Agilent FieldFox RF Analyzer N9912A

Quick Reference Guide

Contents

Do you have everything needed for your measurement?

- ☐ **FieldFox** –To check for installed options, press `System` then `System Configuration` then `Options` then `Show Options`

- ☐ **Phase stable jumper cable or adapters** – Used to connect the FieldFox to devices with various connector types and gender.

- ☐ **Attenuators** – Reduces power and prevents damage to the FieldFox at the RF IN port.

- ☐ **Cal Kit** – OSL Tee or other calibration devices.

- ☐ **Mini SD card or USB flash drive** – Save files to these devices for quick download to a PC.

- ☐ **USB Power Sensor** – For making Power Meter measurements. (Opt 302)

- ☐ **Battery charger** or extra battery

The Power Button and LED

- ▪ To turn power **ON**, briefly press the power button. The LED is green. The boot-up takes about 60 seconds.

- ▪ To switch to **Stand by** power (low battery drain) briefly press the power button. The LED is amber and blinks slowly. To turn power ON, briefly press the power button. Power and settings are restored instantly.

- ▪ To turn Power **OFF** (very low battery drain) press and hold the power button until power is shut OFF - about 4 seconds. The LED is OFF.

Battery Usage

A fully charged battery should last about **four hours.**

Battery charge status is viewable:

- In the upper-right corner of the screen.
  84% |IIIII

- On the battery. To view the LED gauge on the Tyco battery, remove it from the FieldFox and momentarily press the button next to the gauge. To view the LCD gauge on the Inspired Energy battery, open the FieldFox battery compartment door.

To conserve battery power:

- Use **Hold** mode to trigger a measurement only when needed. **Hold** is shown on the display.

- Press **System** then **Display** then **Brightness** then dim the FieldFox display as much as possible.

- Briefly press the power button to switch to Stand By mode when not being used. Press again to restore power. All current settings are preserved.

The FieldFox will shutdown automatically when battery power is very low to prevent it from being completely discharged.

Use ONLY a FieldFox charger to recharge a battery.

- The battery can be fully charged while in the FieldFox in about 4 hours with the FieldFox either ON or OFF. A fully discharged battery takes about 1.5 hours to recharge to 80%.

- The battery can be fully charged in about 4 hours using the external battery charger (Opt 872).

Measure Return Loss

Return loss can be thought of as the absolute value of the reflected power as compared to the incident power.

When measuring an OPEN or SHORT, all incident power is reflected and 0 dB return loss is displayed.

When measuring a LOAD, very little power is reflected and values of 40 dB to 60 dB are displayed.

1. Connect the Device Under Test (DUT).

2. Select **Preset** then **Preset** Returns the FieldFox to known settings.

3. Select **Mode** then **CAT** (Cable and Antenna Test)

4. Then **Return Loss** (Default measurement).

5. Press **Freq/Dist** and enter **Start** and **Stop** frequency values of the measurement.

6. Press **Meas Setup 4** then **Settings** to make appropriate settings before calibrating.

7. Disconnect the DUT and press **Cal 5** then follow the calibration prompts.

8. Reconnect the DUT (cable to be tested).

Optional

- Add Markers – All Modes except Power Meter
- Add Limits – All Modes
- Save Settings and Data – All Modes

Measure Cable Loss (1-Port)

Required Equipment:

- LOAD with correct connector type and gender to terminate the end of the DUT.

- Optional phase stable jumper cable or adapter to connect the beginning of the DUT to the FieldFox.

1. Press **Preset** then **Preset**

2. Then **More** then **Cable Loss (1-Port)**

3. Connect the DUT.

4. Press **Freq/Dist** and enter **Start** and **Stop** frequency values of the measurement.

5. Press **Sweep 3** then **Min Swp Time** Increase the sweep time until a stable trace is visible on the screen.

6. Press **Cal 5** then follow the calibration prompts.

7. Connect the DUT (cable to be tested) to the FieldFox and connect a LOAD at the end of the DUT.

8. Press **Trace 6** then **Data->Mem** to store the trace into Memory.

9. Remove the LOAD and leave the end of the DUT open.

10. Press **Data Math** then **Data – Mem**. The ripple in the measurement is removed.

11. Use Averaging for high-loss measurements. Press **BW 2** then **Averaging**

12. Read **Avg Cable Loss** on the FieldFox screen.

Measure Distance to Fault

Required Equipment:

- LOAD with correct connector type and gender to terminate the end of the DUT.
- Known length and cable type or Cable Loss (dB/Meter) and velocity factor of the DUT.
- Optional phase stable jumper cable or adapter to connect the beginning of the DUT to the FieldFox.

1. Connect any necessary jumper cable or adapter to the FieldFox RF OUT port.

2. Press **Preset** then **Preset**

3. Then **Mode** then **CAT**

4. Then **Distance to Fault**

5. Press **Freq/Dist** then **Stop Distance** and enter the length of the DUT.

6. If a diplexer or other filter is in the measurement path, press **Freq/Dist** then **More**, then select **Bandpass Mode ON** and manually type the **Center Freq** and **Max Span** to test either the bandpass or rejection capabilities of the filter.

7. Press **Cal 5** and follow the Cal prompts.

8. Disconnect any components or antenna that should NOT be measured and connect a LOAD at the end of the DUT.

9. Press **Meas Setup 4** then **DTF Cable Specifications**.

10. Either press **Recall Coax Cable** or enter the **Velocity Factor** and **Cable Loss** of the DUT.

11. Connect the start end of the DUT to the FieldFox. The DTF measurement is displayed.

Calibration

Calibration is performed in CAT and NA Modes.

A calibration is performed automatically when the FieldFox is powered ON and when Preset. This Preset Cal (also known as CalReady) sets the reference plane at the RF OUT connector.

For highest accuracy, perform a QuickCal or O,S,L when any of the following occur:

- The temperature changes significantly.

- The Frequency Range, Resolution, Min Swp Time, or Power Level is changed.

- When using a phase stable jumper cable or adapter to connect the DUT to the FieldFox. These should be high-quality components.

Press **Cal 5** then follow the prompts.

During a QuickCal, press **Skip Load** when NOT using a jumper cable or adapter.

Cal ON is shown on the screen when a **Preset Cal** is correcting the measurement.

Cal ON Q is shown on the screen when a **QuickCal** is correcting the measurement.

CAL ON U is shown on the screen when an **O,S,L** Cal is correcting the measurement.

When a calibration is being interpolated, an asterisk is added to the screen annotation as follows:
Cal ON*

A Normalization Cal is **REQUIRED** when making 2-port CAT or NA Mode measurements.

Spectrum Analyzer (SA) Mode

SA measurements require NO calibration.

Check for a Compressed Measurement

1. Using a marker at the signal peak, make note of the signal power level.

2. Increase the RF Attenuation level by 5 dB.

   - If the signal level does NOT change, then NO compression exists. This indicates that the signal is in the linear region of the receiver.

   - If the signal level DOES increase with more attenuation, then compression DID exist. Set the RF Attenuation value at the setting when further increases no longer result in an increase in the displayed power level.

Set RF Attenuation

1. Press **Preset** then **Preset**

2. Press **Mode** then **SA**

3. Press **Scale/Amptd** then **RF Atten**

   - **Auto** RF Attenuation is set by adjusting the Reference Level.

   - **Man** Change the RF Attenuation level manually.

Display up to four types of traces

SA settings are applied to all traces.

1. Press **Trace 6** then **Trace 1,2,3,4** repeatedly to select a trace number to display.

2. Then **State** to select a trace type.

Power Meter Mode

Power Meter measurements are made using the **Agilent U2000 Series USB Power Sensors.**

Damage levels are:

- +25 dBm (320 mW) average
- +33 dBm peak (2 W) <10µs
- +5V

Use an Attenuator between the DUT and the power sensor when measuring power levels that are higher than +20 dBm. The attenuator value can be subtracted from the measurement using Offset as follows:

Select Offset

- Press **Scale / Amptd** then **Offset On Off**
- Then **Offset Val** Enter a value by which the power meter display is offset. A positive value compensates for a component with loss, such as an attenuator.

Zeroing

The Agilent USB Power Sensors perform internal zeroing automatically. Internal zeroing does NOT require that the power source be turned OFF.

Perform external zeroing when measuring power levels below -30 dBm. During external zeroing, the power source MUST either be turned OFF or the power sensor be disconnected from the DUT.

- Press **Cal   5**
- Then **External Zero**

Save and Recall Files

Save current settings and calibration, trace data (CSV) and .S1P), or a picture of the FieldFox screen.

Press **Save/Recall   9**

1. Then **Select Device** to set the **LOCATION** where the file is to be saved. Choose from the following:

   - **Internal** Saves/Recalls files to or from the FieldFox internal memory.

   - **SD Card** Saves/Recalls files to or from the mini SD card.

   - **USB** Saves/Recalls files to or from a USB Flash drive.

2. Then **File Type**

   - **State** Saves ALL FieldFox instrument settings and calibration for ALL Modes to an *.sta file.

   - **Trace + State** Saves the current trace (all traces in SA mode) and instrument settings to an *.sta file.

   - **Picture** Saves the FieldFox screen to a *.png file.

   - **Data (S1P)** Saves **CAT** and **NA** Mode trace data to an *.S1P file.

   - **Data (CSV)** Saves trace data from the current mode to a *.csv file.

3. Then press **Save** to save the specified **file type** to the specified **device location**.

4. Press **Recall** to read an *.sta file into the FieldFox.