

Granite River Labs

User Guide

GRL WPC Qi Wireless Test Power Receiver Tester (GRL-WP-TPR-C3) with Automation Test Browser Application



This material is provided as a reference to get started with the Granite River Labs (GRL) WPC Qi Wireless Test Power Receiver Tester (GRL-WP-TPR-C3) Hardware and the GRL-WP-TPR-C3 Automation Test Browser Application.

For software support, contact support@graniteriverlabs.com.

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1 Reference Documents

The test methods outlined in this document are tests required by the Wireless Power Consortium (WPC) for Qi compliance of a Wireless Power Transmitter/Receiver device. The Qi Wireless Power Transfer System for Power Class 0 Specification may be referenced in this document that includes, but is not limited to, the following specification versions.

Note: In order to have access to all specifications, it is required that you are a member of the WPC Web site and have attained the proper permissions.

WPC Specification Compliance Documents are available for download at: <u>https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications.html</u>

The Qi Wireless Power Transfer System for Power Class 0 Specification:

Introduction to the Power Class 0 Specification Version 1.2.3 (February 2017)

Parts 1 and 2: Interface Definitions Version 1.2.3 (February 2017)

Part 3: Compliance Testing Version 1.2.4 (February 2018)

Part 4: Reference Designs Version 1.2.3 (February 2017)

2 Acronym/Abbreviation Glossary

TPR	Test Power Receiver
DUT	Device Under Test
OS	Operating System
BSUT	Base Station Under Test
FPGA	Field Programmable Gate Array
BPP	Base Power Profile
EPP	Extended Power Profile
API	Application Programming Interface
СТЅ	Compliance Test Specification
MOI	Method of Implementation
GP	Guaranteed Power
FOD	Foreign Object Detection
Power Tx	Power Transmitter
ID/Config	Identification & Configuration
RP	Received Power
EPP5	Extended Power Profile 5
Qf	Quality Factor
PRMC	Power Receiver Manufacturer Code



3 Scope of this User Guide

This User Guide serves as the primary user documentation for the GRL-WP-TPR-C3 (aka GRL-C3) WPC Qi Wireless Test Power Receiver Tester Hardware and GRL-C3 Automation Test Browser Application. The subsequent sections describe the GRL-C3 initial setup and each feature provided by the GRL-C3 automation test browser application when connected to the GRL-C3 tester hardware.

4 Overview of GRL-C3 Standard Purchase Items and Orderable Accessories

4.1 GRL-C3 Shipping Box Contents





E-Load Firmware Update Cable

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TPR #1E Coil Assembly







TPR #5 Coil Assembly



TPR #MP1A Coil Assembly



TPR #MP1B Coil Assembly



TPR #MP1C Coil Assembly



TPR #MP3 Coil Assembly



TPR #MP4 Coil Assembly

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TPR Thermal 5W Coil Assembly





TPR Thermal 15W Coil Assembly



Foreign Object #1: Steel Disc Centered



Foreign Object #1: Steel Disc Off Centered



Foreign Object #2: Aluminum Ring



Foreign Object #3: Aluminum Foil
Foreign Object #1 for EPP – Steel Disc
Foreign Object #2 for EPP – Aluminum Ring
Foreign Object #3 for EPP – Aluminum Foil
Foreign Object #4 for EPP – Aluminum Disc



	Foreign Object Holder #1
- Handing and a second s	Foreign Object Holder #2
	Foreign Object Holder #3
	2mm Spacer
2	5mm Spacer
Spacer 1.50mm	1.5mm Spacer



5 Getting Started with GRL-C3

This section describes how to get started with the GRL-C3 test solution for Qi wireless charging compliance testing. Whether you are installing for the first time or doing an upgrade, please make sure to follow all the steps in this section to verify your setup prior to testing a Device Under Test (DUT). The procedure is as follows:

- 1. Install the latest version of GRL-C3 automation test browser application (Browser App) on the host computer (laptop or desktop) connected to the GRL-C3 tester hardware. It is recommended that the host computer supports the Intel Core i7 processor and 8GB RAM with Google Chrome version 80.0.3987.122 or above (64-bit) for the Browser App to run properly. Make sure to clear the browser cache before launching the GRL-C3 Browser App.
- 2. Make sure the GRL-C3 tester firmware has been updated to the latest version. Refer to Section 7.

If this procedure is followed and any issues arise, please contact support@graniteriverlabs.com.

5.1 Install GRL-C3 Browser App

- 1. Download the GRL-C3 Browser App from <u>http://graniteriverlabs.com/download-center/</u>.
- 2. Run the installer by double clicking the extracted executable (*GRL_GRL-C3_Browser_App_V1x.x.exe*) and then click on the 'Next' button.



FIGURE 5.1: START GRL-C3 BROWSER APP INSTALLATION

3. Read and accept the license agreement by clicking on the 'I Agree' button.



٨	GRL-WP-TPR-C3 V1.2.1.0 Setup -	×
Li	icense Agreement	
	Please review the license terms before installing GRL-WP-TPR-C3 V1.2.1.0.	\oslash
	Press Page Down to see the rest of the agreement.	
		^
	GRANITE RIVER LABS	
	SOFTWARE END USER LICENSE AGREEMENT	
	INSTALLATION NOTICE: THIS IS A CONTRACT. BEFORE YOU DOWNLOAD THE SOFTWARE AND/OR COMPLETE THE INSTALLATION PROCESS, CAREFULLY READ THIS SOFTWARE END USER LICENSE AGREEMENT ("FULLA"), BY DOWNLOADING THE SOFTWARE AND/OR	v
	If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install GRL-WP-TPR-C3 V1.2.1.0.	
Nul	lsoft Install System v3.06.1	
	< <u>B</u> ack I <u>A</u> gree Can	cel

FIGURE 5.2: ACCEPT GRL-C3 BROWSER APP LICENSE AGREEMENT

4. The software installation will then proceed.

Installing	o serup		
Please wait while GRL-WP-	rPR-C3 V1.2.1.0 is being insta	alled.	٨
Extract: dir_4ad42a82d07	ad0cc7f09bbbf98a867be.html.	100%	
Extract: dir_29d0bb42c2	2e6267c2f418e8ffaec102.htm	l 100%	~
Extract: dir_2e1db6d6ea)25cb7e8af5f17932ba2dc.htm	nl 100%	
Extract: dir_315f8a4ccc4	36663f4d646aaf58d5549.htm	l 100%	
Extract: dir_344548f9ad	43168fa8ab350491bbbc1d.htm	nl 100%	
Extract: dir_35ffe83d75e	1cd5b08b21f61879a86ff.html	100%	
Extract: dir_393564c1d4	57115d65211a0d1bdf4211.htr	ml 100%	
Extract: dir_3e896358d6	9e8b7cf2f9db7c599070cd.htm	ıl 100%	
Extract: dir_411fae37c5	ef29dbc4f69093e8a5752.htm	l 100%	
Extract: dir_46c7e5e089	1390d6542ae44ea4115f4b.htr	ml 100%	
Extract: dir_4ad42a82d0	7ad0cc7f09bbbf98a867be.htm	nl 100%	\mathbf{v}
Jullsoft Install System v3.06.			

FIGURE 5.3: GRL-C3 BROWSER APP INSTALLATION IN PROGRESS

5. Install the device driver when prompted. Click on the 'Next' button to proceed.





FIGURE 5.4: START GRL-C3 DEVICE DRIVER INSTALLATION

6. The device driver installation will then proceed and upon completion, click on the 'Finish' button.



FIGURE 5.5: GRL-C3 DEVICE DRIVER INSTALLATION COMPLETED

7. Click on the 'Finish' button to complete the software installation.





FIGURE 5.6: GRL-C3 BROWSER APP INSTALLATION COMPLETED

8. The GRL-C3 Browser App is now ready for use.

5.2 Start Up and Navigate GRL-C3 Browser App

1. Once installed, you can directly open the GRL-C3 Browser App using the "**GRL-WP-TPR-C3**" Browser App desktop shortcut. This will initiate the App server to run backend operations before launching the GRL-C3 Browser App.

Note: Do not close this window except when you need to exit from the GRL-C3 Browser App.



FIGURE 5.7: APP SERVER SCREEN RUNNING BACKEND OPERATIONS



- 2. The GRL-C3 Browser App should launch after a few seconds on a browser window with the appropriate port number. If for some reason the browser window does not appear after a few minutes, open a new browser tab and navigate to *http://IP address of host PC Windows software:3003/* (for example, http://192.168.3.241:3003/).
- 3. The GRL-C3 Browser App when launched will display "Connection Setup" as the landing screen as follows:

🔳 🥠 G	RL a	Test Power Receiver Application (1.2.2.14) GRL-WP-TPR-C3	CTS 🗾 API 📴 🔔
Connection	Connection-Type Ethernet	Tester Status : Disconnected Serial Number : NA Firmware Version : NA	
QI- Exerciser	Scall Velwork GRL-WP-TPR-C3 IP Address: 192.168.255.1 X ×	Next Calibration Date : NA Tester IP Address : 192.168.255.1 Port : NA	
Test	Setup Diagram		
Results	Update rimware	License Info :	
Report		Module Name License Type	
Report Analyser			
QI- Authenticator			
P Help			

FIGURE 5.8: GRL-C3 BROWSER APP LANDING SCREEN

This screen allows you to set up connection between the GRL-C3 Browser App and the GRL-C3 Tester hardware as well as performing firmware/software updates. More details are provided in Section 7.

5.2.1 Using GRL-C3 Browser App in Chrome OS

Note: Make sure that the GRL-C3 tester hardware is connected to a control PC running Windows 10.

- 1. Install the GRL-C3 Browser App on a Windows 10 control PC connected to the GRL-C3 tester hardware.
- 2. Once installed, open the GRL-C3 Browser App using the **GRL-C3 Browser App** desktop shortcut.
- 3. Open a new Chrome browser tab in Chrome OS and navigate to *http://IP address of host PC Windows software:3003/* (for example, http://192.168.3.241:3003/).

Note: Make sure that both the Windows 10 control PC and Google Chromebook are connected to the same Ethernet network (wired or wireless).

See Figure 5.9 below for an illustration of the above steps.





FIGURE 5.9: USING GRL-C3 BROWSER APP IN CHROME OS

5.2.2 Using GRL-C3 Browser App in macOS

Note: Make sure that the GRL-C3 tester hardware is connected to a control PC running Windows 10.

- 1. Install the GRL-C3 Browser App on a Windows 10 control PC connected to the GRL-C3 tester hardware.
- 2. Once installed, open the GRL-C3 Browser App using the **GRL-C3 Browser App** desktop shortcut.
- 3. Open a new Chrome browser tab in macOS and navigate to *http://IP address of host PC Windows software:3003/* (for example, http://192.168.3.241:3003/).

Note: Make sure that both the Windows 10 control PC and Apple MacBook are connected to the same Ethernet network (wired or wireless).

See Figure 5.10 below for an illustration of the above steps.





FIGURE 5.10: USING GRL-C3 BROWSER APP IN MACOS



6 Connection and Setup of GRL-C3 Tester Hardware

Figure 6.1 below shows an example setup for testing a Qi wireless base station DUT.



FIGURE 6.1: GRL-C3 HARDWARE SETUP FOR QI WIRELESS BASE STATION DUT

The GRL-C3 Browser App installed on a Windows 10 (or higher) computer automates the testing process. Below is a procedure for connecting the hardware and verifying proper hardware connections.

- 1. Connect power supply to the GRL-C3 tester hardware.
- 2. Connect the GRL-C3 tester hardware using a physical Ethernet connection between the control computer and the tester.
- 3. Connect an external oscilloscope to the GRL-C3 tester hardware. This is useful if the user wants to run measurements on the oscilloscope. Otherwise, the oscilloscope can be omitted from the setup.
- 4. Connect the Base Station under test (BSUT) / DUT to a power outlet.
- 5. Connect the Test Power Receiver (TPR) coil assembly to the "TPR Coil" connector on the GRL-C3 tester hardware. Place the TPR coil assembly on the BSUT / DUT.



6.1 Connect Power Supply to GRL-C3 Tester Hardware

Connect the GRL-C3 Power interface using the Power Brick included with the tester hardware.



FIGURE 6.2: GRL-C3 POWER INTERFACE

6.2 Connect Ethernet Cable and Turn On GRL-C3 Tester Hardware

Connect the Ethernet (RJ-45) connector to one of the control computer's Ethernet ports. A USB to Ethernet adapter can be used if there are no native Ethernet ports on the control computer.



FIGURE 6.3: GRL-C3 ETHERNET CONNECTOR



Turn on the GRL-C3 tester hardware using the Power On/Off button on the front of the tester as shown in Figure 6.4.



FIGURE 6.4: GRL-C3 POWER BUTTON

6.2.1 Verify GRL-C3 Tester Hardware Ethernet Connection

The Ethernet port on the control computer needs to be configured correctly for the GRL-C3 tester hardware to recognize the control computer and vice versa.

To make sure the network connection is set up correctly, open the Network Connections panel from the Control Panel.



FIGURE 6.5: NETWORK CONNECTIONS BEFORE CONNECTING GRL-C3

Open the Ethernet panel for the Ethernet port that will connect to the GRL-C3 tester hardware, select "Internet Protocol Version 4 (TCP/IPv4)" and click on the "Properties" button below and to the right.



Ethernet 5 Properties ×							
Networking (2014)							
Networking Sharing							
Connect using:							
ASIX AX88179 USB 3.0 to Gigabit Ethemet Adapter							
Configure							
This connection uses the following items:							
Client for Microsoft Networks							
File and Printer Sharing for Microsoft Networks							
QoS Packet Scheduler							
Internet Protocol Version 4 (TCP/IPv4)							
Microsoft Network Adapter Multiplexor Protocol							
Microsoft LLDP Protocol Driver							
Internet Protocol Version 6 (TCP/IPv6)							
< >							
Install Uninstall Properties							
Description							
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.							
OK Cancel							

FIGURE 6.6: ETHERNET PROPERTIES

Set up the TCP/IPv4 properties as shown below.

Internet Protocol Version 4 (TCP/IPv4)) Properties
General	
You can get IP settings assigned autor this capability. Otherwise, you need to for the appropriate IP settings.	matically if your network supports o ask your network administrator
Obtain an IP address automatica	lly
• Use the following IP address:	
IP address:	192 . 168 . 255 . 3
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	192.168.255.1
Obtain DNS server address autor	matically
Use the following DNS server add	fresses:
Preferred DNS server:	
Alternate DNS server:	• • •
Validate settings upon exit	Advanced
	OK Cancel

FIGURE 6.7: ETHERNET PROPERTIES WITH TCP/IPV4 SELECTED

Select a static IP address ("Use the following IP address:") which should be 192.168.255.*n* where *n* is any number between 2 and 255. The subnet mask should be 255.255.255.0 and the default gateway should be 192.168.255.1. The rest of the items should remain unchanged.



Click on the "OK" button on the Internet Protocol Properties and close the Ethernet Properties. Make sure the GRL-C3 tester hardware is powered on and completely booted up (front panel display shows firmware version number) and then connect the Ethernet cable from the GRL-C3 tester hardware to the computer's Ethernet port that was just set up. The network connections window should now look as pictured in Figure 6.8 below:



FIGURE 6.8: NETWORK CONNECTIONS AFTER SETUP AND CONNECTION OF GRL-C3

The GRL-C3 tester hardware is now set up and ready for use.

Before running any tests, it is recommended that you verify that the control computer and the GRL-C3 are communicating by going to the "Connection Setup" screen on the GRL-C3 Browser App and clicking on the "Connect" button. The tester status should display "Connected". Refer to Section 7 for more information.

6.3 Connect Oscilloscope to GRL-C3 Tester Hardware

An external oscilloscope can be connected to the GRL-C3 tester hardware to perform measurements. The GRL-C3 currently supports oscilloscope measurements with the Tektronix DPO7000 and PicoScope 6403D oscilloscopes.

Connect the oscilloscope channels to the "TP1" & "TP2" and "TP3" & "TP4" connector pairs and trigger port to the "Trigger 2" connecter on the back of the GRL-C3 tester hardware.



FIGURE 6.9: OSCILLOSCOPE TO GRL-C3 CONNECTIONS





The user can use the default oscilloscope configuration file, "TekScope Settings" which is available with the GRL-C3 Browser App to load into the TekScope to perform measurements. This config file is located in *C*:*GRL**GRL-WP-TPR-C3**TekScopeSettings* on the control computer.

6.4 Connect TPR Coil to GRL-C3 Tester Hardware

Connect the TPR coil assembly to the "TPR Coil" connector as shown in below example:



FIGURE 6.10: TPR COIL TO GRL-C3 CONNECTION

Note: Make sure to place the TPR coil assembly on the BSUT / DUT connected to a power outlet to perform testing.





7 Connection and Setup of GRL-C3 Browser App

Note: The following procedure assumes that the GRL-C3 tester hardware has been properly set up as described above.

To connect the GRL-C3 Browser App with the GRL-C3 tester hardware, do the following:

 On the GRL-C3 Browser App landing page ("Connection Setup" screen), enter the IP address as displayed on the GRL-C3 tester hardware screen and click on the **Connect** button. You can also click on the **Scan Network** button to detect all available GRL-C3 tester hardware connected to the same network.

GRL	
GRANITE RIVER LABS	
Tester Mode	Qi-BST
Power Profile - Rect_Voltage - 000000 mV Rect_Current - 0000 mA Coil Type -	Test Case No – Test Status – Init.SS Value –
IP Address - Firmware Version - System Info -	- 192.168.255.1 - 1.0.0.63 - GRL-C3-2019013

Connection	Connection-Type	Tester Status	•	Connected	
	Ethernet	Serial Number	•	GRL-C3-2019024	
	Scan Network	Firmware Version	•	7.0.0.7 / 2.6	
QI- Exerciser	GRL-WP-TPR-C3 IP Address:	Next Calibration Date		Wednesday, December 21, 2022	
	102 188 255 1 Connect Connect	Tester IP Address	:	192.168.255.1	
Test	Setup Diagram	Port		5002	
☑— rest □—Configuration					
	Tool Updates				
_	Update Firmware				
Results					
rên					
Report					
Report		1			
EQ Analyser		License into .			
				Module Name	License Type
e. a.				Qi-V1.2.4_BPP	PERM
Authenticator				Qi-V1.2.4_EPP	PERM
				Qi-V1.3_BPP	PERM
A Help				Qi-V1.3_EPP5	PERM
U				QI-V1.3_EPP	PERM
_				SAMSUNG-V1.1_PPDE	PERM
				SAMSUNG-FWC2.0_PPDE	PERM
				Qi-V2.0.1 BPP	PERM
				Qi-V2.0.1 EPP EPP5	PERM

FIGURE 7.1: CONNECTION CONFIGURATION SCREEN AFTER SUCCESSFUL CONNECTION



- 2. The GRL-C3 tester hardware and Browser App are now connected as indicated by the tester information display ("Tester Status", "Serial Number", "Firmware Version", etc.).
- 3. Optionally you can also select "Setup Diagram" below the IP address field to display the test setup connection diagram. This shows how to attach the TPR coil assembly to the GRL-C3 tester hardware before placing the coil on the DUT and also shows how to connect the tester hardware to the control computer via Ethernet.

Along with each GRL-C3 Browser App revision, a new version of FPGA firmware and E-Load code is provided. Use the following procedure to update the GRL-C3 tester hardware's FPGA and E-Load firmware.

4. Click on the **Update Firmware** button to update the GRL-C3 tester hardware's FPGA and E-Load firmware. Clicking this button causes a set of instructions to appear to guide you through the entire updating process. Follow the instructions to perform the updates accordingly.



FIGURE 7.2: UPDATE GRL-C3 FIRMWARE BUTTON

7.1 Update GRL-C3 Tester Hardware's Firmware

Follow the steps below to perform firmware update for the GRL-C3 tester hardware:

1. Click on the **Update Firmware** button and the following pop-up message will appear (Figure 7.3 below). Using a standard USB Type-B cable, connect the USB Type-B port (for firmware update as indicated in the image) at the back of the GRL-C3 tester hardware to the control PC (where the GRL-C3 Browser App is running). When connected, click "Ok" to proceed.



FIGURE 7.3: UPDATE GRL-C3 FIRMWARE-#1



2. The firmware update process will start and may take a few minutes to complete (Figure 7.4 below).

Connection Setup	Connection-Type Ethernet
QI- Exerciser	Scan Network GRL-WP-TPR-C3 IP Address:
	192.168.255.1 Connect Setup Diagram Tool Updates
Results	Update Firmware

FIGURE 7.4: UPDATE GRL-C3 FIRMWARE-#2

3. A pop-up message will appear when the firmware update process has completed successfully (Figure 7.5 below). Click "Ok" to proceed with E-Load firmware update for the GRL-C3 tester hardware.

GRL-WP-TPR-C3 Compliance Test Solution					
*	Firmware Updated Successfully, Click Ok to proceed Eload Firmware update.				
	Ok				

FIGURE 7.5: UPDATE GRL-C3 FIRMWARE-#3

4. Once the E-Load firmware update process has completed successfully, click "Ok" for the GRL-C3 tester hardware to power cycle and reboot (Figure 7.6 below).

GRL-WP-TPR-C3 C	Compliance Test Solution	
*	Latest Eload Firmware version 2.6 is already available in controller.	
		Ok
GRL-WP-TPR-C3 C	Compliance Test Solution	
GRL-WP-TPR-C3 C	Compliance Test Solution Please wait for the controller to finish rebooting.	

FIGURE 7.6: UPDATE GRL-C3 E-LOAD FIRMWARE



5. After the GRL-C3 tester hardware has rebooted, click on the Connect button to re-establish connection with the Browser App (Figure 7.7 below).

Connection-Type Ethernet GRL-WP-TPR-C3 IP Address: 192.168.255.1 × Setup Diagram	Tester Status Serial Number Firmware Version Next Calibration Date Tester IP Address Port		Disconnected NA NA NA 192.168.255.1 NA	
Tool Updates Update Firmware	License Info :			
	Modu	le Na	me	License Type

FIGURE 7.7: UPDATE GRL-C3 FIRMWARE-#4

6. The GRL-C3 tester hardware and Browser App should now be connected and ready for use with updated firmware (Figure 7.8 below).

Connection-Type	Tester Status :	Connected	
Ethernet	Serial Number :	GRL-C3-2019024	
Scan Network	Firmware Version :	7.0.0.7 / 2.6	
GRL-WP-TPR-C3 IP Address:	Next Calibration Date :	Wednesday, December 21, 2022	
100 180 255 1 Connect	Tester IP Address	192.168.255.1	
Setup Diagram	Port :	5002	
Tool Updates			
Update Firmware			
	License Info :		
		Module Name	License Type
		QI-V1.2.4_BPP	PERM
		Qi-V1.2.4_EPP	PERM
		Qi-V1.3_BPP	PERM
		QI-V1.3_EPP5	PERM
		Qi-V1.3_EPP	PERM
		SAMSUNG-V1.1_PPDE	PERM
		SAMSUNG-FWC2.0_PPDE	PERM
		Qi-V2.0.1_BPP	PERM
		Qi-V2.0.1_EPP_EPP5	PERM

FIGURE 7.8: UPDATE GRL-C3 FIRMWARE-#5

In the event that the firmware fails to update automatically, a pop-up message will appear as shown in Figure 7.9 below. Follow the procedure as given in the pop-up message to update the firmware manually.



	Firmware update failed! Please update the firmware manually.
	Manual firmware update procedure:
	1. Connect firmware update USB port of GRL-WP-TPR-C3 to the test PC using standard
-	USB Type-B cable where GRL-WP-TPR-C3 Compliance Test Solution Application is running
	2. Press the reset button on the back-side of the GRL-WP-TPR-C3 controller
	3. Wait for the test PC to detect a new removable USB drive
	4. Copy all the files from "C:\GRL\GRL-WP-TPR-C3\Firmware_Files" folder into newly
	detected removable USB drive
	5. Power cycle the GRL-WP-TPR-C3 controller using the push button on the left top corner
	in the front panel of GRL-WP-TPR-C3 controller
	Note1. If Step-4 fails, format the GRL-WP-TPR-C3 SD card's removable drive that appears in
	the Test PC after connecting FW update USB cable
	Note2. If the above step(Note1) Fails, remove the SD card, connect it to the Test PC, and
	format it

FIGURE 7.9: MANUAL GRL-C3 FIRMWARE UPDATE PROCEDURE

1. Once the user presses on the **Reset button** at the back of the GRL-C3 tester (as indicated in Figure 7.10 below), the control PC should detect a new removable USB drive.



FIGURE 7.10: GRL-C3 RESET BUTTON



2. Copy the files from "C:\GRL\GRL-WP-TPR-C3\Firmware_Files" into the newly detected removable USB drive. Refer to Figure 7.11 below.

Connection	Connection-Type			- USB Drive (F:)	×	+				-
Setup.	Ethernet		GRL-WP-TPR-C3 Compliance Tes	🕀 New - 🐰	0 D		🖄 🔟 🛝 Sort ~	🗮 View 🛆 Eject		
Firmware_Files	×	Downloads	× +							
🕀 New 🗸	O ()	A) 🖻 🛈	↑↓ Sort ~ 📃 View ~ ····	$\leftarrow \ \rightarrow \ \lor \ \uparrow$	> USB Drive (F:))			~ C	Search USB Drive (F
· · ·				Documents	*		Name	Date modified	Туре	Size
\leftrightarrow \rightarrow \checkmark \uparrow	> This PC > OS ((C:) > GRL > GRL-WP-TP	R-C3 > Firmware_Files	Nictophile	*		The Auth	26-06-2023 15:31	File folder	
🚞 Nego	*	Name	^ Date modifie	🚞 Suman	*		BOOT.BIN	18-05-2023 23:33	BIN File	4,418 KB
늘 sw	*	Auth	21-06-2023	🚞 Nego	*	1	🗋 image.ub	18-05-2023 23:33	UB File	11,949 KB
🚞 Report	*	BOOT.BIN	18-05-2023	🚞 SW	*	I.	🔳 start	11-03-2022 13:42	SH Source File	1 KB
🚱 Music	*	bossac	05-03-2015 (🚞 Report	*	I.				
Videos	*	EloadFW.ino.bin	06-04-2022	🕑 Music	*	I.				
*** 822		EloadService	22-09-2021	Videos	*	I.				
1 825		image.ub	18-05-2023	822		L				
*** 826		🔳 start	11-03-2022	825		L				
Screenshots				826		L				
				Screenshots		L				
> 🔷 OneDrive						1				
👻 💻 This PC				> 📥 OneDrive						
> 🏪 OS (C:)				🗸 💻 This PC						
> 🖷 New Volume (E):)			> 🐜 OS (C:)						
> S USB Drive (F:)				4 items			_			

FIGURE 7.11: COPY GRL-C3 FIRMWARE FILES INTO REMOVABLE USB DRIVE

3. When the following pop-message appears, click **Ok** to proceed to the next step.

GRL-WP-TPR-C3 Compliance Test Solution		
*	Latest Eload Firmware version 2.6 is already available in controller.	
		Ok

4. Power cycle the GRL-C3 tester using the Power button on the front of the tester as shown in Figure 6.4.

Note 1: If Step-4 fails, format the GRL-C3 SD card's removable drive that appears in the control PC after connecting the firmware update USB cable.

Note 2: If the above step (Note 1) fails, remove the SD card, connect it to the control PC and format it.


8 Compliance Testing with GRL-C3

GRL-C3 supports testing of Qi Base Power Profile (BPP) and Extended Power Profile (EPP) of Qi wireless base stations, for compliance with Qi specification versions 1.2.4 and 1.3 respectively. GRL-C3 also supports compliance testing of proprietary varieties of Qi wireless charging that follows Qi standards. GRL-C3 uses the GRL-C3 Browser App for automated or manual test execution.

GRL-C3 also supports oscilloscope measurements with the Tektronix DPO7000 and PicoScope 6403D oscilloscopes.

Apart from automated testing, the user can also choose to execute tests using custom mode configurations or API's on the GRL-C3.

The various screens presented by the GRL-C3 Browser App allow the user to select, configure, run and generate reports from the tests for a variety of Qi wireless base stations (Devices Under Tests or DUT's). There are also more specific controls that allow the user to perform offline analysis and debug specific DUT features and capabilities using saved waveforms.

8.1 App Mode

The GRL-C3 Browser App allows the user to choose between **CTS** mode and **API** mode for test execution. The CTS mode is applied by default while the user can optionally select the API mode to run tests on the App using a separate GRL API Tool. Use the **Set App Mode** slider at the top right of screen to set the required mode.



FIGURE 8.1: APP MODE SELECTION

If the **API** mode is selected:

The user will be directed to the *Results* screen and all other screens on the GRL-C3 Browser App will not be accessible.







FIGURE 8.2: RESULTS SCREEN IN API MODE

The user can use the GRL API Tool to automate testing for the Qi DUT when in API mode. The API tool will be available in *C:\GRL\GRL-WP-TPR-C3\APILibrary\GRLC3ApiLibTestingTool.exe* once the GRL-C3 Browser App is installed. The user can directly open the **GRLC3ApiLibTestingTool.exe** tool to set up the test environment, perform measurements and acquire test results.



GRLC3ApiLib	TestingTool	- 🗆 X
Connect	Status: Connected Version No.: 1.0.1	1.61 / 2.3 Serial No.: GRLC3-2019011
Configure Cont	roller	Read Data
Select Coil:	TPR#1A V Enable Digital Ping	Read Values Stop Read
	Start Capture Stop Capture	Signal Strength: -
Set Voltage:	4.2 Volts Set Voltage	Received Power (W): -
	Set l and in Ohme	Rectified Voltage(V): -
Set Load:	32 Ohms	Rectified Current(A): -
	O SetLoad in mA SetLoad	Rectified Power(W): -
Qi Messages:		

8.1.1 Using GRLC3ApiLibTestingTool in API Mode

FIGURE 8.3: GRLC3APILIBTESTINGTOOL WINDOW

Click on the **Connect** button to connect the GRLC3ApiLibTestingTool to the GRL-C3 tester hardware. Once connection is established, the tester information ("Status", "Version No." and "Serial No.") will be displayed.

Connect	Status:	Connected	Version No.:	1.0.1.61/2.3	Serial No.:	GRLC3-2019011

FIGURE 8.4: CONNECT GRLC3APILIBTESTINGTOOL WITH GRL-C3



8.1.1.1 Configure Controller

The Configure Controller panel allows the user to set up and run tests using the GRL-C3 tester hardware.

Configure Contr	oller	
Select Coil:	TPR#1A ~	Enable Digital Ping
	Start Capture	Stop Capture
Set Voltage:	4.2 Volts	Set Voltage
Set Load:	 SetLoad in Ohms SetLoad in mA 	32 Ohms SetLoad

FIGURE 8.5: GRLC3APILIBTESTINGTOOL- CONFIGURE CONTROLLER

- **Select Coil**: The Select Coil drop down selects the coil assembly type of the reference TPR to be used.
- **Set Voltage**: The Set Voltage field displays the default operating voltage for the TPR coil assembly selected in the Select Coil field. The user can also enter a custom coil voltage value if required. Click on the **Set Voltage** button to apply the configured voltage.
- **Set Load**: Depending on which load condition ("SetLoad in Ohms" or "SetLoad in mA" checkbox) is selected, the Set Load field displays the default load resistance value or default variable load current value respectively for the TPR coil assembly selected in the Select Coil field. The user can also enter a custom load value if required. Click on the **Set Load** button to apply the configured load.
- **Enable Digital Ping**: Select the **Enable Digital Ping** checkbox to enable the DUT to send digital pings to provide information about the optimum positioning of the TPR coil.
- **Start Capture**: Click on the **Start Capture** button to start test execution using the configured voltage and load values. The test run along with signal trace acquisition will happen in the *Results* screen as shown in the example below:





Connection Time(s:ms:us:ms) Description 28.86.637.900 #57.Set, RL oad = 32 Ohms (a) 29.693.254.500 29.693.254.500 29.063.7200 #58.(Ping Phase).Object_Detecded (c) 29.706.637.200 #60.Set, RL oad = 32 Ohms (a) 29.706.637.200 #60.Set, RL oad = 32 Ohms (a) 21.13.581.200 #60.Set, RL oad = 32 Ohms (a)	
Setup 28.185 637.900 #57.Set_RLoad = 32 Ohms QI- 29.693.254.500 #58.(Ping Phase).Object_Deleded 29.705.612.500 29.706.637.200 #60.Set_RLoad = 32 Ohms Y= Test 31.21.581.200 #61.251.201	
29 693 254 500 29 693 254 500 29 705 612 500 29 705 612 500 29 705 612 500 29 706 637 200 29 706 637 200 31213 561 200 31213 561 200 31213 561 200	
Ch- 29.705 612:500 #59: Object_Removed 29.706 637:200 #60 Set_RLoad = 32 Ohms # 29.706 637:200 #60 Set_RLoad = 32 Ohms # Image: Configuration 31:213:581:200 #61:(Ping Phase).Object_Detected #	
29.706.637.200 #60 Set_RLoad = 32 Ohms (e)	
Test 31.213:581:200 #61:(Ping Phase).Object_Detected ct	
31.225/916.400 #02.: Object_Removed []	
31.226:649:600 #63.Set_RLoad = 32 Ohms 👩	
Kesuits	
──────────────────────────────────────	
Page 1	
EQ. Analyser 13 33	
3 · · · · · · · · · · · · · · · · · · ·	
13.50 19.00 13.50 19.00 22.50 27.00 31.50 30.00 Timer (See)	40.50 45.00

FIGURE 8.6: GRLC3APILIBTESTINGTOOL- TEST EXECUTION EXAMPLE

To terminate the test run, click on the **Stop Capture** button.

Details of the test run will be logged in the **Qi messages** panel as shown in the example below:

Qi Messages:

Start Time = 85.952s Stop Time = 85.952s Object_Removed	~
Start Time = 85.9528s Stop Time = 85.9528s	
StartTime = 87.4593s StopTime = 87.4593s Object_Detected	
Start Time = 87.4717s Stop Time = 87.4717s Object_Removed	
StartTime = 87.4718s StopTime = 87.4718s	
Start Time = 88.9794s Stop Time = 88.9794s Object_Detected	
StartTime = 88.9917s StopTime = 88.9917s Object_Removed	
StartTime = 88.9928s StopTime = 88.9928s	
Start Time = 90.2489s Stop Time = 90.2489s	
Start Time = 90.4993s Stop Time = 90.4993s Object_Detected	
StartTime = 90.5117s StopTime = 90.5117s Object_Removed	
Start Time = 90.5118s Stop Time = 90.5118s	
StartTime = 92.0194s StopTime = 92.0194s Object_Detected	
StartTime = 92.0317s StopTime = 92.0317s Object_Removed	
StartTime = 92.0318s StopTime = 92.0318s	
StartTime = 93.5397s StopTime = 93.5397s Object_Detected	
StartTime = 93.5521s StopTime = 93.5521s Object_Removed	
Start Time = 93.5528s Stop Time = 93.5528s	
Start Time = 95.0596s Stop Time = 95.0596s Object_Detected	
StartTime = 95.0719s StopTime = 95.0719s Object_Removed	
Start Time = 95.0728s Stop Time = 95.0728s	
Statting _ 96 5702a Stan Time _ 96 5702a Object Detected	

FIGURE 8.7: GRLC3APILIBTESTINGTOOL- TEST EXECUTION QI MESSAGES EXAMPLE



8.1.1.2 Read Data

The Read Data panel allows the user to acquire measurement readings in runtime (while tests are running) by clicking on the **Read Values** button. To stop the data acquisition, click on the **Stop Read** button.

Read Data	
Read Values	Stop Read
Signal Strength:	0 (0 V)
Received Power (W):	0
Rectified Voltage(V):	0
Rectified Current(A):	0.0006
Rectified Power(W):	0

FIGURE 8.8: GRLC3APILIBTESTINGTOOL- READ DATA

8.1.2 Develop Custom Test Cases Via GRL-WP-QI-C3 API Programming

The user can choose to create custom test cases to meet more customized test requirements using a defined list of GRL-WP-QI-C3 API commands. Custom test cases can be written in either C# or Python platform as an independent standalone application. These test cases call the API's defined in GrlC3ApiLib.dll along with all the support functions and helper classes from C:\GRL\GRL-WP-TPR-C3\APILibrary\. For details, refer to the **GRL-WP-QI-C3 API Documentation** by selecting the **API Guide** shortcut in C:\GRL\GRL-WP-TPR-C3\APILibrary\.





8.2 Qi-Exerciser

The GRL-C3 Browser App *Qi-Exerciser* screen allows the user to configure and test a specific sequence of Packets.



FIGURE 8.9: QI-EXERCISER SCREEN

8.2.1 Set Qi Specification

The Qi-Exerciser allows the user to choose the following Qi specification versions- **1.2.4**, **1.3**, **1.3.3**, **2.0.1** and **Technology Development** for configuration and test execution. Use the **Qi Specification** drop-down menu at the top of screen to set and apply the required spec version.



FIGURE 8.10: QI SPECIFICATION SELECTION

The following subsections describe how to set up and test the Packet sequence.



8.2.2 Configure GRL-C3 Tester Hardware



FIGURE 8.11: CONFIGURE GRL-C3

• **Test Case**: The Test Case drop down selects and applies the required MOI test case to be run on the GRL-C3 tester hardware.

To execute the selected test case, the user FIRST needs to click on the **Start Exerciser** button (below the Qi Exerciser screen; see Section 8.2.8) and then followed by the **Start** button. Details of the test run will be displayed in the Results screen.

- **C3 Trigger Settings**: The C3 Trigger Settings drop down selects the trigger type for the GRL-C3 tester hardware by clicking on the **Send** button.
- **C3 Controller Settings**: The C3 Controller Settings drop down selects to power cycle or perform a reset on the GRL-C3 tester hardware by clicking on the **Send** button.

8.2.3 Set Up DUT Power Transmitter Capability



FIGURE 8.12: SELECT DUT POWER PROFILE

The **DUT Power Profile** panel displays the Baseline Power Profile (BPP) (up to 5W) or the Extended Power Profile (EPP) (up to 15W) as supported by the Base Station under test (BSUT) / DUT. Note: The displayed power profile will follow the TPR coil assembly type selected in the Coil Type field (see Section 8.2.4 below).

• **Potential Load Power**: The Potential Load Power drop down displays the default maximum power supported by the DUT for the TPR coil assembly selected in the Coil Type field (see Section 8.2.4 below). The user can also select an available power value from the drop-down list if required.

8.2.4 Select and Set Up Reference Test Power Receiver (TPR) Coil



FIGURE 8.13: CONFIGURE TPR COIL



- **Coil Type**: The Coil Type drop down selects the coil type of the reference TPR to be used.
- **Enable Coil Detection**: The Enable Coil Detection check box when selected allows the TPR coil to be detected during testing.
- **Rectified Volt**: The Rectified Volt field displays the default operating voltage for the TPR coil selected in the Coil Type field. The user can also enter a custom coil voltage value if required.
- **Set Volt**: The Set Volt button when clicked applies the configured voltage for testing. If required, the user can select to configure additional parameters as follows:



FIGURE 8.14: CONFIGURE ADDITIONAL PARAMETERS

Click on the **Set** button to apply the above configuration for testing.

• **Coil Threshold Volt**: The Coil Threshold Volt field sets the coil voltage limit for the selected TPR coil.



Load	d Configuration
Initial Load 32 Ω	Load 32 👻 D
	Set Load Current Load: 5 Ω
Load Ramp	
Min Load 50	mA Max Load 1000 mA
Step Load 10	mA Step Time 1000 ms
Test Duration 600	s
	Start Load
Add Thermal Channels	Get Temperature
Amb Temp (0°C)	Current Load : 0
FO Temp (0°C)	Max Temp (°C) : 0
Temp Diff (0.00°C)	Time Elapsed :

8.2.5 Set Up Load Condition in Load Circuit

FIGURE 8.15: CONFIGURE LOAD CONDITION

- **Initial Load**: The Initial Load field displays the default initial load resistance value for the TPR coil assembly selected in the Coil Type field under the TPR Coil Configuration panel. The user can also enter a custom initial load value if required.
- **Load**: The Load field displays the default load (with external load added) resistance value to be applied for the TPR coil assembly selected in the Coil Type field under the TPR Coil Configuration panel. The user can also enter a custom load value if required.
- **Set Load**: The Set Load button when clicked applies the configured load while the DUT is in the Power Transfer phase. The user can verify load change of the Guaranteed Power (GP) test using the Set Load function.
- **Min Load & Max Load**: The Min Load and Max Load fields set the range of current values of the variable load used for the Foreign Object Detection (FOD) test.
- **Step Load & Step Time**: The Step Load and Step Time fields set the variable load current step size value and time for stepping across each current over a specified duration during the FOD test.
- **Test Duration**: The Test Duration field sets the time interval in seconds for running the FOD test.
- **Start Load**: The user FIRST needs to click on the **Start Exerciser** button (below the Qi Exerciser screen; see Section 8.2.8) and then followed by the **Start Load** button to execute the FOD test for the TPR using the configured load current and step values. Details of the test run will be displayed in the *Results* screen as shown in the below example:



Connection	Time[s:ms:us:	s] Description Y
Setup	220.422.729:700	#1138::Object_Removed
- QI-	220.953:437:20	#1139:(Ping Phase):Object_Detected
Exerciser	221.018:464:10	#1140::Object_Removed CI
	221.018:546:70	#1141:(Ping Phase) Object_Detected
Configuration	221.018:669:500	#1142: Objed_Removed
	221.050:476:700	#1143 (Ping Phase) Object_Delected 👩
Results	221.115:305:700	#1144::Object_Removed 👩
40	2.0 8	
62 Depart	10-6	
in Report	Centron 67	
Ol-	Rectifie	
E Authenticator	0.18 V @7	
	0.00 A -10- 0	
EO Analyser	1.3- 5	
	0.7- 2	
A Help	Il Votag	
U	88 -0.72	
	-0.09 V -1.3 - 4	
	(jev 34.10 72.20 tok.30 144.40 180.50 218.40 255.70 268.40 324.20 381.00 Time (Sec) >

FIGURE 8.16: START LOAD FOD TEST EXECUTION EXAMPLE

To terminate the test run, click on the **Stop Exerciser** button.

- Add Thermal Channels: The Add Thermal Channels checkbox when enabled allows you to add heat based channels/devices to the TPR coil assembly.
- **Get Temperature**: The **Get Temperature** checkbox when enabled acquires readings of top-surface temperature of the TPR coil assembly and ambient temperature during the FOD test run.

8.2.6 Set Up Coil Modulation in Modulator Circuit



FIGURE 8.17: CONFIGURE COIL MODULATION

The **Coil Modulation** drop down selects the default capacitance value for the capacitive modulator or the default resistance value for the resistive modulator to be applied for the TPR coil assembly selected in the Coil Type field under the TPR Coil Configuration panel. The user can also select a custom value if required.





8.2.7 Set Up Packet Simulation Test Sequence

FIGURE 8.18: CONFIGURE PACKET SIMULATION TEST SEQUENCE

The Exerciser Sequence Configuration panel allows the user to configure each Packet Phase & Packet and send Packets as required for running the Packet simulation tests in a particular order.

8.2.7.1 Configure Packet Sequence

For each Phase, the user can select to delete an existing Packet. To configure an existing Packet information, select which opens the following settings panel:

Conniguro Fucilior)
	Timing Detai	ls	
t_Start 15	ms t_Wake 40	ms t_Silent 9.5 ms	
Preamble Count 11	Repeat Count 0	Corrupt Checksum	
	Payload Deta	ils	
Signal Strengt	th Value (B0-b7:0)		P
	Save to Sequence Set De	efault Cancel	



FIGURE 8.19: CONFIGURE PACKET INFORMATION

- **Configure Packet**: The Configure Packet drop down selects the Packet type to be applied.
- **Packet Phase**: The Packet Phase drop down selects the default Phase type of either ID/Config, Power Tx, Negotiation or Calibration Phase that corresponds to the selected Packet type.
- **Timing Details**: The Timing Details section displays the default settings for the selected Packet Phase. The user can also choose to enter custom values if required.
 - a) If the **ID/Config Phase** is selected, the following settings are available:
 - **t_Start (ms)**: The t_Start field sets the time that elapses between Packets.
 - t_Wake (ms): The t_Wake field sets the time period after the DUT has initiated the Digital Ping when the GRL-C3 tester hardware needs to initiate the first Packet.
 - **t_Silent (ms)**: The t_Silent field sets the silent time that elapses between the transmission of Packets.
 - **Preamble Count**: The Preamble Count field sets the number of preamble bits of the selected Packet.
 - **Repeat Count**: The Repeat Count field sets the number of times the selected Packet has to be sent.
 - **Corrupt Checksum**: The Corrupt Checksum checkbox when selected enables all bits of the selected Packet checksum to be inverted to obtain an incorrect value.
 - b) If the **PT Phase** (Power Transfer Phase) is selected, the following settings are available:
 - **t_Interval (ms)**: The t_Interval field sets the time interval between two consecutive Control Error Packets.
 - **t_Received (ms)**: The t_Received field sets the time interval between two consecutive Received Power Packets.
 - **t_Control (ms)**: The t_Control field sets the time interval between two consecutive Control Error Packets.
 - **t_Silent (ms)**: The t_Silent field sets the silent time that elapses between the transmission of Packets.
 - **t_Charge (ms)**: The t_Charge field sets the time interval between two consecutive Charge Status Packets.



- **Preamble Count**: The Preamble Count field sets the number of preamble bits of the selected Packet.
- **Repeat Count**: The Repeat Count field sets the number of times the selected Packet has to be sent.
- **Corrupt Checksum**: The Corrupt Checksum checkbox when selected enables all bits of the selected Packet checksum to be inverted to obtain an incorrect value.
- **Enable Reserved Bits**: The Enable Reserved Bits checkbox when selected enables all Reserved bits of the selected Packet to be set.
- Send packet every # ms after 1st: This checkbox when selected enables the Packet to be sent at every specified time interval and after the start of the first selected Packet type.
- **Insert packet after RP-CE**: This checkbox when selected enables the selected Packet to be inserted after each Received Power Packet and Control Error Packet.
- c) If the **Negotiation Phase** is selected, the following settings are available:
 - **t_Start (ms)**: The t_Start field sets the time that elapses between Packets.
 - **t_Silent (ms)**: The t_Silent field sets the silent time that elapses between the transmission of Packets.
 - **t_Responsetimeout (ms)**: The t_Responsetimeout field sets the time period (after the end of a response) after which the power signal is to be removed if a Packet is not correctly received.
 - **Preamble Count**: The Preamble Count field sets the number of preamble bits of the selected Packet.
 - **Repeat Count**: The Repeat Count field sets the number of times the selected Packet has to be sent.
 - **Corrupt Checksum**: The Corrupt Checksum checkbox when selected enables all bits of the selected Packet checksum to be inverted to obtain an incorrect value.
 - disableRetry: The disableRetry checkbox when selected disables retry for the selected Packet.
- d) If the **Calibration Phase** is selected, the following settings are available:
 - **t_Interval (ms)**: The t_Interval field sets the time interval between two consecutive Control Error Packets.



- **t_Received (ms)**: The t_Received field sets the time interval between two consecutive Received Power Packets.
- **t_Charge (ms)**: The t_Charge field sets the time interval between two consecutive Charge Status Packets.
- t_Received_Mode1 (ms): The t_Received_Mode1 field sets the time interval between two consecutive Received Power Packets in the light-load calibration value mode.
- t_Received_Mode2 (ms): The t_Received_Mode2 field sets the time interval between two consecutive Received Power Packets in the connected-load calibration value mode.
- **Preamble Count**: The Preamble Count field sets the number of preamble bits of the selected Packet.
- **Repeat Count**: The Repeat Count field sets the number of times the selected Packet has to be sent.
- **Corrupt Checksum**: The Corrupt Checksum checkbox when selected enables all bits of the selected Packet checksum to be inverted to obtain an incorrect value.
- **Payload Details**: The Payload Details section displays the default settings for the selected Packet Type which set the raw data to be sent in the hex format. The user can also choose to enter custom values if required.

When all the above configurations have been made, click on the **Save to Sequence** button

Save to Sequence to apply the configurations and update the existing Packet information in the

Configure Packet Sequence panel. Otherwise, click on the **Cancel** button Cancel to keep the existing Packet information and exit the settings panel.

To reset the configurations to default values, click on the **Set Default** button

8.2.7.2 Additional Packet Settings

Additional configuration can be made to the Packet Sequence by selecting the sicon for the Base Power Profile (BPP) or Extended Power Profile (EPP) DUT as follows:

Note that these additional settings apply specifically for the ID/Config Phase and Power Transfer (PT) Phase (for both the BPP and EPP DUT's) as well as the Negotiation Phase and Calibration Phase (for the EPP DUT only).





FIGURE 8.20: ADDITIONAL PACKET SETTINGS FOR BPP AND EPP DUT'S (ID/CONFIG PHASE & PT PHASE)

The following additional settings are available for both the **BPP and EPP DUT's**:

- **t_Retry**: The t_Retry field sets the time interval in milliseconds for the TPR to retry the Packet after the end of the last Packet sent.
- Force Received Power Mode4 0x31: The Force Received Power Mode4 0x31 checkbox when selected enables the GRL-C3 tester hardware to initiate the TPR to send the Received Power Packets with Mode 4 (instead of the default Mode 0) in the Power Transfer phase for related test cases.
- **Control Error Invert**: The Control Error Invert button when selected inverts the control error value, by enabling the inverter of the power transmitter to be changed to use the





full-bridge topology after receiving the first Control Error Packet. This applies for the case when the power transmitter establishes the Power Transfer Contract at the end of the negotiation phase with a maximum power greater than 5W.

- **t_Control**: The t_Control field sets the time interval between two consecutive Control Error Packets in milliseconds.
- **Received Power Offset**: The Received Power Offset field sets the TPR to use a Received Power Offset value in mW.
- **Replace RP Mode0 with Rp/x**: The Replace RP Mode0 with Rp/x drop down selects the Mode for the Received Power Packets to be sent by the TPR in the Power Transfer phase (instead of the default Mode 0).
- **Replace nth RP/x packet**: The Replace nth RP/x packet field sets the particular Received Power Packets with current existing Mode to be replaced with the ones using the Mode selected from the "Replace RP Mode0 with Rp/x" drop down.

	0 11 Payload. 1-2-010E-0-30313235 Taise	
*	Force Negotiation Phase Packet Retry Count 2 Disable Negotiation Phase t_Retry 60 Enable Guaranteed power equal to BSUT Potential Load Power Fetch Coil Q Q:	×]]ms
	t_Start=15 t_Silent=9.5 Repeat Preamble General Request (0x07) Checksum Count Count Bayloard:30 Froot Checksum	3
	t_Start=15 t_Silent=9.5	
	Count 0 11 Centeral Request (0x07) Checksum Error false	3
Negotiation	t_Start=15 t_Silent=9.5	
Phase	Count Count Specific Request (0x20) Checksum	2

FIGURE 8.21: ADDITIONAL PACKET SETTINGS FOR EPP DUT (NEGOTIATION PHASE)

The following additional settings are available for the **EPP DUT only** for the Negotiation Phase:

- Force Negotiation Phase: The Force Negotiation Phase checkbox when selected enables the GRL-C3 tester hardware to initiate the DUT to send its Packets in the Negotiation phase.
- **Disable Negotiation Phase**: The Disable Negotiation Phase checkbox when selected ends Negotiation for the Packets.



- Enable Guaranteed power equal to BSUT Potential Load Power: The Enable Guaranteed power equal to BSUT Potential Load Power checkbox when selected sets the content of the Guaranteed Power Value field to be equal to the Potential Power Value field.
- **Packet Retry Count**: The Packet Retry Count field sets the number of times for the TPR to retry the last Packet sent due to communications error in the received Packet.
- **t_Retry**: The t_Retry field sets the time interval in milliseconds for the TPR to retry the Packet after the end of the last Packet sent.
- **Fetch Coil Q**: The Fetch Coil Q button when clicked calculates and displays the Reference Quality Factor value of the reference TPR coil. The Reference Quality Factor value will be applied in the Extended Power Profile tests.

	-	Exerciser Sequence Configuration				
		Configure Packet Sequence	Send Instant Packets			
		Pleating Specific Request (IIV/II)	Checksum			
		Enable Calibration Phase		×)		
		Number of Calibration Phase Retries 20				
		Light Load 32	Ω			
	-	Full Load 8.7	Ω			
	~	Calibration Phases Timers				
Calibra	tion	Configure CE Timer 150	ms			
Phase	uon	Configure RP Mode 1 Timer 500	ms			
		Configure RP Mode 2 Timer 2000	ms			

FIGURE 8.22: ADDITIONAL PACKET SETTINGS FOR EPP DUT (CALIBRATION PHASE)

The following additional settings are available for the **EPP DUT only** for the Calibration Phase:

- **Enable Calibration Phase**: The Enable Calibration Phase checkbox when selected enables the GRL-C3 tester hardware to execute the Calibration phase for the Packets.
- **Number of Calibration Phase Retries**: The Number of Calibration Phase Retries field sets the number of times to retry the Packet after the end of the last Packet sent.
- **Light Load**: The Light Load field sets the load resistance of the extended Digital Ping as the light load.
- **Full Load**: The Full Load field sets the load resistance of the Guaranteed Power as the full load.
- **Configure CE Timer**: The Configure CE Timer field sets the time interval between two consecutive Control Error Packets in milliseconds.



- **Configure RP Mode 1 Timer**: The Configure RP Mode 1 Timer field sets the time interval between two Received Power Packets that have their Mode fields set to the light-load calibration value in milliseconds.
- **Configure RP Mode 2 Timer**: The Configure RP Mode 1 Timer field sets the time interval between two Received Power Packets that have their Mode fields set to the connected-load calibration value in milliseconds.

8.2.7.3 Manage Packet Simulation Sequence (Configure Packet Sequence)

	Exerciser Sequence Configuration							
	Configure Packet Sequence Send Instant Packets							
	t_Start=15 t_Wake=40 t_Silent=9.5							
	0 Preamble Count Count Payload: Checksum Error false	X						
ID/Config	t_Start=15 t_Wake=40 t_Silent=9.5							
Phase	1 Preamble Count 11 Payload:1-0-0027-0-30313235 Checksum Error false	X						
	t_Start=15 t_Wake=40 t_Silent=9.5							
	2 Preamble Count 11 Payload:0-10-0-0-0-0-64-16-0-0-0-0 Checksum Error false	X 🗷						
Power Tx	t_Silent=9.5 t_Interval=250 t_Recevied=5000 t_Control=24							
Phase	3 Preamble Control Error (0x03) Checksum Error false	X 🗷						
	Reset Packet Sequence Remove All Add Set Packet Sequence							
	Reset Packet Sequence Remove All Add Set Packet Sequence							

FIGURE 8.23: REMOVE OR ADD PACKETS & RESET OR SET PACKET SEQUENCE

The Configure Packet Sequence panel allows the user to add a new Phase and/or Packet to the Packet Sequence by clicking on the **Add** button at the bottom of the panel. This will display a settings panel similar to the one described above in Section 8.2.7.1 which is obtained on clicking the edit button to configure Packet information. Once configured, clicking on the **Add to Sequence** button causes the new Phase and/or Packet to be added to the existing Packet Sequence.





Configure Packet	Identification (0x71)	▼ Packet Phase ID/Config Phase ▼
	Timing Details	5
t_Start 15	ms t_Wake 40 m	ns t_Silent 9.5 ms
Preamble Count 11	Repeat Count 0	Corrupt Checksum
	Payload Details	5
	Major Version(B0-b7:4) 0X	
	Minor Version(B0-b4:0) 0X 0	
	Add to Sequence Set Def	ault Cancel
Reset Packe	et Sequence Remove All Add	Set Packet Sequence 🕕

FIGURE 8.24: ADD NEW PHASE & PACKET TO PACKET SEQUENCE

Once the user has confirmed the Packet Sequence, click on the **Set Packet Sequence** button to apply the sequence for testing. In case there is a need to return to the default Packet Sequence, click on the **Reset Packet Sequence** button. To clear the existing Packet Sequence, click on the **Remove All** button.

8.2.7.4 Send Instant Packets

The user can configure and send any Packets in runtime (when Packet simulation test is running) through the **Send Instant Packets** panel.

Exerciser Sequence Configuration							
	Configure Packe	et Sequence	Send Instant F	Packets			
Configure F	Packet	Signal Str	ength (0x01)	•			
t_Sta Repeat Cou	Timing Details t_Start 15 ms t_Silent 9.5 ms Preamble Count 11 Repeat Count 0 Corrupt Checksum 11						
		Payload Detail	ls				
	Signal Strength Va	alue (B0-b7:0)					
	🗸 Add in H	istory Send Add to H	listory Set Defa	ault			
S.No	Time Parameters	Packet Header	Packet Payload	Actions			
0 t_Start = 15 t_Silent = 9.5 Signal Strength (Send			
Remove All Send Selected Rows Send All							

FIGURE 8.25: CONFIGURE AND SEND INSTANT PACKETS



- **Configure Packet**: The Configure Packet drop down selects the Packet type to be applied.
- **Timing Details**: The Timing Details section displays the default settings for the selected Packet. The user can also choose to enter custom values if required.
 - **t_Start (ms)**: The t_Start field sets the time that elapses between Packets.
 - t_Silent (ms): The t_Silent field sets the silent time that elapses between the transmission of Packets.
 - **Preamble Count**: The Preamble Count field sets the number of preamble bits of the selected Packet.
 - Repeat Count: The Repeat Count field sets the number of times the selected Packet has to be sent.
 - **Corrupt Checksum**: The Corrupt Checksum checkbox when selected enables all bits of the selected Packet checksum to be inverted to obtain an incorrect value.
- **Payload Details**: The Payload Details section displays the default settings for the selected Packet which set the raw data to be sent in the hex format. The user can also choose to enter custom values if required.

After taking care of all the above configurations, the user can click on the **Send** button **Send** to

send the configured Packet to the GRL-C3 tester hardware. To reset the configurations to default

values, click on the **Set Default** button

The user can also choose to add or log the configured Packet to the "History" table by selecting the **Add in History** checkbox and then clicking on the **Add to History** button.

		🗸 Add in H	listory Send	Add to H	istory	Set Defa	ault		
	S.No	Time Parameters	Packet Header		Packet	t Payload	Actions		ns
	0	t_Start=15 t_Silent=9.5	Signal Strengt	th (0x01)			Ø	×	Send

FIGURE 8.26: ADD PACKET TO HISTORY TABLE

Once the Packet is added to the table, the user can make edits to the Packet configuration by

clicking on 🕼 in the respective Packet row. When finished, click on the **Save to History** button

Save to History to apply and update the existing Packet row with the new configuration. To send out the Packet, select the Packet row checkbox and click on the **Send** button. If there is a need to delete a particular Packet row, click on **X**.



To send out Packets for selected Packet rows only, select the desired Packet rows and click on the **Send Selected Rows** at the bottom. To send out all Packets in the History table, select all Packet rows and click on the **Send All** button Send All at the bottom. If there is a need to clear all Packet rows in the History table, click on the Remove All

8.2.8 Run Packet Simulation Test



FIGURE 8.27: RUN PACKET SIMULATION TEST AND MANAGE CONFIGURATION

• **Start Exerciser**: Click on the **Start Exerciser** button to start test execution/simulation for the configured Packets. The test run details along with signal trace acquisition will be displayed in the Results screen as shown in the example below:



FIGURE 8.28: START EXERCISER PACKET SIMULATION TEST RUN EXAMPLE

To terminate the test run, click on the **Stop Exerciser** button.

- **Clear Capture**: Click on the **Clear Capture** button to remove existing test run details and signal trace acquisition displayed on the Results screen.
- **Reset Exerciser**: Click on the **Reset Exerciser** button to return all Packet configurations to default values.
- **Recall Sequence**: Click on the **Recall Sequence** button to load and apply information from a saved Packet configuration file.





• Save Sequence: Click on the Save Sequence button to save the current Packet configuration to a file in the "C:\GRL\GRL-WP-TPR-C3\Report\" directory. See example below:



FIGURE 8.29: EXAMPLE OF SAVED CONFIGURATION FILE PATH

8.3 Test Configuration

The GRL-C3 Browser App *Test Configuration* screen allows the user to select which set of tests is run on the DUT, set up test parameters, run selected tests and generate test reports.

Connection	Test Selection CTS Mode 🔵		BSUT Self	Declaration Form Ø	Debug 🔵	8	Report Generation	
r Setup	Project Name: C_N_D indiasami - V_1.3.3	Transmitter Type		MP-A5	•		BSUT Information	
		Potential Load Power		15	٧	Manufacturer/Brand Name		
Exerciser	Quick Select: 🕑 (X) 🕜 (-) 🔽	Supported Prop		Select	•	Product Name		
	Execute: Repeat: 0 Start	Supported SRQ Prop		Select	•	Model Number		
Tast	O. Saarch Tarinana Nama	Supported ADC Prop		Select	•	0-10		
Configuration	TPR Colls Selection: All Colls Selected (10)	Supported 2.5W	Multi Tx		No of Colis 1	Serial Number		
	R Rever Transmitter Compliance Test Cases V1.2.3 (2010)	Enable Coil Remove/Place popup					Test Lab Information	
Darute	8 Mechanical tests	Enable Optimum Position				Lab Name		
	Thermal tests	Enable if sample supports Authen	tication			Lab Location		
	Connected Load tests		Teste	r Configuration		Lab Manager		
Report	Coad modulation tests	PRMC Code		0x010E	Load Pool Data	Test Engineer		
	Progency-sink keying lesis Prog phase tests	Basic Device Identifier		30313235		E-mail		
	Configuration phase tests		Onter	Coll Backlan		Phone Number		
E Analyser	Negotiation phase tests Power transfer phase tests	2017 H	(manay	um con Position		Notes/Remarks		
	Authentication tests	Col Type		TPD	F 14		FOD 7-11 F-11-11-1	
ea 01-	Pre-power transfer tests In-oower transfer tests	our type		Gal Onlin	Um Position		POD Test Execution	124 1.3
Authenticator		C-8	L		Malue	Select Testcase	6431	
		200			****	Select Col	194_0	Fetch Coll Of
		TPR_1A			222	FOD QT		
U		TPR_18		1	137	Maximum (Sull Load	50	mA
		TPR_1C		1	225	Load Step	10	mA/s
		TPR_1D		8	83	Test Duration	600	S
		TPR 1F			138	Δ (P)	0	Wm
						Δ (Ω)	0	56
		TPR_MP18		1	121	Negotiate Guaranteed Power to	Potential Load Power	
		TPR_MP1C			101	Get Temperature		
						Ambient Temperature : 0	FO Temperature : 0	
		Clear Data		Load Data	Save Data	Temp Difference : 0.	00 Current Load : 0	
			Read Power	fransmitter Capabilitie	15	Max Temperature : 0	Time Elapsed :	
		BSUT Name		Sample				
		Major Version		1		Start Test Case	Save Test Case	
		Minor Version		3		*Saved Files will be in "C:IGRL\GF	RL-WP-TPR-C3iReport/" Folder	
		PT Manufacturer Code		0×0000		"Note: Connect Channel-1 of them Connect Channel-2 of them	momux to Ambient Coll. momux to FOD.	
		Potential Load Power		5				
		Guaranteed Power		5		FOD Setup Dispram		
		IsWPID Supported		False				

FIGURE 8.30: TEST CONFIGURATION SCREEN

Prior to accessing the test configuration, the user first needs to create a new project or upload an existing project that was saved previously, as described in the following sections.





8.3.1 Create New Test Project

The following procedure describes how to create a new test project:

1. Click on **Create New Project** as indicated in Figure 8.31 below.



FIGURE 8.31: CREATE NEW PROJECT—#1

Enter the Project Name (allowed up to 15 letters and special characters) and select the Certification standard (as supported by the DUT). Select the Power Profile that the DUT supports as the Baseline Power Profile (BPP) (≤ 5 W), Extended Power Profile (EPP5) (≤ 5 W) or the Extended Power Profile (EPP) (≤ 15 W). Then, click on the Create Project button.

		Create New Project
Connection	Test Selec	Project Name: New Project name Certification: V_1.2.4
QI- Exerciser	Quick Select: \bigcirc \bigotimes $?$ \bigcirc	Power Profile: BPP Create Project
	Execute: Repeat: 0 🛟 Start 0	

FIGURE 8.32: CREATE NEW PROJECT—#2

3. The new project will be created with the provided project name and selected certification standard as shown in the Figure 8.33 example below. The user can now proceed with the test configuration.

			Te	st Selection		CTS Mo	de 🔵
Project Name	Sampl	le - V_1.2	2.4		Test Sequence:	💾 🚞	
Quick Select:	\oslash	(\mathbf{x})	?	Θ.			0/0 🕦
			#2				

FIGURE 8.33: CREATE NEW PROJECT—#3



8.3.2 Upload Existing Saved Test Project

The following procedure describes how to upload an existing test project that was saved previously:

1. Click on the **Upload Project** icon as indicated in Figure 8.34 below.

Connection Setup	Tes Upload Project CTS Mod	e 🌒
	Project Name: Sample - V_1.2.4 Test Sequence: 💾 🥅	
QI- Exerciser	Quick Select: 🔗 🙁 🥐 🕞 🔽	0/0 🌖

FIGURE 8.34: UPLOAD PROJECT—#1

2. If the required project file (**.gproj** file) was saved in the local file directory, select that project file under "Local File" as shown in Figure 8.35 below.

CTS Mode 🌒	BSUT N Coil Typ	Upload Test sequence or Project ×		Lab Name Lab Location
		Unload Project(aproj):	ןכ	Lab Manager
0/30 🕤		opioud i iojeci(.gpioj).	ור	Test Engineer
		Local File:		E-mail
		> O apple_V_2_0_1_131023_162155		Phone Number
	BSUT	> O apple20_V_2_0_1_161023_112014		Notes/Remarks
	Major	O Custom Location:		
	Minor'	File Path: Enter custom path		Select Testcase
	PT Ma			Select residase
	Potent	🛓 Upload		Select Coil
				FOD Qf

FIGURE 8.35: UPLOAD PROJECT— #2

3. If the required .gproj file was saved in another location other than the local file directory, select **Custom Location** and enter the project file path, for example, *"C:\GRL\GRL-WP-TPR-*

C3\Report\XYZ_TPR_100823_084915\Run1\ReferenceData**TPR_Run1_TestBackup.gproj** ".

Note: Make sure to provide the project file name (TPR_Run1_TestBackup.gproj) in the path.

5	Mode 🌒	Transmitt	Upload Test sequence or Project	×		
		Potential	Unload Project(annoi):		W	Manufacturer/Brand Na
	0/0 🚯	Supporte				Product Name
		Supporte	 ✓ Report 			Model Number
		Supporte	0			Qi-ID
	•	Supp	Custom Location:			Serial Number
		🗌 Enab	File Path: C:\GRL\GRL-WP-TPR-C3\Report\XYZ_TPR_100823_084	*		
		🗌 Enab				Lab Name
		🔽 Enab	🏝 Upload			Lab Location
			Lester Lontiguration			Lab Manager

FIGURE 8.36: UPLOAD PROJECT—#3



4. Click on the **Upload** button and the selected project file will be loaded as shown in the Figure 8.37 example below. The user can now proceed to access/configure the project.



FIGURE 8.37: UPLOAD PROJECT-#4

8.3.3 Test Configuration

Before running any tests, make sure to configure the following main categories:

- BSUT Self Declaration Form
- Tester Configuration
- Read Power Transmitter Capabilities
- Read Certificate

8.3.3.1 BSUT Self Declaration Form

BSUT Self	Declaration Form 2 Debug 🔵							
Transmitter Type	Select Transmitter Type							
Potential Load Power	5	W						
Supported Prop	Select •							
Supported SRQ Prop	Select •							
Supported ADC Prop	Select •							
Supported 2.5W Multi T	x No of Coils 1							
Enable Coil Remove/Place popups	✔ Enable Coil Remove/Place popups							
Enable Optimum Position								
Enable if sample supports Authenticatio	'n							

FIGURE 8.38: CONFIGURE BSUT (DUT)



- **Debug**: Toggle the Debug slider to perform debugging for the DUT capabilities.
- **Transmitter Type**: The Transmitter Type drop down selects the type of Power Transmitter of the DUT.
- **Potential Load Power**: The Potential Load Power field sets the maximum power supported by the DUT.
- **Supported Prop**: The Supported Prop drop down selects the Proprietary Packets supported by the DUT.
- **Supported SRQ Prop**: The Supported SRQ Prop drop down selects the SRQ Proprietary Packets supported by the DUT.
- **Supported ADC Prop**: The Supported ADC Prop drop down selects the ADC Proprietary Packets supported by the DUT.
- **Supported 2.5W**: Select the Supported 2.5W checkbox if the DUT supports a 2.5 W USB power supply.
- **Multi Tx**: Select the Multi Tx checkbox if the DUT supports multiple coils.
- **No of Coils**: If the Multi Tx checkbox is selected, specify the number of coils supported by the DUT in the No of Coils field.
- **Enable Coil Remove/Place popups**: Select this checkbox to allow removal of coils or placement of device accessories during testing.
- **Enable Optimum Position**: Select the Enable Optimum Position checkbox to enable the coil to be placed at an optimized position for testing.
- **Enable if sample supports Authentication**: Select this checkbox if the DUT supports the Qi Authentication requirements.

8.3.3.2 Tester Configuration

Tester Configuration						
PRMC Code	0x010E	Load Pool Data				
Basic Device Identifier	30313235					

FIGURE 8.39: CONFIGURE TESTER

- **PRMC Code**: The PRMC Code field sets the Power Receiver Manufacturer Code (PRMC) ID of the TPR.
- **Basic Device Identifier**: The Basic Device Identifier field sets the Basic Device Identifier ID of the TPR.
- **Load Pool Data**: This function allows you to use different power receiver manufacturer codes (PRMC's) other than the GRL-C3's own power receiver manufacturer code (PRMC)



in order to obtain expected test results. Click on the Load Pool Data button to load an existing data file and this will enable PRMC codes to be assigned randomly for each test case when running multiple tests.

Note: The PRMC_pool data is available in the WPC website.

220601_prmc_pool_ch5rsdk (1)	10-01-2023 10:30	Microsoft Excel Co	1 KB
GRL_REPORT (27)	28-12-2022 13:27	File folder	
GRL_REPORT (27)(1)	28-12-2022 13:27	File folder	



FIGURE 8.40: LOAD PRMC CODE FROM SELECTED POOL DATA FILE

8.3.3.3 Read Power Transmitter Capabilities

Read Power Transmitter Capabilities			
BSUT Name	:	Sample	
Major Version	:	1	
Minor Version	:	3	
PT Manufacturer Code	:	0×0000	
Potential Load Power	:	5	
Guaranteed Power	:	5	
IsWPID Supported	:	False	
IsAI Supported	:	E False	
IsOB Supported	:	False	
IsDub Supported	:	False	
IsNRS Supported	:	False	
Buffer Size	:	0	
	Read Capa	bilities	
*Note: 1.Place TPR#1F Coil on Top of B 2.Turn on Al bit, if sample support	SUT and Click Read	Capabilities Button. efore running Authentication testcases.	

FIGURE 8.41: READ POWER TRANSMITTER CAPABILITIES

- **Read Capabilities**: The Read Capabilities button when clicked reads and displays the capabilities of the DUT. Before clicking on this button, make sure to place the mentioned TPR coil on top of the DUT. Once the capabilities are read, the information from the DUT will be populated in each field above the button.
- Is WPID / AI / OB / Dub / NRS Supported: Select these checkboxes if WPID, AI, OB, Dub and/or NRS is supported by the DUT. If the DUT supports Qi Authentication, make sure to turn on the AI bit before running Authentication tests.



8.3.3.4 Read DUT Qi Authentication

Read Certificate			
Product Name	XXXXX		
Certificate Chain Validly Signed	:False Download TBS Data		
Is Challenge Signature Valid	: False <u>Download Certificate Chain</u> <u>Hash</u>		
Digest	:		
Read Certificate	Save Certificate		

FIGURE 8.42: READ DUT QI AUTHENTICATION

- **Product Name**: Enter the vendor defined name of the DUT in the Product Name field.
- **Read Certificate**: The Read Certificate button when clicked reads and displays the Qi authentication details of the DUT above the button. The user can download certain authentication data by clicking on **Download TBS Data** and **Download Certificate Chain Hash**.
- **Save Certificate**: Click on the Save Certificate button to save the displayed authentication details to a file.

After all the above configuration has completed, additional configuration can be made as follows:

Optimum Coil Position			
BSUT Name	XXXXX		
Coil Type	TPR_1A		
	Get Optimum Position		
Coil		Value	
TPR_1A		222	
TPR_1B		137	
TPR_1C		225	
TPR_1D		83	
TPR_1F		136	
TPR_MP1B		121	
TPR_MP1C		101	
Clear Data	Load Data	Save Data	

8.3.3.5 Optimum Coil Position

FIGURE 8.43: CONFIGURATION FOR OPTIMUM COIL POSITION



- **BSUT Name**: The BSUT Name field sets the name of the DUT (BSUT) for the coil positioning test.
- **Coil Type**: The Coil Type drop down selects the type of TPR coil assembly to be positioned on the Interface Surface of the DUT such that the DUT can achieve the maximum signal strength value.
- **Get Optimum Position**: Click on the Get Optimum Position button to start the coil positioning test once the TPR coil is placed on the Interface Surface of the DUT. During this process, adjust the coil in various positions on the DUT surface to obtain the maximum signal strength value. When the test has completed, the results will be displayed below this button. The *Results* screen will also display the results/details of the test case that is running in real-time as shown in the example below:



FIGURE 8.44: OPTIMUM COIL POSITION TEST EXECUTION EXAMPLE

- **Clear Data**: Click on the Clear Data button to clear existing test results or details.
- **Load Data**: Click on the Load Data button to load and use data from a saved configuration file.
- **Save Data**: Click on the Save Data button to save the current configuration to a file.



8.3.3.6 FOD Test Execution

	FOD Test Execution 1.2	.4 🔵 1.3
Select Testcase	5431	•
Select Coil	TPR_5	Fetch Coil Qf
FOD Qf		
Minimum Load	50	mA
Maximum / Full Load	1000	mA
Load Step	10	mA/s
Test Duration	600	S
Δ(Ρ)	0	mW
Δ (Q)	0	%
Get Temperature Ambient Temperature :	0 FO Temperature : 0	
Temp Difference :	0.00 Current Load : 0	
Max Temperature :	0 Time Elapsed :	
Start Tes	Case Save Test Case	
*Saved Files will be in "C *Note: Connect Channel Connect Channel	GRL/GRL-WP-TPR-C3/Report\" Folder I of thermomux to Ambient Coil. 2 of thermomux to FOD.	
FOD Setup Diagram		

FIGURE 8.45: CONFIGURE MANUAL FOD TEST EXECUTION METHOD

The **FOD Test Execution** panel allows the user to perform manual Foreign Object Detection (FOD) test execution. The FOD test is executed by a Power Transmitter or Power Receiver to detect the presence of a foreign object on the Interface Surface of the DUT. During the FOD test, the lateral distance (offset) between the centers of the representative foreign object and the TPR coil assembly on the Interface Surface of the DUT will be varied.

The user can refer to an example of the FOD test setup by clicking on <u>FOD Setup Diagram</u> at the bottom of the FOD Test Execution panel.

- Set Qi Specification: The ^{1.2.4} ^{1.3} slider allows the user to choose and apply Qi specification version **1.2.4** or **1.3** for FOD configuration and test execution.
- **Select Testcase**: The Select Testcase drop down selects the FOD test to execute based on the Qi specification version selected.
- **Select Coil**: The Select Coil drop down selects the TPR coil assembly type to be used in the test setup.
- **Fetch Coil Qf**: The Fetch Coil Qf button when clicked calculates and displays the Reference Quality Factor value of the reference TPR coil at the **FOD Qf** field. The Reference Quality Factor value will be applied in the Extended Power Profile tests.
- **Fetch Coil Rf** (*for spec V1.3 only*): The Fetch Coil Rf button when clicked calculates and displays the Resonance Frequency value of the reference TPR coil at the **FOD Rf** field.
- **Minimum Load & Maximum/Full Load**: The Minimum Load and Maximum Load fields set the minimum and maximum (full) load conditions to be used by the selected TPR coil assembly respectively.



- **Load Step**: The Load Step field sets the variable load rate which would be the rate at which load current would continuously increase in the power transfer phase from the minimum load to the maximum load.
- **Test Duration**: The Test Duration field sets the time interval (in seconds) for which the DUT would be in the power transfer phase after initiating power transfer.
- **Resonance Frequency** (for spec V1.3 only): The Resonance Frequency field sets the resonance frequency (in percentage) of the resonant circuit.
- Δ (P): The Δ (P) field sets the Received Power Offset (in milliwatts) to be used by the TPR.
- **Δ**(**Q**): The Δ (**Q**) field sets the Reference Quality Factor offset (in percentage) to be used by the TPR.
- **Negotiate Guaranteed Power to Potential Load Power**: This checkbox when selected enables negotiation of the Guaranteed Power to be equal to the Potential Load Power.
- **Get Temperature**: Click on the Get Temperature button to acquire the temperature of the representative foreign object and ambient temperature.
- **Start Test Case**: Click on the Start Test Case button to start the FOD test execution and stream data on the trace plot in the *Results* screen. If changes are made to the test configuration, e.g., applying load or setting coil voltages, these changes can be viewed in the Results screen.

An example of the Results screen after clicking on the "Start Test Case" button is as shown below:



FIGURE 8.46: FOD START TEST CASE RESULTS SCREEN EXAMPLE

To terminate data capture, click on the **Stop Test Case** button.





• **Save Test Case**: Click on the Save Test Case button to save the FOD test data to a file in the "C:\GRL\GRL-WP-TPR-C3\Report\" folder.

8.3.3.7 Thermal Performance Measurement

The PicoScope 8-Channel Temperature Datalogger (or ThermoMux) acts as a thermometer with data logging capability that is used to determine the DUT thermal performance by measuring the top-surface temperature of the TPR-THERMAL that is positioned on the Interface Surface of the DUT.

Note: The ThermoMux is included in the list of accessories shipped with the GRL-C3 tester hardware.

The user will need to connect the ThermoMux to the control computer to measure the temperature while running the 5.4.2 Thermal Performance test cases. Once connected the GRL-C3 Browser App will read the channel information of the ThermoMux as required. Make sure that the respective channels of the ThermoMux are connected to the appropriate coil assembly or foreign object according to the specific test case:

- Connect Channel 1 of the ThermoMux to an ambient temperature probe.
- Connect Channel 2 of the ThermoMux to a foreign object.

Figure 8.47 below shows the GRL-C3 connection setup which includes the ThermoMux and TPR Thermal coil assembly.



FIGURE 8.47: THERMOMUX CONNECTION SETUP DIAGRAM



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Once the TPR Thermal coil assembly is connected to the GRL-C3 tester hardware, attach the coil's cable with the yellow pin to one of the numbered slots/channels (e.g., Channel 2) of the ThermoMux. Then connect the ThermoMux's USB cable to the control computer's USB port.

When running tests that require the use of ThermoMux, several pop-up messages will appear to guide the user through the test run. See example below:



FIGURE 8.48: THERMAL TEST RUN POP-UP MESSAGE EXAMPLE

8.3.4 Test Selection

The tests available to be run are shown on the "Test Selection" panel.

8.3.4.1 Select CTS Mode or Simple Mode

The user can toggle between the CTS Mode and Simple Mode using the Simple Mode slider.

	Test Selection	CTS Mode
Project Name: C_N_D indiesemi - V_1.3.3	Test Sequence: 💾	
Quick Select: 🔗 (🤇		0/672 🚯
Execute: Repeat: 0 🛟 Start	0	
Q Search Testcase Name		
TPR Coils Selection: All Coils Selected (18)		•
Power Transmitter Compliance Test Cases	V1.3.3 Certified	88
Mechanical tests		

FIGURE 8.49: SELECT CTS MODE OR SIMPLE MODE

The CTS Mode is applied by default while the user can optionally select the Simple Mode to run tests for pre-compliance testing, to ensure the communication is happening properly between the transmitter and receiver.

• For compliance testing, tests need to be performed using the **CTS Mode**.

If the Simple Mode is selected:

- Test timings will not be followed accurately as per the compliance test specification.
- The signal trace plot will not be displayed during test runs.



- Voltage measurements will be handled internally by the GRL-C3 tester hardware.
- Thermal performance test cases and FOD test cases will not be available in the test selection.

8.3.4.2 Select Tests

Individual tests are grouped together based on their definition in a specific version of specification. Selecting a group will cause all tests in that group to be selected. Selecting individual tests within a group will lead to just those individual tests to be selected.

Tests that comply with a certain certification standard can be selected by clicking on the **Certification** drop-down menu along with the **Power Profile** of the DUT from the "Create New Project" pop-up panel:

1			· · · · · · · · · · · · · · · · · · ·
	Create New Project		
Test Select	Project Name: Sample	Certification: V_1.2.4	
Execute: Repeat: 0 🗊 Start	Crea	ate Project	Select
Q Search Testcase Name		oupported Albor Top	
TPR Coils Selection: All Coils Selected (9)	•	Supported 2.5W Multi Tx	

FIGURE 8.50: SELECT TESTS BASED ON CERTIFICATION AND POWER PROFILE

Note: For a detailed listing of all the tests and test methodology, please refer to the specification documents referenced in Section 1.

8.3.4.2.1 V_1.2.4 Tests

Run the Base Stations compliance tests based on the Qi Wireless Specification Version 1.2.4 for DUT's supporting the Baseline Power Profile, Extended Power Profile (≤ 5 W) and the Extended Power Profile (≤ 15 W).



FIGURE 8.51: V_1.2.4 SPECIFICATION TEST SELECTION



8.3.4.2.2 V_1.3 Tests

Run the Base Stations compliance tests based on the Qi Wireless Specification Version 1.3.



FIGURE 8.52: V $_1.3$ Specification Test Selection

8.3.4.2.3 V_1.3.3 Tests

Run compliance tests for DUT's supporting the Qi Wireless Specification Version 1.3.3.



FIGURE 8.53: V $_1.3.3$ Specification Test Selection


8.3.4.2.4 Technology Development Tests

Run compliance tests for DUT's supporting the Qi Wireless Specification for technology development purposes.

		Test Selectio	n	CTSI	Mode 🔵
Project Name:	Sample - Tech	nology De 🔓	1	Test Sequence: 💾	
Quick Select:	⊘ ⊗	?			0/30 🌖
Execute:	Repeat: 0	Start 0			
Q Search Testo	case Name				
TPR Coils Selecti	ion: All Coils	Selected (1)			•
 Technology I Technology I FFSK FFSK TD_1 	Developments (gy Development Normal_Seque Authentication 1_1_PTX_AUT 1_2_PTX_AUT 1_3_PTX_AUT 1_4_PTX_AUT 1_5_PTX_AUT 1_5_PTX_AUT 1_5_PTX_AUT 1_6_PTX_AUT 1_6_PTX_AUT 1_7_PTX_AUT 1_7_PTX_AUT 1_9_PTX_AUT 1_9_PTX_AUT 1_9_PTX_AUX 1_2_PTX_APX 1_2_PTX_APX 1_2_PTX_APX 1_2_PTX_APX 1_2_PTX_APX 1_2_PTX_APX 1_2_PTX_APX 1_2_PTX_APX 1_2_PTX_APX 1_2_PTX_XXX 1_2_PTX_XXX 1_2_PTX_XXX 1_2_PTX_XXX 1_2_PTX_XXX 1_3_PTX_APX 1_3_PTX_APX 1_3_PTX_APX 1_3_PTX_APX 1_3_PTX_APX 1_4_PTX_AVT 1_2_PTX_AUT 1_2_PTX_AUT 1_4_PTX_AUT 1_2_PTX_AUT 1_2_PTX_AUT 1_4_PTX_AUT 1_2_PTX_AUT 1_2_PTX_AUT 1_4_PTX_AUT 1_2_PTX_AUT	BetaVersion 	01 102 103 01 02		

FIGURE 8.54: TECHNOLOGY DEVELOPMENT SPECIFICATION TEST SELECTION



8.3.4.2.5 V_2.0.1 Tests

Run compliance tests for DUT's supporting the Qi Wireless Specification Version 2.0.1.

	Test Selection		CTS Mode 🔵						
Project Name: Sample - V_2.0.1	📄 🔒 📜	Test Sequence: 💾 🚞							
Quick Select: 🔗 (? 🧿	✓		0/354 🚯						
Execute: Repeat: 0 📜 Start	•								
Q, Search Testcase Name									
TPR Coils Selection: All Coils Selected (10)			•						
Qi v2.0 Power Receiver Compliance Tests			00						
Mechanical tests									
Thermal tests									
Disconnected Load tests									
Connected Load tests									
Load modulation tests									
Image: Ping phase tests									
Configuration phase tests									
Power transfer phase tests									
In-power transfer tests									

FIGURE 8.55: V_2.0.1 Specification Test Selection

Tests that are applicable for a certain TPR coil that comply with a certain certification standard and power profile can be selected by clicking on the drop-down menu:

	Test Selection	CTS Mode 🔵
Project Name: Sample - V_2.0.1	Tes	t Sequence: 💾 🚞
Quick Select: 🔗 🙁 🤇	? ⊡ ✓	0/0 🚯
Execute: Repeat: 0	Start	
Q Search Testcase Name		
TPR Coils Selection: All Coils Selection	cted (10)	•
Select All		×
✓ TPR_1A		
✓ TPR_1B		
V TPR_1C		
✓ TPR_1D		
V TPR_1E		
V TPR_3		
V TPR_4		
TPR_5		•

FIGURE 8.56: SELECT TESTS BASED ON TPR COIL, CERTIFICATION AND POWER PROFILE



8.3.4.3 Manage Test Selection

You can click on the icon to select all the test cases in the list or io load an existing saved test case sequence file for running specific tests or to save the existing test case sequence to a JSON file.

Test Selection								
Project Name:	NewProject 🔓 🚺 Test Sequence: 💾 🥅							
Quick Select:	⊘ ⊗ ? ⊖ ✓ 0/1	Ð						
Execute:	Repeat: 0 🔶 Start 🕕							

8.3.5 Report Generation

The "Report Generation" panel allows full reports to be created after running a set of tests.

	Report Generation								
	BSUT Information								
Manufacturer/Brand Name	GRL								
Product Name	Qi_Charger								
Model Number	001								
Qi-ID	AA1								
Serial Number	000345								
	Test Lab Information								
Lab Name	Granite River Labs								
Lab Location	India								
Lab Manager	John								
Test Engineer	David								
E-mail									
Phone Number									
Notes/Remarks									

FIGURE 8.57: REPORT GENERATION PANEL

The "BSUT Information" and "Test Lab Information" sections are text entry fields in which the user can enter information relevant to the specific DUT and the specific set of tests about to be run. Once tests have completed, the test report can be viewed in the *Report* screen (see Section 8.4).



8.3.6 Run Tests

Once the desired test cases have been selected, they can be run by clicking on the **Start** button as indicated in Figure 8.58 below. Click on this button (**Stop**) again to terminate the test run.

				Test Se	lection		CTS Mode
Project Name:	sample	- V_1	1.2.4		1	Test Sequ	uence: 💾 🛅
Quick Select:	\odot		Exec	ute test o	ases	-	1/124 🌒
Execute:	Repeat:	0	1	Start	0		

FIGURE 8.58: RUN TESTS

You can also select the number of times to repeat running the selected tests by clicking on the

Repeat up/down button Conce testing has started you can view each test being run in real-time mode on the *Results* screen:



FIGURE 8.59: RESULTS SCREEN – TEST RUN IN PROGRESS





≡ 🥠G	RL	QI Test Power Power	Los Anderstan (1 9 1 60) i in progras, plaase wait	CTS 🔵 API 🖳 🔔
Connection	Test Results	Time[r	6_1_2_Signal_Strength	Q Search 🖉 🏹 🛛
Setup	Test Progress: 🔗 3/3 😠 0/3 🥝 0/3 😑 0/3 🛑 0 🕟 🕟	00:00:295:974	63 13: Set_RLoad 32 Ohms	,
		00:00:319:946	14: TestExecution: 0x02; SubID:0x00; Step:2;	
QI-	V OBPP EPP and EPP-5 V1.3.3	00:00:324:989	Et 15: Test_Stop	
C Exerciser	V OTD_5_1_1_Magnet_presence_check	00:00:375:870	16: Shutdown	
Tect	✓ ID_5_1_1: lest for DSUI	00:00:419:473	03 17: Ping Detected , TPR_1A	,
Configuration	✓ Ø TD_6_1_1 : Measure F(op) of AC signal	00:00:467:352	😢 18: Shutdown	
	Transmitter Operating Frequency is : 127.68KHz, Limit[100 KHz ~200 KHz]. Measured TD 6 1 1 : Measure V(r) of DC signal #TPR 14.	00:02:532:252	19:	Ping Detected , TPR_1AC3
	TPR regulated Rectified voltage Vr to [3V ~ 9V], Measured regulated Voltage is 3.914V	00:02:601:806		20: Shutdown
	V OTD_6_1_2_Signal_Strength	00:02:646:248		21: Ping Detected , TPR_1A
	 O TD 6_1_2 : Verity T_start TPR set timing in between Signal Strength and Identification data packets is 18.50 mS 	00:02:692:500		22: Shutdown 😣 👦
Report	TPR set timing in between Identification and Configuration data packets is 18.50 mS at 183	8 🗁 🕯	• 28 5 5 6 10 10 4 ▶ ▲ ▼ 10 5 1 1 10	Channels 🔻
	 OTD 6_1_2 : Measure F(op) of AC signal Transmitter Operating Frequency is : 127.68KHz. Limit [100 KHz ~ 200 KHz]. Measure 	1.0- 6.0-		
- Report	✓ ⊘ TD 6_1_2 : Measure V(r) of DC signal			
EO, Analyser	TPR regulated Rectified voltage Vr to [3V ~ 9V], Measured regulated Voltage is 3.944V TD 6. 1. 2: Measurement of Frequency packet			
	Tester sent Freq packet at 9.435 mS after stop bit of SS packet at 170.6 mS	0.1	a la haile a la h	
		4.0]//∥_/, _,	
Authenticator		0.3		
		o te	a among a	
P Help		d Volt d Cur	- -	
-		10 2.0-		
		-0.3		
		-0.7	╴╶┧╢╴╴╴╴╴╴╴も╢╴╘┰╾╴╅╼╌╂╼╌┠╼╌┟╼╌╂╼╌╂╼╌╂╼╌╂╌╴┨╴╴┨╴╴┨╴╴┨	╘─┰──╁──┧──┧╴し╢╶し╁──┟─
		-1.0-	90.00.000 00.00288 00.00576 00.00865 00.01153 00.01442 00.01730 00.02918 Time (mm.ss.ms.us) >	00:02:307 00:02:595 00:02:884

FIGURE 8.60: RESULTS SCREEN – TEST RUN COMPLETED

While tests are running, several pop-up messages will appear to guide the user through the test run. The Test Results panel will display the pass/fail/warning status of each test as well as each subtest which you can view by clicking the drop-down arrow of the test group if applicable. The Packet communications exchange protocol and waveform displays next to the Test Results panel allow you to scroll to the section representing the start of the selected test– this allows you to trace failing test to determine the cause of the test failure.

If you only want to view specific measurement channels on the trace plot, select the "Channels" drop down option and click/unclick on the checkbox(s) of the desired channels.



FIGURE 8.61: SELECT MEASUREMENT CHANNELS EXAMPLE

When the Packet communications exchange protocol is running, click on the **Stop Test Case Execution** button **O** under the Test Results panel at any time to end or pause the process respectively. To skip a test case that is currently running to the next test case, click on the **Skip Current Running Test Case** button **O**. To select specific test cases in the test sequence, click on the **D** icon. To quickly navigate to the test case that is currently running, click on the **Scroll To**

Current Test button Scroll To Current Test

Test results and configuration of any test run will automatically be saved to a JSON file in the Report folder of your PC's local file path.



To view a specific portion of the Packet communications exchange, click on the "Filter" drop down to filter out the communications list by selecting the available options:

_	Q Search	Ø	70							
	Clear Filters									
Authentication Messages										
Tester Messages										
	Qi Messages									
	SK Messages									
□F	SK Messages									
	PRx Packet									
Si	gnal strength									
ΠE	nd Power Transfer									

FIGURE 8.62: FILTER PACKET COMMUNICATIONS OPTIONS

To enable syncing of the Packet timings, click on the 🙋 icon and vice versa.

The common plot specific buttons can be used to control the trace view as desired which includes panning, merge/unmerge, fit and zooming in/out of the trace plots. You can use your mouse cursor to hover on top of each plot specific button to view the description of each button function.



FIGURE 8.63: TRACE PLOT CONTROL BUTTONS

The work buttons in particular can be selected to enable cursors for a test/subtest which lets you turn on/off vertical and horizontal markers at certain areas of the plot. You can also click on a test/subtest to navigate to the exact time stamp and packet details of the plot.

When the testing is complete, the screen displays all the data gathered during the testing process. Select the **Save trace file** button to save the trace plot to a file and the **Load trace file** button to open and use an existing saved trace file (refer to Section 8.3.6.1 for the procedure).

You can then also return to the *Test Configuration* screen to filter out the test selection list for those tests with Pass/Fail/Inconclusive/Incomplete status. This allows you to easily determine the

status of each test using the respective icons 🔗 😢 🕐 😑 under the Test Selection panel.

8.3.6.1 Load Previously Saved Trace Files for Test Capture Verification

1. In the Results screen, click on the **Load trace file** button as indicated in Figure 8.64 below.





	Connection			Test Resu	ults			Time	[m:s:m	s:µs]	Des	cription	of										Q Sea	arch	Ø	7 0
Þ	Setup	Test Progress:	Ø 0/0	× 0/0	? 0/0	<u> </u>	•																			
	QI- Exerciser																									
년— 년—	Test Configuration																									
1	Results								₽ ₽																	
	Report							B		ă (C Q	ĕ	<u>i</u> Q	jQ	•	▶		▼	ĵ	Ì	Â	Ý	۵	Channe	ls 🔻
Ēð	Report Analyser						1																			
Ë,	QI- Authenticator																									
?	Help															Drag [J & d Brow	lrop f or /se h	ile he ere	ere						

FIGURE 8.64: LOAD TRACE FILE BUTTON

2. Select the required **.grltrace** file (that was saved from a previous test run) as shown in the example in Figure 8.65 below.

← → ▼ ↑ □→ Thi	← → • ↑ 🔓 > This PC > Local Dek (C) > 68L > 68L VM-THR-CI > Report > Registry 134231382315943 > 70533323. Text 9										
Organize 👻 New folde						i: • 🔳 😲					
Organize Vew folde Vew folde Oracle access Oracle or Personal This PC B D Objects Destop Destop Downloads Maric Pictures Videos Local Disk (C) Local Disk (C) Network	n Neme ITD_ <u>53332</u> Tis <u>t</u> ûgîtrece	Date modified 13-10-2023 1756	Type GRITRACE File								
File <u>n</u> a	ime:				Custom files	ĭ					
					<u>O</u> pen	Cancel					

FIGURE 8.65: SELECT SAVED TRACE FILE

3. The selected trace file will be loaded as shown in the example in Figure 8.66 below. After loading the capture, the test data with packet, waveform & description details will





be updated and to verify the packet details, the user can click on the respective packet and select the **Expand All** button.



FIGURE 8.66: SELECTED TRACE FILE LOADED FOR VERIFICATION

4. To verify the exact failure packet, the user can just select the failure description and the GRL-C3-MP-TPT Browser App will automatically map the respective packet as shown in the example in Figure 8.67 below.

Test Results		Time[m:s:ms:µs]	Description	of TD_8_3_6_	TEST_PTX_C	PX_NEG			Q Sea	rch		@ 70
Test Progress: 🔗 0/1 💉 1/1 ? 0/1 😑 0/1 🛑 0 🕟 🕑		00:00:885:698	1	M1 : 00:00:986: Rect : 2.908 V ;	529 / AT : 24.9 0.091 A ; 0.26	9ms 5 W 00 15: 1	pecific	Request {F	Received Pow	er reporti	ng: 0x31} (lego
		00:00:917:714		, ,		UUT	16: AC	Nego				
✓ Ø V_2_0_1		00:00:953:940		M2:00:01:0	11:396 / AT : :	24.9ms		FOD Status	s {Rf:111} №	go		
TD_8_3_6_TEST_PTX_CPX_NEG_S07_RES_002		00:00:986:529		Rect : 2.898	V;0.090A;0	.261 W	UUT	18: ND	0.02			
 ID_8_3_6: Verify Negotiation Phase ID_8_3_6: Verify FOD packet 		00:01:015:950						C3 19: Tes	t_Stop			
Provide the sent FOD/rf data packet with payload as 0x3F observed at 953.9 mS		00:01:276:446					Ħ		20: Sh	utdown C	3	
FOD/rf is sent next immediate to SRQ/rpr packet Tester initiated Reserved field. Tester set field :63 Expected : 63		00:02:050:698					$\rightarrow \uparrow$			21: Pi	ng Detected	I, TPR 1F
Tester initiated invalid Mode field, Tester set field : Expected:1		00:02:123:013					++				22	Shutdown C3
Tester initiated FOD_Value field, Tester set field :111 Expected : 111		00:02:927:767					++			23: Pi	ng Detected	J, TPR 1FC3
Contract Contrac		00:03:000:018					+				24	Shutdown 03
					ia (••• •	**	•	
	1							ΥĮΨ	• ×	Y		Channels V
		1.0- 4.0										
		0.7										
		2.7										
		0.3- 8 E										
		Curre										
		ctified ctified										
		& &										
		0.0	_									
		-0.7										
		-1.0 -1.0										
		00	:00:486 00:00:54	89 00:00:691	00:00:793 Time	00:00:896 (mm:ss:ms:µ	00:00:9 s) >	98 00:01:1	101 00:01:2	03 00:01	1:306 00:0	1:408 00:01:511

FIGURE 8.67: VERIFY FAILURE PACKET



5. To remove the trace file from the screen, the user can click on the **Clear Capture** button as indicated in Figure 8.68 below.



FIGURE 8.68: CLEAR CAPTURE BUTTON

8.4 Test Report View

After running a set of tests, the GRL-C3 Browser App *Report* screen allows full reports to be created:

Connection Setup	Vew Report Deanload Current HTML Report Download Current BSUT Report Data Report Data Management								
QI- Exerciser	🌏 GRL		GRL-WP-TPR-C3 Compliance Test Report						
	BSUT Information								
e Test	Manufacturer								
Comparation	Product Name								
	Model Number								
Results	Qi-ID								
3 0	Serial Number								
	Test Information								
Report	Test Lab								
	Test Location								
	Test Manager								
Report	Test Engineer								
EQ Analyser	Email Id								
	Phone Number								
🖼 QI-	Remarks								
Authenticator	Date and Time	22-02-2024 16:38:49							
	Controller and Instrument In	formation							
P Help	Parameter	Value							
•	GRL-C3 Software Version	1.2.2.14							
	GRL-C3 Firmware Version	7.0.0.7							
	GRL-C3 HW ELoad Version	2.6							
	BSUT Name								
	Next Calibration Date	Wednesday, December 21, 2022							
	Board Calibration	Calibration Success.							
	Serial Number	GRL-C3-2019024							
	Selected Power Profile	V_1_2_4							
	BSUT Profile	врр							
	Transmitter Type								
	Potential Power	5							
	PRMC Code	0x010E							
	BDI Code	0x30313235							
	Testing Mode	CTS Mode							
	Check for SSVMAX	False							
	Internal Measurements	True							
	Enable Pop-ups	False							

FIGURE 8.69: REPORT SCREEN



If the report is not displayed when accessing the Report screen, click on the **View Report** button

View Report at the top of screen to refresh the report view.

The content of the generated reports can consist of one or more of:

- **Configuration** The product configuration information for the DUT.
- **Packet List** A list of all the packets exchanged during testing.
- **Test Results** The individual test Pass / Fail results.
- **Saved Images** Any other images created during the test process.

The most recent set of results for all tests run (regardless of when they were run) will be captured in the generated reports.

Scroll down to view the full report as shown in the example (Figure 8.70) below.

lext Calibr	ration Date 08 February 2022				
Board Calib	ibration Calibration Success.				
Serial Num	nber GRL-C3-2019019				
Selected P	Power Profile V_1_3_3				
BSUT Profi	ile BPP				
Transmitte	er Type				
Potential P	Power 5				
PRMC Code	e 0x010E				
BDI Code	0x30313235				
Testing Mo	ode CTS Mode				
Check for S	SSVMAX False				
Internal M	leasurements True				
Enable Pop	p-ups False				
Total Test(325	Cases Selected TestCases Count 325	Pass Count 3	Fail Count 0	Inconclusive Count 0	Not Run Count 322
Total Test(325	Cases Selected TestCases Count 325	Pass Count 3	Fail Count 0	Inconclusive Count 0	Not Run Count 322
Total Test(325 Result S	Cases Selected TestCases Count 325 Summary	Pass Count 3	Fail Count 0	Inconclusive Count O	Not Run Count 322
Total Test(325 Result S	Cases Selected TestCases Count 325 Summary Test ID	Pass Count 3 Test Name	Fail Count 0	Inconclusive Count 0	Not Run Count 322 Test Result
Total Test(325 Result S SI No 1	Cases Selected TestCases Count 325 Summary Test ID TD_5_1_1_Magnet_presence_check	Pass Count 3 Test Name TD_5_1_1_Magnet_presence_cht	Fail Count O	Inconclusive Count O	Not Run Count 322 Test Result PASS
Total Test(325 Result S SI No 1 2	Cases Selected TestCases Count 325 Summary Test ID TD_5_1_1_Hagnet_presence_check TD_6_1_1_Test_3a_Power_Signal_Characteristics	Pass Count 3 Test Name 10.5.1.1. Magnet, presence, chr 70.6.1.1. Test.3a. Power Sign	Fail Count 0 eck al Characterístics	Inconclusive Count O	Not Run Count 322 Test Result PASS PASS
Total Testo 325 Result S SI No 1 2 3	Cases Selected TestCases Count 325 Summary Test ID TD_5_1_1_Magnet_presence_check TD_6_1_2_Test_3a_Power_Signal_Characteristics TD_6_1_2_Signal_Strength	Pass Count 3 Test Name 10.5.1.1 Maanet, presence, ch 10.6.1.1.Test, Ja: Power, Sign 10.6.1.2. Signal, Strength	Fail Count 0 eck al Characteristics	Inconclusive Count: O	Nok Run Count 322 Test Result MASS PASS PASS
Total Test0 325 Result S SI No 1 2 3 4	Cases Selected TestCases Count 325 Summary Test ID TD_5_1_1_Magnet_presence_check TD_6_1_1_Test_3a_Power_Signal_Characteristics TD_6_1_2_Signal_Strength TD_6_2_1_Selection_Phase	Pass Count 3 Test Name TD 5.1.1 Magnet, presence, ch TD 6.1.1 Test 3a Power Signi TD 6.1.2 Signal Strength TD 6.2.1 Selection Phase	Fail Count 0 exk al Characteristics	Inconclusive Count O	Not Run Count 322 Test Result PASS PASS PASS ROT_ROH
Total Test 325 Result S SI No 1 2 3 4 5 5	Cases Selected TestCases Count 325 Summary Test ID TD_6_1_1_Test_3a_Power_Signal_Characteristics TD_6_1_2_Signal_Strength TD_6_2_1_Selection_Phase TD_6_2_7_Guaranteed_Load_Power_23a	Pass Count 3 Icst Name 10.5.1.1 Magnet, presence, ch 10.6.1.2 Signal Strength 10.6.2.2 Solution (Phase) 10.6.2.7 Guaranteed Load Point	Fail Count 0 eck al Characterístics werr 238	Inconclusive Count O	Net Run Count 322 Fest Result PASS PASS PASS PASS NOT 1004 HOT 1004
Total Test0 325 Result S SI No 1 2 3 4 5 5 6 7	Cases Selected TestCases Count 325 Summary Test ID TD_5_1_1_Magnet_presence_check TD_6_1_2_frest_3a_Power_Signal_Characteristics TD_6_1_2_Selection_Phase TD_6_2_1_Selection_Phase TD_6_2_1_Causarateed_Load_Power_23a TD_8_1_1_TEST_PTX_CPX_PM(S_501_EPT_001 TD_8_4_1_1_TEST_PTX_CPX_PM(S_501_EPT_001 TD_8_4_1_1_TEST_PTX_CPX_PM(S_501_EPT_001)	Pass Count 3 Test Name TD 5 1 1 Hannet presence.ch TD 6 1 1 Test 3a Power Sign TD 6 1 2 Signal Strength TD 6 2 1 Selection Phase TD 6 2 7. Guaranteed Load Por TD 6 1 1 TEST PTX CPX PTG TD 6 1 1 TEST PTX CPX PTG	Fail Count 0 eck al Characteristics S01 EFT 001 501 STR 001	Inconclusive Count. O	Nok Run Count 322 Test Result PASS PASS PASS 401 - 804 401 - 804 401 - 804
Total Test0 325 Result 5 SI No 1 2 3 4 5 5 6 6 7 7	Cases Selected TestCases Count 325 Summary Test ID To_5_1_1_Magnet_presence_check TD_6_1_1_Test_3a_Power_Signal_Characteristics TD_6_1_2_Signal_Strength TD_6_2_1_Selection_Phase TD_6_2_7_Guaranteed_Load_Power_23a TD_6_1_1_TEST_PTX_CPX_PMG_S01_EPT_001 TD_8_1_1_TEST_PTX_CPX_PMG_S01_EPT_002 TD_8_1_1_TEST_PTX_CPX_PMG_S01_EPT_002	Pass Count 3 Test Name 10.5.1.1 Monet. presence. ch 10.6.1.1 Test. 3a Power. Sign 10.6.2.1 Selection. Phase 10.6.2.1 Selection. Phase 10.6.3.1 TEST PTX CPX PRG 10.8.1.1 TEST. PTX CPX PRG 10.8.1.1 TEST. PTX CPX PRG	Fail Count 0 eck al Characteristics S01 FPT 001 S01 FPT 002	Inconclusive Count O	Not Run Count 322 Test Result PASS PASS PASS VOT 1004 NOT 1004 NOT 1004
Total Test 325 SI No 1 2 3 4 5 6 6 7 7 8 9	Cases Selected TestCases Count 325 Summary Test ID TD_6_1_1_Test_3a_Power_Signal_Characteristics TD_6_1_2_Signal_Strength TD_6_2_7_Guranted_Load_Power_22a TD_6_2_7_Guranted_Load_Power_23a TD_6_2_7_GURANTED_CON_Phase TD_6_1_1_TEST_PTX_CPX_PHG_S01_EPT_001 TD_6_1_1_TEST_PTX_CPX_PHG_S01_EPT_002 TD_6_1_1_TEST_PTX_CPX_PHG_S01_EPT_002 TD_6_1_1_TEST_PTX_CPX_PHG_S01_EPT_002 TD_6_1_1_TEST_PTX_CPX_PHG_S01_EPT_002 TD_6_1_1_TEST_PTX_CPX_PHG_S01_EPT_002	Pass Count 3 To 5 1 1 Magnet, presence, ch TO 6 1 1 To 6 1 2, Signal Strength To 6 2, 7, Guaranteed Load Po To 8 1, 1 TEST PTX CPX PR6, To 8, 1, 1 TEST PTX CPX PR6,	Fail Count 0 8 al Characteristics 501 EPT 001 501 EPT 002 501 EPT 002 501 EPT 002	Inconclusive Count O	Not Run Count 322 Test Result PASS PASS PASS ROT, RUN
Total Test0 325 SI No 1 2 3 4 5 5 6 7 7 8 9 9	Selected TestCases Count 325 Summary To_5_1_1_Hagnet_presence_check To_6_1_2_freat_3a_Power_Signal_Characteristics To_6_1_2_section_Phase To_6_1_2_section_Phase To_6_1_2_section_Phase To_6_1_1_TEST_PTX_CPX_PMC_Sol_EPT_001 To_6_1_1_TEST_PTX_CPX_PMG_Sol_EPT_002 To_6_1_1_TEST_PTX_CPX_PMG_Sol_EPT_002 To_6_1_1_TEST_PTX_CPX_PMG_Sol_EPT_003 To_6_1_1_TEST_PTX_CPX_PMG_Sol_EPT_003 To_8_1_1_TEST_PTX_CPX_PMG_Sol_EPT_003 To_8_1_1_TEST_PTX_CPX_PMG_Sol_EPT_003 To_8_1_1_TEST_PTX_CPX_PMG_Sol_EPT_003 To_8_1_1_TEST_PTX_CPX_PMG_Sol_EPT_003 To_8_1_1_TEST_PTX_CPX_PMG_Sol_EPT_003 To_8_1_1_TEST_PTX_CPX_PMG_Sol_EPT_003	Pass Count 3 Tots Name 10.5.1.1 Hannet presence the 10.6.1.2 Signal Strength 10.6.1.2 Signal Strength 10.6.1.1 Test Jap Power Signs 10.6.1.1 Test Pix CPX PRG 10.8.1.1 TEST PIX CPX PRG	Fail Count 0 eck al Characteristics sol 1:PT 001 	Inconclusive Count O	Not Run Count 322 Test Result PASS PASS Vort RUM Vort RUM Nort RUM
Total Test0 325 Result S SI No 1 2 3 4 4 5 5 6 7 7 8 9 9 10 11	Selected TestCases Count 325 Summary TD_5_1_1_Hagnet_presence_check TD_6_1_2_Signal_Strength TD_6_2_2_Signal_Strength TD_6_2_2_Signal_strength TD_6_2_2_Signal_strength TD_6_2_2_Signal_Strength TD_6_1_1_TEST_PTX_CPX_PMG_SOI_EPT_001 TD_6_1_1_TEST_PTX_CPX_PMG_SOI_EPT_002 TD_6_1_1_TEST_PTX_CPX_PMG_SOI_EPT_003 TD_6_1_1_TEST_PTX_CPX_PMG_SOI_EPT_004 TD_6_1_1_TEST_PTX_CPX_PMG_SOI_EPT_005 TD_6_1_1_TEST_PTX_CPX_PMG_SOI_EPT_005 TD_6_1_1_TEST_PTX_CPX_PMG_SOI_EPT_005 TD_6_1_1_TEST_PTX_CPX_PMG_SOI_EPT_005 TD_6_1_1_TEST_PTX_CPX_PMG_SOI_EPT_005	Pass Count 3 Test Name TD 5.1.1 Mount Dresence.ch TD 5.1.1 Mount Dresence.ch TD 6.1.2 Signal Strength TD 6.2.1 Selection.Phase TD 6.2.7 Guaranteed Load Per TD 8.1.1 TEST PTX CPX PHG TD 8.1.1 TEST PTX CPX PHG	Fail Count 0 eck al Characteristics S01 EPT 001 S01 EPT 002 S01 EPT 003 S01 EPT 004 S01 EPT 005 S01 EPT 005 S01 EPT 006	Inconclusive Count O	Net Run Count 322 Test Result PASS PASS 0455 057 051 051 051 051 051
Total Test 325 Result S SI No 1 2 3 4 5 6 7 8 9 10 11 12	Selected TestCases Count 325 Summary TD_6_1_1_Test_3a_Power_Signal_Characteristics TD_6_1_3_Signal_Strength TD_6_2_7_Guranted_Load_Power_23a TD_6_2_7_Guranted_Load_Power_23a TD_6_1_1_TEST_PTX_CPX_PNG_S01_EPT_001 TD_6_1_1_TEST_PTX_CPX_PNG_S01_EPT_003 TD_6_1_1_TEST_PTX_CPX_PNG_S01_EPT_003 TD_6_1_1_TEST_PTX_CPX_PNG_S01_EPT_004 TD_6_1_1_TEST_PTX_CPX_PNG_S01_EPT_004 TD_6_1_1_TEST_PTX_CPX_PNG_S01_EPT_004 TD_6_1_1_TEST_PTX_CPX_PNG_S01_EPT_004 TD_6_1_1_TEST_PTX_CPX_PNG_S01_EPT_004 TD_6_1_1_TEST_PTX_CPX_PNG_S01_EPT_004 TD_6_1_1_TEST_PTX_CPX_PNG_S01_EPT_004 TD_6_1_1_TEST_PTX_CPX_PNG_S01_EPT_005 TD_8_1_1_TEST_PTX_CPX_PNG_S01_EPT_005 TD_8_1_1_TEST_PTX_CPX_PNG_S01_EPT_005 TD_8_1_1_TEST_PTX_CPX_PNG_S01_EPT_005 TD_8_1_1_TEST_PTX_CPX_PNG_S01_EPT_005 TD_8_1_1_TEST_PTX_CPX_PNG_S01_EPT_005 TD_8_1_1TEST_PTX_CPX_PNG_S01_EPT_005 TD_8_1_1TEST_PTX_CPX_PNG_S01_EPT_005	Pass Count 3 To 5 11 Magnet, presence, ch To 6 1 1 Test 3a Power Signi To 6 1 2 Signal Strength To 6 1 2 Signal Strength To 6 1 2 Signal Strength To 6 1 1 Test 97K CPX PRG To 8 1 1 TEST PTX CPX PRG	Fail Count 0 0 edi al Characterístics Sól EPT 601 Sól EPT 602 Sól EPT 603 Sól EPT 605 Sól EPT 605 Sól EPT 605 Sól EPT 605	Inconclusive Count O	Not Run Count 322 Test Result PASS PASS PASS ROT, RUN ROT, RUN
Total Testo 325 SI No 1 2 3 4 5 6 6 7 7 8 9 10 11 12 13	Selected TestCases Count 325 Summary To 5_1_1_Megnet_presence_check To 6_1_2_freat_3s_Power_Signal_Characteristics To 6_1_2_freat_3s_Power_Signal_Characteristics To 6_1_2_signal_Strength To 6_1_2_clearanteed_Load_Power_23a To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_001 To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_003 To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_003 To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_004 To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_006 To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_006 To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_007 To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_006 To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_006 To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_006 To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_006 To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_006 To 8_1_1_TEST_PTX_CPX_PMG_S01_EPT_006	Pass Count 3 Tots Name 10.5.1.1 Hagnet presence the 10.6.1.2 Signal Strength 10.6.1.2 Signal Strength 10.6.1.1 Test Jap Power Signs 10.6.1.1 Test Pix CPX PRG 10.8.1.1 TEST PIX CPX PRG	Fail Count 0 0 eck al Characteristics sol EPT 001 501 EPT 002 501 EPT 002 501 EPT 004 501 EPT 005 501 EPT 005 501 EPT 005 501 EPT 005	Inconclusive Count O	Not Run Count 322 Test Result PASS PASS Kort, Ruk

FIGURE 8.70: SCROLL DOWN TO VIEW FULL REPORT

The buttons at the top of the Report screen perform the following functions:

View Report Download Current HTML Report Download Current BSUT Report Data Report Data Management

FIGURE 8.71: REPORT MANAGEMENT FUNCTIONS

- **View Report** Click on the View Report button at any time you want to jump to the beginning of the report or refresh the report view.
- **Download Current HTML Report** Click on the Download Current HTML Report button to save the test report in HTML format.





- **Download Current BSUT Report Data** Click on the Download Current DUT Report Data button to save all the result information to a ZIP folder.
- **Report Data Management** Click on the Report Data Management button to access other test reports including from previous test runs. This allows you to delete or save the reports as desired from the database.



8.5 JSON Report Analyzer

The GRL-C3 Browser App *Report Analyzer* screen allows the user to view, configure and manage report logs in the JSON file format. The JSON report log will be automatically generated after completion of a test run.

Connection Setup	JSON Report Analyser	1 🖲 B P 🖬 🕹
QI-	Expand All	Report.json
Exerciser	✓ Test Lab	
erest	Y Test Execution 6	
Configuration	Y Report Remark	
Results	Y Test Tool Info	
- D	V DUT Info 9	
Report	Y Testing Scopes O	
	V Digital Signature Info	
Report Analyser		

FIGURE 8.72: JSON REPORT ANALYZER SCREEN

The JSON Report Analyzer screen will display the results and configuration log of the most recent test run as shown in the Figure 8.72 example above.

8.5.1 Expand Data Fields in JSON Report

The report log has multiple fields that the user can expand to view data under each field. To

expand all fields, slide the Expand All toggle button as shown in the Figure 8.73 example below.

JSON Report Analyser					t	. 👁 (8 P	Б f	č 1	ł
Expand All		V13_INDIESEMI_5791_GRL_C3_FinalReport_2.json (15/03/2023, 12 ×	V13_INDIESEMI_5791_GRL_C3_FinalReport.json (15/03/2023, 12:00 ×	V13_INDIESEMI_5791_GRL_C3_FinalReport_1.json (15/03/2023, 12 ×	Final Report					
∧ Test Lab	6	6 (& Byx) (V BANGALORE)	6 (a tyx) (P BANGALORE)	6 (& syx) (* BANGALORE)						
Lab Name		GRL	GRL	GRL						
Lab Location		BANGALORE	BANGALORE	BANGALORE						
Lab Manager		abc	abc	abc						
Test Engineer		syx	syx	syx						
Email		xyx@graniteriverlabs.in	xyx@graniteriverlabs.in	xyx@graniterivertabs.in						
Remarks		none	none	none						
~ Test Execution	6	6 1 (GRL-WP-TPR-C3)	6 1 (GRL-WP-TPR-C3)	6 1 (GRL-WP-TPR-CS)						
Project Id		GRL-WP-TPR-C3	GRL-WP-TPR-C3	GRL-WP-TPR-C3						
Report Sequence		1	1	1						
Test Scope				TD_8_2_1_TEST_PTX_CPX_CFG_S02_IDX_002						
				TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_002						
				TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_003						
				TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_004						
		TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_007		TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_007						
		TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_011		TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_011						
		TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_015		TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_015						
		TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_017		TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_017						
		TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_020		TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_020						
		TD_8_2_6_TEST_PTX_CPX_CFG_S03_ILL_014								
		TD_8_2_6_TEST_PTX_CPX_CFG_S03_ILL_015								
		TD_8_2_6_TEST_PTX_CPX_CFG_S03_JLL_016								
		TD_8_2_6_TEST_PTX_CPX_CFG_S03_ILL_018								
		TD_8_2_6_TEST_PTX_CPX_CFG_S03_ILL_020								
		TD_8_2_8_TEST_PTX_CPX_CFG_\$04_ILL_027	TD_8_2_8_TEST_PTX_CPX_CFG_S04_ILL_027	TD_8_2_8_TEST_PTX_CPX_CFG_S04_ILL_027						
			TD_8_2_8_TEST_PTX_CPX_CFG_S04_JLL_028							
		10_8_2_8_1ES1_PTX_CPX_CFG_S04_ILL_029	10_8_2_8_1ES1_PTX_CPX_CFG_S04_ILL_029	IU_8_2_8_IEST_PTX_CPX_CFG_S04_ILL_029						
		TD 8 2 8 TEST DTV CDV CEC S04 ODT 801	TD_0_2_0_TEST_PTX_CPX_CFG_S04_ILL_000	TD 0.2.0_TEST_PIA_UPA_UPG_S04_ULL_030						
		10_0_2_9_1E31_FIX_0FX_0F3_304_0P1_001	10_0_2_9_1031_P1A_0PA_0P0_S04_0P1_001	10_0_2_9_1031_F1A_0FA_0F0_304_0P1_001						V

FIGURE 8.73: EXPAND ALL DATA FIELDS EXAMPLE



To expand only a certain field, just click on the drop-down arrow of the respective field to view the data under that field only.

8.5.2 JSON Report Data Fields Definition

The data fields in the JSON report log are based on the test configuration made by the user in *Section 8.3, Test Configuration*. Each of these data fields can be defined as follows:

8.5.2.1 Test Lab Field

Under the Test Lab field, the user can view details of the test laboratory used to run the test cases which includes the following:

- Lab Name: Name of the test laboratory.
- Lab Location: Location of the test laboratory.
- Lab Manager: Name of the personnel in charge of the test laboratory.
- Test Engineer: Name of the engineer running the tests.
- Email: E-mail contact of the personnel to be reached in regard to the test run.
- Remarks: Any remarks made on the test run.

See example in Figure 8.74 below.

JSON Report Analyser				± 🖬 🗗 4 S 👁 ±
Expand All	V13_INDIESEMI_5791_GRL_C3_FinalReport_2.json (15/03/2023, 12 ×	V13_INDIESEMI_5791_GRL_C3_FinalReport.json (15/03/2023, 12:00 ×	V13_INDIESEMI_5791_GRL_C3_FinalReport_1.json (15/03/2023, 12.0 × Final Report	
^ Test Lab 🚯	5 (# Bys) (9 BANGALORE)	(6 (± vyz) (P BANGALORE)	
Lab Name	GRL	GRL	GRL	
Lab Location	BANGALORE	BANGALORE	BANGALORE	
Lab Manager	abc	abc	abc	
Test Engineer	Syx	syx	syx	
Email	xyx@graniteriverlabs.in	xyx@graniteriverlabs.in	xyx@graniteriverlabs.in	
Remarks	none	none	none	
~ Test Execution	(GRL-WP-TPR-C3)	GRL-WP-TPR-C3	(GRL-WP-TPR-C3)	
~ Report Remark	0	0	0	
Test Tool Info O	(PW:1.0.1.125) (SW:1.2.1.80) (@ Calibrated on 2021-11-28)	(FW:1.0.1.125) (SW:1.2.1.80) (@ Calibrated on 2021-11-28)	(FW:1.0.1.125) (5W:1.2.1.40) (@ Calibratist on 2021-11-28)	
~ DUT Info (3)	9 (INDIE SEMI-65723-QI V_1.3) (BPP) (PTx)	(INDIE SEMI-05725-QI V_1.3) (BPP) (PTx)	(INDIE 5EMI-05725-01 V_1.3) (BPP) (PTX)	
Testing Scopes (6)	2 🕜 🔁 😳 🚳	🛛 💷 🚺 💶 🔘	2 🖸 🚺 🖸	
 > Digital Signature Info (2) 	0	0	0	

FIGURE 8.74: TEST LAB DATA FIELD

8.5.2.2 Test Execution Field

Under the Test Execution field, the user can view details of the test run and related information. These include the following:

- Project ID: Name of the test project.
- Report Sequence: Sequence in which is the test report was created.
- Test Scope: List of test cases that have been run.
- Test Result: Aggregate of the overall test results (% pass, fail, etc.).
- Creation Time: Time when the test report was created.





• Spec Version: Version of the Qi specification that the test cases referred to.

See example in Figure 8.75 below.

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 Test Execution 	(EPRE)	C C (6.2%)	(u.n.a.)
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	15,4,3,1,7,1131,914,094,019,343,44,00	T0,0,0,7,900,90,090,00,00,00,00	10,0,0,17,1038,975,095,000,000,000	
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		NO STRUCTURE CONTRACTOR	ROOKSEP CROSCHOLD	
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* Sighel Egranue inte	0	0	0	

FIGURE 8.75: TEST EXECUTION DATA FIELD

8.5.2.3 Report Remark Field

Under the Report Remark field, the user can view remarks of the test run that have been added to the test report. See example in Figure 8.76 below.

Note: Report Remark is the only data field that can be edited by the user. Refer to Section 8.5.4 on how to edit the data field.

JSON Report Analyser	SON Report Analyser 🕹 🖉 🖗 🕨 🖄							
Expand All		V13_INDIESEMI_5791_GRL_C3_FinalReport_2.json (15/03/2023, 12 H	V13_INDIESEMI_5791_GRL_C3_FinalReport.json (15/03/2023, 12:00 H	V13_INDIESEMI_5791_GRL_C3_FinalReport_1.json (15/03/2023, 12:0 H Final Report				
✓ Test Lab	•	(RANGALORE)	((A VYX) (V BANGALORE)				
 Test Execution 		(GRL-WP-TPR-03)	(GRL-WP-TPR cs)	GRL-WP-TPR-03				
	•	•	0	0				
Report Remark		none	none	none				
		(FW:1.0.1.125) (SW:1.2.1.40) (@ Calibrated on 2021-11-28)	(FW:1.8.1.125) (BW:1.2.1.80) (@ Calibrated on 2021-11-28)	(FW:1.0.1.125) (SW:1.2.1.86) (@ Calibrated on 2021-11-28)				
~ DUT Info	•	(NOIE 5EMI-45723-QI V_1.3) (BPP) (PTx)	(INCRESEMI-45723-QLV_1.5) (BPP) (PTx)	(INDIE SEMI-45725-GI V_1.3) (BPD) (PTx)				
✓ Testing Scopes	4 6	🔁 😳 🔁 🚥 🚳	🕶 💷 🔁 😳 🚳	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
✓ Digital Signature Info	•	•	•	•				

FIGURE 8.76: REPORT REMARK DATA FIELD

8.5.2.4 Test Tool Info Field

Under the Test Tool Info field, the user can view details of the tester hardware used for testing (e.g., GRL-C3). These include the following:

- Test Tool Manufacturer: Manufacturer of the tester hardware.
- Model Name: Tester hardware model.
- Serial Number: Serial number of the tester hardware.
- Last Calibration Date: When the tester hardware was last calibrated.



- Is Calibrated: Whether or not the tester hardware has been calibrated.
- Software / Firmware / Hardware Version: Software, firmware & hardware version numbers of the tester hardware.

See example in Figure 8.77 below.

JSON Report Analyser				1 🔍 🖉 🖓 🕹
Expand All	V13_INDIESEMI_5791_GRL_C3_FinalReport.json (15/03/2023, 12:00: ×	V13_INDIESEMI_5791_GRL_C3_FinalReport_1.json (15/03/2023, 12:0 ×	V13_INDIESEMI_5791_GRL_C3_FinalReport_2.json (15/03/2023, 12 ×	Final Report
✓ Test Lab	6 (4 syz) (9 BANGALORE)	6 (a tyx) (9 BANGALORE)	6 (a syx) (9 BANGALORE)	
Test Execution 6	GRL-WP-TPR-C3	6 (1) (GRL-WP-TPR-C3)	GRL-WP-TPR-C3	
	0	0	0	
∧ Test Tool Info 3	(FW:1.0.1.125) (\$W:1.2.1.50) (@ Catterated on 2021-11-38)	8 (FW:1.0.1.125) (SW:1.2.1.60) (@ Cattoraled on 2021-11-28)	8 (FW:1.0.1.125) (SW:1.2.1.60) (@ Cathorised on 2021-11-28)	
Test Tool Manufacturer	Granite River Labs	Granite River Labs	Granite River Labs	
Model Name	GRL-WP-TPR-C3	GRL-WP-TPR-C3	GRL-WP-TPR-C3	
Serial Number	GRLC3-2019023	GRLC3-2019023	GRLC3-2019023	
Last CalibrationDate	2021-11-28	2021-11-28	2021-11-28	
Is Calibrated	✓	✓	✓	
Software Version	1.2.1.60	1.2.1.60	1.2.1.60	
Firmware Version	1.0.1.125	1.0.1.125	1.0.1.125	
Hardware Version	E-2.6	E-2.6	E-2.6	
V DUT Info 3	9 (INDIE SEMI-45723-QI V_1.3) (BPP) (PTX)	3 (INDIE 5EMI-d6723-QI V_1.3) (BPP) (PTX)	9 (INDIE 5EMI-d5723-QI V_1.3) (BPP) (PTx)	-
V Testing Scopes 46	2 💷 🚺 💶 💷	22 😢 🚯 😢 🕕	2 12 12 10	
 ✓ Digital Signature Info 	2	2	2	

FIGURE 8.77: TEST TOOL INFO DATA FIELD

8.5.2.5 DUT Info Field

Under the DUT Info field, the user can find details of the device under test, which include the following:

- DUT Type: DUT type of either power transmitter or receiver.
- Brand Name: Brand of the DUT.
- Product Name: Vendor-defined name of the DUT.
- Qi-ID: Qi identification of the DUT.
- Serial Number: Serial number of the DUT.
- Power Profile: Power profile of either "BPP" (Baseline Power Profile), "EPP" (Extended Power Profile) or "EPP5" (Extended Power Profile 5) as supported by the DUT.
- Specification Supported: Qi specification as supported by the DUT.
- Base Station Details: Capabilities of the Base Station under test DUT.
- Mobile Device Info: Capabilities of the Mobile Device under test DUT.

See example in Figure 8.78 below.



JSON Report Analyser								± 🖉	C∦ P ∣	
Expand All	_	V13_INDIESEMI_5791_GRL_C3_FinalReport	t.json (15/03/2023, 12:00:09) 🛛 🗙	V13_INDIESEMI_5791_GRL_C3_FinalRepo	rt_1.json (15/03/2023, 12:04:54) 🛛 🕷	V13_INDIESEMI_5791_GRL_C3_FinalRep	ort_2.json (15/03/2023, 12/09/37) 🛛 🕷	Final Report		
△ DUT Info	•	•	(NO16 16M1-06723-Q1V_11) (8PP) (PTx)	•	(NOIE 8EMI-06720-GI V_1.1.) (EPP) (PTx)	•	(NOIE IENI (4172) (41 V., 1.3) (8PP) (PTx)			
DUT Type		PTx		PTx		PTx				
Brand Name		INDIESEMI		INDIESEMI		INDIESEMI				
Product Name		INDIESEMI		INDIESEMI		INDIESEMI				
QLID		d6723		d5723		d5723				
Serial Number		9939200		9939200		9939200				
Power Profile		866		866		BPP				
Specification Supported		V_1.3		V_1.3		V_1.3				
Base Station Details		Manufacturing Code	0x00FB	Manufacturing Code	0x00FB	Manufacturing Code	0x00FB			
		Transmitter Type	MP-A5	Transmitter Type	MP-A5	Transmitter Type	MP-A5			
		Potential Load Power	15	Potential Load Power	15	Potential Load Power	15			
		Is WPID Supported	×	Is WPID Supported	×	Is WPID Supported	×			
		Is Authentication Supported	✓	Is Authentication Supported	✓	Is Authentication Supported	✓			
		Is Simultaneous Incoming and Outgoi Supported	****	Is Simultaneous Incoming and Outgo Supported	ing 🗙	Is Simultaneous Incoming and Outg Supported	oing 🗙			
		Is Out of BandCommunication Support	ted 🗙	Is Out of BandCommunication Suppo	orted 🗙	Is Out of BandCommunication Supp	orted 🗙			
		Max Transport Layer Buffer Size	128	Max Transport Layer Buffer Size	128	Max Transport Layer Buffer Size	128			
		Is Non Resonance Sensitive	×	Is Non Resonance Sensitive	×	Is Non Resonance Sensitive	×			
		Supported Prop Data		Supported Prop Data		Supported Prop Data				
		Srq Prop		Srq Prop		Srq Prop				
		Ado Prop		Ado Prop		Ado Prop				
		Is 2.5W Support	×	Is 2.5W Support	×	Is 2.5W Support	×			
		Is MultiTx	×	Is MultiTx	×	Is MultiTx	×			
		No of MultiCoils	1	No of MultiCoils	1	No of MultiCoils	1			
Mobile Device Info		Manufacturing Code		Manufacturing Code		Manufacturing Code				
		Is Negotiation Support	×	Is Negotiation Support	×	Is Negotiation Support	×			
		Is Authentication Supported	×	Is Authentication Supported	×	Is Authentication Supported	×			
		Is Out of Band Communication	. ×	Is Out of Band Communication	×	Is Out of Band Communication	×			
		Is Simultaneous Incoming and Outgoi	ng 🗙	Is Simultaneous Incoming and Outgo	ing 🗙	Is Simultaneous Incoming and Outg	oing 🗙			
		Supported Prop Data		Supported Prop Data		Supported Prop Data				

FIGURE 8.78: DUT INFO DATA FIELD

8.5.2.6 Testing Scopes Field

Under the Testing Scopes field, the user can view the list of executed test cases with their respective results, overall test results and the option to view details of each test case. See example in Figure 8.79 below.

JSON Report Analyser	1. 👁	8 2 6 6 ±
(Expand All	V13_INDIESEMI_5791_GRL_C3_FinalReport_json (15/03/2023, 12:00.09) ×	A
✓ Test Lab	0 0	(& U)X) (V EANOALORE)
✓ Test Execution	GG	(GRL-WP-TPR-CI)
✓ Report Remark	0 0	
Y Test Tool Info	() () (P(:14.158)	(W:12.1.80) (@ Calibratiation 2021.11.28)
→ DUT Info		
	m m m m Overall result	
TD 8.2.8 TEST PTX CPX CFG S04 III 027		View Details
TD 8 2 8 TEST PTX CPX CFG S04 ILL 028	Pass	view Details
TD 8 2 8 TEST PTX CPX CFG 504 ILL 029	Pass	
TD, 8, 2, 8, TEST, PTX, CPG, 504, JLL, 030	Pass	•
TD.8.2.9.TEST.PTX.CPX.CPG.504.0PT.001 List of testcases	Pass	
TD_8,2,17,TEST_PTX_CPX_CFG_S05_ILL_008	Pass Result	•
TD_8,2,17,TEST_PTX,CPX,CFG_S05_ILL_009	Pass	
TD.8.2.17.TEST.PTX.CPX.CFG.505.JUL.010	Pass	٠
TD_8.2_17_TEST_PTX_CPX_CFG_S05_ILL_011	Inconclusive	٠
TD_8.2_17_TEST_PTX_CPX_CFG_505_ILL_012	Inconclusive	æ
TD_8_2_17_TEST_PTX_CPX_CFG_505_ILL_013	Inconclusive	
TD_8_2_17_TEST_PTX_CPX_CFG_S05_ILL_014	Inconclusive	
TD_8_2_17_TEST_PTX_CPX_CFG_505_ILL_015	Pass	•
TD_8,2_18,TEST_PTX_CPX_CFG_S05_ILL_016	Fal	
TD_8,2,18,TEST,PTX,CPK,CFG,S05,ILL,017	Fal	
TD_8_2_18_TEST_PTX_CPX_CFG_S05_ILL_018	Fal	
TD_8_2_18_TEST_PTX_CPX_CFG_S05_ILL_019	Fail	•
TD_8_2_18_TEST_PTX_CPX_CFG_505_ILL_020	Fai	
TD_8_2_18_TEST_PTX_CPX_CFG_505_ILL_021	Fai	•
TD_8_2_18_TEST_PTX_CPX_CFG_505_IIL_022	Fai	•
TD_8,2,18,TEST_PTX_CPX_CFG_S05_ILL_023	Inconclusive	•
TD_8_2_18_TEST_PTX_CPX_CFG_505_ILL_024	Inconclusive	•
TD_8.2.18.TEST_PTX_CPX_CFG_505_IIL_025	Fal	•
TD_8_2_18_TEST_PTX_CPX_CFG_506_ILL_026	Inconclusive	•
TD_8.2_18_TEST_PTX_CPX_CFG_505_ILL_027	Inconclusive	
TD_8_2_18_TEST_PTX_CPX_CFG_505_ILL_028	Pass	•
TD_8_2_18_TEST_PTX_CPX_CFG_505_ILL_029	Pass	•
✓ Digital Signature Info		v

FIGURE 8.79: TESTING SCOPES DATA FIELD





To view details of a test case, click on the View Details icon <a> of the respective test case. This will display the signal trace plot along with the Packet transaction log for the test case. An example is shown in Figure 8.80 below.

Also see Section 8.5.3, Load Multiple JSON Report Files for more details when loading and comparing between multiple JSON files.



FIGURE 8.80: VIEW TEST CASE DETAILS

8.5.2.7 Digital Signature Info Field

Under the Digital Signature Info field, the user can find the Encrypted Hash 256 Bits algorithm and Test tool public key of the Qi DUT.

JSON Report Analyser				1 🗗 🕺 🖉 🕹 📩
Expand All		V13_INDIESEMI_5791_GRL_C3_FinalReport.json (15/0 X	V13_INDIESEMI_5791_GRL_C3_FinalReport_1.json (15 X	V13_INDIESEMI_5791_GRL_C3_FinalReport_2 Final Report
✓ Test Lab	6	6 (\$ Syx) (P BANGALORE)	6 (& syx) (@ BANGALORE)	6 <u>(å syx</u>
✓ Test Execution	6	GRL-WP-TPR-C3	GRL-WP-TPR-C3	6 1
✓ Report Remark	1	0	0	
✓ Test Tool Info	8	8 (FW:1.0.1.125) (SW:1.2.1.60) (@ Calibrated on 2021-11-28)	8 (FW:1.0.1.125) (SW:1.2.1.68) (@ Calibrated on 2021-11-28)	8 (FW:1.0.1.128) (SW:1.2.1.60) (@ Call
✓ DUT Info	9	9 (INDIE SEMI-d5723-QI V_1.3) (BPP) (PTx)	9 (INDIE SEMI-d5723-Qi V_1.3) (BPP) (PTx)	9 (INDIE SEMI-d5723-Qi V
✓ Testing Scopes	46	27 11 8 8 0	32 24 6 2 0	23 17 2 10 0
^ Digital Signature Info	2	2	2	2
Encrypted Hash 256 Bits		Mv8hawyW9WRI458snwzYrSIrWCWd6r8Z7Ias57XLvy3S	qfdInR5AHBVfPAs7pm3nsjCrY+ca+0DnCt1rnwSX2pvMH	SLjw+EPDJol4mY8eTNmEldDjKl5hg+4Lwz
Test Tool Public Key		vSPpZZ4r5zhM3rlaS75i33l6wgQjk9YR1y/QV6+r2NoJS8I	vSPpZZ4r5zhM3rlaS75i33l6wgQjk9YR1y/QV6+r2NoJS8I	vSPpZZ4r5zhM3rlaS75i33l6wgQjk9YR1y/Q

FIGURE 8.81: DIGITAL SIGNATURE INFO DATA FIELD



8.5.3 Load Multiple JSON Report Files

The user can load multiple JSON reports from existing JSON files and compare the results. To load the JSON report files, follow the steps below.

1. Click on the Upload icon 📤 at the top right of the JSON Report Analyzer screen as shown in Figure 8.82 below.

JSON Report Analyser	± i j 4 5 0 ±
Expand All	Report,ison

FIGURE 8.82: UPLOAD JSON REPORT ICON

2. The following pop-up window will appear as shown in Figure 8.83. The "Local File" panel on the left will show the list of all JSON report files that have been generated from previous test runs and stored in the default file location. The user can select one or more of these files and click on the **Upload** button on the bottom right of the window.

Alternatively, the user can drag and drop JSON files from the list on to the "Drag and drop" box on the right and then click on the **Upload** button.

If the required JSON files are stored in another directory other than the default file location, click on the "Drag and drop" box to browse for the files. After selecting the required JSON files, click on the **Upload** button.

JSON Report Ana	alyser		
Expand All	Upload JSON		*
∨ Test Lab	Local File	Drag and drop	~
✓ Test Execution	✓ ☑ D Report ✓ ☑ D GRI V13 090123 152219		
✓ Report Remark			
✓ Test Tool Info	 Project_V13_060123_145459 Project_V13_060123_145459 		Nihoro
✓ DUT Info	 Project_V13_060123_124932 Project V13 060123 124522 	Drag & Drop JSO	N nere
✓ Testing Scopes	 C Project_V13_060123_114640 C Project_V13_060123_114454 	Browse here	3
 Digital Signature Info 	> > Project_V13_050123_161109 > > Project_V13_050123_17548 > > Project_V13_050123_17548 > > Project_V13_050123_173857 > > Project_V13_050123_173701 > > Project_V13_060123_173701 > > Project_V13_060123_173701 > > Project_V13_060123_160802 > > Project_V13_060123_160802 > > Project_V13_060123_160802 > > Project_V13_00123_16542 > > Project_V13_00123_165425 > > Project_V13_00123_165485 > > Project_V13_00122_174420 > > Project_V13_01222_174207		Lupicad (1)

FIGURE 8.83: SELECT JSON FILES TO UPLOAD

3. After clicking on the **Upload** button, the selected JSON files will be loaded on to the *JSON Report Analyzer* screen as shown in the example in Figure 8.84 below.





😑 🥠 GF	۲.				QI Test Power Rece GRL-N	iver Application (1.2.1.60) NP-C3-TPR				стя	🗩 API 📴 🚺
Connection Setup	JSON Report Analyser									1 💿 🕜 P	Ē û ≛
. QI-	Expand All		V13_GRL_C3_FinalReport.json (03/03/2023, 20:28	-35) X	V13_GRL_C3_FinalRep	ort.json (03/03/2023, 21:00:52) X	V13_GRL_C3_Fina	IReport.json (04/03/2023, 13:27:22) 🗙	Final Report		
Exerciser	✓ Test Lab	G	0	(No data)	0	(No data	•	No data			
₫— ^{Test}	✓ Test Execution	6	()	GRL-WP-TPR-C3	6 1	GRL-WP-TPR-C	O O	GRL-WP-TPR-CS			
-Configuration	∧ Report Remark	•	0	No data Editable	0	No data Editable	•	No data (Editable)			
Results	Report Remark										
	✓ Test Tool Info	•	(FW:1.0.1.125) (SW:1.2.1)	58 @ Calibrated on 2021-11-28	0	(FW:1.0.1.126) (SW:1.2.1.58) (Q Calibrated on 2021-11-0	3	FW:1.0.1.125 (8W:1.2.1.58) @ Calibrated on 2021-11-28			
Report	✓ DUT Info	•	6)	GIV_1.5 (EPP) (PTx)	3		5	QIV_1.3 (EPP) (PTx)			
- Denut	✓ Testing Scopes	69	2 💶 💶 😳		43 63 62 🤇	9 🖸	12 💽 🚺	0 10 10			
Analyser	V Digital Signature Info	2	2		2		2				
QI- Authenticator											
9 Help											

FIGURE 8.84: JSON FILES LOADED ON SCREEN EXAMPLE

8.5.3.1 Compare Multiple JSON Report Files Results

When expanding the Testing Scopes data field (as described in Section 8.5.2.6) and clicking on the View Details icon ⁽²⁾ of the respective test case, the user can slide the **Compare Reports** toggle button ^{Compare Reports} (²⁾ to compare the results between the loaded JSON files.

In the example in Figure 8.85 below, the user can select any of the loaded JSON files (as indicated by "1", "2" and "3") to view and compare the results for a particular test case.

JSON Report Ar	nalyser							± ● ♂ ₽ Њ ⊕ ±
Expand All			5/03/2023, 12:00:09) × V13_INC		023, 12:04:54) ¥ V13_INDIESEMI,	_5791_GRL_C3_FinalReport_2.json (15/03/2023, 12-09-37) ×		
✓ Test Lab	6	G	(4 Syx) (V BANGALORE) 6		(& SYX) (P BANGALORE) 6	(4 SYX) (V RANOLLOR		
✓ Test Execution	Testscope Details							Compare Reports 💽 🗙
Report Remark	Re-Ping Delay	1000		1000	1000			
Test Tool Info	Choose a file to view graph and log table:							
 DUT Info 	V13_INDIE SEMI_5791_GRL_C3_FinalReport	tjson V13_INDIESEMI_5791_GRL_C3_FinalReport	t_1.json V13_INDIESEMI_5791_GRL_C3_Fina	sReport_2 json				
 Testing Scopes 	Signal elot 1	2	3					
TD_8_2_1_TEST_PTX_C								⊛⊝ Q.∄ ♠ ≣
TD_8_2_2_TEST_PTX_C	9.1315		A (\wedge	0.2937
TD_8_2_2_TEST_PTX_C	6.8485		$- \land - \land$	\ /	\ / /		_/ \	0.2203
TD 8 2 2 TEST PTX C	1							1
TD_8_2_2_TEST_PTX_C	4.5607							0.1400 ng
TD_8_2_2_TEST_PTX_C	2.2829		$/ \wedge /$					0.0734
TD_8_2_2_TEST_PTX_C				→ Time	(Secs)			
TD_8_2_2_TEST_PTX_C	0	0.8000	1.0	000	2.4000	3.2000	4.0000	0.000
TD_8_2_6_TEST_PTX_C				Rectified_Voltage Volt	Rectified_Current Amps			
TD_8_2_6_TEST_PTX_C	Test Logs							
TD_8_2_6_TEST_PTX_C	Origin of Packet	TimeStamp	Packet Type	Packet Subtype	Packet Duration	Raw Data		
TD_8_2_6_TEST_PTX_C	No filter		No filter 🗸 🗸	No filter 🗸				
TD 8 2 8 TEST PTX C	Seat	10.020203 11.04.11	AGY	MontEnglian	64 772	Dv71 0v13 0v1 0va 0v30 0v31 0v23 0v36 0v8h		
TD_8_2_8_TEST_PTX_C	um.	100010000, 11.09.11	~		unit.	ers i fer i sterri feren ferende erse ferend ferende		
TD_8_2_8_TEST_PTX_C	Sent	15/03/2023, 11:54:11	ASK	Identification	54.772	0x71.0x13.0x1.0xe.0x49.0xef.0xf7.0x87.0xbb		
TD_8_2_9_TEST_PTX_C								
TD_8_2_10_TEST_PTX_	Sent	15/03/2023, 11:54:11	ASK	Signal_Strength	21.760	Dx1,Dx64,Dx65		
TD_8_2_12_TEST_PTX_	Seat	16102/2022 11:64-12	ASY	Sizesi Streeth	21 750	D-1 D-04 D-05		
TD_8_2_13_TEST_PTX_				-9				
TD_8_2_14_TEST_PTX_	Sent	15/03/2023. 11:54:12	ASK	Signal_Strength	21.759	0x1,0x84,0x85		
TD_8_2_17_TEST_PTX_								
TD_8_2_17_TEST_PTX_	Sent	16/03/2023, 11:54:13	ASK	Signal_Strength	21.760	Dx1,0x84,0x85		
TD_8_2_17_TEST_PTX_C	PX_CFG_S05_ILL_011	Inconclusive	@ Pass		@ Inconclusive		a	
								h

FIGURE 8.85: SELECT AND COMPARE MULTIPLE JSON FILES RESULTS

8.5.4 Manage JSON Reports

Use the following icons *P* on the top right of the *JSON Report Analyzer* screen to configure and manage the JSON reports.



JSON Report Analyser		± • 🕑 ۲ 🖪 🕯
Expand All	Report.json	

FIGURE 8.86: MANAGE JSON REPORT ICONS

- 🦳 🖉 Click on this icon to edit the JSON report. Note: Only the Report Remark field can be edited (refer Section 8.5.2.3, Report Remark Field).
- \mathbb{P} Click on this icon to merge two or more JSON reports (refer Section 8.5.5 below).
- 🗈 Click on this icon to view a summary of the JSON report. An example is as shown in Figure 8.91 below which displays the number of test cases with their respective test run results for each JSON report.





The user can also switch to view the cumulative results for the test cases of each JSON

Test reports



FIGURE 8.88: JSON REPORT TEST REPORTS SUMMARY EXAMPLE





The user can download/save the report summary to an SVG, PNG or CSV file by clicking on ≡ and selecting the file type as shown in Figure 8.89 below. The user can find the saved report file in the Downloads folder.



FIGURE 8.89: JSON REPORT TEST REPORTS SUMMARY EXAMPLE

• 🛍 – Click on this icon to delete the JSON report.

8.5.5 Merge Results of Multiple JSON Report Files

After loading two or more JSON report files, the user can merge the results of these files into one report as required. Follow the instructions below:

1. Click on the Merge icon \mathbb{P} as shown in Figure 8.90.

JSON Report Analyser					± • • • • • • •
Expand All		V13_INDIESEMI_5791_GRL_C3_FinalReport.json (15/03/2023, 12:00: ¥	V13_INDIESEMI_5791_GRL_C3_FinalReport_1.json (15/03/2023, 12.0 ×	V13_INDIESEMI_5791_GRL_C3_FinalReport_2.json (15/03/2023, 12: × Final Report	t 📈 .
✓ Test Lab	6	(S BANGALORE)	(6 (& Byx) (@BANGALORE)	Merge Icon
✓ Test Execution	6	(GRL-WP-TPR-C3)	GRL-WP-TPR-C3	GRL-WP-TPR-C3	-
✓ Report Remark		0	0	0	

FIGURE 8.90: MERGE ICON

 Then click on the Testing Scopes data field and select the test results from JSON Report #1, JSON Report #2 and JSON Report #3 as indicated in the Figure 8.91 example below. The selected test results will be reflected under "Final Report" as merged results.





JSON Report Analyser		JSON Report #1		JSON Report #2		JSON Report #3		1 • 8 ¥ B	ń ±
Expand All	V	8_INDIESEMI_5791_GRL_C3_FinalReport.json (15/03/2023, 12.00:09) ×	V13_INDIESEMI	.5791_GRL_C3_FinalReport_1.json (15/03/2023, 12:04:54) *	V13_INDIESEML	5791_GRL_C3_FinalReport_2.json (15/03/2023, 12.09:37)	Final Report		A
~ Test Lab	0	L (3) (VBANGALORE)	6	(& SYX) (9 BANDALORE)	6	(& Syx) (V BANDALORE)			
~ Test Execution	6	(ORLWP-TPR-CO)	6 6	(ORL-WF-TPR-CO)	6 6	(ORL-WP-TPR-CO)			
~ Report Remark	DC		0		0				
✓ Test Tool Info	DC	(FW:1.0.1.128) (W:1.2.1.89) (@ Calibrated on 2021-11.31	8	(FW:1.0.1.128) (BW:1.2.1.80) (@ Calibrated on 2021.11.23)	8	(PW:1.4.1.128) (8W:1.2.1.80) (@ Calibrated on 2021.11.28)			
× DUT Info			0		•			Merged Results	
a Testing Sconer				6 2 6		2 0 0	Final rep	oort 💋	Remove AI
TD 8 3 1 TECT BTY CBY CEG 503 IDV 003	-						P		
TD 8 2 2 TEST PTX CPX CFG 502 UL 002			 Inconclusiv 				Inconclusive		
TD 8 2 2 TEST DTX CPX CF5 S02 UL 003			Pass				Pass		
TD 8 2 2 TEST PTX CPX CFG S02 ILL 004			Pass				Pass		0.0
TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_007			Pass		O Pass	•	Pass		0.0
TD_8_2_2_TEST_PTX_CPX_CFG_502_ILL_011			Pass		O Pass		Pass		0.0
TD.8.2.2.TEST_PTX_CPX_CFG_502_ILL_015			Pass	*	O Pass		Pass		8
TD_8_2_2_TEST_PTX_CPX_CFG_502_ILL_017			Pass		O Pass		Pass		0.0
TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_020			Pass	*	O Pass		Pass		0.0
TD_8_2_6_TEST_PTX_CPX_CFG_S03_ILL_014					Pass	٠	Pass		8 👁
TD_8_2_6_TEST_PTX_CPX_CFG_S03_ILL_015					Pass	•	Pass		0.0
TD_8_2_6_TEST_PTX_CPX_CFG_S03_ILL_016					Pass	•	Pass		0.0
TD_8_2_6_TEST_PTX_CPX_CFG_S03_ILL_018					Pass	*	Pass		0.0
TD_8_2_6_TEST_PTX_CPX_CPG_S03_ILL_020					 Inconclusive 		Inconclusive		10 m
TD_8_2_8_TEST_PTX_CPX_CFG_S04_JLL_027	9	Pass	○ Pass	•	Pass	•	Pass		0.0
TD_8_2_8_TEST_PTX_CPX_CFG_S04_ILL_028	•	Pass test results *					Pass		0 @
TD_8_2_8_TEST_PTX_CPX_CFG_S04_ILL_029	•) Pass 🔹 🔅	O Pass	*	O Pass	*	Pass		0.0
TD_8_2_8_TEST_PTX_CPX_CFG_S04_ILL_030	_) Pass 🔹 👁	O Pass	*	 Inconclusive 	*	Pass		0 👁
TD_8_2_9_TEST_PTX_CPX_CFG_S04_OPT_001) Pass 🔹	 Inconclusiv 	• •	O Pass	•	Pass		0.0
TD_8_2_10_TEST_PTX_CPX_CFG_S04_PCH_001			O Pass	٠	Inconclusive	•	Inconclusive		0.0
TD_8_2_11_TEST_PTX_CPX_CFG_S04_PCH_002			O Pass	*	Inconclusive	•	Inconclusive		0.0
TD_8_2_12_TEST_PTX_CPX_CFG_S04_RES_001			O Pass	٠	Inconclusive	•	Inconclusive		0.0
TD_8_2_13_TEST_PTX_CPX_CFG_S05_BPX_001			O Pass	*	Inconclusive	•	Inconclusive		0.0
10_8_2_14_TEST_PTX_CPX_CFG_S05_8PX_012		- Dava -	O Pass	*	Pass	*	Pass		
10_8_2_17_TEST_PTX_CPX_CFG_505_ILL_008	9	9 mm	O Pass	*	Inconclusive	*	inconclusive		
10,8,2,17,1531,P1X,CPX,CFG,505,JLL,009	0	, ras 9	O Pass	*	Inconclusive	*	Inconclusive		
TD 8 2 17 TEST DTV CDV CPG S05 UL 010) rass 🛷	O Pass	*	 Inconclusive Inconclusive 	*	Inconclusive		
10.002.01101.P1A.CPA.CP0.505.00.001		i moononaama 🧶	0 1 435	٠	 monordsive 				u 👁 y

FIGURE 8.91: MERGED TEST RESULTS FROM MULTIPLE JSON REPORT FILES

3. If the user wants to delete certain results in the final merged report, click on the Delete icon for the respective result. The user can also delete all merged results by selecting "Remove All".

8.5.6 Download/Export JSON Reports

The user can download the JSON reports or export the reports to HTML or PDF files using the following steps:

- 1. Click on the Download icon 📥 at the top right of the JSON Report Analyzer screen as shown in Figure 8.92 below.
- 2. Select "JSON" to download/save the reports as JSON files, or select "HTML" and "PDF" to export the reports to HTML and PDF files respectively. Otherwise select "All" to save the reports in all of these three file formats.
- 3. Then, click on the **Export** button. The user can find the exported/downloaded report files in the Downloads folder.



JSON Report Analyser								1 👁 🕜 🕨 🖪 🖞 土
C Expand All	V13, INDIESEMI,	5791_GRL_C3_FinalReport.json (15/03/2023, 12:00:09) ×	V13_INDIESEMI_5791_GF	IL_C3_FinalReport_1_joon (15/03/2023, 12:04:54)	V13.JNDIESEMI, 5791, GRL, C3.J	FinalReport, 2 json (15/13/2023, 12:09:37) 🕷	Final Report	
~ Test Lab	6	(& tyr)(V BANDALORE)	6	(BRUALORE)	0	(& TYR) (FEANDALORE)		
 Test Execution 	0	(0RL@P.TPR.CI)	0	(0#L-#F-TFR-CE)	0	(ORL-WP-TPR-CO)		JSON 3
~ Report Remark	0		0		0			Cancel Appen
~ Test Tool Info	0	(FW1.8.1.126) (EW1.2.1.88) (@ Calibrate on 2021.11.03)	0	(FW141126) (BW12188) (@ Calibrated on 202115.03)	0	(FW:1.0.1.126) (FW:1.2.1.40) (@ Calibrated on 2021.11.22)		
~ DUT info	0	(nosism.coll.g.v.1.) (899) (Pl)	0	(NOS 1691-06712-07V_1.2) (879) (PTs)	0	(NDIE 6689-46722-42 V_1.3) (879) (97x)		
	• 77 61	000	• 🖸 🖸 🚯	0	• 🖸 💷 🔁 😳 (0		Remove Al
TD,8,2,1,TEST,PTX,CPK,CFG,S02,IDX,002			Pass				Pass	
TD_8_2_2_TEST_PTX_CPX_CFG_502_ILL_002			Inconclusive				Inconclusive	
TD_8_2_2_TEST_PTX_CPK_CFG_502_ILL_003			Pass	•			Pass	
TD_8_2_2_TEST_PTX_CPX_CFG_502_ILL_004			Pass				Pass	
TD.8.2.2.TEST.PTX.CPK.CFG.502.ILL.007			Pass	•	O Pass	•	Pass	
TD_8_2_2_TEST_PTX_CPX_CFG_S02_ILL_011			Pass		O Pass		Pass	
TD_8.2.2.TEST_PTX_CPX_CFG_502_ILL_015			Pass	•	O Pass		Pass	
TD_8_2_2_TEST_PTX_CPX_CPG_502_ILL_017			Pass	•	O Pass		Pass	
TD_8.2_2_TEST_PTX_CPX_CFG_S02_ILL_020			Pass	•	O Pass	•	Pass	B +
TD_8_2_6_TEST_PTX_CPX_CFG_503_ILL_014					Pass	•	Pass	
TD_8_2_6_TEST_PTX_CPX_CFG_S03_ILL_015					Pass	•	Pass	
TD_8_2_6_TEST_PTX_CPK_CFG_503_ILL_016					Pass	٠	Pass	
TD_8_2_6_TEST_PTX_CPX_CPG_S03_ILL_018					Pass		Pass	
TD_8,2_6_TEST_PTX_CPX_CFG_503_ILL_020					Inconclusive	•	Inconclusive	
TD_8_2_8_TEST_PTX_CPX_CFG_S04_ILL_027	O Pass	•	⊖ Pass	•	Pass	•	Pass	
TD_8_2_8_TEST_PTX_CPX_CFG_S04_ILL_028	Pass	•					Pass	
TD_8_2_8_TEST_PTX_CPX_CFG_S04_ILL_029	Pass	•	O Pass	*	O Pass	*	Pass	8 e
TD.8.2.8.TEST.PTX.CPX.CFG.504.JLL.030	Pass	•	O Pass	•	 Inconclusive 	*	Pass	
TD_8_2_9_TEST_PTX_CPK_CFG_S04_OPT_001	Pass	•	 Inconclusive 		O Pass	*	Pass	
TD_8.2_10_TEST_PTX_CPX_CFG_S04_PCH_001			O Pass	•	Inconclusive	*	Inconclusive	8 · •
TD_8_2_11_TEST_PTX_CPX_CFG_S04_PCH_002			O Pass	•	Inconclusive	•	Inconclusive	
TD_8_2_12_TEST_PTX_CPX_CFG_S04_RES_001			O Pass	•	Inconclusive	•	Inconclusive	
TD_8_2_13_TEST_PTX_CPX_CFG_505_BPX_001			O Pass	*	Inconclusive	*	Inconclusive	
TD_8_2_14_TEST_PTX_CPX_CFG_505_8PX_012			⊖ Pass	•	Pass	•	Pass	
TD_8_2_17_TEST_PTX_CPX_CFG_505_ILL_008	O Pass	•	O Pass	*	Inconclusive	*	Inconclusive	
TD_8_2_17_TEST_PTX_CPX_CFG_505_ILL_009	○ Pass	•	○ Pass	•	Inconclusive	•	Inconclusive	
TD_8.2_17_TEST_PTX_CPX_CFG_505_ILL_010	O Pass	•	O Pass	*	Inconclusive	•	Inconclusive	5 e
TD_8,2,17,TEST_PTX_CPX_CF6_505_UL_011	 Inconclusive 	•	⊖ Pass	•	Inconclusive	•	Inconclusive	• • 🖬

FIGURE 8.92: DOWNLOAD/EXPORT JSON REPORT FILES





8.6 Qi Authenticator Configuration & Validation

The GRL-C3 Browser App *Qi-Authenticator* screen allows the user to configure and validate the Qi certification of a power transmitter and receiver to ensure compliance to the WPC Qi Specification Version 1.3. This is important to ensure that wireless devices are Qi certified for wireless transmission and charging.

Connection Setup	Certificate Validation
	Of Upload PTX's Auth Certificate Chain
Exerciser	Choose File No file chosen Download Update Clear Save Changes Download Certificate Raw Certificate Chain Bytes Decoded Certificate D
⊠ —Test	Root Certificate Hash
	Manufacturer CA Certificate 🗸
Results	Product Unit Certificate 🗸
Report	
Report Analyser	Challenge Auth Validation
	03 Nonce Certificate chain Digest
QI- Authenticator	
	02 Challenge Auth TBS Auth
P Help	
	Validate Challenge Auth

FIGURE 8.93: QI-AUTHENTICATOR SCREEN

8.6.1 Validate Qi Certificate of Power Transmitter

Use the **Certificate Validation** panel to select and perform decoding/configuration of an existing certificate of a Qi wireless power transmitter.

	Cert	ficate Validation	
01 Upload PTX's Auth Certificate Chain			
Choose File No file chosen	Download Update Clea		Save Changes Download Certificate -
Raw Certificate Chain Bytes		Decoded Certificate	
		Root Certificate Hash	~
		Manufacturer CA Certificate	~
		Product Unit Certificate	~

FIGURE 8.94: CERTIFICATE VALIDATION PANEL FOR POWER TRANSMITTER

1. Click on **Choose File** to select an existing Auth Certificate Chain file of the power transmitter to be evaluated. The raw certificate chain bytes of the selected file will then be populated. See example below:



Note: Make sure the **Header byte** is removed from the chain bytes when populating the raw certificate chain bytes.

This DC	Name	Date modified	Туре	Size			
	ChallengeAuth.txt	08-03-2022 17:39	Text Document	1 K3	В		Certificate Validation
> Desktop	Getcertificatechain.txt	08-03-2022 23:32	Text Document	4 Ki	в		
> Documents	Nounce.txt	08-03-2022 17:39	Text Document	1 K	В		
> v Downloads							Clear
> 🕑 Music							Decoded C
> Pictures							Root Cert
> 🔁 Videos							Manufactu
> 🚨 OS (C:)							Product II
> Local Disk (D:)							Product of
> GRL (E:)							
File na	me			→ TXT	File (*.txt)	~	
					Open	Cancel	
							-1
QI- Authenticator	03Nonce						Challenge Auth Validatio
QI- Authenticator	03Nonce					Cortifi	Challenge Auth Validatio
Connection Setup	03Nonce	n				Certifi	Challenge Auth Validatio Certificate che cate Validation
Connection Setup	03 Nonce Upload PTX's Auth Certificate Chai	n				Certifi	Challenge Auth Validatio
Authenticator	03 Nonce Upload PTX's Auth Certificate Chai Choose File Getcertificatechain.bt	n	Downic	pad] [l	Jpdate	Certifi	Challenge Auth Validatio Certificate che cate Validation
Authenticator	Upload PTX's Auth Certificate Chai Choose File Getcertificatechain.bt w Certificate Chain Bytes	n 18 3E DE CD DE D4 A5 DB 7D 83		Dad U	Jpdate)	Clear	Challenge Auth Validatio Certificate che cate Validation Decoded Certificate Decoded Certificate
QI- Authenticator Setup QI- Exerciser Test Configuration	Upload PTX's Auth Certificate Chai Choose File Getcertificatechain.bt w Certificate Chain Bytes 2 CAA1 75 9E CC A0 BE 3B 85 01 18 1 2 01 02 02 08 59 FF E3 F8 5E 99 78 66	n 18 3E D6 CD D6 D4 A5 DB 7D 83 30 0A 06 08 2A 86 48 CE 3D 04 f	Downic E6 FD 0E 6F 47 5C E4 I 33 02 30 11 31 0F 30 0D	Dad U BB 6E A0 14 2 0 06 03 55 04 0	Jpdate 4 30 82 01 43 03 0C 06 57 50	Clear 30 81 EB A0 03 0 43 43 41 31 30	Challenge Auth Validatio Certificate cha cate Validation Decoded Certificate Root Certificate Hash
Connection Setup QI- Setup QI- Exerciser Test Configuration	OBINONCE Upload PTX's Auth Certificate Chai Choose File Getcertificatechain.bt w Certificate Chain Bytes 2 CAA1 75 9E CC A0 BE 3B 85 01 18 * 2 01 02 02 08 59 FF E3 F6 85 E9 97 866 0 17 0D 32 31 30 36 31 36 31 30 32 30 7 03 33 22 35 2D 30 31 30 59 30 13 106	n 18 3E D6 CD D6 D4 A5 D8 7D 83 30 0A 06 08 2A 86 48 CE 3D 04 32 31 5A 18 0F 39 39 39 31 32 07 2A 86 48 CE 3D 02 01 06 08 2	Downic E6 FD 0E 6F 47 5C E4 1 03 02 30 11 31 0F 30 0D 2 33 31 32 33 35 39 35 3 A86 48 CE 3D 03 01 07	Dad U BB 6E A0 14 2 06 03 55 04 0 39 5A 30 12 31 03 42 00 04 5	Jpdate 4 30 82 01 43 33 0C 06 57 5 10 30 0E 06 10 35 FB FZ 23 0	Clear 30 81 EB A0 03 143 43 41 31 30 33 55 04 03 0C BEC 39 3B 4A	Challenge Auth Validatio Certificate che cate Validation Decoded Certificate Root Certificate Hash Manufacturer CA Certifi
Connection Setup QI- Connection Setup QI- Configuration Configuration Configuration Configuration Configuration Configuration	03 Nonce Upload PTX's Auth Certificate Chai Choose File Choose File CacA1 75 9E CCA0 BE 3B 85 01 18 1 20 10 20 20 85 9FF E3 F6 5E 99 78 66 17 00 32 31 30 36 31 36 31 30 32 30 7 30 30 32 35 2D 30 31 30 59 30 13 06 2 53 ED 9D 0F 38 43 94 AB 09 1E 7D E	n 18 3E D6 CD D6 D4 A5 DB 7D 83 30 0A 06 08 2A 86 48 CE 3D 04 32 31 5A 18 0F 39 39 39 39 31 52 07 2A 86 48 CE 3D 02 01 06 08 2 10 8B 7E 27 69 88 B5 F6 35 BF 05	Downic E6 FD 0E 6F 47 5C E4 I 33 02 30 11 31 0F 30 0D 33 31 32 33 35 39 35 3 A 86 48 CE 3D 03 01 07 9 83 D4 3C 0D 56 16 73	Dad U BB 6E A0 14 2 0 06 03 55 04 0 19 5A 30 12 31 7 03 42 00 04 9 9B C4 F2 C9	Jpdate 4 30 82 01 43 33 0C 06 57 54 10 30 0E 06 53 FB E7 23 0 14 8B 84 BD	Clear Clear 30 81 EB A0 03 0 43 43 41 31 30 33 55 04 03 0C B EC 39 3B 4A CC 61 0B 55 BB	Challenge Auth Validatio Certificate che cate Validation Decoded Certificate Root Certificate Hash Manufacturer CA Certifi Product Unit Certificate
Connection Setup QI- Connection Setup QI- Configuration Co	03 Nonce Upload PTX's Auth Certificate Chai Choose File Getcertificatechain.bt w Certificate Chain Bytes 2 CAA1 75 9E CC A0 BE 3B 85 01 18 1 2 01 02 02 08 59 FF E3 F6 5E 99 78 66 0 17 0D 32 31 30 36 31 36 31 30 32 30 7 30 30 32 35 2D 30 31 30 59 30 13 06 5 3 ED 9D 0F 38 43 94 AB 09 1E 7D E 5 44 9F FB CAAE CF 07 21 36 6D 86 A 01 01 01 FF 04 06 04 04 00 00 00 00 13	n 18 3E D6 CD D6 D4 A5 DB 7D 83 30 0A 06 08 2A 86 48 CE 3D 04 f 32 31 5A 18 0F 39 39 39 39 31 32 07 2A 86 48 CE 3D 02 01 06 08 2 10 8B 7E 27 69 88 B5 F6 35 BF 03 32 A3 02 83 01 22 06 03 55 1D 13 0A 06 08 2A 84 48 CE 3D 04 03 0	Downic E6 FD 0E 6F 47 5C E4 1 03 02 30 11 31 0F 30 0D 2 33 31 32 33 35 39 35 3 A 86 48 CE 3D 03 01 07 9 83 D4 3C 0D 56 16 73 01 01 FF 04 08 30 06 0 ² 2 03 47 00 30 44 02 20	Dad U BB 6E A0 14 2 0 06 03 55 04 0 39 5A 30 12 31 7 03 42 00 04 1 98 C4 F2 C9 98 C4 F2 C9 98 C4 F2 C9 101 FF 02 01 7A 4A 6A CE 4	Jpdate 4 30 82 01 43 03 0C 06 57 56 10 30 0E 06 6 53 FB E7 23 0 14 8B E4 BD 00 30 12 06 0 00 30 12 06 0	Clear Clear 30 81 EB A0 03 0 43 43 41 31 30 03 55 04 03 0C B EC 39 3B 4A CC 61 0B 55 BB CC 93 B 4A CC 61 0B 55 BB 567 81 14 01 F 24 B0 C9 A5	Challenge Auth Validatio Certificate cha cate Validation Decoded Certificate Root Certificate Hash Manufacturer CA Certifi Product Unit Certificate
Connection Setup QI- Configuration QI- Configuration QI- Configuration QI- Configuration QI- Configuration QI- Configuration QI- QI- QI- QI- QI- QI- QI- QI- QI- QI-	OB Nonce Upload PTX's Auth Certificate Chai Choose File Getcertificatechain.bt w Certificate Chain Bytes CAA1 75 9E CC A0 BE 3B 85 01 18 12 2 01 02 02 08 59 FF E3 F6 5E 99 78 66 017 00 32 31 30 36 31 36 31 30 32 30 2 33 20 32 35 2D 30 31 30 59 91 E7 DE 53 E0 90 0F 38 43 94 AB 09 1E 7D E 13 60 91 E7 DE 64 49 FB CAAE CF 07 21 36 CD 864 1 01 01 FF 04 06 04 04 00 00 00 01 30 33 7 CI 7E E1 42 84 3A 37 9B 49 59 D	n 18 3E D6 CD D6 D4 A5 DB 7D 83 30 0A 06 08 2A 86 48 CE 3D 04, 32 31 5A 18 0F 39 39 39 39 31 32 07 2A 86 48 CE 3D 02 01 06 08 2 D8 B7 E 27 69 88 B5 F6 35 BF 05 32 A3 02 83 01 22 06 03 55 1D 13 0A 06 08 2A 86 48 CE 3D 04 03 0 9 92 13 27 BC 91 F4 02 20 13 70 /	E6 FD 0E 6F 47 5C E4 8 33 02 30 11 31 0F 30 0D 33 31 32 33 35 39 35 3 A 86 48 CE 3D 03 01 07 98 3D 4 3C 0D 56 16 73 01 01 FF 04 08 30 06 0 01 01 FF 04 08 30 06 0 2 03 47 00 30 44 02 20 AE 7C D3 42 0F 0B 38	Dad U BB 6E A0 14 2 0 06 03 55 04 0 99 5A 30 12 31 7 03 42 00 04 9 98 C4 F2 C9 98 C4 F2 C9 98 C4 F2 C9 7A 4A 6A CE 4 C0 30 87 EC 4	Jpdate 4 30 82 01 43 33 0C 06 57 54 10 30 0E 06 4 53 FB E7 23 0 14 8B 84 8D 03 03 01 20 6 0 4E E9 9E C0 E 46 76 AC 7A 4	Clear Clear 30 81 EB A0 03 0 43 43 41 31 30 0 43 43 41 31 30 0 45 04 03 0C B EC 39 3B 4A CC 61 0B 55 BB 5 67 81 14 01 367 C A6 DA	Challenge Auth Validatio Certificate cha cate Validation Decoded Certificate Root Certificate Hash Manufacturer CA Certifi Product Unit Certificate
Connection Setup QI- Setup QI- Configuration QI- CON QI-	OB OB Upload PTX's Auth Certificate Chai Upload PTX's Auth Certificate Chai Choose File Getcertificatechain.bt w Certificate Chain Bytes 2 CAA1 75 9E CC A0 BE 3B 85 01 18 1 2 01 02 02 08 59 FF E3 F6 5E 99 78 66 0 17 0D 32 31 30 36 31 30 53 31 30 32 30 7 30 30 32 35 2D 30 31 30 59 30 13 06 2 54 9F FB CAAE CF 07 21 36 6D 86 A 0 10 17 FF 04 06 04 04 00 00 00 01 30 3 97 C1 7E E1 42 84 3A 37 9B 49 59 D 5 F7 96 42 7F F2 62 8C 07 B1 30 82 01 12 31 10 30 0E 06 03 55 04 30 3C 07	n 18 3E D6 CD D6 D4 A5 DB 7D 83 30 0A 06 08 2A 86 48 CE 3D 04,6 32 31 5A 18 0F 39 39 39 39 31 32 07 2A 86 48 CE 3D 02 01 06 08 2 10 8B 7E 27 69 88 B5 F6 35 BF 05 32 A30 28 30 12 06 03 55 1D 13 0A 06 08 2A 86 48 CE 3D 04 030 9 92 13 27 BC 91 F4 02 20 13 70 / 15 D 30 82 01 04 A0 03 02 01 02 0 30 30 32 35 2D 30 31 30 1E 17 0	Downic E6 FD 0E 6F 47 5C E4 f 33 02 30 11 31 0F 30 0D 33 31 32 33 35 39 55 A 86 48 CE 3D 03 01 07 9 83 D4 3C 0D 56 16 73 01 01 FF 04 08 30 06 0 2 03 47 00 30 44 02 20 AE 7C D3 42 DF 0B 3B 2 07 BA DB 80 A8 D6 7f D 32 31 30 37 30 31 30	Dad U BB 6E A0 14 2 06 03 55 04 0 39 5A 30 12 31 9B C4 F2 C9 1 01 FF 02 01 7A 4A 6A CE 4 C0 30 B7 EC 4 B 95 30 0A 06 30 30 30 30 30	Jpdate 4 30 82 01 43 30 0C 06 57 5 10 30 0E 06 53 FB E7 23 0 00 30 12 06 0 46 76 AC 7A 4 08 2A 86 48 (0 05 A17 0D 32	Clear 30 81 EB A0 03 0 43 43 41 31 30 33 55 04 03 0C B EC 39 3B 4A CC 61 0B 55 BB 567 81 14 01 57 24 B0 C9 A5 158 7C A6 DA 158 7C A6 0A 25 3D 04 03 02 31 30 37 30 32	Challenge Auth Validatio Certificate che cate Validation Decoded Certificate Root Certificate Hash Manufacturer CA Certifi Product Unit Certificate

FIGURE 8.95: UPLOAD POWER TRANSMITTER AUTH CERTIFICATE CHAIN FILE EXAMPLE

- To remove the selected Auth Certificate Chain file in any case, click on the Clear button. To download or update the file, click on the Download button or Update button respectively.
- User can configure or perform decoding of the selected Auth Certificate Chain file in the "Decoded Certificate" panel on the right. Select from the Root Certificate Hash, Manufacturer CA Certificate or Product Unit Certificate drop-down panel to configure each respective field as required.



Decoded Certific	ate	
Root Certificate	Hash	^
02 Upload Wi	PC Certificate	
Choose File	No file chosen	Clear
Root Cert Bytes	3	
0xA1, 0x75, 0x98 0xFD, 0x0E, 0x6	E, 0xCC, 0xA0, 0xBE, 0x3B, 0x85, 0x01, 0x18, 0x18, 0x3E, 0xD6, 0xCD, 0xD6, 0xD4, 0xA5, 0xDB, 0 F, 0x47, 0x5C, 0xE4, 0xBB, 0x6E, 0xA0, 0x14, 0x24	1x7D, 0x83, 0xE6,

FIGURE 8.96: ROOT CERTIFICATE HASH DROP-DOWN PANEL

GRL

Manufacturer CA Certificate						
Manufacturer Cert Hash						
0x63, 0x69, 0x55, 0x32, 0x0A, 0x29, 0x88, 0xCF, 0x32, 0xDD, 0x79, 0x68, 0x17, 0x1A, 0xA6, 0xDC	0x70, 0x8B, 0x83, 0xDE, 0x4D, 0xD5, 0x98, 0xCC, 0x0D, 0x6E, 0xEB, 0xCC, 0x6A, , 0xC5, 0xF3, 0xE6					
RawBytes	30 82 01 43 30 81 EB A0 03 02 01 02 02 08 59 FF E3 F8 5E 99 78 66 30 0A 06 08 2A 86 48 CE 3D 04 03 02 30 11 31 0F 30 0D 06 03 55 04 03 0C 06 57 50 43 43 41 31 30 20 17 0D 32 31 30 36 31 36 31 30 32 30 32 31 5A 18 0F 39 39 39 39 31 32 33 31 32 33 35 39 35 39 5A 30 12 31 10 30 0E 06 03 55 04 03 0C 07 30 30 32					
Version	2					
SerialNumber	6485152644315314278					
Signature	1.2.840.10045.4.3.2					
Issuer	WPCCA1					
ValidityNotBefore	2021.06.16 10:20:21					
ValidityNotAfter	9999.12.31 23:59:59					
Subject	0025-01					
SubjectPublicKeyInfoAlgorithm	1.2.840.10045.2.1					
SubjectPublicKeyInfoAlgorithm1	1.2.840.10045.3.1.7					
	0453FBE7230BEC393B4A1253ED9D0F384394AB091E7DED8B7 E276988B5F635BF0983D43C0D5616739BC4F2C9148BB4BDCC6					

FIGURE 8.97: MANUFACTURER CA CERTIFICATE DROP-DOWN PANEL



Product Cert Hash	
0xDC, 0xCC, 0xCE, 0xFA, 0x99, 0xA1, 0xE3, 0x13, 0 0x5F, 0xC1, 0xA3, 0x2A, 0x3E, 0xE3, 0x05, 0x54, 0xi	x02, 0xAF, 0x03, 0x5E, 0xB9, 0x41, 0x8B, 0x06, 0xB9, 0xE2, 0x3C, 0x18, 0x51, E5, 0xE5, 0x31
RawBytes	30 82 01 5D 30 82 01 04 A0 03 02 01 02 02 07 BA DB 80 A8 D6 7B 95 30 0A 06 08 2A 86 48 CE 3D 04 03 02 30 12 31 10 30 0E 06 03 55 04 03 0C 07 30 30 32 35 2D 30 31 30 1E 17 0D 32 31 30 37 30 31 30 30 30 30 30 30 5A 17 0D 32 31 30 37 30 32 30 30 30 30 30 5A 30 3F 31 14 30 12 06 03 55 04 03 0C 0B 30 31 31
Version	2
SerialNumber	-19461902734820459
Signature	1.2.840.10045.4.3.2
Issuer	0025-01
ValidityNotBefore	2021.07.01 00:00:00
ValidityNotAfter	2021.07.02 00:00:00
SubjectAttribute1	011277-Gen5
SubjectAttribute2	20200923F4
SubjectAttribute3	SEPT-23
SubjectPublicKeyInfoAlgorithm	1.2.840.10045.2.1
SubjectPublicKeyInfoAlgorithm1	1.2.840.10045.3.1.7

FIGURE 8.98: PRODUCT UNIT CERTIFICATE DROP-DOWN PANEL

- 4. Once configured, click on the **Save Changes** button at the top right of the screen. This will overwrite the existing certificate details with the new configuration/changes. The new changes will also be reflected in the "Raw Certificate Chain Bytes" panel where applicable.
- 5. User can download the newly configured certificate file by clicking on the **Download Certificate** button at the top right of the screen.

8.6.2 Validate Challenge Authentication for Power Receiver

Use the **Challenge Auth Validation** panel to validate the Challenge-Response Authentication which is authentication based on a challenge/response principle. This is to ensure that a wireless power receiver is connected to a recognized power transmitter.

Certificat	e Validation
01 Upload PTX's Auth Certificate Chain	
Choose File No file chosen Download Update Clear	Save Changes Download Gertificate -
Raw Certificate Chain Bytes	Decoded Certificate
	Root Certificate Hash
	Manufacturer CA Certificate 🗸 🗸
	Product Unit Certificate 🗸
Challenge A	uth Validation
(1) Nonce	Certificate chain Digest
Challenge Auth	TBS Auth
	Validate Challenge Auth

FIGURE 8.99: CHALLENGE AUTH VALIDATION PANEL



1. Select and open an existing **Nonce** file of the wireless device to be evaluated. Copy the contents of the Nonce file and paste them into the "Nonce" panel. See example below:

							- 0	>
Observe City								
Choose File Getcertificated	🕀 New 🖌 🤞 🚺	E) 🖻 🔟 📬 se	ort ~ 🔲 View ~ •••					
aw Certificate Chain Bytes								
2 CAA1 75 9E CC A0 BE 3B	$\leftarrow \rightarrow \neg \uparrow \stackrel{\simeq}{=} \rightarrow$ This PC	> GRL (E:) > Q/Wireless > 1.3 implem	nentation > Auth > Auth Certif	icates Verify > Certific	ate Example	~	C C Search Certificate Exampl	ė
2 01 02 02 08 59 FF E3 F8 5	••• 114 A	Name	Date modified	Type	Size			
0 17 0D 32 31 30 36 31 36 3 7 30 30 32 35 2D 30 31 30 50	Un yr	Bernard	00.00.0000.0000	7.10	1 1/0			
2 53 ED 9D 0F 38 43 94 AB (2 835-EX1	ChallengeAuth.txt	08-03-2022 17:59	lext Document	1 KB			
5 44 9F FB CA AE CF 07 21	🚞 Auth Certificates Verify	Getcertificatechain.txt	08-03-2022 23:32	Text Document	4 KB			
1 01 01 FF 04 06 04 04 00 00	Certificate Example	Nounce.txt	08-03-2022 17:39	Text Document	1 KB			
5 97 C1 7E E1 42 84 3A 37 9 F F7 96 42 7F F2 62 8C 07 F	- GPL (E)	hờ.						
0 12 31 10 30 0E 06 03 55 04	- GRL (E)							
0 30 30 30 30 30 5A 30 3F 3	> 🔷 OneDrive							
	This PC							
Nonce	> 🛄 Desktop							
A E4 51 30 5E 29 5E 0C 66 8	> Documents							
	> J Downloads							
Challenge Auth	> 🔮 Music							
x13 0x13 0x71 0x05 0x37 0x	> 🔀 Pictures							
xC6 0xC7 0x24 0xC5 0x27 0	> 🚺 Videos							
x36 0xE0 0x5B 0xAB 0x02 0	> = 05(C)							
	/ _ 07(0)							
	> Local Disk (D:)							
	> GRL (E:)							
	> 🖆 Network							
	3 items 1 item selected 47 bytes							Ξ
Nounce.txt - No	> Sa Network 3 items 1 item selected 47 bytes						- 0)
Nounce.txt - No File Edit Vie) de Network 3items 1 item selected 47 bytes						- 0)
Nounce.txt - No File Edit Vie D8-D9-57-59-C2-	3 items 1 item selected 47 bytes	9-8A-D2-A0-9F					- 0	
Nounce.txt - No iile Edit Vie D8-D9-57-59-C2-	3 dem Network 3 dem selected 47 bytes otepad 9W -46 - AB - FE - 3B - E8 - 89 - 3	9-8A-D2-A0-9F					– D	
Nounce.txt - No File Edit Vie D8-D9-57-59-C2-	 Metwork Trem selected 47 bytes 	9-8A-D2-A0-9F I					– D	A
Nounce.txt - Nc ile Edit Vie)8-D9-57-59-C2-	 Metwork 3 items 1 item selected 47 bytes 	9-8A-D2-A0-9F I					– D	

FIGURE 8.100: SELECT AND PASTE CONTENTS OF NONCE FILE

- 2. The "Certificate Chain Digest" panel on the right of the Nonce panel will be auto populated.
- 3. Select and open an existing **Challenge Auth** file, and copy the contents of the Challenge Auth file and paste them into the "Challenge Auth" panel. See example below:





						- 0 × -
01Upload PTX's Auth Certif	Certificate Example					- 🗆 ×
Choose File Getcertificated	🕀 New - 👗 🚺 🛅	E)	≡ View ~ •••			
Raw Certificate Chain Bytes						
02 CAA1 75 9E CC A0 BE 3B	\leftarrow \rightarrow \checkmark \uparrow $\stackrel{\frown}{=}$ \rightarrow This PC \rightarrow	GRL (E:) > QIWireless > 1.3 implementation	> Auth > Auth Certifica	tes Verify > Certificate Exam	mple ~ C	, Search Certificate Example
02 01 02 02 08 59 FF E3 F8 5				i. i.e.		
20 17 0D 32 31 30 36 31 36 3	🚞 bin 🛷	Name	Date modified	Type Size	e	
07 30 30 32 35 2D 30 31 30 5	2 835-EX1	ChallengeAjith.txt	08-03-2022 17:39	Text Document	1 KB	
12 53 ED 9D 0F 38 43 94 AB 1 75 44 9E EB CA AE CE 07 21	935.EV2	Getcertificatechain.txt	08-03-2022 23:32	Text Document	4 KB	
01 01 01 FF 04 06 04 04 00 00	055-672	P Maurere bet	09.02.2022 17.20	Text Desument	1 1/2	
83 97 C1 7E E1 42 84 3A 37 9	Auth Certificates Verify	I Nounce.or	00-03-2022 11:39	lext Document	T KD	
7F F7 96 42 7F F2 62 8C 07 E	- GRL (E:)					
30 12 31 10 30 0E 06 03 55 04	1					
30 30 30 30 30 30 30 5A 30 3F 3	> OneDrive					
	Y This PC					
	- more					
03Nonce	> 🛄 Desktop					
2A E4 51 30 5E 29 5E 0C 66 8	> Documents					
	> Downloads					
04 Challenge Auth	> 🕑 Music					
	> 🔀 Pictures					
	> 🚺 Videos					
	. II. 05/01					
	/ _ 03(0.)					
	> Local Disk (D:)					
	> GRL (E:)					

	Chal	llengeA	uth.txt	- Notep	ad																				-		×
File	E	dit	View																								\$
(40 0:	x92 (ØxED	ØxDB	0x61	0x75	0xE2	ØxAD	0xC9	0x7A	0x49	0x36	ØxEØ	0x5B	ØxAB	0x02	0x88	0xF3	0x1C	0x3E	0xB0	0x75	0x0B	0x1C	0x23	0xC7	0x4E	ØxBB
			1	I																							

	04 Challenge Auth
1	0x13 0x13 0x71 0x05 0x37 0xD4 0xB9 0xDE 0x7D 0x4C 0x19 0x0C 0xA8 0x9F 0x61 0x98 0x69 0xA1 0x65 0xC3 0x91 0x9C 0x98 0xF6 0xC9
	0xC6 0xC7 0x24 0xC5 0x27 0x10 0x71 0xEC 0x0F 0xF6 0xD9 0x10 0x7A 0xB0 0x40 0x92 0xED 0xDB 0x61 0x75 0xE2 0xAD 0xC9 0x7A 0x49
	0x36 0xE0 0x5B 0xAB 0x02 0x88 0xF3 0x1C 0x3E 0xB0 0x75 0x0B 0x1C 0x23 0xC7 0x4E 0xBB

FIGURE 8.101: SELECT AND PASTE CONTENTS OF CHALLENGE AUTH FILE

4. Click on the **Validate Challenge Auth** button at the bottom right of the screen. Upon successful validation, the "TBS Auth" panel will be auto populated, and the **Challenge Signature Valid** status will appear. See example below:

- Shahenge A	
03Nonce	Certificate chain Digest
D8-D9-57-59-C2-46-AB-FE-3B-E8-89-39-8A-D2-A0-9F	D2 46 72 A9 E5 20 0B 64 45 79 DA 75 7F 29 9B 08 B0 27 7B 91 0E B9 D0 81 AA 12 C8 24 98 A0 63 71
04 Challenge Auth	TBS Auth
0x13 0x13 0x71 0x05 0x37 0xD4 0xB9 0xDE 0x7D 0x4C 0x19 0x0C 0xA8 0x9F 0x61 0x98 0x69 0xA1 0x65 0xC3 0x91 0x9C 0x98 0xF6 0xC9	41 D2 46 72 A9 E5 20 0B 64 45 79 DA 75 7F 29 9B 08 B0 27 7B 91 0E B9 D0 81 AA 12 C8 24 98 A0 63 71 1B 00 D8 D9 57 59 C2 46 AB FE 3B
0xC6 0xC7 0x24 0xC5 0x27 0x10 0x71 0xEC 0x0F 0xF6 0xD9 0x10 0x7A 0xB0 0x40 0x92 0xED 0xDB 0x61 0x75 0xE2 0xAD 0xC9 0x7A 0x49	E8 89 39 8A D2 A0 9F 13 13 71
0x36 0xE0 0x5B 0xAB 0x02 0x88 0xF3 0x1C 0x3E 0xB0 0x75 0x0B 0x1C 0x23 0xC7 0x4E 0xBB	
	✓Challenge Signature Valid, Validate Challenge Auth

Challenge Auth Validation





9 GRL-C3 Information and Help

The GRL-C3 Browser App *Help* screen allows the user to view the current version of the GRL-C3 Browser App as well as a brief description of the GRL-C3 tester hardware. The user can also access customer support or download debug logs using the links provided.



FIGURE 9.1: HELP SCREEN

END_OF_DOCUMENT