quantumdata

980 MHL CBUS Compliance Test Module

User Guide

Rev: A4

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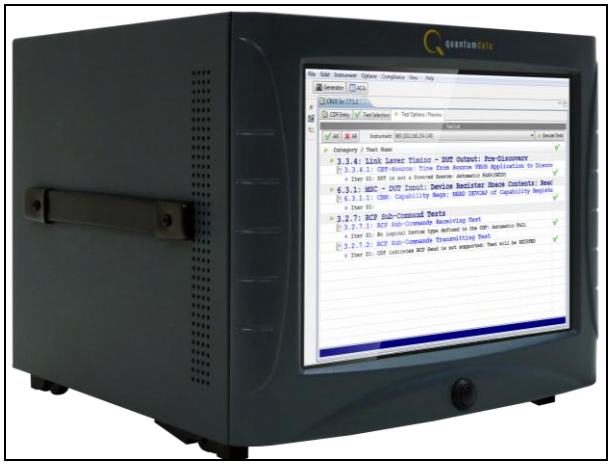
1 About the 980 MHL CBUS Compliance Test Module

This chapter provides an overview of features of the 980 MHL CBUS Compliance Test module and the 980 GUI Manager. The module can be equipped in either of two 980 Advanced Test Platforms:

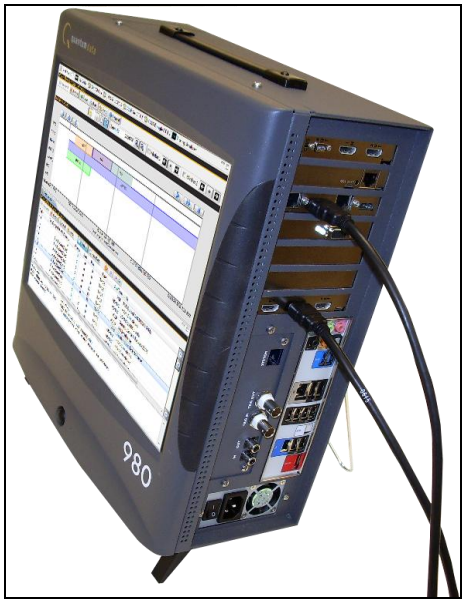
1) The 980 Advanced Test Platform – 2-slot chassis with a 10.4 inch touch display (example shown below).
2) The 980B Advanced Test Platform – 5-slot chassis with a 15 inch touch display

The 980 MHL CBUS Compliance Test module provides CBUS compliance testing for MHL CTS 1.2 and 2.0 source, sink and dongle devices. The 980 GUI Manager is a PC application to manage and use the 980 MHL CBUS Compliance Test module. The test require no additional external equipment. You can disseminate the test results and Log Plots to colleagues, subject matter experts and Quantum Data support for analysis. Your colleagues and subject matter experts are not required to have a 980 test instrument to view the test results and Log Plots; they simply need to download the 980 GUI Manager application from the Quantum Data website.



980 Advanced Test Platform – Front View

980 Advanced Test Platform – Rear View



980 Advanced Test Platform

1.1 Scope of this User Guide

This User Guide provides descriptive and procedural information on the 980 MHL CBUS compliance test module for testing MHL sources, sinks and dongles.

Although you can run the compliance tests through the 980's "embedded GUI," all the examples used in the procedures in this User Guide are taken from the external standalone PC 980 GUI Manager. The procedures are identical between the embedded GUI running through the 980 front panel display and the external standalone PC application but the look and feel is slightly different.

The following is a list of the User Guides available for the 980 systems:

- 980 HDMI Protocol Analyzer Gen 3 System – This User Guide covers source analysis testing for HDMI and MHL source devices as well as various transmitter features. This user guide is specifically for the functions of the 980 HDMI Protocol Analyzer Gen 3 system sold through 2012.
- 980 HDMI Protocol Analyzer module – This User Guide covers source analysis features of the 980 HDMI Protocol Analyzer module. Used in conjunction with the 980 Advanced Test Platform Quick Start Guide for purchases in 2013.
- 980 Advanced Test Platform Quick Start Guide – This Quick Start Guide covers startup procedures for the 980/980B platform. Used in conjunction with the 980 HDMI Protocol Analyzer Module User Guide for purchases in 2013.
- 980 HDMI Protocol Analyzer module – This User Guide covers source analysis testing for HDMI and MHL source devices as well as various transmitter features. This user guide is specifically for the functions of the 980 HDMI Protocol Analyzer module equipped in one of the 980 Advanced Test Platform slots (980 Gen 3 or 980B). Used in conjunction with the 980 Advanced Test Platform Quick Start Guide.
- 980 HDMI Protocol Analyzer HDMI/MHL Source Compliance Test – This User Guide covers source compliance testing for both MHL and HDMI sources. These compliance test applications are provided by the

980 HDMI Protocol Analyzer module or the 980 HDMI Protocol Analyzer Gen 3 system. Used in conjunction with the 980 Advanced Test Platform Quick Start Guide.

- 980 HDMI Protocol Analyzer HDMI/MHL Sink Compliance Test – This User Guide covers sink compliance testing for both MHL and HDMI sinks (and MHL dongles). These compliance test applications are provided by the 980 HDMI Protocol Analyzer module or the 980 HDMI Protocol Analyzer Gen 3 system. Used in conjunction with the 980 Advanced Test Platform Quick Start Guide.
- 980 MHL CBUS Compliance Test Module - This User Guide covers MHL CBUS compliance testing for both MHL sources as well as sinks and dongles. This compliance test applications are provided by the 980 CBUS Compliance Test module. Used in conjunction with the 980 Advanced Test Platform Quick Start Guide.
- 980 HDMI Video Generator module – This User Guide covers the features and functions offered by the 980 HDMI Video Generator module. Used in conjunction with the 980 Advanced Test Platform Quick Start Guide.

1.2 Changes to this User Guide

The following changes were made to this document:

This User Guide has been updated recently to include the following:

- Include MHL CBUS 2.0 compliance tests.
- Include discussion of the 980B Advanced Test Platform
- Include descriptive and procedural information on the CBUS Event Log Plot.

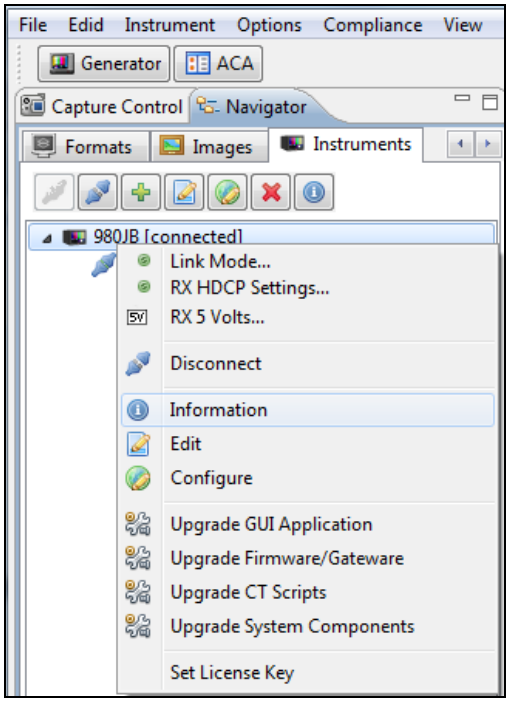
Note: Please be sure to check the Quantum Data website for updates to this User Guide.

1.3 What options are available with the 980 MHL CBUS Compliance Test module?

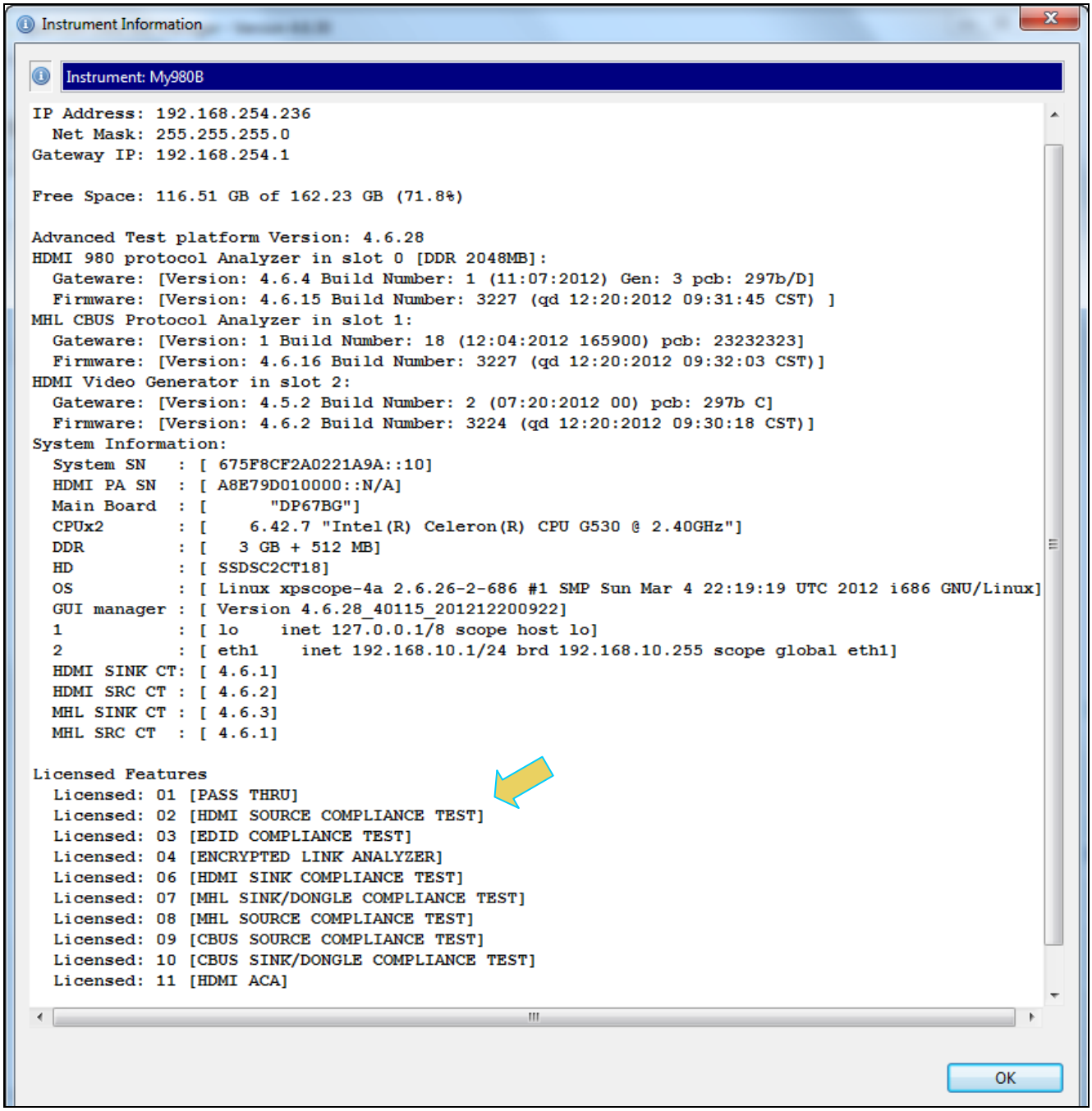
There are two options that you can purchase with the 980 MHL CBUS Compliance Test module. You must have a license to use these options:

- MHL CBUS Source Compliance module which tests in accordance with MHL 1.2 CTS and MHL CTS 2.0.
- MHL CBUS Sink/Dongle Compliance module which tests in accordance with MHL 1.2 CTS and MHL CTS 2.0.

You can determine what options the 980 is provisioned with by accessing the Instrument Information screen on either the built-in or external 980 GUI manager. When using the external 980 GUI Manager you must be connected to the 980 in order to read the Instrument Information. Refer to the following screen.

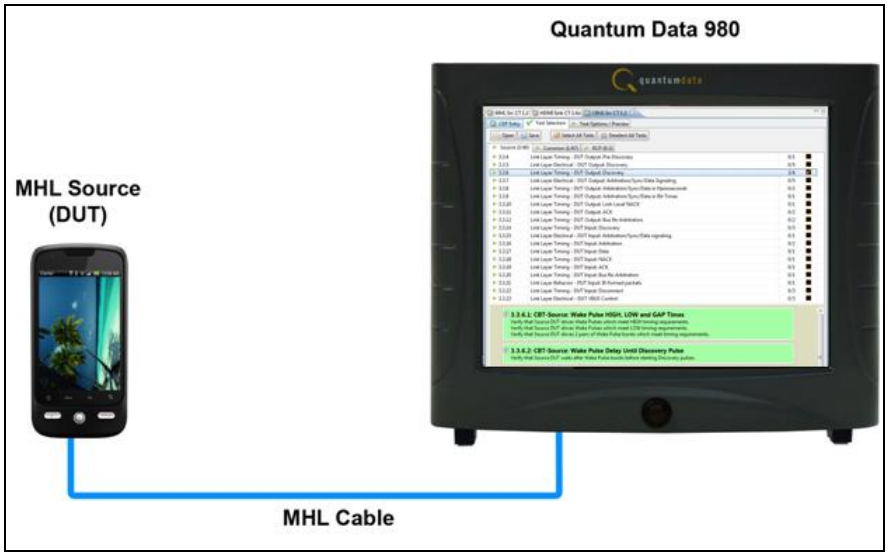


Select **Information** to view the **Instrument Information** panel.


Instrument Information
Instrument: My980B
IP Address: 192.168.254.236
Net Mask: 255.255.255.0
Gateway IP: 192.168.254.1
Free Space: 116.51 GB of 162.23 GB (71.8%)
Advanced Test platform Version: 4.6.28
HDMI 980 protocol Analyzer in slot 0 [DDR 2048MB]:
Gateware: [Version: 4.6.4 Build Number: 1 (11:07:2012) Gen: 3 pcb: 297b/D]
Firmware: [Version: 4.6.15 Build Number: 3227 (qd 12:20:2012 09:31:45 CST)]
MHL CBUS Protocol Analyzer in slot 1:
Gateware: [Version: 1 Build Number: 18 (12:04:2012 165900) pcb: 23232323]
Firmware: [Version: 4.6.16 Build Number: 3227 (qd 12:20:2012 09:32:03 CST)]
HDMI Video Generator in slot 2:
Gateware: [Version: 4.5.2 Build Number: 2 (07:20:2012 00) pcb: 297b C]
Firmware: [Version: 4.6.2 Build Number: 3224 (qd 12:20:2012 09:30:18 CST)]
System Information:
System SN : [675F8CF2A0221A9A::10]
HDMI PA SN : [A8E79D010000::N/A]
Main Board : ["DP67BG"]
CPUx2 : [6.42.7 "Intel(R) Celeron(R) CPU G530 @ 2.40GHz"]
DDR : [3 GB + 512 MB]
HD : [SSDSC2CT18]
OS : [Linux xpscope-4a 2.6.26-2-686 #1 SMP Sun Mar 4 22:19:19 UTC 2012 i686 GNU/Linux]
GUI manager : [Version 4.6.28_40115_201212200922]
1 : [lo inet 127.0.0.1/8 scope host lo]
2 : [eth1 inet 192.168.10.1/24 brd 192.168.10.255 scope global eth1]
HDMI SINK CT: [4.6.1]
HDMI SRC CT : [4.6.2]
MHL SINK CT : [4.6.3]
MHL SRC CT : [4.6.1]
Licensed Features
Licensed: 01 [PASS THRU]
Licensed: 02 [HDMI SOURCE COMPLIANCE TEST]
Licensed: 03 [EDID COMPLIANCE TEST]
Licensed: 04 [ENCRYPTED LINK ANALYZER]
Licensed: 06 [HDMI SINK COMPLIANCE TEST]
Licensed: 07 [MHL SINK/DONGLE COMPLIANCE TEST]
Licensed: 08 [MHL SOURCE COMPLIANCE TEST]
Licensed: 09 [CBUS SOURCE COMPLIANCE TEST]
Licensed: 10 [CBUS SINK/DONGLE COMPLIANCE TEST]
Licensed: 11 [HDMI ACA]
OK

1.4 980 User Interface

The 980 provides a graphical user interface for operation. This GUI can run both on the 980 itself through the built-in color touch screen display or as a standalone application running on a PC. The look and feel and functions are similar but not identical.



1.4.1 External 980 GUI Manager

The external 980 GUI Manager provides easy access to the captured data on your PC for sharing with others. Also the external 980 GUI Manager enables you to operate the 980 through a larger interface which allows you to use multiple panels at the same time.

1.4.2 Embedded 980 GUI Manager

You can operate the 980 fully through the built-in color touch screen display. There are two key features that are available only with the embedded 980 GUI Manager: 1) viewing the video in real time, 2) viewing the MHL video/audio metadata and DDC (MHL C-Bus) transactions in real time using the **Real Time** mode. These features apply to the 980 HDMI Protocol Analyzer module and not to the MHL CBUS Compliance module.

You can transfer data captures and compliance test results taken from the built-in touch display to your PC where they can be viewed through the external 980 GUI Manager and also disseminated to others for analysis.

2 Getting Started

This chapter explains what is involved in getting your 980 CBUS Compliance Test Module up and running in the 980/980B Advanced Test Platform.

2.1 What is in the 980 shipping box?

When the Quantum Data 980 is shipped it will contain a variety of items. The items it will contain will depend on the module configurations and whether it is a 980 ATP or a 980B ATP. The following list shows all the items in the 980 shipping box with the standard configuration of the 980, which includes the 980 HDMI Protocol Analyzer, and also those items specific to the MHL CBUS Compliance Test module.

Standard configuration items with 980/980B:

- Quantum Data 980 test instrument (comes standard with 980; optional for 980B).
- 980 HDMI Protocol Analyzer module (pre-installed).
- Ethernet cable (P/N 30-00151) – used for connecting a host PC to the 980 over the LAN interface.
- Detachable power cable – used for supplying power to the 980.
- HDMI cable (P/N 30-00146) – Category 2 HDMI cable, 6 feet (comes standard with 980; optional for 980B).
- ESD warning sheet (P/N 68-00204) – information useful for protecting the HDMI interface against static discharge.

MHL CBUS Compliance module items:

- MHL CBUS Compliance Test module

  Note: The MHL CBUS Compliance test module will be pre-installed in the 980 chassis.
- HDMI cable (P/N 30-00202) – Short (30 centimeter) HDMI cable CBUS compliance test. (Used for MHL CBUS sink compliance test option).
- MHL cable (P/N 30-00197) – Short (30 centimeter) MHL cable for running compliance test. (Used for MHL CBUS source compliance test option).

2.2 Operational workflow for CBUS Compliance Testing

The following are the high level steps you will need to follow MHL CBUS compliance testing.

2.2.1 Procedures covered in 980 Advanced Test Platform Quick Start Guide:

1. Remove the 980 from the shipping box.
2. Assemble the source device under test into your lab area and power it up. When using the optional pass-through feature to monitor between an HDMI or MHL source and an HDMI or MHL sink, assemble the display device as well.
3. Connect the 980 Protocol Analyzer power cable (provided) to a suitable outlet (110-240V 50/60Hz) and apply power to the 980.
4. (Optional – not required if using the built-in display) Select a suitable PC to host the 980 GUI Manager application. A minimum of 512MB of RAM is recommended. (Note that you do not need a PC because you can use the built-in Front Panel display; however the external 980 GUI Manager provides you with a larger viewing area).

5. (Optional – not required if using the built-in display) Determine how you are going to connect to the 980 Protocol Analyzer from the external 980 GUI Manager in order to operate the instrument:
   - Put the 980 on your corporate network and enable DHCP using an available Ethernet patch cable, or…
   - Connect directly with a host PC or laptop using the Ethernet crossover cable provided.
6. (Optional – not required if using the built-in display) Assign an IP address to the 980/980B either directly or by enabling DHCP.
7. (Optional – not required if using the built-in display) Download the latest 980 GUI Manager application from the Quantum Data website: www.quantumdata.com/downloads/index.asp.
8. (Optional – not required if using the built-in display) Install the 980 Manager application on your host PC.
9. (Optional – not required if using the built-in display) Establish a connection to the 980 from the 980 Manager resident on your host PC.
10. (Optional – not required if using the built-in display) Through the 980 Manager "Add" the 980/980B as an Instrument.

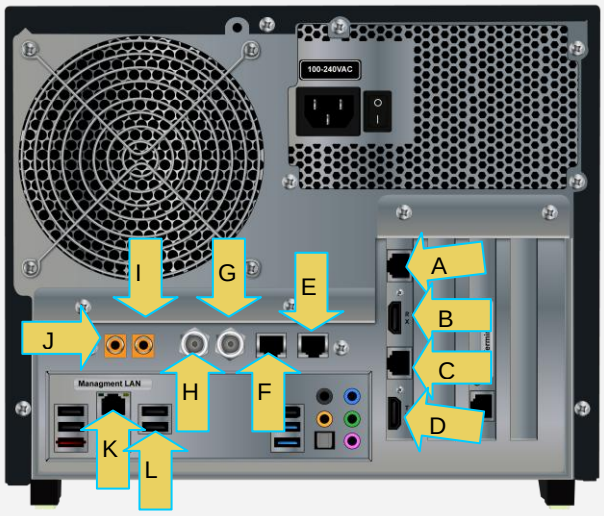
2.2.2 Procedures covered in this User Guide:

1. Connect the MHL device under test to the CBUS Compliance Test module.
2. Launch the 980 GUI Manager application, either the external 980 GUI Manager or the embedded 980 GUI Manager.
3. Launch the CBUS Compliance application in the 980 GUI Manager application.
4. Complete a (or load an existing) Capabilities Declaration Form (CDF) for the device under test using the **CDF Entry** panel.
5. Select the tests that you wish to run from the **Test Selection** panel.
6. Initiate the tests through the **Test Options / Review** panel.
7. View the detailed data for test failures if failures occur.
8. View the results in the **Test Results** panel under the **Navigator** panel.

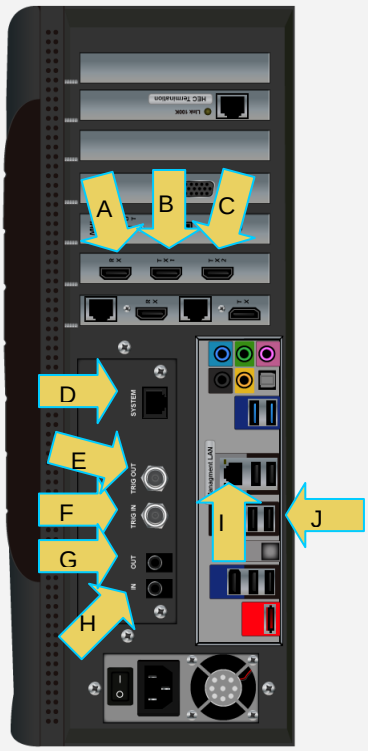
2.3 Connector Description

This User Guide covers three configurations of the 980 rear panels with the MHL CBUS Compliance test module installed. Each illustration shows the CBUS Compliance test module installed in the 980/980B. Use the following table to identify the connector function and descriptions on your 980/980B system configuration.

980 Configurations	Information / Function
CBUS Compliance Module - 980	The following is a description of each connector: **980 MHL CBUS module:** ▪ A – MHL OUT connector for running tests on MHL CBUS compliance tests on dongle devices. ▪ B – MHL IN connector for running tests on MHL CBUS compliance tests on source devices. ▪ C – MHL IN connector and HDMI cable connection to run MHL CBUS compliance tests on sink devices.

980 Configurations	Information / Function
	**QD Bus Board (99-000631):** ▪ D – Ethernet Tx connector use for HEAC function. Not used for CBUS compliance testing. ▪ E – BNC Trig OUT connector. Not used for CBUS compliance testing. ▪ F – BNC Trig IN connector. Not used for CBUS compliance testing. ▪ G – RCA OUT connector for SPDIF function. Not used for CBUS compliance testing. ▪ H – RCA IN connector for SPDIF function. Not used for CBUS compliance testing. **Lower Panel:** ▪ K – Ethernet port for connection to PC host for 980 GUI Manager application, telnet for command line control and FTP for transferring files. ▪ L – Various USB ports for transferring files and restoring system.

Use the following table to identify the connector function and descriptions on your 980/980B system configuration.

980B Configurations	Information / Function
CBUS Compliance Module – 980B 	The following is a description of each connector: **980 MHL CBUS module:** ▪ A – MHL OUT connector for running tests on MHL CBUS compliance tests on dongle devices. ▪ B – MHL IN connector for running tests on MHL CBUS compliance tests on source devices. ▪ C – MHL IN connector and HDMI cable connection to run MHL CBUS compliance tests on sink devices. **QD Bus Board (99-000631):** ▪ D – Ethernet Tx connector use for HEAC function. Not used for CBUS compliance testing. ▪ E – BNC Trig OUT connector. Not used for CBUS compliance testing. ▪ F – BNC Trig IN connector. Not used for CBUS compliance testing. ▪ G – RCA OUT connector for SPDIF function. Not used for CBUS compliance testing. ▪ H – RCA IN connector for SPDIF function. Not used for CBUS compliance testing.

980B Configurations	Information / Function
	Lower Panel: ▪ I – Ethernet port for connection to PC host for 980 GUI Manager application, telnet for command line control and FTP for transferring files. ▪ J – Various USB ports for transferring files and restoring system.

3 MHL CBUS Source Compliance Tests

This chapter describes how to run the MHL CBUS source compliance tests. Please note you will have to purchase the optional 980 MHL CBUS Compliance Test module in order to run these tests. These procedures assume that you have the 980 Advanced Test Platform powered up and the 980 GUI Manager up and running.

The 980 MHL CBUS Compliance test module supports the following test sections in the MHL 1.2 and MHL 2.0 Compliance Test specifications:

3.1 Electrical Tests

- 3.1.13 Rx Sense Impedance

3.2 System Tests

- 3.2.6 EDID and Device Capability Register Tests
  - 3.2.6.1 EDID Reading Test
  - 3.2.6.2 Device Capability Registers Test
- 3.2.7 RCP Sub-Command Tests
- 3.2.9 3D Tests
  - 3.2.9.1 3D Video Mode Support (MHL CTS 2.0 only)
- 3.2.10 UCP Sub-Command Tests (MHL CTS 2.0 only)

3.3 CBUS Tests

- 3.3.1 CBUS Source DUT Common Test Equipment Setups
- 3.3.2 CBUS Source DUT Common Methodologies
- 3.3.3 Link Layer Electrical – Source: Absolute Maximum Voltages
- 3.3.4 Link Layer Timing – Source DUT Output: Pre-Discovery
- 3.3.5 Link Layer Electrical – Source DUT Output: Discovery
- 3.3.6 Link Layer Timing – Source DUT Output: Discovery
- 3.3.7 Link Layer Electrical – Source DUT Output: Arbitration/Sync/Data Signaling
- 3.3.8 Link Layer Timing – Source DUT Output: Arbitration/Sync/Data in Nanoseconds
- 3.3.9 Link Layer Timing – Source DUT Output: Arbitration/Sync/Data in Bit Times
- 3.3.10 Link Layer Timing – Source DUT Output: Link-Level NACK
- 3.3.11 Link Layer Timing – Source DUT Output: ACK
- 3.3.12 Link Layer Timing – Source DUT Output: Bus Re-Arbitration
- 3.3.13 Link Layer Behavior – Source DUT Output: Ill-formed packets
- 3.3.14 Link Layer Timing – Source DUT Input: Discovery
- 3.3.15 Link Layer Electrical – Source DUT Input: Arbitration/Sync/Data signaling
- 3.3.16 Link Layer Timing – Source DUT Input: Arbitration
- 3.3.17 Link Layer Timing – Source DUT Input: Data
- 3.3.18 Link Layer Timing – Source DUT Input: NACK
- 3.3.19 Link Layer Timing – Source DUT Input: ACK
- 3.3.20 Link Layer Timing – Source DUT Input: Bus Re-Arbitration

- 3.3.21 Link Layer Behavior – Source DUT Input: Ill-formed packets
- 3.3.22 Link Layer Timing – Source DUT Input: Disconnect
- 3.3.23 Link Layer Electrical – Source DUT VBUS Control

6.3 CBUS Common Tests

- 6.3.1 MSC – Source and Sink DUT Input: Device Register Space Contents; Reads
- 6.3.2 MSC – Source and Sink DUT Output: NACK Packet Response to MSC_MSG
- 6.3.3 MSC – Source and Sink DUT Output: Never Initiates Bad Commands
- 6.3.4 MSC – Source and Sink DUT Output: NACK Packet Response to MSC_MSG
- 6.3.5 MSC – Source and Sink DUT Output: Never Initiates Bad Commands
- 6.3.6 MSC – Source and Sink DUT Output: Errors and Exceptions
- 6.3.7 MSC – Source and Sink DUT Output: Disconnect
- 6.3.8 MSC – Source and Sink DUT Input: Device Register Space Contents; Writes
- 6.3.9 MSC – Source and Sink DUT Input: Vendor Specific and Reserved Header Values
- 6.3.10 MSC – Source and Sink DUT Input: Normal Commands
- 6.3.11 MSC – Source and Sink DUT Input: Errors and Exceptions
- 6.3.12 MSC – Source and Sink DUT Input: Argument Timeouts
- 6.3.13 MSC – Source DUT Output: Never Initiates Bad Commands
- 6.3.14 MSC – Source DUT Input: Normal Commands
- 6.3.17 DDC – Source DUT Output; DUT Never Sends Illegal DDC Command
- 6.3.18 DDC – Source DUT Output; Normal Operation
- 6.3.19 DDC – Source DUT Output; Illegal Responses

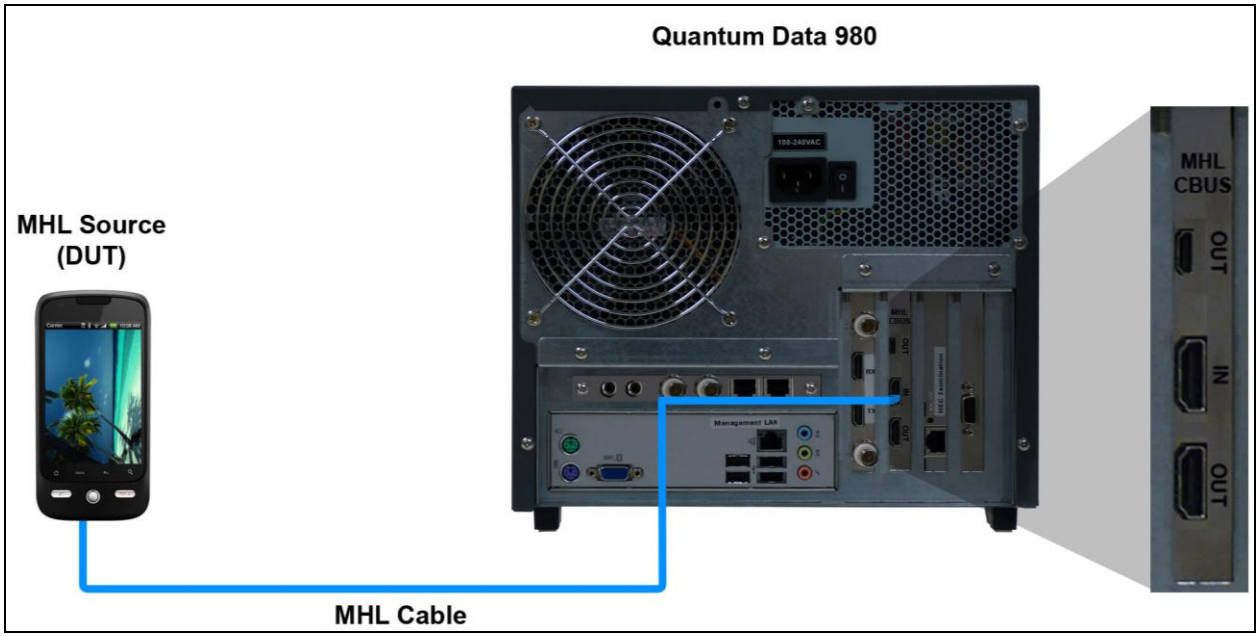
3.1 Workflow for running the MHL CBUS Source Compliance Tests

The list below is the high level workflow for running the MHL CBUS Source Compliance Tests. Note that the installation of the external 980 GUI Manager and the Ethernet session are optional; you can run the compliance tests through the embedded GUI Manager.

1. Power up the 980. Refer to the procedures in 980 Advanced Test Platform Quick Start Guide available from the quantum data website on the downloads page.
2. (Optional; only necessary if using the external 980 GUI Manager) Establish an Ethernet/IP connection between the external 980 GUI Manager and the 980.
3. Connect the MHL source device under test to the CBUS Rx ports on the 980 MHL CBUS Compliance Test module.
4. Complete a (or load an existing) Capabilities Declaration Form (CDF) for the device under test using the **CDF Entry** panel.
5. Select the tests that you wish to run from the **Test Selection** panel.
6. Initiate the tests through the **Test Options / Review** panel.
7. View the detailed data for test failures if failures occur.
8. View the results in the **Test Results** panel under the **Navigator** panel.

3.2 Making the physical MHL connections

This subsection describes the physical MHL connections required to run the MHL CBUS source compliance tests.



Connections for MHL CBUS source compliance test – 980

To make the physical MHL connections:

This procedure assumes that you have assembled the 980 with the MHL CBUS Compliance Test module and the MHL source device under test and applied power to all these devices. Refer to the procedures below and the diagram above.

1. Connect your MHL source device under test to the MHL IN connector on the 980 MHL CBUS Compliance Test module. Use the short (30 centimeter) MHL cable provided by Quantum Data.

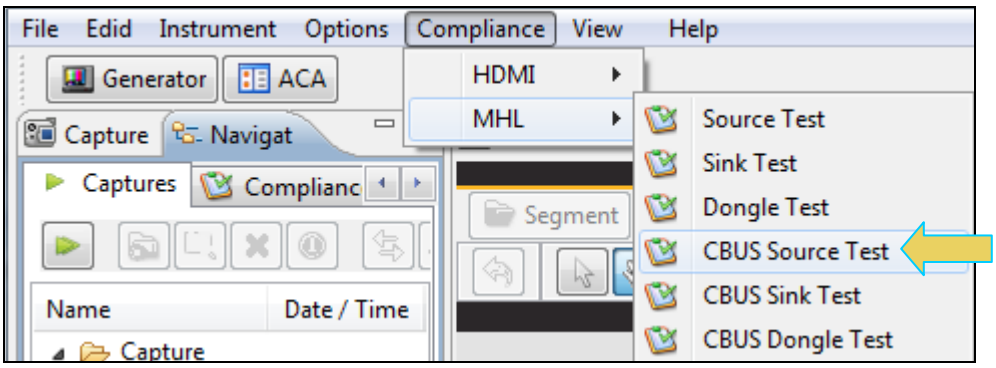
3.3 Completing the CDF

Use the following procedures to complete the CDF for the MHL CBUS source compliance tests.

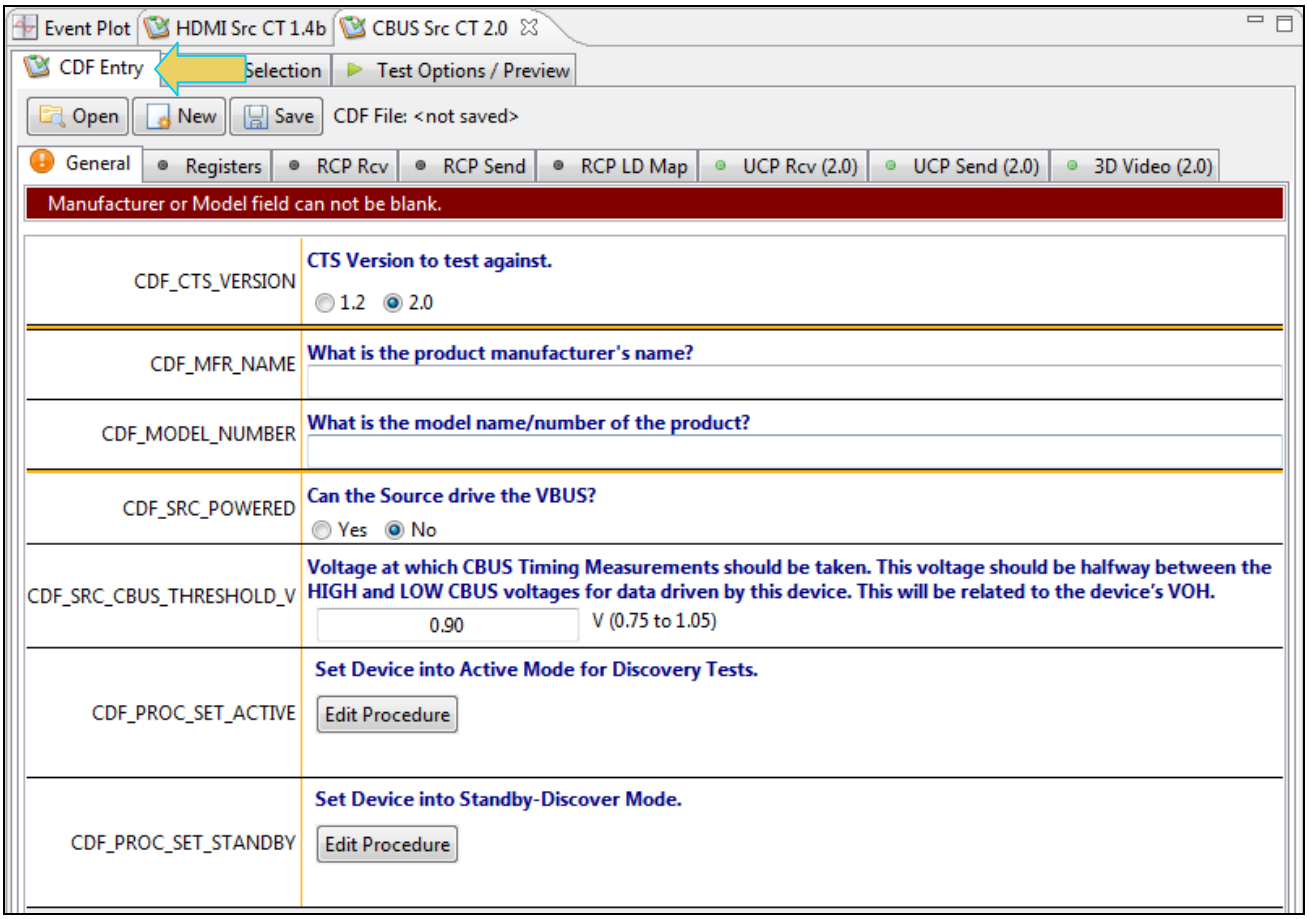
Note: The example workflows and screens use MHL 2.0 except where noted. Workflow and screens are similar for testing MHL 1.2 devices.

To complete the CDF:

1. From the **View** menu, enable viewing of the **MHL CBUS Src CT** panel.

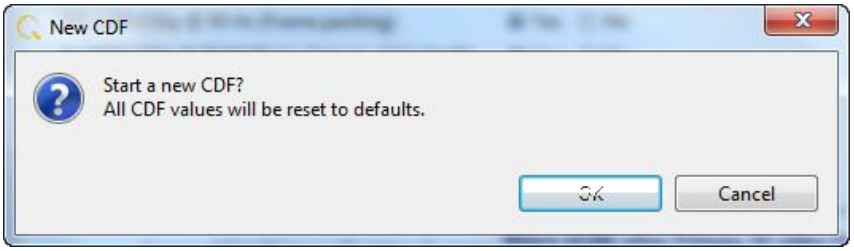


2. Select the **CDF Entry** panel as shown below.



3. To create a new CDF, click on the **New** activation button.

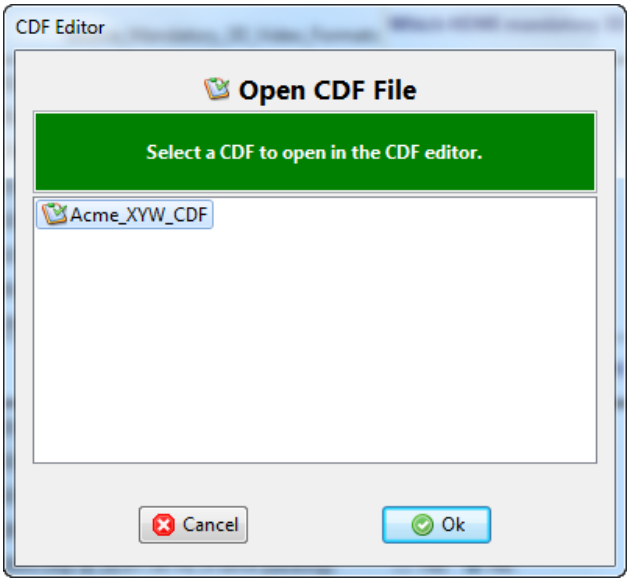
   You will be prompted with a confirmation that you want to start a new CDF and reset the values. Click **OK** to proceed.



4. To open an existing CDF, click on the **Open** activation button.

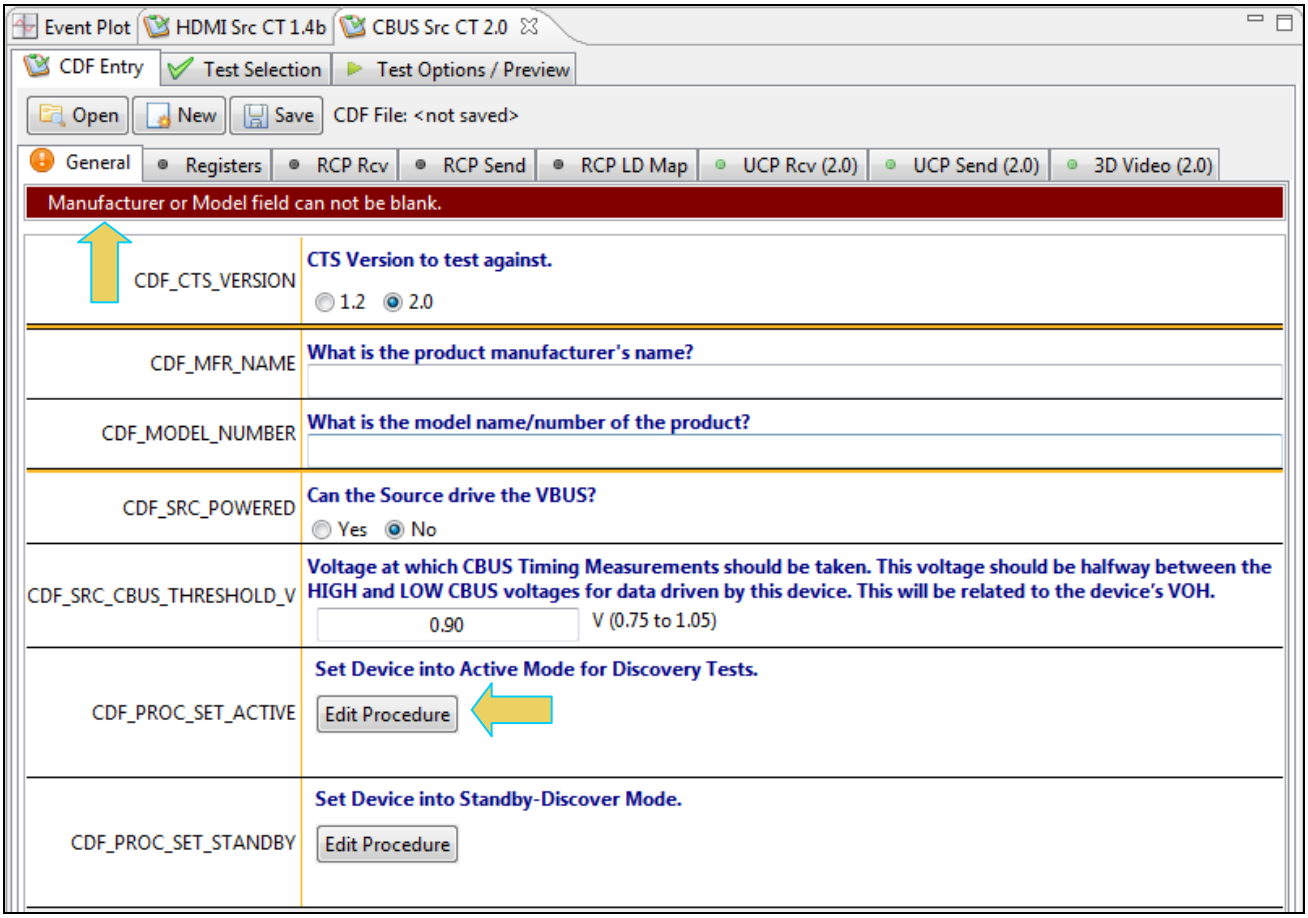
   You will be prompted with a dialog box that enables you to open a CDF. Select a CDF and then **OK** to proceed.

   Note: You can save these CDFs to your PC for use on other PCs and by other colleagues.

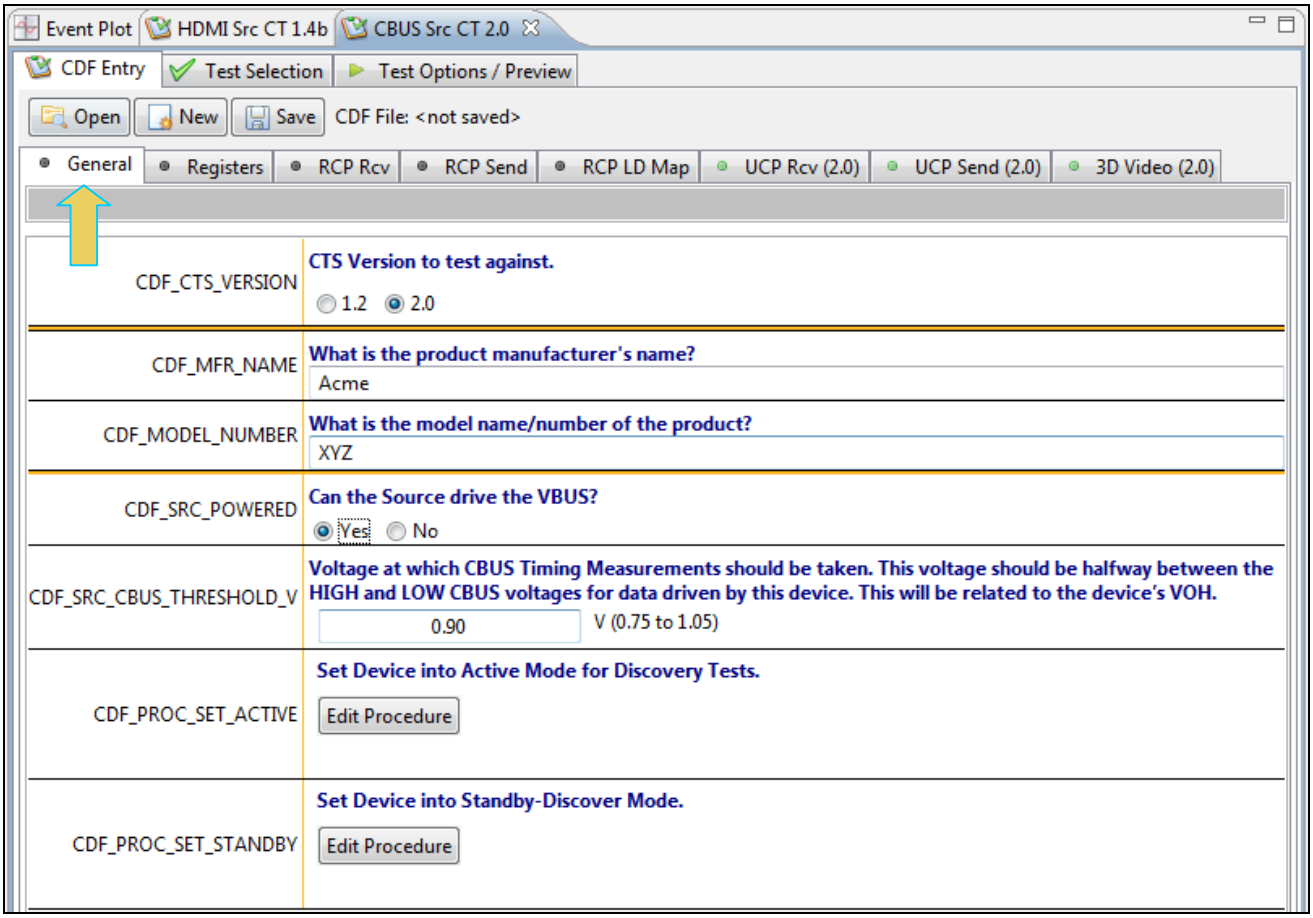


5. Complete the items in the **General** tab of the CDF Entry panel shown below. Note that you will have to complete the essential fields in order to proceed. A read status message will appear indicating if you have not completed all the essential fields. This is shown in the example below.

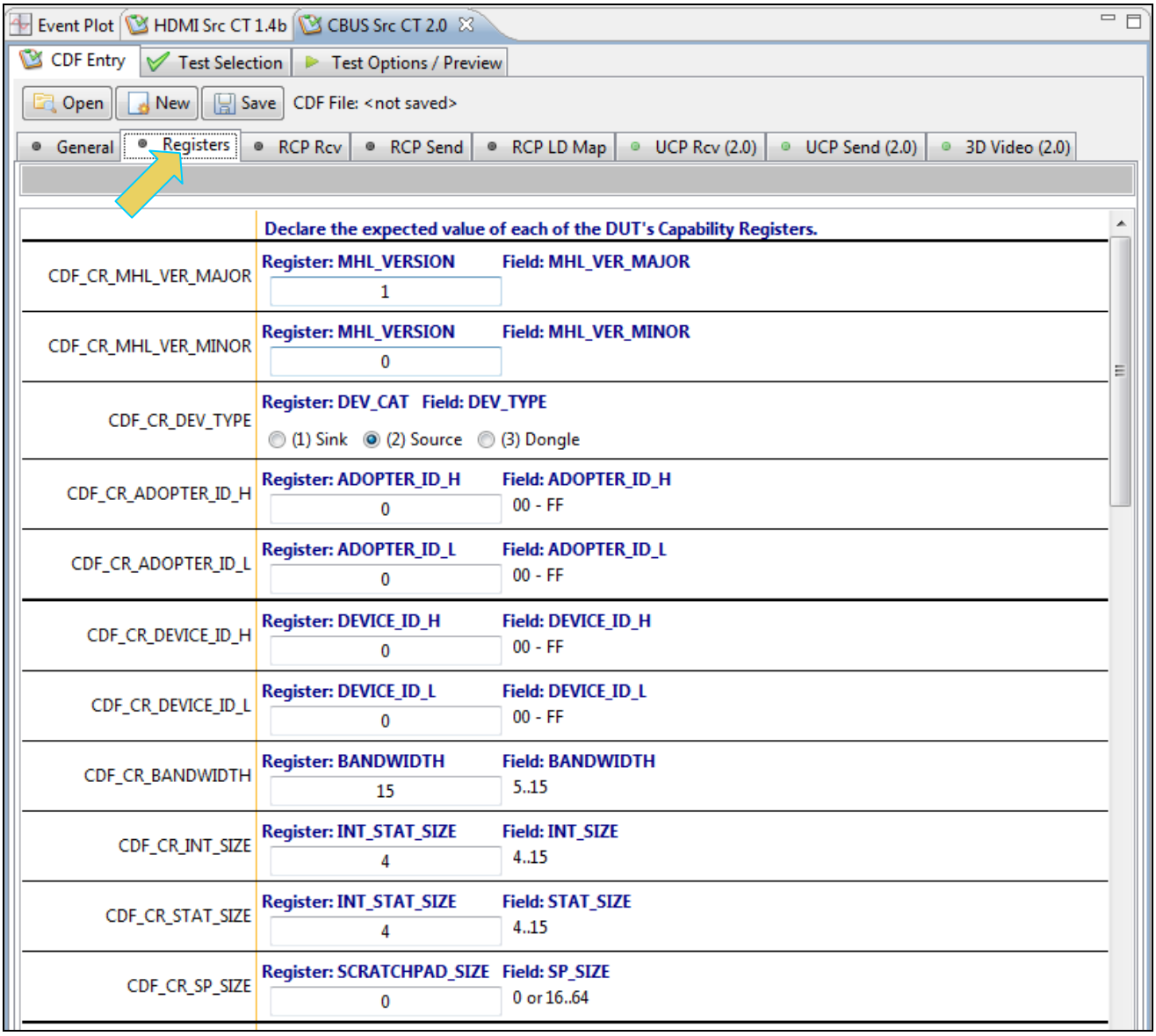
   You can enter helpful information using the “Edit Procedure” dialog box. The information entered into this dialog box will appear during the test and can be helpful to instruct users on running a particular test.



   When you have entered in all the required fields the error indication will go away as shown in the example below.

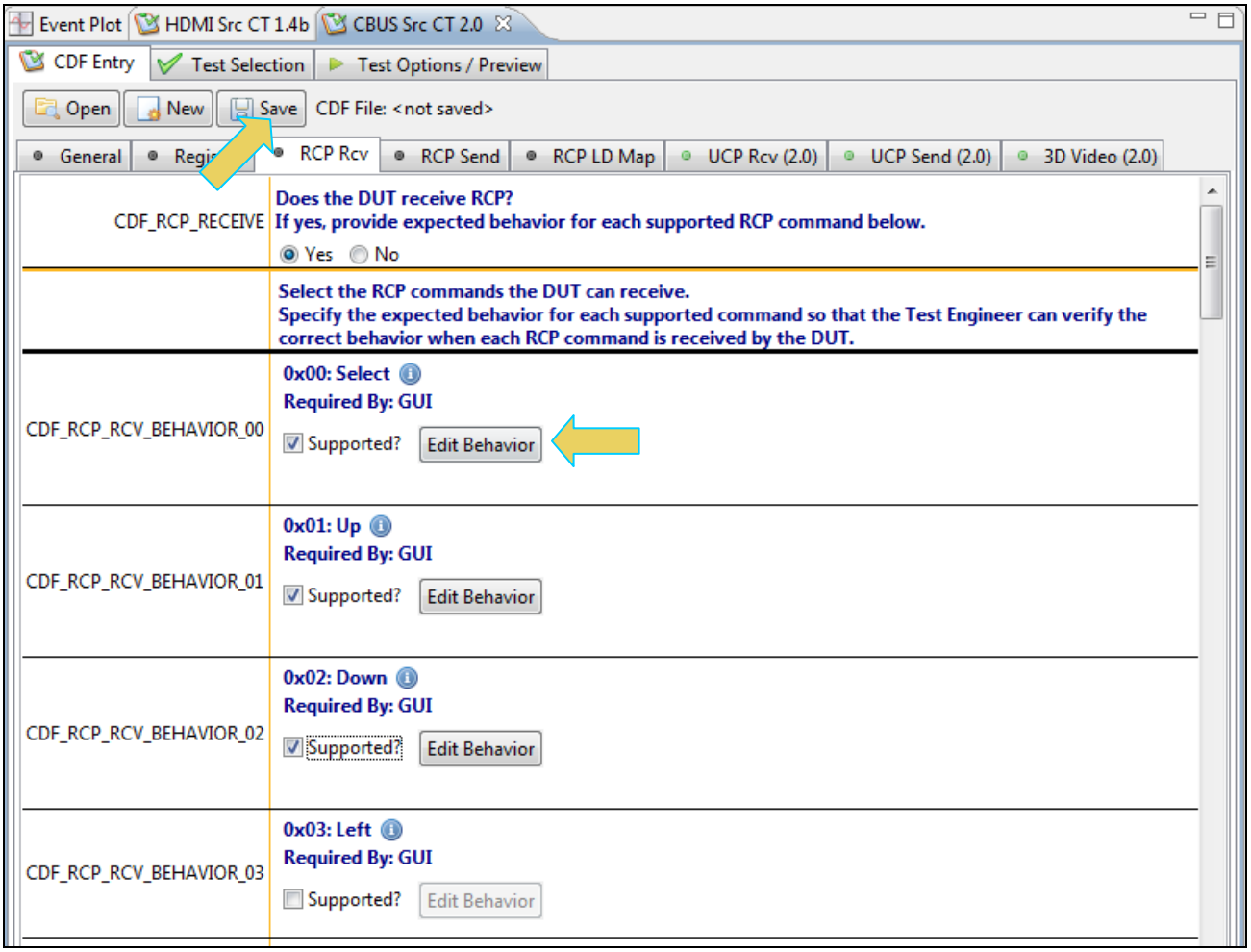

Event Plot
HDMI Src CT 1.4b
CBUS Src CT 2.0
CDF Entry
Test Selection
Test Options / Preview
Open
New
Save
CDF File: <not saved>
General
Registers
RCP Rcv
RCP Send
RCP LD Map
UCP Rcv (2.0)
UCP Send (2.0)
3D Video (2.0)
CDF_CTS_VERSION
CTS Version to test against.
1.2
2.0
CDF_MFR_NAME
What is the product manufacturer's name?
Acme
CDF_MODEL_NUMBER
What is the model name/number of the product?
XYZ
CDF_SRC_POWERED
Can the Source drive the VBUS?
Yes
No
CDF_SRC_CBUS_THRESHOLD_V
Voltage at which CBUS Timing Measurements should be taken. This voltage should be halfway between the HIGH and LOW CBUS voltages for data driven by this device. This will be related to the device's VOH.
0.90
V (0.75 to 1.05)
CDF_PROC_SET_ACTIVE
Set Device into Active Mode for Discovery Tests.
Edit Procedure
CDF_PROC_SET_STANDBY
Set Device into Standby-Discover Mode.
Edit Procedure

6. Complete the items in the **Registers** tab.



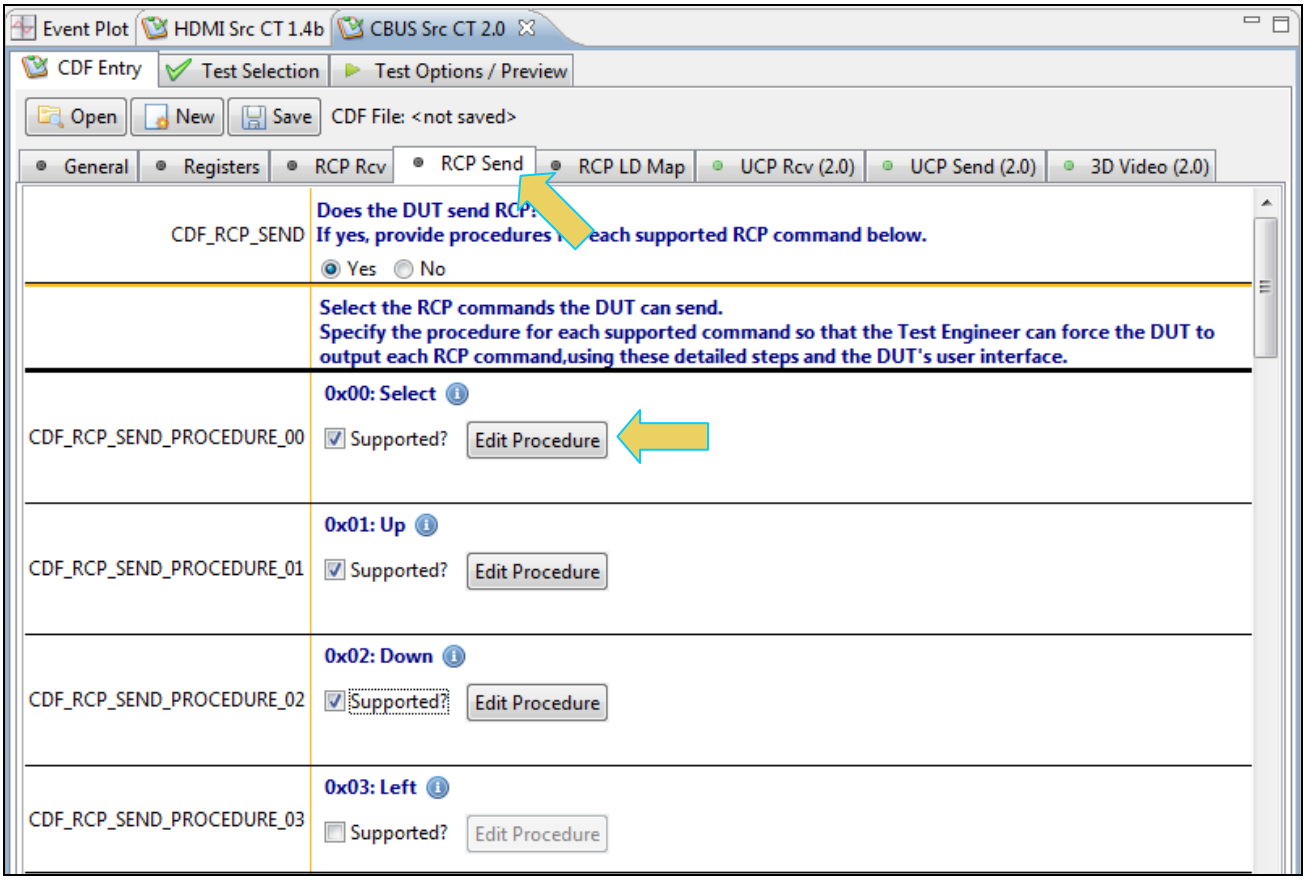
7. Complete the items in the **RCP Rcv** tab.

   You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test. You can enter in the expected behavior for each supported command so that the test engineer can verify that the source DUT behaves properly when receiving the various RCP commands.



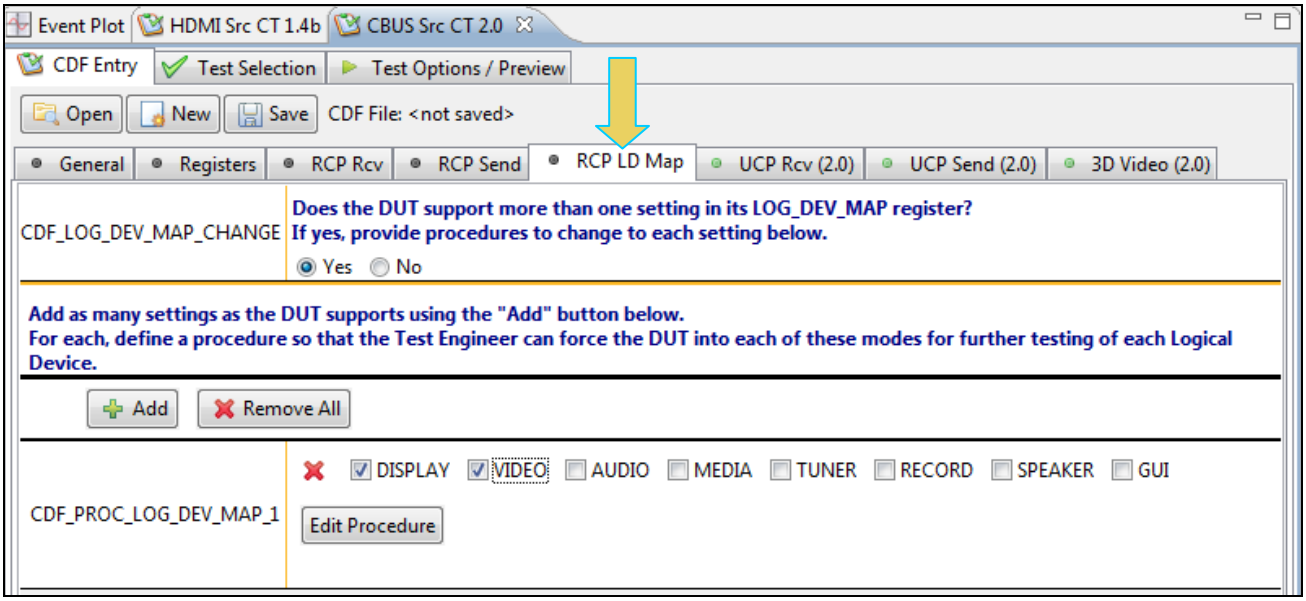
8. Complete the items in the **RCP Send** tab.

   You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test and can be helpful to instruct a test engineer on how to set up a device in order to run a particular test. In the example below you would enter in procedural information which a test engineer could use to cause the source to issue the various RCP commands.



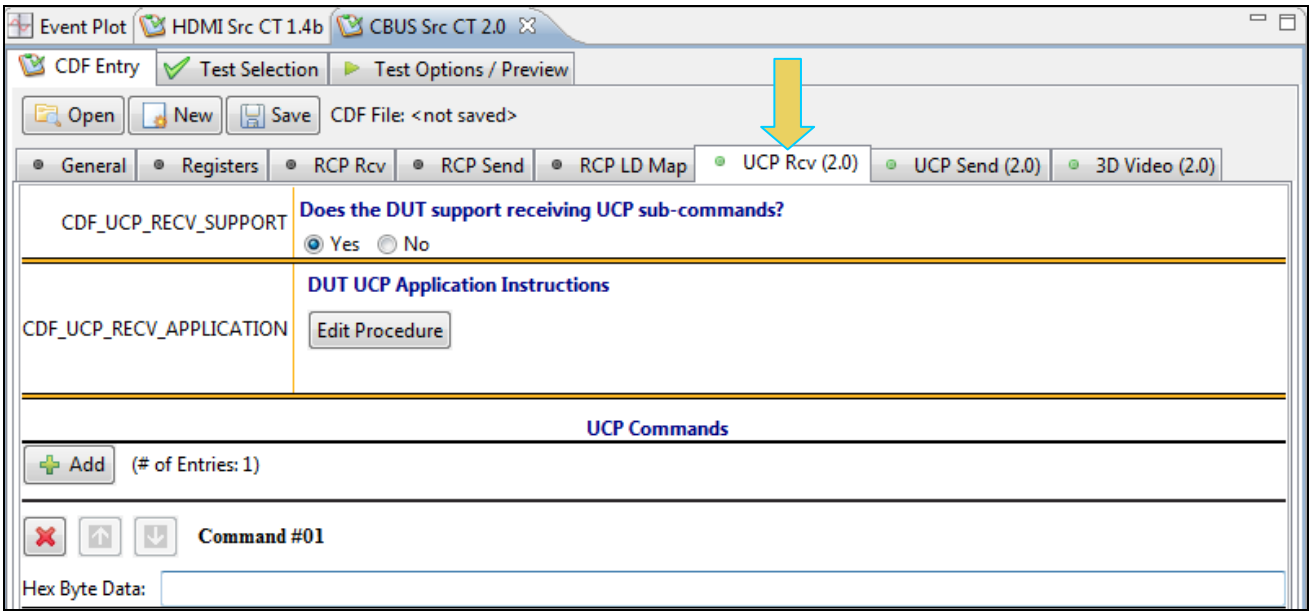
9. Complete the items in the **RCP LD Map** tab.

   You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test to assist the test engineer. In the example below you would enter in procedural information which a test engineer could use to force the source into the proper mode for further testing of each logical device.



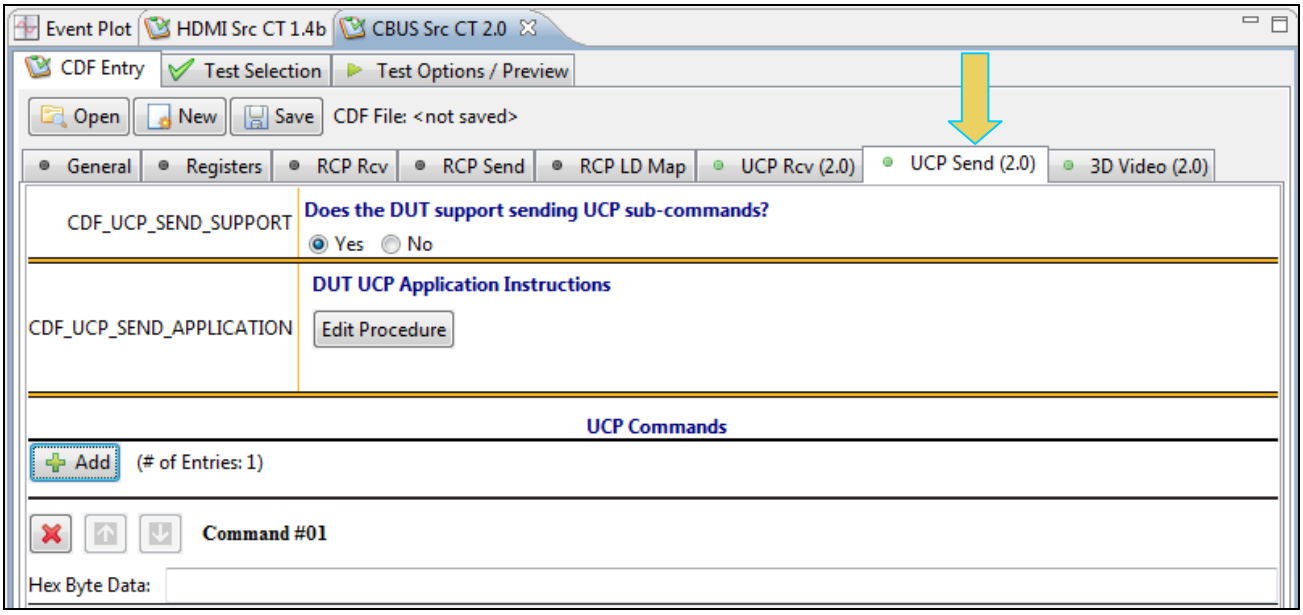
10. Complete the items in the **UCP Rcv** tab.

    You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test to assist a test engineer. You can enter in the expected behavior for each supported command so that the test engineer can verify that the source DUT behaves properly when receiving the various UCP commands.

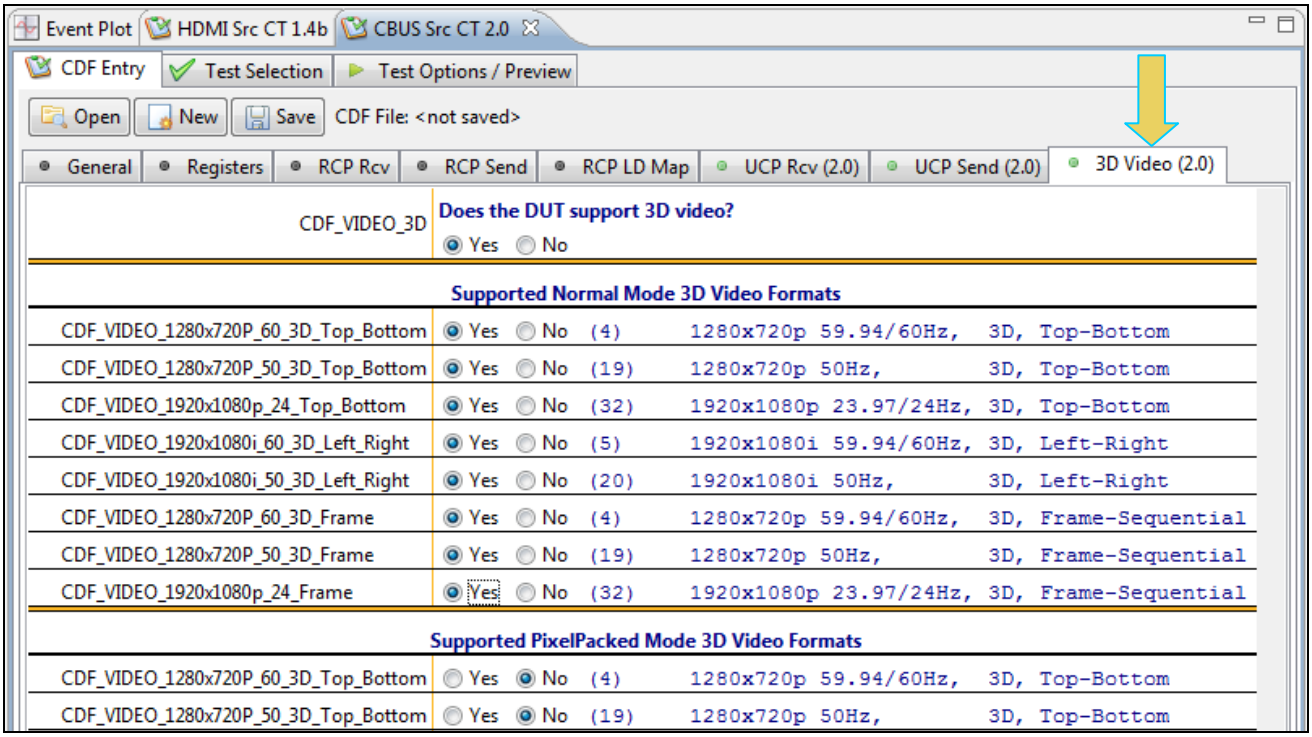


11. Complete the items in the **UCP Send** tab.

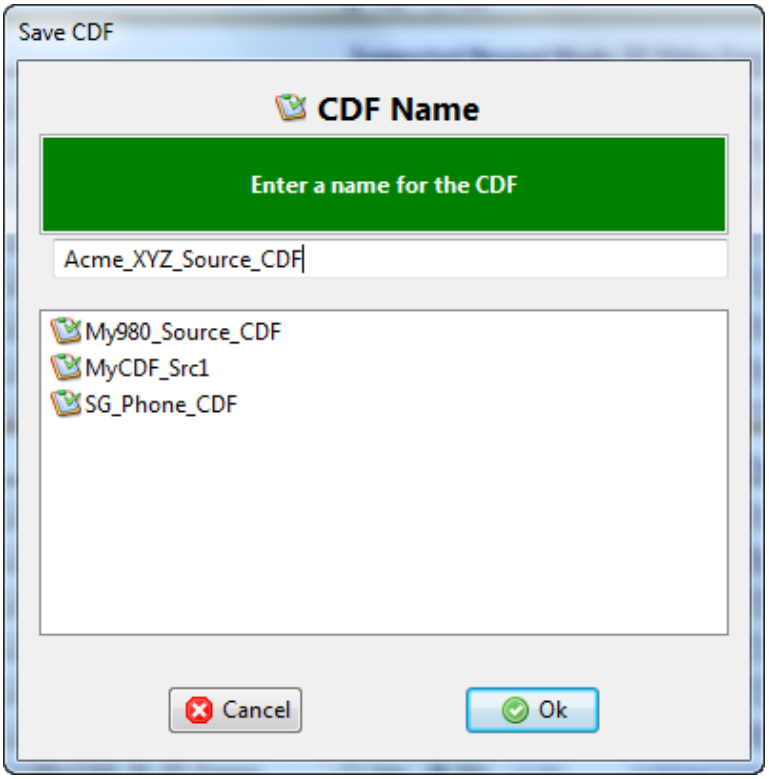
You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test and can be helpful to instruct a test engineer on how to set up a device in order to run a particular test. In the example below you would enter in procedural information which a test engineer could use to cause the source to issue the various UCP commands.



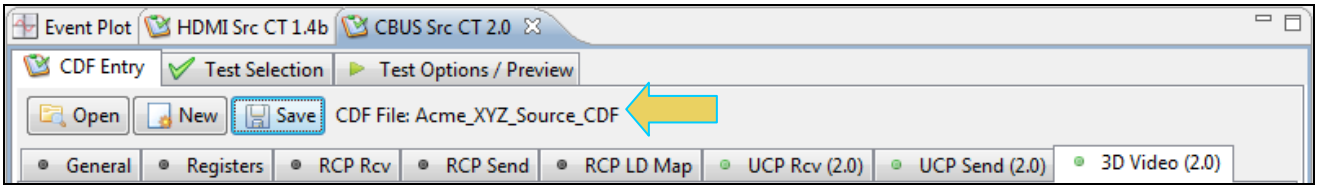
12. Complete the items in the **3D Video** tab.



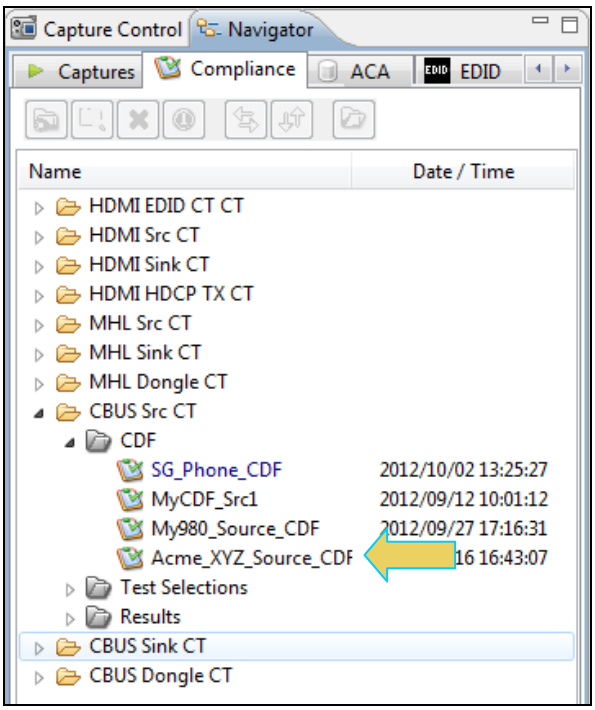
13. Save the CDF. A confirmation box with a default name will appear as shown below. Edit the name if necessary and click OK.



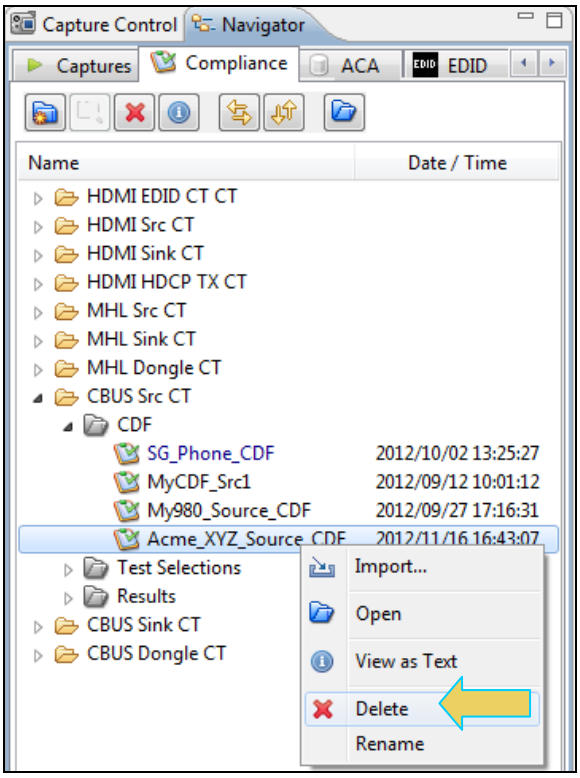
The name of the CDF will appear next to the **Save** button as shown below:



You can then view the CDF or load other CDFs from the Navigator/Compliance view as shown below:



You can open for use these CDF files using the right click **Open** menu item as shown below. You can also delete a CDF or rename it. If you wish to view a text file of the CDF you can do so by selecting **View as Text**. In some cases you might want to share these files with other colleagues. Since these files are stored locally on your PC you can simply email them. Conversely if you wish to import a CDF file from another user for use on your application you can do that using the **Import** function on the right click menu also show below.



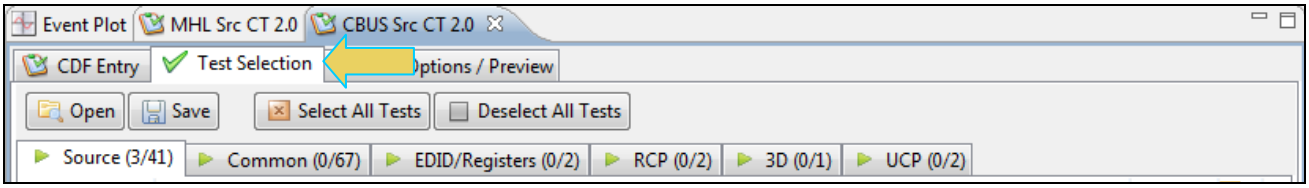
3.4 Selecting which tests to run

Use the following procedures to select the tests to run. There are multiple tabs which correspond to each section in the CTS.

Note: The example workflows and screens use MHL 2.0 except where noted. Workflow and screens are similar for testing MHL 1.2 devices.

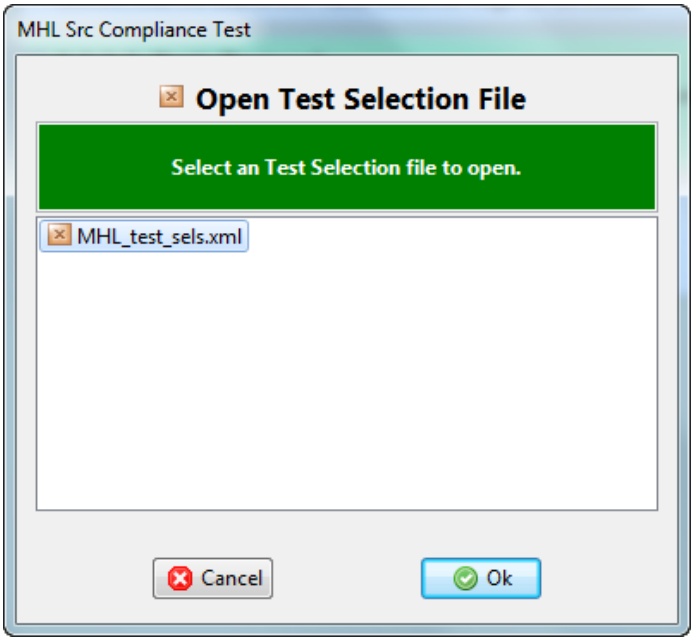
To select the tests to run:

1. Select the **Test Selection** panel as shown below.
2. If you have an existing Test Selection option file saved you can recall that for use in your testing. Simply click on the **Open** activation button.



A dialog box will appear as follows. Simply select the file and click on the **OK** activation button.

Note: You can save the Test Selection files to your host PC and transfer them to other PCs and for others to use.



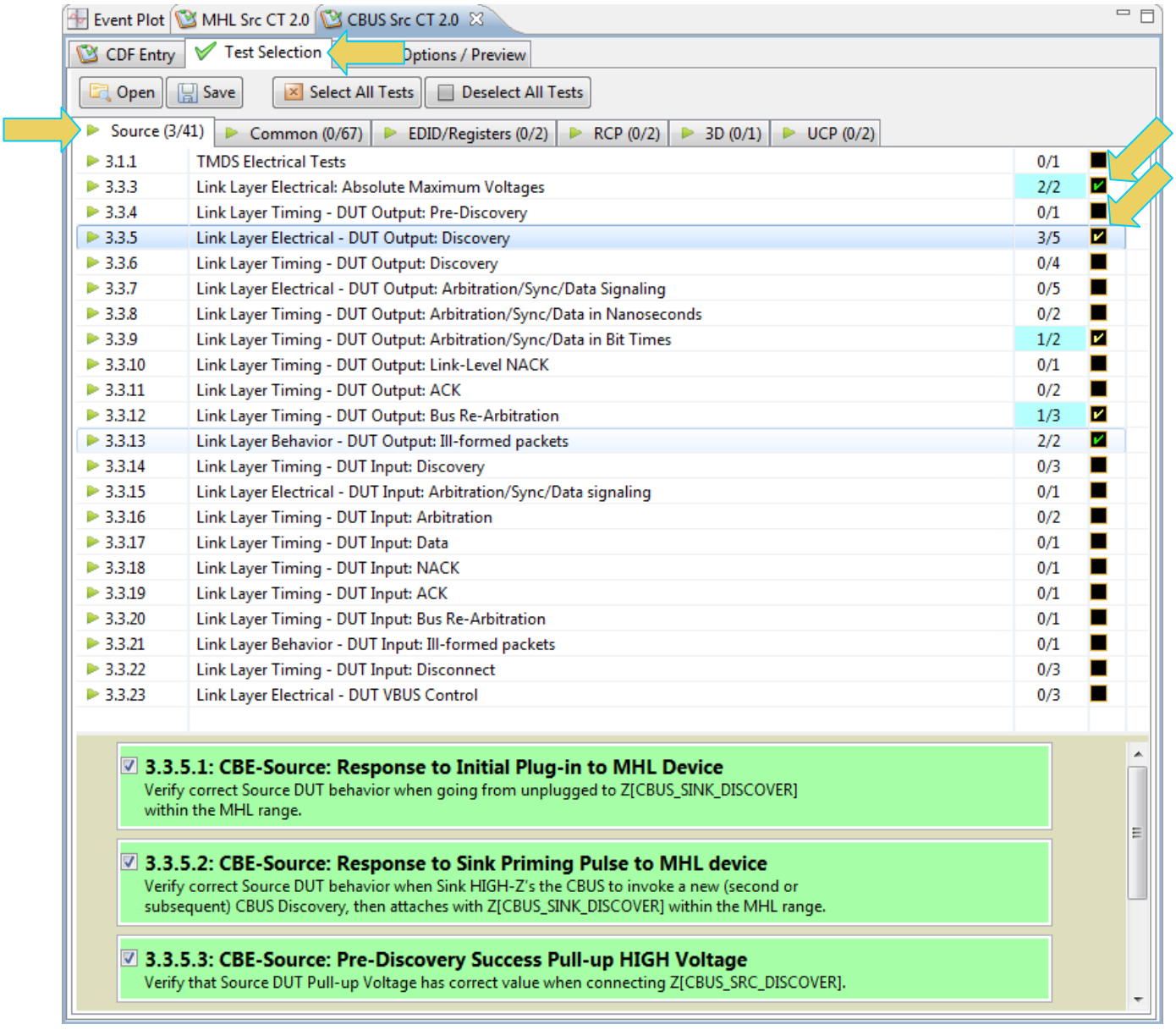
3. Complete the items in the **Source** tab of the **Test Selection** panel shown below.

   For convenience you can **Select All** or **Deselect All** tests using the activation buttons provided.

   Check box indicators inform how many tests in each section and how many are selected. Each tab (Source, Common or RCP) inform you of how many tests in that section have been selected.

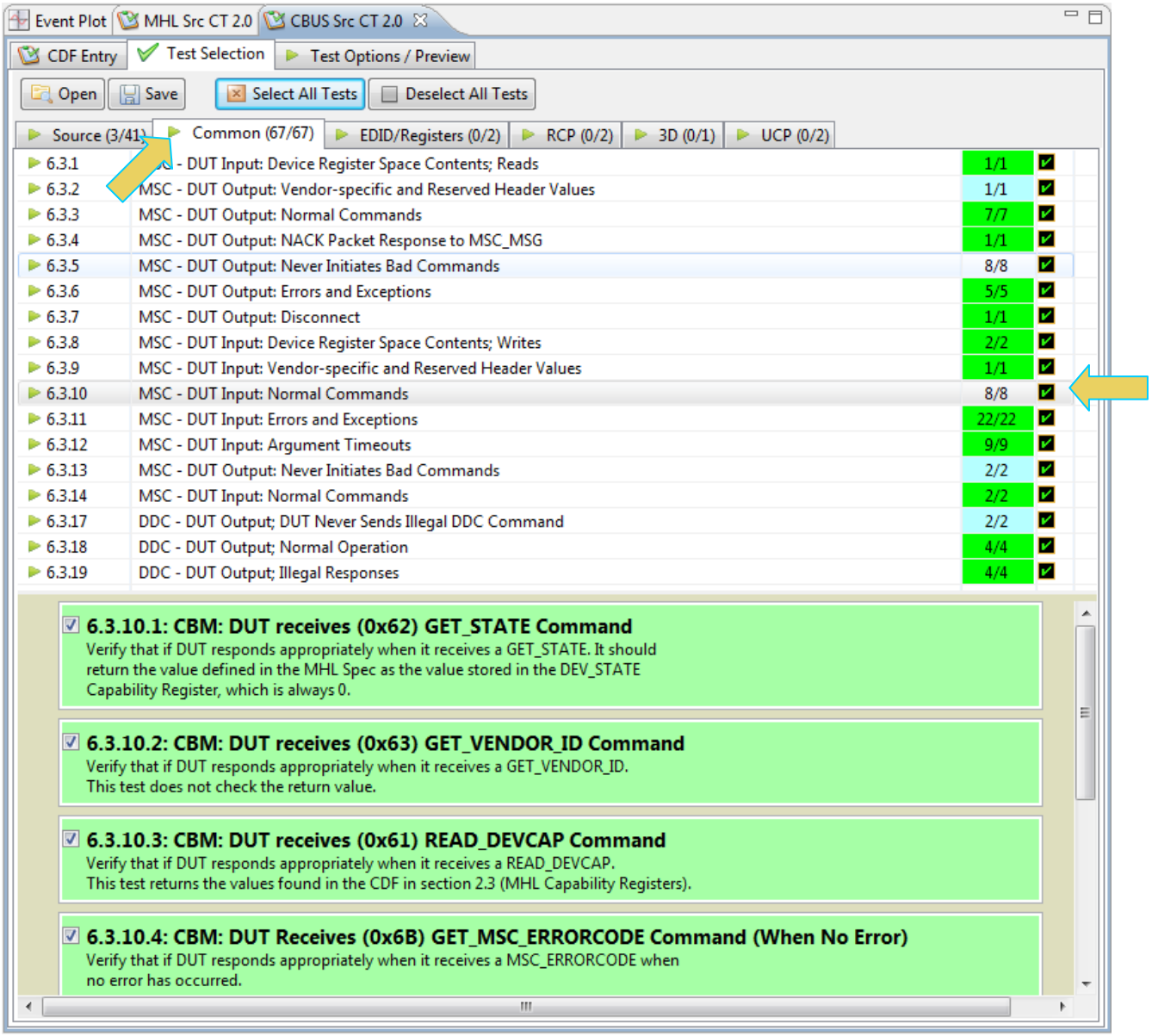
   Each test section list includes several tests. In the example shown below the 3.2.6 EDID and Device Capability Register Test section is selected and the specific tests in that section are then available to be selected.

   Note: Some tests are run in background and cannot be deselected.

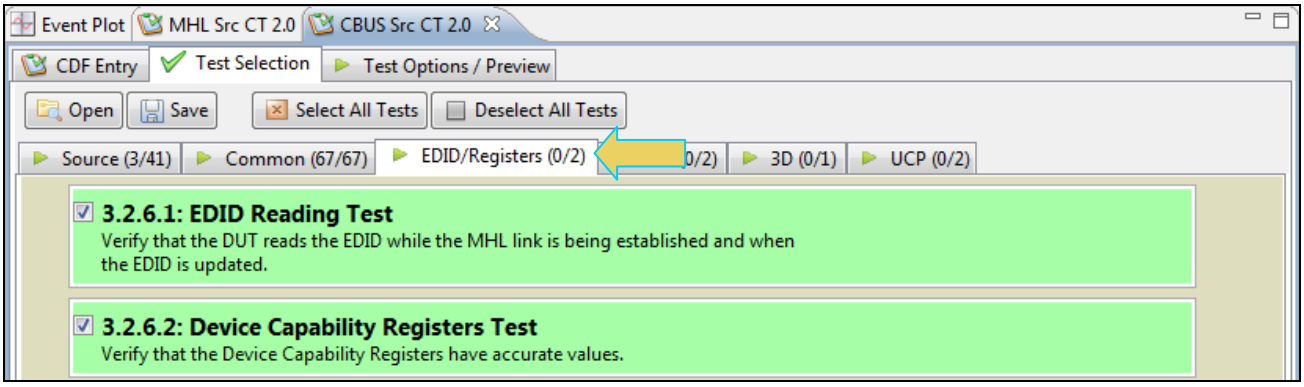


4. Complete the items in the **Common** tab of the **Test Selection** panel shown below.

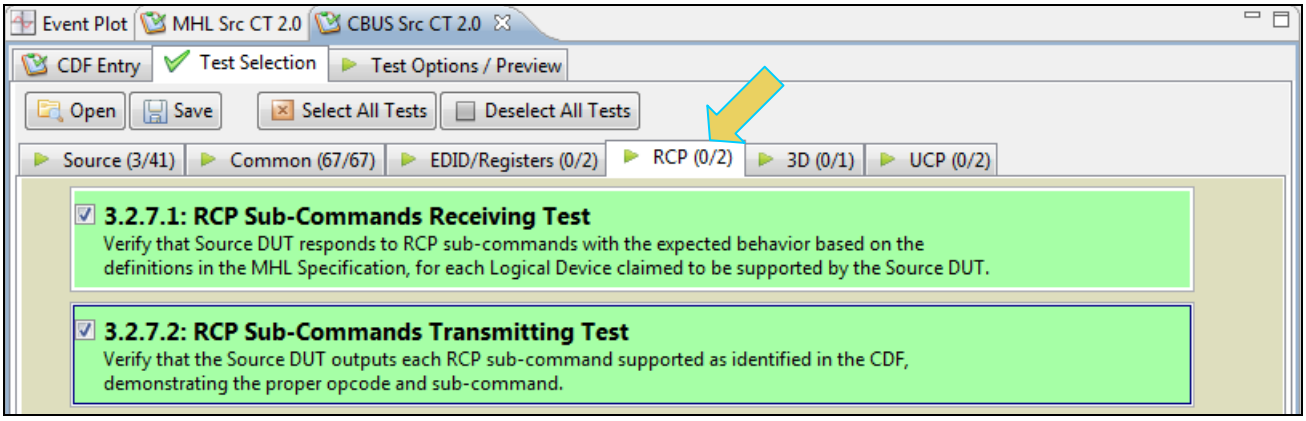
   For convenience you can **Select All** or **Deselect All** tests using the activation buttons provided.



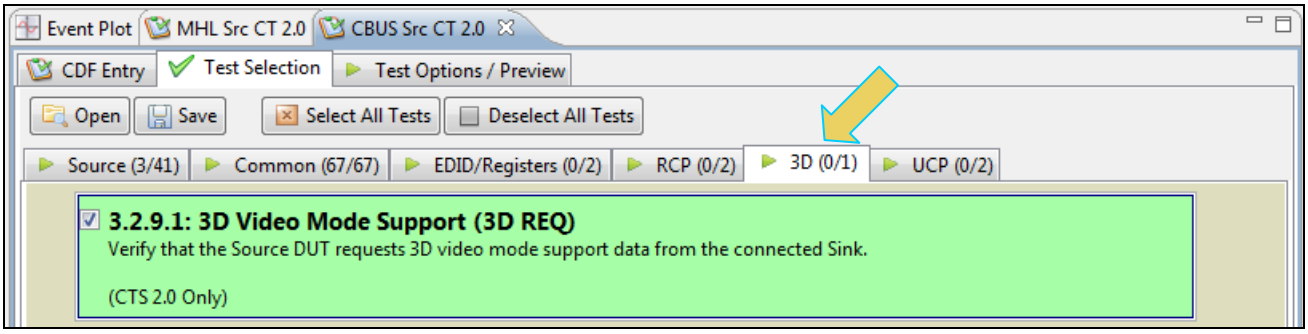
5. Complete the items in the **EDID Registers** tab of the **Test Selection** panel shown below.



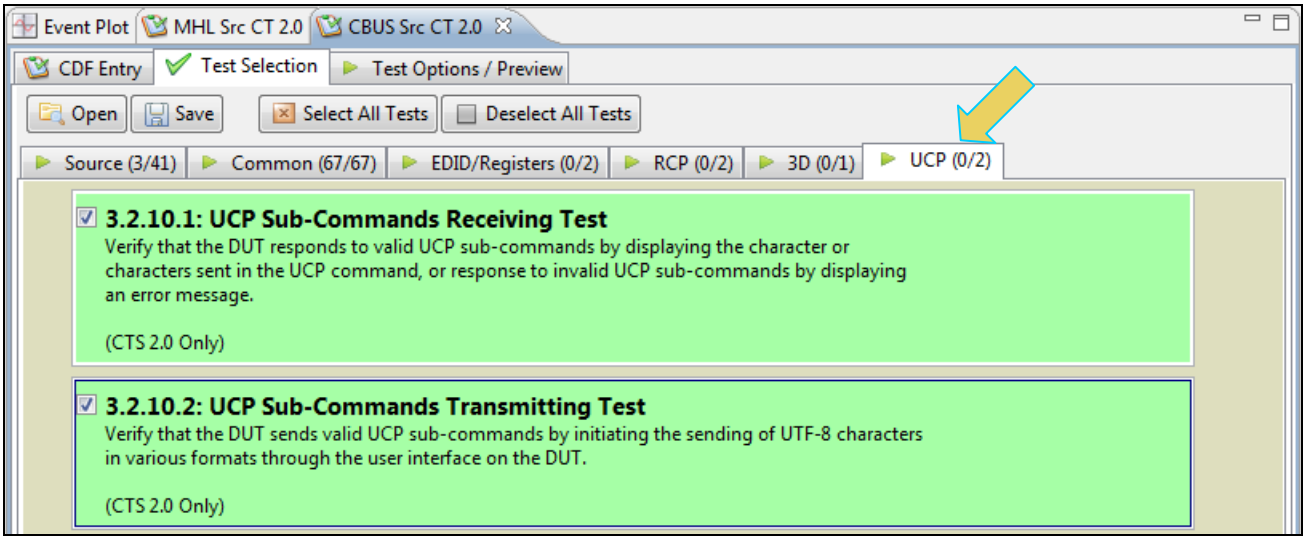
6. Complete the items in the **RCP** tab of the **Test Selection** panel shown below.



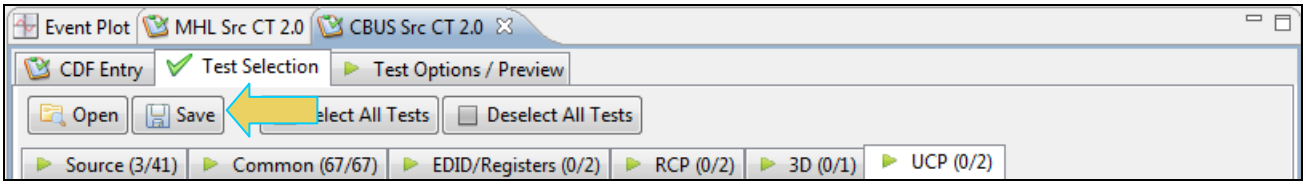
7. Complete the items in the **3D** tab of the **Test Selection** panel shown below.



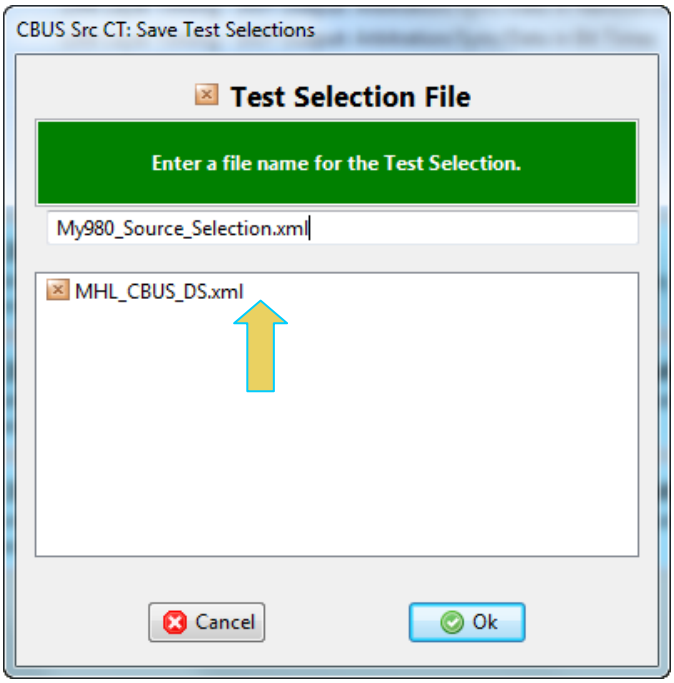
8. Complete the items in the **UCP** tab of the **Test Selection** panel shown below.



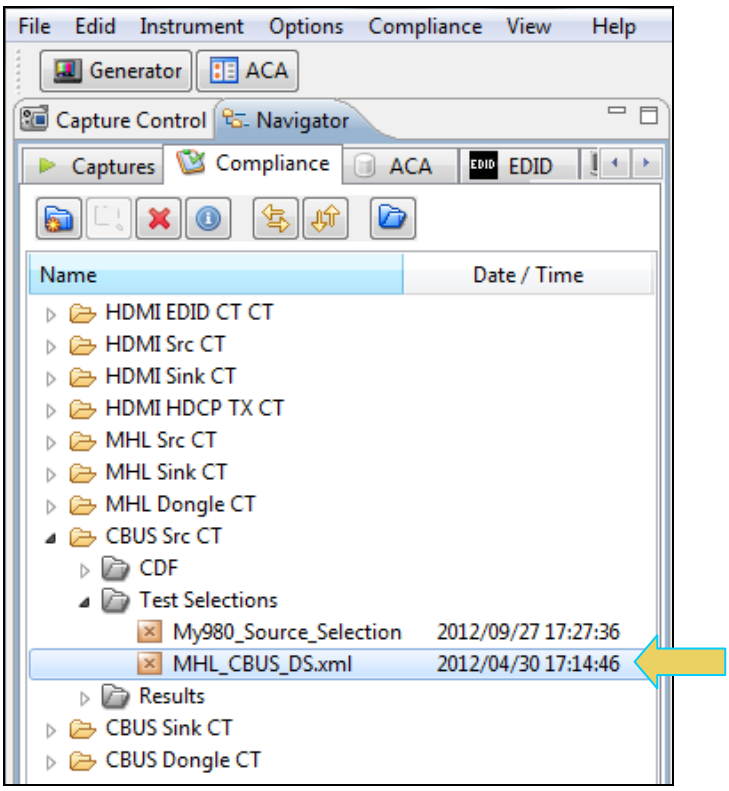
9. You can save the Test Selection options using the **Save** activation button.



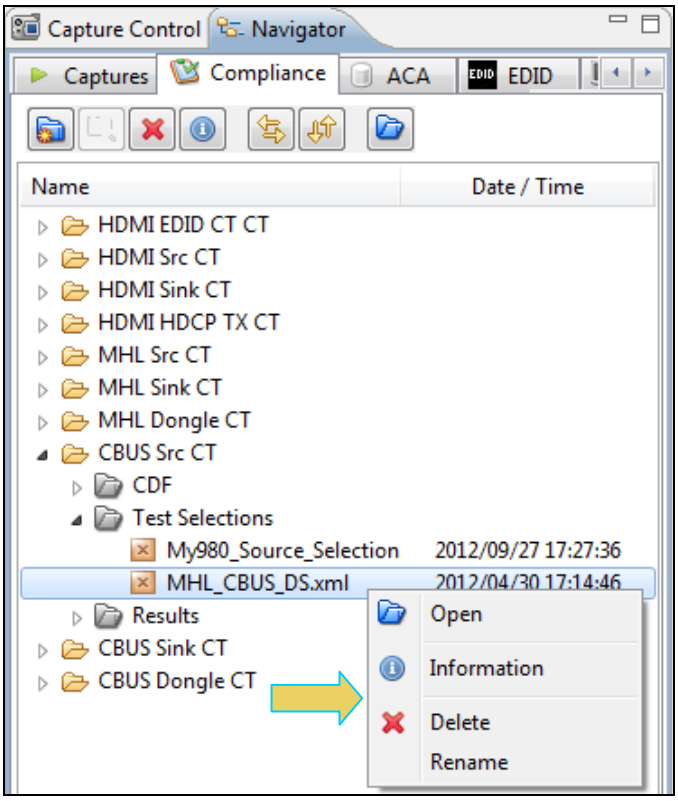
A dialog box will appear as follows. Simply assign a name and click on the **OK** activation button. Click **Cancel** to exit.



You can then view the Test Selection in the Navigator/Test Selections view as shown below. You can delete Test Selections and load Test Selections from this list as well.



You can use the right click menu to open, delete or rename a Test Selection file as shown below.



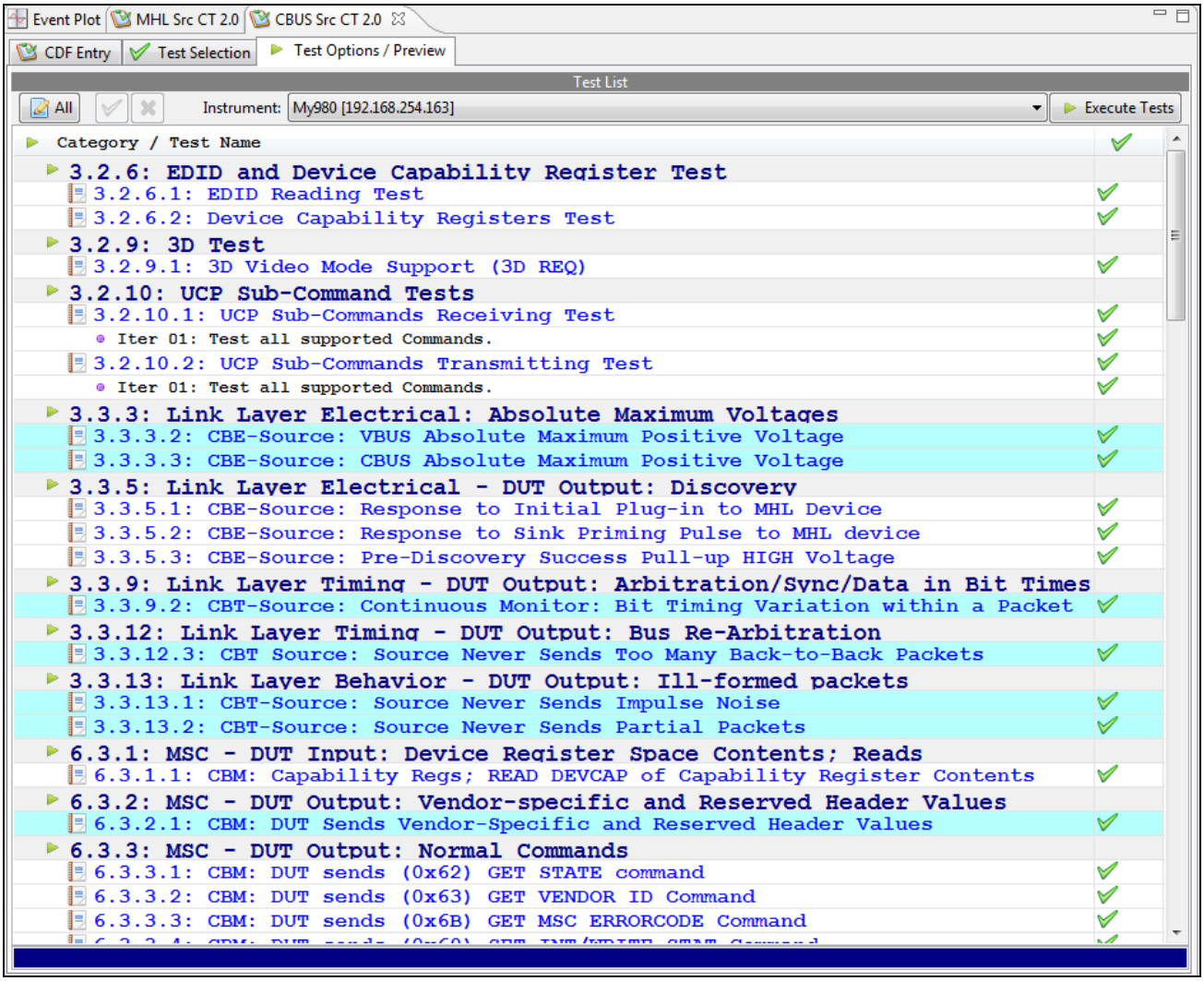
3.5 Executing the MHL CBUS Source Compliance Tests

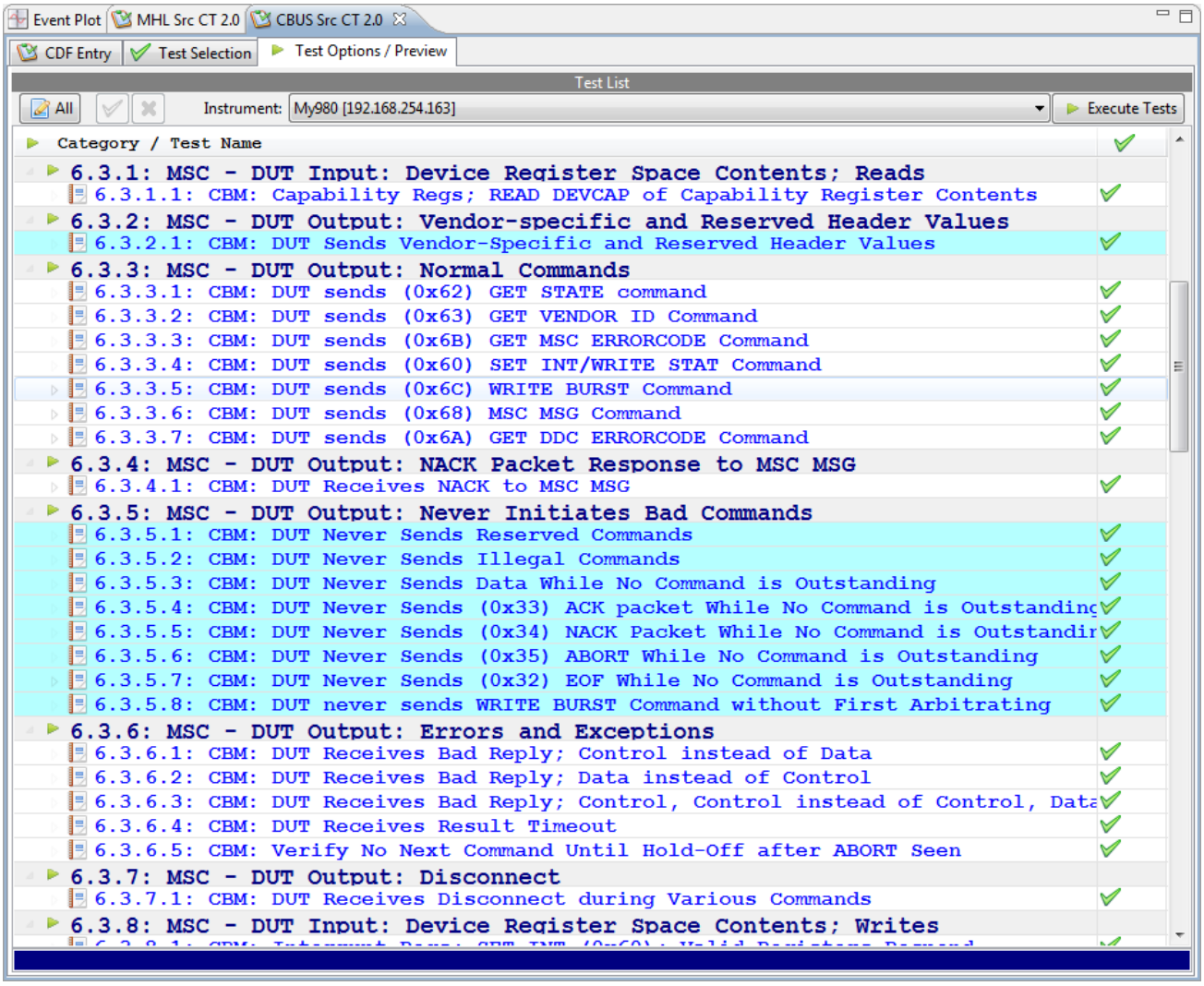
Use the following procedures to initiate the execution of an MHL CBUS Source Compliance test series.

Note: The example workflows and screens use MHL 2.0 except where noted. Workflow and screens are similar for testing MHL 1.2 devices.

To initiate a test series:

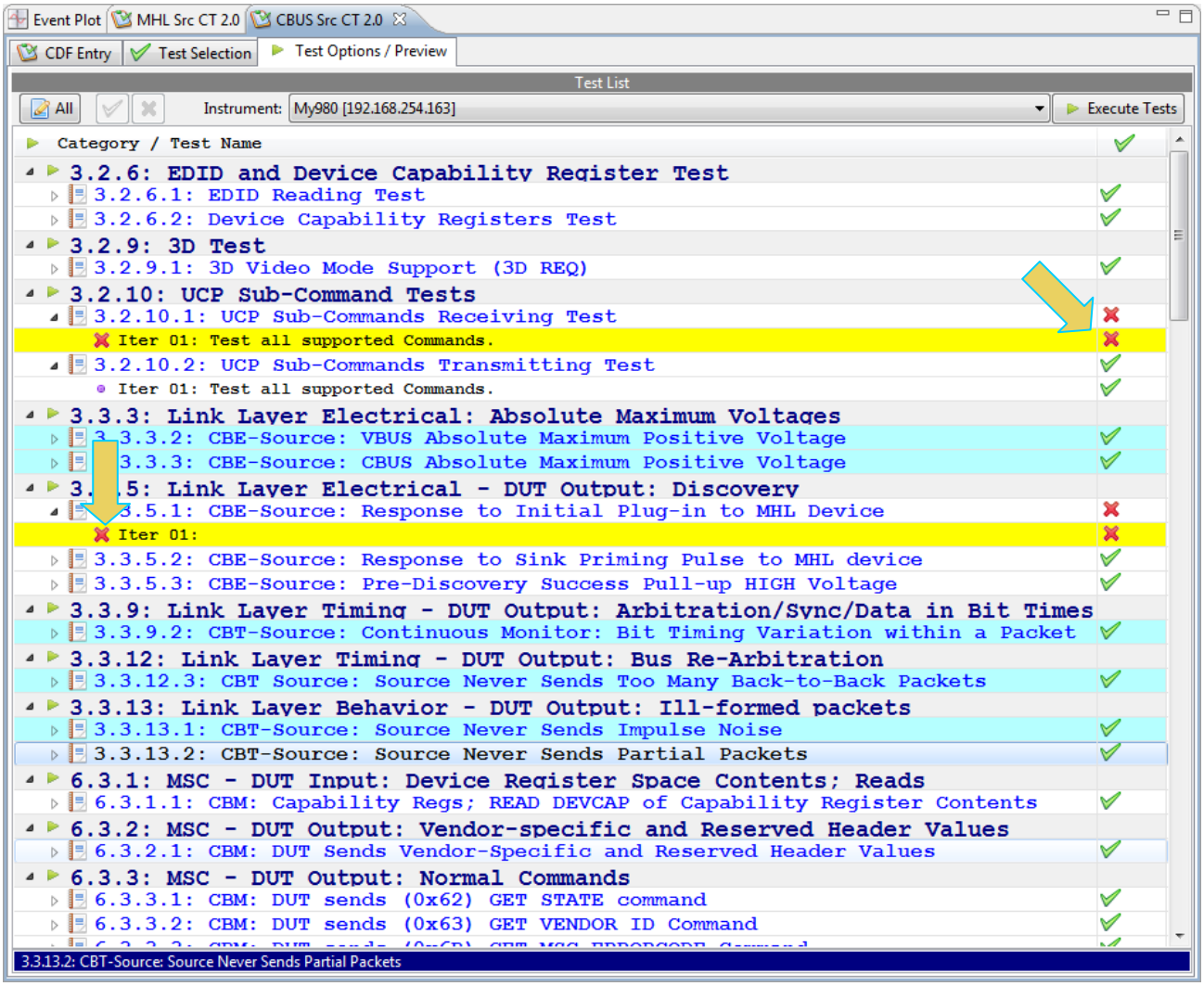
1. Select the **Test Options / Preview** panel as shown below.

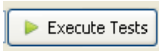



Event Plot
MHL Src CT 2.0
CBUS Src CT 2.0
CDF Entry
Test Selection
Test Options / Preview
Test List
All
Instrument:
My980 [192.168.254.163]
Execute Tests
Category / Test Name
6.3.1: MSC - DUT Input: Device Register Space Contents; Reads
6.3.1.1: CBM: Capability Regs; READ DEVCAP of Capability Register Contents
6.3.2: MSC - DUT Output: Vendor-specific and Reserved Header Values
6.3.2.1: CBM: DUT Sends Vendor-Specific and Reserved Header Values
6.3.3: MSC - DUT Output: Normal Commands
6.3.3.1: CBM: DUT sends (0x62) GET STATE command
6.3.3.2: CBM: DUT sends (0x63) GET VENDOR ID Command
6.3.3.3: CBM: DUT sends (0x6B) GET MSC ERRORCODE Command
6.3.3.4: CBM: DUT sends (0x60) SET INT/WRITE STAT Command
6.3.3.5: CBM: DUT sends (0x6C) WRITE BURST Command
6.3.3.6: CBM: DUT sends (0x68) MSC MSG Command
6.3.3.7: CBM: DUT sends (0x6A) GET DDC ERRORCODE Command
6.3.4: MSC - DUT Output: NACK Packet Response to MSC MSG
6.3.4.1: CBM: DUT Receives NACK to MSC MSG
6.3.5: MSC - DUT Output: Never Initiates Bad Commands
6.3.5.1: CBM: DUT Never Sends Reserved Commands
6.3.5.2: CBM: DUT Never Sends Illegal Commands
6.3.5.3: CBM: DUT Never Sends Data While No Command is Outstanding
6.3.5.4: CBM: DUT Never Sends (0x33) ACK packet While No Command is Outstandinc
6.3.5.5: CBM: DUT Never Sends (0x34) NACK Packet While No Command is Outstandir
6.3.5.6: CBM: DUT Never Sends (0x35) ABORT While No Command is Outstanding
6.3.5.7: CBM: DUT Never Sends (0x32) EOF While No Command is Outstanding
6.3.5.8: CBM: DUT never sends WRITE BURST Command without First Arbitrating
6.3.6: MSC - DUT Output: Errors and Exceptions
6.3.6.1: CBM: DUT Receives Bad Reply; Control instead of Data
6.3.6.2: CBM: DUT Receives Bad Reply; Data instead of Control
6.3.6.3: CBM: DUT Receives Bad Reply; Control, Control instead of Control, Data
6.3.6.4: CBM: DUT Receives Result Timeout
6.3.6.5: CBM: Verify No Next Command Until Hold-Off after ABORT Seen
6.3.7: MSC - DUT Output: Disconnect
6.3.7.1: CBM: DUT Receives Disconnect during Various Commands
6.3.8: MSC - DUT Input: Device Register Space Contents; Writes

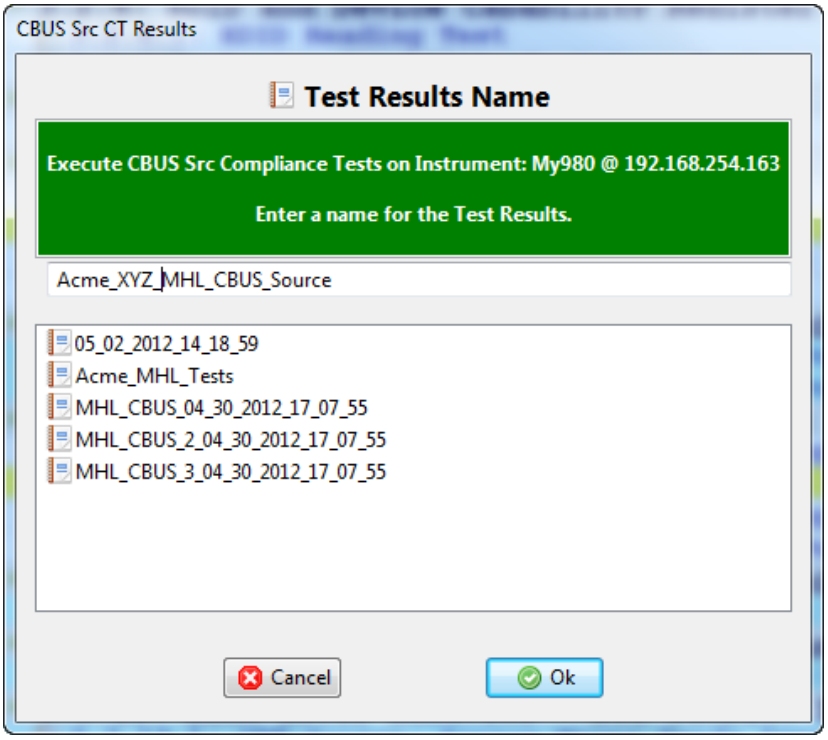
2. (Optional) Review the list of tests for each category. If you wish to skip some of the tests. You can skip tests by clicking on the Check mark on the right side of the **Test Options / Preview** panel.

   The screen shot below shows some of the tests that have been skipped (highlighted in yellow with a red **X**).

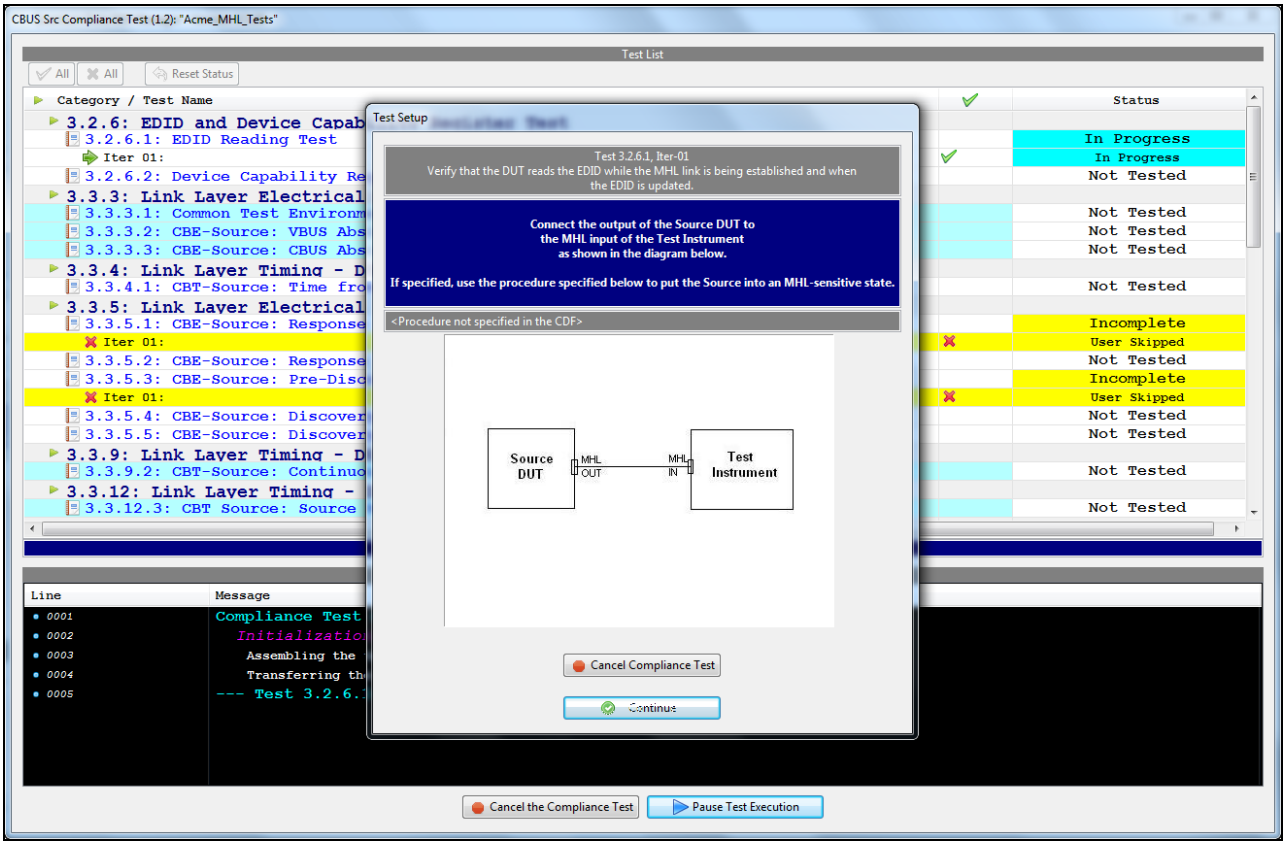


3. Click on the Execute Tests 

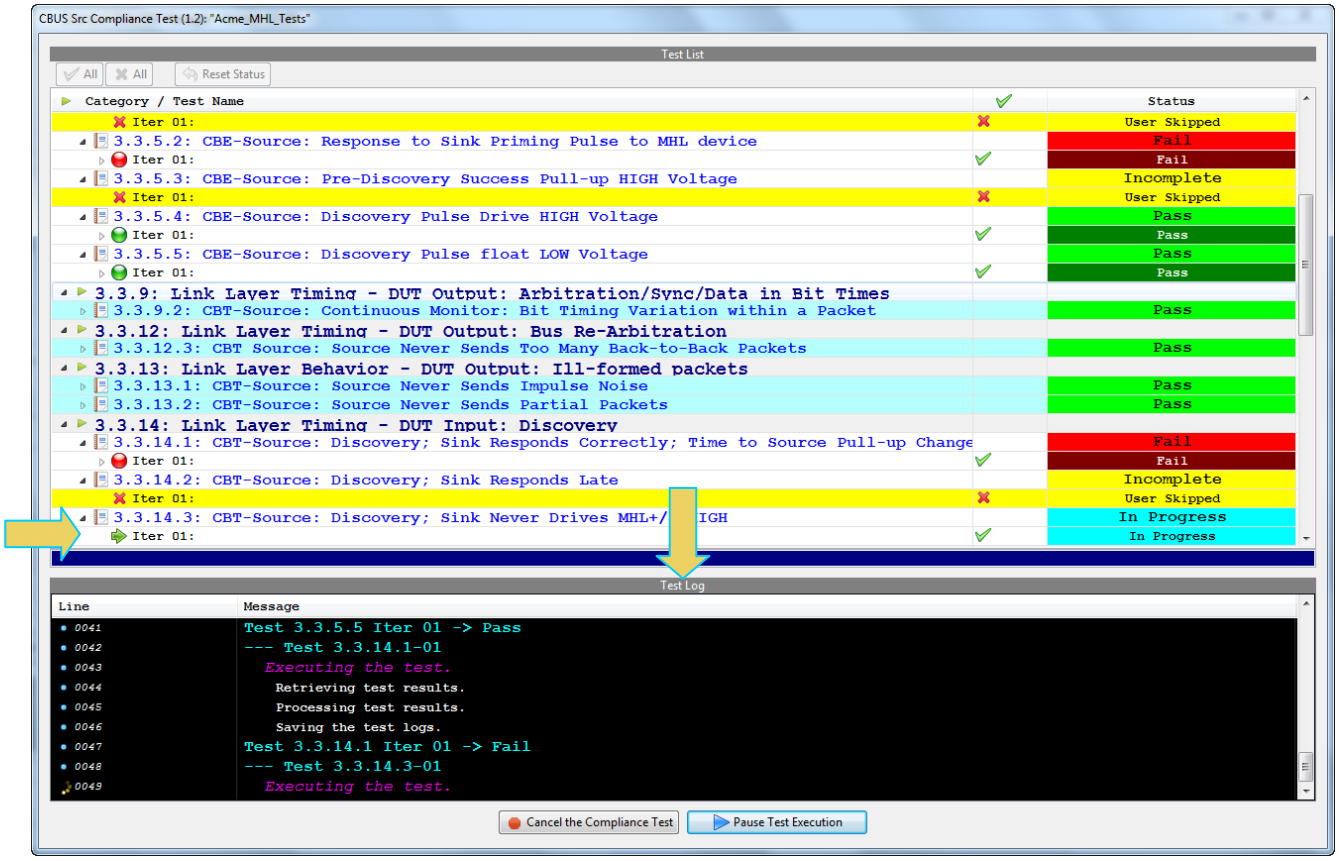
activation button to initiate the test suite. You will be prompted for a name for the tests. This dialog box is shown below.

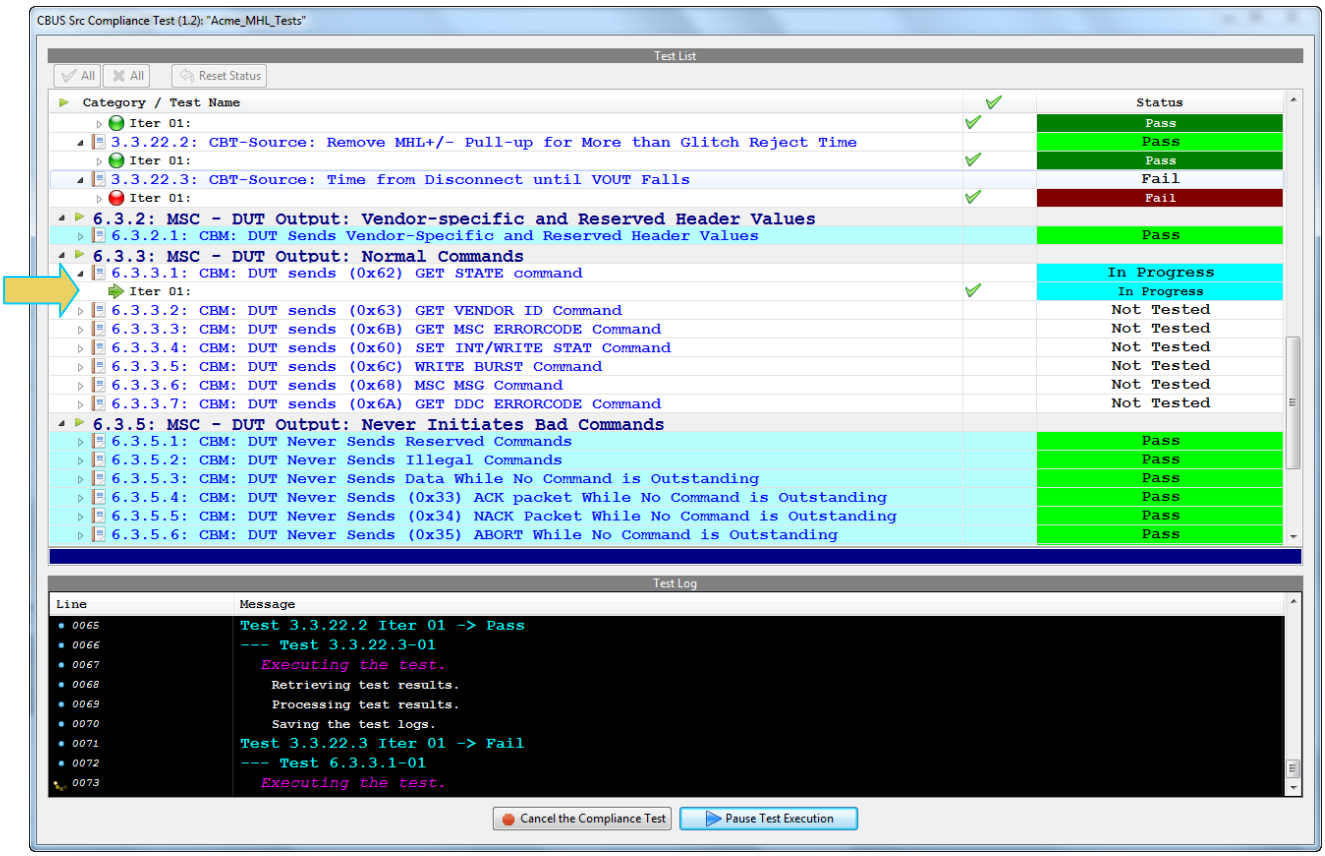


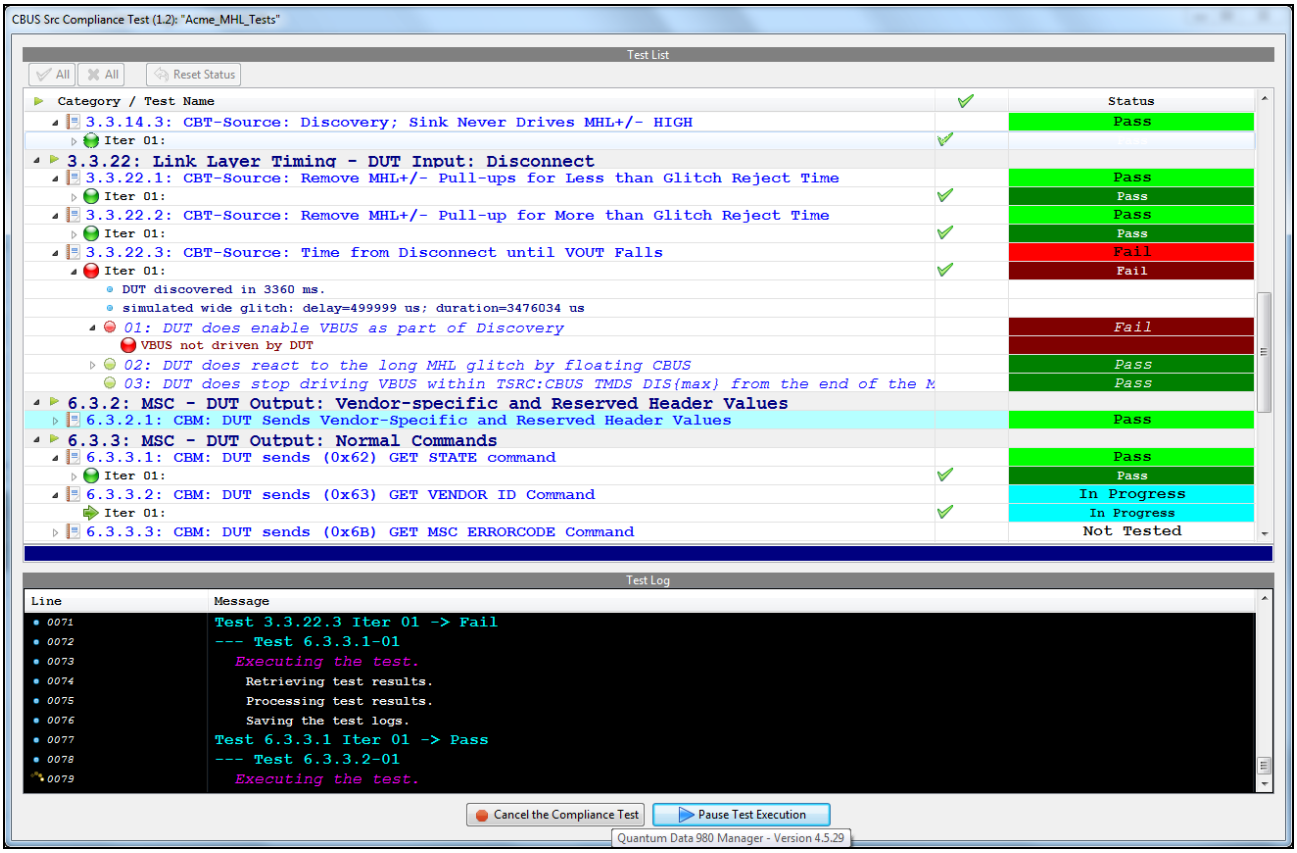
A screen will appear instructing you on how to connect your MHL CBUS source device for testing. A sample screen is shown below:



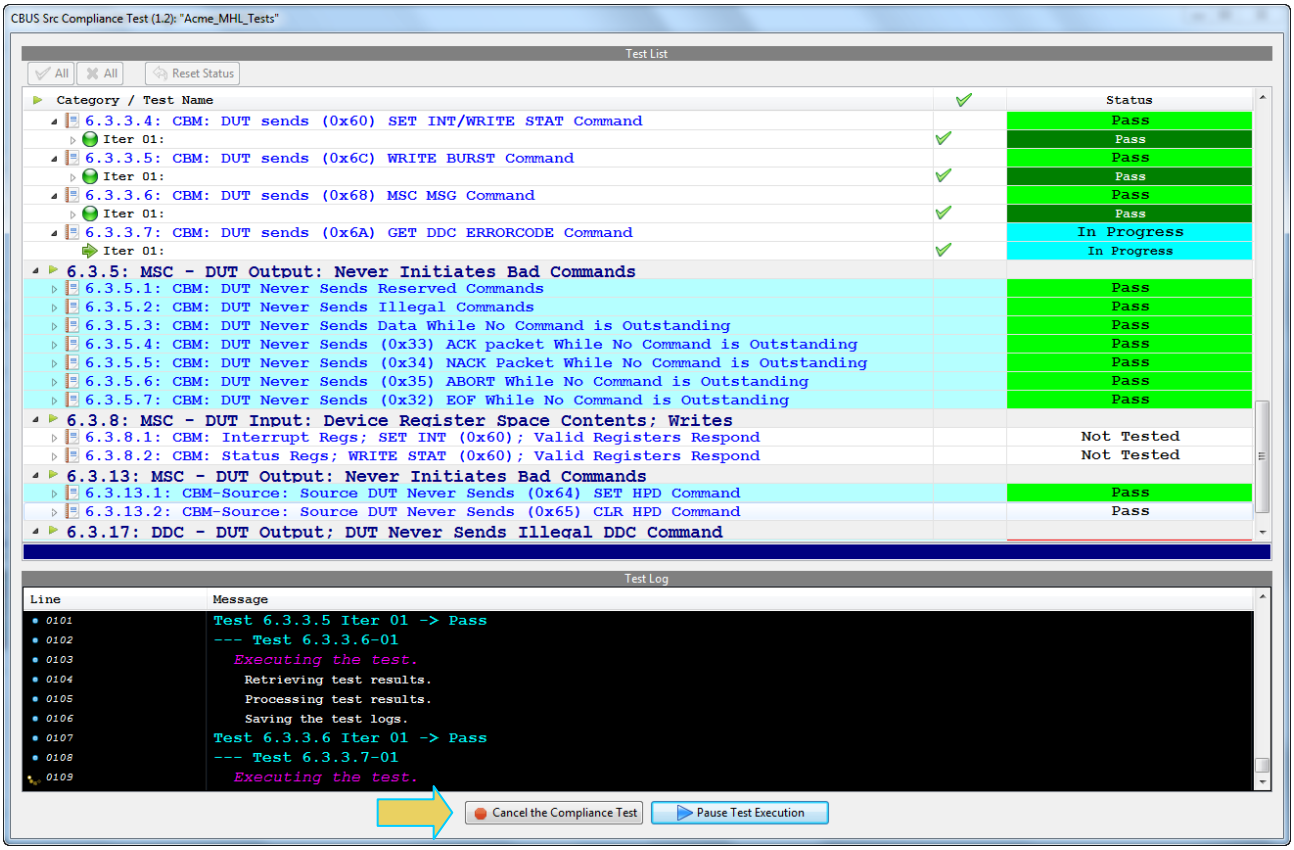
During the test, the test results are shown. There is a progress arrow which points to the test that is currently being run. The lower panel **Test Log** shows the testing activity as it occurs. Refer to the screen examples below.


CBUS Src Compliance Test (1.2): "Acme_MHL_Tests"
Test List
All
All
Reset Status
Category / Test Name
Status
Iter 01:
User Skipped
3.3.5.2: CBE-Source: Response to Sink Priming Pulse to MHL device
Fail
Iter 01:
Fail
3.3.5.3: CBE-Source: Pre-Discovery Success Pull-up HIGH Voltage
Incomplete
Iter 01:
User Skipped
3.3.5.4: CBE-Source: Discovery Pulse Drive HIGH Voltage
Pass
Iter 01:
Pass
3.3.5.5: CBE-Source: Discovery Pulse float LOW Voltage
Pass
Iter 01:
Pass
3.3.9: Link Layer Timing - DUT Output: Arbitration/Sync/Data in Bit Times
3.3.9.2: CBT-Source: Continuous Monitor: Bit Timing Variation within a Packet
Pass
3.3.12: Link Layer Timing - DUT Output: Bus Re-Arbitration
3.3.12.3: CBT Source: Source Never Sends Too Many Back-to-Back Packets
Pass
3.3.13: Link Layer Behavior - DUT Output: Ill-formed packets
3.3.13.1: CBT-Source: Source Never Sends Impulse Noise
Pass
3.3.13.2: CBT-Source: Source Never Sends Partial Packets
Pass
3.3.14: Link Layer Timing - DUT Input: Discovery
3.3.14.1: CBT-Source: Discovery; Sink Responds Correctly; Time to Source Pull-up Change
Fail
Iter 01:
Fail
3.3.14.2: CBT-Source: Discovery; Sink Responds Late
Incomplete
Iter 01:
User Skipped
3.3.14.3: CBT-Source: Discovery; Sink Never Drives MHL+/
IGH
In Progress
Iter 01:
In Progress
Test Log
Line
Message
0041 Test 3.3.5.5 Iter 01 -> Pass
0042 --- Test 3.3.14.1-01
0043 Executing the test.
0044 Retrieving test results.
0045 Processing test results.
0046 Saving the test logs.
0047 Test 3.3.14.1 Iter 01 -> Fail
0048 --- Test 3.3.14.3-01
0049 Executing the test.
Cancel the Compliance Test
Pause Test Execution

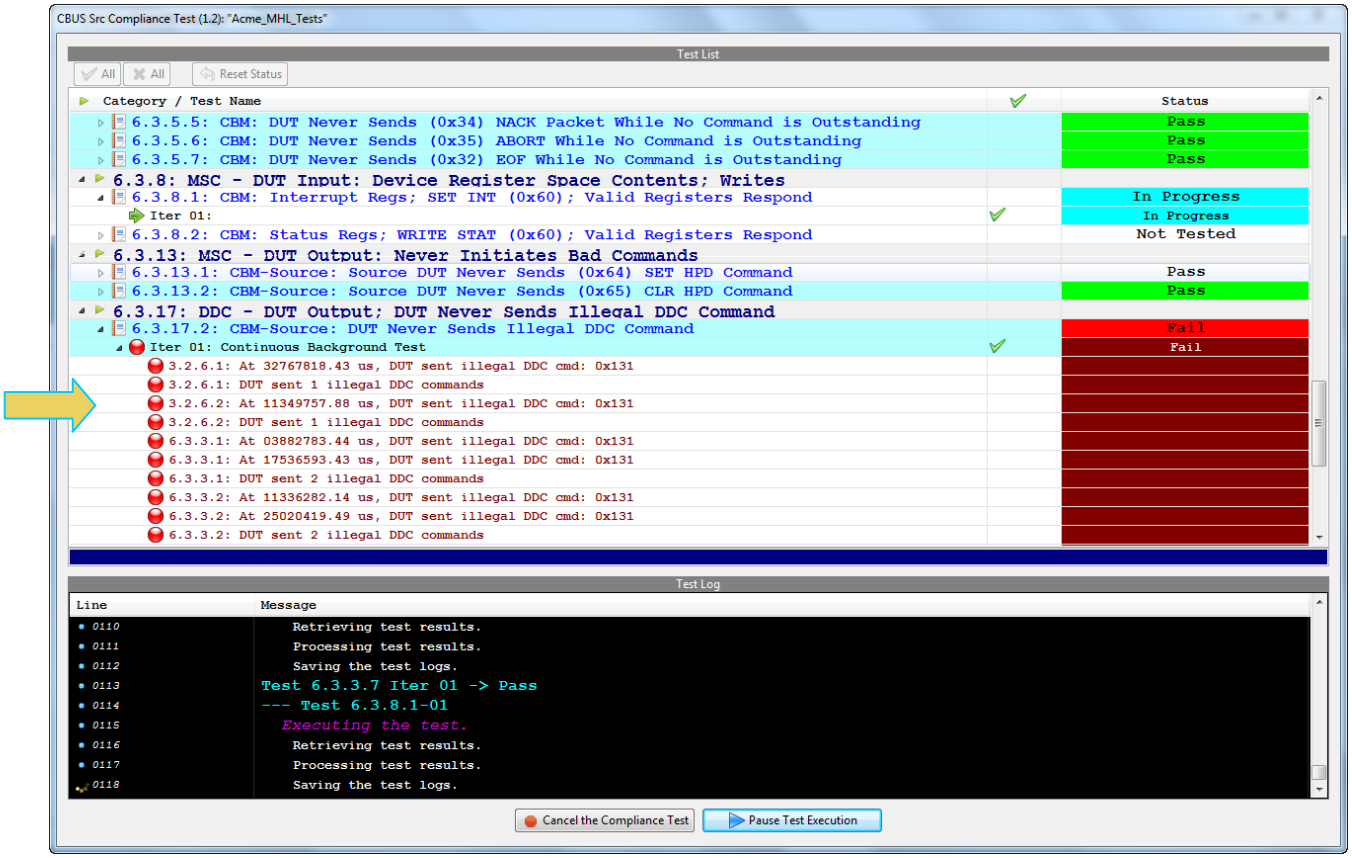

CBUS Src Compliance Test (1.2): "Acme_MHL_Tests"
Test List
All
All
Reset Status
Category / Test Name
Status
Iter 01: Pass
3.3.22.2: CBT-Source: Remove MHL+/- Pull-up for More than Glitch Reject Time Pass
Iter 01: Pass
3.3.22.3: CBT-Source: Time from Disconnect until VOUT Falls Fail
Iter 01: Fail
6.3.2: MSC - DUT Output: Vendor-specific and Reserved Header Values
6.3.2.1: CBM: DUT Sends Vendor-Specific and Reserved Header Values Pass
6.3.3: MSC - DUT Output: Normal Commands
6.3.3.1: CBM: DUT sends (0x62) GET STATE command In Progress
Iter 01: In Progress
6.3.3.2: CBM: DUT sends (0x63) GET VENDOR ID Command Not Tested
6.3.3.3: CBM: DUT sends (0x6B) GET MSC ERRORCODE Command Not Tested
6.3.3.4: CBM: DUT sends (0x60) SET INT/WRITE STAT Command Not Tested
6.3.3.5: CBM: DUT sends (0x6C) WRITE BURST Command Not Tested
6.3.3.6: CBM: DUT sends (0x68) MSC MSG Command Not Tested
6.3.3.7: CBM: DUT sends (0x6A) GET DDC ERRORCODE Command Not Tested
6.3.5: MSC - DUT Output: Never Initiates Bad Commands
6.3.5.1: CBM: DUT Never Sends Reserved Commands Pass
6.3.5.2: CBM: DUT Never Sends Illegal Commands Pass
6.3.5.3: CBM: DUT Never Sends Data While No Command is Outstanding Pass
6.3.5.4: CBM: DUT Never Sends (0x33) ACK packet While No Command is Outstanding Pass
6.3.5.5: CBM: DUT Never Sends (0x34) NACK Packet While No Command is Outstanding Pass
6.3.5.6: CBM: DUT Never Sends (0x35) ABORT While No Command is Outstanding Pass
Test Log
Line
Message
0065 Test 3.3.22.2 Iter 01 -> Pass
0066 --- Test 3.3.22.3-01
0067 Executing the test.
0068 Retrieving test results.
0069 Processing test results.
0070 Saving the test logs.
0071 Test 3.3.22.3 Iter 01 -> Fail
0072 --- Test 6.3.3.1-01
0073 Executing the test.
Cancel the Compliance Test
Pause Test Execution

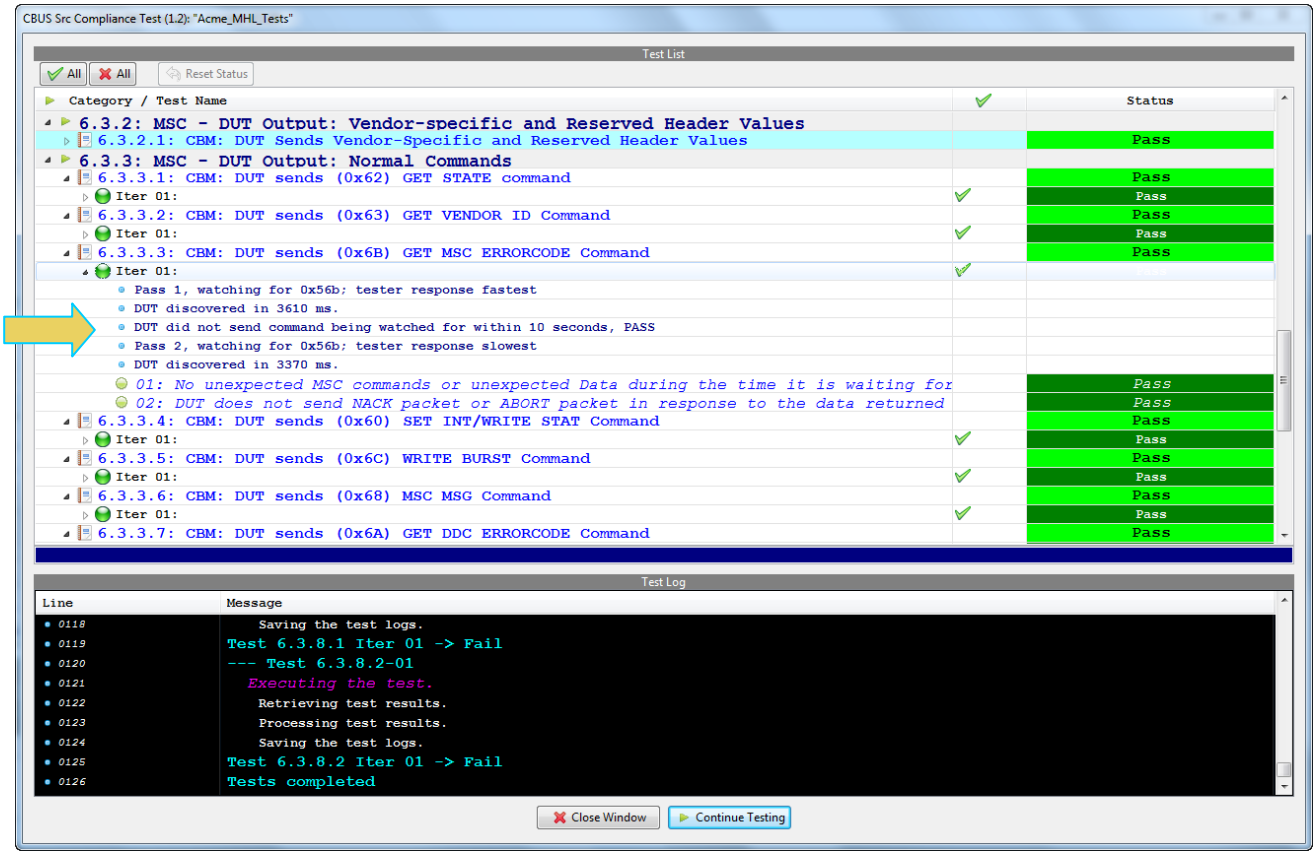


You can cancel the compliance test or pause at any time. If you pause the test you can resume later at any time even if you exit the 980 Manager application. Refer to the following screen example.

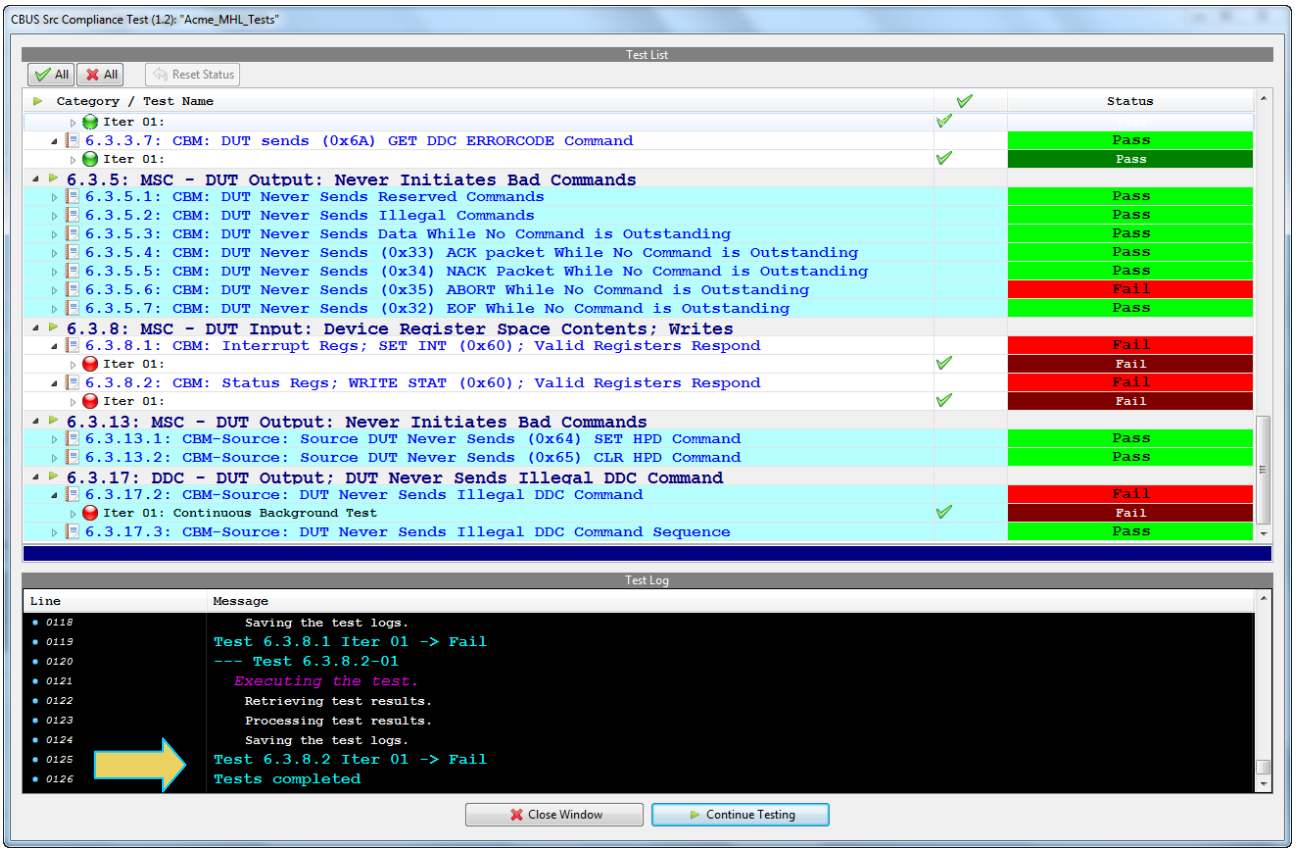

CBUS Src Compliance Test (1.2): "Acme_MHL_Tests"
Test List
All
All
Reset Status
Category / Test Name
Status
6.3.3.4: CBM: DUT sends (0x60) SET INT/WRITE STAT Command
Pass
Iter 01:
Pass
6.3.3.5: CBM: DUT sends (0x6C) WRITE BURST Command
Pass
Iter 01:
Pass
6.3.3.6: CBM: DUT sends (0x68) MSC MSG Command
Pass
Iter 01:
Pass
6.3.3.7: CBM: DUT sends (0x6A) GET DDC ERRORCODE Command
In Progress
Iter 01:
In Progress
6.3.5: MSC - DUT Output: Never Initiates Bad Commands
6.3.5.1: CBM: DUT Never Sends Reserved Commands
Pass
6.3.5.2: CBM: DUT Never Sends Illegal Commands
Pass
6.3.5.3: CBM: DUT Never Sends Data While No Command is Outstanding
Pass
6.3.5.4: CBM: DUT Never Sends (0x33) ACK packet While No Command is Outstanding
Pass
6.3.5.5: CBM: DUT Never Sends (0x34) NACK Packet While No Command is Outstanding
Pass
6.3.5.6: CBM: DUT Never Sends (0x35) ABORT While No Command is Outstanding
Pass
6.3.5.7: CBM: DUT Never Sends (0x32) EOF While No Command is Outstanding
Pass
6.3.8: MSC - DUT Input: Device Register Space Contents; Writes
6.3.8.1: CBM: Interrupt Regs; SET INT (0x60); Valid Registers Respond
Not Tested
6.3.8.2: CBM: Status Regs; WRITE STAT (0x60); Valid Registers Respond
Not Tested
6.3.13: MSC - DUT Output: Never Initiates Bad Commands
6.3.13.1: CBM-Source: Source DUT Never Sends (0x64) SET HPD Command
Pass
6.3.13.2: CBM-Source: Source DUT Never Sends (0x65) CLR HPD Command
Pass
6.3.17: DDC - DUT Output; DUT Never Sends Illegal DDC Command
Test Log
Line
Message
0101 Test 6.3.3.5 Iter 01 -> Pass
0102 --- Test 6.3.3.6-01
0103 Executing the test.
0104 Retrieving test results.
0105 Processing test results.
0106 Saving the test logs.
0107 Test 6.3.3.6 Iter 01 -> Pass
0108 --- Test 6.3.3.7-01
0109 Executing the test.
Cancel the Compliance Test
Pause Test Execution

You can view the details of failures when they occur by exposing the navigation arrows on the left. Examples are shown on the following two screens.

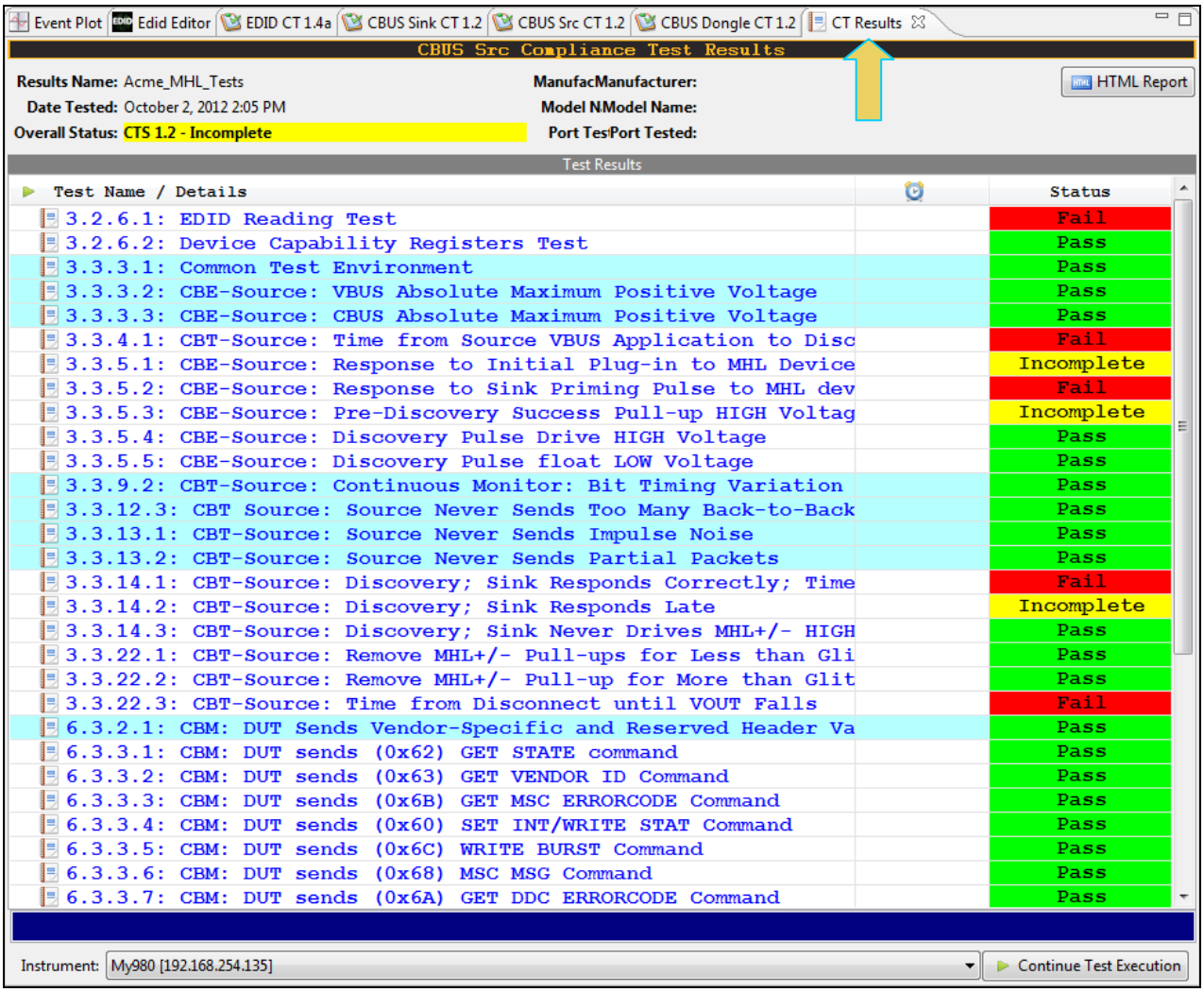



CBUS Src Compliance Test (1.2): "Acme_MHL_Tests"
Test List
All
All
Reset Status
Category / Test Name
Status
6.3.2: MSC - DUT Output: Vendor-specific and Reserved Header Values
6.3.2.1: CBM: DUT Sends Vendor-Specific and Reserved Header Values
Pass
6.3.3: MSC - DUT Output: Normal Commands
6.3.3.1: CBM: DUT sends (0x62) GET STATE command
Pass
Iter 01:
Pass
6.3.3.2: CBM: DUT sends (0x63) GET VENDOR ID Command
Pass
Iter 01:
Pass
6.3.3.3: CBM: DUT sends (0x6B) GET MSC ERRORCODE Command
Pass
Iter 01:
Pass 1, watching for 0x56b; tester response fastest
DUT discovered in 3610 ms.
DUT did not send command being watched for within 10 seconds, PASS
Pass 2, watching for 0x56b; tester response slowest
DUT discovered in 3370 ms.
01: No unexpected MSC commands or unexpected Data during the time it is waiting for
Pass
02: DUT does not send NACK packet or ABORT packet in response to the data returned
Pass
6.3.3.4: CBM: DUT sends (0x60) SET INT/WRITE STAT Command
Pass
Iter 01:
Pass
6.3.3.5: CBM: DUT sends (0x6C) WRITE BURST Command
Pass
Iter 01:
Pass
6.3.3.6: CBM: DUT sends (0x68) MSC MSG Command
Pass
Iter 01:
Pass
6.3.3.7: CBM: DUT sends (0x6A) GET DDC ERRORCODE Command
Pass
Test Log
Line
Message
0118 Saving the test logs.
0119 Test 6.3.8.1 Iter 01 -> Fail
0120 --- Test 6.3.8.2-01
0121 Executing the test.
0122 Retrieving test results.
0123 Processing test results.
0124 Saving the test logs.
0125 Test 6.3.8.2 Iter 01 -> Fail
0126 Tests completed
Close Window
Continue Testing

The log will indicate when the tests have completed.



When the tests are completed the test window that shows the current activity will close. A new tab and panel will appear called the **CT Results** tab. You can view the test results in this panel. Refer to the following screen shot for an example of the **CT Results** panel.

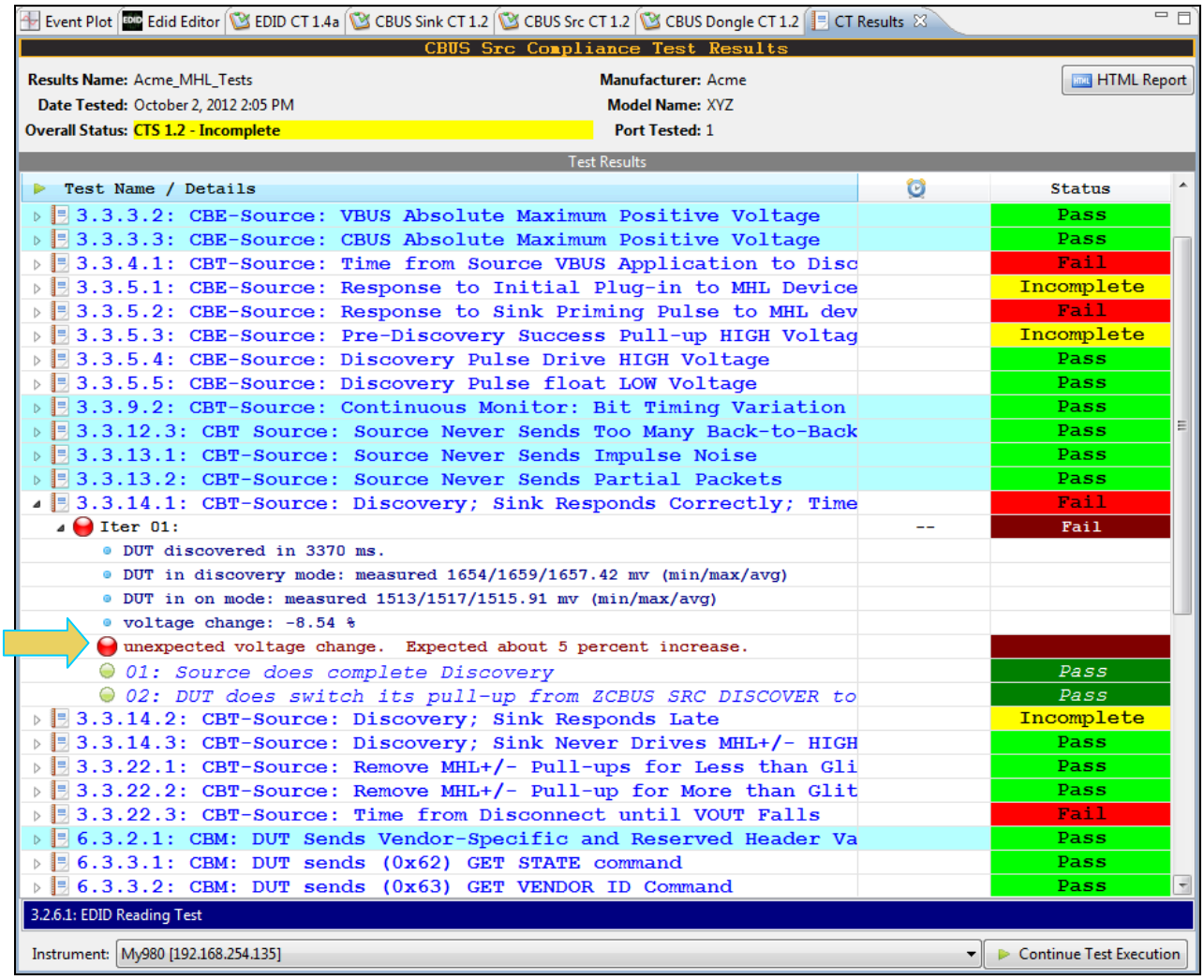


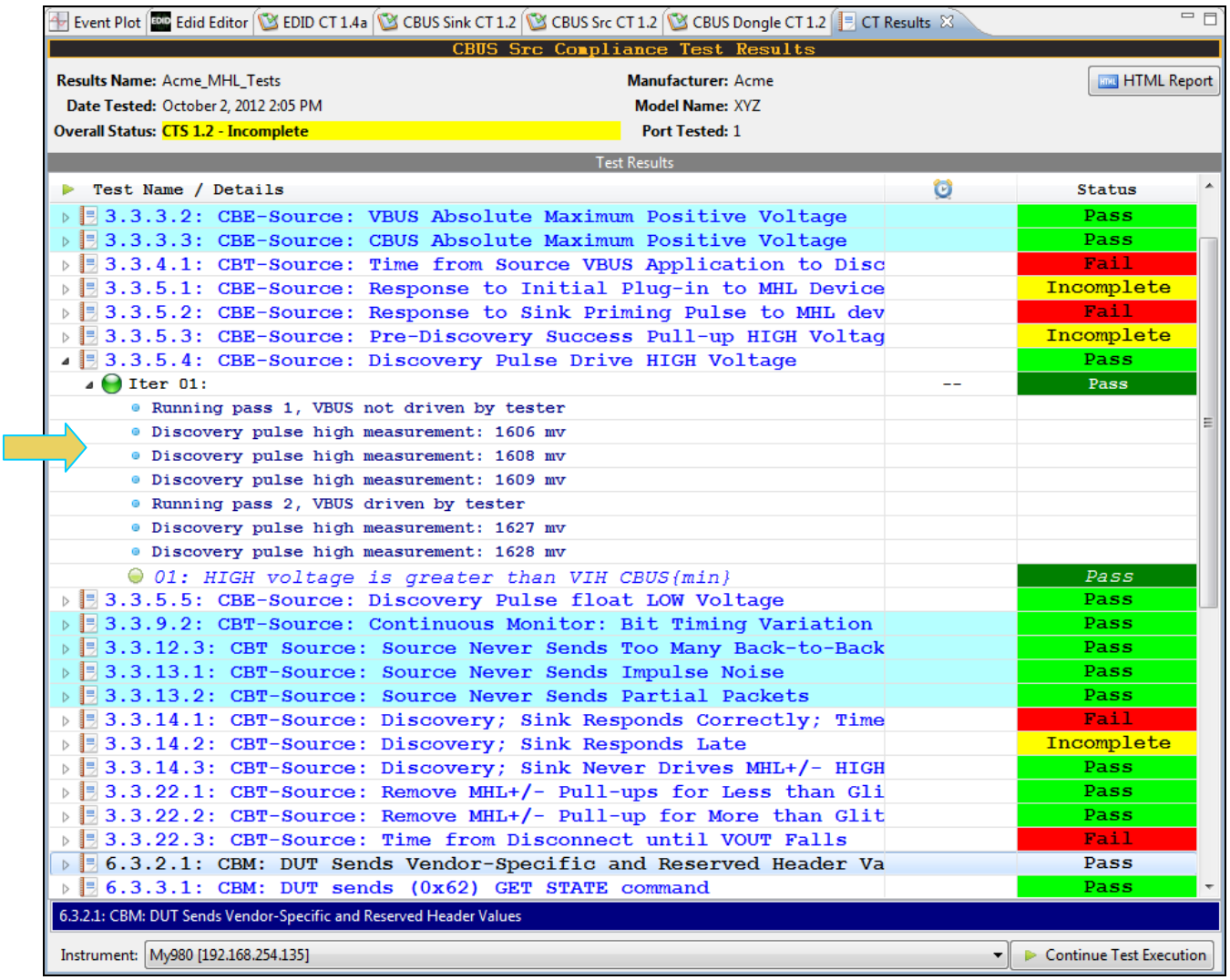
3.6 Viewing Details of Source Compliance Test Passes or Failures

When you have completed the test series you will have an opportunity to view the detailed data for a particular failure. Use the following procedures to view the details of a test.

To view the details of each test:

1. Expose the detailed results of a failure and highlight a failure. Refer to the screen example below.



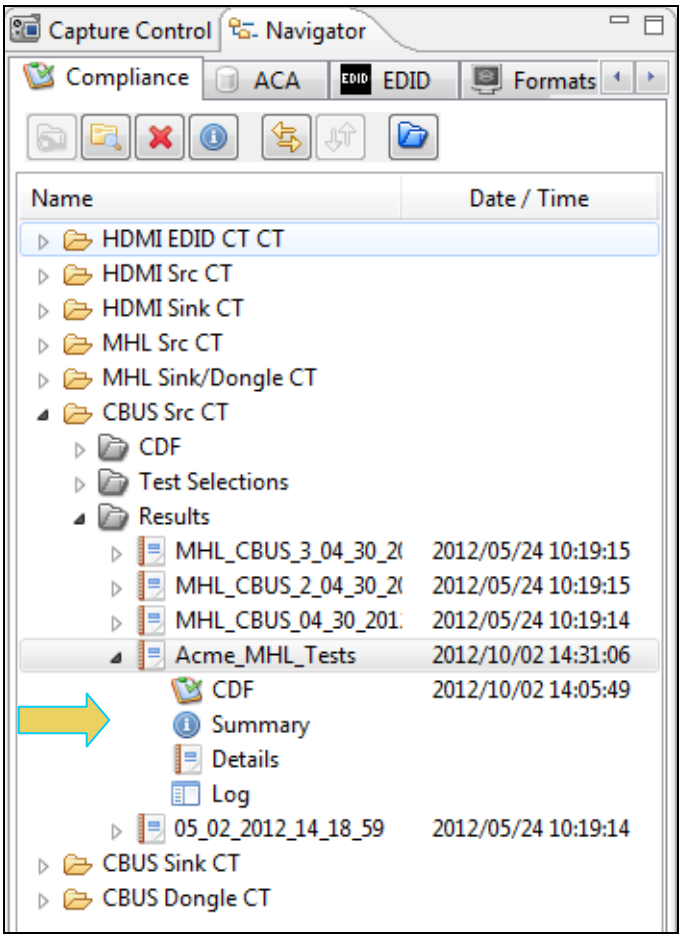

Event Plot
Edid Editor
EDID CT 1.4a
CBUS Sink CT 1.2
CBUS Src CT 1.2
CBUS Dongle CT 1.2
CT Results
CBUS Src Compliance Test Results
Results Name: Acme_MHL_Tests
Date Tested: October 2, 2012 2:05 PM
Overall Status: CTS 1.2 - Incomplete
Manufacturer: Acme
Model Name: XYZ
Port Tested: 1
HTML Report
Test Results
Test Name / Details
Status
3.3.3.2: CBE-Source: VBUS Absolute Maximum Positive Voltage Pass
3.3.3.3: CBE-Source: CBUS Absolute Maximum Positive Voltage Pass
3.3.4.1: CBT-Source: Time from Source VBUS Application to Disc Fail
3.3.5.1: CBE-Source: Response to Initial Plug-in to MHL Device Incomplete
3.3.5.2: CBE-Source: Response to Sink Priming Pulse to MHL dev Fail
3.3.5.3: CBE-Source: Pre-Discovery Success Pull-up HIGH Voltag Incomplete
3.3.5.4: CBE-Source: Discovery Pulse Drive HIGH Voltage Pass
Iter 01: -- Pass
Running pass 1, VBUS not driven by tester
Discovery pulse high measurement: 1606 mv
Discovery pulse high measurement: 1608 mv
Discovery pulse high measurement: 1609 mv
Running pass 2, VBUS driven by tester
Discovery pulse high measurement: 1627 mv
Discovery pulse high measurement: 1628 mv
01: HIGH voltage is greater than VIH CBUS{min} Pass
3.3.5.5: CBE-Source: Discovery Pulse float LOW Voltage Pass
3.3.9.2: CBT-Source: Continuous Monitor: Bit Timing Variation Pass
3.3.12.3: CBT Source: Source Never Sends Too Many Back-to-Back Pass
3.3.13.1: CBT-Source: Source Never Sends Impulse Noise Pass
3.3.13.2: CBT-Source: Source Never Sends Partial Packets Pass
3.3.14.1: CBT-Source: Discovery; Sink Responds Correctly; Time Fail
3.3.14.2: CBT-Source: Discovery; Sink Responds Late Incomplete
3.3.14.3: CBT-Source: Discovery; Sink Never Drives MHL+/- HIGH Pass
3.3.22.1: CBT-Source: Remove MHL+/- Pull-ups for Less than Gli Pass
3.3.22.2: CBT-Source: Remove MHL+/- Pull-up for More than Glit Pass
3.3.22.3: CBT-Source: Time from Disconnect until VOUT Falls Fail
6.3.2.1: CBM: DUT Sends Vendor-Specific and Reserved Header Va Pass
6.3.3.1: CBM: DUT sends (0x62) GET STATE command Pass
6.3.2.1: CBM: DUT Sends Vendor-Specific and Reserved Header Values
Instrument: My980 [192.168.254.135]
Continue Test Execution

3.7 Accessing the test results through the navigator panel

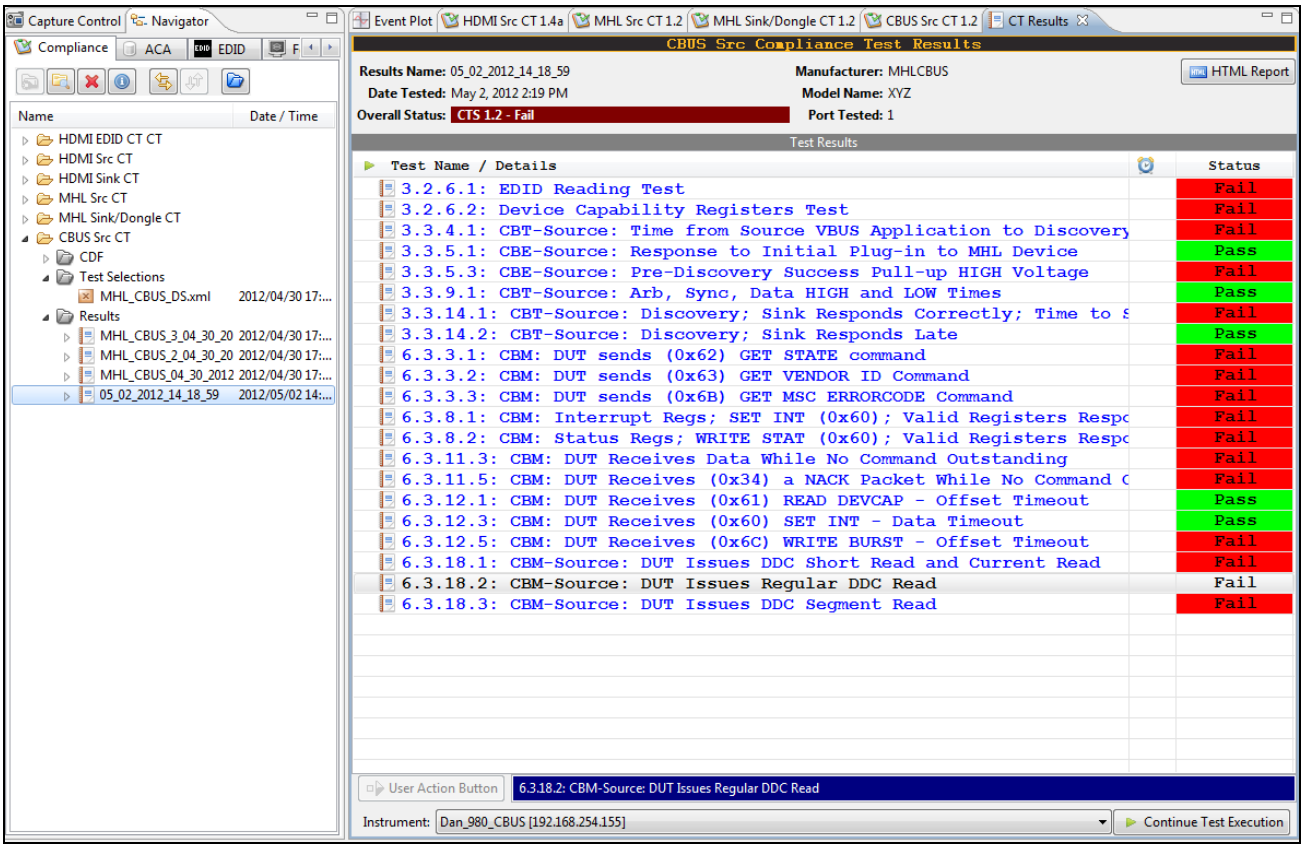
You can view the results of the tests at any time after you run them through the 980 GUI Manager's **Navigator** panel. Use the following procedures to view the details of a test.

To access the test results:

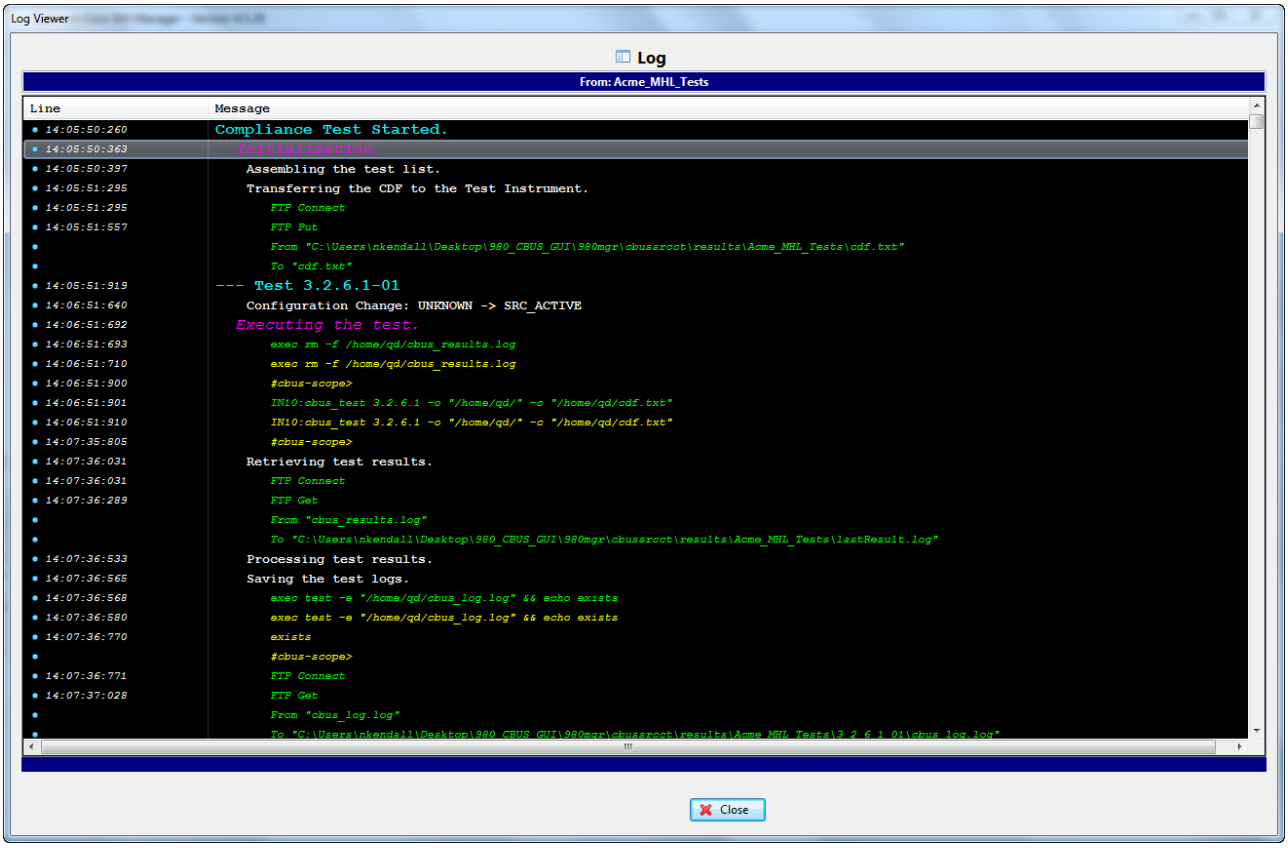
1. Access the **Navigator** tab and select **Compliance**. Refer to the screen example below.



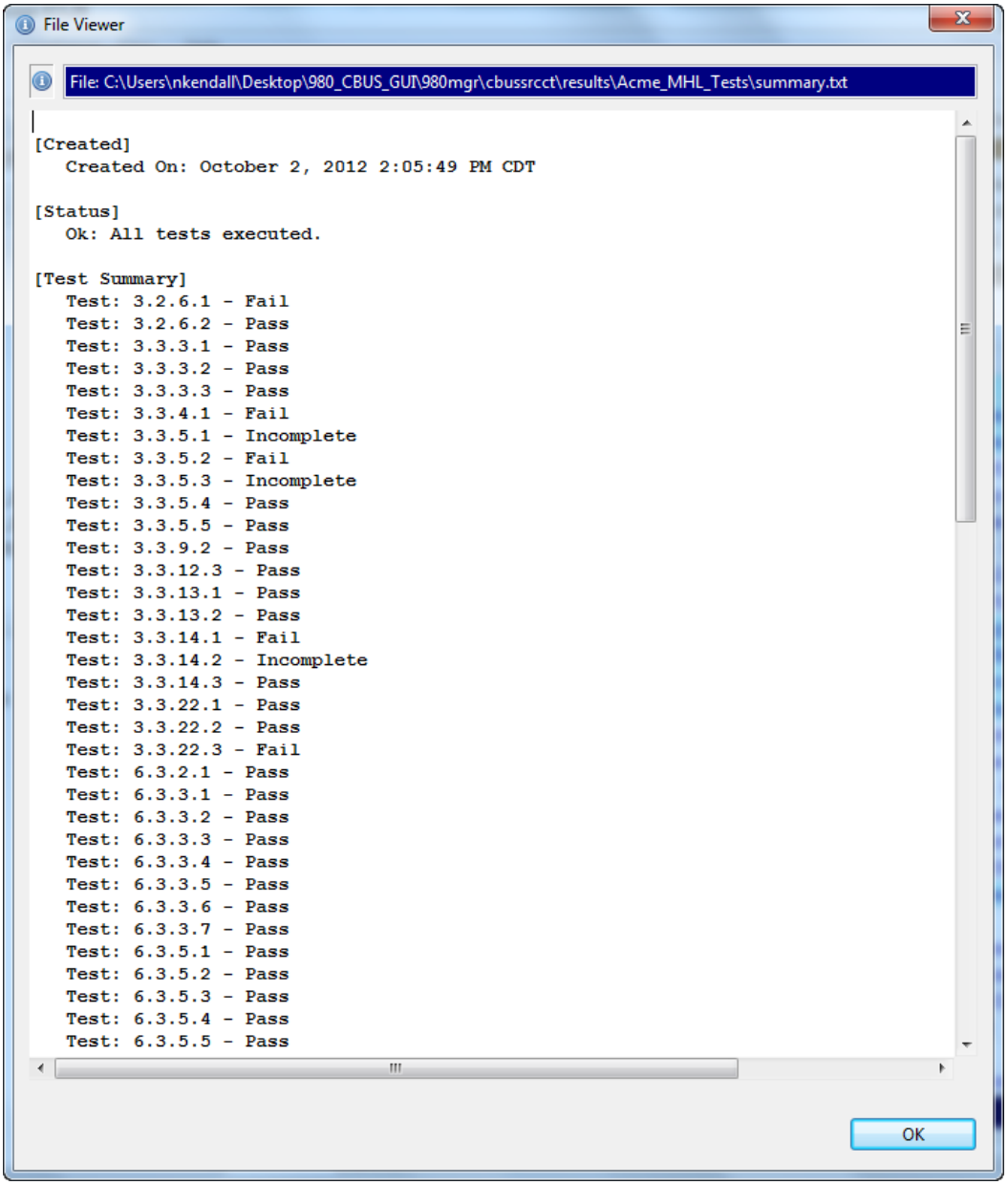
2. Double click on the Results file you wish to view. The results will appear in a CT Results window on the right. Refer to the screen example below.



3. Double click on the Log file you wish to view. The results will appear in a new window. Refer to the screen example below.



4. Double click on the Summary file. The Summary file will appear in a new window. Refer to the screen example below.



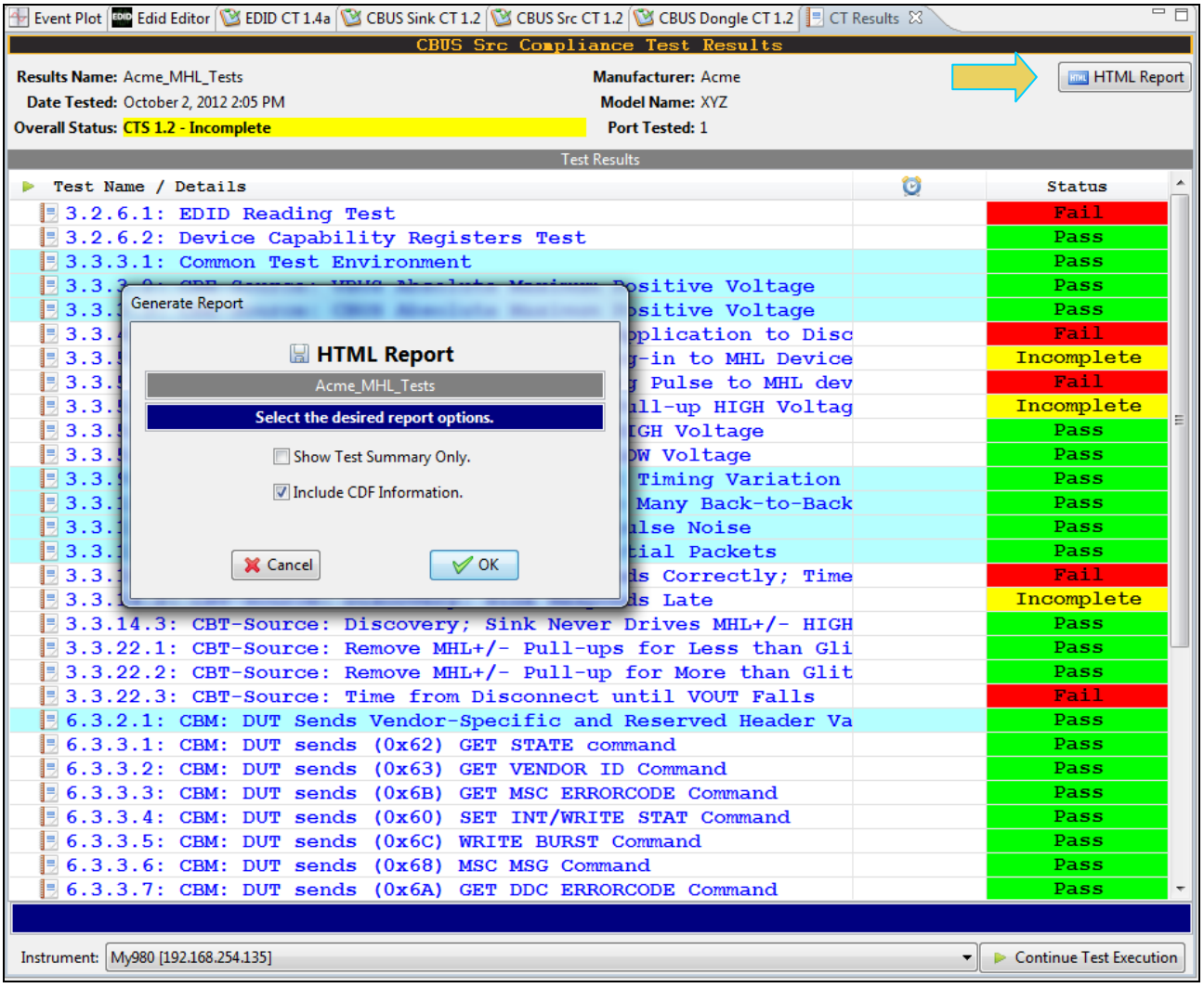
3.8 Viewing the MHL Source Compliance HTML test report

After you have completed the tests, an HTML Report activation button will appear in the upper right of the screen which enables you to access the html report of the test results. Use the following procedures to view the html test report.

To view the html test report:

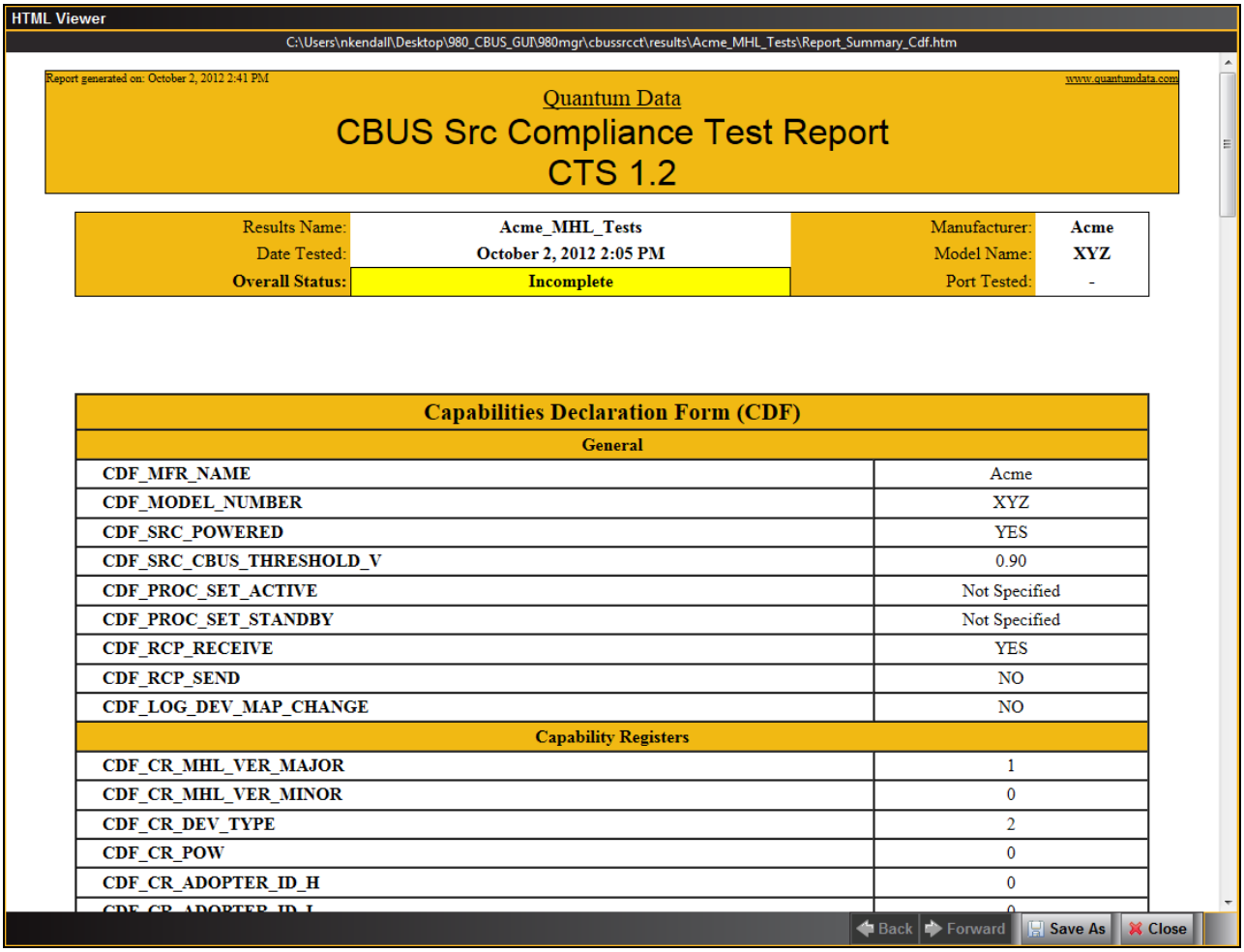
1. Select the **CT Results** panel as shown below.
2. Click on the **HTML Report** activation button.

   A dialog box will appear asking if you want a summary of the test results or a version that includes the CDF. This dialog box is shown in the screen shot below.



   Specify if you want to see a summary report and if you want to see the CDF. If you leave Show Test Summary Only unchecked the application will produce a full detailed report. The following screens provide samples of the report.

   Note: This example shows an MHL 1.2 test result; MHL 2.0 test results are similar in content and structure.



Report generated on: October 2, 2012 2:41 PM

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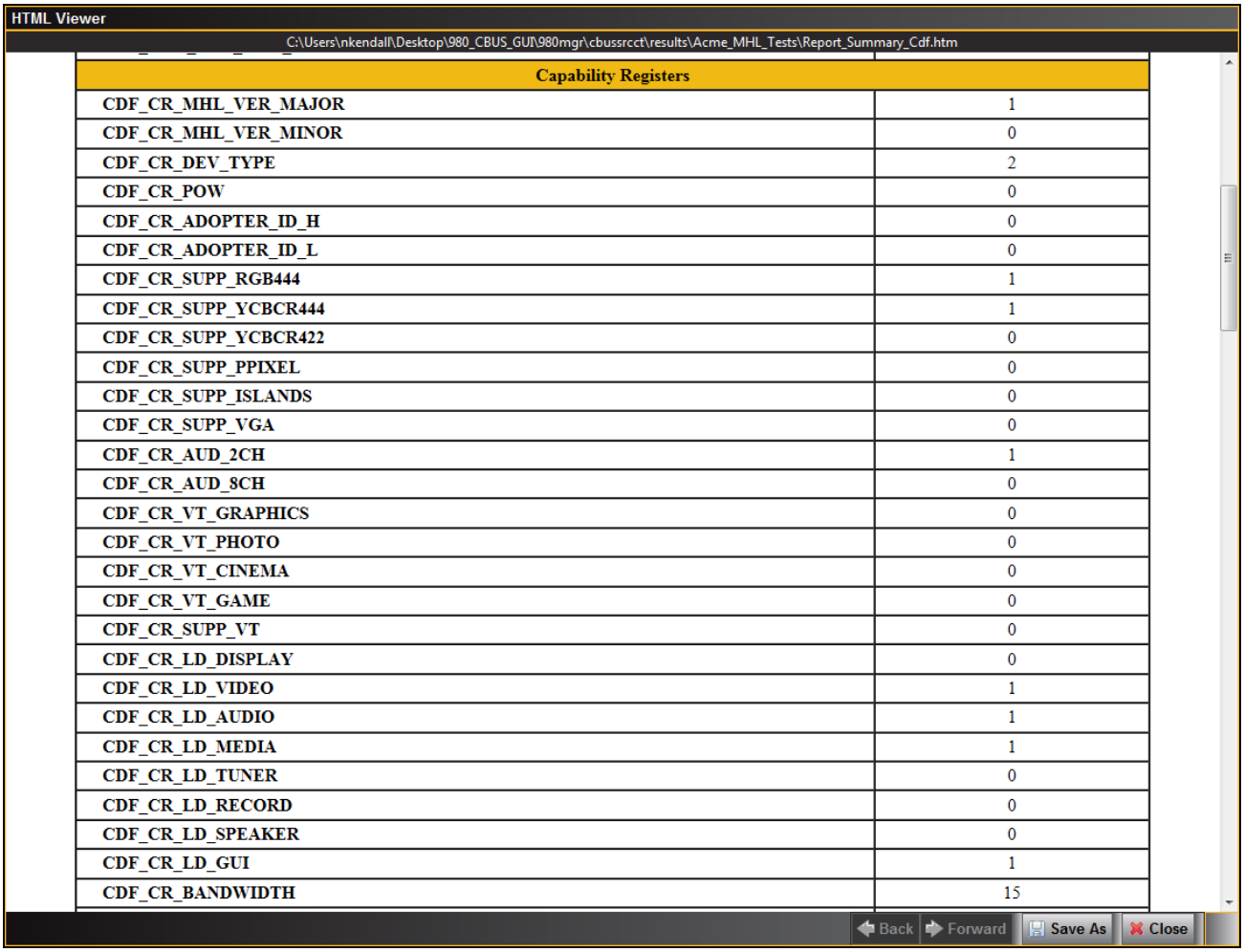
Quantum Data

CBUS Src Compliance Test Report
CTS 1.2

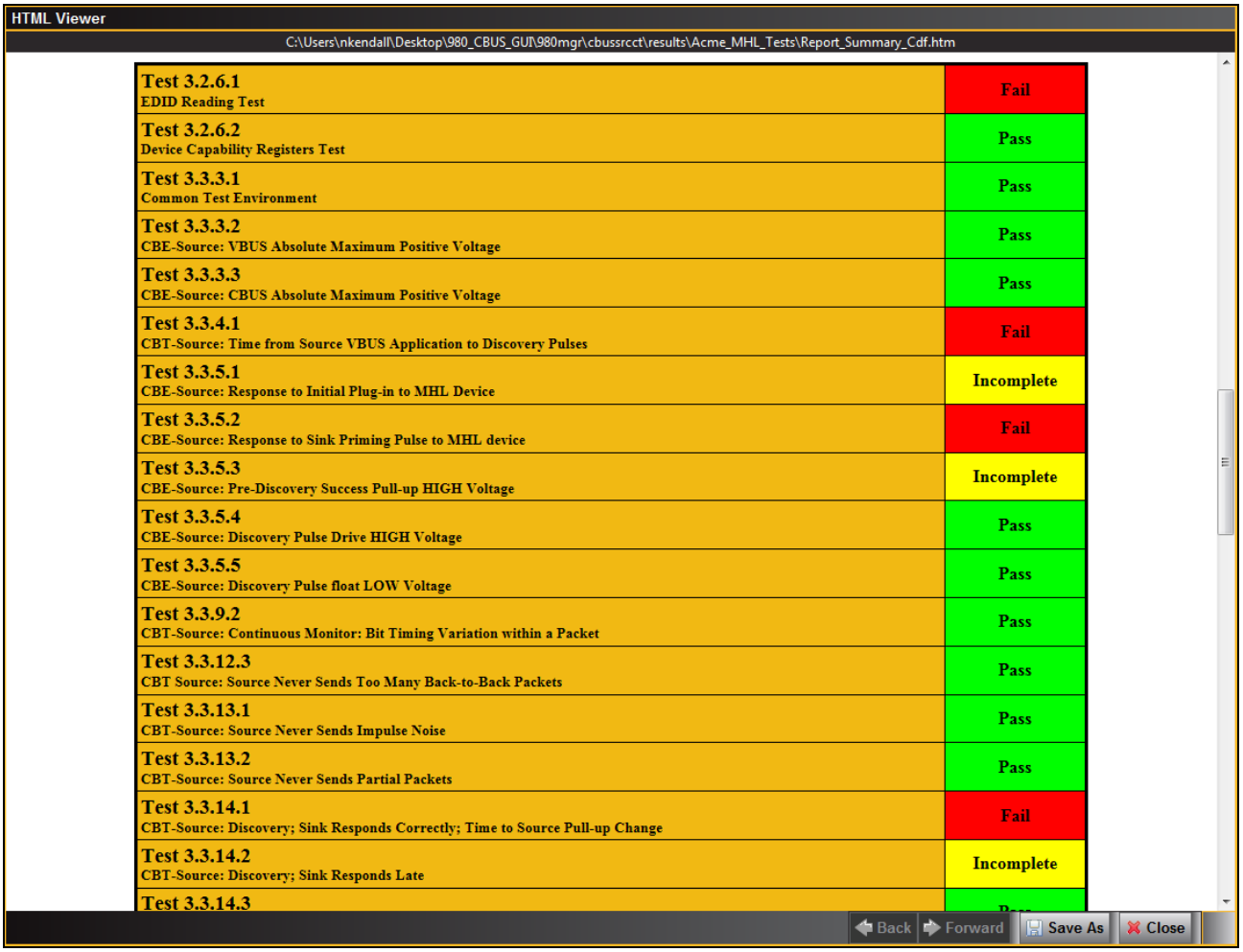
Results Name:	**Acme_MHL_Tests**	Manufacturer:	**Acme**
Date Tested:	**October 2, 2012 2:05 PM**	Model Name:	**XYZ**
Overall Status:	**Incomplete**	Port Tested:	-

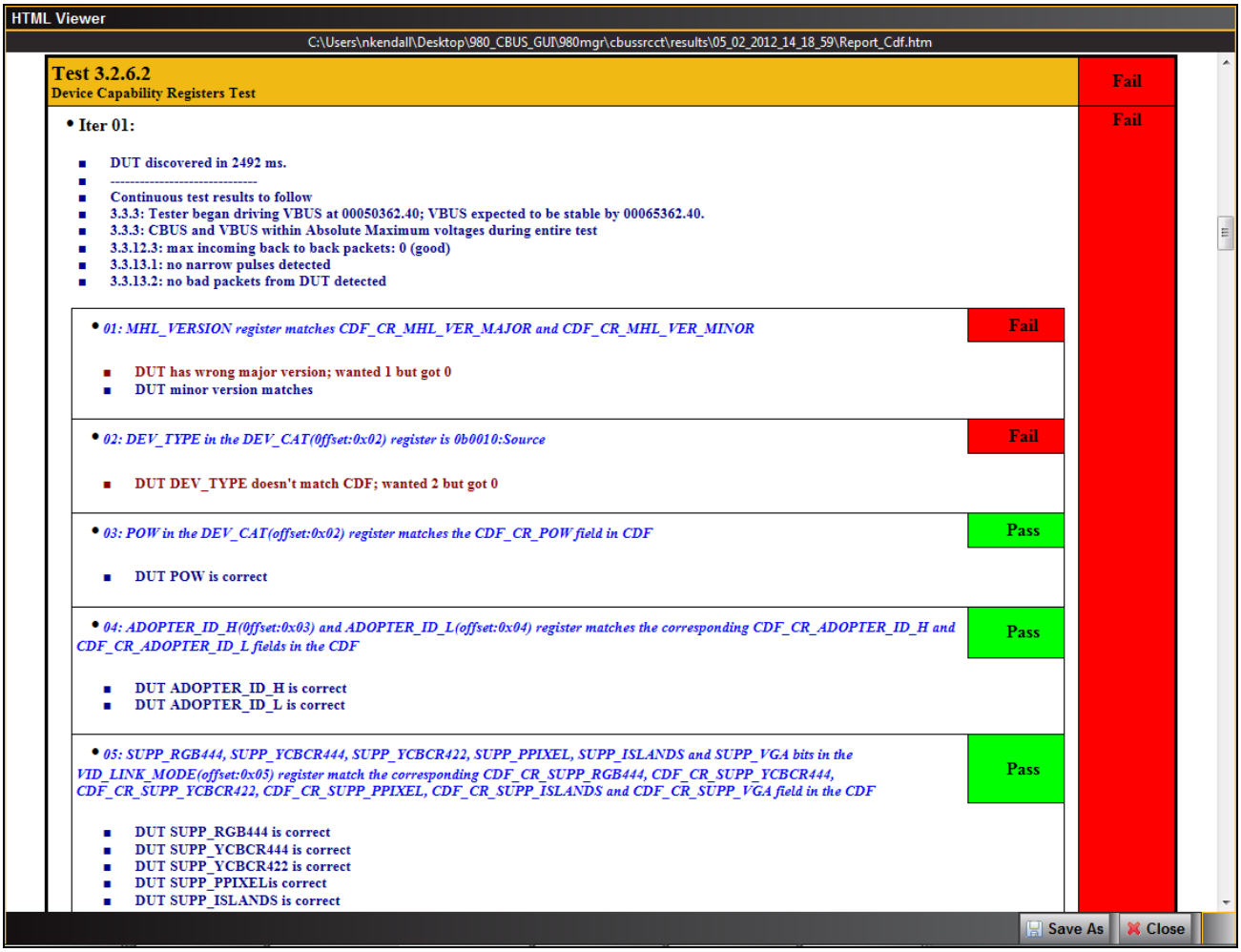
Capabilities Declaration Form (CDF)	
General	
CDF_MFR_NAME	Acme
CDF_MODEL_NUMBER	XYZ
CDF_SRC_POWERED	YES
CDF_SRC_CBUS_THRESHOLD_V	0.90
CDF_PROC_SET_ACTIVE	Not Specified
CDF_PROC_SET_STANDBY	Not Specified
CDF_RCP_RECEIVE	YES
CDF_RCP_SEND	NO
CDF_LOG_DEV_MAP_CHANGE	NO
Capability Registers	
CDF_CR_MHL_VER_MAJOR	1
CDF_CR_MHL_VER_MINOR	0
CDF_CR_DEV_TYPE	2
CDF_CR_POW	0
CDF_CR_ADOPTER_ID_H	0
CDF_CR_ADOPTER_ID_L	0

The CDF is shown below:



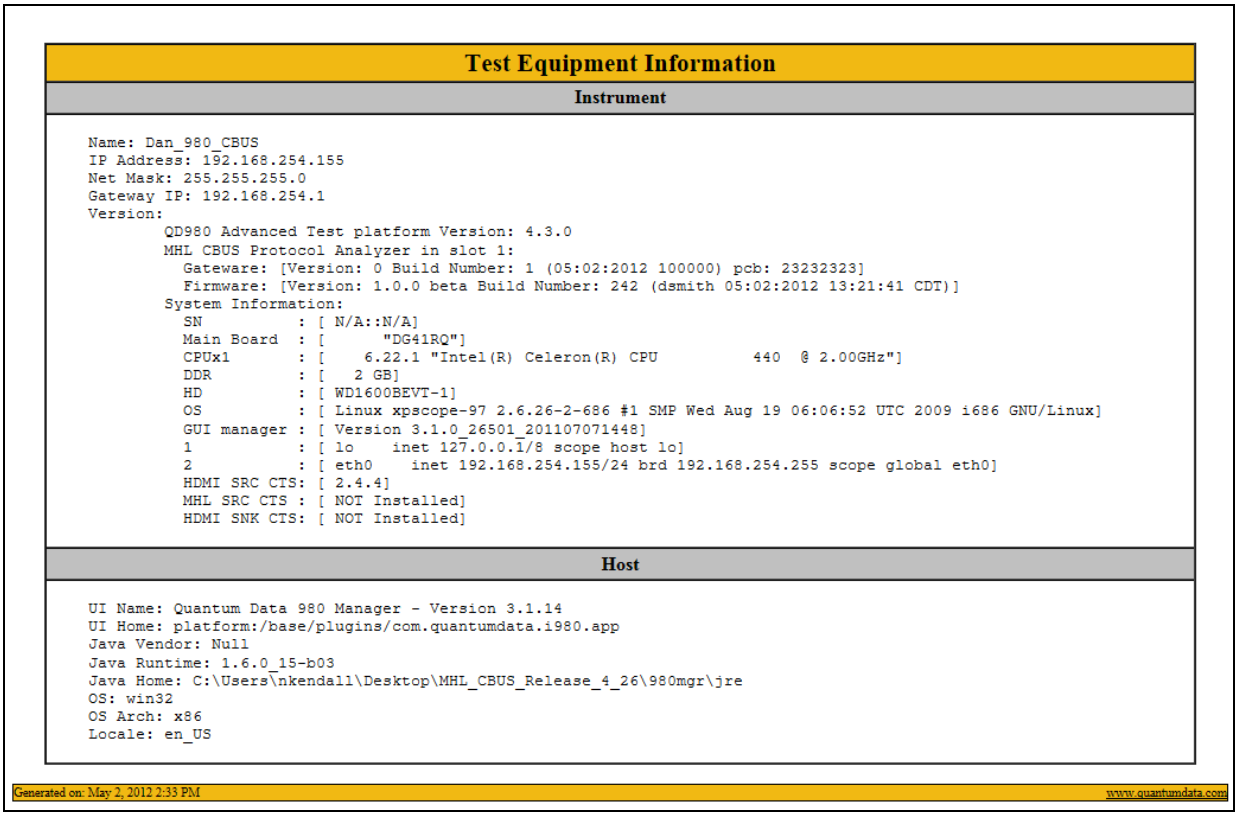
The detailed results for a failure are shown below:




HTML Viewer
C:\Users\nkendall\Desktop\980_CBUS_GUI\980mgr\cbussrcct\results\05_02_2012_14_18_59\Report_Cdf.htm
Test 3.2.6.2
Device Capability Registers Test
Fail
Fail
Iter 01:
DUT discovered in 2492 ms.

Continuous test results to follow
3.3.3: Tester began driving VBUS at 00050362.40; VBUS expected to be stable by 00065362.40.
3.3.3: CBUS and VBUS within Absolute Maximum voltages during entire test
3.3.12.3: max incoming back to back packets: 0 (good)
3.3.13.1: no narrow pulses detected
3.3.13.2: no bad packets from DUT detected
01: MHL_VERSION register matches CDF_CR_MHL_VER_MAJOR and CDF_CR_MHL_VER_MINOR
Fail
DUT has wrong major version; wanted 1 but got 0
DUT minor version matches
02: DEV_TYPE in the DEV_CAT(0ffset:0x02) register is 0b0010:Source
Fail
DUT DEV_TYPE doesn't match CDF; wanted 2 but got 0
03: POW in the DEV_CAT(offset:0x02) register matches the CDF_CR_POW field in CDF
Pass
DUT POW is correct
04: ADOPTER_ID_H(0ffset:0x03) and ADOPTER_ID_L(offset:0x04) register matches the corresponding CDF_CR_ADOPTER_ID_H and CDF_CR_ADOPTER_ID_L fields in the CDF
Pass
DUT ADOPTER_ID_H is correct
DUT ADOPTER_ID_L is correct
05: SUPP_RGB444, SUPP_YCBCR444, SUPP_YCBCR422, SUPP_PPIXEL, SUPP_ISLANDS and SUPP_VGA bits in the VID_LINK_MODE(offset:0x05) register match the corresponding CDF_CR_SUPP_RGB444, CDF_CR_SUPP_YCBCR444, CDF_CR_SUPP_YCBCR422, CDF_CR_SUPP_PPIXEL, CDF_CR_SUPP_ISLANDS and CDF_CR_SUPP_VGA field in the CDF
Pass
DUT SUPP_RGB444 is correct
DUT SUPP_YCBCR444 is correct
DUT SUPP_YCBCR422 is correct
DUT SUPP_PPIXELis correct
DUT SUPP_ISLANDS is correct
Save As
Close

The final page of the report shows the test equipment configuration as shown below.



Test Equipment Information

Instrument

```
Name: Dan_980_CBUS
IP Address: 192.168.254.155
Net Mask: 255.255.255.0
Gateway IP: 192.168.254.1
Version:
        QD980 Advanced Test platform Version: 4.3.0
        MHL CBUS Protocol Analyzer in slot 1:
          Gateware: [Version: 0 Build Number: 1 (05:02:2012 100000) pcb: 23232323]
          Firmware: [Version: 1.0.0 beta Build Number: 242 (dsmith 05:02:2012 13:21:41 CDT)]
        System Information:
          SN          : [ N/A::N/A]
          Main Board  : [       "DG41RQ"]
          CPUx1       : [    6.22.1 "Intel(R) Celeron(R) CPU          440  @ 2.00GHz"]
          DDR         : [   2 GB]
          HD          : [ WD1600BEVT-1]
          OS          : [ Linux xpscope-97 2.6.26-2-686 #1 SMP Wed Aug 19 06:06:52 UTC 2009 i686 GNU/Linux]
          GUI manager : [ Version 3.1.0_26501_201107071448]
          1           : [ lo    inet 127.0.0.1/8 scope host lo]
          2           : [ eth0    inet 192.168.254.155/24 brd 192.168.254.255 scope global eth0]
          HDMI SRC CTS: [ 2.4.4]
          MHL SRC CTS : [ NOT Installed]
          HDMI SNK CTS: [ NOT Installed]
```

Host

```
UI Name: Quantum Data 980 Manager - Version 3.1.14
UI Home: platform:/base/plugins/com.quantumdata.i980.app
Java Vendor: Null
Java Runtime: 1.6.0_15-b03
Java Home: C:\Users\nkendall\Desktop\MHL_CBUS_Release_4_26\980mgr\jre
OS: win32
OS Arch: x86
Locale: en_US
```

Generated on: May 2, 2012 2:33 PM www.quantumdata.com

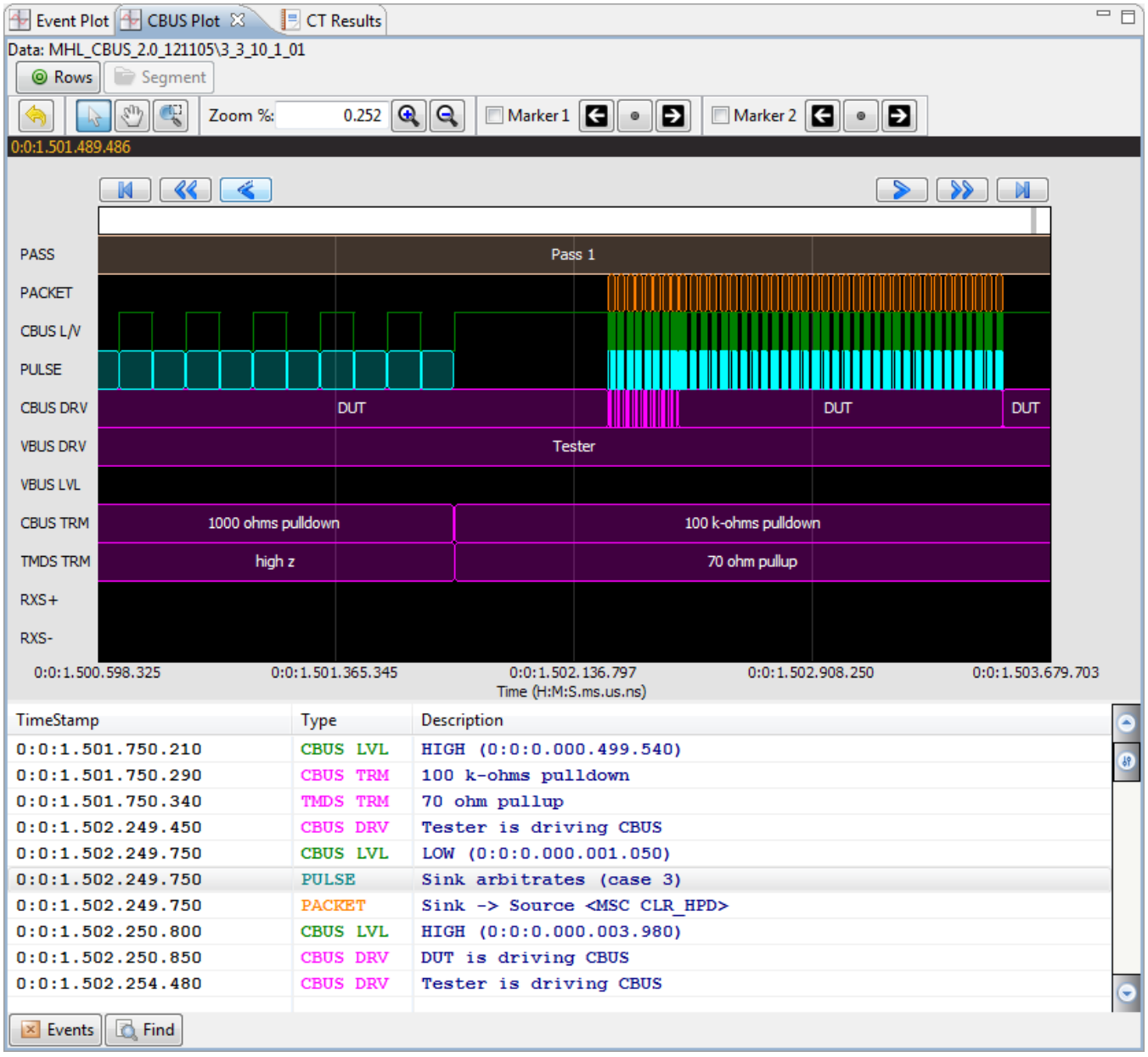
3.9 CBUS Log Plot

The **CBUS Log Plot** panel (shown below) is panel used for viewing the bit and byte timing events of the CBUS controls and commands that occurred during a specific test. A **CBUS Log Plot** is provided for each source CBUS compliance test. The panel has both a graphical depiction of CBUS timing events and a sequential table list out of each event. The vertical axis shows the various CBUS event types. The **CBUS Log Plot** panel provides a set of CBUS event types labeled on the left that indicate the type of event. The horizontal axis is time.

The **CBUS Log Plot** is useful diagnosing CBUS compliance test failures.

The example below shows a series of events captured during a source test.

For more detailed information about the **CBUS Log Plot**, please refer to CBUS Log Plot.



TimeStamp	Type	Description
0:0:1.501.750.210	CBUS LVL	HIGH (0:0:0.000.499.540)
0:0:1.501.750.290	CBUS TRM	100 k-ohms pulldown
0:0:1.501.750.340	TMDS TRM	70 ohm pullup
0:0:1.502.249.450	CBUS DRV	Tester is driving CBUS
0:0:1.502.249.750	CBUS LVL	LOW (0:0:0.000.001.050)
0:0:1.502.249.750	PULSE	Sink arbitrates (case 3)
0:0:1.502.249.750	PACKET	Sink -> Source <MSC CLR_HPD>
0:0:1.502.250.800	CBUS LVL	HIGH (0:0:0.000.003.980)
0:0:1.502.250.850	CBUS DRV	DUT is driving CBUS
0:0:1.502.254.480	CBUS DRV	Tester is driving CBUS

Events Find

4 MHL CBUS Sink Compliance Tests

This chapter describes how to run the MHL CBUS sink compliance tests. Please note you will have to purchase the optional 980 MHL CBUS Compliance Test module in order to run these tests.

The 980 MHL CBUS Compliance test module supports the test sections listed below in the MHL 1.2 and MHL 2.0 Compliance Test specifications. ***Please note that some non-CBUS compliance tests are also covered by the 980 MHL CBUS Compliance Test module***.

4.1 System Test – Section 4.2

- 4.2.5 EDID and Device Capability Register Tests
  - 4.2.5.1 EDID Reading Test
  - 4.2.5.2 Device Capability Registers Test
- 4.2.6 RCP Sub-Command Tests
- 4.2.8 3D Tests
  - 4.2.8.1 3D Video Most Support (MHL CTS 2.0 only)
- 4.2.9 UCP Sub-Command Tests (MHL CTS 2.0 only)

4.2 CBUS Tests – Section 4.3

- 4.3.1 CBUS Sink DUT Common Test Equipment Setups
- 4.3.2 CBUS Sink DUT Common Required Methodologies
- 4.3.3 Link Layer Electrical - Sink: Absolute Maximum Voltages
- 4.3.4 Link Layer Electrical – Sink DUT Output: Standby Discovery Impedance
- 4.3.5 Link Layer Timing – Sink DUT Output: Pre-Discovery
- 4.3.6 Link Layer Electrical – Sink DUT Output: Arbitration/Sync/Data Signaling
- 4.3.7 Link Layer Timing – Sink DUT Output: Arbitration/Sync/Data in Nanoseconds
- 4.3.8 Link Layer Timing – Sink DUT Output: Arbitration/Sync/Data in Bit Times
- 4.3.9 Link Layer Timing – Sink DUT Output: Link Level NACK
- 4.3.10 Link Layer Timing – Sink DUT Output: Link Level ACK
- 4.3.11 Link Layer Timing – Sink DUT Output: Bus Re-Arbitration
- 4.3.12 Link Layer Timing – Sink DUT Output: Ill-formed packets
- 4.3.13 Link Layer Electrical – Sink DUT Input: Discovery
- 4.3.14 Link Layer Timing – Sink DUT Input: Discovery OK
- 4.3.15 Link Layer Timing – Sink DUT Input: Discovery Reject
- 4.3.16 Link Layer Electrical – Sink DUT Input: Arbitration/Sync/Data Signaling
- 4.3.17 Link Layer Timing – Sink DUT Input: Arbitration
- 4.3.18 Link Layer Timing – Sink DUT Input: Data
- 4.3.19 Link Layer Timing – Sink DUT Input: NACK
- 4.3.20 Link Layer Timing – Sink DUT Input: ACK

- 4.3.21 Link Layer Timing – Sink DUT Input: Bus Re-Arbitration
- 4.3.22 Link Layer Timing – Sink DUT Input: Ill-formed Packets
- 4.3.23 Link Layer Timing – Sink DUT Input: Disconnect
- 4.3.24 Link Layer Electrical – Sink DUT VBUS Output
- 4.3.25 Link Layer Timing – Sink DUT VBUS Turn On Transition

4.3 CBUS Common Tests – Section 6.3

- 6.3.1 MSC – Source and Sink DUT Input: Device Register Space Contents; Reads
- 6.3.2 MSC – Source and Sink DUT Output: NACK Packet Response to MSC_MSG
- 6.3.3 MSC – Source and Sink DUT Output: Never Initiates Bad Commands
- 6.3.5 MSC – Source and Sink DUT Output: Errors and Exceptions
- 6.3.6 MSC – Source and Sink DUT Input: Device Register Space Contents; Writes
- 6.3.7 MSC – Source and Sink DUT Input: Vendor Specific and Reserved Header Values
- 6.3.8 MSC – Source and Sink DUT Input: Device Register Space Contents; Writes
- 6.3.9 MSC – Source and Sink DUT Input: Vendor-specific and Reserved Header Values
- 6.3.10 MSC – Source and Sink DUT Input: Normal Commands
- 6.3.11 MSC – Source and Sink DUT Input: Errors and Exceptions
- 6.3.12 MSC – Source and Sink DUT Input: Argument Timeouts
- 6.3.15 MSC – Sink DUT Output: Normal Commands
- 6.3.16 MSC – Sink DUT Input: Errors and Exceptions
- 6.3.20 DDC – Sink DUT Input; Continuous Monitors and Normal Operation
- 6.3.21 DDC – Sink DUT Input; Normal Operation
- 6.3.22 DDC – Sink DUT Input; Illegal Responses

4.4 Workflow for running the MHL CBUS Sink Compliance Tests

The list below is the high level workflow for running the MHL CBUS Sink Compliance Tests. Note that the installation of the external 980 GUI Manager and the Ethernet session are optional; you can run the compliance tests through the embedded GUI Manager.

1. Power up the 980. Refer to the procedures in Getting Started.

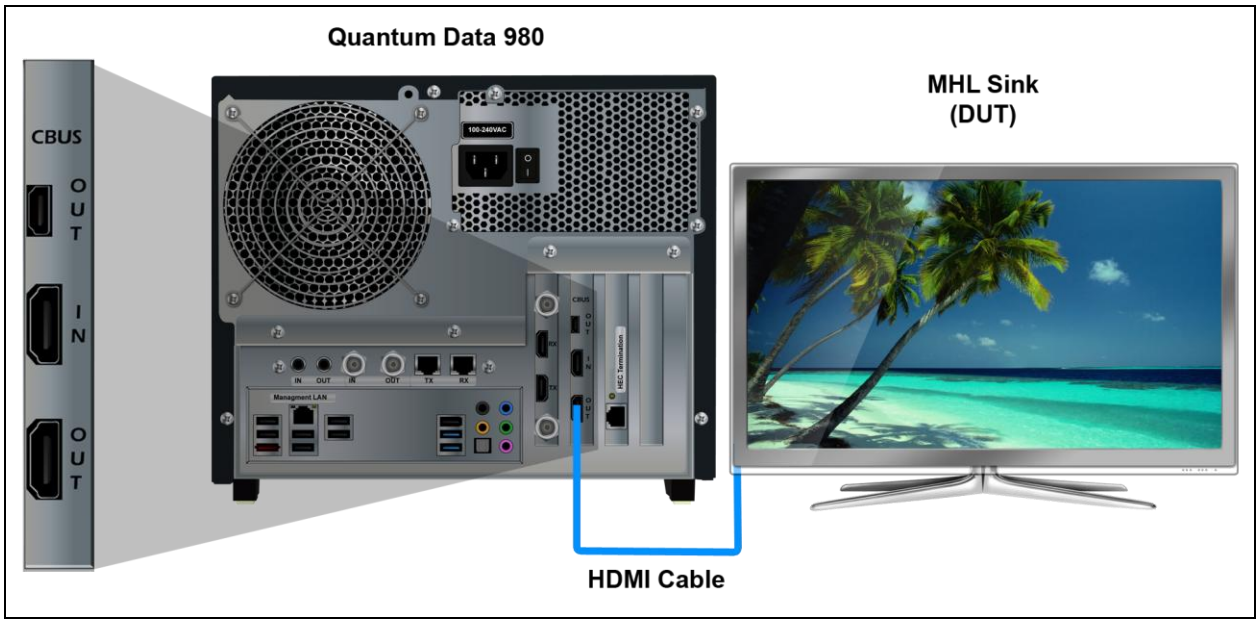
   Note: The power switch in the front is used when you are turning off the 980 for a short period of time. For extended periods of off time, it is best to power the 980 down by first using the power button on the front and then the rocker switch on the back.

2. (Optional; only necessary if using the external 980 GUI Manager) Establish an Ethernet/IP connection between the external 980 GUI Manager and the 980.
3. Connect the MHL sink device under test to the CBUS Out port on the 980 MHL CBUS Compliance module using an HDMI cable.
4. Complete a (or load an existing) Capabilities Declaration Form (CDF) for the device under test using the **CDF Entry** panel.
5. Select the tests that you wish to run from the **Test Selection** panel.

6. Initiate the tests through the **Test Options / Review** panel.
7. View the detailed data for test failures if failures occur.
8. View the results in the **Test Results** panel under the **Navigator** panel.

4.5 Making the physical MHL connections

This subsection describes the physical MHL connections required to run the MHL CBUS sink compliance tests.



Connections for MHL CBUS sink compliance test – 980

To make the physical MHL connections:

This procedure assumes that you have assembled the 980 with the MHL CBUS Compliance Test module and the MHL source device under test and applied power to all these devices. Refer to the procedures below and the diagram above.

1. Connect your MHL sink device under test to the lower OUT connector (HDMI) on the 980 MHL CBUS Compliance Test module as shown in the figure above.

   Important Note: Quantum Data provides a short 30cm HDMI cable for running the MHL CBUS sink compliance tests. Although we recommend that you use this cable for all MHL CBUS sink compliance tests, the cable is optional except for the following tests where the supplied 30cm cable is mandatory:

   - 4.3.6.2
   - 4.3.7.2
   - 4.3.15.1
   - 4.3.15.2
   - 4.3.24.1

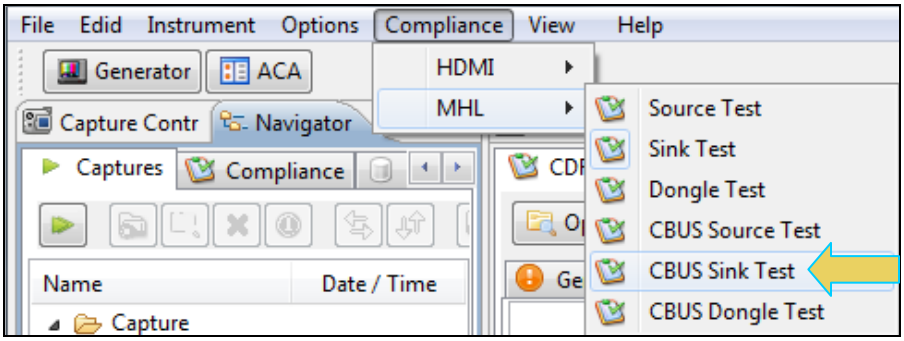
4.6 Completing the CDF

Use the following procedures to complete the CDF for the MHL CBUS sink compliance tests.

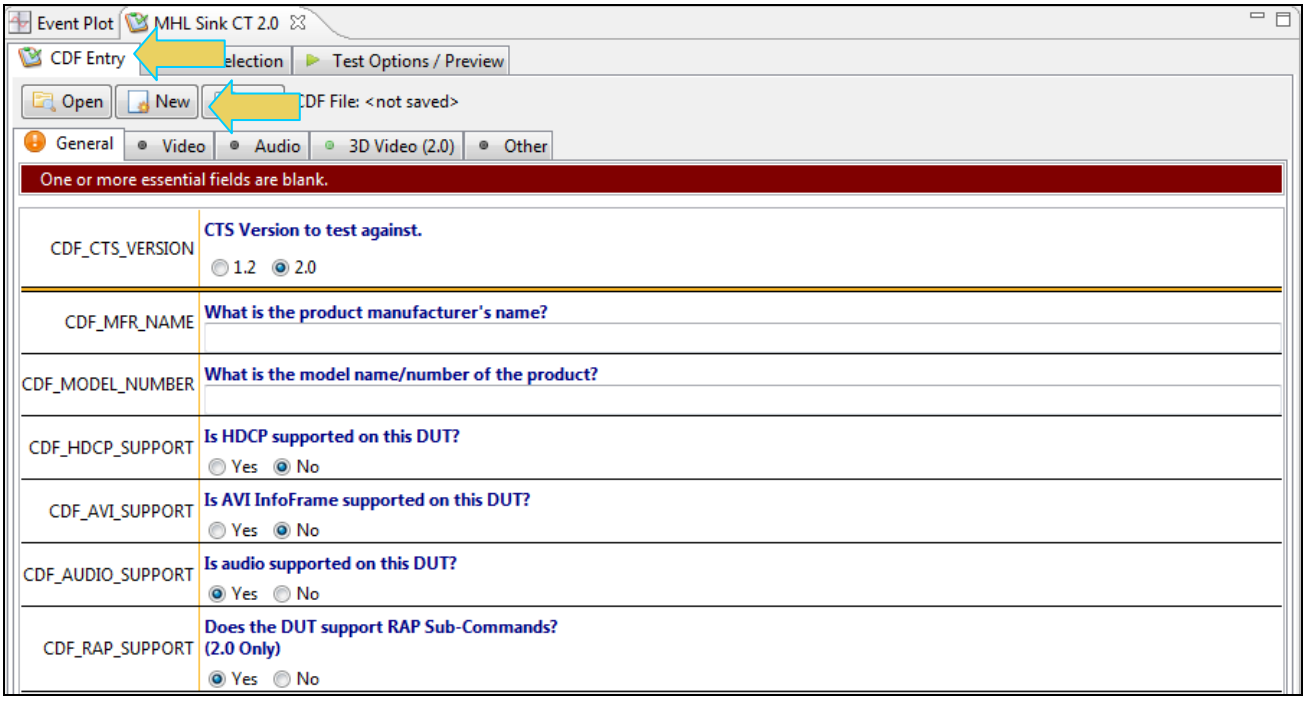
Note: The example workflows and screens use MHL 2.0 except where noted. Workflow and screens are similar for testing MHL 1.2 devices.

To complete the CDF:

1. From the **View** menu, enable viewing of the **MHL CBUS Sink CT** panel.

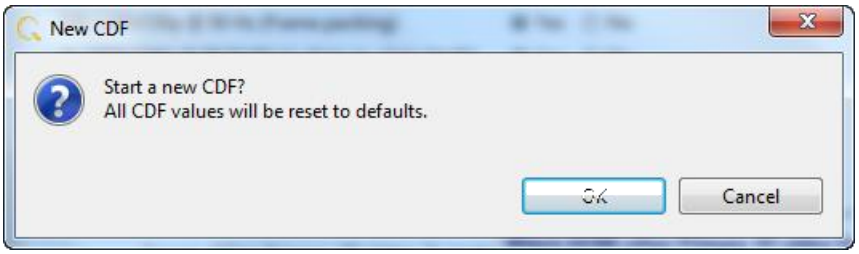


2. Select the **CDF Entry** panel as shown below.



3. To create a new CDF, click on the **New** activation button.

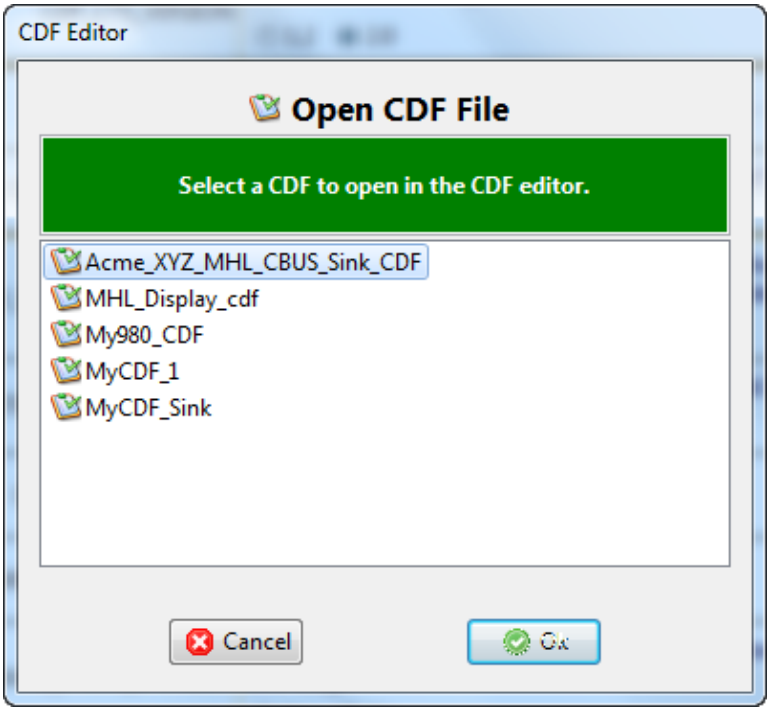
   You will be prompted with a confirmation that you want to start a new CDF and reset the values. Click **OK** to proceed.



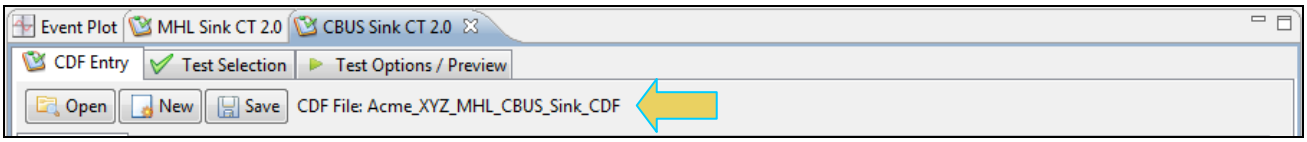
4. To open an existing CDF, click on the **Open** activation button.

You will be prompted with a dialog box that enables you to open a CDF. Select a CDF and then **OK** to proceed.

Note: You can save these CDFs to your PC for use on other PCs and by other colleagues.



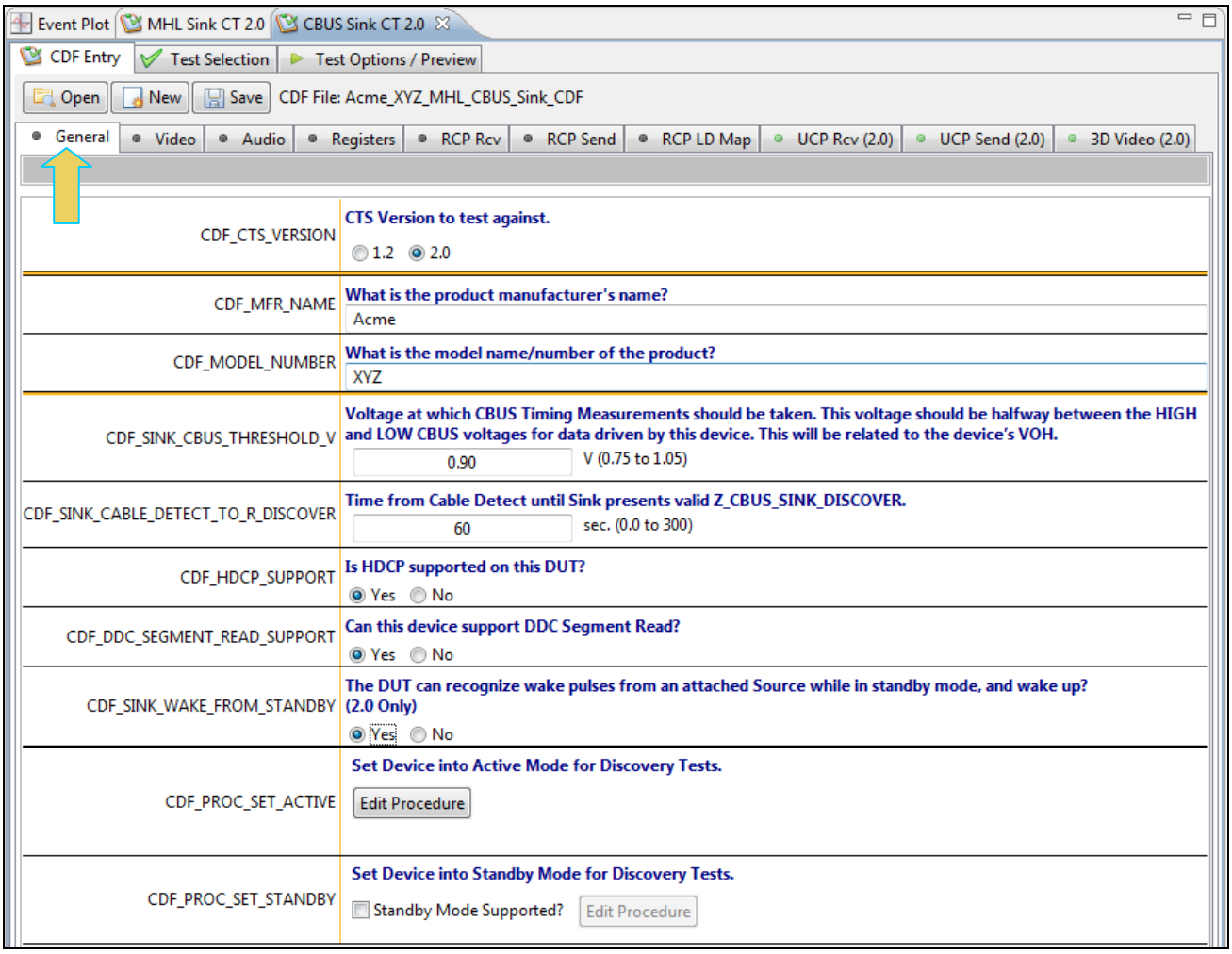
After you open an existing CDF or save it the name will appear beside the **Save** activation button as shown below:



5. Complete the items in the **General** tab of the CDF Entry panel shown below. Note that you will have to complete the essential fields in order to proceed.

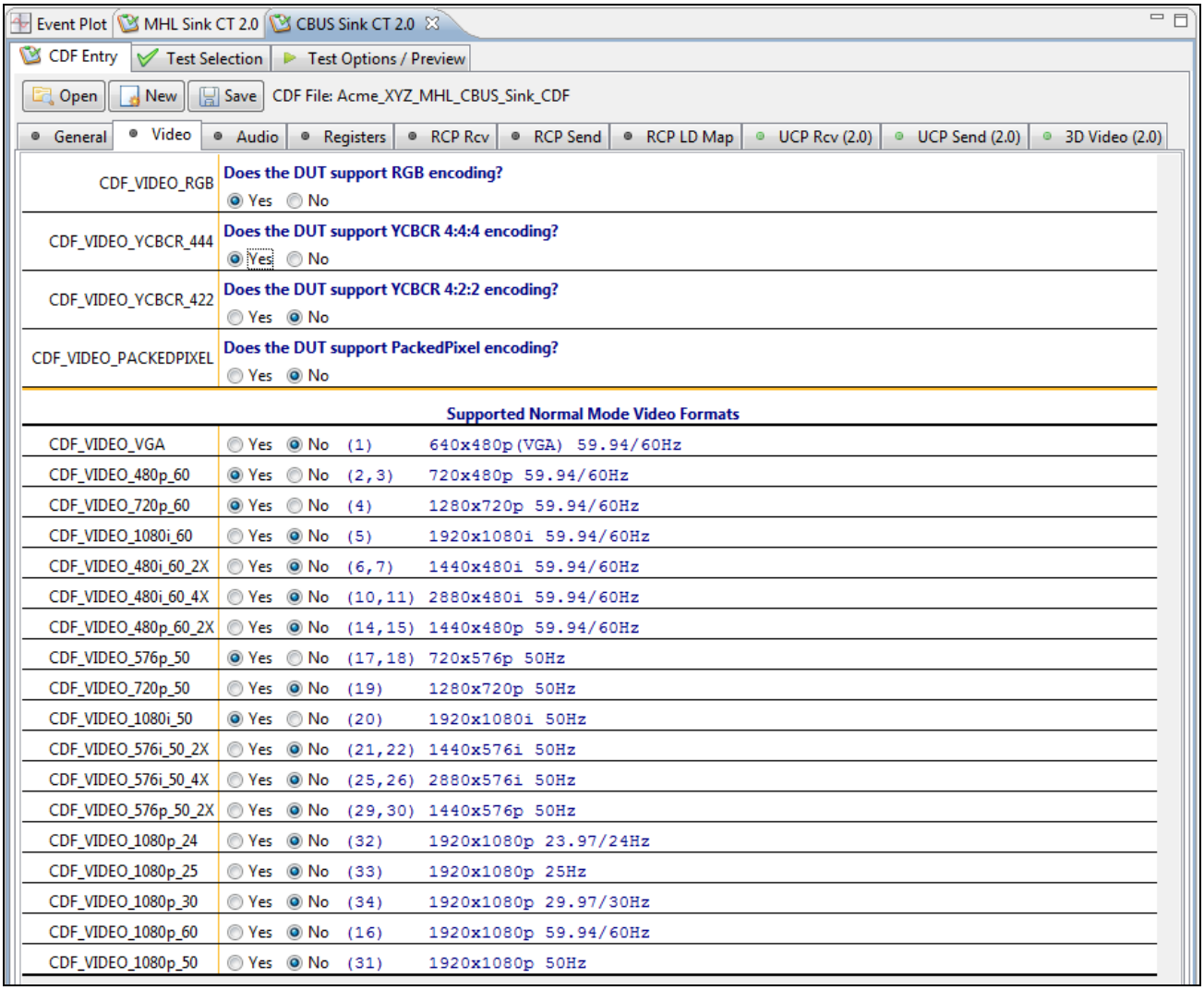
   Note: A read status message will appear indicating if you have not completed all the essential fields. This is shown in the example below.

When you have entered in all the required fields the error indication will go away as shown in the example below.

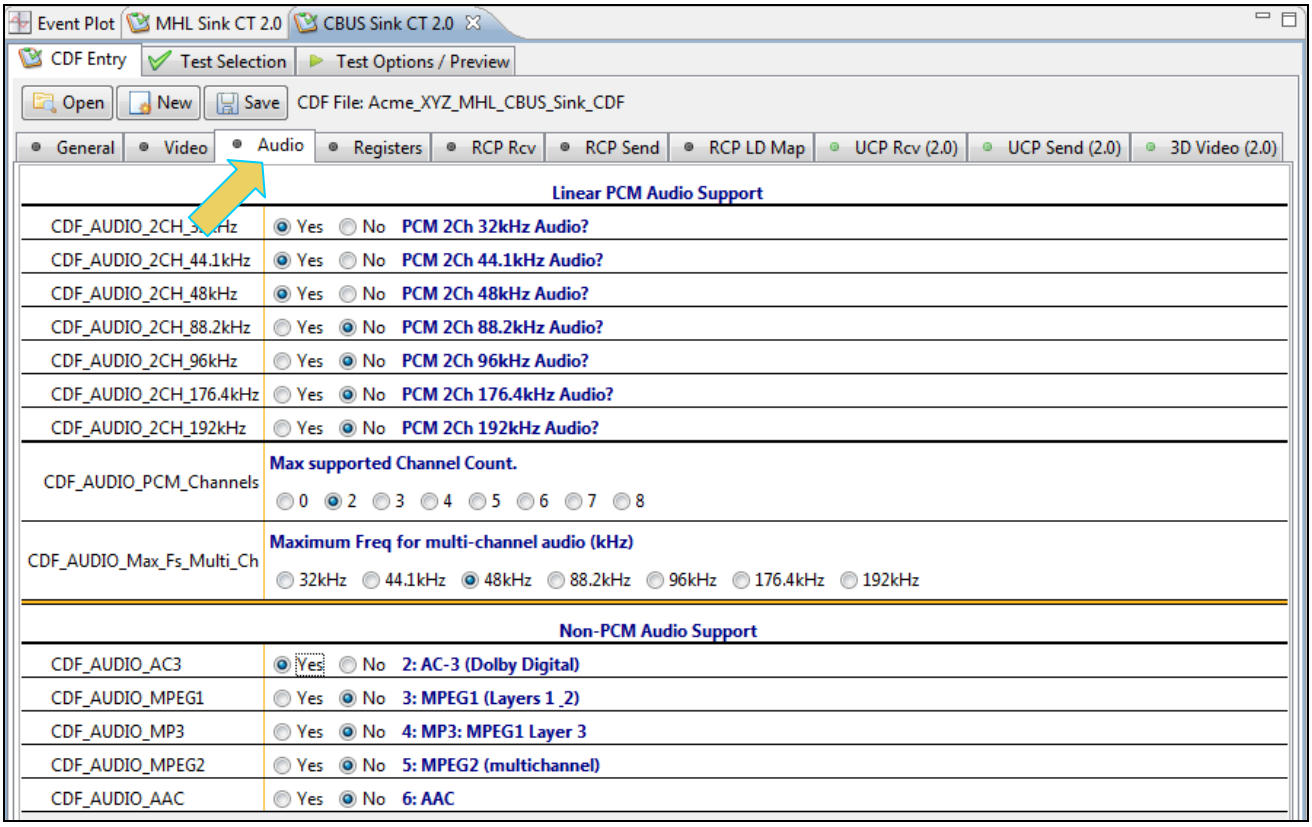


You can enter information using the “Edit Procedure” dialog box to help test engineers understand how to put the device in the proper mode. The information entered into this dialog box will appear during the test.

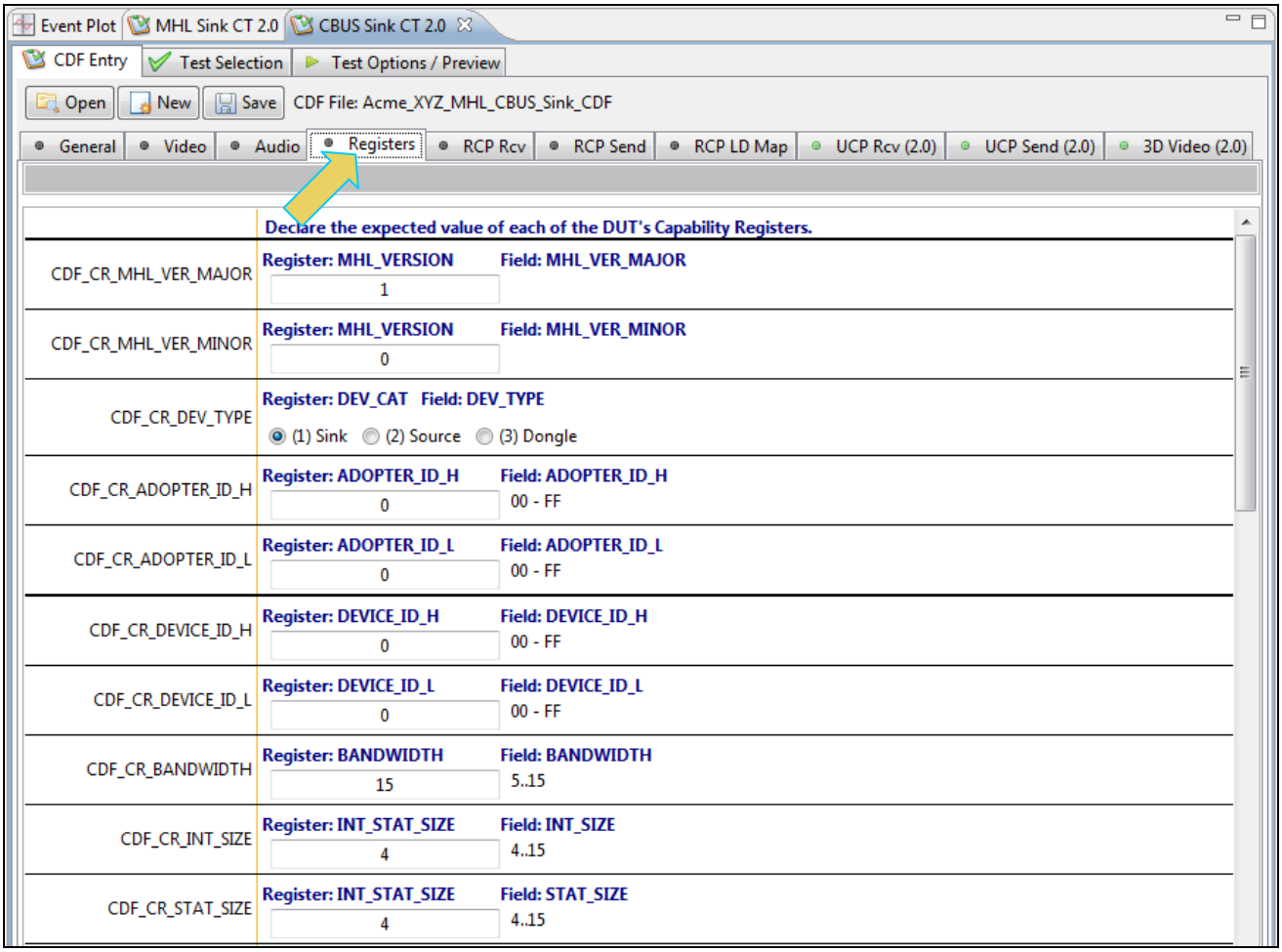
6. Complete the items in the **Video** tab.



7. Complete the items in the **Audio** tab.

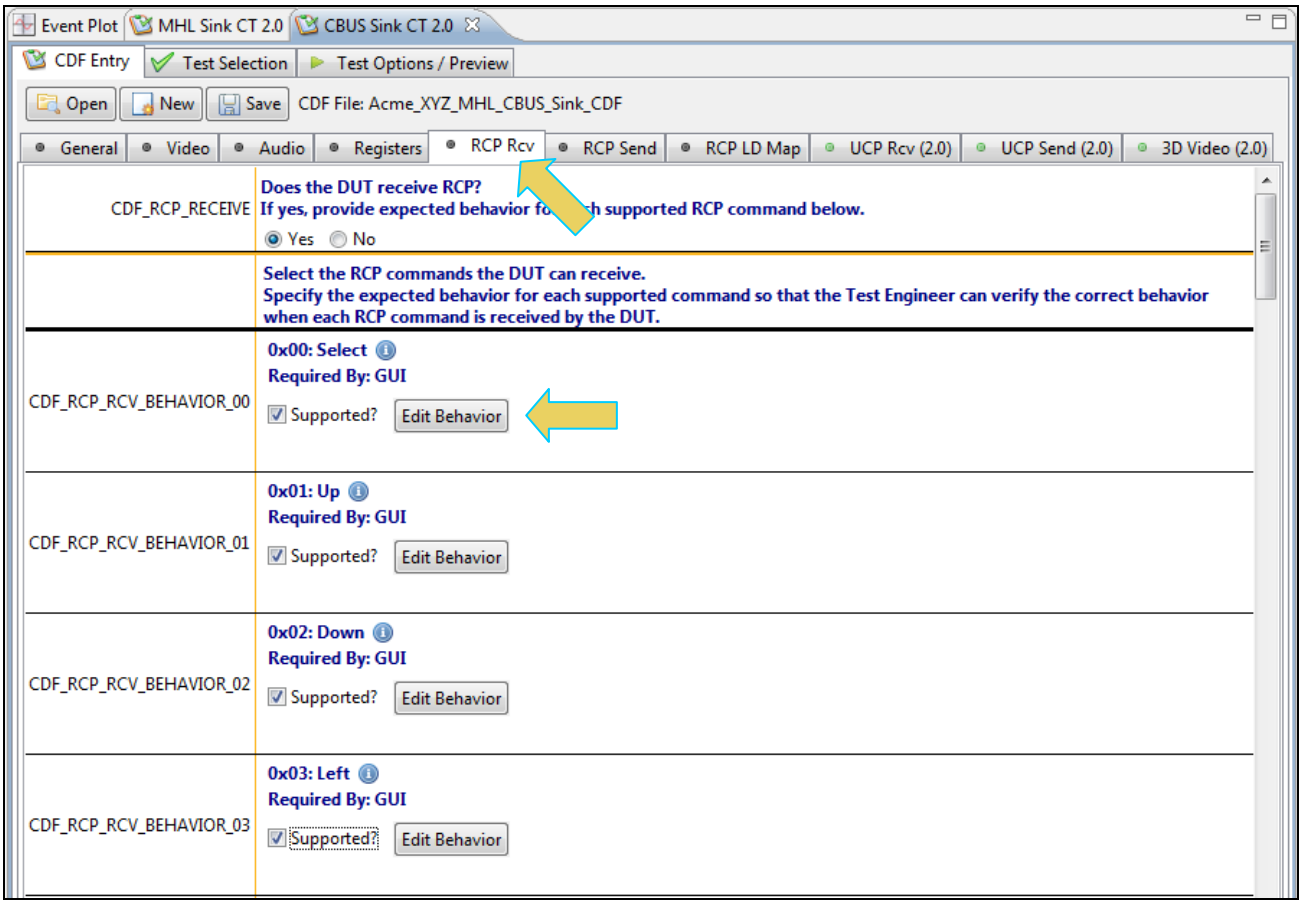


8. Complete the items in the **Registers** tab.



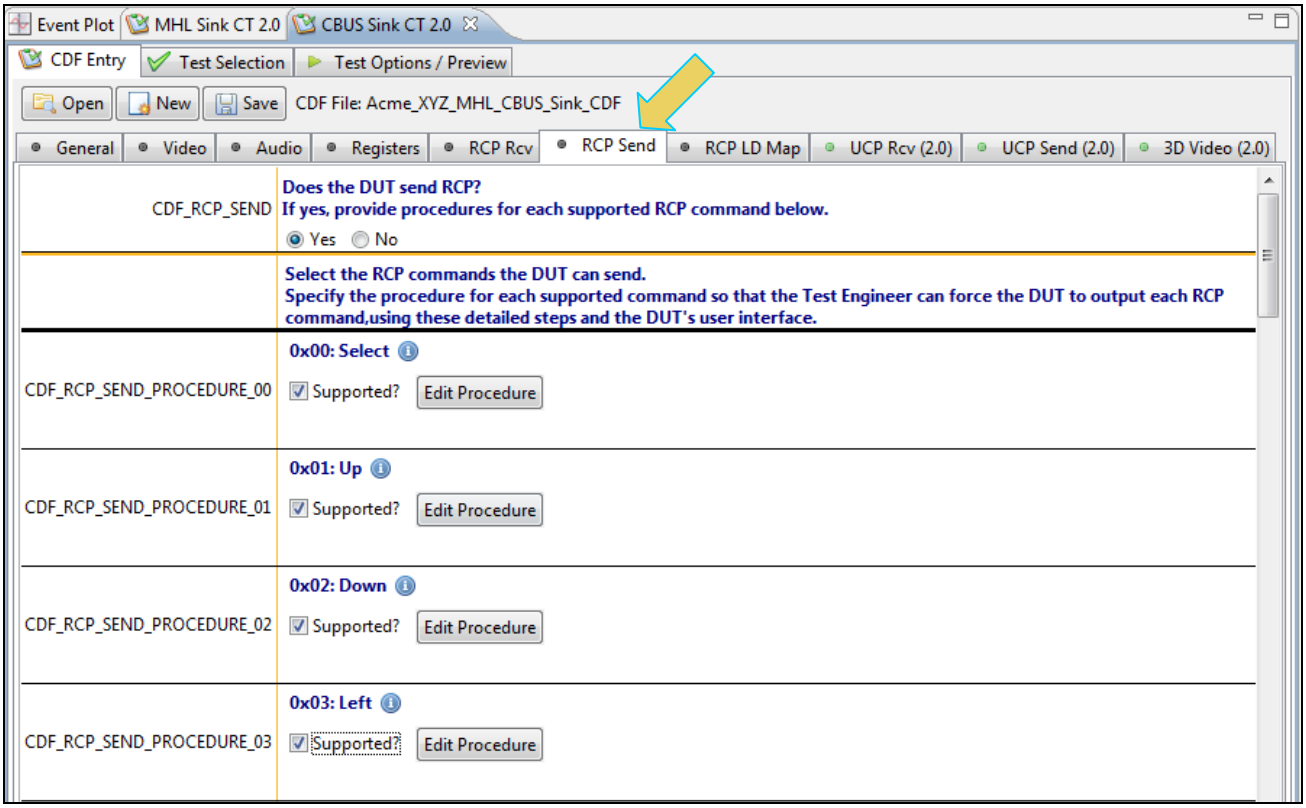
9. Complete the items in the **RCP Rcv** tab.

   You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will help a test engineer determine if the device behaves properly when the various RCP commands are received.



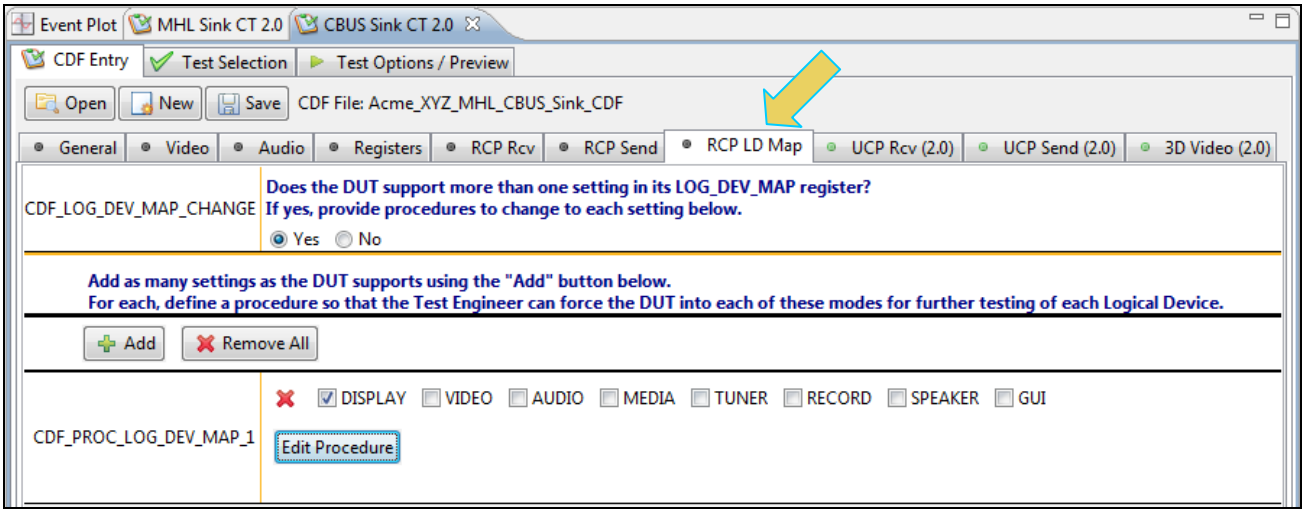
10. Complete the items in the **RCP Send** tab.

    You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test and can be helpful to instruct a test engineer on how to set up a device in order to run a particular test. In the example below you would enter in procedural information which a test engineer could use to cause the sink to issue the various RCP commands.


Event Plot
MHL Sink CT 2.0
CBUS Sink CT 2.0
CDF Entry
Test Selection
Test Options / Preview
Open
New
Save
CDF File: Acme_XYZ_MHL_CBUS_Sink_CDF
General
Video
Audio
Registers
RCP Rcv
RCP Send
RCP LD Map
UCP Rcv (2.0)
UCP Send (2.0)
3D Video (2.0)
CDF_RCP_SEND
Does the DUT send RCP?
If yes, provide procedures for each supported RCP command below.
Yes
No
Select the RCP commands the DUT can send.
Specify the procedure for each supported command so that the Test Engineer can force the DUT to output each RCP command,using these detailed steps and the DUT's user interface.
0x00: Select
CDF_RCP_SEND_PROCEDURE_00
Supported?
Edit Procedure
0x01: Up
CDF_RCP_SEND_PROCEDURE_01
Supported?
Edit Procedure
0x02: Down
CDF_RCP_SEND_PROCEDURE_02
Supported?
Edit Procedure
0x03: Left
CDF_RCP_SEND_PROCEDURE_03
Supported?
Edit Procedure

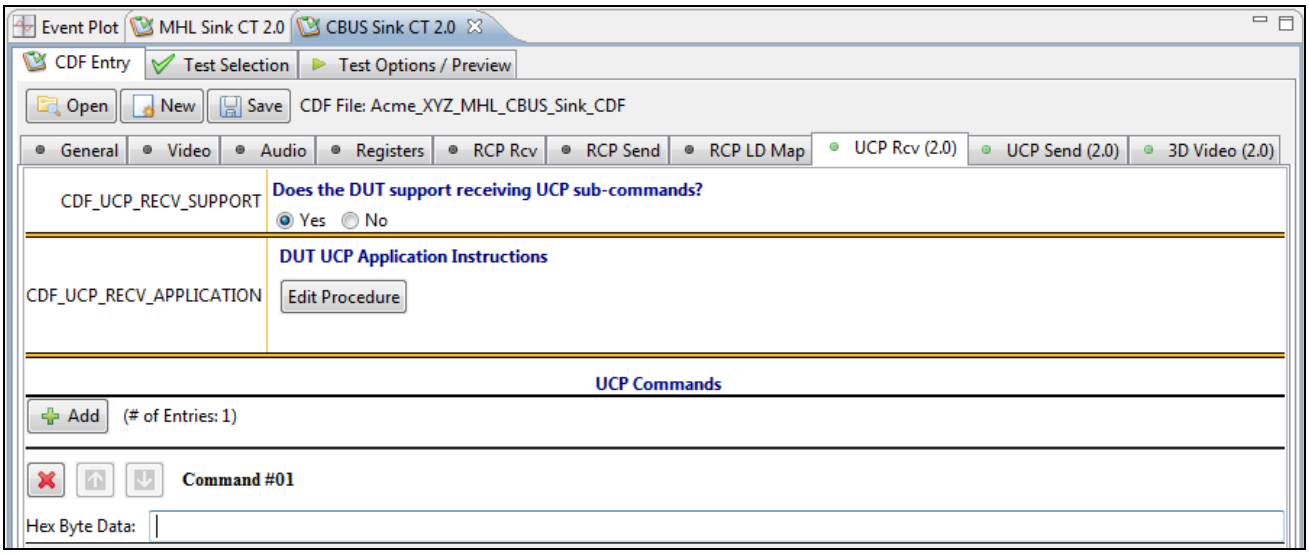
11. Complete the items in the **RCP LD Map** tab.

    You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test to assist the test engineer. In the example below you would enter in procedural information which a test engineer could use to force the sink into the proper mode for further testing of each logical device.



12. Complete the items in the **UCP Rcv** tab.

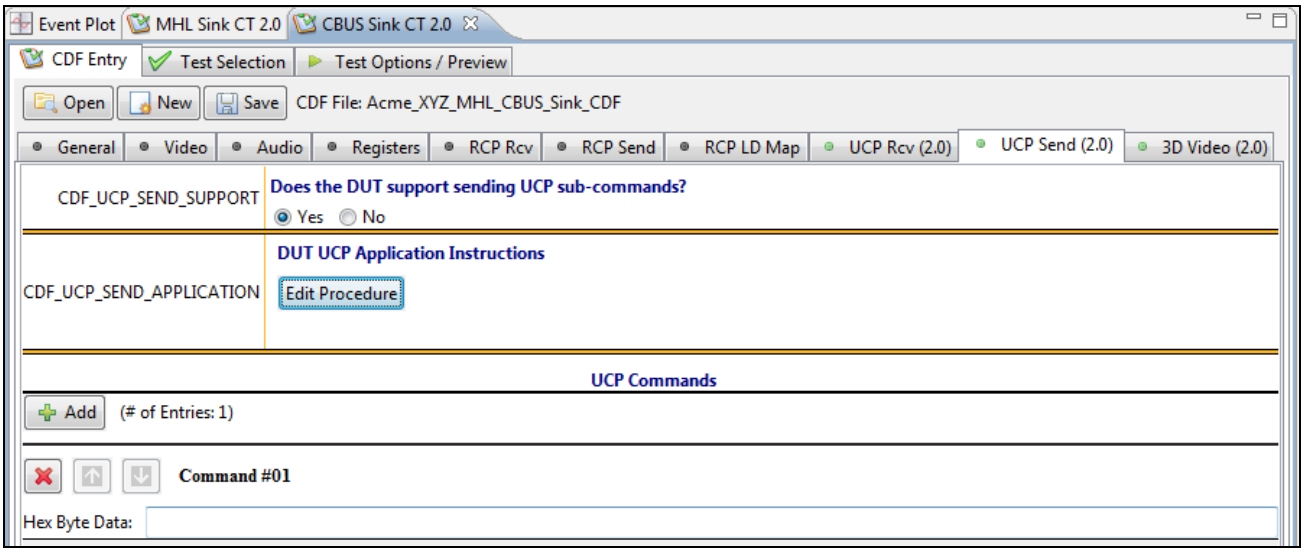
    You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test to assist a test engineer. You can enter in the expected behavior for each supported command so that the test engineer can verify that the sink DUT behaves properly when receiving the various UCP commands.



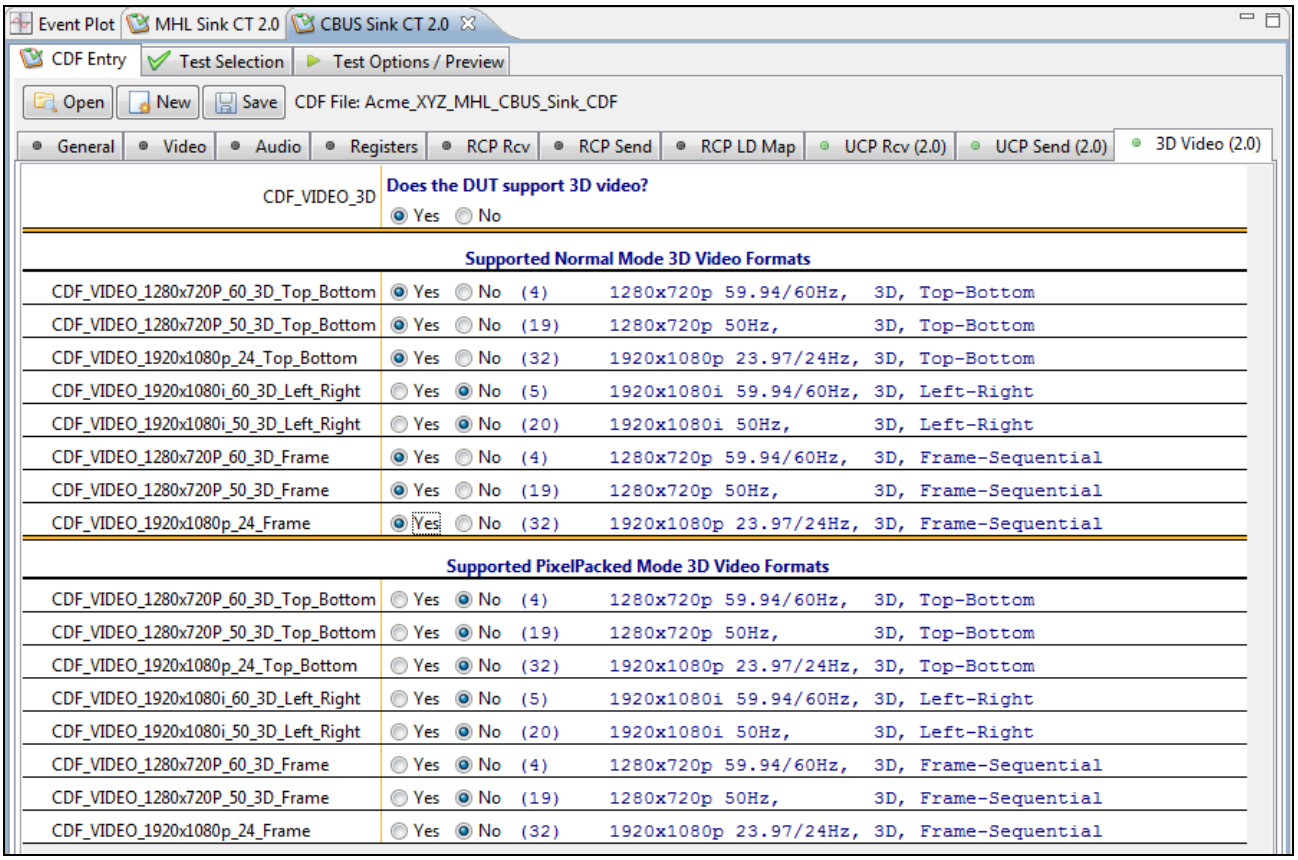
13. Complete the items in the **UCP Send** tab.

    You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test and can be helpful to instruct a test engineer on how to set up a device in

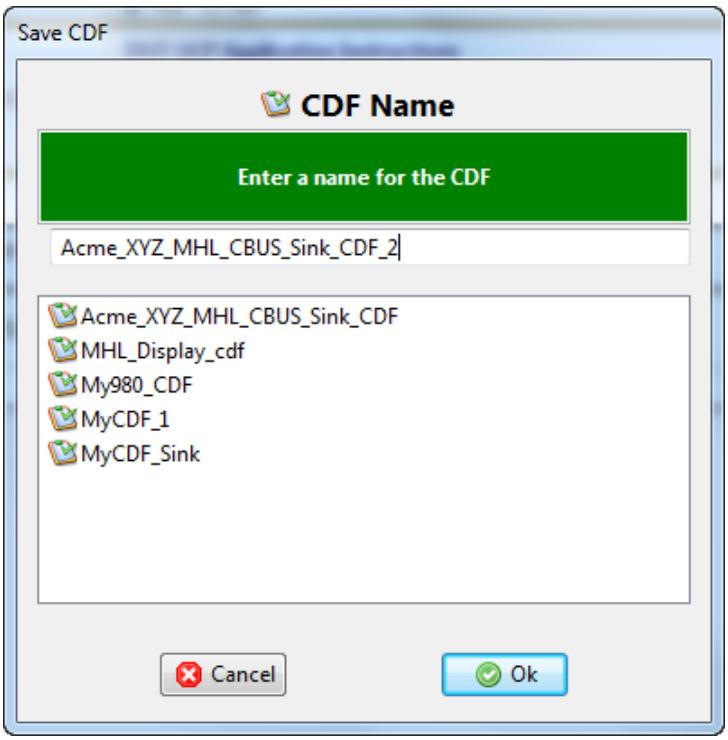
order to run a particular test. In the example below you would enter in procedural information which a test engineer could use to cause the sink to issue the various UCP commands.



14. Complete the items in the **3D Video** tab.



15. Save the CDF. If you have not already saved the CDF, you can do so with the **Save** activation button. Alternatively you can save the CDF under a different name.


Save CDF
CDF Name
Enter a name for the CDF
Acme_XYZ_MHL_CBUS_Sink_CDF_2
Acme_XYZ_MHL_CBUS_Sink_CDF
MHL_Display_cdf
My980_CDF
MyCDF_1
MyCDF_Sink
Cancel
Ok

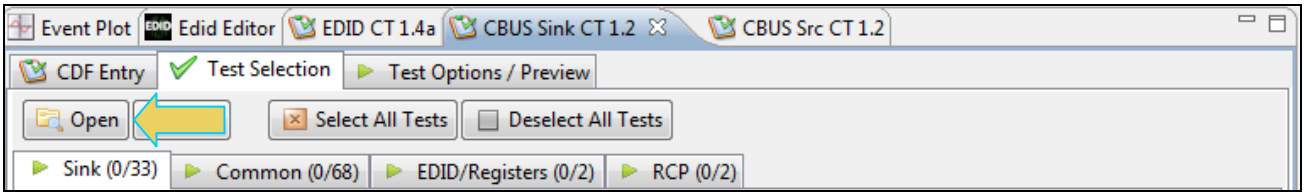
4.7 Selecting which tests to run

Use the following procedures to select the tests to run. There are multiple tabs which correspond to each section in the CTS.

Note: The example workflows and screens use MHL 2.0 except where noted. Workflow and screens are similar for testing MHL 1.2 devices.

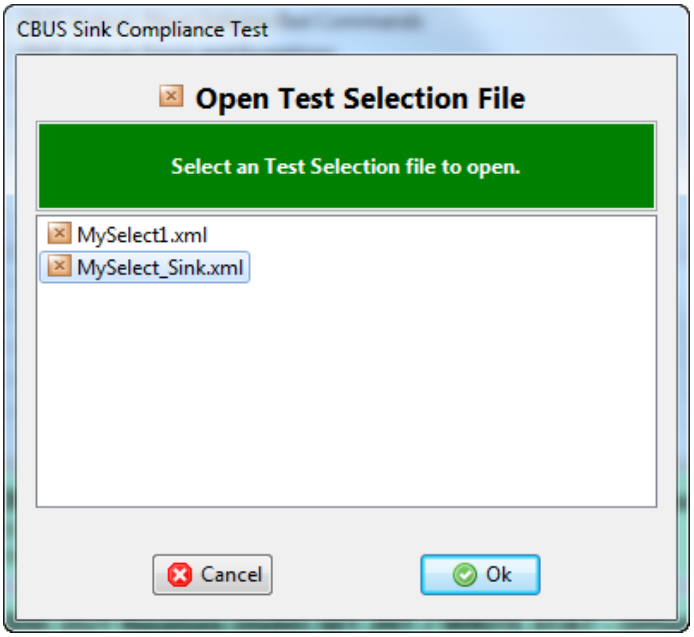
To select the tests to run:

1. Select the **Test Selection** panel as shown below.
2. If you have an existing Test Selection option file saved you can recall that for use in your testing. Simply click on the **Open** activation button.



A dialog box will appear as follows. Simply select the file and click on the **OK** activation button.

Note: You can save the Test Selection files to your host PC and transfer them to other PCs and for others to use.



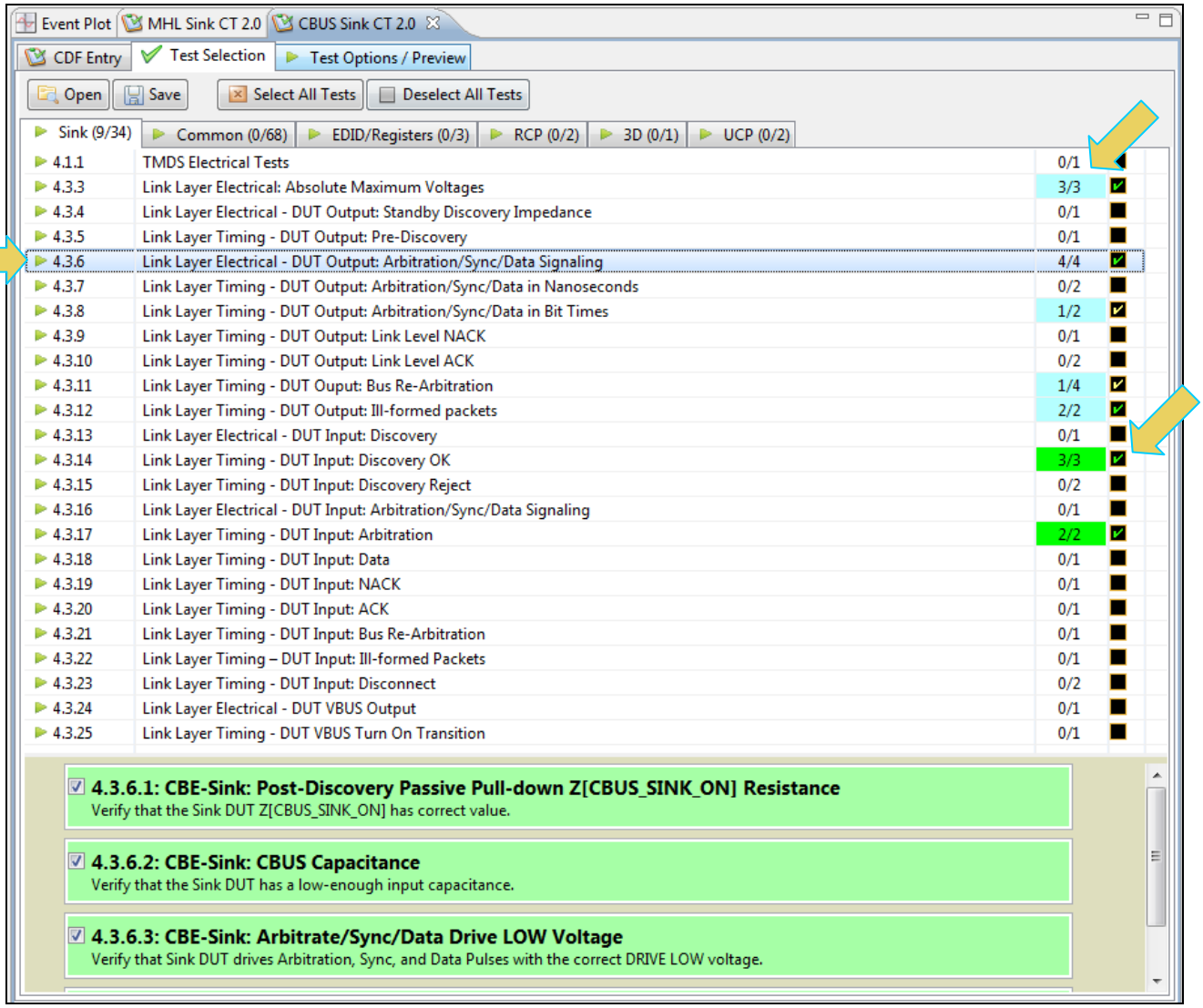
3. Complete the items in the **Sink** tab of the **Test Selection** panel shown below.

   For convenience you can **Select All** or **Deselect All** tests using the activation buttons provided.

   Check box indicators inform how many tests in each section and how many are selected. Each tab (Sink, Common or RCP) inform you of how many tests in that section have been selected.

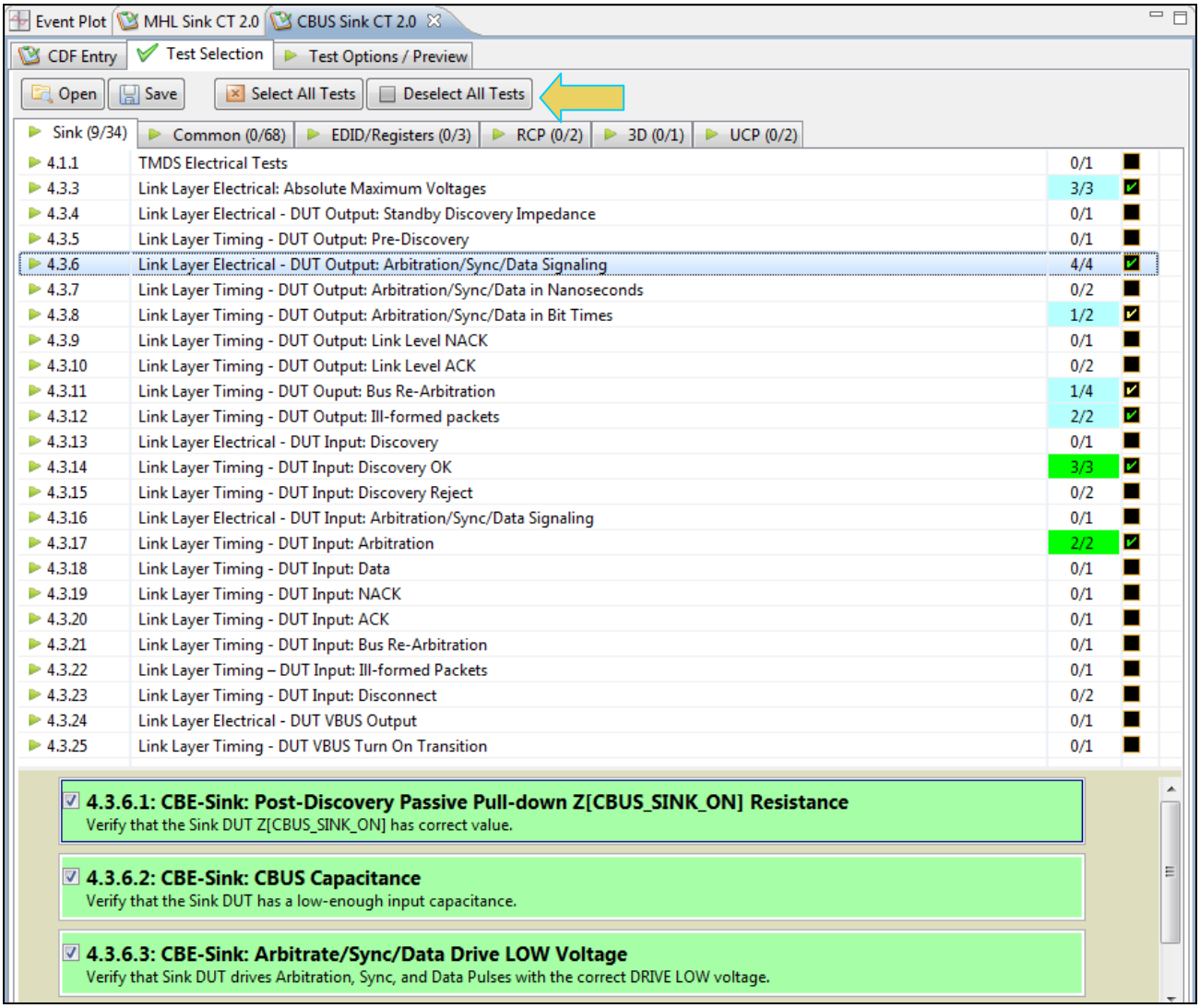
   Each test section list includes several tests. In the example shown below, the 4.3.6 Link Layer Timing – DUT Output: Bus Arbitration/Sync/Data Signaling Test section is selected and the specific tests in that section are then available to be selected.

   Note: Some tests are run in background and cannot be deselected such as the 4.3.3 but there are other background tests within other 4.3.x sections are that are also background. The background tests are highlighted in a light blue as shown in the example below.

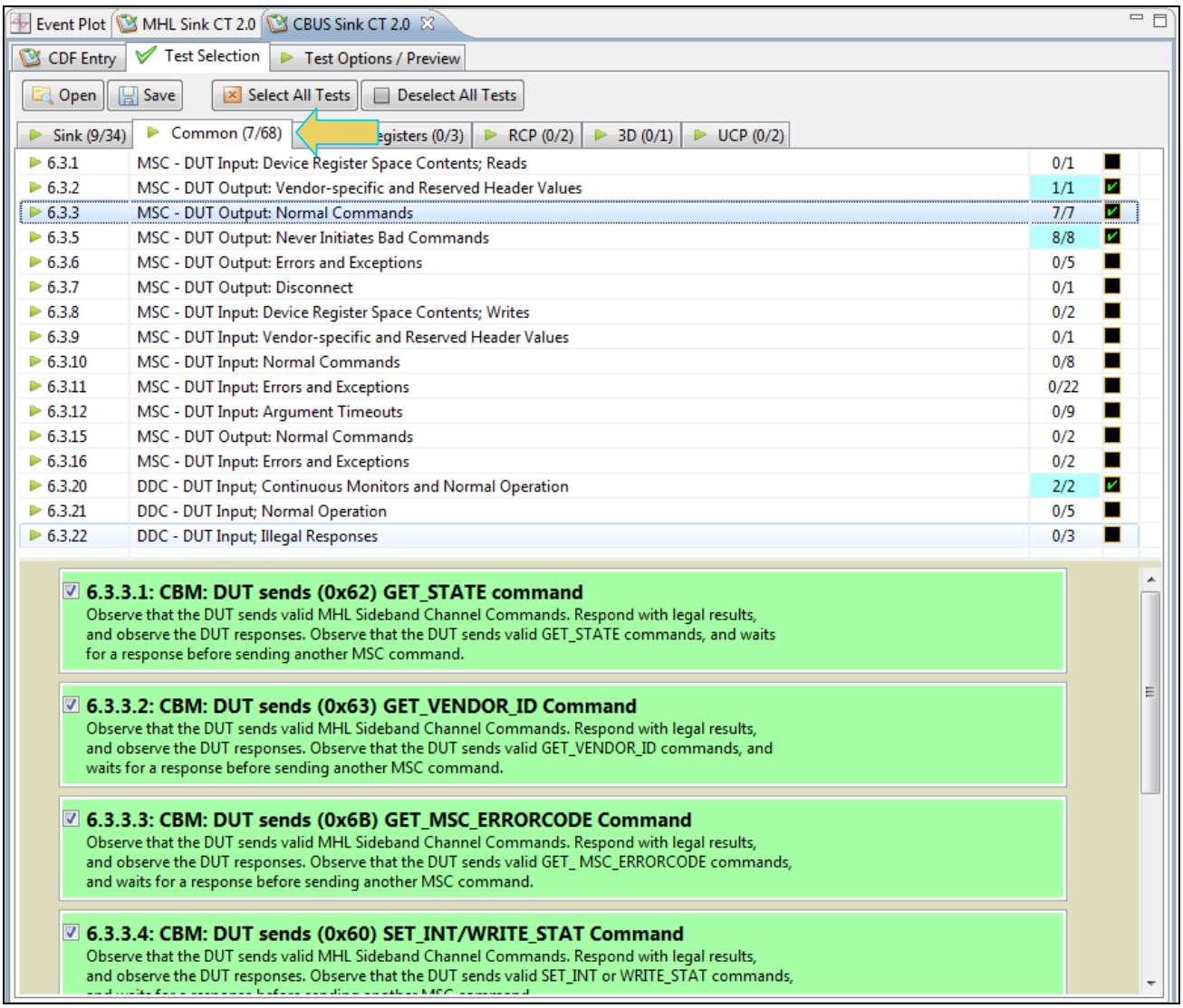


4. Complete the items in the **Common** tab of the **Test Selection** panel shown below.

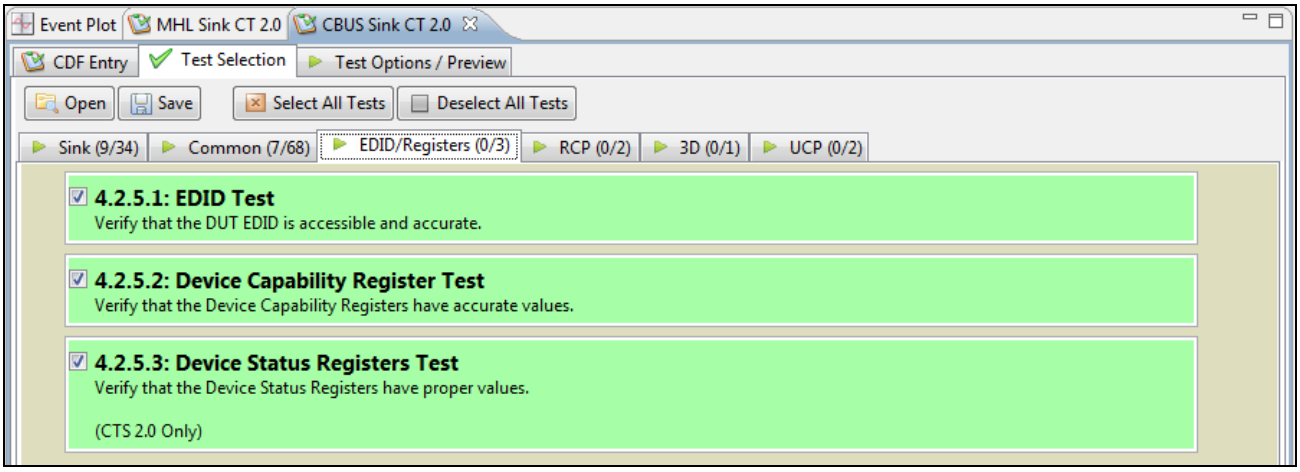
   For convenience you can **Select All** or **Deselect All** tests using the activation buttons provided.



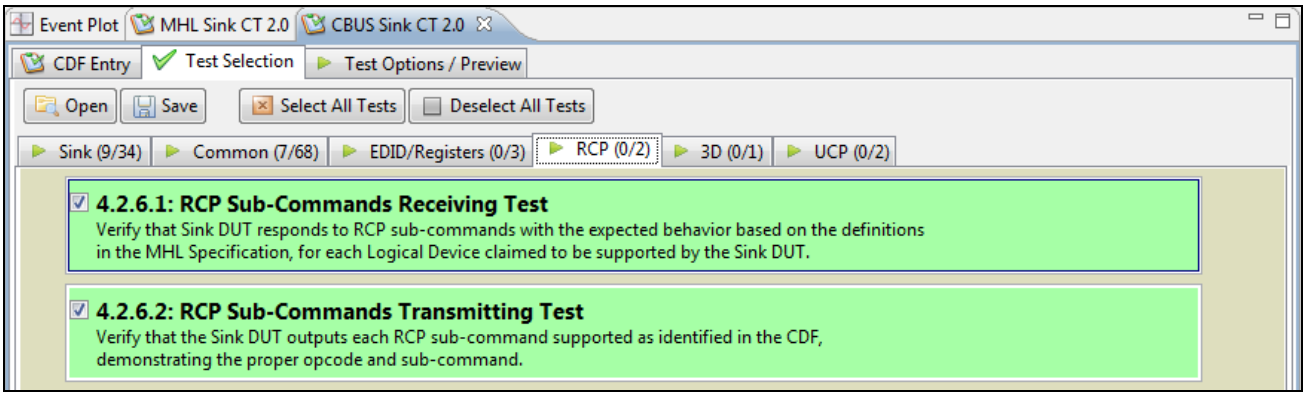
5. Complete the items in the **Common** tab of the **Test Selection** panel shown below.



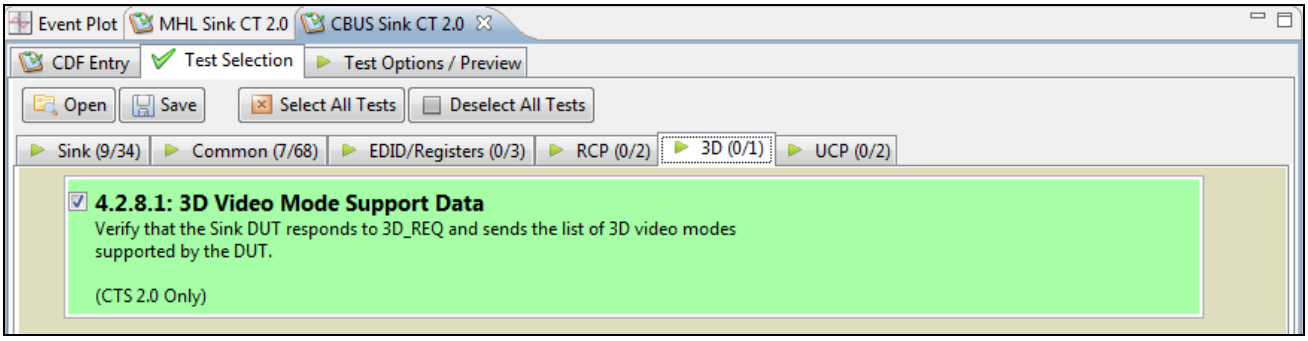
6. Complete the items in the **EDID** tab of the **Test Selection** panel shown below.



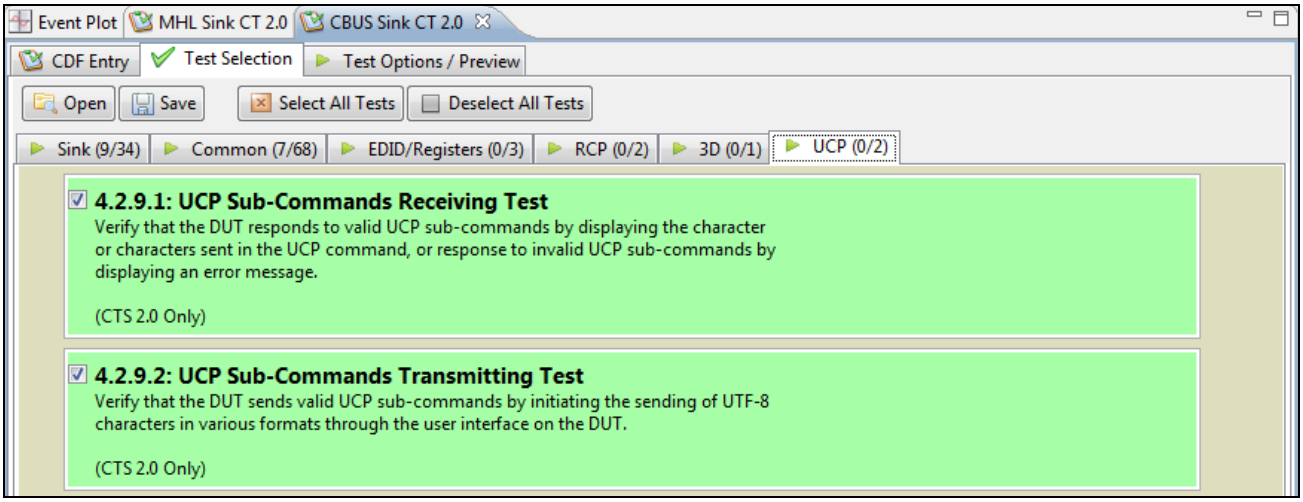
7. Complete the items in the **RCP** tab of the **Test Selection** panel shown below.



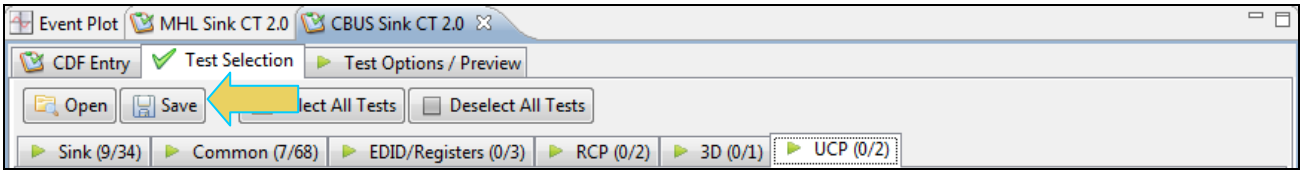
8. Complete the items in the **3D** tab of the **Test Selection** panel shown below.



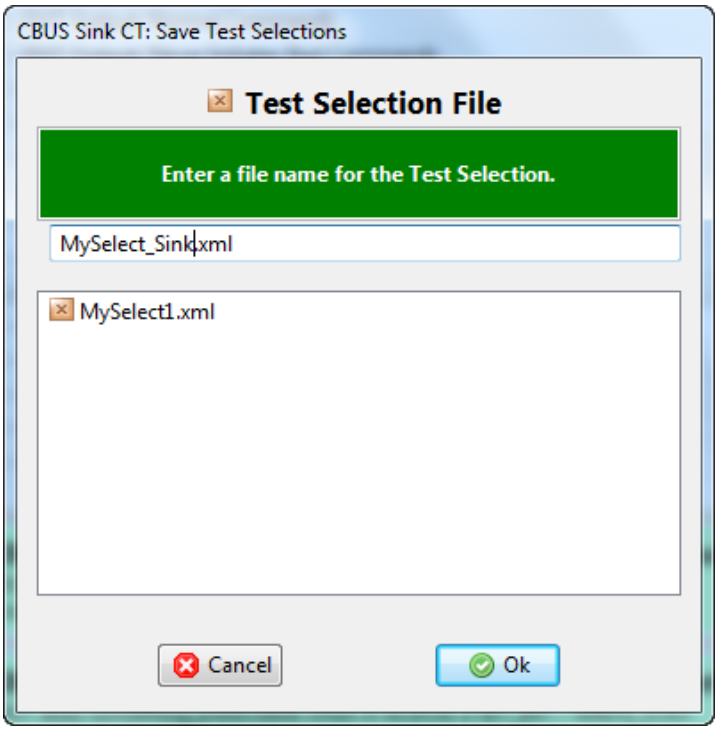
9. Complete the items in the **UCP** tab of the **Test Selection** panel shown below.



10. You can save the Test Selection options using the **Save** activation button.



11. A dialog box will appear as follows. Simply assign a name and click on the **OK** activation button. Click **Cancel** to exit.



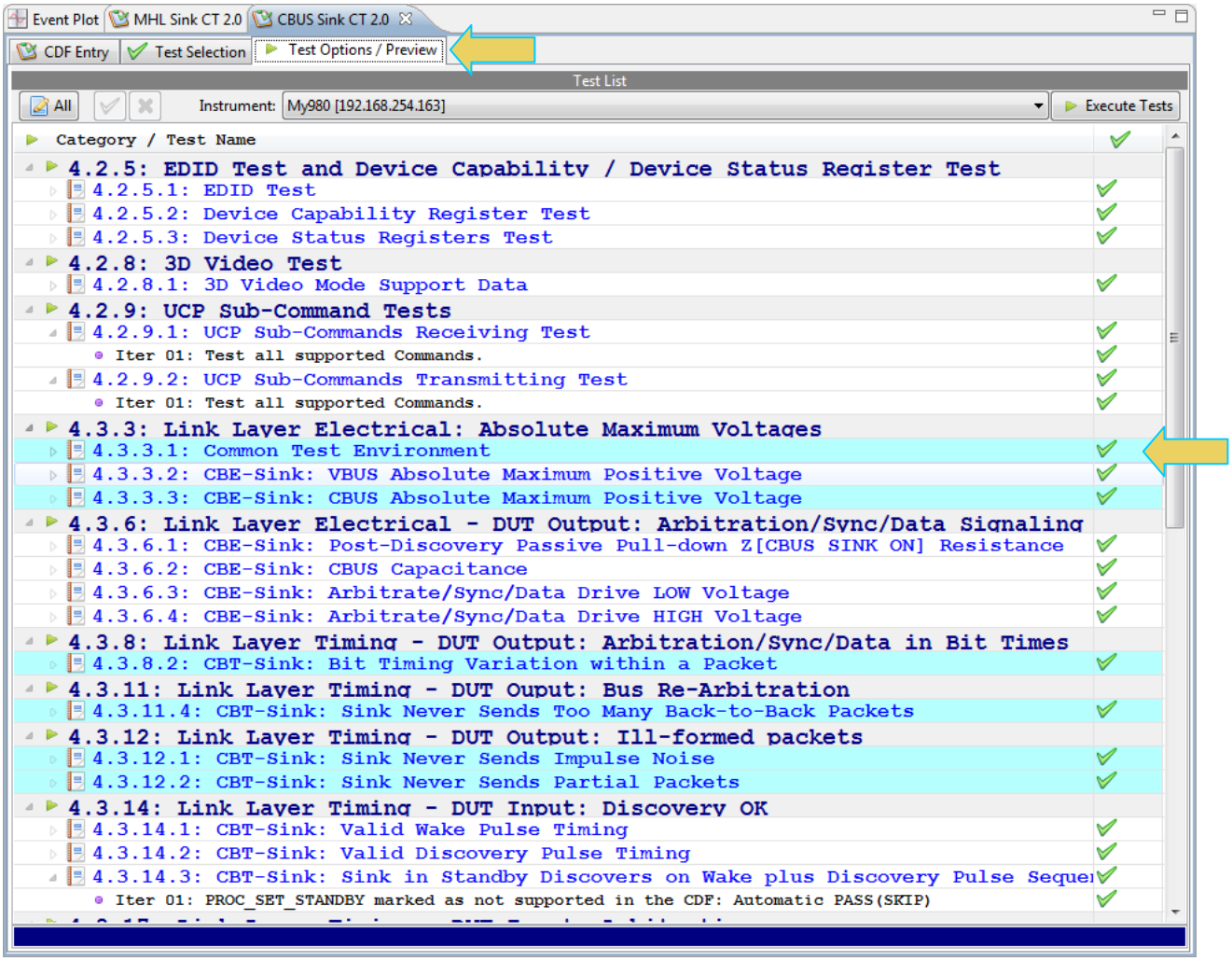
4.8 Executing the MHL CBUS Sink Compliance Tests

Use the following procedures to initiate the execution of an MHL CBUS Sink Compliance test series.

Note: The example workflows and screens use MHL 2.0 except where noted. Workflow and screens are similar for testing MHL 1.2 devices.

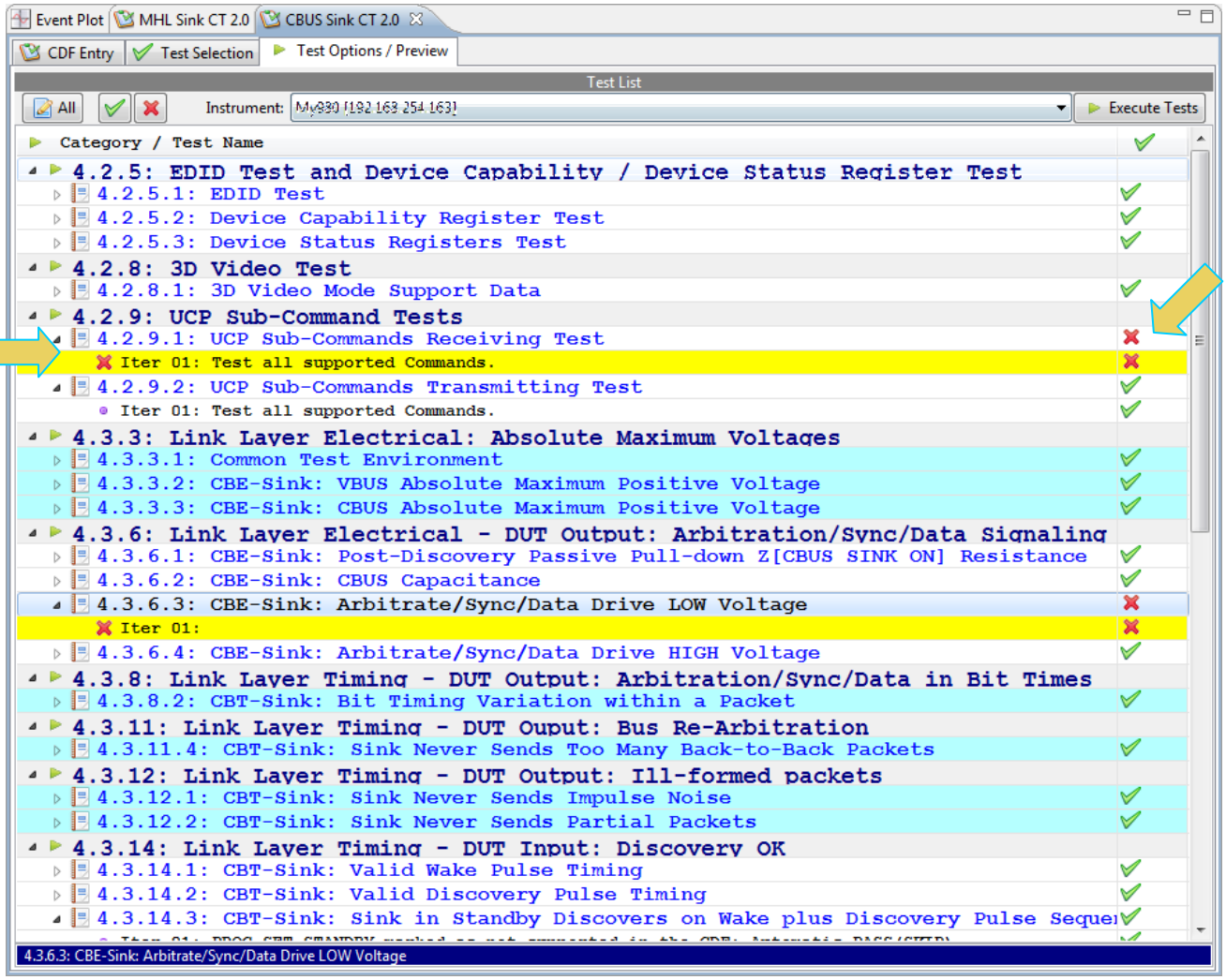
To initiate a test series:

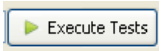
1. Select the **Test Options / Preview** panel as shown below.
   Note: The background tests are highlighted in light blue. These are tests that are run in the background during the remaining test suite. Refer to the two screen shots below.



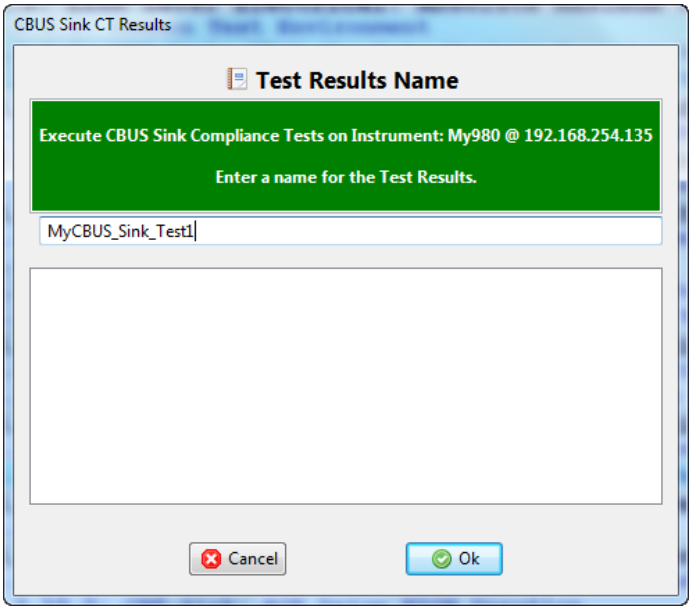
2. (Optional) Review the list of tests for each category. If you wish to skip some of the tests. You can skip tests by clicking on the Check mark on the right side of the **Test Options / Preview** panel.

   The screen shot below shows some of the tests that have been skipped (highlighted in yellow with a red X).

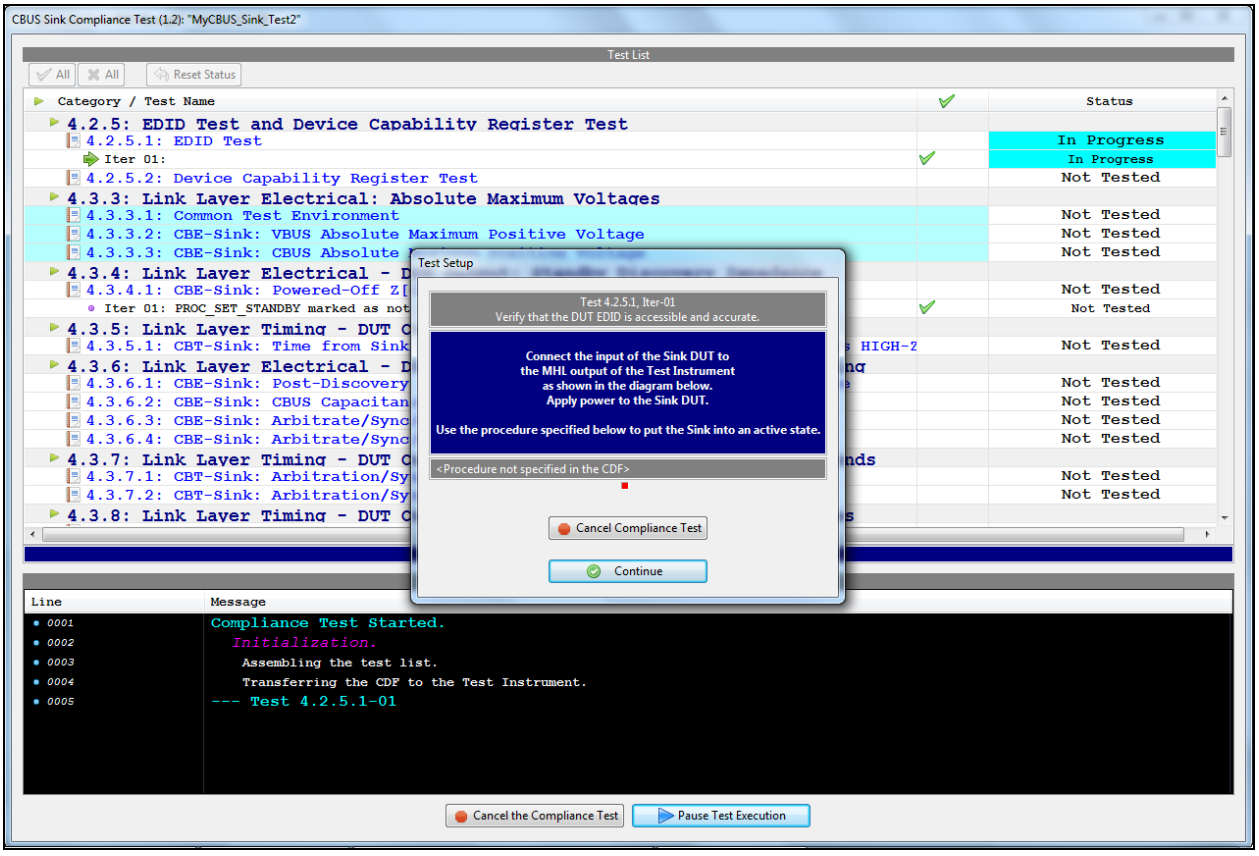


3. Click on the Execute Tests 

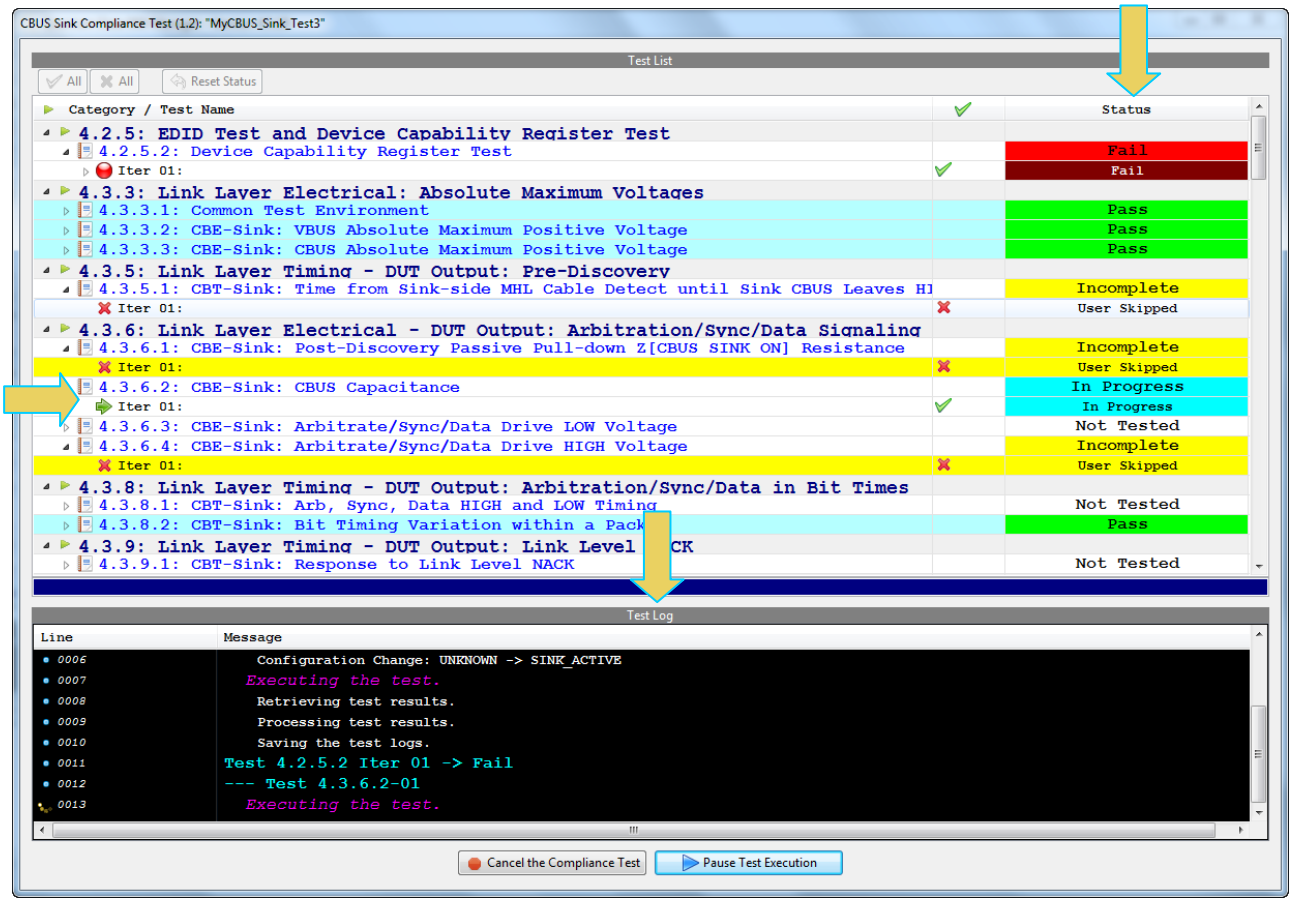
activation button to initiate the test suite. You will be prompted for a name for the tests. This dialog box is shown below.



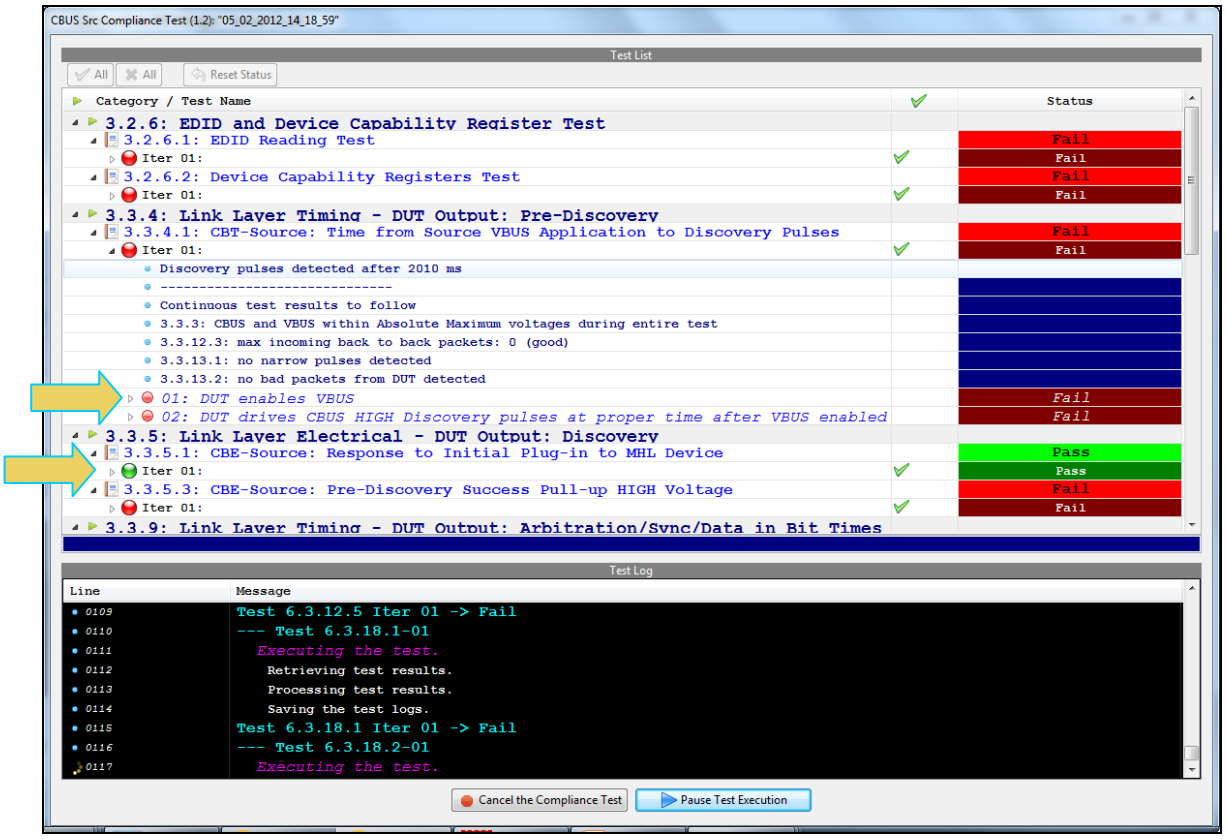
A screen will appear instructing you on how to connect your MHL CBUS sink device for testing. A sample screen is shown below:



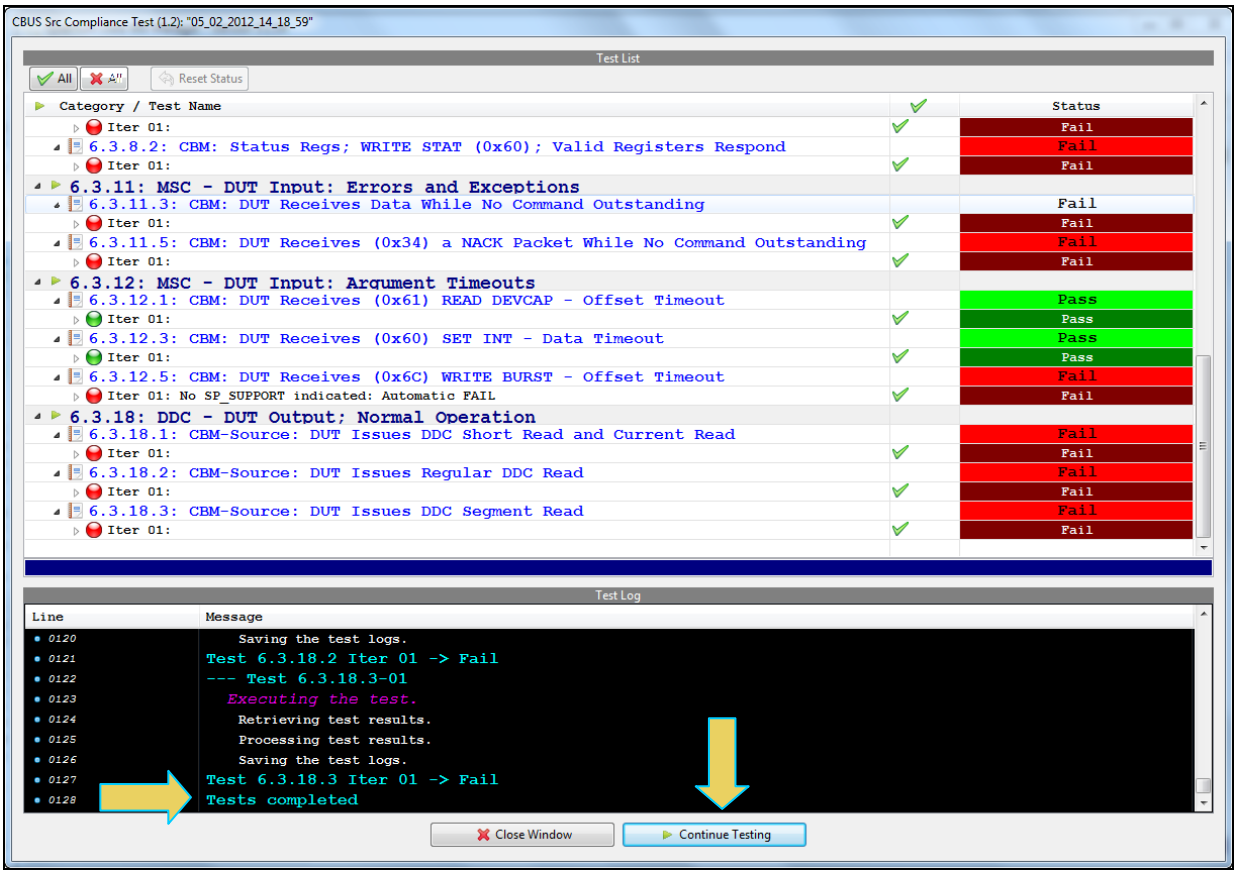
During the test, the test results are shown under the Status column. There is a progress arrow which points to the test that is currently being run. The lower panel **Test Log** shows the testing activity as it occurs. Refer to the screen examples below.



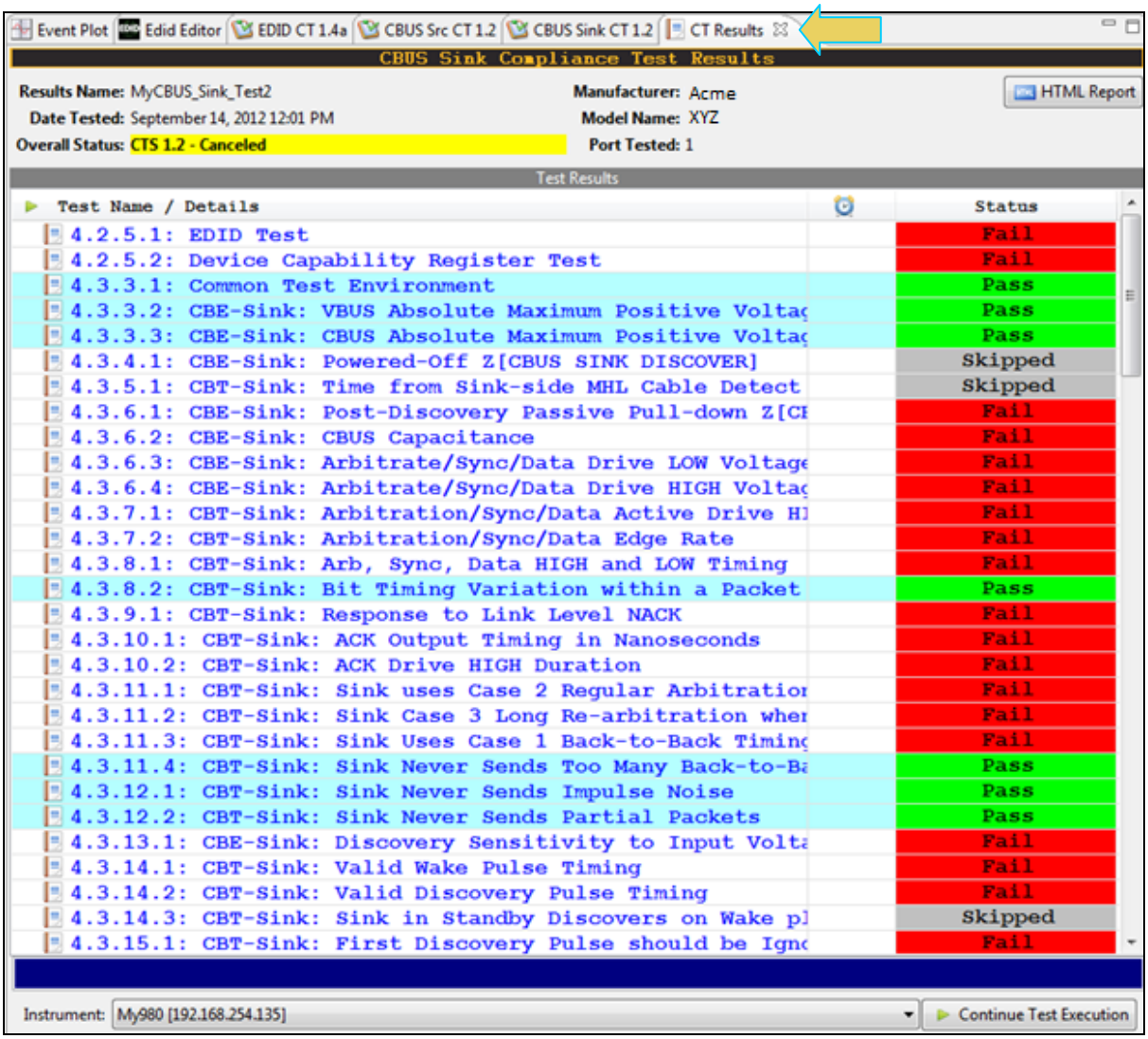
You can view the details of failures or passes when they occur by exposing the navigation arrows on the left. Examples are shown on the following screen.



The log will indicate when the tests have completed. You can cancel the compliance test or pause at any time. If you pause the test you can resume later at any time even if you exit the 980 Manager application. Refer to the following screen example.



When the tests are completed the test window that shows the current activity will close. A new tab and panel will appear next to the **CBUS Sink CT 1.2** tab called the **CT Results** tab. You can view the test results in this panel. Refer to the following screen shots to see examples of the **CT Results** panel.

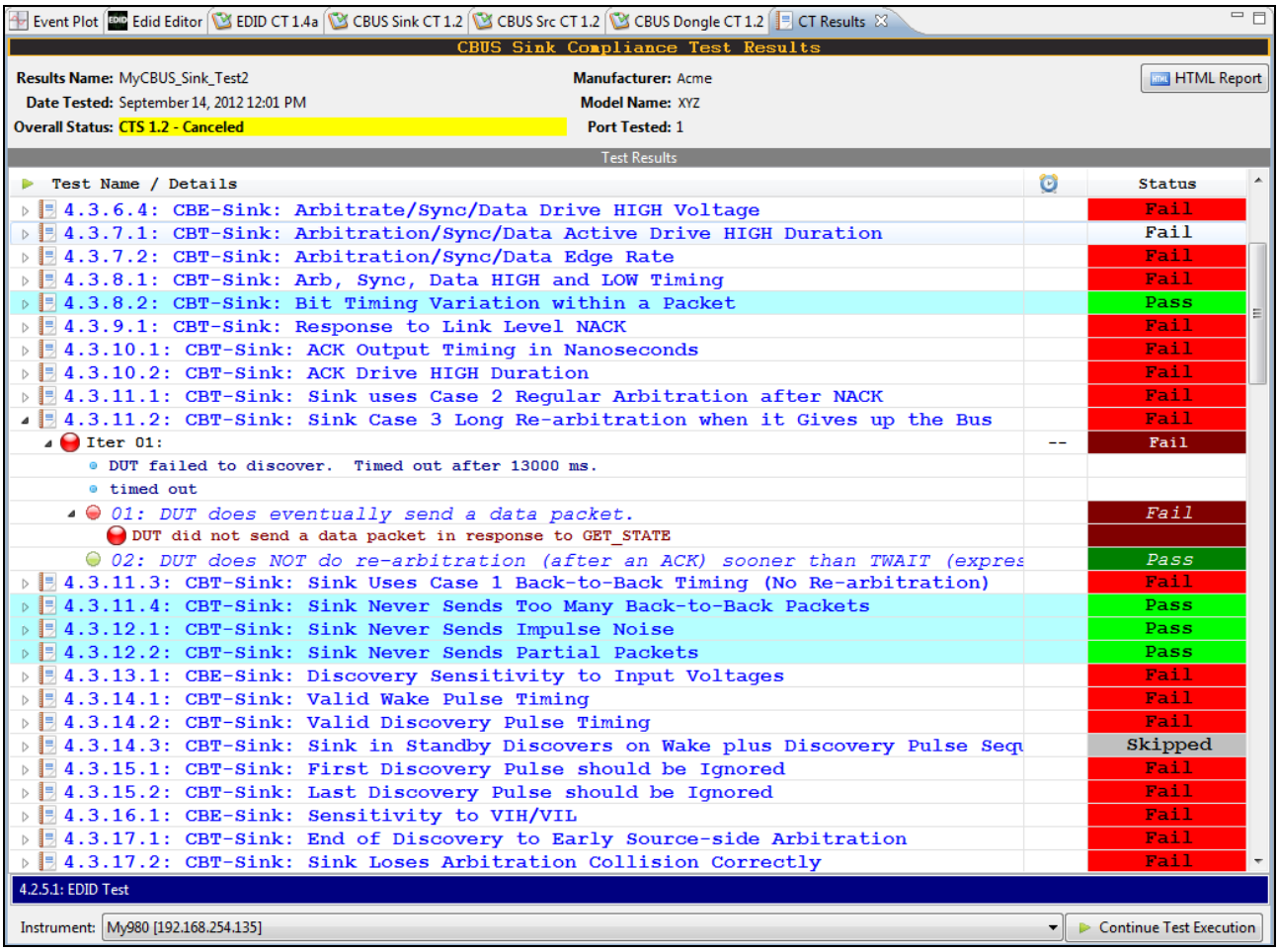


4.9 Viewing Details of Sink Compliance Test Passes or Failures

When you have completed the test series you will have an opportunity to view the detailed data for a particular failure. Use the following procedures to view the details of a test.

To view the details of each test:

1. Expose the detailed results of a failure and highlight a failure. Refer to the screen example below.

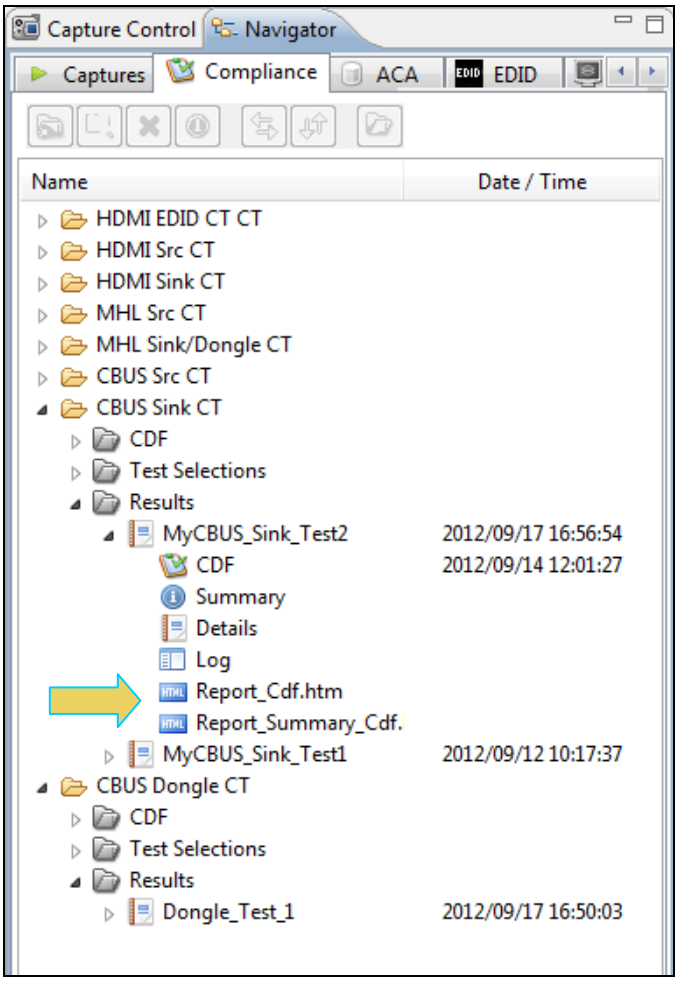


4.10 Accessing the test results through the navigator panel

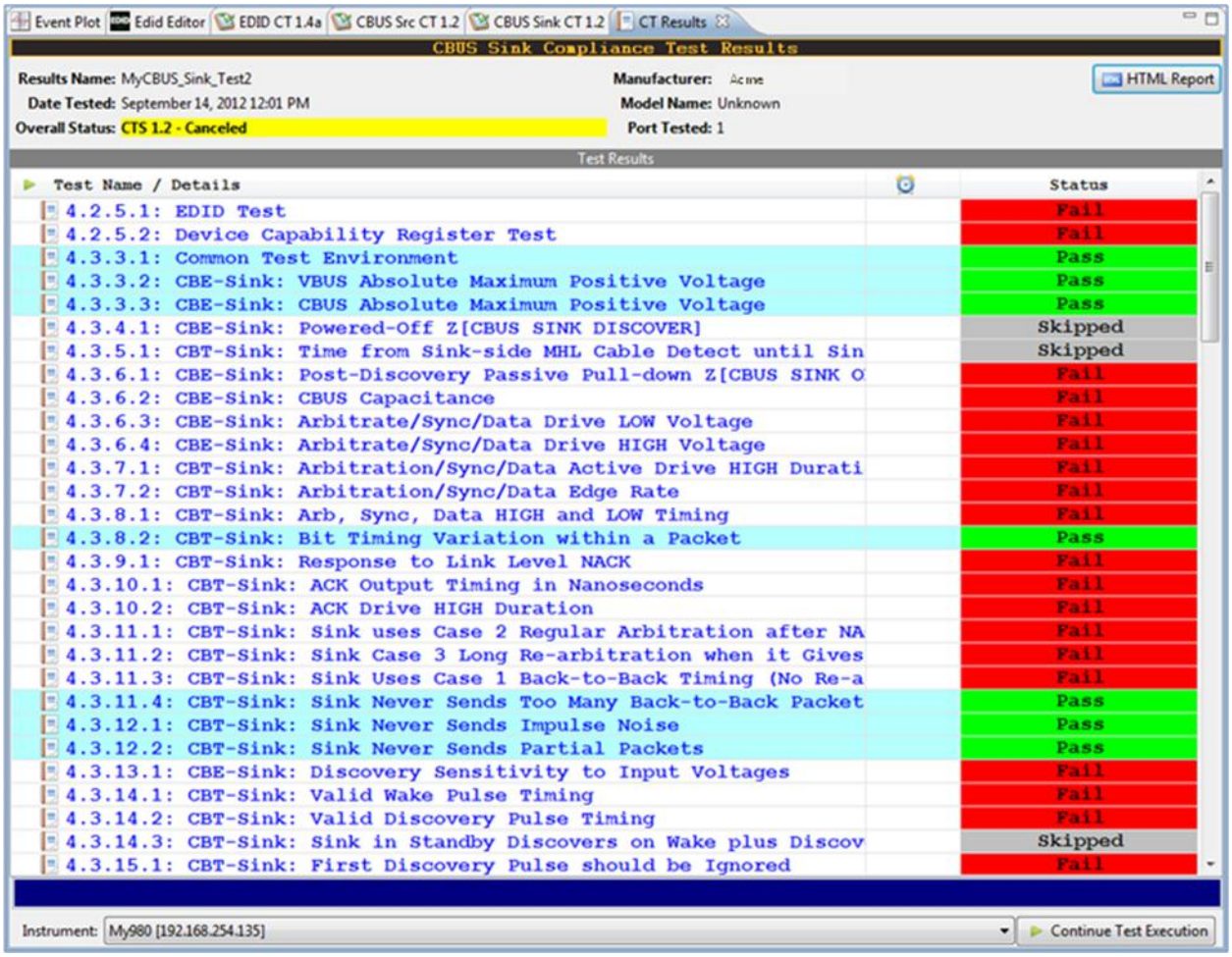
You can view the results of the tests at any time after you run them through the 980 GUI Manager's **Navigator** panel. Use the following procedures to view the details of a test.

To access the test results:

1. Access the **Navigator** tab and select **Compliance**. Refer to the screen example below.



2. Double click on the Results file you wish to view. The results will appear in a CT Results window on the right. Refer to the screen example below.

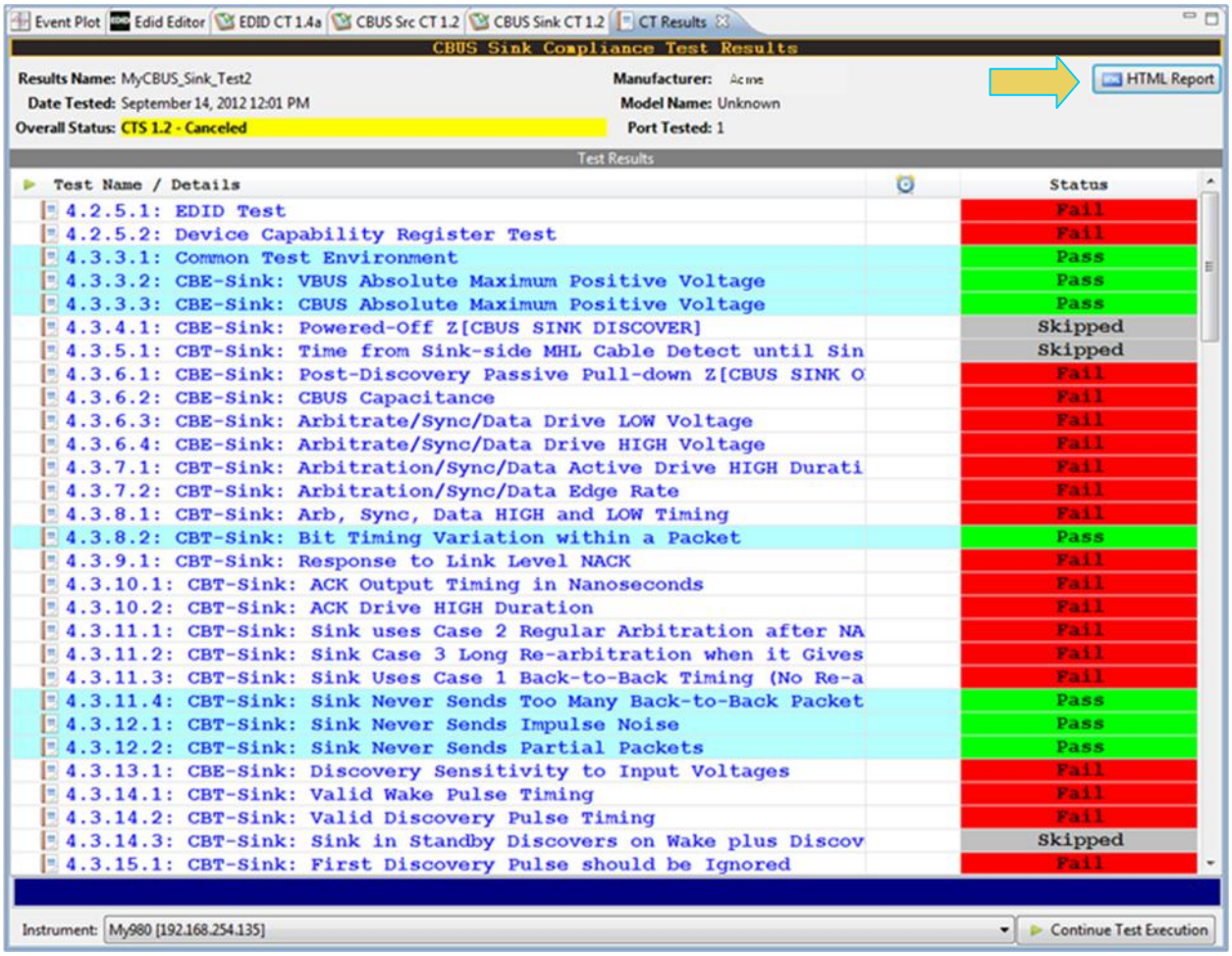


4.11 Viewing the MHL Sink Compliance HTML test report

After you have completed the tests, an HTML Report activation button will appear in the upper right of the screen which enables you to access the html report of the test results. Use the following procedures to view the html test report.

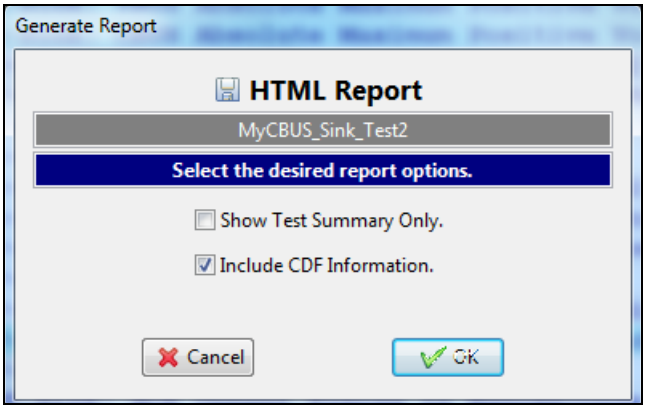
To view the html test report:

1. Select the **CT Results** panel as shown below.



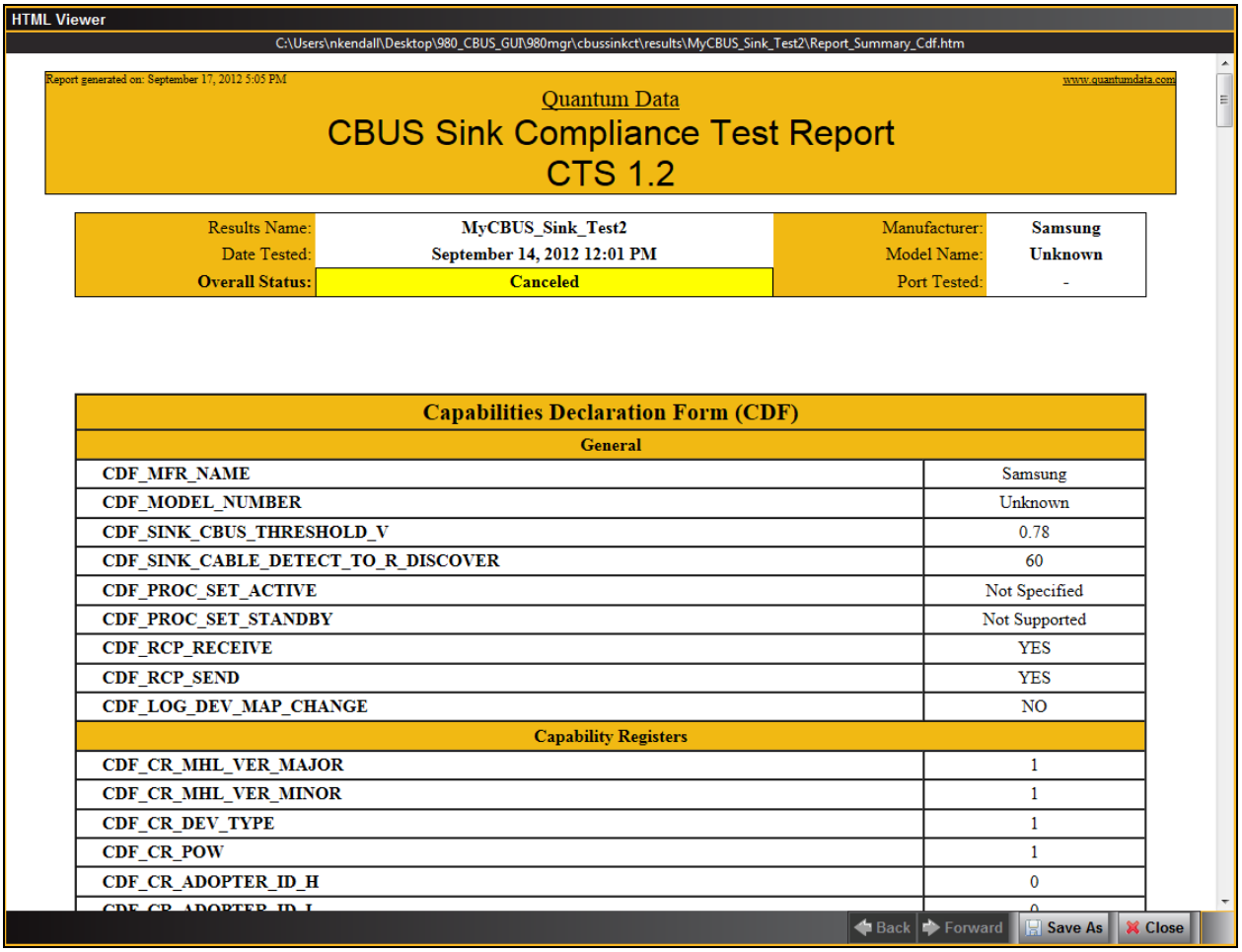
2. Click on the **HTML Report** activation button.

   A dialog box will appear asking if you want a summary of the test results or a version that includes the CDF. This dialog box is shown in the screen shot below.

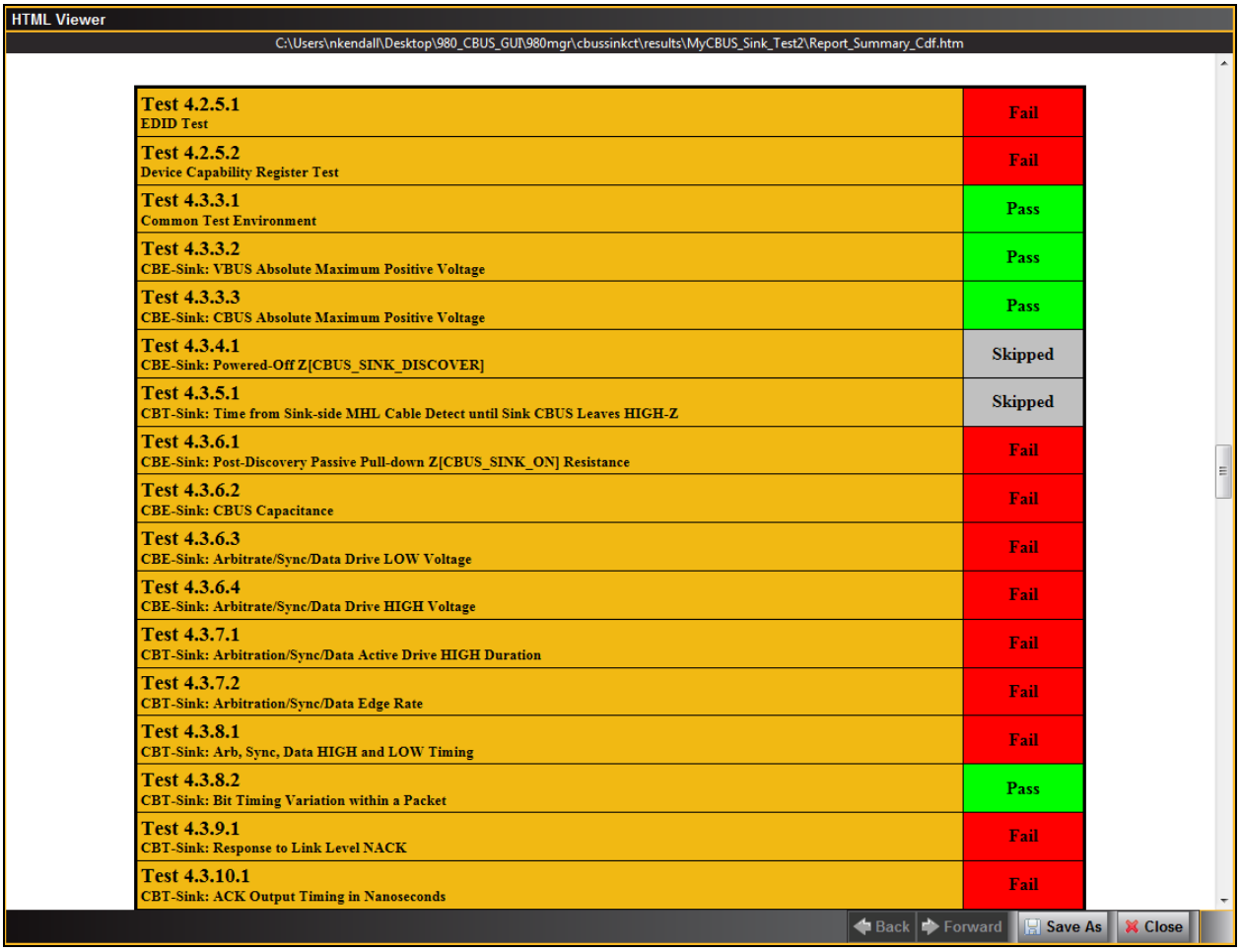


Specify if you want to see a summary report and if you want to see the CDF. If you leave Show Test Summary Only unchecked the application will produce a full detailed report. The following screens provide samples of the report.

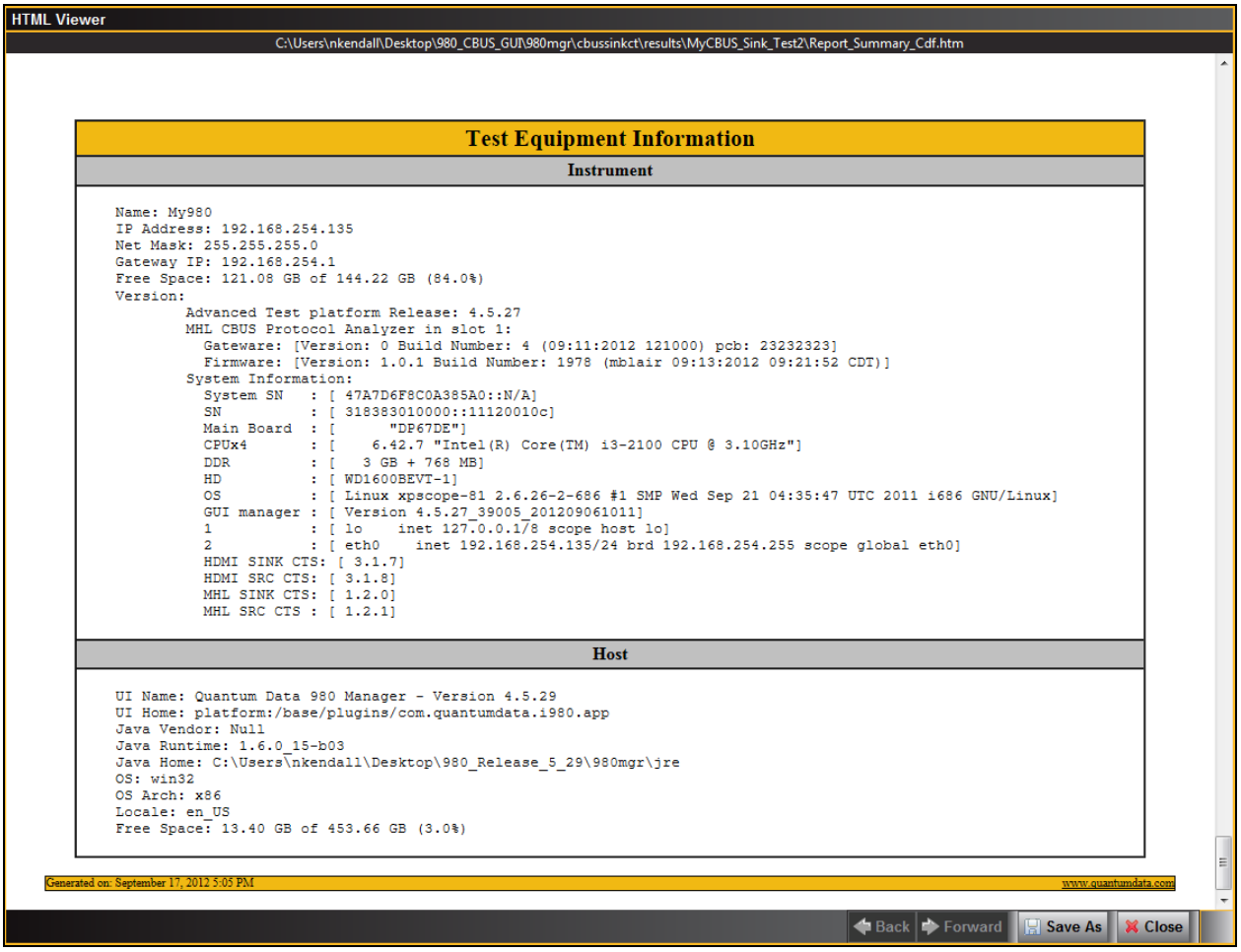
Note: This example shows an MHL 1.2 test result; MHL 2.0 test results are similar in content and structure.



The CDF is shown below:



The final page of the report shows the test equipment configuration as shown below.



4.12 CBUS Log Plot

The **CBUS Log Plot** panel (shown below) is panel used for viewing the bit and byte timing events of the CBUS controls and commands that occurred during a specific test. A **CBUS Log Plot** is provided for each source CBUS compliance test. The panel has both a graphical depiction of CBUS timing events and a sequential table list out of each event. The vertical axis shows the various CBUS event types. The **CBUS Log Plot** panel provides a set of CBUS event types labeled on the left that indicate the type of event. The horizontal axis is time.

The **CBUS Log Plot** is useful diagnosing CBUS compliance test failures.

The example below shows a series of events captured during a source test.

For more detailed information about the **CBUS Log Plot**, please refer to CBUS Log Plot.

5 MHL CBUS Dongle Compliance Tests

This chapter describes how to run the MHL CBUS dongle compliance tests. Please note you will have to purchase the optional 980 MHL CBUS Compliance Test module in order to run these tests.

The 980 MHL CBUS Compliance test module supports the test sections listed below in the MHL 1.2 and 2.0 Compliance Test specification. ***Please note that some non-CBUS compliance tests are also covered by the 980 MHL CBUS Compliance Test module***.

5.1 System Test – Section 5.2

- 5.2.5.1 EDID Test
- 5.2.5.2 Device Capability Register Test
- 5.2.6 RCP Sub-command Tests
- 5.2.8.1 3D Video Mode Support Data (MHL 2.0)
- 5.2.9 UCP Sub-Commands Tests (MHL 2.0)

5.2 CBUS Tests – Section 5.3

- 5.3.1 CBUS Dongle DUT Common Test Equipment Setups
- 5.3.2 CBUS Dongle DUT Common Required Methodologies
- 5.3.3 Link Layer Electrical – Dongle Absolute Maximum Voltages
- 5.3.4 Link Layer Electrical – Dongle DUT Output: Standby Discovery Impedance
- 5.3.5 Link Layer Timing – Dongle DUT Output: Pre-Discovery
- 5.3.6 Link Layer Electrical – Dongle DUT Output: Arbitration/Sync/Data Signaling
- 5.3.7 Link Layer Timing – Dongle DUT Output: Arbitration/Sync/Data in Nanoseconds
- 5.3.8 Link Layer Timing – Dongle DUT Output: Arbitration/Sync/Data in Bit Times
- 5.3.9 Link Layer Timing – Dongle DUT Output: Link Level NACK
- 5.3.10 Link Layer Timing – Dongle DUT Output: Link Level ACK
- 5.3.11 Link Layer Timing – Dongle DUT Output: Bus Re-Arbitration
- 5.3.12 Link Layer Timing – Dongle DUT Output: Ill-formed packets
- 5.3.13 Link Layer Electrical – Dongle DUT Input: Discovery
- 5.3.14 Link Layer Timing – Dongle DUT Input: Discovery OK
- 5.3.15 Link Layer Timing – Dongle DUT Input: Discovery Reject
- 5.3.16 Link Layer Electrical – Sink DUT Input: Arbitration/Sync/Data Signaling
- 5.3.17 Link Layer Timing – Sink DUT Input: Arbitration
- 5.3.18 Link Layer Timing – Sink DUT Input: Data
- 5.3.19 Link Layer Timing – Sink DUT Input: NACK
- 5.3.20 Link Layer Timing – Dongle DUT Input: ACK
- 5.3.21 Link Layer Timing – Dongle DUT Input: Bus Re-Arbitration
- 5.3.22 Link Layer Timing – Sink DUT Input: Ill-formed Packets

- 5.3.23 Link Layer Timing – Sink DUT Input: Disconnect
- 5.3.24 Link Layer Electrical – Sink DUT VBUS Output
- 5.3.25 Link Layer Timing – Sink DUT VBUS Turn On Transition

5.3 CBUS Common Tests – Section 6.3

- 6.3.1 MSC – Source and Sink DUT Input: Device Register Space Contents; Reads
- 6.3.2 MSC – Source and Sink DUT Output: NACK Packet Response to MSC_MSG
- 6.3.3 MSC – Source and Sink DUT Output: Never Initiates Bad Commands
- 6.3.5 MSC – Source and Sink DUT Output: Errors and Exceptions
- 6.3.6 MSC – Source and Sink DUT Input: Device Register Space Contents; Writes
- 6.3.7 MSC – Source and Sink DUT Input: Vendor Specific and Reserved Header Values
- 6.3.8 MSC – Source and Sink DUT Input: Device Register Space Contents; Writes
- 6.3.9 MSC – Source and Sink DUT Input: Vendor-specific and Reserved Header Values
- 6.3.10 MSC – Source and Sink DUT Input: Normal Commands
- 6.3.11 MSC – Source and Sink DUT Input: Errors and Exceptions
- 6.3.12 MSC – Source and Sink DUT Input: Argument Timeouts
- 6.3.15 MSC – Sink DUT Output: Normal Commands
- 6.3.16 MSC – Sink DUT Input: Errors and Exceptions
- 6.3.20 DDC – Sink DUT Input; Continuous Monitors and Normal Operation
- 6.3.21 DDC – Sink DUT Input; Normal Operation
- 6.3.22 DDC – Sink DUT Input; Illegal Responses

5.4 Workflow for running the MHL CBUS Dongle Compliance Tests

The list below is the high level workflow for running the MHL CBUS Dongle Compliance Tests. Note that the installation of the external 980 GUI Manager and the Ethernet session are optional; you can run the compliance tests through the embedded GUI Manager.

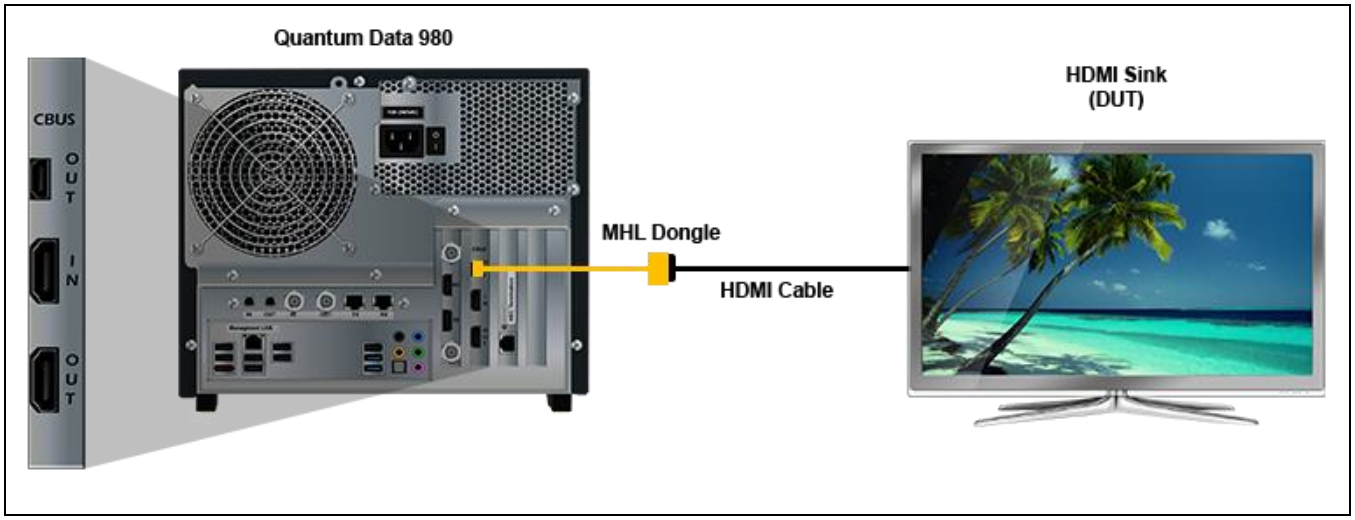
1. Power up the 980. Refer to the procedures in Getting Started.

   Note: The power switch in the front is used when you are turning off the 980 for a short period of time. For extended periods of off time, it is best to power the 980 down by first using the power button on the front and then the rocker switch on the back.

2. (Optional; only necessary if using the external 980 GUI Manager) Establish an Ethernet/IP connection between the external 980 GUI Manager and the 980.
3. Connect the MHL dongle device under test to the CBUS MHL Out (MHL micro USB) port on the 980 MHL CBUS Compliance Test module.
4. Complete a (or load an existing) Capabilities Declaration Form (CDF) for the device under test using the **CDF Entry** panel.
5. Select the tests that you wish to run from the **Test Selection** panel.
6. Initiate the tests through the **Test Options / Review** panel.
7. View the detailed data for test failures if failures occur.
8. View the results in the **Test Results** panel under the **Navigator** panel.

5.5 Making the physical MHL connections

This subsection describes the physical MHL connections required to run the MHL CBUS dongle compliance tests.



To make the physical MHL connections:

This procedure assumes that you have assembled the 980 with the MHL CBUS Compliance Test module and the MHL dongle device under test and applied power to all these devices. Refer to the procedures below and the diagram above.

1. Connect your MHL dongle device under test to the top most OUT connector (MHL micro USB) on the 980 MHL CBUS Compliance Test module as shown in the figure above. Use the cable connected to the dongle.
2. Connect your HDMI sink device to the MHL dongle using a standard HDMI cable.

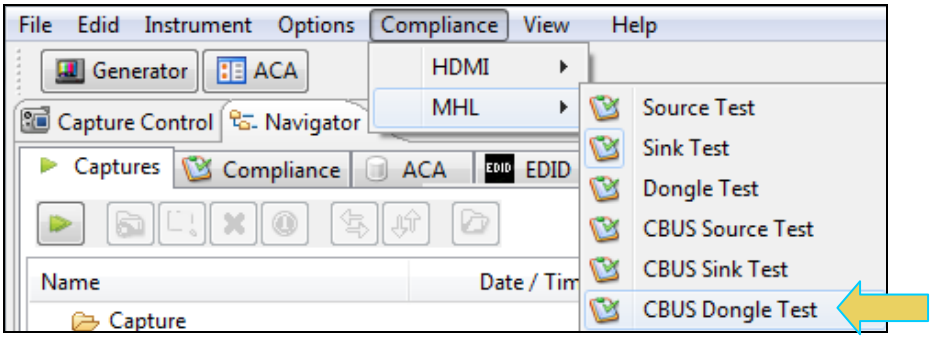
5.6 Completing the CDF

Use the following procedures to complete the CDF for the MHL CBUS dongle compliance tests.

Note: The workflow screen examples in this section show MHL 2.0 except where noted. MHL 1.2 workflow and screens are similar.

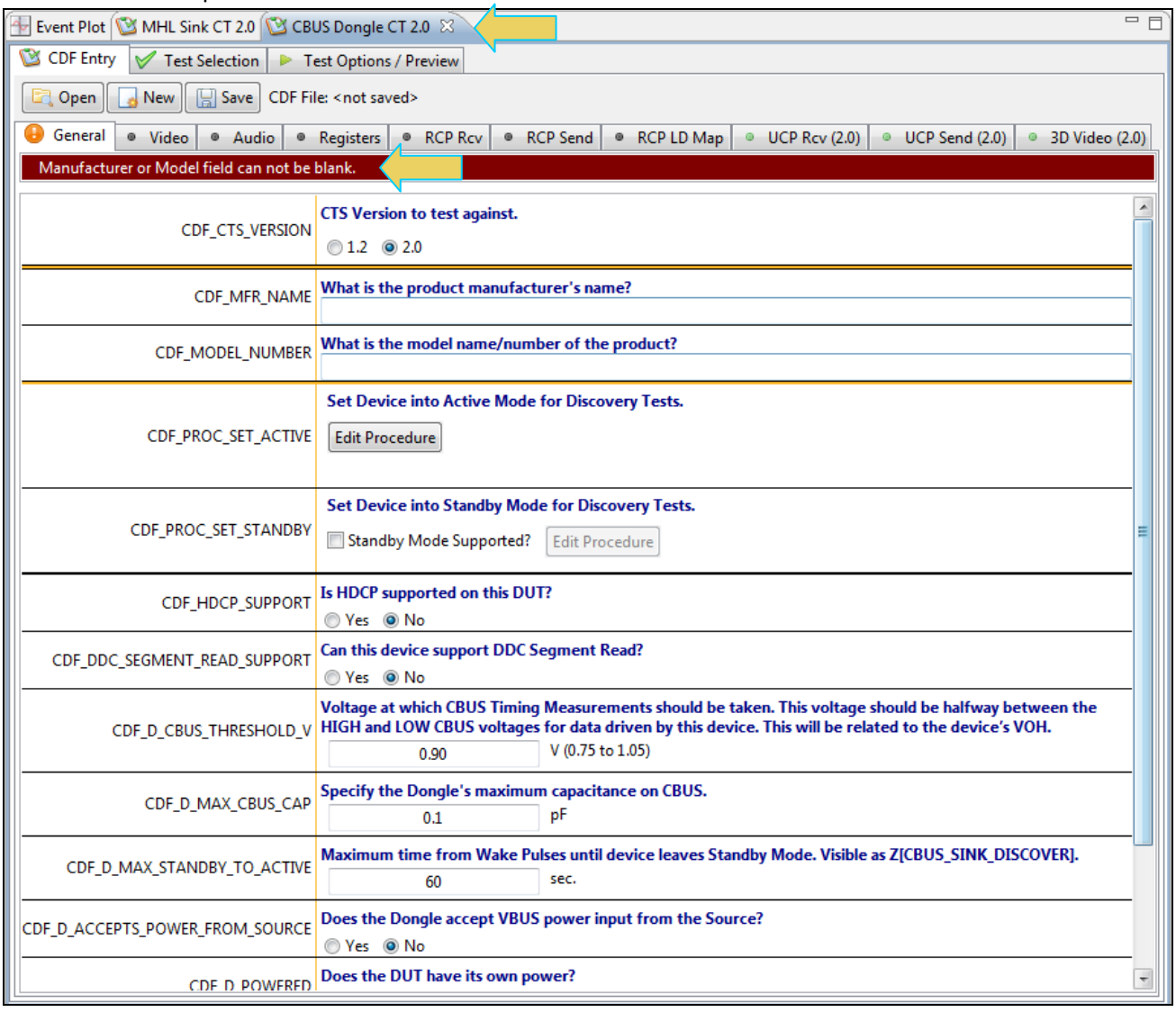
To complete the CDF:

1. From the **View** menu, enable viewing of the **MHL CBUS Dongle CT** panel.



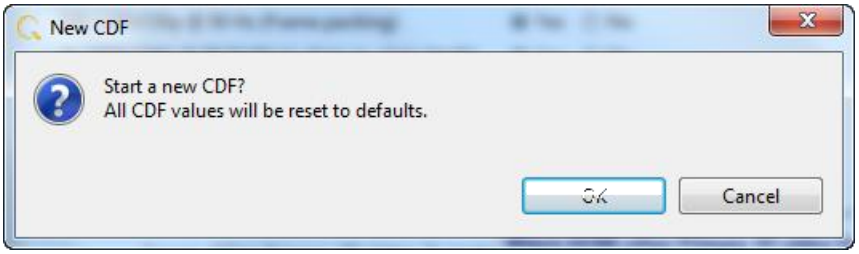
2. Select the **CDF Entry** panel as shown below.

   Note: A read status message will appear indicating if you have not completed all the essential fields. This is shown in the example below.



3. To create a new CDF, click on the **New** activation button.

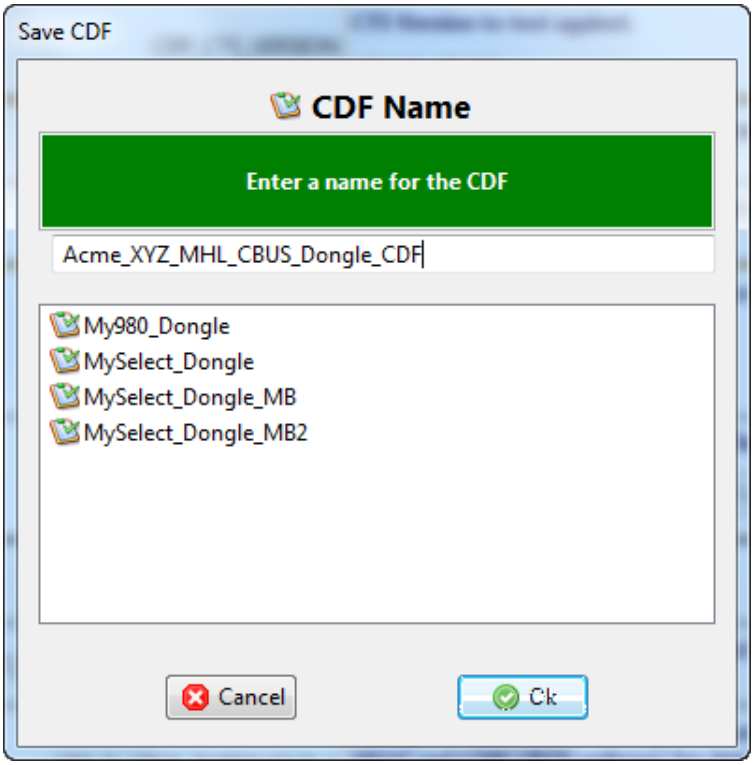
You will be prompted with a confirmation that you want to start a new CDF and reset the values. Click **OK** to proceed.



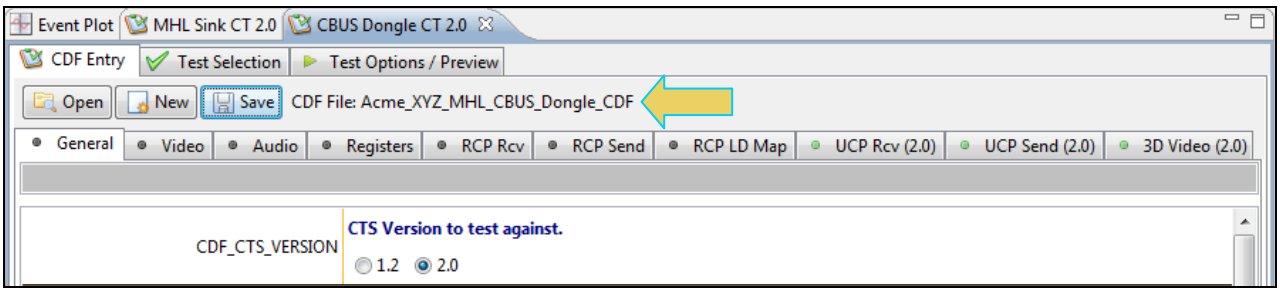
4. To open an existing CDF, click on the **Open** activation button.

   You will be prompted with a dialog box that enables you to open a CDF. Select a CDF and then **OK** to proceed.

   Note: You can save these CDFs to your PC for use on other PCs and by other colleagues.

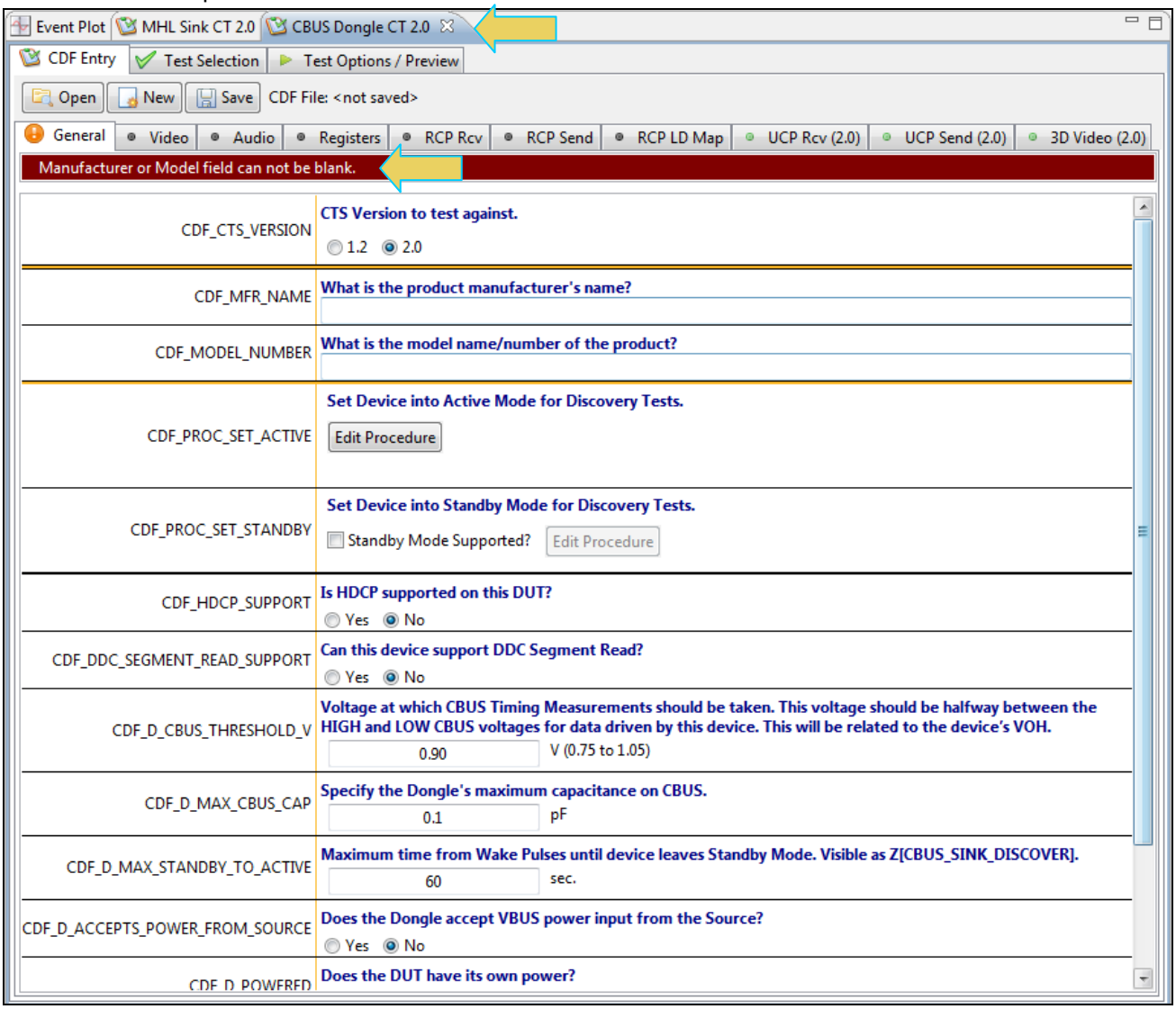


After you open an existing CDF or save it the name will appear beside the **Save** activation button as shown below:

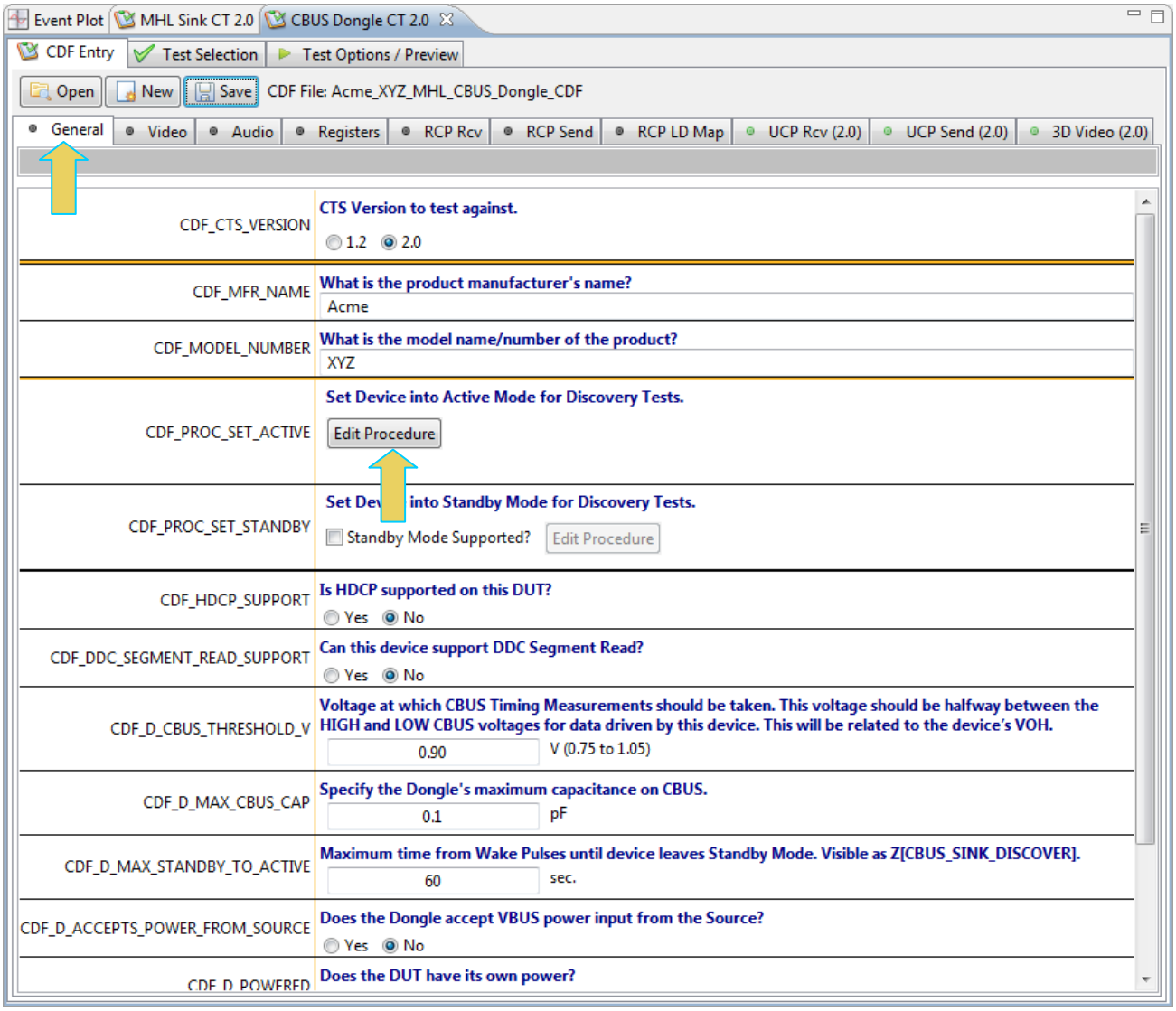


5. Complete the items in the **General** tab of the CDF Entry panel shown below. Note that you will have to complete the essential fields in order to proceed.

6. **Note**: A read status message will appear indicating if you have not completed all the essential fields. This is shown in the example below.

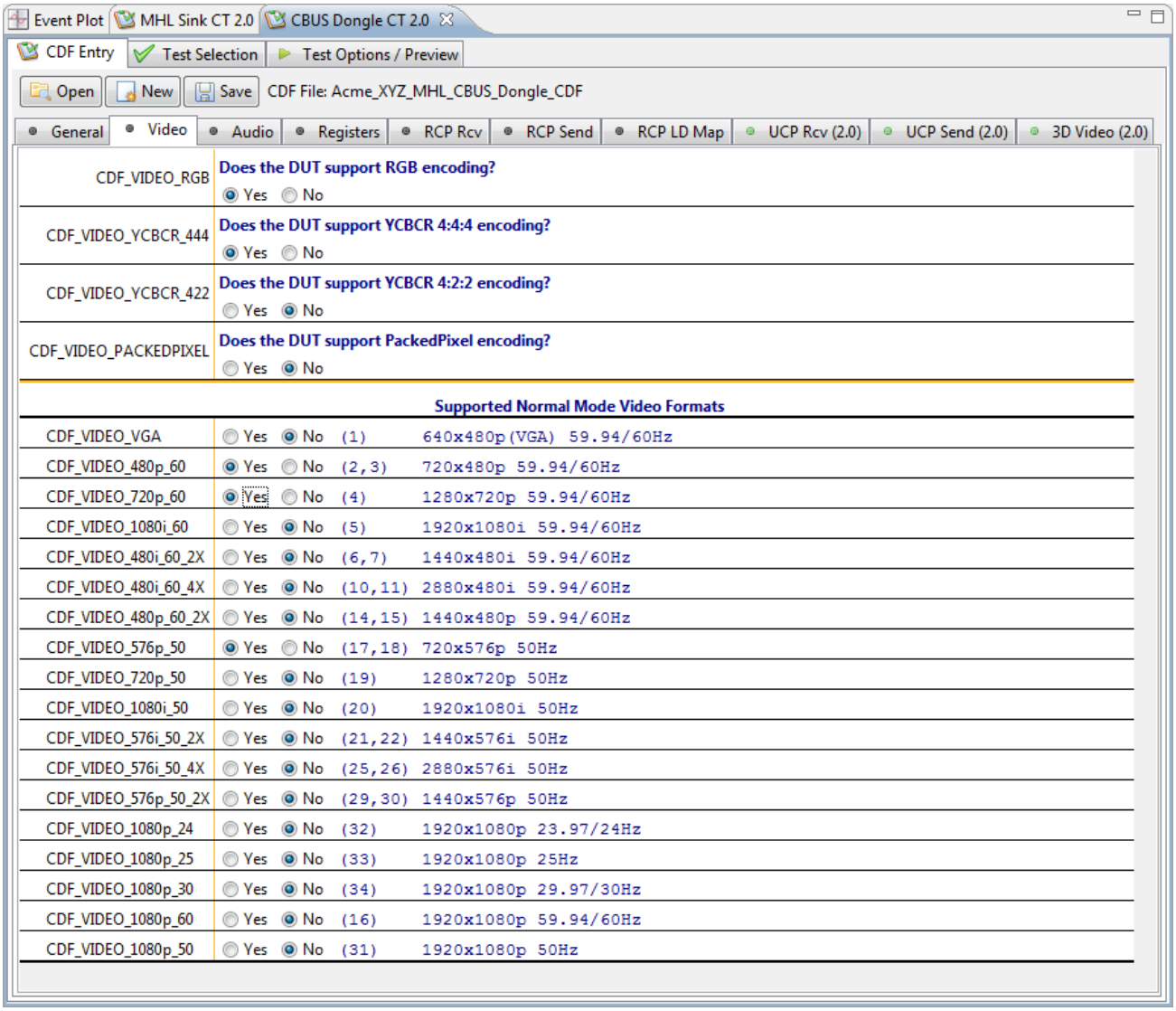


When you have entered in all the required fields the error indication will go away as shown in the example below.

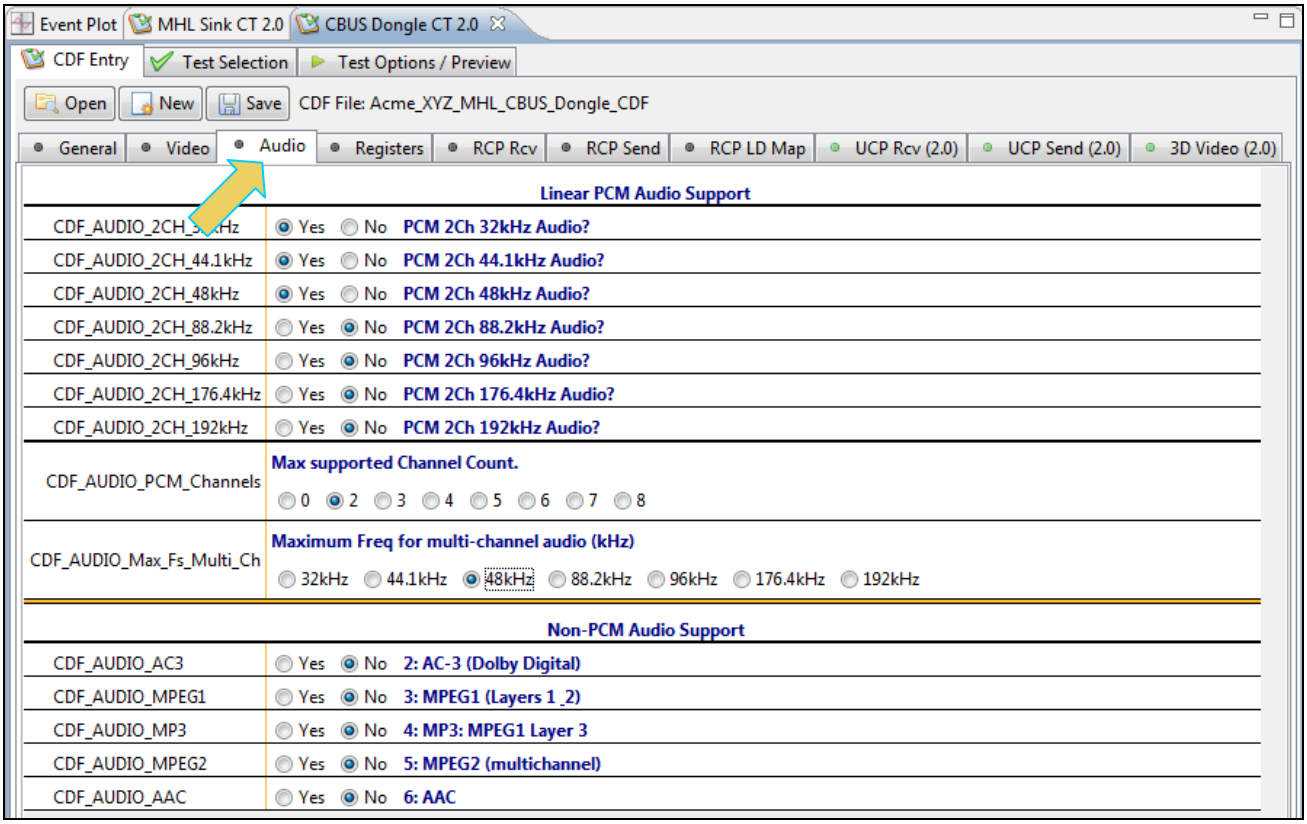


You can enter helpful information using the “Edit Procedure” dialog box to instruct a test engineer how to put the device in the proper mode. The information entered into this dialog box will appear during the test.

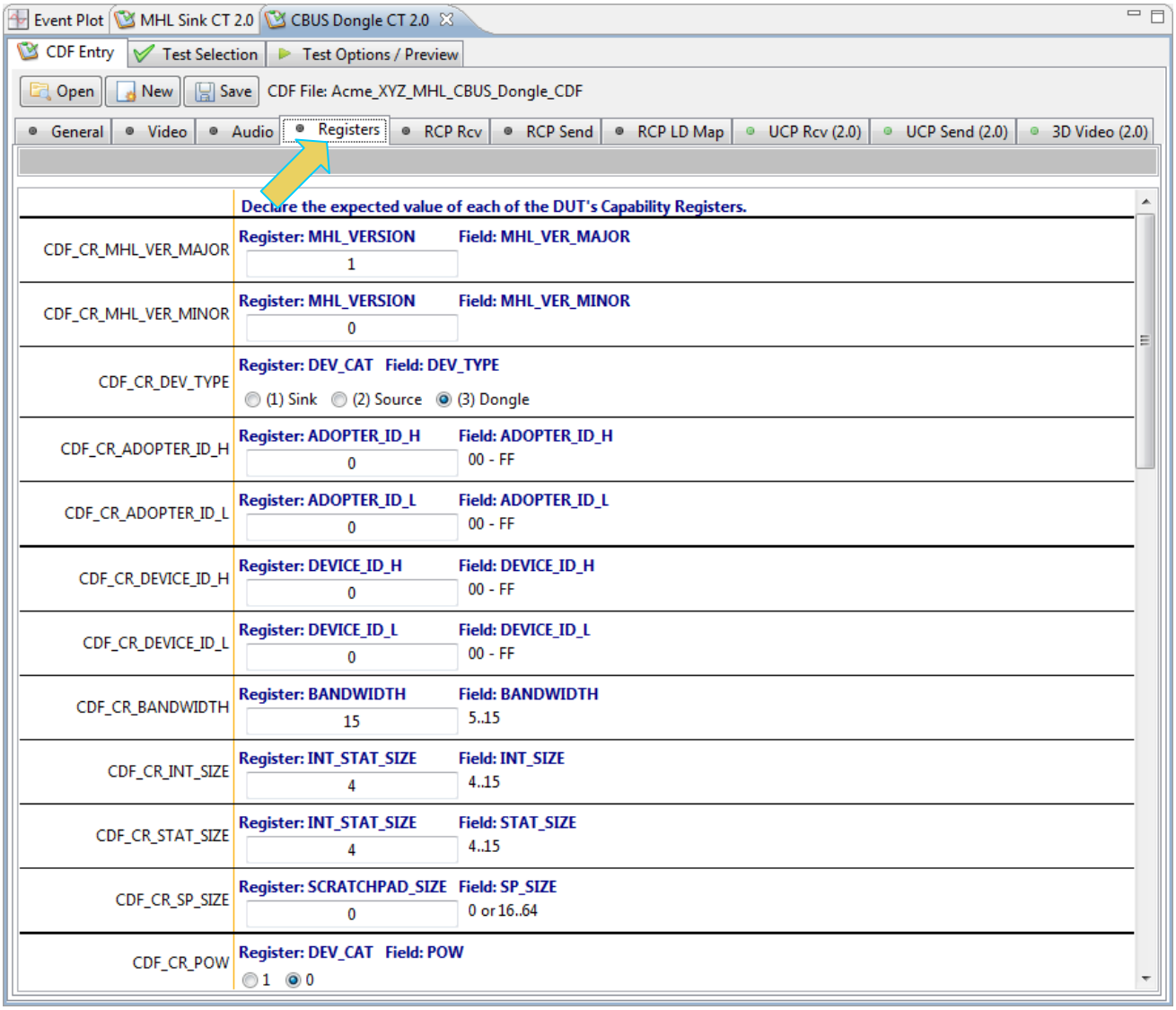
7. Complete the items in the **Video** tab.



8. Complete the items in the **Audio** tab.

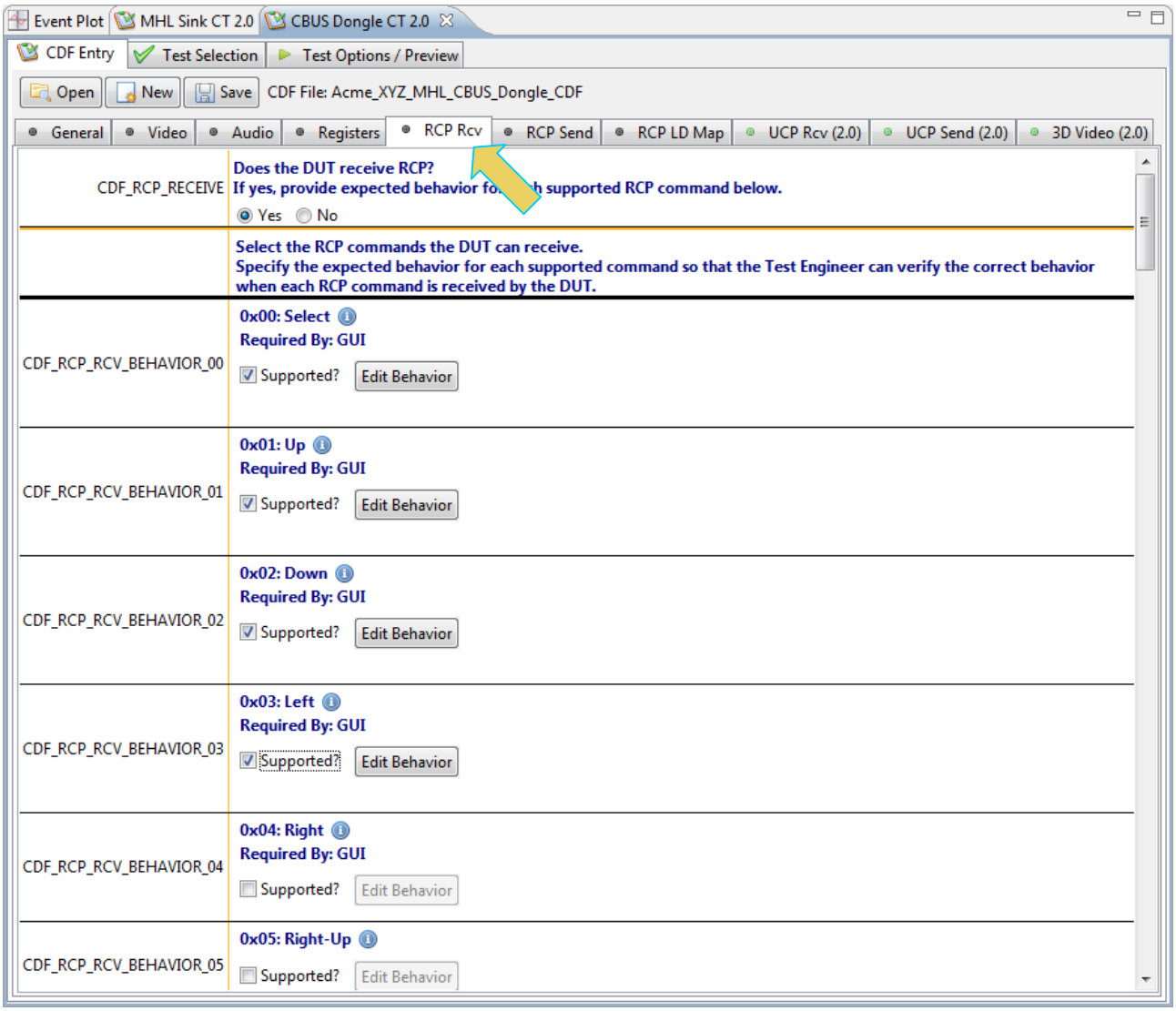


9. Complete the items in the **Registers** tab.



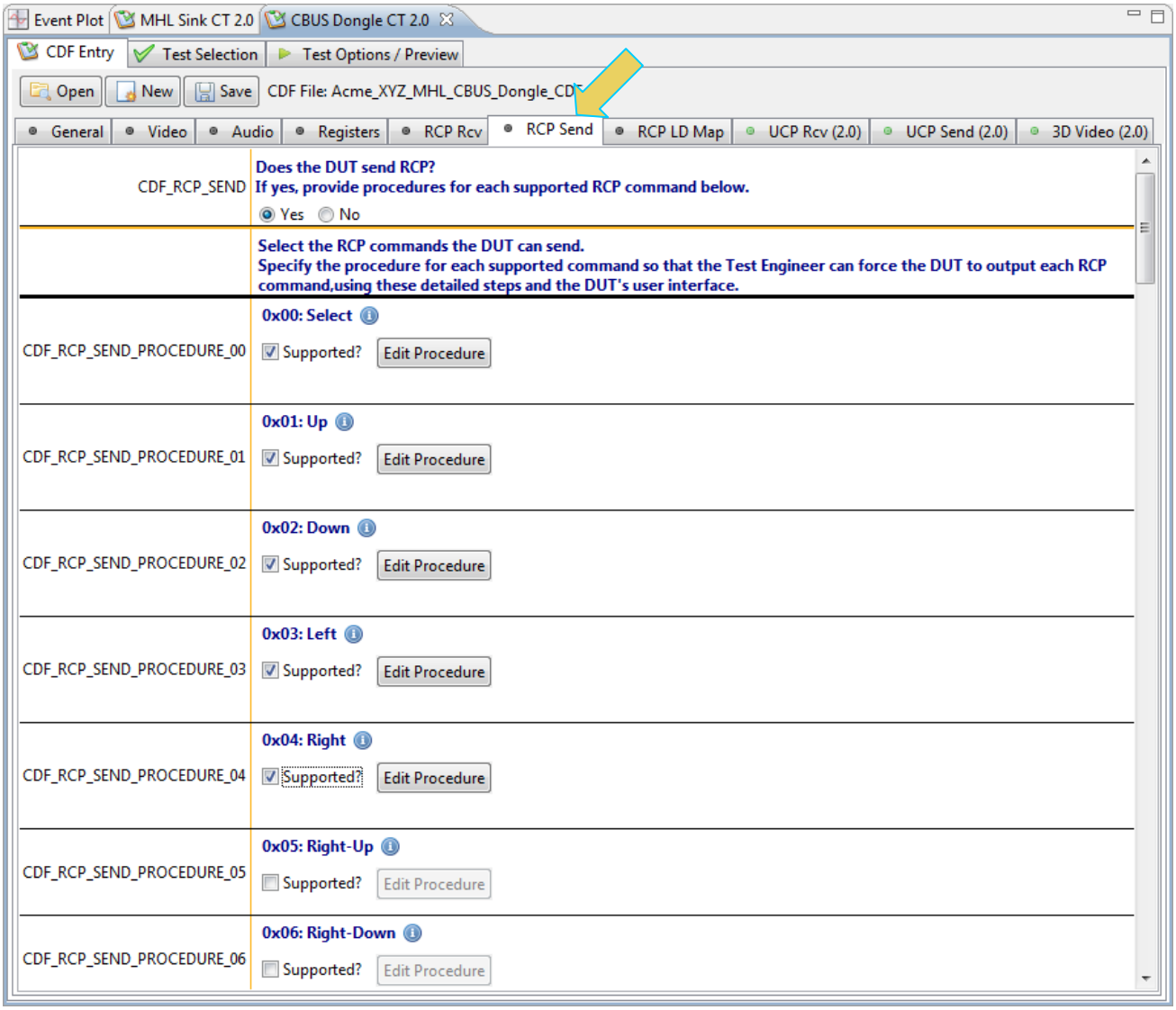
10. Complete the items in the **RCP Rcv** tab.

    You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will help a test engineer determine if the device behaves properly when the various RCP commands are received.



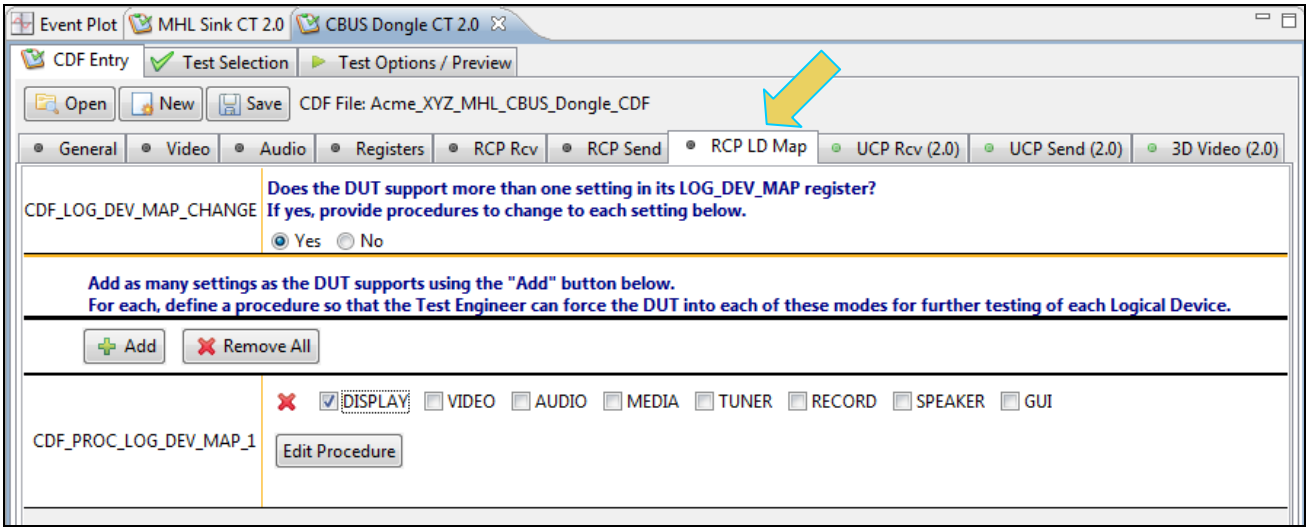
11. Complete the items in the **RCP Send** tab.

    You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test and can be helpful to instruct a test engineer on how to set up a device in order to run a particular test. In the example below you would enter in procedural information which a test engineer could use to cause the dongle to issue the various RCP commands.


Event Plot
MHL Sink CT 2.0
CBUS Dongle CT 2.0
CDF Entry
Test Selection
Test Options / Preview
Open
New
Save
CDF File: Acme_XYZ_MHL_CBUS_Dongle_CD
General
Video
Audio
Registers
RCP Rcv
RCP Send
RCP LD Map
UCP Rcv (2.0)
UCP Send (2.0)
3D Video (2.0)
CDF_RCP_SEND
Does the DUT send RCP?
If yes, provide procedures for each supported RCP command below.
Yes
No
Select the RCP commands the DUT can send.
Specify the procedure for each supported command so that the Test Engineer can force the DUT to output each RCP command,using these detailed steps and the DUT's user interface.
CDF_RCP_SEND_PROCEDURE_00
0x00: Select
Supported?
Edit Procedure
CDF_RCP_SEND_PROCEDURE_01
0x01: Up
Supported?
Edit Procedure
CDF_RCP_SEND_PROCEDURE_02
0x02: Down
Supported?
Edit Procedure
CDF_RCP_SEND_PROCEDURE_03
0x03: Left
Supported?
Edit Procedure
CDF_RCP_SEND_PROCEDURE_04
0x04: Right
Supported?
Edit Procedure
CDF_RCP_SEND_PROCEDURE_05
0x05: Right-Up
Supported?
Edit Procedure
CDF_RCP_SEND_PROCEDURE_06
0x06: Right-Down
Supported?
Edit Procedure

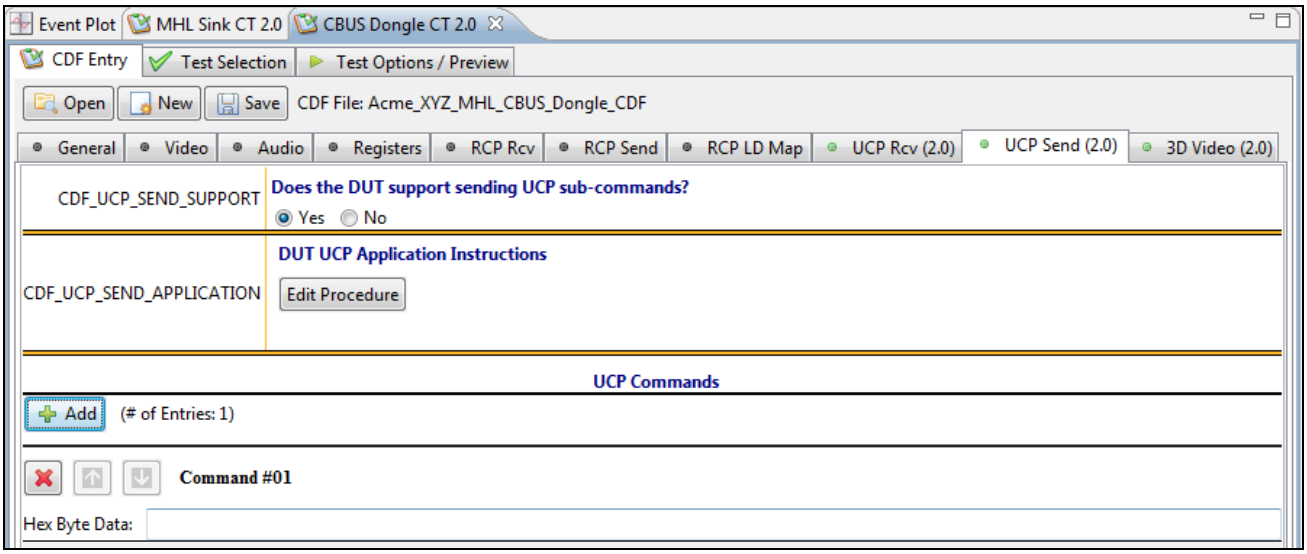
12. Complete the items in the **RCP LD Map** tab.

    You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test to assist the test engineer. In the example below you would enter in procedural information which a test engineer could use to force the dongle into the proper mode for further testing of each logical device.



13. Complete the items in the **UCP Rcv** tab.

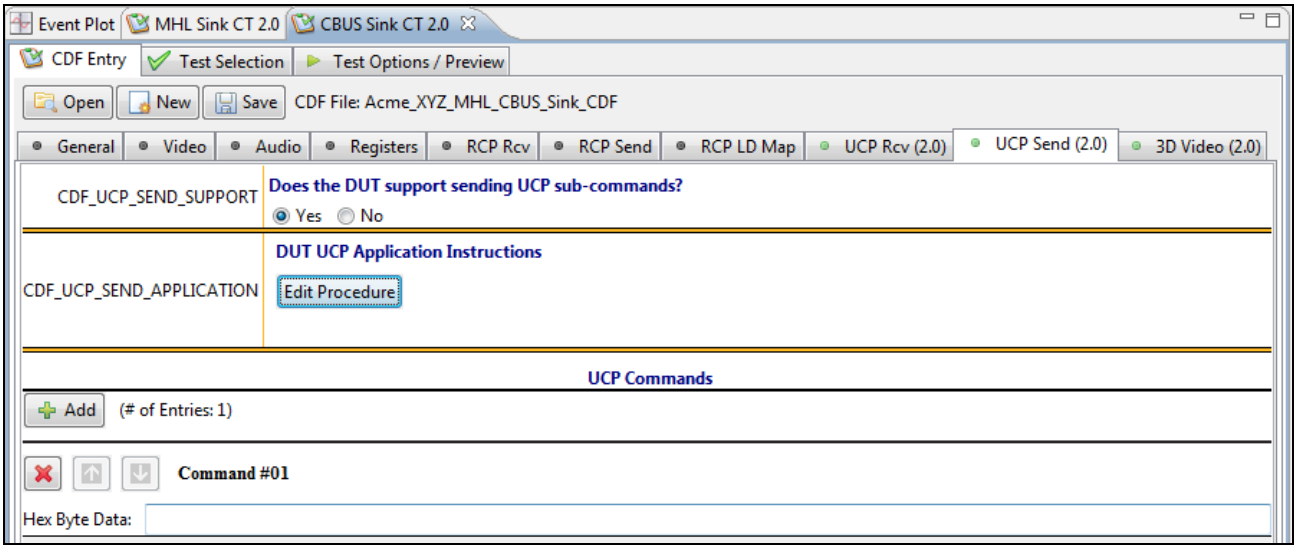
    You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test to assist a test engineer. You can enter in the expected behavior for each supported command so that the test engineer can verify that the dongle DUT behaves properly when receiving the various UCP commands.



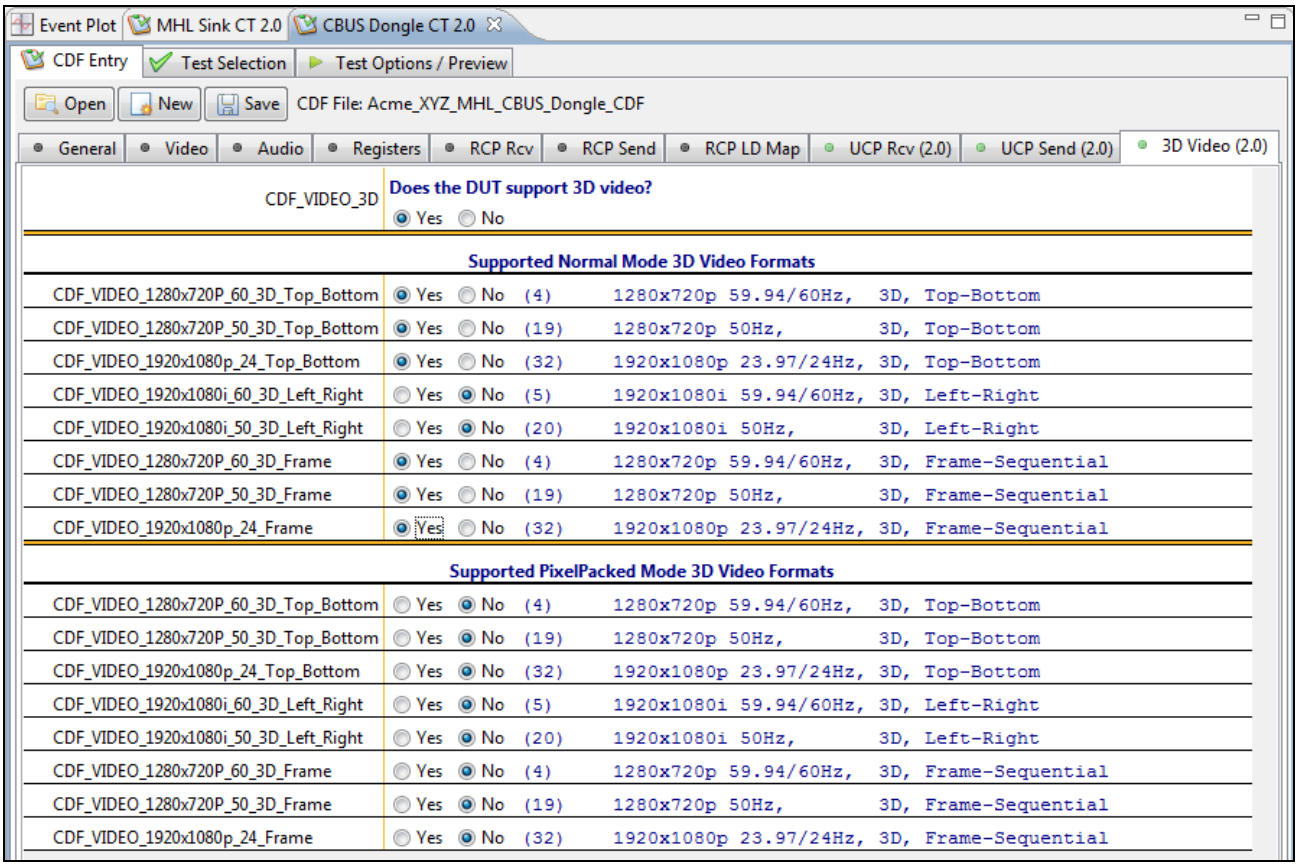
14. Complete the items in the **UCP Send** tab.

    You can enter helpful information using the "**Edit Procedure**" dialog box. The information entered into this dialog box will appear during the test and can be helpful to instruct a test engineer on how to set up a device in

order to run a particular test. In the example below you would enter in procedural information which a test engineer could use to cause the dongle to issue the various UCP commands.



15. Complete the items in the **3D Video** tab.



16. Save the CDF. If you have not already saved the CDF, you can do so with the **Save** activation button. Alternatively you can save the CDF under a different name.

Save CDF
CDF Name
Enter a name for the CDF
Acme_XYZ_MHL_CBUS_Dongle_CDF
The name already exists.
Acme_XYZ_MHL_CBUS_Dongle_CDF
My980_Dongle
MySelect_Dongle
MySelect_Dongle_MB
MySelect_Dongle_MB2
Cancel
Ok

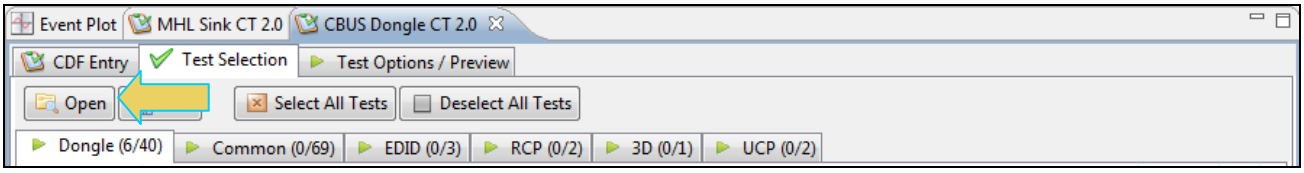
5.7 Selecting which tests to run

Use the following procedures to select the tests to run. There are multiple tabs which correspond to each section in the CTS.

Note: The workflow screen examples in this section show MHL 2.0 except where noted. MHL 1.2 workflow and screens are similar.

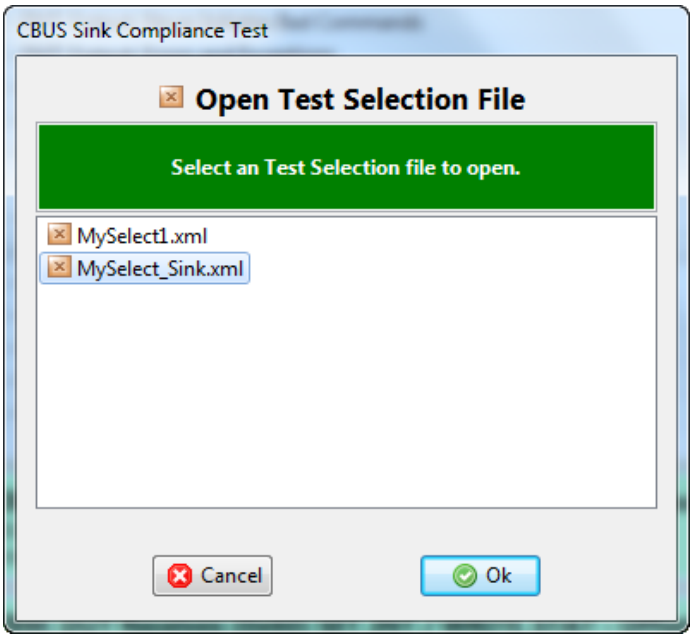
To select the tests to run:

1. Select the **Test Selection** panel as shown below.
2. If you have an existing Test Selection option file saved you can recall that for use in your testing. Simply click on the **Open** activation button.



A dialog box will appear as follows. Simply select the file and click on the **OK** activation button.

Note: You can save the Test Selection files to your host PC and transfer them to other PCs and for others to use.



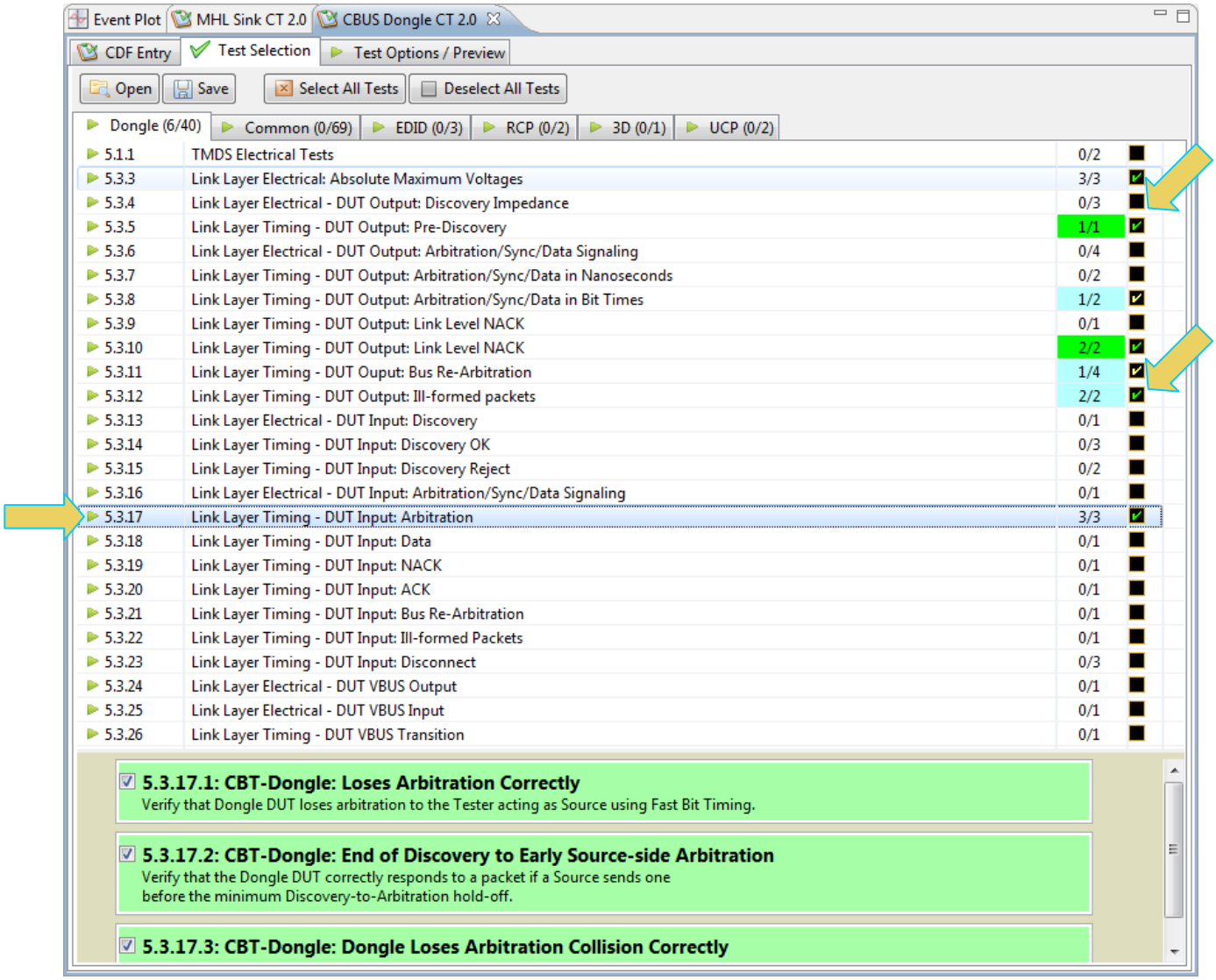
3. Complete the items in the **Sink** tab of the **Test Selection** panel shown below.

   For convenience you can **Select All** or **Deselect All** tests using the activation buttons provided.

   Check box indicators inform how many tests in each section and how many are selected. Each tab (Sink, Common or RCP) inform you of how many tests in that section have been selected.

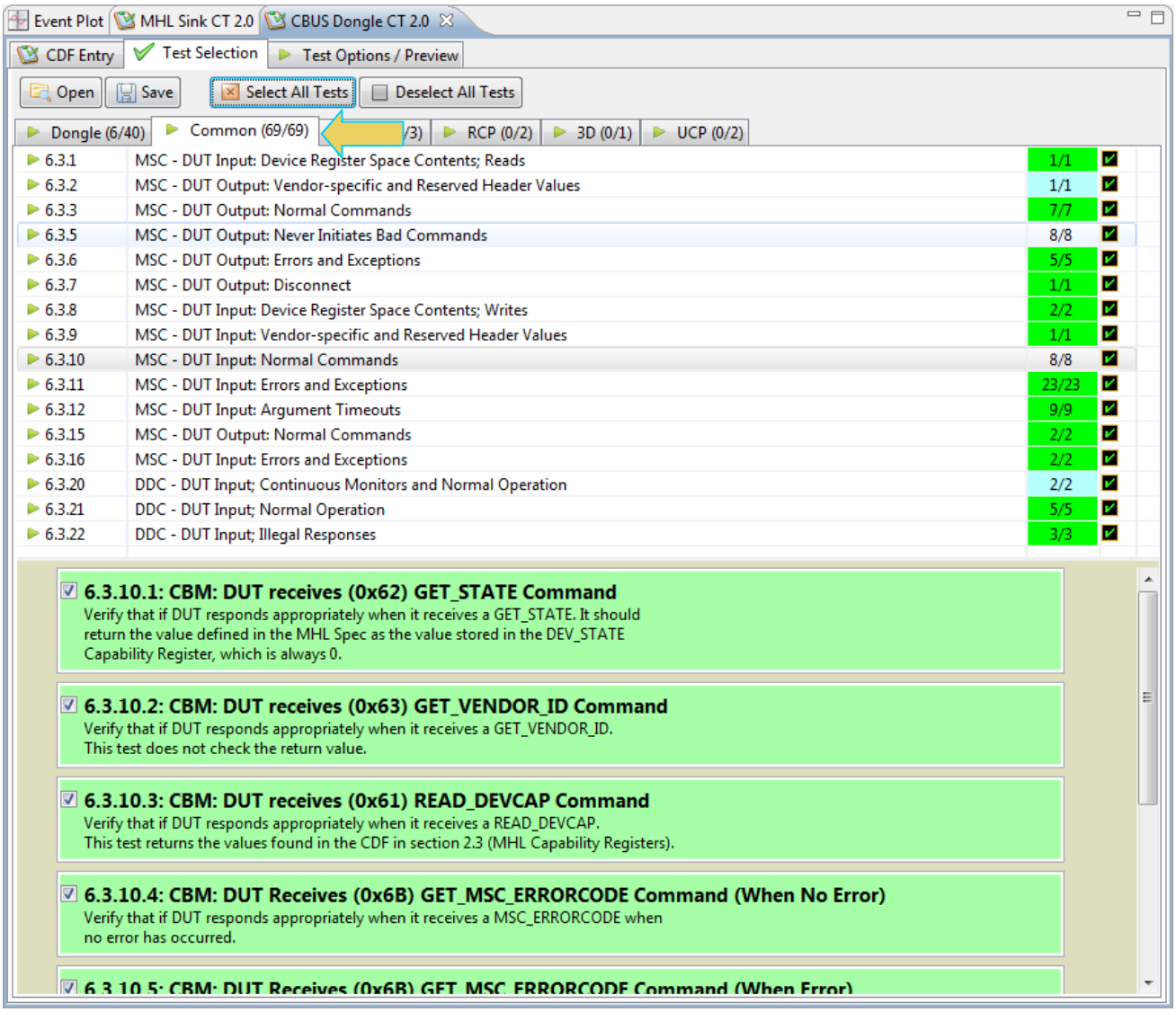
   Each test section list includes several tests. In the example shown below, the 5.3.17 Link Layer Timing – DUT Input: Arbitration Test section is selected and the specific tests in that section are then available to be selected.

   Note: Some tests are run in background and cannot be deselected such as the 5.3.12. The background tests are highlighted in a light blue as shown in the example below.

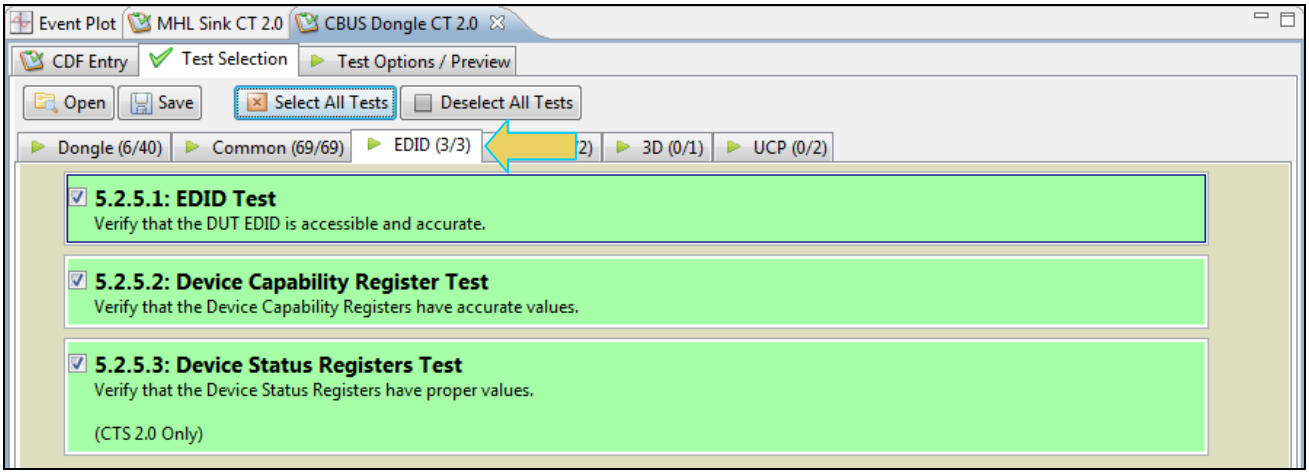


4. Complete the items in the **Common** tab of the **Test Selection** panel shown below.

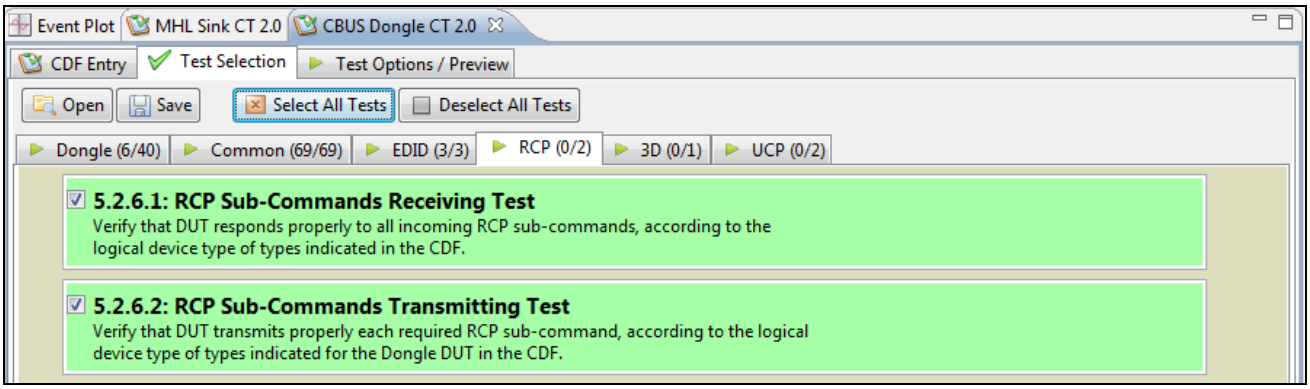
   For convenience you can **Select All** or **Deselect All** tests using the activation buttons provided.



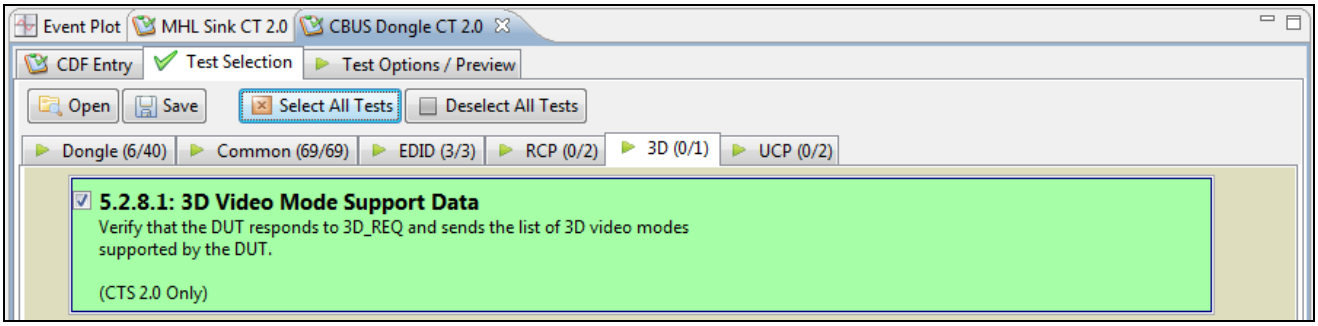
5. Complete the items in the **EDID** tab of the **Test Selection** panel shown below.



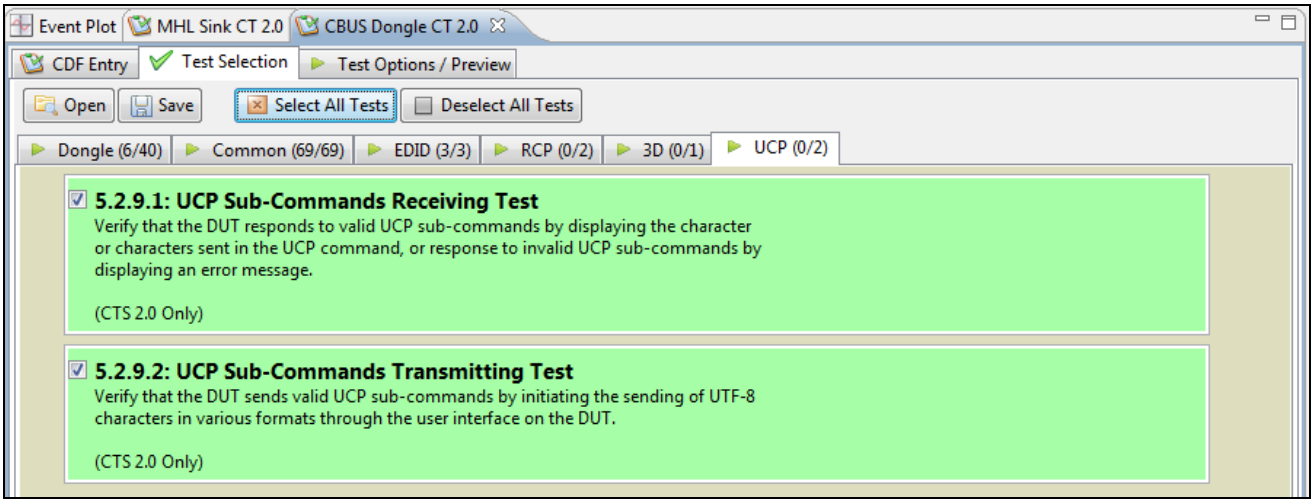
6. Complete the items in the **RCP** tab of the **Test Selection** panel shown below.



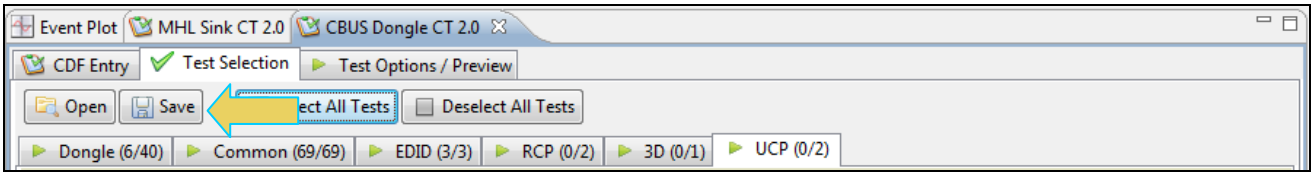
7. Complete the items in the **3D** tab of the **Test Selection** panel shown below.



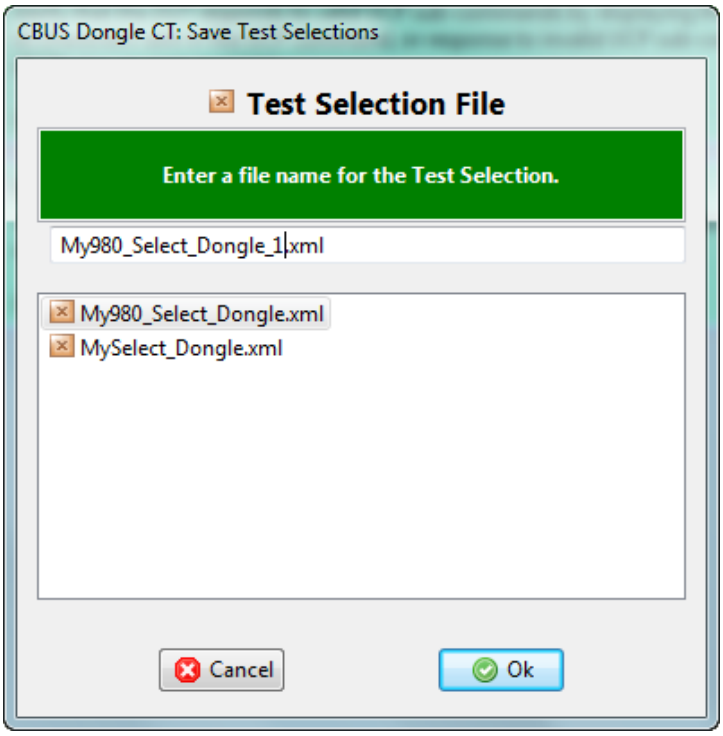
8. Complete the items in the **UCP** tab of the **Test Selection** panel shown below.



9. You can save the Test Selection options using the **Save** activation button.



10. A dialog box will appear as follows. Simply assign a name and click on the **OK** activation button. Click **Cancel** to exit.



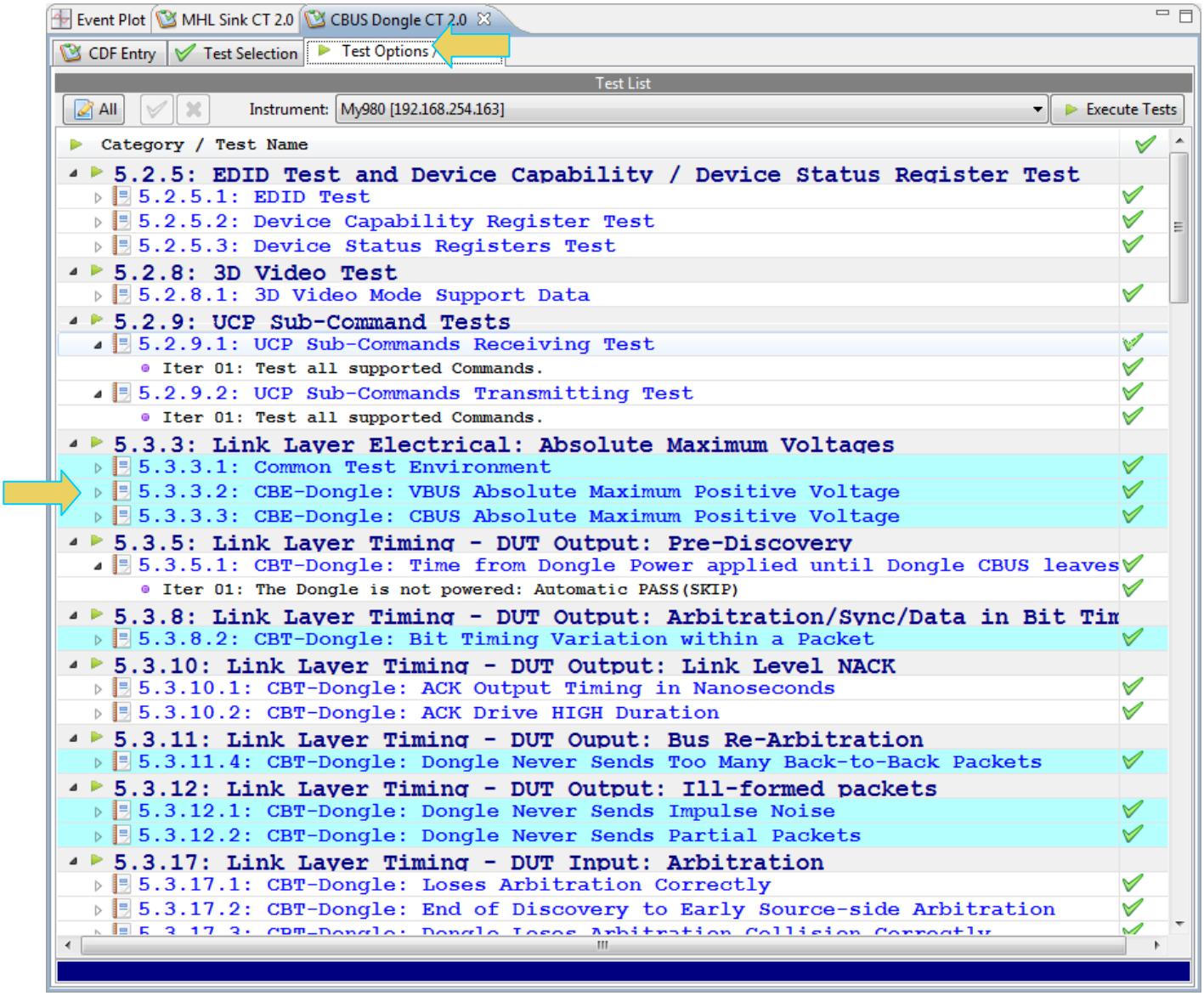
5.8 Executing the MHL CBUS Dongle Compliance Tests

Use the following procedures to initiate the execution of an MHL CBUS Dongle Compliance test series.

Note: The workflow screen examples in this section show MHL 2.0 except where noted. MHL 1.2 workflow and screens are similar.

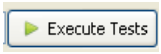
To initiate a test series:

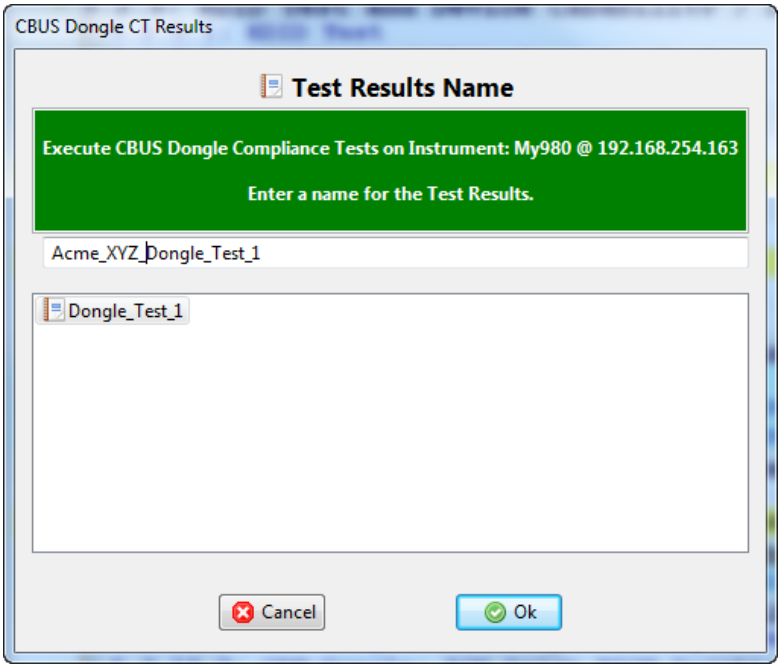
1. Select the **Test Options / Preview** panel as shown below.
   Note: The background tests are highlighted in light blue. These are tests that are run in the background during the remaining test suite. Refer to the two screen shots below.



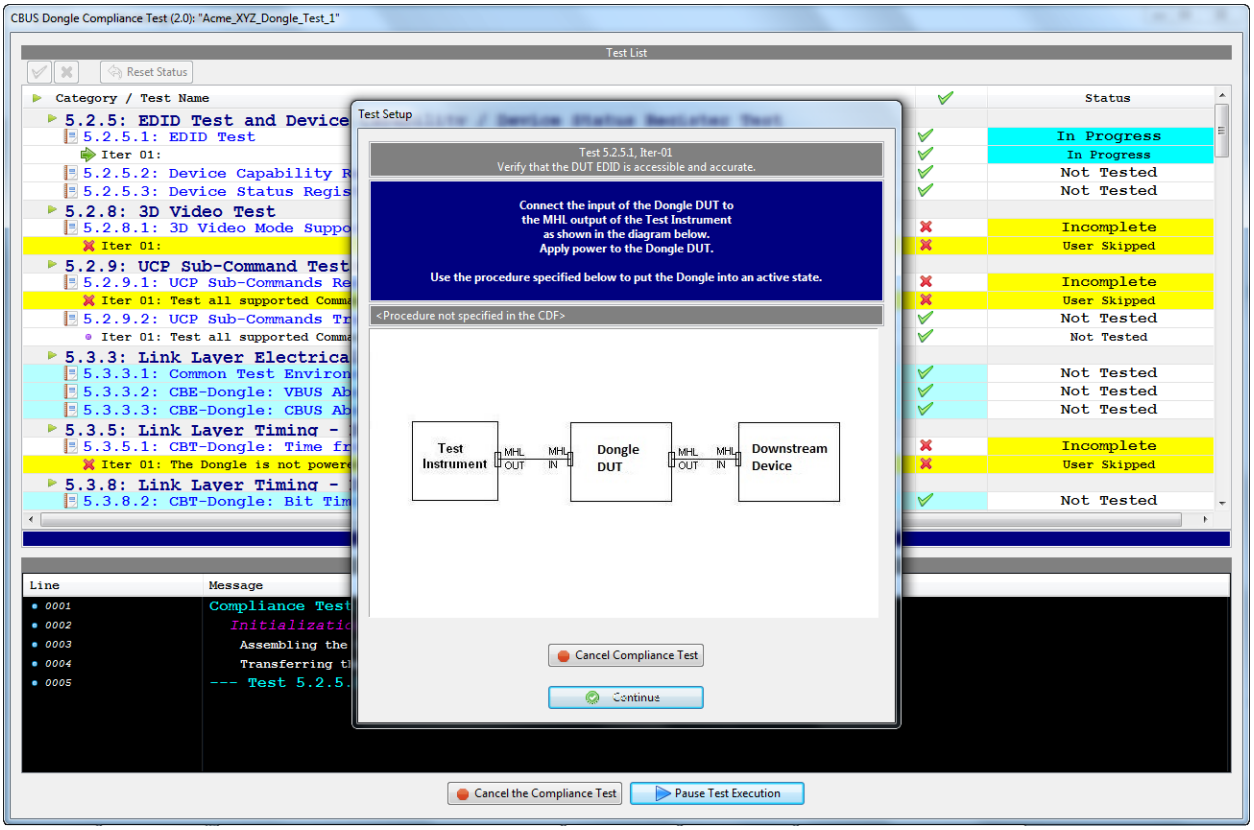
2. (Optional) Review the list of tests for each category. If you wish to skip some of the tests. You can skip tests by clicking on the Check mark on the right side of the **Test Options / Preview** panel.

   The screen shot below shows some of the tests that have been skipped (highlighted in yellow with a red X).

3. Click on the Execute Tests  activation button to initiate the test suite. You will be prompted for a name for the tests. This dialog box is shown below.

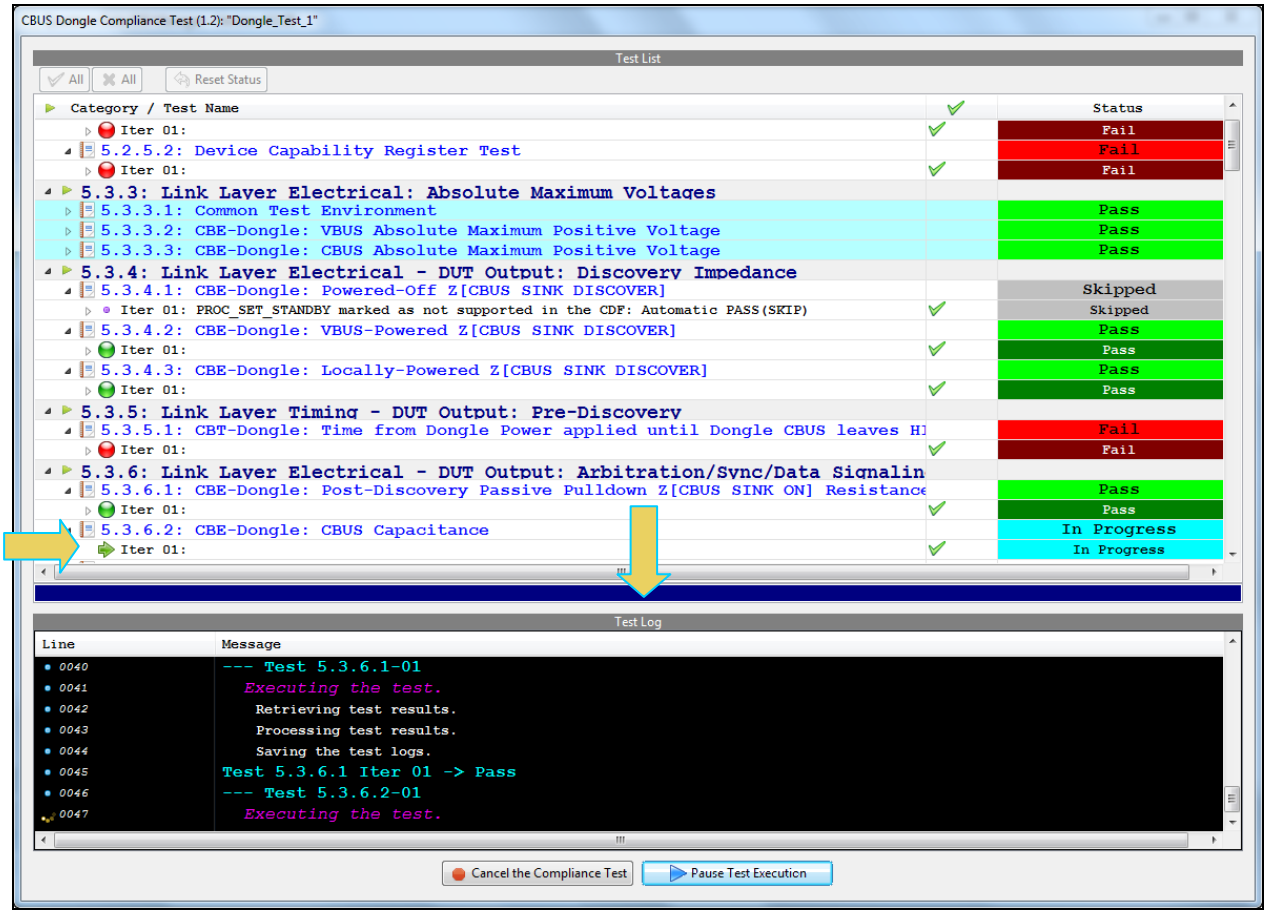


A screen will appear instructing you on how to connect your MHL CBUS dongle device for testing. A sample screen is shown below:

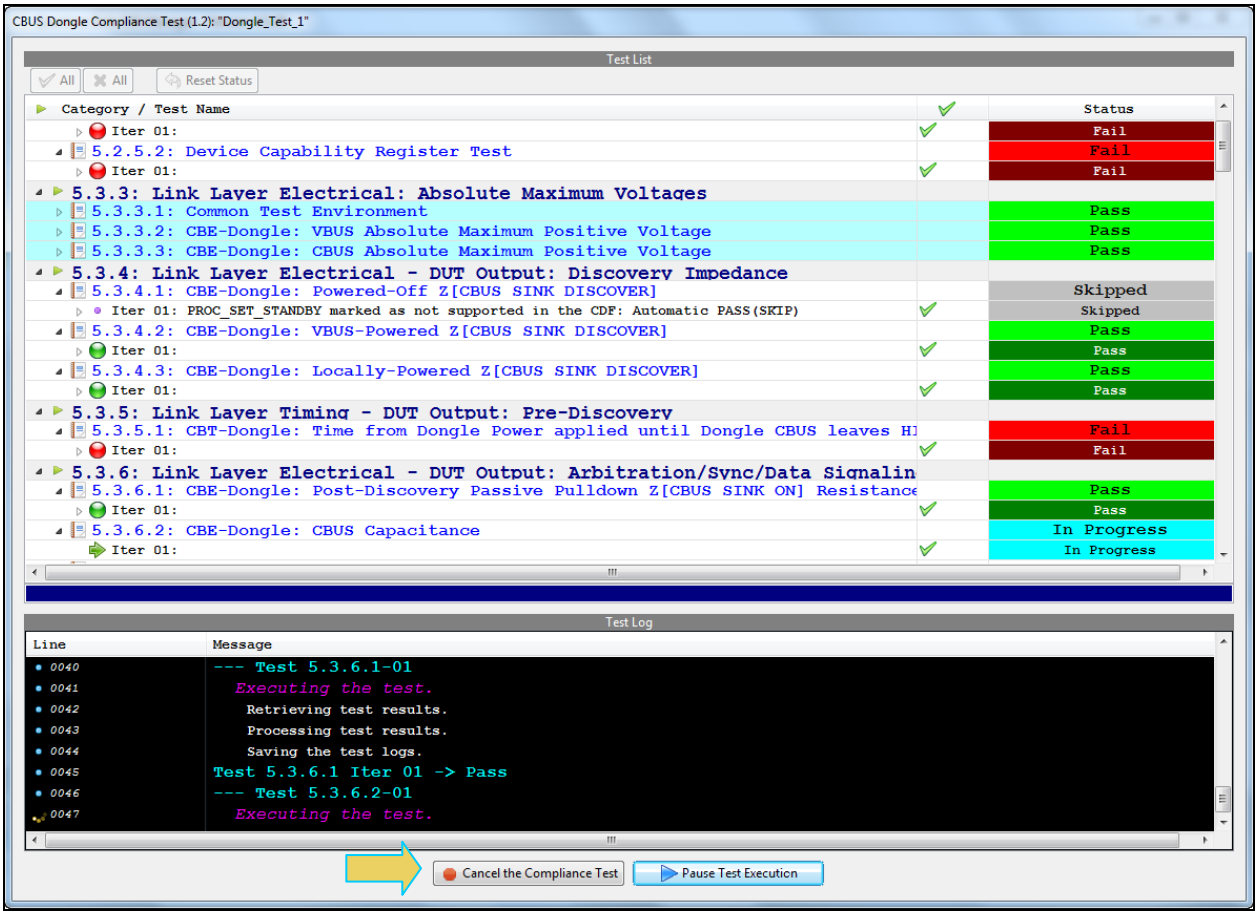


.

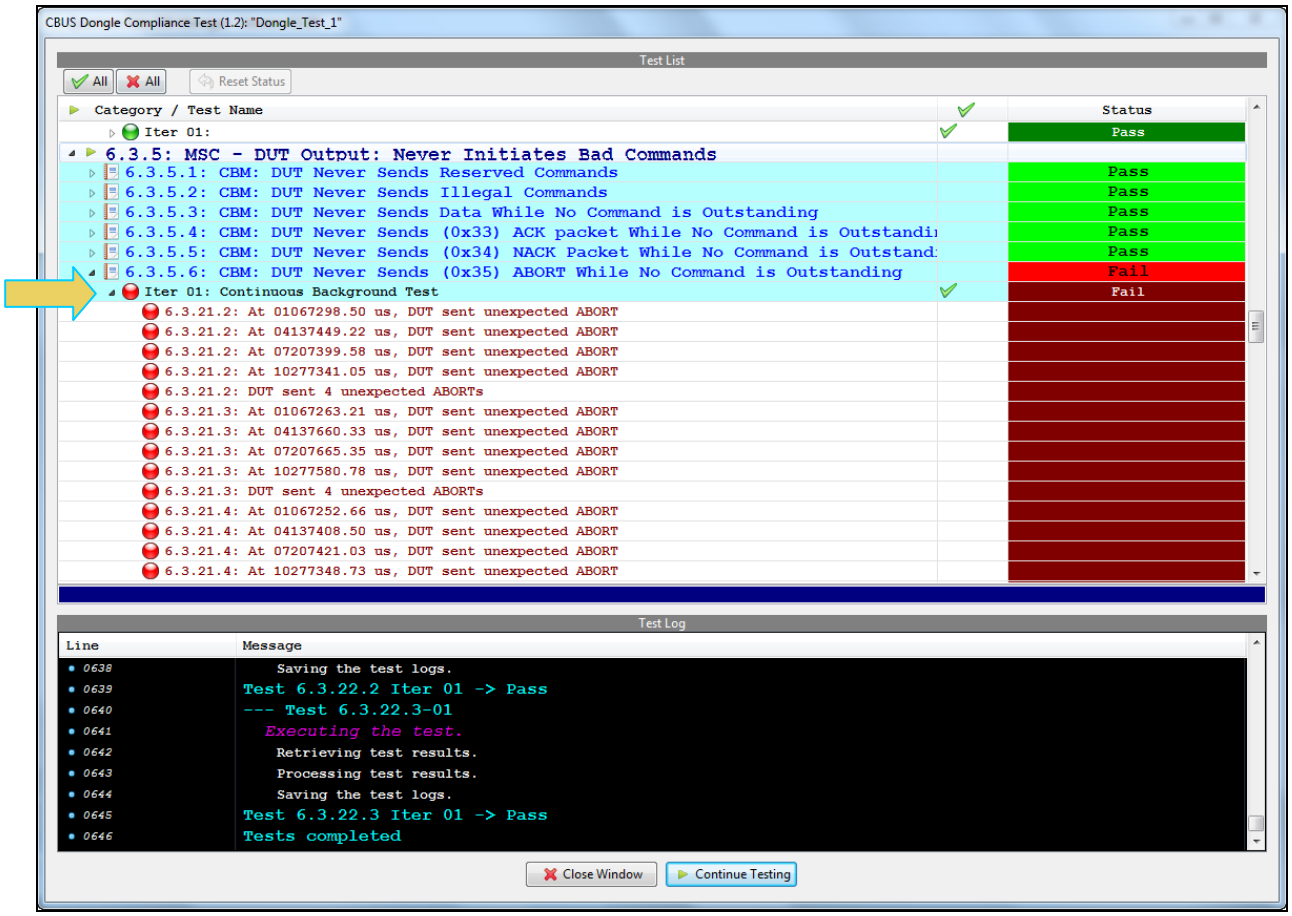
During the test, the test results are shown. There is a progress arrow which points to the test that is currently being run. The lower panel **Test Log** shows the testing activity as it occurs. Refer to the screen examples below.

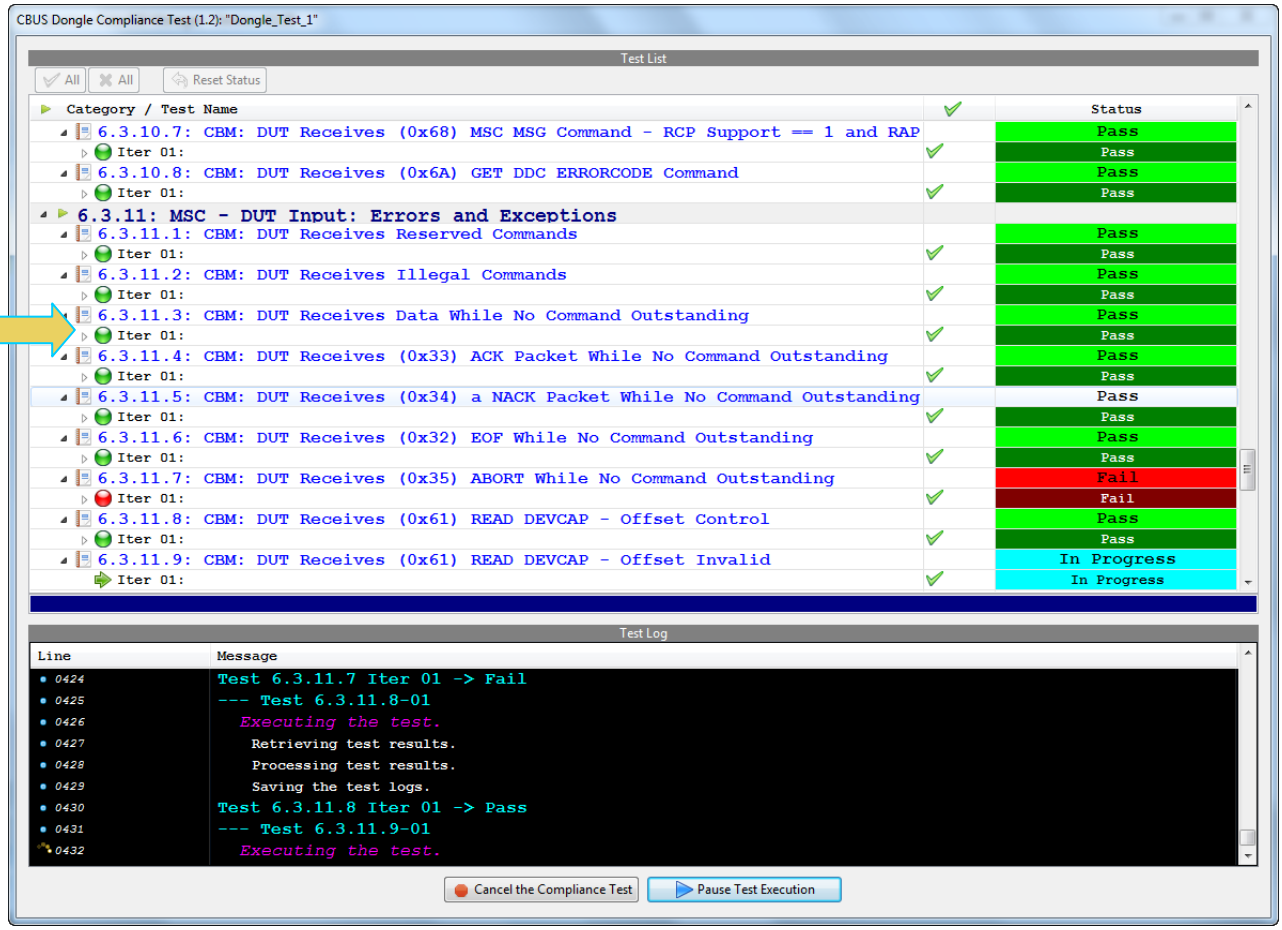


You can cancel the compliance test or pause it at any time. If you pause the test you can resume later at any time even if you exit the 980 Manager application. Refer to the following screen example.

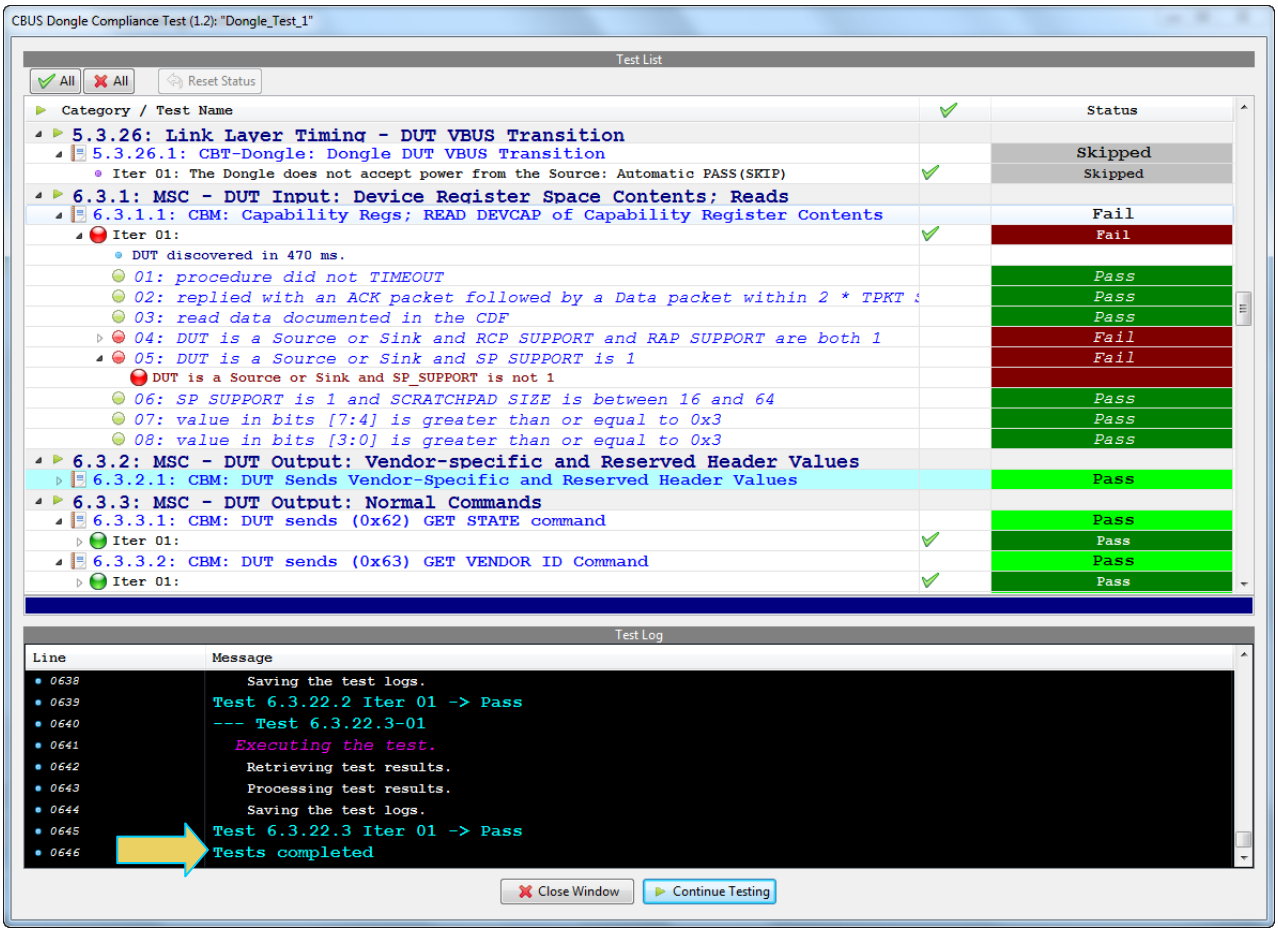


You can view the details of failures and passes when they occur by exposing the navigation arrows on the left. Examples are shown on the following two screens.

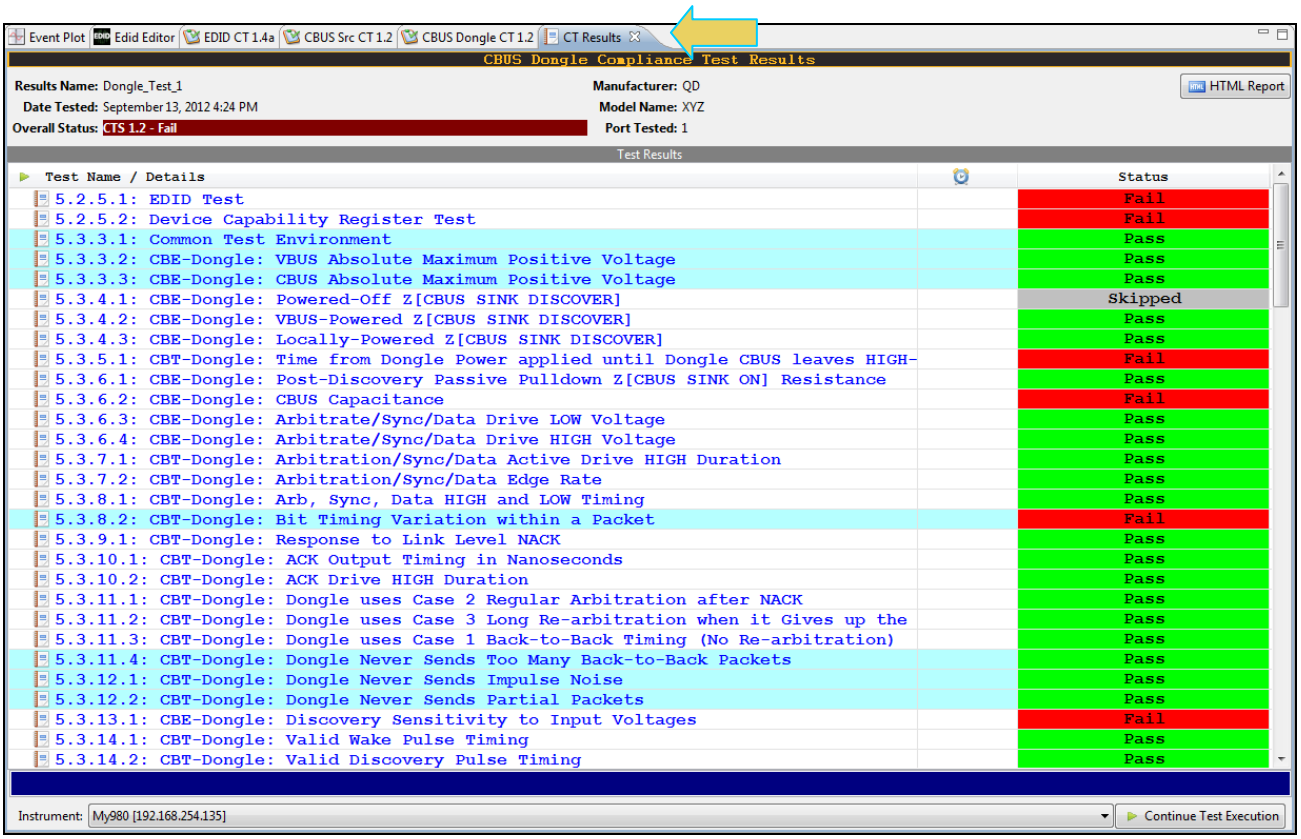



CBUS Dongle Compliance Test (1.2): "Dongle_Test_1"
Test List
All
All
Reset Status
Category / Test Name
Status
6.3.10.7: CBM: DUT Receives (0x68) MSC MSG Command - RCP Support == 1 and RAP
Pass
Iter 01:
Pass
6.3.10.8: CBM: DUT Receives (0x6A) GET DDC ERRORCODE Command
Pass
Iter 01:
Pass
6.3.11: MSC - DUT Input: Errors and Exceptions
6.3.11.1: CBM: DUT Receives Reserved Commands
Pass
Iter 01:
Pass
6.3.11.2: CBM: DUT Receives Illegal Commands
Pass
Iter 01:
Pass
6.3.11.3: CBM: DUT Receives Data While No Command Outstanding
Pass
Iter 01:
Pass
6.3.11.4: CBM: DUT Receives (0x33) ACK Packet While No Command Outstanding
Pass
Iter 01:
Pass
6.3.11.5: CBM: DUT Receives (0x34) a NACK Packet While No Command Outstanding
Pass
Iter 01:
Pass
6.3.11.6: CBM: DUT Receives (0x32) EOF While No Command Outstanding
Pass
Iter 01:
Pass
6.3.11.7: CBM: DUT Receives (0x35) ABORT While No Command Outstanding
Fail
Iter 01:
Fail
6.3.11.8: CBM: DUT Receives (0x61) READ DEVCAP - Offset Control
Pass
Iter 01:
Pass
6.3.11.9: CBM: DUT Receives (0x61) READ DEVCAP - Offset Invalid
In Progress
Iter 01:
In Progress
Test Log
Line
Message
0424 Test 6.3.11.7 Iter 01 -> Fail
0425 --- Test 6.3.11.8-01
0426 Executing the test.
0427 Retrieving test results.
0428 Processing test results.
0429 Saving the test logs.
0430 Test 6.3.11.8 Iter 01 -> Pass
0431 --- Test 6.3.11.9-01
0432 Executing the test.
Cancel the Compliance Test
Pause Test Execution

The log will indicate when the tests have completed.



When the tests are completed the test window that shows the current activity will close. A new tab and panel will appear next to the **CBUS Dongle CT 1.2** tab called the **CT Results** tab. You can view the test results in this panel. Refer to the following screen shots to see examples of the **CT Results** panel.

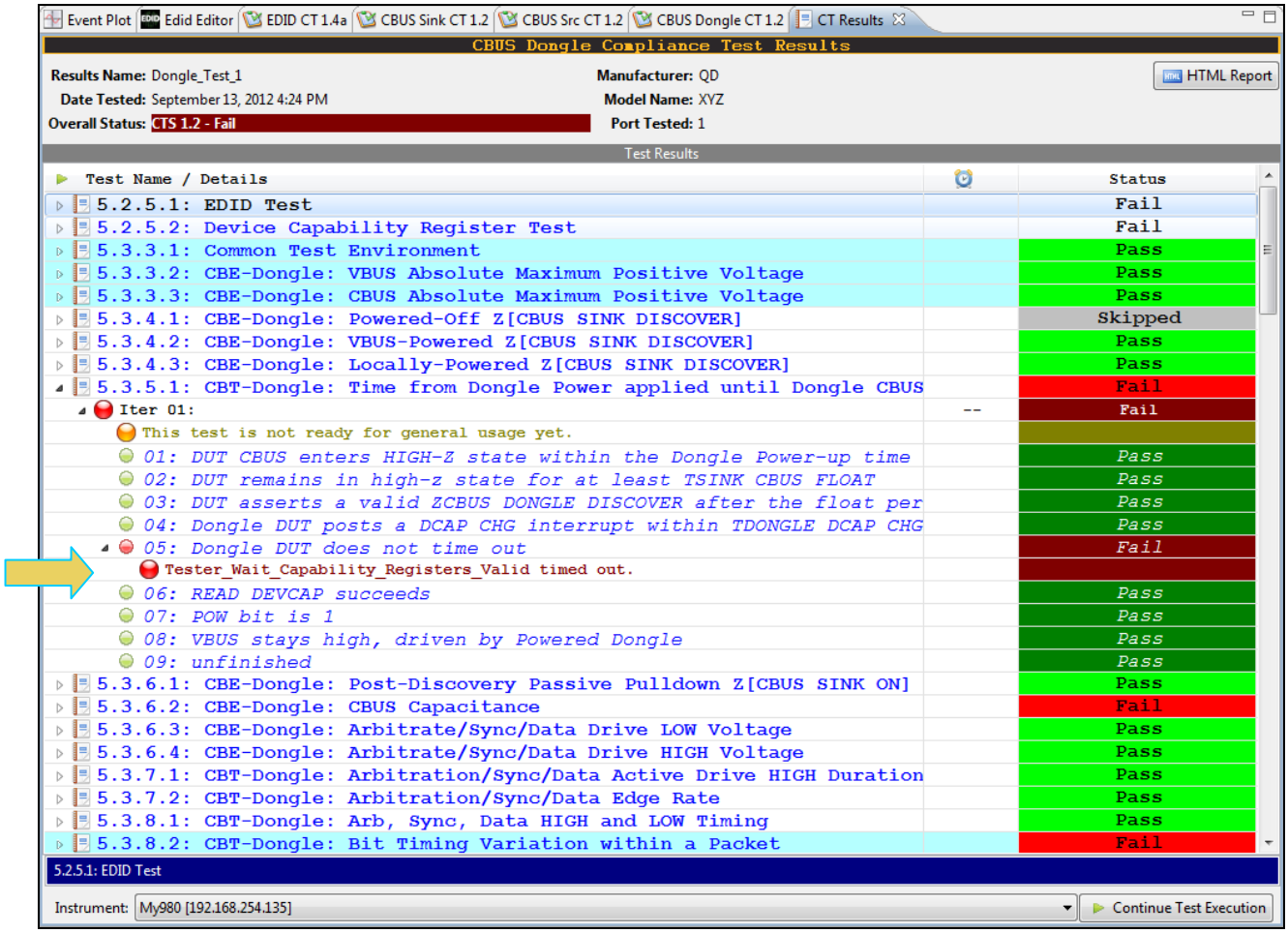


5.9 Viewing Details of Dongle Compliance Test Passes or Failures

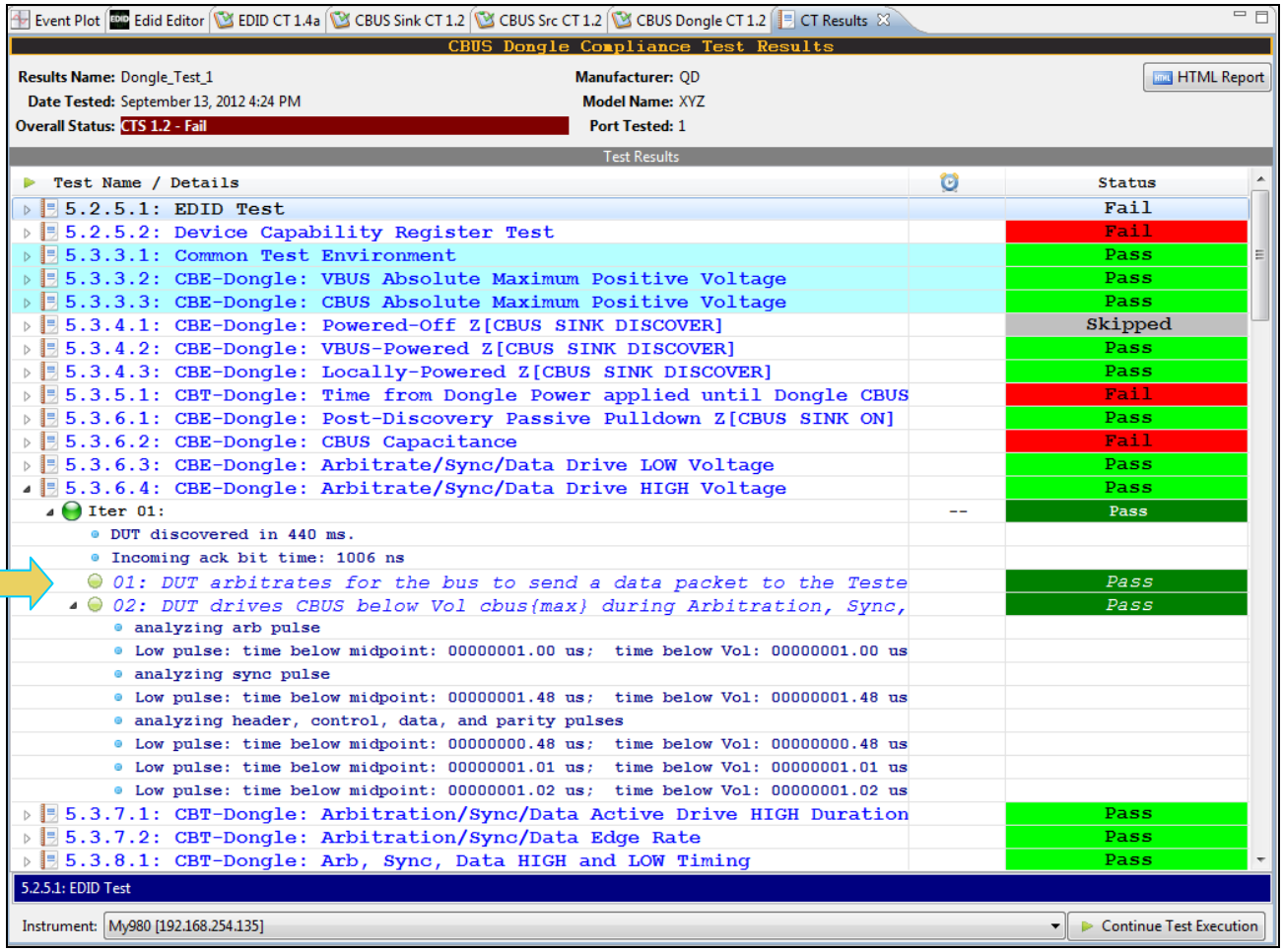
When you have completed the test series you will have an opportunity to view the detailed data for a particular failure. Use the following procedures to view the details of a test.

To view the details of each test:

1. Expose the detailed results of a failure and highlight a failure. Refer to the screen example below.



Similarly, you can view the details of a test which passed as shown below:

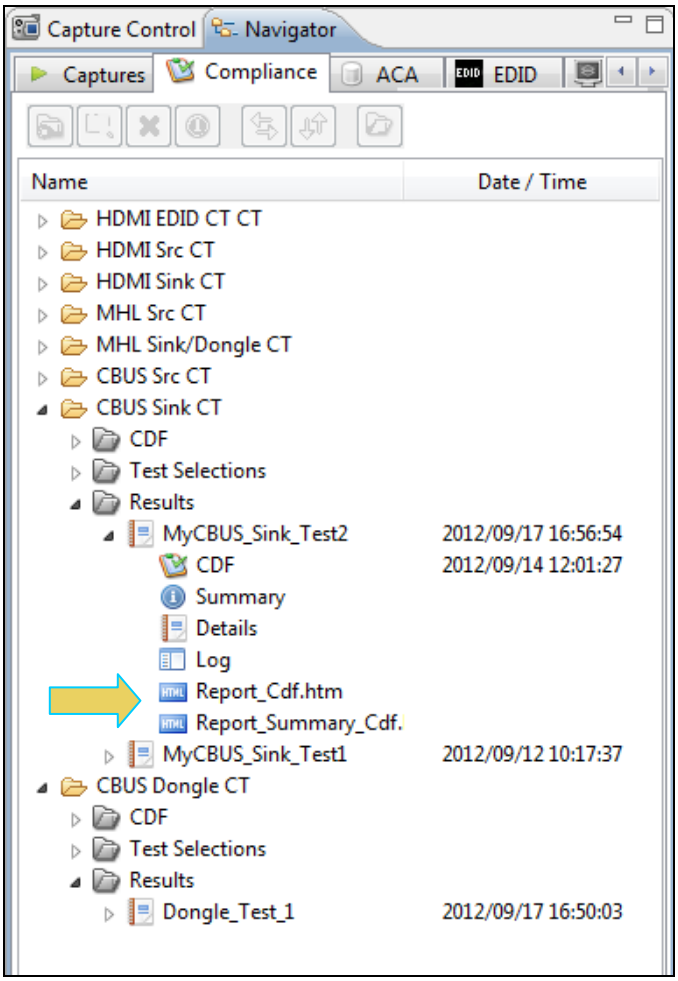

Event Plot
Edid Editor
EDID CT 1.4a
CBUS Sink CT 1.2
CBUS Src CT 1.2
CBUS Dongle CT 1.2
CT Results
CBUS Dongle Compliance Test Results
Results Name: Dongle_Test_1
Date Tested: September 13, 2012 4:24 PM
Overall Status: CTS 1.2 - Fail
Manufacturer: QD
Model Name: XYZ
Port Tested: 1
HTML Report
Test Results
Test Name / Details
Status
5.2.5.1: EDID Test Fail
5.2.5.2: Device Capability Register Test Fail
5.3.3.1: Common Test Environment Pass
5.3.3.2: CBE-Dongle: VBUS Absolute Maximum Positive Voltage Pass
5.3.3.3: CBE-Dongle: CBUS Absolute Maximum Positive Voltage Pass
5.3.4.1: CBE-Dongle: Powered-Off Z[CBUS SINK DISCOVER] Skipped
5.3.4.2: CBE-Dongle: VBUS-Powered Z[CBUS SINK DISCOVER] Pass
5.3.4.3: CBE-Dongle: Locally-Powered Z[CBUS SINK DISCOVER] Pass
5.3.5.1: CBT-Dongle: Time from Dongle Power applied until Dongle CBUS Fail
5.3.6.1: CBE-Dongle: Post-Discovery Passive Pulldown Z[CBUS SINK ON] Pass
5.3.6.2: CBE-Dongle: CBUS Capacitance Fail
5.3.6.3: CBE-Dongle: Arbitrate/Sync/Data Drive LOW Voltage Pass
5.3.6.4: CBE-Dongle: Arbitrate/Sync/Data Drive HIGH Voltage Pass
Iter 01: -- Pass
DUT discovered in 440 ms.
Incoming ack bit time: 1006 ns
01: DUT arbitrates for the bus to send a data packet to the Teste Pass
02: DUT drives CBUS below Vol cbus{max} during Arbitration, Sync, Pass
analyzing arb pulse
Low pulse: time below midpoint: 00000001.00 us; time below Vol: 00000001.00 us
analyzing sync pulse
Low pulse: time below midpoint: 00000001.48 us; time below Vol: 00000001.48 us
analyzing header, control, data, and parity pulses
Low pulse: time below midpoint: 00000000.48 us; time below Vol: 00000000.48 us
Low pulse: time below midpoint: 00000001.01 us; time below Vol: 00000001.01 us
Low pulse: time below midpoint: 00000001.02 us; time below Vol: 00000001.02 us
5.3.7.1: CBT-Dongle: Arbitration/Sync/Data Active Drive HIGH Duration Pass
5.3.7.2: CBT-Dongle: Arbitration/Sync/Data Edge Rate Pass
5.3.8.1: CBT-Dongle: Arb, Sync, Data HIGH and LOW Timing Pass
5.2.5.1: EDID Test
Instrument: My980 [192.168.254.135]
Continue Test Execution

5.10 Accessing the test results through the navigator panel

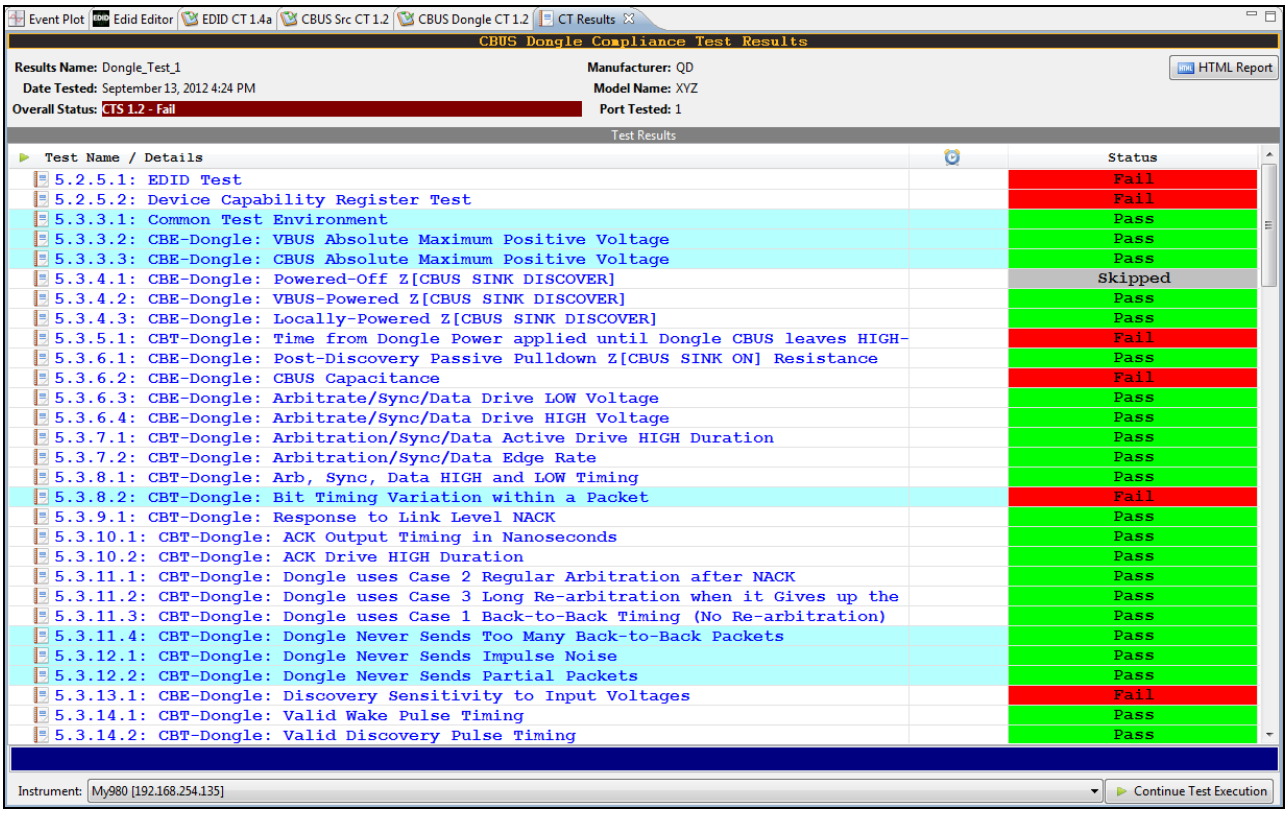
You can view the results of the tests at any time after you run them through the 980 GUI Manager's **Navigator** panel. Use the following procedures to view the details of a test.

To access the test results:

1. Access the **Navigator** tab and select **Compliance**. Refer to the screen example below.



2. Double click on the Results file you wish to view. The results will appear in a CT Results window on the right. Refer to the screen example below.

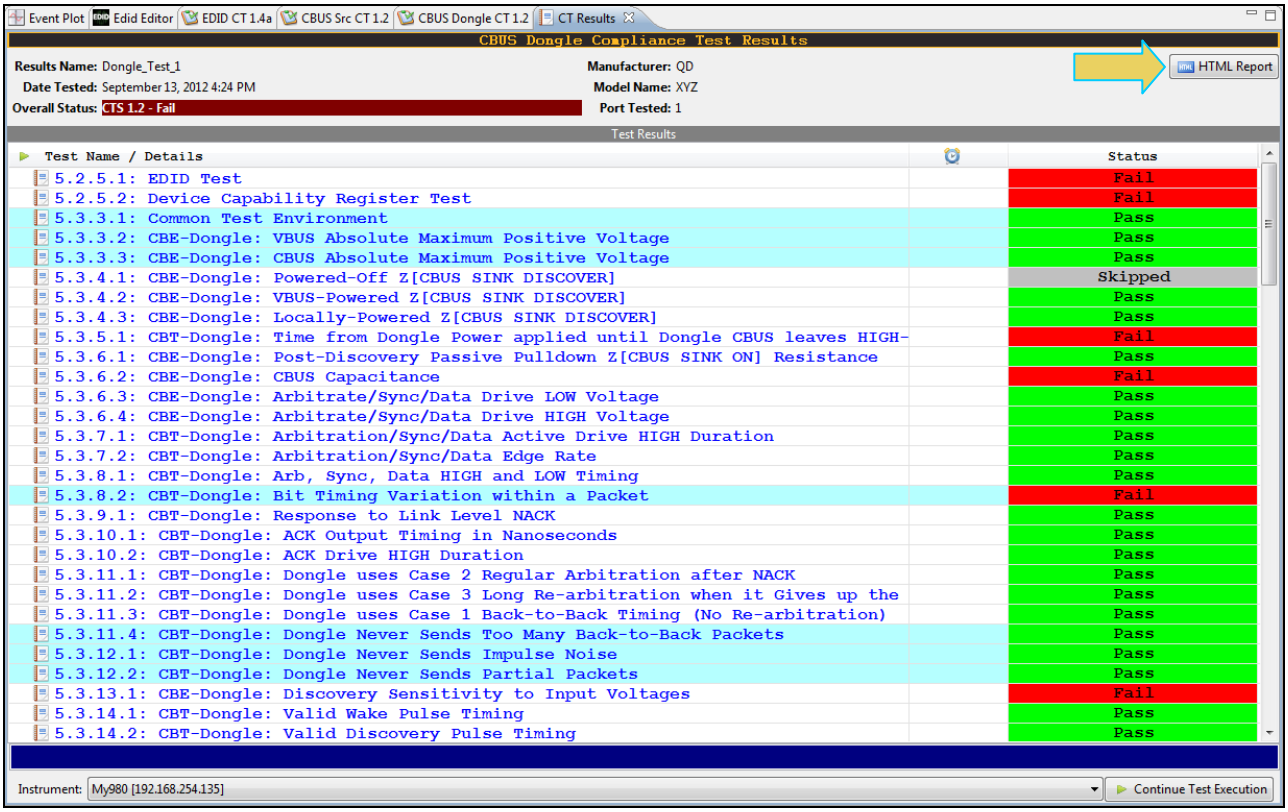


5.11 Viewing the MHL Dongle Compliance HTML test report

After you have completed the tests, an HTML Report activation button will appear in the upper right of the screen which enables you to access the html report of the test results. Use the following procedures to view the html test report.

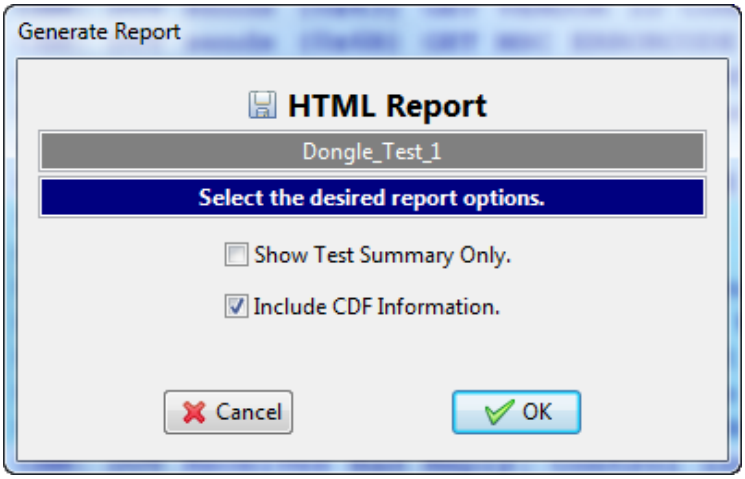
To view the html test report:

1. Select the **CT Results** panel as shown below.



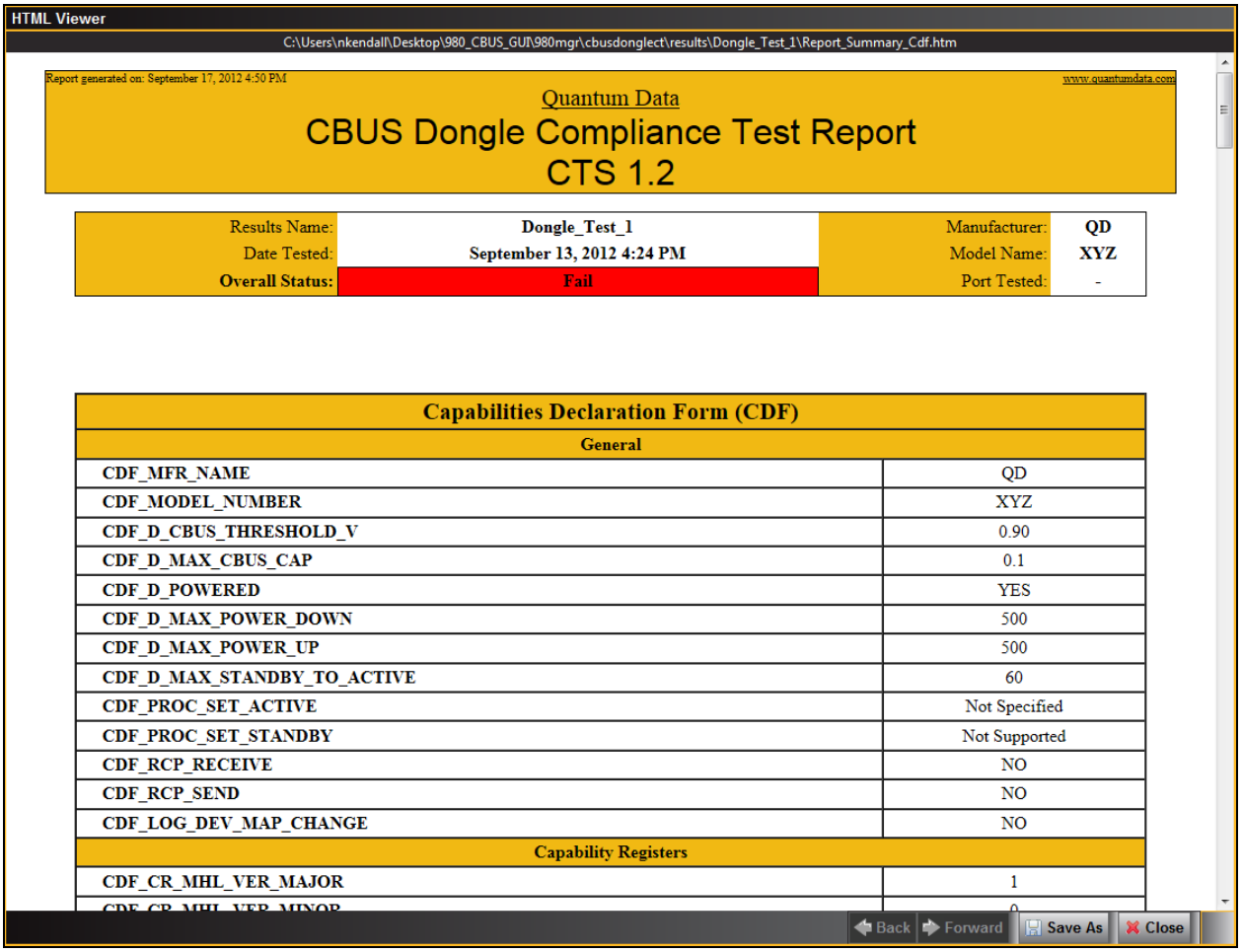
2. Click on the **HTML Report** activation button.

   A dialog box will appear asking if you want a summary of the test results or a version that includes the CDF. This dialog box is shown in the screen shot below.

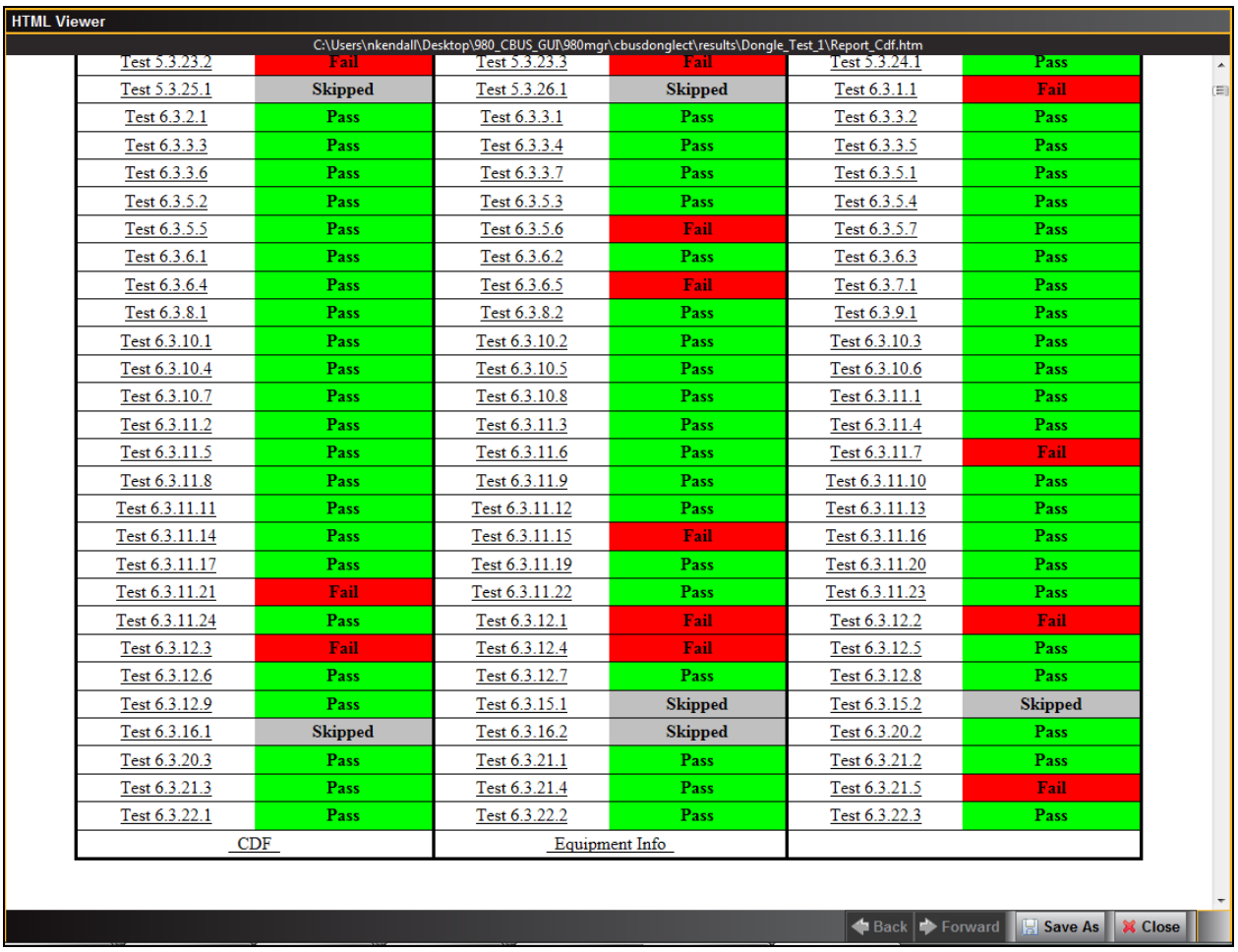


Specify if you want to see a summary report and if you want to see the CDF. If you leave Show Test Summary Only unchecked the application will produce a full detailed report. The following screens provide samples of the report. Note the first items in the CDF shown below.

Note: This example shows an MHL 1.2 test result; MHL 2.0 test results are similar in content and structure.

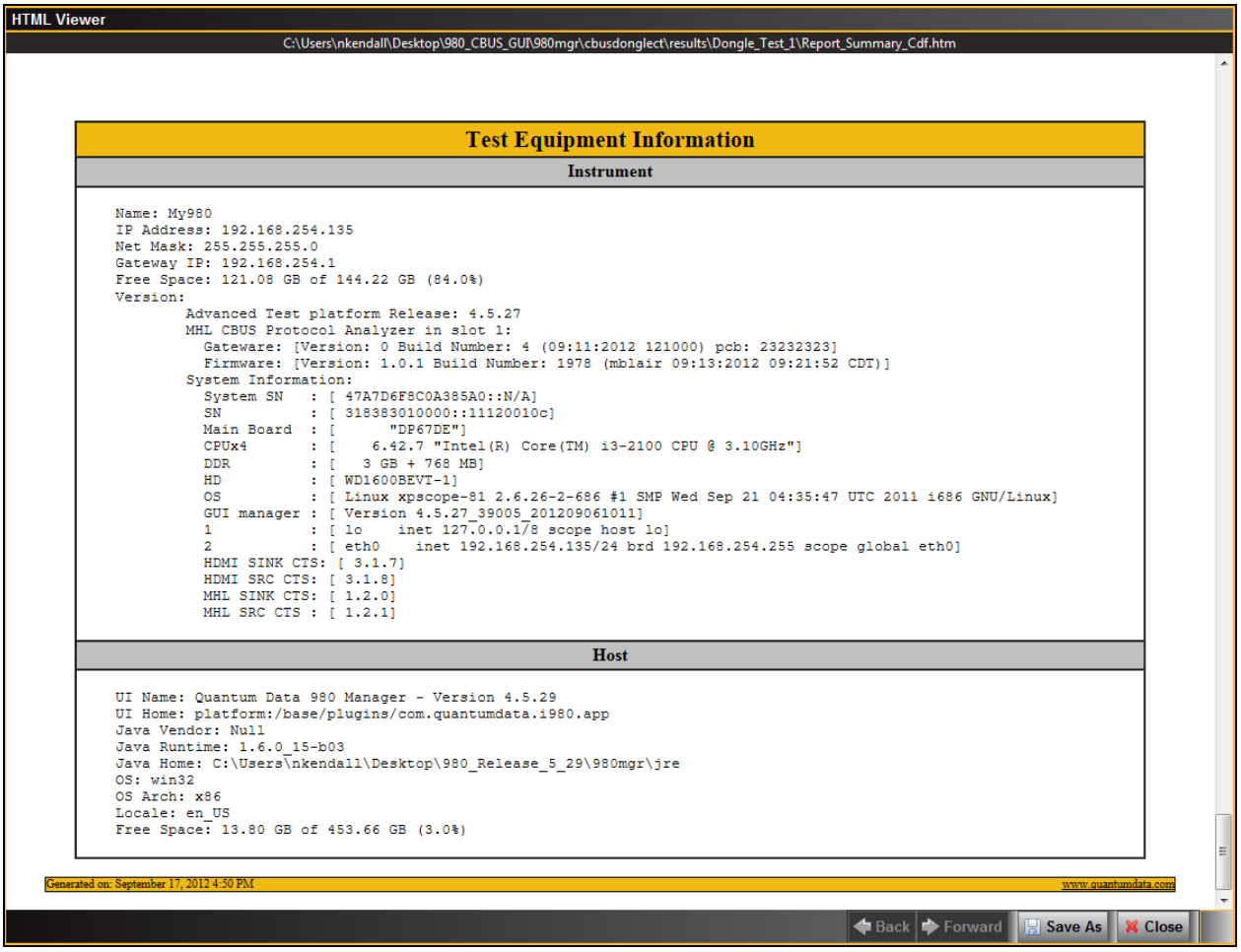


The summary results are shown below:



Test 5.3.23.2	Fail	Test 5.3.23.3	Fail	Test 5.3.24.1	Pass
Test 5.3.25.1	Skipped	Test 5.3.26.1	Skipped	Test 6.3.1.1	Fail
Test 6.3.2.1	Pass	Test 6.3.3.1	Pass	Test 6.3.3.2	Pass
Test 6.3.3.3	Pass	Test 6.3.3.4	Pass	Test 6.3.3.5	Pass
Test 6.3.3.6	Pass	Test 6.3.3.7	Pass	Test 6.3.5.1	Pass
Test 6.3.5.2	Pass	Test 6.3.5.3	Pass	Test 6.3.5.4	Pass
Test 6.3.5.5	Pass	Test 6.3.5.6	Fail	Test 6.3.5.7	Pass
Test 6.3.6.1	Pass	Test 6.3.6.2	Pass	Test 6.3.6.3	Pass
Test 6.3.6.4	Pass	Test 6.3.6.5	Fail	Test 6.3.7.1	Pass
Test 6.3.8.1	Pass	Test 6.3.8.2	Pass	Test 6.3.9.1	Pass
Test 6.3.10.1	Pass	Test 6.3.10.2	Pass	Test 6.3.10.3	Pass
Test 6.3.10.4	Pass	Test 6.3.10.5	Pass	Test 6.3.10.6	Pass
Test 6.3.10.7	Pass	Test 6.3.10.8	Pass	Test 6.3.11.1	Pass
Test 6.3.11.2	Pass	Test 6.3.11.3	Pass	Test 6.3.11.4	Pass
Test 6.3.11.5	Pass	Test 6.3.11.6	Pass	Test 6.3.11.7	Fail
Test 6.3.11.8	Pass	Test 6.3.11.9	Pass	Test 6.3.11.10	Pass
Test 6.3.11.11	Pass	Test 6.3.11.12	Pass	Test 6.3.11.13	Pass
Test 6.3.11.14	Pass	Test 6.3.11.15	Fail	Test 6.3.11.16	Pass
Test 6.3.11.17	Pass	Test 6.3.11.19	Pass	Test 6.3.11.20	Pass
Test 6.3.11.21	Fail	Test 6.3.11.22	Pass	Test 6.3.11.23	Pass
Test 6.3.11.24	Pass	Test 6.3.12.1	Fail	Test 6.3.12.2	Fail
Test 6.3.12.3	Fail	Test 6.3.12.4	Fail	Test 6.3.12.5	Pass
Test 6.3.12.6	Pass	Test 6.3.12.7	Pass	Test 6.3.12.8	Pass
Test 6.3.12.9	Pass	Test 6.3.15.1	Skipped	Test 6.3.15.2	Skipped
Test 6.3.16.1	Skipped	Test 6.3.16.2	Skipped	Test 6.3.20.2	Pass
Test 6.3.20.3	Pass	Test 6.3.21.1	Pass	Test 6.3.21.2	Pass
Test 6.3.21.3	Pass	Test 6.3.21.4	Pass	Test 6.3.21.5	Fail
Test 6.3.22.1	Pass	Test 6.3.22.2	Pass	Test 6.3.22.3	Pass
CDF		Equipment Info			

The final page of the report shows the test equipment configuration as shown below.



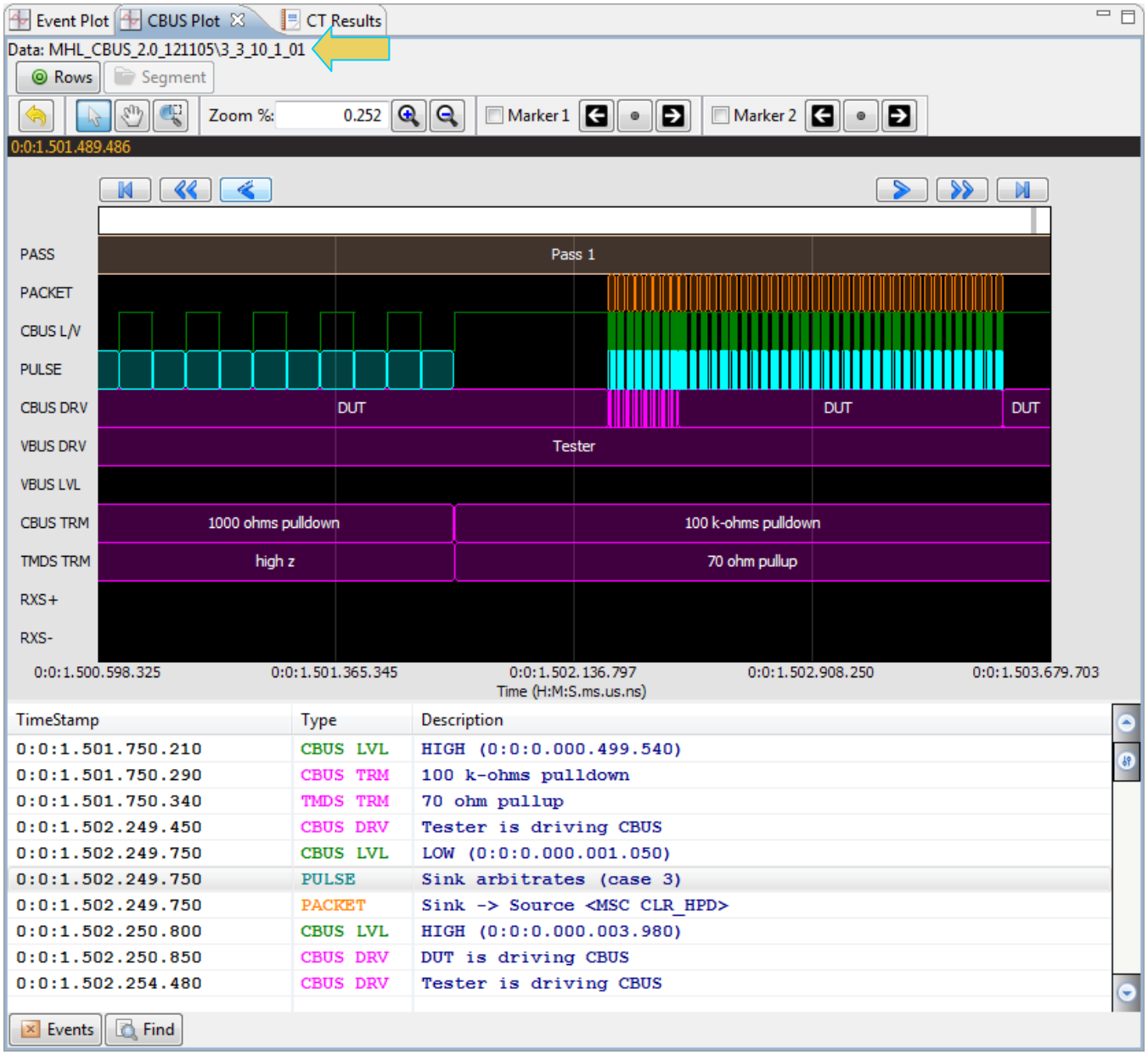
6 CBUS Log Plot

The **CBUS Log Plot** panel (shown below) is panel used for viewing the bit and byte timing events of the CBUS controls and commands that occurred during a specific test. A CBUS Log Plot is provided for each source, sink and dongle CBUS compliance tests. You can disseminate these Log Plots to colleagues as part of the test results. Your colleagues, subject matter experts are not required to have a 980 test instrument to view them; they simply need to download the 980 GUI Manager application from the Quantum Data website.

The panel has both a graphical depiction of CBUS timing events and a sequential table list out of each event. The vertical axis shows the various CBUS event types. The **CBUS Log Plot** panel provides a set of CBUS event types labeled on the left that indicate the type of event. The horizontal axis is time. The scale along the bottom of the **CBUS Log Plot** shows the timestamp for each point in time.

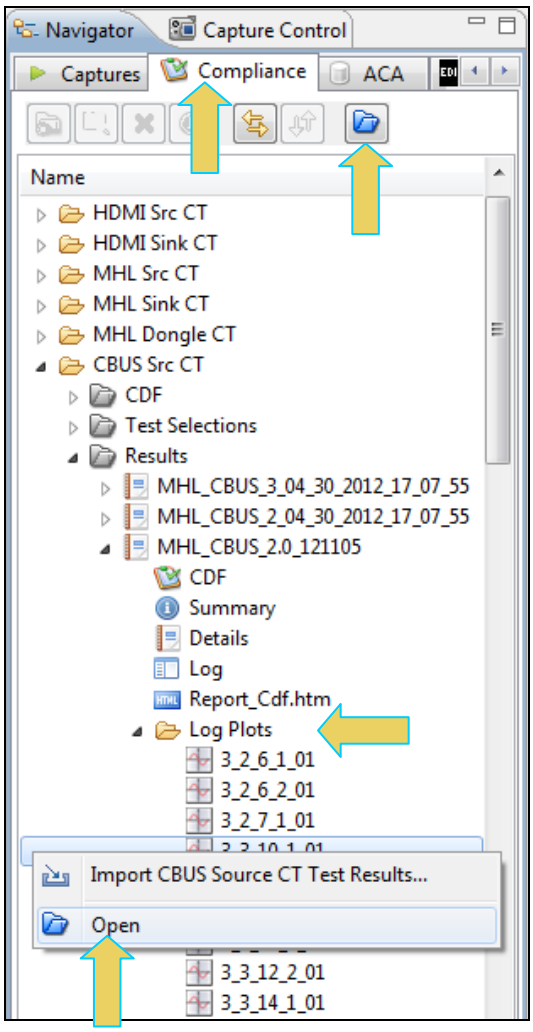
The **CBUS Log Plot** is useful diagnosing CBUS compliance test failures.

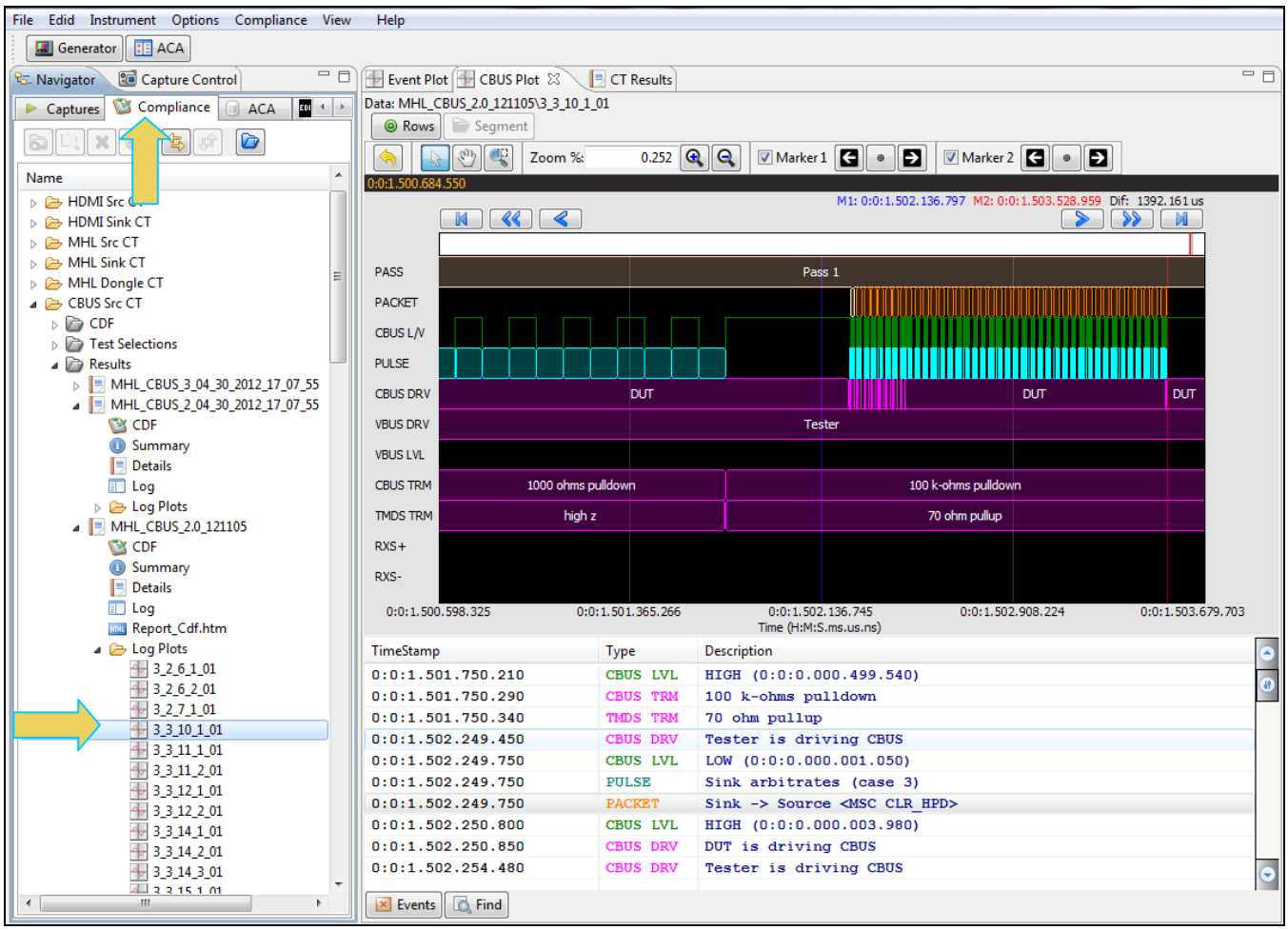
The example below shows a series of events captured during a source test. The test section and number are shown on the top of the panel.



6.1 Accessing the CBUS Log Plots

You can access the **CBUS Log Plot** through the **Navigator/Compliance** panel shown. There is a separate **CBUS Log Plot** for each test in a series of tests. Simply select the log and double click, select open from the right click menu or select the Open icon near the top of the panel to open a **CBUS Log Plot**. Refer to the following two screen shots to view the method of access for the **CBUS Log Plot**.

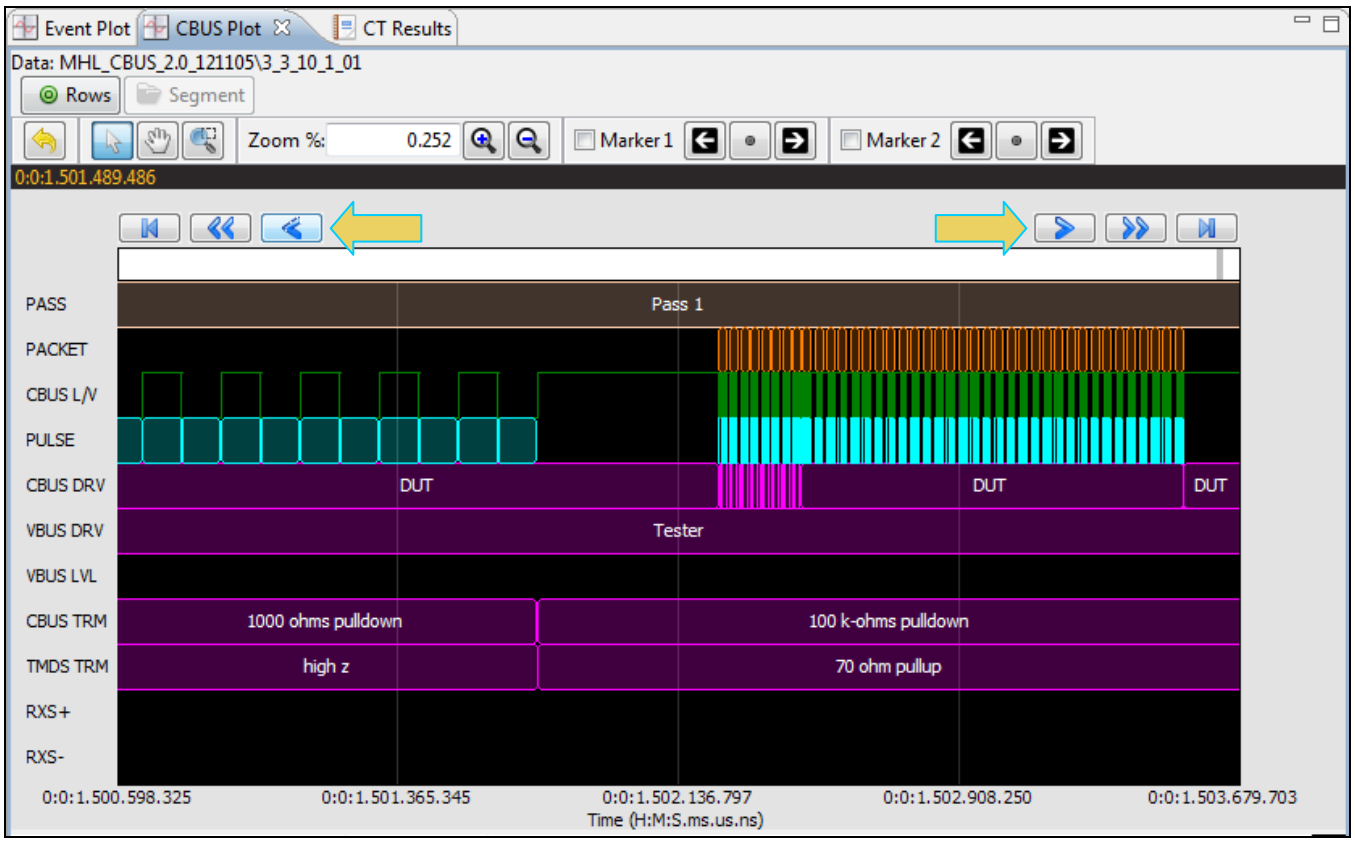

Navigator
Capture Control
Captures
Compliance
ACA
Name
HDMI Src CT
HDMI Sink CT
MHL Src CT
MHL Sink CT
MHL Dongle CT
CBUS Src CT
CDF
Test Selections
Results
MHL_CBUS_3_04_30_2012_17_07_55
MHL_CBUS_2_04_30_2012_17_07_55
MHL_CBUS_2.0_121105
CDF
Summary
Details
Log
Report_Cdf.htm
Log Plots
3_2_6_1_01
3_2_6_2_01
3_2_7_1_01
Import CBUS Source CT Test Results...
Open
3_3_12_2_01
3_3_14_1_01



6.2 Locating Data in the CBUS Log Plot Panel

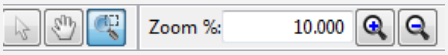
The **CBUS Log Plot** enables you to locate events by searching for specific event types, panning, scrolling and zooming using various techniques. You can filter the events by type to limit the amount of events to sift through. You can synchronize between the upper graphical section of the panel and the lower tabular section.

A scroll bar is provided to enable you to quickly browse through the data. The scroll bar is under the set of function icons just above the data panel where the data is displayed. You can also scroll to the end, scroll by page or scroll incrementally in either direction using the backward and forward activation buttons. See the screen shot below.


Event Plot
CBUS Plot
CT Results
Data: MHL_CBUS_2.0_121105\3_3_10_1_01
Rows
Segment
Zoom %: 0.252
Marker 1
Marker 2
0:0:1.501.489.486
PASS
PACKET
CBUS L/V
PULSE
CBUS DRV
VBUS DRV
VBUS LVL
CBUS TRM
TMDS TRM
RXS+
RXS-
Pass 1
DUT
DUT
DUT
Tester
1000 ohms pulldown
100 k-ohms pulldown
high z
70 ohm pullup
0:0:1.500.598.325
0:0:1.501.365.345
0:0:1.502.136.797
0:0:1.502.908.250
0:0:1.503.679.703
Time (H:M:S.ms.us.ns)

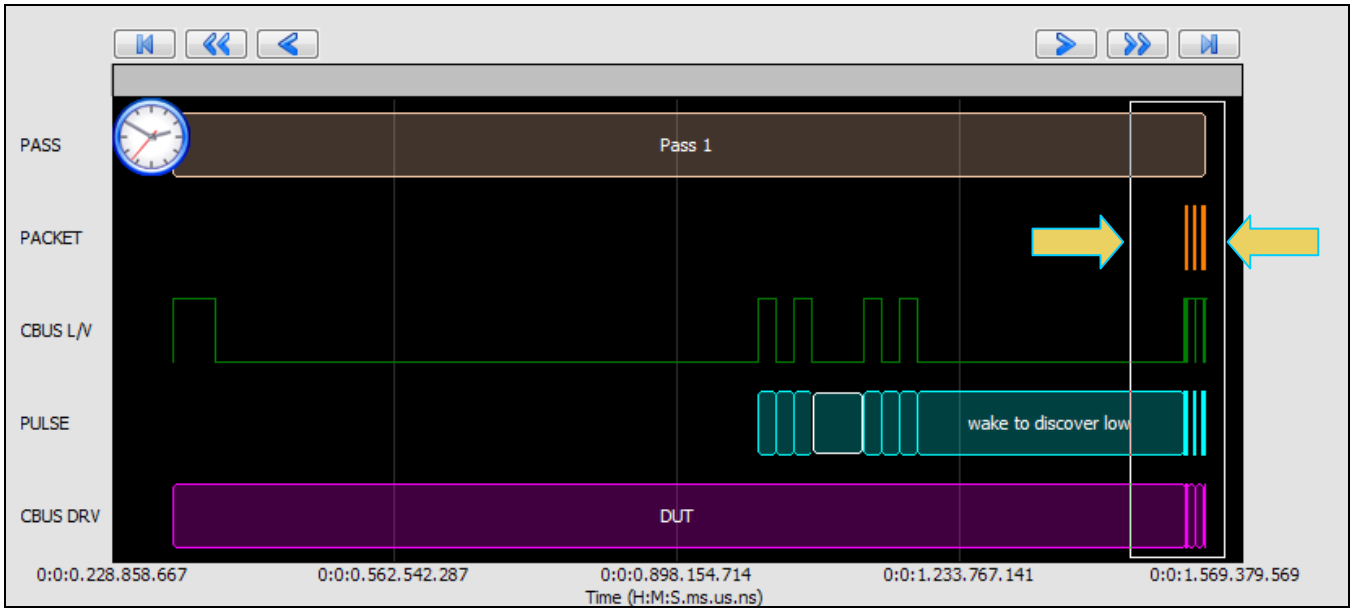
6.3 Viewing Events in the CBUS Log Plot Panel

You can zoom in and zoom out and pan across the events using the slide bars provided. You can also zoom by surrounding a specific section of the captured events. These functions are described in the following table.

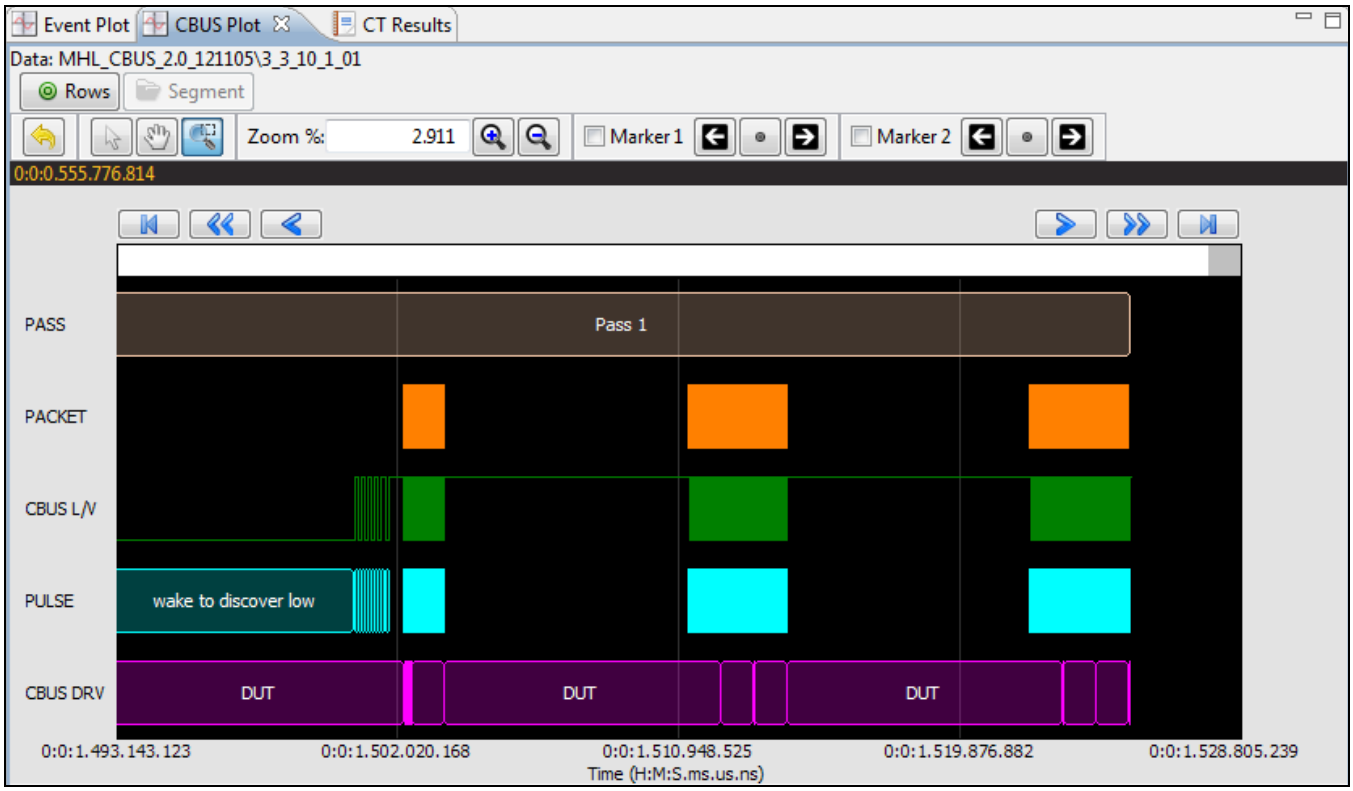
Even Plot Zoom & Panning Icons	Function
Icons – Zoom and Panning 	▪ Surround activation button – You can select an area of the **CBUS Log Plot** by clicking and dragging across. When you do this the new view will be limited to the horizontal range that you selected. The midpoint of the selection will become the new center of the data displayed. ▪ Zoom % – The **Zoom %** function enables you to enter a specific zoom amount in the associated field provided. ▪ Zoom In/Out icons – The Zoom In/Out function buttons enables you to zoom in and zoom out by clicking on the activation button. The centered point will remain the same. ▪ Panning – The panning function enables you scan across the data quickly by clicking and dragging. ▪ Pointer – The pointer icon enables you to click on any point and obtain information such as the data packet type and the timestamp, about that data packet. The information is displayed in a dark panel just above the scroll bar and below the icons.

6.3.1 Surrounding and Zooming with the Range Zoom tool

The **CBUS Log Plot** provides a Range Zoom tool . You can select an area of the plot by clicking and dragging across. When you do this the new view will be limited to the horizontal range that you selected. The midpoint of the selection will become the new center of the events displayed. The two screens below show an example of surrounding a segment of data. The rectangular section identified by the arrows in the screen example below indicates the section that is surrounded. The second view shows the resulting view.



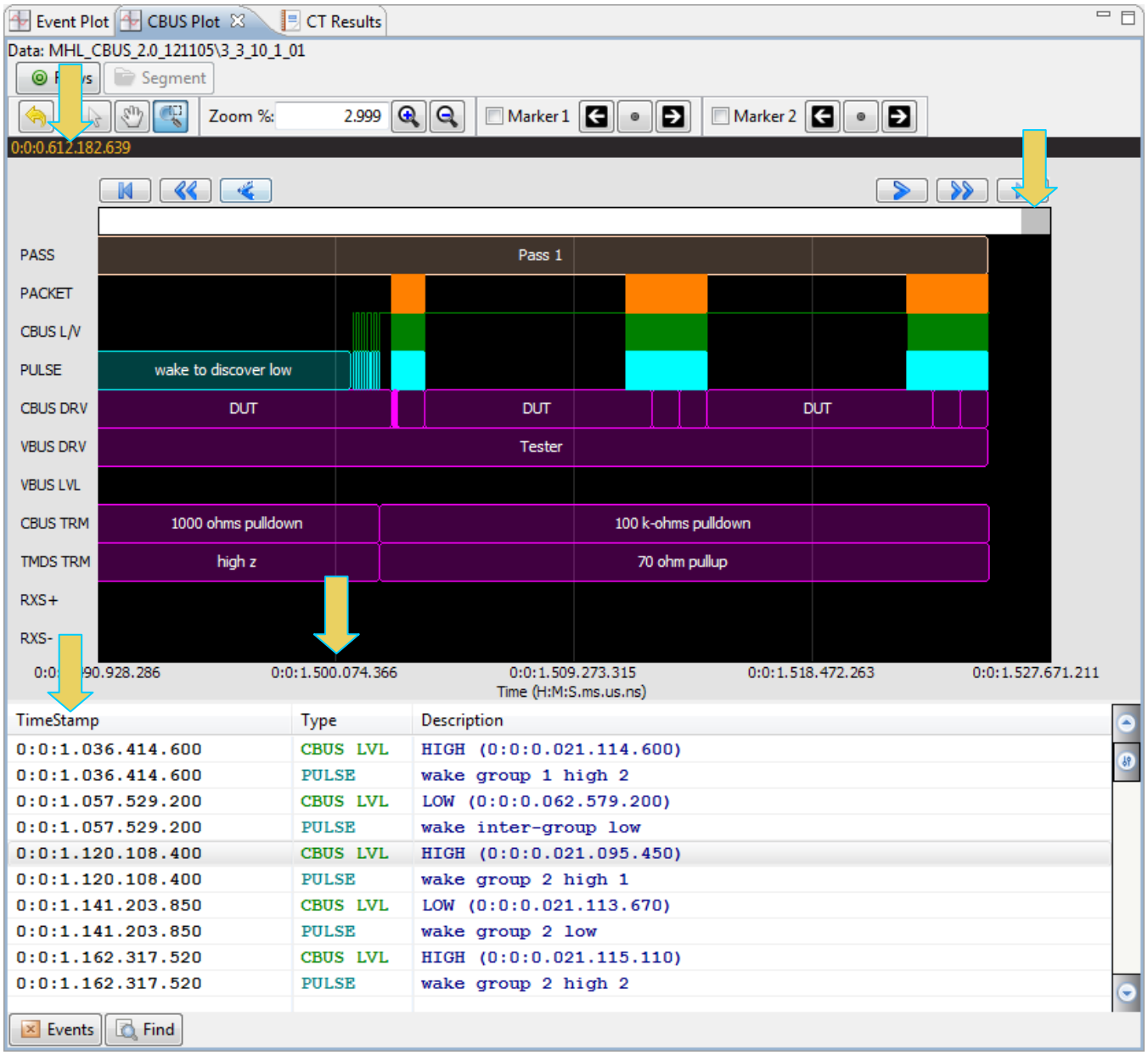
The resulting view is shown below.



6.4 Viewing the Timestamps of the Events

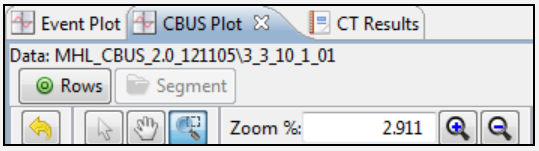
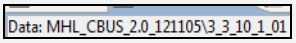
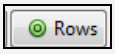
There is a scroll bar on the status panel just above the events that indicates the location of the scroll bar. When you scroll or pan through the data, the timestamps are shown in the status panel below the window where the events are displayed. If you use the pointer tool to select a particular event, the timestamp will be shown in the dark strip above the graphical window and below the control icons. The timestamp in this area always reflects the location of

the cursor. Also when you click on an item in the graphical window the event item will be shown in lower table view. In the example below, a selection has been made on a sync pulse with the pointer tool.



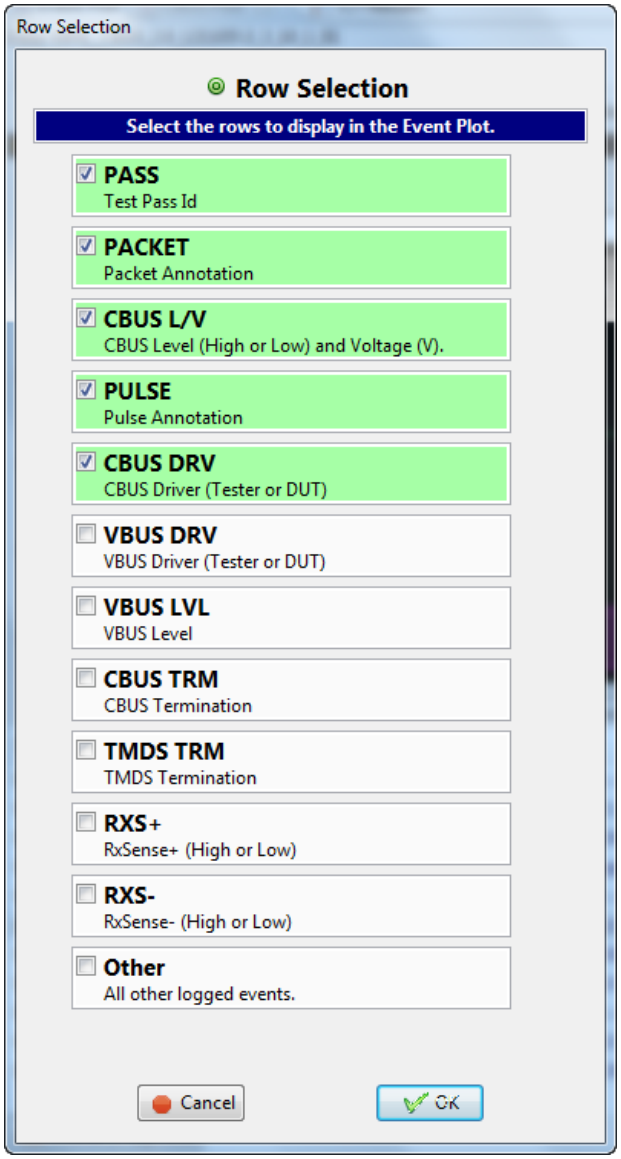
6.5 General Controls – CBUS Log Plot

The various other icons and controls in the **CBUS Log Plot** are described in the tables and screens that follow. There are two tables below, one describing the icons on the top and a second table describing the items on the bottom of the **CBUS Log Plot**.

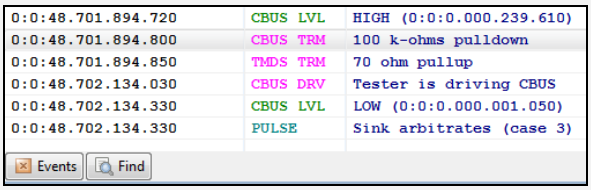
CBUS Log Plot Icons – Upper Status Section	Function
Icons – General Control 	▪ User path status  – shows the name of the capture file and its location. ▪ Rows  – The Rows activation button enables you to configure the data types that appears in the CBUS Log Plot window. When you click on this icon a dialog box appears enabling you to configure the rows. This dialog box is described further below. ▪ Segment – Large captures are broken into smaller distinct sections called segments to make them more manageable and to improve speed and performance. When you click on the Segment activation button, a dialog box appears enabling you to select and load another segment. In the example to the left, there are no segments to the button is grayed out (as shown in the example).

6.5.1 Configuring Row Information on the CBUS Log Plot

You can customize the CBUS events that appear on the **CBUS Log Plot** Row using the Row configuration dialog. The default configuration is shown below. Simply check the additional items that you wish to show in the **CBUS Log Plot**. Then click OK.



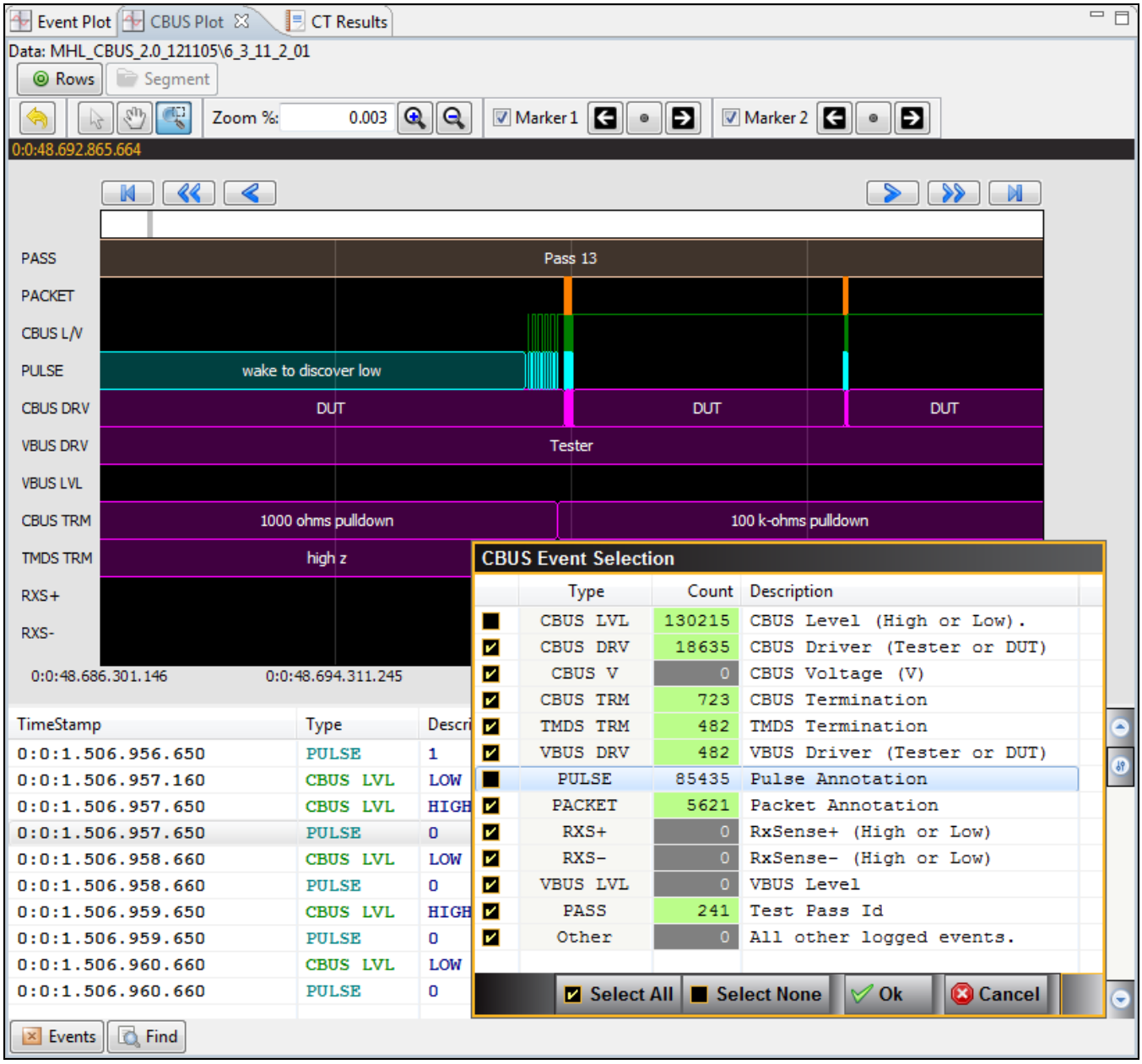
The various other icons and controls in the **CBUS Log Plot** are described in the tables and screens that follow.

CBUS Log Plot Icons – Bottom Status Section	Function
Icons – General Control 	▪ Events – The Events activation button enables you to filter the captured data by type. When you click on the Events button a dialog box appears enable you do select or deselect data types individually or a page at a time. This dialog box is described further below. ▪ Find – The Find activation button enables you to locate captured data by type. When you click on the Find button a dialog box appears enable you do specify

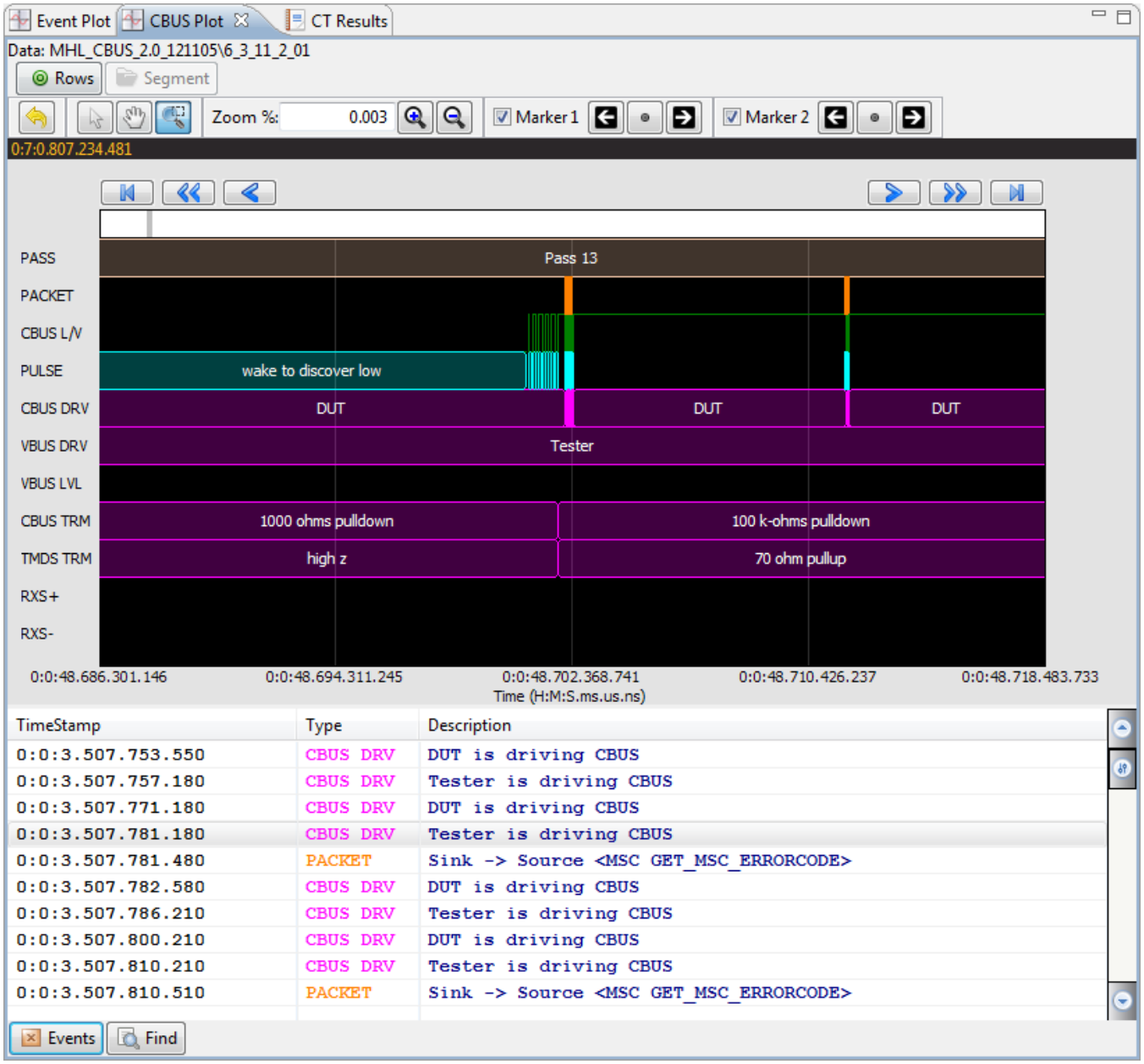
CBUS Log Plot Icons – Bottom Status Section	Function
	a data type to search on. This dialog box is described further below.

6.5.2 Filtering Events on the CBUS Log Plot

You can filter the CBUS events that appear on the **CBUS Log Plot** using the **Event** button and associated dialog box. Simply click on the **Event** button and check the event types on the dialog box that you wish to view on the **CBUS Log Plot**. Then click OK. The screen examples below depict an Event filter scenario.

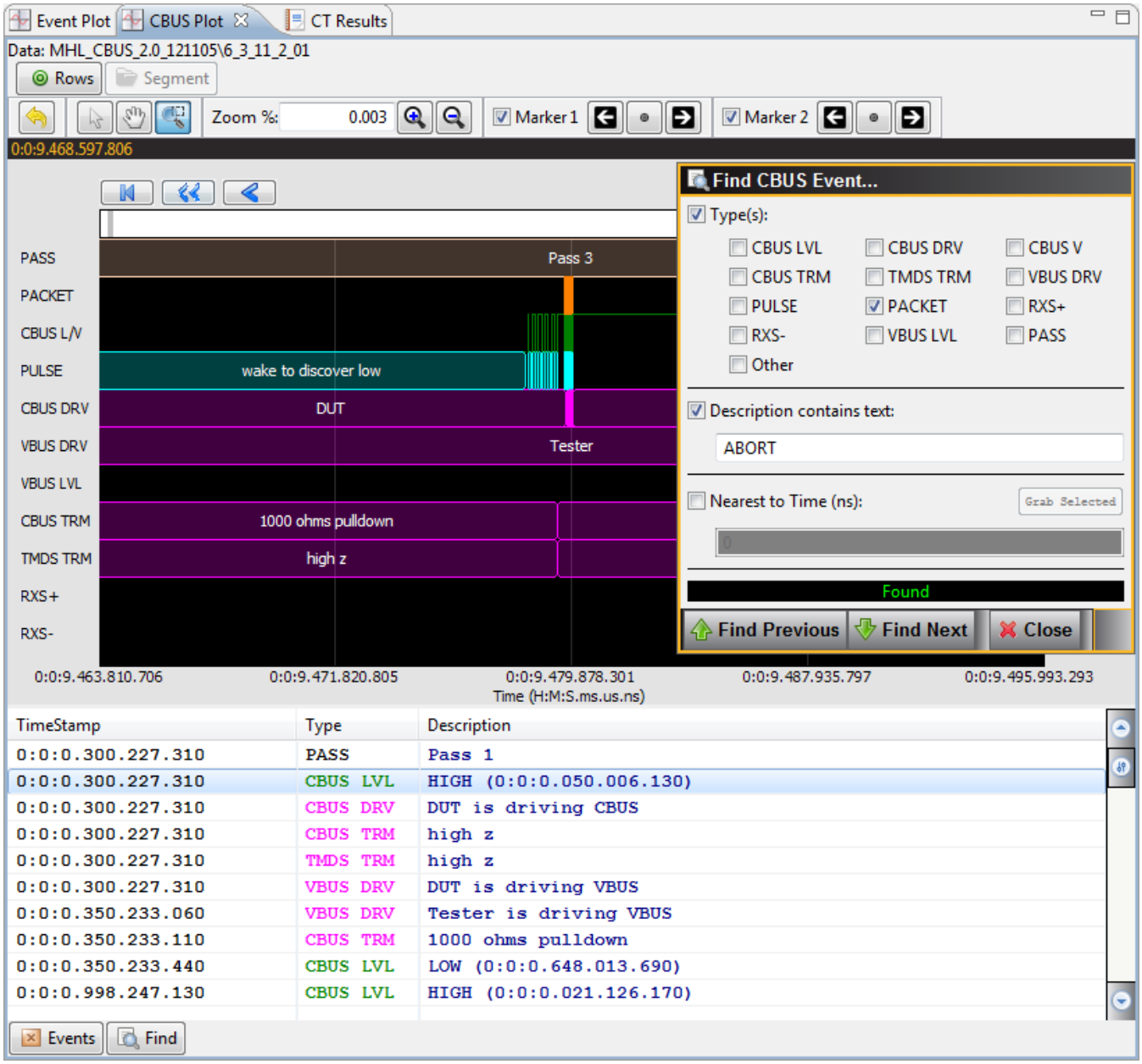


The resulting view is shown on the screen example below.

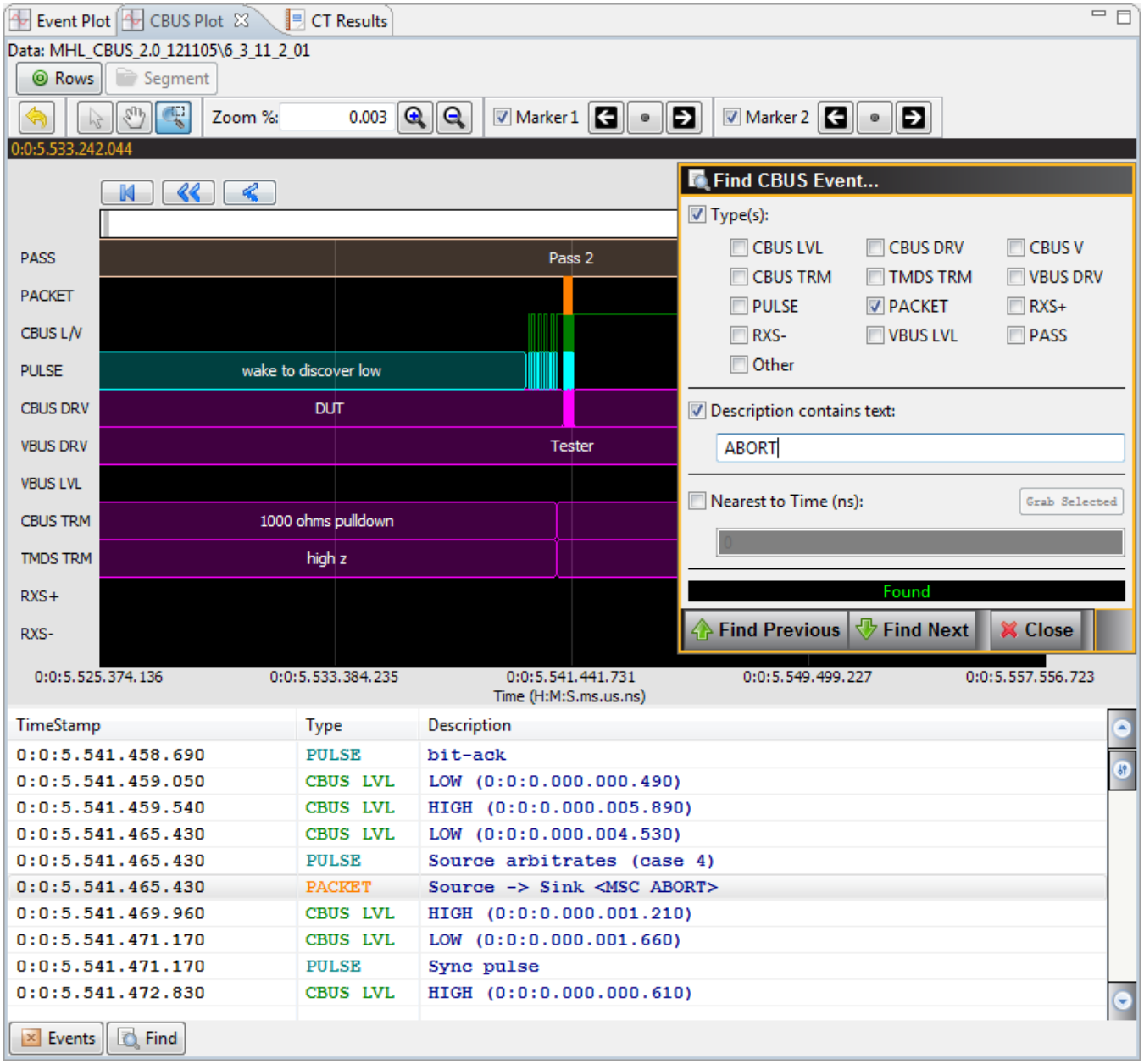


6.5.3 Finding Events on the CBUS Log Plot

You can locate specific CBUS events in the **CBUS Log Plot** using the **Finnd** button and associated dialog box. Simply click on the **Find** button and check the event type and text string on the dialog box for the Event that you looking for on the **CBUS Log Plot**. Then click OK. The screen examples below depict an Event filter scenario.


Event Plot
CBUS Plot
CT Results
Data: MHL_CBUS_2.0_121105\6_3_11_2_01
Rows
Segment
Zoom %: 0.003
Marker 1
Marker 2
0:0:9.468.597.806
PASS
PACKET
CBUS L/V
PULSE
CBUS DRV
VBUS DRV
VBUS LVL
CBUS TRM
TMDS TRM
RXS+
RXS-
Pass 3
wake to discover low
DUT
Tester
1000 ohms pulldown
high z
0:0:9.463.810.706
0:0:9.471.820.805
0:0:9.479.878.301
0:0:9.487.935.797
0:0:9.495.993.293
Time (H:M:S.ms.us.ns)
Find CBUS Event...
Type(s):
CBUS LVL
CBUS DRV
CBUS V
CBUS TRM
TMDS TRM
VBUS DRV
PULSE
PACKET
RXS+
RXS-
VBUS LVL
PASS
Other
Description contains text:
ABORT
Nearest to Time (ns):
Grab Selected
Found
Find Previous
Find Next
Close
TimeStamp
Type
Description
0:0:0.300.227.310 PASS Pass 1
0:0:0.300.227.310 CBUS LVL HIGH (0:0:0.050.006.130)
0:0:0.300.227.310 CBUS DRV DUT is driving CBUS
0:0:0.300.227.310 CBUS TRM high z
0:0:0.300.227.310 TMDS TRM high z
0:0:0.300.227.310 VBUS DRV DUT is driving VBUS
0:0:0.350.233.060 VBUS DRV Tester is driving VBUS
0:0:0.350.233.110 CBUS TRM 1000 ohms pulldown
0:0:0.350.233.440 CBUS LVL LOW (0:0:0.648.013.690)
0:0:0.998.247.130 CBUS LVL HIGH (0:0:0.021.126.170)
Events
Find

The result is shown on the screen example below.



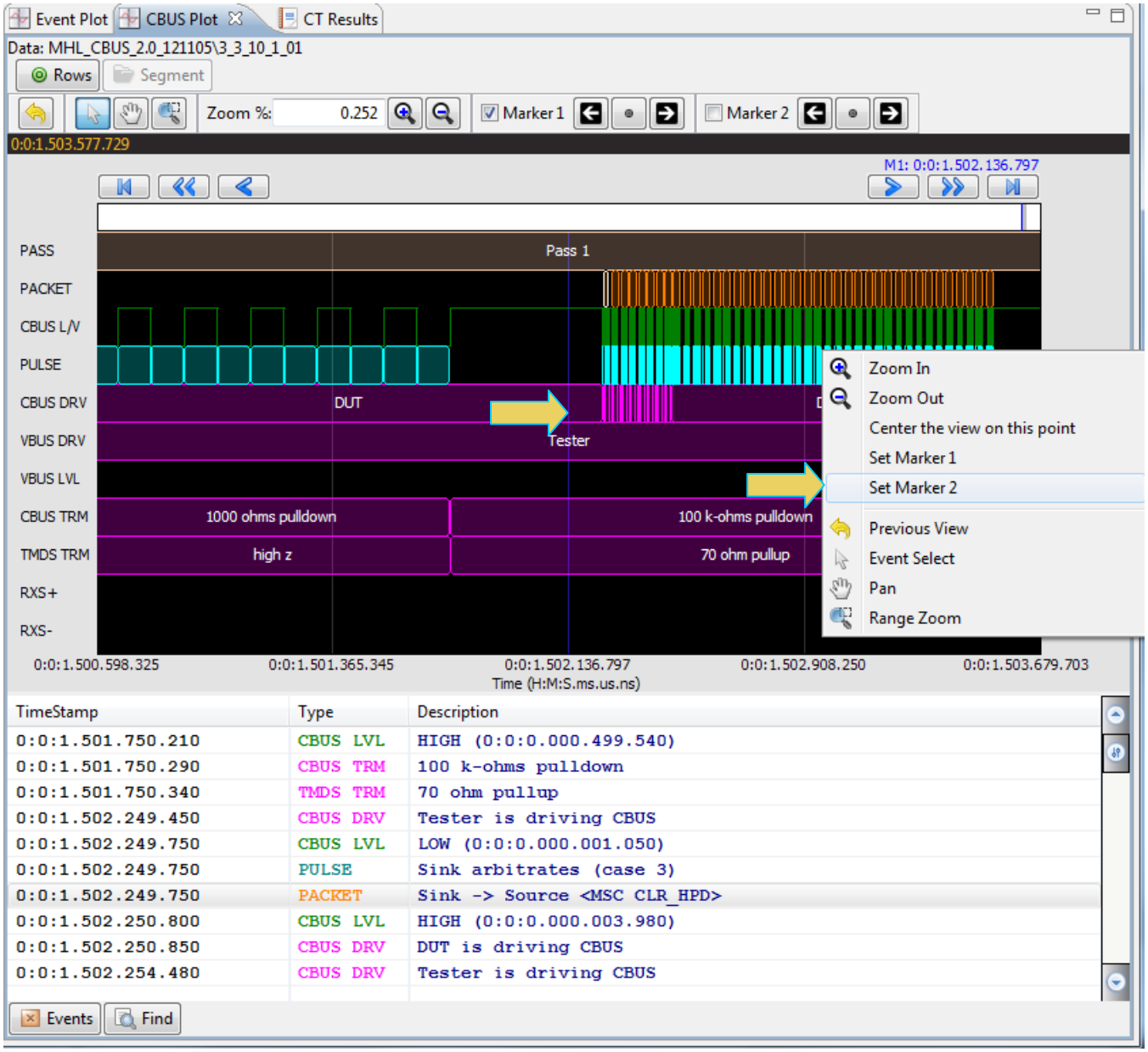
6.6 Working with Markers

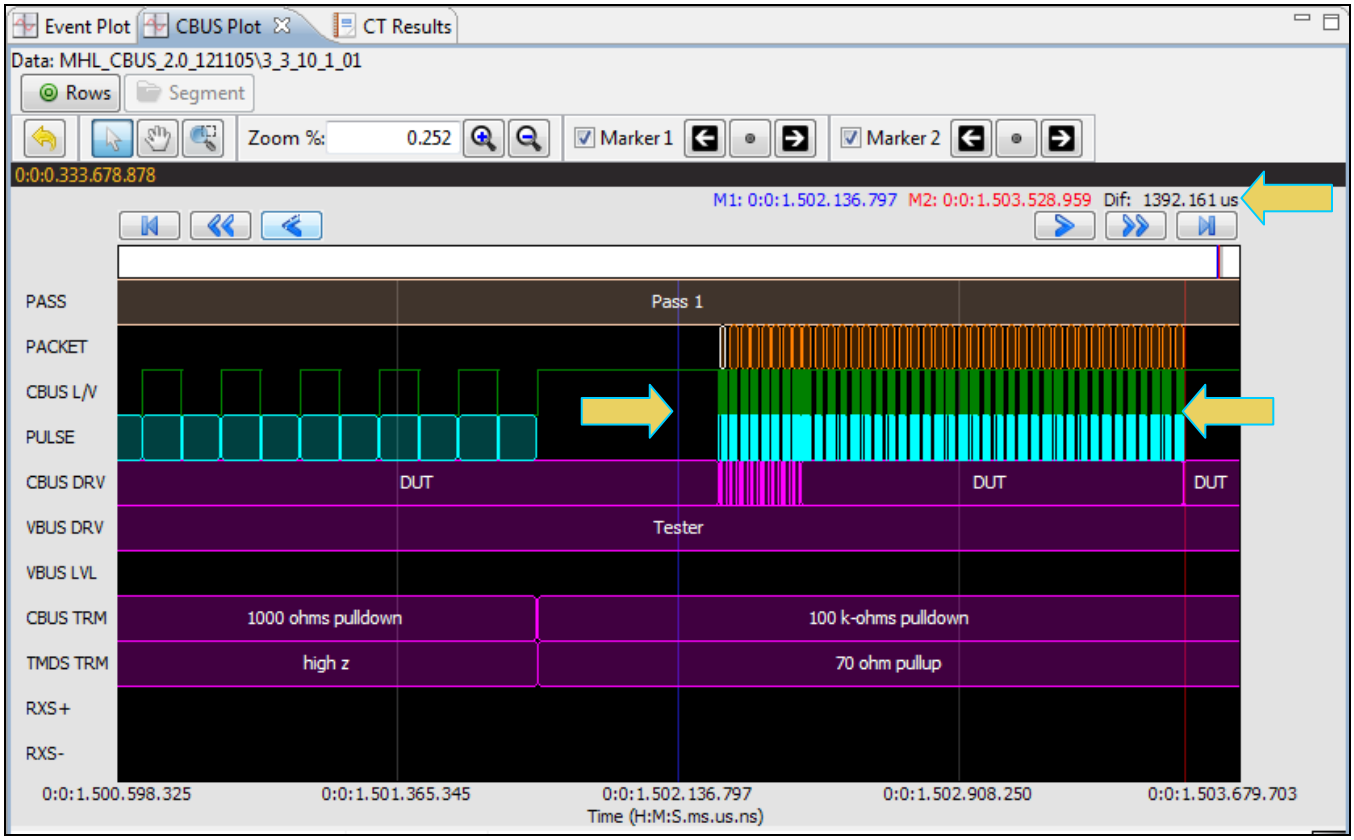
The **CBUS Log Plot** panel enables you to view the events at a high level and identify points of interest for further analysis. You can set two cursors or "markers" in the **Plot** at particular points of interest. The **CBUS Log Plot** will show you the time difference between the two cursors. You can fine tune the position of the cursors with the left and right arrows associated with each marker

. The center icon allows you to center the particular marker on the **CBUS Log Plot** window. The screens below show the markers being set and the resulting markers placed in the **CBUS Log Plot** panel. Note that you can also set the markers using the right

click menu also shown below and this is the preferred method because the markers will appear exactly where you right click.

You can see the timestamp associated with each marker which are color coded (blue and red) just above the area where the data is shown. The dark text to the right shows the difference in microseconds and pixels between the two markers. Examples are shown in the following two screen shots.




Event Plot
CBUS Plot
CT Results
Data: MHL_CBUS_2.0_121105\3_3_10_1_01
Rows
Segment
Zoom %: 0.252
Marker 1
Marker 2
0:0:0.333.678.878
M1: 0:0:1.502.136.797 M2: 0:0:1.503.528.959 Dif: 1392.161 us
PASS
PACKET
CBUS L/V
PULSE
CBUS DRV
VBUS DRV
VBUS LVL
CBUS TRM
TMDS TRM
RXS+
RXS-
Pass 1
DUT
DUT
DUT
Tester
1000 ohms pulldown
100 k-ohms pulldown
high z
70 ohm pullup
0:0:1.500.598.325
0:0:1.501.365.345
0:0:1.502.136.797
0:0:1.502.908.250
0:0:1.503.679.703
Time (H:M:S.ms.us.ns)