MT1000A
MU100040A
Network Master Pro
Operation Manual

First Edition

For safety and warning information, please read this manual before attempting to use the equipment. Keep this manual with the equipment.

ANRITSU COMPANY

MT1000A/MU100040A
Network Master Pro
Operation Manual

August 2016 (First Edition)

About This Manual

The documentation for MT1000A Network Master Pro applies to the instrument with the MU100040A CPRI RF Module installed. This operation manual describes both the basic operation of the instrument and the operations available via interface options and predefined applications/tests.

MT1000A/MU100040A Network Master Pro Operation Manual (this manual)

Operations for the MT1000A Network Master Pro mainframe with CPRI RF module (MU100040A) are described.

Manual Structure

The content of the manual is structured as follows:

Chapter 1 - Introduction

Chapter 2 - Configuration

Chapter 3 - Operator Interface

Chapter 4 - Graphical User Interface

Chapter 5 - CPRI RF Application

Chapter 4 consists of a general introduction to the GUI. Chapter 5 contains descriptions of each screen, sub-screen and major dialog box.

This operation manual is intended for users with basic knowledge of the following:

Optical fiber communication, handling optical parts and optical fibers
Common Public Radio Interface (CPRI) technology
Mobile communication systems

Table of Contents

1 Introduction

This section provides a general introduction to the MT1000A Network Master Pro and describes the symbols and conventions used in this manual. It also includes safety and compliance information and terms of warranty.

1.1 Mainframe

The MT1000A Network Master Pro, also referred to as the Network Master or simply as "the instrument," is a battery-powered multi-purpose telecommunications test instrument designed for a wide range of applications, from fast first-aid troubleshooting to comprehensive, in-depth analysis of transmission problems. The installed options enable the Network Master to be used both as a full-featured transmission line quality tester and as an advanced signal analyzer.

The Network Master features a wide TFT LCD display with touch screen functionality for user control of the interface and test result analysis. The Network Master lets you save configuration setups for convenient recall of frequently used settings. For fast and efficient data transfer and external communication, the Network Master supports a LAN interface, Bluetooth®, and three USB ports.

The robust construction of the Network Master and its detachable shoulder strap and handgrip make it highly portable and well suited for field use. A rechargeable, intelligent high-capacity Li-Ion battery is provided. For extended tests in a controlled environment, an AC power adapter is also included.

For the latest information, refer to the product page at:
www.anritsu.com/en-us/test-measurement/products/mt1000a

1.2 CPRI RF Module (MU100040A)

MU100040A is the measurement module used for CPRI RF testing. Refer to "CPRI RF Measurement Setup" for a description of this application's graphical user interface.

1.3 Symbols and Conventions

1.3.1 Symbols Used in Manual

Anritsu Company uses the following symbols to indicate safety-related information. To avoid physical injury and property loss caused by improper use of the equipment, always obey these safety instructions. Some or all of the following symbols may be used on Anritsu equipment. There may be other labels attached to products that are not shown in this manual.

⚠ DANGER This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

⚠ WARNING This indicates a hazardous procedure that could result in serious injury or death if not performed properly.

⚠ CAUTION This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

1.3.2 Safety Symbols Used on Equipment

The following safety symbols are used on Anritsu equipment to provide operation instructions and warnings. Make sure you understand the meanings of the symbols and take all necessary precautions before using the equipment.

⊘ This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.

◯ This indicates a safety precaution. The related operation is indicated symbolically in or near the circle.

△ This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.

☐ This indicates a note. The contents are described in the box.

♻ 🗑 These indicate that the marked part should be recycled.

Some annotation conventions are used for different types of information. Illustrations below are highlighted with a gray background only to indicate that they are examples.

1.3.3 Notes

The Note symbol indicates information, procedures, or recommendations that need to be followed to make correct measurements, etc. Text is shown in italics to visually differentiate the note from other information.

1.3.4 Hints

The Hint symbol indicates information that should be treated as user tips, suggestions, or recommendations. Text is shown in italics to visually differentiate the hint from other information.

1.3.5 Options

The Option symbol indicates that the information relates to a function or feature that is available only if the associated option (hardware or software) is installed. The Option text is shown in italics to visually differentiate it from other information.

1.4 Warnings

This section contains warnings related to the safe operation and handling of this product and its accessories. Failure to follow these instructions may lead to personal injury, product damage, or harm to the environment.

⚠ **WARNING**

- Always refer to the Operation Manual when performing tasks or handling components that display the mark on the left. Not complying with posted warnings will increase the risk of personal injury and equipment failure or poor performance. The alert mark shown on the left may be used alongside other marks to indicate different types of hazard.

- Overvoltage Category

  This equipment complies with Overvoltage Category II as defined in IEC 61010. Do not connect this equipment to a power supply of Overvoltage Category III or IV.

- Laser radiation

  Laser radiation will cause serious injury to the eye. Never look directly into a fiber optic connector or the end of a cable that may be carrying an optical signal.

Repair

⚠ **WARNING**
NO OPERATOR SERVICE-
ABLE PARTS INSIDE.
REFER SERVICING TO
QUALIFIED PERSONNEL.

- This equipment cannot be repaired by the user. Do not attempt to disassemble internal components. To avoid injury and possible property damage, only qualified personnel with the proper training should service this equipment.

Calibration

VOID IF SEAL BROKEN
/Anritsu
CALIBRATION SERVICES

- The performance guarantee seal verifies the integrity of equipment coming out of the factory. To ensure the continued integrity of the equipment, only service personnel from Anritsu or an authorized sales representative should break this seal to repair or calibrate the equipment.

  If the seal is broken by the user or an unauthorized third party, the performance of the equipment cannot be guaranteed.

⚠ **WARNING**

Replacing Battery

- Use only approved replacement batteries. If the wrong type of battery is used or the battery terminals are not positioned correctly, there is a risk of explosion causing severe injury or death.

  For California (USA) Only

  This product uses a CR Coin Lithium Battery which contains perchlorate material. Special handling may be required. Refer to www.dtsc.ca.gov/hazardouswaste/perchlorate.

Battery Fluid

- Do not short-circuit the battery terminals and never attempt to disassemble the battery or expose it to fire. If battery fluid leaks for any reason, do not ingest it or let it come in contact with your skin or eyes. Should this occur by accident, rinse with water immediately and seek medical help.

Battery Disposal

- Do not discard batteries in the trash. They contain chemicals harmful to the environment. They may also explode if burned.

LCD

- This equipment uses a Liquid Crystal Display (LCD) that can break and leak if mishandled. The liquid is caustic and poisonous. Do not touch or ingest it. If this happens, rinse with water immediately and seek medical help.

1.5 Cautions

⚠ CAUTION

Replacing Backup Battery	This equipment uses a polycarbon monofluoride lithium battery for memory backup. This battery must be replaced by service personnel when it has reached the end of its useful life. Contact your nearest Anritsu sales representative.

Note: The battery has a maximum useful life of 8 years. It should be replaced before this period has elapsed.

The life of the battery will vary depending on equipment usage and the operating environment.

Symptoms that may indicate an exhausted backup battery include the following:

- When power is supplied to the equipment, the instrument clock is incorrect.
- Parameter and data settings are not retained when power to the equipment is cut.

External Storage

This equipment supports the use of USB devices for external storage of data and programs. If these media devices are mishandled or become faulty, data may be lost. You should regularly back up all of your important data and programs. Anritsu offers no warranty against lost data.

- Never disconnect the USB device while data is being transmitted.
- USB devices are sensitive to static electric charges.
- Anritsu has thoroughly tested all external storage media shipped with this product. Storage media not shipped with this equipment may not have been tested by Anritsu and cannot be guaranteed for suitability or performance.

Lifetime of Parts

The life span of certain components is affected by the operating time or the power-on time. If the equipment is in use continuously over an extended period, some parts may need to be replaced at the customer's expense even if the guaranteed period described in the product Warranty has not expired. Performance cannot be guaranteed if component parts are used beyond their life spans.

For details on life span, refer to the corresponding section in this manual.

- LCD: Brightness at 50% after 40,000hrs
- Battery pack capacity: 70% after 300 charge/discharge cycles

Use in Residential Environment

This equipment is designed for use in an industrial environment. It may cause radio interference in a residential environment, in which case the user may be required to take adequate measures.

Use in Corrosive Atmosphere

Exposure to corrosive gases such as hydrogen sulfide, sulfurous acid, and hydrogen chloride will cause faults and failures. This may occur in the presence of organic solvents, some of which are known to release corrosive gases.

1.5.1 Cautions Against Computer Virus Infection

Copying files and data

Only files that have been provided directly by Anritsu or generated using Anritsu equipment should be copied to the instrument. All other files should be loaded only after a thorough virus scan.

Adding software

Do not download or install software that is not specifically recommended or licensed by Anritsu.

Network connections

Make sure the network has adequate anti-virus security protection in place.

1.6 Precautions

This section describes precautions you should take to avoid damage or malfunction due to incorrect use, handling and transportation of the Network Master.

1.6.1 Electrostatic Discharge (ESD)

Measurement modules and hardware options for the Network Master contain electronic components that are sensitive to ESD. All such items are shipped from Anritsu in anti-static shielding packages.

Electrostatic discharge can seriously damage these devices and lead to equipment failure. When installing or removing modules, it is your responsibility to control ESD. Consider the following whenever you handle the equipment or components.

⚠ CAUTION

Avoid build-up of electrostatic charge.

Keep your workplace clear of any item that can build up an electrostatic charge, that is, all items that are not made of anti-static material.

Minimize exposure to ESD.

- Remove ESD-sensitive items from their protective anti-static packaging only when you need to.
- Do not remove ESD-sensitive items from equipment or packaging unless you are properly grounded with a grounding wrist strap.
- Return ESD-sensitive items to their anti-static shielding packaging as quickly as possible.

Keep the equipment, ESD-sensitive items and yourself at the same static potential.

If your workplace has established guidelines for handling ESD-sensitive items, perform your tasks according to approved procedures. If not, take the precautionary steps described below, using a grounding wrist strap.

- Attach the wrist end of the wrist strap firmly around your wrist and the other end to the equipment chassis or ground plug.
- Keep the wrist strap on while you install or remove ESD-sensitive items. Do not remove the wrist strap until the ESD-sensitive parts are either installed or returned to the anti-static shielding package.

1.6.2 Optical Connectors

Optical connectors are highly sensitive to contamination, which may result in significant loss of signal.

⚠ CAUTION

To prevent contamination, optical connectors should always be capped when no fiber optic cables are connected.

1.6.3 Fiber Optic Cables

Improper handling of the cable may damage the optical fiber and degrade performance.

⚠ CAUTION

Do not pull on the cable when disconnecting the fiber.

Grasp the connector instead. Pulling on the cable may break the optical fiber or cause other damage to the cable sheath and connector.
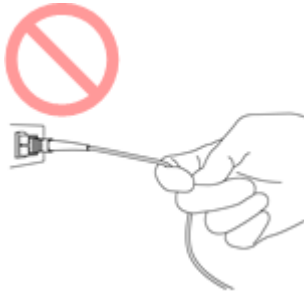
⚠ CAUTION

Do not crimp or pinch an optical fiber cable.

Keep the bend radius at 30 mm or more to avoid fiber damage and potential cable loss.
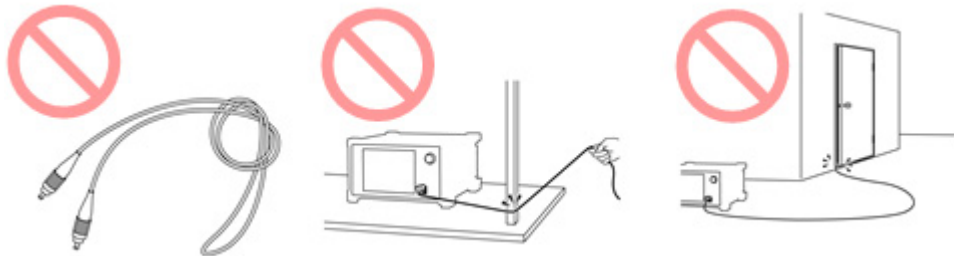
⚠ CAUTION

Do not twist or place undue stress on an optical fiber cable.

Stretching and twisting can break the optical fiber.

⚠ **CAUTION**

Handle optical fiber cables and connectors with care.

Impact against a hard surface can damage the connector end and lead to signal loss.

⚠ **CAUTION**

Do not disassemble optical connectors.

⚠ **WARNING**

Do not touch the end of a broken optical fiber cable.

The broken optical fiber may be sharp and pierce the skin.

1.6.4 Ventilation

The Network Master has internal fans and ventilation openings in the mainframe chassis to prevent overheating.

⚠️ **CAUTION**

Do not cover or otherwise block the air vents on the instrument.

1.6.5 Countries and Regions Permitting WLAN Use

Use of WLAN is restricted in some countries and regions, and illegal use may be punishable under national or local regulations. To avoid violating WLAN regulations, visit the Anritsu website to check where use is allowed.

http://dl.cdn-anritsu.com/en-en/test-measurement/files/Brochures-Datasheets-Catalogs/Brochure/nmx-wlan-mt1000a-160407.pdf

Anritsu cannot be held liable for any problem arising from WLAN use in other countries and regions.

1.7 Laser Safety

Class 1, 1M and 3R indicate the danger level of laser radiation according to IEC 60825-1:2007 standard.

1.7.1 Class 1

Lasers that are safe under reasonably foreseeable operating conditions, including the use of optical instruments for intrabeam viewing.

1.7.2 Class 1M

Lasers emitting in the 302.5 to 4000 nm wavelength range that are safe under reasonably foreseeable operating conditions, but may be hazardous if:

   a. in the case of diverging beams, the user views the laser output with certain optical instruments (such as loupes, magnifiers and microscopes) within a distance of 100 mm; or,

   b. in the case of collimated beams, the user views the laser output with certain optical instruments like telescopes and binoculars.

1.7.3 Class 3R

Lasers that emit in the 302.5 to 10^6 nm wavelength range where direct intrabeam viewing is potentially hazardous but the risk is lower than for Class 3B lasers.

⚠ WARNING

Before using this instrument, always ensure that the warning light is lit when the optical output switch is turned on.

If this warning light does not turn on, the equipment may be faulty and should be returned to an Anritsu service center or authorized representative for repair.

The laser in the module provided for this equipment is classified as Class 1, 1M, or 3R according to the IEC 60825-1:2007 standard.

Never use optical instruments to directly view Class 1M laser products. Doing so may result in serious eye injury.

⚠ CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

1.8 Declaration of Conformity

EU DECLARATION OF CONFORMITY

Manufacturer's Name: ANRITSU COMPANY

Manufacturer's Address: 490 Jarvis Drive
Morgan Hill, CA 95037-2809
USA

declares that the product specified below:

Product Name: CPRI RF Measurement Module

Model Number: MU100040A, MU100040A-001

conforms to the requirement of:

EMC Directive:	2014/30/EU
Low Voltage Directive:	2014/35/EU
RoHS Directive:	2011/65/EU
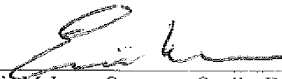
Electromagnetic Compatibility: EN 61326-1:2013

Emissions: EN 55011:2009 +A1:2010 Group 1 Class A

Immunity:		
	EN 61000-4-2:2009	4 kV CD, 8 kV AD
	EN 61000-4-3:2006 +A2:2010	3 V/m
	EN 61000-4-4:2012	0.5 kV S-L, 1 kV P-L
	EN 61000-4-5:2014	0.5 kV L-L, 1 kV L-E
	EN 61000-4-6:2014	3 V
	EN 61000-4-8:2010	3 A/m
	EN 61000-4-11: 2004	100% @ 20 ms

Electrical Safety: EN 61010-1:2010

Eric McLean, Corporate Quality Director

490 Jarvis Drive
Morgan Hill, CA 95037-2809

3 August 2016
Date

European Contact: For Anritsu product CE information, contact Anritsu EMEA Limited, 200 Capability Green, Luton, Bedfordshire, LU1 3LU, England. (Telephone: +44 (0)1582 433200; Email: bert.francis@anritsu.com)

1.9 Product Warranty

Anritsu Company will repair this equipment free of charge if a malfunction caused by a manufacturing defect occurs within one year of the shipment date. The warranty covers the original equipment purchaser only and is non-transferable.

Anritsu assumes no liability for injury or financial loss resulting from the use of or failure to be able to use this equipment.

This warranty is in effect for the stated period unless:

- The defect or fault is outside the scope of the warranty conditions described elsewhere in the Operation Manual.
- The fault is due to mishandling, misuse, or unauthorized modification or repair of the equipment by the customer.
- The fault is a result of extreme operating conditions clearly exceeding normal usage.
- The fault is due to improper or insufficient maintenance by the customer.
- The fault results from a natural disaster, including fire, wind, flooding, earthquake, lightning, or volcanic ash.
- The fault is due to damage caused by acts of destruction, including civil disturbance, riot, or war.
- The fault is due to explosion, accident, or breakdown of any other machinery, facility, or plant.
- The fault is caused by the use of non-approved equipment, power supply, parts, accessories, or consumables.
- The fault is due to activities or ingress of living organisms, such as insects, spiders, fungus, pollen, or seeds.
- The fault is a result of equipment exposure to:
    - direct sunlight
    - dust
    - liquids such as water, oil, or organic solvents and medical fluids
    - salty air or chemically active gases such as sulfur dioxide, hydrogen sulfide, chlorine, ammonia, nitrogen dioxide, or hydrogen chloride
    - high-intensity static electric charges or electromagnetic fields
    - power failures or abnormal power voltages (high or low)
    - heavy condensation
    - lubricating oil mists
    - altitudes above 2,000 m (approximately 6,500 ft)
    - frequent vibration or mechanical shock, such as in cars, ships, or airplanes

2 Configuration

This section provides instructions for connecting the power adapter, charging the battery, attaching the shoulder strap and handgrip, and for installing the measurement modules.

2.1 Accessories

Accessories included with the Network Master depend on the options purchased. When unpacking for the first time, it is recommended to check these accessories against the packing list. Refer to the Technical Data Sheet for the Network Master Pro with CPRI RF Module for the lists of standard and optional accessories.

2.2 Power Adapter

The Network Master is delivered with an AC power adapter as standard accessory. To connect the instrument to an AC power source:

1. Insert the adapter's DC power plug into the 18 VDC input connector on the Network Master connector panel.

2. Connect the AC plug of the power adapter to a live outlet. The **Power** button flashes rapidly in orange during boot-up.
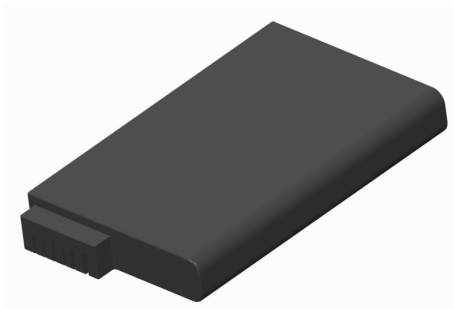
⚠ **CAUTION**

To prevent instrument damage or personal injury, use only power adapters approved by Anritsu Company.

2.3 Rechargeable Battery

The Network Master is delivered with a 10.8 V Intelligent Li-Ion rechargeable battery. The typical operation capacity (with a fully charged battery) is approximately 6 hours.

⚠️ **CAUTION**

To minimize the risk of instrument damage or personal injury, use only original batteries approved by Anritsu Company.

2.3.1 Initial Charging

The battery may be partially charged or fully discharged upon delivery. It is recommended to charge the battery immediately after unpacking. Install the battery in the Network Master and plug the instrument into a live AC outlet. With the instrument off (Standby mode), the **Power** button flashes slowly in orange to indicate the battery is charging. The **Power** button stops flashing when the battery is fully charged.

NOTE *If you anticipate not using the battery for an extended period of time, charge the battery to at least 20% of capacity before placing it in storage.*

2.3.2 Temperature

The battery generates heat while charging. The instrument should be in a normal operating environment during charging to prevent overheating.

2.3.3 Installing or Replacing the Battery

To install or replace the battery in the Network Master:

1. Unplug the power adapter if it is connected.

2. Switch the Network Master off.

3. Turn counterclockwise the lock screw of the battery compartment cover. The screw slot should line up with the unlock mark on the cover.

4. Remove the battery cover.

5. Pull out the battery pack.

6. When inserting the battery pack, note the position of the battery terminals. With the instrument screen facing up and the battery compartment towards you, the terminals should be in the upper left corner.

Push the battery in firmly for a secure connection.

7. Place the battery compartment cover and turn the screw clockwise to the lock position.

2.3.4 Charging the Battery

The battery automatically charges anytime the instrument is plugged in to a live AC power source using the power adapter.

Battery power replenishes more quickly if the instrument is turned off (Standby mode). When the power adapter is connected and plugged in, the **Power** button flashes rapidly in orange while the instrument boots up. The button then flashes slowly to indicate the battery is charging. Flashing stops when the charging is complete.

The **Power** button is a solid green when the instrument is on (Operating mode), regardless of battery status. In this case, use the battery icon in the Status bar or the Information icon on the Instrument toolbar to view its status.

2.3.5 Battery Status Information

You can check the battery status by touching the Information icon on the Instrument toolbar. There is also a battery indicator icon on the Status bar, at the bottom of the Network Master display screen.

 The battery is charging or fully charged. The Network Master is getting power from an AC power source via the AC adapter.

 No battery is installed (or the battery is malfunctioning). The Network Master is getting power from an AC power source via the AC adapter.

 The Network Master is using the battery as power source. The AC adapter is not connected to the instrument or not plugged in.

 NOTE *There may be a delay of a few seconds before the battery status is updated.*

More detailed battery status information is displayed when you touch the battery icon. The example below shows the pop-up status of a fully charged battery with AC power.

Battery: Fully Charged
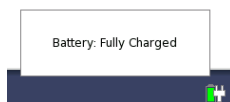
2.4 Optical Fibers

Remove the protective cap from the measurement port, then connect the optical fiber under test.

⚠️ CAUTION

Never force the connector ferrule into the adapter or insert it at an angle. Optical fibers are susceptible to loss from minute bends or other stress.

Connecting the fiber cable to the wrong port will result in failed or inaccurate measurements.

1. Remove the protective cap from the measurement port.
2. Clean the surfaces of the connector and fiber before making the connection.
3. Connect the fiber under test to the measurement port.

Some commonly used optical connector types are shown below.
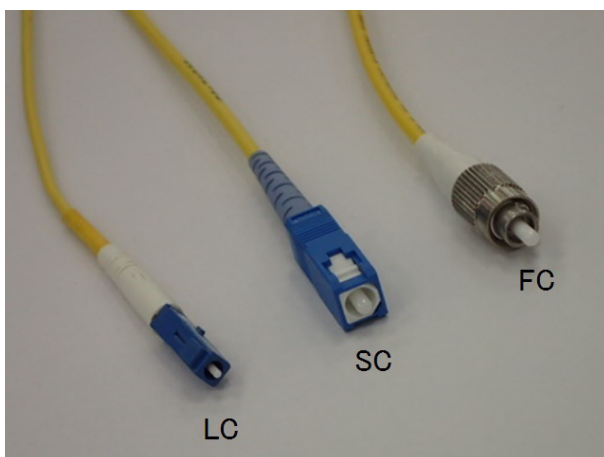
2.5 Tilt Bail and Shoulder Strap

2.5.1 Tilt Bail

A tilt bail is attached to the back of the Network Master for improved stability when the instrument is set down. To deploy the tilt bail, pull the bottom of the tilt bail away from the back of the instrument. Extend the tilt bail fully for maximum stability and for proper air flow through the vents at the bottom of the instrument.

When not used, push the tilt the bail in and flush against the back of the Network Master.

2.5.2 Shoulder Strap and Handgrip

Use the detachable shoulder strap and handgrip provided to carry the Network Master in the field.

⚠ **WARNING**

Wear the strap over the shoulder, not around the neck.

To attach the shoulder strap and handgrip to the MT1000A Network Master Pro:

**1.** Use a screwdriver or coin to unlock and remove the battery compartment cover.

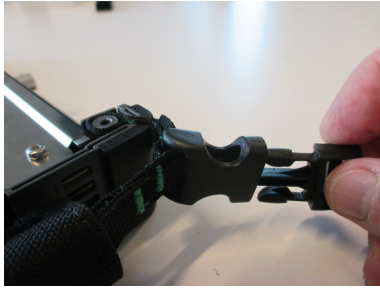**2.** Remove the battery pack.

3. Lay the instrument face down on a flat surface and remove the screw from each of the four corners.

4. Detach the hardware module(s) from the MT1000A controller, then attach the handgrip to the controller. The handgrip can be placed on the left or the right side of the instrument, whatever your preference.
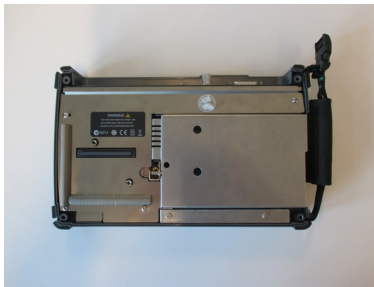
5. Remove the buckle cap from the handgrip and the shoulder strap.

6. Attach the strap ends to the top left and top right corners of the instrument.

7. Re-attach the module(s) to the main controller, then re-insert the battery pack and close the battery compartment cover.

2.6 Attaching the Hardware Modules

Measurement modules are stacked one behind the other, between the MT1000A mainframe controller and the rear cover panel. If the OTDR module is present, it must be attached directly to the MT1000A controller. In a configuration that includes the OTDR, CPRI RF, and 10G Multirate modules, for example, attach the modules serially in that order, from front to back.

⚠️ **CAUTION**

Before installing or replacing modules, take all necessary precautions to prevent damage to electronic components from electrostatic discharge (ESD).

Following are the basic steps for attaching measurement modules to the mainframe.

1. Switch the Network Master off.

2. Disconnect the AC power adapter and remove the battery pack.

3. Lay the instrument face down on a flat surface and remove the screw from each of the four corners.

4. The mainframe controller and measurement modules have guide pins to help you align the hardware components for proper connection. In the illustration below, the connectors and guide pins should line up in pairs identified as 1-4, 2-5, and 3-6.

5. Repeat this step as necessary to install additional measurement modules. Line up the connectors and guide pins as shown in the example (pairs 7-10, 8-11, 9-12).

6. Depending on the option configuration you purchased and the number of measurement modules installed, you may need to replace the four screws referenced in Step 3 above with screws of a different type (length).

7. Attach the last module with rear cover and tighten the corner screws.

8. Re-insert the battery pack and secure the battery compartment cover. Optionally, connect the AC power adapter.

3 Operator Interface

Operator Interface covers the methods of communication between the user and the instrument. The Network Master also supports data transfer to and from a network PC or external storage device.

The installed hardware module or modules determine the applications that can be activated and the associated tests and measurements available. Configuration setups and other user actions are entered using the touch screen display. Status information, signal traces and test results are displayed on the instrument screen. The **Power** button serves both as a status indicator and a user action button.

Physical connections to other devices, systems, and networks are made via the service and the test interface ports. To avoid potential signal loss and performance degradation, the operator should periodically clean all fiber optic connections.

3.1 Touch Screen Display

The 9-inch active TFT display with WVGA resolution (800x480 pixels) is used for instrument and measurement setup as well as for the display of test results. The display's touch screen functionality gives you control of the user interface with the tip of your finger or with the standard accessory stylus.

⚠ CAUTION

Only use a soft cloth moistened with a mild detergent to clean the touch screen surface. Be sure to power off and disconnect the power adapter.

The screen surface is susceptible to scratches and other damage when misused.

Do not expose the touch screen to excessive pressure, which may cause damage.

Never use sharp objects (e.g., pens, paper clips) that may scratch the touch screen surface.

Do not let any liquid that may leak from the screen or other parts of the instrument come in contact with your skin or eyes. Contact your local Anritsu Service Center.

3.2 Power Button

The **Power** button is the only physical operator key on the MT1000A Network Master Pro. In addition to powering up and down the instrument, the button gives you access to other functions:

- Switch application
- Capture screen
- Lock screen

The color of the **Power** button and how it flashes depend on the Network Master on/off state and whether AC power is supplied to the instrument.

Gray (indicator light is off): Power is off and instrument is not plugged in.

Orange flashing (fast): Instrument is turned off and is booting using AC power.

Green flashing: Instrument is booting using battery power. Instrument is not plugged in.

Orange flashing (slow): Power is off and instrument is plugged in (Standby mode). Battery is charging.

Orange: Power is off and instrument is plugged in (Standby mode). Battery is fully charged or not installed.

Green: Power is on (Operating mode).

3.2.1 Turning the Power On

While the instrument is off, press the **Power** button once to turn it on. During power-up, the product splash screen is displayed, followed by a startup splash screen, then the Application Selector screen.

3.2.1.1 AC Operation

Connect the Network Master to a live AC power source using the power adapter provided. If the instrument is currently turned off, the **Power** button lights up in orange and flashes rapidly while the instrument boots up. If no battery is present or the battery is fully charged, the **Power** button then remains a steady orange. The button flashes slowly in orange if the battery is charging.

If the instrument was on battery power and turned on when you supply AC power, the **Power** button will remain green.

3.2.1.2 Battery Operation

The **Power** button is off (gray) when the instrument is off and not plugged in to an AC power source. The indicator flashes in green when the button is pressed to turn on the instrument, then stays a steady green following power-up.

Refer to "Battery Status Information" for a description of battery status indicators.

3.2.2 Turning the Power Off

While the instrument is on, press the **Power** button once to display the pop-up menu shown below. Touch the **Shut Down** button, then **Yes** to confirm.

3.2.3 Forced Shutdown

A forced shutdown should only be used in an emergency, after normal power-off attempts have failed. If the instrument will not power down using the **Shut Down** button:

1. Disconnect the AC power if connected.
2. Press and hold the **Power** button for approximately two seconds.

3.2.4 Other Functions of the Power Button

From the Power pop-up menu, the following action buttons are also available.

3.2.4.1 Apps Switcher

Opens the **Application Selector** screen, which displays the currently active applications.

3.2.4.2 Capture Screen

Saves the current screen display as a PNG file. The image file can be stored either in the instrument internal memory or a USB device.

3.2.4.3 Lock Screen

Disables the touch screen functionality of the display. To unlock, press the **Power** button and touch **Unlock Screen**.
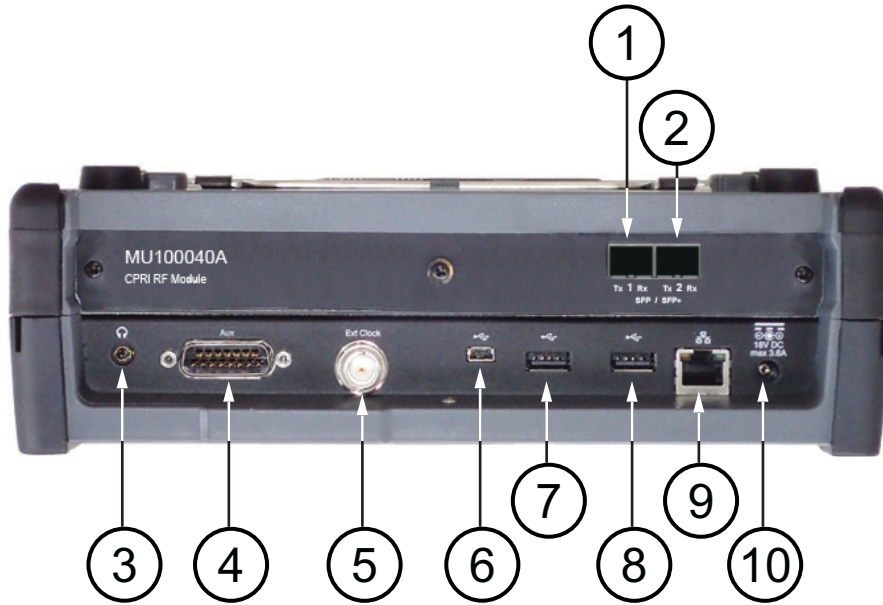
3.3 Headset

You can use the optional headset available from Anritsu. Connect the headset to the socket marked with a headset symbol on the Network Master connector panel. To adjust the sound, touch the **Configuration** icon on the Instrument toolbar, and select the **General** tab.

With the CPRI RF application, audio output is limited to alarm signals.

3.4 Connector Panel

All physical connections to both the test interfaces and the service interfaces of the Network Master are located on the instrument connector panel. The figure below shows the MT1000A mainframe and MU100040A CPRI RF connector panels.

Test Interfaces (CPRI RF Module)	
1	Optical Port 1 - SFP and SFP+ (850 nm / 1310 nm)
2	Optical Port 2 - SFP and SFP+ (850 nm / 1310 nm)
Service Interfaces (Network Master Mainframe Controller)	
3	Audio - used to connect optional headset
4	AUX - used with optional GPS receiver
5	Ext Clock - Reference clock input
6	USB B
7	USB A
8	USB A
9	RJ45 Ethernet
10	18 VDC Input

3.5 Optical Connector Cleaning

Optical connectors and adapters need periodic cleaning. The following instructions illustrate how to clean an FC-type connector and adapter. They also apply to the cleaning of other fiber optic connector types.

⚠ WARNING

Before cleaning, make sure that no light is emitting from the optical fiber.

⚠ CAUTION

- A dirty ferrule tip will degrade instrument performance. Damage to the optical fiber or the Network Master, or both, may also occur.
- Do not clean with a used ferrule cleaner.
- Do not use a cotton swab or other cleaning aid that may leave fibers on the connector and ferrule tip.

3.5.1 Cleaning the Network Master Connector Ferrule Tip

Use an approved adapter cleaner to clean the ferrule inside the Network Master measurement port.

1. Remove the adapter from the optical port by raising the lever to disengage the latch.
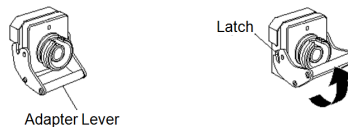
2. Gently pull the adapter straight out.

3. Dampen an adapter cleaner with isopropyl alcohol and clean the ferrule tip.
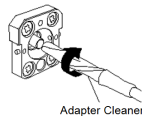
4. Use a new, dry adapter cleaner to wipe the ferrule tip dry in two or three rotations.
5. Clean the connector adapter before re-attaching it. Refer to the instructions that follow.
6. Place the adapter over the optical port, taking care not to scratch the ferrule tip.
7. Push on the lever to lock the adapter in place. You should hear a click, indicating the adapter is securely latched.
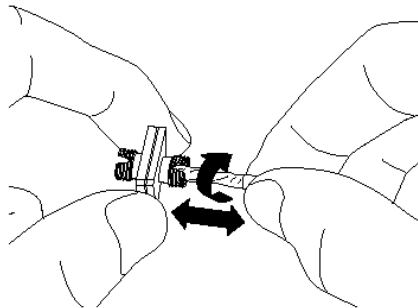
3.5.2 Cleaning the Optical Adapter

Use an approved adapter cleaner to clean the optical fiber cable adapter.

NOTE *Use a cleaner only on adapters with a ferrule diameter of 1.25 mm or 2.5 mm.*

1. Remove the adapter from the test port.
2. Dampen an adapter cleaner with isopropyl alcohol and insert it into the split sleeve of the adapter.
3. Wipe the adapter in a back and forth, rotating motion.

3.5.3 Cleaning the Fiber Optic Cable Ferrule Tip

It is good practice to clean the ferrule tip of the optical fiber with an approved ferrule cleaner prior to making any connections.

1. Press the ferrule cleaner lever to expose the cleaning surface.
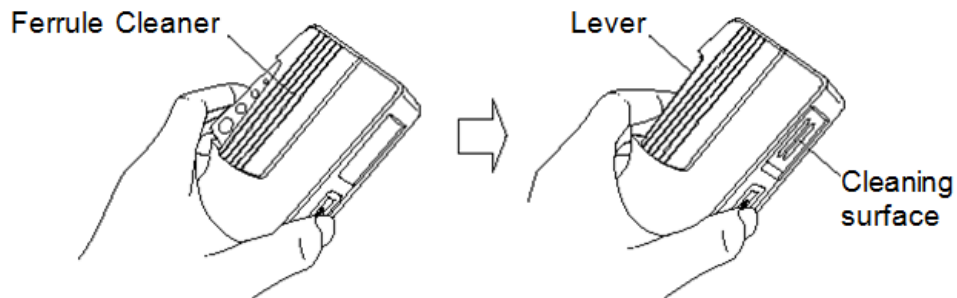
2. Hold the lever in the open position and push the connector ferrule tip into the cleaning surface, swiping the connector to clean.
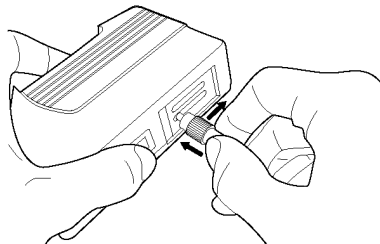
3.6 File Access via USB Interface

Data stored in the Network Master internal memory is accessible to other devices using the USB interface.

NOTE *The instrument internal memory is usually not accessible to read or write operations while an application is running. The restriction does not apply to some applications, like CPRI RF.*

To copy files to a computer or to confirm test results, make the USB connection as described below. If you are running the CPRI RF application, there is no need to close it and you should skip Step 1.

1. Close the current application on the Network Master by touching the **Close** icon on the Application toolbar.

2. Repeat and close any remaining applications that are currently running.

3. Connect your PC or laptop to the USB type B connector on the Network Master. The computer should automatically detect the instrument as a new USB device.

4. You can use Windows Explorer or any suitable application to copy files and folders from the Network Master.

3.7 File Access via Ethernet Interface

By connecting the Network Master to your Local Area Network, you can enable file sharing to copy data from the instrument to a PC or load files from a network computer. Folders and files are read-only.

3.7.1 Accessing Files in Network Master from a PC

To set up the Network Master as a shared device on your LAN:

1. Use an Ethernet cable to connect the RJ45 port on the Network Master to the LAN.

2. Go to the Network Configuration screen from the Instrument toolbar and assign an IP address to the instrument, in the Ethernet Settings dialog box.

3. In the File Sharing dialog box, select the **Share File System** checkbox.

4. Open an Explorer window on your PC.

5. Enter the Network Master IP address in the address bar.
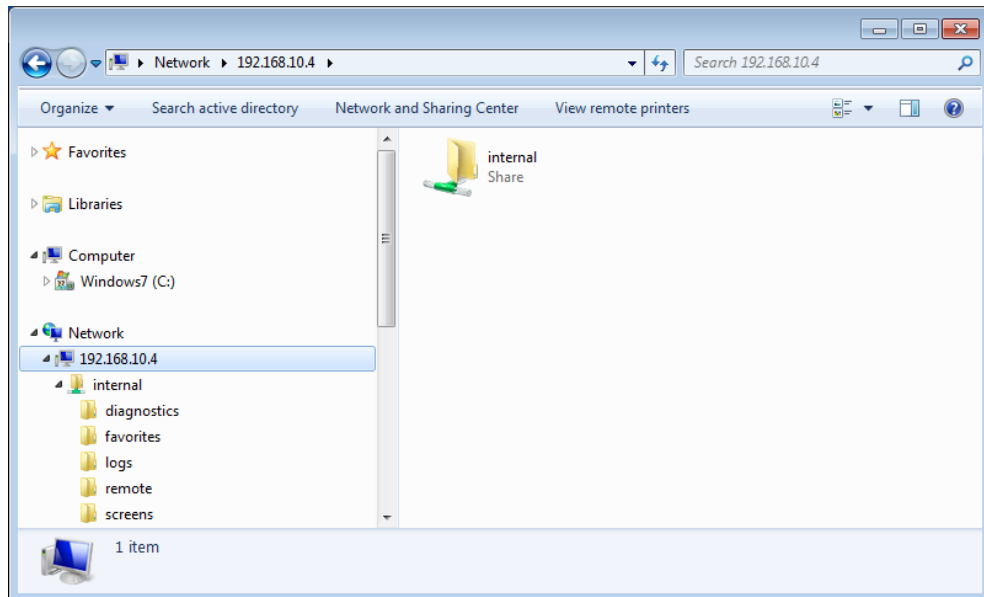
NOTE *Data in internal memory is not accessible while an application or test is running on the Network Master. Folders and files are read-only.*
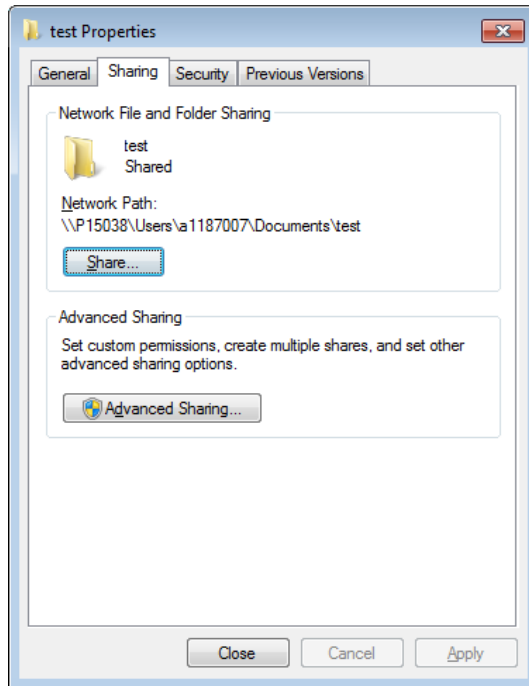
3.7.2 Mounting a Shared Folder on PC to the Network Master

To mount a shared folder on a network PC to the Network Master:

1. Right-click the folder on your PC and select Properties.

2. Under the Sharing tab, click Share, then select Everybody and click Add.

3. Use an Ethernet cable to connect the RJ45 port on the Network Master to the LAN.

4. Go to the Network Configuration screen from the Instrument toolbar and assign an IP address to the Network Master, in the Ethernet Settings dialog box.

5. In the File Sharing dialog box, select the **Mount Remote Folder** checkbox.

6. Enter the IP address of the network PC, the user login information, and the shared folder name.

7. Touch the **Apply** button. If mounted correctly, the **Mount Status** will show CONNECTED.

8. Close the File Sharing dialog.

9. Touch the File Manager icon in the Instrument toolbar. The PC shared folder will be mounted to the instrument Internal/remote folder.
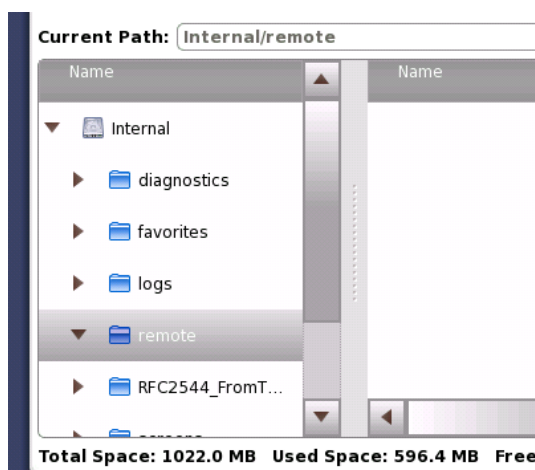
3.8 GPS Receiver (Not Used with CPRI RF Application)

The Network Master supports an optional GPS Receiver, which activates automatically when connected to the AUX port on the instrument connector panel. Refer to the The synchronization accuracy against UTC is ± 1 µs or less.

NOTE   *The CPRI RF application currently does not make use of GPS information.*

You can check the GPS receiver status by touching the GPS icon on the Status bar, at the bottom of the Network Master display screen.

 The GPS is receiving signal from a sufficient number of satellites.

 No GPS receiver is connected.

More detailed GPS information is displayed in a pop-up dialog when you touch the GPS icon.

4 Graphical User Interface

This section contains a general introduction to the graphical user interface (GUI) of the MT1000A Network Master Pro. Descriptions of screen buttons and dialog boxes related to a specific technology and measurement module such as CPRI RF are provided in that application section.

NOTE *Not all elements of the GUI may be relevant or apply to all applications. For example, the measurement setup, test setup and test result screens in the CPRI RF application workspace are combined into a single screen.*

4.1 General Handling of the GUI

Along with the **Power** button, the touch screen display is the only user interface you need to access all the functions supported by the Network Master mainframe controller and the installed measurement modules. These functions include configuration and setup tasks, the running of specific tests, and the display of measurement results.

The graphical user interface consists of two main functional spaces or levels: the *desktop* and the *workspace*. The GUI structure is designed to allow easy switching between the functional spaces.

- The *desktop* is the entry point following boot-up. It features the Application Selector, which lets you start the desired application, and the Result File Browser, which gives you access to previously saved test results.

- The *workspace* is where an application is loaded and you can set up and run a test and display the results. Your selection on the desktop creates the workspace and loads the relevant data. You can also navigate horizontally within a workspace to modify test setup parameters, rerun the test, and display the new results.
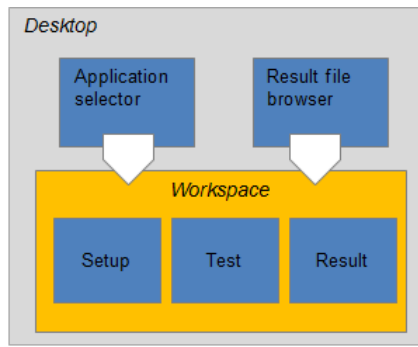
NOTE

A specific set of resources (that is, ports) are assigned to a workspace when it is created. More than one workspace can therefore exist at the same time, each assigned to different resources.

4.1.1 Startup Splash Screen

The splash screen illustrated below appears during boot-up while the instrument controller software is loading. The screen shows the main functional spaces of the graphical user interface.
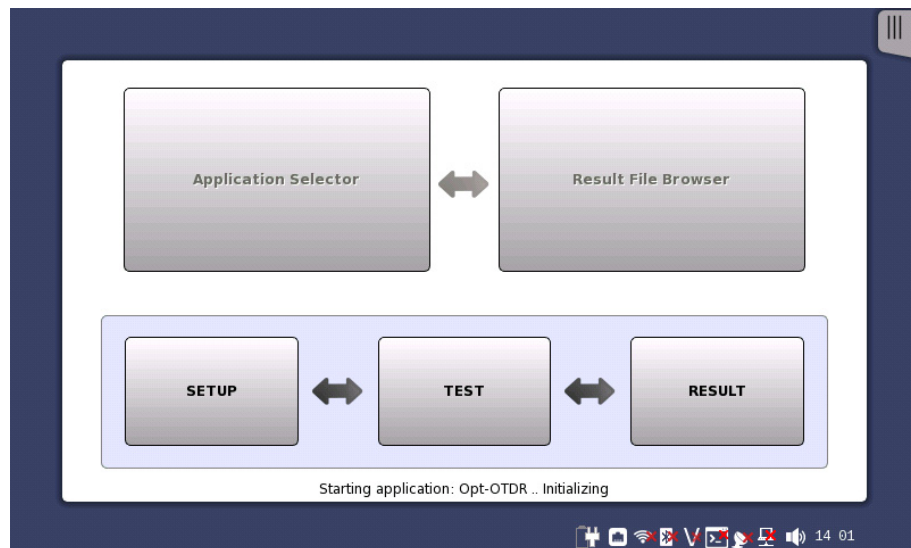

4.1.2 Application Selector

The Application Selector screen is the main entry point following startup of the Network Master. The navigation tabs at the lower left and lower right corners of the screen let you switch between the Application Selector and the Result File Browser. Touch the tab at the upper right corner of the display to show or hide the Instrument toolbar.

4.1.2.1 Applications

Under the Applications tab, press an application icon to load it into the workspace. You may need to scroll to bring the desired icon into view. The application can be either one of the standard applications provided with the instrument or a previously saved application with partial or full configuration of interface/test setup parameters.
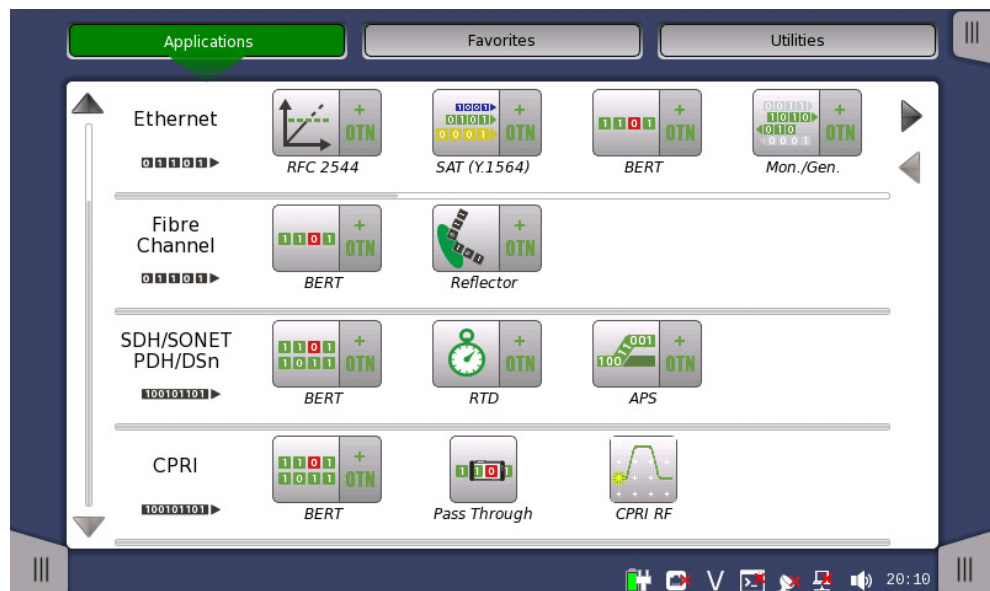
4.1.2.2 Favorites

You can save a set of frequently used port resources and application settings by adding it to a Favorites list. Touch the **Favorites** button to display the Favorite icons, if any.
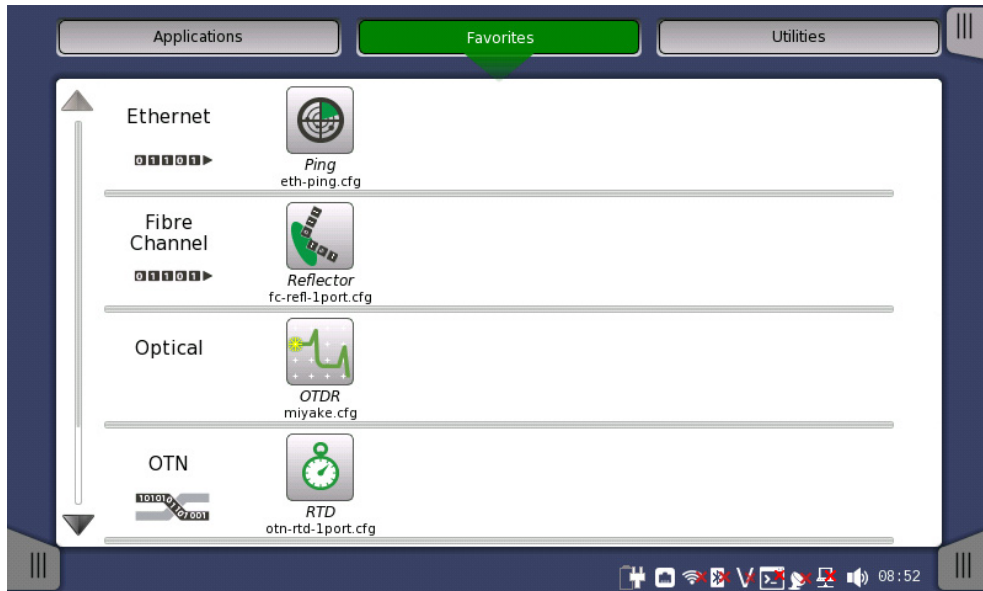

To launch a favorite application, touch the related icon on the Application Selector Favorites screen. The port resources associated with the application when the favorite was created are automatically allocated and the saved settings are loaded. If the designated resources are not available, you will be prompted to select alternative port(s).

Creating Favorites

If the application for which you want to create a favorite entry is currently running but not displayed on the workspace screen, activate it from the Applications Switcher. If you need to launch the application, touch the appropriate icon on the "Applications" screen.

1. From the application workspace, touch the **Save** icon in the Application toolbar.

2. Touch the **File name** field in the Save file dialog box and enter a name for the favorite item you are creating.

3. Select **Add to Favorites**.
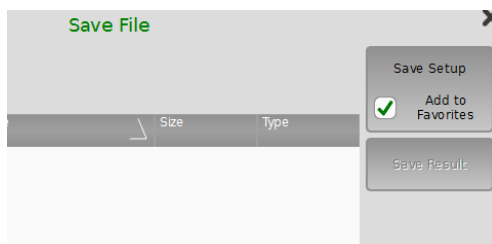
4. Touch the **Save Setup** button.

Duplicate configuration files (extension .cfg) are created in internal memory and in the Favorites folder. A new Favorite icon associated with the current application resources and settings will appear on the Application Selector Favorites screen.

Adding to Favorites

Existing configuration files (*.cfg) can be added to the Favorites list using the File Manager. A corresponding icon will appear on the application Favorites screen.

1. Open the File Manager from the Instrument toolbar.

2. Select the .cfg file you wish to mark as favorite.

3. Touch **Add to Favorites** in the File Manager task bar at the top of the screen.

A duplicate of the selected file is created in the Favorites folder.

Deleting Favorites

1. Touch and hold an icon on the Favorites screen until a pop-up menu displays.

2. Select **Delete Favorite**.

3. Touch **Delete** in the confirmation dialog.

Renaming Favorites

1. Touch and hold an icon on the Favorites screen until a pop-up menu displays.

2. Select **Rename Favorite**.

3. Enter a new name in the dialog box.

NOTE

Favorites may not have the same name. If a conflict occurs, rename the .cfg file or the existing favorite before copying.

If your application does not display a pop-up menu, use the File Manager to delete or rename favorite files.

4.1.2.3 Utilities

Utility applications such as PDF Viewer and VIP (Video Inspection Probe) are accessed from the Utilities screen in the Application Selector. Not all utilities are supported or applicable to all application modules.
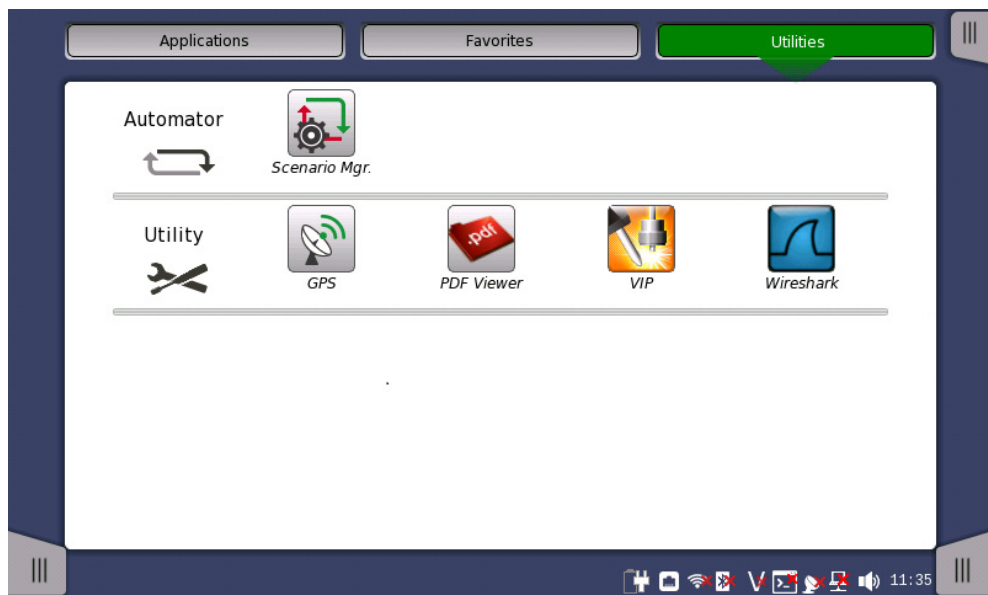
Scenario

If scenario files are loaded, the associated icons are displayed in the Scenario row. The Scenario Mgr manages the scenario file which runs applications automatically. Parameters in the file can be edited.

Utility

GPS – logs data from GPS receiver and shows the satellite positions

PDF Viewer – used to view PDF files created with an application's Report feature

VIP – Video Inspection Probe, used to examine the edge surface of an optical fiber

Wireshark – used to view and analyze captured Ethernet frames

4.1.3 Result File Browser

The Result File Browser loads the results and configuration of a previous test into the workspace. This allows you to generate reports from the results and optionally to rerun the test, using either the original settings or with various configuration modifications.

NOTE *The CPRI RF application currently does not support the reporting or loading of test result data.*

The navigation tabs at the lower left and lower right corners of the screen let you switch between the Result File Browser and the Application Selector. Touch the tab at the upper right corner of the display to show or hide the Instrument toolbar.
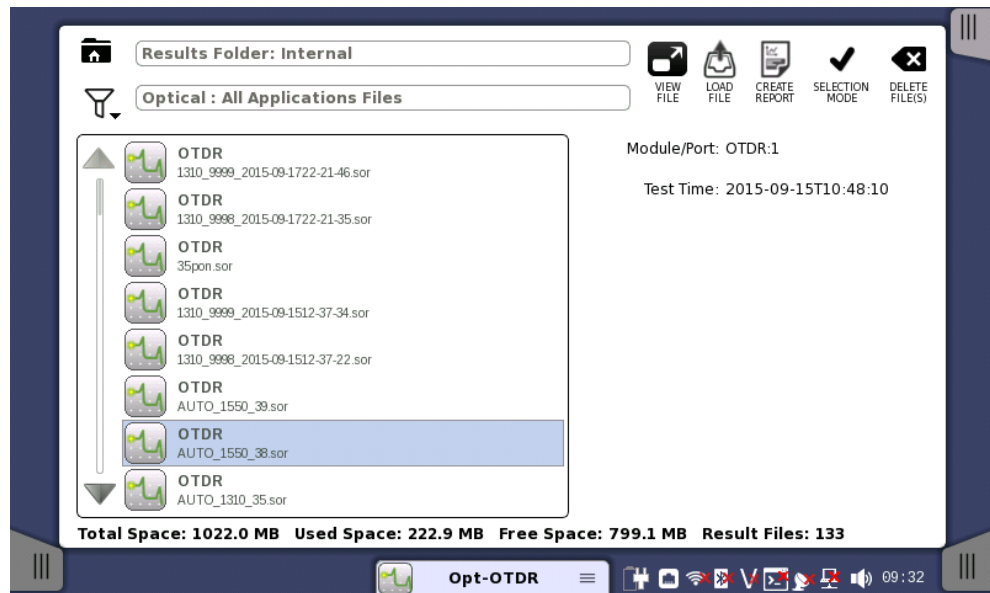

Browses for the folder where the results file is located.

Sets the file type filter.

Loads the selected results file and starts the application in Viewer mode.

Loads the selected results file.

Creates a report from the result data.

Selects a single file.

Selects multiple files.

Deletes the selected file or files.

4.1.4 Navigating the GUI

The Network Master graphical user interface lets you switch screens both horizontally at the desktop level and within a workspace, and vertically between the desktop and workspace.

### 4.1.4.1 Horizontal Navigation at Desktop Level

You can switch between the Application Selector and the Result File Browser by touching the tab at the lower right or lower left corner of the screen.
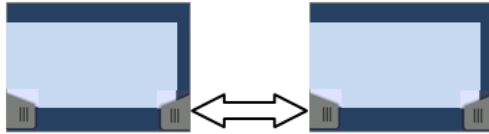
4.1.4.2 Horizontal Navigation in Application Workspace

In the workspace, you can step through the setup by touching the navigation tabs located at the bottom corners of the screen. The lower right tab takes you to the next step in the setup, while the lower left tab takes you a step backwards.

If present, you can use the screen selectors at the bottom of the display to move at will between measurement setup, test setup and test result. This is particularly useful if you want to switch directly from the test result screen to the setup, for example, in order to rerun the test with different settings.
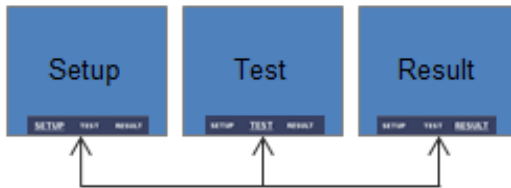

NOTE   *To get from the test setup to the test result screen during a new test, you must first run the test. This is done by touching the Start (green arrow) icon in the Application toolbar. Some applications, such as CPRI RF, display setup and results on the same workspace screen.*

4.1.4.3 Vertical Navigation Between Desktop and Workspace

If an application is currently running, the Application Selector screen will show a tab at the bottom of the display which allows you to go directly to the screen last displayed in the application's workspace. Similarly, the Result File Browser screen will contain a tab that takes you to the test result screen of the running application.
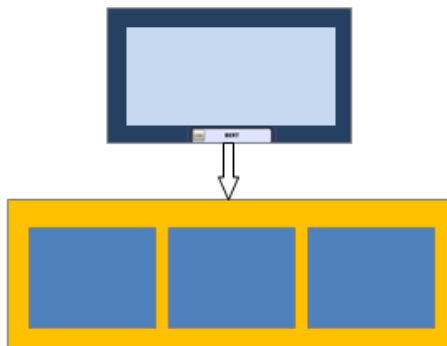
To switch from a setup screen to the Application Selector screen, touch the Application Selector tab at the top of the display. Test result screens also have a tab at the top that will take you to the Result File Browser screen.
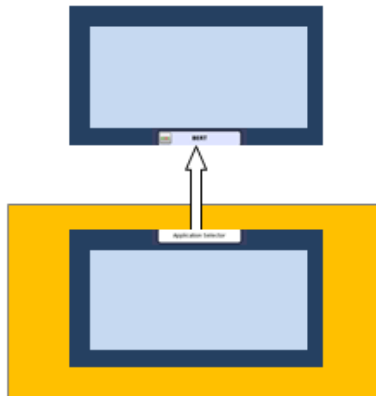
4.1.5 Status Icons

The Status bar at the bottom of the display contains icons showing the status of device and communication connections and other accessories.

 Battery status

 Link status of Ethernet service interface

 WLAN (option)

 Bluetooth (option)

 VNC (Virtual Network Computing)

 Controlled by remote command

 Connection status of GPS receiver

 Remote PC control status

 Speaker on/off status

 Warning light blinks when optical output switch is on

4.1.6 Starting an Application

1. On the Application Selector screen, press an icon to load the application into the workspace. You may need to scroll to bring the desired application icon into view.
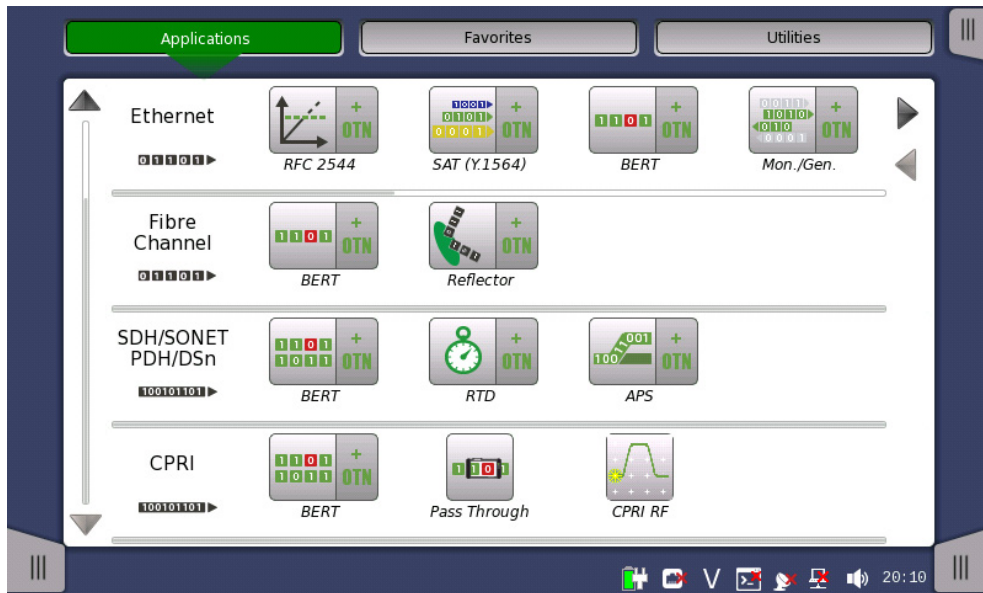
2. On the Instrument Resources screen that appears, touch the appropriate module and select the resources (ports) to be used for the test. The selected ports are highlighted in green.

NOTE *For some test modules such as the CPRI RF application module, ports are allocated automatically and there is no need to select resources. Touching the application icon in the previous step is the only action needed to load the application and assign the ports.*

3. Touch the **Accept** button.

4.1.7 Switching Applications

You can switch between multiple running applications using any of the following three methods:

- At the desktop level, touch the workspace navigation button at the bottom center of the screen.

- On the workspace screen, touch the application on the left side of the Status bar.

- Press the **Power** button and touch **Apps Switcher** on the pop-up menu. Then, touch the desired application button in the Applications Switcher area at the bottom of the screen (second figure below).
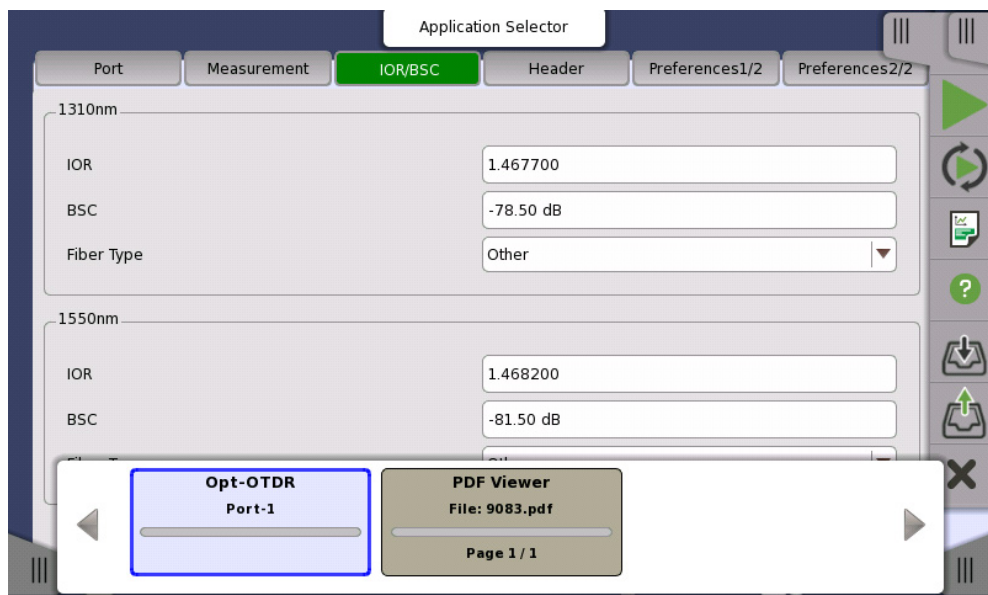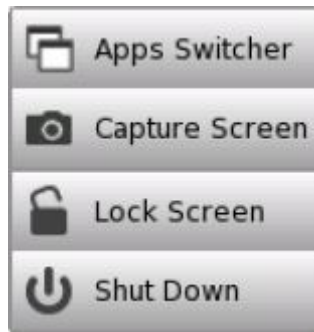
4.1.8 Operating the Application

This section describes the workspace screens common to most applications that run on the MT1000A Network Master. Not every application uses the same interface structure. Refer to "Status Icons" and "Toolbars" for a description of the Status bar and the vertical toolbars on the right side of the screen.

4.1.8.1 Setup Screen

The Setup screen is usually the first screen to display following application startup and selection of resources. It consists of several functional areas illustrated below.
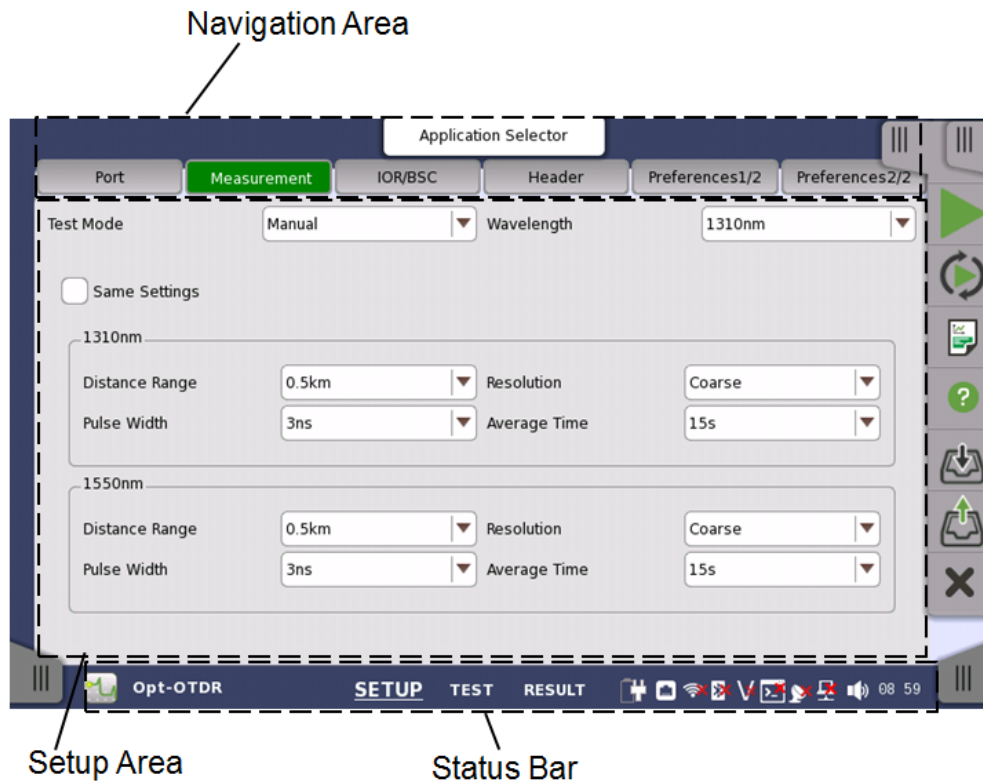
- The *navigation area* at the top of the display contains buttons or tabs used to open different screens.

- The *setup area* is the main area of the screen, where test and measurement parameters are entered and displayed. The screen contents change with the button that you press in the navigation area.

4.1.8.2 Test Screen

The Test Setup screen is typically the second screen in the workspace. It may contain one or more setup pages, with a row of navigation buttons at the top of the display which are used to switch between the pages.
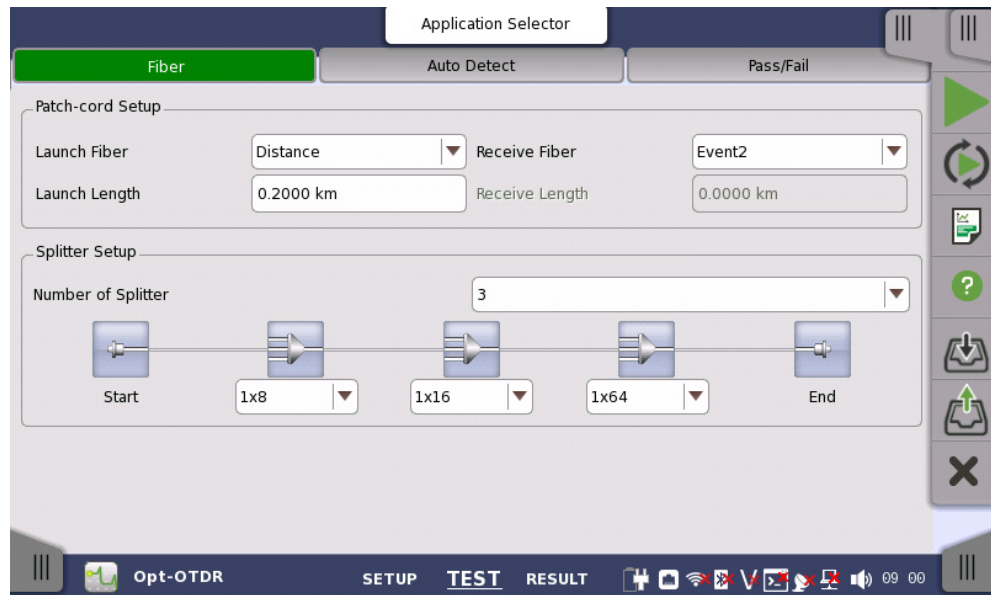
4.1.8.3 Test Results Screen

The Test Results screen is usually the last screen in the application workspace. It generally contains several pages showing the test results. Navigation buttons at the top of the screen let you switch between the pages.
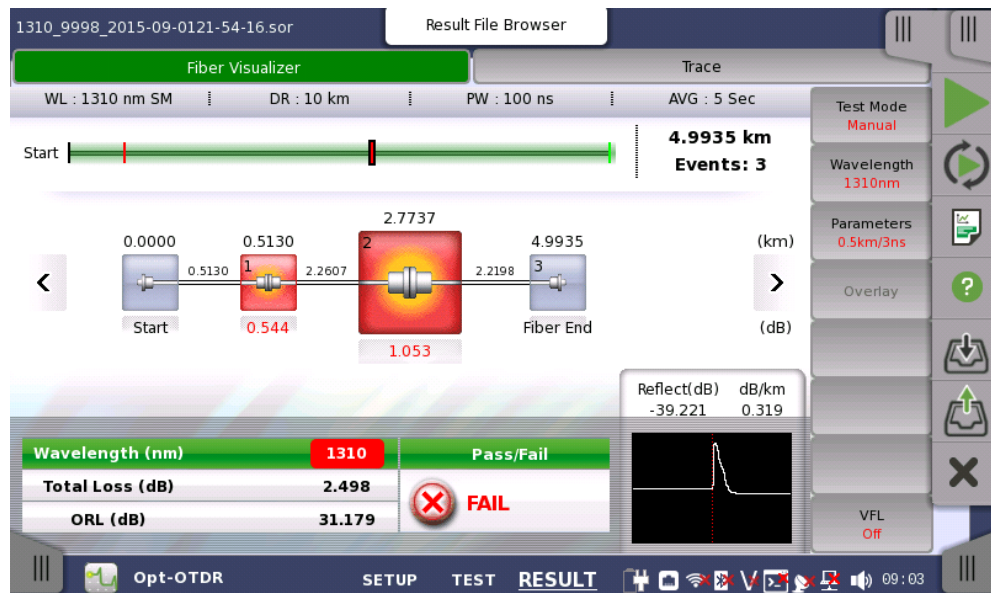
The layout and contents of the Test Results screen vary from application to application. There may be a vertical menu of soft keys on the right side, where you can change parameter values before re-running the test (green arrow icon on the Application toolbar). To save results to a file, touch the **Download** icon on the Application toolbar.

4.1.9 Soft Keypads

Measurement settings and other parameter values are entered in data fields or via soft keys on the workspace screen. To enter or change a parameter setting, touch the field or key to open the data input keypad. The keypad contents and layout depend on the parameter type, which may be numeric or alphanumeric. There may be cursor control keys for editing, unit selection keys, and others. For some numeric parameters, the minimum and maximum values may be displayed.
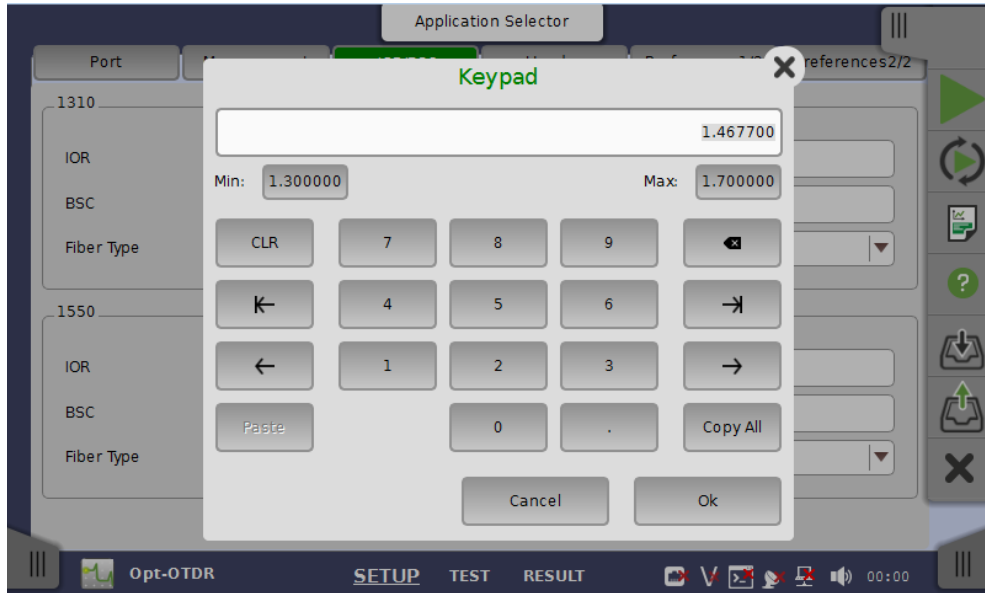
To apply the new value and close the keypad, touch **OK**. Some parameters may display a list of selectable unit keys in place of **OK**.

To close the keypad without applying the change, touch **Cancel** or the X at the top right corner of the keypad.

4.2 Toolbars

The Network Master user interface features two vertical toolbars on the right side of the instrument display: the *Instrument toolbar* and the *Application toolbar*.

4.2.1 Instrument Toolbar

The Instrument toolbar gives access to general system functions and information, including instrument configuration and connectivity, resource monitoring, and file management.

The toolbar is usually hidden from view. To show the Instrument toolbar, touch the toolbar tab in the top right corner of the display. To hide the toolbar, touch the tab again or touch the setup (main) area of the screen.
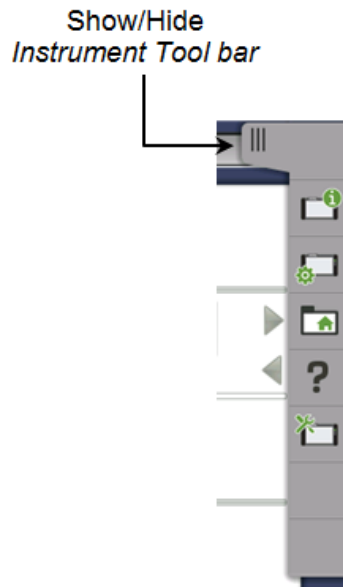
Touch an icon on the Instrument toolbar to access one of the following function groups:

- Instrument information
- Configuration: General, Network
- File manager
- Help
- Resource monitoring

To switch to a different information or configuration screen, touch another icon on the Instrument toolbar. To close the screen and return to the application workspace screen, touch the icon associated with the current instrument screen.

4.2.1.1 Instrument Information

The **Information** icon launches the System Information screen. Touch one of the buttons on the right to skip to an information topic, or you can touch and drag the vertical slider to scroll up and down the page.

- System Information
- Controller Information
- Module Information
- Software Information
- Battery Information
- Self Test Results

NOTE
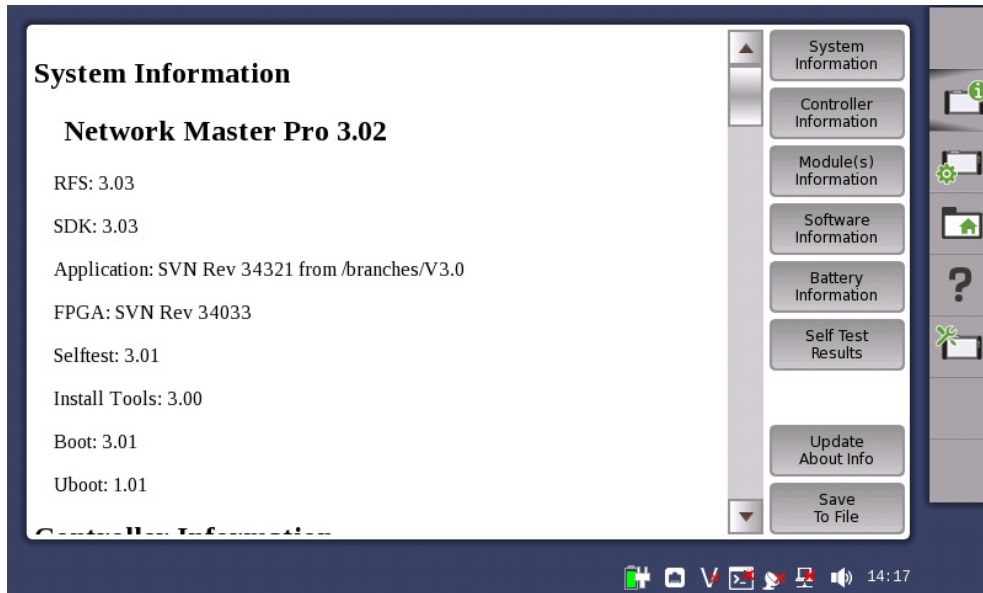
If the self test results show "NG," try rebooting the Network Master. If "NG" persists in the results, contact your local authorized Anritsu service center.

The **Update About Info** button refreshes the instrument information. To save the system information in an HTML file, touch **Save To File** and select the output location and file name in the dialog box that opens. Refer to File Manager for details on file saving functions.
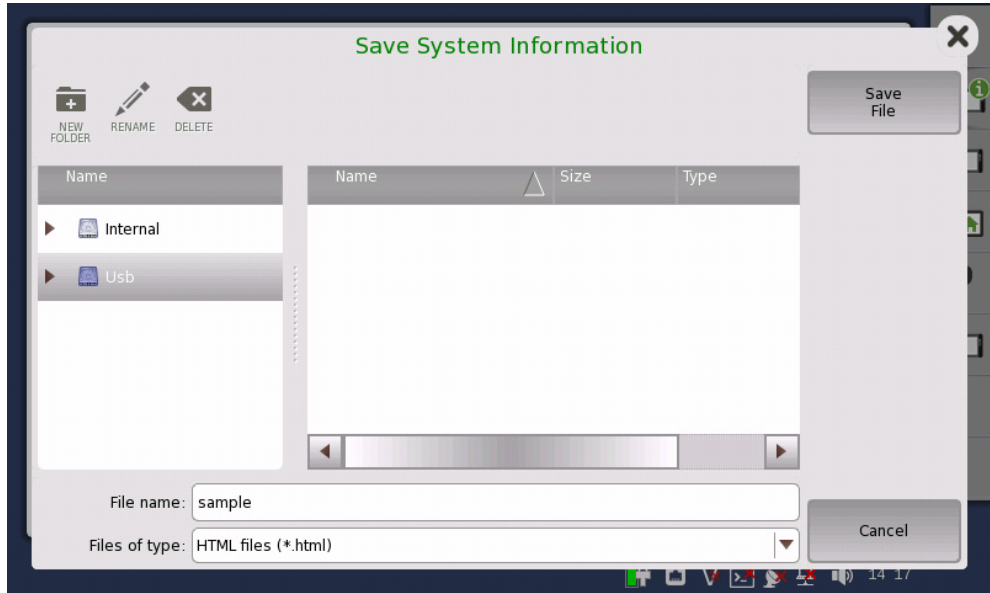
4.2.1.2 Configuration

The **Configuration** icon launches the Global Configuration screen. Touch one of the top navigation tabs to access the available configuration screens:

- General – instrument settings that include date and time, password.
- Network – connection settings and status

General
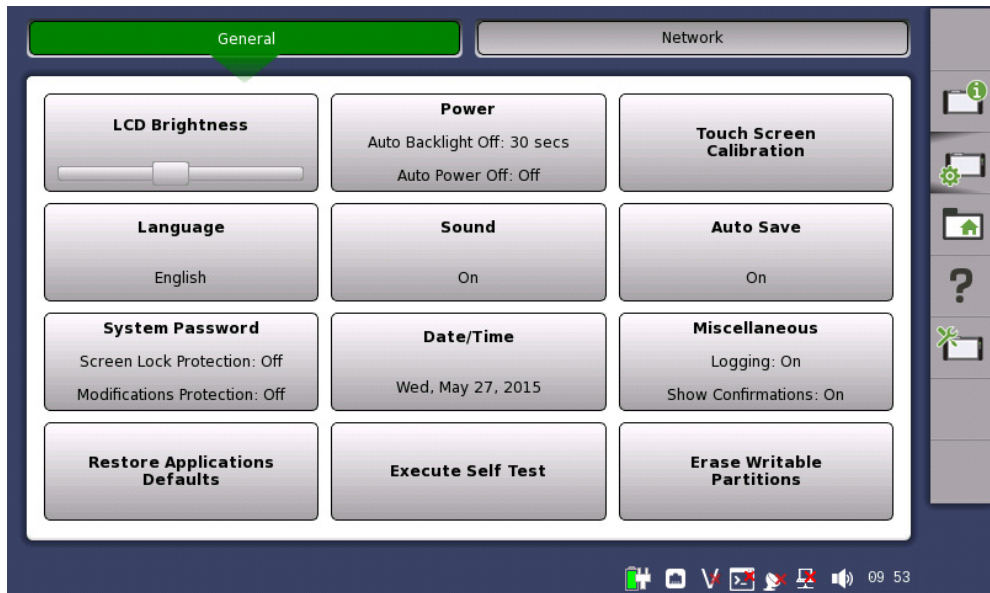
LCD Brightness lets you adjust the screen brightness by dragging the slide bar.

Power allows you to enable and disable auto-shutoff and set the amount of idle time before the instrument back light automatically turns off (that is, the screen goes dim). These settings apply only when the instrument is running solely on battery power. Auto Backlight Off is ineffective while the Wireshark application is running.

Touch Screen Calibration lets you calibrate the screen for touch input. Prior to initiating the calibration, save your measurement settings and results. All unsaved data will be lost when the Network Master automatically reboots, following screen calibration. The instrument does not reboot if operating on battery.

Language selects the language of text displayed on the screens and dialog boxes.

Sound allows you to set the speaker and headphones on/off state. Adjust the volume using the slide bar.

 Speaker on

 Speaker off
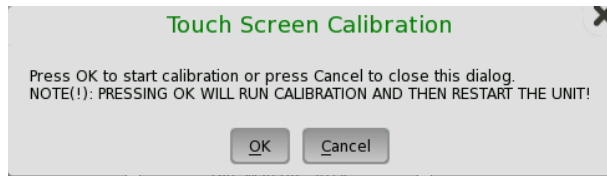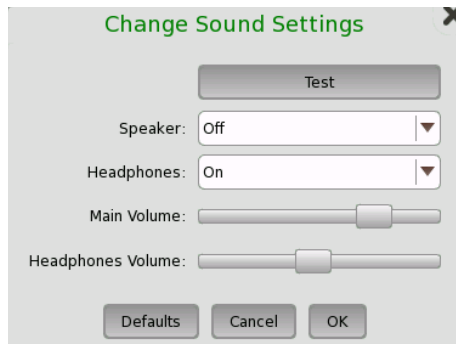
Auto Save specifies the saving option applied to measurement results.

- **Prompt** generates a dialog asking the user whether to save result data after a test.
- **On** causes result data to be saved automatically following a test, with no notification.
- **None** will discard test result data without saving, unless saved manually.

System Password lets you enable and disable password protection of the touch screen and setup data. When enabled, starting an application and making configuration changes require password authentication. Select one or both checkboxes and touch **OK** to enable password protection.
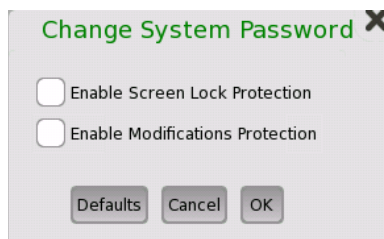
In the dialog box that follows, you can optionally enter a new password in the text field. Your key input is masked by default. To see the characters as you type, select the Display Password checkbox. Touch **Cancel** to keep the current system password.
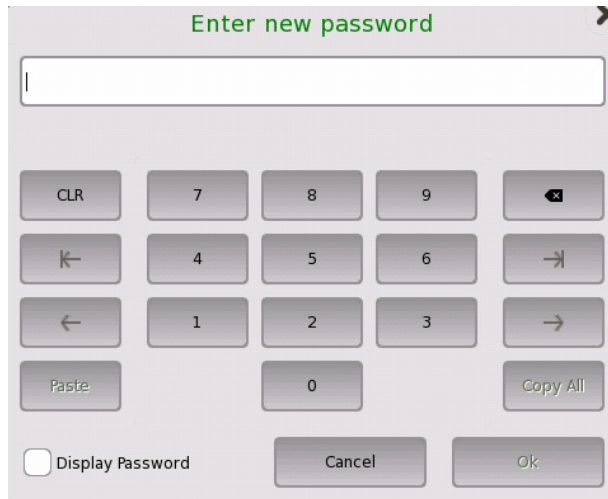
NOTE   *The factory default password is 0614.*
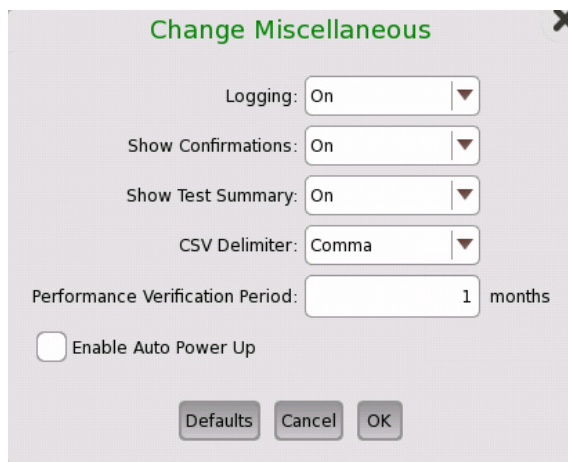
Date/Time allows you to set the system date and time. Prior to changing the time and date, save your measurement settings and results. All unsaved data will be lost when the Network Master reboots. Select a component of time or date and use the up/down buttons to adjust, then touch **OK**. Touch **Yes** in the confirmation dialog to set the time and start the reboot.
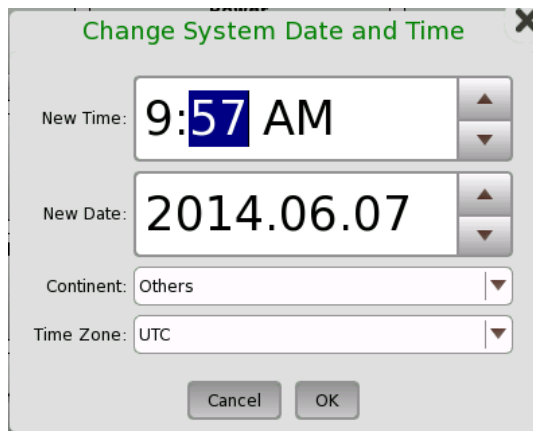
NOTE   *The Network Master does not automatically reboot if it is running on battery power. The newly set time and date will be applied after the instrument is booted with the **Power** button.*

Miscellaneous includes the following system configuration items:

- **Logging** specifies the logging level, which should be set to Off. Other settings are reserved for use in service mode.

- **Show Confirmations** specifies whether to display prompts to confirm dependencies. This setting applies to the MU100010A 10G Multirate Module.

- **Show Test Summary** specifies whether to show the summarized test status in the Status bar. This setting applies to the MU100010A 10G Multirate Module.

- **CSV Delimiter** selects the delimiter character to be used when generating output of Comma Separated Values.

- **Performance Verification Period** is used to calculate the performance validation due dates. Due dates are not calculated if the period is set to zero.

- **Enable Auto Power Up** controls whether the Network Master starts automatically when AC power is applied.

Restore Applications Defaults restores default settings in all currently running applications. Exercise caution when initiating this action.

Execute Self Test starts the instrument self test. Prior to performing this action, save the measurement settings and results of all running applications. Any unsaved data will be lost when the Network Master reboots. The instrument does not reboot if it is operating on battery power.

Erase Writable Partitions deletes the contents of all writable partitions.

Network

Ethernet lets you set up the instrument for Ethernet connection, either via dynamic addressing (DHCP) or manual specification of IP address, subnet mask, and default gateway.
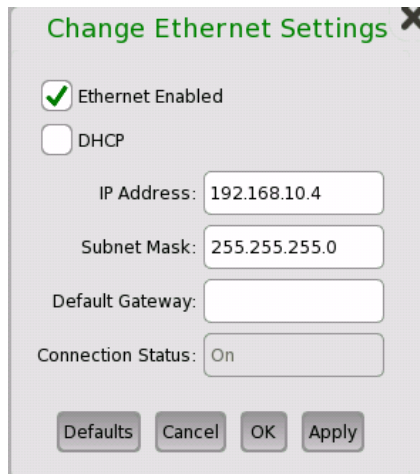
This icon in the Status bar indicates the link status of the Ethernet port.

WLAN allows the instrument to connect to a network via Wireless Local Area Network. Ethernet connection is not possible when WLAN is enabled.

OPTION

WLAN connection requires Option MT1000A-003.

1. Touch **WLAN** on the Network screen.

2. In the WLAN Setup dialog, select the **Enable WLAN** checkbox, then touch the **Scan** button. Scan results are displayed.
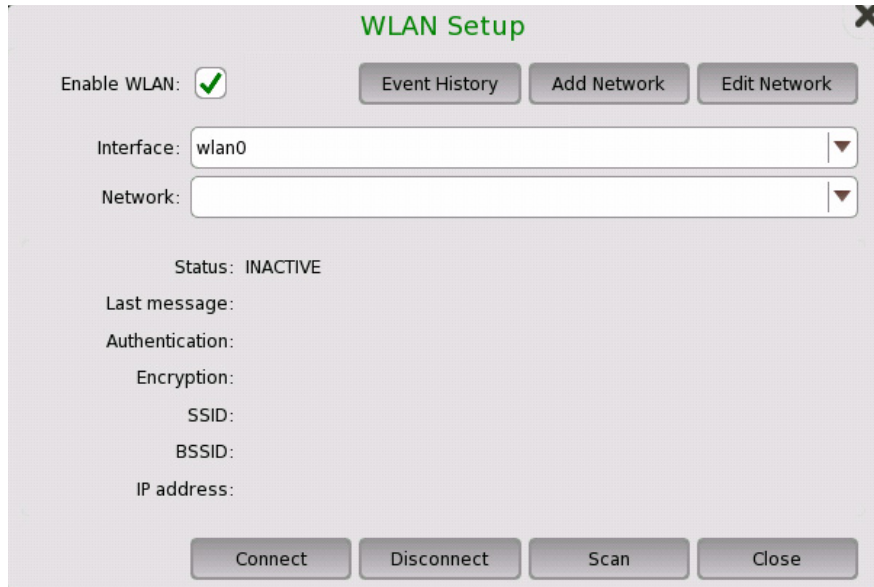
3. Select the network from the results and touch the **View** button.

4. Touch **Add Network** in the WLAN Setup dialog and enter the network information, then touch the **Add** button.
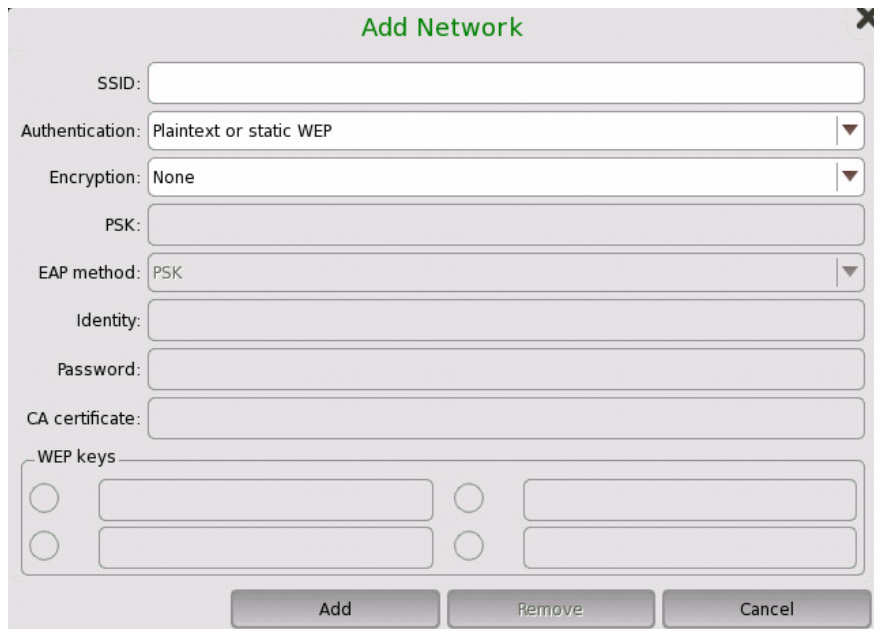
5. Confirm that the Status in the WLAN Setup dialog changes to Connected.

The WLAN icon is displayed in the Status bar when the option is installed. It indicates the WLAN connection status.

To change the current network settings, touch **Edit Network**. The **Event History** button is used to diagnose the WLAN connection.

Bluetooth lets you set up a Bluetooth connection.

OPTION

Bluetooth connection requires Option MT1000A-003.

Change Bluetooth Settings

☑ Enable Bluetooth
☐ Make visible
☑ Share files using FTP

Defaults Cancel OK
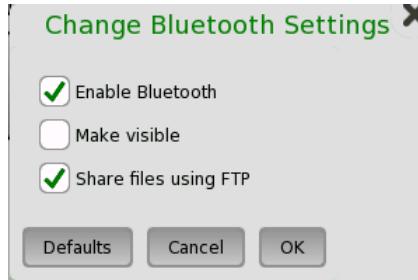
- **Enable Bluetooth** activates the Bluetooth connection.
- **Make visible** allows other Bluetooth devices to detect the Network Master.
- **Share files using FTP** makes files stored in the Network Master internal memory accessible via Bluetooth. The shared folder is /property/mnt/internal. A login ID and password are not required for FTP connection.

The Bluetooth icon is displayed in the Status bar when the option is installed. It indicates the Bluetooth connection status, enabled or disabled.

Remote Control allows you to specify a TCP port for command-based remote control of the instrument.

Change Remote Control Options

SCPI control TCP port: 56001
GPIB Address: 1

☐ Enable Remote Reset

Incoming remote PC control:
☑ Allow remote PC connections

Defaults Cancel OK
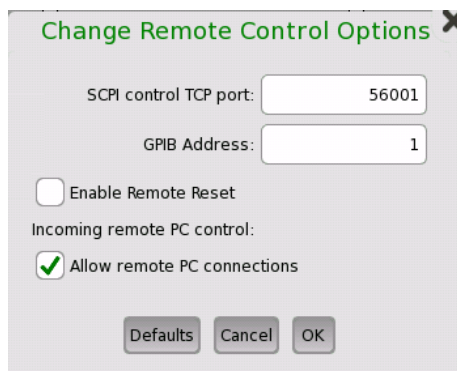
- **SCPI control TCP port** is where you enter the TCP port number.
- **GPIB address** is the General Purpose Interface Bus address.
- **Enable Remote Reset**, when selected, allows users to reset the Network Master from a remote PC.
- **Incoming remote PC control** makes available remote PC control via Ethernet, when the checkbox is selected.

This icon in the Status bar indicates whether remote PC control is enabled.

● **NOTE** *Some Network Master applications such as MU100020A, MU100021A, and MU100040A do not support the remote control function.*

VNC allows remote control of the instrument via Virtual Network Computing. Enter the appropriate information in the dialog box and select **Enable VNC Server**.
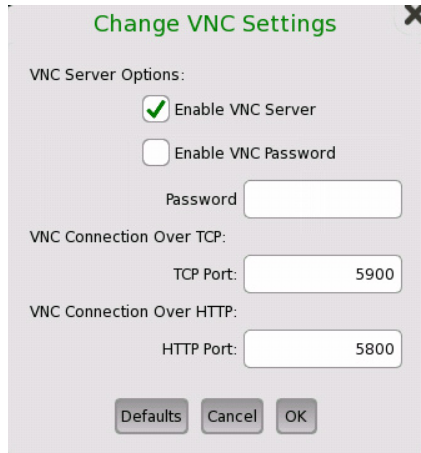
This icon in the Status bar indicates whether remote control via VNC is enabled. Touch this icon to toggle the status between enabled and disabled.

File Sharing enables file transfer between a remote PC and the Network Master. An Ethernet connection is required. In the File Sharing dialog, select **Share File System** to allow remote, read-only access to files and folders in the instrument internal memory. Select **Mount Remote Folder** and enter the folder information, then touch **Apply** to enable access to a shared folder on the remote PC.
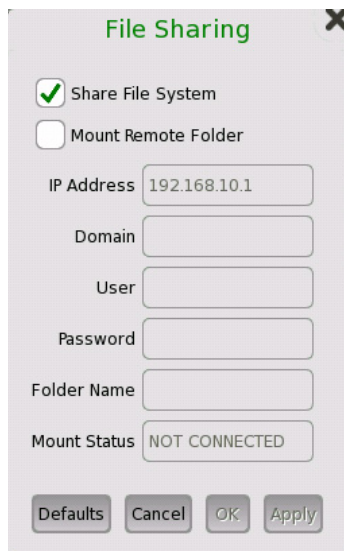
- **IP Address** is the address of the network PC.
- **Domain** is the domain name.
- **User** is the PC user ID or account.
- **Password** is the account password.

• **Folder Name** is the name of the shared folder on the network PC.

NOTE *Enter the name of the shared folder only, not the entire directory path shown in Windows.*

If the remote folder mounts successfully after you touch **Apply**, the Mount Status in the File Sharing dialog will show "CONNECTED." If not, the specified folder on the remote PC may not have been set up for file sharing.

To set up a shared folder on the network PC:

1. Right-click the folder and select **Properties**.
2. Click the **Sharing** tab, then the **Share** button.
3. Select **Everyone** from the drop-down menu, then click **Add**.

The PC shared folder is mounted to the instrument Internal\remote folder.

4.2.1.3 File Manager

The **File Manager** icon on the Instrument toolbar opens the file management screen, from which you can manipulate files and folders located either in the instrument internal memory or on an external storage device such as a USB memory stick.
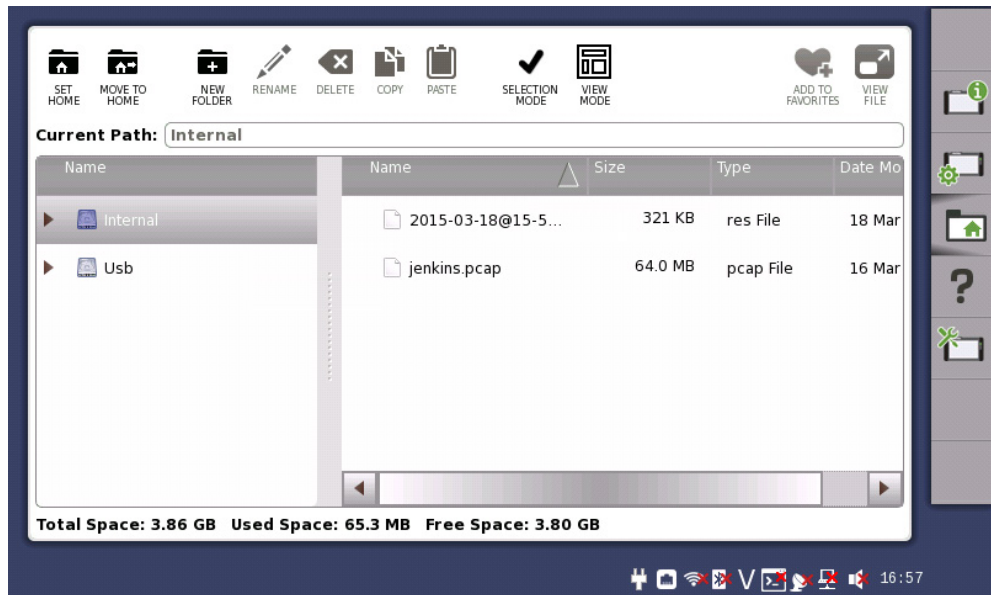
Appears on the remote control application screen only. Displays the local folder of the control PC.

Appears on the remote control application screen only. Displays the folder of the Network Master.

Sets the current folder to the home folder.

Moves to the home folder.

Creates a new folder.

Edits the file name or the folder name.

Deletes the selected file(s) or folder(s).

Copies the selected file(s) or folder(s).

Pastes the file(s) or folder(s).

Selects a single file or folder.

Selects multiple files or folders.

Switches the GUI layout.

Adds the selected file (.cfg) to Favorites.

Shows the contents of a text file.

4.2.1.4 Help

The **Help** icon opens a context-sensitive help screen. The described topic relates to the current setup or test screen. Depending on the application, you may be able to search for specific words or phrases, or step through the available help topics.
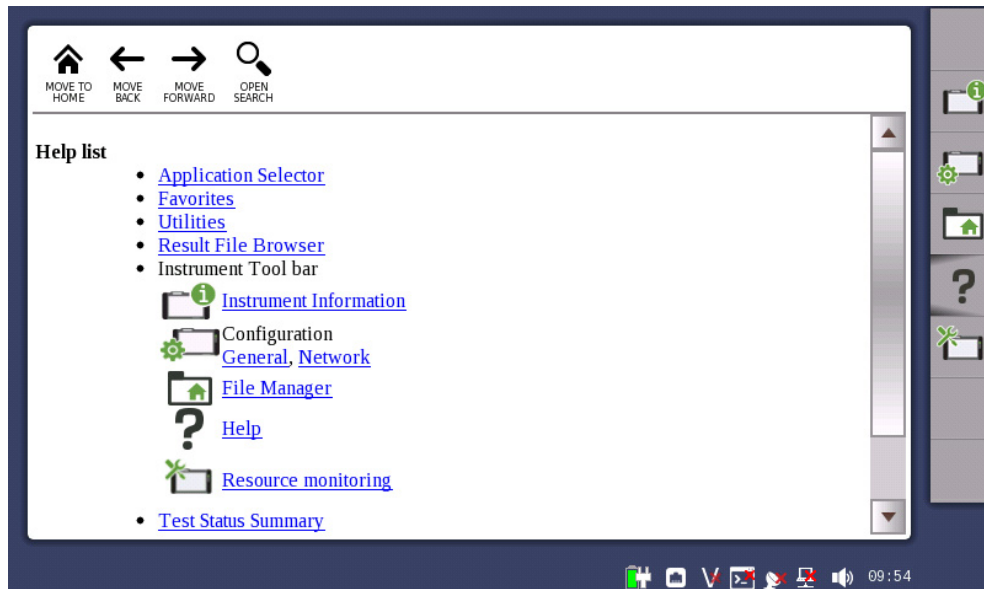
Moves to the Help list.

Back

Forward

Shows/hides the search box and buttons at the bottom of the help screen. To consider uppercase and lowercase characters in the entered search string, select the **Case Sensitive** checkbox.

Searches backward.

Searches forward.

4.2.1.5 Resource Monitoring

The **Resource Monitoring** icon launches a screen that shows the currently activated applications and the ports that have been assigned to each.
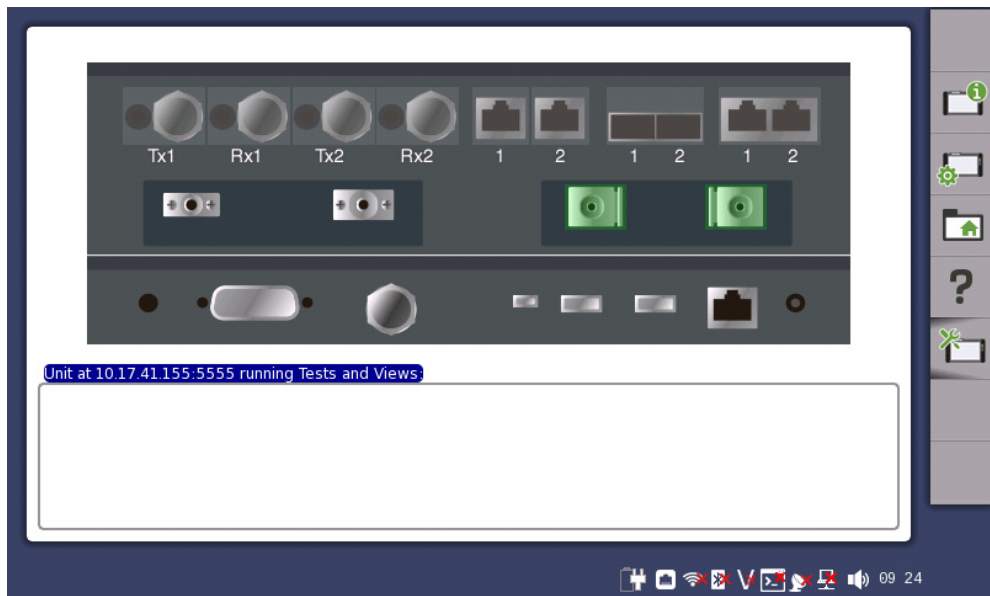
4.2.2 Application Toolbar

The Application toolbar is located on the right side of the Network Master display and consists of icons that give access to commonly used functions. Some icons described in this section may not apply to all applications. For information on icons not shown here, refer to the documentation topic for the associated application.

With some applications, the toolbar can be expanded to show additional functions and status information. Touch the toolbar tab to expand or collapse the view.
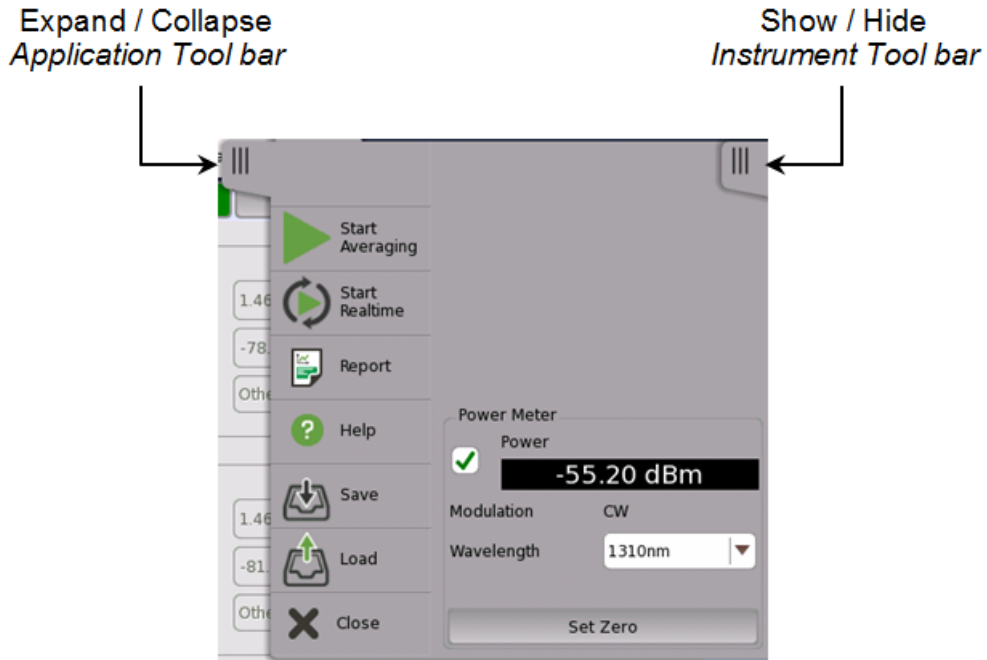
4.2.2.1 Main Toolbar Area

The Application toolbar may contain these or similar icons.

Touch the **Start** icon to start the currently selected test. The icon changes to the **Stop** icon shown below, which can then be used to stop the test.

Stops the current test. The icon then changes to the **Start** icon shown above.

Starts the real-time test. This function is available with certain applications only.

Creates a report containing the current test results and settings. Touch this icon and follow the instructions below.

NOTE

*Creating reports from the Result File Browser does not take up port resources on the system and may be a better alternative than generating reports from the Application toolbar. From the Result File Browser, select the desired file and touch the **Report** icon.*

The CPRI RF application currently does not support the reporting of test result data.

1. Touch the **Select Report** field in the Report Generator dialog to select the type of report you wish to create.

2. Touch the appropriate checkbox to select the output file format.

3. To display a logo in the report, select the **Include Logo** checkbox and enter or browse for the image file name.
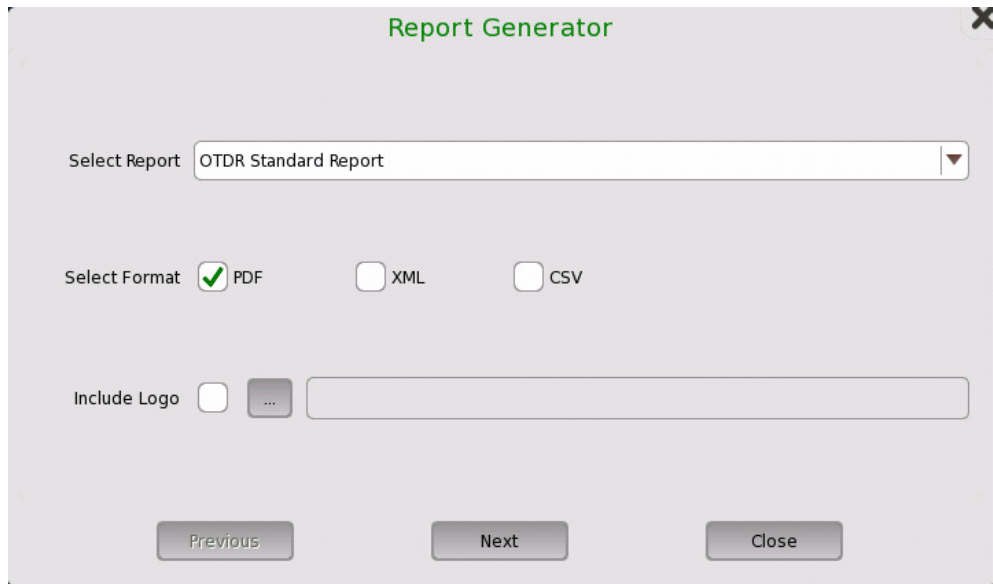
4. Touch **Next** to continue.

5. Choose the information items to include in the report by selecting the corresponding checkboxes.

6. When selecting **VIP1** or **VIP2**, use the **Browse** button to find the Video Inspection Probe image file.

7. Touch the **Generate** button to start the report generation.
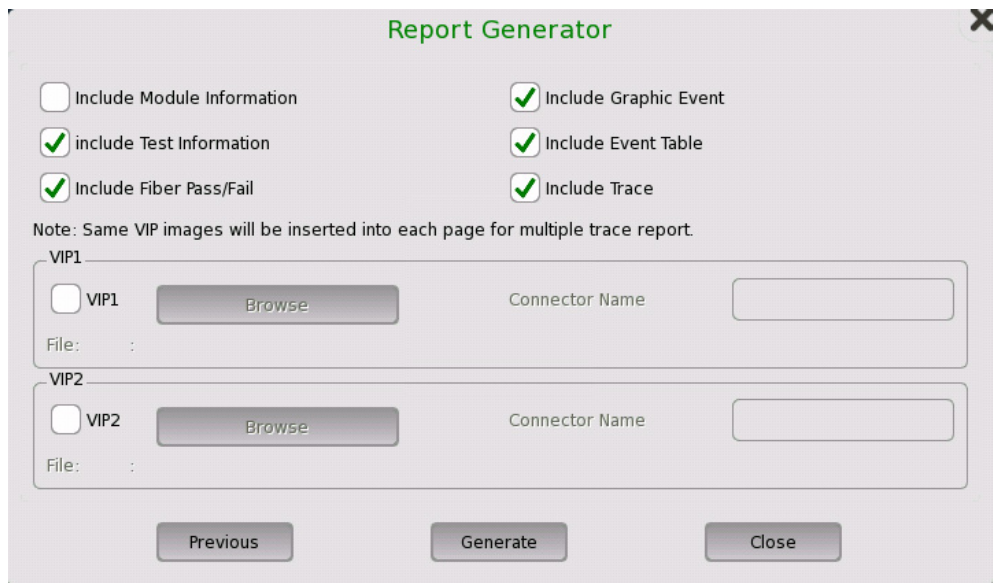
NOTE *Adobe® Reader® is recommended as a PDF viewer to open or print the report.*

Touch this icon to access the online help for the currently displayed screen or dialog. Depending on the application, you may be able to search for specific words or phrases in the help library, or step through the available help topics.
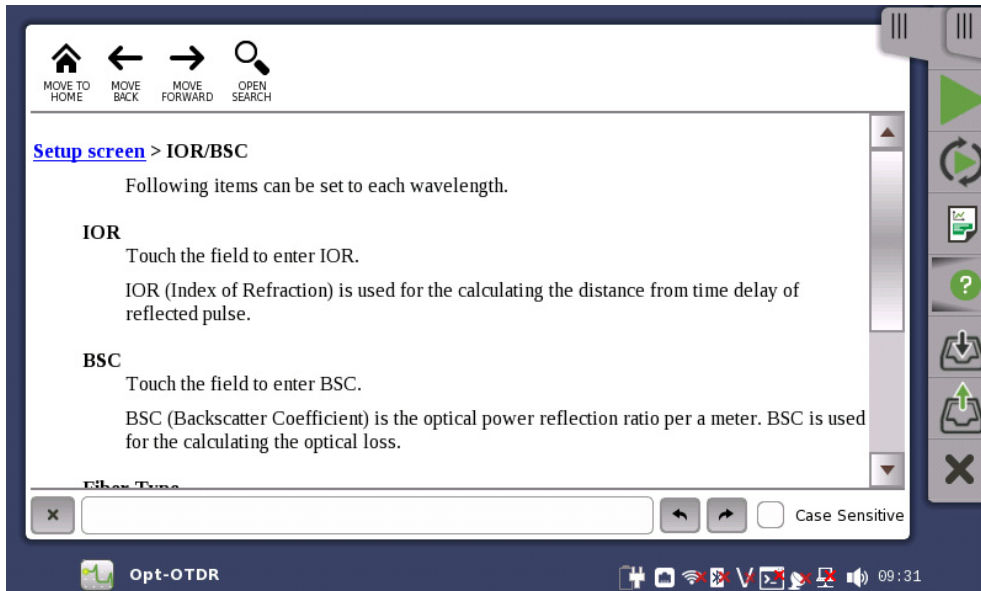

Moves to the topic initially opened when the **Help** icon was pressed.

Back

Forward

Shows/hides the search box and buttons at the bottom of the help screen. To consider uppercase and lowercase characters in the entered search string, select the **Case Sensitive** checkbox.

Searches backward.

Searches forward.

Touch this icon to open the Save dialog. Enter a file name in the **File name** field and touch **Save Setup** to save the test setup parameters or **Save Results** to save both setup parameters and test results. Saved files may be one of three types:

- Result file (*.sor) contains test setup parameters and the results of a single trace. Parameters on the Preferences 1/2 and Preferences 2/2 setup screens and the Pass/Fail test screen are not saved.

- Result file (*.zip) contains test setup parameters and the results of dual traces. Two *.sor files are zipped into this file.

- Setup file (*.cfg) contains all parameters from the Setup and Test screens.

Touch this icon to open the Load dialog, where you can select a setup file or result file. Touching a file on the list will display its name in the **File name** field. Select **Files of type** to apply a filter to the file list.

- **Load Setup** loads a setup file (*.cfg).
- **Load Result Primary** loads a test result file (*.sop or *.zip). If loading a result file (*.sop), the primary trace is overwritten.
- **Load Result Primary w/ Setup** loads a test result file (*.sop or *.zip). If loading a result file (*.sop), the primary trace is overwritten and the application test setup will change according to parameters in the loaded file. However, parameters on the Preferences 1/2 and Preferences 2/2 setup screens and the Pass/Fail test screen are not overwritten.
- **Load Result Overlay** loads a test result file (*.sop or *.zip). If loading a result file (*.sop), the overlay trace will be appended. Up to 12 overlay traces may be appended.
- **Load Result Overlay w/ Setup** loads a test result file (*.sop or *.zip). If loading a result file (*.sop), the overlay trace will be appended and the application test setup will change according to parameters in the loaded file. However, parameters on the Preferences 1/2 and Preferences 2/2 setup screens and the Pass/Fail test screen are not overwritten.

Not all functions are available in all applications. When running the FTTA application (OTDR module MU100020A/MU100021A), for example, only the **Load Result Primary** button will appear.

NOTE

When loading setup files, the output port setting (Single Mode or Multi Mode) enclosed in the file must match that of the current application.

When loading a compressed result file (.zip), the current traces are cleared and overwritten with the loaded results.*

HINT

Loading result files into a viewer will not take up port resources on the system. This is practical if you only want to review previous results and don't need to run the test again. From the Result File Browser, select the result file you wish to view and touch the **View** *icon at the top of the screen.*

Touch this icon to close the current application.

4.2.2.2 Expanded Toolbar Area

Some applications provide quick access to additional information and functions by making the Application toolbar expandable. Touch the toolbar tab to expand or collapse the view.

Refer to your product documentation for a description of the toolbar functions available with the application you are running. The CPRI RF module has no hidden icons outside the main area of the Application toolbar.

4.3 Startup and Shutdown Sequences

This section describes instrument behavior when you switch the Network Master on and off and when you start and close an application.

4.3.1 Instrument Startup

During instrument boot-up, the Network Master displays a splash screen illustrating the desktop and workspace areas of the graphical user interface, followed by the Application Selector screen. Refer to "Startup Splash Screen" and "Application Selector".

4.3.2 Application Startup

To start an application, touch the corresponding icon on the Application Selector screen. The relevant data is automatically loaded to the workspace that is created, then the Setup screen is displayed, with the appropriate interface types for the selected application. Refer to "Starting an Application".

Alternatively, you can start an application by selecting a result file on the Result File Browser screen. This method is not available with the CPRI RF application.

4.3.3 Accessing Previous Tests and Test Results

When selecting a test result file on the Result File Browser screen, you can choose to create either a report from the results (**Create Report** button) or an application workspace containing the setup data and associated test results. *.sor and *.zip files can be opened with different applications, and you need to specify the application you wish to launch.

Creating a workspace for a previous test using the **View File** or the **Load File** button allows you to view the test results directly on the test result screen. You can navigate from here to other screens in the workspace.
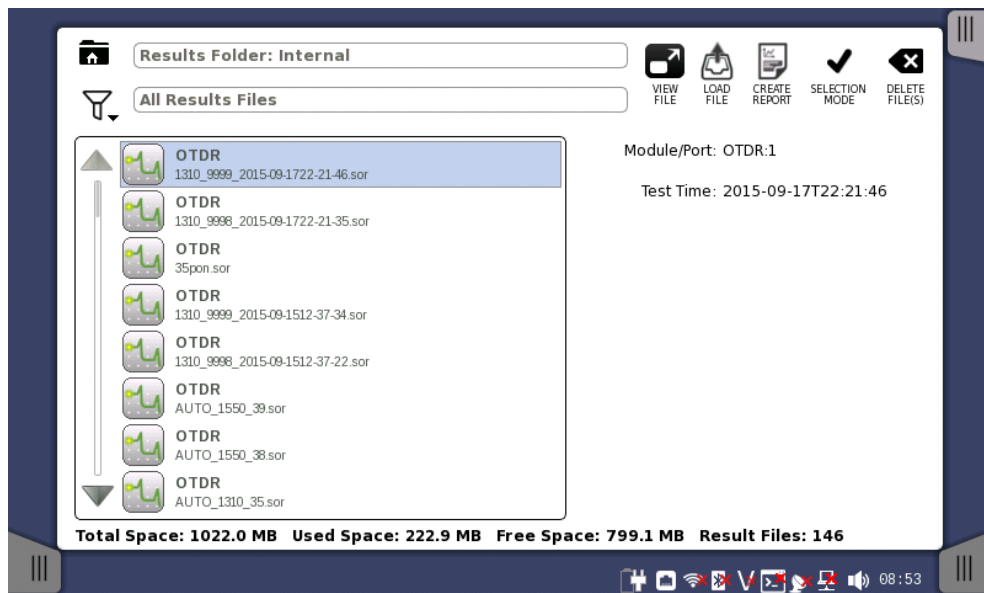
If you pressed **View File**, the application starts in Viewer mode, which is suitable if you do not plan to re-run the test or start a new measurement.

If you pressed **Load File**, the application starts using the setup parameters contained in the file.

If another application is using the same ports as specified in the loaded result file, the error message below is displayed. In this case, you can abort or start the application in Viewer mode, or launch it from the Application Selector screen and select different ports.

Error Loading result file ✖

The enclosed port resources are not available.
Do you want to load the results in a viewer instead?

Abort   Yes
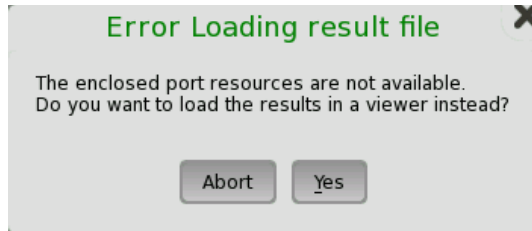
Touch the **Create Report** button to open the Report Generator dialog, where you can name and save the report in PDF format. Select the report type using **Select Report**. The report is created using pass/fail thresholds of the selected application.

4.3.4 Application Shutdown

Touch this icon in the Application toolbar to close the current application. Select **Yes** in the confirmation dialog to close the workspace and return to the Application Selector screen. Resources previously allocated to the application are released and available to other applications.

4.3.5 Instrument Shutdown

To turn off the Network Master, press the **Power** button once to display the pop-up menu shown below. Touch the **Shut Down** button, then **Yes** to confirm.

Apps Switcher

Capture Screen

Lock Screen

Shut Down

NOTE   *Any applications still running when the instrument is turned off will close automatically. Unsaved configuration data and test results will be lost.*

5 CPRI RF Application

This section covers the Common Public Radio Interface (CPRI) analyzer test and measurement functions of the Anritsu MU100040A application module. It contains descriptions of the application's graphical user interface and provides instructions for setting up and running a typical CPRI RF measurement.

The MU100040A module currently supports CPRI Specification V5.0.

5.1 CPRI RF

The Common Public Radio Interface (CPRI) is a protocol standard for wireless communications between remote radio units, also referred to as Radio Equipment (RE), and the Radio Equipment Controller (REC). The main differences with traditional RF signals are summarized in the table.

RF	CPRI
Analog	Digital
Absolute measurements	Relative measurements
dBm	dB
Specific center frequency	Base Band 0 Hz
Absolute power levels	Relative power levels
Full Span capable	Max Span = Carrier BW + 50%

The CPRI RF application allows users to make RF-based measurements over a fiber optic CPRI link to look for interference problems affecting a Remote Radio Unit (RRU). This is accomplished by tapping into the fiber link between the RRU and BBU (Base Band Unit), using an optical splitter to connect the RRU and BBU to the Anritsu Network Master. The instrument will decode the CPRI protocol IQ data and convert it to RF data.

Two types of CPRI RF measurements are available:

*   Spectrum mode is typically used to test the CPRI link in real time.
*   Spectrogram mode lets users monitor for intermittent interference over a specifiable recording time.

These CPRI RF test and measurement functions can be performed from ground level, eliminating the risk and costs of climbing towers. The figure below illustrates a typical connection configuration for CPRI RF testing with an Anritsu Network Master.
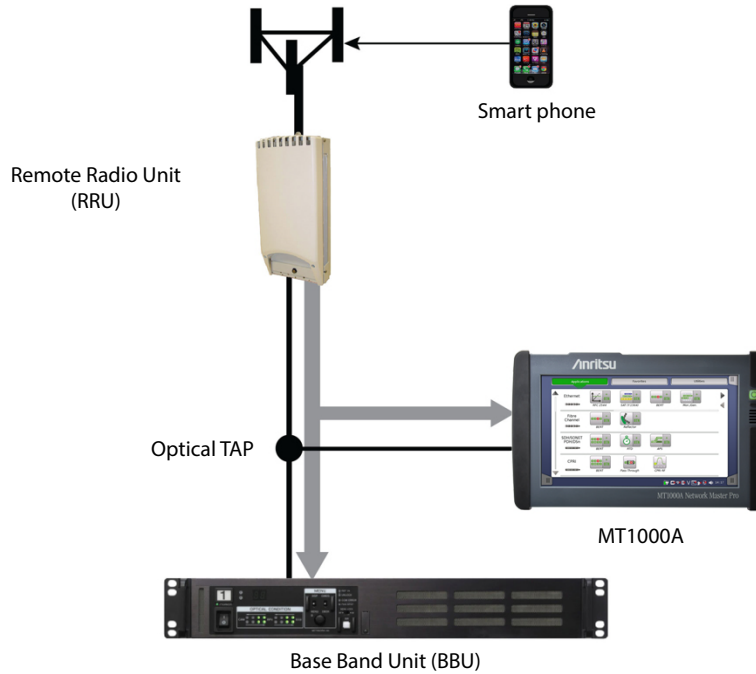
5.2 Setup Requirements and Checklist

Following is a list of accessories and questions to be answered prior to setting up a CPRI connection for testing:

- SFP optical transceiver used to connect the measurement device must match the link rate of SFPs on the BBU and RRU. The CPRI RF module for MT1000A Network Master Pro has dual SFP ports.

- Optical splitter or TAP (Test Access Point), Single Mode or Single/Multi Mode

- Optical cables

- What is the bandwidth of LTE carrier?

- Who is the network equipment manufacturer (NEM)?

- What is the CPRI line rate (or link rate)?

- Is the fiber optic connection Single Mode (Yellow) or Multi Mode (Orange)?

Required accessories are available from Anritsu Company. Refer to the instrument Technical Data Sheet.

5.3 Typical CPRI Connection

1. Lock down the RRU before disconnecting the fiber optic cable.

2. Disconnect the fiber cable from the BBU.

3. Connect the RRU to Port A on the optical TAP.

4. Connect a 3-meter LC/LC Duplex Jumper from Port B on the optical TAP to the BBU.

5. Use a compatible SFP transceiver and Simplex fiber cable to connect the Anritsu test instrument to Port AB on the optical TAP.

   Port A Out from Port AB is the uplink RRU spectrum.

   Port B Out from Port AB is the downlink BBU spectrum.

6. You can optionally connect the Network Master to another RE using the second SFP port. However, you can only test one CPRI link at a time.

7. When all connections are complete, unlock the RRU.

8. Perform measurements using live traffic.
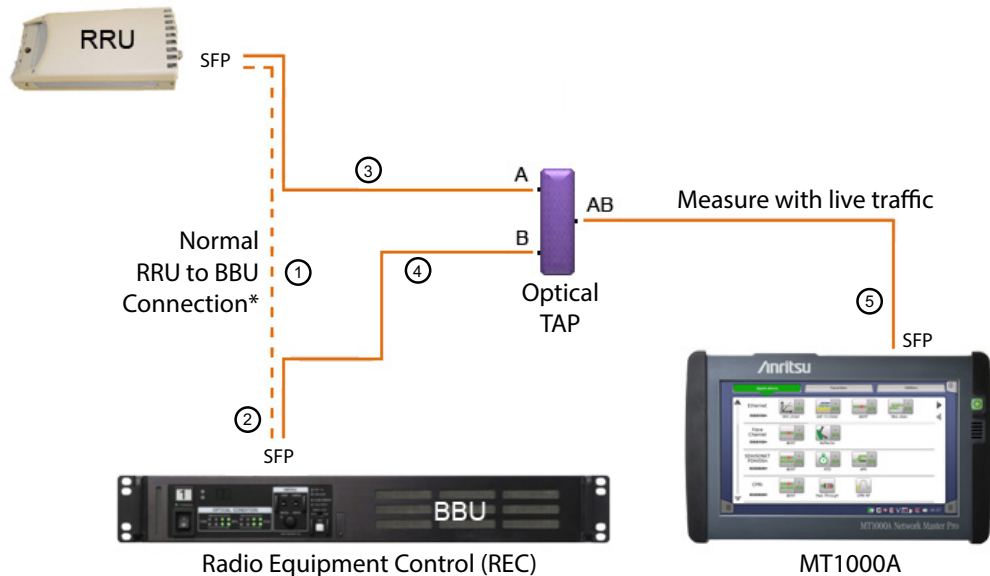
* Lock down the Radio before disconnecting fiber from BBU

⚠️ **WARNING**

Laser radiation may be present at fiber optic cable connectors and ports. This laser radiation could present a nominal ocular hazard from either direct viewing or by diffuse reflection. Do not view the emitted laser radiation directly or indirectly because permanent blindness may result.

5.4 CPRI RF Measurement Setup

The primary application for CPRI RF is to check for interference on the RRU-to-BBU uplink. When monitoring traffic over the CPRI link, the Anritsu test instrument will extract the IQ data, modulate it into the proper baseband frequency, and process the signal into data points to be plotted on the instrument screen. The parameters described in the following sections are needed for the CPRI RF application to process and display the data correctly. Note that configurations may be different for the uplink and downlink. The uplink spectrum represents mobile phone LTE data. The downlink spectrum is the display spectrum of BBU LTE control channel to RRH.

CPRI parameters can be set manually or with the aid of radio presets if you know the equipment manufacturer (such as Alcatel-Lucent, Ericsson, or Huawei). With a vendor-specific preset selected, the application will automatically determine the IQ bit width, number of reserve bits, and the start container.

5.4.1 Frequency

To select frequency settings, touch the **Frequency** button in the navigation area. To allow the movement of the CPRI signal off center (pan), offset the center frequency to a different value from the carrier frequency. Touch the Preset icon at the top of the Application toolbar to reset frequency parameters to their default values.

NOTE *Before pressing the Preset icon in the Application toolbar, keep in mind that this button functions as a master reset. All other setup and measurement parameters will also be reset to their factory default values.*

5.4.1.1 Carrier Frequency

All CPRI IQ data is at baseband frequency (0 Hz). The default carrier frequency value is 1 GHz. During CPRI configuration, enter the correct signal frequency for your carrier. Touching **Carrier Freq** in the status area will display the screen shown below.
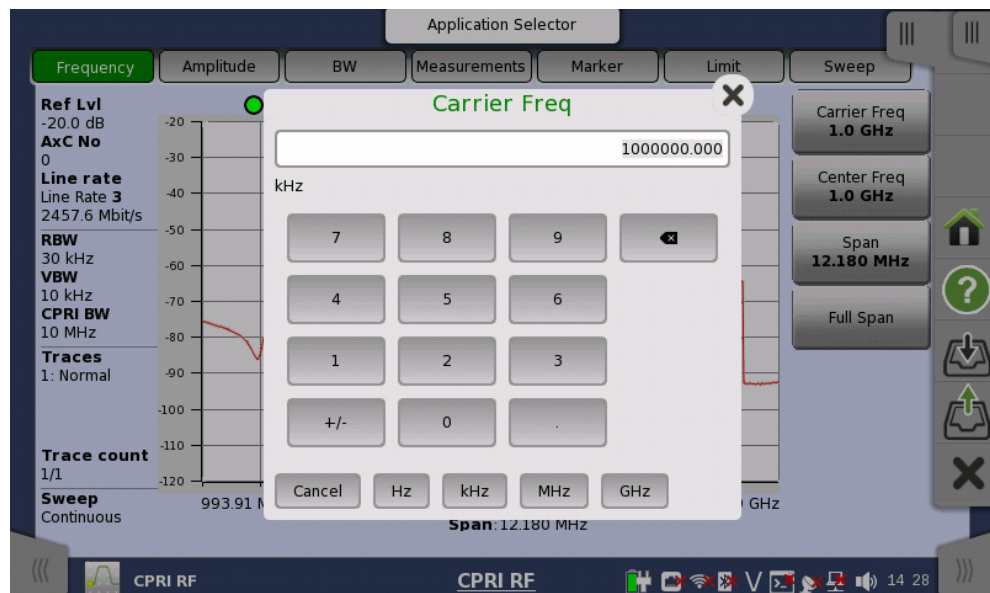
5.4.1.2 Center Frequency

When the carrier frequency is set as described above, the center frequency defaults to the same value. To allow the CPRI signal to move off center (pan), adjust the center frequency to a different value. Depending on the value entered, this may automatically adjust the frequency span, as there cannot be panning without zooming.

5.4.1.3 Span

Use the frequency span to zoom in to the CPRI signal. A span setting of 0 Hz (or zero span) is not valid when running CPRI RF measurements. The default span is 15.360 MHz.

The maximum span is approximately the LTE carrier bandwidth plus 50%. No signal will be displayed outside the maximum CPRI span boundary. The minimum span is 10 Hz. The current span setting does not change if you enter a value outside the valid range.

NOTE *Changing the frequency span will also change the resolution bandwidth and video bandwidth if the coupling state of these values is set to On (the default), using the Auto RBW and Auto VBW settings on the BW setup screen.*

5.4.1.4 Full Span

Touching this button sets the span to cover the entire tunable spectrum of the instrument.

5.4.2 Amplitude

Touch the **Amplitude** button in the navigation area to access amplitude-related parameters. The Preset icon at the top of the Application toolbar resets amplitude parameters and all other application settings to their default values.
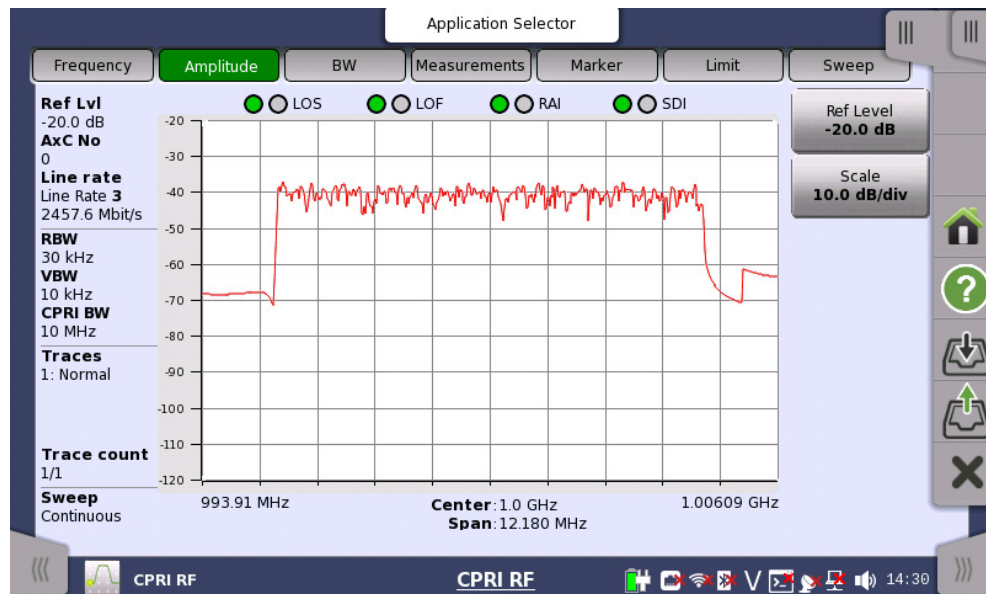
5.4.2.1 Reference Level

The reference level is the top grid line in the sweep window. The default value is 10.0 dB. Adjust the reference level amplitude (in dB) to bring the signal trace toward the center of the display, relative to the Y axis.

5.4.2.2 Scale

The sweep window on the instrument screen is a 10x10 grid. Enter the scale value to adjust the Y axis (amplitude) intervals for optimal viewing of the signal trace. The default setting is 10.0 dB/div.

5.4.3 Bandwidth

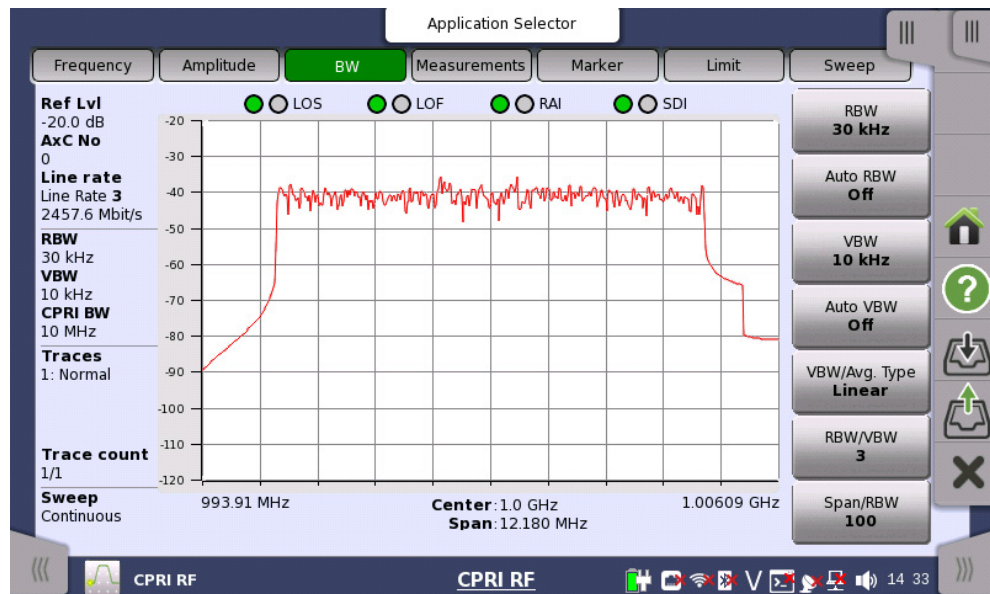Touch the **BW** button in the navigation area to view or change the bandwidth settings. The Preset icon at the top of the Application toolbar resets bandwidth parameters and all other application settings to their default values.

5.4.3.1 RBW

The resolution bandwidth ranges from 10 Hz to 3 MHz. Available settings are: 10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, and 3 MHz. The default is 30 kHz.

The RBW value changes automatically when the frequency span is changed and Auto RBW is enabled. In this case, the new RBW value is an approximation selected out of the valid settings listed above, based on the current ratio of span to resolution bandwidth. Refer to "Span/RBW".

Manually changing the resolution bandwidth turns off the Auto RBW setting.

5.4.3.2 Auto RBW

This parameter controls the coupling state of the resolution bandwidth to the frequency span. When Auto RBW is on (the default), the instrument adjusts the RBW value anytime the span width changes. RBW is then based on the current frequency span and the ratio of span to RBW, as specified by the Span/RBW setting. Note, however, that RBW is not affected when you change the Auto RBW setting from Off to On, only when Auto RBW is on *and* the span is changed.

To disassociate RBW from the span, turn off Auto RBW.

5.4.3.3 VBW

The video bandwidth ranges from 10 Hz to 3 MHz. Available settings are: 10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, and 3 MHz. The default is 300 Hz.

The VBW value changes automatically when RBW is changed and Auto VBW is on, in which case VBW is set at one of the valid frequencies listed above, as determined by the ratio of resolution bandwidth to video bandwidth. Refer to "RBW/VBW". VBW also adjusts automatically when you change the Auto VBW setting from Off to On.

For example, if RBW is 100 kHz, Auto VBW is on, and the ratio RBW/VBW is 4, the VBW value would automatically adjust to 30 kHz, which is the valid VBW setting closest to 25 kHz (100 divided by 4).

Manually changing the video bandwidth turns off Auto VBW.

5.4.3.4 Auto VBW

This parameter sets the coupling state of the video bandwidth to the resolution bandwidth. When Auto VBW is on (the default), the instrument adjusts the VBW value anytime RBW changes. VBW is then determined by the ratio of resolution bandwidth to video bandwidth, which is an integer value specified by the RBW/VBW setting.

To disassociate VBW from RBW, turn off Auto VBW.

5.4.3.5 VBW/Average Type

Touch this button to select linear averaging (arithmetic mean) or logarithmic averaging (geometric mean). Linear is the default setting.

5.4.3.6 RBW/VBW

Touch the **RBW/VBW** button to set the ratio between resolution bandwidth and video bandwidth. The value you enter is rounded to the nearest integer. This parameter is effective only when Auto VBW is on. The default ratio is 100.

5.4.3.7 Span/RBW

Touch the **Span/RBW** button to specify the ratio between frequency span and resolution bandwidth. The value you enter is rounded to the nearest integer. This ratio is in effect only when Auto RBW is on.

The default ratio is 100, meaning that the span width is approximately 100 times the resolution bandwidth. The value is approximate because resolution bandwidth filters come in discrete steps while span width can be set to any value up to the maximum span of the instrument.

5.4.4 Measurements

Touch the **Measurements** button in the navigation area to access the "CPRI Configuration" and related screens. The Preset icon at the top of the Application toolbar resets all setup and measurement settings to their default values.
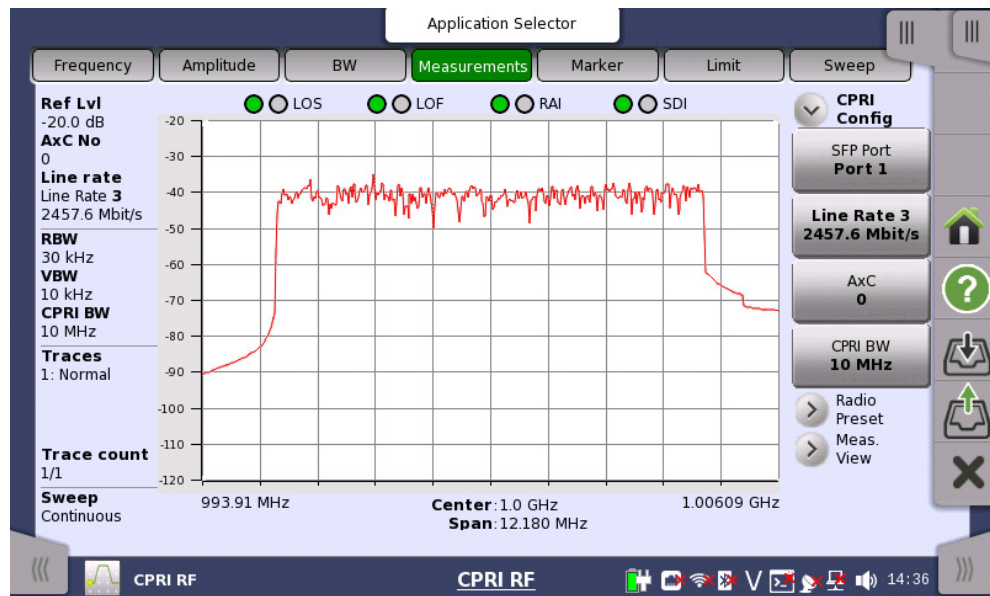
5.4.4.1 CPRI Configuration

To view or set the CPRI Configuration settings, touch the **CPRI Config** button in the status area.

SFP Port

Touch this button to select the port and CPRI link you want to test.

Line Rate

Line Rate is the speed of the CPRI link. The table lists the selectable line rates and associated rate numbers, 1 through 7. The default setting is 3.

CPRI Rate	Line Rate (Mbit/s)
1	614.4
2	1228.8
3	2457.6
4	3072.0
5	4915.2
6	6144.0
7	9830.4

AxC Container/Group

The CPRI AxC contains the IQ data used to generate the RF spectrum. Antenna container mapping determines the location of IQ data for a given carrier (that is, the signal).

Container groups are used to achieve the desired sample rate by aggregating a number of containers into groups that form one basic frame. The number of containers in a group depends on the carrier bandwidth and the line rate. You can specify the location of the IQ data samples inside the CPRI basic frame by selecting the **AxC** group (0 through 10). The default selection is 0.
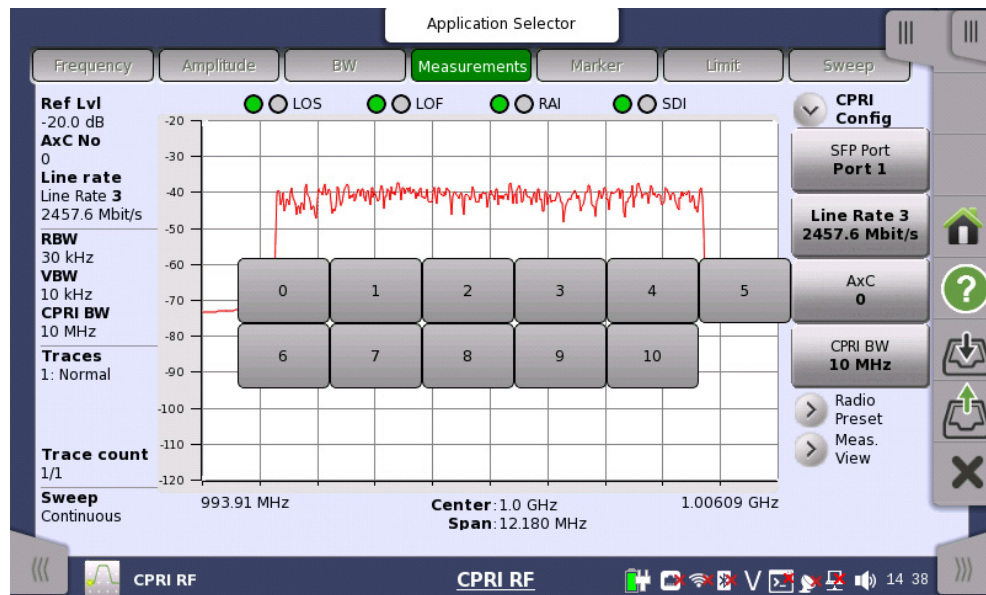

CPRI Bandwidth

This is the bandwidth of the LTE carrier that is transmitted via CPRI. Supported LTE carrier bandwidths are 5 MHz, 10 MHz, 15 MHz, and 20 MHz. The default bandwidth is 10 MHz.

The I and Q samples include the LTE carrier plus 50% dummy data, which appears as noise floor on either side of the spectrum. The maximum span is approximately 50% greater than the carrier bandwidth. For example, if the LTE carrier bandwidth is 10 MHz, the maximum span will be 15 MHz.

5.4.4.2 Radio Preset

The easiest way to configure the Network Master for CPRI RF testing is to use one of the radio presets provided with the application. By doing so, the IQ bit width, number of reserve bits, and start container settings appropriate for the selected vendor will be applied automatically.
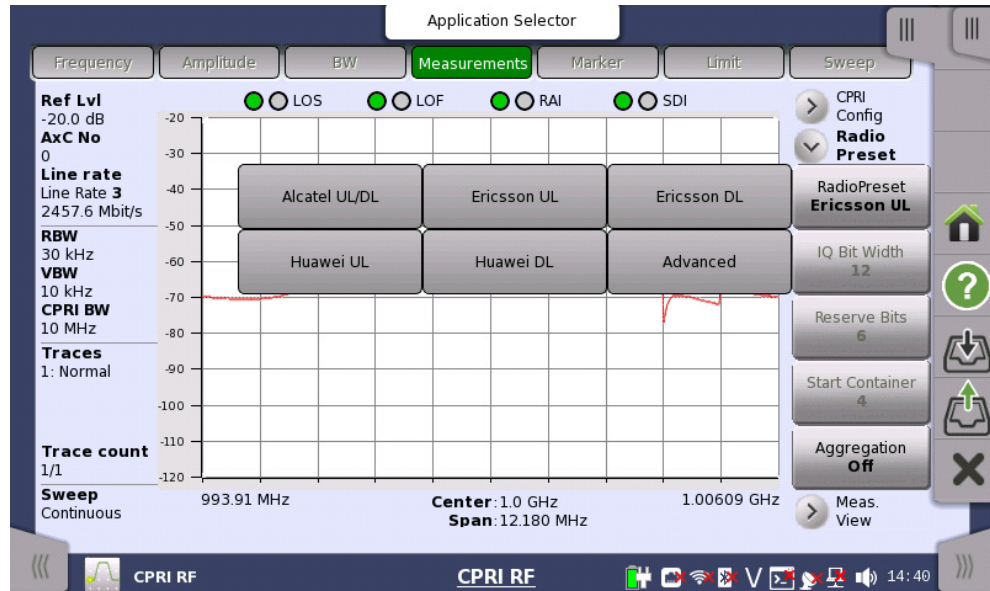
- **Alcatel UL/DL** is the radio preset for Alcatel-Lucent uplink/downlink.
- **Ericsson UL** is the radio preset for Ericsson uplink (RRU to BBU). Touch the **CPRI Aggregation** button to set aggregation on or off.
- **Ericsson DL** is the radio preset for Ericsson downlink (BBU to RRU). Touch the **CPRI Aggregation** button to set aggregation on or off.
- **Huawei UL** is the radio preset for Huawei uplink (RRU to BBU).
- **Huawei DL** is the radio preset for Huawei downlink (BBU to RRU).
- **Advanced** lets you specify custom settings when no radio preset is available for the RRU being used, or you don't know who the equipment manufacturer is.

The parameters described below are selectable only with Advanced preset, except for CPRI Aggregation On/Off when the chosen radio preset is Ericsson UL or DL.

IQ Bit Width

This is the IQ bit width, or sample width, for downlink and uplink. Selectable values are 10, 12, 15, and 16.

Reserve Bits

The reserve (or stuffing) bits are vendor-specific and are used with IQ bit width to align sample frequencies to the basic frame frequency. Reserve bits can be set at 0 through 6. For LTE, 0 and 6 are the most common reserve bit values.

Start Container

With most radio manufacturers, the IQ samples start at the beginning of the CPRI data flow. If your carrier uses a different frame structure, you can select the start container number (0-15) to specify the start location of the IQ data block within the CPRI stream. This setting determines the offset location of container group AxC0 relative to the beginning of the data stream.

Aggregation

Aggregation is common with some LTE equipment manufacturers. It refers to the aggregation of smaller carriers to make one large carrier within one AxC. For example, two 5 MHz carriers can be aggregated to make a single 10 MHz carrier.

For a single carrier, set CPRI aggregation off. For multiple carriers, choose aggregation on. The default setting is off.
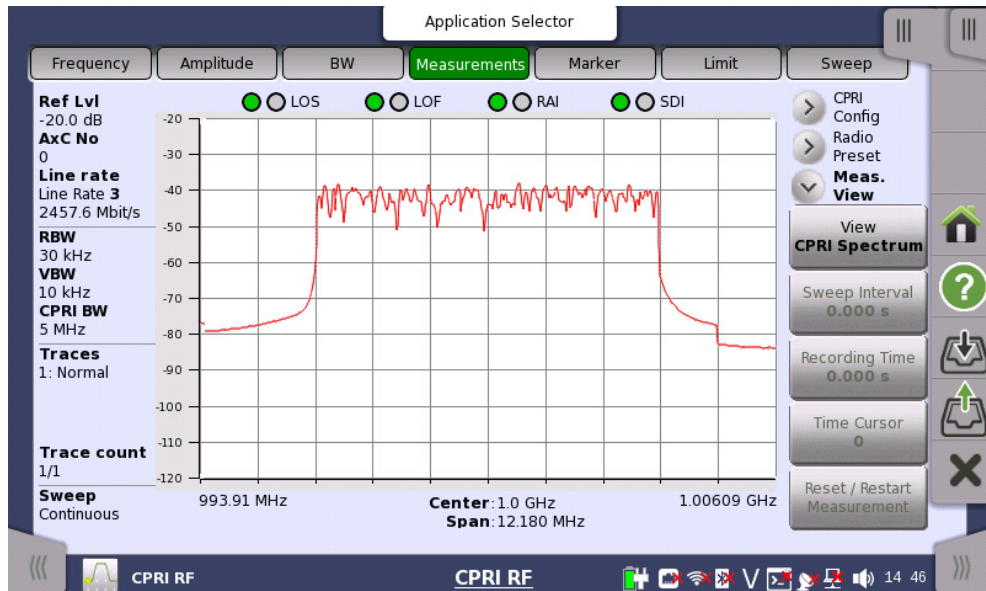
5.4.4.3 Measurement View

Touch the **Meas. View** button in the status area to select the type of view displayed in the setup area of the screen.
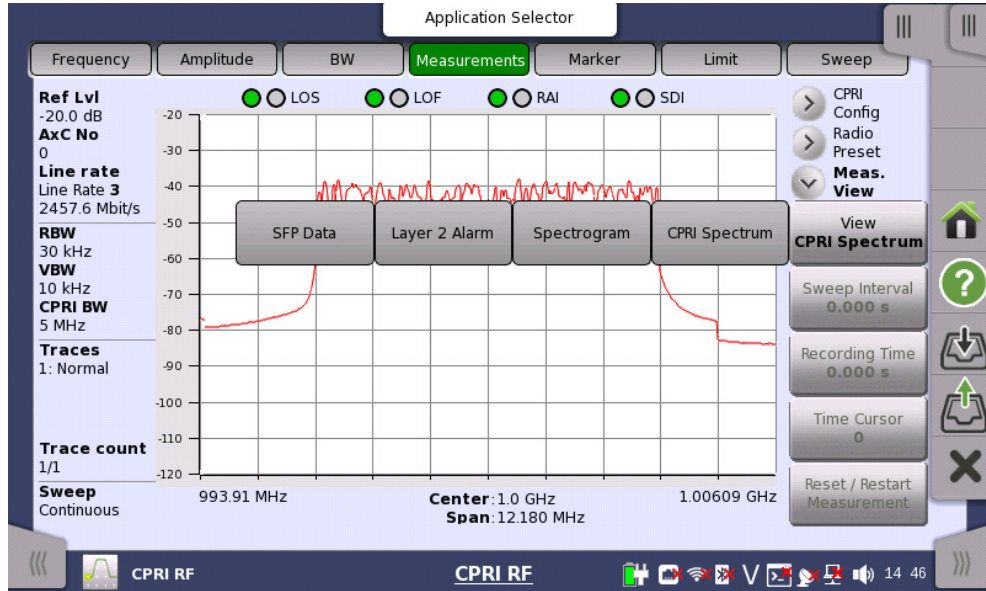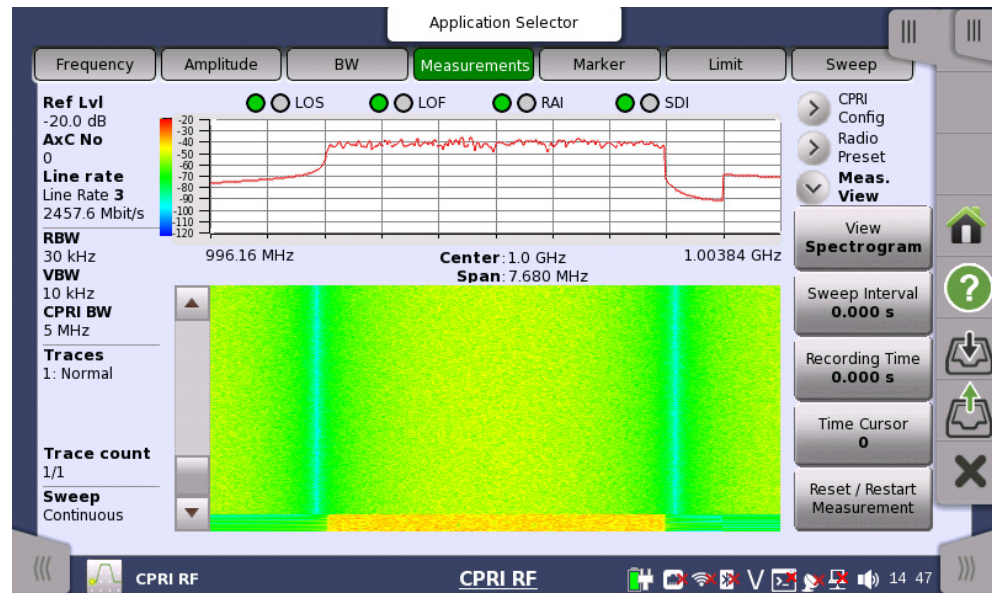

CPRI Spectrum View

The spectrum display shows the CPRI signal as a waveform in a traditional spectrum analyzer view.

Spectrogram View

A spectrogram is a three-dimensional representation of frequency, time, and power. Color is used to represent the relative power levels.

- **Sweep Interval** sets the time interval between sweeps.

- **Recording Time** specifies the length of time for recording measurement data. At the end of the timed measurement, touch **Save** in the message box that appears to save the recorded data in a time-stamped folder in internal memory.

- **Time Cursor** sets the time cursor value. The current measurement is stopped when the value is not zero.

- **Reset/Restart Measurement** clears the display and restart the measurement.
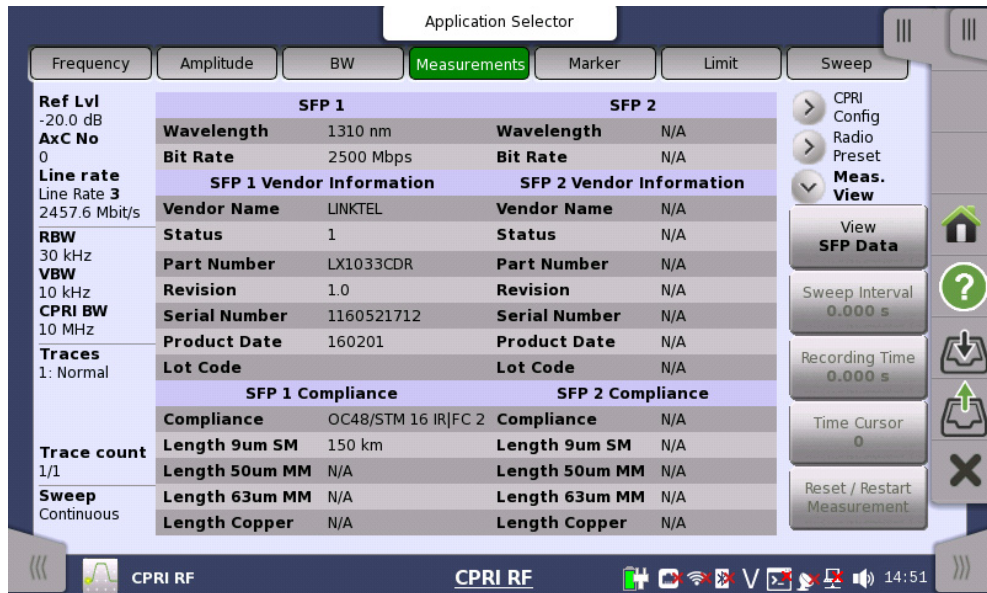
Layer 2 Alarm

Touching this button displays the SFP port alarm status and the Tx and Rx optical power levels. Pass status is shown as green; Fail is red. No color means there is no connection at the SFP port.
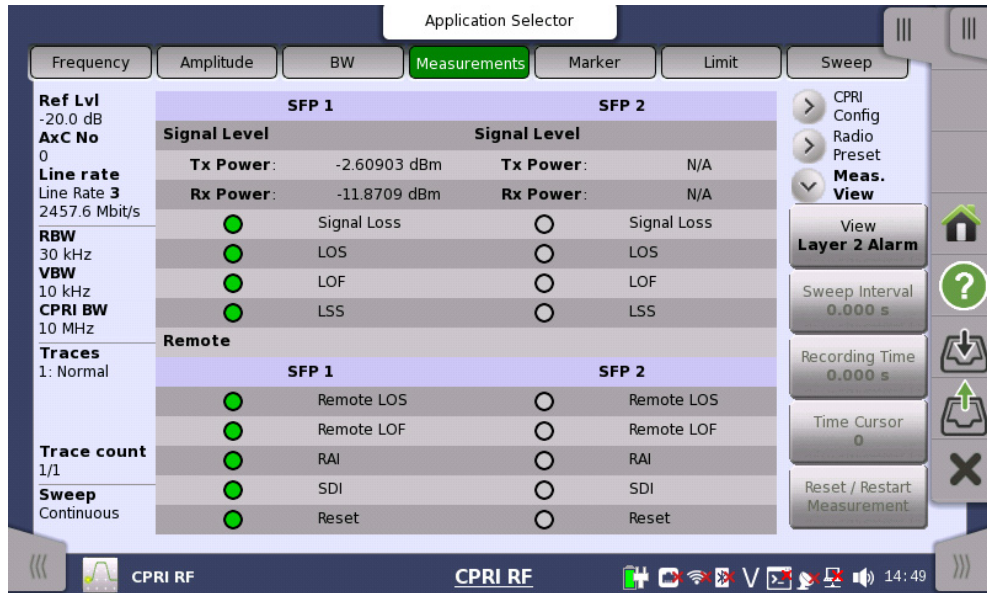

SFP Data

Touch the **SFP Data** button to display a table that lists the signal data and vendor information at the SFP port or ports.

5.4.5 Marker

Touch the **Marker** button in the navigation area to access the Marker Setup and Marker Search screens. The Preset icon at the top of the Application toolbar resets marker parameters and all other application settings to their default values. To reset only the markers, touch the **Preset Markers** button.
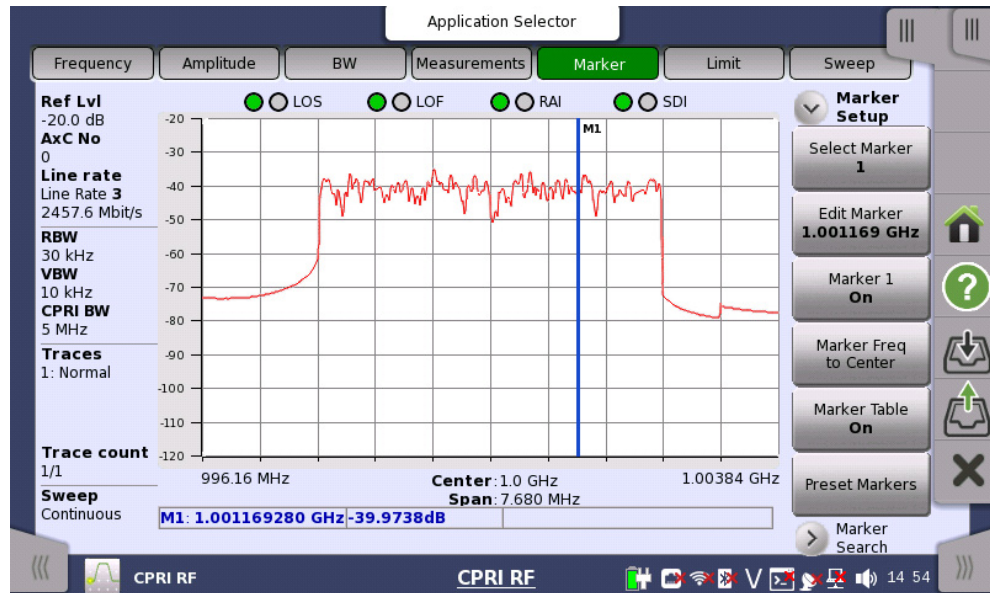
5.4.5.1 Marker Setup

Select Marker

Select a marker number (1 through 6) to edit.

Edit Marker

Enter the frequency value for the currently selected marker in Hz, kHz, MHz, or GHz. You can also move the marker using the touch screen. Press and hold the blue marker line until the color changes to pink, then drag. The marker frequency displayed on the **Edit Marker** button (and in the Marker Table if turned on) changes as you move the marker.

Marker

Turns the selected marker on or off. The default is off.

Marker Freq to Center

Touch this button to move the frequency noted by the selected marker to the center frequency position and center of the display. This allows the CPRI signal to move off center (pan). No signal will be displayed outside the maximum CPRI span boundary, which is approximately the LTE carrier bandwidth plus 50%.

To re-center the signal on the display, change the center frequency to match the carrier frequency.

Marker Table

When turned on, the marker table is displayed below the sweep window, listing the frequency and amplitude of all currently active markers. The default setting is off.

Preset Markers

Touch the **Preset Markers** button to remove previously set markers. Touch **Yes** to confirm.

5.4.5.2 Marker Search

Touch the **Marker** button in the navigation area to access the Marker Setup and Marker Search screens.
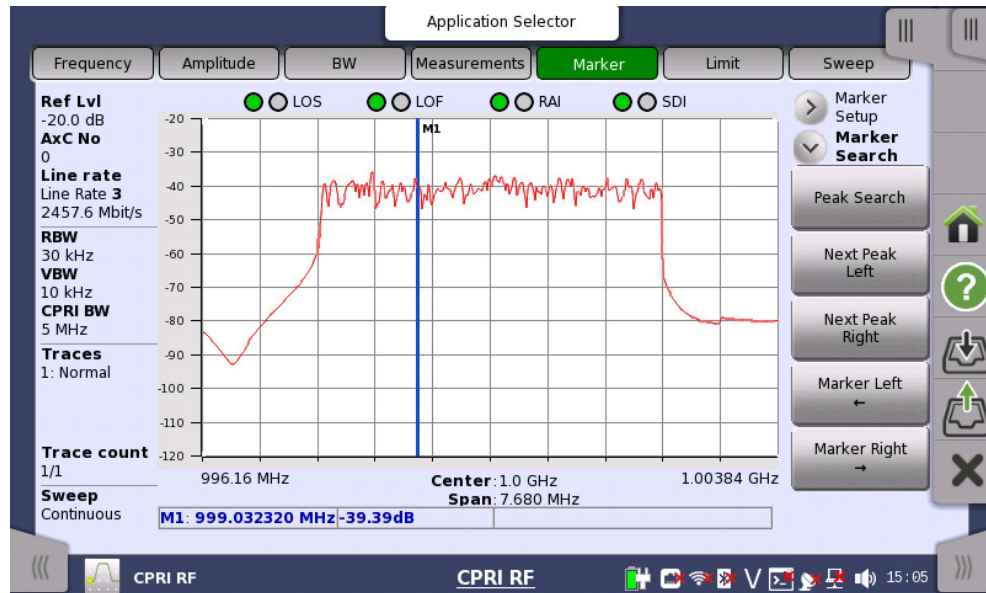
Peak Search

Places the selected marker number on the highest amplitude signal currently on screen.

Next Peak Left

From the current position of the selected marker, the instrument searches to the left (toward lower frequencies) for a peak signal that rises at least a certain amount above the average noise level. If no such peak is found, the marker is placed at the left end of the trace.

Next Peak Right

From the current position of the selected marker, the instrument searches to the right (toward higher frequencies) for a peak signal that rises at least a certain amount above the average noise level. If no such peak is found, the marker is placed at the right end of the trace.

Marker Left

Touch this button to move the currently selected marker one display point to the left. You can also move the marker by entering a frequency value using the **Edit Marker** button on the Marker Setup screen or, simply press and hold the blue marker line until the color changes to pink, then drag.

Marker Right

Touch this button to move the currently selected marker one display point to the right. You can also move the marker by entering a frequency value using the **Edit Marker** button on the Marker Setup screen or, simply press and hold the blue marker line until the color changes to pink, then drag.
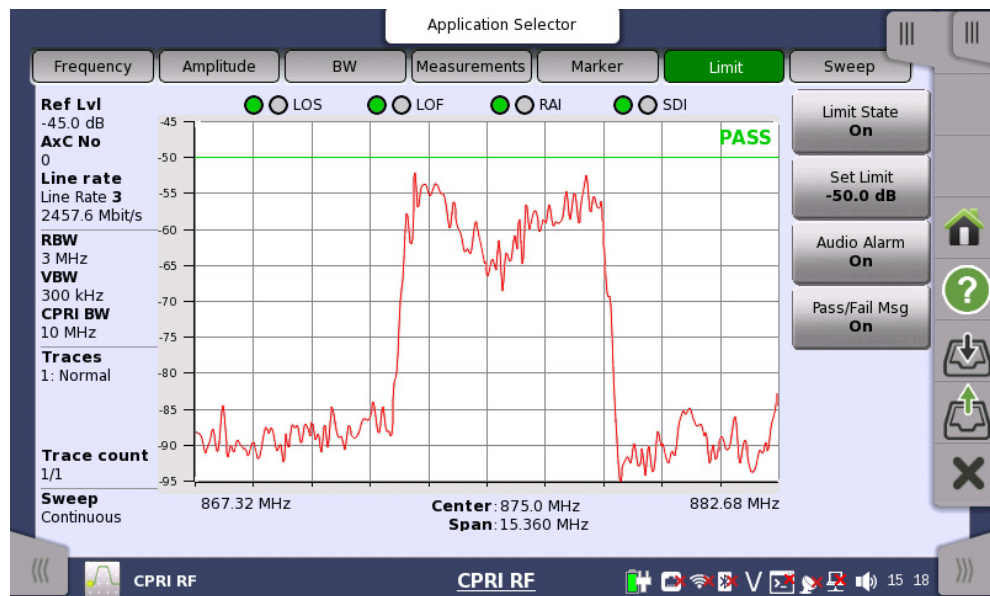
5.4.6 Limit

Touch the **Limit** button in the navigation area to set up a limit line on the instrument display. The limit line serves as a visual reference and as an upper limit in a pass/fail test. The Preset icon at the top of the Application toolbar resets limit parameters and all other application settings to their default values.

5.4.6.1 Limit State

Touch this button and select On or Off to display or hide the limit line. The default setting is off.

5.4.6.2 Set Limit

Touch this button to set the limit line at the specified power level, in dB. The limit is a flat line (non-segmented) that triggers an alarm when Limit State is set to On and the signal exceeds the set amplitude level.
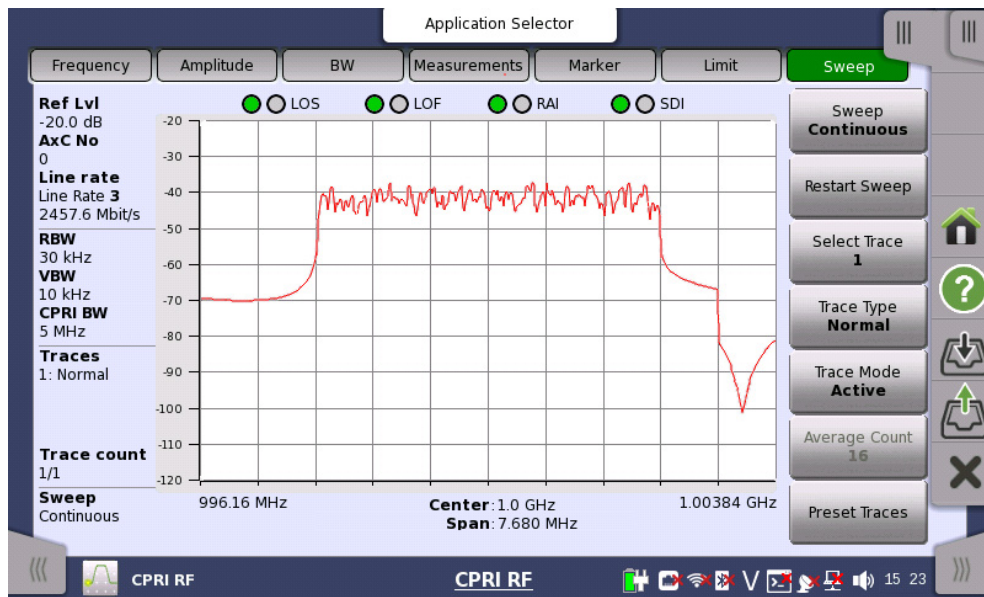
5.4.6.3 Audio Alarm

When set to On, limit alarm failures are reported whenever a signal data point exceeds the specified limit. The default setting is off.

5.4.6.4 Pass/Fail Msg

Enables or disables the display of a Pass/Fail status message. The default is off.

5.4.7 Sweep

5.4.7.1 Sweep

Choose between Continuous sweep and Single sweep. In single sweep mode, the results of a sweep are displayed on the screen while the instrument awaits a trigger event to start a new sweep. Continuous is the default setting.

5.4.7.2 Restart Sweep

Touch this button to start a new measurement sweep.

5.4.7.3 Select Trace

Choose the active trace: 1, 2, or 3.

5.4.7.4 Trace Type

Normal

Displays data for the current trace sweep. This is the default setting for Trace 1.

Average

Shows an exponential average of a number of traces, determined by the Average Count.

Max Hold

Shows the cumulative maximum value of each display point over many trace sweeps. This is the default for Trace 2.

Min Hold

Shows the cumulative minimum value of each display point over many trace sweeps. This is the default for Trace 3.

5.4.7.5 Trace Mode

Blank

Hide the trace. Any active markers will still be visible. This is the default setting for Traces 2 and 3.

Hold/View

Freeze the trace display.

Active

Normal trace display is the default setting for Trace 1.

5.4.7.6 Average Count

Sets the number of traces for use in calculating the average display value, when the selected trace type is Average. The selectable count values are 2, 4, 8, 10, 16, 32, 64, 128, 256, 512.

5.4.7.7 Preset Traces

Resets the trace and sweep settings to default.

5.5 Saving and Loading Files

To save or load application data to the Network Master, touch one of the Application toolbar icons described below.

Touch this icon to save the current setup parameters in a file (extension .cfg) in internal memory.

In the Save File dialog, touch the **File name** field to open the Edit File Name dialog, then enter the name and touch **OK**. Optionally, touch the **Add to Favorites** checkbox to simultaneously create a duplicate file in the Favorites folder in internal memory. Touch **Save Setup** to save the setup parameters in internal memory.

Touch this icon to load setup parameters from a previously saved file in internal memory or a USB device.

In the Load File dialog, go to the folder in either internal memory or an external USB device that contains the saved setup data and select the file (*.cfg). Touch **Load Setup** to load the setup parameters to the application workspace.

5.6 CPRI RF Configuration Example

Following is an example of configuring the Network Master for CPRI RF testing on the RRU or uplink LTE signal (Port A Out from Port AB on the optical TAP), using one of the available uplink radio presets.

1. On the Measurements screen of the CPRI RF application workspace, touch the **CPRI Config** button in the status area.

2. Select the SFP port to which the CPRI link you want to monitor is connected.
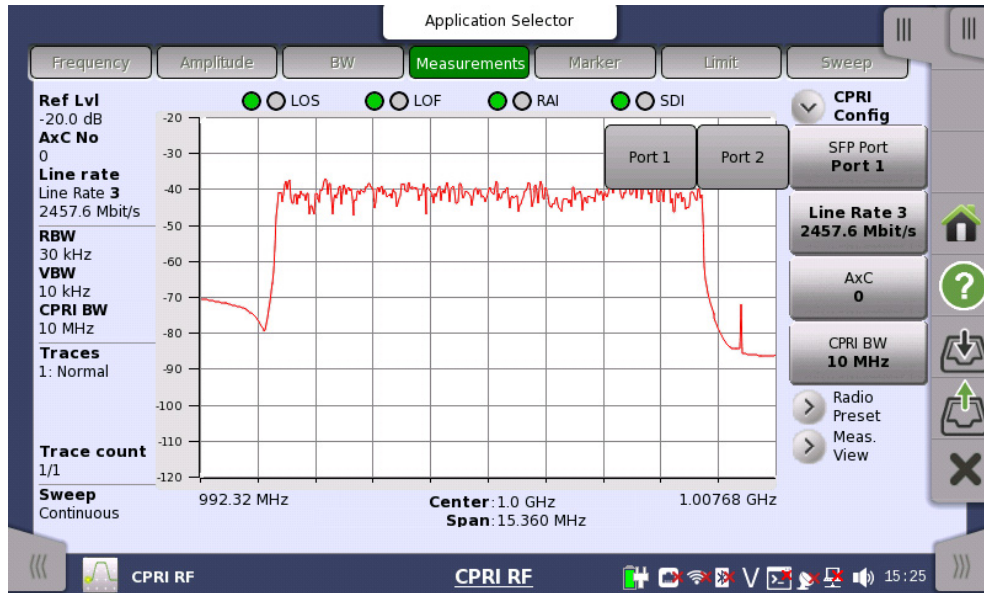

3. Set the line rate, AxC container group, and the CPRI bandwidth as appropriate.

4. Under the **Frequency** navigation tab, enter the carrier frequency. The center frequency will default to the value you enter here, while the span is approximately the carrier bandwidth plus 50%.

5. Under **Amplitude**, set the reference level and scale values as needed to move the signal trace close to the center of the sweep window on the instrument screen.

6. Touch **Measurements**, then **Radio Preset**, and select the desired radio manufacturer and uplink/downlink type in the setup area.
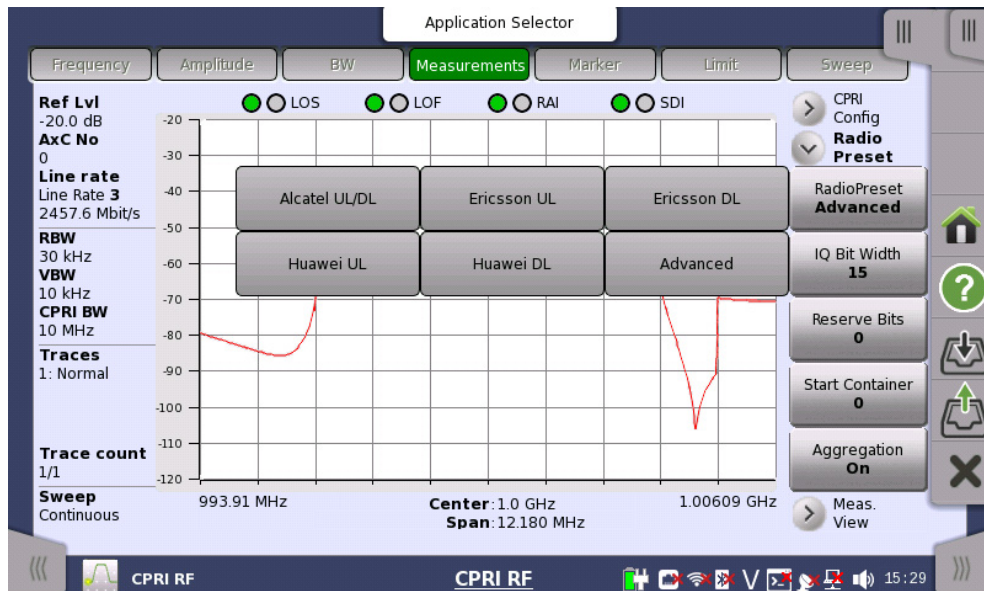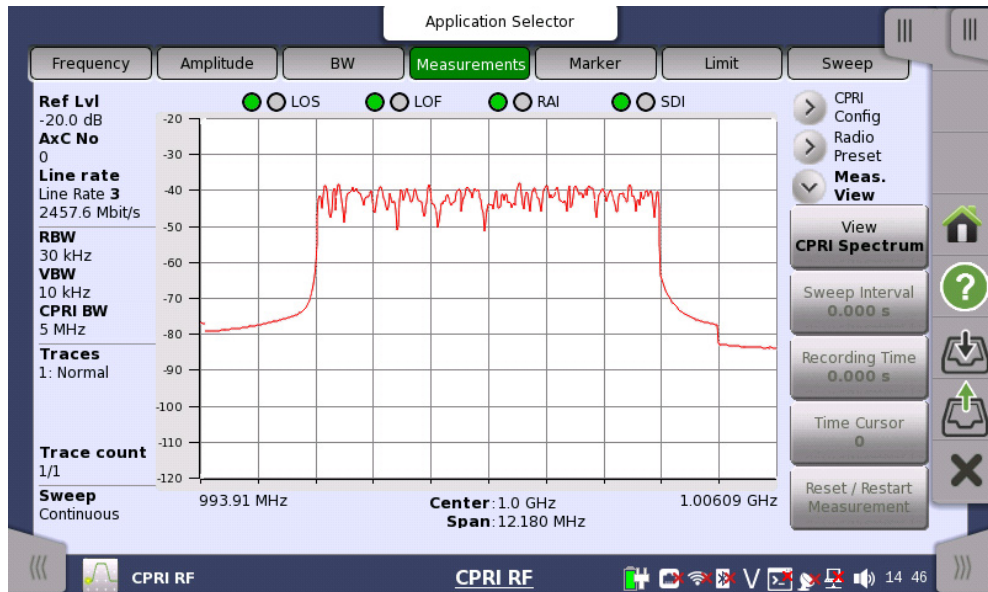
7. If the preset is Ericsson, touch the **CPRI Aggregation** button and select On or Off as appropriate.
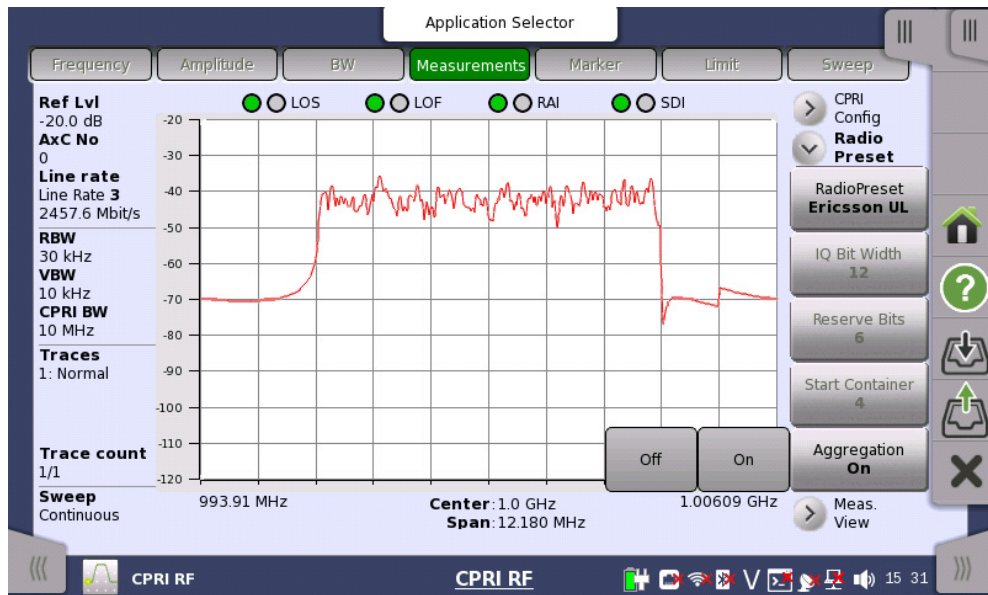
8. A Spectrum view similar to the screen below is displayed.

The connection status of SFP Port 1 and Port 2 is indicated on the display screen, above the trace window. Green indicates Pass, Red is Fail, and gray (no color) means no connection. In the example above, Port 2 has no connection.

- LOS – Loss of signal
- LOF – Loss of frame
- RAI – Remote alarm indication
- SDI – SAP defect indication

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