QUICK CARD

Ethernet Optics Self-Test

This quick card describes how to configure and run an Ethernet Optics Self-Test to verify proper operation and stability of an optical transceiver. The quick card documents a procedure to set up the OneAdvisor on a 1GigE Optical Interface, however the same workflow may be applied to other data rates as well.

EQUIPMENT REQUIREMENTS

- OneAdvisor 800 equipped with the following:
  - RAxxMA-O Radio Analysis Module, SPA06MA-O Spectrum Analyzer Module, TM400GB-QQ 400G Module, or TM400GB-QO 400G Module.
  - Transport software release V5.1.0 or greater
  - CA10M1GE or ONA-SP-10M1GE 1-Gigabit Ethernet option
- Optical Transceiver supporting the Ethernet data rate to be tested (SFP, SFP+, SFP28, QSFP28, QSFP-DD, etc.)
- Simplex Cable or loopback plug to match the optical transceiver
- Fiber optic inspection microscope (P5000i, FiberChek Probe, or INX-760)
- Fiber optic cleaning supplies

Figure 1: Equipment Requirements

LAUNCH TEST

1. Press the power button on the ONA-800 base top panel to turn on the OneAdvisor.
2. Tap **Home** to display the Home Screen.
3. Tap **Tests** to display the Tests menu.
4. Tap **Radio Analysis Transport >** or **400G Transport >** to show the Transport test application.
5. Tap the **Transport** icon. TRANSPORT
6. If the **Select Test** menu is not displayed, tap **>> All Tests** in the lower left screen corner.
7. Using the **Select Test** menu or favorite test list, launch the Ethernet Optics Self-Test for the desired data rate and port (P1 or P2).
   Example:
   Ethernet ►1GigE Optical ►Optics Self-Test ►P1 Terminate or
   Ethernet ►1GigE Optical ►Optics Self-Test ► Terminate
8. Tap the **Go →** button next to "**Start a New Configuration (reset to defaults)**"

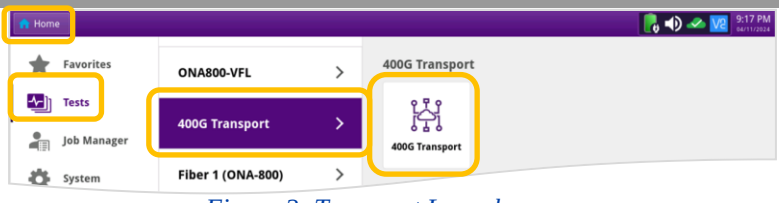

Figure 2: Transport Launch screen

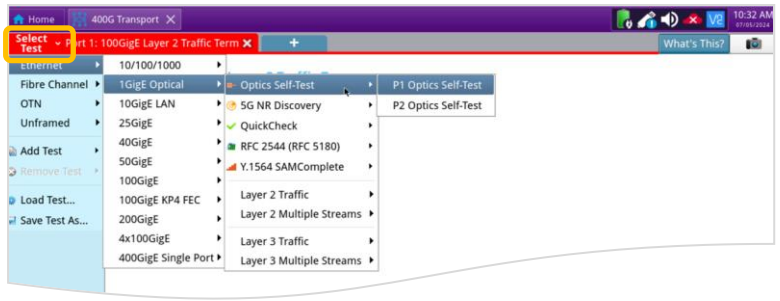

Figure 3: Select Test

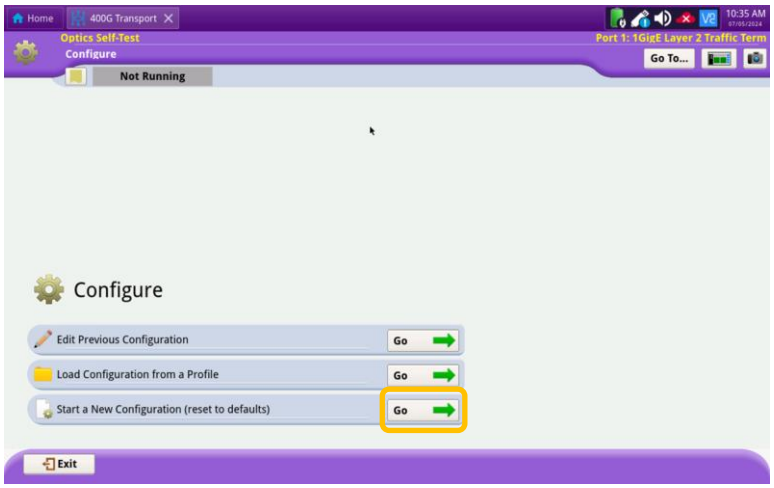

Figure 4: Configure

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CONFIGURE TEST

1. Set **Test Duration** to **Recommended**. The recommended duration is determined by the line rate, BER Threshold, and a 95% confidence level (CL) using BER theory.
2. Set **FEC Type** and **BER Threshold Type** per the following table, based on the Interface type.
3. Set **BER Threshold** and **Optics Temperature Threshold** to match the transceiver manufacturer specifications or network requirements.
   * Use the recommended values in the following table only if specifications are unknown:

Interface Type	FEC Type	BER Threshold Type	BER Threshold	Optic Temperature Threshold (°C)
400GBASE-FR4	RS (544, 514)	Pre-FEC	1x10^-5 *	75 *
400GBASE-LR4	RS (544, 514)	Pre-FEC	1x10^-5 *	75 *
400GBASE-SR4.2	RS (544, 514)	Pre-FEC	1x10^-5 *	75 *
400GBASE-SR8	RS (544, 514)	Pre-FEC	1x10^-5 *	75 *
200GBASE-FR4	RS (544, 514)	Pre-FEC	1x10^-5 *	75 *
200GBASE-SR4	RS (544, 514)	Pre-FEC	1x10^-5 *	75 *
100GBASE-CWDM4	RS (528,514)	Pre-FEC	1x10^-5 *	75 *
100GBASE-LR4	No FEC	N/A	1x10^-12 *	75 *
100GBASE-SR4	RS (528,514)	Pre-FEC	1x10^-8 *	75 *
50GBASE-LR	RS (544,514)	Pre-FEC	1x10^-5 *	75 *
50GBASE-SR	RS (544,514)	Pre-FEC	1x10^-5 *	75 *
40GBASE-LR4	No FEC	N/A	1x10^-12 *	75 *
40GBASE-SR4	No FEC	N/A	1x10^-12 *	75 *
25GBASE-SR	RS (528,514)	Pre-FEC	1x10^-8 *	75 *
25GBASE-LR	RS (528,514)	Pre-FEC	1x10^-8 *	75 *
10GBASE-LR	No FEC	N/A	1x10^-12 *	75 *
10GBASE-SR	No FEC	N/A	1x10^-12 *	75 *
1000BASE-LX	No FEC	N/A	1x10^-11 *	75 *
1000BASE-SX	No FEC	N/A	1x10^-11 *	75 *

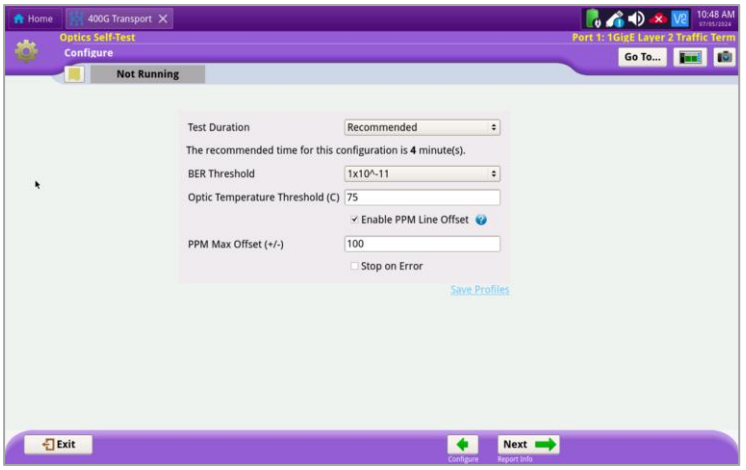

Figure 5: 1GigE Optical Default Settings

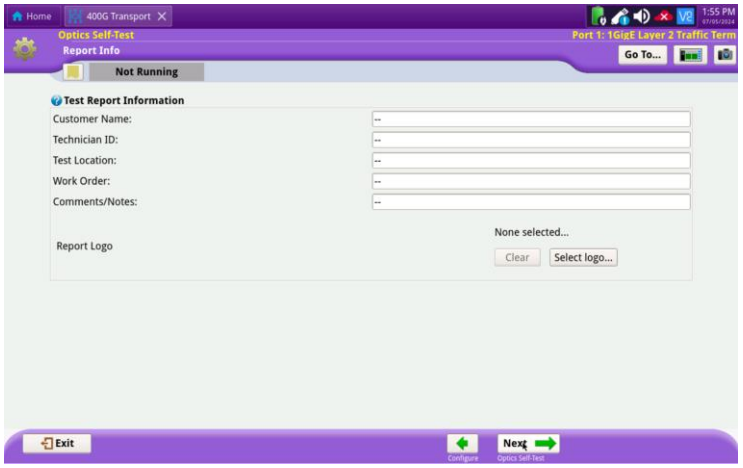

Figure 6: Report Info

Figure 7: Optics Self-Test

4. Tap **Next** → to display the **Report Info** screen. If you wish to generate a report, enter Test Report Information.
5. Tap **Next** → to display the **Optics Self-Test** screen.

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INSPECT BEFORE YOU CONNECT

- Use the VIAVI P5000i, FiberChek Probe or INX 760 microscope to inspect the optical transceiver and patch cable or loopback plug before attempting to test the optics.
  - Follow the ***Inspect Before You Connect*** process depicted in *Figure 8* to the right.

- **Note:** Fiber optic transceiver designs vary. The Transmit (Tx) side of a single-mode transceiver is generally a ferrule or fiber stub and can be inspected with a microscope and cleaned like a bulkhead connector. The Receive (Rx) side may be a fiber stub, physical contact lens, or non-contact lens. Please reference the following Application Note for additional information: *Transceiver Fiber Inspection and Cleaning (viavisolutions.com)*

Figure 8: Inspect Before You Connect

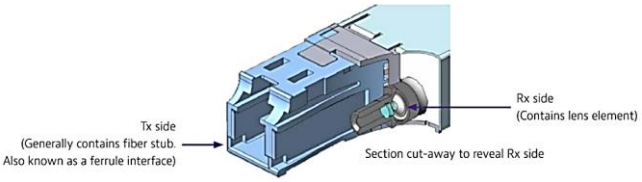

Figure 9: SFP Transceiver Cut-away View

TEST OPTICS

1. Insert the optical transceiver into the Port 1 SFP or QSFP slot on the top of the ONA-800.
2. Tap the blue question mark ? below the picture of the SFP or QSFP to view **Interface Details**. Verify that the SFP supports the required data rate (1G, 10G LAN, etc.) and note the **Max Rx Level (dBm)** and **Max Tx Level (dBm)**. If necessary, insert optical attenuators into the Tx and/or Rx ports of the transceiver.
   - Note: Optics that support **CMIS** can be configured in the SFP/QSFP Expert tab.
3. Connect the Tx port to the Rx ports of the transceiver using a clean patch cable or loopback plug.
4. Tap ← **Back** to return to the **Optics Self-Test** screen.
5. Tap the **Test SFP Optics** button.

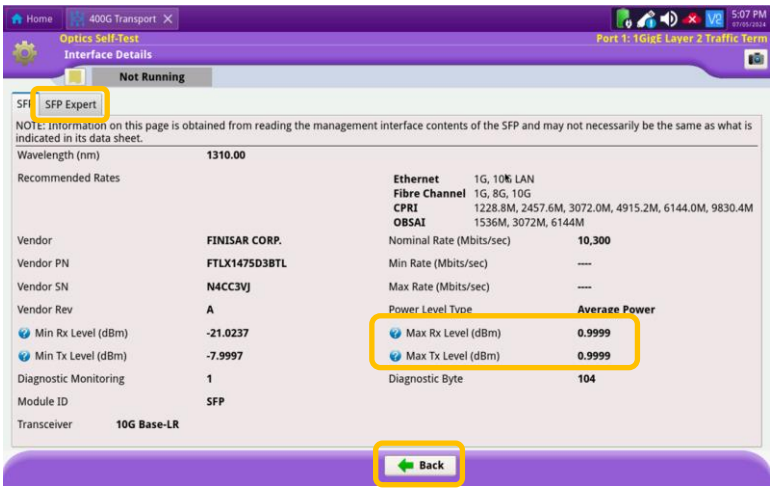

Figure 10: Interface Details

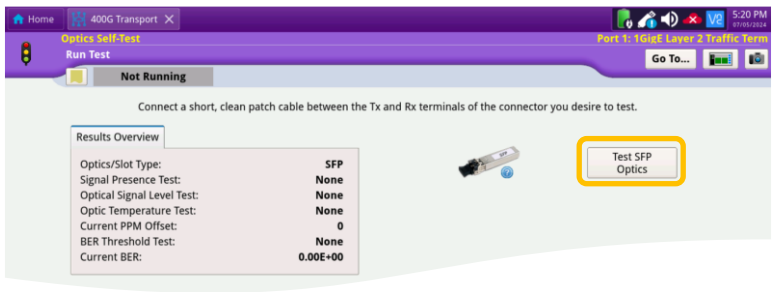

Figure 11: Run Test

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TEST OPTICS (Continued)

6. Wait for the test to complete and verify that all tests passed.

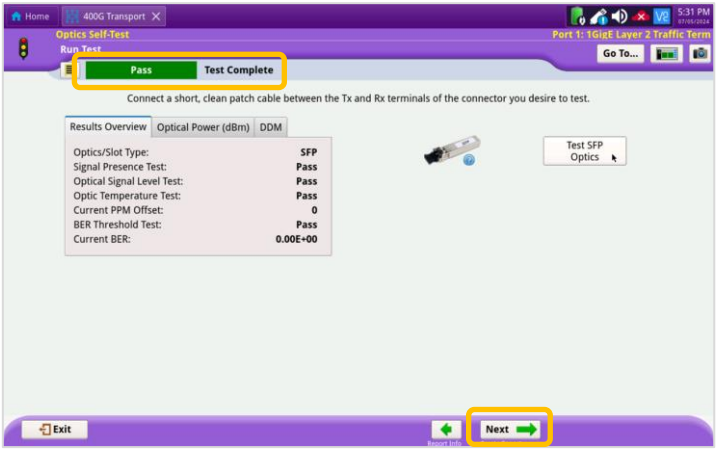

Figure 12: Test Complete

CREATE REPORT

1. If you wish to save a report, tap the **Next** → button to display the **Report** screen.

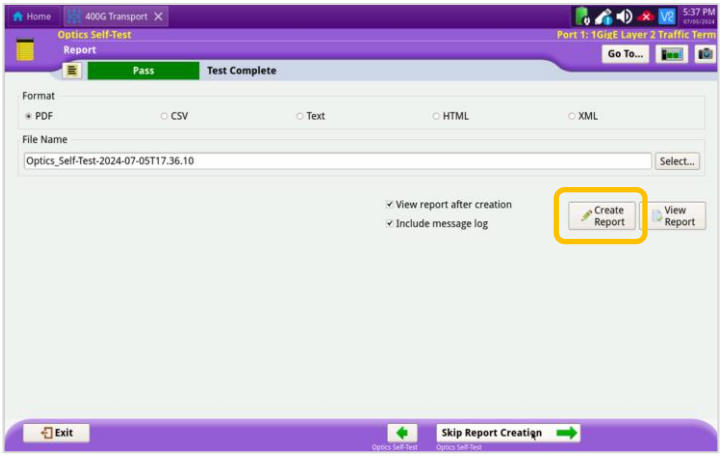

Figure 13: Create Report

2. Tap the **Create Report** button.

3. Tap the ← **Exit** button to close the report.

4. If you performed a **Pre-FEC** test on optics with RS FEC, optionally repeat the test with **Threshold Type** = **Post-FEC** and **BER Threshold** = **1x10^-12** for 25GE optics and **1x10^-13** for 50GE, 100GE, 200GE, or 400GE optics.

5. Tap the ← **Exit** buttons twice to exit the Optics Self-Test.

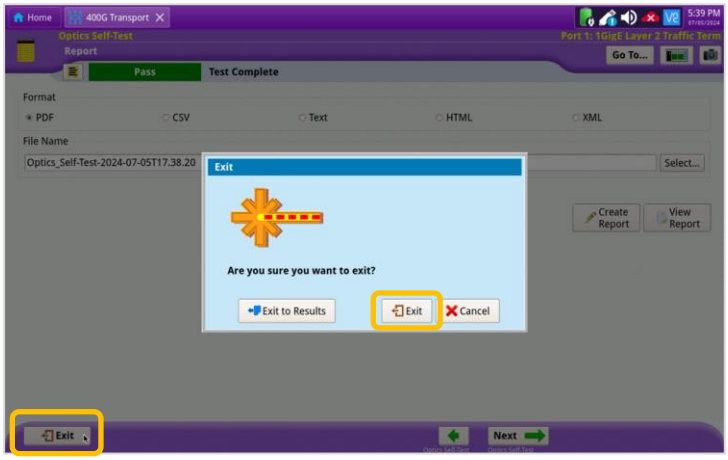

Figure 14: Exit

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