



GRL Platform Solutions

USB4® Version 2.0 Return Loss Test User Guide Using Anritsu MS46524B Vector Network Analyzer (VNA) and GRL-USB4V2RL-AN Automation Software

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1 Introduction

This User Guide describes how to perform automated Calibration and Testing of the USB4® Version 2.0 (or USB4 Gen 4) Return Loss using the Anritsu MS46524B Vector Network Analyzer and GRL-USB4V2RL-AN Automation Software.

The GRL-USB4V2RL-AN automation software supports calibration for time and frequency domain and impedance and return loss measurements for USB4 Gen 4 Hosts and Devices. When combined with a satisfactory level of interoperability testing, these tests provide a reasonable level of confidence that the device under test will function properly in many USB4 Gen 4 environments.

This User Guide mainly covers the following for USB4 Gen 4 Return Loss calibration and testing:

1. Equipment required for calibration and testing.
2. GRL-USB4V2RL-AN Automation Software setup for calibration and testing.
3. Specification Standard automated calibration and test procedures.

2 Resource Requirements

2.1 Equipment Requirements

TABLE 1. EQUIPMENT REQUIREMENTS – SYSTEMS

System	Qty.	Description	Key Specification
Vector Network Analyzer (VNA)	1	Anritsu MS46524B ShockLine™ 4-Port Performance Vector Network Analyzer - MS46524B-020 – Frequency Domain option (50 kHz to 20 GHz) - MS46524B-002 – Time Domain option (with time gating) - Firmware Version: V2018.2.1 or above	40 GHz 140 dB max

TABLE 2. EQUIPMENT REQUIREMENTS – ACCESSORIES

Accessory	Qty.	Description	Key Specification
Computer	1	External PC for running GRL-USB4V2RL-AN Software	Windows 10+ OS
Calibration Kit	1	Anritsu TOSLKF50A-20 Calibration Kit OR Anritsu 3652A K Connector Calibration Kit	Type K(f), DC to 20GHz, 50 ohms 2.92 mm
USB4 Microcontroller	1	USB4 Gen 4 Microcontroller	Optional for some test configurations, see Section 3.1.2
USB4 Test Fixture	1	USB4 CIO Plug board	
Matched Cable Pairs	2 pairs	Rosenberger UFC142A 2.92m (x2), 1m SMA cable	Phase matched $\pm 2^\circ$ at 40 GHz Insertion loss 1 dB max in 10 GHz

2.2 Software Requirements

TABLE 3. SOFTWARE REQUIREMENTS

Software	Source
GRL-USB4V2RL-AN	GRL Platform Solutions USB4 Version 2.0 Return Loss Calibration and Test Automation Software – www.grlps.com
VISA (Virtual Instrument Software Architecture) API Software	VISA Software is required to be installed on the host PC running GRL-USB4V2RL-AN software. GRL Platform Solutions' software framework has been tested to work with all three versions of VISA available on the Market: 1. NI-VISA: http://www.ni.com/download/ni-visa-17.0/6646/en/ 2. Keysight IO Libraries: www.keysight.com (Search on IO Libraries) 3. Tektronix TekVisa: www.tek.com (Downloads > Software > TekVisa)
SigTest Application	SigTest Version 0.9 is required. Downloadable from USB-IF's website. <i>(Note: Approval and NDA as a USB-IF Adopter is required to gain access to USB-IF products.)</i>
USB4 Electrical Test Tool (ETT)	ETT Version 2.0.0 is required. Downloadable from USB-IF's website. See Section 3.1.2 for more details.

3 Installation and Setup of GRL-USB4V2RL-AN Software

This section provides the procedure for installing, configuring and verifying the operation of the GRL-USB4V2RL-AN and USB4 electrical test toolset (ETT). It also helps you familiarize yourself with the basic operation of the GRL-USB4V2RL-AN software.

The GRL-USB4V2RL-AN software installer automatically creates shortcuts in the Desktop and Start Menu.

To open the GRL-USB4V2RL-AN software application, follow the procedure in the following section.

3.1 Download and Set Up GRL-USB4V2RL-AN Software

Install, launch and set up the GRL-USB4V2RL-AN software on a PC (where the GRL-USB4V2RL-AN is referred to as ‘Control PC’ in this User Guide).

1. Install VISA (Virtual Instrument Software Architecture) on to the PC where GRL-USB4V2RL-AN is to be used (see Section 2.2).
2. Download the GRL-USB4V2RL-AN ZIP file package from the GRL Platform Solutions support site.
3. The ZIP file contains:
 - **AnritsuUSB4V2ReturnLossxxxxxxxxxxSetup** – Run this on the PC to install the application.
 - **AnritsuUSB4V2ReturnLossSetupFileInstallationxxxxxxxxxxSetup** – Run this on the VNA to install the proper setup files. Note that the user needs to save the following:
 - VNA setup files “USB4_V2_TimeCal_Setup.cha” and “USB4_V2_FreqCal_Setup.cha” to “C:\GRL\Setups\Anritsu VNA\Anritsu_USB4_V2_Return_Loss_Test_Application” on the VNA.
 - VNA limit file “AN_MS46524B_USB4V2_RL_Limit.lmt” to “C:\GRL\Setups\Anritsu VNA\Anritsu_USB4_V2_Return_Loss_Test_Application\Limit” on the VNA.
4. Launch and set up the GRL-USB4V2RL-AN software as follows:
 - a) Open the **GRL** folder from the Windows Start Menu. Click on **GRL – Automated Test Solutions** within the GRL folder to launch the GRL Platform Solutions software framework.

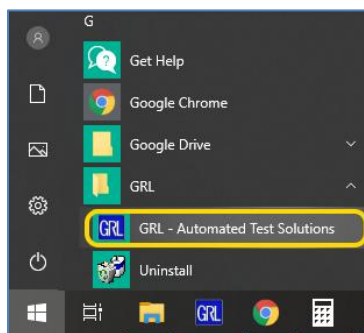


FIGURE 1. LAUNCHING GRL PLATFORM SOLUTIONS SOFTWARE FRAMEWORK

- b) From the **Application** → **Framework Test Solution** drop-down menu, select **Anritsu USB4 V2 Return Loss Test Application**. If the selection is grayed out, it means your license has expired.

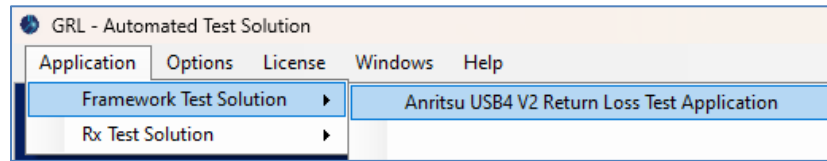


FIGURE 2. START GRL-USB4V2RL-AN APPLICATION

- i) To enable license, go to **License** → **License Info**.

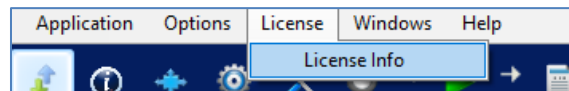


FIGURE 3. SEE LICENSE DETAILS

- ii) Check the license status for the installed application.

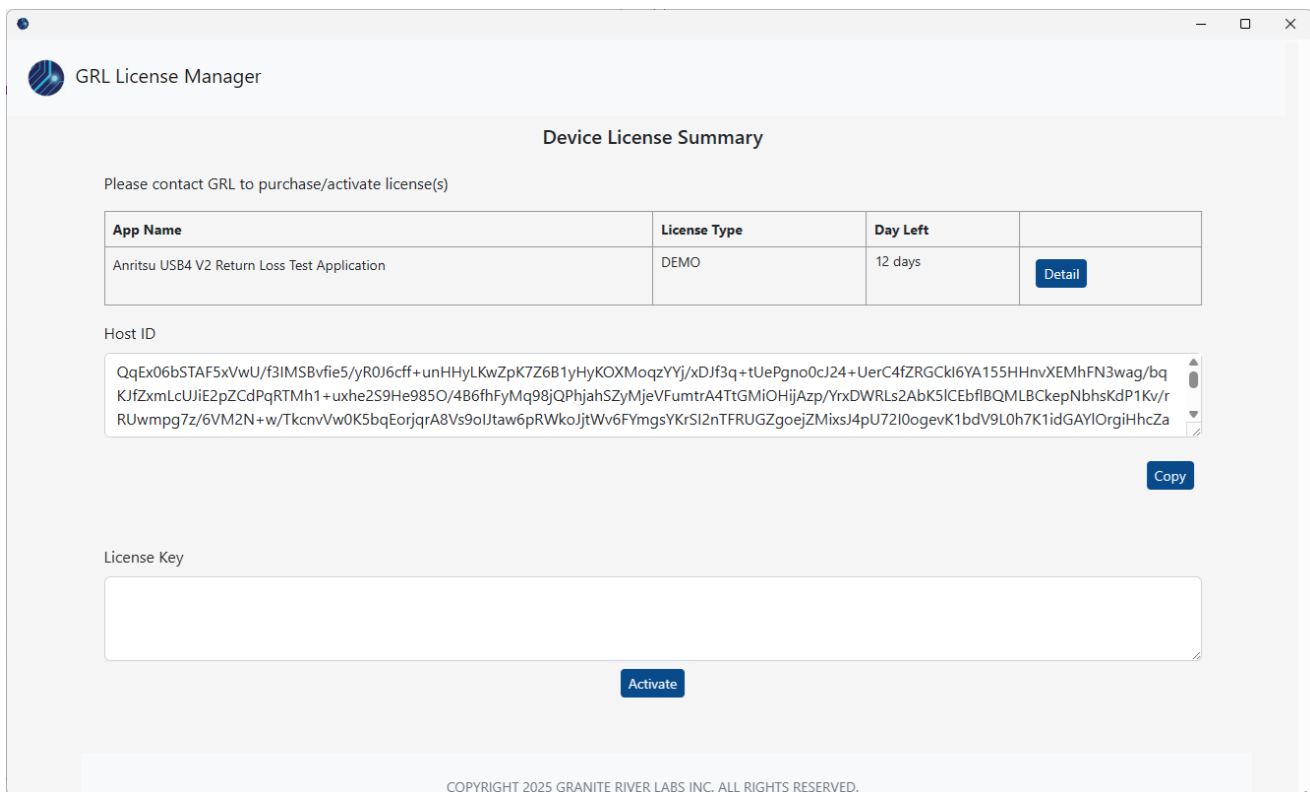


FIGURE 4. CHECK LICENSE FOR INSTALLED APPLICATIONS

- iii) Activate a License:

- If you have an Activation Key, enter it in the **License Key** field provided and select **Activate**. The installed application is ready for use upon successful activation.
- If you do not have an Activation Key, close the above window to use a demo version of the application over a free 12-day trial period.

Note: Once the 12-day trial period ends, you will need to request an Activation Key to continue using the application on the same computer by contacting support@grlps.com.

3.1.1 Connect Anritsu Vector Network Analyzer with PC

1. Connect the Anritsu VNA with the Control PC using an Ethernet cable.

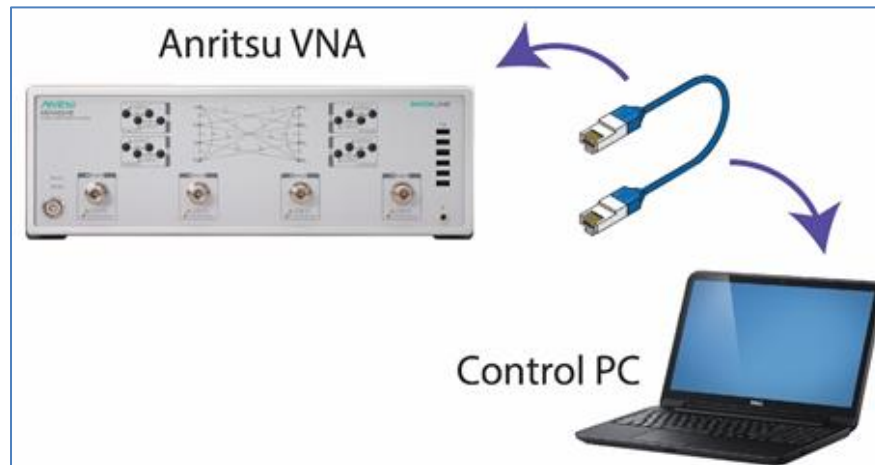
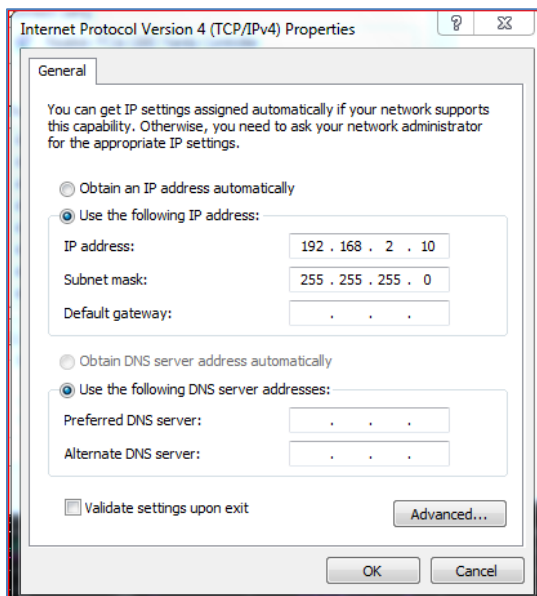
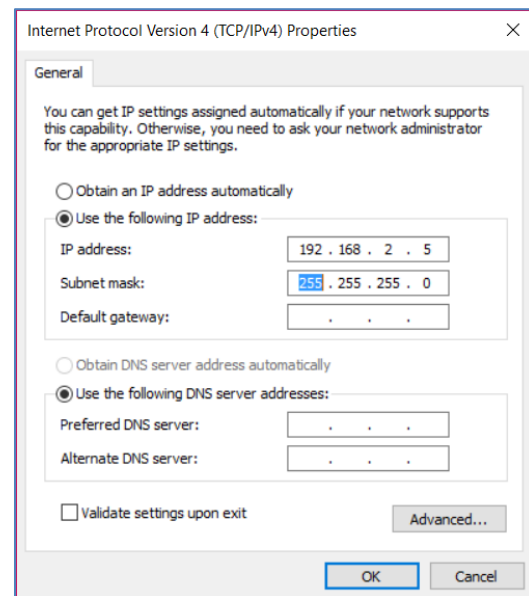


FIGURE 5. CONNECTING ANRITSU VNA WITH CONTROL PC

2. Set both VNA and PC to the same network.



VNA



Control PC

FIGURE 6. SETTING VNA AND CONTROL PC NETWORK

3.1.2 Download and Install USB4 Electrical Test Tools (ETT)

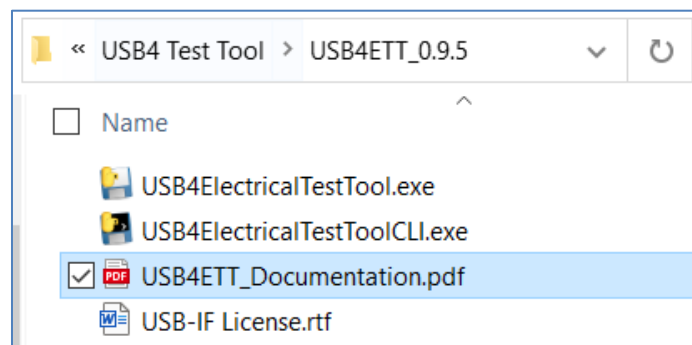
For USB4 Gen 4 Return Loss measurements, the Host/Device's CIO PHY must be in an active state during testing. Its transmitters shall be transmitting PRTS-7 into the VNA measurement channel during testing and its receivers shall have their terminations enabled during testing. Thus, a PHY microcontroller must be used to put the DUT into the right state for return loss testing.

Download ETT:

Visit the USB-IF official website and download "USB4 Electrical Test Tool" (ETT) at <https://www.usb.org/usb4tools>.

Install ETT:

Before running ETT, configure the Control PC's environment using the instructions in **USB4ETT_Documentation.pdf** from the ETT package downloaded from USB-IF.



For USB4 Gen 4 Host Testing:

The ETT can be loaded on the Control PC with the GRL-USB4V2RL-AN software. In this case, the USB4 Gen 4 microcontroller is required. The DUT is controlled using an Apple 0.8m USB Type-C® cable from the microcontroller to the USB4 V2 Test Fixture.

For USB4 Gen 4 Device Testing:

- **Upstream Facing Port (UFP):** The ETT can be loaded on the Control PC with the GRL-USB4V2RL-AN software. In this case, the USB4 Gen 4 microcontroller is required. The DUT is controlled using an Apple 0.8m USB Type-C cable from the microcontroller to the USB4 V2 Test Fixture.
- **Downstream Facing Port (DFP):** Connect the DUT's UFP to any USB4 Gen 4 host via the USB4 based USB Type-C® cable. The ETT tools can be loaded on the Control PC with the GRL-USB4V2RL-AN software. In this case, the USB4 Gen 4 microcontroller is required. The DUT is controlled using an Apple 0.8m USB Type-C cable from the microcontroller to the USB4 V2 Test Fixture.

**Disclaimer: USB Type-C® is a registered trademark of USB Implementers Forum.*

3.1.3 Launch and Set Up GRL-USB4V2RL-AN Software

3.1.3.1 On the Control PC

1. Launch the GRL Platform Solutions Host Application from **Start Menu → GRL → GRL – Automated Test Solutions**.
2. Select **Application → Framework Test Solution → Anritsu USB4 V2 Return Loss Test Application**.
3. Select the Equipment Setup icon  on the Anritsu USB4 V2 Return Loss Test Application menu.
4. Type in the respective IP Address of the Anritsu VNA into the “Address” field and click on the “lightning” button (). The “lightning” button should turn green () if successfully connected to the equipment.

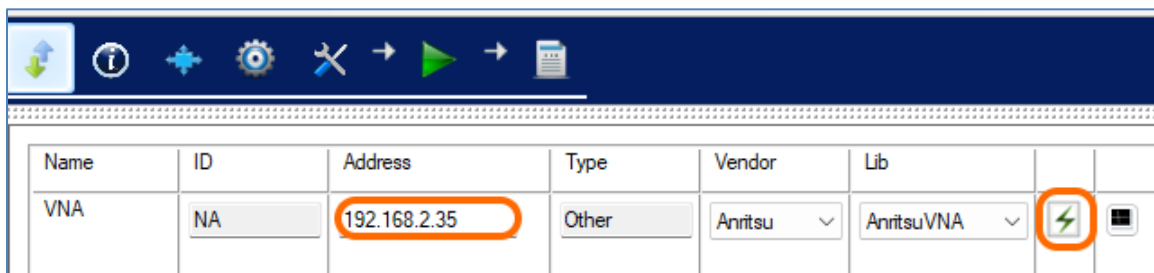


FIGURE 7. IP ADDRESSING ON ANRITSU VNA

3.1.3.2 Session Info

Select  from the software menu to access the **Session Info** page. Enter the information as required for the calibration/test session that is currently being run. The information provided will be included in the test report generated by the software once calibration/tests are completed.

- The fields under **DUT Info** and **Test Info** are defined by the user.
- The **Software Info** field is automatically populated by the software.

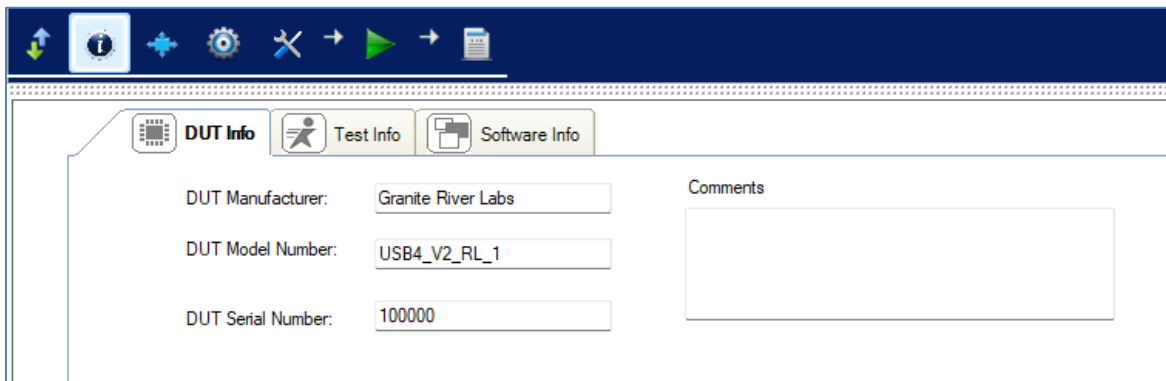


FIGURE 8. SESSION INFO PAGE

3.1.3.3 Test Conditions

Select  from the software menu to access the Conditions page.

In this section, conditions for calibration and testing will need to be set.

a) **Test Port tab:** Select the test ports on the device under test.

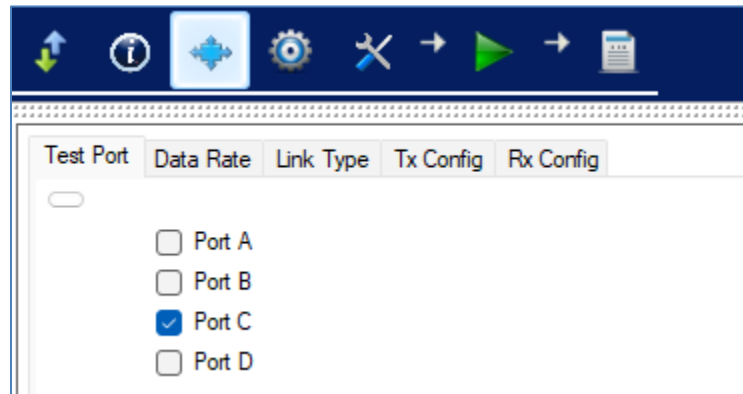


FIGURE 9. SELECT TEST PORT

b) **Data Rate tab:** Select the data rate.

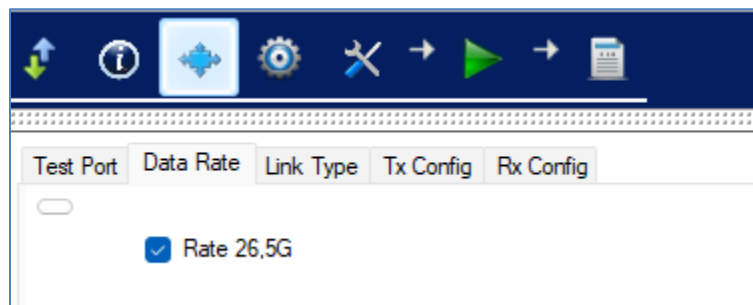


FIGURE 10. SELECT DATA RATE

c) **Link Type tab:** Select the USB4 Symmetric Link (where the number of TX and RX lanes are the same, e.g. "1*TX/1*RX" or "2*TX/2*RX") or Asymmetric Link (where one side transmits e.g. "3*TX/1*RX", while the other side transmits "1*TX/3*RX").

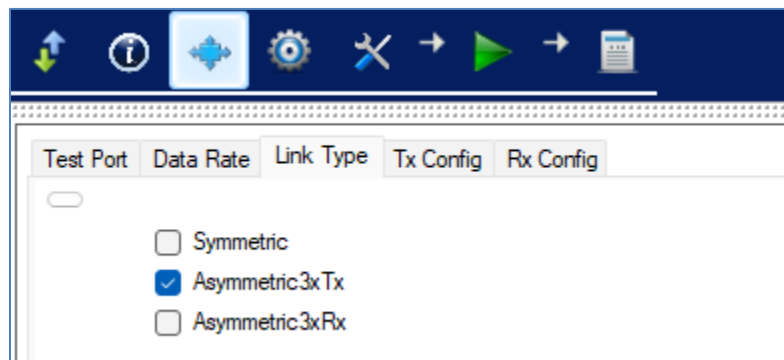


FIGURE 11. SELECT USB4 SYMMETRIC LINK AND ASYMMETRIC LINK

d) **Tx Config tab:** For the selected test port and link type, select the Tx configuration (e.g., Tx test lane and straight/reverse insertion of the USB Type-C connector).

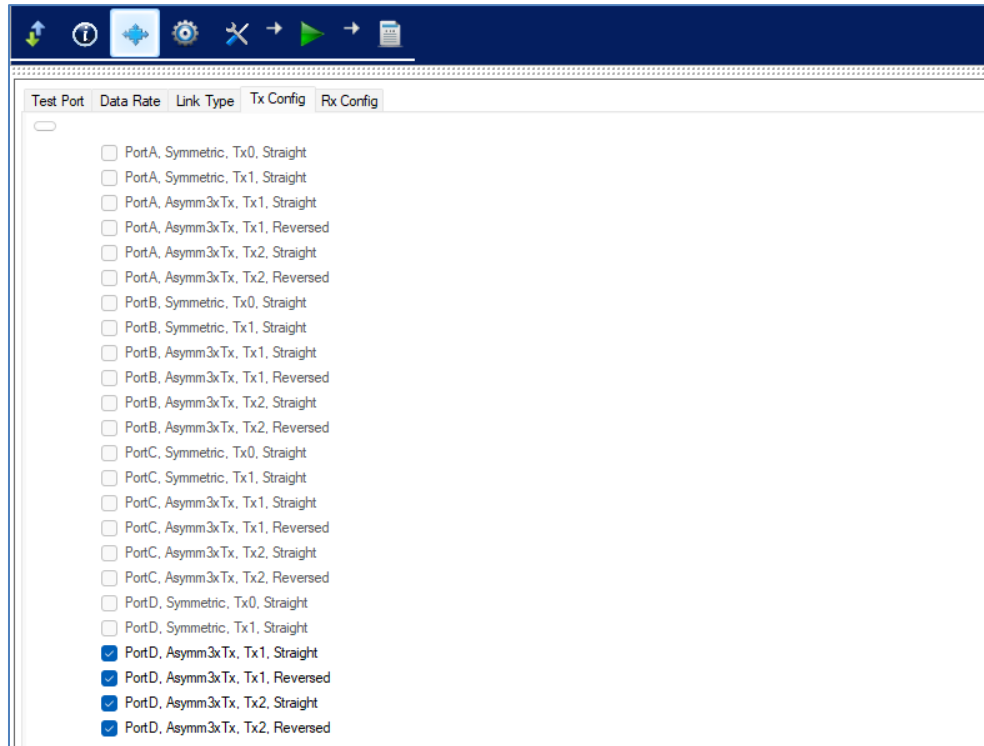


FIGURE 12. SELECT TX CONFIGURATION FOR SELECTED TEST PORT AND LINK TYPE

- e) **Rx Config tab:** For the selected test port and link type, select the Rx configuration (e.g., Rx test lane and straight/reverse insertion of the USB Type-C connector).

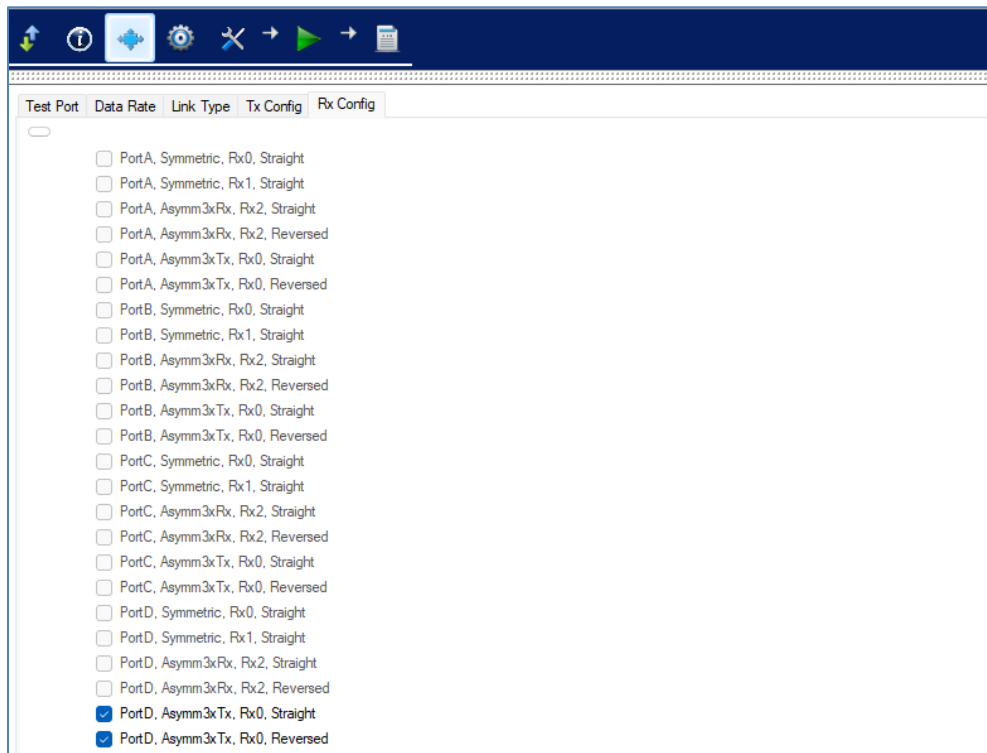


FIGURE 13. SELECT RX CONFIGURATION FOR SELECTED TEST PORT AND LINK TYPE

4 Time and Frequency Domain Calibration Setup

Perform calibration for RF effects such as delay, loss or mismatch of RF cables using the “SOLT” calibration method before running measurements. Calibration must be performed for both the time domain and frequency domain.

Note: The test fixture is not used for calibration.

The figures below show the calibration setup diagram for time domain and frequency domain, which require the Anritsu TOSLK50A-20 VNA calibration kit.

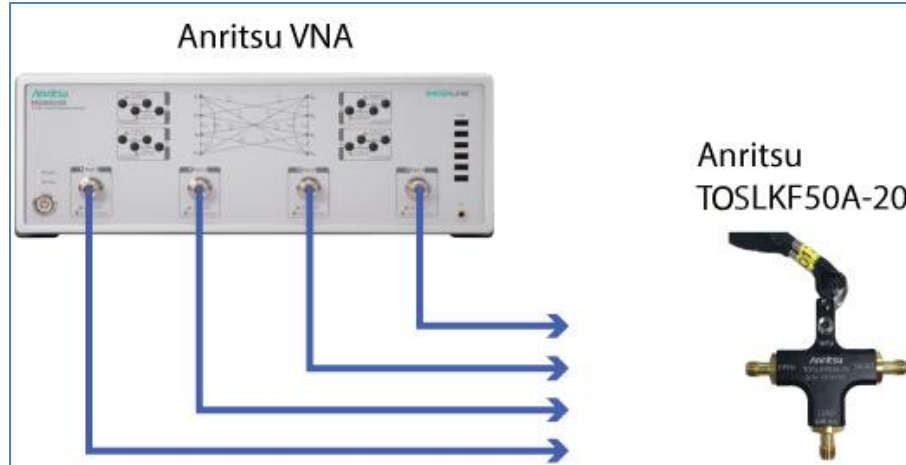


FIGURE 14. CALIBRATION SETUP FOR TIME AND FREQUENCY DOMAIN CALIBRATION

The GRL-USB4V2RL-AN software will guide the user step by step on how to connect the equipment and perform the SOLT calibration.

5 Calibrating with GRL-USB4V2RL-AN Software

5.1 Select Calibration

The Select Tests page is the place where the calibration and tests that need to be performed are selected. Initially, when starting for the first time or changing anything in the setup, it is suggested to run Calibration first. If calibration is not completed, the tests will show an error message.

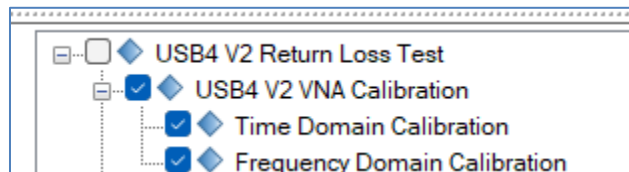


FIGURE 15. SELECT CALIBRATION TYPES

Select the “USB4 V2 VNA Calibration” group to set up the VNA test environment and perform time & frequency domain calibration. The GRL-USB4V2RL-AN software will guide the user step by step while calibration is being run.

Note: All calibrations must be performed for both the time domain and frequency domain.

5.2 Configure Calibration Parameters

Select  from the software menu to access the Configurations page. Set the parameters required for the calibration setup.

To return all parameters to their default values, select the ‘Set Default’ button.



FIGURE 16. CALIBRATION CONFIGURATION PAGE

TABLE 4. CALIBRATION PARAMETERS

Parameter	Description
Select Calibration Kit	Select the calibration kit as supported by the GRL-USB4V2RL-AN software – Anritsu TOSLK50A-20 Calibration Kit or Anritsu 3652A K Connector Calibration Kit, to be used.

5.3 Run Calibration

Select  from the software menu to access the Run Tests page.

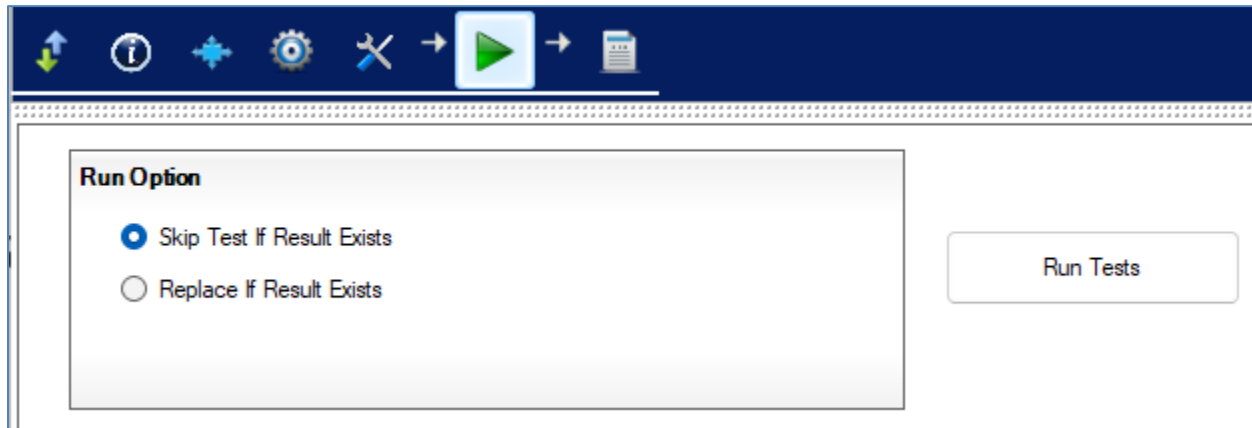


FIGURE 17. RUN TESTS PAGE

TABLE 5. RUN OPTIONS

Run Option	Description
Skip Test if Result Exists	If previous test or calibration results exist, then the software will <i>skip</i> the tests/calibration steps that have existing reports.
Replace if Result Exists	If previous test or calibration results exist, then the software will <i>replace</i> each step in the test/calibration with new results.

If you need to re-run only certain calibration/tests on certain conditions, please delete the calibration/tests from the Report page (see Section 8.2 for example) and Run with **Skip Test if Result Exists**. The GRL-USB4V2RL-AN software will keep track of the missing calibration/tests in the report and perform those tests only.

6 Configure Proper Setup in Configurations Menu

After calibration has completed, testing for DUT compliance can then be performed. The USB4 V2 Return Loss VNA test setup consists of Impedance measurement (informative) and Return Loss measurement on receiver/transmitter lanes of the DUT. The USB4 ETT as listed in Section 2.2 is required to run the automation tests.

Refer to Section 3.1.2 for options on how to configure the test setup. The ETT can be loaded on the control PC. The USB4 V2 microcontroller can be used to test any Host or Device Port. Take note for the device DUT, if the port under test is a Downstream Facing Port (DFP), a USB4 Gen 4 Host will be required to connect to the DUT's Upwards Facing Port (UFP). Follow the steps in the below section for setup depending on the configuration chosen.

6.1 Host DUT Setup

If testing a Host, and the ETT's have been loaded on the Control PC, and the USB4 V2 Controller has been connected to the Control PC via a USB cable, follow the below procedure:

1. Connect the equipment as follows:

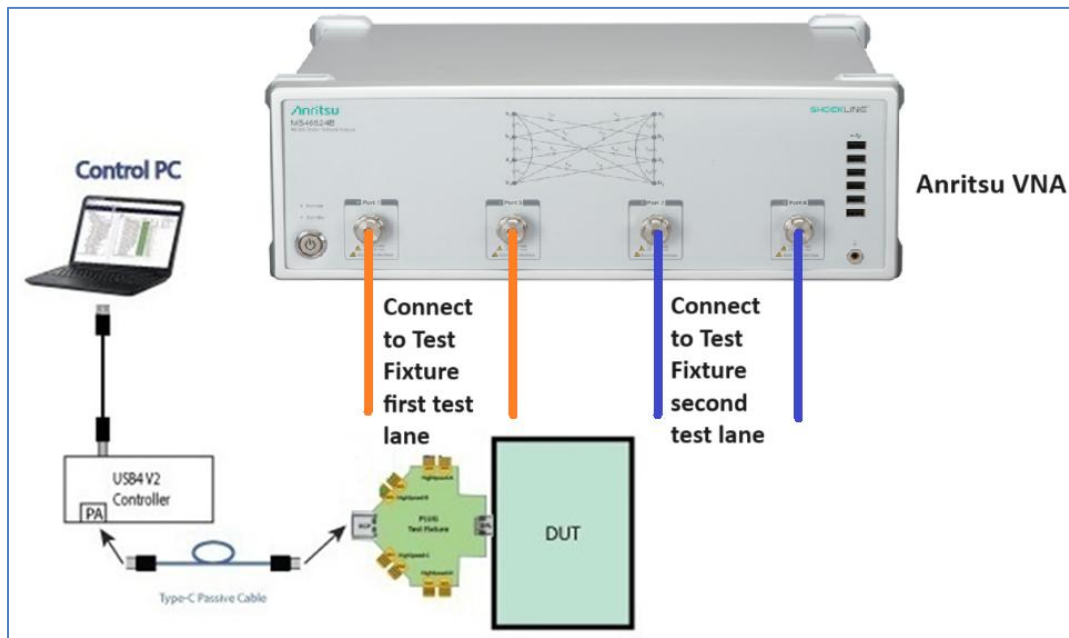


FIGURE 18. TEST SETUP FOR HOST DUT

Connection Steps:

- a) Connect a USB Type-C passive cable from the USB4 V2 Controller to the plug test fixture's receptacle.
- b) Connect the plug test fixture to the DUT's test port.
- c) Based on the setup configuration, connect cables from the Anritsu VNA Port 1 and 2 to the first test lane pair according to the test port configuration in Figure 23.

d) For 2-lane testing, connect another set of cables from the Anritsu VNA Port 3 and 4 to the second test lane pair on the test fixture's connectors, according to the test port configuration in Figure 23.

2. On the main GRL-USB4V2RL-AN menu, select  to access the Configurations page.
 - a) Specify the directory of the ETT/SigTest on the Host DUT in the “ETT/SigTest Working Directory” field.

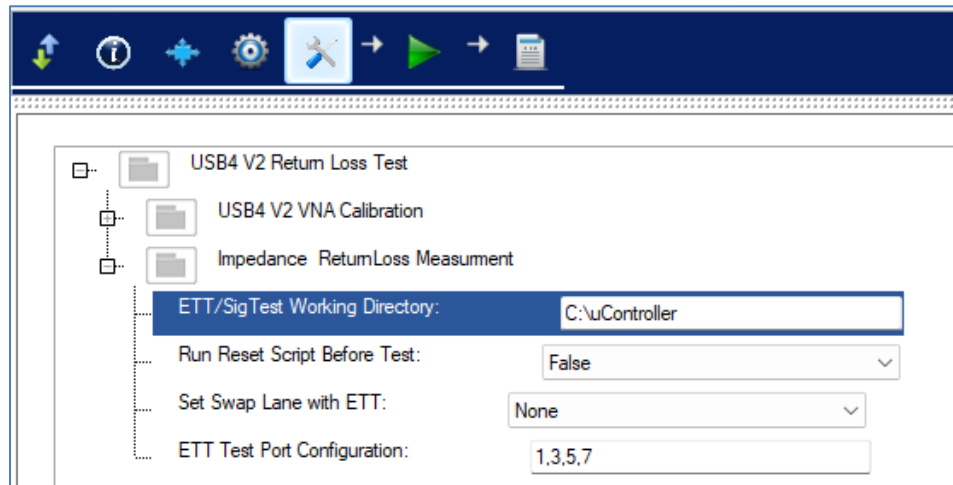
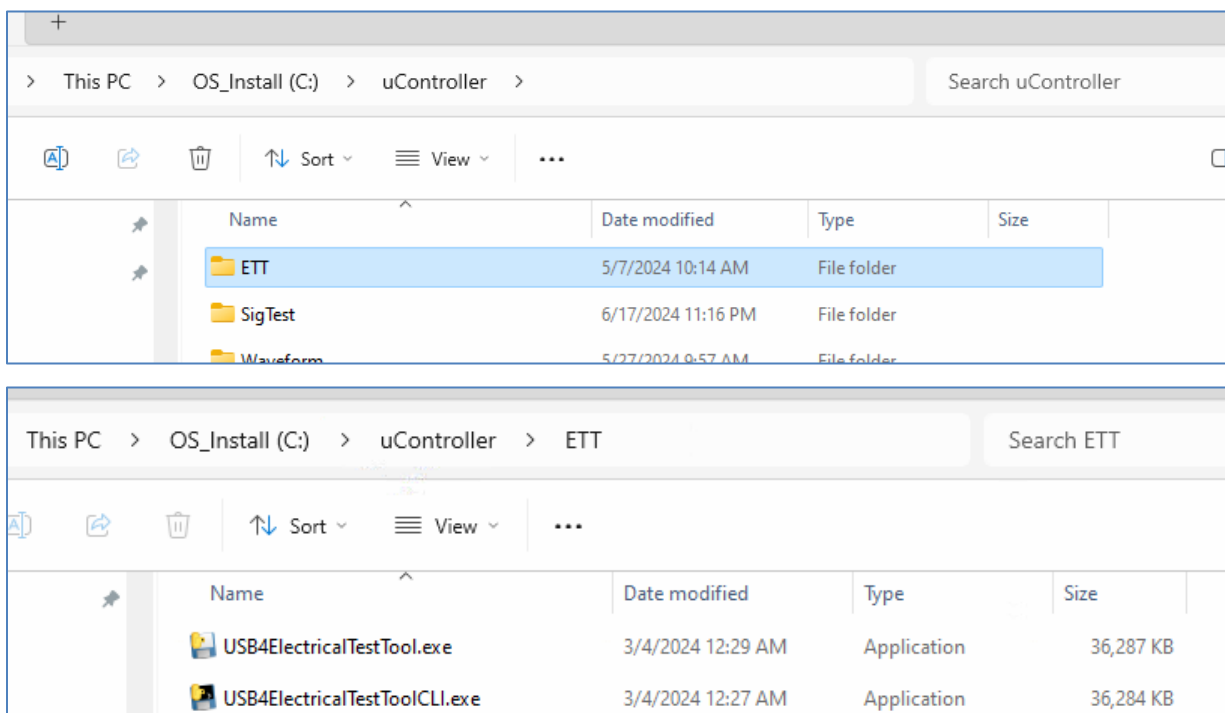
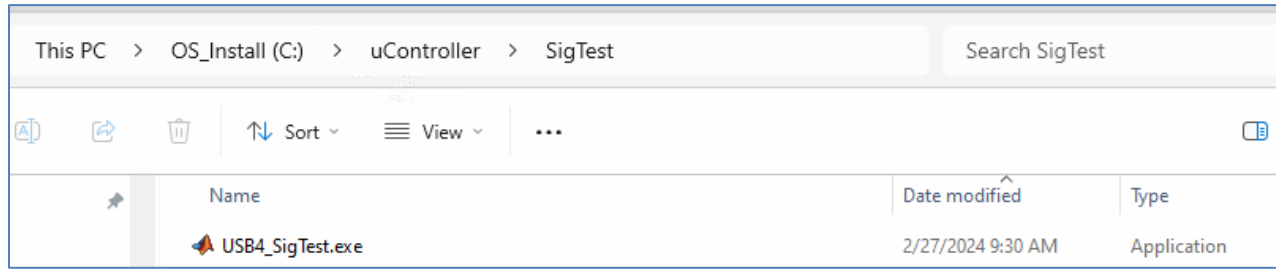


FIGURE 19. CONFIGURE HOST DUT EXAMPLE IN GRL-USB4V2RL-AN SOFTWARE

Note: Ensure that the ETT and SigTest software have already been installed to their respective ETT and SigTest folders in the specified directory. Examples as below:





6.2 Device DUT Setup for UFP

If testing a Device's UFP, connect the equipment similar to the Host DUT setup in Section 6.1. Then, follow the below procedure:

On the main GRL-USB4V2RL-AN menu, select  to access the Configurations page.

- Specify the directory of the ETT/SigTest on the USB4 remote host in the "ETT/SigTest Working Directory" field.
- Specify the ETT API argument "-Dp"(DUT Test Port), {PortA,PortB,PortC,PortD} in the "ETT Test Port Configuration" field.

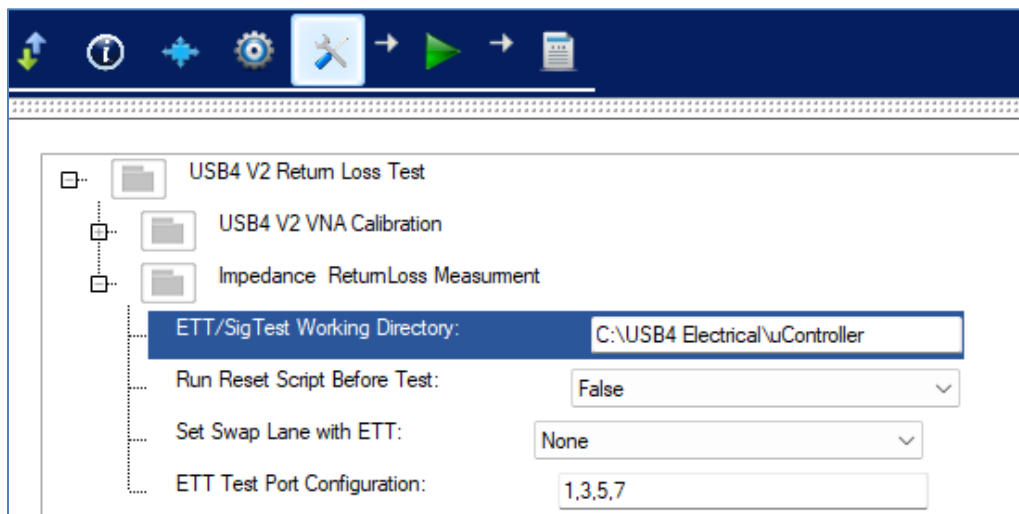


FIGURE 20. CONFIGURE DEVICE DUT (UFP) EXAMPLE IN GRL-USB4V2RL-AN SOFTWARE

Note: Similar to the Host DUT Setup, ensure that the ETT and SigTest software have already been installed to their respective ETT and SigTest folders in the specified directory.

6.3 Device DUT Setup for DFP

If testing a Device's DFP, connect the equipment similar to the Host DUT setup in Section 6.1. Take note that the DUT's UFP should be connected to a USB4 Gen 4 host port.

Follow the same procedure as for the Device's UFP setup in Section 6.2 above.

7 DUT Compliance Testing with GRL-USB4V2RL-AN Software

7.1 Select Tests

On the Select Tests page, un-check all Calibration Selections as they have been performed and completed in the previous section. Then select the tests required to be run.

Note: GRL Platform Solutions recommends running Rx and Tx Tests Separately in this version of GRL-USB4V2RL-AN. Otherwise for each data rate a prompt will come up to change from Rx to Tx on the Fixture. If Rx and Tx are tested separately, then all Rx will be tested and then all Tx will be tested with only one change needed to the fixture.

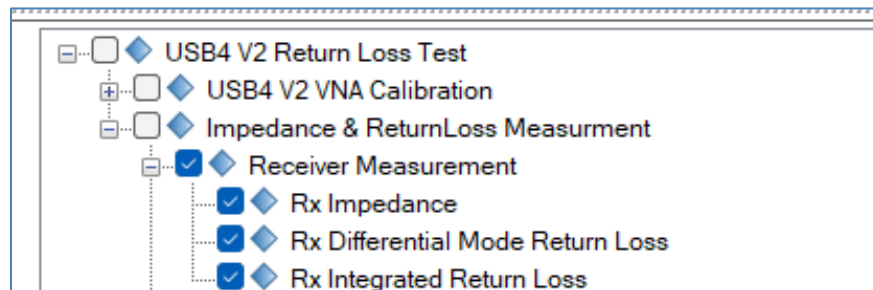


FIGURE 21. SELECT RX MEASUREMENT TESTS

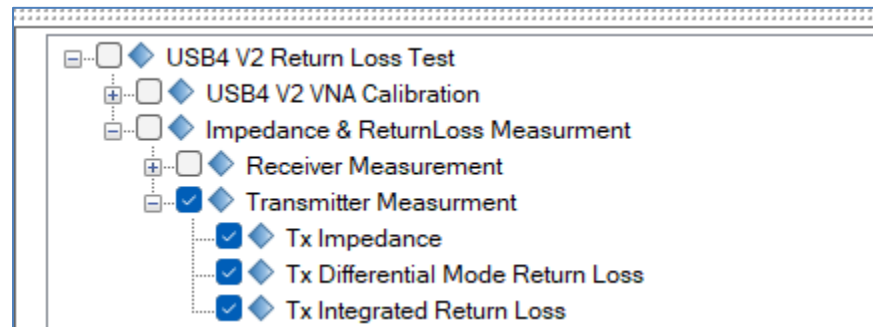


FIGURE 22. SELECT TX MEASUREMENT TESTS

7.2 Set Up Test Port and SigTest Waveform Path

Select  from the software menu to access the Setup Configuration page.

- Test Port Configuration** tab: Select the test lane to the corresponding differential port of the VNA.

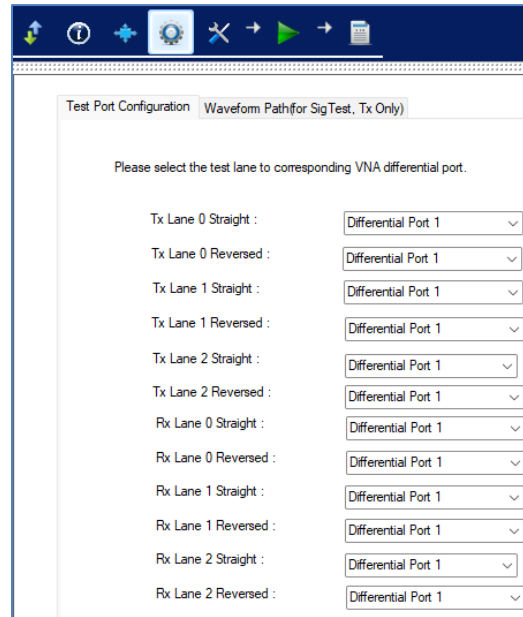


FIGURE 23. CONFIGURE TEST PORT

- b) **Waveform Path (for SigTest, Tx Only)** tab: Specify the path where captured waveforms are saved for the corresponding Tx test configuration to be used for SigTest analysis. SigTest allows captured waveforms to be analyzed and checked against the specified pass/fail criteria.

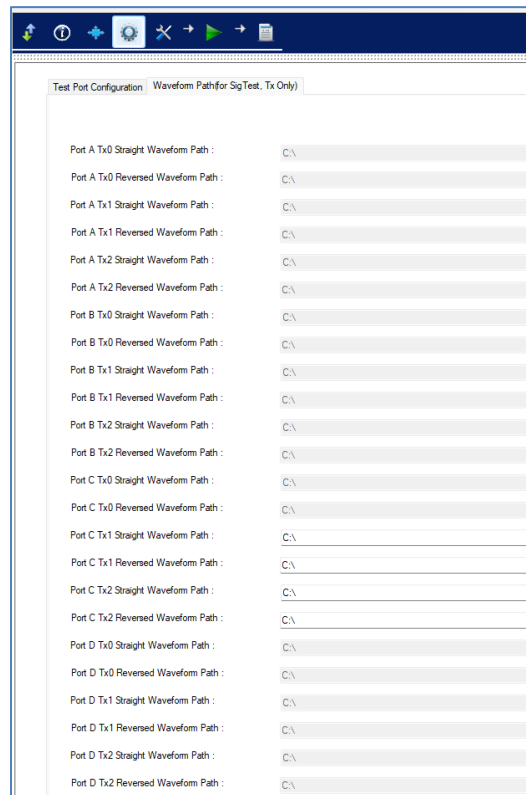


FIGURE 24. SET WAVEFORM PATH FOR SIGTEST PROCESSING

7.3 Configure Test Parameters

Select  from the software menu to access the Configurations page. Set the parameters required for the test setup.

To return all parameters to their default values, select the ‘Set Default’ button.

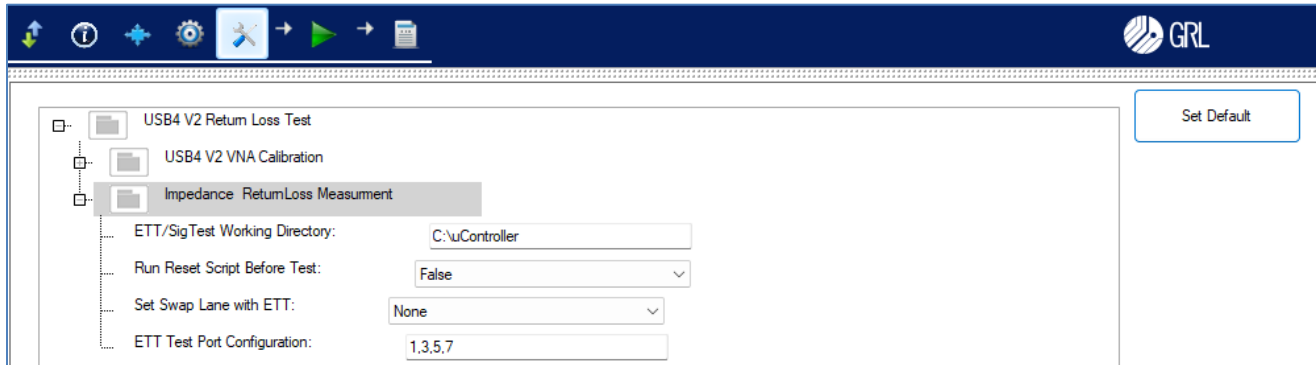


FIGURE 25. TEST CONFIGURATION PAGE

TABLE 6. TEST PARAMETERS

Parameter	Description
ETT/SigTest Working Directory	Set the working directory to the path where the μ Controller test script, ETT or SigTest tool is installed on the control PC.
Run Reset Script Before Test	Select True to enable the GRL-USB4V2RL-AN software to reset the μ Controller before running the test script or ETT command each time.
Set Swap Lane with ETT	Select the Swap Lane(s) in the Router and/or Retimer side (“None” is selected by default).
ETT Test Port Configuration	If the Device DUT is being used, specify the ETT API argument “-Dp”(DUT Test Port), {PortA,PortB,PortC,PortD}

7.4 Performing Impedance and Return Loss Measurement

The following example describes how to measure impedance and return loss. Impedance is measured at the time domain while return loss is measured at the frequency domain. Measurement should be performed on both the transmitter and receiver lanes.

Note: The impedance measurement is carried out for information purpose only, meaning it has no test limit specification.

Note: Prior to running measurements, make sure that the relevant test setup described in Section 6 has been completed.

1. Select  from the GRL-USB4V2RL-AN software menu to access the Run Tests page and click on the “Run Tests” button. Select whether to Skip existing results or Replace if results exist.

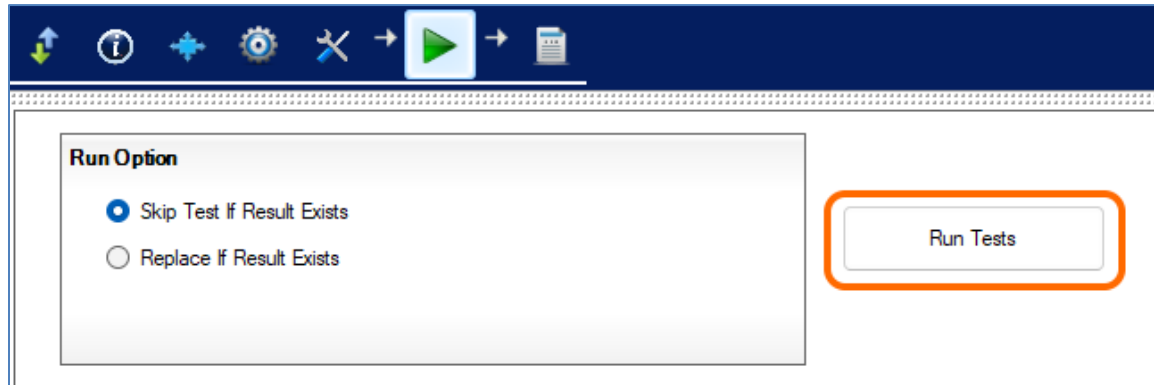
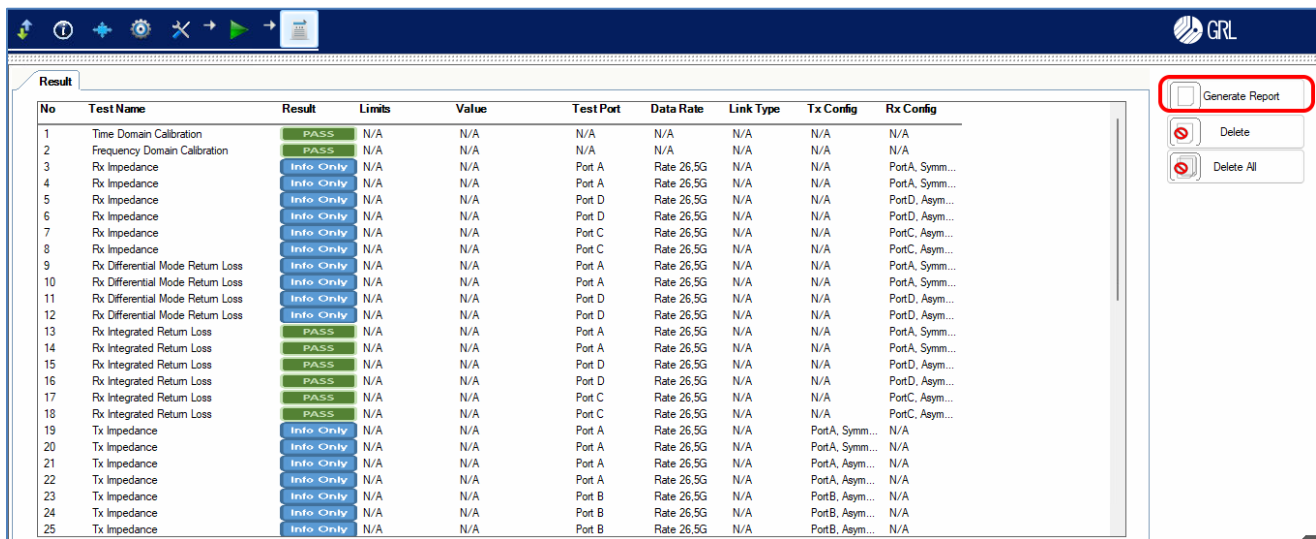


FIGURE 26. RUN TESTS PAGE

2. Follow the software instructions step by step to set up the connection and run the selected tests.
3. Once tests have completed, the test results will be saved automatically and populated on the Report page (select  from the GRL-USB4V2RL-AN software menu). Click on the “Generate Report” button to view details of each result.



No	Test Name	Result	Limits	Value	Test Port	Data Rate	Link Type	Tx Config	Rx Config
1	Time Domain Calibration	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Frequency Domain Calibration	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Rx Impedance	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
4	Rx Impedance	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
5	Rx Impedance	Info Only	N/A	N/A	Port D	Rate 26.5G	N/A	N/A	PortD, Asym...
6	Rx Impedance	Info Only	N/A	N/A	Port D	Rate 26.5G	N/A	N/A	PortD, Asym...
7	Rx Impedance	Info Only	N/A	N/A	Port C	Rate 26.5G	N/A	N/A	PortC, Asym...
8	Rx Impedance	Info Only	N/A	N/A	Port C	Rate 26.5G	N/A	N/A	PortC, Asym...
9	Rx Differential Mode Return Loss	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
10	Rx Differential Mode Return Loss	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
11	Rx Differential Mode Return Loss	Info Only	N/A	N/A	Port D	Rate 26.5G	N/A	N/A	PortD, Asym...
12	Rx Differential Mode Return Loss	Info Only	N/A	N/A	Port D	Rate 26.5G	N/A	N/A	PortD, Asym...
13	Rx Integrated Return Loss	PASS	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
14	Rx Integrated Return Loss	PASS	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
15	Rx Integrated Return Loss	PASS	N/A	N/A	Port D	Rate 26.5G	N/A	N/A	PortD, Asym...
16	Rx Integrated Return Loss	PASS	N/A	N/A	Port D	Rate 26.5G	N/A	N/A	PortD, Asym...
17	Rx Integrated Return Loss	PASS	N/A	N/A	Port C	Rate 26.5G	N/A	N/A	PortC, Asym...
18	Rx Integrated Return Loss	PASS	N/A	N/A	Port C	Rate 26.5G	N/A	N/A	PortC, Asym...
19	Tx Impedance	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	PortA, Symm...	N/A
20	Tx Impedance	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	PortA, Symm...	N/A
21	Tx Impedance	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	PortA, Asym...	N/A
22	Tx Impedance	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	PortA, Asym...	N/A
23	Tx Impedance	Info Only	N/A	N/A	Port B	Rate 26.5G	N/A	PortB, Asym...	N/A
24	Tx Impedance	Info Only	N/A	N/A	Port B	Rate 26.5G	N/A	PortB, Asym...	N/A
25	Tx Impedance	Info Only	N/A	N/A	Port B	Rate 26.5G	N/A	PortB, Asym...	N/A

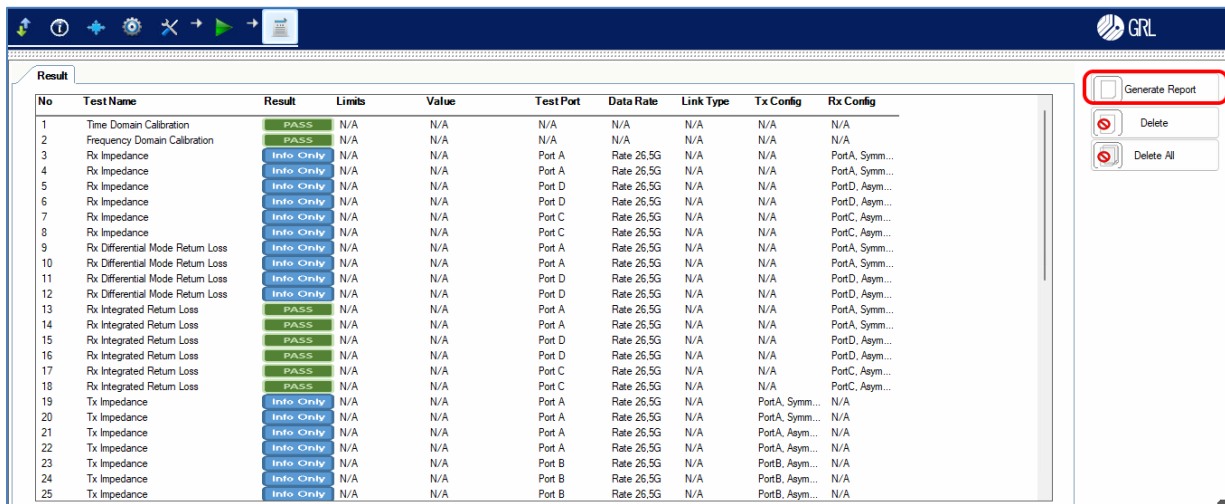
FIGURE 27. VIEW TEST RESULTS EXAMPLE

8 Test Results and Reports with GRL-USB4V2RL-AN Software

The **Report**  page displays all the results from all test and calibration runs. If some of the results are not desired, they can be individually deleted by clicking on the “Delete” button. Also for a PDF report, select the “Generate report” button.

8.1 Generate Test Report

The Report page shows all the results of tests and calibration. Select **Generate report** for the detailed report.

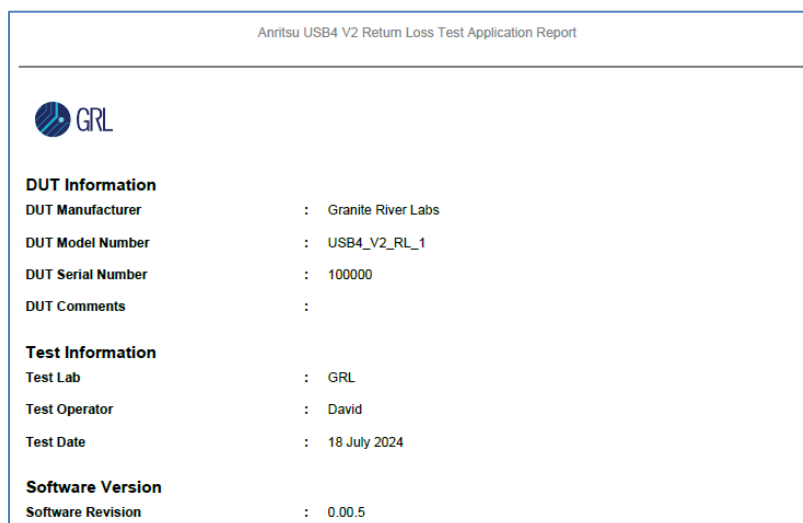


No	Test Name	Result	Limits	Value	Test Port	Data Rate	Link Type	Tx Config	Rx Config
1	Time Domain Calibration	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Frequency Domain Calibration	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Rx Impedance	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
4	Rx Impedance	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
5	Rx Impedance	Info Only	N/A	N/A	Port D	Rate 26.5G	N/A	N/A	PortD, Asym...
6	Rx Impedance	Info Only	N/A	N/A	Port D	Rate 26.5G	N/A	N/A	PortD, Asym...
7	Rx Impedance	Info Only	N/A	N/A	Port C	Rate 26.5G	N/A	N/A	PortC, Asym...
8	Rx Impedance	Info Only	N/A	N/A	Port C	Rate 26.5G	N/A	N/A	PortC, Asym...
9	Rx Differential Mode Return Loss	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
10	Rx Differential Mode Return Loss	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
11	Rx Differential Mode Return Loss	Info Only	N/A	N/A	Port D	Rate 26.5G	N/A	N/A	PortD, Asym...
12	Rx Differential Mode Return Loss	Info Only	N/A	N/A	Port D	Rate 26.5G	N/A	N/A	PortD, Asym...
13	Rx Integrated Return Loss	PASS	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
14	Rx Integrated Return Loss	PASS	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
15	Rx Integrated Return Loss	PASS	N/A	N/A	Port D	Rate 26.5G	N/A	N/A	PortD, Asym...
16	Rx Integrated Return Loss	PASS	N/A	N/A	Port D	Rate 26.5G	N/A	N/A	PortD, Asym...
17	Rx Integrated Return Loss	PASS	N/A	N/A	Port C	Rate 26.5G	N/A	N/A	PortC, Asym...
18	Rx Integrated Return Loss	PASS	N/A	N/A	Port C	Rate 26.5G	N/A	N/A	PortC, Asym...
19	Tx Impedance	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
20	Tx Impedance	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Symm...
21	Tx Impedance	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Asym...
22	Tx Impedance	Info Only	N/A	N/A	Port A	Rate 26.5G	N/A	N/A	PortA, Asym...
23	Tx Impedance	Info Only	N/A	N/A	Port B	Rate 26.5G	N/A	N/A	PortB, Asym...
24	Tx Impedance	Info Only	N/A	N/A	Port B	Rate 26.5G	N/A	N/A	PortB, Asym...
25	Tx Impedance	Info Only	N/A	N/A	Port B	Rate 26.5G	N/A	N/A	PortB, Asym...

FIGURE 28. GENERATE REPORT PAGE

8.1.1 DUT Information

This portion is populated from the information in the DUT tab on the **Session Info** page.



Anritsu USB4 V2 Return Loss Test Application Report	
	
DUT Information	
DUT Manufacturer	: Granite River Labs
DUT Model Number	: USB4_V2_RL_1
DUT Serial Number	: 100000
DUT Comments	:
Test Information	
Test Lab	: GRL
Test Operator	: David
Test Date	: 18 July 2024
Software Version	
Software Revision	: 0.00.5

FIGURE 29. DUT INFORMATION

8.1.2 Summary Table

This portion is populated from the tests and calibration performed and their results. This gives a summarized view of all the results and test conditions.

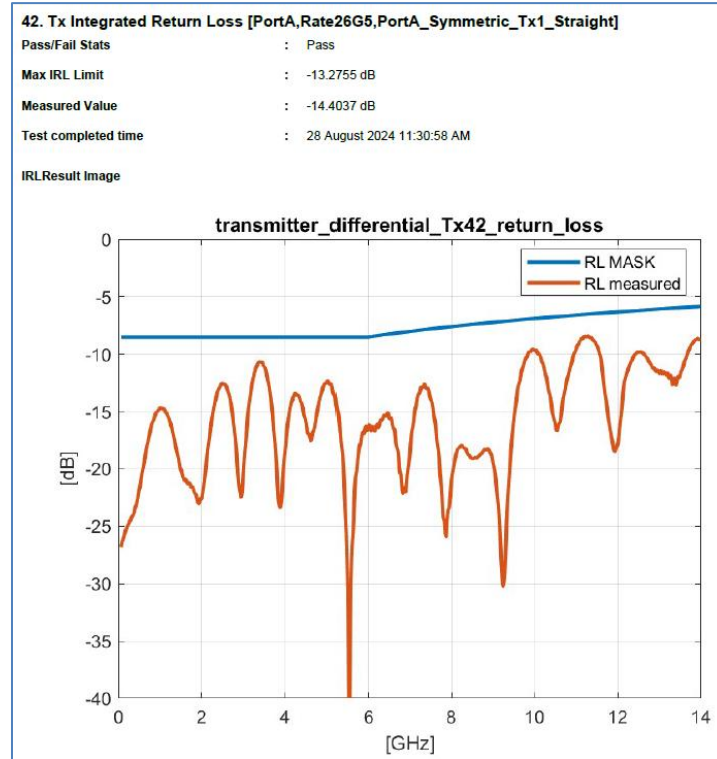
No	TestName	Limits	Value	Results	Test Port	Data Rate	Link Type	Tx Config	Rx Config
1	Time Domain Calibration	N/A	N/A	Pass					
2	Frequency Domain Calibration	N/A	N/A	Pass					
3	Rx Impedance	N/A	N/A	InfoOnly	Port A	Rate 26,5G	N/A	N/A	PortA, Symmetric, Rx0, Straight
4	Rx Impedance	N/A	N/A	InfoOnly	Port A	Rate 26,5G	N/A	N/A	PortA, Symmetric, Rx1, Straight
5	Rx Impedance	N/A	N/A	InfoOnly	Port C	Rate 26,5G	N/A	N/A	PortC, Asymm3xTx, Rx0, Straight
6	Rx Impedance	N/A	N/A	InfoOnly	Port C	Rate 26,5G	N/A	N/A	PortC, Asymm3xTx, Rx0, Reversed
7	Rx Impedance	N/A	N/A	InfoOnly	Port D	Rate 26,5G	N/A	N/A	PortD, Asymm3xRx, Rx2, Straight
8	Rx Impedance	N/A	N/A	InfoOnly	Port D	Rate 26,5G	N/A	N/A	PortD, Asymm3xRx, Rx2, Reversed
9	Rx Differential Mode Return Loss	N/A	N/A	InfoOnly	Port A	Rate 26,5G	N/A	N/A	PortA, Symmetric, Rx0, Straight
10	Rx Differential Mode Return Loss	N/A	N/A	InfoOnly	Port A	Rate 26,5G	N/A	N/A	PortA, Symmetric, Rx1, Straight

FIGURE 30. SUMMARY TABLE

8.1.3 Test Result Details

This portion is populated from each of the test and calibration results. Here the results are shown with supporting screenshots.

Note: The user can obtain .s2p and SigTest test results at “C:\GRL\Framework Test Solution\Applications\Anritsu_USB4_V2_Return_Loss_Test_Application\AppData\Report\Data”, and images from VNA capture at “C:\GRL\Framework Test Solution\Applications\Anritsu_USB4_V2_Return_Loss_Test_Application\AppData\Report\Image”.



Note: Trace plot images such as the example above will also be saved to “C:\GRL\Framework Test Solution\Applications\Anritsu_USB4_V2_Return_Loss_Test_Application\AppData\Report\Data\IRL_TestResult\”.

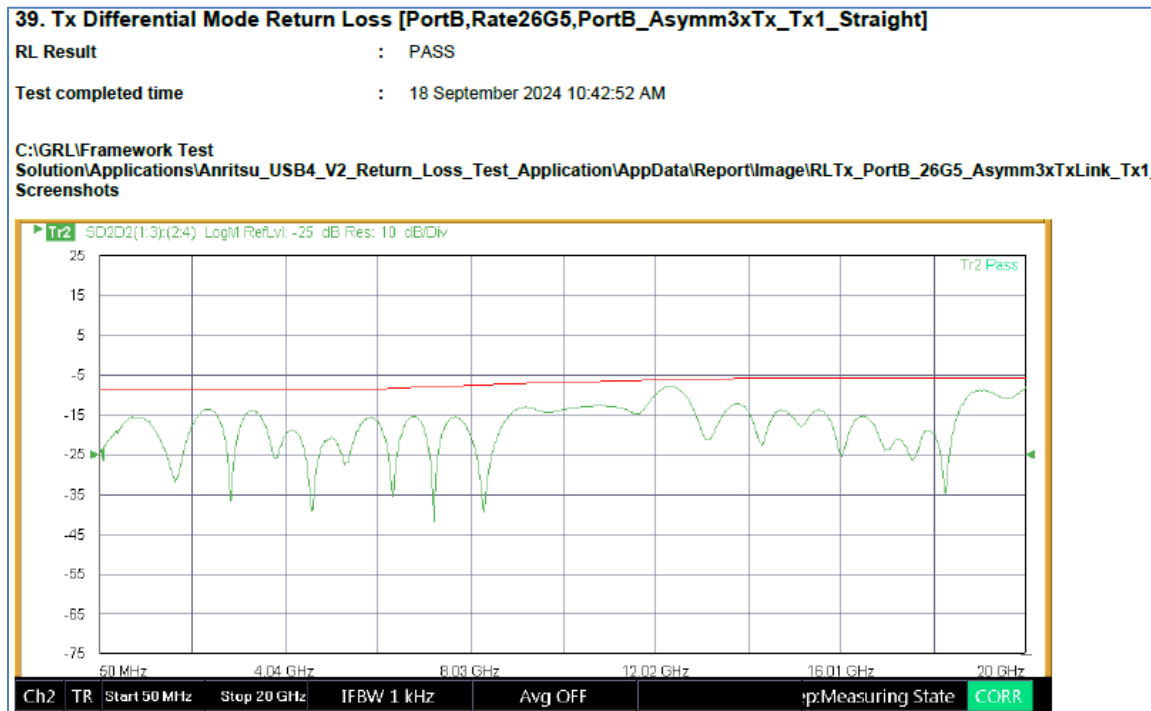


FIGURE 31. TEST RESULT DETAILS EXAMPLE

8.2 Delete Reports

If some of the results are not desired, they can be individually deleted by selecting the “Delete” button.

To remove all results, select the “Delete All” button.

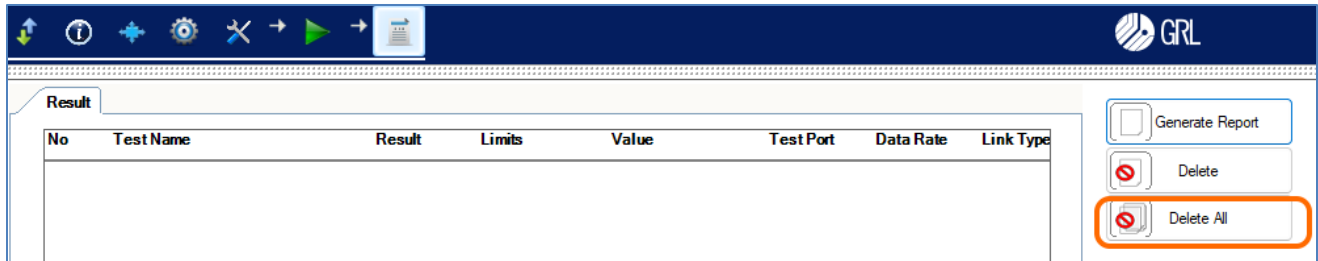


FIGURE 32. DELETE ALL RESULTS

9 Troubleshooting GRL-USB4V2RL-AN Errors

If an error is thrown by the GRL-USB4V2RL-AN software, it may be due to one of the following common issues:

1. The VNA's firmware needs to be updated – Confirm that the VNA's firmware is V2018.2.1 or above.
2. USB4 ETT is not properly installed – To troubleshoot this, follow the ETT PDF User Guide and confirm that **USB4ElectricalTestTool.exe** can be run manually from the ETT folder. If ETT is not properly installed, a software error may occur.
3. After checking the above and error persists, contact support@grlps.com for further support.

END_OF_DOCUMENT