

HDMI Compliance Tests with Quantum Data Instruments

Section 7: Source tests

Source EDID Test:

7-1 EDID – Yes **980** and **882E** series can be used for this test this because they can emulate any type of EDID. TPA-DDC-RR is also needed.

Source Electrical Tests:

7-2 TMDS-V low – No.

7-3 TMDS-Voff (leakage current) – This is a physical test that requires an oscilloscope.

7-4 TMDS Trise and Tfall – No. This is a physical test that requires an oscilloscope.

7-5 Not applicable (Reserved)

7-6 TMDS Inter pair skew - No. This is a physical test that requires an oscilloscope.

7-7 TMDS Intra pair skew – No. This is a physical test that requires an oscilloscope.

7-8 TMDS Clock duty cycle - No. This is a physical test that requires an oscilloscope.

7-9 TMDS Clock jitter – No. This is a physical test that requires an oscilloscope.

7-10 TMDS Eye - No. This is a physical test that requires an oscilloscope.

7-11 5v power – No. Spec specifies Advantest Voltage Current Source/Monitor

7-12 Hot plug detect – No. This is done with a DC supply, multimeter and a TPA. (QD **TPA-MP-4R** TPA can be used to access control signals.)

7-13 DDC capacitance – No. This is done with a DC supply, multimeter and a TPA. QD **TPA-MP-4R** TPA can be used to access control signals.)

7-14 CEC Line connectivity – The **TPA-MP-4R** provides access to the CEC line for this test.

7-15 CEC Line degradation – Yes, the **882E** series CEC compliance test supports this test.

Source Protocol Tests:

7-16 Legal codes – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-17 Basic protocol – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option..

7-18 Extended control period – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-19 Packet types – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

Source Video Tests:

7-20 Not applicable (Reserved)

7-21 Minimum format support – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option and also by manually checking the CDF per the CTS.

7-22 Additional format support – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option and also by manually checking the CDF per the CTS.

7-23 Pixel encoding RGB – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-24 Pixel encoding YCbCr – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-25 Video format timing – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-26 Pixel repetition – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option. This can also be performed manually by verifying the **882** AVI infoframe with our PacketRx image. You can also manually verify that the pixels are repeated using the **882** ViewPix analyzer function.

7-27 AVI infoframe - Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

Source Audio Tests:

7-28 Audio IEC format – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-29 ACR – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-30 Audio jitter – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-31 Audio infoframe – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-32 Audio sample packet – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

Source Interoperability with DVI:

7-33 DVI – Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

Source Advanced Features:

7-34 Deep Color - Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-35 Gamut Metadata Transmission - Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-36 High Bitrate Audio - Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-37 One Bit Audio - Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-38 3D Video Format Timing - Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

7-39 4K x 2K Video Format – Yes. This test can be performed with our **980** Generation 3 with HDMI Source Compliance Test Option.

7-40 Extended Colorimetry Transmission - Yes. This test can be performed with our **980** HDMI Source Compliance Test Option.

Section 8: Sink Tests**Sink EDID Tests:**

8-1 EDID Readable – Yes the **980** and the **882E** series both support the HDMI EDID Compliance Test option, including this test.

8-2 EDID VESA Structure – Yes the **980** and the **882E** series both support the HDMI EDID Compliance Test option, including this test.

8-3 CEA Timing Extension Structure – Yes the **980** and the **882E** series both support the HDMI EDID Compliance Test option, including this test.

Electrical Tests:

8-4 TMDS – Termination Voltage – No.

8-5 TMDS – Min/Max Differential Swing Tolerance - Yes the **882E** series can be used for this test as it has the ability to control the TMDS digital voltage swing.

8-6 TMDS – Intra-Pair Skew – No.

8-7 TMDS – Jitter Tolerance – No.

8-8 TMDS – Differential Impedance – No.

8-9 DDC/CEC Line Capacitance and Voltage – **TPA-MP-4R** provides access to the DDC and CEC lines for this test.

8-10 HPD Output Voltage – No.

8-11 HPD Output Resistance – No.

8-12 +5V Power Max Current – Limited: The **882E** series can imprecisely support this. The current is purposely limited to test maximum current draw. If the circuit breaker trips, then the sink is not compliant.

8-13 CEC Line Connectivity - **TPA-MP-4R** provides access to the CEC line for this test.

8-14 CEC Line Degradation - Yes our **882EA** instrument supports CEC compliance testing.

Sink Protocol Tests:

8-15 Character Synchronization – Yes. The **980** Generation 3 with HDMI Sink Compliance option performs this test.

8-16 Acceptance of All Valid Packet Types – Yes. The **980** Generation 3 with HDMI Sink Compliance option performs this test. It can also be performed manually with our **882E** series. The **882E** can generate General Control Packet, Vendor Specific Infoframe, AVI Infoframe, Source Product Description packet, Audio Infoframe and MPEG Source Infoframe, but will require manual configuration of all needed test parameters.

Sink Video Tests:

8-17 Basic Format Support Requirements - Yes the **980** and the **882E** series both support the HDMI EDID Compliance Test option, including this test.

8-18: HDMI Format Support Requirements – Yes the **980** and the **882E** series both support the HDMI EDID Compliance Test option, including this test.

8-19: Pixel Encoding Requirements - Yes the **980** supports the HDMI Sink Compliance Test option and the HDMI EDID Compliance Test option, including this test. The **882E** series can perform the EDID Compliance portion of this test.

8-20: Video Format Timing - Yes the **980** supports the HDMI Sink Compliance Test option and the HDMI EDID Compliance Test option, including this test. The **882E** series can perform the EDID Compliance portion of this test.

Sink Audio Tests:

8-21 Audio Clock Regeneration – Yes the **980** supports the HDMI Sink Compliance Test option, including this test. The **882E** series can be used to manually perform this test: you can set the N and CTS values, using 480p and 48kHz sampling rate.

8-22 Audio Sample Packet Jitter – No.

8-23 Audio Formats – Yes the **980** supports the HDMI Sink Compliance Test option, including this test. The **882E** series can be used to manually perform this test.

Sink Interoperability with DVI:

8-24 Interoperability With DVI – Yes the **980** supports the HDMI Sink Compliance Test option, including this test. The **882E** series can be used to manually perform this test.

Sink Advanced Features:

8-25 Deep Color – Yes the **980** supports the HDMI Sink Compliance Test option, including this test. The **882E** series can be used to partially perform this test manually. (The **882E** can be used to test for 30- and 36-bit Deep Color.)

8-26 Not applicable. (Reserved)

8-27 High Bitrate Audio – Yes the **980** supports the HDMI Sink Compliance Test option, including this test. The **882E** series can be used to manually perform this test.

8-28 One Bit Audio – Currently no support.

8-29 3D Video Format Timing – Yes the **980** supports the HDMI Sink Compliance Test option, including this test. The **882E** series can be used to manually perform this test.

8-30 4K x 2K Video Format Timing – Yes the **980** Generation 3 supports the HDMI Sink Compliance Test option, including this test.

8-31 AVI Infoframe supporting Extended Colorimetry, Content Type and Selectable YCC Quantization Range – Yes the **980** Generation 3 can perform this test with the HDMI Sink Compliance Test option. The **882E** series can perform this test manually.

Section 9: Repeater Tests**Tests of Output Ports:**

9-1 Repeated Output Port

Verify that the HDMI output on an A/V stream from an HDMI input is compliant.

This test specifies a range of equipment for testing the HDMI output(s) of the repeater.

As with source devices, Quantum Data does not provide the equipment for most of the physical layer tests. However, the CTS does recommend our **882EA** or **882CA** as the EDID Emulator.

Additionally, this test requires each test of Section 7 – Source tests, repeated for each HDMI output. See above for details of Quantum Data **980** and **882** applicability to Section 7 test coverage.

9-2 Source Functionality

Verify that the Source “generator” functionality contained within a repeater product is compliant. Requires each test of section 7 – Source tests, repeated for each HDMI output, but there is no need to repeat the tests if they have already been performed in 9-1. See above for details of Quantum Data **980** and **882** applicability to Section 7 test coverage.

Tests of Input Ports:

9-3 Repeated Input Port

Verify that the HDMI input of a stream that is transported to an HDMI output is compliant. Requires each test of section 8 – Sink tests, repeated for each HDMI input. See above for details of Quantum Data **980** and **882** applicability to Section 8 test coverage.

9-4 Sink Functionality

Verify that the sink “consumer” functionality contained within a repeater product is compliant. Requires each test of Section 8 – Sink tests, repeated for each input, but there is no need to repeat the tests if they have already been performed in 9-3. See above for details of Quantum Data **980** and **882** applicability to Section 8 test coverage.

Tests of Physical Address Handling:

9-5 Physical Address – The **882EA** can be used for this test.

Sources

1. High-Definition Multimedia Interface Compliance Test Specification Version 1.4a, HDMI Licensing, LLC, <http://www.hdmi.org>
2. 882EA HDMI Analyzer User Guide, Quantum Data, Inc. <http://www.quantumdata.com/downloads/index.asp>
3. 980 Protocol Scope for HDMI User Guide, Quantum Data, Inc. <http://www.quantumdata.com/downloads/index.asp>
4. 980 Protocol Scope for HDMI User Guide for HDMI Compliance Tests, Quantum Data, Inc. <http://www.quantumdata.com/downloads/index.asp>