

# HDMI Compliance Tests with Quantum Data Instruments

## Section 7: Source tests

### Source EDID Test:

7-1 EDID – Yes **882C** and **882E** series can be used to test this since they can emulate any type of EDID. **980** Can also be used for this test.

### Source Electrical Tests:

7-2 TMDS-V low – No.

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

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

7-5 Not applicable (Reserved)

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

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

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

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

7-10 TMDS Eye - No. This is a low level test that requires 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 – Yes. The **882E** and **882C** series can initiate a ping test to each device.

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

### Source Protocol Tests:

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

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

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

7-19 Packet types – Yes. This test can be performed with our **980** HDMI 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 Compliance Test Option and also manually with the **882EA** and **882CA** SAM+ analyzer application.

7-22 Additional format support – Yes. This test can be performed with our **980** HDMI Compliance Test Option and also manually with the **882EA** and **882CA** SAM+ analyzer application.

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

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

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

7-26 Pixel repetition – Yes. Yes. This test can be performed with our **980** HDMI 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** ReadRGB analyzer function.

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

**Source Audio Tests:**

- 7-28 Audio IEC format – Yes. This test can be performed with our **980** HDMI Compliance Test Option.
- 7-29 ACR – Yes. This test can be performed with our **980** HDMI Compliance Test Option.
- 7-30 Audio jitter – Yes. This test can be performed with our **980** HDMI Compliance Test Option.
- 7-31 Audio infoframe – Yes. This test can be performed with our **980** HDMI Compliance Test Option.
- 7-32 Audio sample packet – Yes. This test can be performed with our **980** HDMI Compliance Test Option.

**Source Interoperability with DVI:**

- 7-33 DVI – Yes. This test can be performed with our **980** HDMI Compliance Test Option.
- Advanced Features:
- 7-34 Deep Color - Yes. This test can be performed with our **980** HDMI Compliance Test Option.
  - 7-35 Gamut Metadata Transmission - Yes. This test can be performed with our **980** HDMI Compliance Test Option.
  - 7-36 High Bitrate Audio - Yes. This test can be performed with our **980** HDMI Compliance Test Option.
  - 7-37 One Bit Audio - Yes. This test can be performed with our **980** HDMI Compliance Test Option.
  - 7-38 3D Video Format Timing - Yes. This test can be performed with our **980** HDMI Compliance Test Option.
  - 7-39 4K x 2K Video Format – Not currently supported.
  - 7-40 Extended Colorimetry Transmission - Yes. This test can be performed with our **980** HDMI Compliance Test Option.

## Section 8: Sink Tests

### Sink EDID Tests:

- 8-1 EDID Readable – Yes the **882E** and **882C** series support the EDID HDMI compliance test including this test.
- 8-2 EDID VESA Structure – Yes the **882E** and **882C** series support the EDID HDMI compliance test including this test.
- 8-3 CEA Timing Extension Structure – Yes the **882E** and **882C** series supports the EDID HDMI compliance test including this test.
- Electrical Tests:
  - 8-4 TMDS – Termination Voltage – No.
  - 8-5 TMDS – Min/Max Differential Swing Tolerance - Yes the **882E** and **882C** 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 – Yes our **882EA** and **882CA** instruments support CEC compliance testing.
  - 8-10 HPD Output Voltage – No.
  - 8-11 HPD Output Resistance – No.
  - 8-12 +5V Power Max Current – Limited: The **882E** and **882C** 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 - Yes our **882EA** and **882CA** instruments support CEC compliance testing.
  - 8-14 CEC Line Degradation - Yes our **882EA** and **882CA** instruments support CEC compliance testing.

### Sink Protocol Tests:

- 8-15 Character Synchronization – No.
- 8-16 Acceptance of All Valid Packet Types – Yes **882E** and **882C** series can be used for this test. The **882** can send out general control packets, vendor specific packets, AVI, Source product description, audio and MPEG packets.

### Sink Video Tests:

- 8-17 Basic Format Support Requirements - Yes our **882E** and **882C** series support this test as part of our EDID HDMI compliance test.
- 8-18: HDMI Format Support Requirements – Yes our **882E** and **882C** series support this test as part of our EDID HDMI compliance test.
- 8-19: Pixel Encoding Requirements - Yes our **882E** and **882C** series support this test as part of our EDID HDMI compliance test.
- 8-20: Video Format Timing - Yes our **882E** and **882C** series can be used for this test.

### Sink Audio Tests:

- 8-21 Audio Clock Regeneration – Yes the **882E** and **882C** series can be used for 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 **882E** and **882C** series can be used for this test.

### Sink Interoperability with DVI:

- 8-24 Interoperability With DVI – Yes the **882E** and **882C** series can be used for this test.

### Advanced Features:

- 8-25 Deep Color – Yes/partial, 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 **882E** can be used to test for high bitrate audio
- 8-28 One Bit Audio - No.

## 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 **882** and **980** 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 **882** and **980** 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 **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 **882** applicability to Section 8 test coverage.

### Tests of Physical Address Handling:

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

### References

1. High-Definition Multimedia Interface Compliance Test Specification  
Version 1.4a, HDMI Licensing, LLC, <http://www.hdmi.org>
2. 881/882 Series 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>