User Guide

Field Master™ MS2070A/MS2080A

Handheld RF Spectrum Analyzer

Note	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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PN: 10580-00483 Rev. C

Chapter 1 — General Information

1-1   Introduction

The Field Master User Guide is part of a set of manuals that cover all of the instrument functions and their use. This manual covers the instrument overview, system functions, and other common features, along with a brief guide to basic measurement concepts and setups. Most instrument operations are covered in specific chapters of this manual as listed below. Remote programming is covered in the programming manual. Additionally, the Field Master offers a remote PC software that replicates the instrument user interface on your PC screen and allows network connection to an instrument or the ability to recall data and perform on-screen measurement analysis without a connection to an instrument (refer to Appendix C, "PC Software").

Before You Begin

- Read the *Important Information, Compliance, and Safety Guide* (PN: 10100-00069) for important safety, legal, and regulatory notices before operating the equipment.

- Charge the instrument battery using the supplied battery charger until fully charged.

Note	The instrument may reboot when the battery charge level is low and external power is removed.

Additional Documentation

Table 1-1.   Related Manuals

Document Part Number	Model Number	Description
10100-00069	MS20x0A	Important Product Information, Compliance, and Safety Notices
11410-01001	MS2080A	MS2080A Field Master™ Technical Data Sheet
11410-02892	MS2070A	MS2070A Field Master™ Technical Data Sheet
10580-00484	MS20x0A	MS20x0A Field Master™ Programming Manual
10580-00447	MS20x0A	Field Master Series Spectrum Analyzer Measurement Guide Interference Finder (Option 24) Zero Span IF Output (Option 89) Gated Sweep (Option 90) Coverage Mapping (Option 431) EMF Measurement (Option 444)
10580-00448	MS2080A	Field Master Series Real-Time Spectrum Analyzer (RTSA) Measurement Guide Interference Analysis RTSA (IA RTSA) Analyzer (Option 24)
10580-00449	MS2080A	Field Master Series 5GNR Measurement Guide (Option 888) GNSS Receiver (Option 31 Gated Sweep (Option 90) Coverage Mapping (Option 431)
10580-00450	MS2080A	Field Master Series LTE FDD/TDD Signal Analyzer (Option 883) Measurement Guide GNSS Receiver (Option 31 Gated Sweep (Option 90) Coverage Mapping (Option 431)
10580-00492	MS20x0A	Field Master Series High Accuracy Power Meter Measurement Guide (Option 19)
10580-00493	MS2080A	Field Master Series Cable and Antenna Analyzer Measurement Guide (Option 331)

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/ms2070a

http://www.anritsu.com/en-us/test-measurement/products/ms2080a

Document Conventions

The following conventions are used throughout the MS20x0A documentation set.

Instrument Identification

When identifying a frequency option for the MS20x0A, that option number is appended after the model number; example: MS20x0A-0706.

User Interface

The MS20x0A user interface consists of menus, buttons, toolbars, and dialog boxes.

User Interface Navigation

Elements in navigation paths are separated as follows: MARKER > PEAK SEARCH > NEXT PEAK.

1-2 Instrument Description

The MS20x0A Field Master is a synthesizer-based handheld RF spectrum analyzer that provides quick and accurate measurement results. The instrument is designed for monitoring, measuring, and analyzing signal environments. Measurements can easily be made by using the main instrument functions: frequency, span, amplitude, and bandwidth. A 10.1" capacitive touchscreen enables fast, easy data entry.

Typical measurements include in-band interference and transmit spectrum analysis, plus cell site and 802.11a/b/g interference testing. Options are available for RF, advanced demodulation, and over-the-air (OTA) measurement. A full range of marker capabilities (such as peak, center, and delta functions) are provided for faster, more comprehensive analysis of displayed signals. Upper and lower multi-segmented limit lines are available to create quick, simple pass/fail measurements.

Time and date stamping of measurement data is automatic. The internal memory provides for the storage and recall of up to 1000 measurement setups and up to 1000 traces. Measurements and setups can be stored internally on the instrument or on a USB memory device for later recall.

Note	Not all after-market USB drives are compatible with Field Master. The USB drive must contain a single partition using either FAT32, exFAT, NTFS and ext4 file formats.

Available Options

Available options for the Field Master are listed in Table 1-2.

Table 1-2.   Available Options

Option	Description
MS2070A-0005	Wi-Fi
MS2070A-0008	Preamp
MS20x0A-0019*	High Accuracy Power Meter (requires compatible USB power sensor, sold separately)
MS20x0A-0024*	Interference Finder (requires GNSS Receiver Option 31, and directional antenna, sold separately)
MS20x0A-0031*	GNSS Receiver (requires external GPS antenna)
MS2080A-0090*	Gated Sweep
MS2080A-0102*	40 MHz Analysis Bandwidth (20 MHz standard)
MS2080A-0199*	Real-Time Spectrum Analyzer
MS20x0A-0431*	Coverage Mapping (requires GNSS Receiver Option MS20x0A-0031)
MS20x0A-0509*	AM/FM Modulation Measurement
MS2080A-0883*	LTE FDD/TDD Measurement (requires GNSS Receiver Option MS20x0A-0031)
MS2080A-0888*	5GNR FDD/TDD/FR1 Downlink Measurements (requires GNSS Receiver Option MS20x0A-0031)
MS20x0A-070x-0097	Accredited Calibration to ISO17025 and ANSI/NCSL Z540-1. Includes calibration certificate, test report, and uncertainty data.
MS20x0A-070x-0098	Standard Calibration to ISO17025 and ANSI/NCSL Z540-1. Includes calibration certificate.
MS20x0A-070x-0099	Premium Calibration to ISO17025 and ANSI/NCSL Z540-1. Includes calibration certificate, test report, and uncertainty data.
* Timed-Limited Options	Options marked with an asterisk are offered as a 90-day time limited option by ordering as a -9xxx series option. For example, MS2080A-9888 is the 90-day time limited option for 5GNR FDD/TDD FR1 Measurements. The option start time begins when the user first activates the option.

Table 1-3.   Supported Software

Model	Description
MX280007A	Mobile InterferenceHunter™ Software
MS20x0A	PC Remote User Interface

1-3   Instrument Care and Preventive Maintenance

Instrument care and preventive maintenance consist of proper operation in a suitable environment, occasional cleaning of the instrument, and inspecting and cleaning the RF connectors and all accessories before use. Clean the instrument with a soft, lint-free cloth dampened with water or water and a mild cleaning solution.

Caution	To avoid damaging the display or case, do not use solvents or abrasive cleaners.

Ventilation and Cooling

The Field Master provides active cooling of the internal components to prevent damage from overheating. The airflow vent on the bottom right of the instrument must be kept clear and unobstructed while the instrument is powered on.

Caution	Do not operate or store the Field Master in extreme environments. Refer to the instrument Technical Data Sheet for the specified operating and storage conditions.

Connector Care

Clean the RF connector and center pins with a cotton swab dampened with denatured alcohol. Visually inspect the connectors. The fingers of the N(f) connectors and the pins of the N(m) connectors should be unbroken and uniform in appearance. If you are unsure whether the connectors are undamaged, gauge the connectors to confirm that the dimensions are correct. Visually inspect the test port cable(s). The test port cable should be uniform in appearance and not stretched, kinked, dented, or broken.

To prevent damage to your instrument, do not use pliers or a plain wrench to tighten the Type-N connectors. The recommended torque is 12 lbf ·in to 15 lbf ·in (1.36 N ·m to 1.70 N ·m). Inadequate torque settings can affect measurement accuracy. Over-tightening connectors can damage the cable, the connector, the instrument, or all of these items.

Visually inspect connectors for general wear, cleanliness, and for damage such as bent pins or connector rings. Repair or replace damaged connectors immediately. Dirty connectors can limit the accuracy of your measurements. Damaged connectors can harm the instrument. Connection of cables carrying an electrostatic potential, excess power, or excess voltage can damage the connector, the instrument, or both.

Connecting Procedure

1.   Carefully align the connectors. The male connector center pin must slip concentrically into the contact fingers of the female connector.

2.   Align and push connectors straight together. Do not twist or screw them together. A slight resistance can usually be felt as the center conductors mate.

3.   To tighten, turn the connector nut, not the connector body. Major damage can occur to the center conductor and to the outer conductor if the connector body is twisted.

4.   If you use a torque wrench, initially tighten by hand so that approximately 1/8 turn or 45 degrees of rotation remains for the final tightening with the torque wrench.

     Relieve any side pressure on the connection (such as from long or heavy cables) in order to assure consistent torque. Use an open-end wrench to keep the connector body from turning while tightening with the torque wrench.

     Do not over-torque the connector.

Disconnecting Procedure

1. If a wrench is needed, use an open-end wrench to keep the connector body from turning while loosening with a second wrench.

2. Complete the disconnection by hand, turning only the connector nut.

3. Pull the connectors straight apart without twisting or bending.

ESD Caution

The Field Master, like other high performance instruments, is susceptible to electrostatic discharge (ESD) damage. Coaxial cables and antennas often build up a static charge, which (if allowed to discharge by connecting directly to the instrument without discharging the static charge) may damage the Field Master input circuitry. Instrument operators must be aware of the potential for ESD damage and take all necessary precautions.

Operators should exercise practices outlined within industry standards such as JEDEC-625 (EIA-625), MIL-HDBK-263, and MIL-STD-1686, which pertain to ESD and ESDS devices, equipment, and practices. Because these apply to the Field Master, it is recommended that any static charges that may be present be dissipated before connecting coaxial cables or antennas to the instrument. This may be as simple as temporarily attaching a short or load device to the cable or antenna prior to attaching to the Field Master. It is important to remember that the operator may also carry a static charge that can cause damage. Following the practices outlined in the above standards will ensure a safe environment for both personnel and equipment.

1-4   Calibration and Verification

The Field Master 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 — Instrument Overview

2-1   Introduction

This chapter provides an overview of the Anritsu MS20x0A Field Master. It describes the instrument hardware features, touch screen display, general system settings, GUI overview and instrument configurations, and the connector panels.

2-2   Instrument Front Panel

The Field Master uses an LCD touch screen for data input. The menus can vary depending on the current measurement configuration, installed options, and selected instrument function.

1. LCD Touch Screen Display
2. "Top Connector Panel" on page 2-2
3. Power Button
4. Speaker
5. Fan Ventilation Port
6. Battery Compartment Door (see "Replacing the Battery" on page 2-6)
7. Fan

Figure 2-1.   Front Panel Overview

2-3   Connector Panels

The MS20x0A Field Master uses the top connector panel to provide for all physical IO. The top panel uses a variety of connector types intended for their purpose.
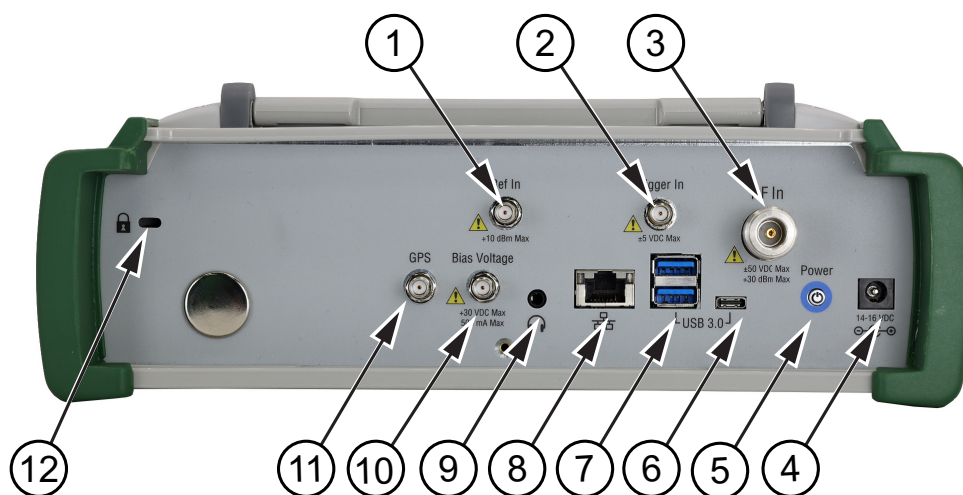
RF Connectors

The main RF input connector is Type N. It is a ruggedized 50 Ω female connector. Additional IO is provided with the SMA style connectors. The SMA connectors are also 50 Ω female.

Caution	To prevent damage to your instrument, do not use pliers or a plain wrench to tighten the connectors. Do not overtighten the connector. The recommended torque for Type K and V is 8 lbf·in (0.9 N·m or 90 N·cm). The recommended torque for Type N is 12 lbf·in (1.35 N·m or 135 N·cm).

Top Connector Panel

Figure 2-2 shows the top connector panel on the MS20x0A. Field Master.

Figure 2-2.   Top Connector Panel

1. Ref In: The external reference input port is a 50 Ω SMA connector that provides for input of an external frequency reference. Refer to your Technical Data Sheet for valid frequencies. The instrument automatically selects the frequency reference in the following order of priority: external, GPS, then the internal time base. To prevent damage to your instrument, do not use pliers or a wrench to tighten the connector.

2.Trigger In: A TTL signal that is applied to the external trigger 50 Ω SMA input connector causes a single sweep to occur. In spectrum analysis, triggering is generally used in zero span, and triggering occurs on the rising edge of the signal. After the sweep is complete, the resultant trace is displayed until the next trigger signal arrives. To prevent damage to your instrument, do not use pliers or a wrench to tighten the connector.

3. RF In Port: This is a 50 Ω Type N female ruggedized connector.

Maximum Input: ±50 VDC, +30 dBm, +13 dBm with Preamp On

To prevent damage to your instrument, do not try to mate incorrect connector types or use pliers or a plain wrench to tighten the connector. Do not overtighten the connector. The recommended torque for Type N is 12 lbf·in (1.35 N·m or 135 N·cm).

4. External Power: This is a 2.5 mm by 5.5 mm barrel connector, 15 VDC, 5 A, center positive. The external power connector is used to power the unit and for battery charging.

Warning	When using the AC-DC Adapter, always use a three-wire power cable that is connected to a three-wire power line outlet. If power is supplied without grounding the equipment in this manner, the user is at risk of receiving a severe or fatal electric shock.

5. Power Button: The power LED/Button is used to turn on the instrument. See Section 2-6 "Turning On the MS20x0A Field Master".

6. USB Interface – Type C: The USB Type-C port is used to connect the Field Master directly to a PC and provides a remote SCPI programming interface via USBTMC (USB Test and Measurement Class). Refer to the MS20x0A programming manual for remote SCPI control setup and command.

7. USB Interface – Type A: The Field Master has two Type A and one Type C USB connectors that accept USB storage devices for saving measurements, setup data, and screen images. Two connectors are located on the top panel and one is located on the side panel. To ensure the device or its data does not become corrupted, Select the eject icon to eject (unmount) the USB device before it is unplugged from the USB port (see Section 2-8 "Selecting the Analyzer" on page 2-18).

8. LAN Connection: The RJ-45 connector is used to connect the Field Master to a local area network or directly to a PC with an Ethernet crossover cable. See "Ethernet Connection" on page 2-29 for more details.

9. Headset Jack: The 3-wire headset jack provides audio output from the built-in sounds generated by the instrument. The jack accepts a 3.5 mm 3-wire miniature phone plug such as those commonly used with cellular telephones.

10. Bias Voltage: The bias voltage output port is a 50 Ω SMA connector. The power supply is set up to provide 1 V to 30 V with a resolution of 0.1 V. The maximum current is 500mA, but with at total maximum power of 15 W. To prevent damage to your instrument, do not use pliers or a wrench to tighten the connector.

11. GPS Antenna Connector: The GPS antenna connection on the Field Master is type SMA female. This connector also provides 5.0/3.3 VDC for an active GPS antenna. To prevent damage to your instrument, do not use pliers or a wrench to tighten the connector.

12. Kensington® Lock (K-slot): Provides a slot that accepts Kensington style cable locks.

2-4   Tilt Bail Stand

The attached tilt bail can be used for desktop operation. The tilt bail provides a backward tilt for improved stability and air flow. To deploy the tilt bail, pull the bottom of the tilt bail away from the back of the instrument. To store the tilt bail, push the bottom of the bail towards the back of the instrument and snap the bail into the clips on the back of the instrument.

Figure 2-3.   Tilt Bail Stand

2-5   Battery Information

The batteries that are supplied with the Field Master may need charging before use. They can be charged using either the provided AC-DC adapter or the automotive DC adapter. The batteries can be charged in the instrument or removed for charging using an optional battery charger (refer to the product technical data sheet for ordering information). The batteries are installed at the factory and can be replaced by the user. Refer to the next section for information on removing the batteries. Battery information and status is shown in "Battery Information" on page 2-45.

Caution	Use only Anritsu-approved batteries, adapters, and chargers with this instrument.
	When using the automotive cigarette lighter adapter, always verify that the supply is rated for a minimum of 75 watts @ 15 VDC, and that the socket is clear of any dirt or debris.
	If the adapter plug becomes hot to the touch during operation, discontinue use immediately.
	Anritsu Company recommends removing the battery for long-term storage of the instrument.

Note	The batteries will charge at a faster rate when the instrument is turned off.
	To prolong the useful battery life, the internal charging circuit monitors the battery temperature. Normal charging occurs when the battery temperature is between 0 °C and 45 °C. Charging is paused if the internal battery temperature is outside this range.
	In order to maintain the battery capacity and to keep the remaining capacity indicator (found in the "Battery Information" dialog) as accurate as possible, it's recommended to run the through a recalibration cycle on the external battery charger every three months. Refer to the product technical data sheet for ordering information.

Replacing the Battery

The battery can be replaced without the use of tools. The battery compartment door is located on the lower left side of the instrument (when you are facing the measurement display). To remove the battery:

1. Push in and slide the battery door tab to the left to remove the battery access door.

2. Pull straight out on the lanyard to remove the battery pack from the instrument.

3. After inserting the new battery pack, press the battery door to secure it.

Note	When inserting the battery, the battery contacts should face up and slide in first. If the battery door does not close tightly, the battery may be inserted incorrectly.

Figure 2-4.   Battery Removal

2-6   Turning On the MS20x0A Field Master

The Anritsu MS20x0A Field Master is capable of approximately three hours of continuous operation from a fully charged, field-replaceable battery (refer to "Battery Information" on page 2-5). The instrument can also be operated from a 15 VDC source (which will simultaneously charge the battery). This can be achieved with either the Anritsu AC-DC adapter or the automotive power adapter, which can be purchased as an optional accessory. Refer to the instrument Technical Data Sheet for more options and accessories. The instrument can also be charged for up to six hours using an Extended Power Pack that is sold separately.

Caution	When using the Automotive Power Adapter, always verify that the supply is rated for a minimum of 75 watts @ 15 VDC, and that the socket is clear of any dirt or debris. If the adapter plug becomes hot to the touch during operation, discontinue use immediately.

To turn on the Field Master, briefly press the power button on the top right of the top connector panel (see Figure 2-2 on page 2-2).

The Field Master takes approximately 80 seconds to complete power-up and to load the instrument software. At the completion of this process, the instrument is ready for use.

Note	Keep the fan inlet and exhaust ports clear of obstructions at all times for proper ventilation and cooling of the instrument.

Power/Charge LED Indicators

The power/charge LED is integrated with the power button. The LED has the following indicators:

- Solid purple when the instrument is on or booting up.
- Solid red when the instrument is off and connected to an external power source.

Shutting Down and Restarting

To shut down or restart the instrument, briefly press the power button (a shutdown dialog will be displayed), then select RESTART INSTRUMENT or POWER OFF. The current setup is saved when the instrument is shut down or is restarted. Once the instrument shuts down, it will either power off completely (if running on batteries) or it will go into a low power state (if running on external power).

2-7 GUI Overview

The MS20x0A Field Master software controls all instrument functions. The software runs locally on the instrument and primary operation is through the touch screen display. The figure below identifies the main display areas, which are each described in more detail later in this chapter.
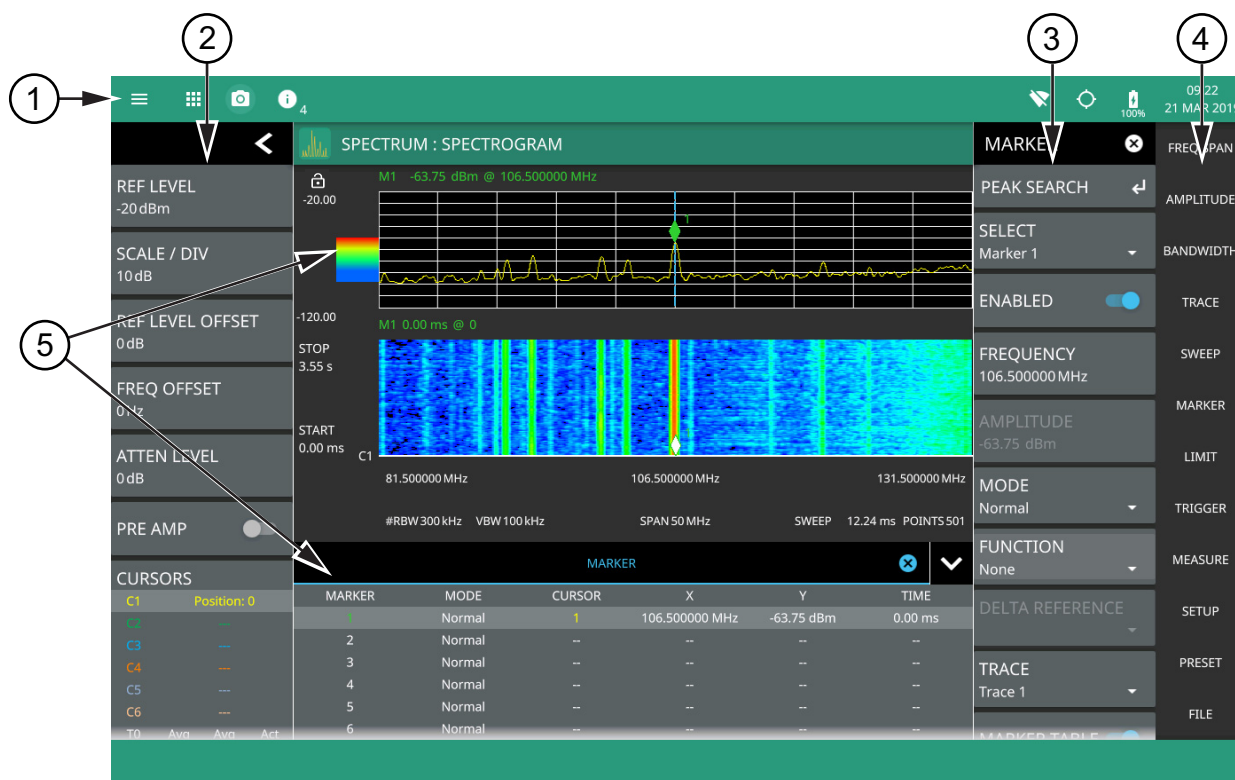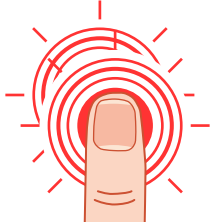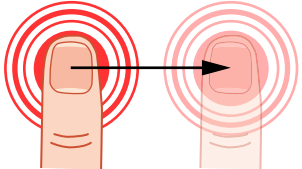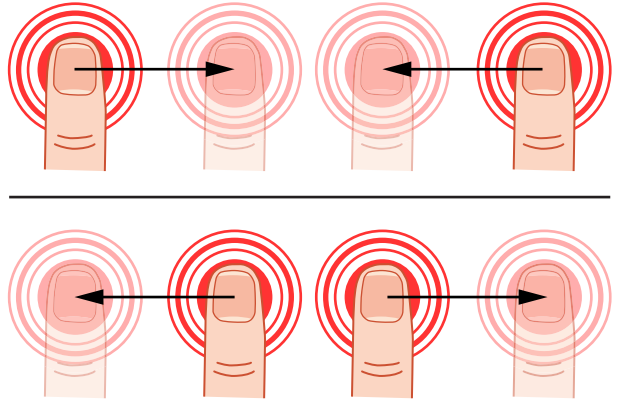

1. The title bar provides quick access to system settings, measurement mode selection, informational dialogs, and screen capture.

2. The status and trace panel is used to show common settings and controls, and to provide trace and cursor information. The information displayed on this panel depends on the current measurement and view settings. Refer to the appropriate chapter in this guide for information about this panel.

3. Menus are used to configure measurement settings such as frequency, amplitude, and bandwidth, and to enable measurement modes and views such as Spectrogram view, OBW, ACP, and SEM measurements.

4. The main menu provides access to setting menus and other instrument controls.

5. The upper area typically displays graphical data such as spectrum trace and spectrogram plots. The lower area typically displays tabular measurement data such as marker data, demodulation results, or other measurement data depending on the selected measurement.

Figure 2-5. GUI Overview (sample display elements)

Operating the Touch Screen

Field Master uses common touch gestures to achieve a variety of operations. These include interactions on hot areas by pressing, double pressing (or tapping), dragging, and pinching.

	Single Press: Most controls require a single press or tap. Touch the screen briefly and then release.
	Double Press: Some controls require a double press or tap. This action is similar to a double mouse click. If a second press is not detected in a certain time period, the action is dismissed or considered a single press.
	Press and Drag: Some items can be dragged to a new location. This action is accomplished by pressing and holding the item lightly while dragging it to a new location, then releasing. You can drag items such as markers, limit line nodes, and the center frequency by dragging the trace to the left or right.
	Pinch: Some items can be reduced or expanded. This action is accomplished by simultaneously pressing the item with two fingers and holding the item lightly when dragging the fingers in closer together or out farther apart, and then releasing. You can pinch items in or out, such as the frequency span by touching and holding the trace in two positions, and then dragging your fingers closer together to narrow the span or dragging your fingers farther apart to widen the span.

Figure 2-6. Touch Screen Gestures

Title Bar

The title bar is located at the top of the interface screen. It displays icons that provide access to information and user actions as described below. All of the icons are active and will open the appropriate menu or item when touched.
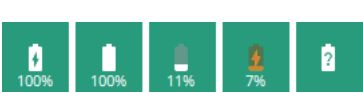
1. Select the 3-line icon to display the System Menu. The instrument model with frequency option and its serial number are also displayed.

2. The 9-dots icon is used for Selecting the Analyzer.

3. Select the camera icon to capture a screen shot of the current display. The image file is saved in PNG format with the following naming scheme: screenshot_yymmdd_hhmmss.png (year, month, day, hour, minute, second). Using the Screenshot Setup, you can set the screen capture region, color theme, annotations, and destination directory.

4. Notifications are generated when an error is detected or an activity such as a screen shot has taken place. The number of unread notifications appears next to the icon. Select the icon to display the Notifications list.

5. Displayed when a USB device is attached. To ensure the device or its data does not become corrupted, select this icon to eject (unmount) the USB device before it is unplugged from the USB port. A similar icon can be accessed via Section 2-11 "File Management" on page 2-42.

6. Displayed when a USB device contains an installable software package or one is found from an Internet resource. Selecting the icon launches the "Software Update" on page B-2.

7. Select the wireless networking icon to display the WIFI Settings.

8. Select the battery icon to open the Battery Information and view battery charge state and capacity.

9. Select the GNSS (GPS) icon to view the GNSS(GPS) Settings (Option 31). If toggled on, the GPS coordinates will also display here.

10. The right side of the instrument title bar displays the system date and time. Selecting this field opens the "Date Time Settings".

Figure 2-7.   Title Bar

Common GUI Controls

In addition to the touch gestures described in the previous section, the following lists the most common controls that you will encounter when working with the Field Master.

	☰	The 3-line icon provides quick access to system information, settings, file management, and built-in diagnostic tools. Refer to Section 2-9 "System Menu" on page 2-19.
	⚏	The 9-dot icon provides access for selecting the analyzers. Refer to Section 2-8 "Selecting the Analyzer" on page 2-18.
	📷	The camera icon will capture a screen image and save it to a file. Refer to "Screenshot Setup" on page 2-34.
	🛈 9+	The notification icon provides access to informational and error messages. If displayed, the number indicates the number of notifications. Refer to "Notifications" on page 2-20 and Appendix A, "Instrument Messages and Troubleshooting".
	⏏ 2	The USB eject icon is displayed when the instrument detects one or more USB devices. Selecting this icon ejects the USB device, or presents a dialog to select which USB device to eject when more than one device is detected.
	⬇	The software update icon is displayed when the instrument detects a valid software package. Selecting this icon opens an updated dialog to select the software to install. Refer to Section B-4 "Software Update" on page B-2.
	🖵	The local host icon is displayed only on the MS20x0A PC application when connected to the local host instead of an instrument. The icon is not functional. Refer to "Connector Panels" on page 2-2.
	▽ ▼ ▼ 🔒	The wireless networking icon shows connection status (no connection, weak connection, strong connection, connected to access point) and relative signal strength. Selecting this icon opens the Wi-Fi settings menu. Refer to "WIFI Settings" on page 2-31.
	⊘ ○ ◎ ◉	The GNSS (GPS) icon shows connection status (no connection, no fix, good fix, using last good fix). Selecting the icon opens the GNSS (GPS) settings menu. Refer to "GNSS(GPS) Settings (Option 31)" on page 2-32 for detailed information.
	🔋100% 🔋100% 🔋11% 🔋7% 🔋?	The battery icon shows the current battery charge state and indicates that the battery is charging with a lightning bolt. A question mark (?) indicates that the battery is not installed or has a malfunction. Selecting the icon opens the battery information dialog. Refer to "Battery Information" on page 2-45.
	⊗	The close icon is used to close menus and other dialogs.
	‹	The chevron will expand and collapse the status and table displays. A similar chevron on the virtual keyboard may be for capital letters or to scroll through key sets.
	⬤▬	Toggle icon will enable and disable the feature. When highlighted in blue, the item is enabled.
	▼	The drop-down icon exposes a list of items from which to choose.
	↻	The refresh icon will restart a process, such as a sweep or averaging count.
	✎	The edit icon allows editing of a feature or label.
	↵	The enter icon accepts an entry. A similar icon is found on menu buttons to indicate an additional menu.

Figure 2-8. Common GUI Controls

🔒 🔓	Select the padlock icon next to center frequency on the graticule to change the frequency by dragging, when using a touch-screen enabled PC. Select the padlock icon next to SPAN to change the span by pinching, when using a touch-screen enabled PC. You can toggle on DRAG and PINCH options by selecting GESTURES in Frequency menu. Refer to GESTURES menu in the Field Master Series spectrum analyzer measurement guide (10580-00447).
	Reference Level padlock icon by default, locks the reference level that is accidentally prone to swiping when using a touch-screen enabled PC.
＋	Shortcut icon used to create a shortcut of a desired application from current settings or an existing setup file.

Figure 2-8.   Common GUI Controls

Data Entry
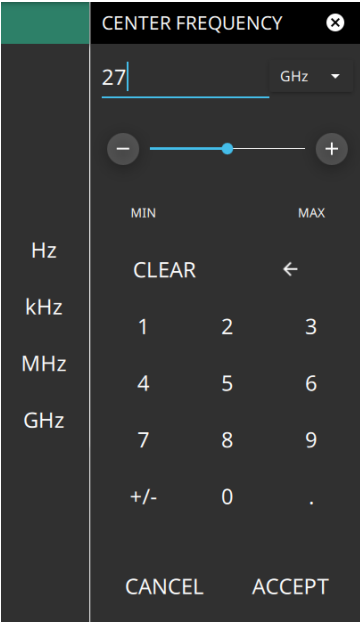
User input can be in the form of numeric values for instrument or measurement settings, selected values from a preset list, or alphanumeric text when entering file names, for example. To view or change a parameter value, access the appropriate menu or control, then enter data using the data entry control or attached physical keyboard. Some items can be accessed directly on the annotated display by touching their value.

Invalid Entries

When setting parameters or entering other types of data, if an entry is out of range or is otherwise invalid, Field Master will shade the background display and may provide a message indicating a valid range. In this case, clear or cancel the entry and enter a valid value or change the units by using either the drop-down selection next to the data entry window, or with the unit terminators to the left of the keypad.

Numeric Values

To modify a numeric parameter setting that is displayed on a menu or annotated field, press the item to make it active and to display the numeric keypad data entry control. Use the touch screen to enter or change the value.

The keypad typically provides controls to:

- Enter new values directly, such as frequency entries in Hz, kHz, MHz, or GHz. There are two places on the keypad to enter unit terminators when applicable, on left side pop-out that occurs as frequency keypad entries are selected, or on the top right corner drop-down of the entry field.

- Drag a parameter value within its settable range using a sliding control.

- Increment the parameter value up or down. At each end of the slider are plus (+) and minus (−) controls that increment the parameter value. Most parameters have a fixed increment, such as bandwidth that follows a 1:3:10 sequence and span that follows a 1:2:5:10 sequence. In the case of frequency, you can set a custom frequency step increment value. Once the entry is complete, press the desired unit or press ACCEPT to complete the entry.

- Set the parameter to the maximum or minimum possible value.

- CLEAR the entire entry.

- Left arrow to backspace and delete the entry

- CANCEL to terminate any entries made for that particular setting. Note that pressing the "X" to close the keypad is the same as pressing cancel. Selecting CANCEL will restore settings back to the state they were in before the keypad opened, even if changes from the +/- controls are already reflected in the data display.

- ACCEPT to operate with the settings displayed on the keypad.

Figure 2-9.   Touchscreen Keypad

A physical keyboard connected via USB can also be used to enter values in a similar manner and the keyboard ENTER key used to accept the new value.

Selection Lists

Some parameters and instrument functions are selectable from a list. These list boxes display the available selections and value limits as applicable. Use the touch screen to scroll through the list and select the desired entry.
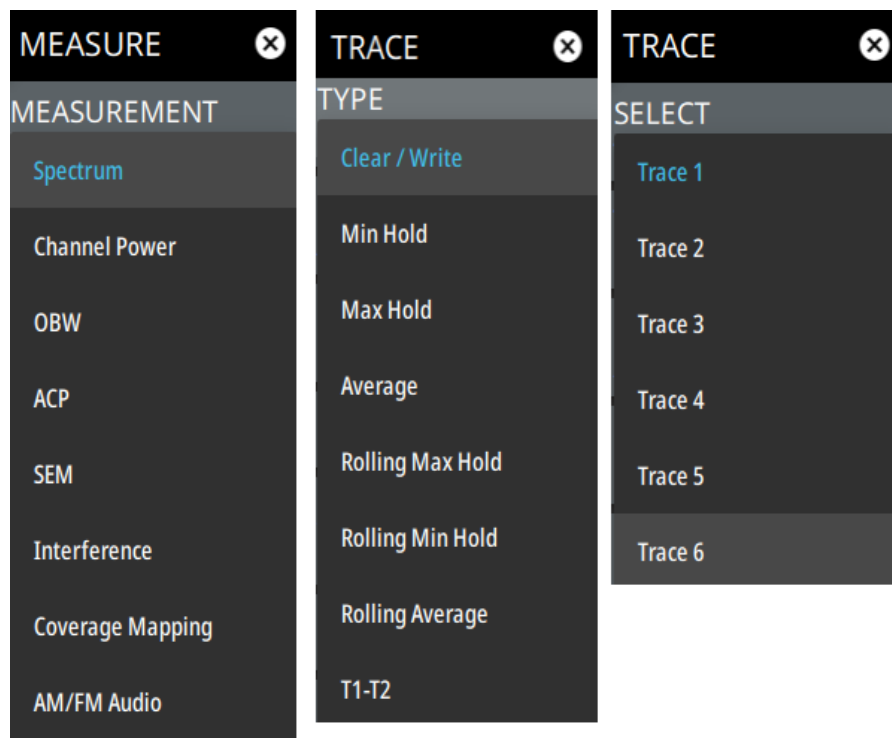
Figure 2-10. Selection Lists

To cancel the selection, touch somewhere else on the display or close the menu.

Scroll Indication

In some cases, menus, status panels, or other lists contain more information than can be displayed in the available area. In these cases, the top or bottom of the panel will have a fade-to-white appearance as shown below. You can scroll the control to move it up or down and expose the hidden information.
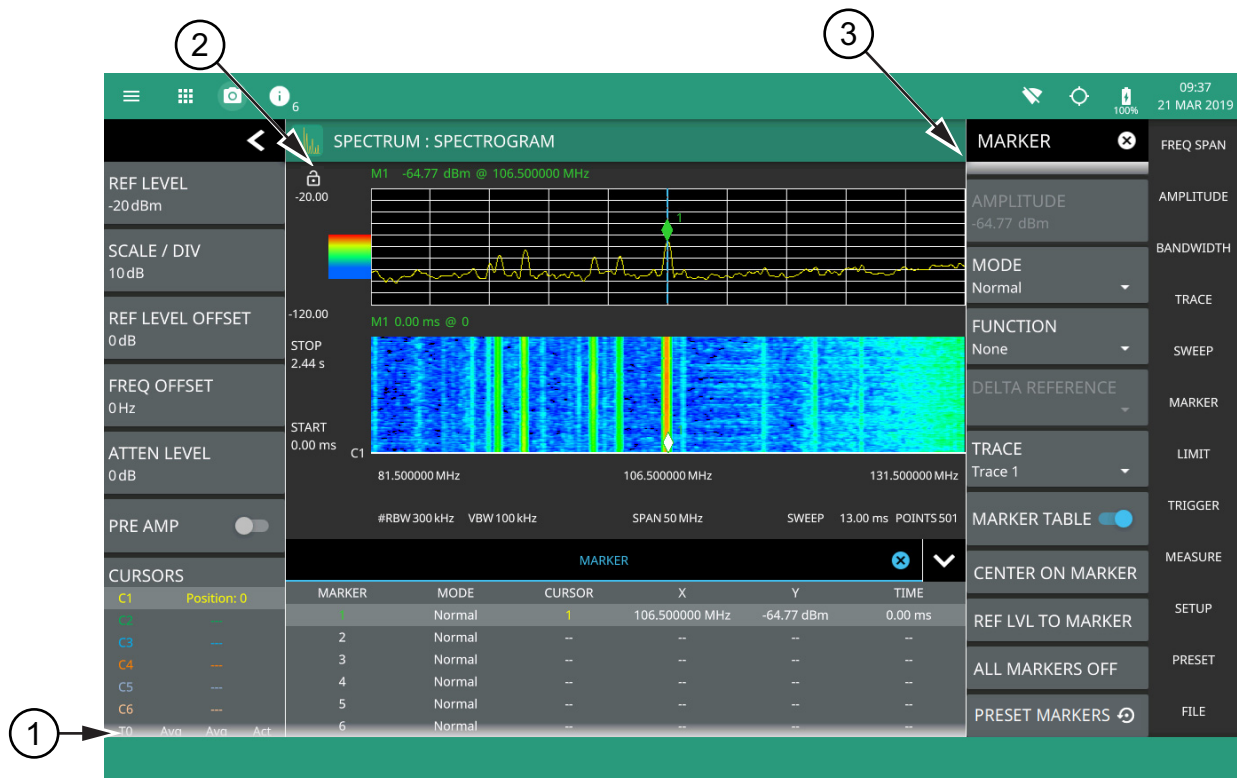
1. The fade-to-white at the bottom of the status panel and marker table here indicates that there is more information below the display area. The panel can be scrolled by dragging it upward to expose more information.

2. Reference Level Dragging lock icon is used to lock the reference level, so that any accident modification of the setup parameters can be avoided.

3. The fade-to-white at the top of the menu here indicates that there is more information above the display area. The menu can be scrolled by dragging it downward to expose the information.

Figure 2-11. Scroll Indication

Note	If the display is set to another color theme, the fade effect remains the same but the color may fade to a dark shade.

Text Entry and EZ Keyboard

When an instrument function requires you to enter text, such as entering an Ethernet hostname or IP address, a touch screen alphabetic keyboard is displayed. See Figure 2-12. Select the "?123" key to switch to the digits and symbols keyboard. Use the left arrow key (backspace) to delete the character to the left of the insertion point. The insertion point can be moved to a touched position in the data entry field. You can enable caps lock by double tapping the shift key.
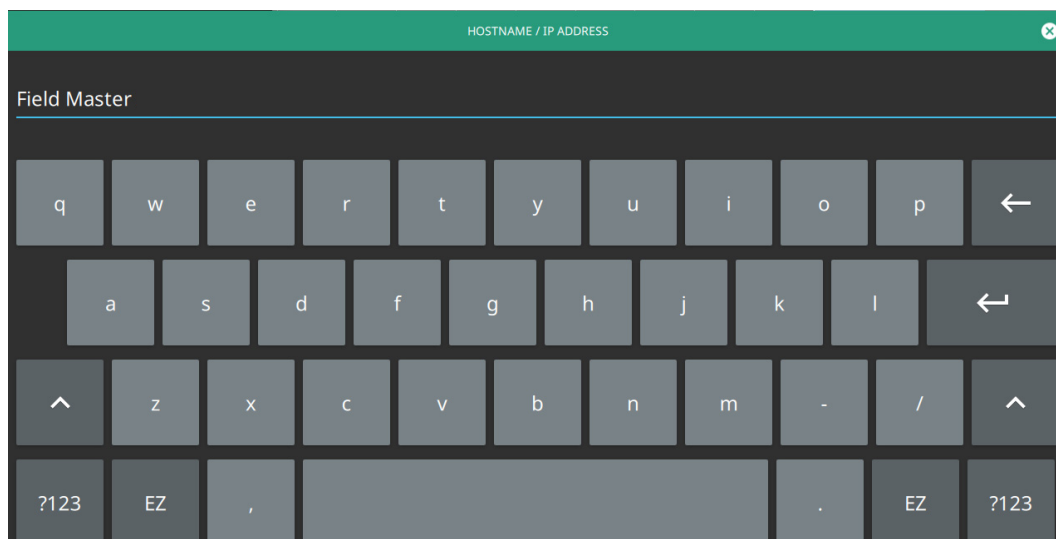
Figure 2-12.   Touch Screen Keyboard

The EZ key switches to a configurable EZ keyboard, illustrated below.
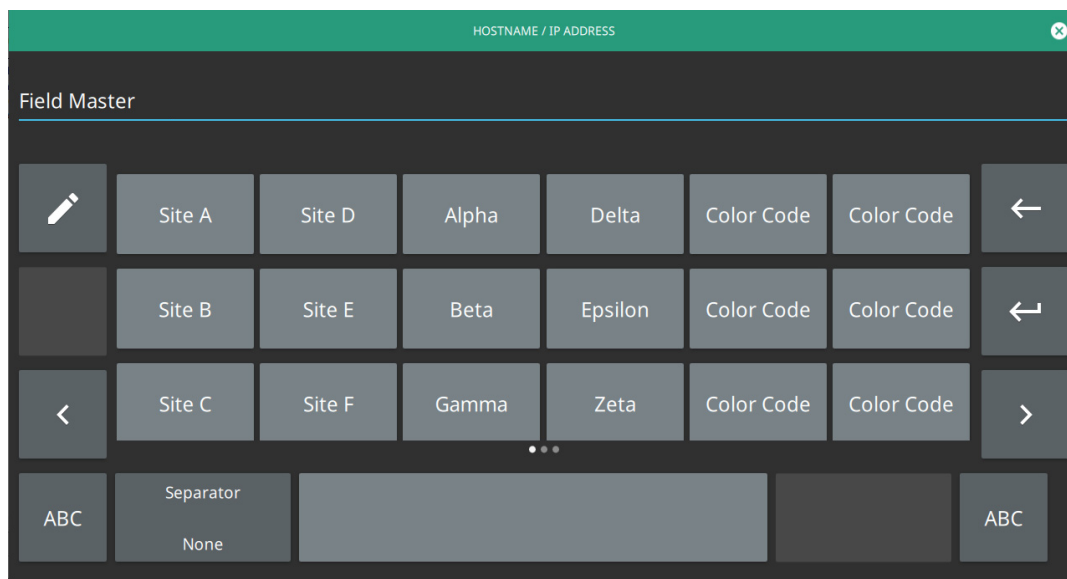
Figure 2-13.   Touch Screen EZ Keyboard

Use the EZ keyboard to enter frequently used text strings with a single screen tap. The EZ keyboard is initially populated with default values. Each key enters the entire string as shown on the key. For convenience, you can set an automatic Separator character to be placed between each EZ key string.

To change a key's value:

1.   Select the pencil (edit) key. The EZ keys will become highlighted.
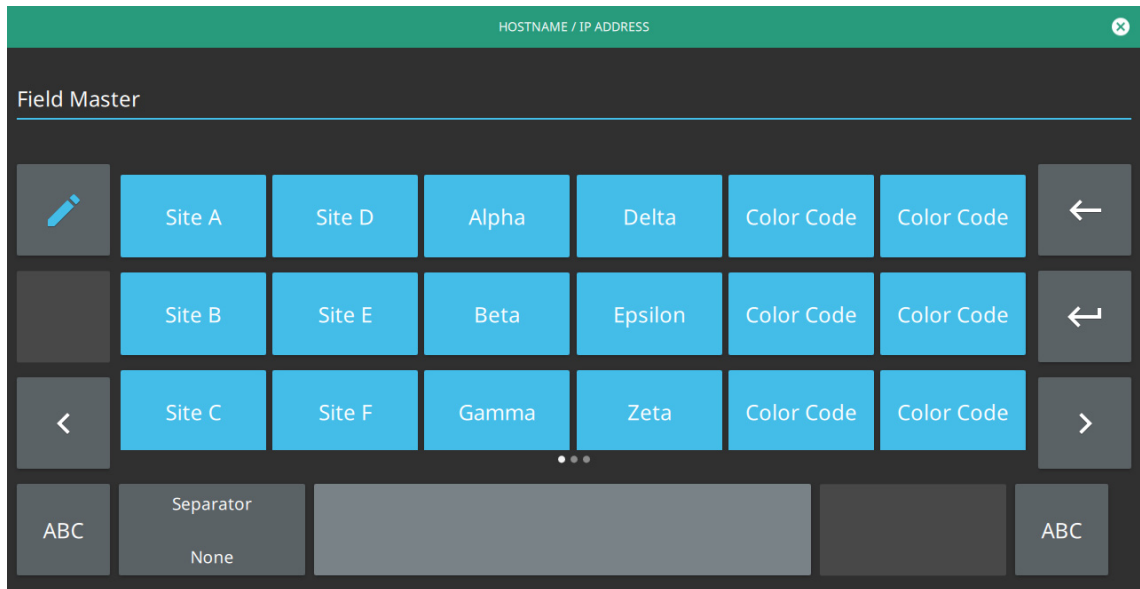
Figure 2-14. Touch Screen EZ Keyboard

2.   Select the key to be edited. This will display the standard keyboard for entering a new EZ key value.
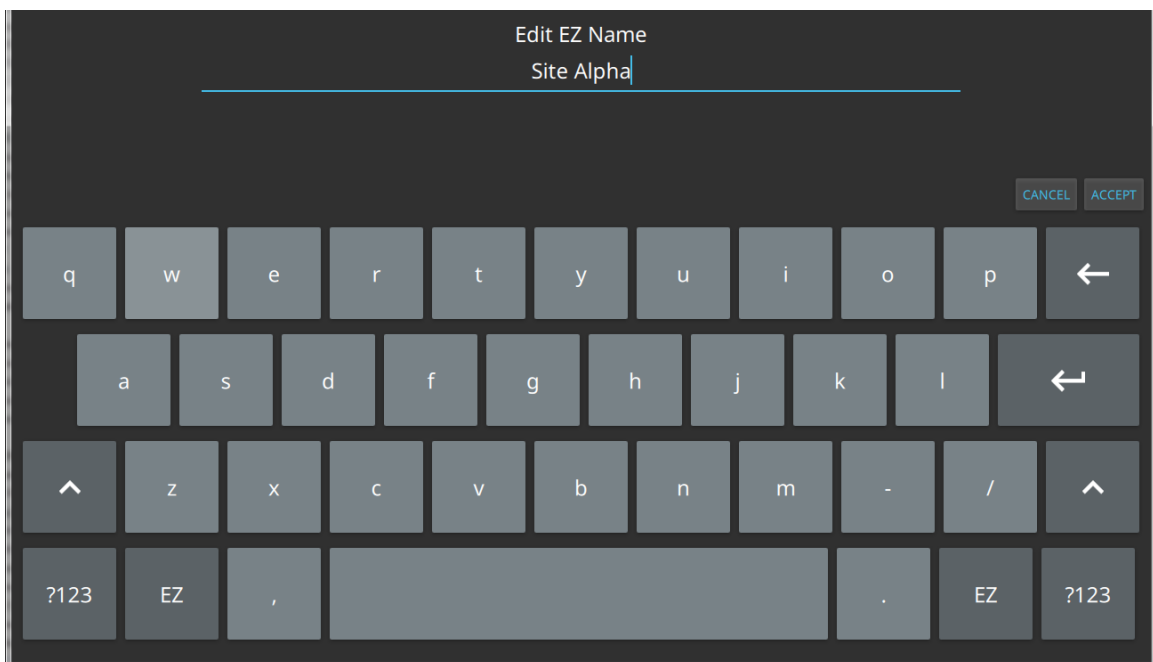
Figure 2-15. Touch Screen EZ Keyboard

3.   Enter the new value, then press ACCEPT to assign the new value to the EZ key, or press CANCEL.

2-8   Selecting the Analyzer
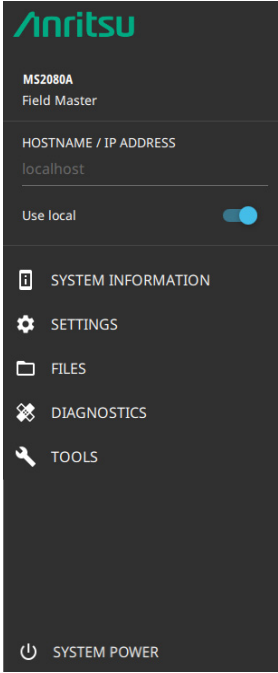
The instrument analyzers are selected from the 9-dot icon. To select an analyzer, press the 9-dot icon in the title bar to display the available analyzers, illustrated in Figure 2-16. Simply touch the desired icon to load the new analyzer. The analyzers available for selection depend on the options that are installed and activated on your instrument. Some measurements and views are accessed via other measurement setup menus.
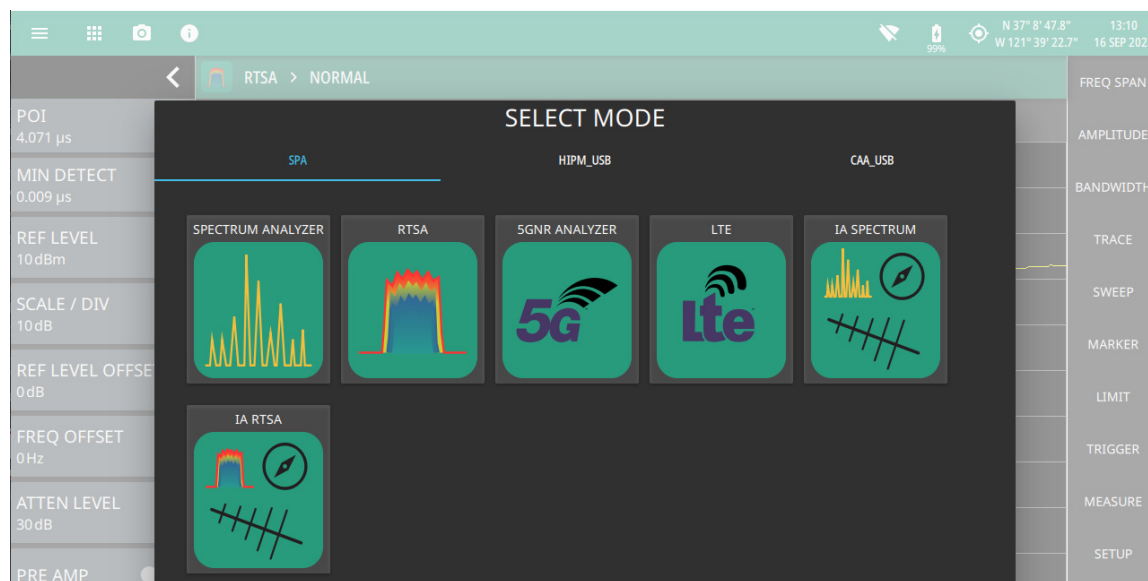
Figure 2-16.   Example Analyzers

For detailed information on the selected application's user interface and setup functions, refer to the relevant measurement guide. See Chapter 1, "Additional Documentation" to find the list of the measurement guides.

2-9 System Menu

The System menu identifies the instrument model and serial number.

HOSTNAME/IP ADDRESS: Displayed only on the MS20x0A PC application. This field is used to specify the IP address or hostname of an instrument that is connected to the network. When **Use local** (localhost) is toggled on, the software will connect locally to provide some UI functionality. Refer to Appendix C, "PC Software" for details.

SYSTEM INFORMATION: Opens the System Information panel showing instrument, software, and network connection details.

SETTINGS: Opens the "Settings Menu" on page 2-21, providing access to all system level settings and controls.

FILES: Opens "File Management" on page 2-42. Note that the file management menus are different from the right-side FILE menu. Use file management to organize, copy, and rename files. Use the right side FILE menu to save and recall measurement data, instrument setup files, or to save a screenshot.

DIAGNOSTICS: Opens "Diagnostics" on page 2-45.

TOOLS: Opens "Tools Menu" on page 2-47.

SYSTEM POWER: Opens a dialog to RESTART or POWER OFF the instrument.

Figure 2-17. System Menu

System Information

The System Information panel shows all information about the instrument hardware, software, and connectivity. From here, you can also toggle software update checking when connected to the Internet and start a software update when one is available. If web updates are toggled on, the instrument will automatically check for updates once every 24 hours or when the user presses the "CHECK FOR UPDATES" button. Select the 3-dot icon on the top right to export the system information to a text file or to view license information.
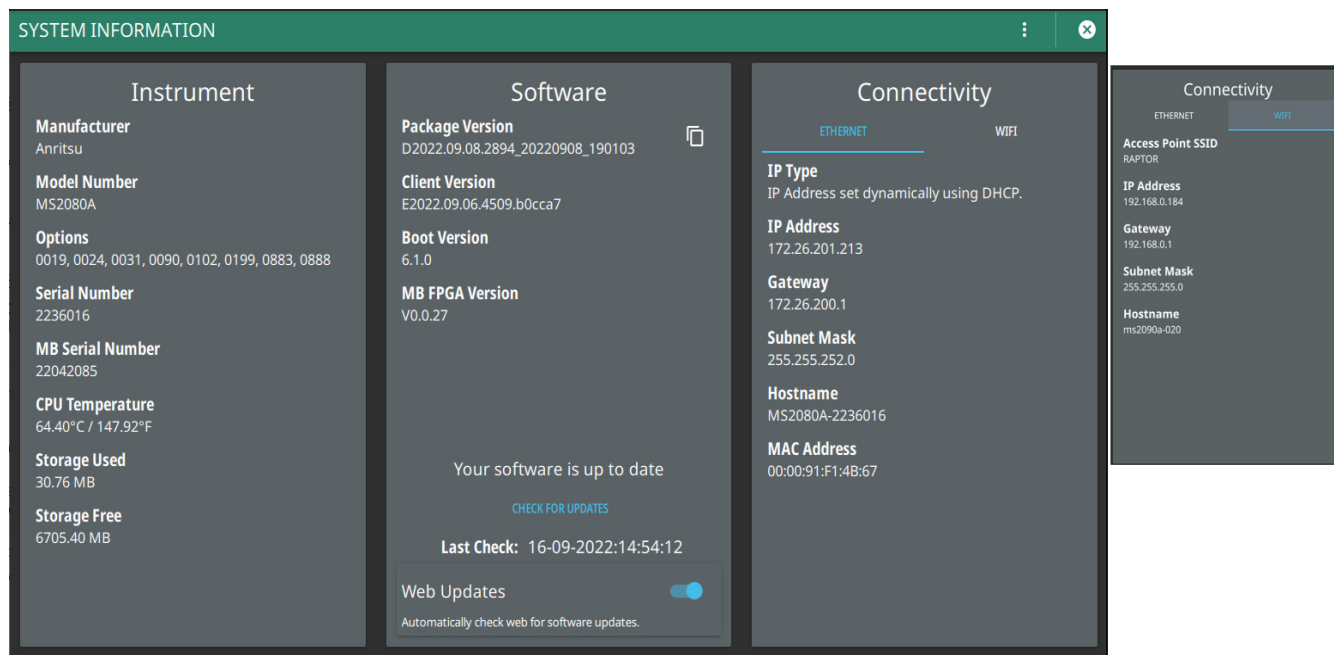
Figure 2-18.   System Information

Notifications

The notification area is where all dynamic notifications are presented. These notifications are generally information messages to the user and not hardware failure messages. Refer to "Self Test" on page 2-46 and Appendix A, "Instrument Messages and Troubleshooting" for more diagnostic information.
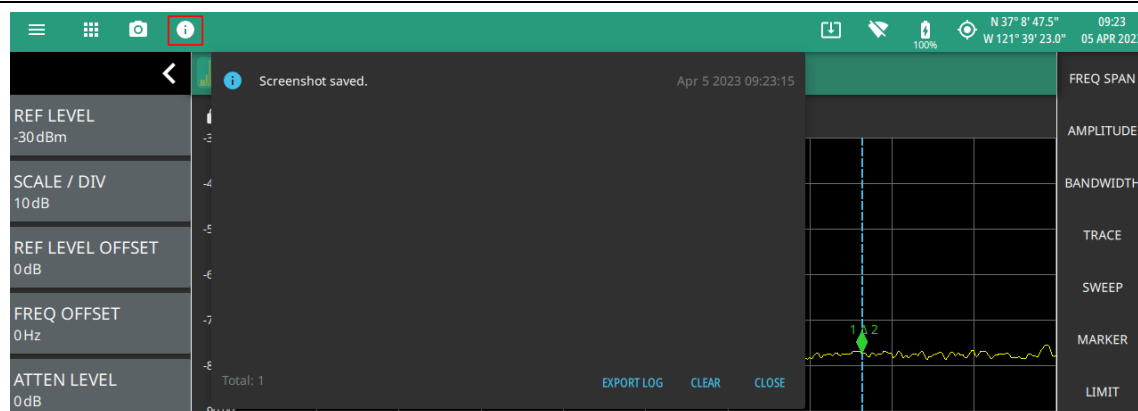
Figure 2-19.   Notifications Icon

2-10 Settings Menu

The system settings menu provides access to all instrument system-level settings such as network, GNSS (GPS), date and time, and display. The system settings menu provides access to all instrument system-level settings such as network, GPS/GNSS, date and time, and display.

DISPLAY	**DISPLAY:** Opens the "Display Settings".
SOUND	**SOUND:** Opens the Sound Settings.
ETHERNET	**ETHERNET:** Opens the Network Settings.
WIFI	**WIFI:** Opens the WIFI Settings.
GNSS (GPS)	**GNSS (GPS):** Opens the GNSS(GPS) Settings (Option 31).
SCREENSHOT	**SCREENSHOT:** Opens the Screenshot Setup.
LANGUAGE	**LANGUAGE:** Opens the "Language Settings".
DATE TIME	**DATE TIME:** Opens the "Date Time Settings".
PORT SETUP	**PORT SETUP:** Opens Port Setup.
OPTIONS	**OPTIONS:** Opens the Options Settings.
MAPS	**MAPS:** Opens the Maps Settings (Option 431).
ADVANCED	**ADVANCED:** Opens the Advanced Settings.
RESET	**RESET:** Opens the Reset Settings.

Figure 2-20. Settings Menu

Display Settings

The DISPLAY settings allow you to adjust the display brightness, choose the display color scheme and to view or hide shortcuts to the saved application settings.

Brightness

The BRIGHTNESS option consists of a slider to adjust the screen brightness, in addition to selecting the amount of idle time before the screen automatically dims to conserve battery life.

The DIM DISPLAY AFTER drop-down provides up to 15 minutes idle time settings. Or you can select NEVER option to keep the display illuminated for as long as the instrument remains powered on.

Note that DIM DISPLAY AFTER feature will only work if the instrument is running on the battery. This feature will not work if the unit is connected to the AC power supply.
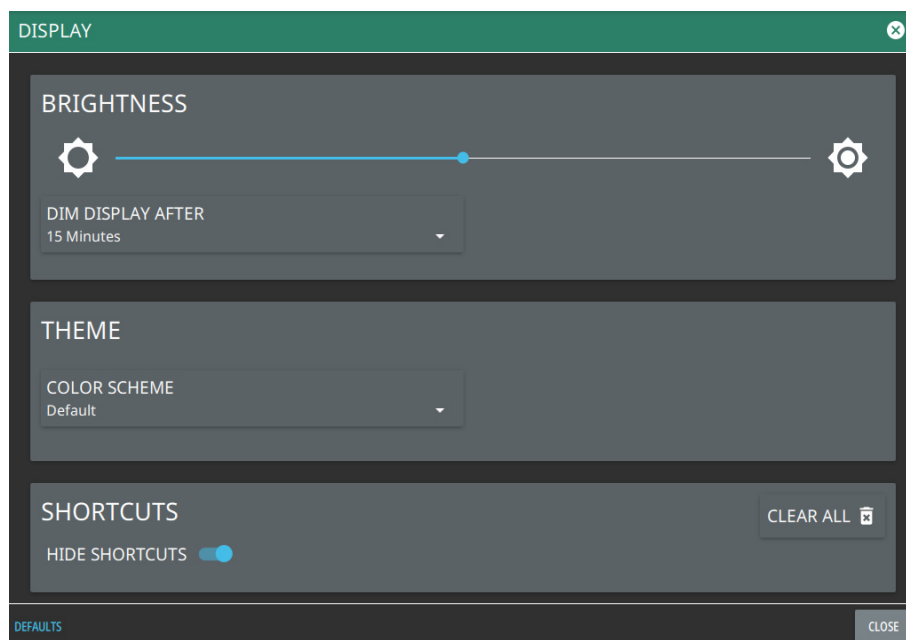
Figure 2-21. Display Settings

Theme

Under THEME option press COLOR SCHEME drop-down menu and select either Default, Light, Black on White or Night Vision to set the display color scheme of your choice. If the THEME is set to Light it may be more suitable for viewing in bright ambient conditions. But if the THEME is set to Night Vision it may be suitable for viewing in a poorly lit night time conditions.

Figure 2-22. Light Theme Display Settings
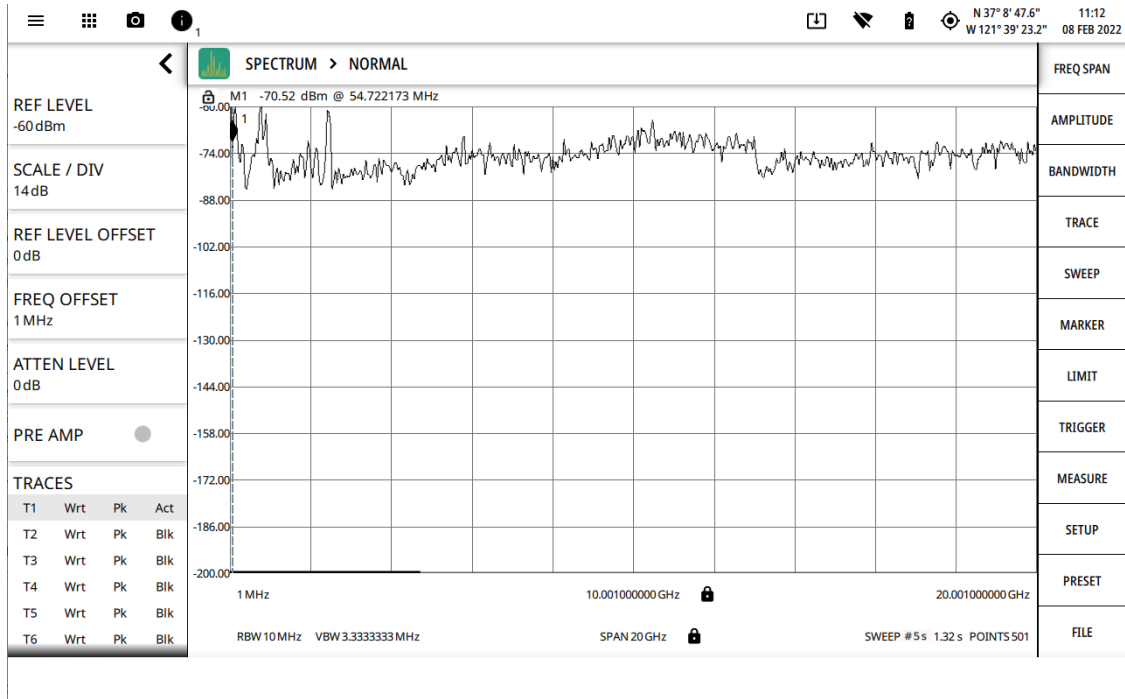
Figure 2-23.   Black on White Theme Display Setting
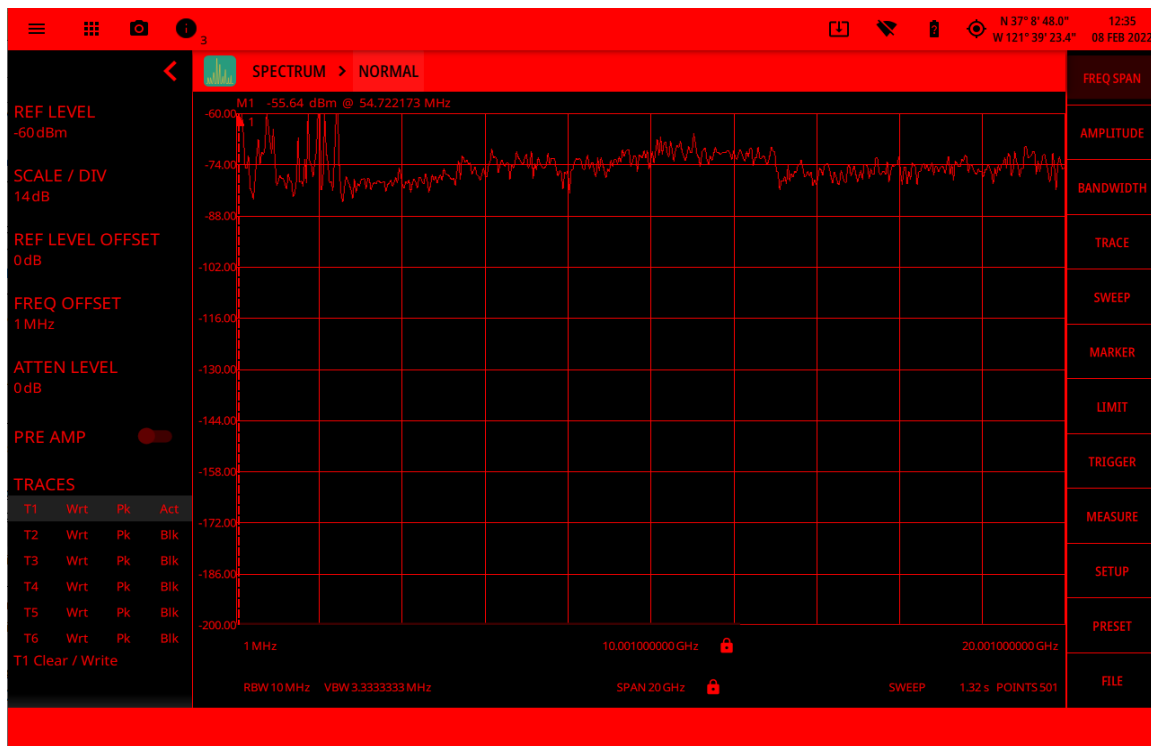
Figure 2-24.   Night Vision Theme Display Setting

Shortcuts

Under the SHORTCUTS option, toggle the HIDE SHORTCUTS button to view or hide the shortcuts.

Select + SHORTCUT button located at the bottom left of the display screen to create or save specific settings of an application.
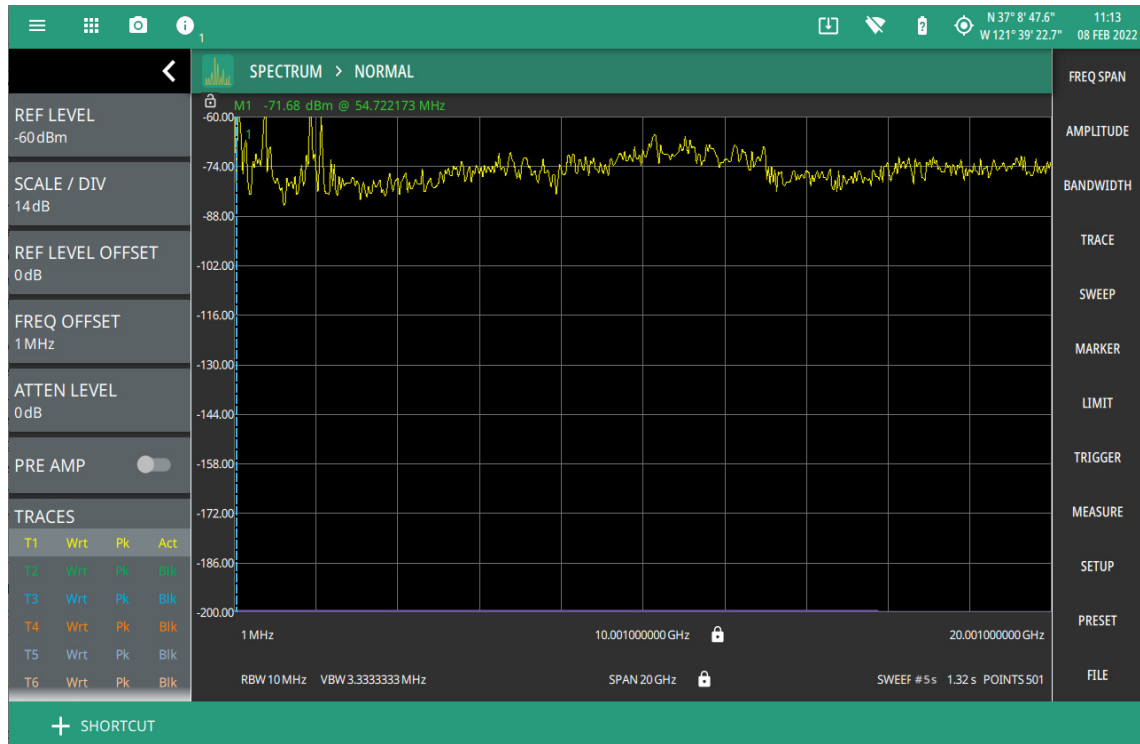
Figure 2-25. +Shortcut Button

Follow the steps below to create/load/rename a shortcut:

1.   Select +SHORTCUT button at the bottom left of the instrument display screen.
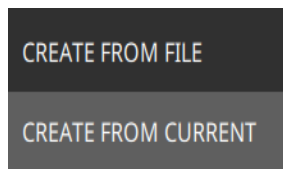
Figure 2-26. +Shortcut button

2.   Select CREATE FROM FILE option to create a new shortcut from an already saved setup file.

3.   Enter the shortcut name which is optional, and press CONTINUE.
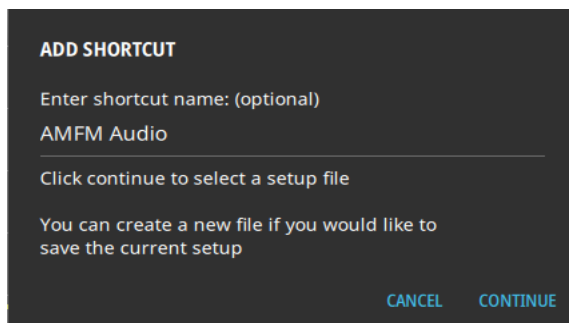
Figure 2-27. Add Shortcut Dialog (Create from File)

4.   Alternately, select CREATE FROM CURRENT option to create a shortcut of the current (trace) settings of the instrument.

5.   Enter the name of the shortcut and press CONTUNUE to save the shortcut.
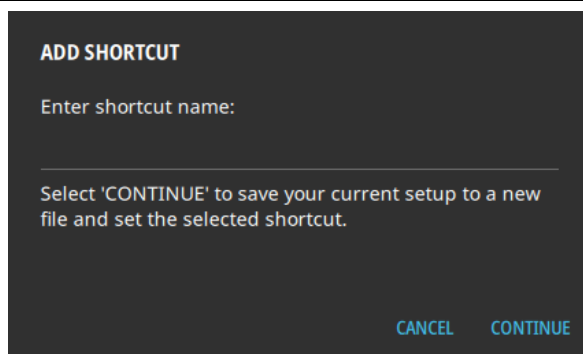
Figure 2-28. Add Shortcut Dialog (Create from current)

6. Select the newly created shortcut to recall the saved setup file.

To delete all the shortcuts, press SYSTEM MENU (3-line icon), go to SETTINGS menu, press DISPLAY settings and press CLEAR ALL button at the bottom right of the instrument's display.
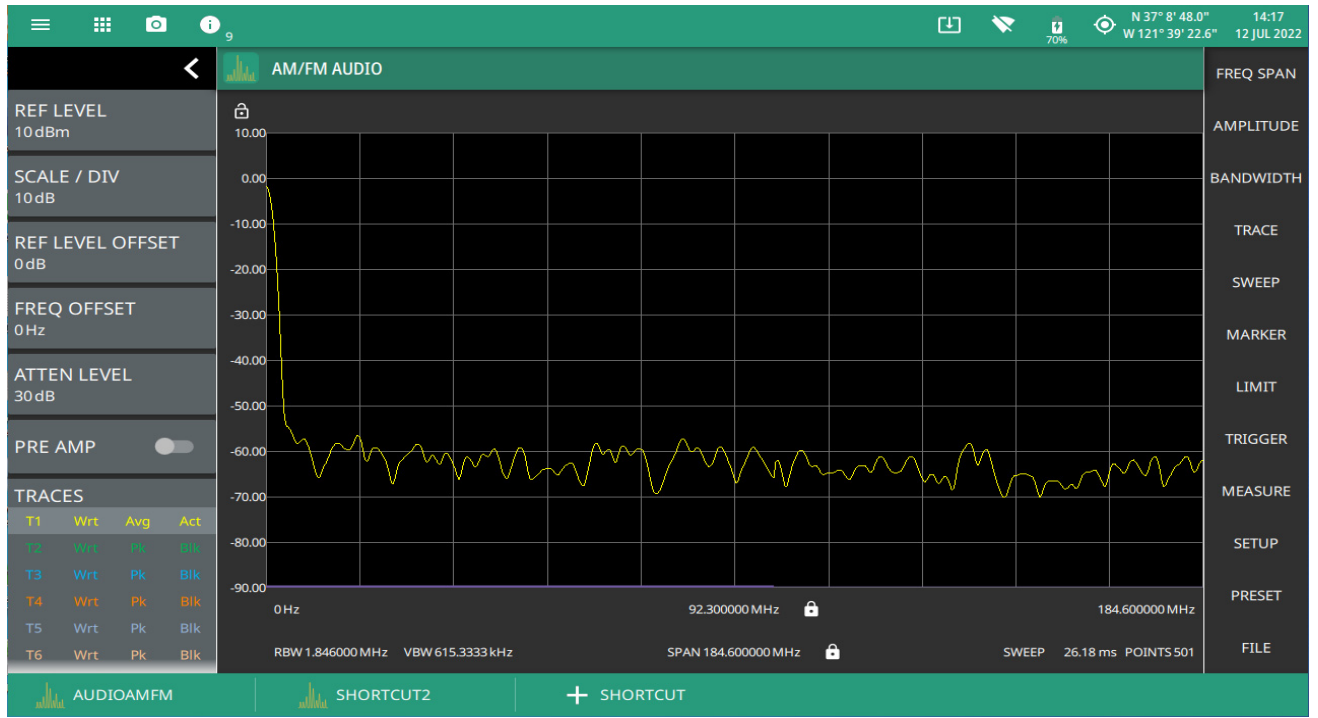
Figure 2-29. Recalled Setup File: Shortcut Button

Sound Settings

The SOUND settings allow you to adjust the SYSTEM VOLUME or MUTE ALL of the instrument sounds. The system volume may affect other volume settings found in various setup menus.

Figure 2-30. Sound Settings

Network Settings

The MS20x0A uses Ethernet or WLAN (Wi-Fi) to communicate remotely with a controller. Most instrument functions (except power on/off) can be controlled via a network connection to a PC connected directly (with an Ethernet cross-over cable or Wi-Fi peer-to-peer) or through a network. The instrument software supports the TCP/IP raw socket network protocol.

Ethernet networking uses a bus or star topology in which all of the interfacing devices are connected to a central cable called the bus, or are connected to a hub. Ethernet uses *Carrier Sense Multiple Access/Collision Detection* (CSMA/CD) access method to handle simultaneous transmissions over the bus. This standard enables network devices to detect simultaneous data channel usage, called a *collision*, and provides for a contention protocol. When a network device detects a collision, the CSMA/CD standard dictates that the data is retransmitted after waiting a random amount of time. If a second collision is detected, the data is again retransmitted after waiting twice as long. This is known as exponential back off.
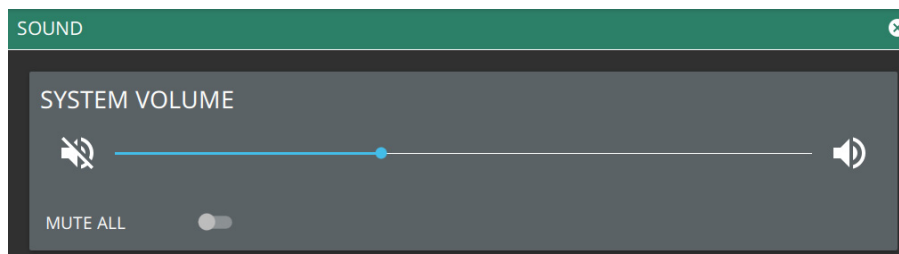
Wi-Fi uses a similar star topology in which all of the interfacing devices are connected to an access point. Wi-Fi uses *Carrier Sense Multiple Access/Collision Avoidance* (CSMA/CA) access method to handle simultaneous transmissions. CSMA/CA doesn't detect collisions but rather avoids them through the use of a control message. If the control message collides with another control message from another node, it means that the medium is not available for transmission and the back-off algorithm is applied before attempting another transmission.

The TCP/IP setup requires the following:

*   IP Address: Every computer and electronic device in a TCP/IP network requires an IP address. An IPv4 address has four numbers (each between 0 and 255) separated by periods. For example: 128.111.122.42 is a valid IP address.

*   Subnet Mask: The subnet mask distinguishes the portion of the IP address that is the network ID from the portion that is the station ID. The subnet mask 255.255.0.0, when applied to the IP address given above, would identify the network ID as 128.111 and the station ID as 122.42. All stations in the same local area network should have the same network ID, but different station IDs.

*   Default Gateway: A TCP/IP network can have a gateway to communicate beyond the LAN identified by the network ID. A gateway is a computer or electronic device that is connected to two different networks and can move TCP/IP data from one network to the other. A single LAN that is not connected to another LAN requires a default gateway setting of 0.0.0.0. If you have a gateway, then the default gateway would be set to the appropriate value of your gateway.

*   Ethernet Address: An Ethernet address, or *Media Access Control* (MAC) address, is a unique 48-bit value that identifies a network interface card to the rest of the network. Every network card has a unique Ethernet address permanently stored in its memory.

*   Remote programming and operation between the instrument and remote program is accomplished via a TCP/IP raw socket connection to port 9001. The remote program must establish a TCP/IP raw socket connection at port 9001 to the MS20x0A.

- The remote program may connect to the instrument IP address or to its `HOSTNAME` (Ethernet only). If using DHCP instead of a static IP, using the `HOSTNAME` may be more reliable for finding an instrument on a network.
- You may need to contact your network administrator to ensure network security policies, anti-virus, and firewall settings do not block access to the controlling computer and its ports.

The MS20x0A can be configured for *Dynamic Host Configuration Protocol* (DHCP), an Internet protocol that automates the process of setting IP addresses for devices that use TCP/IP, and is the most common method of configuring a device for network use.

To determine if a network is set up for DHCP, connect the instrument to the network and select DHCP protocol. Power cycle the instrument. If the network is set up for DHCP, the assigned IP address should be displayed in the network settings.

Ethernet Connection

Interface between the instrument and other devices on the network is via a category five (CAT-5) interface cable connected to a network. This cable uses four twisted pairs of insulated copper wires terminated into an RJ45 connector. CAT-5 cabling is capable of supporting frequencies up to 100 MHz and data transfer speeds up to 1 Gbps, which accommodates 1000Base-T, 100Base-T, and 10Base-T networks. CAT-5 cables are based on the EIA/TIA 568 Commercial Building Telecommunications Wiring Standard developed by the Electronics Industries Association. A pinout diagram is shown in Table 2-1.

Table 2-1.   8-pin Ethernet RJ45 Connector Pinout Diagram

8 7 6 5 4 3 2 1
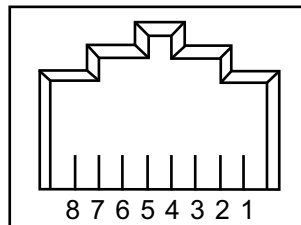
Pin	Name	Description	Wire Color
1	TX+	Transmit data (> +3 volts)	White/Orange
2	TX–	Transmit data (< –3 volts)	Orange
3	RX+	Receive data (> +3 volts)	White/Green
4	–	Not used (common termination)	Blue
5	–	Not used (common termination)	White/Blue
6	RX–	Receive data (< –3 volts)	Green
7	–	Not used (common termination)	White/Brown
8	–	Not used (common termination)	Brown

Integrated into the RJ45 connector are two LEDs that illuminate as follows:

- LED 1 Off: 10 Mbit/s LAN connection
- LED 1 Orange: 100 Mbit/s LAN connection
- LED 1 Green: 1000 Mbit/s LAN connection
- LED 2 Amber/Yellow: On or blinking indicates LAN traffic

The instrument IP address and its `HOSTNAME` are set via the System menu (upper left corner) and accessing the ETHERNET or WIFI settings menu.

Note	Wi-Fi does not support connections using HOSTNAME; use IP addressing to establish a wireless network connection.
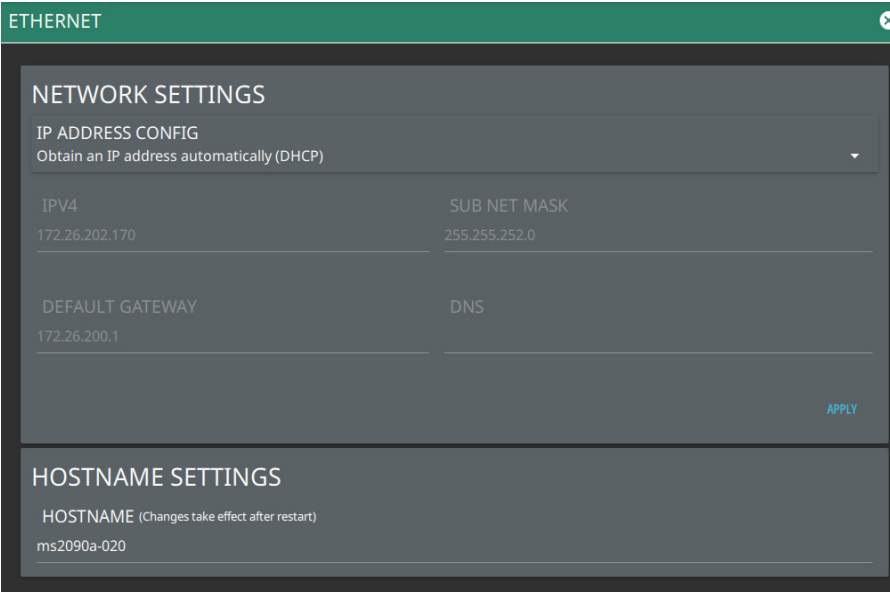
TCP/IP connectivity requires setting up the parameters described at the beginning of this section. The following is a brief overview of how to set up a general LAN connection on the MS20x0A.

Note	You may need to consult your network documentation or network administrator for assistance in configuring your network setup.

Ethernet Settings

Refer to "Network Settings" on page 2-28 for general network setup and information.

1. Access the System menu (3-line icon in the upper left corner).

2. Select SETTINGS to access the instrument settings menu, then select ETHERNET to view the current network settings (IP address, `HOSTNAME`, etc.).

Figure 2-31. Ethernet Settings

The instrument IP address can be set automatically using DHCP or manually by entering the desired IP address, gateway address, and subnet mask.

Note	If an active Ethernet cable is connected to the instrument while it is turned on, a reboot may be required to establish a DHCP connection. If the port becomes inactive, verify that an active Ethernet cable is attached to the instrument, then cycle the instrument power off and on.

WIFI Settings

Refer to "Network Settings" on page 2-28 for general network setup and information.

   1. Access the System menu (3-line icon in the upper left corner).

   2. Select SETTINGS to access the instrument settings menu, then select WIFI to display the current network settings (IP address, HOSTNAME, etc.).
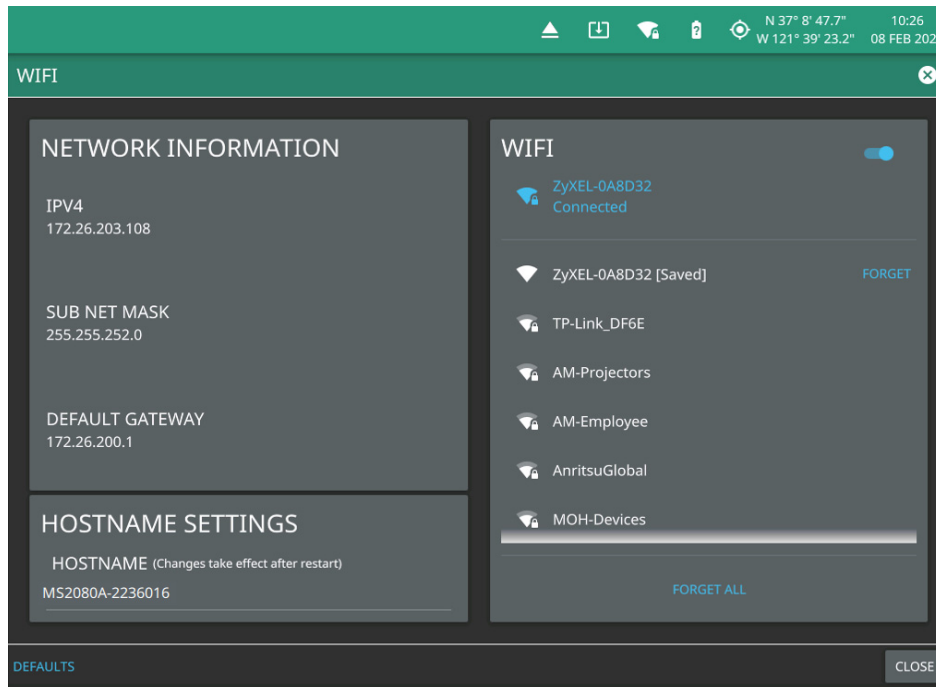
Figure 2-32. Wi-Fi Settings

The instrument IP, subnet mask, and gateway address are managed by the access point or wireless router.

Note	An active Wi-Fi connection to an access point must be established in order to enable DHCP. If Wi-Fi becomes inactive, cycle the instrument power off and on, then verify that the Wi-Fi device is connected to an access point.
	Field Master is not able to connect to networks that require sign-in through web servers.
	Wi-Fi is offered as an option in MS2070A Field Master.

   3. Enable the Wi-Fi radio by toggling it on from the right-side panel, then select an access point from the list.

   4. When an access point is selected, the keyboard will display for you to enter the access point key (or password).

   5. The access point will display below the toggle as the active connection.

GNSS(GPS) Settings (Option 31)

The MS20x0A Field Master is available with a built-in global positioning receiver feature (Option 31) that can provide latitude, longitude, altitude, and UTC timing information. This option also enhances frequency reference oscillator accuracy. When the global positioning receiver is actively locked to satellites, this information is saved with all saved measurements.

Note	The MS20x0A Field Master Data Sheet provides a list of the options and measurements that require GNSS Receiver (Option 31). In addition to having Option 31 installed, a GPS antenna is required. Refer to the instrument Technical Data Sheet for compatible GPS antennas.

The MS20x0A supports the following global positioning satellite systems:

- **GPS:** The United States Global Positioning System (GPS). GPS is currently the world's most utilized satellite navigation system.

- **GNSS:** Global Navigation Satellite System, a term used worldwide. This term includes GPS, GLONASS, BeiDou and Galileo. Accessing multiple satellites provides increased accuracy, redundancy, and availability at all times.

Activating the GNSS/GPS Feature

Attach the GPS antenna to the GPS connector on the top of the instrument and follow the steps below:

1. Access the System menu (3-line icon in the upper left corner).

2. Select SETTINGS to access the instrument settings menu, then select GNSS (GPS) to open the GNSS (GPS) settings and info window.
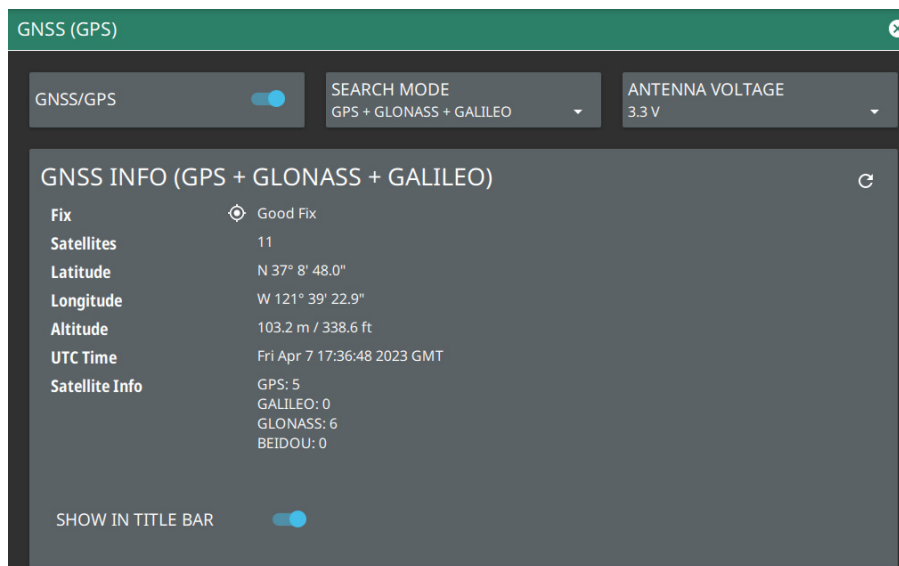
Figure 2-33. GNSS (GPS) Settings

3. Activate the GNSS (GPS) by sliding the GNSS/GPS toggle button to on.

4. Select SEARCH MODE drop-down menu to choose the combination of the satellite systems.

5. Set ANTENNA VOLTAGE to 3.3 V or 5.0 V.

6. When the GNSS (GPS) receiver has established a "good fix", the GNSS (GPS) icon is displayed with a center dot and the following information is kept updated:

   - Fix status
   - Tracked satellites
   - Latitude
   - Longitude
   - Altitude
   - UTC timing information
   - Satellite Info

7. Toggling SHOW IN TITLE BAR shows the GNSS (GPS) coordinates in the title bar at the top of the display.

After GNSS (GPS) location fix is attained, the internal reference oscillator begins to correct its frequency to match the GNSS (GPS) standard. After the internal frequency is adjusted to match the GNSS (GPS) standard, the status is indicated by "GNSS (GPS) High Accuracy" showing in the Status panel, which is displayed on the left side of the measurement display. When the GNSS (GPS) feature is not enabled, the reference source displays either "Internal Standard Accuracy" or a user-selected external reference frequency in the Status panel.

In order to acquire data from the GNSS (GPS) satellites, you must have line-of-sight to the satellites, or the antenna must be placed outside with no obstructions. If no GNSS (GPS) is connected for at least three days, the Frequency Reference annotation reads Int Std Accy.

Screenshot Setup

1. Access the System menu (3-line icon in the upper left corner).

2. Select SETTINGS to access the instrument settings menu, then select SCREENSHOT to open the screenshot setup menu.
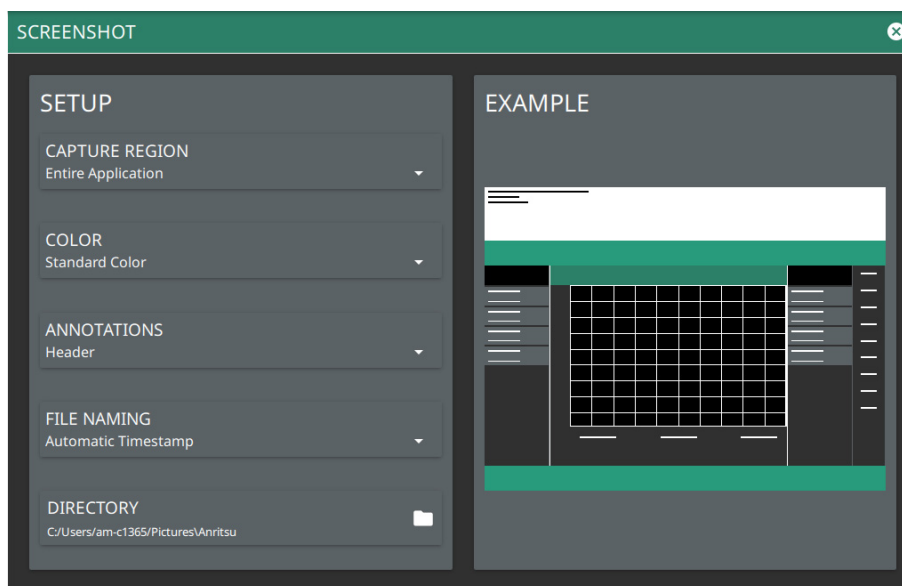
Figure 2-34. Screenshot Setup

Screenshot setup lets you configure the following:

- CAPTURE REGION: entire window or graph area only
- COLOR: standard or printer-friendly
- ANNOTATIONS: may be placed at top (header) or bottom (footer) of captured image
- FILE NAMING: saves a file with an automatic or manual time stamp
- DIRECTORY: directory path to destination folder where the file is to be saved

Note	Screenshots can be previewed on the instrument display from "File Management" on page 2-42.

Language Settings

Follow the steps below to access language settings in order to change a selected display language

1. Access the System menu (3-line icon in the upper left corner).

2. Select SETTINGS to access the instrument settings menu, then select LANGUAGE to open the language menu.

Note	When a non-English language is selected as the display language, the primary menus and the screen annotation gets updated, but the keyboard used for file naming and similar tasks, notification messages and specific system menu names remain in the English language.
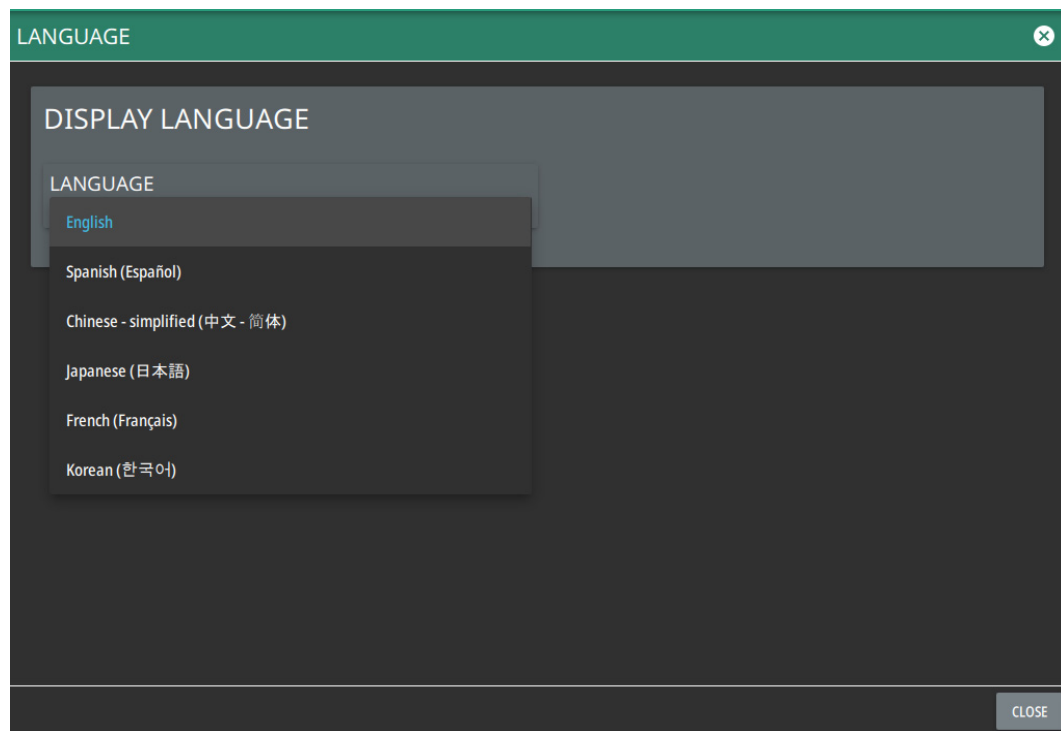
Figure 2-35. Language Settings

3. Select the LANGUAGE drop-down menu and select a desired display language as shown in the Figure 2-35.

Date Time Settings

1. Access the System menu (3-line icon in the upper left corner).

2. Select SETTINGS to access the instrument settings menu, then select DATE TIME to display the current date and time settings.
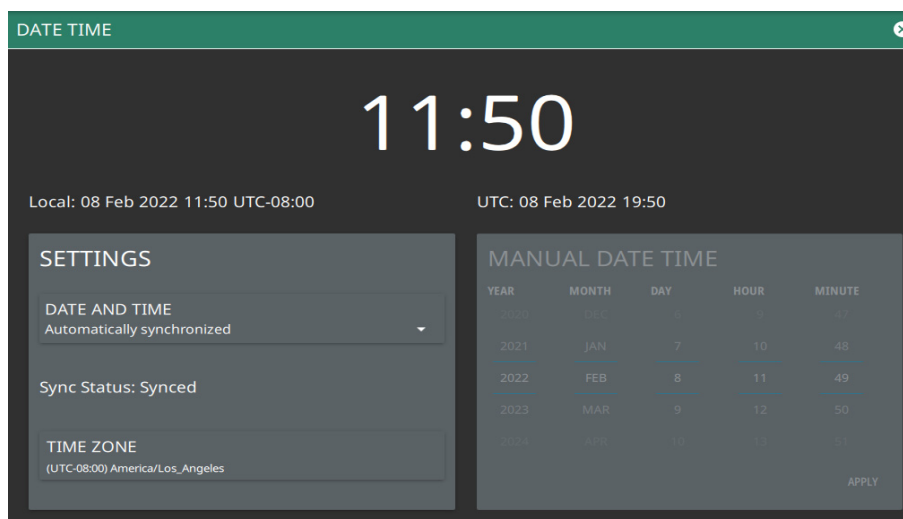
Figure 2-36. Date Time Settings

The Date Time setup lets you set the current date and time and the time zone.

- Date and Time: Manually set or automatically synchronized. When synchronized (Sync Status: Synced), the system uses the network time; if the instrument also has a GPS location fix, the system will determine and use the more accurate of the two, between network and GPS time. Select Manually set to activate the MANUAL DATE TIME window. Here you can scroll to a selectable year, month, day, hour, and minute.

- Time Zone: Lists the selectable time zones.

Port Setup

The PORT SETUP menu allows you to set the bias voltage range.

Bias Voltage

Bias Voltage setup provides controls to set the voltage level and to monitor the precise voltage and current, and trip state.

1. Access the System menu (3-line icon in the upper left corner).

2. Select SETTINGS to access the instrument settings menu, then select PORT SETUP to view the bias voltage information.
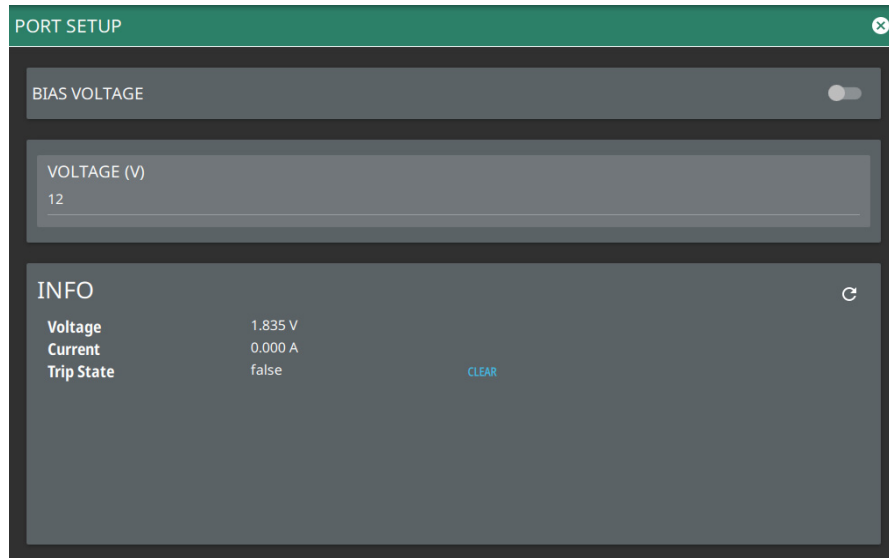
Figure 2-37. Bias Voltage Port Settings

3. Manually set the voltage in the range of 0 V to 34 V (note: stable output voltage setting is ≥ +1 V).

4. Toggle the bias voltage on or off.

Options Settings

To view the installed options, follow the steps below:

1. Access the System menu (3-line icon in the upper left corner).

2. Select SETTINGS to access the instrument settings menu.

3. Select OPTIONS to view the list of currently installed options in the left tab, and available options in the right tab. Time-limited options will show the expiration in the EXPIRATION column.

Some options can be installed using only a software file. Others may require additional hardware. Contact your local sales or service representative for information on ordering or installing new options.

Note	Not all instrument models offer every option. For example, Coverage Mapping Option (0431) is offered as a 90-day time limited option by ordering Option 9431. 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 time limited options

4. To upgrade your instrument with a specific option, press INSTALL OPTIONS FROM WEB to install options available on the web.

5. Select ENABLE OPTIONS USING FILE to install options available in a software file.

6. Select SAVE CONFIG to save the configuration settings as a configuration file.
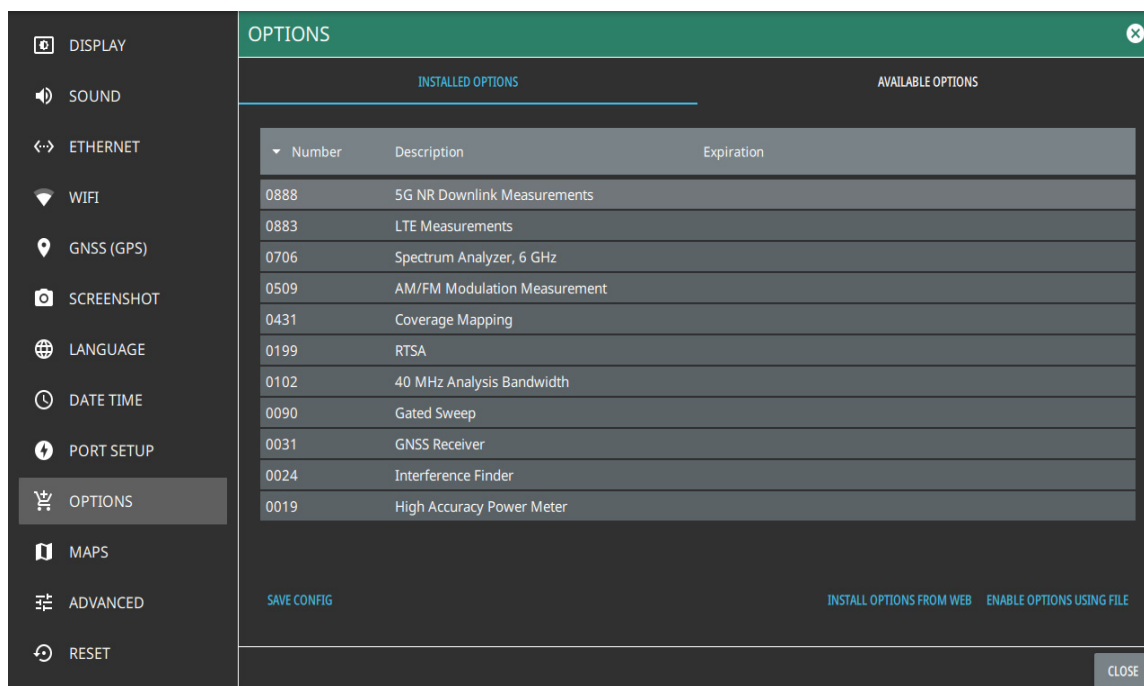
Figure 2-38. Options Settings

Caution	Once a time limited option is activated, the 90-day time period begins countdown and cannot be halted. Ensure you intend to activate the option before pressing Activate.

When time-limited options are installed but not yet active, press the ACTIVATE button to activate the option and begin the 90-day trial.
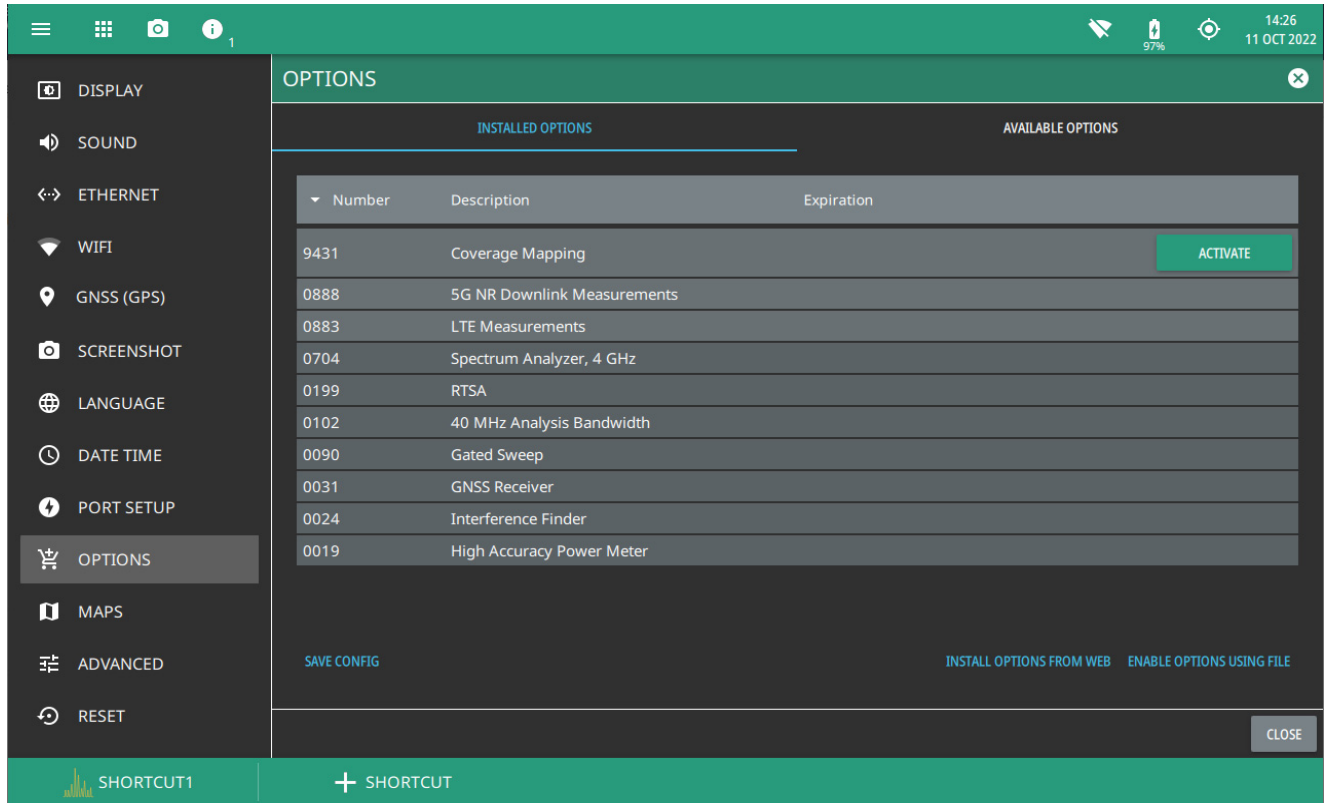
Figure 2-39. Options Settings

Maps Settings (Option 431)

Map settings are available when Option 431, Coverage Mapping is installed. Maps settings are used to delete map tiles from instrument memory. Refer to Coverage Mapping section of SPA measurement guide (10580-00447).

1.   Access the System menu (3-line icon in the upper left corner).

2.   Select SETTINGS to access the instrument settings menu.

3.   Select MAPS to display the maps tile usage.

4.   To free up internal storage space, delete loaded tiles using the DELETE TILES button. All tiles will be deleted.
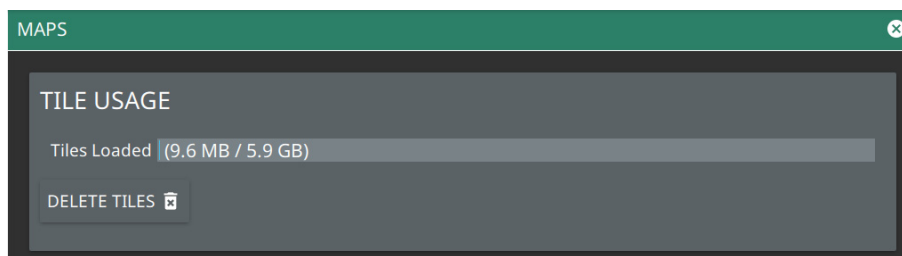
Figure 2-40.   Maps Settings (Option 431)

Advanced Settings

Advanced settings provides an RF SAFE MODE toggle to protect the internal detection circuitry on boot-up.

1.   Access the System menu (3-line icon in the upper left corner).

2.   Select SETTINGS to access the instrument settings menu.

3.   Select ADVANCED to enable/disable the RF SAFE MODE and SCPI ERRORS controls.

4.   Toggle RF SAFE MODE on or off.

Figure 2-41.   Advanced Settings

5.   Toggle SCPI ERRORS on to get notified of the errors in the SCPI commands.

Reset Settings

1. Access the System menu (3-line icon in the upper left corner).

2. Select SETTINGS to access the instrument settings menu.

3. Select RESET to open the Reset menu.
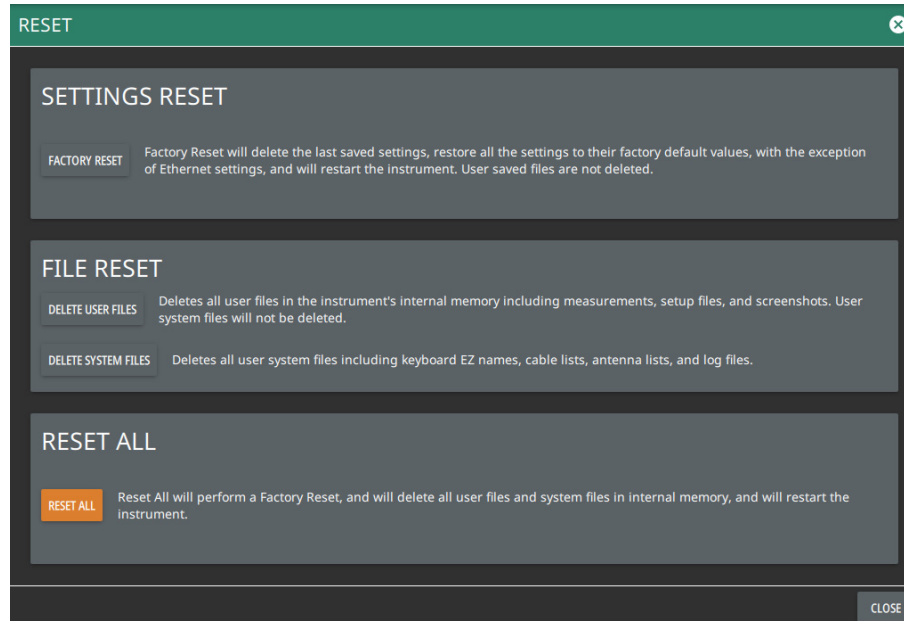
Figure 2-42. Reset Settings

The following reset options are available:

SETTINGS RESET

- FACTORY RESET: Restores the instrument to the factory default settings for all measurement modes and system settings, including language and the display and audio settings. Ethernet settings and user files are not affected. The instrument will automatically restart.

FILE RESET

- DELETE USER FILES: Deletes all user files from the instrument's internal memory, including measurement, setup, and screenshot files. System files are not affected.

- DELETE SYSTEM FILES: Deletes all user system files from the instrument's internal memory, including keyboard EZ names, cable and antenna lists, and log files. Other user files are not affected.

RESET ALL

- RESET ALL: Performs a Factory Reset as described above and deletes all user files and system files from the instrument's internal memory. The instrument will automatically restart.

2-11　File Management

1.　Access the System menu (3-line icon in the upper left corner).

2.　Select FILES to access the instrument file management menu.
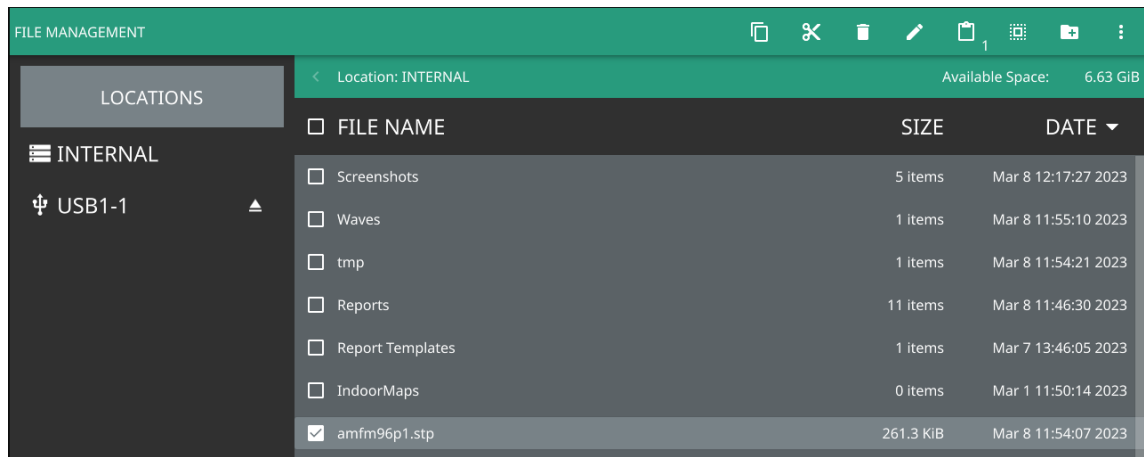
Figure 2-43.　File Management Menu

File Locations

Displays the available memory locations. Select the location that you want to access and the available files will be displayed on the right side. You can touch the column headers to change the sort order.

File Management Operations

All file operations are selected via the following icons:

3-Dots	Use the 3-dots menu to refresh the displayed folder contents or to close the file management menus.
New Folder	Use the New Folder icon to create a new directory in the current memory location. When pressed, the virtual keyboard is displayed, allowing you to enter a new directory name.
Select	The Select icon enables checkboxes next to your folder and file names. You can then select multiple files to move, copy, or delete.
Clipboard	The Clipboard icon displays the number of items that you have selected and copied to the clipboard. Use this icon to paste the copied items to the destination folder.
Edit	Use the Edit icon to change file or folder names. Select the item you wish to edit, then press Edit to display the virtual keyboard and edit the item's name.
Delete	Use the Delete icon to remove files or folders from memory. Select the item you wish to delete, then press Delete to remove the item. **Caution:** The item will be permanently deleted and cannot be recovered.
Cut	Use the Cut icon to move files or folders. Select the items you wish to move, then press Cut to store the items on the clipboard. Navigate to the new location and press the Clipboard icon to paste the items. The moved items are deleted from the source location.
Copy	Use the Copy icon to select files and folders to copy to a new location. Select the items you wish to copy, then press Copy to store the items on the clipboard. Navigate to the new location and press the Clipboard icon to paste the items. Copies of the items remain in the source location.
USB Eject	Use the USB Eject icon to properly dismount the USB memory device before removing it from the instrument port. Failing to properly eject the device could cause data corruption.

Figure 2-44. File Management Icons

Previewing Screenshots

While in File Manager, you can preview screenshots on the instrument display simply by touching the screenshot file name. While the preview is displayed, you can use the controls to:

- Cycle forward and backward through each screenshot in the directory.
- Rename the file by selecting RENAME, then use the keypad to enter a new filename.
- Delete the file by selecting DELETE and then confirming your choice.
- Copy the file by selecting COPY, then press CLOSE to close the preview dialog and navigate to the desired location, then touch the Paste icon at the top of the File Manager.
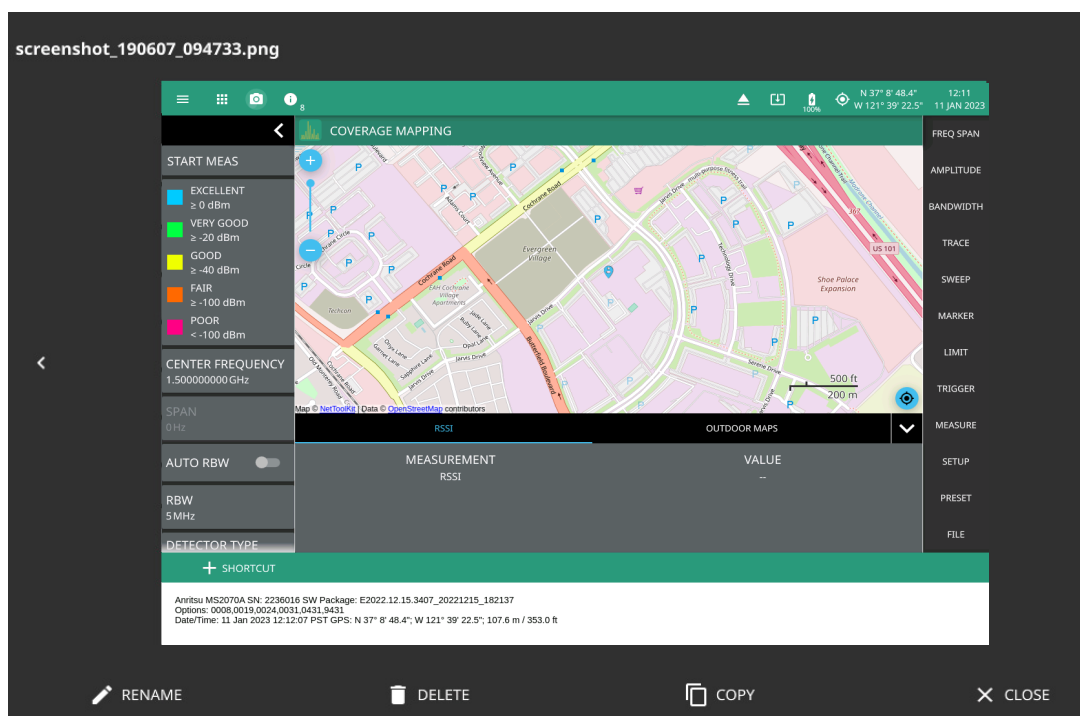
Figure 2-45. Screenshot Preview

FTP Access

An FTP server has been included in the instrument to allow direct access to files stored on the instrument (or on a USB drive connected to the instrument) from a remote computer. To access the FTP server:

1. Connect the instrument to a network.

2. Use an FTP client of choice (such as Windows Explorer or File Explorer) and enter "ftp://" and the IP address of the instrument as the host. For example: ftp://172.155.1.2

3. Enter the user name: ftp

4. Enter the password: serial number of the instrument
   The serial number can be obtained from the System Information menu or through SCPI using the "*IDN?" command.

2-12   Diagnostics

1.   Access the System menu (3-line icon in the upper left corner).

2.   Select DIAGNOSTICS to access the instrument diagnostics menu, then select the diagnostic menu that you wish to open.
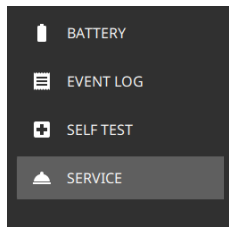
BATTERY: Opens Battery Information.

EVENT LOG: Opens the Event Log.

SELF TEST: Opens the Self Test.

SERVICE: Opens the Service.

Figure 2-46. Diagnostics Menu

Battery Information

The battery information menu shows the available battery information. The relative charge indicates the charge level that the battery is capable of storing. The maximum charge shows the relative capacity of the battery compared to the design capacity. Advanced information can be expanded by touching ADVANCED.

Figure 2-47. Battery Information

Event Log

The event log allows you to save the event log as a file. This log file is a binary file that may be used by customer service.
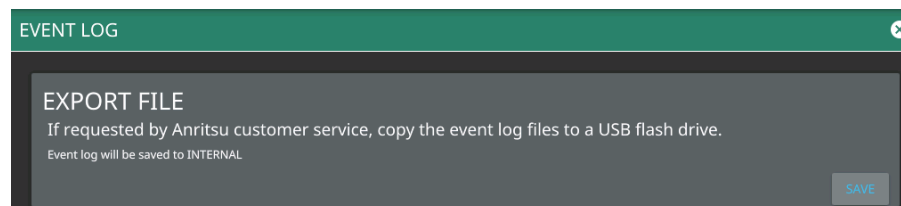
Figure 2-48. Event Log

Self Test

Self test is run when the self test feature is accessed. Basic system results are shown initially. The individual test result can be displayed with test data and a pass/fail status by touching the desired system or application. The self test results can be saved to a file for future reference. Refer to Appendix A, "Instrument Messages and Troubleshooting" for more information.
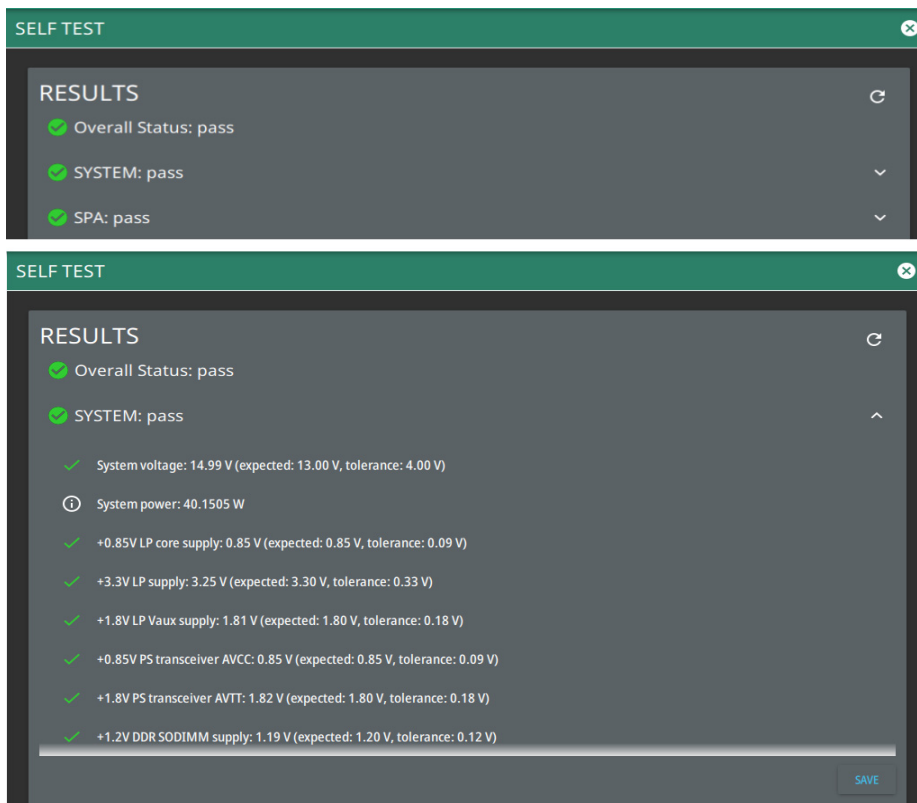
Figure 2-49. Self Test

Service

The service mode is for Anritsu customer service use only.
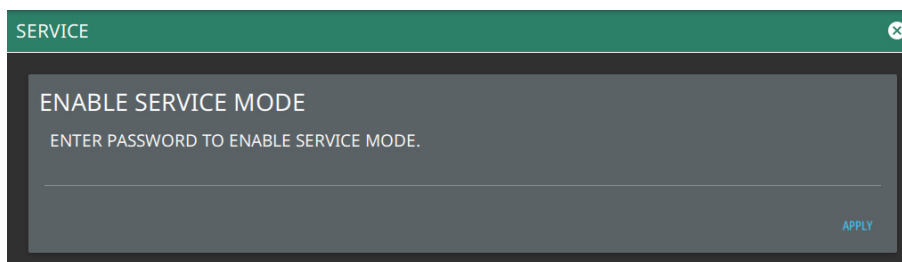
Figure 2-50. Service

2-13   Tools Menu

1. Access the System menu (3-line icon in the upper left corner).

2. Select TOOLS to access the instrument tools menu, then select the tool menu that you wish to open.

WEB: Opens "WEB" tool.

MAP TOOL: Opens Map Tool. Refer to Coverage Mapping section of the Field Master Series Spectrum Analyzer Measurement Guide (10580-00447), for detailed information.

PDF REPORTS: Opens "PDF REPORTS" tool.
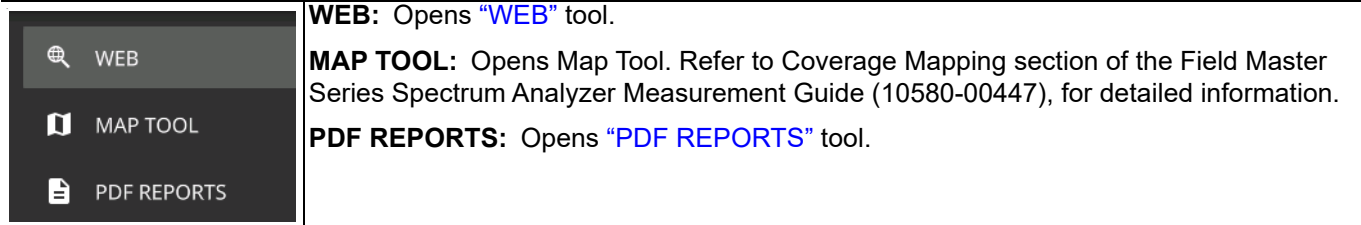
Figure 2-51. TOOLS Menu

WEB

The WEB menu allows you to browse for any information related to your product, for example, training and education.
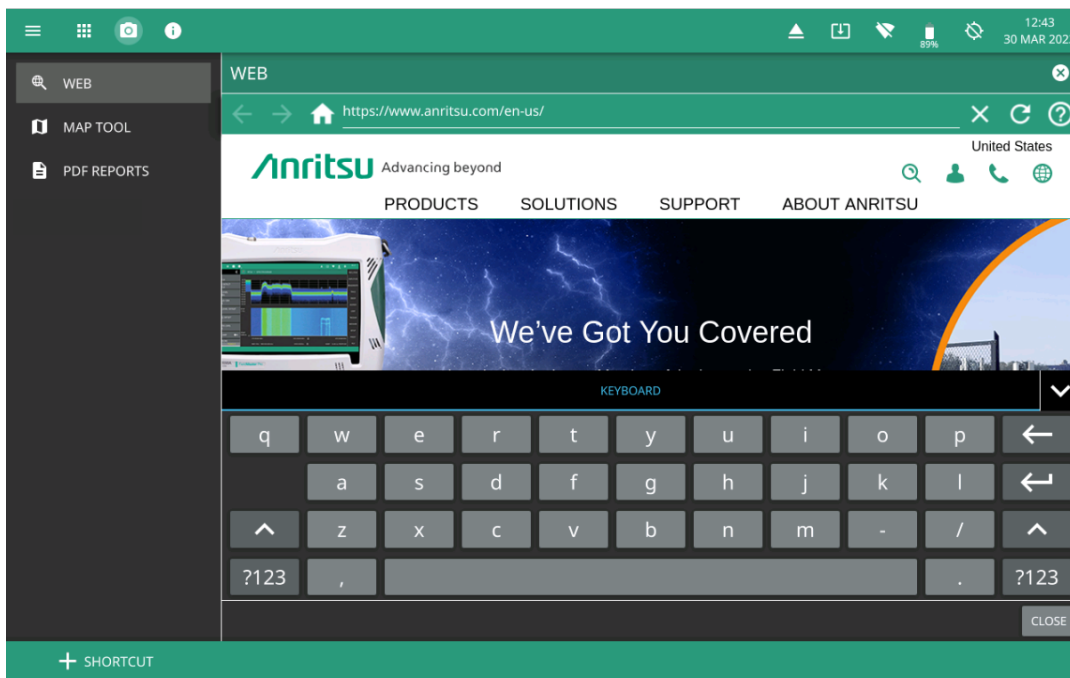
Figure 2-52. WEB Tool

PDF REPORTS

The PDF REPORTS tool allows the user to generate a PDF report or HTML report.

1. Select OPEN REPORT GENERATOR to open REPORT GENERATOR -CONFIG window.
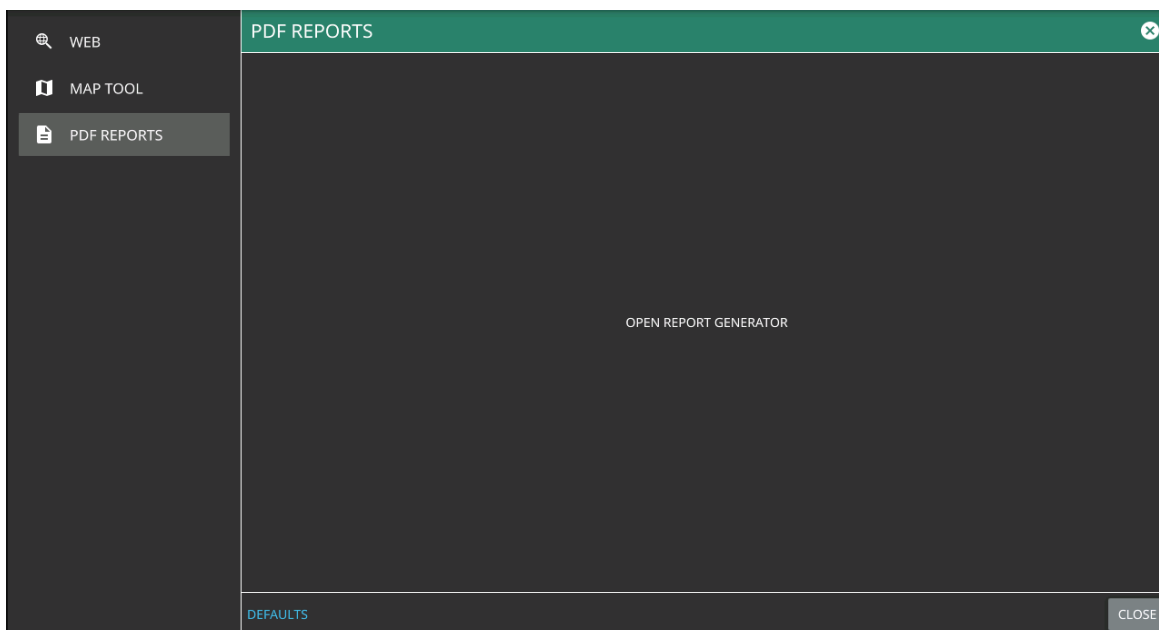
Figure 2-53. PDF Reports Tool

2. In REPORT GENERATOR -CONFIG window you can load a template to populate the given fields.

    - Select LOAD TEMPLATE to use a customized template
    - Select SAVE TEMPLATE to save the template.
    - Select REPORT NAME to enter the name of the report.
    - To have the traces in black and white, toggle on the BLACK & WHITE GRAPHS button.
    - Toggle off the following buttons to exclude the information from the generated report:
        - Work Order Number
        - Technician ID
        - Prepared By
        - Approved By
    - Select CLEAR TEMPLATE to delete the preloaded template.

Figure 2-54. Report Generator - Config Window

3. Select SETUP button in the bottom to add setup or trace files in REPORT GENERATOR - SETUP window.

- Select the blue + ADD FILE (S) button in the upper right to add measurement (.fmcaausb) or image files (.png. jpeg, jpg) to the PDF report.

- To delete a file select the minus button next to the file name, alternately select CLEAR ALL.

- To include a specific note in your report, type the note into the text box located under the graph. Note that you need the select a measurement or image file before adding a note. Select SAVE NOTE button to save the note. Look for the green tick symbol in the lower right corner of the text box once the note is saved successfully.
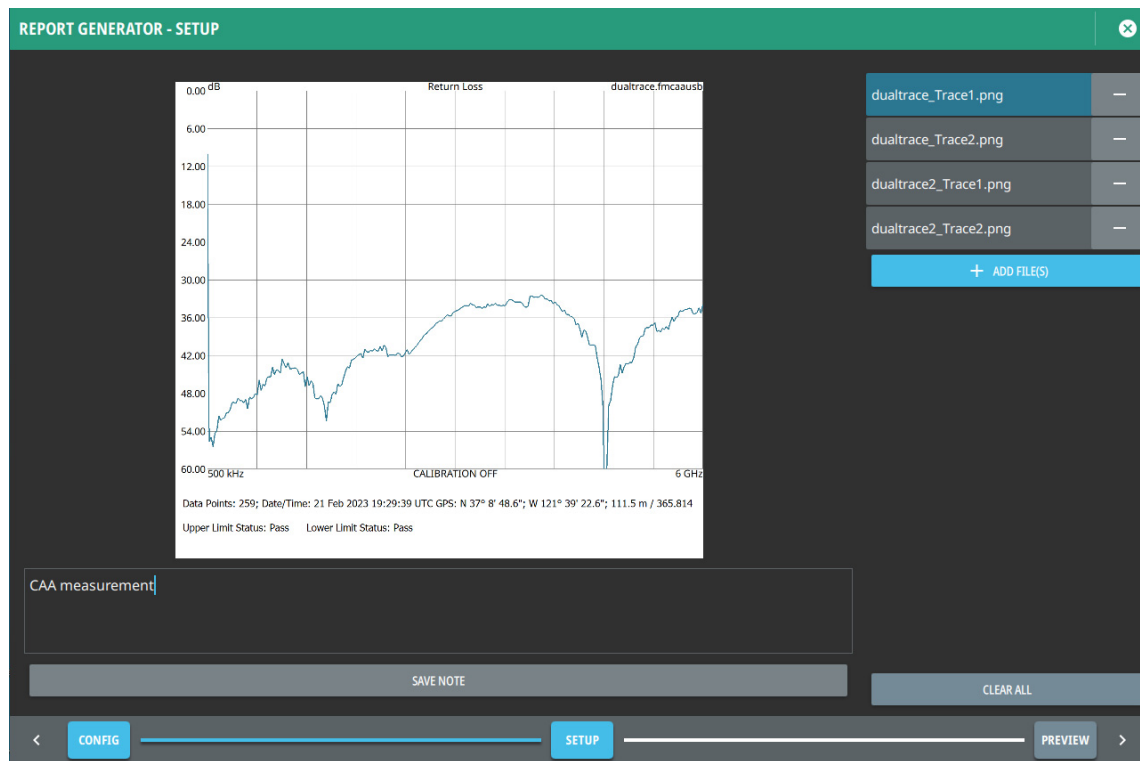
Figure 2-55. Report Generator - Setup Window

4. Select PREVIEW button to see the preview of the generated report in REPORT GENERATOR - PREVIEW window.

5. Select SAVE TO PDF button on the top to save the report internally in REPORTS folder.

6. If you want to preview an internally saved HTML file, touch the 3-dot icon in the top right of the preview window.

7. Select LOAD HTML PREVIEW to open FILE MANAGEMENT window. Select the HTML file and touch OPEN button in the bottom right. If required, touch SAVE TO PDF to save the HTML preview as a PDF file.
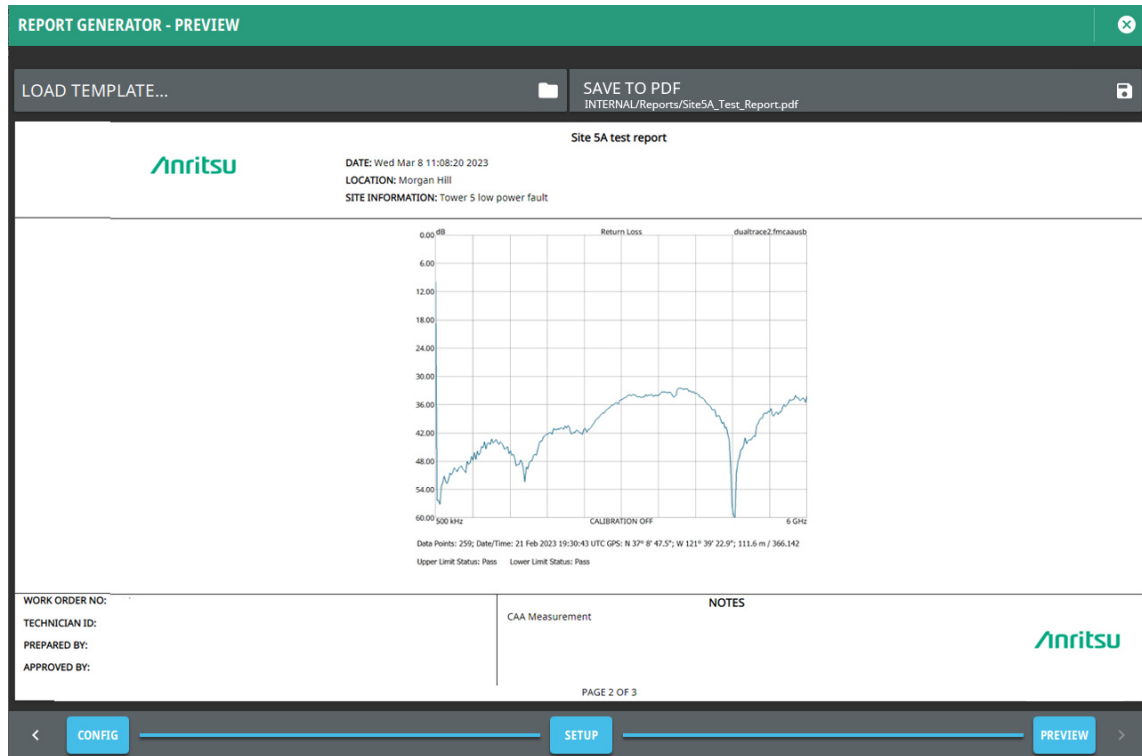
Figure 2-56. Report Generator - Preview Window

Appendix A — Instrument Messages and Troubleshooting

A-1 Introduction

This appendix provides a list of instrument messages and their meaning and procedures for a full system recovery. If any error condition persists, contact your local Anritsu Service Center (http://www.anritsu.com/contact-us).

Field Master displays the following message types:

- Self-Test Messages, indicating self-test pass or fail conditions.
- File Management Messages, relating to the system (three-line) menu FILES actions.
- Informational Messages, such as notification of a screen capture.
- Warning Messages, such as an ADC over-range warning.
- Error Messages, such as an internal instrument fault.

Messages have the following display characteristics:

- Transient messages appear briefly and then fade away.
- Persistent messages remain on the display and require user intervention to correct the condition.
- Some messages are logged but not displayed, such as messages in the event log.
- Messages may be displayed either in the toolbar or in a pop-up window.

Procedures to recover from system software faults can be found in Section A-7 "System Recovery" on page A-18.

Follow the Section A-8 "UDP Discovery Tool Firewall Settings" on page A-22 to change the Windows firewall settings if Discovery Tool is unresponsive.

Refer to Section A-9 "System Override" on page A-24 if the instrument does not respond to SCPI commands and needs to be reset remotely.

A-2   Self-Test Messages

Field Master has built-in diagnostics that allow you to run a built-in self test. The test results can be viewed on the screen and saved to a log file. To run self test, use the 3-line menu to access DIAGNOSTICS, then select SELF TEST and RUN SELF TEST. Below is a sample list of self tests with passing results:

```
TEST DATE: 2022-10-11 14:52:47 MDT


OVERALL STATUS : PASS


SYSTEM : OVERALL STATUS : PASS
   System voltage : 15.03 V (expected: 17.55 V, tolerance: 0.00 V)
   System power : 28.6835 W
   +0.85V LP core supply : 0.86 V (expected: 0.85 V, tolerance: 0.09 V)
   +3.3V LP supply : 3.29 V (expected: 3.30 V, tolerance: 0.33 V)
   +1.8V LP Vaux supply : 1.81 V (expected: 1.80 V, tolerance: 0.18 V)
   +0.85V PS transceiver AVCC : 0.85 V (expected: 0.85 V, tolerance: 0.09 V)
   +1.8V PS transceiver AVTT : 1.83 V (expected: 1.80 V, tolerance: 0.18 V)
   +1.2V DDR SODIMM supply : 1.20 V (expected: 1.20 V, tolerance: 0.12 V)
   +1.0V Ethernet supply : 1.00 V (expected: 1.00 V, tolerance: 0.10 V)
   +1.8V FPGA supply : 1.80 V (expected: 1.80 V, tolerance: 0.18 V)
   +2.5V FPGA supply : 2.50 V (expected: 2.50 V, tolerance: 0.25 V)
   +5.0V USB/misc supply : 5.12 V (expected: 5.00 V, tolerance: 0.50 V)
   +3.9V analog supply : 3.99 V (expected: 3.90 V, tolerance: 0.39 V)
   +5.7V analog supply : 5.80 V (expected: 5.70 V, tolerance: 0.57 V)
   -5.7V analog supply : 5.28 V (expected: 5.70 V, tolerance: 0.57 V)
   +24.0V analog supply : 24.99 V (expected: 24.00 V, tolerance: 2.40 V)
   Backlight voltage : 20.71 V (expected: 14.25 V, tolerance: 0.00 V)
   Backlight current : 0.18 A (expected: 0.20 A, tolerance: 0.20 V)
   12.0V for fan : 11.99 V (expected: 12.00 V, tolerance: 1.20 V)
   CPU Temperature : 64.1 C
   Motherboard Temperature : 46.0 C
   Fan speed, percent of full speed : 59 %
   Fan speed : 3726 RPM
   Temperature at Reference : 41.8 C
```

```
SPA : OVERALL STATUS : PASS

  +3V3_RF: 3.34 V (expected: 3.30 V, tolerance: 0.33 V)

  +5V_PREAMP: 4.94 V (expected: 5.00 V, tolerance: 0.25 V)

  +5VA: 5.00 V (expected: 5.00 V, tolerance: 0.50 V)

  +3V3_IF: 3.36 V (expected: 3.30 V, tolerance: 0.33 V)

  -5V_SW: -4.88 V (expected: -5.00 V, tolerance: 0.60 V)

  +3V3_IFA: 2.98 V (expected: 3.00 V, tolerance: 0.30 V)

  +3V3IFC: 3.34 V (expected: 3.30 V, tolerance: 0.33 V)

  +3V3IF_OUT: 3.30 V (expected: 3.30 V, tolerance: 0.33 V)

  +3V3_L02F: 3.26 V (expected: 3.30 V, tolerance: 0.33 V)

  SPARE: 0.00 V (expected: 0.00 V, tolerance: 1.00 V)

  +1V8D : 1.78 V (expected: 1.80 V, tolerance: 0.18 V)

  +3V3_REF: 3.28 V (expected: 3.30 V, tolerance: 0.33 V)

  +3V3_10M: 3.24 V (expected: 3.30 V, tolerance: 0.33 V)

  +3V3_L01: 3.28 V (expected: 3.30 V, tolerance: 0.33 V)

  +3V3_OFFSET: 3.34 V (expected: 3.30 V, tolerance: 0.33 V)

  +5V_L01: 4.94 V (expected: -5.00 V, tolerance: 0.50 V)

  +1V8_DDS: 1.79 V (expected: 1.80 V, tolerance: 0.18 V)

  +3V3_DDS: 3.24 V (expected: 3.30 V, tolerance: 0.33 V)

  +5V_REF: 4.96 V (expected: 5.00 V, tolerance: 0.50 V)

  +5V_L01OUT: 5.00 V (expected: 5.00 V, tolerance: 0.50 V)

  +1V8_L01: 1.79 V (expected: 1.80 V, tolerance: 0.18 V)

  +1V8_SR: 1.79 V (expected: 1.80 V, tolerance: 0.18 V)

  +1V_ID: 0.49 V (expected: 1.00 V, tolerance: 1.00 V)

  Thermal Sensor 2 (Final IF): 43.50 C (expected: 35.00 V, tolerance: 90.00 C)
```

If any self test fails, try resetting the instrument with a RESET ALL and reboot, and run the test again. If the condition persists, contact your local Anritsu Service Center (http://www.anritsu.com/contact-us).

A-3   File Management Messages

File management functions (accessed by via System menu (3-line icon) > FILES) are used to organize, copy, and rename files. The following messages are displayed in a persistent dialog when using the file manager features.

Cannot access File or Directory

   User does not have permission to access the file or directory.

Cannot copy/move items: no write permission on folder

   User does not have permission to access the file or directory.

Cannot move items: origin and destination folders are the same

   When attempting to move a file to the same location.

Could not remove the directory/file

   The file cannot be deleted.

Error creating new folder

   A folder cannot be created.

File or Directory does not exist

   When attempting to access a file or directory that does not exist.

Path or URL may not exist or cannot be read

   The file location cannot be accessed.

Rename error

   The file or directory cannot be renamed.

There is no space to copy

   There is not enough space to copy the file.

A-4   Informational Messages

Audio must be turned on to record.

In Toolbar, Not Logged, Transient

Battery Over Charge Temperature.

In Toolbar, Not Logged, Persistent

Cannot start measurement without a connected Antenna.

In Toolbar, Not Logged, Persistent

Calibration abort is not allowed.

In Toolbar, Not Logged, Transient

Calibration temperature range exceeded. User cal has been disabled.

In Toolbar, Not Logged, Transient

Concatenation has been aborted.

When user aborts concatenation of streaming metadata files

Connecting to access point.

In Toolbar, Not Logged, Persistent

Current USB Site Master model or serial number does not match active calibration settings. 1-Port ReadyCal will be applied.

Pop-up, Not Logged, Transient

Density data not available in playback

In Toolbar, Not Logged, Transient

External reference detected - switching reference source to external

In Toolbar, Logged, Transient

External reference disconnected – switching reference source to GPS

In Toolbar, Logged, Transient

External reference disconnected – switching reference source to internal

In Toolbar, Logged, Transient

External reference disconnected – switching reference source to Internal High

In Toolbar, Logged, Transient

File Does Not Exist

In Toolbar, Not Logged, Transient

File Recall Failed

In Toolbar, Not Logged, Transient

File Recalled Successfully

In Toolbar, Not Logged, Transient

File Save Failed

In Toolbar, Not Logged, Transient

File Saved Successfully

In Toolbar, Not Logged, Transient

File successfully saved as: filename

When saving a file (e.g., trace, setup)

File <filename> import successfully

In Toolbar, Not Logged, Transient. X represents the filename.

File <filename> export successfully

In Toolbar, Not Logged, Transient. X represents the filename.

Frequency setting is outside sensor range. Measurement performance is not guaranteed outside the range of sensor. It is recommended to keep start and stop frequencies within range listed on sensor

Pop-up, Not Logged, Transient

GPS reference detected - acquiring GPS

In Toolbar, Logged, Transient

GPS reference acquired - switching reference source to GPS

In Toolbar, Logged, Transient

GPS reference disconnected – switching reference source to Internal

In Toolbar, Logged, Transient

GPS reference no longer available – switching reference source to Internal High

In Toolbar, Logged, Transient

Internal High reference no longer valid – switching frequency reference source to Internal

In Toolbar, Logged, Transient

Internal High reference no longer valid – switching time reference source to Internal

In Toolbar, Not Logged, Transient

Insufficient data. A map point is skipped. Setting a higher distance or increasing sweep time can help.

In Toolbar, Not Logged, Persistent

Initializing the USB VNA...

In Toolbar, Not Logged, Transient

Input greater than DMax: <value>

In Toolbar, Not Logged, Transient

Language successfully updated to X

In Toolbar, Logged, Transient. X is the selected display language.

Limit recall initiated

When a limit setup file is selected for recall.

Limits are not available for circular graphs

In Toolbar, Not logged, Transient

Measurement changed. Trace recording stopped

In Toolbar, Logged, Transient

Measurement changed. Trace playback stopped

In Toolbar, Logged, Transient

Measurement changed. Trace recording in csv stopped

In Toolbar, Logged, Transient

Memory Full

Popup, Not Logged, Transient

Memory Full

In Toolbar, Not Logged, Transient

Model and/or serial number of the device does not match calibration stored. 1-Port ReadyCal will be applied

In Toolbar, Not Logged, Transient

Missing GPS data. Ensure good GPS fix or directional antenna connection

In Toolbar, Not Logged, Persistent

No bearing from directional antenna. Check connection and try again

In Toolbar, Not Logged, Transient

No USB CAA HW connected

In Toolbar, Not Logged, Persistent

No USB Site Master is detected. Please connect device to continue.

In Toolbar, Not Logged, Transient

No application loaded. Factory reset required

In Toolbar, Logged, Persistent

<model> Sensor connected

In Toolbar, Logged, Persistent

Outdoor mapping requires GNSS/GPS

In Toolbar, Not Logged, Persistent

Options upgraded. Please restart the instrument to use new features

In Toolbar, Not Logged, Transient

Preset Completed

In Toolbar, Not Logged, Transient

Presetting Instrument

In Toolbar, Not Logged, Transient

Rebooting Instrument

In Toolbar, Not Logged, Transient

Rebooting instrument into Recovery mode

In Toolbar, Not Logged, Transient

Recall initiated

When a file is selected for recall

Reset Completed

In Toolbar, Logged, Transient

Resetting Instrument

In Toolbar, Logged, Transient

Restoring calibration settings

In Toolbar, Not Logged, Transient

Recording In Progress

In Toolbar, Logged, Persistent

Recording Complete. File saved as <filename>

In Toolbar, Logged, Transient

Remove any RF input signal to the external sensor

Pop-up, Not Logged, Transient

RF Attenuation Auto must be OFF or Reference Level must be below -40dBm to enable PreAmp

> In Toolbar, Logged, Transient

Successfully concatenated <N> files

> When the concatenation of streaming metadata files is complete.

Successfully connected to access point

> In Toolbar, Not Logged, Transient

Screenshot saved

> When saving a screenshot is successful

Scale adjusted to accommodate user change

> In Toolbar, Not logged, Transient

<setting> range adjusted to accommodate user change

> In Toolbar, Not logged, Transient

Self test Passed

> In Toolbar, Logged, Transient

Self test Failed

> In Toolbar, Logged, Transient

Software update files found on USB

> In Toolbar, Not Logged, Transient

Sensor <model> is not supported

> In Toolbar, Logged, Transient

Stopped saving sweeps after sweep complete

> When the save on event triggers are disabled after end-of-sweep.

Stopped saving sweeps after limit crossing

> When the save on event triggers are disabled after a limit fails.

Trigger delay updated to minimum allowable value for selected bandwidth and bit format

> In Toolbar, Not Logged, Transient

The selected mode is not yet available

> When an unavailable mode is selected.

Transmission (Ext. Sensor) measurement requires supported USB sensor

> In Toolbar, Not Logged, Persistent

USB drive <name> ejected

> In Toolbar, Not Logged, Transient

USB Power Sensor %1 detected

> In Toolbar, Logged, Transient

USB Power Sensor %1 disconnected

> In Toolbar, Logged, Transient

Zeroing. Please wait

> In Toolbar, Logged, Persistent

Zeroing <sensor>

> In Toolbar, Not Logged, Persistent

Zeroing Sensor...

> In Toolbar, Logged, Persistent

Zeroing Sensor completed

> In Toolbar, Logged, Transient

No sensor connected

> In Toolbar, Not Logged, Persistent

USB sensor <model> detected

> In Toolbar, Logged, Transient

USB sensor is required for this calibration

> In Toolbar, Not Logged, Transient

USB sensor is required for this calibration. Connect sensor and retry

> In Toolbar, Not Logged, Transient

Warning: User Cal must be turned off before Cal TYPE can be changed

> Pop-up, Not Logged, Transient

A-5   Warning Messages

ADC Overrange

In Toolbar, Logged, Persistent

Antenna information invalid

In Toolbar, Not Logged, Persistent

Battery Fault

In Toolbar, Logged, Transient

Battery level is critically low. Automatic shutdown is imminent

Popup, Logged, Persistent

Battery level low

Popup, Logged, Persistent

Battery Low warning

Pop-up Window, Logged, Persistent: Requires User Intervention

This message is sent once per low battery charge condition per boot cycle per charge cycle. A low battery charge condition is defined as the battery charge being at or below 10%.

Booted from backup SW slot. Reinstall SW to clear this message

Popup, Logged, Persistent

Could not read from input file. Please verify that the storage device is still accessible and try again

In Toolbar, Not Logged, Transient

Could not create output file. Please verify that the device is accessible and can be written to

In Toolbar, Not Logged, Transient

Current settings do not allow for simultaneous sweep and audio output

In Toolbar, Not Logged, Persistent

Device transfer speed insufficient for gapless transfer at current BW/bit depth settings; some samples will be missed

In Toolbar, Logged, Persistent

Error occurred during concatenation. Error code: <code>

Popup, Not Logged, Transient

Failed to recall limit

When the limit setup file selected for recall could not be accessed.

Failed to save file: filename

When any other error occurred while trying to save a file.

Failed to save screenshot. Device may be full.

When saving a screenshot fails.

IF Gain Calibration is off

In Toolbar, Logged, Persistent

IF Shape Calibration is off

In Toolbar, Logged, Persistent

Invalid frequency setup for this antenna

In Toolbar, Logged, Transient

Limit recall initiated

When a limit setup file is selected for recall.

Not enough available space to save file: <filename>

When the entire file could not be written.

Playback file corrupted, stopping playback

In Toolbar, Logged, Transient

RBW changed: cannot be greater than IF bandwidth

In Toolbar, Logged, Transient

Recall file does not exist

When the file selected for recall could not be accessed

Record CSV file failed to open

In Toolbar, Logged, Transient

Reference Level Calibration is off

In Toolbar, Logged, Persistent

Restart required for new settings to take effect.

Persistent. When host name or options (in the Debug menu) are changed.

RF or Reference Level must be below <value> to enable Preamp

In Toolbar, Logged, Transient

Setting change detected; unloading playback file

In Toolbar, Logged, Transient

Save failed. File size exceeds save limits. Adjust setup and try again

In Toolbar, Logged, Transient

Shutdown Battery Level Reached

     Pop-up Window, Logged, Persistent: Requires User Intervention

     Sent after a **Battery Low** warning. A shutdown will occur when the battery charge is or below 5%.

Shutdown Temperature Reached

     Popup, Logged, Persistent

Simulated Test Signal data being displayed

     In Toolbar, Logged, Persistent

Spectrogram view not available

     In Toolbar, Logged, Transient

Segment gate length too short. Increase RBW or VBW setting for segments (X)

     In Toolbar, Logged, Persistent. X indicates the incorrect segments.

Temperature High Warning

     In Toolbar, Logged, Persistent

Triangulation line limit reached

     In Toolbar, Logged, Transient

The selected mode is not yet available.

     When an unavailable mode is selected.

The ALC Cal Data is incorrect for the attached microwave module

In Toolbar, Logged, Persistent

The following options will expire in less than 24 hours <Option Number>. Reboot required. The system will reboot at X.

     In Toolbar, Logged, Persistent. X denotes the date and time.

The following options have expired <Option Number>. Reboot required. The system will reboot at X

     Popup, Logged, Transient. X denotes the date and time.

The following options have expired <Option Number>

     In Toolbar, Logged, Transient

The following options have expired <Option Number>

     Popup, Logged, Transient

Quasi-peak detection selected. Sweep will be slower

     In Toolbar, Logged, Transient

Zero Span is not available

     In Toolbar, Logged, Transient

<value> exceeds the min/max range <value>

In Toolbar, Logged, Transient

<setting> value change is not allowed with calibration applied

In Toolbar, Logged, Transient

setting change is not allowed while a calibration is in progress

In Toolbar, Logged, Transient

setting change is not allowed with flex calibration

In Toolbar, Logged, Transient

A-6   Error Messages

Antenna disconnected. Terminating measurement

In Toolbar, Logged, Transient

ALC Unlevel Error (X) @ Y Hz

In Toolbar, Logged, Transient. X represents the ALC that failed and Y represents the specific frequency value at which the failure occurred.

Attempt to reboot instrument into Recovery mode failed

In Toolbar, Logged, Transient

Cannot start measurement without a connected Antenna

In Toolbar, Logged, Transient

Cannot set auto RBW ON due to exceeding IF bandwidth. RBW set to IF bandwidth

In Toolbar, Not Logged, Transient

Command Error

In Toolbar, Logged, Persistent

Could not lock to internal reference

In Toolbar, Logged, Persistent

Could not lock to external reference - check connection and try again

In Toolbar, Logged, Transient

Failed to connect to hardware

Persistent. When the connection to the hardware (server) could not be established.

Failed to recall limit

When the limit setup file selected for recall could not be accessed.

Failed to save file: filepath/filename

When any other error occurred while trying to save a file or when the connection to the hardware (server) is broken.

Failed to save screenshot. Device may be full.

When saving a screenshot fails.

HW communication problem: SPA app unloaded

In Toolbar, Logged, Persistent

Not enough available space to save file: filepath/filename

When the entire file could not be written

Out of Range

In Toolbar, Not Logged, Transient

Options <value> are not valid for the currently installed firmware version. The device might not function properly

In Toolbar, Logged, Persistent

PLL Unlock Error (X)

In Toolbar, Logged, Persistent. X represents either LO1, LO2, SLO or a combination of them.

PLL Unlock Error (X) @ Y Hz

In Toolbar, Logged, Persistent. X represents the PLL that failed and Y represents the specific frequency value at which the failure occurred. The frequency range of Y is from 30,000.00 Hz to 54,000,000,000 Hz.

Query Error

In Toolbar, Not Logged, Transient

Recall file does not exist

When the file selected for recall could not be accessed.

SPA FPGA Programming Error

In Toolbar, Logged, Persistent

Setting mismatch; cannot display memory trace

In Toolbar, Logged, Transient

To minimize distortion on higher level signals, please add external attenuation

In Toolbar, Not Logged, Persistent

The selected custom mask is invalid

In Toolbar, Logged, Transient

Trace playback not available

In Toolbar, Logged, Transient

Trace recording not available

In Toolbar, Logged, Transient

Unexpected software exception. Reboot required.

When the instrument software requires a reboot due to unknown error, Persistent

Options <value> are not valid. Running without any options

In Toolbar, Not Logged, Persistent. This error may occur after a firmware update. Indicates that invalid option numbers were detected (<value> indicates the invalid option numbers).

Options listed <value> are not valid. Restored to previous options

In Toolbar, Not Logged, Transient. This error may occur when upgrading options from an options upgrade file fails due to an invalid option configuration. The options will be restored to the previous options numbers.

Failed to upgrade options. Restored to previous options #

In Toolbar, Not Logged, Transient. This error may occur when upgrading options from an options upgrade file fails due to an unknown reason. The options will be restored to the previous options numbers.

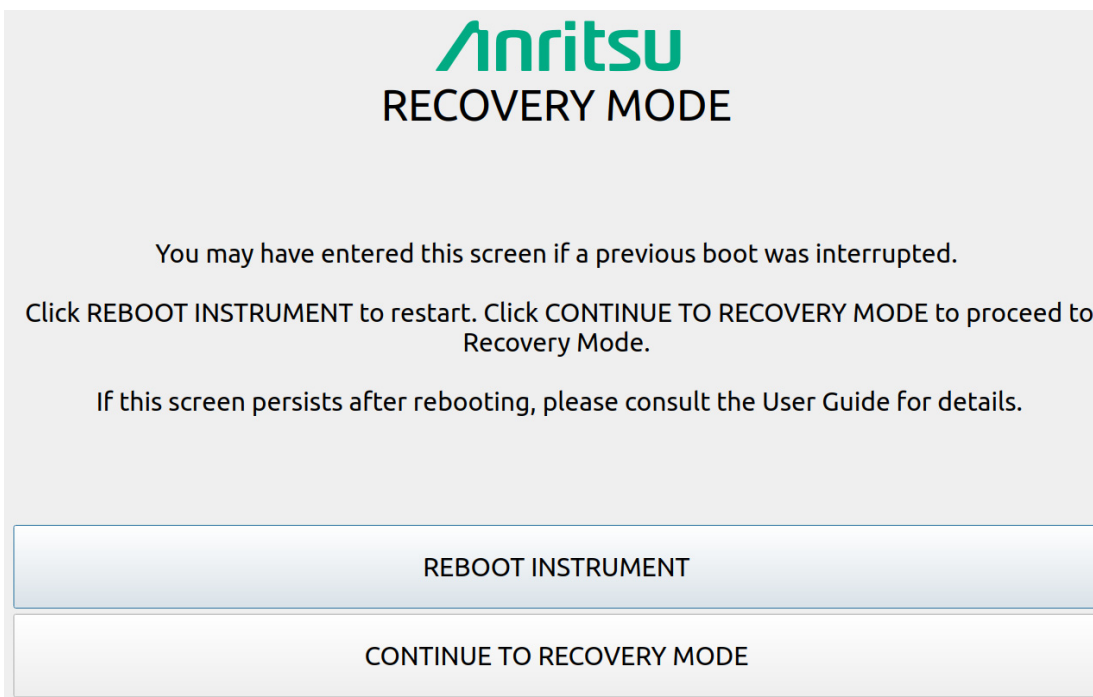**Zero Sensor Error, remove any RF input signal to the external sensor**

In Toolbar, Logged, Transient

A-7   System Recovery

This section can be referred to in the event the MS20x0A does not boot properly and the normal attempts to restart the instrument have failed.

Introduction

If the MS20x0A fails to boot properly, a second boot attempt will load a recovery menu as shown in Figure A-1. This menu is only displayed when the instrument fails a normal boot process. A failure to boot properly might not indicate a problem. A boot disruption, such as removing power before the instrument can complete the boot process, will initiate a recovery menu on the next boot.

/Inritsu

RECOVERY MODE

You may have entered this screen if a previous boot was interrupted.

Click REBOOT INSTRUMENT to restart. Click CONTINUE TO RECOVERY MODE to proceed to Recovery Mode.

If this screen persists after rebooting, please consult the User Guide for details.

**REBOOT INSTRUMENT**

CONTINUE TO RECOVERY MODE

Figure A-1.   Recovery Mode

If you see this screen:

1. Select the REBOOT INSTRUMENT button once the recovery menu loads.

2. If boot failure continues, a system recovery can be performed by pressing CONTINUE TO RECOVERY MODE.

The Recovery Mode menu (Figure A-2) shows instrument information and provides a variety of recovery options in ascending invasive order:

1.   Select REBOOT to reboot the instrument without any further action.

2.   Save all internal user files and logs by inserting a USB device and press the EXPORT button.

3.   Refer to "Reset" on page A-20 for information about various reset options.

4.   Refer to "Boot Order" on page A-20 to select a different boot order.

5.   Refer to "Install SW to SLOT X" on page A-21 to reload or update the system software.
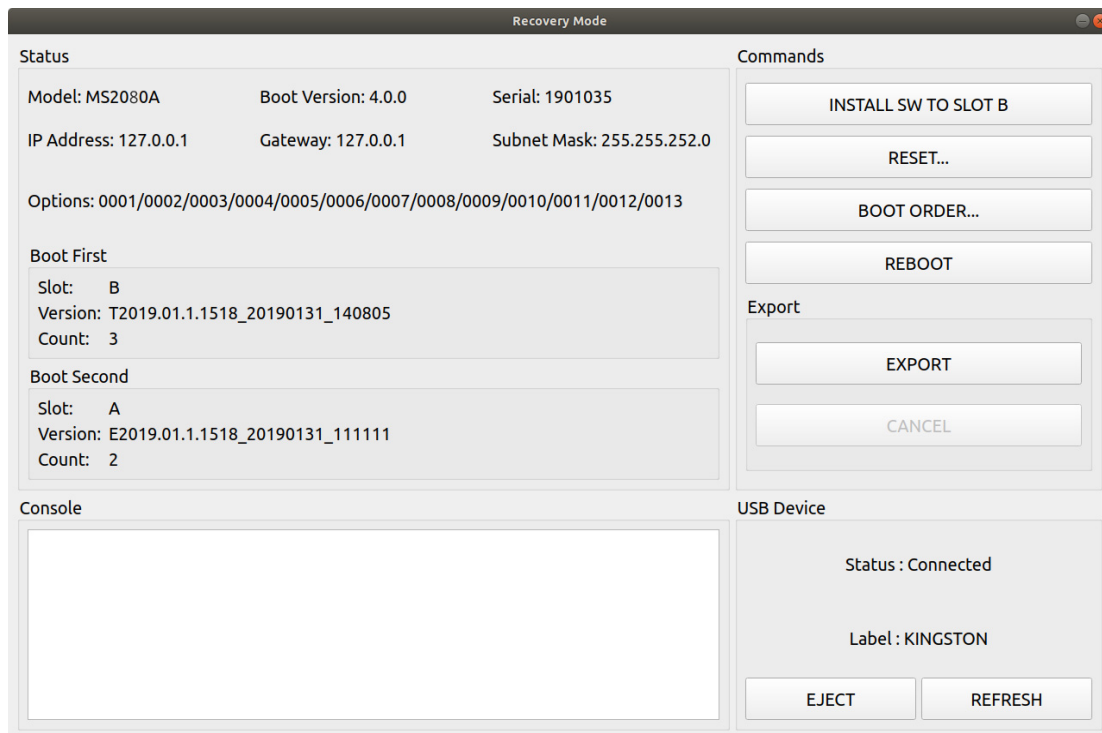
Status: Shows the Model, Boot Version, Serial Number of the MS20x0A, IP Address, Gateway, Subnet Mask.

Options: Shows the Options currently installed.

Boot First: Shows the Slot, Version, and Count in the Boot First position.

Boot Second: Shows the Slot, Version, and Count in the Boot Second position.

Console: Provides a readout of the reboot activity.

Commands: Choose the command method to restart the instrument:
   • INSTALL SOFTWARE TO SLOT B: Indicates which slot will be overwritten as described in "Install SW to SLOT X"
   • RESET: Provides the RESET dialog as shown in "Reset" on page A-20.
   • BOOT ORDER: Provides the Boot Order dialog as shown in "Boot Order" on page A-20.
   • REBOOT: Reboots the instrument.

Export: Select EXPORT to save all internal user files and logs to a USB device. Select CANCEL to cancel the export. The saved files can be copied back to internal memory by using the file management menus.

USB Device: This section provides:
   • Status: The USB memory device is connected or unconnected.
   • Label: The Manufacturer of the USB memory device.
   • EJECT: Select to eject and remove the USB memory device.
   • REFRESH: Select to reconnect to the USB memory device.

Figure A-2.   Recovery Mode

Reset

The recovery RESET dialog is shown in Figure A-3. Here you can reset the MS20x0A from the choices shown. In rare cases, system, internal, or other user files may interfere with instrument operation, so choosing to delete this data in that order may resolve a problem.

Caution	Any data that is deleted by the following selections is unrecoverable. Use the EXPORT button to save this data before proceeding.

Once reset options are selected, press the RESET SELECTED button.
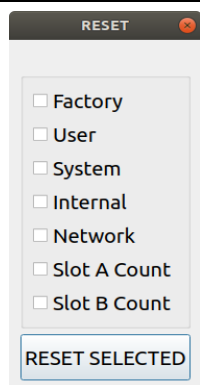
Factory: Performs a Factory reset, which deletes last saved settings files for all applications.

User: Performs a User reset, which deletes all user setup, measurement, csv, limit, screenshot, IQ captures, and user calibration files.

System: Performs a Factory reset and also deletes event and error logs.

Internal: For service use only. Performs an Internal reset, which deletes non-volatile system files, except for critical files such as the serial number, options, and network configuration. Does not take effect until the next boot.

Network: Performs a Network reset, which deletes manual Ethernet settings and reverts the networking to DHCP. All saved Wireless networks will also be lost.

Slot A Count: Resets Slot A Count to 3. This is used for the recovery mode countdown.

Slot B Count: Resets Slot B Count to 3. This is used for the recovery mode countdown.

RESET SELECTED: Resets the MS20x0A by the method chosen.

Figure A-3.   RESET Dialog

Boot Order

The order of which slot boots first can be changed from the BOOT ORDER menu (shown in Figure A-4). You may want to change the boot order to select a different software image in case of corruption or for preference. Selecting SWAP will change the boot sequence order: Slot A or Slot B. Once selected, press CLOSE and then reboot the instrument. This setting can only be changed from the Recovery Mode menu.
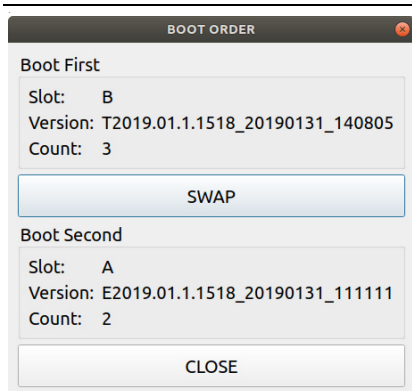
Boot First: Provides the first boot version to boot.
 • Slot: Provides the slot designated location.
 • Version: Provides the boot version number.
 • Count: Boot attempts with this version.

SWAP: Swap Slot A and Slot B in the boot sequence.

Boot Second: Provides the first boot version to boot.
 • Slot: Provides the slot designated location.
 • Version: Provides the boot version number.
 • Count: Boot attempts with this version.

Close: Closes the BOOT ORDER dialog.

Figure A-4.   BOOT ORDER

Install SW to SLOT X

The recovery mode shows two slots (A and B). These slots contain different system software packages that are installed. Each slot contains the following information:

- Slot name (A,B): Boot version package (A or B).
- Slot count (3,2,1): The count indicates how many unsuccessful boot attempts before the slot is marked as unbootable. Every failed attempt decrements the value until it reaches 0 (unbootable). This count can be reset to 3 using the "Reset" menu.
- Slot version: The version represents the software package version available in the slot.

You can install a new software package by inserting a USB memory device with the system software file (.raucb) and pressing "Install SW to SLOT X." The X will be replaced with an A or B depending on which slot is to be overwritten. You will not be able to select which system software file will be installed from the attached USB, it will always install the first one found.
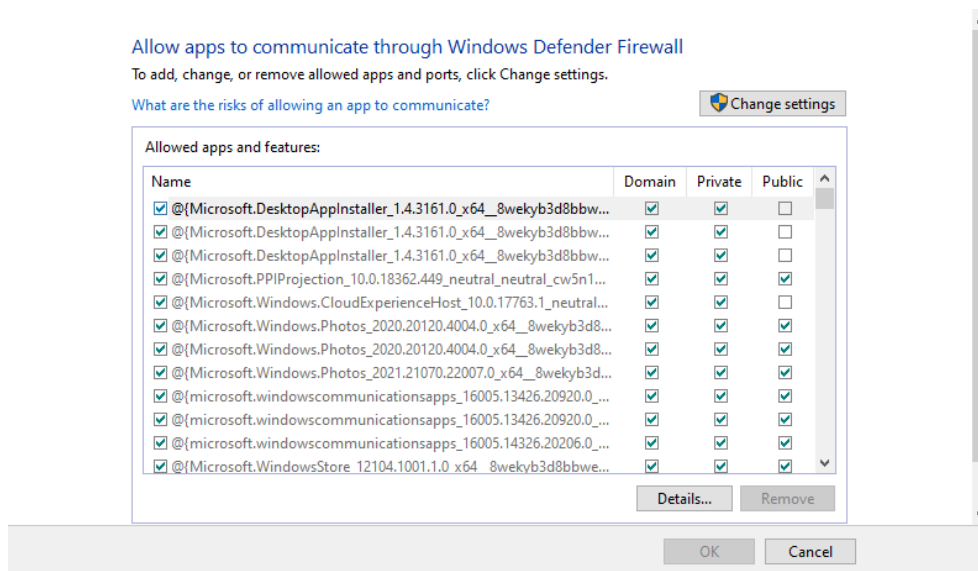
A-8   UDP Discovery Tool Firewall Settings

Follow the instructions below if the Discovery tool is not responding:

1.   Go to Control Panel and open Windows Defender Firewall settings.

2.   Click Allow an app or feature through Windows Defender Firewall.

Figure A-5.   Windows Defender Firewall window

3.   Click Change Settings button.

Figure A-6.   Allow apps to communicate through Windows Defender Firewall window

4. Find fieldmaster_base in the list of apps, and make sure that the fieldmaster_base box and Domain box are checked. Private and Public boxes may also need to be checked depending on where the instruments are on the network.

5. Click OK. Note that if the fieldmaster_base is missing, click Allow an app or feature through Windows Defender Firewall, and search for fieldmaster_base.exe file available in the installation directory.

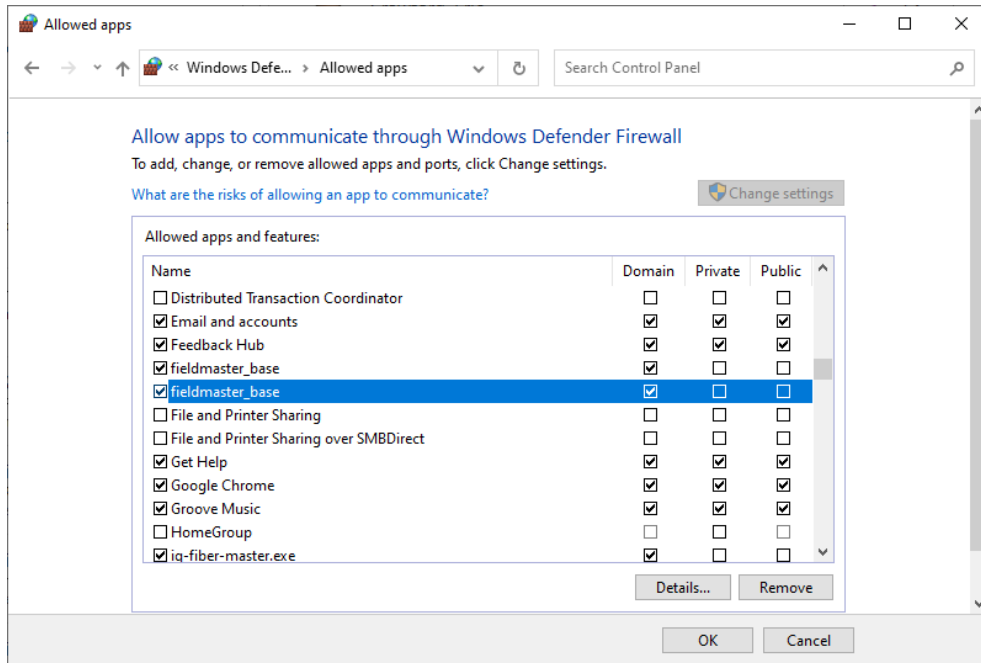Note that if more than one fieldmaster product is installed, multiple entries will need to be enabled.

Figure A-7.   Field master base app

A-9   System Override

In the event that the instrument does not respond to SCPI commands (due to circumstances like a long sweep used in conjunction with `*OPC?`) and needs to be reset remotely, the system override feature can be used. System override can be accessed through TCP port 8001 of the instrument. All commands except a password reset will require the instrument's password to be sent. The default password for an instrument is the MAC address interleaved with the word "system" between MAC address pairs. As an example, an instrument with the MAC address "1a:2b:3c:4d:5e:6f" will have a default password of "1as2by3cs4dt5ee6fm". Currently, system override supports the commands as described below:

1. Reboot the instrument:

    To reboot the instrument, send the following string to the instrument through port 8001:

    `"force_reboot,<instrument_password>"`

    Replace <instrument_password> with the password of the instrument. After the command has been sent, the instrument will respond with "`ok`" if the command has been successfully processed. If the password is incorrect, "`password_match_fail`" will be returned.

2. Set a new password:

    To set a new password for the instrument, the following string should be sent through port 8001:

    `"change_password,<old_instrument_password>,<new_instrument_password>"`

    Note that the max length of a password is 50 characters. If the new password has been successfully set, "`ok`" will be returned. If the password is too long, a "`password_over_50_characters_fail`" will be returned. If the old password does not match, a "`password_set_fail`" message will be returned.

3. Reset the password:

    In the case where the system override password needs to be reset to default, the following command can be sent through port 8001:

    `"reset_password"`

    Note that this command DOES NOT require the instrument password. If the password has been successfully reset, "`ok`" will be returned.

4. Disconnect SCPI connections:

    This command causes all currently established SCPI connections (on TCP port 9001) to be disconnected.

    reset_scpi_connection

    It can be used to immediately clean up connections that were left open due to network interruption (e.g. close handshake packets were dropped, client thinks it is disconnected but the instrument thinks the connection is still there) or to establish sole control of an instrument by forcing all other clients to reconnect. This command is automatically executed when secure mode is turned on.

If an improperly formatted command is sent to the instrument, a "`command_match_fail`" will be sent back.

To use dbutil:

1. Open a command window in Windows.

2. Enter the command:

dbutil /f ip_address where ip_address is the address of Field Master. Then the DNS name can be used instead of the ip_address.

Appendix B — Software Option Upgrades

B-1   Introduction

Upgrading software options on MS20x0A consists of two main steps:

1. Export and send the unit's configuration file to Anritsu.

2. Import the new license file provided by Anritsu

B-2   Exporting a Software Configuration File

Exporting the configuration file:

1. Insert a USB memory device.

2. Open the System menu from the upper left 3-line icon.

3. Navigate to SETTINGS > OPTIONS menu.

4. Touch SAVE CONFIG at the lower left of INSTALLED OPTIONS.

5. Save the configuration file to a USB memory device, preserving the default filename. The filename will be in the format of MS20x0A_XXXXXXX.config on the USB drive when the operation is complete.

6. Email the file to [Anritsu] (example@example.com).

B-3   Importing Software License

Importing a new license file:

1. After receiving a new license file from Anritsu, place the file on the USB memory device in the top (root) level, not in any directory.

2. Open the System menu from the upper left 3-line icon.

3. Navigate to SETTINGS > OPTIONS menu

4. Touch ENABLE OPTIONS USING FILE at the lower right of INSTALLED OPTIONS.

   The instrument will search for a valid license file on the USB memory device and apply the changes to the system.

5. Select INSTALL OPTIONS FROM WEB at the lower right of INSTALLED OPTIONS to install options available on the Anritsu's website.

6. Reboot the instrument and ensure all changes are applied.

B-4   Software Update

To update your Anritsu instrument software, use a high quality USB memory device with at least 1 GB of free space and FAT32 file system format.

1. Insert the USB memory device into your PC or laptop.

2. From a browser, go to your product's page:

    http://www.anritsu.com/en-US/test-measurement/products/ms2070a

    http://www.anritsu.com/en-US/test-measurement/products/ms2080a

3. On the product page, click DOWNLOADS.

4. Select the software update for your product and copy the downloaded software into the USB memory device.

5. Insert the USB memory device into the one of the MS20x0A USB ports.

Installing the Software

1. Start the software update via one of the two ways below (see Figure B-1):

    • Access the upper left System Menu (3-line icon), then press SYSTEM INFORMATION > INSTALL UPDATE.

    • Select the software update icon from the "Title Bar".

2. Select the latest available update from the drop-down selections and press INSTALL.

    • A dialog will appear stating Software Update in Progress.

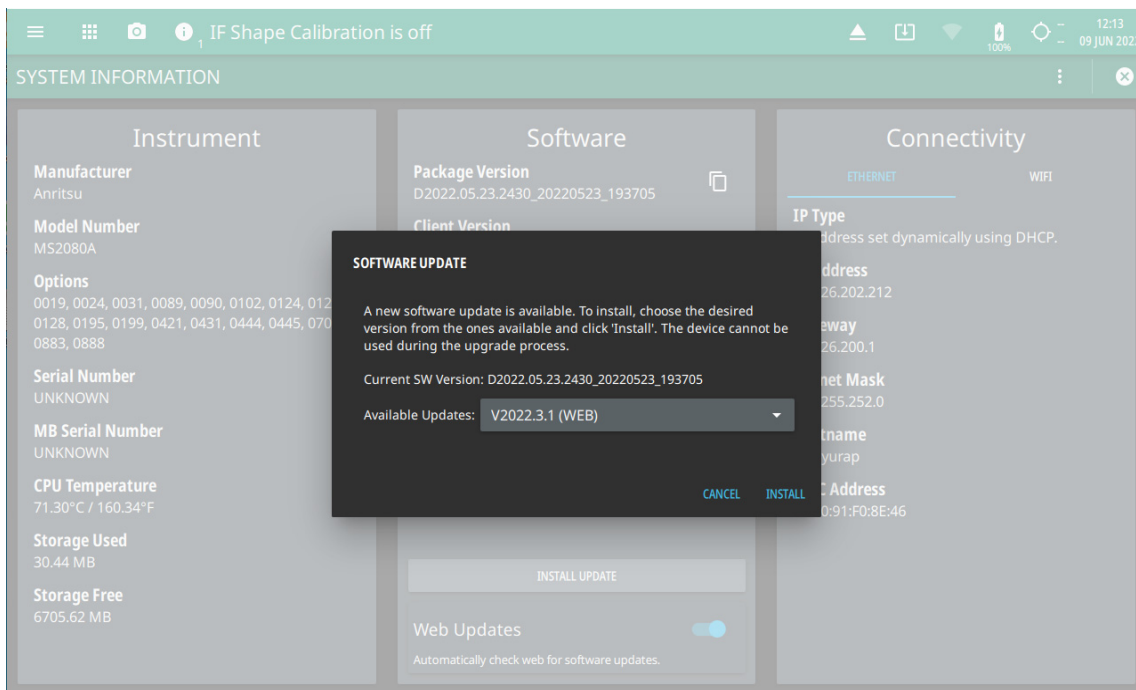3. When the installation is complete, see "Verify the Software Update".

Figure B-1.   Updating the Software

Verify the Software Update

1. Once the software update is complete, power off the MS20x0A.

2. Power on the MS20x0A.

3. Select the System menu icon (3-line icon) from the MS20x0A to display the System Menu.

4. Select the System Information menu (see Figure B-2).

5. Verify the Software Package Version displayed is the most current version installed.
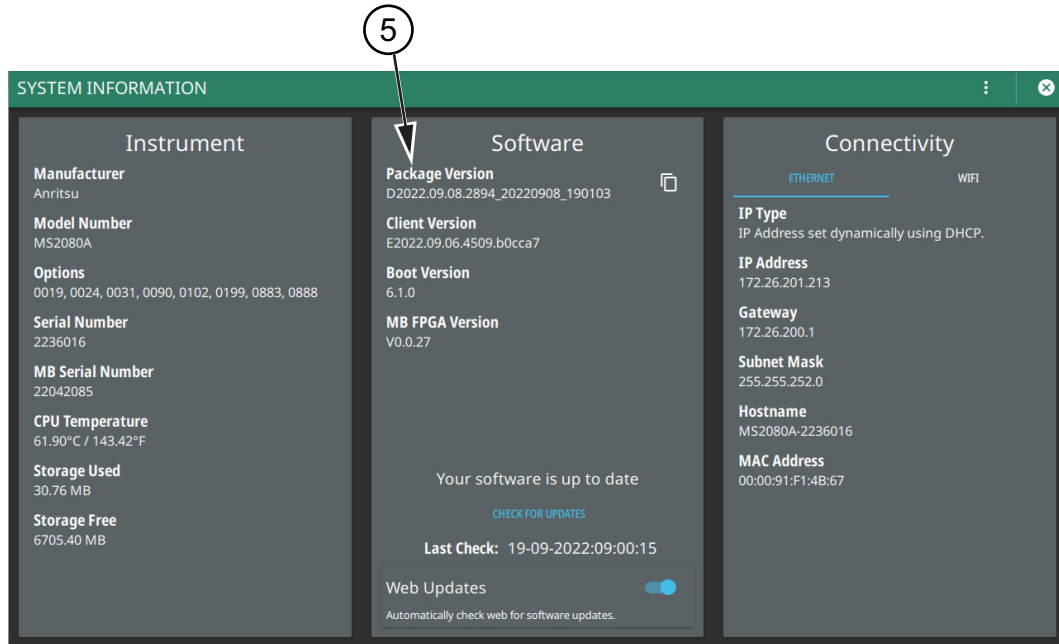
Figure B-2.　System Information

Appendix C — PC Software

C-1   Introduction

The MS20x0A PC software provides remote access to a network connected instrument and displays the same MS20x0A user interface, instrument controls, and live measurement data on the computer screen. The software also allows you to load measurement and setup data from saved files and then perform measurement analysis on the recalled traces, even when instrument hardware is not available or is not connected to the PC by using the localhost (refer to Section C-4 "Connecting to the MS20x0A or Localhost"). The user interface provides the same functionality when an instrument is connected with a few exceptions:

- File operations will interface with the PC file system rather than on the instrument and save on event operations will be saved to the instrument memory (refer to Section C-7 "FILE (File Management)").

- In RTSA mode, the display density is not shown due to data transfer requirements, so you will just see the spectrum trace. The trace persistence state and time still function normally.

Connecting to the localhost is like connecting to an instrument so there is no expectation of carrying over settings or trace data from one to the other. The localhost will include option controlled functionality with most options automatically enabled (refer to Section C-6 "Working with the Localhost").

C-2   PC Requirements

Minimum computer requirements are listed below:

- Intel Core i5 or higher processor
- 8 GB RAM
- Windows 10, 64-bit
- 1 GB disk space
- Open GL (ES) 2.0 support
- Display resolution 1280 x 800
- Ethernet or Wi-Fi (for connecting to an MS20x0A instrument)

C-3   Installation

1. Download the MS20x0A software from the product page:

    http://www.anritsu.com/en-us/test-measurement/products/ms2070a

    http://www.anritsu.com/en-us/test-measurement/products/ms2080a

2. Launch the MS20x0A executable file and follow the on-screen instructions after selecting YES to the User Account Control dialog.
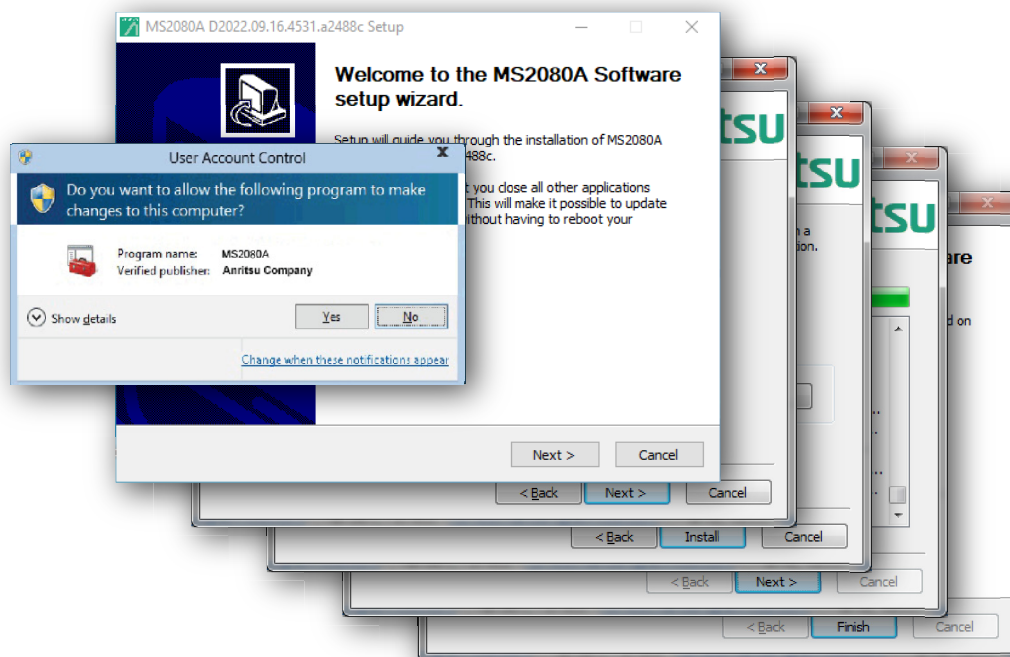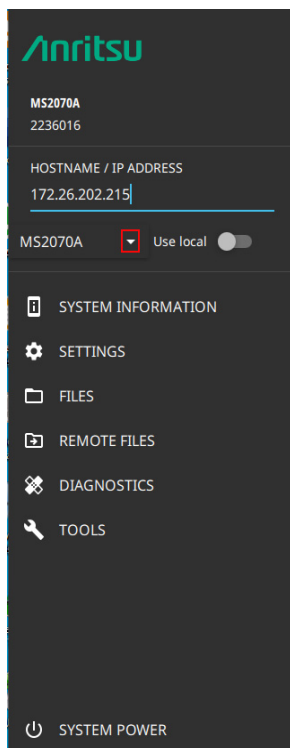

Figure C-1.   MS20x0A PC Software Installation

C-4   Connecting to the MS20x0A or Localhost

Connecting to a networked instrument or to the localhost is established via the system menu. If connecting to an instrument, the instrument must first be connected to the network via Ethernet or Wi-Fi and the IP address of the instrument must be known.

C-5   System Menu

Select the 3-line icon to access the system menu.

|	
 Ʌnritsu **MS2070A** 2236016 HOSTNAME / IP ADDRESS 172.26.202.215 MS2070A ▼ Use local ⬤ ⓘ SYSTEM INFORMATION ⚙ SETTINGS 🗁 FILES ⬒ REMOTE FILES ✖ DIAGNOSTICS 🔧 TOOLS ⏻ SYSTEM POWER	The System menu identifies the instrument model and serial number. **HOSTNAME/IP ADDRESS:** Displayed only on the MS20x0A PC software. This field is used to specify the IP address or hostname of an instrument that is connected to the network. When **Use local** (localhost) is toggled on, the software will connect locally to provide some UI functionality. Note that some of the system menus have limited functionality when the software is connected to the localhost. When connected to an instrument, refer to "System Menu" on page 2-19. **SYSTEM INFORMATION:** Displays information about the instrument and software. **SETTINGS:** Provides access to setting the display color theme and screenshot capture settings (refer to "Display Settings" on page 2-22). **FILES:** Opens the Windows file explorer. Refer to "FILE (File Management)" on page C-9. **REMOTE FILES:** Opens the "Remote Files" on page C-6. **DIAGNOSTICS:** Opens "Diagnostics" on page 2-45. **TOOLS:** Opens the "Tools Menu" on page 2-47. **SYSTEM POWER:** Opens a dialog to RESTART or POWER OFF the instrument.

Figure C-2.   System Menu

System Information

1. Access the System menu (3-line icon in the upper left corner).

2. Click SETTINGS to access the settings menu, then select SYSTEM INFORMATION to view the system
   details.
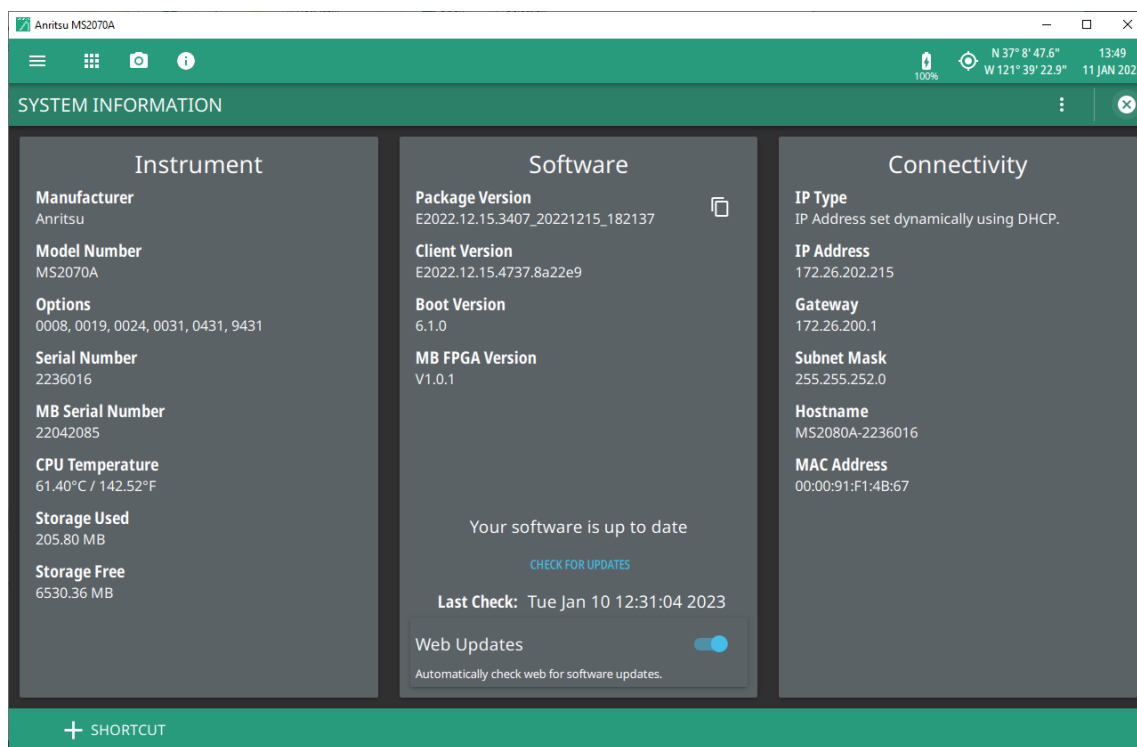
Figure C-3.   System Information Menu

Files (File Management)

The PC file system is used for all file operations when connected to either an instrument or to the localhost. The FILE menu will display the Windows Save As or Recall File dialogs; the FILES system menu will launch Windows Explorer. Note that files cannot be recalled from nor written to a connected instrument. Also, SAVE ON EVENT files will always be saved to the instrument and not the local PC.

1. Access the System menu (3-line icon in the upper left corner).

2. Click FILES to access the FILES menu.
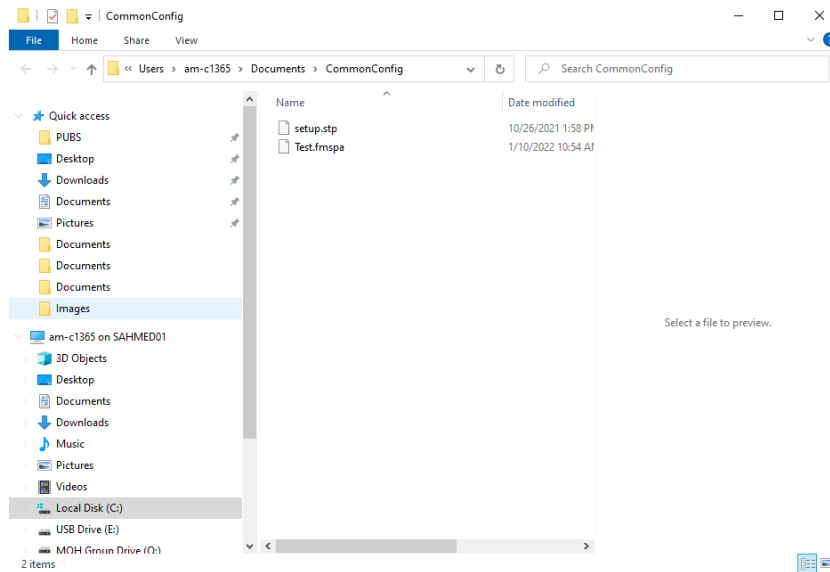
Figure C-4. Files Menu

Remote Files

1. Access the System menu (3-line icon in the upper left corner).

2. Click SETTINGS to access the settings menu, then select REMOTE FILES to open the default browser window and download the internally saved files for e.g. screenshots. See Figure C-5.

3. Click the desired file from the list and download the content as needed.

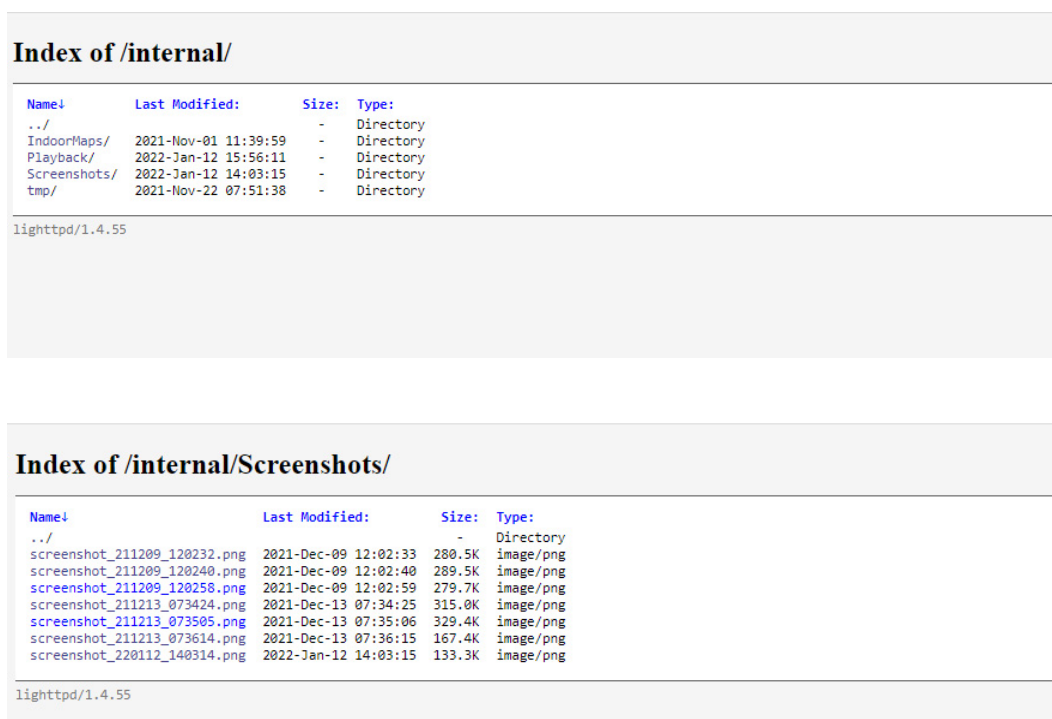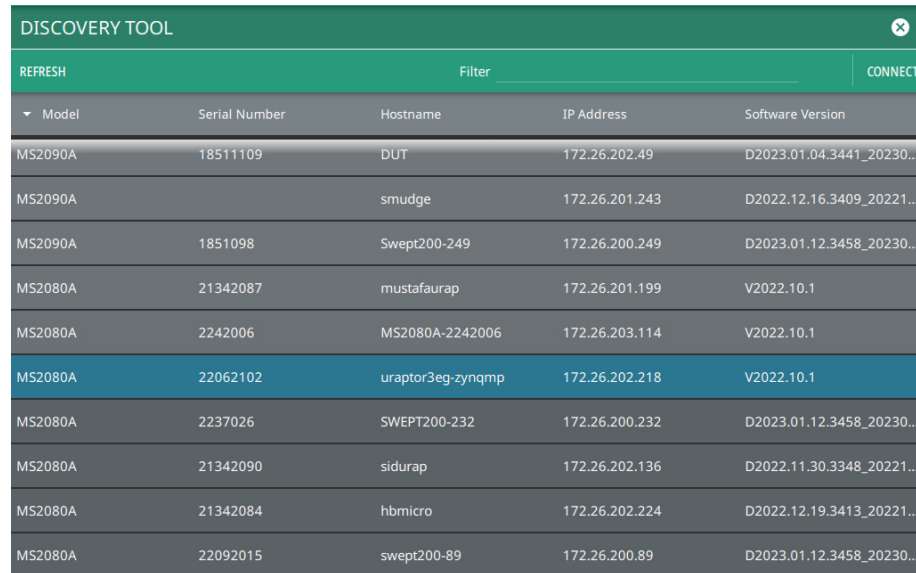**Figure C-5.**   Remote Files Menu

Tools Menu

1. Access the System menu (3-line icon in the upper left corner).

2. Click TOOLS to access the tools menu, then select the tool menu that you wish to open.

IQ STREAMING MAP TOOL DISCOVERY TOOL PDF REPORTS	**IQ STREAMING:** No measurements can be made as this functionality is not supported by the MS2070A/MS2080A instruments. Use this option to concatenate IQ streaming metadata files. For more information refer to IQ Streaming section of spectrum analyzer measurement guide (10580-00447).
	MAP TOOL: Opens Map Tool. Refer to Map Tool section of spectrum analyzer measurement guide (10580-00447).
	DISCOVERY TOOL: Opens "Discovery Tool" on page C-7
	PDF REPORTS: Facilitates report generation in a web browser. Click to open REPORT GENERATOR- PREVIEW window in the browser. Refer to "PDF REPORTS" on page 2-48 for information about report generation. You can either print or save a copy of the report in the PDF format.

Figure C-6.   Tools Menu

Discovery Tool

The DISCOVERY TOOL displays all of the compatible units found on the local network. Select an instrument and then click CONNECT.

Figure C-7. Discovery Tool

C-6 Working with the Localhost

The localhost setting provides a simulated connection to the instrument hardware, but does not provide simulated data. When an instrument is not connected and the MS20x0A software instead connects with the localhost, most of the menus are available and operate the same as they do on the instrument, but there are some differences as discussed in the following sections. In order to analyze measurement data, this data must first be acquired using instrument hardware and then saved locally to the PC or transferred to the PC from instrument storage at a later time.

Some notes and caveats when connected to the localhost:

- The PC software supports the following modes:
  - Spectrum analyzer
  - RTSA (trace data only)
  - 5GNR Analyzer
  - LTE Analyzer
  - IA Spectrum
  - IA RTSA
  - HIPM
  - CAA

- The software must be set to the correct mode to recall a file for that mode. For example, to recall a .fm5gnr file, the 5GNR mode from the PC software must be selected first.

- Trace files will be recalled into a "HOLD" state, just like they would be on an instrument. This means that if the user changes the span, center frequency, or other settings that invalidate the data, all trace data will be cleared from the screen. The only way to get it back is to recall the trace again.

- Some buttons presented in the interface may not be applicable when connected to the localhost. Selecting them will have no effect.

- Measurements such as channel power or occupied bandwidth can be performed on recalled trace data, but the sweep must be set to Continuous. The same is true for evaluating the trace on a limit line.

- Measurements that change the span, such as SEM, are not functional unless the original file was saved while making an SEM measurement.

Measurement Setup Parameters

Since most of the setup parameters are available, you can use the PC software to create measurement setup files (.stp) for later use on the instrument; however, when recalling and analyzing measurement data, changing settings that would affect the data acquisition may cause the recalled data to be removed from the display. For example, you can change amplitude parameters, but you cannot change frequency parameters such as start/stop, span, and bandwidth parameters since there would be no data associated with those changed parameters. You can apply measurement features to the saved measurement data such as markers and limit lines and you can change many measurement and view settings. Opening a .fmxxxx measurement file when connected to the localhost will work basically the same as recalling a measurement on an instrument.

Below is a summary of menu behaviors when working with recalled measurement data and when connected to the localhost. Note that when connected to an instrument, the menus behave the same as on the instrument.

FREQ SPAN

Changes here suppress recalled data.

AMPLITUDE

Changes to REF LEVEL, SCALE/DIV, Y AXIS UNIT will change the graticule. PRE AMP and ATTEN LEVEL have no affect. All other changes will suppress recalled data.

BANDWIDTH

Changes here suppress recalled data.

TRACE

You can select different Traces or add Cursors if spectrogram data was captured. Most other trace settings have no affect.

SWEEP

You can recall GATED SWEEP and PWR VS TIME data, and you can change the GATE DELAY. Most other sweep settings have no affect.

MARKER

All marker measurements are available.

LIMIT

All limit line functions are available.

TRIGGER

Trigger functions have no affect.

MEASURE

Some measurements can be selected when the appropriate data is recalled. For example, a an Channel Power, OBW, and ACP measurements can be applied to a normal spectrum trace.

SETUP

Setup parameters for Channel Power, OBW, and ACP can be adjusted.

PRESET

Preset functions will preset the selected items and suppressed recalled measurement data.

C-7   FILE (File Management)

The PC file system is used for all file operations when connected to either an instrument or to the localhost. The FILE menu buttons will display the Windows Save As or Recall File dialogs; the FILES system menu will launch Windows Explorer. Note that files cannot be recalled from nor written to a connected instrument. Also, SAVE ON EVENT files will always be saved to the instrument and not the local PC.

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