Measurement Guide

Electromagnetic Field (EMF) Meter

MS2090A Field Master Pro™

Electromagnetic Field (EMF) Meter	**Option 445**

Notes	EMF Meter measurements require Isotropic EMF probe (20 MHz to 40 MHz) that is sold separately. 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.

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Part Number: 10580-00489
Revision: B
Published: September 2023

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Table of Contents

Chapter 1 — General Information

1-1 Introduction

This measurement guide gives a brief overview of the Electromagnetic Field (EMF) Meter (Option 445). The EMF Meter is used for electromagnetic field (EMF) compliance testing over the broadband frequency range determined by the EMF probe that is connected to the instrument. After measurements are taken, refer to "File Management" section of Instrument Overview chapter of the user guide, and Section 2-6 "Saving and Recalling Measurements" on page 2-7"for a description of saving, recalling, and managing measurement files.

Related Manuals

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

http://www.anritsu.com/en-US/test-measurement/products/ms2090a

Product Information, Compliance, and Safety

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

- MS2090A PN: 10100-00069

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:

- 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
- Listing of all related documentation such as measurement guides, programming and maintenance manuals.

1-2 Option Description

The EMF Meter Option 445 installed in Field Master series instruments is used to measure all the EMF power within 20 MHz to 40 MHz band. The Isotropic probe (2000-1985-R) when connected to the USB port of the instrument reports the measurement power as a percentage of FCC (public or technician) or ICNIRP (public or technician) regulatory limits. Refer to 11410-01185 Technical Data Sheet for more information.

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

1-3 Document Conventions

The following conventions are used throughout the MS2090A documentation set.

User Interface Navigation

The MS2090A user interface consists of menus, buttons, toolbars, and dialog boxes. Elements in navigation paths are separated as follows: MARKER > PEAK SEARCH > NEXT PEAK.

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 Contacting Anritsu for Sales and Service

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Chapter 2 — EMF Meter (Option 445)

2-1 Introduction

This chapter covers the EMF Meter (Option 445) measurements. Refer to your instrument's technical data sheet for compatible probes. For frequency selective EMF analysis, EMF measurement Option 444 is covered in "Electromagnetic Field (EMF) Measurements (Option 444)" section of the Spectrum Analyzer Measurement Guide (10580-00447).

Note	EMF measurements require that an Anritsu isotropic EMF probe is connected to the analyzer.

This chapter describes the measurement setup, including selecting the EMF Meter mode and setting the limit testing criteria. After measurements are taken, refer to "File Management" section of Instrument Overview chapter of the user guide and Section 2-6 "Saving and Recalling Measurements" for a description of saving, recalling, and managing measurement files. For detailed information about other specific measurements, refer to the appropriate chapter in this guide.

2-2 Selecting the Analyzer

The instrument analyzers are selected from the 9-dot icon or the current measurement icon at the top of the display area. 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.

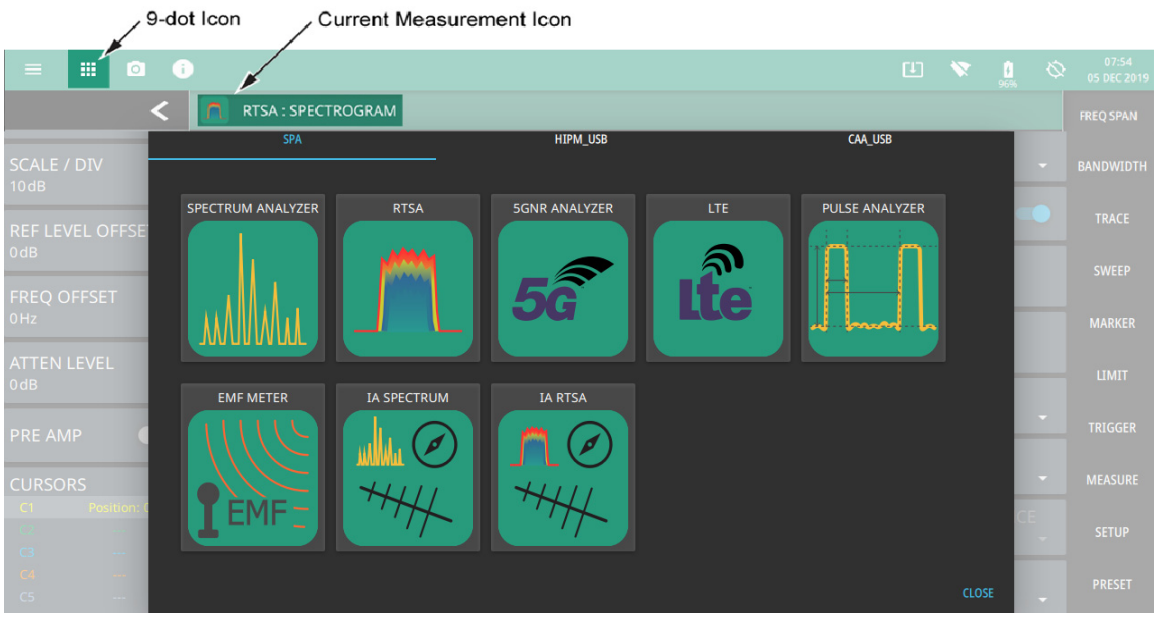


Figure 2-1. Example Analyzers

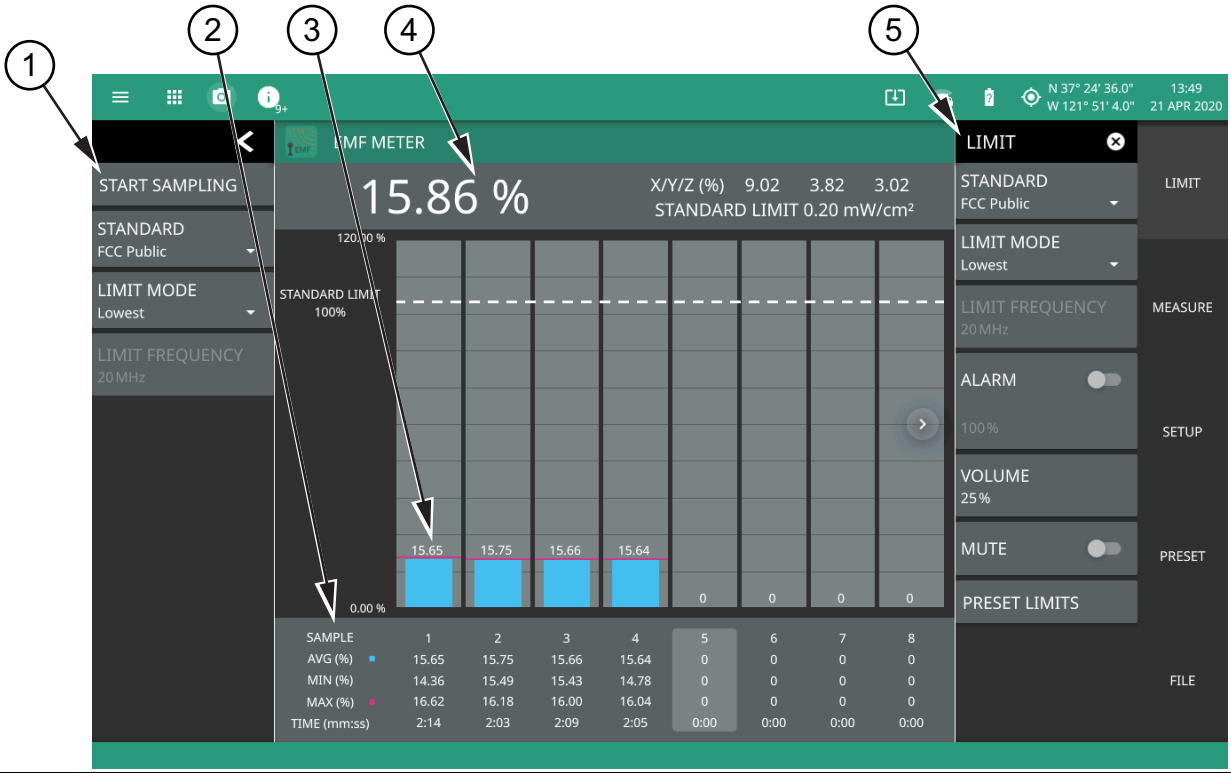
2-3 Connecting the Probe

1. Connect the probe USB connector to one of the top panel USB Type A ports.
2. Set up the EMF Meter for compliance testing of your standard using the following sections.

Figure 2-2. EMF Meter Probe Connection

2-4 EMF Meter GUI Overview

EMF Meter limit testing is set up using the “LIMIT Menu (EMF Meter)” on page 2-4. After completing the data collection for the three axes (X, Y, and Z), the isotropic result is calculated and displayed for each sample. Up to 16 samples can be saved into a single file. The max, min, and average values of the isotropic result are computed and displayed in the table below the graph region for each sample. The current sample data is displayed at the top of the display area.



1. The status panel provides controls for starting a new set of eight measurement samples across the frequency range of the connected probe, selecting the standard for the limit test, and for selecting the limit mode (lowest or selected frequency).
2. Tabular measurement data shows the EMF measurement results (average, maximum, and minimum) along with the test time for each sample.
3. The bar graph area displays the sampled result on a percentage scale relative to the current test limit.
4. The upper data area shows the currently selected sample data for each axis and the calculated total result (%) along with the currently set standard limit in mW/cm^2.
5. The LIMIT menu is where most of the EMF measurement settings are configured. See “LIMIT Menu (EMF Meter)” on page 2-4.

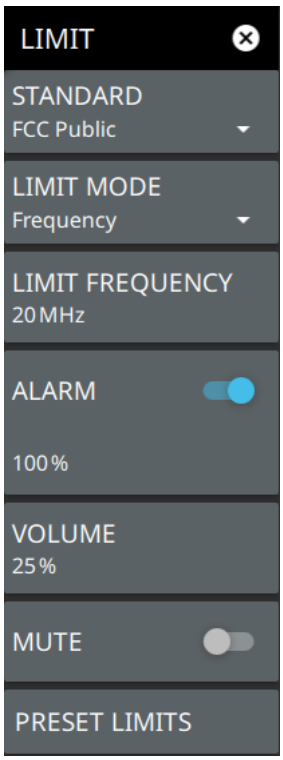
Figure 2-3. EMF Meter Measurement

EMF Meter Measurement

Press START SAMPLING and move the EMF probe through the sector of interest. The EMF probe handle can be removed and the probe can be attached to a standard tripod with a ¼ inch mounting screw for stationary measurements. When finished measuring a sector, press STOP SAMPLING. The meter will automatically save the data to the current sample and then move to the next sample. Up to 16 samples can be taken by starting and stopping the sampling. The data can then be saved as a screenshot (png) or as a comma separated value (csv) file and viewed on a PC.

LIMIT Menu (EMF Meter)

The EMF Meter measurement is primarily set up using the LIMIT menu.



STANDARD: Selects the limit test standard to use for compliance testing:

- FCC Public: FCC field density limit for the general public
- FCC Workers: FCC field density limit for the workers
- Icpublic: International Commission on Non-Ionizing Radiation Protection (ICNIRP) limit for the general public
- Icworker: International Commission on Non-Ionizing Radiation Protection (ICNIRP) limit for workers

LIMIT MODE: Selects the lowest limit value within the frequency range of the probe or the limit value of the specified frequency. Note that selecting "frequency" does not mean that the probe is only measuring at the set frequency. It is still a broadband measurement. Frequency limit mode means that the percentage calculation of the EMF energy is based on the limit of the set frequency.

LIMIT FREQUENCY: When LIMIT MODE is set to frequency, the test limit criteria is applied at the set frequency rather than the lowest limit within the EMF probe frequency range.

ALARM: Toggles the alarm on or off. An alarm will sound when a test limit threshold for any sample is crossed.

VOLUME: Sets the alarm volume from 0% to 100%.

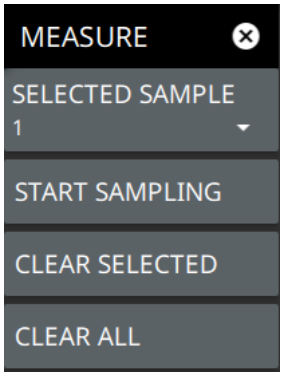
MUTE: Sets the alarm volume to minimum (effectively 0%).

PRESET LIMITS: Presets all limit parameters to factory default.

Figure 2-4. LIMIT Menu (EMF Meter)

MEASURE Menu (EMF Meter)

The MEASURE menu is used to select a sample and to start sampling a new set of data.



SELECTED SAMPLE: Selects one of the 16 available samples. The selected sample is where data will be stored when START SAMPLING is pressed. The selected sample is highlighted in the tabular display area and can also be selected by touching the bar graph or table area of the desired sample.

START SAMPLING: Initiates a new measurement. During a series of measurements, the meter will cycle through and update each of the 16 sample data sets. After pressing, this button will become STOP SAMPLING and can be pressed to stop the current sample. After stopping a sample, the selected sample will automatically increment to the next available sample.

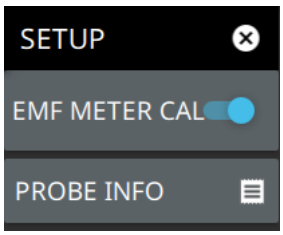
CLEAR SELECTED: Clears the currently selected sample data.

CLEAR ALL: Clears all 16 sets of sampled data.

Figure 2-5. MEASURE Menu (EMF Meter)

SETUP Menu (EMF Meter)

The SETUP menu is used to toggle the EMF Meter probe calibration.



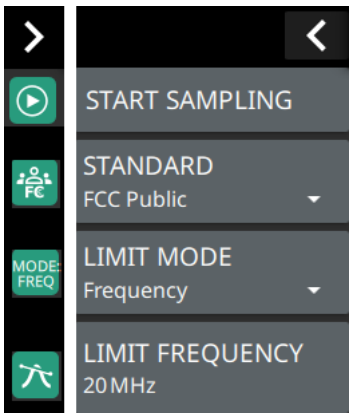
EMF METER CAL: Toggles the internal EMF Meter probe calibration on or off. This enables correction factors that are stored in the probe's memory. The measured values are corrected at a given frequency using the factors measured during the latest factory calibration.

PROBE INFO: Displays EMF Probe details such as Model, Unit and Year.

Figure 2-6. SETUP Menu (EMF Meter)

Status Panel (EMF Meter)

The figure 2-7 shows status panel with mini status panel icons.



START SAMPLING: Initiates a new measurement. During a series of measurements, the meter will cycle through and update each of the 16 sample data sets. After pressing, this button will become STOP SAMPLING and can be pressed to stop the current sample. After stopping a sample, the selected sample will automatically increment to the next available sample.

STANDARD: Selects the limit test standard to use for compliance testing:

- FCC Public: FCC field density limit for the general public
- FCC Workers: FCC field density limit for the workers
- Icpublic: International Commission on Non-Ionizing Radiation Protection (ICNIRP) limit for the general public
- Icworker: International Commission on Non-Ionizing Radiation Protection (ICNIRP) limit for workers

LIMIT MODE: Selects between lowest and frequency.

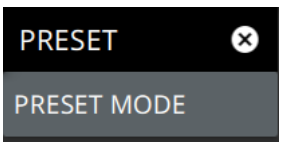
LIMIT FREQUENCY: When LIMIT MODE is set to frequency, the test limit criteria is applied at the set frequency rather than the lowest limit within the EMF probe frequency range.

Figure 2-7. Status Panel with Mini Status Panel Icons (EMF Meter)

2-5 Presetting the Meter

The PRESET menu sets certain settings to the default state. Preset only affects the current analyzer settings. Preset does not affect user files or system settings such as networking settings. For other reset options, such as a complete factory reset of the instrument, refer to “Reset Settings” section in Instrument Overview chapter of the user guide. To recover from system software faults, refer to Appendix A, “Instrument Messages and Troubleshooting”. chapter of the user guide.

PRESET Menu



PRESET MODE: Presets all of the current analyzer settings to default values.

Figure 2-8. PRESET Menu

2-6 Saving and Recalling Measurements

The Field Master Pro can save measurement setups, CSV measurement data, and screenshots. You can recall setup and CSV data files. For other file operations such as copy, move, and directory management, refer to

Saving a Measurement

To save a measurement or setup, refer to Figure 2-9:

1. Press 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. Press SAVE to save the file.

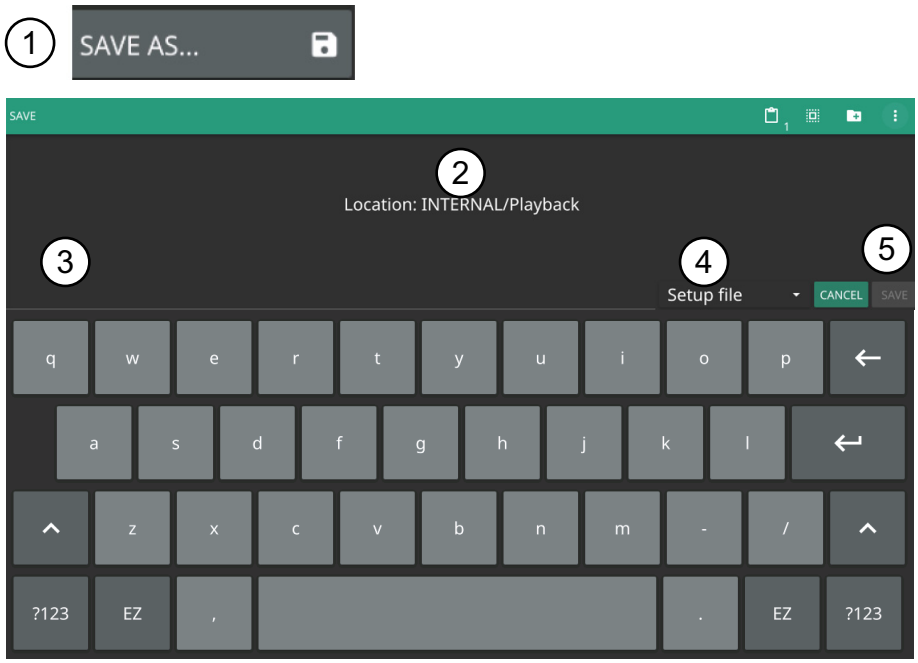


Figure 2-9. File Save Dialog

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, native trace measurement, and a limit line. 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 2-10:

1. Press 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. Press OPEN to recall the file.

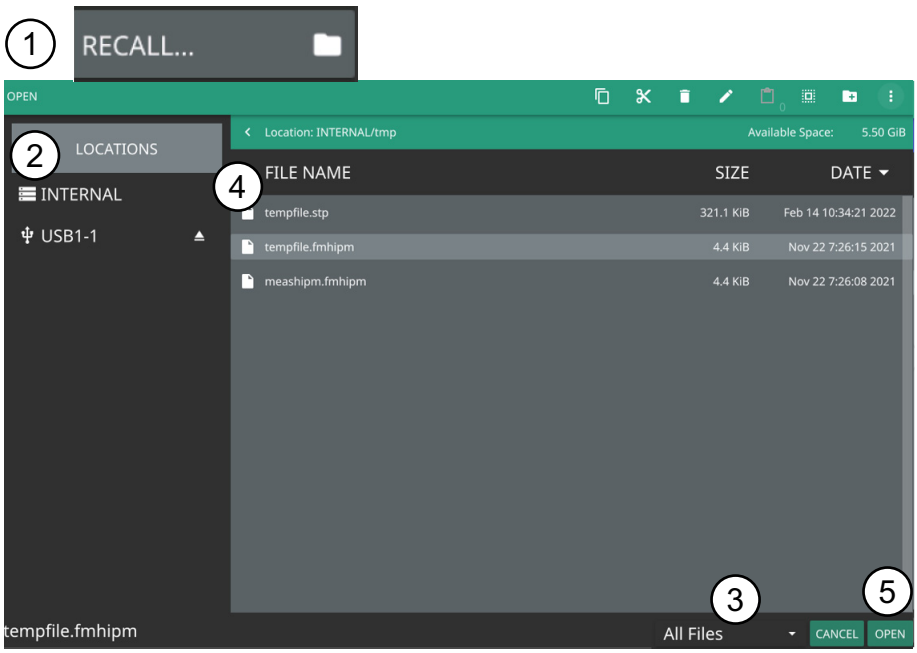


Figure 2-10. File Open Dialog

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).
- Measurement: Saves the current measurement data in comma separated value format (csv file type). This format is useful for further analysis using other software tools.
- KML: Saves measurement data in Keyhole Markup Language format, including the instrument model number, installed options, sample data with GPS coordinates, if GPS is installed.
- Screenshot: Saves a screenshot of the current measurement (png file type).
- Trace + Screenshot: Saves both the current measurement and screenshot files (both csv 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.

BROWSE FILES: Refer to “File Management” section of Instrument Overview chapter of the user guide.

Figure 2-11. FILE Menu

Anritsu

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