

# quantumdata™ 980

## 18G Protocol Analyzer / Generator

### Module for HDMI Testing

#### Deep Analysis and Compliance

#### Testing up to 600MHz

**Important Note:** The name and description for this module has been changed from: "980 HDMI 2.0 Protocol Analyzer / Generator module" to: "980 18G Protocol Analyzer / Generator module for HDMI Testing."

### Key Features

- Captures and decodes metadata, control data, protocol data, data islands, InfoFrames and auxiliary channel data up to 600 MHz
- Captured data presented graphically in Event Plot and in Data Decode Table; searching and filtering data are supported
- Captures video frames and detailed timing data over multiple frames
- Provides log of auxiliary channels such as display data channel for monitoring HDCP (including HDCP 2.2), SCDC and EDID transactions
- Provides real time view of incoming video and metadata
- Supports variety of HDMI 2.0 source compliance tests – approved by HDMI Forum
- Supports UHD Alliance source compliance tests
- Supports HDCP 2.2 source, sink & repeater compliance tests
- Supports HDMI 1.4 source compliance tests
- Capture video stream from source and playback to test sink
- Passively monitor unencrypted video stream between HDMI source and sink up to 600 MHz



The Teledyne LeCroy quantumdata 980 18G Protocol Analyzer / Generator module for HDMI Testing is equipped with an HDMI Rx port operating up to 600 MHz. The HDMI Rx analyzer port provides full visibility into the HDMI video, protocol, metadata, timing, control and auxiliary data. The module supports deep analysis of HDMI 1.4 and 2.0 sources up to 600MHz TMDS rates.

A wide variety of compliance tests are supported by the 980 18G Protocol Analyzer / Generator module including: Ultra HD HDMI 2.0 source compliance; HDMI 2.0 source compliance; HDMI 1.4 source and sink compliance; HDCP 2.2 source, sink and repeater compliance testing.

The module is also equipped with an HDMI 2.0 Tx port with *limited functionality* supporting: 1) Passively monitoring video, audio and control protocol data between an HDMI 2.0 source and sink, and 2) Playback of captured video stream from a source device to a sink device under test.

### Deep Analysis – Capture/Store

The Protocol Analyzer's capture and store function provides the deep analysis of an incoming HDMI stream up to HDMI 2.0 rates of 600MHz TMDS rate. The deep visibility into the HDMI protocol enables you to identify design problems early in the product life cycle enabling you to necessary to get your product to market more quickly and with reduced expense.

### Compliance Testing

The 980 18G Protocol Analyzer / Generator module for HDMI Testing also supports HDMI 2.0 compliance tests, UHD Alliance source compliance tests, HDMI 1.4 source compliance tests and HDCP 2.2 source, sink and repeater compliance tests.

### Source Test Modes

The 980 18G Protocol Analyzer operates in one of two modes:

- 1) Capture and Store or
- 2) Real Time Monitoring.

In the Real Time mode users can view the video and all metadata from an incoming HDMI 2.0 stream in real time.

### Operation

The 980 18G Protocol Analyzer module for HDMI Testing can be equipped in either the 980B or 980R Advanced Test Platform. It can be operated either through the embedded GUI or from a PC running the 980 GUI Manager

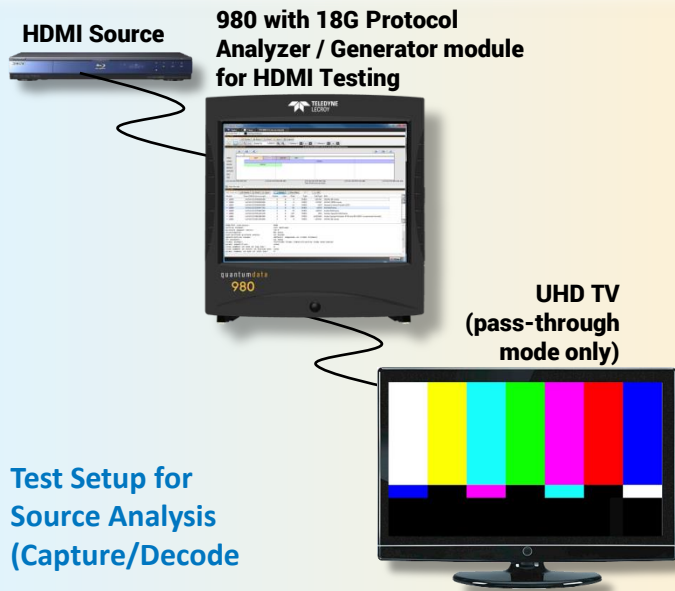
# SOURCE TESTS – CAPTURE & DECODE, PIXEL ERROR

## Capture and Decode

The module captures and decodes incoming encrypted or unencrypted metadata (protocol data, audio samples, InfoFrames, data islands, DDC channel etc.) from a source up to 600 MHz pixel rate. The captured data enables you to identify and resolve interoperability problems early in the product life cycle. Unlike competing analyzers for HDMI 2.0 protocol testing, the module captures *all* protocol data, data islands and control packets with accurate timestamps.

## Timing & Video Analysis

The capture and decode feature also captures video frames and timing data. You can apply a filter to capture only timing data in order to catch intermittent timing anomalies.



Test Setup for Source Analysis (Capture/Decode)

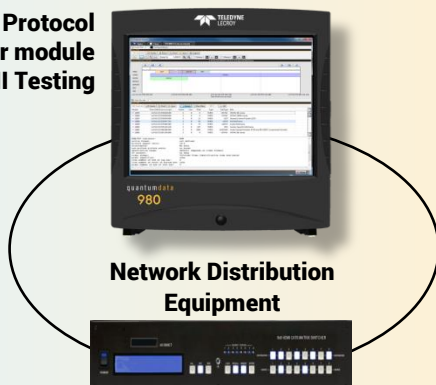
## Pass-through Monitoring

Monitor the video, audio and protocol data passively between an HDMI source and sink up to 600MHz. Use capture and decode mode or real time monitoring mode.

## Pixel Error Test

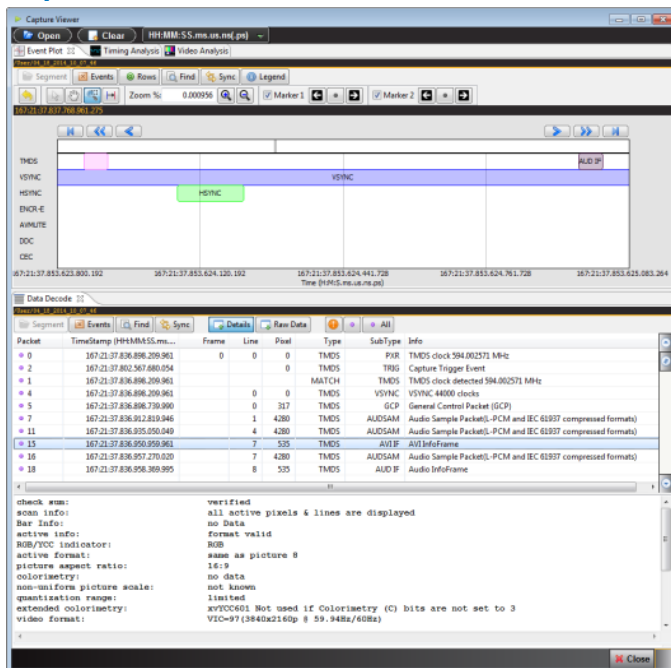
Test cables and distribution networks using Pixel Error test up to 600MHz. Run test either in loopback configuration using the module's HDMI Tx and Rx ports or from a source through a distribution network. Detailed test report shows errors per frame and per line.

980 with 18G Protocol Analyzer / Generator module for HDMI Testing

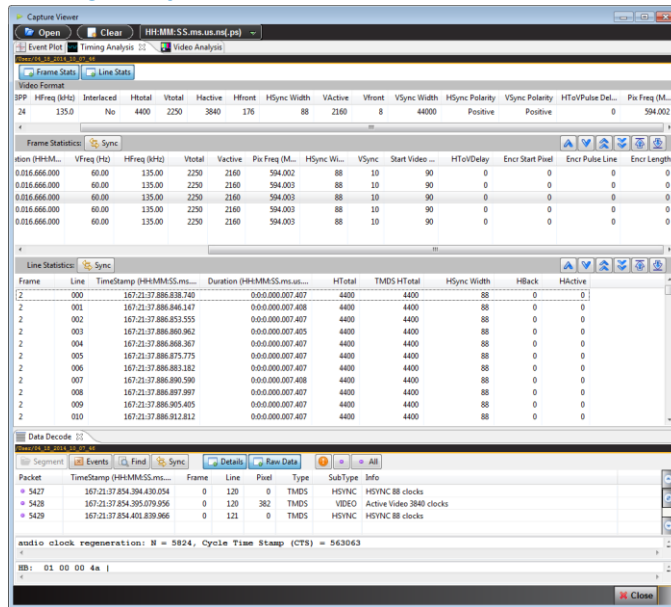


Test Setup for Cable & Network Pixel Error test

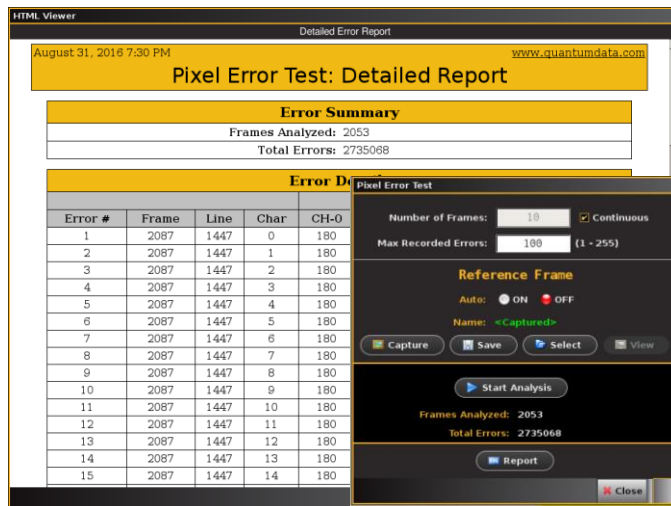
## Capture and Decode

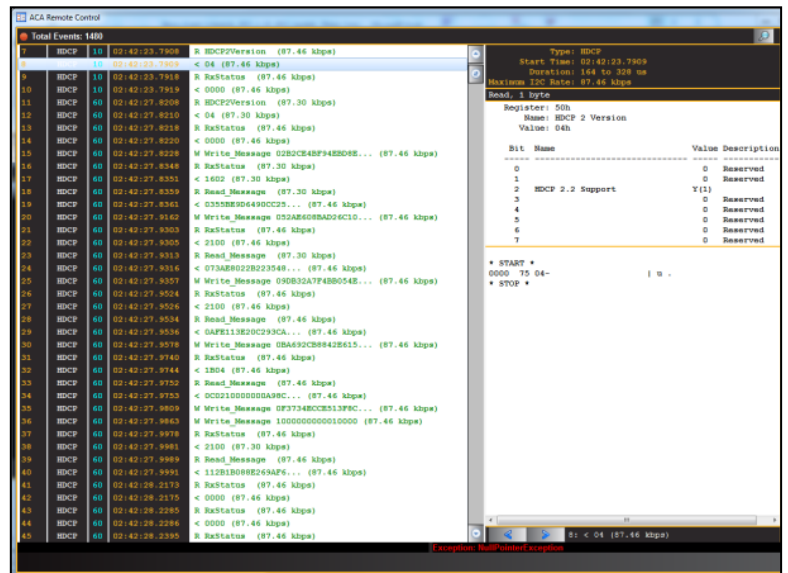


## Timing Analysis



## Pixel Error Test



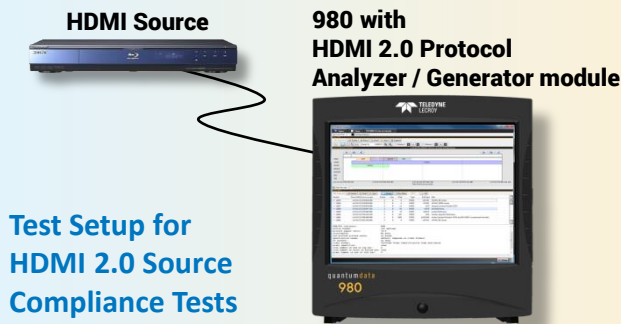




# HDMI 2.0 SOURCE COMPLIANCE TESTS

## HDMI 2.0 Source Compliance

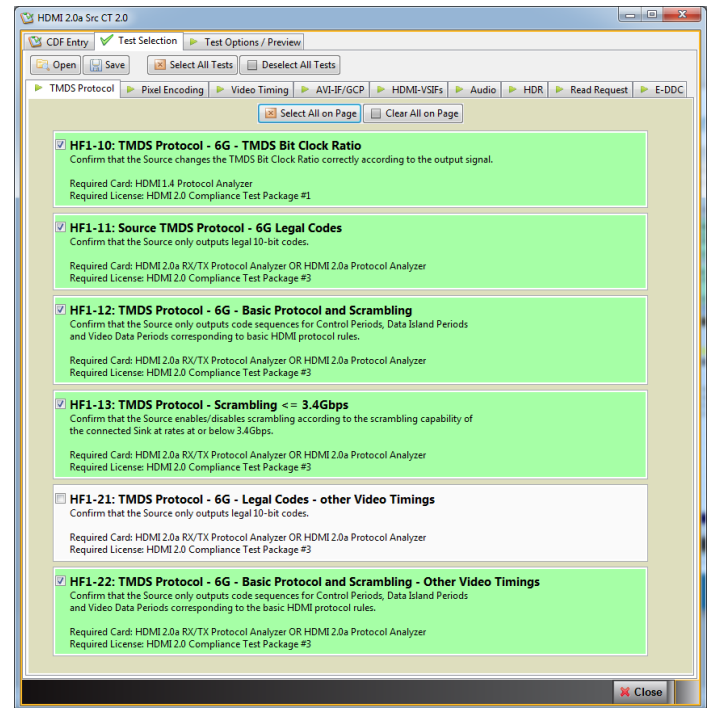
The 980 HDMI 2.0 source compliance tests are ideal for pre-testing your HDMI 2.0 source product prior to submission to an Authorized Test Center for approval. Pre-testing provides added assurance that your product will pass at the ATC when submitted. Where permitted, the 980 HDMI Protocol Analyzer can be used to self-test your product. Self-testing offers greater benefits for time to market and cost reduction than pre-testing by avoiding submission to the ATC for approval. The compliance tests enable you to view the captured data and detailed test results which help pinpoint the cause of compliance test failures.



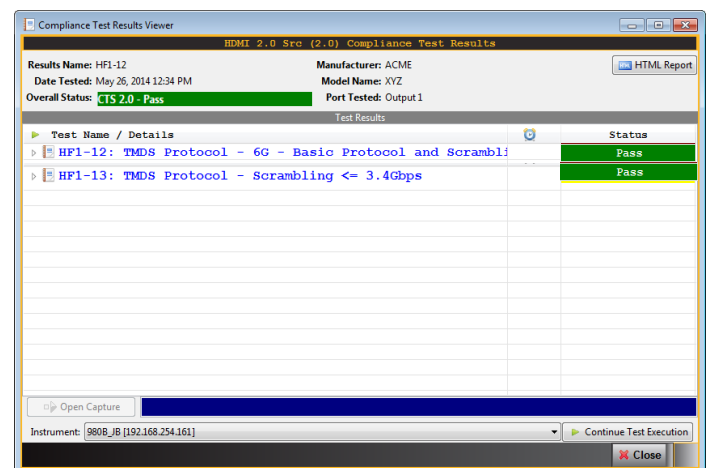
## HDMI 2.0 Test Selection – Video Timing Tests



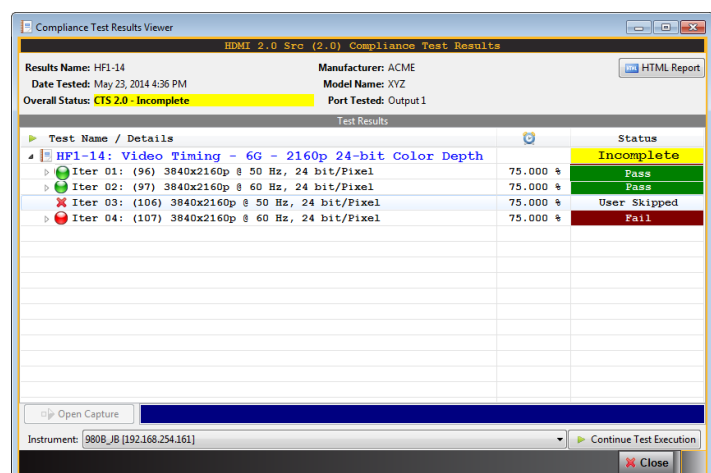
## HDMI 2.0 Test Selection – TMDS Protocol Tests



## HDMI 2.0 Test Results–TMDS Protocol Tests



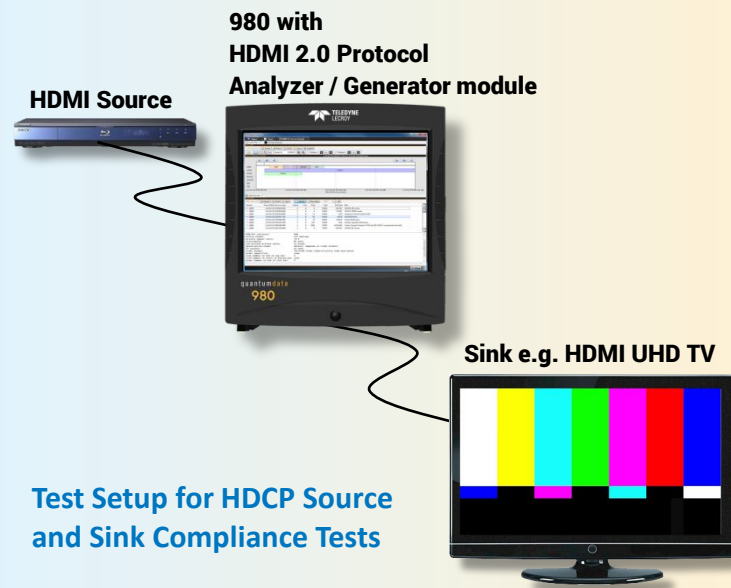
## HDMI 2.0 Test Results– Video Timing Tests



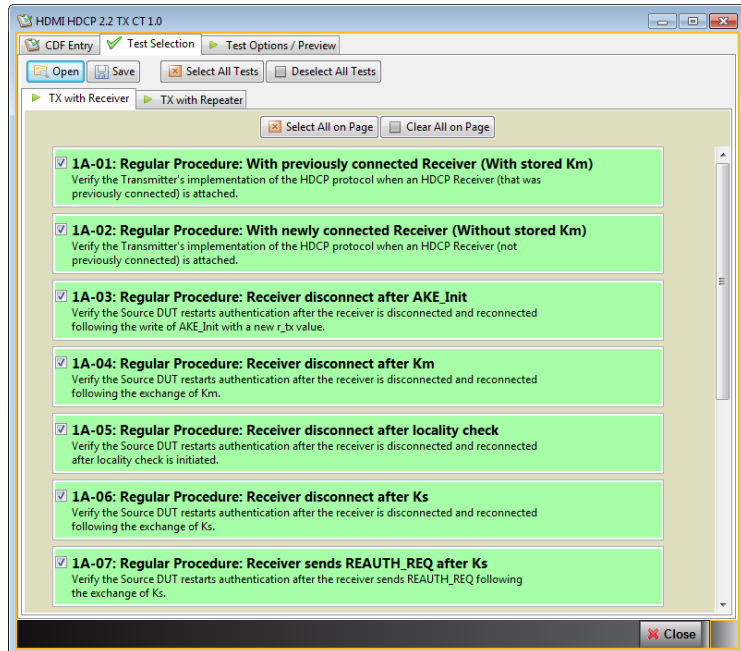
# HDCP 2.2 SOURCE, SINK, REPEATER COMPLIANCE TESTS

## HDCP 2.2 Compliance

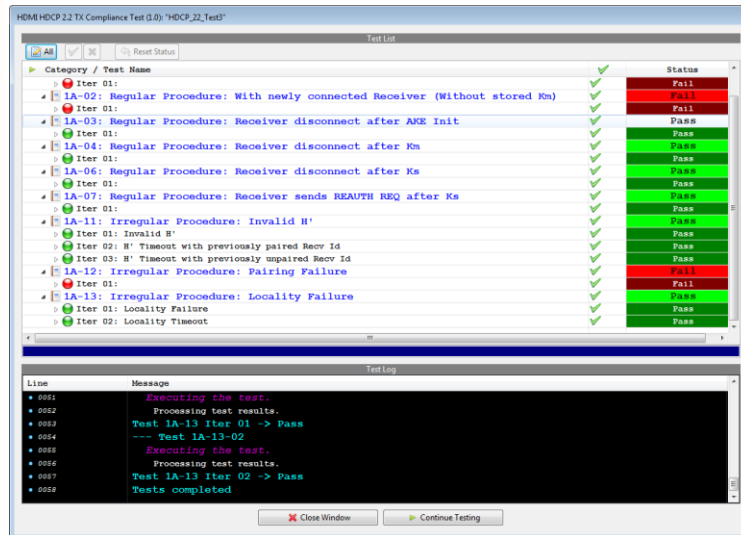
The 980 HDCP 2.2 compliance tests are ideal for pre-testing your HDMI 2.0 source, sink or repeater product prior to submission to an Authorized Test Center for approval. Pre-testing provides assurance that your product will pass at the ATC when submitted. The compliance tests enable you to view the auxiliary channel analyzer traces logged during the test to help diagnose the cause of compliance test failures.



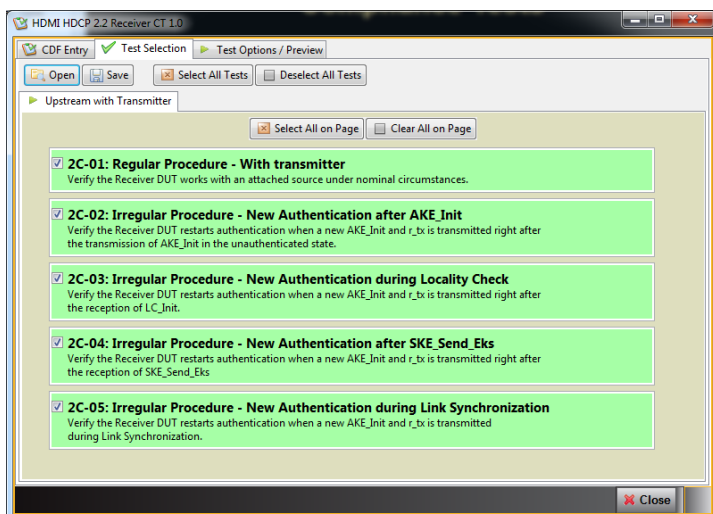
## HDCP 2.2 Test Selection – Source Tests



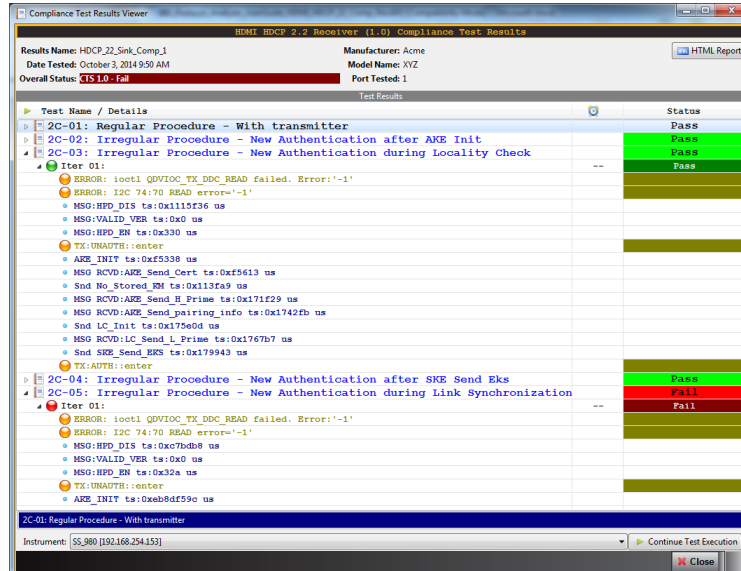
## HDCP 2.2 Test Results– Source Tests



## HDCP 2.2 Test Selection – Sink Tests



## HDCP 2.2 Test Results – Sink Tests



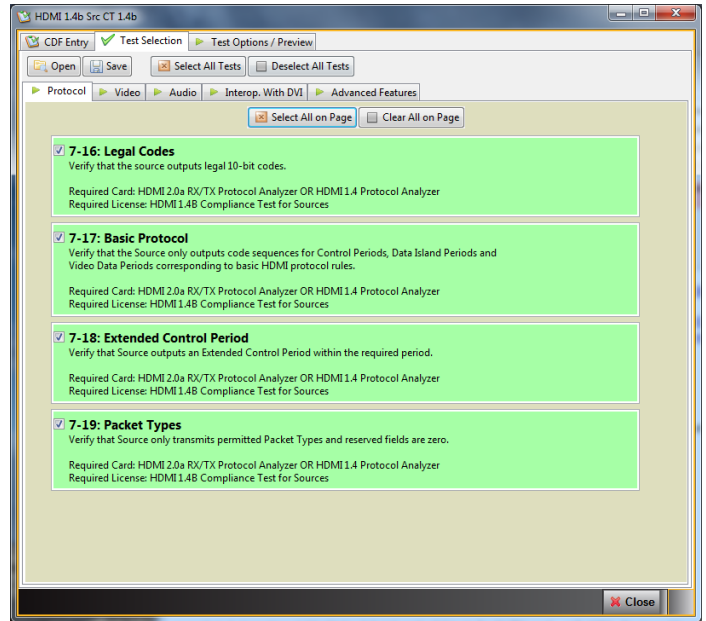
# HDMI 1.4 SOURCE COMPLIANCE TESTS

## HDMI 1.4 Source Compliance

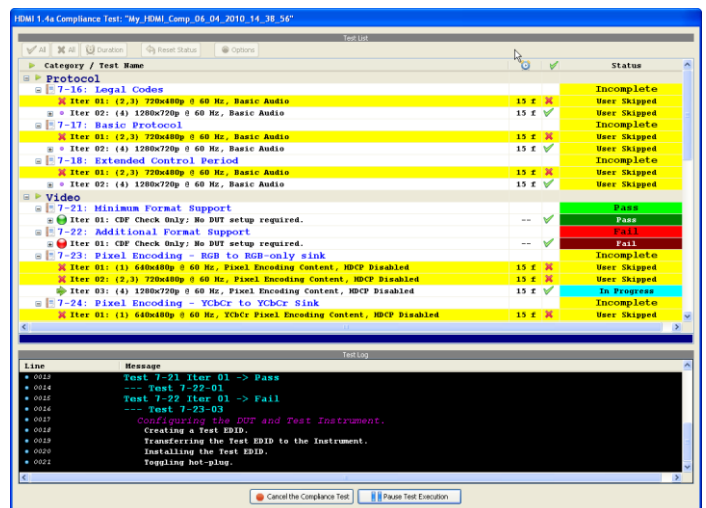
The 980 compliance tests are ideal for pre-testing your HDMI 1.4 source product prior to submission to an Authorized Test Center for approval. Pre-testing provides added assurance that your product will pass at the ATC when submitted. Where permitted, the 980 HDMI Protocol Analyzer can be used to self-test your product. Self-testing offers greater benefits for time to market and cost reduction than pre-testing by avoiding submission to the ATC for approval. The source compliance tests enable you to view the captured data and detailed test results which help identify the cause of compliance test failures.



## HDMI 1.4 Source Test Selection – Protocol Tests

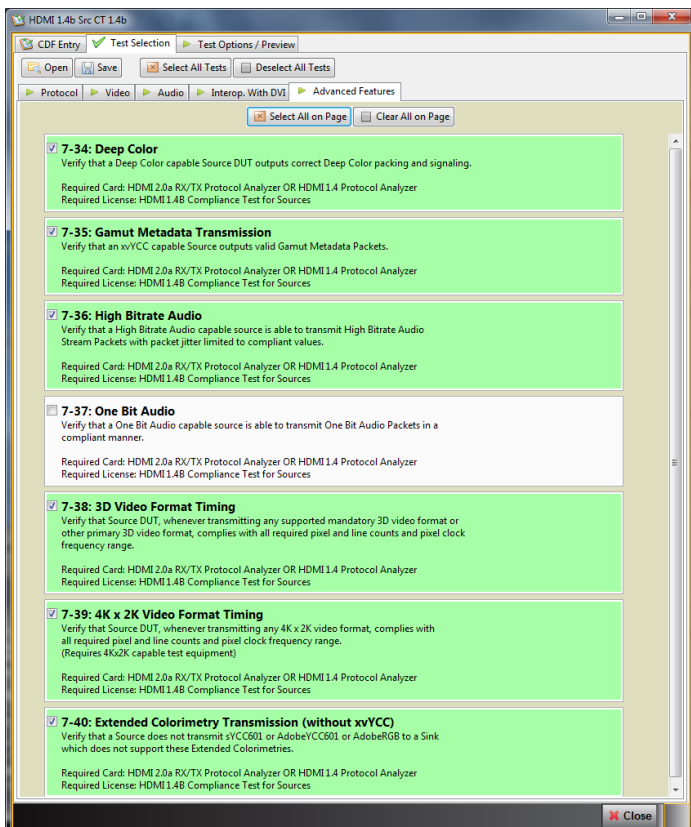


## HDMI 1.4 Source Test Results – Protocol Tests

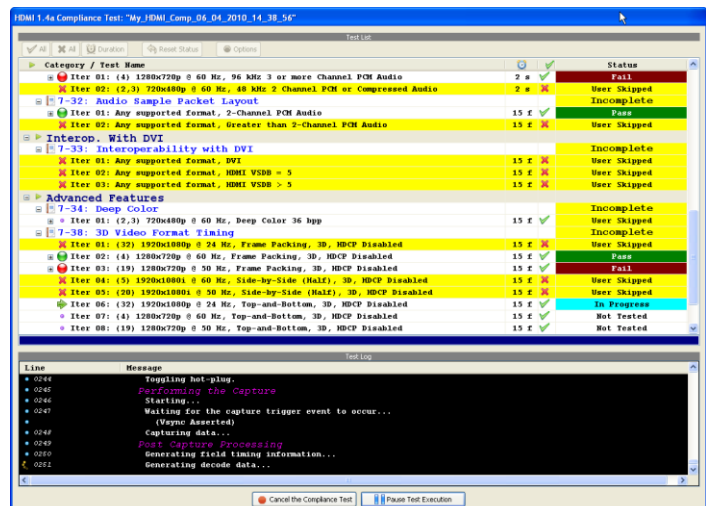


## Test Setup for HDMI 1.4 Source Compliance Tests

## HDMI 1.4 Test Selection – Advanced Features Tests



## HDMI 1.4 Source Results – Advanced Features Tests



# SPECIFICATIONS

## HDMI Ports

Version	HDMI 2.0a
Standard Formats	VESA, CEA
Connector	Rx Type A Tx Type A
Protocol	HDMI, DVI
Video Colorimetry	ITU-R BT.601-5, ITU-R BT.709-5, ITU-R BT.2020
Video Max Pixel Rate	600MHz (6.00 Gbps/channel TMDS rate)
Color Depths	8, 10, 12 bits
Video Encoding	RGB, YCbCr
Video Sampling Modes	4:4:4, 4:2:2, 4:2:0
HDCP	Versions 1.4 & 2.2
Capture memory	8 GBytes

## Compliance Test Support

HDMI 2.0 Source Test Packages #1, #2 and #3	Various tests in Sections: 7.2 TMDS Protocol; 7.3 Pixel Encoding; 7.4 Video Timing; 7.7 AVI InfoFrame; 7.12 High Dynamic Range InfoFrame; 9.7 Repeater Output HDR
HDMI HDCP 2.2 Source	Sections 1A and 1B
HDMI HDCP 2.2 Sink	Section 2C
HDMI HDCP 2.2 Repeater	Sections 3A, 3B, 3C 2C
HDMI 1.4b Source	Sections: 7.4 Protocol; 7.5 Video; 7.6 Audio; 7.7 DVI; 7.8 Advanced Features
UHD Alliance Source	Test IDs: 4-1, 4-2, 4-3, 4-4, 4-5, 4-6

## Options

Compliance Test Packages	See list in table above
HDMI Aux Channel Analyzer	Monitor HDMI DDC transactions and CEC message in real time

## 980 Test Platforms

Embedded Display	980B: 15" diagonal; Resolution: 1024(H); x 768 (V) resolution; 24 bit RGB color. 980R: 7" diagonal: Resolution: 800 (H) x 480 (V); 24 bit RGB color.
Power	90-264 VAC, 47-63Hz
Weight	23.76 LBS; 10.78 Kg
Size	980B: Height: 15.25 in. (38.7 cm) Width: 14.57 in. (36.5 cm) Depth: 6.29 in. (15.9 cm) 980R: Height: 6.29 in. (15.9 cm); Width: 15.25 in. (38.7 cm); Depth: 14.57 in. (36.5 cm)
Command Line Control	Ethernet (RJ-45) for external GUI and telnet
Environmental	Operating Temp: 32 to 104 (F); 0 to 40 (C)



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