Quick Card

T-BERD 5800 Network Tester
SONET Bit Error Rate Testing (BERT)

This quick card describes how to configure and run a SONET Bit Error Rate Test at the full concatenated line rate. Please note that the T-BERD can also test channelized payloads (DS1, VT1.5, and STS-n). Please refer to the T-BERD 5800 User's Guide for more information.

Equipment Requirements:
- T-BERD 5800 equipped with the following:
  - BERT software release V26.2 or greater
  - Test options:
    - C5LSSONSDH: OC-3/OC-12 option
    - C525GSONSDH: OC-48 option
    - C510GSONSDH: OC-192 option
- Optical Transceiver supporting the Optical Carrier level to be tested (SFP or SFP+)
- LC Attenuators (5dB, 10dB, and/or 15dB)
- 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

The following information is required to complete the test:
- Optical wavelength (typically 1310nm or 1550nm)
- Optical Carrier Level (OC-3, OC-12, OC-48 or OC-192)
- Test Pattern(s) (default is 2^23-1 ANSI)
- BER Pass/Fail Threshold

Fiber Inspection Guidelines:
Inspect and clean (if necessary) both sides of every fiber optic connection being used (bulkhead connectors, patch cords, SFP ports, etc.) prior to reconnection for each test. Using the VIAVI P5000i or FiberChek Probe inspection microscope:
- Focus the fiber on the screen. If dirty, clean the connector.
- If it appears clean, run the inspection test.
- If the test fails, clean the fiber and re-run inspection test. Repeat until it passes.
- To inspect SFP ports with the **P5000i**, insert the **FBPT-LC** probe tip into the SFP, move the focus wheel all the way to one end, and slowly move the focus wheel to the other end.

Figure 2: FiberChek Probe

- To inspect SFP ports with the **FiberChek Probe**, insert the **FBPT-LC** probe tip into the SFP, manually focus with middle toggle switch, or pull the trigger to auto-focus.
- If a fiber stub (a darker circle on a lighter background as shown in figure 3) is detected, follow standard inspection and cleaning procedures. If you are unable to focus on a fiber end face, do not clean the port. The SFP contains a lens and cannot be cleaned.

Figure 3: Image of Clean Fiber

Setup Test:

1. Press the Power button ⏻ to turn on the test set.

2. Press the **Test** icon 🔳 Tests at the top of the screen.

3. Using the **Select Test** menu, **Quick Launch** menu, or **Job Manager**, launch the SONET Bulk BERT test on Port 1 for the desired Optical Carrier level. For Example: **SONET►OC-3►STS-3c Bulk BERT►P1 Terminate**.

Figure 4: Launch Screen

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

5. Press ✓ OK to continue.

6. Press the **Setup** soft key, ⏩ Setup, on the top right side of the screen.

Figure 5: Tools Panel

7. Review SFP information in the **Connector** tab:
   - Verify that the SFP operates on the required wavelength (1310nm or 1550nm).
   - Verify that the SFP supports the required optical carrier level (OC-3, OC-12, OC-48, or OC-192).
   - Note the Min and Max Tx Levels (dBm) and Max Rx Level (dBm) to assess if optical attenuators are required.

Figure 6: SFP Information

8. Tap the **Signal** tab at the top of the display and set **Clock Source** to "**Recovered**" unless you are testing dark fiber with no SONET equipment.

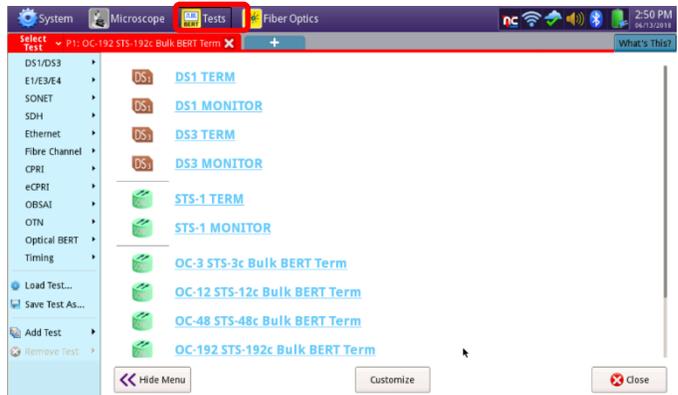9. Press the **Results** soft key ⬅ Results to view the **Test Results** screen.

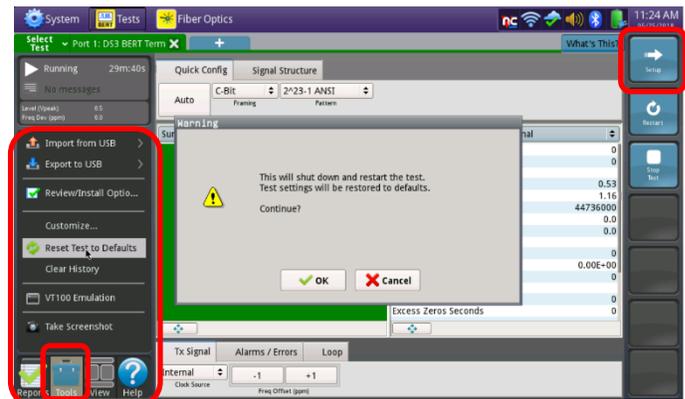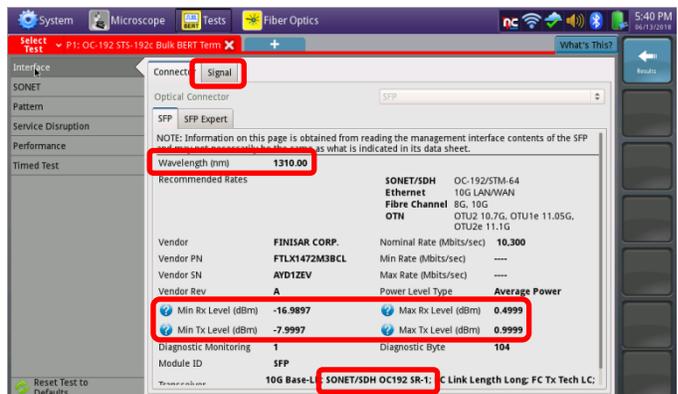**Connect to line under test:**

- Insert desired SFP into the Port 1 slot on the top of the T-BERD.
- Inspect and, if necessary, clean all SFPs, attenuators, fibers, and bulkheads, as described on page 1.
- If necessary, insert optical attenuators into the SFP TX and/or RX ports.
- Connect the SFP to the port under test using a jumper cable compatible with the line under test.

Port 1
SFP+ Port

Figure 7: T-BERD 5800v2 Dual Port mainframe

Port 1
SFP+/SFP28 Port

Figure 8: T-BERD 5800-100G mainframe

Run Test:

1. Using the drop-down menus, select "**Payload/BERT**" for the right Results display.
2. Select the **Laser** tab in the **Actions panel,** and press [Laser Off]. The button will turn yellow and be relabeled [Laser On].
3. Press the **Restart** soft key [Restart].
4. Verify the following:
   - **Summary** LED is green
   - **Signal Present** LED is green
   - **Frame Sync** LED is green
   - **Path Pointer Present** LED is green
   - **Pattern Sync** LED is green
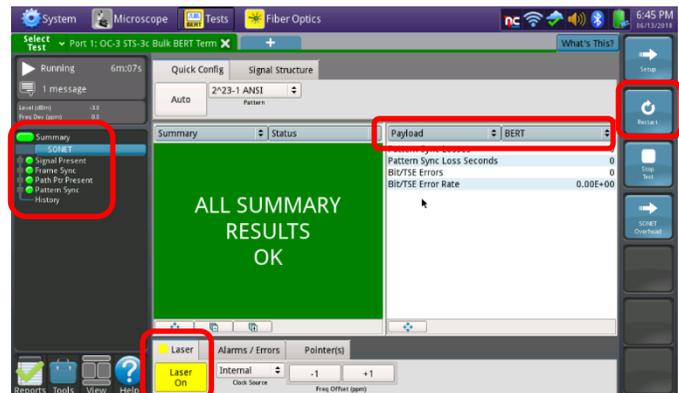   - **Summary/Status** results shows 'ALL SUMMARY RESULTS OK"

Figure 9: Test Results Screen

5. Allow the test to run for desired duration and verify the following:
   - **Bit/TSE Error Rate** result does not exceed your required threshold (0.00E+00 if pass/fail threshold unknown)
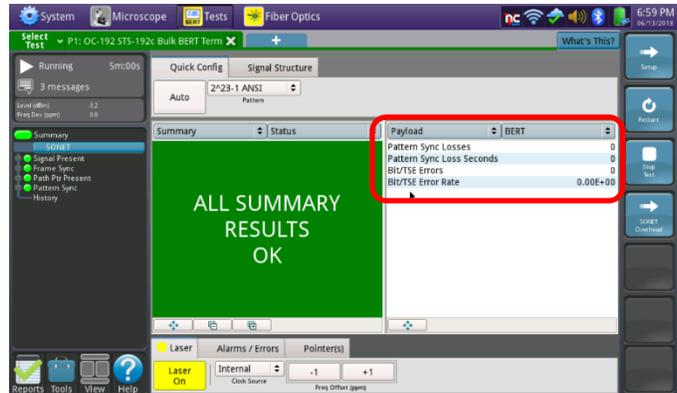

Figure 10: Payload/BERT Results

6. In the T-BERD's **Quick Config** menu, change "**Pattern**" to the next value in the test plan.

7. Press the **Restart** soft key to reset results.

8. Allow test to run for desired duration and verify the following:
   - **Pattern Sync** LED is green
   - **Bit/TSE Error Rate** does not exceed your required threshold (0.00E+00 if pass/fail threshold unknown)
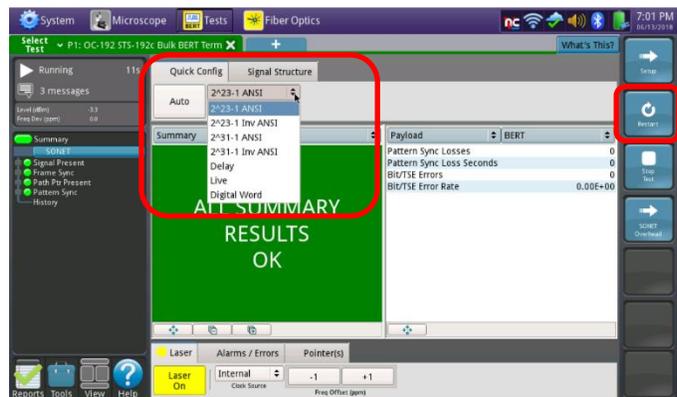

Figure 11: Test Plan

9. Repeat steps 6 through 8 for all Patterns in the test plan. Patterns may include:

   - **Delay:** Measures Round Trip Delay (RTD) instead of Bit Errors. RTD values are shown instead of BER in the "**Payload/BERT**" results display.

Troubleshooting Tips:
- If the **Signal Present** LED is not green, check your **cables.** Tx and Rx may be reversed.
- If the **Path Pointer Present** LED is not green and **AIS-P** alarm is on, there may be no loop, no connectivity to the loop, or the wrong payload may be selected (concatenated vs. channelized).
- If **RDI-L** alarm is on, the Tx Level is too high. Add an attenuator between the SFP Tx port and the line under test.
- If **Path Pointer Adjustments** is incrementing, **Clock Source** is set incorrectly. Change **Clock Source** to "**Recovered**."

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