



# **SL-863 MHL AVLink/CBUS Analyzer 3.0**

## **User Guide**

Simplay-UG-1006-A

July 2014

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# 1. Introduction

## 1.1. Scope

Mobile High-Definition Link (MHL<sup>®</sup>) is a new generation interface, which enables high-definition content transfer from mobile devices to display devices.

Simplay Labs MHL 3.0 AVLink/CBUS Analyzer 3.0, SL-863, is designed for MHL Source/Sink/Dongle DUT audio/video/eCBUS testing.

The SL-863 analyzer 3.0 is used in conjunction with Simplay Labs Universal Test System (UTS) testing platform. The SL-863 analyzer 3.0 can provide the following MHL testing capabilities:

1. Receive MHL 3.x stream, analyze, and re-encode back to the HDMI stream to display on an HDMI capable AV display.
2. Measure A/V timing of the received MHL 3 stream. Determine A/V format, pixel encoding, and pixel repetition.
3. Analyze eCBUS/ oCBUS commands and determine its validity.
4. Analyze AVI InfoFrame and Audio InfoFrame.
5. Send MHL 3 stream to sink DUT with required pattern and formats.
6. Provide EDID contents and monitor EDID access.
7. Support 3D formats and 3D mode handshake procedure test.
8. Support source and sink/dongle MHL 3 TMDS coding test.
9. Verify RBP and other MHL 3 system command.



Figure 1.1. SL-863 MHL 3 AVLink/CBUS Analyzer Hardware

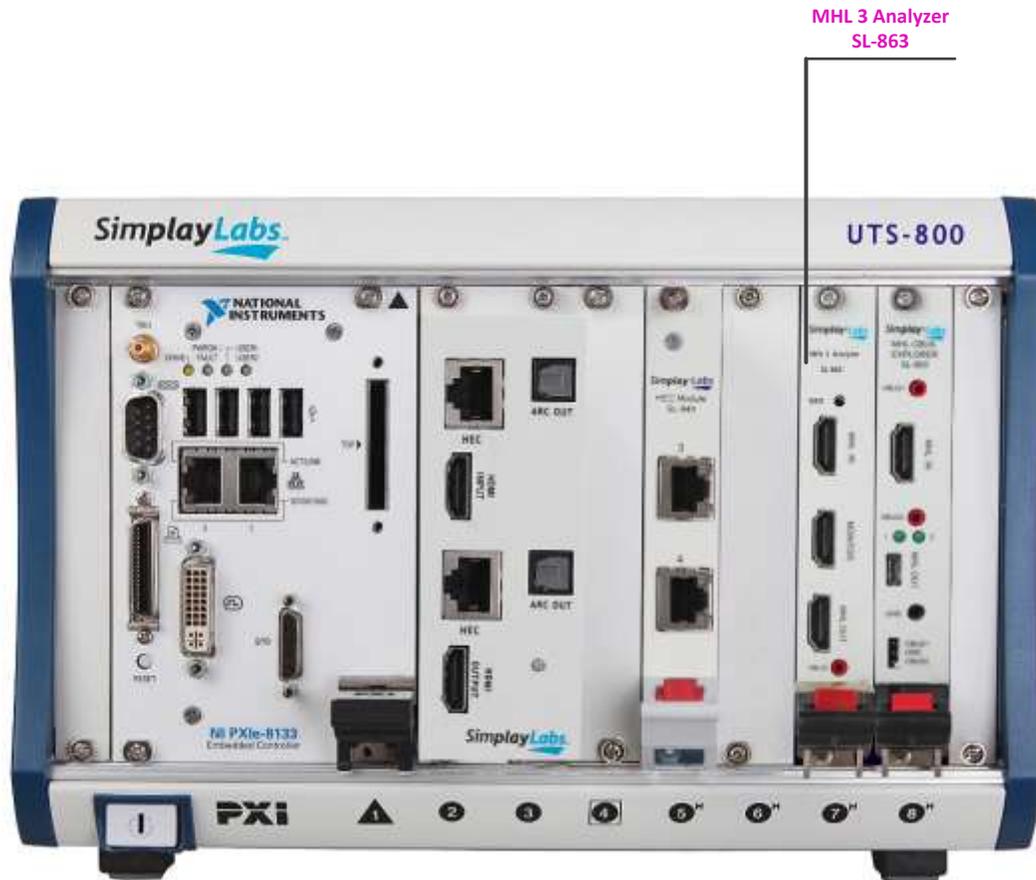
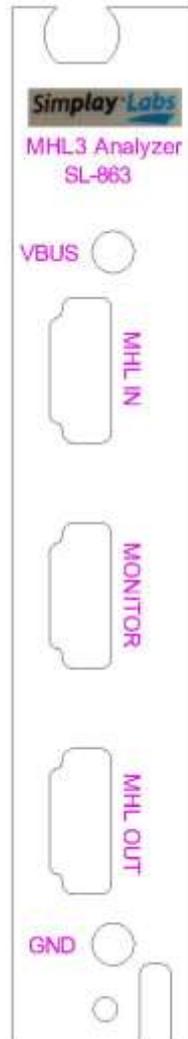


Figure 1.2. SL-863 Analyzer 3.0 Installed in UTS-800 Chassis

## 1.2. Hardware Interfaces

The following [Figure 1.3](#) is the Front Panel of the SL-863 MHL Receiver (Rx)/Transmitter (Tx) Analyzer 3.0.



**Figure 1.3. Schematic Presentation of SL-863 MHL Rx/Tx CBUS Analyzer 3.0 Front Panel**

The port functions are listed in the following [Table 1.1](#).

**Table 1.1. Front Panel Port Function**

Port Name	Function
MHL IN	Connect to MHL 3 Source DUT.
MHL OUT	Connect to SL-863 PB fixture board, then SL-863 PB fixture board is connected to MHL 3 Sink/Dongle DUT.
MONITOR	Connect to an external display with HDMI Port. <ul style="list-style-type: none"> <li>In source DUT test, the monitor displays the Audio/Video coming from Source DUT.</li> <li>In sink DUT test, the monitor displays the Audio/Video stream self-generated by the analyzer, and sends the stream to sink DUT.</li> </ul>
VBUS	For monitoring the VBUS voltage level.
GND	Ground level for VBUS voltage monitoring.

## 2. Installation

This section explains how to set up the SL-863 testing facility.

### 2.1. Package Contents

The Simplay Labs MHL 3 Protocol Analyzer package contains the following components:

- MHL 3.0 AVLink/CBUS Analyzer module, SL-863.
- MHL 3 Cable
- Source/Sink test fixtures, SL863PB

The SL-863 software, including its drivers and RTL update (if applicable), can be downloaded from Simplay Labs website ([http://www.simplaylabs.com/support/product\\_support.aspx](http://www.simplaylabs.com/support/product_support.aspx)).

### 2.2. System Requirements

The application for SL-863 can only be operated on a Simplay Labs UTS-800 test platform, running Microsoft Windows 7 64-bit operating system.

### 2.3. Driver Installation

Follow these steps to install the driver on UTS-800. This installation only needs to be done once.

1. Open the Device Manager on the Test Control Unit. If the driver is not previously installed on the TCU, you can find the device named “PCI Memory Controller” in “Other devices” (Figure 2.1).

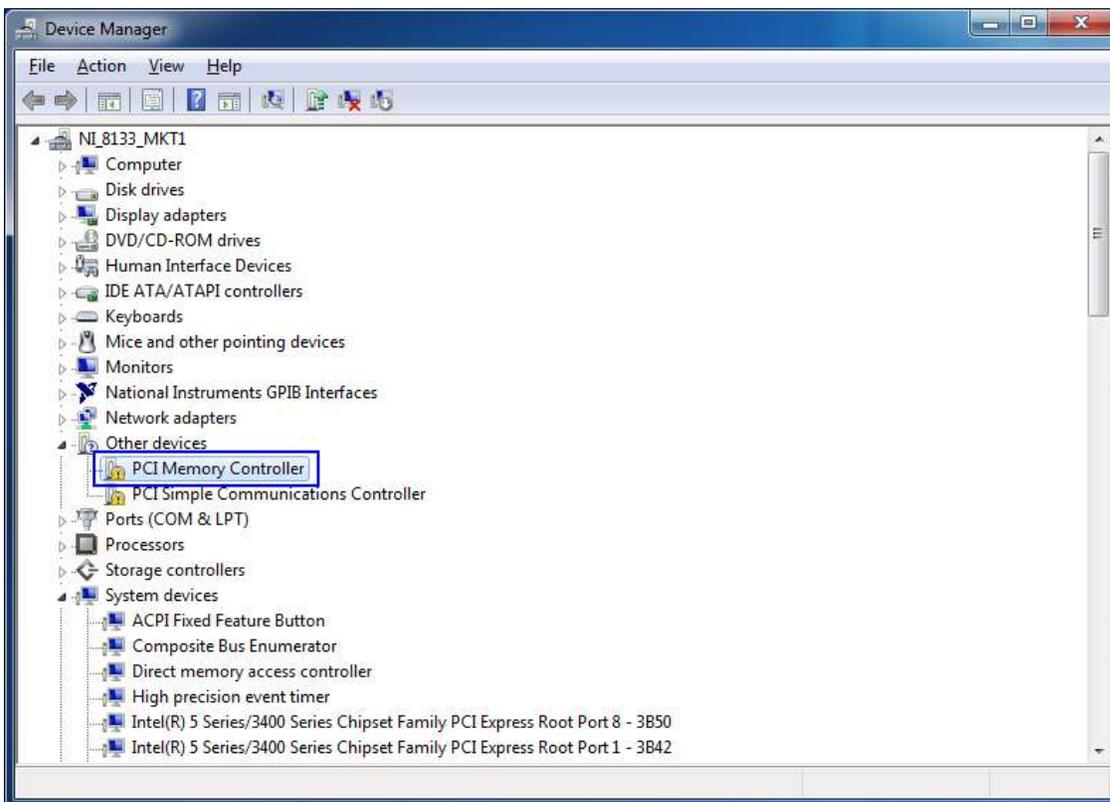


Figure 2.1. Device Manager

2. Right click “PCI Memory Controller”, and select the “Update Driver Software...” menu item (as shown in Figure 2.2).

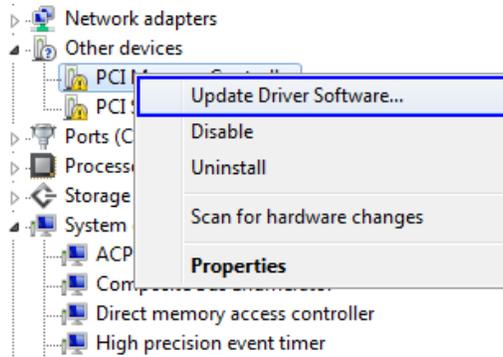


Figure 2.2. Popup Menu for Driver Update

- From the pop-up dialog, select “Browse my computer for driver software” (Figure 2.3).

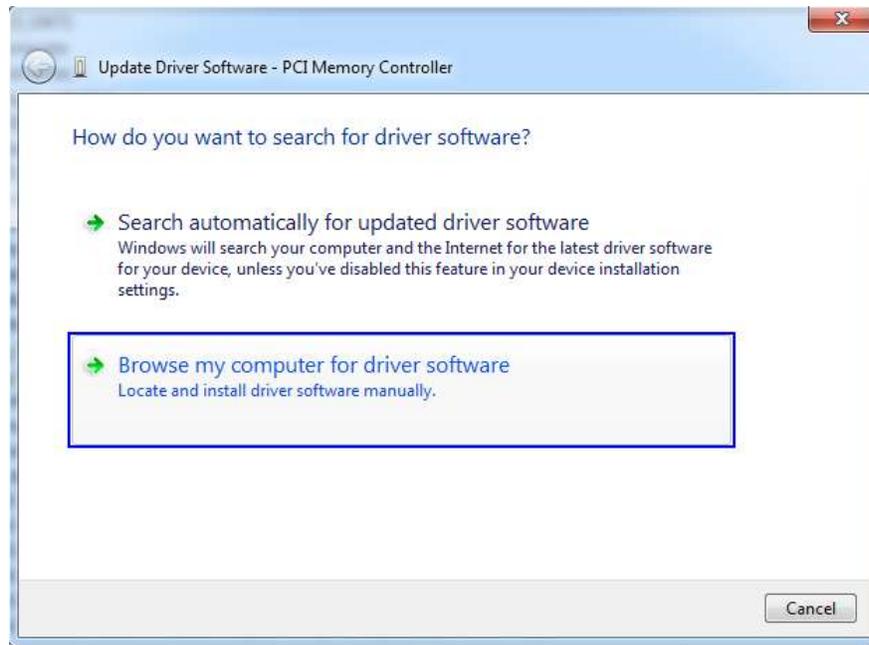


Figure 2.3. Driver Upgrade Dialog (1)

- From the following dialog (Figure 2.4), click the “Browse...” button. Select the folder which contains the driver. Click the “Next” button to continue.



Figure 2.4. Driver Upgrade Dialog (2)

5. Select "Install the driver software anyway" from the pop-up window (Figure 2.5).

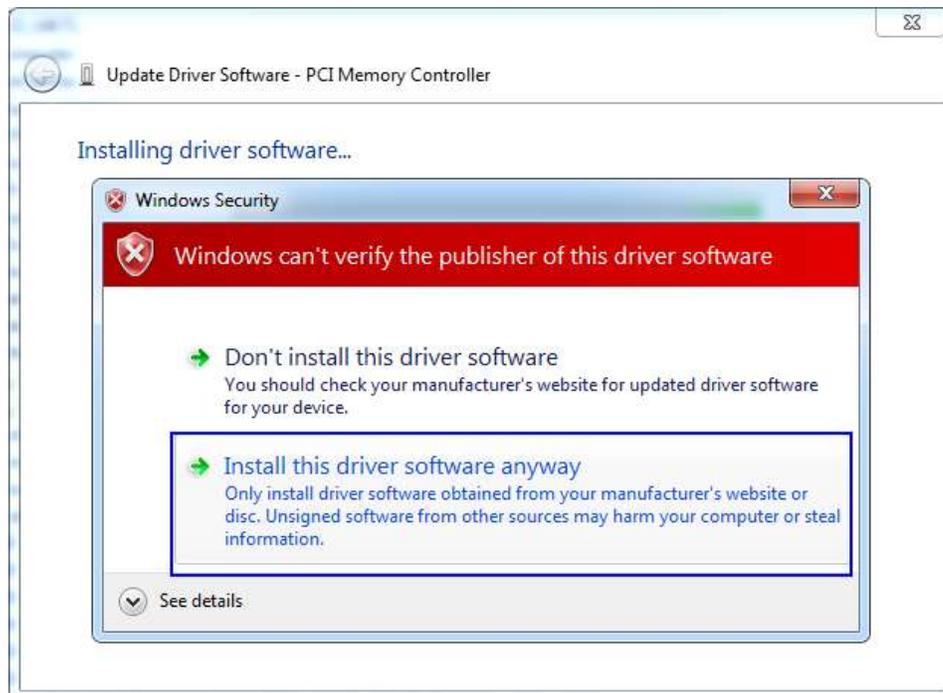
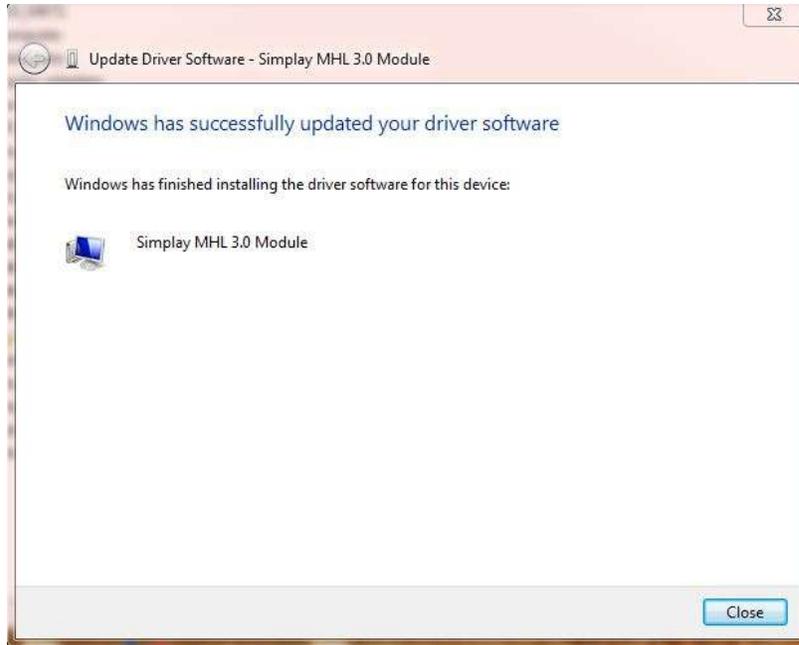


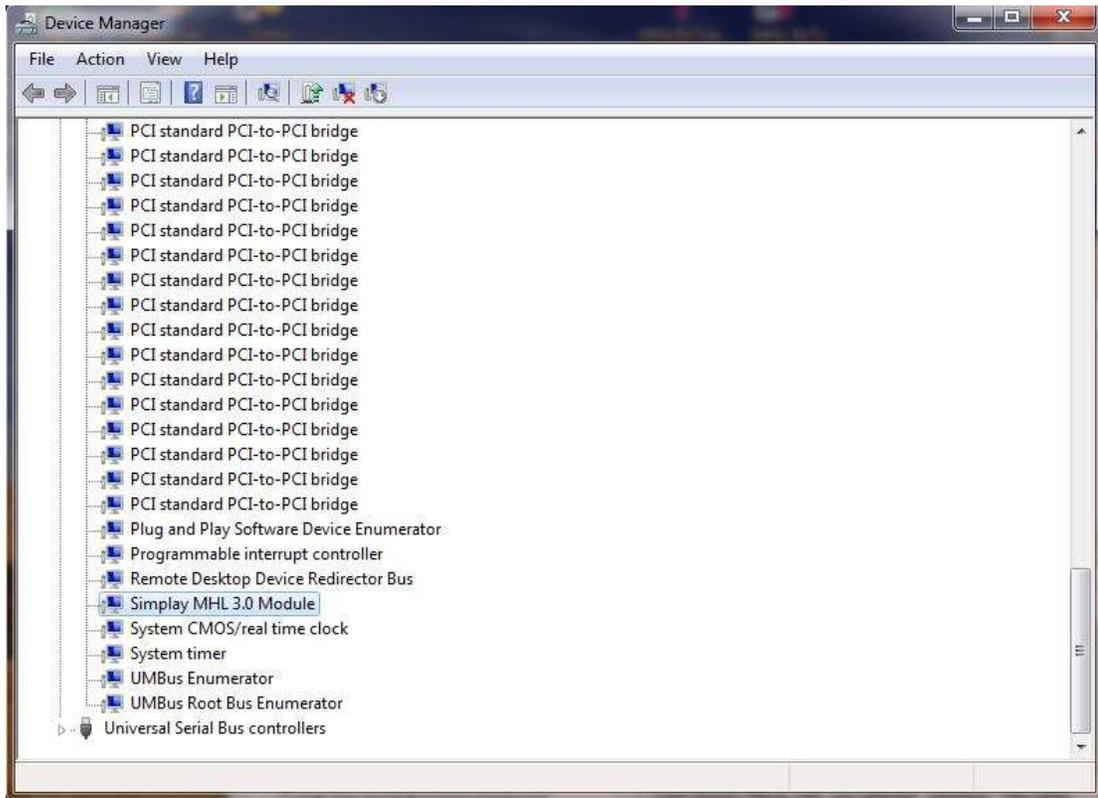
Figure 2.5. Windows Security Dialog

6. After the driver is installed, you can see the following dialog (Figure 2.6).



**Figure 2.6. Driver Installed Successfully**

7. At the same time, you can find the installed driver from the Device Manager ([Figure 2.7](#)).



**Figure 2.7. The Installed Driver in the Device List**

## 2.4. Microsoft .NET Framework Installation

The software for the SL-863 analyzer requires Microsoft .NET Framework and Visual C++ 2010 Redistributable Package in order to work properly. Before installing the software, go to Microsoft website and obtain both installers. Following are the links from Microsoft:

- <http://www.microsoft.com/net/downloads>
- <http://www.microsoft.com/en-us/download/details.aspx?id=5555>

### 3. SL-863 MHL Rx/Tx CBUS Analyzer 3.0 Application

The software application for SL-863 covers all test listed in MHL 3 CTS. With this application, you can load MHL 3 CDF files, select test, and run the test in sequence. Brief test results are shown in the Graphic User Interface (GUI) Main Window. Details of the test results can be found from the log file saved to your local disk.

Follow these steps to perform the CTS testing.

1. Double click the “MHL 3 CTS Test Explorer” shortcut from your desktop to launch the GUI.  
The main window for SL-863 MHL Rx/Tx CBUS Analyzer 3.0 is shown as follows (Figure 3.1)

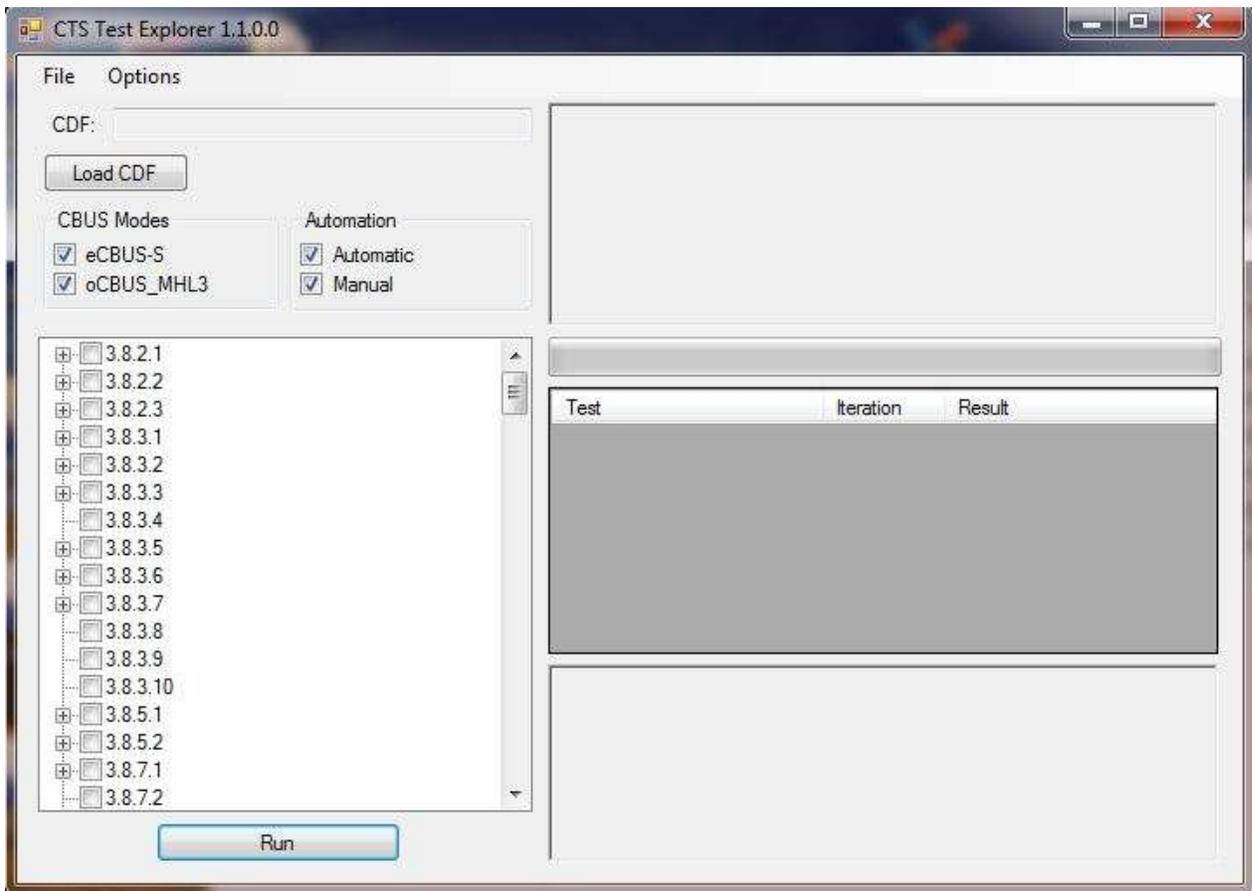


Figure 3.1. Main Window of SL-863 MHL Rx/Tx CBUS Analyzer 3.0

2. Click the “Load CDF” button to load the correct Customer Declaration Form (CDF) for source, sink, or dongle DUT. The default CDFs are included with the software bundle, and store in the `C:\<users>\<user_name>\Documents\Simplay MHL 3.0 CTS Test` directory. You need to modify the CDFs according to the Device Under Test (DUT) performance information.  
All the requested test items show up in the left side of the GUI. Tests are sorted by CBUS mode. Each mode has automated testing and manual testing.
3. Check the desired test case. Single choice or multiple choices are allowed.
4. Click the “Run” button to start the test.
5. The log files are stored in the same folder as that of the CDF (Figure 3.3).

### 3.1. Loading Customer Declaration Form (CDF)

Customer Declaration Form (CDF) file is with “.ini” extension, which is a text-based file and can be modified easily. For certain DUT, you need to fill the CDF file according to the DUT’s capabilities and features.

Open the .ini file in any text editor. Edit the CDF file. Normally, a supported feature has the value “=1”, while an unsupported feature has the value “=0”.

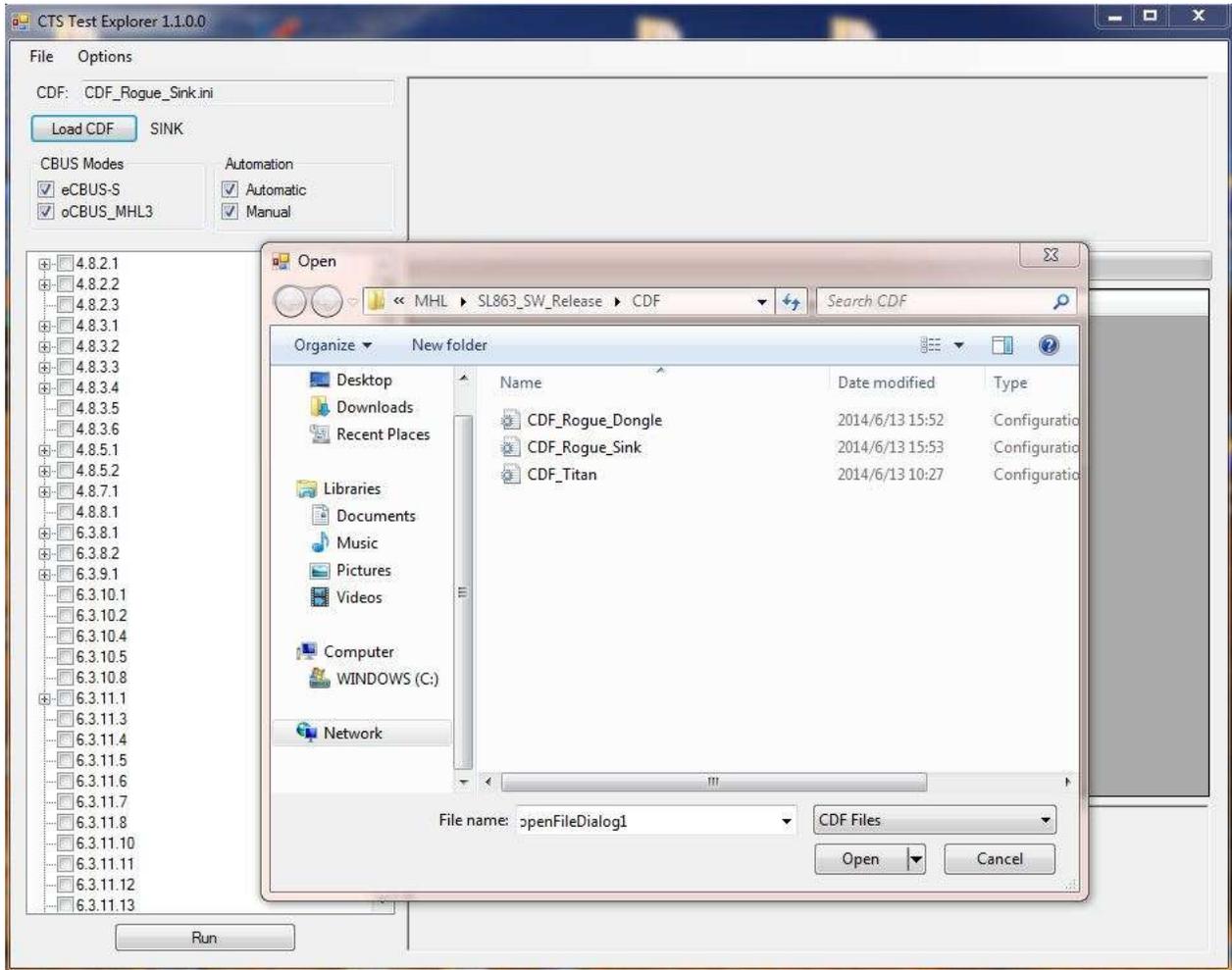


Figure 3.2. Loading CDF

### 3.2. Run Tests

After loading CDF file, test cases are listed in the left-tree view (Figure 3.4). Select desired tests. Press the “Run” button to run a series of test.

The Options menu gives you additional control while running test. See Figure 3.3 and Table 3.1.

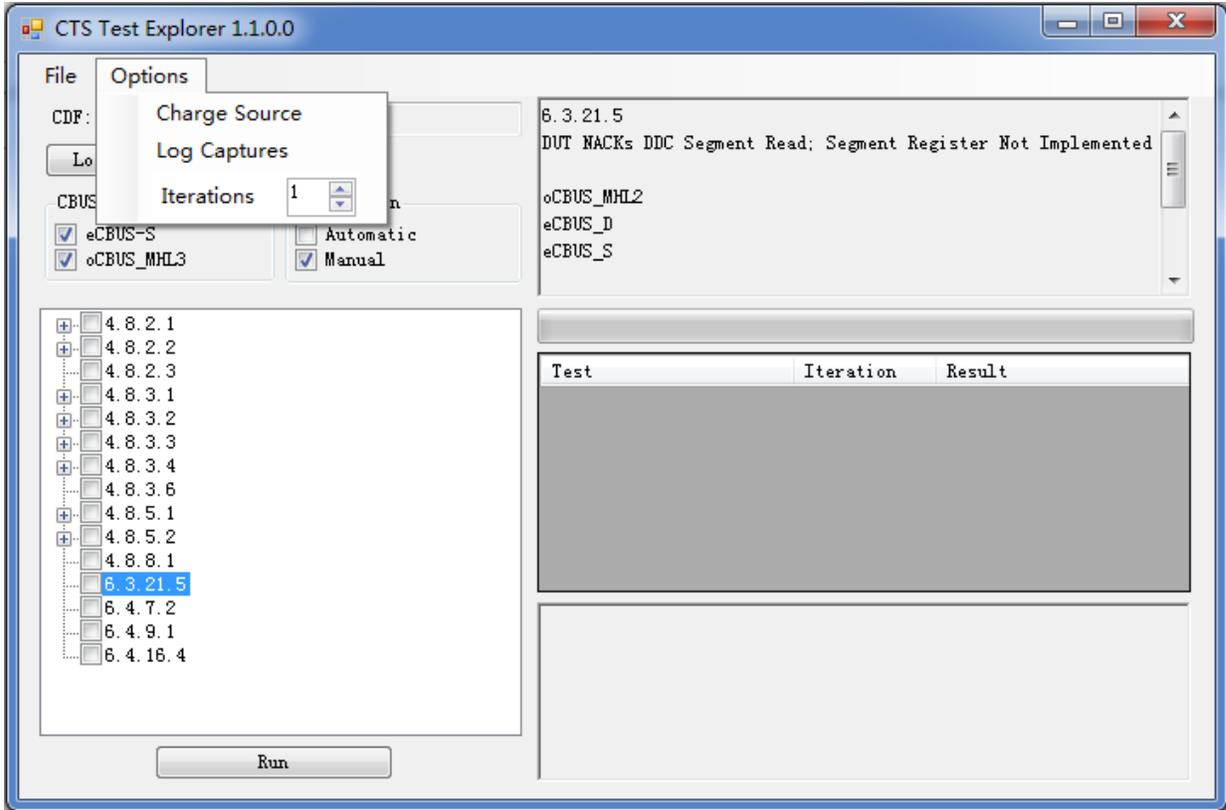


Figure 3.3. Options Menu

Table 3.1. Function of Option Menu Items

Options Menu Item	Function
Charge Source	When testing Source DUT, 5 volt power is supplied to Source DUT to maintain the power level of DUT.
Log Capture	CBUS logging data is saved under the same folder as that of the results for further analysis. Normally when a test is for CBUS analysis and the result shows failure, the log file shows the captured data.
Iterations	The default number is 1. All the selected test cases will run once. You can adjust the number by using the up and down arrows beside the number. All the selected cases will run multiple times upon the number you set.

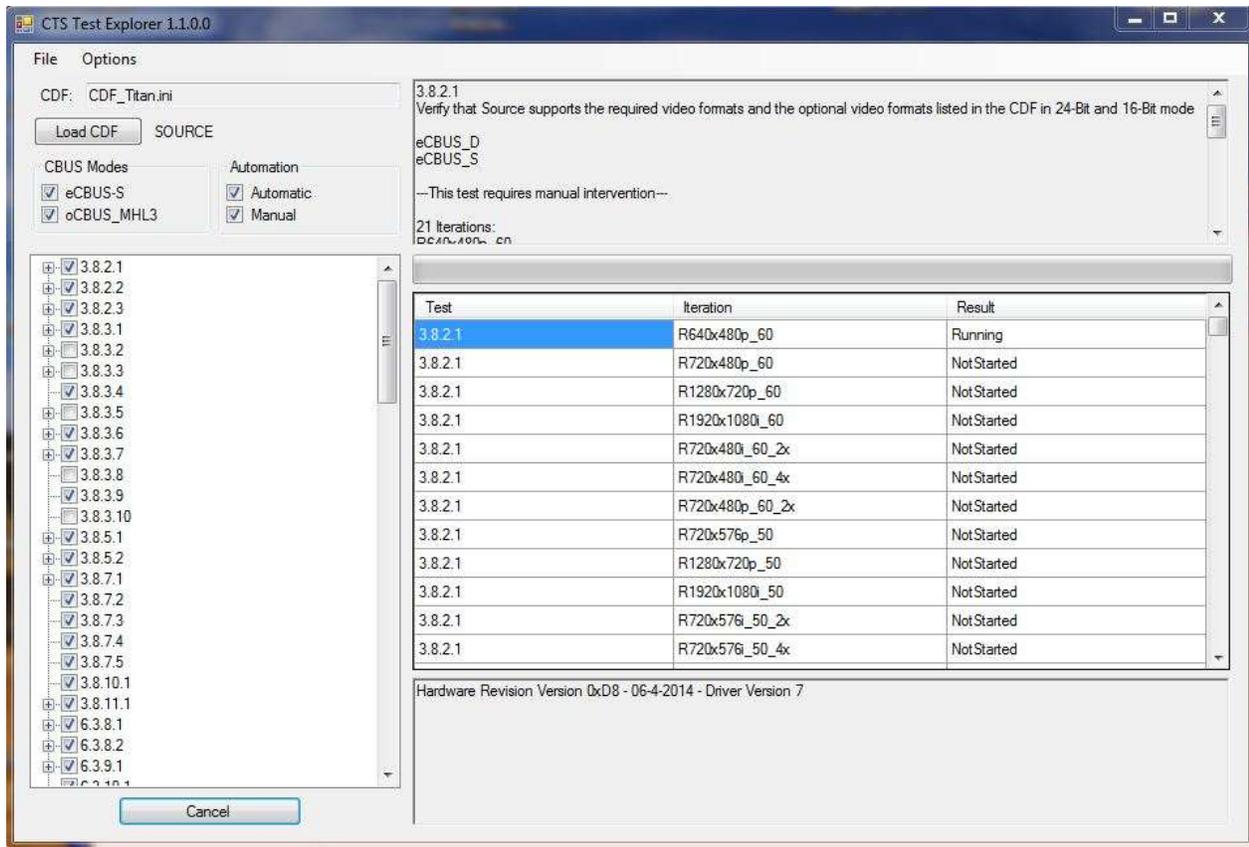


Figure 3.4. Main Window with Test Cases Details

### 3.3. Test Result

Test result is saved under the same directory as that of the CDF files, with date and time appended in the file name.

There are “Details.log” and “Summary.log”, from which you can overlook how many tests passed or failed. Inside the “Logs” folder (Figure 3.5), you have all the detailed log information for each test case.

For a single test case, test log may have “L1.log”, “L2.log” and “L5.log”, showing different logging levels. “L5” shows the most detailed logging information. If you want to see logging information in brief, try viewing “L1” log.

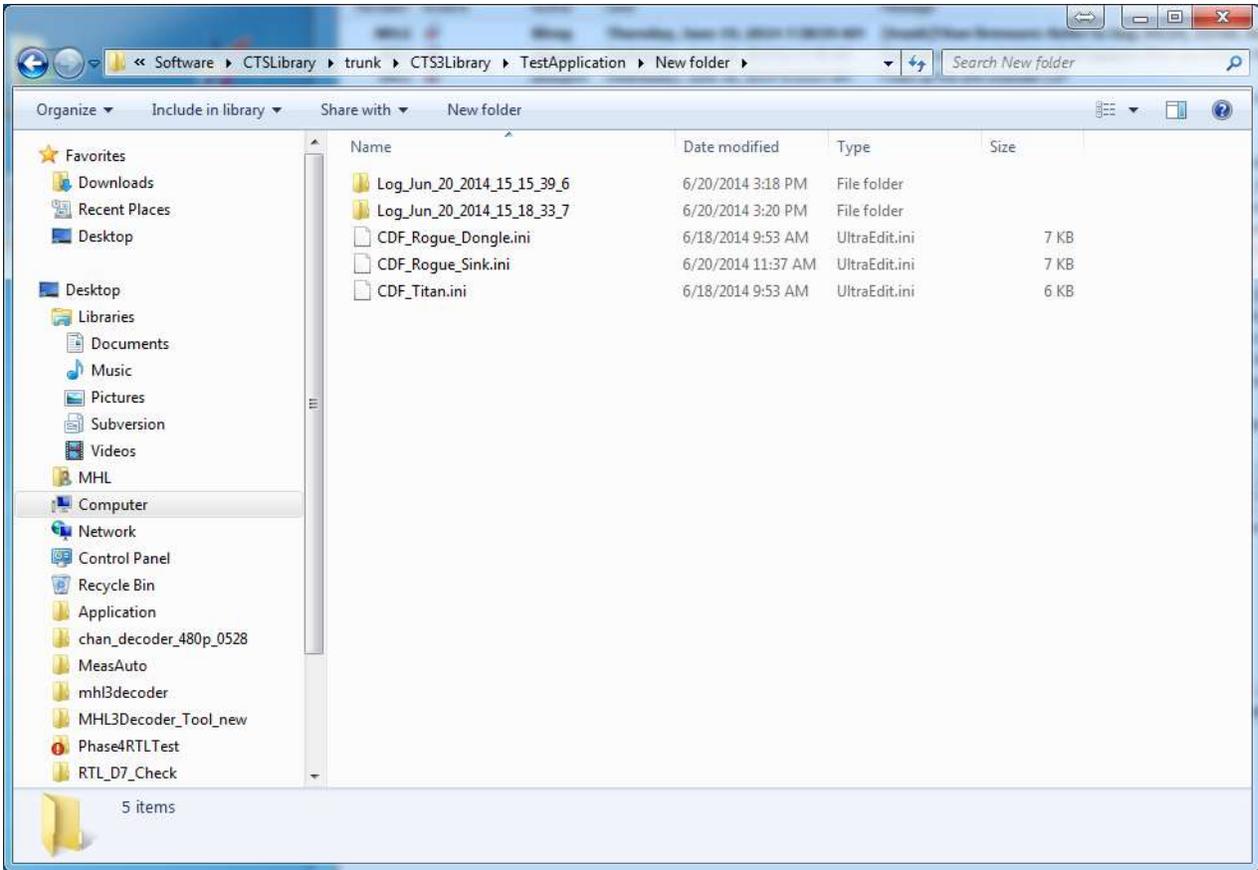


Figure 3.5. Log File Folder

## 4. Test Connection and Setup

### 4.1. Source DUT Test Connection

In an MHL Source DUT test, as show in [Figure 4.1](#), DUT needs to be connected to the MHL IN port of the SL-863 analyzer using an MHL 3 cable. A display, usually a TV with HDMI port, needs to be connected to the Monitor port through an HDMI cable.

#### 4.1.1. eCBUS Startup Specific

When testing eCBUS start-up state machine test (MHL 3 CTS Test ID 6.4.7.1), a test fixture SL863PB1 is needed for this test case. The fixture needs to be connected between the DUT and the MHL IN port of the SL-863 analyzer.

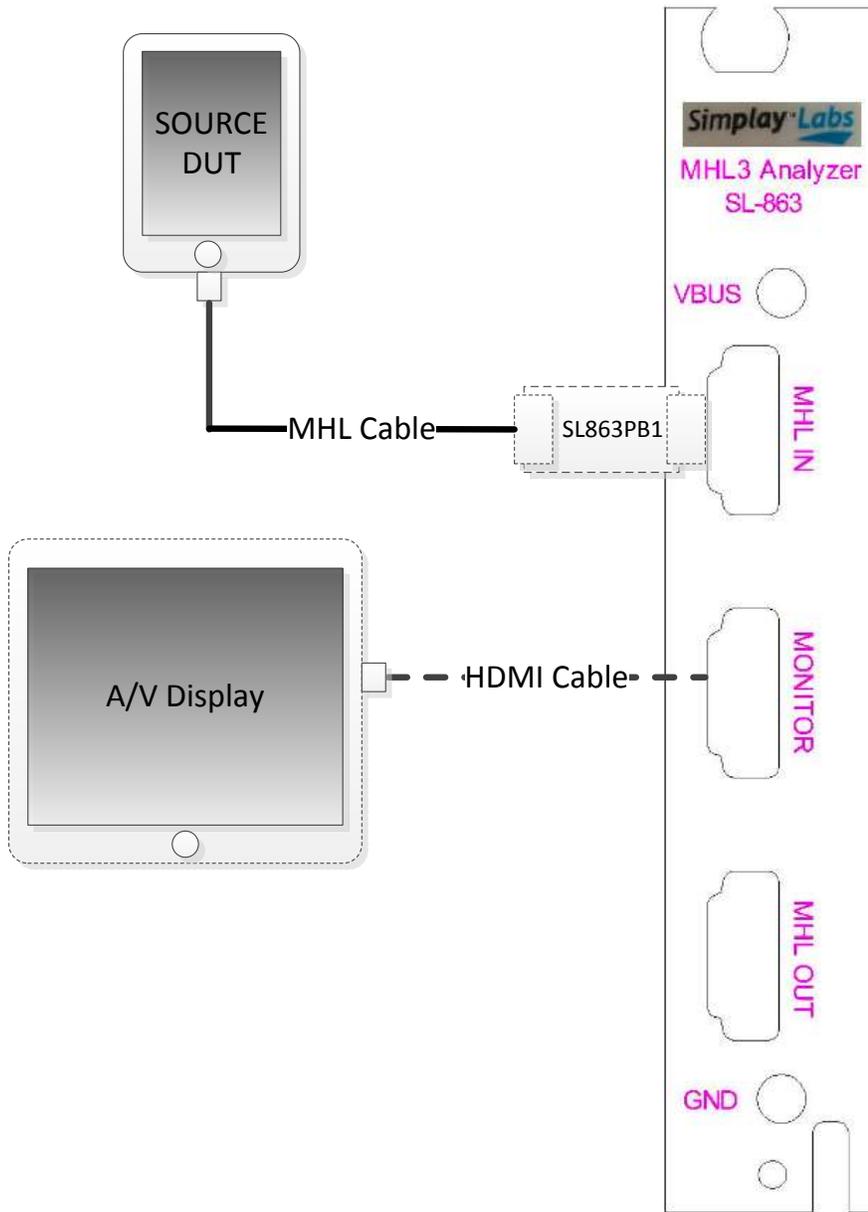


Figure 4.1. Connection for Source DUT Test

## 4.2. Sink DUT Test Connection

In MHL Sink DUT test, as shown in Figure 4.2, DUT needs to be connected to the MHL OUT port of the SL-863 analyzer through an MHL 3 cable. A display needs to be connected to the Monitor port through an HDMI cable.

A test fixture SL863PB2 is needed for all the test cases. The fixture needs to be connected between DUT and the MHL OUT port of the SL-863 analyzer (Figure 4.2).

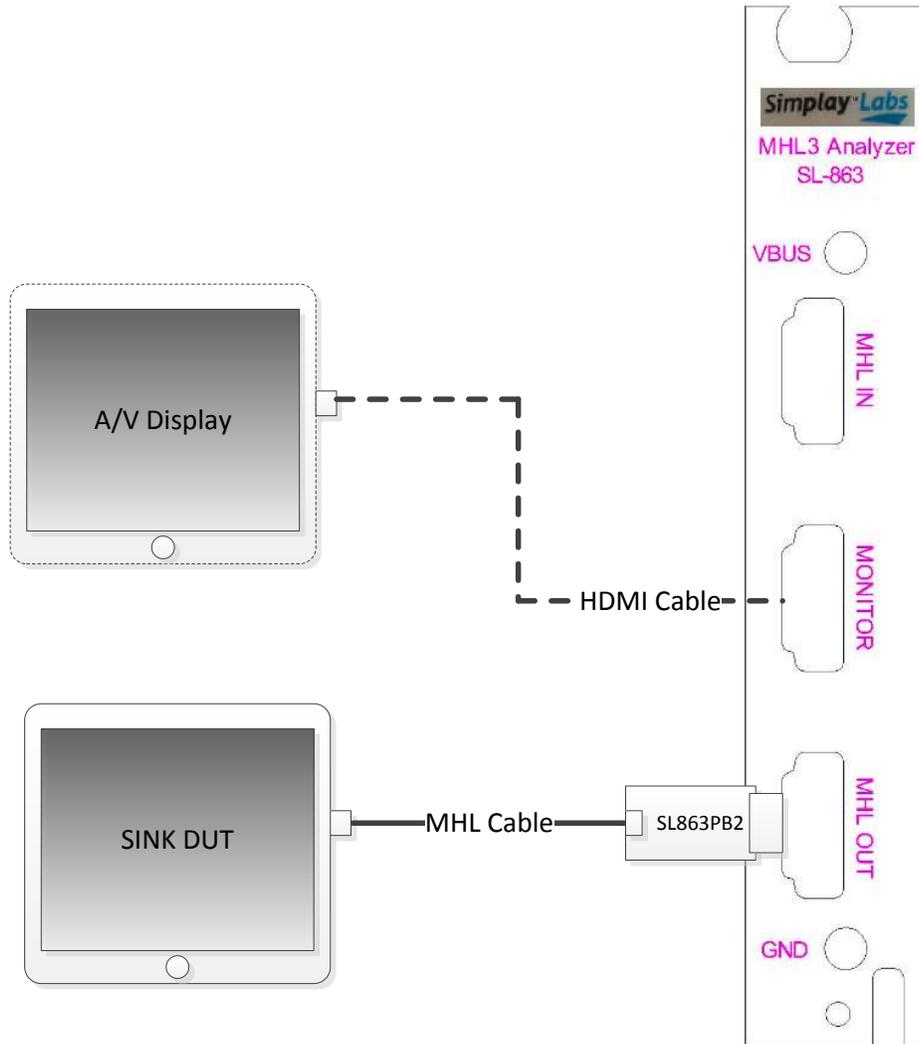


Figure 4.2. Connection for Sink DUT Test

### 4.3. Dongle DUT Test Connection

In MHL Dongle DUT test, as shown in Figure 4.3, the MHL male connector of DUT should be connected to the MHL OUT port of the SL-863 analyzer. The HDMI port of DUT should be connected to a display through an HDMI cable. Another display should be connected to the Monitor port through an HDMI cable.

A test fixture SL863PB2 is needed for all the test cases. The fixture needs to be connected between DUT and the MHL OUT port of the SL-863 analyzer (as shown in Figure 4.3).

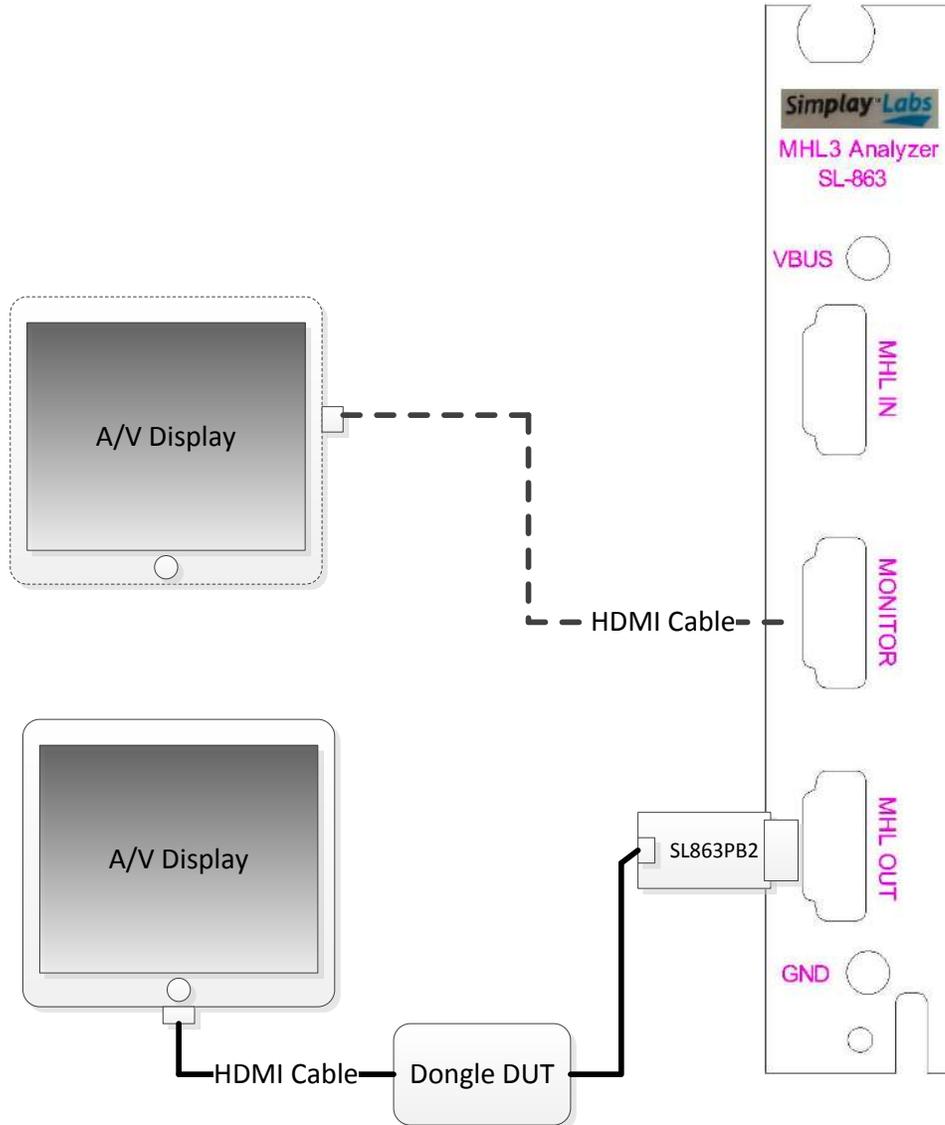


Figure 4.3. Connection for Dongle DUT Test

### 4.4. Test Method and Procedure

For detailed test method and procedure, refer to the Main Required Methods section and the Simplay MOI section of the MHL Compliance Test Specification.

## 5. Support

In case of problems or questions, check the information from [www.simplexlabs.com](http://www.simplexlabs.com) (Manufacturers – Product Support). You can find software updates, known issues, and other information there.

If you need direct support, contact [tools@simplexlabs.com](mailto:tools@simplexlabs.com).

## References

This is a list of the standards abbreviations appearing in this document.

Abbreviation	Standards Publication, Organization, and Date
MHL	<i>Mobile High-definition Link Specification, Version 3, MHL, LLC, August 2013</i>
MHL CTS	<i>Main required methods, Version 3.0</i>
CTS MOI	<i>Simplay MOI for CTS 3.2</i>

## Revision History

### Revision A, July 2014

First product release.

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- Damage caused by impact with other objects, dropping, falls, spilled liquids, or submersion in liquids.
- Damage caused by unauthorized repair or disassembling of the product.
- Damage caused by any other abuse, misuse, mishandling, or misapplication.
- Damage caused by third party peripherals (including but not limited to visible damages on motherboard or other electronic parts of the product such as burn spots after electric discharge, melting, fusing, splitting, etc.).
- Any unauthorized software or modification of built-in software not approved by Simplay Labs.
- The serial number of the product (or serial number stickers of its parts) has been modified, removed, blurred or damaged.
- Cracks and scratches on LCD and plastic material as well as other defects caused by transportation, handling or customer abuse.



1140 E. Arques Avenue  
Sunnyvale, CA 94085  
T 408.616.4000 F 408.616.6398  
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