

High-Definition Multimedia Interface

Version 2.0

Quantum Data MOI v1.0

Test ID: HF2-9

July 15, 2014

Preface

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Document Revision History

1.0 July 15, 2014 – Initial Release.

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Contact Information

The URL for the HDMI Forum web site is: <http://www.hdmiforum.org/>

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Introduction

This document provides a set of Method of Implementation for test method described in HDMI Compliance Test Specification Version 2.0 (HDMI CTS 2.0). HDMI Forum created HDMI CTS 2.0 to specify a set of tests that should be performed to verify features described in HDMI Specification Version 2.0.

Scope

This document provides testing procedures for HDMI CTS 2.0 Test ID HF2-9: Sink TMDS Protocol – Scrambling $\leq 340\text{Mcsc}$.” The procedure below deals with single resolution and only one Test ID is considered at a time.

References Document

Normative References

High-Definition Multimedia Interface Specification Version 1.4b, October 11, 2011.
HDMI Compliance Test Specification Version 1.4b, October 11, 2011.
High-Definition Multimedia Interface Specification Version 2.0, August, 2013.
HDMI Compliance Test Specification Version 2.0.

Informative Reference

No additional informative references.

Test ID HF2-9: Sink TMD5 Protocol – Scrambling $\leq 340\text{Mcsc}$

Objective

Confirm that the Sink properly supports scrambling for TMD5 Character Rates at or below 340Mcsc.

Table 8-11 Sink TMD5 Protocol – Scrambling $\leq 340\text{Mcsc}$ Status Requirements

Reference	Requirement
[HDMI 2.0: 10.4.1.4] TMD5 Configuration	<See reference for details>
HDMI 2.0: 6.1.3.1]	<See reference for details>
[HDMI 2.0: 10.3.2] HDMI Forum Vendor Specific Data Block	<See reference for details>
[HDMI 2.0: 10.4.1.4] TMD5 Configuration	<See reference for details>
[HDMI 2.0: 10.4.1.5] Scrambler Status	<See reference for details>

Capability(s)

The Sink DUT supports scrambling.

Test Equipment

Item	Generic Equipment	Vendor Specific Equipment	Quantity
1	TMD5 Signal Generator	980 Advanced Test Platform series:	1
1	I2C Analyzer	980 HDMI 2.0 Video Generator module HDMI CTS 2.0 Compliance Test Package #4	1

Generic Procedure

Setup:

- 1 If HF-VSDB does not exist in the EDID, then SKIP this test.
- 2 Connect the TMD5 Signal Generator to the Sink DUT.

Measure:

- 3 Perform the following test for any one of the Video Formats listed below which are indicated in the EDID:
 - 720x480p 3795 59.94/60Hz.

- 720x576p 50Hz.

- 3.1 If byte 6, bit 3 in the HF-VSDB of the first CEA Timing Extension in the EDID equals 1, then perform the following:
 - 3.1.1 Use the I2C Analyzer to write 1 to the Scrambling_Enable bit of the Sink DUT.
 - 3.1.2 Configure the TMDS Signal Generator to transmit the tested format to the Sink DUT with scrambling without the exception specified in Section 6.1.2.4.1 of HDMI Forum Spec v2.0.
 - 3.1.3 Read the Scrambling_Status bit with the I2C Analyzer.
 - 3.1.4 If the Sink DUT does not set the Scrambling_Status bit to 1, then FAIL.
 - 3.1.5 If the Sink DUT does not adequately support this format, then FAIL.
 - 3.1.6 Use the I2C Analyzer to write 0 to the Scrambling_Enable bit of the Sink DUT.
 - 3.1.7 Configure the TMDS Signal Generator to transmit the tested Video Format to the Sink DUT without scrambling.
 - 3.1.8 Read the Scrambling_Status bit with the I2C Analyzer.
 - 3.1.9 If the Sink DUT does not set the Scrambling_Status bit to 0, then FAIL.
 - 3.1.10 If the Sink DUT does not adequately support this format, then FAIL.
- 3.2 If byte 6, bit 3 in the HF-VSDB of the first CEA Timing Extension in the EDID equals 0 and the CDF field Sink_Above_340 is "Y", then perform the following:
 - 3.2.1 Use the I2C Analyzer to write 0 to the Scrambling_Enable bit of the Sink DUT.
 - 3.2.2 Configure the TMDS Signal Generator to transmit the tested Video Format to the Sink DUT without scrambling.
 - 3.2.3 Read the Scrambling_Status bit with the I2C Analyzer.
 - 3.2.4 If the Sink DUT does not set the Scrambling_Status bit to 0, then FAIL.
 - 3.2.5 If the Sink DUT does not adequately support this format, then FAIL.

Vendor Specific Test Procedure

Test Equipment

A variety of equipment is needed for testing HDMI products. Each piece is authorized and included by name in this Compliance Test Specification. This section describes the Quantum Data test equipment.

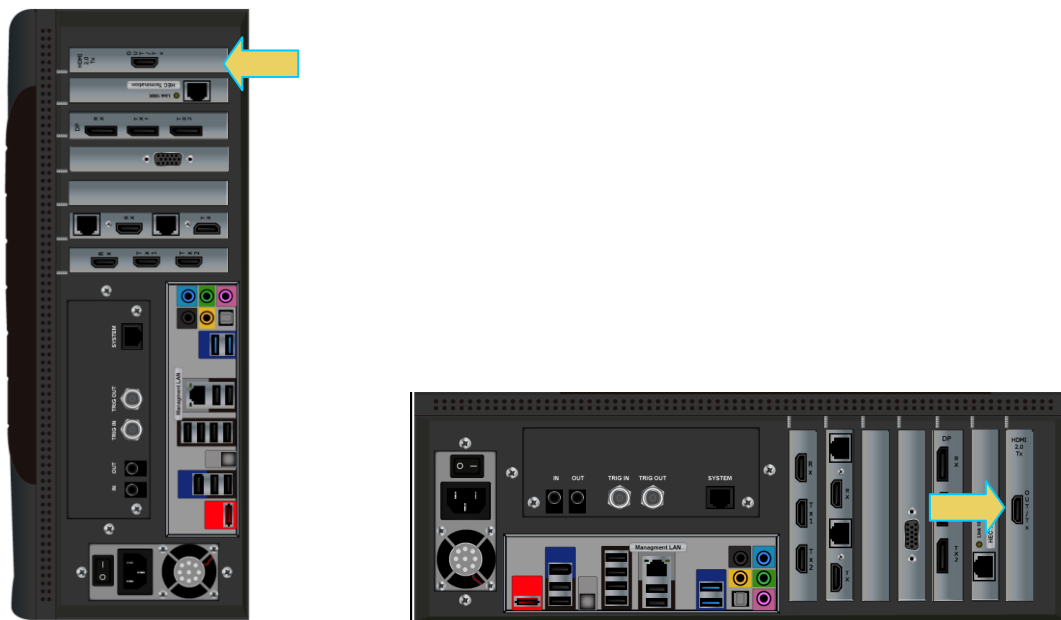
HDMI 2.0 Video Generator module

The Quantum Data 980 HDMI 2.0 Video Generator module can be installed in the 980B or 980R Advanced Test Platforms. This 980 HDMI 2.0 Video Generator module serves the generic test functions called out in the HDMI 2.0 Generic CTS. Refer to the table below:

Item	Quantum Data Equipment	
1	980 Advanced Test Platform series:	
	Equipped with:	980 HDMI 2.0 Video Generator module
		HDMI CTS 2.0 Compliance Test Package #4

980 HDMI 2.0 Video Generator Module with 980 Series Platform Configurations

The figures below show depictions of the 980 HDMI 2.0 Video Generator module equipped in various 980 series platforms. **Note:** Card positioning may vary depending on configuration.



Sink Video Timing – 6G – 2160p 3D

Test ID HF2-9: Sink TMDS Protocol – Scrambling $\leq 340\text{Msc}$

1. Objective

Confirm that the Sink properly supports scrambling for TMDS Character Rates at or below 340Mcsc

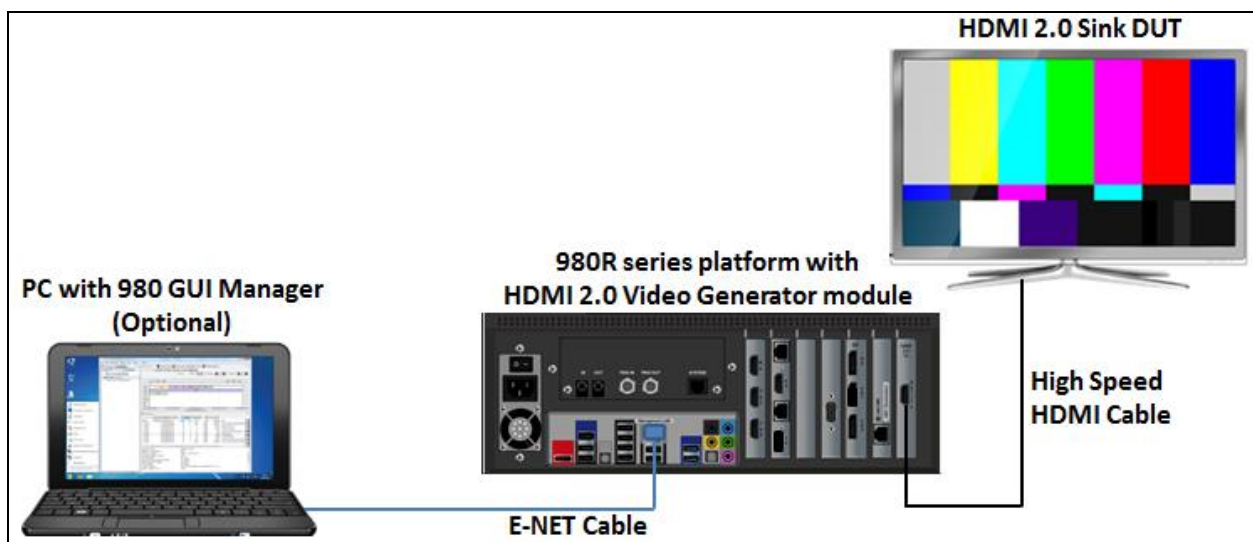
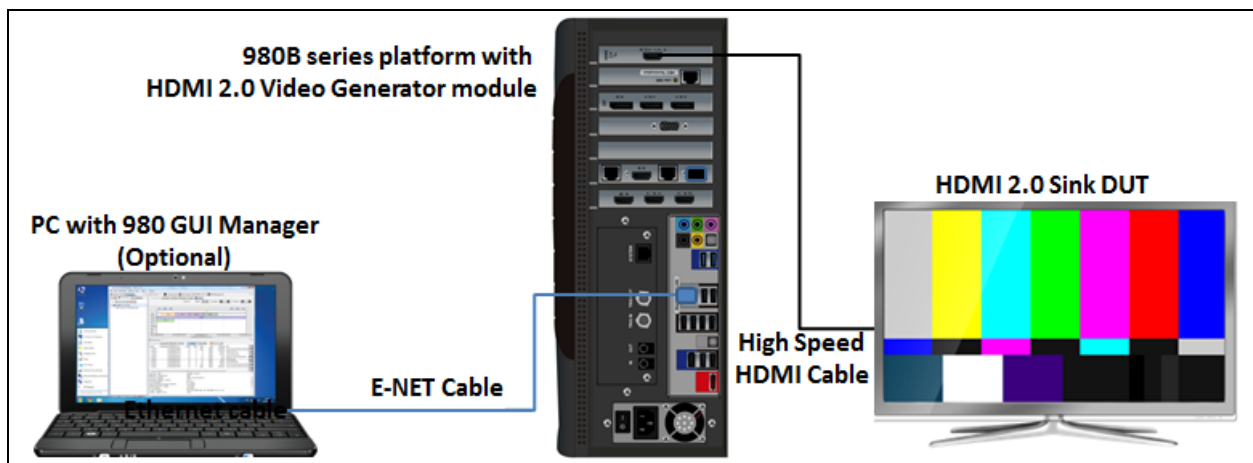
2. Test Overview

The Pass/Fail criteria for this test is assessed by human observation of an test image displayed on the sink DUT.

3. Procedure

Use the following procedure to conduct this test.

1. Connect Sink DUT to the Quantum Data 980 HDMI 2.0 Video Generator module HDMI Tx port. Use a High Speed HDMI cable. Refer to the figures below for reference.

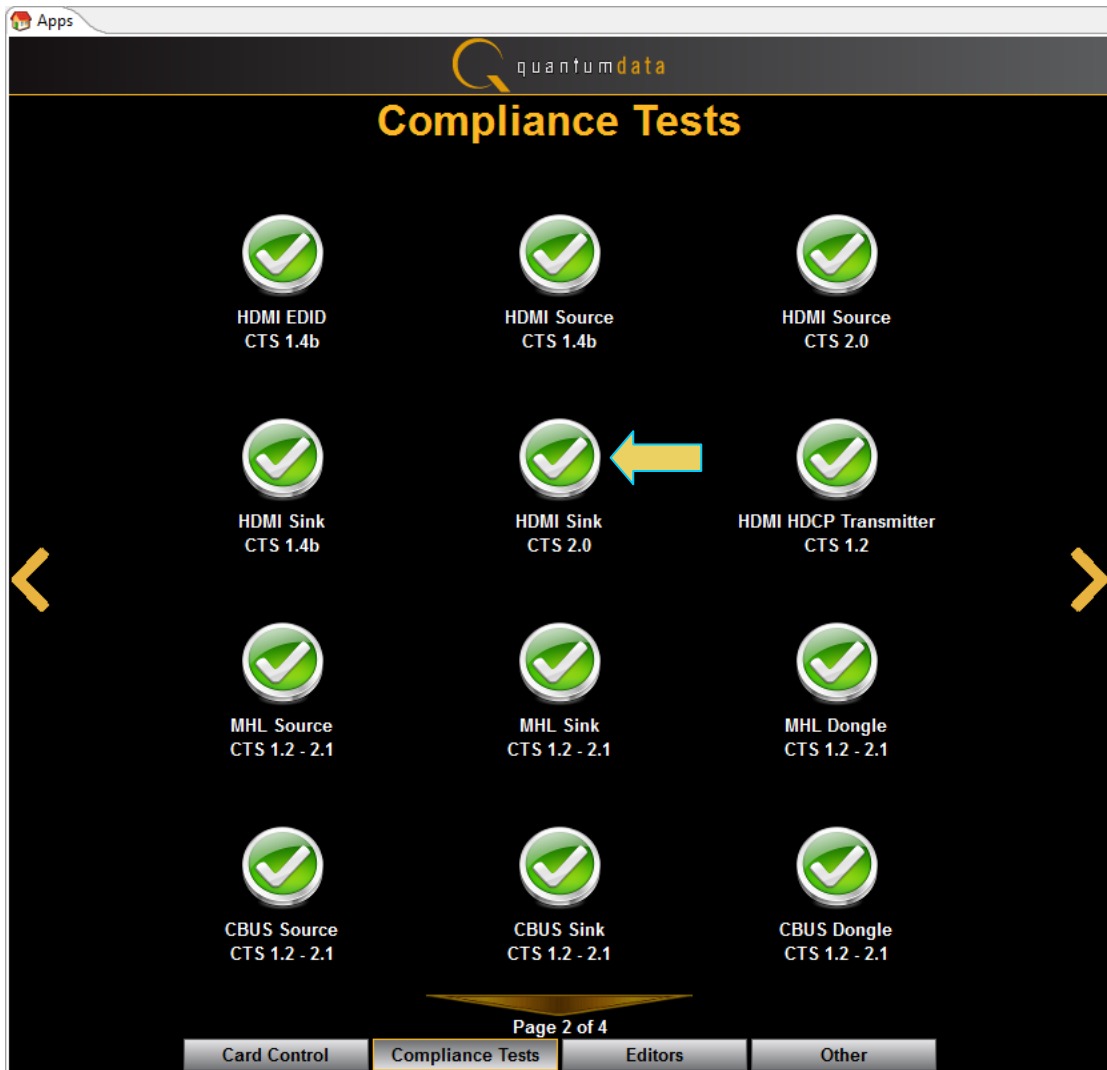


2. Use Quantum Data 980 Embedded Manager GUI (touchscreen) or invoke Quantum Data 980 External Manager GUI (Windows application).

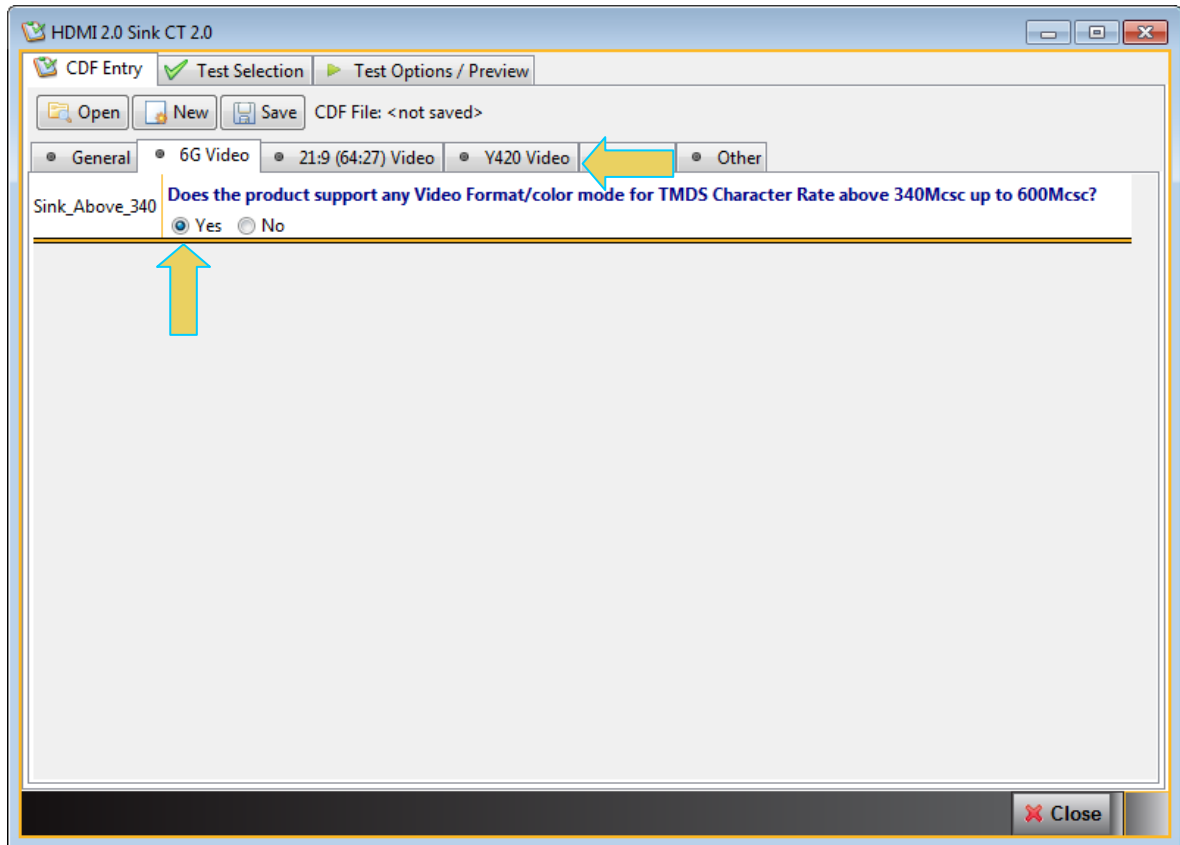
Note: You will not need to connect the PC shown in the figures above if you are running the compliance test through the 980's embedded display. The PC running the 980 HDMI 2.0 Video Generator module's compliance test application is connected to the 980 through a standard Ethernet cable.

3. Complete the following steps:

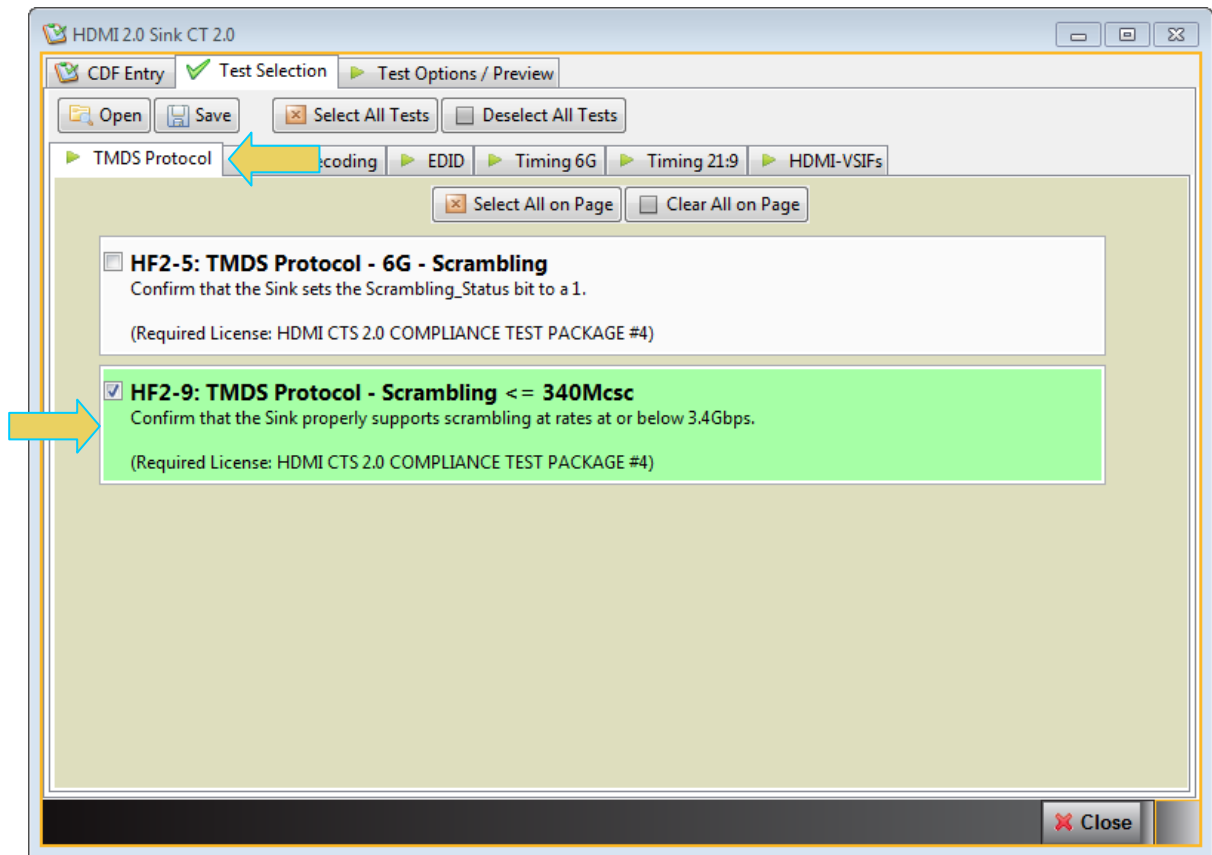
3.1 Click on the HDMI Sink CTS 2.0 icon in the Compliance Tests page of the Apps panel. Refer to the screen example below.



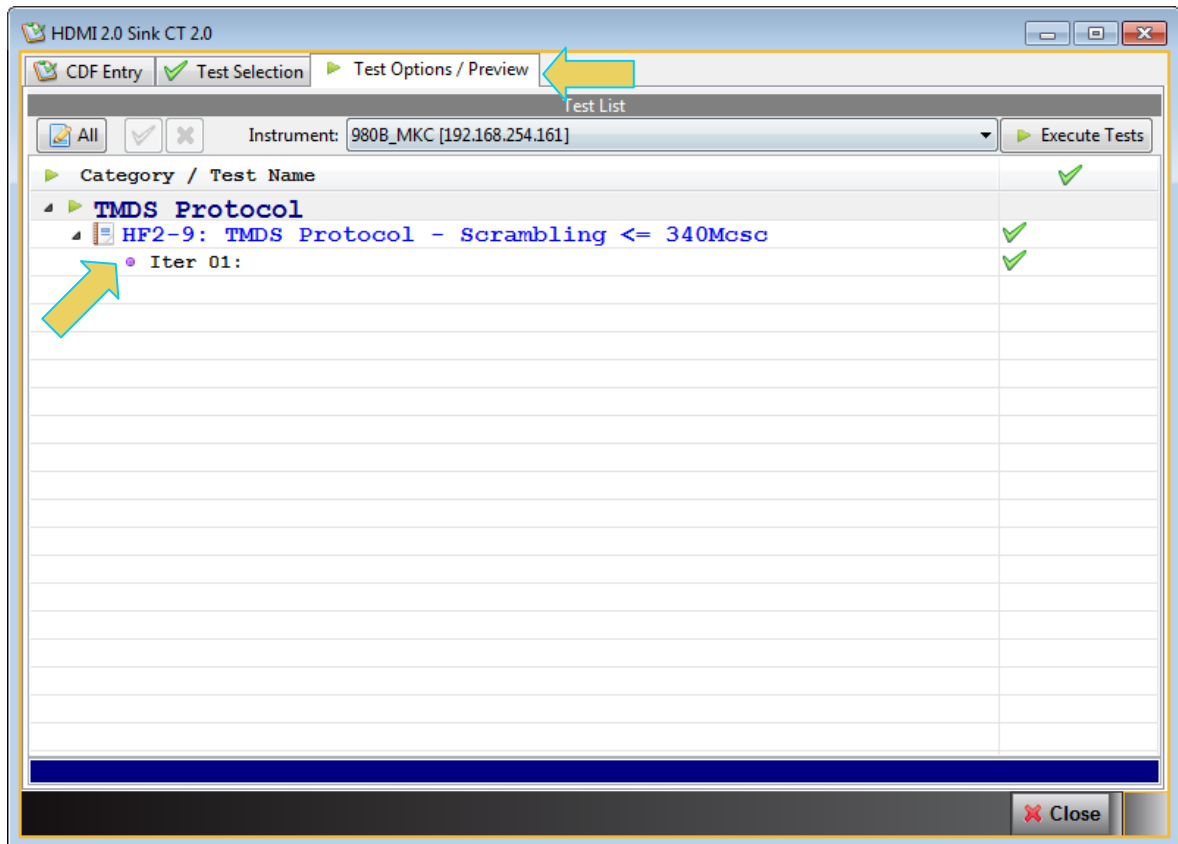
- 3.2 Navigate to the CDF tab if not already there. Complete the General sub tab and the 6G Video sub tab in the CDF. If there is a saved CDF file, then click on Open and select it. Otherwise, enter the DUT's CDF information and optionally click on Save to save the CDF. Refer to the screen example below.



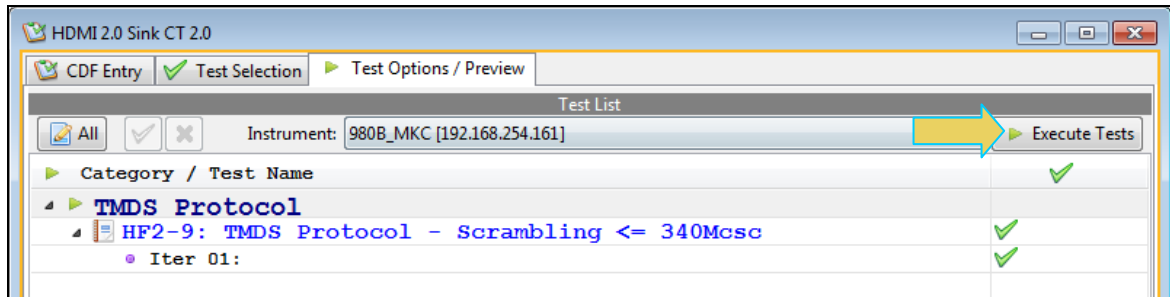
- 3.3 Click on the Test Selection tab, and select the TMDS Protocol tab and then the Test ID HF2-9: Sink TMDS Protocol – Scrambling \leq 340Mcsc Test. Refer to the screen example below.



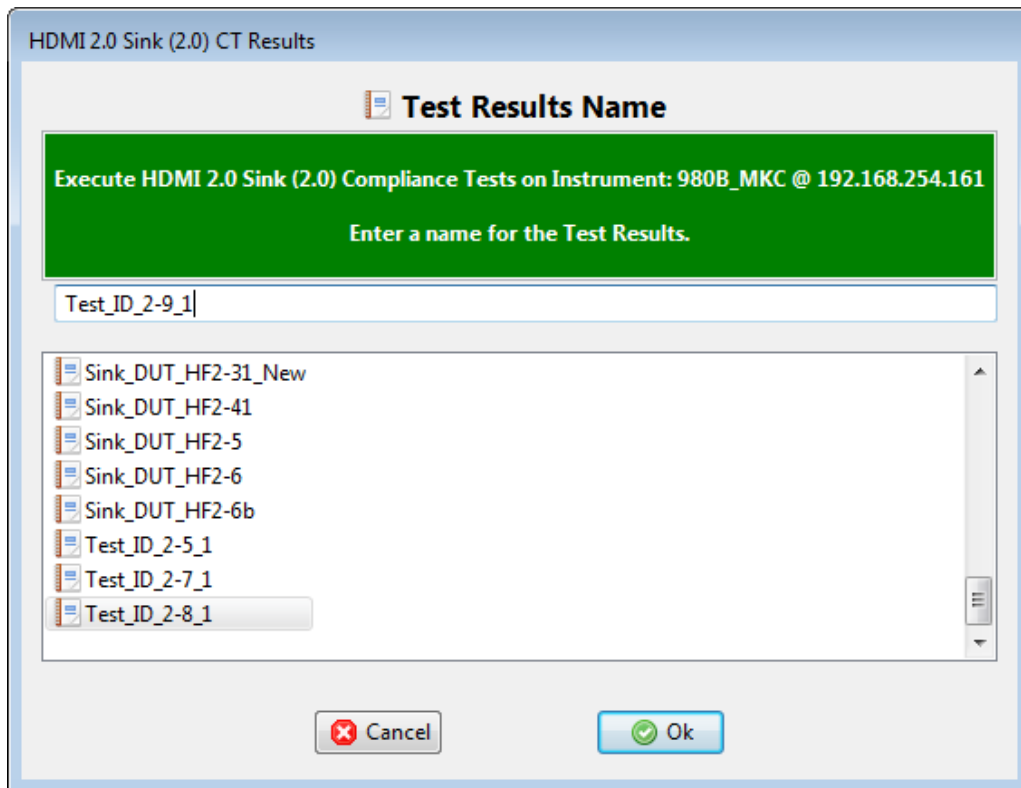
- 3.4 Click on Test Options / Preview tab and review the list of tests. Refer to the screen example below.



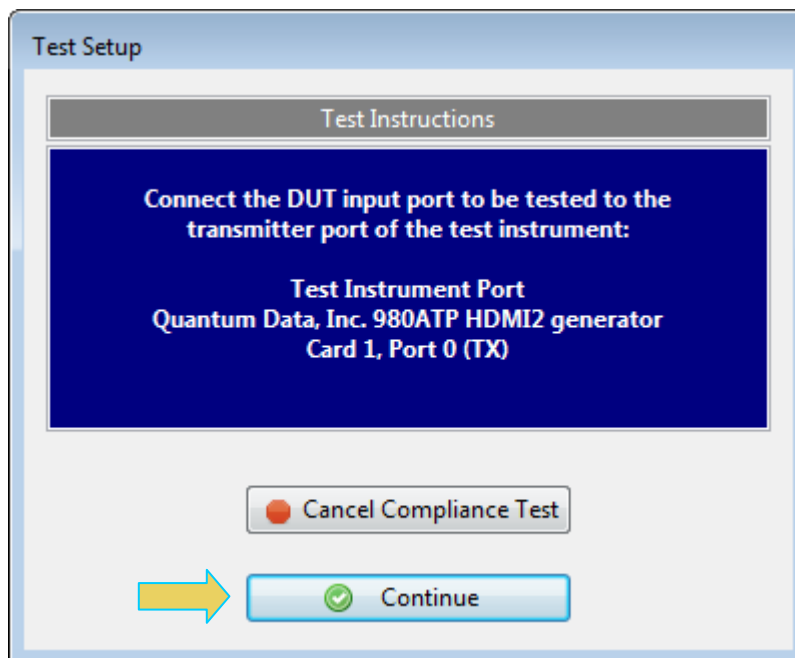
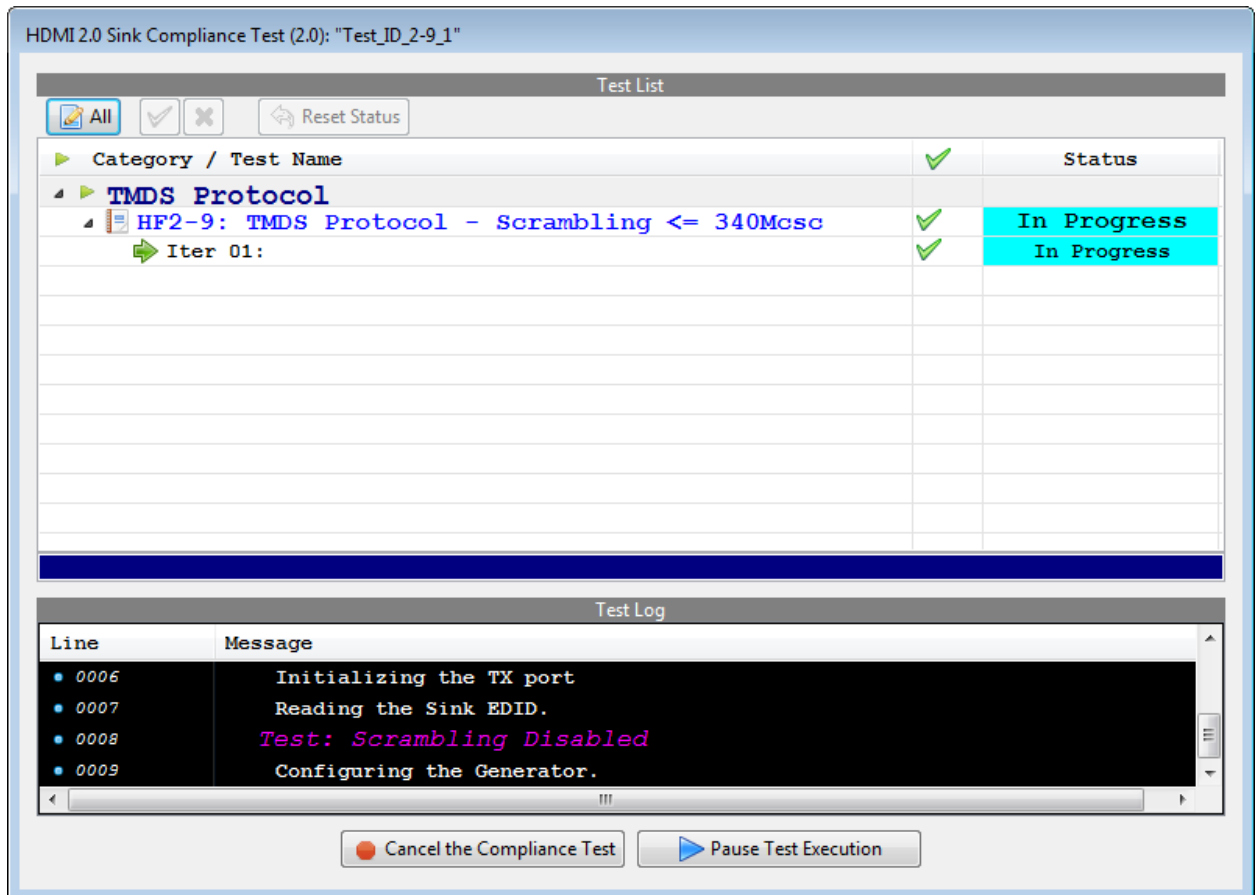
- 3.5 Click on the Execute tests activation button to initiate the test. Refer to the screen example below.



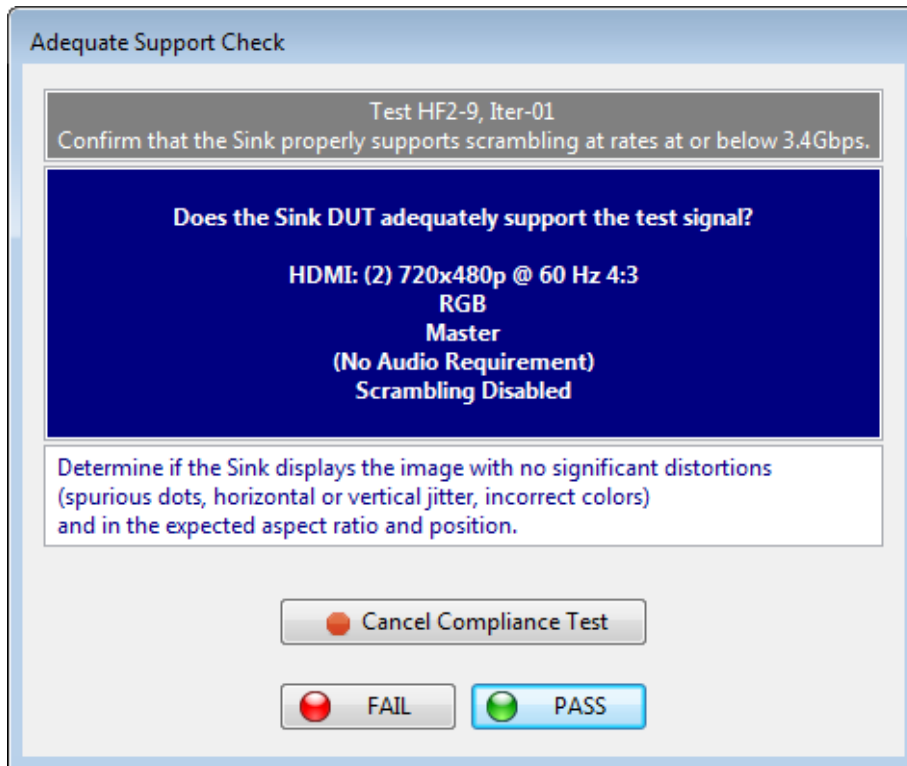
Note: You will be prompted with a dialog box to assign a name to the test results. Refer to the screen example below.



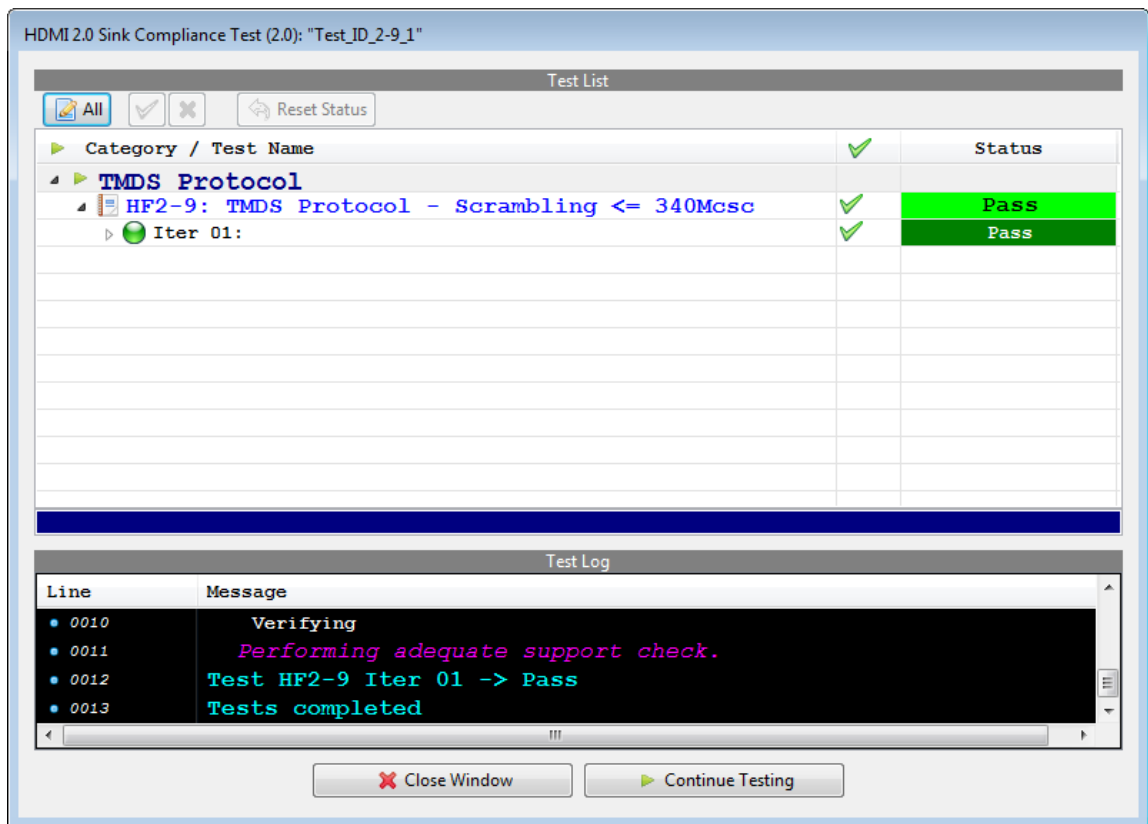
A Test Results window and log will appear and you will be prompted with the test setup description. Verify the test setup and click on Continue to run the test.



The test results will be assessed user examination as described in the following dialog box. Click on the PASS or FAIL button depending on whether the image looks correct or not.



The results are indicated on the test window as shown below.



4. If the 980 HDMI 2.0 sink compliance test application reports PASS, then PASS. If the 980 HDMI 2.0 sink compliance test application reports FAIL, then FAIL.

When the test is completed a Test Results Viewer screen will appear. Note that tests are skipped if the EDID does not support a particular format.

