OneAdvisor 800 Platform

QUICK CARD

IEEE 1588v2 Precision Timing Protocol (PTP) Verification Measurements in an ITU-T G.8275.1 PTP Telecom Profile Architecture

This quick card outlines how to run IEEE 1588 measurements for Time Distribution in an ITU-T G.8275.1 PTP Telecom Profile Architecture with full timing support. The quick card documents how to set up a TEM V2 Timing Expansion Module and OneAdvisor on a 10GigE Optical Interface, but the same workflow may be applied to other data rates.

EQUIPMENT REQUIREMENTS

- OneAdvisor 800 equipped with the following:
  - RAxxMA-O Radio Analysis Module or SPA06MA-O Spectrum Analyzer Module.
  - Transport software release V5.1.0 or greater
  - ONA-SP-10GELAN 10 Gig Ethernet option
  - PTP Option ONA-SP-10G1588

- Timing Expansion Module V2 (TEM V2)

- GNSS Antenna (Taoglas A.171, Taoglas AA.162, Tallysman TW7882, or Maxtena M9706CWT recommended)

- SFP+ Optical Transceiver and cables to match the line under test

Figure 1: Equipment Requirements

CONNECT GNSS ANTENNA AND ACTIVATE TEM V2

1. Press the Power button 🔘 to turn on the OneAdvisor.

2. Connect the male SMA connector on the end of the antenna cable to the female SMA connector on the TEM V2 (labeled Antenna).

3. Tighten the connector until the antenna is securely attached.

4. Place the antenna in a location with minimum interference or blocking.

5. Tap **🏠 Home** to display the Home Screen.

6. Tap **🔼 Tests** to display the Tests menu.

7. Tap **Timing Module >**.

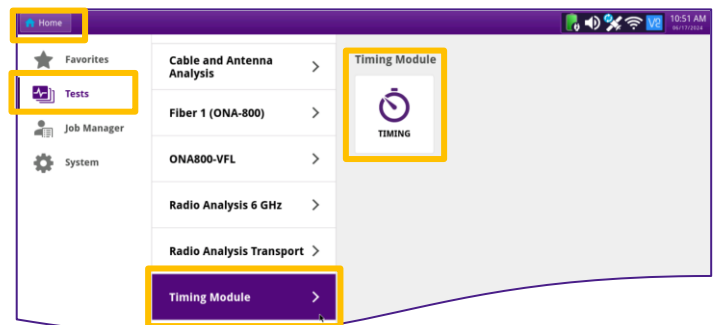8. Tap the **Timing** icon ⏱ to activate the TEM V2 Timing Module.

Figure 2: TEM V2

Figure 3: Home Screen

https://www.viavisolutions.com/en-us/products/oneadvisor

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SETUP GNSS RECEIVER AND START SURVEY

1. Tap the **Setup** soft key on the upper right-hand corner of the screen.

2. Configure **GNSS** settings as follows:
   - ➢ **GNSS System**: Select **GPS** for use in North America. Other constellations or combination of constellations can also be used:
     - **Galileo** and **SBAS**: European systems
     - **GLONASS**: Russian System
     - **BeiDou**: Chinese system
     - **QZSS**: Japanese system
   - ➢ **Too few Satellites Alarm**: 3
   - ➢ **Time Reference**: GPS
   - ➢ **Time Format**: 12-hour
   - ➢ **Elevation Limit**: 5 to 15 deg recommended, Using satellites near the horizon may degrade performance but may be needed in "urban canyons".
   - ➢ **Minimum C/No**: 9 dB-Hz recommended, 30 dB-Hz maximum. Using satellites with a weak carrier to noise ratio may degrade performance but may be needed in "urban canyons".
   - ➢ **Antenna Power**: 5 volts for VIAVI supplied magnetic mount antennas. If you are using a different antenna, enter the antenna power, or select 0V if the site powers the GPS antenna.
   - ➢ **Antenna Time Bias**: Select Antenna Type for VIAVI supplied antennas; otherwise, Select "User Defined" and enter the cumulative delay introduced by the antenna, cables, and any in-line splitters or amplifiers. In absence of more specific information, use 1.2ns/foot or 4.5ns/meter of cable.
   - ➢ **Jamming Detection Mode**: Off

3. Tap the **Location** settings tab and configure location settings as follows:
   - ➢ **Survey mode**: **Typical** (3 hours) is recommended, **Fast** (15 minutes) may be used with reduced position accuracy, **Quick** should not be used.

4. Tap the **Start Survey** button to start a survey. If prompted, tap **OK** to continue.

5. Tap the **Results** soft key on the upper right corner of the screen.
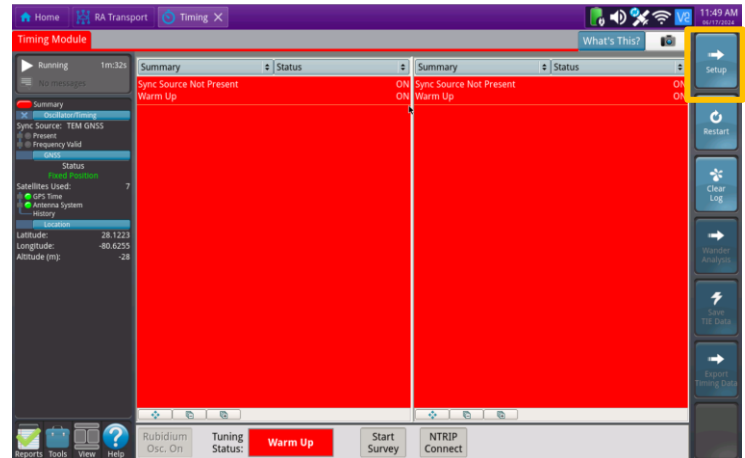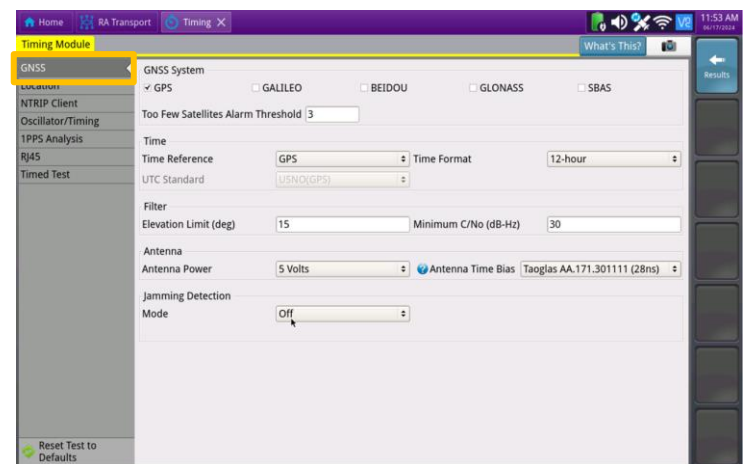

Figure 4: Timing Module Results
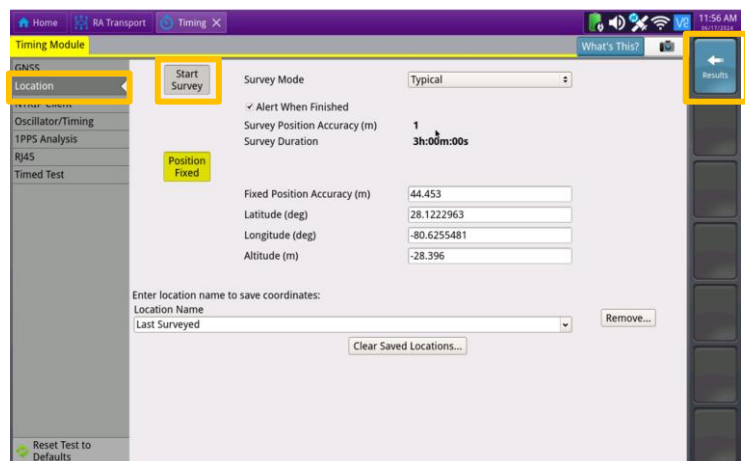

Figure 5: GNSS Settings

Figure 6: Location Settings

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VERIFY GNSS RECEPTION

1. **Tuning Status** will be displayed at the bottom of the screen. The Oscillator will cycle through these stages: Warming Up, Initializing, Wait for 1PPD, Course Tune, Intermediate Tune, Fine Tune. At least **Course Tune** is required.

2. Using the results group and category drop-down menus, change the right results display to the following:

   ► **Satellites/Sky Plot**: Displays the satellites detected by the GNSS receiver.

   ► **Satellites/Signal Strength**: Uses a bar graph to display the signal strength for each identified satellite. Ensure at least 4 satellites are used (green) and that signal strength of used satellites exceeds Minimum C/No setting (bar will be green). Otherwise, relocate antenna to a less obstructed location or reduce the Minimum C/No setting.

   ► **GNSS/Status**: Displays general information concerning the GNSS Satellites. Ensure that Status progresses from "No Lock" to "Locked" to "Fixed Position" during the survey. Ensure that Timing Mode Status progresses from "Survey" to "Survey Done".

   ► **GNSS/Location**: Displays general information concerning the location and position accuracy. A Mean Position Dilution of Precision (PDOP) value below 4.0 is desired.

3. A "Typical" survey will run for 3 hours and stop if it has reached a 1-meter position accuracy. **If, after 3 hours, the survey still shows "Survey Active"**, the Timing Module was not able to attain a 1-meter or better position accuracy. Tap the **Setup** soft key, set **Survey Mode** to **Fast**, and tap the **Results** soft key. Repeat steps 1 and 2 above to conduct a 15-minute survey with 45-meter position accuracy.
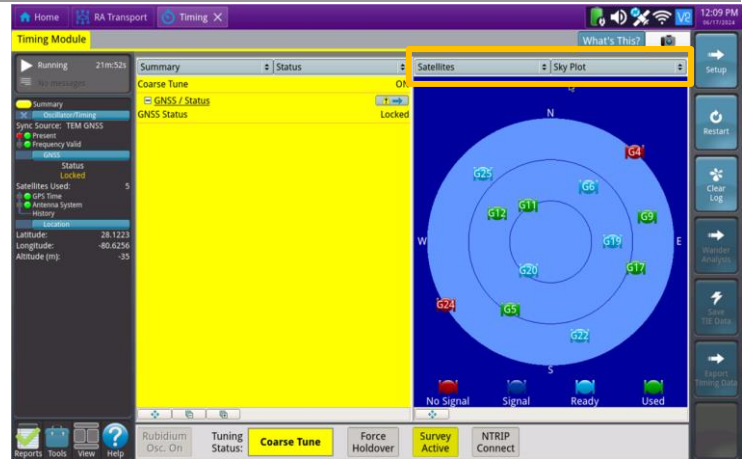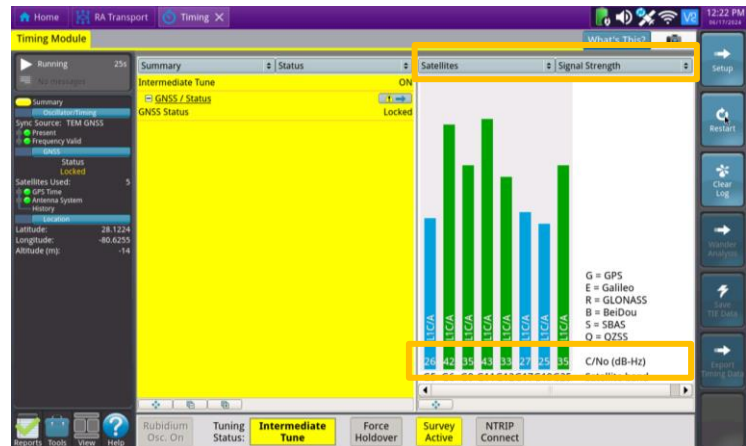

Figure 7: Satellites/Sky Plot Results
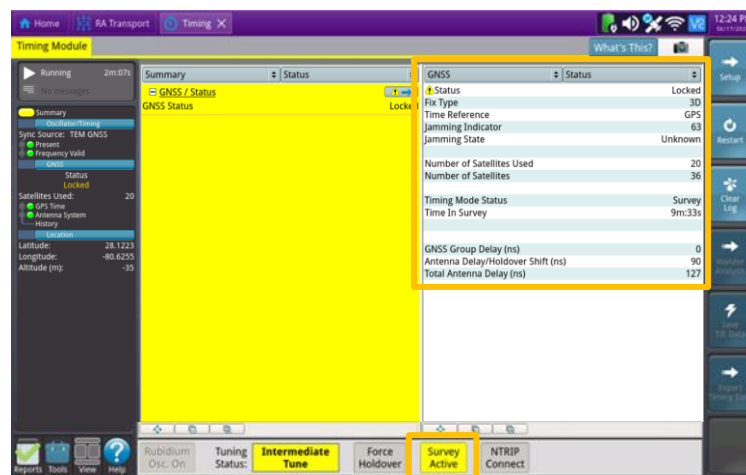

Figure 8: Satellites/Signal Strength Results

Figure 9: GNSS/Status Results

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LAUNCH PTP/1588 TEST

1. Tap [🏠 Home] to display the Home Screen.

2. Tap [⏚] [Tests] to display the Tests menu.

3. Tap Radio Analysis Transport >.

4. Tap the **RA Transport** icon [⚬] to activate the Radio Analysis Module.

Figure 10: RA Transport

5. Tap the Select Test drop-down and select the following test:
   ► **Ethernet> 10GigE LAN> PTP/1588> Terminate**

Figure 11: Select Test

6. Connect the OneAdvisor SFP+ Port 1 to the network port to be tested using an LC patch cable. Note the cable length.
   ► Enable the Laser: [Laser Off] [Laser On]
   ► Press the Restart soft key.
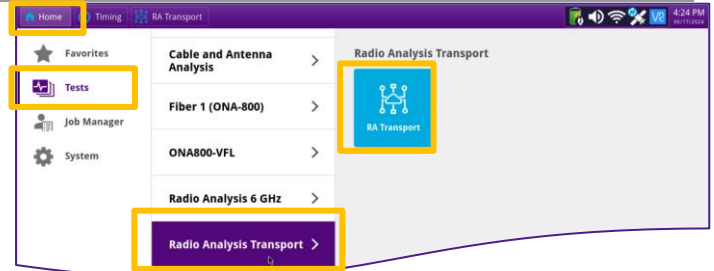   ► Look for 5 or 6 green LEDs: This will indicate that the link is up, and GPS sourced timing is available.
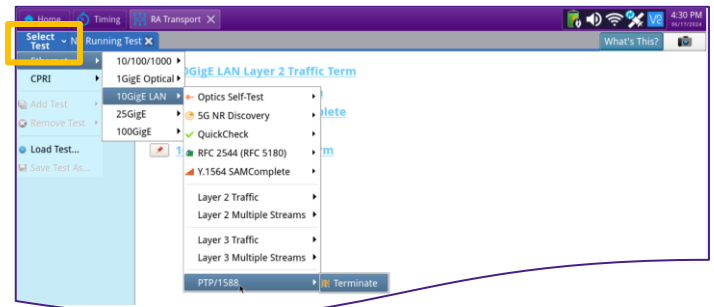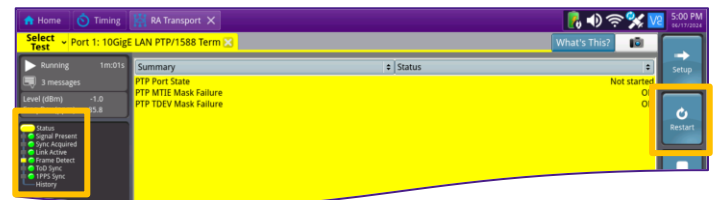

Figure 12: Enable the Laser

Figure 13: Check LEDs

CONFIGURE PTP SLAVE SESSION

1. Tap the Setup soft key.

2. Select the PTP Folder. Make all PTP settings as necessary for a PTP Slave on the network under test:
   - PTP Layer: L2
   - Mode: Slave
   - Address Mode: Multicast
   - Domain: the default value for G.8275.1 is 24, otherwise use the value recommended by your timing administrators, in the range 24 to 43
   - Encapsulation: None
   - Announce Rx Timeout: 3
   - Announce: 8 per second
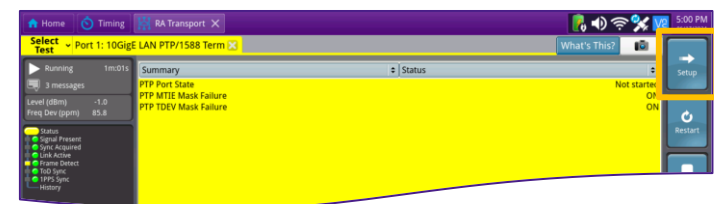   - Cable Delay: 4 ns per meter of patch cable
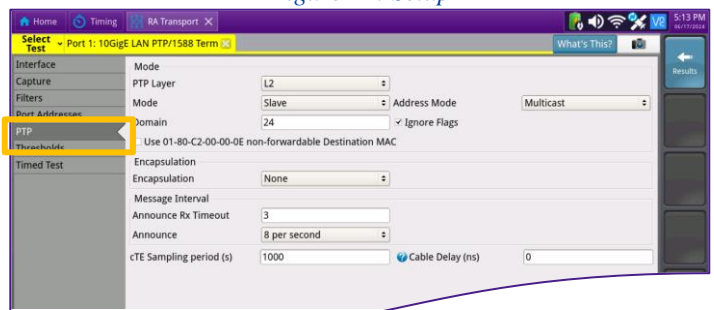

Figure 14: Setup

Figure 15: PTP Setup

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CONFIGURE PTP SLAVE SESSION (Continued)

3. Select the **Thresholds** folder. Enable and set the desired settings thresholds including **Time Error Max**.

   ► Swipe screen or use scroll bar to view and configure additional Measurement settings and pass/fail limits.

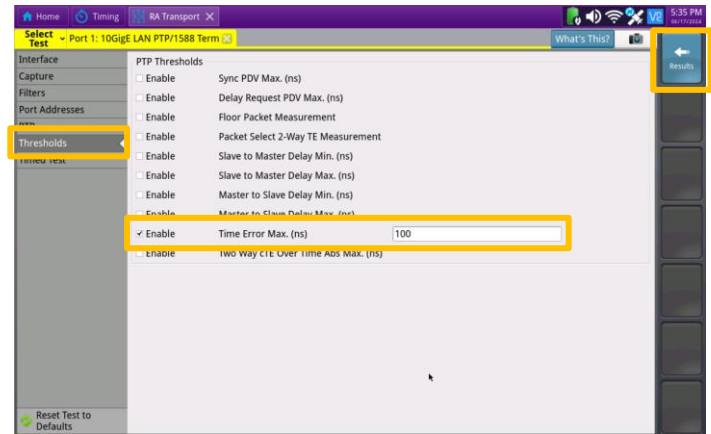4. Tap the **Results** soft key to return to the results view.

Figure 16: Thresholds Setup

START PTP SLAVE SESSION AND REVIEW RESULTS

1. The default Results view is single screen with **Summary** and **Status**. The view can be changed to dual results (Split Left/Right) through the **View** button on the lower left.
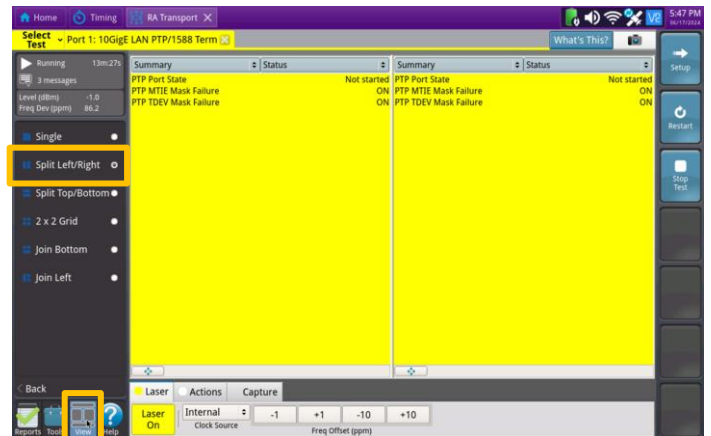

Figure 17: Split Left/Right View

2. Select **PTP / Link Stats** for the left result windows.
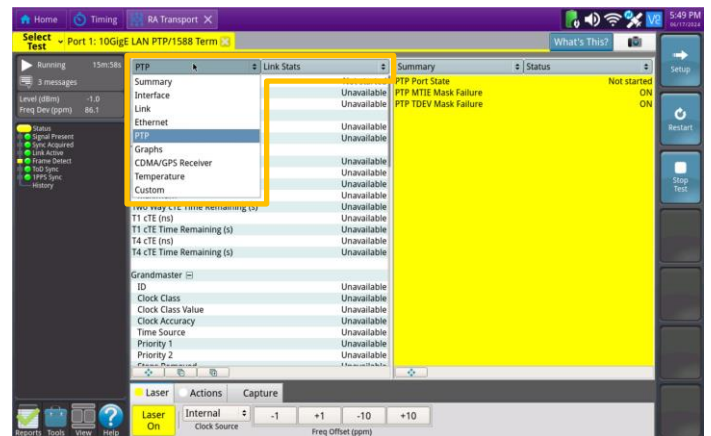

Figure 18: PTP/Link Stats

3. Select the **Actions** tab at the bottom of the screen, press **Start Slave PTP Session**.

Figure 19: Start Slave Session

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- Port State should progress from "**Not Started**" to "**Listening**" to "**Slave**"
- Detecting the Rx Domain Number (24 to 43) and seeing a Max TE value indicates that the PTP Slave Session is active. The OneAdvisor is receiving timing from the PTP master.
- Additional PTP/Link Stats results can be viewed by scrolling through the window.
- If Pass/fail thresholds are met, the Summary/Status window and Status LED will remain green.
- If any thresholds are triggered, Summary/Status window and the Status LED and the value for that result will turn red.

4. Select **Graphs / Max TE** for the right results window to view a graph of a key performance indicator.

5. Note: There are many more categories and sub-categories of results both tabular and graphed.
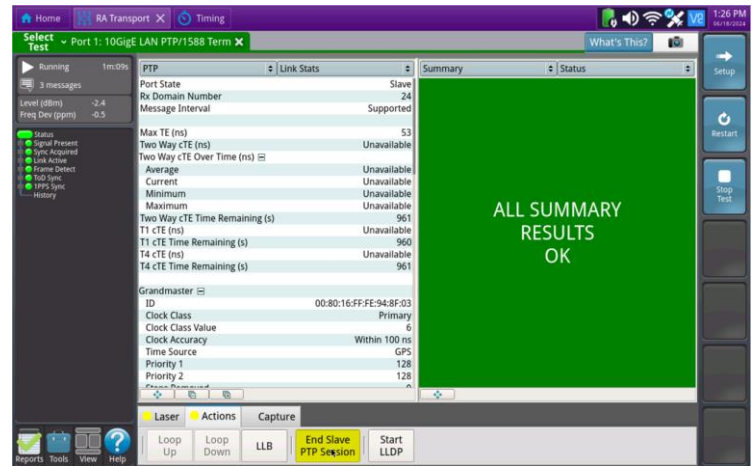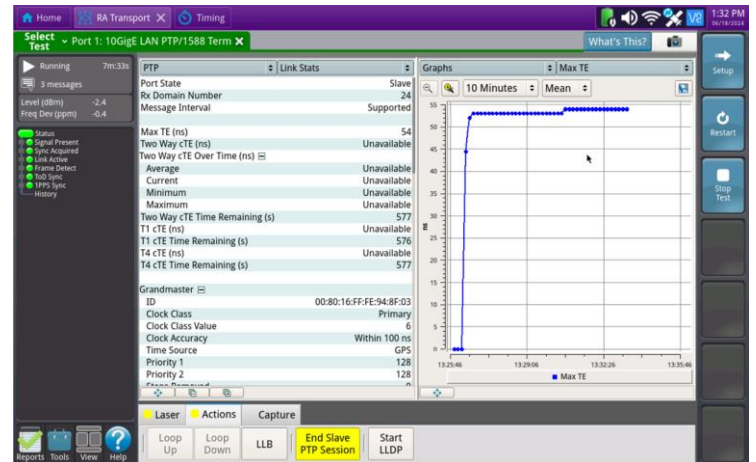

Figure 20: PTP Link Stats

Figure 21: Max TE Graph

CREATE REPORT

1. Tap [Reports] to open the **Reports** Panel and select [Create Report...] .

2. Optionally, tap [Choose Contents] to select and unselect report groups.

3. Tap [Create] .

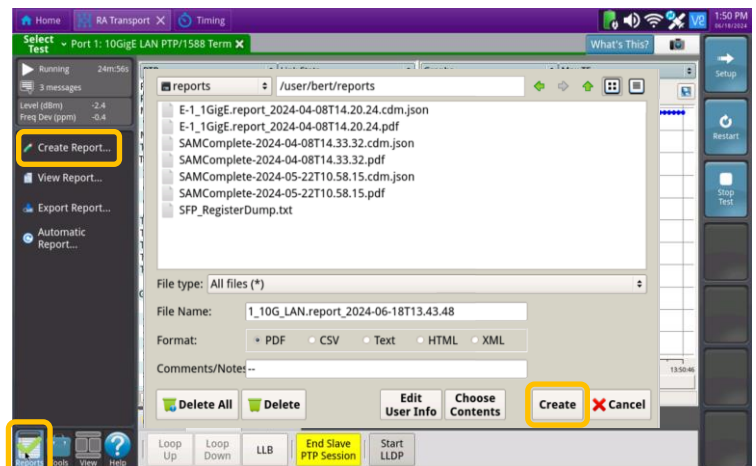4. A report will be saved to the OneAdvisor 800's **/user/bert/reports** folder.

Figure 22: Create Report

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