

## QUICK CARD

### Ethernet Layer 2 Bit Error Rate Test (BERT)

This quick card describes how to set up the OneAdvisor 800 as a Layer 2 Traffic Generator and measure Bit Error Rate (BER). The quick card documents a procedure to set up the OneAdvisor on a 1GigE Optical Interface, but the same workflow may be applied to other data rates.





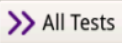
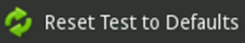

#### EQUIPMENT REQUIREMENTS

- OneAdvisor 800 equipped with the following:
  - RAXXMA-O Radio Analysis Module, 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, or QSFP28)
- Cables to match the optical transceiver and the line under test
- 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  to display the Home Screen.
3. Tap  to display the Tests menu.
4. Tap **Radio Analysis Transport >** or **400G Transport >** to show the Transport test application.
5. Tap the **Transport** icon. 
6. If the **Select Test** menu is not displayed, tap  in the lower left screen corner.
7. Using the **Select Test** menu or favorite test list, launch the Ethernet Layer 2 Traffic test for the desired data rate and port (P1 or P2). For example: **Ethernet ▶ 1GigE Optical ▶ Tools ▶ Layer 2 Traffic ▶ P1 Terminate**.
8. If the current configuration is unknown, tap to open the **Tools** Panel and select .
9. Press  to continue.

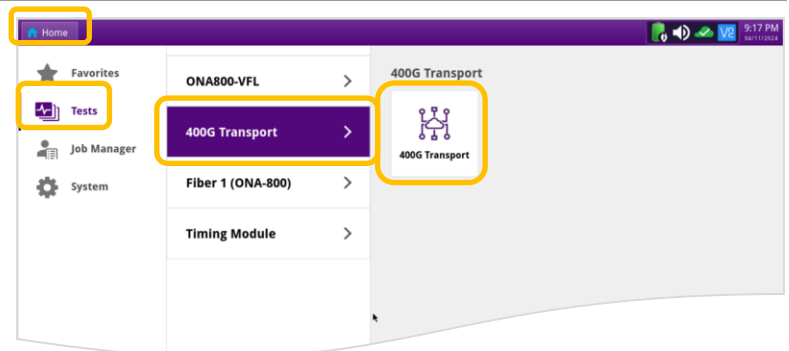


Figure 2: Transport Launch screen

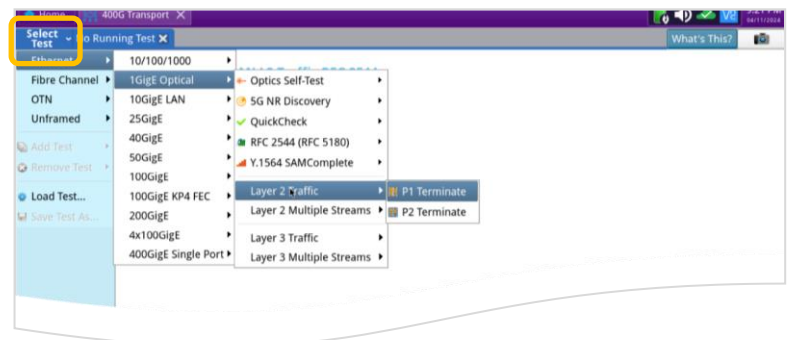


Figure 3: Select Test

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### CONFIGURE TEST


- ▶ The following Info is needed to configure the test:
  - Type of Optical Transceiver (10/100/1000 Copper SFP, 1G/10G Multimode SFP+, 1G/10G Single mode, 100G LR4 QSFP28, etc.)
  - Auto Negotiation settings of the port under test.
  - Bit Error Rate Threshold



Figure 4: Work Order

- ▶ For 1GigE Optical or 10/100/1000 Copper tests, tap the **Ethernet** tab of the Quick Configuration menu and set **Auto Neg.** to the same value as the Ethernet port under test (**On** or **Off**).

- ▶ For 10/100/1000 Copper tests:
  1. Tap the **Setup** soft key  on the top right side of the screen and proceed to page 3.

- ▶ For Optical Interfaces:
  1. Tap the **Setup** soft key  on the top right side of the screen.
  2. Select the **Interface/Connector** folder.
  3. Insert desired Optical Transceiver into the Port 1 SFP or QSFP slot on the top of the OneAdvisor.
  4. Review SFP information:
    - Verify that the SFP operates on the required wavelength (850nm, 1310nm or 1550nm).
    - Verify that the SFP supports the required data rate (1G, 10G, etc.)
    - Note the Min and Max Tx Levels (dBm) and Max Rx Level (dBm) to assess if optical attenuators are required.

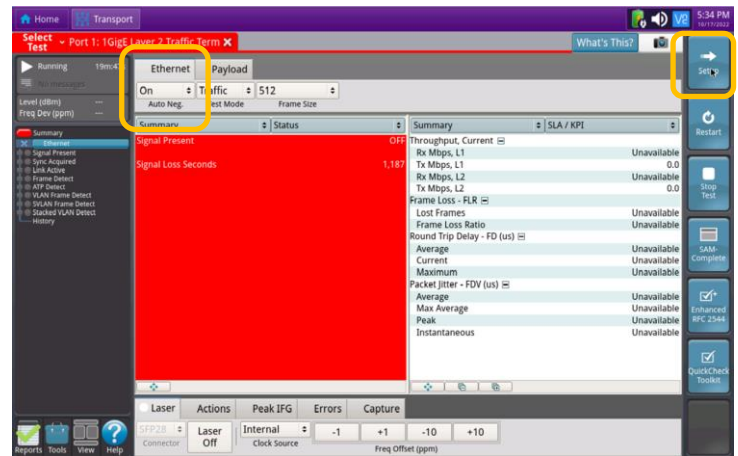


Figure 5: Quick Config, Auto Neg.

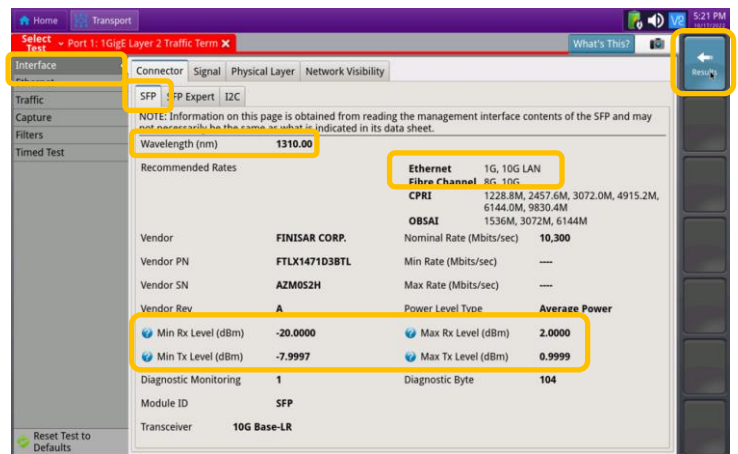


Figure 6: Setup, Interface/Connector/SFP

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### CONFIGURE TEST (CONTINUED)

► Select the **Ethernet** settings tab.

1. If you are testing a VLAN, set **Encapsulation** to **VLAN**, tap the **VLAN** field and enter your **VLAN ID**.
2. If you are testing head-to-head with another OneAdvisor or T-BERD:
  - Tap the **SA** field to display the Factory Default Source MAC Address. Provide this address to the operator of the other OneAdvisor or T-BERD upon request.
  - Tap the **DA** field and enter the Source Address (SA) of the far-end OneAdvisor or T-BERD in the **Destination MAC** field.
3. If you wish to measure Bit Error Rate, tap the **Data** field, and set **Tx Payload** to **BERT**.  
Note: This will disable Frame Loss and Round-Trip Delay results.

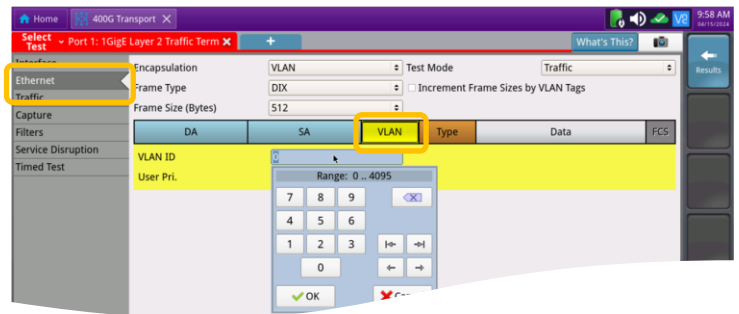


Figure 7: Setup, Ethernet/VLAN

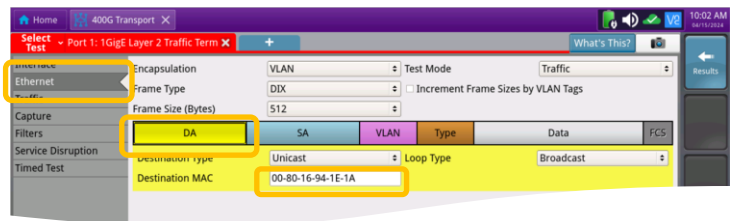


Figure 8: Setup, Ethernet/DA

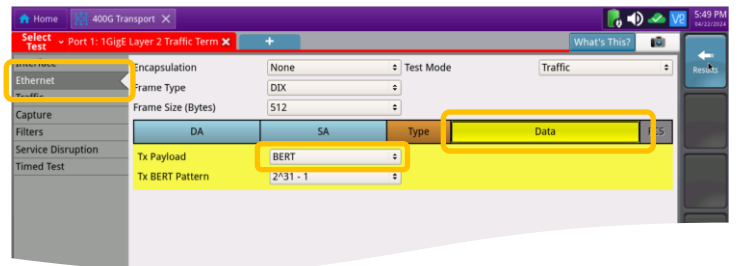


Figure 9: Setup, Ethernet/Data

► Select the **Traffic** settings tab. Set **Load Unit** to **Bit Rate** and set **Load** to the desired traffic rate or Committed Information Rate (CIR).

► Tap the **Results** soft key

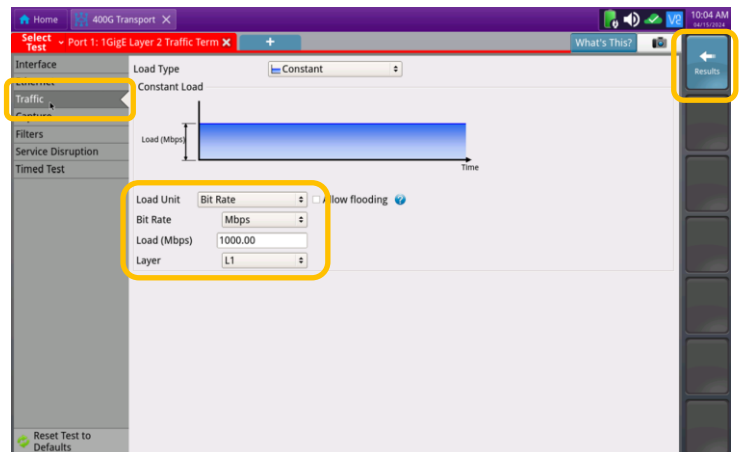





Figure 10: Setup, Traffic

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### CONNECT TO LINE UNDER TEST

#### ► For Optical Interfaces:

- Use the VIAVI P5000i or FiberChek Probe microscope to inspect both sides of every connection being used (SFP, attenuators, patch cables, bulkheads)
  - Focus the fiber on the screen.
  - If it appears dirty, clean the fiber end-face and re-inspect.
  - If it appears clean, run the inspection test.
  - If it fails, clean the fiber and re-run inspection test. Repeat until it passes.
- If necessary, insert optical attenuators into the SFP TX and/or RX ports.
- Connect the optical transceiver to the port under test using a jumper cable compatible with the line under test.
- Select the **Laser** tab in the **Actions** panel.
- Press . The button will turn yellow and be relabeled .
- Press the **Restart** soft key .
- Verify the following:
  - Summary** LED is green.
  - Signal Present** LED is green.
  - Sync Acquired** LED is green.
  - Link Active** LED is green.

#### ► For 10/100/1000M Copper Interfaces:

- Connect the copper SFP to the port under test using CAT5e or better cable.
- Press the **Restart** soft key.
- Verify the following:
  - Summary** LED is green.
  - Sync Acquired** LED is green.
  - Link Active** LED is green.



Figure 11: Inspect Before You Connect

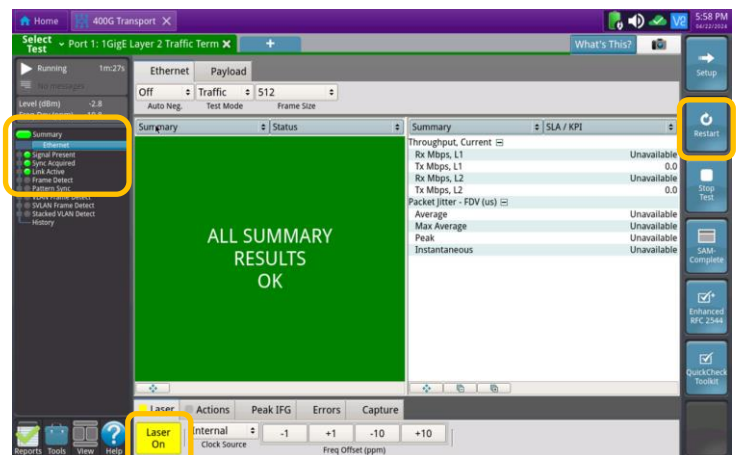

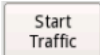




Figure 12: Optical Interface Results



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### LOOP UP AND RUN TEST

1. Select the **Actions** tab in the **Actions Panel**.
  - ▶ If you are testing head-to-head, to a hard loop, or if the loopback device is already in Local Loop Back (LLB) mode, proceed to step 2.
  - ▶ If the Loopback device is a OneAdvisor, T-BERD/MTS 5800 or another VIAVI compatible loopback device, tap  to loop up the far end device.
2. Tap . The button will turn yellow and be relabeled .
3. Press the **Restart** soft key  on the right side of the screen. Verify that the Right Results window shows “Rx Mbps, L1” approximately equal to the Committed Information Rate.
4. Using the drop-down menus, change the right results window to **Ethernet/BERT Stats**.
5. Allow the test to run for the desired duration. Verify that your **Bit Error Rate** is less than the Bit Error Rate threshold.

#### Notes:

- The **Summary/Status** window will turn red if there is a single bit error, regardless of the **Payload Error Rate threshold**.
- If the test traffic is transported through any Layer 2 or Layer 3 network equipment, including Ethernet Switches, Routers, NIDs, and Layer 2 Loopback devices, they will drop all errored frames. This will result in multiple **Bit Errors** and **Pattern Losses**.

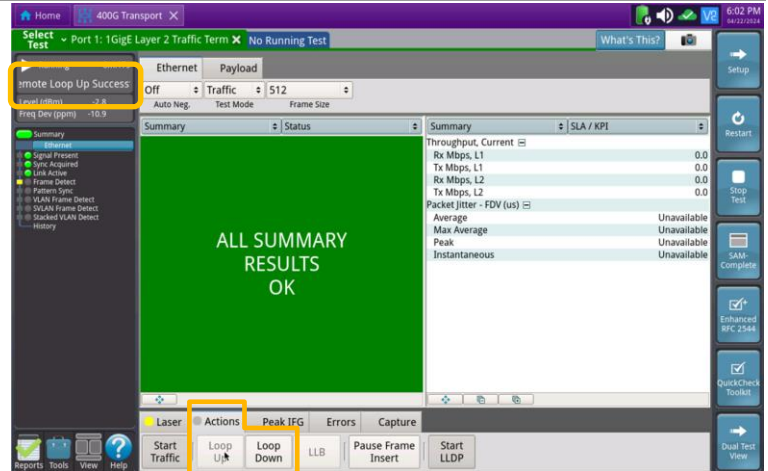


Figure 13: Loop Up

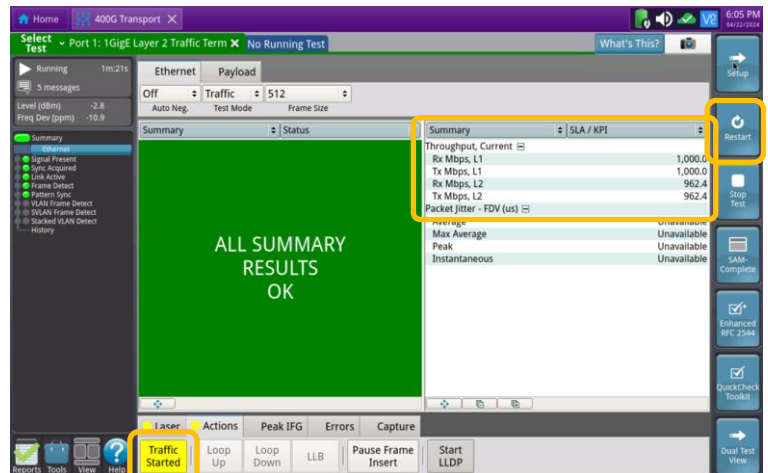


Figure 14: Start Traffic

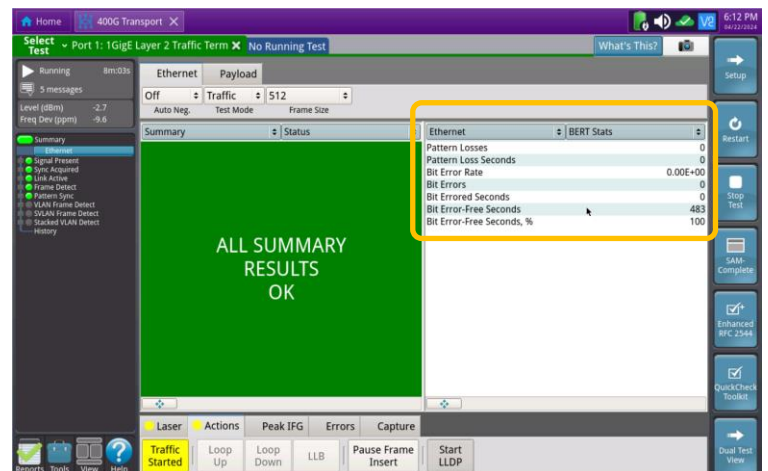


Figure 15: BERT Stats