

Granite River Labs

User Guide

for GRL USB Type-C Power Delivery Tester and Analyzer (GRL-USB-PD-C2-EPR) IEC Safety Test Compliance

This material is provided as a reference to perform safety tests for both functional and controller aspects of the GRL-USB-PD-C2-EPR tester hardware in compliance with the IEC safety requirements.

For customer support, contact support@graniteriverlabs.com.

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1 IEC Functional Safety Testing

To perform the IEC functional safety tests, the **GRL-C2-EPR-SAFETY** license activation is required as indicated in the GRL-USB-PD-C2-EPR Browser App. See Figure 1.1 below.

| | License Information | |
|----------------------------|-----------------------------|----------------|
| License Name | License Type | License Period |
| USB PD3 - 240W | Permanent License Activated | - |
| USB PD3 - 100W 🕦 | Permanent License Activated | - |
| USB-C Functional Tests | Permanent License Activated | - |
| GRL-C2-EPR-SAFETY | Permanent License Activated | - |
| Thunderbolt 3 Power Tests | Permanent License Activated | - |
| DP AUX Sniffer | Permanent License Activated | - |
| Quick Charge 3 Plus Tests | Permanent License Activated | - |
| Quick Charge 3 Tests | Permanent License Activated | - |
| Quick Charge 4 - IOP Tests | Permanent License Activated | - |
| Quick Charge 4 Tests | Permanent License Activated | - |

FIGURE 1.1: GRL-USB-PD-C2-EPR SAFETY LICENSE ACTIVATION

For details on the GRL-USB-PD-C2-EPR test solution, see related user documentation at <u>http://graniteriverlabs.com/download-center/</u>. For any licensing questions and concerns, contact <u>support@graniteriverlabs.com</u>.

1.1 IEC Functional Safety Test Procedure

- 1. Connect the Unit Under Test (UUT) to the GRL-USB-PD-C2-EPR (aka GRL-C2-EPR) tester hardware.
- Open the GRL-C2-EPR Browser App and go to the Test Configuration screen. Select the IEC Functional Safety Tests under the "All Certifications" category and run the tests. See Figure 1.2 below.



FIGURE 1.2: GRL-C2-EPR IEC FUNCTIONAL SAFETY TESTS



3. Details of the test run can be viewed in the Results screen as shown in the Figure 1.3 example below.

| Ξ 🥠 | GRL | | | | | | | USB | Power Deliv | ory and L GRL-I | ISB Type-(USB-PD-C | °™ Test S 2-EPR | oftware (| (1.6.18.0) | | | | | | | | | 0% |
|--------------------|---|-------------|--------|------------|------------------------|--------------------------------|--|-------|-------------|--------------------|------------------------|--------------------|-----------|------------------|--------|---------|------------|------------|----------|-----------|--|------------------|-----------|
| | | | Test | Results | Scroll To Current Test | TimeSt | amp | Descr | ription | | | | | | | | | | | | | Q Search | 07 |
| ↔ | | _ | | | | 7.491 | 074:570 | | | | | | | 0010031 | NUME | Rp_ASS | анаа кр. т | 26_1_98 | ASSEID | 101 | | | |
| Connection | | | Stop E | Execution | | 7.491: | 158:900 | | | | | | | UUT #342 | NONE: | Rd_Dele | cled:Rd in | CC1; | | | | | |
| Setup | | | | | | 7.499 | 059:210 | | | | | | | CZ // 343 | NONE | GroupC | ndTimingP | 'kt:1 | | | | | |
| | Test Status: | | | | | 7.499 | 085:580 | | | | | | | C2 #344 | SOP/SI | RC/ DFF | VendorDe | fined Di | scover M | fode;init | iator; | | |
| | Test Summany : 🔊 0 | 0.0 | • | <u>_</u> 0 | | 7.499 | 842:190 | | | | | | | UUT #345 | SOP/SI | NK/ UFP | GoodCR | 2 | | | | | |
| Product | reat ourmany . 🕑 v | ••• | •• | V | | 7.501 | 490:010 | | | | | | | UUT #346 | SOP/SI | NK/ UFF | VendorDe | fined Di | scover M | lode;AC | К; | | |
| Capability | V IEC Functional Safety | Tests | | | | 7.502 | 295:220 | | | | | | | C2 #347 | SOP/SI | RC/ DFF | GoodCR |) ; | | | | | |
| | 1.Message corruptio | n | | | | 7.502 | 818:390 | | | | | | | CZ #348 | NONE: | GroupC | ndTimingF | kt:Snk_1 | TX_OK_S | Set | | | |
| | 2.Unintended repetiti | on of a mes | sage | | | 7.502 | 820:570 | | | | | | | UUT #349 | NONE: | Rp_Ass | erted:Rp_4 | _7k_3A | Asserte | d | | | |
| Test Config | 3.Incorrect message | sequence | | | | 13.848 | 076:220 | | | | | | | | | | | | C2 # | #350 NC | NE:GroupCmdTimingPkt:0 | | |
| | 4.Message loss | | | | | 13.850 | 381:090 | | | | | | | | | | | | C2 / | #352 NC | NE:FSM_State_Transition:FSM_State_Attached_: | SRC -> FSM_State | _Disabled |
| Ø | 5.Unacceptable delay | of messag | e | | | 13.850 | 381:540 | | | | | | | | | | | | C2 1 | #351 NC | NE:Detach:NONE | | |
| 1 M | 5.Message insertion 7 Message masquera | de | | | | 13.852 | 382 290 | | | | | | | | | | | | UUT | #353 NC | NE:GroupCmdTimingPkt:LOAD_CURRENT:0A | | |
| Results | 8.Incorrect address | | | | | - | | | 10 14 | | | 4 | <u> </u> | | _ | • • | • | | Let. | • | | | |
| | | | | | | | Q | Q | 105 10 | | | • | • | A | · · | × ' | Y 🖤 | - Y | ··· | (C) | | Channels | |
| Report Coptions | | | | | | PORT1-VBUS(A) PORT1-VBUS(A) | 6.0 4.0 2.0 -1.0 | | | | | | | | | | | | | | | | |
| Help | | | | | | PORTI-CC1(A) PORTI-CC1(V) | 4.0 2.7- 1.3 0.0 -1.0 6.0 | | | | | | | | | | | | | | | | |
| | | | | | | PORT1-CC2(A | 4.5 3.0 1.5 | | | | | · | | | | | | | | | | | |

FIGURE 1.3: IEC FUNCTIONAL SAFETY TEST RUN EXAMPLE

4. After the tests have completed, test reports will be generated in the **TempReport** folder at *"C:\GRL\USBPD-C2-Browser-App\Report\TempReport\C2EPR"*. You can also view the test report on the Report screen. Below shows an example of the test report.

| SI No | Test Name | Test Result |
|-------|--------------------------------------|-------------|
| 1 | 1.Message corruption | PASS |
| 2 | 2.Unintended repetition of a message | PASS |
| 3 | 3.Incorrect message sequence | PASS |
| 4 | 4.Message loss | PASS |
| 5 | 5.Unacceptable delay of message | PASS |
| 6 | 6.Message insertion | PASS |
| 7 | 7.Message masquerade | PASS |
| 8 | 8.Incorrect address | PASS |

FIGURE 1.4: IEC FUNCTIONAL SAFETY TEST REPORT EXAMPLE



2 IEC Controller Safety Testing

To perform the IEC controller safety test, the **GRL-CAL-KIT fixture & cable** needs to be connected to the GRL-C2-EPR tester Ports as shown in Figure 2.1 below.



FIGURE 2.1: IEC CONTROLLER SAFETY TEST CONNECTION SETUP

2.1 IEC Controller Safety Test Procedure

 After connecting the GRL-CAL-KIT fixture & cable, go to the **Options** screen and click on the Controller Self Test
 button under the "Config Controller" tab, as indicated in Figure 2.2 below.



FIGURE 2.2: GRL-C2-EPR IEC CONTROLLER SAFETY TEST

2. The GRL-C2-EPR tester will then run eight tests and display pop-up messages such as the example in Figure 2.3 below during the test run. Click "Ok" to proceed.







3. After the test has completed successfully, the test report will be generated in the **TempReport** folder at "C:\GRL\USBPD-C2-Browser-App\Report\TempReport\C2EPR\ControllerSelfTest".

END_OF_DOCUMENT