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882E-DP DisplayPort Compliance Test Solutions

Quantum Data – 882E-DP DisplayPort Solutions for S

Agenda

- Link Layer Compliance Test for Sinks
- EDID Compliance Test for Sinks
- Monitor Link Layer Transactions during Compliance Tes
- Other DisplayPort Compliance Test Solutions

882E-DP DisplayPort Video Test Generator / Analyzer

ta Inc. 2111 Big Timber Road Elgin, IL 60123-1100 USA Phone: (847) 888-0450 www.quantumdata.com

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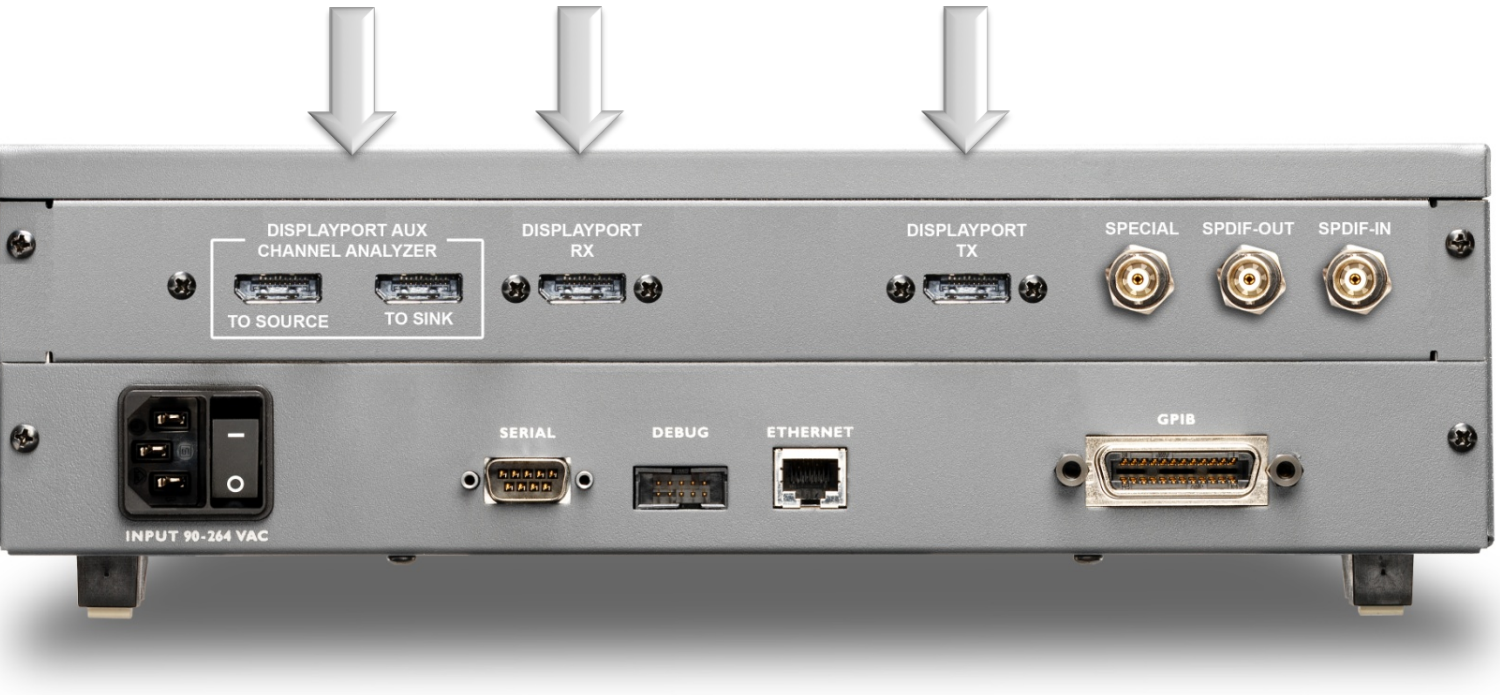
82E-DP Analyzer – DisplayPort Connectors

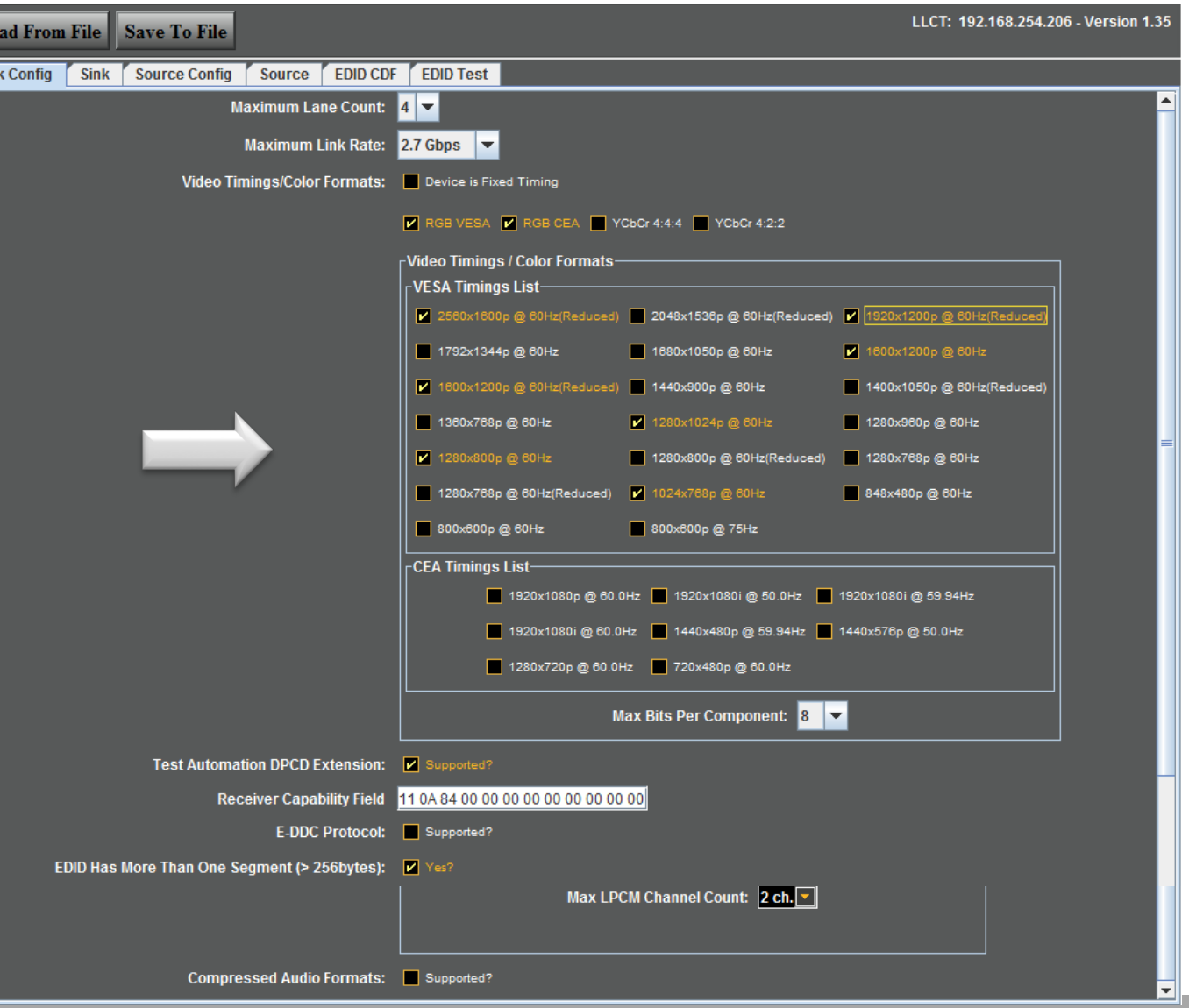


DisplayPort Ports

- DisplayPort Tx port se
  reference source to te
  DisplayPort sinks.
- DisplayPort Rx port se
  reference sink to test
  DisplayPort sources.
- DisplayPort Aux Chan
  Analyzer enable monit
  the Link Layer transac
  (EDID, Link Training, H

882E-DP Link Layer Sink Compliance Testing

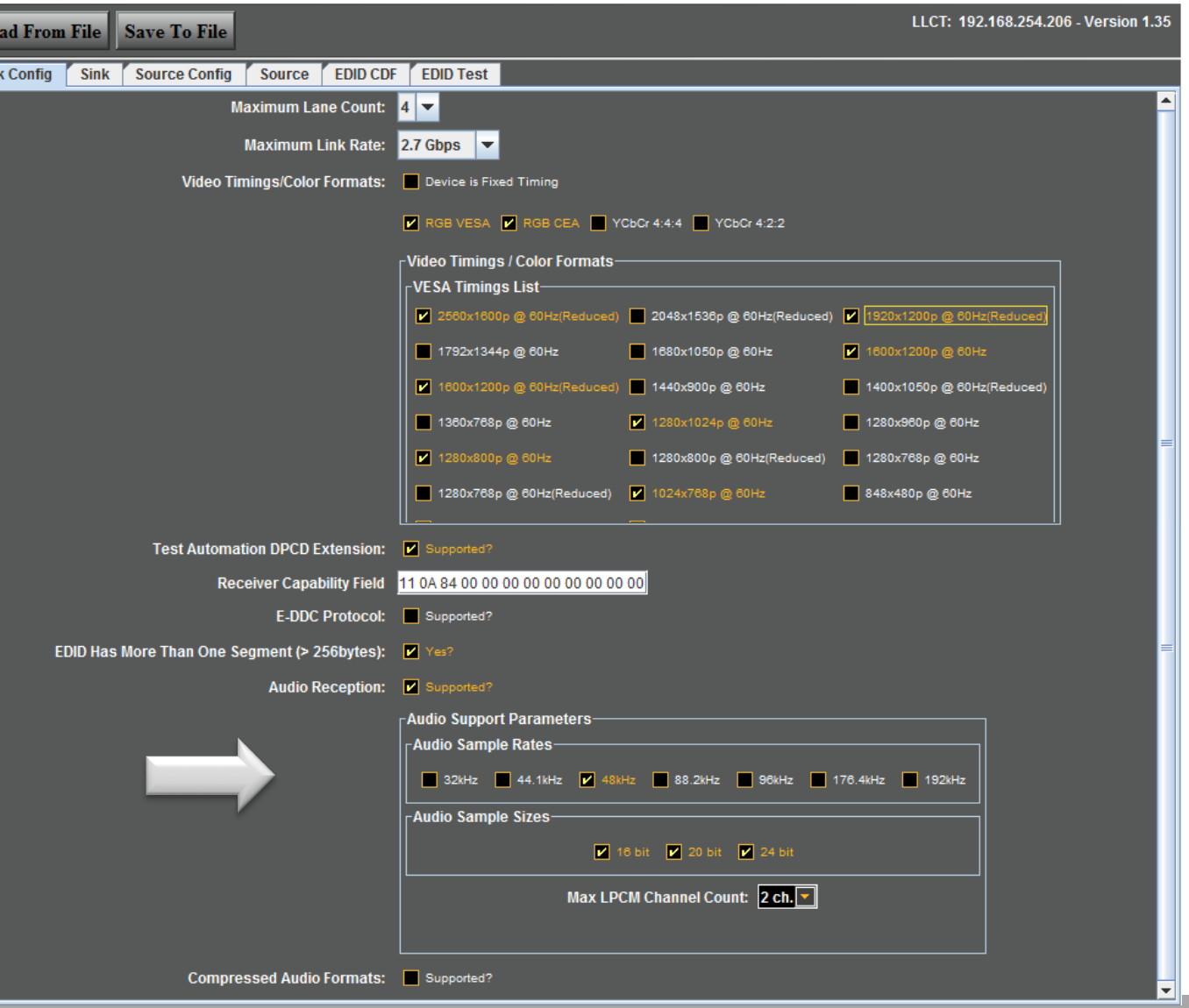
82 Sink Link Layer Compliance Test - Capabilities



Workflow – Configure Layer Capabilities (left

- Access **Sink Configure**
- Use pull-downs and che boxes to configure.
- Set video parameters.

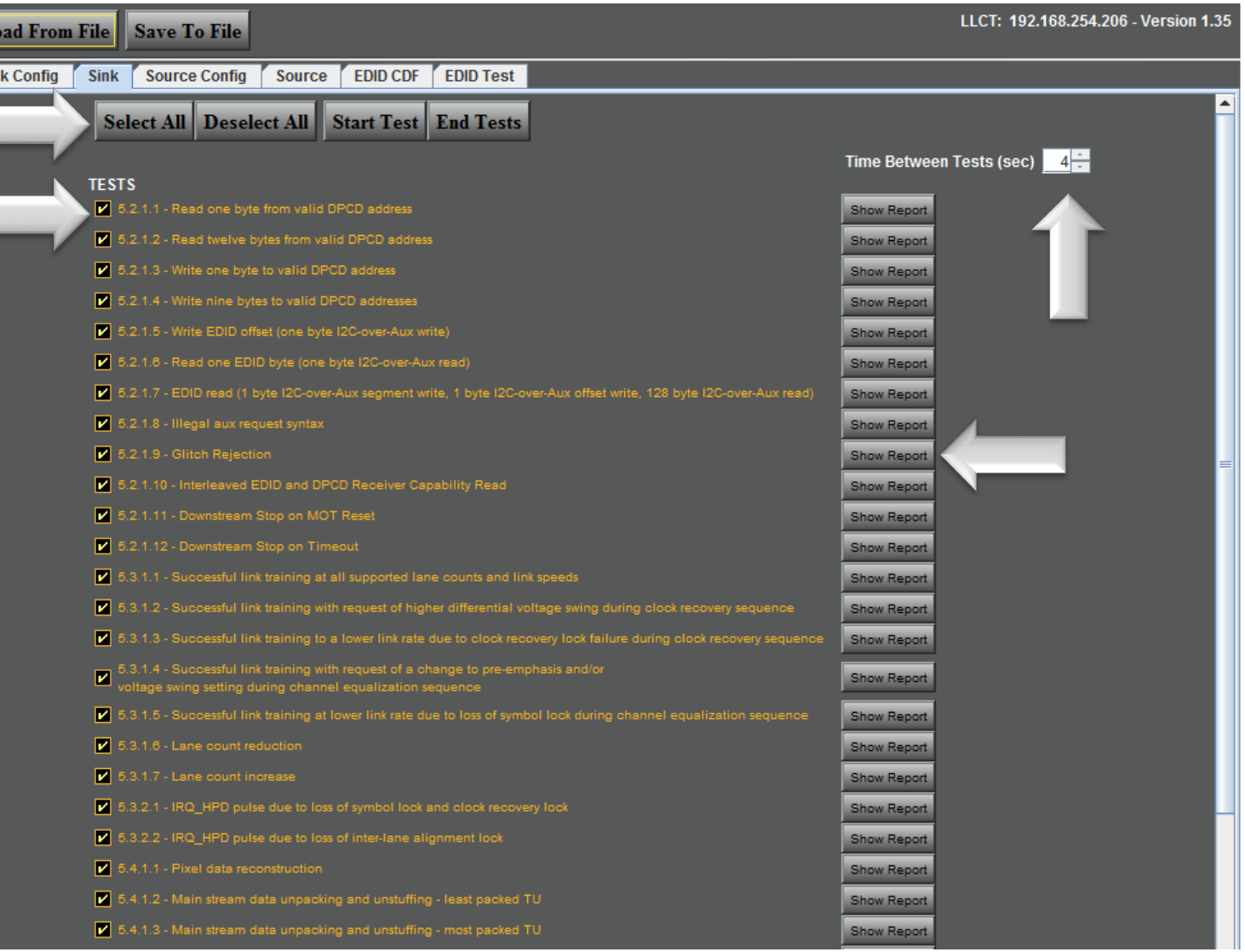
82E-DP Sink Link Layer Compliance Test – Capabilit



Workflow – Configure Layer Capabilities (left

- Set audio parameters.

82 Sink Link Layer Compliance Test – Select Tests



Workflow – Select Test

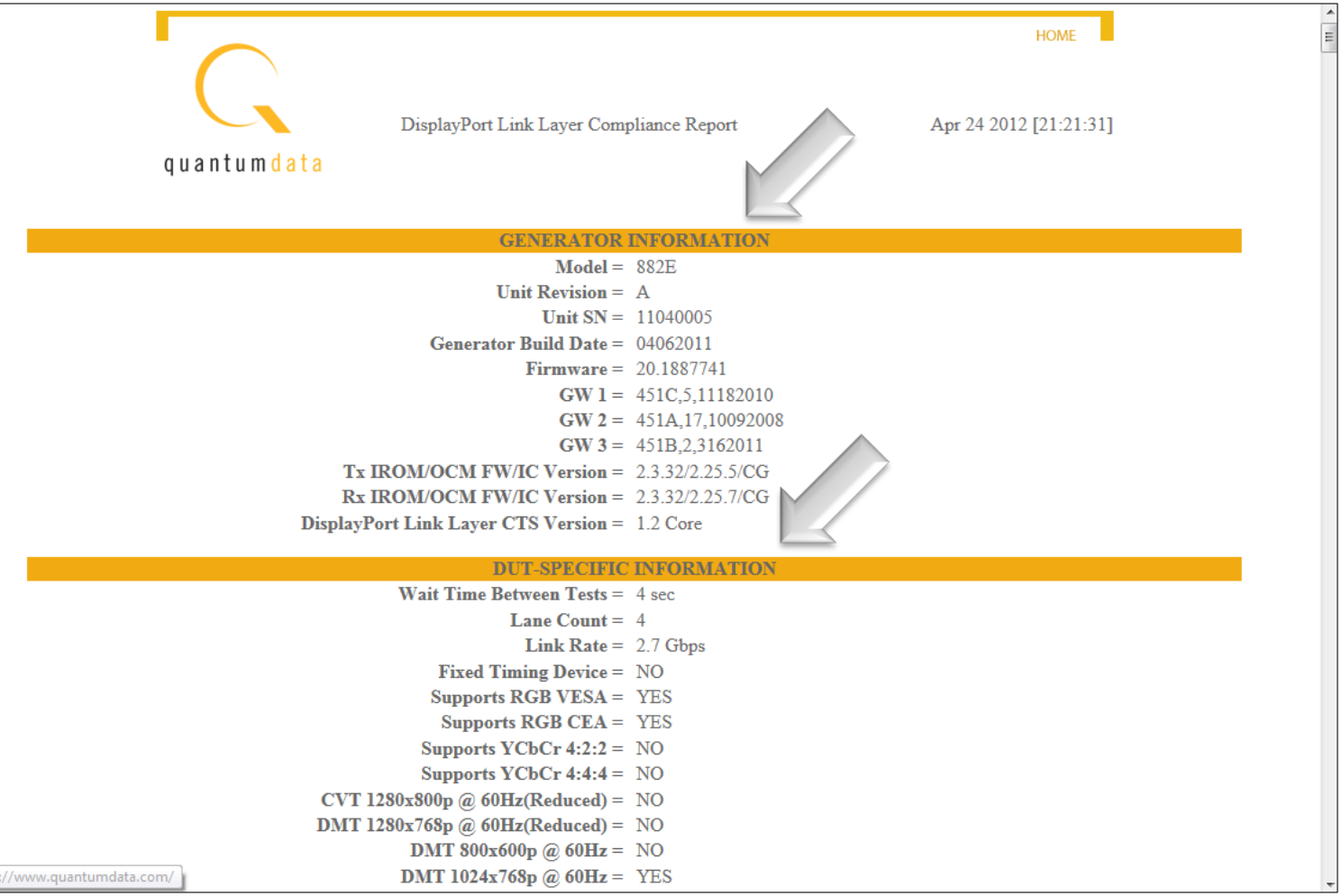
- Access **Sink** tab.
- Use check boxes to sel specific tests.
- Deselect all or Select a
- Specify time between te ensure device and test equipment is reset prope
- Save for later use.
- Recall to save time of e data.

82 Sink Link Layer Compliance Test - Execution

Workflow – Execute Te (left)

- View status of each tes
- Access report for each test.
- De-select all or Select a

882 Sink Link Layer Compliance Test – Test Report



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DisplayPort Link Layer Compliance Report

Apr 24 2012 [21:21:31]

GENERATOR INFORMATION

Model =	882E
Unit Revision =	A
Unit SN =	11040005
Generator Build Date =	04062011
Firmware =	20.1887741
GW 1 =	451C,5,11182010
GW 2 =	451A,17,10092008
GW 3 =	451B,2,3162011
Tx IROM/OCM FW/IC Version =	2.3.32/2.25.5/CG
Rx IROM/OCM FW/IC Version =	2.3.32/2.25.7/CG
DisplayPort Link Layer CTS Version =	1.2 Core

DUT-SPECIFIC INFORMATION

Wait Time Between Tests =	4 sec
Lane Count =	4
Link Rate =	2.7 Gbps
Fixed Timing Device =	NO
Supports RGB VESA =	YES
Supports RGB CEA =	YES
Supports YCbCr 4:2:2 =	NO
Supports YCbCr 4:4:4 =	NO
CVT 1280x800p @ 60Hz(Reduced) =	NO
DMT 1280x768p @ 60Hz(Reduced) =	NO
DMT 800x600p @ 60Hz =	NO
DMT 1024x768p @ 60Hz =	YES

://www.quantumdata.com/

Workflow – View Test R (left)

- 882E Home Page and s Generated Reports.
- Report shows 882E information.
- Report shows capabiliti
- Disseminate test results colleagues, subject matt experts and Quantum D analysis.

882 Sink Link Layer Compliance Test – Test Report

CVT 1280x800p @ 60Hz(Reduced) =	NO
DMT 1280x768p @ 60Hz(Reduced) =	NO
DMT 800x600p @ 60Hz =	NO
DMT 1024x768p @ 60Hz =	YES
DMT 1280x1024p @ 60Hz =	YES
DMT 1280x960p @ 60Hz =	NO
DMT 1360x768p @ 60Hz =	NO
CVT 1280x800p @ 60Hz =	YES
DMT 1400x1050p @ 60Hz(Reduced) =	NO
DMT 1280x768p @ 60Hz =	NO
CVT 1600x1200p @ 60Hz(Reduced) =	YES
CVT 2048x1536p @ 60Hz(Reduced) =	NO
DMT 1792x1344p @ 60Hz =	NO
DMT 1600x1200p @ 60Hz =	YES
CEA 1440x480p @ 59.94Hz =	NO
CEA 1440x576p @ 50Hz =	NO
CEA 1920x1080i @ 50Hz =	NO
CEA 1920x1080i @ 59.94Hz =	NO
CEA 1920x1080i @ 60Hz =	NO
CEA 1920x1080p @ 60Hz =	NO
CEA 1280x720p @ 60Hz =	NO
CEA 720x480p @ 60Hz =	NO
CVT 2560x1600p @ 60Hz(Reduced) =	YES
CVT 1920x1200p @ 60Hz(Reduced) =	YES
CVT 1680x1050p @ 60Hz =	NO
CVT 1440x900p @ 60Hz =	NO
CVT 848x480p @ 60Hz =	NO
CVT 800x600p @ 75Hz =	NO
Maximum Number of Bits per Component =	8
Supports Test Automation =	YES
Receiver Capability Field =	110A840000000000000000
Supports the E-DDC Protocl =	NO
EDID Occupies Greater Than One E-DDC Segment (>256 bytes) =	YES
Supports Audio Reception =	YES
Audio Sample Rates Supported:	

Workflow – View Test R (left)

- 882E Home Page and s Generated Reports.
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- Report shows capabiliti
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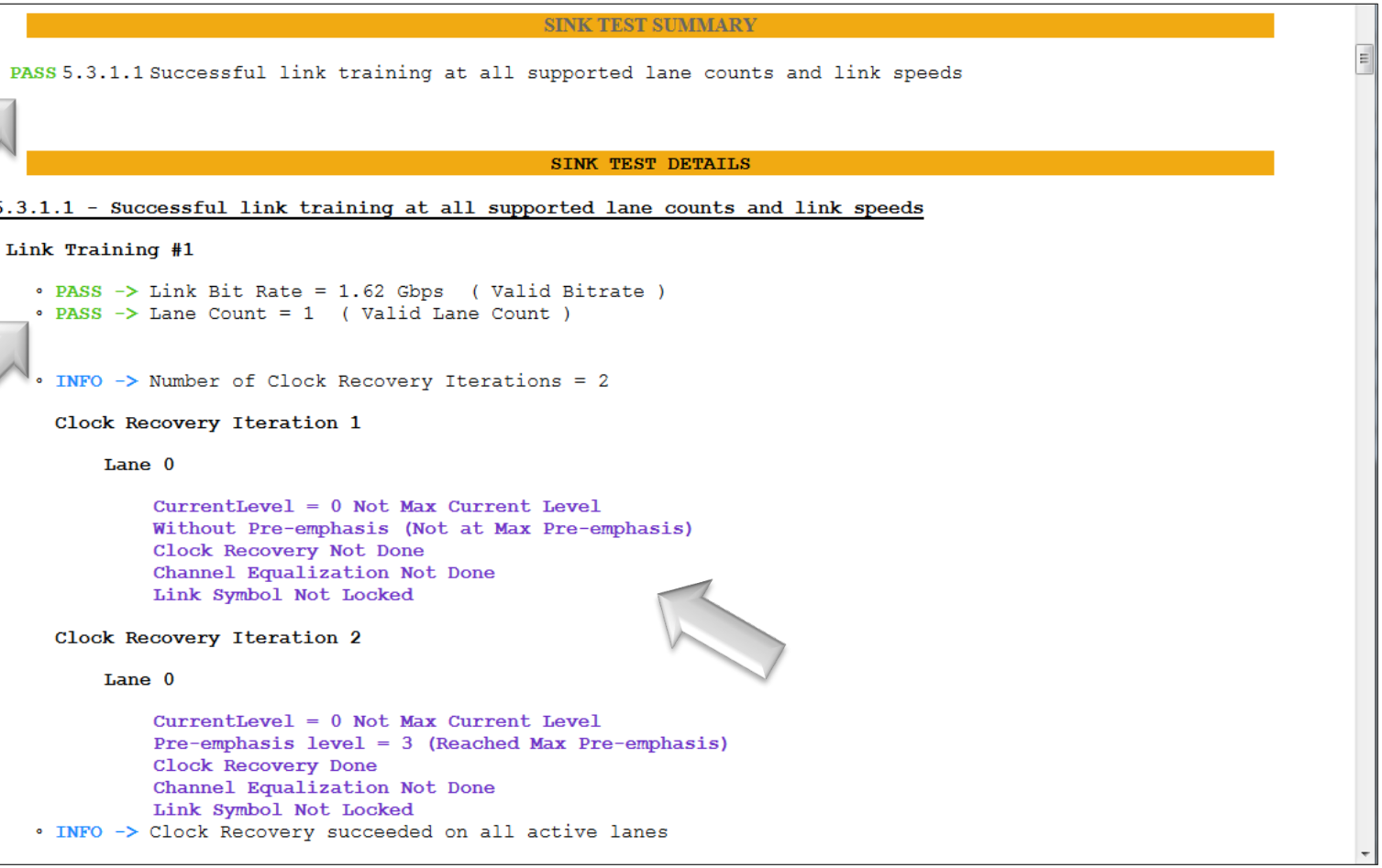
82 Sink Link Layer Compliance Test – Test Report



SINK TEST SUMMARY

PASS 5.3.1.1 Successful link training at all supported lane counts and link speeds

SINK TEST DETAILS

5.3.1.1 - Successful link training at all supported lane counts and link speeds

Link Training #1

- PASS -> Link Bit Rate = 1.62 Gbps (Valid Bitrate)
- PASS -> Lane Count = 1 (Valid Lane Count)
- INFO -> Number of Clock Recovery Iterations = 2

Clock Recovery Iteration 1

Lane 0

CurrentLevel = 0 Not Max Current Level
Without Pre-emphasis (Not at Max Pre-emphasis)
Clock Recovery Not Done
Channel Equalization Not Done
Link Symbol Not Locked

Clock Recovery Iteration 2

Lane 0

CurrentLevel = 0 Not Max Current Level
Pre-emphasis level = 3 (Reached Max Pre-emphasis)
Clock Recovery Done
Channel Equalization Not Done
Link Symbol Not Locked

- INFO -> Clock Recovery succeeded on all active lanes

Workflow – View Test R (left)

- Report shows summary test results.
- Report shows Pass/Fai of each distinct sub-test.
- Report shows detail log each step. Ideal for isola root cause of failures.
- Disseminate test results colleagues, subject matt experts and Quantum D analysis.

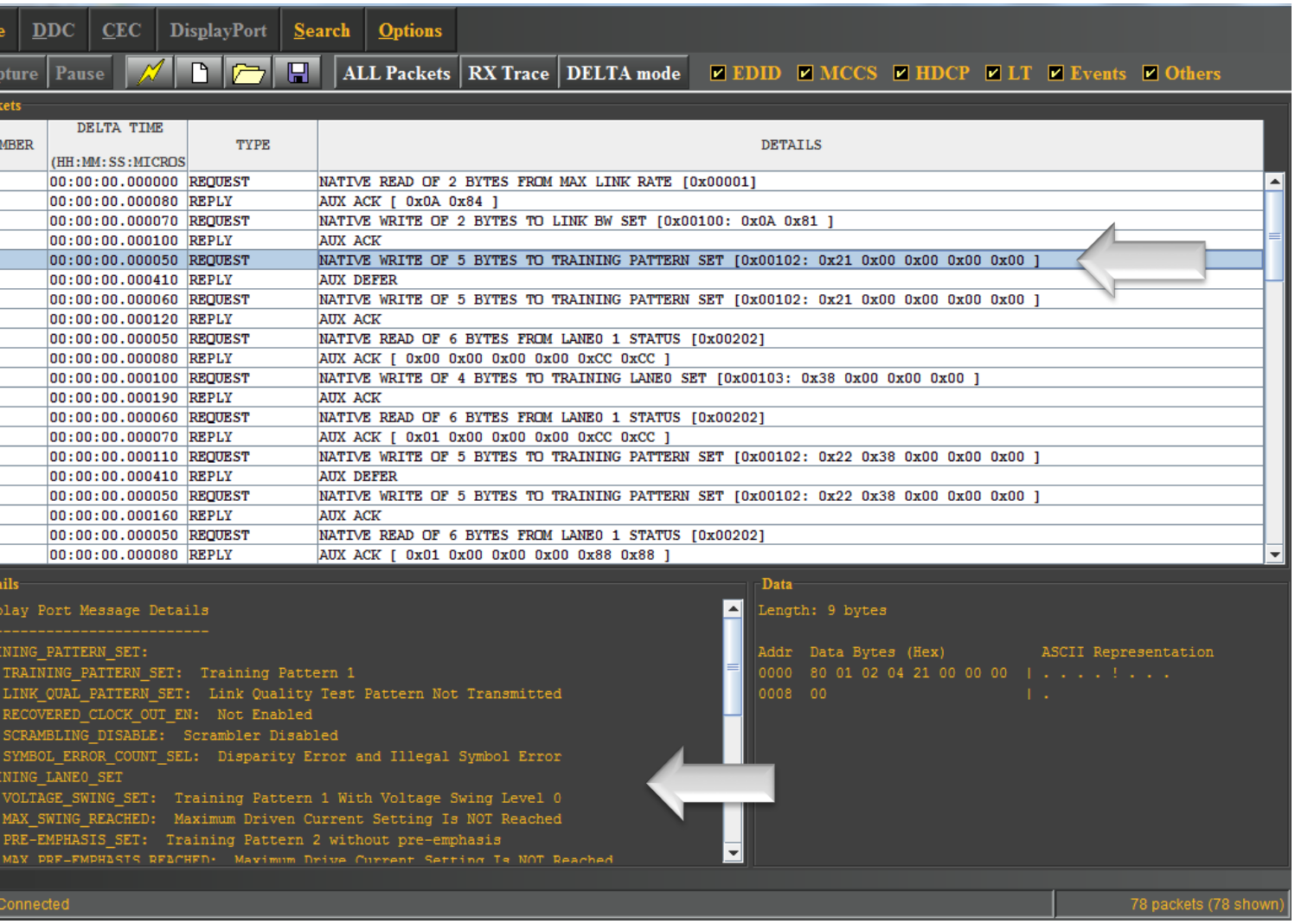
82 Sink Link Layer Compliance Test – Test Report

```
Symbol Lock Iteration 5

    Lane 0

        CurrentLevel = 0 Not Max Current Level
        Pre-emphasis level = 2 (Not at Max Pre-emphasis)
        Clock Recovery Done
        Channel Equalization Done
        Link Symbol Locked

    Lane 1

        CurrentLevel = 0 Not Max Current Level
        Pre-emphasis level = 2 (Not at Max Pre-emphasis)
        Clock Recovery Done
        Channel Equalization Done
        Link Symbol Locked

    Lane 2

        CurrentLevel = 0 Not Max Current Level
        Pre-emphasis level = 2 (Not at Max Pre-emphasis)
        Clock Recovery Done
        Channel Equalization Done
        Link Symbol Locked

    Lane 3

        CurrentLevel = 0 Not Max Current Level
        Pre-emphasis level = 2 (Not at Max Pre-emphasis)
        Clock Recovery Done
        Channel Equalization Done
        Link Symbol Locked
  ■ INFO -> Interlane Align Done
∘ INFO -> Equalization succeeded on all active lanes
∘ INFO -> Symbol Lock succeeded on all active lanes
∘ WARNING -> Link Train Time = 16 ms  ( Link Training Timer > 10 ms )
```

Workflow – View Test R (left)

- Report shows importan information at end of ea
- Disseminate test result colleagues, subject matt experts and Quantum D analysis.

82 Sink Link Layer Transaction Monitoring

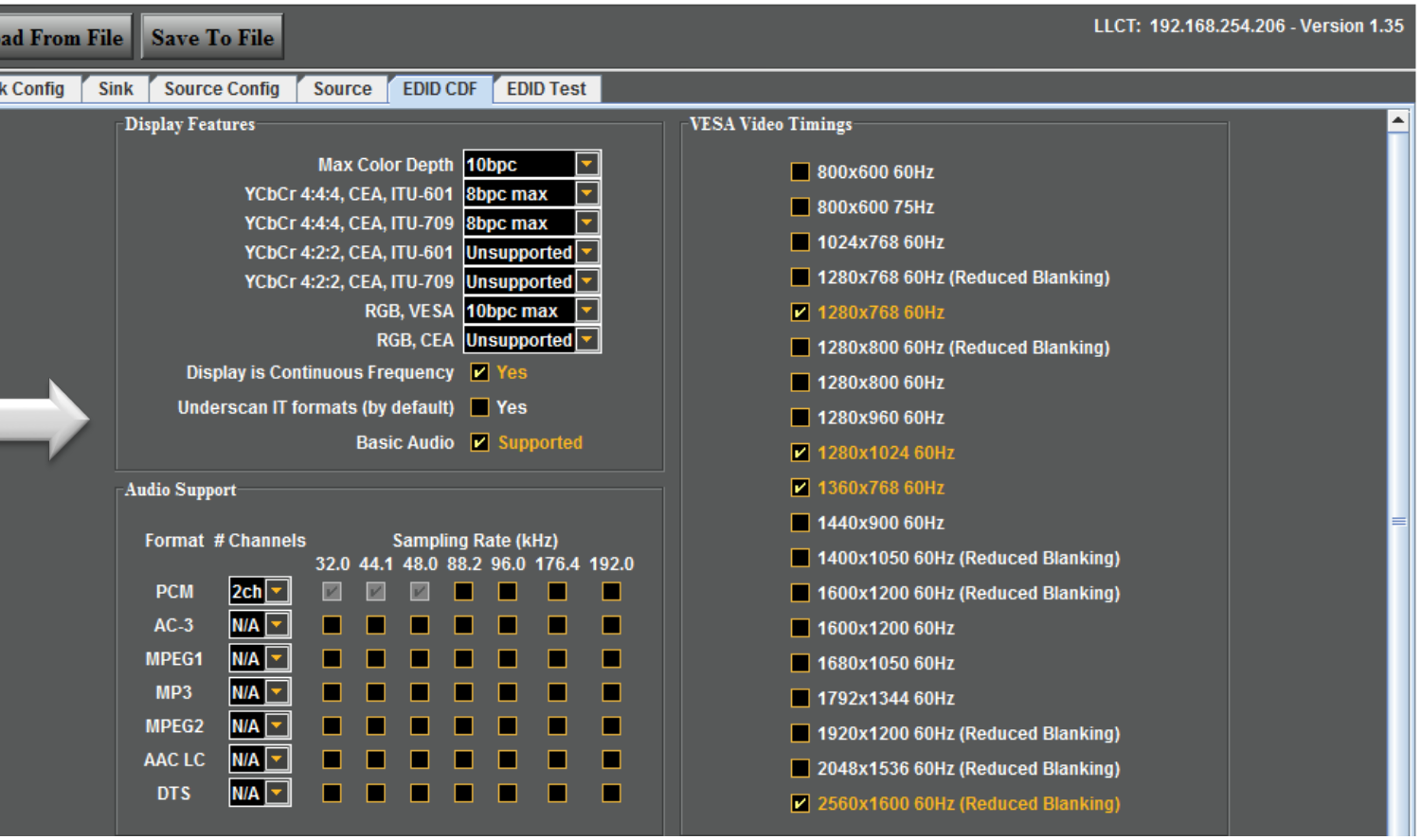


Workflow – Monitor Li transactions during te

- Monitor transactions du Layer Compliance Test t investigate errors or war
- Isolate root cause of co failures along with detail compliance test logs.
- View all Link Layer tran and details of each.
- Monitor passively betwe DUT and any source.
- Save transaction logs f dissemination to colleag subject matter experts a Quantum Data for analy

2E-DP EDID DisplayPort Sink Compliance Testi

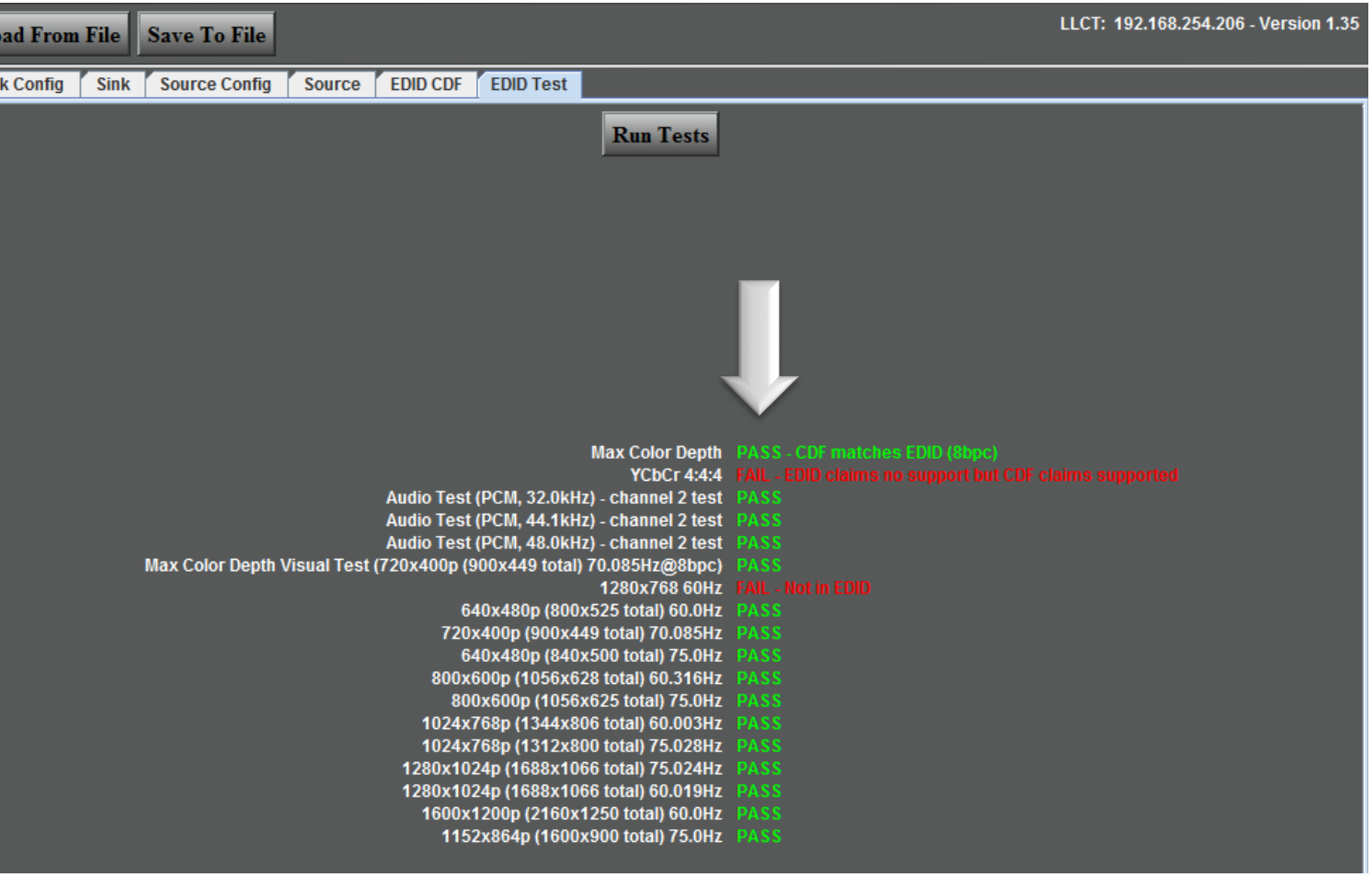
82 Sink EDID Compliance Test - Capabilities



Workflow – Configure Capabilities Declaratio (left)

- Access EDID CDF tab.
- Use pull-downs and ch boxes to configure.
- Set video and audio parameters.
- Save for later use.
- Recall to save time of e data.

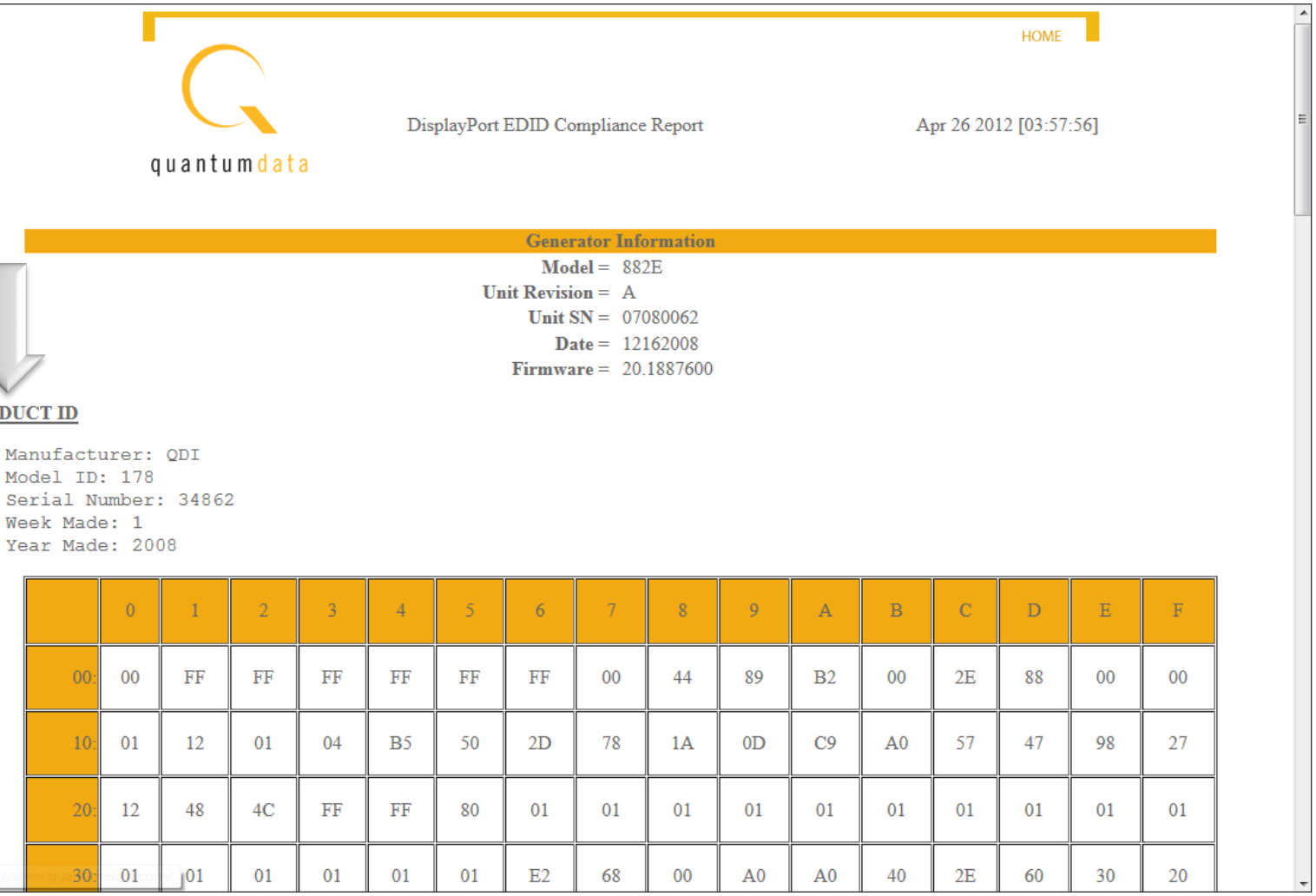
882 Sink EDID Compliance Test – Test Status/Results



Workflow – Select Test

- Initiate tests from EDID tab.
- View Pass/Fail results.

882 Sink EDID Compliance Test – Test Report



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DisplayPort EDID Compliance Report

Apr 26 2012 [03:57:56]

Generator Information

Model = 882E
Unit Revision = A
Unit SN = 07080062
Date = 12162008
Firmware = 20.1887600

DUCT ID

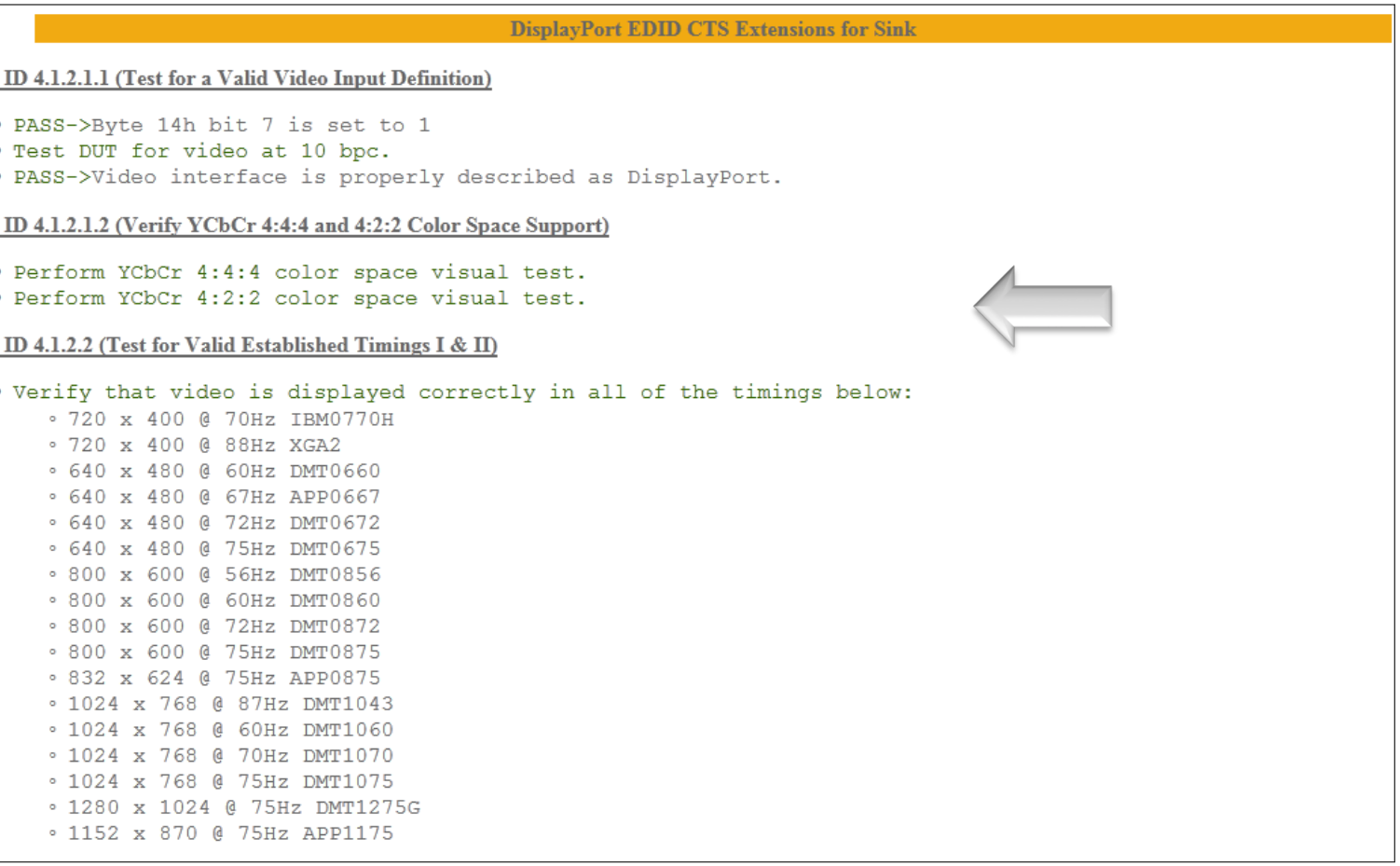
Manufacturer: QDI
Model ID: 178
Serial Number: 34862
Week Made: 1
Year Made: 2008

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00:	00	FF	FF	FF	FF	FF	FF	00	44	89	B2	00	2E	88	00	00
10:	01	12	01	04	B5	50	2D	78	1A	0D	C9	A0	57	47	98	27
20:	12	48	4C	FF	FF	80	01	01	01	01	01	01	01	01	01	01
30:	01	01	01	01	01	01	E2	68	00	A0	A0	40	2E	60	30	20

Workflow – View Test R (left)

- View HTML test report.
- View Product Informatio
- Disseminate test results colleagues, subject matt experts and Quantum D analysis.

82 Sink EDID Compliance Test



DisplayPort EDID CTS Extensions for Sink

ID 4.1.2.1.1 (Test for a Valid Video Input Definition)

- PASS->Byte 14h bit 7 is set to 1
- Test DUT for video at 10 bpc.
- PASS->Video interface is properly described as DisplayPort.

ID 4.1.2.1.2 (Verify YCbCr 4:4:4 and 4:2:2 Color Space Support)

- Perform YCbCr 4:4:4 color space visual test.
- Perform YCbCr 4:2:2 color space visual test.

ID 4.1.2.2 (Test for Valid Established Timings I & II)

- Verify that video is displayed correctly in all of the timings below:
  - 720 x 400 @ 70Hz IBM0770H
  - 720 x 400 @ 88Hz XGA2
  - 640 x 480 @ 60Hz DMT0660
  - 640 x 480 @ 67Hz APP0667
  - 640 x 480 @ 72Hz DMT0672
  - 640 x 480 @ 75Hz DMT0675
  - 800 x 600 @ 56Hz DMT0856
  - 800 x 600 @ 60Hz DMT0860
  - 800 x 600 @ 72Hz DMT0872
  - 800 x 600 @ 75Hz DMT0875
  - 832 x 624 @ 75Hz APP0875
  - 1024 x 768 @ 87Hz DMT1043
  - 1024 x 768 @ 60Hz DMT1060
  - 1024 x 768 @ 70Hz DMT1070
  - 1024 x 768 @ 75Hz DMT1075
  - 1280 x 1024 @ 75Hz DMT1275G
  - 1152 x 870 @ 75Hz APP1175

Workflow – View Test R (left)

- View status and results test per Test ID.
- View Pass/Fail results.
- Disseminate test results colleagues, subject matt experts and Quantum D analysis.

82E-DP Sink EDID Compliance Test

ID 4.1.2.3 (Test for Valid Standard Timings

No standard timings are used. Skip test.

ID 4.1.2.4 (Tests for 18-byte Descriptors)

Verify that video is displayed correctly for all timings in the EDID Formats beginning with "Det". If video is properly displayed for all timings, 4.1.2.4.1 is PASS, otherwise FAIL.

ID 4.1.2.4.7 (Test for Valid Extension Flag and Checksum

PASS->Block 0 checksum
PASS->Block 1 checksum

ID 4.2.1.1 (CEA Extension Version Number)

PASS->CEA Revision Number is valid (1 or 3).

ID 4.2.1.2 (Value of 18-byte Descriptor Offset '*d*')

PASS->*d* points to a location after the data block collection.
PASS->Padding area contains no value that is non-zero.

ID 4.2.1.3 (Byte #3)

Basic audio support claimed by EDID. If basic audio is heard, PASS. Otherwise, FAIL.
Output a known pattern in YCbCr 4:4:4. If the colors are displayed correctly, PASS. Otherwise, FAIL.
Output a known pattern in YCbCr 4:2:2. If the colors are displayed correctly, PASS. Otherwise, FAIL.

ID 4.2.2.1 (Data Block Type Validation)

PASS->Found zero errors.

ID 4.2.2.2 (Short Video Descriptors)

PASS->No VIC greater than 59 found
PASS->All VICs are non-zero
PASS->No duplicate VIC found in SVD block.
PASS->DTD matches an 861B format with VIC = 16
PASS->SVD that matches the VIC of the 861 format is found

Workflow – Select Test

- Initiate tests from EDID tab.
- View Pass/Fail results.
- Disseminate test results colleagues, subject matt experts and Quantum D analysis.

Other 882 DisplayPort Compliance Test Solutions

Other DisplayPort Compliance Test Solutions:

Link Layer Compliance Testing for Sources

HDCP Compliance Testing – Sinks

Thank You!