

Voyager M310e / M4x USB Type-C Functional Verification Suite

The Voyager M310e / M4x is available with the USB Type-C Functional Verification Suite option which is designed to test the logical USB Type-C port operation. The Voyager M310e / M4x is approved by the USB-IF as an official Type-C Compliance Verification System (CVS). Some of the Type-C test procedures are still undergoing revisions by the USB-IF. For the latest release of the specification, please go to the USB.org web site (see: [Type-C Functional Verification spec](http://www.usb.org/developers/standards/usb20/usb20-specs/usb20-specs.html)).

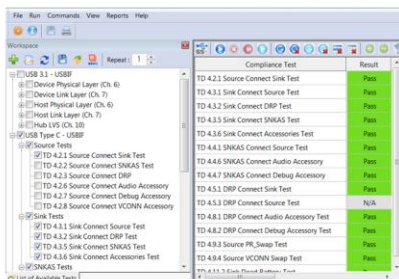
Test Suite Overview

The USB Type-C Functional Verification Suite operates within the Voyager M310e / M4x test platform. The M310e / M4x emulates USB Type-C port behaviors (DFP, UFP and cable marker) to verify logical and electrical USB Type-C state transitions. This test suite provides coverage for the areas below:

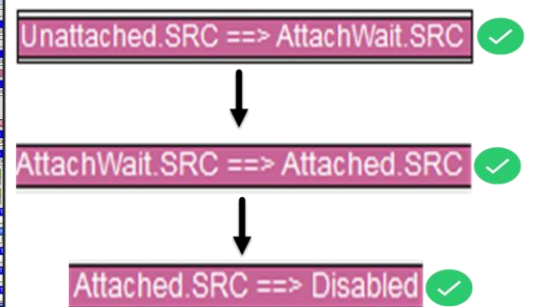
- Source Tests
- Sink Tests
- Sink with Accessory Support (SNKAS) Tests
- DRP Tests
- VCONN Tests
- Source-Capable Tests
- Sink-Capable Tests
- Miscellaneous Tests



The USB Type-C Functional Verification tests can be accessed within the Teledyne LeCroy Compliance Suite application. This test software is fully automated and generates a Pass/Fail report. Trace files are saved allowing complete analysis of individual test results.



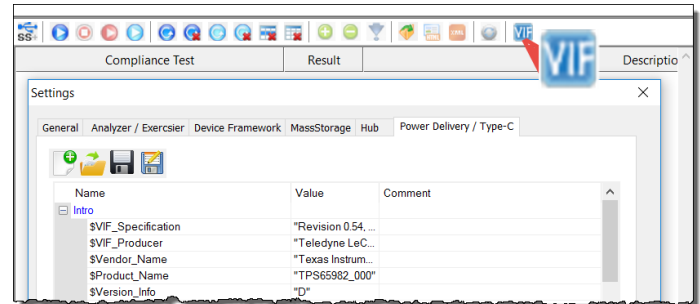

This is another screenshot of the test results table, showing a detailed view of the test results. It includes columns for Test Name, Result, Pass/Fail status, and a 'Trace' column. The table lists various USB Type-C tests and their outcomes.



Test Suite Operation

1. Loading the VIF file

USB Type-C Vendors must generate a Vendor Information File (VIF) defining the capabilities of the product under test (PUT). Download and complete the VIF using the generator from the USB-IF web site:



<https://www.usb.org/document-library/usb-vendor-info-file-generator>

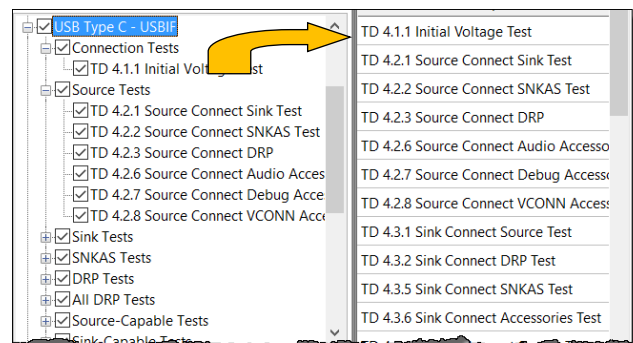
Open the VIF window, and use the folder button to select a predefined VIF file. See section 2.4.2.6 of the USB Compliance Suite manual for additional instructions on loading the VIF.

2. Type-C Tests requiring USB data

Several tests require USB 2.0/3.1/4 protocol traffic synchronized with CC communications. This includes *Source_Suspend_Tests* that verify VBUS & VCONN are maintained during USB 3.1 suspend (U3) states. Test conditions where the CVS emulates a USB2 or USB3 port are fully supported with the Voyager M310E / M4x. Test conditions where the CVS emulates a USB4 port can only be performed with the Voyager M4x.

3. Selecting Type-C Tests

The actual required tests for a given Type-C device are based on the functionality defined in the PUT's VIF. Users can individually select just the appropriate tests for their device. Alternately, they may select all Type-C tests and the Compliance application will skip "not applicable" tests. Use the  button to add the selected tests to the Test Monitoring window.



4. Connecting to Type-C UUT

PUT_R and PUT_V devices should be directly connected to the Exerciser port using the special VCONN pass through cable (USB17CAB-X). Captive cable (PUT_C) devices can be directly attached using their own cable. (PUT_C UUTs can not act as source for VCONN so the special VCONN pass-through cable is not necessary).



PUT_C	PUT that is bound to a USB Type-C captive cable or direct attach plug	
PUT_R	PUT that is bound to a USB Type-C receptacle	
PUT_V	PUT that is capable of sourcing Vconn	

5. Running the Type-C tests

Use the run button  to start running the selected tests. The Compliance Suite will run each test sequentially and generate a pass/fail result. HTML-based test reports will summarize the results of each test. Doubleclick on the result column to view the actual trace log for each test. The table below outlines possible results:

USB Type-C Functional Test Suite provides test coverage for the device types above

Result	Description
Pass	All assertions passed for the specified test
Fail	One (or more) assertions failed for the specified test
N/A	Specific test case is not applicable according to the capabilities in the VIF
Incomplete	Error during recording (e.g. No trace file recorded)

Ordering Information:

The separate part number below is used to order the USB Type-C Functional Test Suite. The Type-C tests are not included when ordering the *USB Power Delivery Compliance* or *Link Layer Compliance Suite*. Offering each suite separately allows developers of “non-PD devices” to lower their costs by ordering only the necessary test package.

USB-AC20-V06-X	Voyager M310e / M310P / M4x USB Type-C Functional Verification Suite & Cable (License option provides access to USB Type C Functional Verification Suite for validating conformance for USB Type-C devices and chipsets. Includes required VCONN pass through cable - USB17CAB-X or USB24CAB-X; Reqs Power Tracker: USB-AC04-V01-A).
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- The Power Tracker option (USB-AC04-V01-A) is also required to perform Type-C tests
- Many tests require measuring VCONN voltage from the DUT acting as “VCONN source”. A special “VCONN Pass-through” cable (USB17CAB-X or USB24CAB-X) is included with the Type-C & the PD Compliance Suite and is required for all USB Type-C and PD Compliance tests.
- An accurate Vendor Information File (VIF) is also necessary to perform Type-C tests.



USB Type-C compliance includes special USB-C to C cable (USB25CAB-X “VCONN pass-through”) which should only be used for Type-C & PD Compliance testing.