QUICK CARD

Ethernet Layer 2 Traffic Generation

This document outlines how to configure and run an Ethernet Bit Error Rate Test (BERT). Bit Error Rate Testing is only recommended when testing head-to-head with another T-BERD/MTS, or when testing to a hard loop on a Layer 1 Transport Network.

- T-BERD/MTS 5800 equipped with the following:
  - Transport software release V31.2.1 or greater
  - C510M1GE test option for 10 Megabit to 1 Gigabit Ethernet
  - C510GELAN test option for 10 Gigabit Ethernet
  - C525GE test option for 25 Gigabit Ethernet
  - C540GE test option for 40 Gigabit Ethernet
  - C550GE test option for 50 Gigabit Ethernet
  - C5100GE test option for 100 Gigabit Ethernet

- Optical Transceiver supporting the line rate to be tested (SFP or QSFP)

- Cables to match the optical transceiver and the line under test

- Fiber optic inspection microscope (P5000i or FiberChek Probe)

- Fiber optic cleaning supplies

Figure 1: Equipment Requirements

LAUNCH TEST

1. Press the Power button ⏻ to turn on the T-BERD.

2. Tap the **Test** icon 🔳 Tests at the top of the screen to display the **Launch Screen**.

3. Using the **Select Test** menu, Quick Launch menu, or Job Manager, launch the Ethernet Layer 2 Traffic test on Port 1 for the desired data rate. For example:
Ethernet ►1GigE Optical ►Layer 2 Traffic ► P1 Terminate.

Figure 2: Launch Screen

4. Tap 🧰 Tools to open the **Tools** Panel and select 🔄 Reset Test to Defaults .
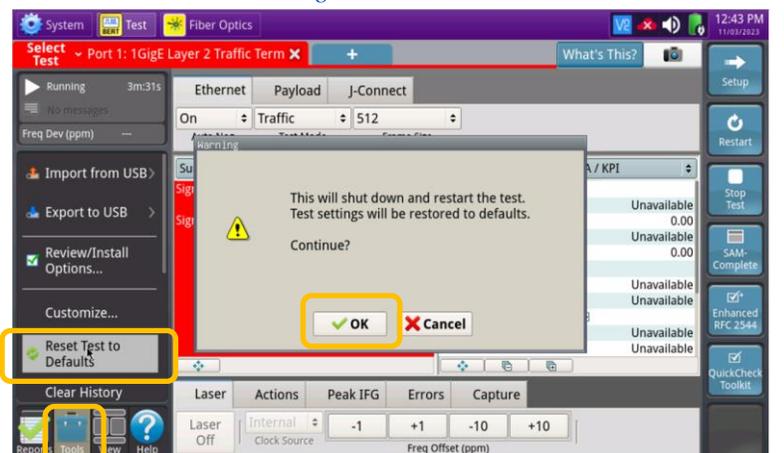
5. Tap ✔ OK to continue.

Figure 3: Tools Panel

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CONFIGURE TEST

► The following Information is needed to configure the test:
- Physical Interface (10/100/1000BASE-T, 1000BASE-LX, 10GBASE-LR, 100GBASE-LR4, etc.)
- Auto Negotiation settings of the port under test.
- Bit Error Rate Threshold

Figure 4: Work Order

► For 10/100/1000 Electrical tests:
1. 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**).
2. Tap the **Setup** soft key on the top right side of the screen and proceed to page 3.
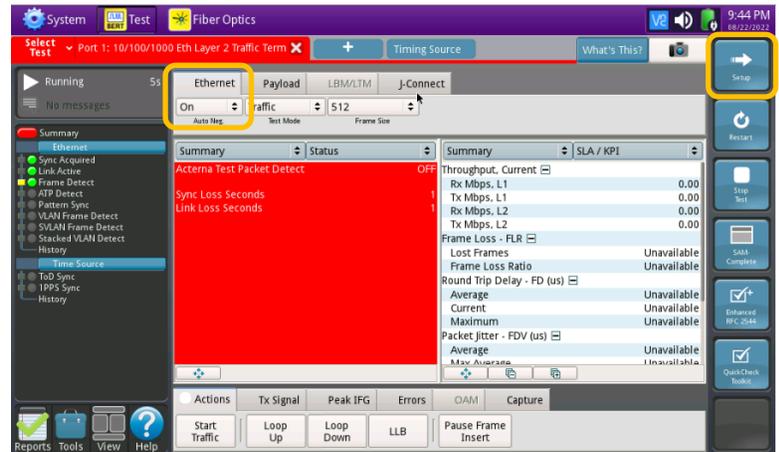
► For Optical Interfaces:
1. Tap the **Setup** soft key on the top right side of the screen.
2. Select the **Interface/Connector** folder.
3. Insert desired optical transceiver into the Port 1 SFP or QSFP slot on the top of the T-BERD/MTS.
4. Review SFP information:
   - o Verify that the SFP operates on the required wavelength (850nm, 1310nm or 1550nm).
   - o Verify that the SFP supports the required data rate (1G, 10G LAN, etc).
   - o Note the Min and Max Tx Levels (dBm) and Max Rx Level (dBm) to assess if optical attenuators are required.
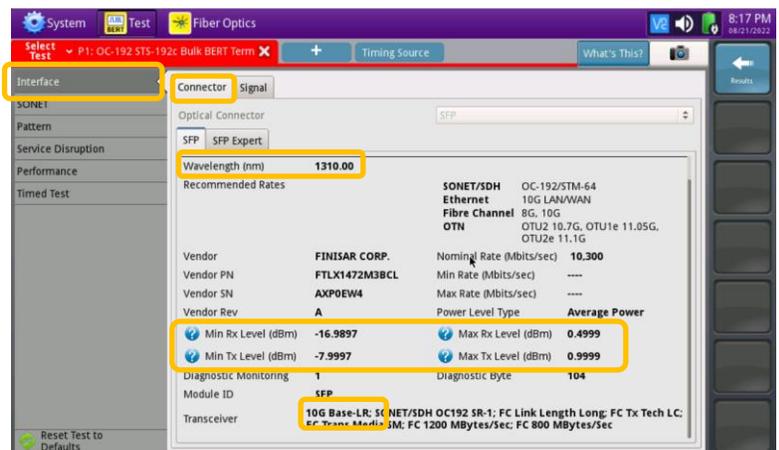

Figure 5: Quick Config, Auto Neg.

Figure 6: Setup, Interface/Connector

T-BERD/MTS 5800 Portable Network Tester

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CONFIGURE TEST (CONTINUED)

► Select the **Ethernet** settings tab.

1. If you are testing to a hard loop, proceed to step 2. If you are testing head-to-head with another T-BERD/MTS:

   • Tap the **SA** field to display the Factory Default Source MAC Address of your T-BERD/MTS. Provide this address to the operator of the other T-BERD/MTS, upon request.

   • Tap the **DA** field and enter the Source Address (SA) of the far-end T-BERD/MTS in the **Destination MAC** field.

2. Tap the **Data** field and set **Acterna Payload** to **BERT**.

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

► Select the **Interface** setting tab and **Physical Layer** folder.

1. Tap the check box to Enable Error Rate Threshold.

2. Set Payload Bit Error Rate Threshold to desired value.
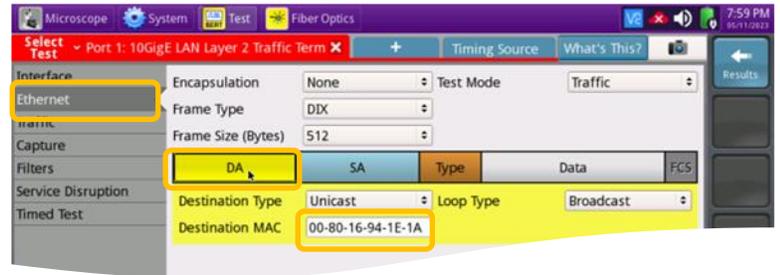
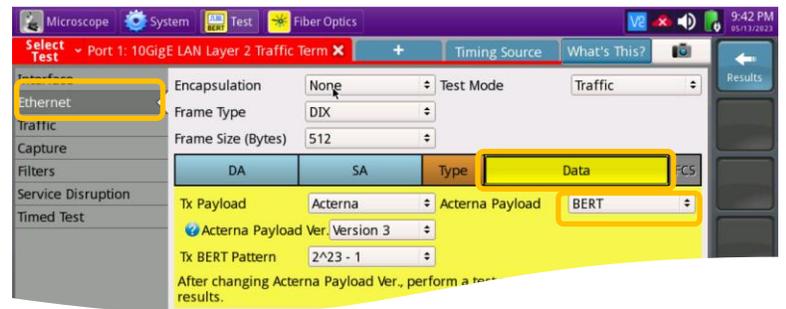► Tap the **Results** soft key.

Figure 7: Setup, Setup, Ethernet/DA
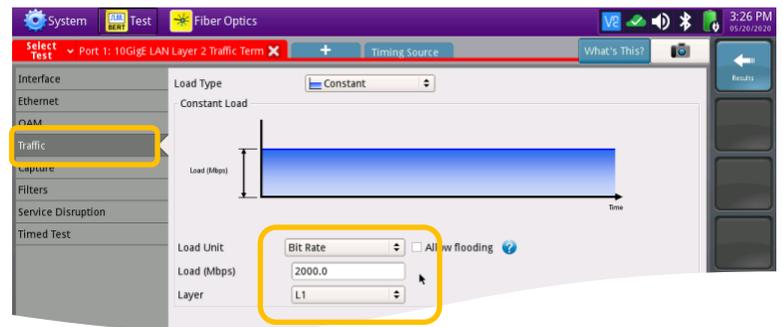

Figure 8: Setup, Ethernet/Data

Figure 9: Setup, Traffic
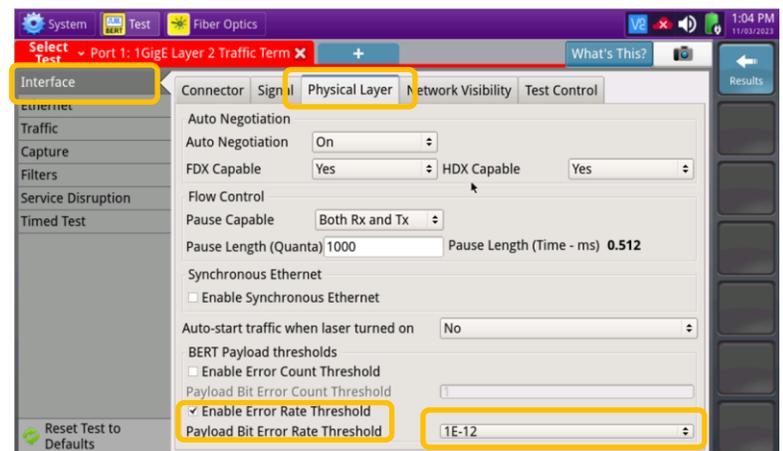
Figure 10: Setup, Interface/Physical Layer

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CONNECT TO LINE UNDER TEST

► **For Optical Interfaces:**

1. 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.
2. If necessary, insert optical attenuators into the SFP TX and/or RX ports.
3. Connect the SFP to the port under test using a jumper cable compatible with the line under test.
4. Select the **Laser** tab in the **Actions** panel.
5. Tap ⬚ Laser Off . The button will turn yellow and be relabeled ⬚ Laser On .
6. Tap the **Restart** soft key ⬚ .
7. Verify the following:
   ○ **Summary** LED is yellow.
   ○ **Signal Present** LED is green.
   ○ **Sync Acquired** LED is green.
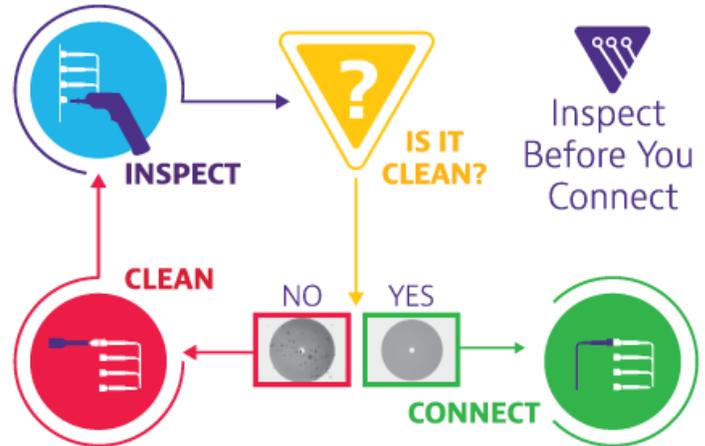   ○ **Link Active** LED is green.
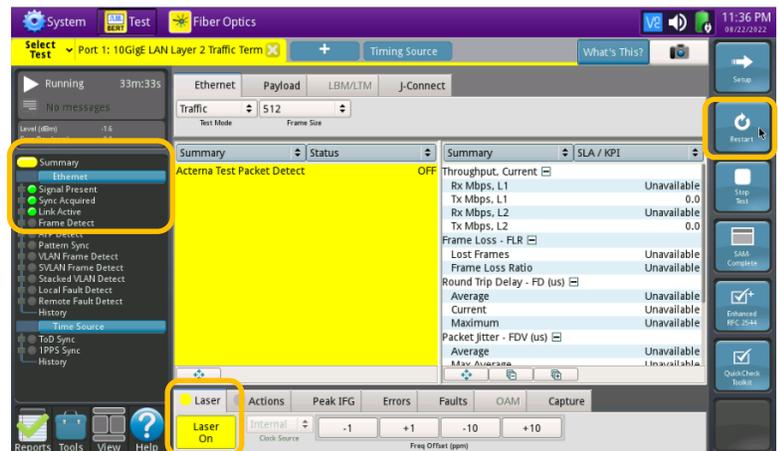
► **For Copper 10/100/1000BASE-T interfaces:**

1. Connect the 10/100/1000 RJ-45 jack to the port under test using CAT 5E or better cable.
2. Tap the **Restart** soft key ⬚ .
3. Verify the following:
   ○ **Summary** LED is yellow.
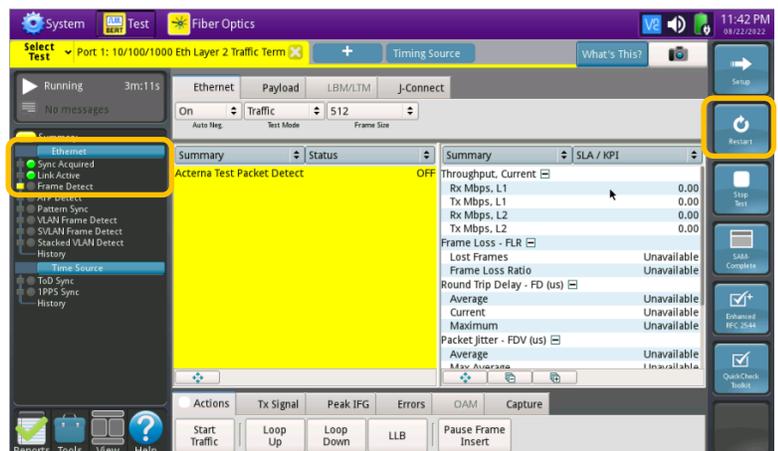   ○ **Sync Acquired** LED is green.
   ○ **Link Active** LED is green.

Figure 11: Inspect Before You Connect

Figure 12: Optical Interface Results

Figure 13: Copper Interface Results

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RUN TEST

1. Select the **Actions** tab in the **Actions** Panel.

2. Tap [Start Traffic]. The button will turn yellow and be relabeled [Traffic Started] .

3. Press the **Restart** soft key [Restart] on the right side of the screen.

4. Verify that:
   - ✓ The Right Results window shows "**Rx Mbps, L1**" is approximately equal to the Committed Information Rate.
   - ✓ The Right Results window shows **Lost Frames** = 0.

5. Using the drop-down menus, change the right results window to **Ethernet/BERT Stats.**

6. Allow the Test to run for the desired duration. Verify that the right result window displays "**Payload Error Rate threshold = OFF**" throughout the test.
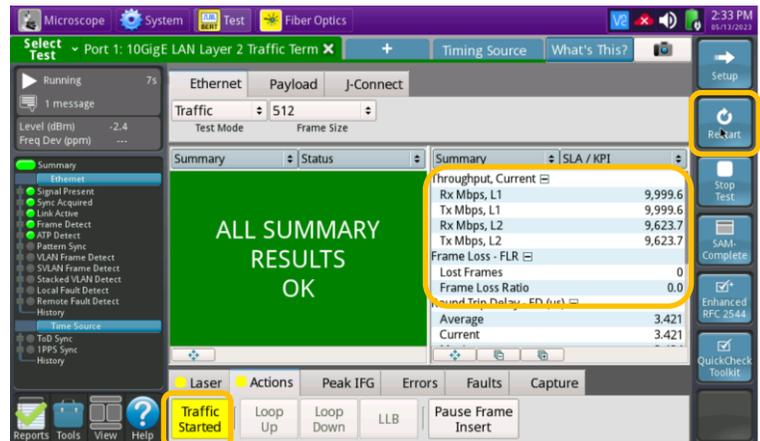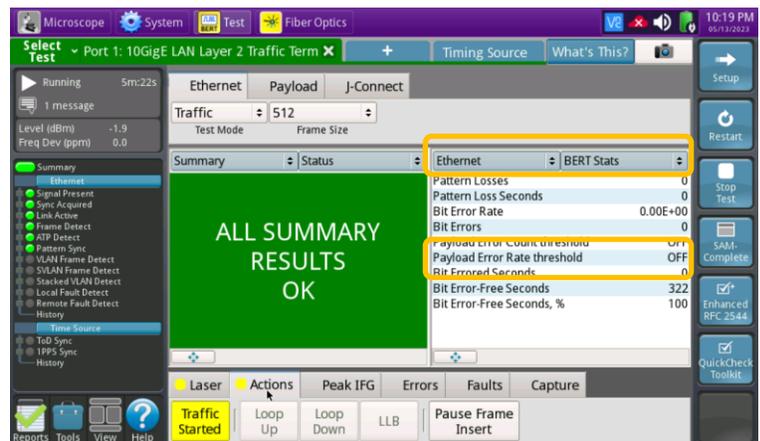

Figure 14: Summary Results

Figure 15: BERT Stats

Notes:
- The **Summary/Status** screen with turn red if there is a single bit error, regardless of the **Payload Error Rate threshold**.
- If the test traffic is transported though 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**, **Lost Frames**, and **Pattern Losses**.

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