, Channel Step Size, and Channel Count result in channel numbers that either precede or exceed the named Signal Standard band's channel numbers, then such channels are not created. However, all channels valid for the named Signal Standard will be added to the channel scanner list.

FREQUENCY RANGE

The FREQUENCY RANGE tab adds new channels from an user specified frequency range.

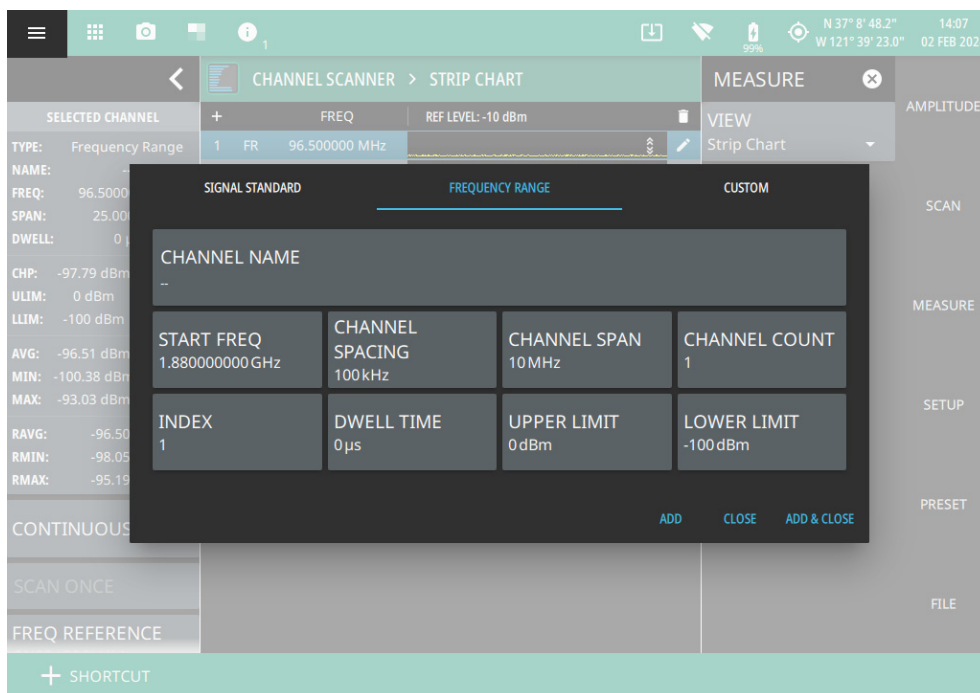


Figure 3-11. Add Channels - Frequency Range

Set the following parameters to add a frequency range channel:

- **START FREQUENCY:** Start Frequency of the first channel's span.
- **CHANNEL SPACING:** The difference between subsequent channels start frequencies.
- **CHANNEL SPAN:** The difference between the start frequency and stop frequency of channels created.
- **CHANNEL COUNT:** Number of channels to be created.
- **INDEX:** Channel scanner list index to be used for the created channel of lowest start frequency, with subsequent (Channel Count - 1) channels enumerated sequentially.
- **CHANNEL NAME:** User specified channel name.
- **DWELL TIME:** The time duration spent scanning a given channel, specified for all channels created. Measurement will complete at the first opportunity greater than the specified time. A 0 or no value indicates measurement complete fast as possible.
- **UPPER LIMIT:** Channel power upper limit (in dBm), specified for all channels copied. In absence of a user specified limit, infinite power will be used, and the limit will always pass.
- **LOWER LIMIT:** Channel power lower limit (in dBm), specified for all channels copied. In absence of a user specified limit, zero power will be used, and the limit will always pass.

Frequency Range Channel Creation Limits

Channels may only be generated within the frequency span of the analyzer. If the Nth channel to be generated by user supplied Start Frequency, Channel Spacing, and Channel Span results in a channel for which:

Start Frequency < Analyzer Min Frequency Start Frequency + (N * Channel Spacing) >

Analyzer Max Frequency

Start Frequency + Channel Span + (N * Channel Spacing) >

Analyzer Max Frequency such channels will not be generated regardless of the user supplied Channel Count.

However all created channels with a valid span will be added to the channel scanner list.

CUSTOM

The CUSTOM tab adds a new custom channel to the channels list, created from a user specified center frequency and channel span.

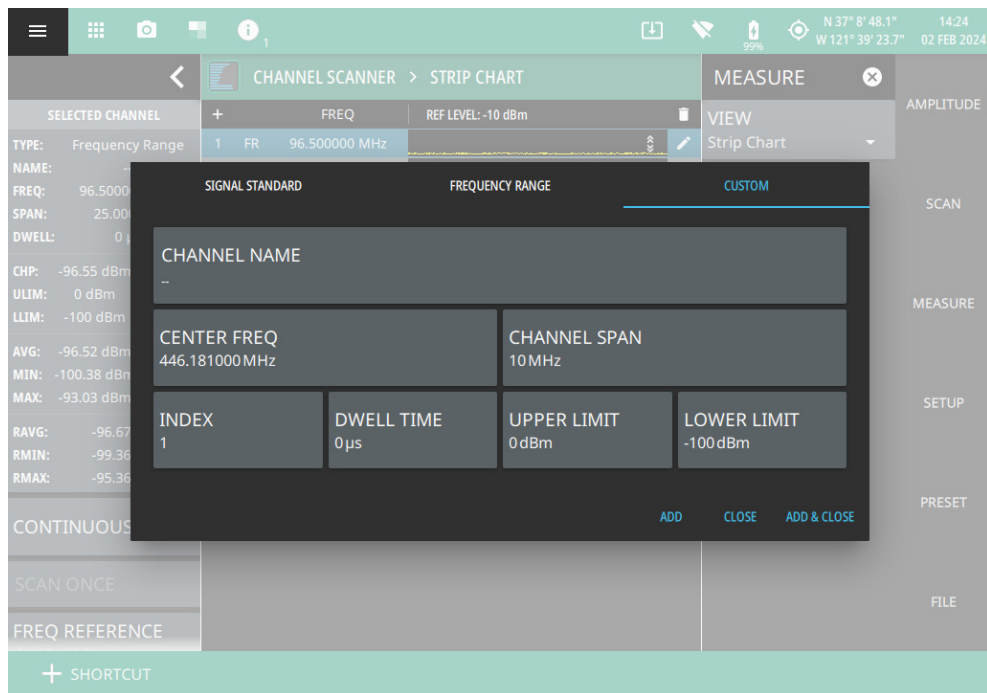


Figure 3-12. Add Channels - Custom Channel

Set the following parameters to add a custom channel:

- **CHANNEL NAME:** User specified channel name.
- **CENTER FREQUENCY:** Center frequency of the new channel.
- **CHANNEL SPAN:** The difference between the start frequency and stop frequency of channels created.
- **CHANNEL COUNT:** Number of channels to be created.
- **INDEX:** Channel scanner list index to be used for the created channel of lowest start frequency, with subsequent (Channel Count - 1) channels enumerated sequentially.
- **DWELL TIME:** The time duration spent scanning a given channel, specified for all channels created. Measurement will complete at the first opportunity greater than the specified time. A 0 or no value indicates measurement complete fast as possible.
- **UPPER LIMIT:** Channel power upper limit (in dBm), specified for all channels copied. In absence of a user specified limit, infinite power will be used, and the limit will always pass.
- **LOWER LIMIT:** Channel power lower limit (in dBm), specified for all channels copied. In absence of a user specified limit, zero power will be used, and the limit will always pass.

Custom Channel Creation Limits

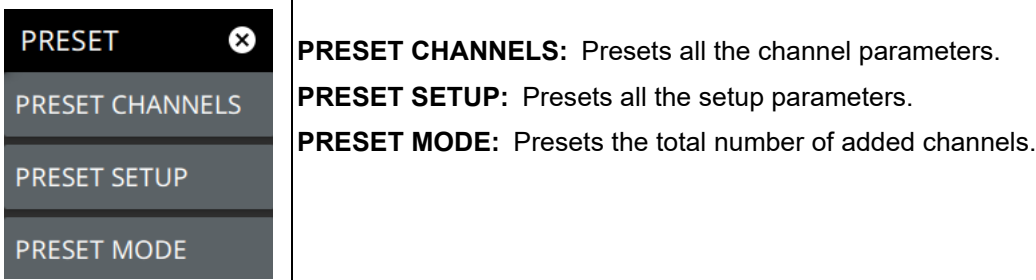
Channels may only be generated within the frequency span of the analyzer. If the channel span generated by user supplied Center Frequency and Channel Span results in either:

$$\text{Center Frequency} - (1/2 * \text{Channel Span}) < \text{Analyzer Min Frequency}$$

$$\text{Center Frequency} + (1/2 * \text{Channel Span}) > \text{Analyzer Max Frequency}$$

such a channel will not be generated.

3-8 PRESET Menu



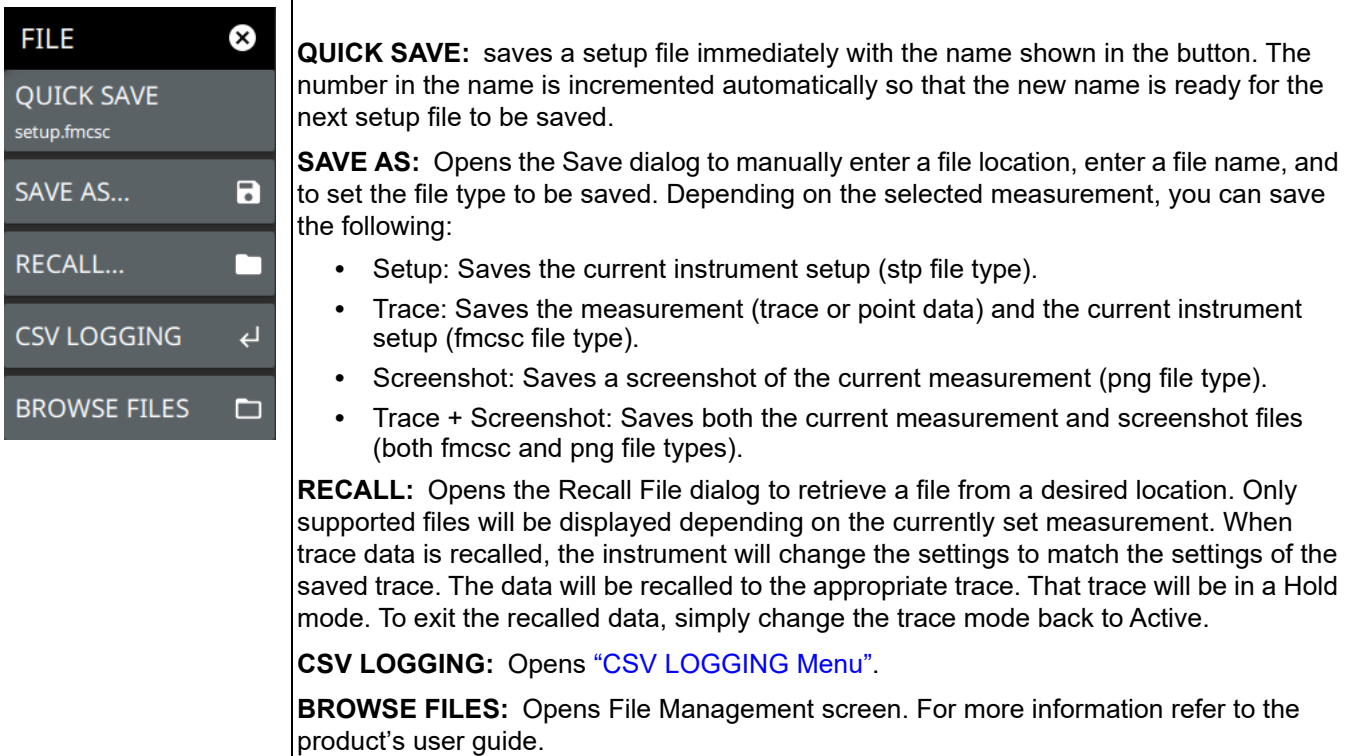
PRESET CHANNELS: Presets all the channel parameters.

PRESET SETUP: Presets all the setup parameters.

PRESET MODE: Presets the total number of added channels.

Figure 3-13. PRESET Menu

3-9 FILE Menu



QUICK SAVE: saves a setup file immediately with the name shown in the button. The number in the name is incremented automatically so that the new name is ready for the next setup file to be saved.

SAVE AS: Opens the Save dialog to manually enter a file location, enter a file name, and to set the file type to be saved. Depending on the selected measurement, you can save the following:

- Setup: Saves the current instrument setup (stp file type).
- Trace: Saves the measurement (trace or point data) and the current instrument setup (fmcs file type).
- Screenshot: Saves a screenshot of the current measurement (png file type).
- Trace + Screenshot: Saves both the current measurement and screenshot files (both fmcs and png file types).

RECALL: Opens the Recall File dialog to retrieve a file from a desired location. Only supported files will be displayed depending on the currently set measurement. When trace data is recalled, the instrument will change the settings to match the settings of the saved trace. The data will be recalled to the appropriate trace. That trace will be in a Hold mode. To exit the recalled data, simply change the trace mode back to Active.

CSV LOGGING: Opens [“CSV LOGGING Menu”](#).

BROWSE FILES: Opens File Management screen. For more information refer to the product’s user guide.

Figure 3-14. FILE Menu

CSV LOGGING Menu

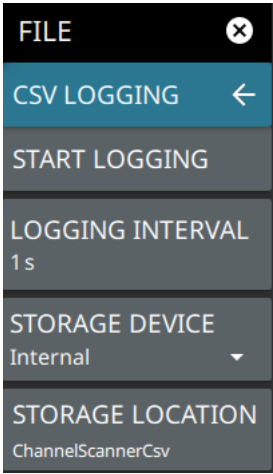
	<p>START/STOP LOGGING: Starts/stops logging channel scanner data points.</p> <p>LOGGING INTERVAL: Sets the time duration to capture the data points. The default interval range is between 100 ms to 60000 ms, and the default value is 1 s.</p> <p>STORAGE DEVICE: Selects the storage device to save the channel scanner log files. The log files can be stored either internally in the instrument or on the external USB memory device.</p> <p>STORAGE LOCATION: Creates a separate folder either internally or in the USB device to store all the CSV log files. You are allowed to rename the default folder name using the keypad.</p>
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Figure 3-15. CSV Logging Menu

3-10 Saving and Recalling Measurements

The instrument can save measurement setups, native trace, trace data, and screenshots. You can recall setup and native trace files. For other file operations such as copy, move, and directory management, refer to “File Management” section of Instrument Overview chapter of the corresponding user guide.

Saving a Measurement

To save a measurement or setup, refer to [Figure 3-16](#):

1. Select FILE > SAVE AS...
2. If desired, press the save location to change the destination.
3. Enter the desired file name using the touchscreen keyboard.
4. Select the type of file to save from the selection list.
5. Select SAVE to save the file.

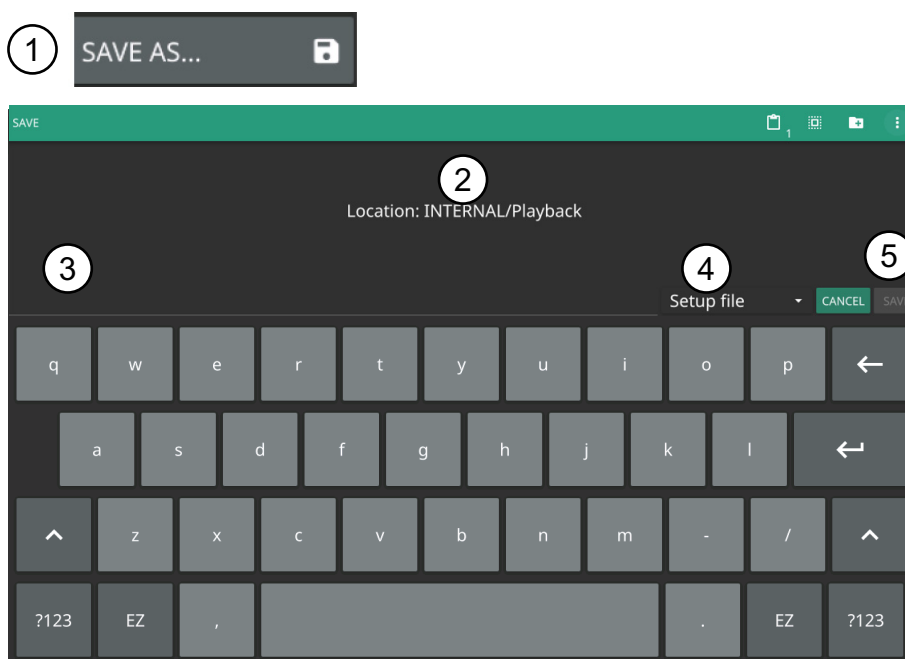


Figure 3-16. File Save As Dialog

Once a file has been saved, the QUICK SAVE feature can be used to quickly save the same type of file with an incrementing number appended to the end of the original file name.

Recalling a Measurement

You can recall a saved setup and native trace measurement. When recalling a setup, the instrument setup and operating state will be restored as it was when the setup was saved. When recalling a trace measurement, the instrument setup and on-screen measurement data will be restored as it was when the trace data was saved.

To recall a measurement or setup, refer to [Figure 3-17](#):

1. Select FILE > RECALL...
2. Select the file location.
3. Use the file type filter to shorten the list if needed.
4. Select the desired file from the displayed list.
5. Select OPEN to recall the file.

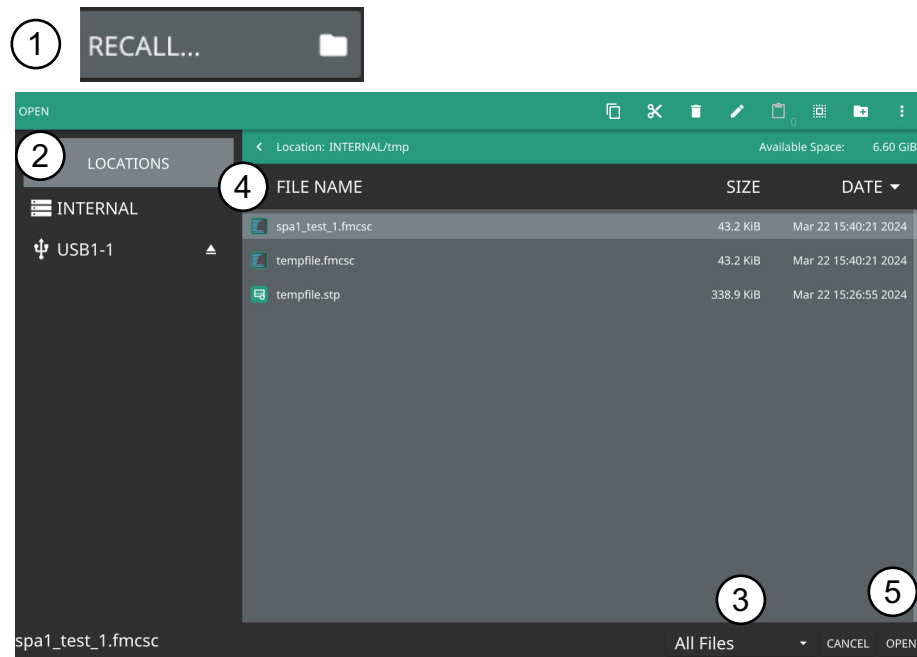


Figure 3-17. File OPEN Dialog

When a setup file or a measurement file is recalled, the measurement state will be set to hold. To restore active measurements, press SCAN menu and turn off HOLD toggle.

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