

QUICK CARD

Testing Ethernet Voice over IP (VOIP) SIP Trunks

- This quick card describes how to configure and run an Ethernet VOIP Test to validate the provisioning and performance of a Session Border Controller (SBC) and SIP trunk at the network border. The following Information is needed to complete this test:
 - ✓ Physical Interface (RJ-45 Copper, 1000BASE-SX Multimode, 1000BASE-LX Single mode, etc.)
 - ✓ Speed and Auto Negotiation settings of the SBC LAN port
 - ✓ VLAN ID (if a VLAN is being used)
 - ✓ IP Address for the SBC LAN port
 - ✓ IP Address, Subnet mask, and default gateway for the T-BERD/MTS or PBX
 - ✓ Is registration required, or is this a non-registering trunk?
 - ✓ Username and Password (required for registering trunks only)
 - ✓ Customer's Billing Telephone Number for the SIP trunk
 - ✓ Destination Telephone Number(s) for outbound call testing

- T-BERD/MTS 5800 equipped with the following:
 - Transport software release V31.2.1 or greater
 - Test options:
 - C5VOIP: Voice over IP option
 - C5BT: Bluetooth (optional, for Bluetooth headset)
 - C5LSCAPTURE or C510GCAPTURE (recommended for packet capture and analysis)
- Headset (Plantronics M114/M210c, or Benertech A310QD)
- CAT5E or fiber optic cables to match the line under test
- For optical interfaces:
 - Fiber inspection microscope (P5000i or FiberChek Probe)
 - Fiber optic cleaning supplies



Figure 1: Equipment Requirements

CONNECT HEADSET AND CONFIGURE AUDIO SETTINGS

1. Press the Power button  to turn on the T-BERD/MTS.
2. Connect the headset to the headset jack on the side of the T-BERD/MTS.
3. Press the **System** icon  in the top left corner of the screen.
4. Press the Audio icon . Set **Speaker Volume** near the maximum setting and set **Microphone Volume** to the center setting. If desired, you can adjust these settings during the test. The speaker icon  on the top bar of the T-BERD provides a shortcut to this screen.

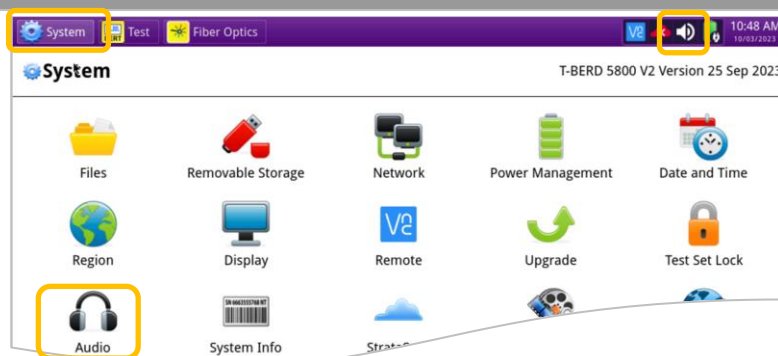


Figure 2: System menu

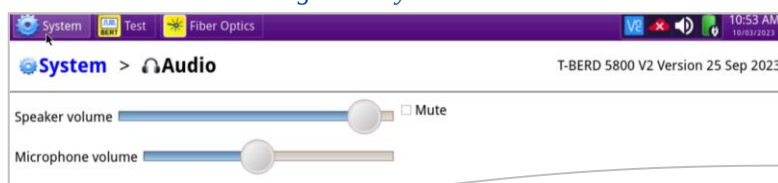
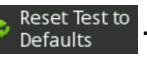


Figure 3: Audio Settings

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LAUNCH TEST

1. Press the **Test** icon  at the top of the screen to display the **Launch Screen**.
2. Using the **Select Test** menu, Quick Launch menu, or Job Manager, launch the Ethernet, VoIP, Terminate test for the desired physical interface/line rate and port; for example:
 - **Ethernet►1GigE Optical►VoIP►P1 Terminate**
 - **Ethernet►10/100/1000►VoIP►P2 Terminate**

► Note: If tests have been launched on both Port 1 and Port 2, you must remove the test on Port 2 before launching the VOIP test. Tap the  icon next to the Port 2 tab in the Select Test bar or tap  **Remove Test** in the Select Test menu to remove the test.
3. Tap  to open the **Tools Panel** and select .
4. Press  to continue.

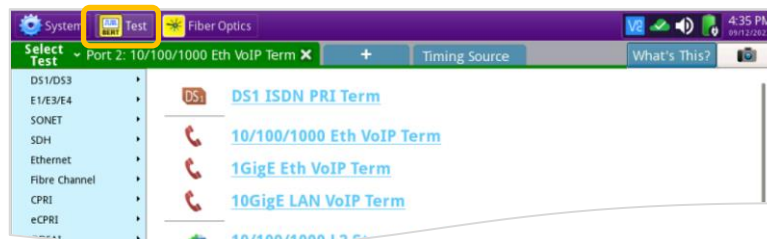


Figure 4: Launch Screen

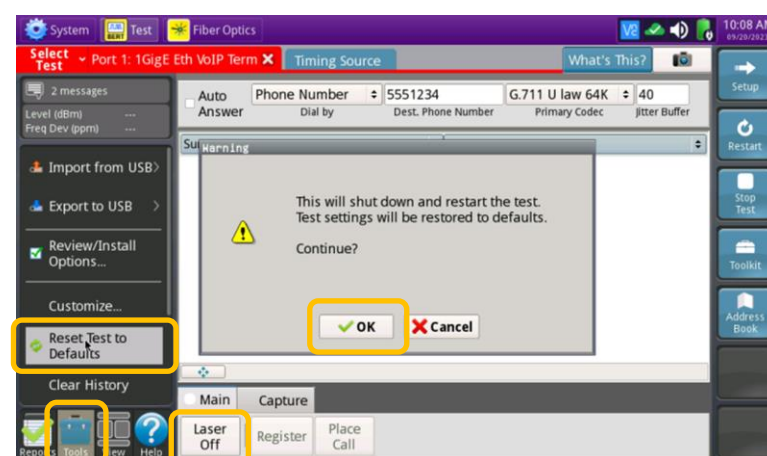


Figure 5: Tools Panel

CONNECT TO LINE UNDER TEST

- For copper testing with the SmartClass 4800 or T-BERD/MTS 5800v2, connect the Port 1 10/100/1000 RJ-45 jack to the Ethernet port under test using CAT 5E or better cable.
- For copper testing with the T-BERD/MTS 5800-100G, connect the Port 2 10/100/1000 RJ-45 jack to the Ethernet port under test using CAT 5E or better cable.
- For optical testing, insert an SFP or SFP+ into the Port 1 slot on the top of the T-BERD/MTS.
 1. Ensure the fiber and connectors are clean using a Fiber Inspection microscope.
 2. Connect the SFP or SFP+ to the Ethernet port under test.
 - Use Multimode jumper cables for 850 nm 1000BASE-SX or 10GBASE-SR.
 - Use Single mode jumper cables for 1310 nm 1000BASE-LX or 10GBASE-LR.
 3. Select the Laser tab in the Main Action Panel and press  to turn the Laser on.



Figure 6: T-BERD/MTS 5800v2

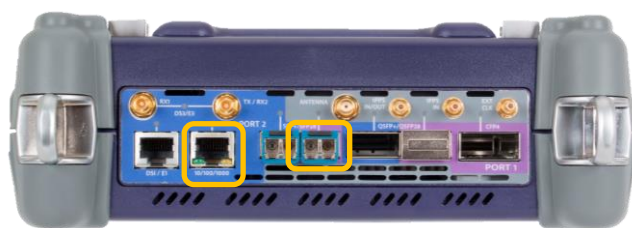


Figure 7: T-BERD/MTS 5800-100G

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CONFIGURE TEST

1. Press the **Setup** soft key  on the top right side of the screen.
2. Select the indicated folders and configure your test as follows. Leave all other values at default, unless specified in the work order.

Folder	Option	Value(s)
Interface, Physical Layer	Auto Negotiation	Set to same value as the SBC LAN port under test. Enter Speed if Auto Negotiation is off; i.e., 100 Mbps.
Ethernet/IP	Encapsulation	None or VLAN . Enter VLAN ID if VLAN is being used.
	Source IP Type	Static or DHCP .
	Source IP	Enter the static Source IP Address for the T-BERD/MTS/PBX.
	Default Gateway	Enter the IP Address for the SBC LAN port.
	Subnet Mask	Enter Subnet Mask for the T-BERD/MTS/PBX.

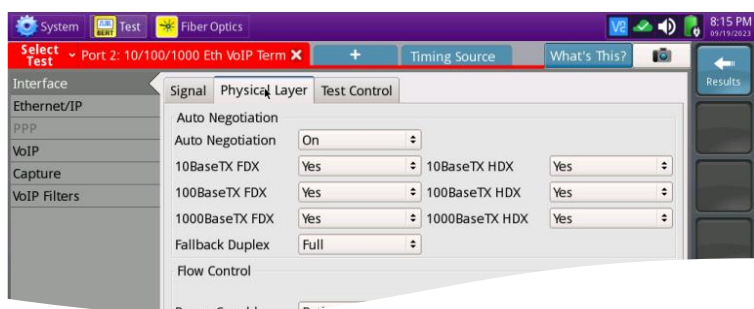


Figure 8: Setup, Interface

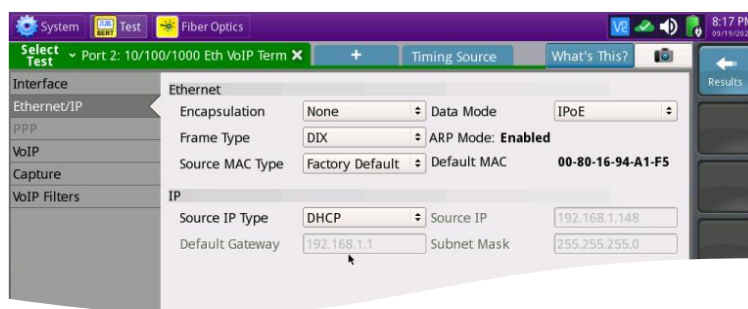


Figure 9: Setup, Ethernet/IP

Folder	Option	Value(s)
VoIP, General	Source Alias	For Registering Trunks, enter Billing Telephone Number (BTN) for the PBX. For Non-Registering Trunks, enter BTN@SBC LAN IP Address; user=phone . i.e. "3215554321@192.168.1.1;user=phone"
	Outbound Alias (Dial by)	For Registering Trunks, select "Phone Number". For Non-Registering Trunks, select "Name/URI/Email"
	Dest. Phone Number/ Name /URI/ Email	For Registering trunks, enter your 10-digit cell phone number. For non-registering trunks, enter Cell Phone Number@SBC LAN IP Address . i.e. "3215551234@192.168.1.1".
	100 Rel Usage	Disabled

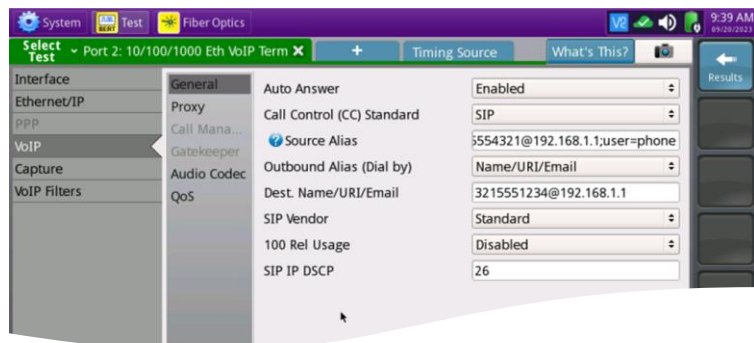


Figure 10: Non-registering Trunk Setup, VOIP/General

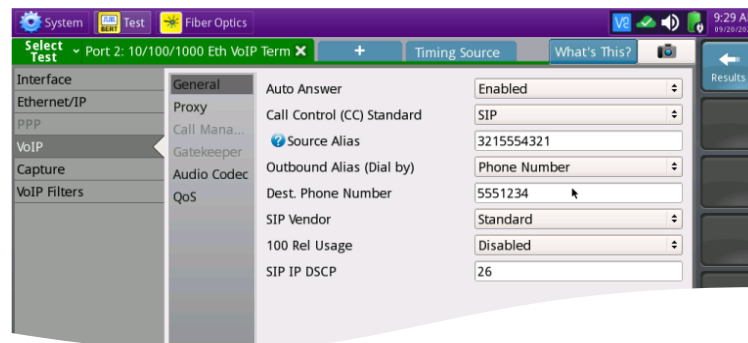


Figure 11: Registering Trunk Setup, VOIP/General

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CONFIGURE TEST (continued)

Folder	Option	Value(s)
VoIP, Proxy	Proxy Mode	For Registering Trunks, select "Static" For Non-Registering Trunks, select "No Proxy"
	Proxy IP	SBC LAN IP Address
	Proxy Username	Enter User Name.
	Proxy Password	Enter Password.

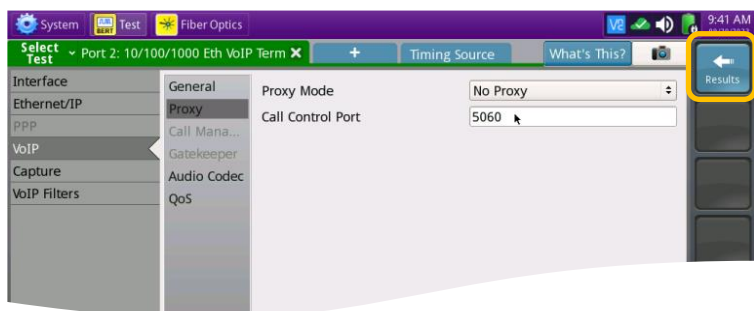


Figure 12: Non-registering Trunk Setup, VoIP/Proxy

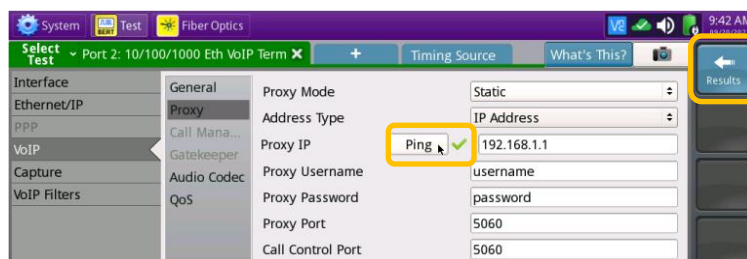


Figure 13: Registering Trunk Setup, VoIP/Proxy

- If you have configured settings for a Registering Trunk, tap **Ping** to verify connectivity to the SBC.
- Tap the **Results** soft key to view the Test Results screen.

VERIFY CONNECTIVITY AND REGISTRATION

- Verify the following:
 - Summary LED is green
 - Network Up LED is green
 - Sync Acquired LED is green
 - Link Active LED is green
- If you are testing a **Registering Trunk** and have configured VoIP/Proxy settings, the T-BERD/MTS automatically sends a REGISTER message to the Proxy IP. A green phone labeled "Registered" in the LED panel indicates successful registration.

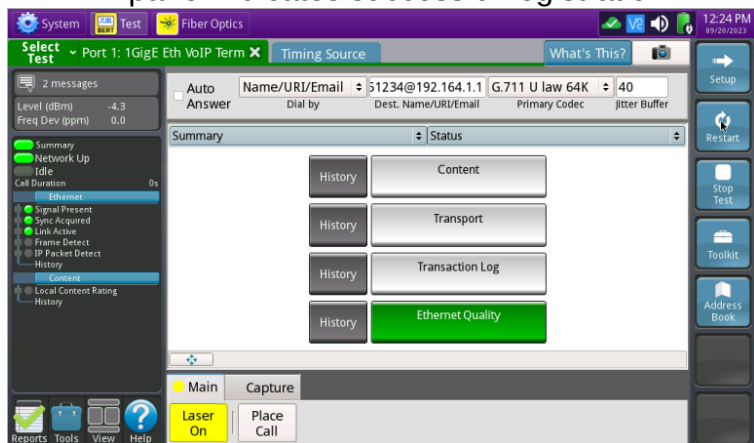


Figure 14: Non-registering Trunk Results

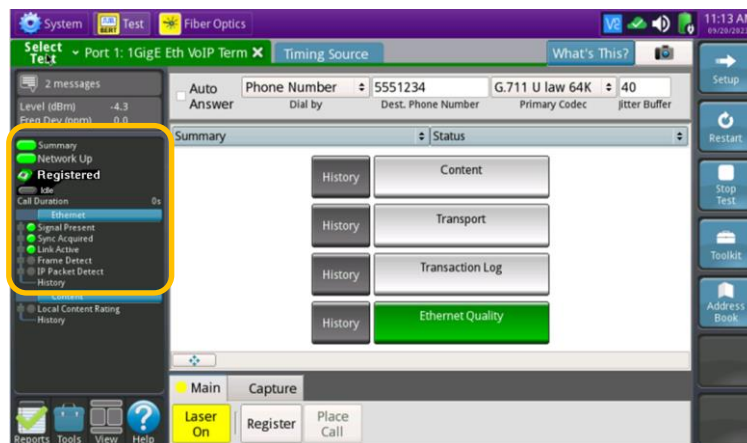
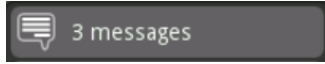


Figure 15: Registering Trunk Results

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VERIFY CONNECTIVITY AND REGISTRATION (continued)

Troubleshooting Tips:

1. If the specified LEDs are not green, verify the following:
 - ▶ The T-BERD/MTS is configured correctly, as outlined above.
 - ▶ The LAN Port of the SBC is properly configured and enabled.
 - ▶ Cables are good quality and properly connected.
2. Tap the message icon in the top left screen  to confirm DHCP IP Address assignment.
3. Change the results category and group from **Summary/Status** to **Ethernet/Stats** to view Ethernet Statistics including Local Config Status and error counts.
4. Change the results category and group to **Transaction Log/Signaling** to view registration messages. If the T-BERD/MTS fails to automatically register, tap the **Register** button in the **Main Action Panel** at the bottom of the screen.
5. If your unit includes options for **Packet Capture**, start a capture session and view signaling messages using WireShark.

INBOUND CALL TESTING

1. Using your cell phone, dial the billing telephone number (BTN) for the PBX (or dial the temporary “test” number if the BTN has not been ported).
2. In the T-BERD/MTS’s Actions Panel, select the **Call Controls** tab. Allow the call to ring at least 2 times. Confirm the Ring back tone is heard on your cell phone and tap  on the T-BERD/MTS to answer the call.
3. Put on the headset. If the headset includes an on/off switch and volume control, turn it on and adjust the volume to the desired level.
4. Confirm that voice is heard, and voice quality is acceptable on both the T-BERD/MTS’s headset and the Cell Phone. If static is heard on your cell phone, move the microphone boom farther away from your mouth to avoid overdriving the microphone.
5. Hang up the call from your cell phone. Verify that the call status on the T-BERD/MTS changes to **IDLE**.

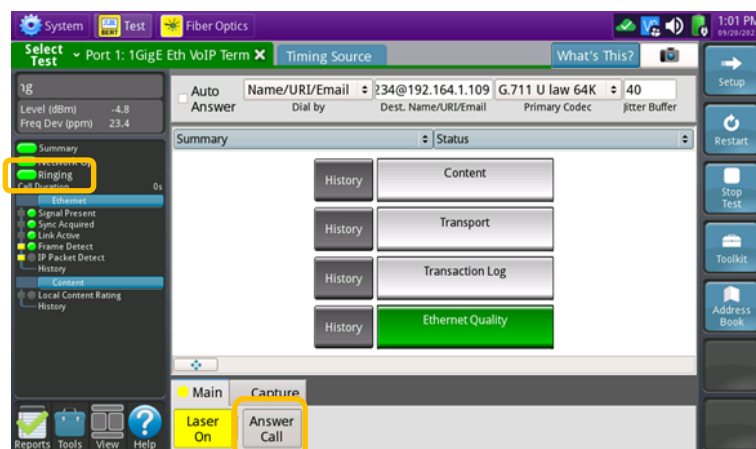


Figure 16: Results, Incoming call



Figure 17: Results, Connected call



Figure 18: Results, Disconnected

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OUTBOUND CALL TESTING

1. In the T-BERD/MTS's Actions Panel, tap . The T-BERD/MTS will transmit INVITE messages to initiate the call. Call status is displayed in the LED panel.
2. Answer the incoming call on your cell phone. If the call is successful, Call Status will change from **Ringback** to **Conversation**.
3. Converse and confirm that voice quality is acceptable on the T-BERD/MTS and the Cell Phone. A wide variety of call statistics can be viewed in the results screen, by changing the Results category and group from **Summary/Status** to other selections including **Content/Current Call Scores**, **Transport/QOS**, **Ethernet/Stats**, and more.
4. In the T-BERD/MTS **Main** Actions Panel, tap  to disconnect the call.
5. In the T-BERD/MTS **Quick Config** menu, change "Destination Phone Number" to the next number in the call plan.
6. In the T-BERD/MTS **Main** Actions Panel, tap  to initiate the call.
7. Converse and confirm that voice quality is acceptable on the T-BERD/MTS and for the called party.
8. In the T-BERD/MTS Actions Panel, tap  to disconnect the call.
9. Repeat steps 5 through 8 for all numbers in the call plan. Call Plans may include:
 - Toll Free numbers
 - Local off-network numbers
 - Local on-network numbers
 - Long Distance numbers
 - International numbers
 - Blocked Calls
 - n11 numbers such as 411 (directory assistance), 611 (customer service), and 911 (emergency services)

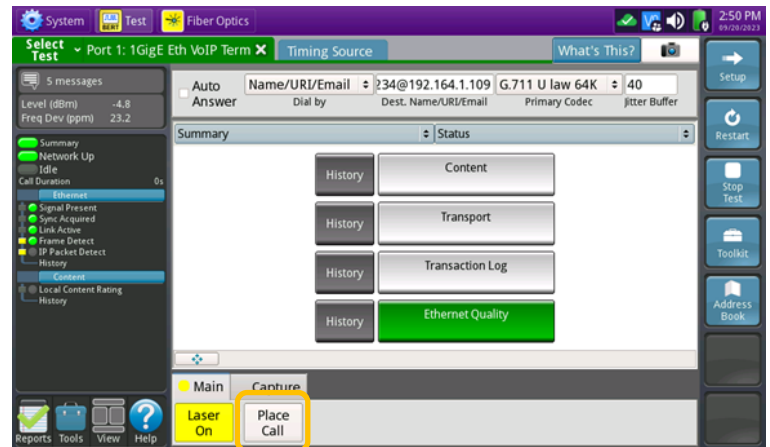


Figure 19: Results, Place Call

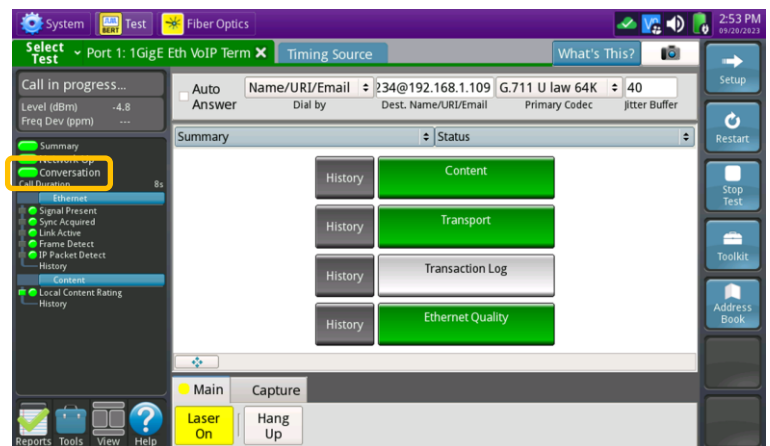


Figure 20: Results, Connected call

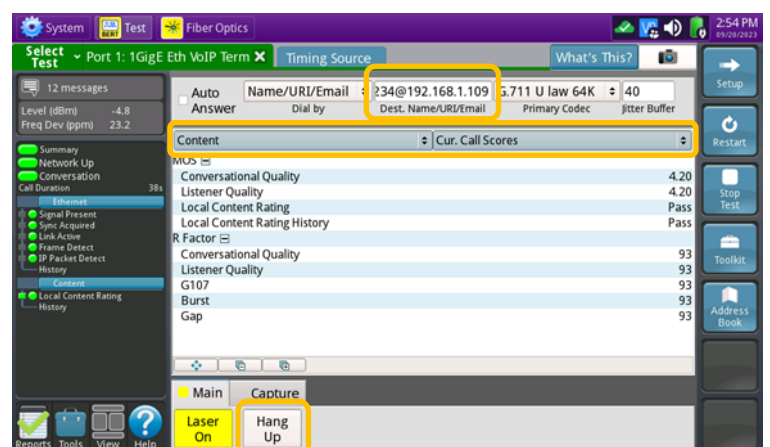
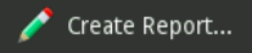


Figure 21: Results, Content/Current Call Scores

T-BERD/MTS 5800 Portable Network Tester

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CREATE REPORT

1. Tap  to open the **Reports** Panel and select .
2. Tap .
3. A report will be saved to the T-BERD/MTS **/bert/reports** folder.

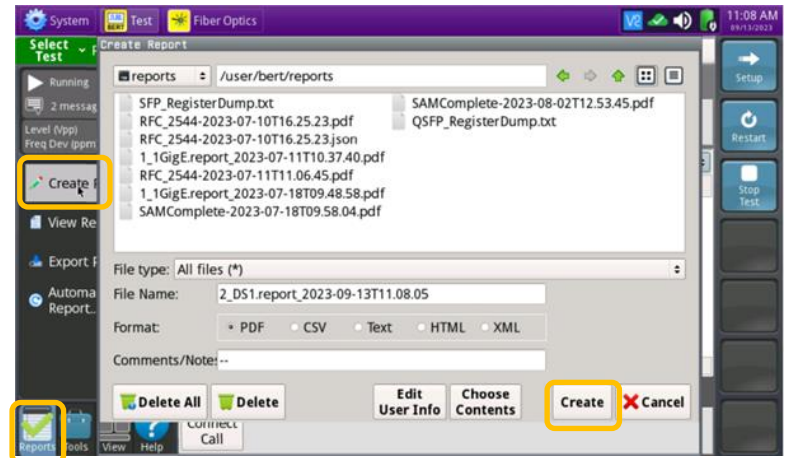


Figure 22: Create Report