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.

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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
 - o 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

LAUNCH TEST

- 1. Press the power button on the ONA-800 base top panel to turn on the OneAdvisor.
- 2. Tap ^{1 Home} to display the Home Screen.
- 3. Tap Tests to display the Tests menu.
- Tap Radio Analysis Transport > or 400G Transport > to show the Transport test application.
- 5. Tap the **Transport** icon.
- 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
- Tap the Go → button next to "Start a New Configuration (reset to defaults)"



Figure 1: Equipment Requirements

Figure 2: Transport Launch screen

A Home 400G Transport 🗙		💦 🆍 📣 🦗 🔽 10:32 AM
Select • Port 1: 100GigE Layer 2 Traffic	Term 🗙 📕 🕂	What's This?
Ethernet > 10/100/1000	•	
Fibre Channel > 1GigE Optical	Optics Self-Test P1 Optics Self-Test	
OTN	SG NR Discovery P2 Optics Self-Test QuickCheck P2 RFC 2544 (RFC 5180) P2 Y.1564 SAMComplete P2	
Load Test 100GigE KP4 FEC Save Test As 200GigE 4x100GigE 400GigE Single Por	Layer 2 Traffic Layer 2 Multiple Streams Layer 3 Traffic Layer 3 Multiple Streams	

Figure 3: Select Test

ome 🔣 400G Transport 🗙							Â		× V	2 10	1:35 A
Optics Self-Test					P	Port 1:	1Gi	gE Lay	er 21	Iraffi	: Ter
Not Running						_		Go To.	- 11		
🐯 Configure											
💸 Configure											
Configure Edit Previous Configuration Go	-	•]								
	+ +	•]								





OneAdvisor 800 Transport and Wireless Platforms



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CONFIGURE TEST

- 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 [*]

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



Figure 5: 1GigE Optical Default Settings

Report Info	Go To., Engl
Not Running	
W Test Report Information	
Customer Name:	
Technician ID:	
Test Location:	-
Work Order:	
Comments/Notes:	
Report Logo	None selected
Report Logo	Clear Select logo

Figure 6: Report Info



Figure 7: Optics Self-Test



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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 noncontact lens. Please reference the following Application Note for additional information: <u>Transceiver Fiber Inspection and Cleaning (viavisolutions.com)</u>

Inspect **ISIT** Before You INSPECT CLEAN? Connect **CLEAN** NO YES CONNECT Figure 8: Inspect Before You Connect Rx side (Contains lens element) Tx side (Generally contains fiber stub. Section cut-away to reveal Rx side Also known as a ferrule interface)

Figure 9: SFP Transceiver Cut-away View

TEST OPTICS

- Insert the optical transceiver into the Port 1 SFP or QSFP slot on the top of the ONA-800.
- 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.
- Connect the Tx port to the Rx ports of the transceiver using a clean patch cable or loopback plug.
- 5. Tap the **Test SFP Optics** button.





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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

- If you wish to save a report, tap the Next → button to display the Report screen.
- 2. Tap the Create Report button.
- 3. Tap the \leftarrow Exit button to close the report.
- 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.
- Tap the Exit buttons twice to exit the Optics Self-Test.



Figure 13: Create Report



Figure 14: Exit

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