



SL-8810 HDCP 2.2 Interface Independent Adaptation Protocol Analyzer

User Guide

Simplay-UG-02002-C

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Contents

1. Overview	3
1.1. SL-8810 Test Equipment	3
1.2. SL-8810 HDCP 2.2 IIA Protocol Analyzer Software	4
1.2.1. System Requirements	4
1.2.2. Inside the Box	4
1.2.3. Installing Software	5
1.2.4. Using the HDCP 2.2 IIA Protocol Analyzer GUI	6
1.2.5. Updating HDCP Firmware	11
2. HDCP 2.2 IIA Transmitter Test for Source Device	13
2.1. Test Items	13
2.2. Test Operation	14
2.2.1. Connection Setup for Source Device Testing	14
2.2.2. Verification Test of the Authentication Procedure	14
2.3. Report File	15
3. HDCP 2.2 IIA Receiver Test for Sink Device	16
3.1. Test Items	16
3.2. Test Operation	16
3.2.1. Connection Setup for Sink Device Testing	16
3.2.2. Verification Test of the Authentication Procedure	17
3.3. Report File	17
4. Log Information	18
4.1. Sample Sink Log File	18
4.2. Sample Source Log File	23
References	28
Revision History	29

Figures

Figure 1.1. SL-8810 TE Interface (Top)	3
Figure 1.2. SL-8810 TE Interface (Front)	3
Figure 1.3. SL-8810 TE Interface (Back)	4
Figure 1.4. Locate and Open SetupPro_HDCP2_IIA.exe File in the USB Stick	5
Figure 1.5. Welcome to the HDCP2_IIA Setup Wizard	5
Figure 1.6. HDCP2_IIA Shortcut	5
Figure 1.7. SL-8810 HDCP 2 IIA Protocol Analyzer Window	6
Figure 1.8. HDCP 2 IIA Protocol Analyzer GUI Main Window	7
Figure 1.9. Facsimile Keys Support	8
Figure 1.10. TE Output Tab in the Main Window of the SL-8810 HDCP 2 IIA Protocol Analyzer GUI	9
Figure 1.11. Dialog with Select Output Video Option	10
Figure 1.12. Dialog without Select Output Video Option	10
Figure 1.13. Enter IP Address in the HDCP 2 IIA Protocol Analyzer GUI	11
Figure 1.14. Update HDCP Firmware	12
Figure 2.1. Connection Setup for Source Device Testing	14
Figure 2.2. Sample Report File of Testing Source Device	15
Figure 3.1. Connection Setup for the Sink Device	16
Figure 3.2. Sample Report File of Testing Sink Device	17

1. Overview

This document describes how to use the SL-8810 High-bandwidth Digital Content Protection (HDCP) 2.2 Interface Independent Adaptation (IIA) Protocol Analyzer Test Equipment (TE) from Simplay Labs, LLC™ (Simplay Labs).

The User Guide also provides details on the setup and testing of sink and source devices for compliance to the HDCP 2.2 IIA Compliance Testing.

For the latest updates to the documentation or the software, check www.vprime.com.

1.1. SL-8810 Test Equipment

Figure 1.1, Figure 1.2, and Figure 1.3 show the top, front, and back panels of the SL-8810 TE.

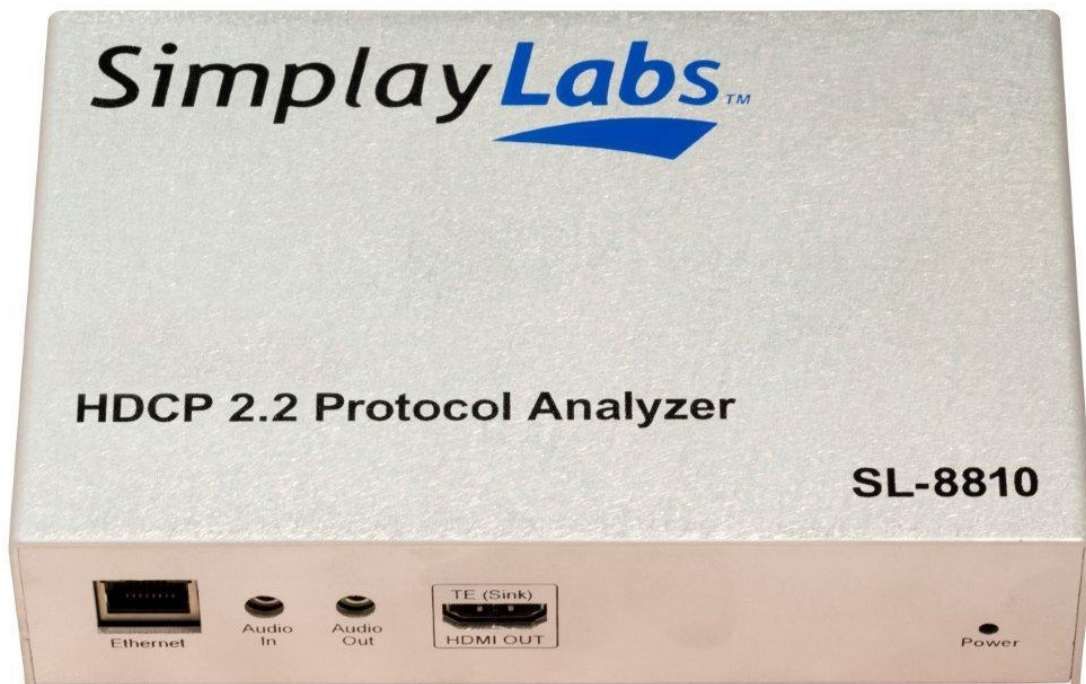


Figure 1.1. SL-8810 TE Interface (Top)



Figure 1.2. SL-8810 TE Interface (Front)

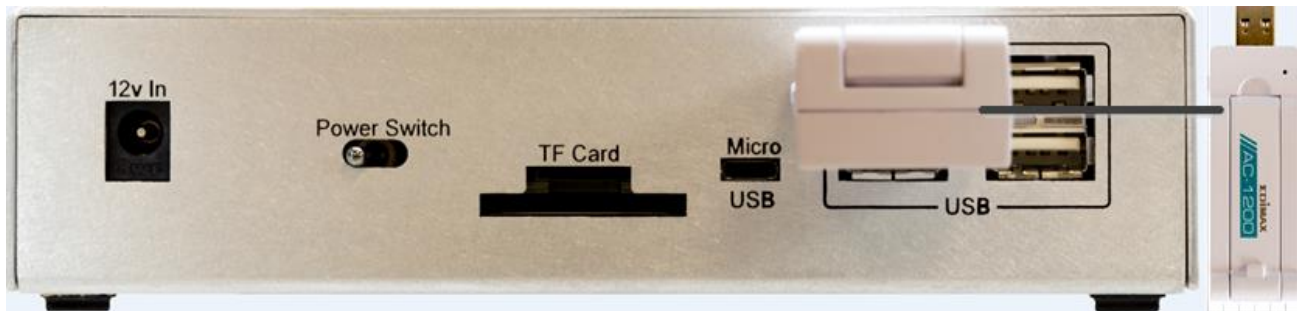


Figure 1.3. SL-8810 TE Interface (Back)

Label	Description
Ethernet	Ethernet port. Used as a control port.
Audio In	Reserved.
Audio Out	Reserved.
TE (Sink)/HDMI OUT	Output HDMI display signal. Connect to a display device such as an HDTV or LCD monitor.
Power	Power indicator.
12v In	Power connector. A 12 V input.
Power Switch	Power On/Off. Note that restart the SL-8810 GUI if the SL-8810 TE power is cycled Off then On.
TF Card	Reserved.
Micro USB	Used for Linux Operating System image update.
USB	Used for EDIMAX AC-1200 wireless dongle.
Wi-Fi dongle	EDIMAX AC-1200.

1.2. SL-8810 HDCP 2.2 IIA Protocol Analyzer Software

This section describes the HDCP 2.2 IIA Protocol Analyzer delivery and software installation.

1.2.1. System Requirements

- A PC or laptop computer with Microsoft Windows 7, 32 bit or 64 bit OS.
- Microsoft .NET Framework Client Profile must be present. If not installed previously, download it from <http://www.microsoft.com/en-us/download/details.aspx?id=24872>.
- Minimum 4 GB, optimum 8 GB RAM.

1.2.2. Inside the Box

The SL-8810 TE delivery includes the following items:

- SL-8810 tester
- 12 V power supply
- One micro USB cable
- One HDMI cable

You can download the HDCP 2.2 IIA Protocol Analyzer software executable and documentation from www.vprime.com.

1.2.3. Installing Software

Follow these steps to install the HDCP 2.2 IIA Protocol Analyzer software.

1. Open and explore the supplied USB stick. Click SetupPro_HDCP2_IIA.msi (see [Figure 1.4](#)) to install HDCP 2.2 IIA Protocol Analyzer software.

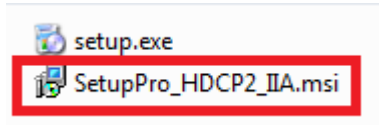


Figure 1.4. Locate and Open SetupPro_HDCP2_IIA.exe File in the USB Stick

2. The Welcome to the HDCP2_IIA Setup Wizard opens. See [Figure 1.5](#). Click Next. Follow the instructions to complete the installation.

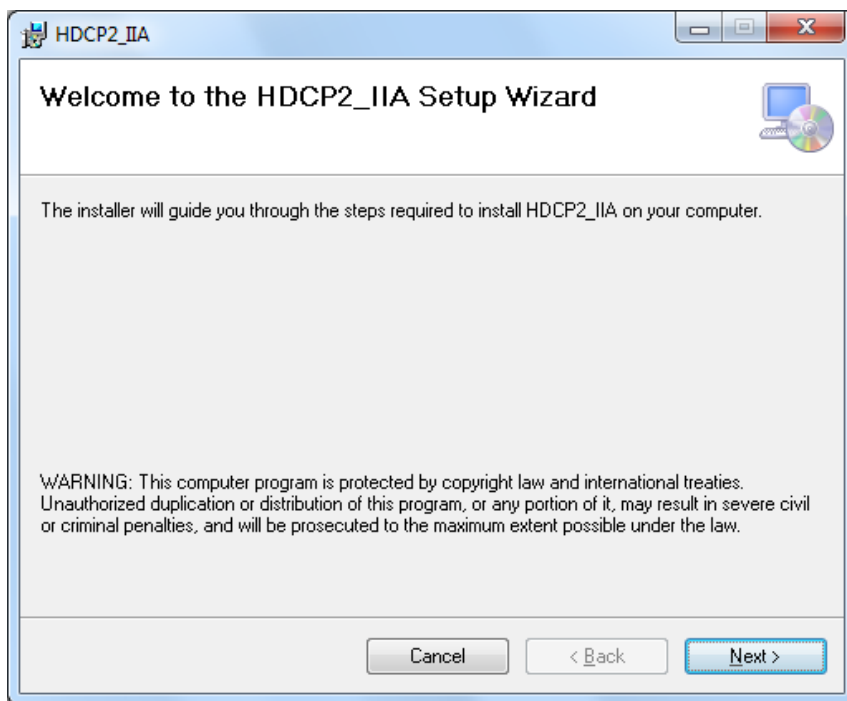


Figure 1.5. Welcome to the HDCP2_IIA Setup Wizard

3. Once the installation is completed, HDCP2_IIA shortcut appears on the desktop. See [Figure 1.6](#).



Figure 1.6. HDCP2_IIA Shortcut

1.2.4. Using the HDCP 2.2 IIA Protocol Analyzer GUI

1. Double-click the “HDCP2_IIA” shortcut to launch the application. See [Figure 1.6](#).
2. The SL-8810 HDCP 2.2 IIA Protocol Analyzer window appears. See [Figure 1.7](#). Click the arrow on the left panel to expand any of the test menus or test menus or test IDs.

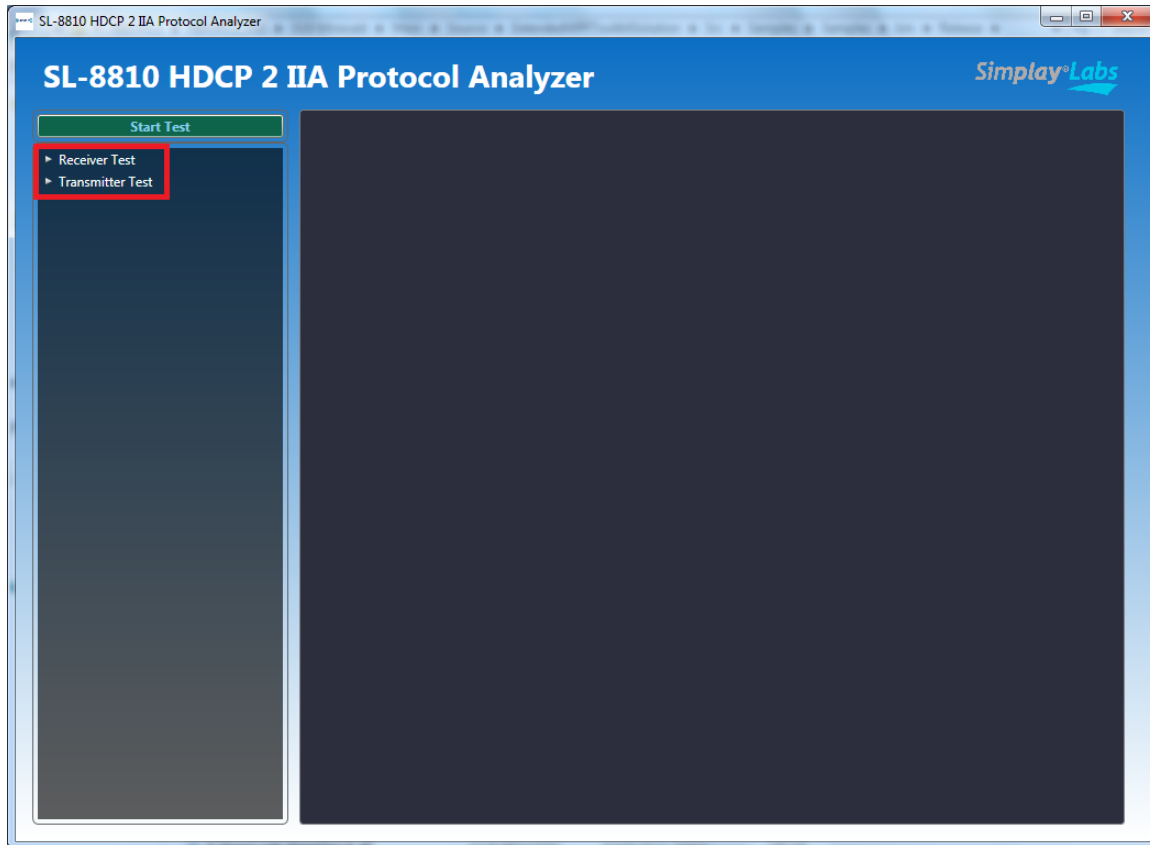


Figure 1.7. SL-8810 HDCP 2 IIA Protocol Analyzer Window

3. Once you expand any of the test menus or test IDs, you can get the GUI main window as shown in Figure 1.8.

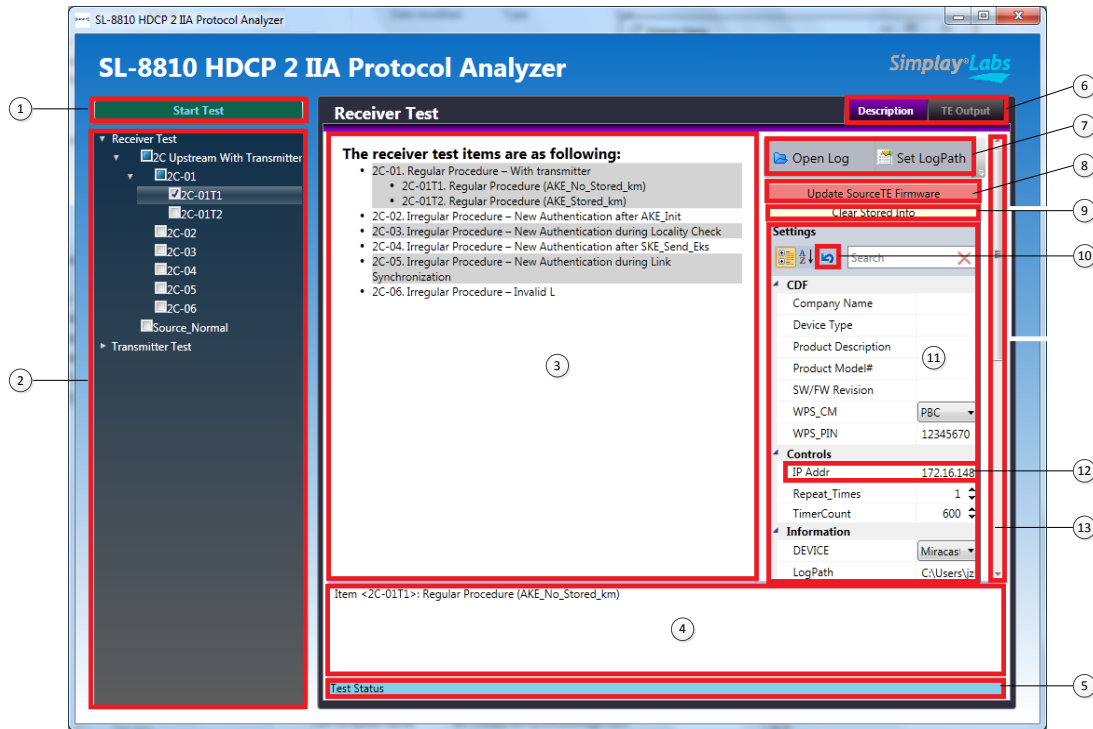


Figure 1.8. HDCP 2 IIA Protocol Analyzer GUI Main Window

Item	Description
1	Start Test button.
2	Test Items and test result status.
3	Full descriptions of the test Items.
4	Operation description for the selected item.
5	Test case simple status during testing.
6	Description and TE Output tab.
7	Set log path and open log file.
8	Update Source TE Firmware.
9	Clear stored information for source TE. This is for Receiver Test only.
10	Reset settings to default values.
11	Settings configuration area.
12	IP Address configuration item for source TE, which is output to HDMI, showed on the display device.
13	Scroll bar for settings and descriptions.

4. Facsimile Keys Support (optional selection) (Figure 1.9).

This feature is used to debug your HDCP part during product development.

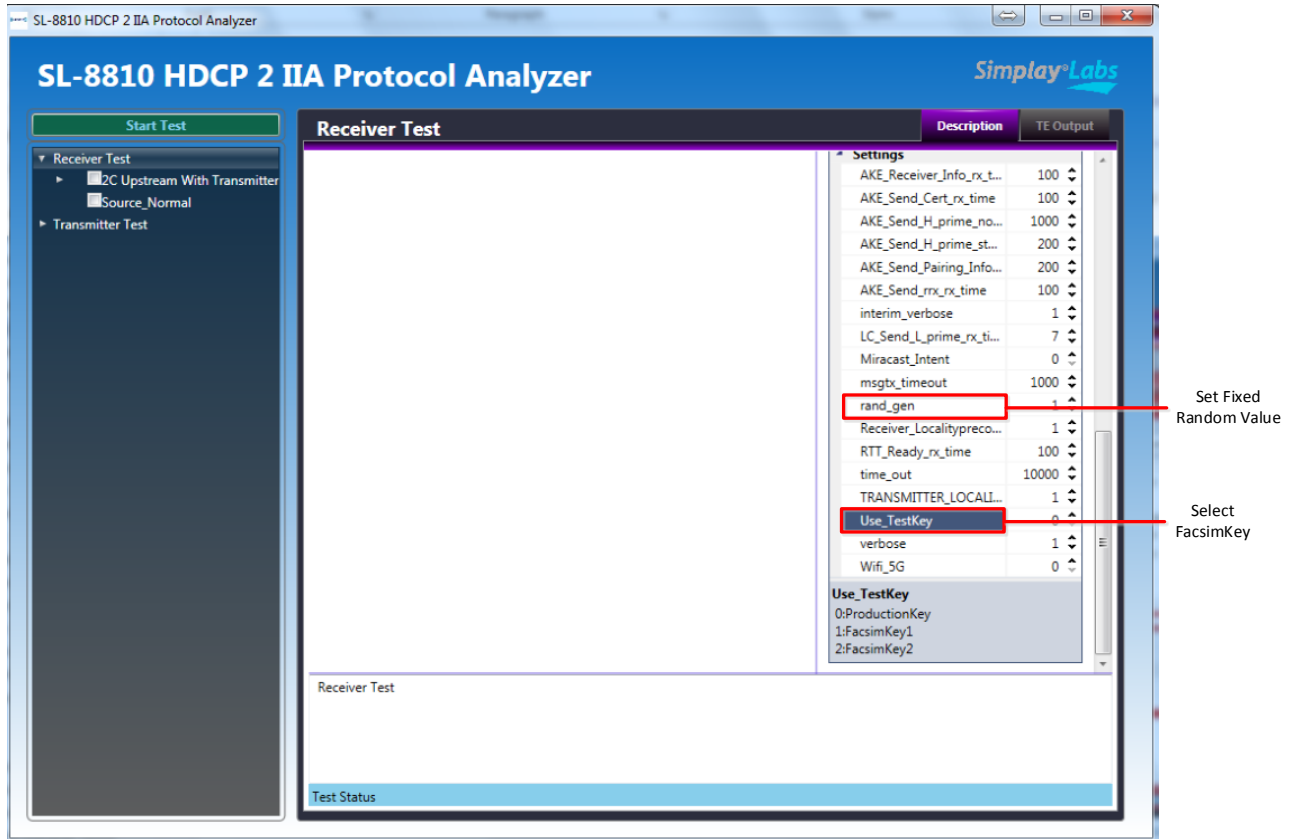


Figure 1.9. Facsimile Keys Support

- **rand_gen:**
 - 0: use rand value during HDCP test
 - 1: use fixed value (defined in the Errata to HDCP Interface Independent Adaptation Specification, Revision 2.2, December 12, 2014) during HDCP test
- **Use_TestKey:**
 - 0: Product Key (ATC Test)
 - 1: Facsimile Key1 (defined in the Errata to HDCP Interface Independent Adaptation Specification, Revision 2.2, December 12, 2014)
 - 2: Facsimile Key2 (defined in the Errata to HDCP Interface Independent Adaptation Specification, Revision 2.2, December 12, 2014)

5. Update HDCP firmware before running the test when:
 - You install the HDCP 2.2 IIA Protocol Analyzer software for the first time.
 - We release new version firmware for the SL-8810 HDCP 2.2 IIA Protocol Analyzer.

Note: Customers are informed when a new version firmware is released.

To update the HDCP firmware, follow the instructions in the [Updating HDCP Firmware](#) section on page 11. If you do not need to update the HDCP firmware, skip step 3 and step 4.

6. After the HDCP firmware is updated, restart the SL-8810 TE and the HDCP 2.2 IIA Protocol Analyzer GUI. Repeat step 1 and step 2.
7. Select one or all the test items that you intend to run. Click the Start Test button (see area 1 of [Figure 1.8](#)).
8. Click TE Output button (see area 6 of [Figure 1.8](#)). You can get the log information. Following is an example of sink 1A-01 log information ([Figure 1.10](#)).

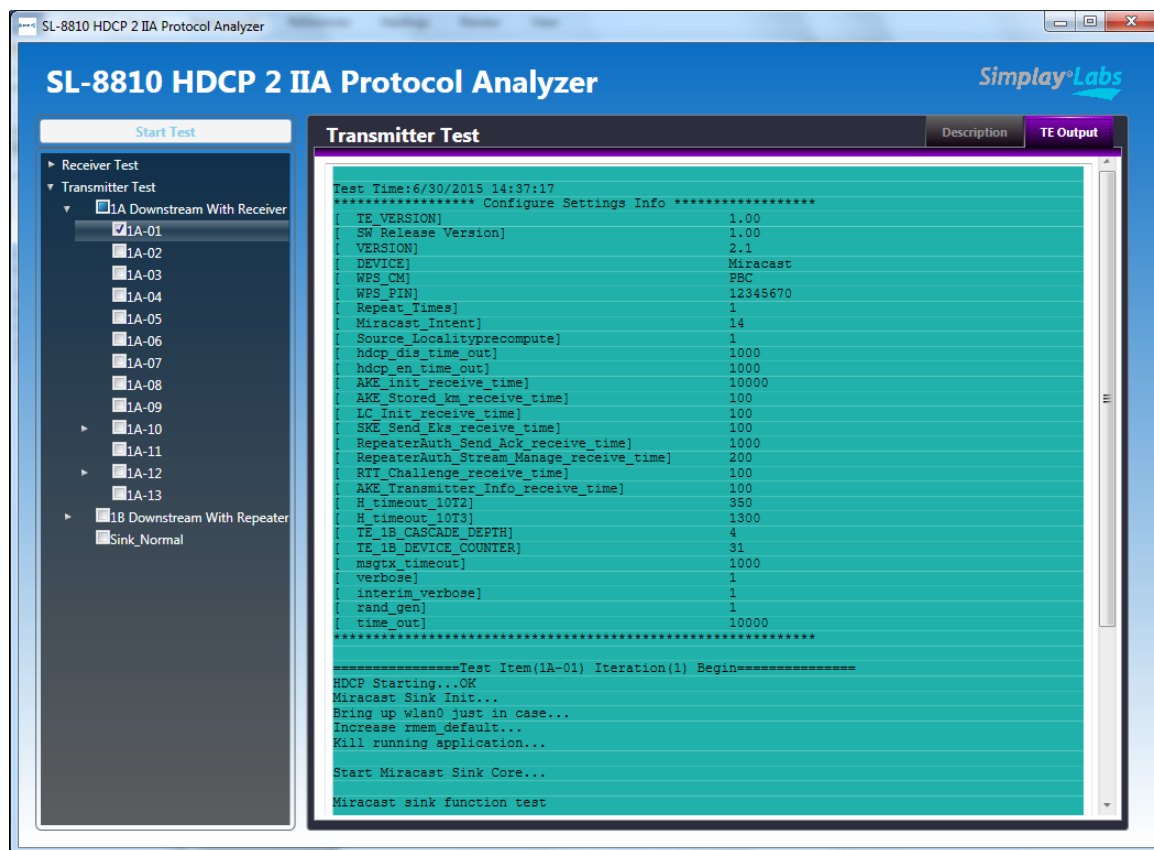


Figure 1.10. TE Output Tab in the Main Window of the SL-8810 HDCP 2 IIA Protocol Analyzer GUI

9. For each test item, when the test is finished, the dialog box with or without the “Select Output Video” option pops up at the end.
 - If the test case shows video at the end of the test and the authentication process has completed successfully, a dialog box pops up to let you select the output video pattern that matches the one on the display device. See [Figure 1.11](#).

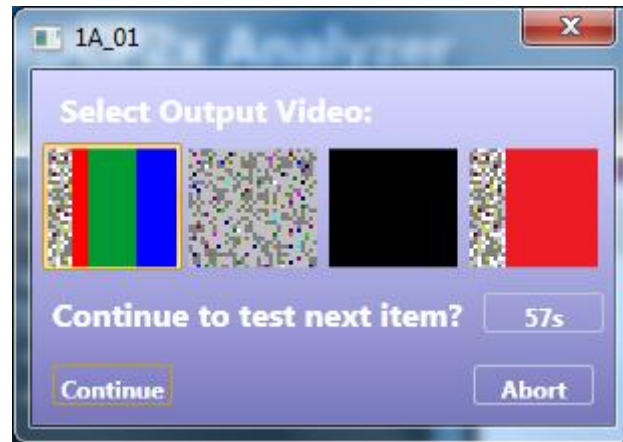


Figure 1.11. Dialog with Select Output Video Option

- If the test case does not show video at the end of the test or the authentication process has failed, the dialog box pops up, as shown in [Figure 1.12](#). Select “Continue” to run the next test item or “Abort”.

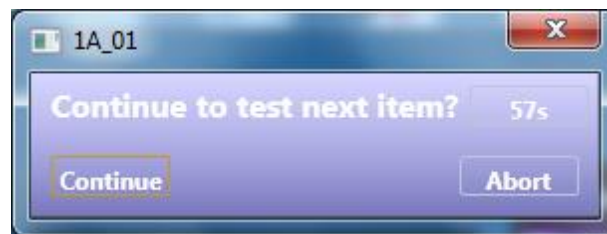


Figure 1.12. Dialog without Select Output Video Option

1.2.5. Updating HDCP Firmware

1. Manually enter Source or Sink board IP address. See area 1 of [Figure 1.13](#).

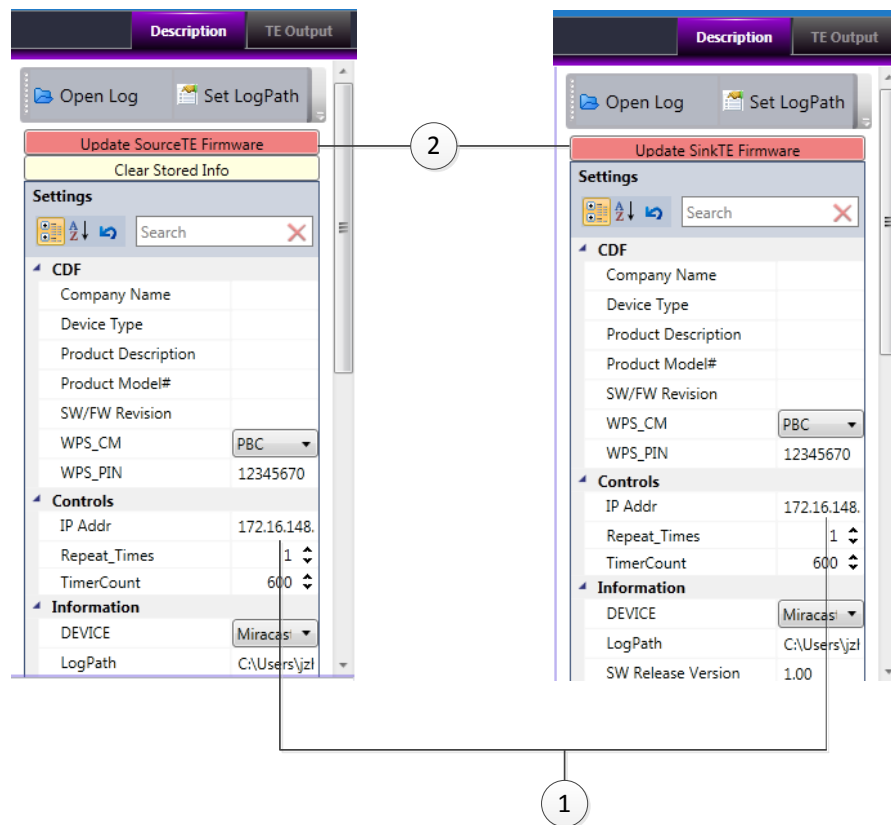


Figure 1.13. Enter IP Address in the HDCP 2 IIA Protocol Analyzer GUI

2. Click the Update SourceTE Firmware button or the Update SinkTE Firmware button. See area 2 of [Figure 1.13](#).
3. The Open dialog pops up. Select updated image file to update firmware. See [Figure 1.14](#).

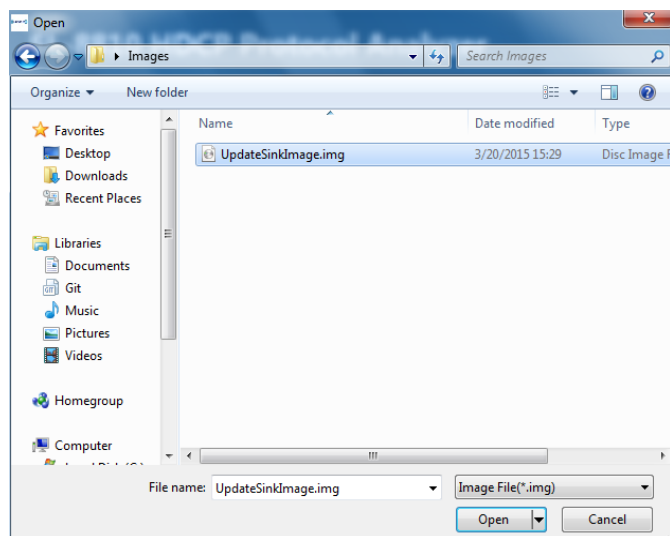


Figure 1.14. Update HDCP Firmware

2. HDCP 2.2 IIA Transmitter Test for Source Device

This section describes the test items, test operation guide, sample log file and report file.

2.1. Test Items

For source device testing when SL-8810 emulates a receiver device.

1A. Downstream procedure with Receiver		
Item ID	Test Description	Check Video
1A_01	Regular Procedure - With previously connected Receiver (With stored km)	Yes
1A_02	Regular Procedure - With newly connected Receiver (Without stored km)	No
	TE does not complete pairing	
1A_03	Regular Procedure - Receiver disconnect after AKE_Init	No
1A_04	Regular Procedure - Receiver disconnect after km	No
1A_05	Regular Procedure - Receiver disconnect after locality check	No
1A_06	Regular Procedure - Receiver disconnect after ks	No
1A_07	Irregular Procedure – Rx certificate not received	No
1A_08	Irregular Procedure – Verify Receiver Certificate	No
1A_09	Irregular Procedure - SRM	No
1A_10T1	Irregular Procedure - Invalid H'	No
	Invalid H'	
1A_10T2	Irregular Procedure – Invalid H'	No
	Not sending H' with Paired Receiver ID	
1A_10T3	Irregular Procedure Invalid H'	No
	Not sending H' with Unpaired Receiver ID	
1A_11	Irregular Procedure - Pairing Failure	No
1A_12T1	Irregular Procedure - Locality Failure	No
	Invalid L'	
1A_12T2	Irregular Procedure - Locality Failure	No
	Not sending L'	
1A_13	Regular Procedure - Locality Pre-Compute Support	No

These items are tested when SL-8810 emulates a repeater device.

1B. Downstream procedure with Repeater		
Item ID	Test Description	Check Video
1B_01	Regular Procedure - With Repeater	Yes
1B_02	Regular Procedure – Authentication with HDCP2.0 Repeater	Yes
1B_03	Regular Procedure – Re-authentication on Receiver Connected Indication	No
1B_04	Irregular Procedure – Timeout of Receiver ID list	No
1B_05T1	Irregular Procedure – Verify V'	No
	Invalid V'	
1B_05T2	Irregular Procedure – Verify V'	No
	REAUTH_REQ=true	
1B_06	Regular Procedure – MAX_DEVS_EXCEEDED	No
1B_07	Regular Procedure – MAX_CASCADE_EXCEEDED	No
1B_08	Irregular Procedure - Rollover of seq_num_V	No
1B_09T1	Irregular Procedure - Failure of Content Stream Management	No
	Sending Invalid M'	
1B_09T2	Irregular Procedure - Failure of Content Stream Management	No
	Not sending M'	

2.2. Test Operation

2.2.1. Connection Setup for Source Device Testing

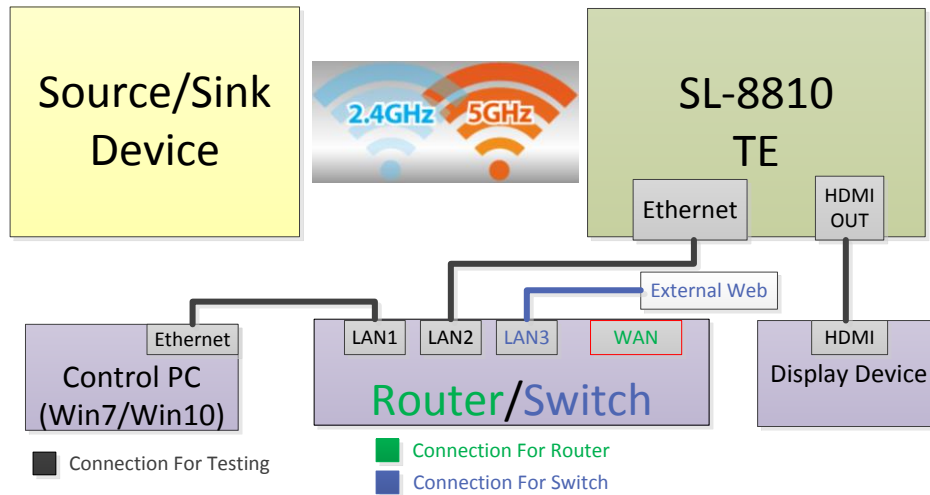


Figure 2.1. Connection Setup for Source Device Testing

Figure 2.1 shows the connection between the source device, SL-8810 (see Figure 1.1), and display device. Follow these steps to setup the connection and start testing.

1. Connect <HDMI OUT> port to TV or other display device, then power on SL-8810. The TE IP address is showed.
CAUTION: Do not connect SL-8810 <Ethernet> port to external web directly.
2. Make sure that the source generates 480P @ 60 Hz/720P @ 60 Hz video.
3. Double-click the “HDCP2_IIA” icon on PC. The HDCP 2.2 IIA Protocol Analyzer GUI main window appears. Expand the “Transmitter Test” field (see area 2 of Figure 1.8).
4. Click the “Set LogPath” to change the log directory to a desired location if needed (see area 7 of Figure 1.8).
5. Set “Wifi_5G” in Settings to 0/1 for 2.4G/5GHz testing (default is 0 for 2.4 GHz).
6. Enter the TE IP address (see area 12 of Figure 1.8), then select test items. Click the “Start Test” button.
7. When “Miracast Sink Connecting...C” showed at GUI log Window, set source Device to Miracast source mode, scan the sink devices and connect to “SinkTE” Device. After that, the verification process starts.

2.2.2. Verification Test of the Authentication Procedure

1. Wait for approximately 120s for each test item.
2. If the test case shows video at the end of the test and the authentication process has completed successfully, a dialog box with the “Select Output Video” option (see Figure 1.11) pops up to let you select the output video pattern that matches with the one on the display device. If the test case does not show video at the end of the test, the dialog box without the “Select Output Video” option (see Figure 1.12) pops up to let you decide whether to continue next item by selecting “Continue” or “Abort.”
3. GUI does not generate a report, rather only txt file for each test item, if “Abort” is selected.
4. Results can be seen in the GUI or on the report.

- Note:**
1. For 1A side, SL-8810 emulates for the receiver functions.
 2. For 1B side, SL-8810 emulates for the repeater functions.

2.3. Report File

Figure 2.2 shows the sample report file.

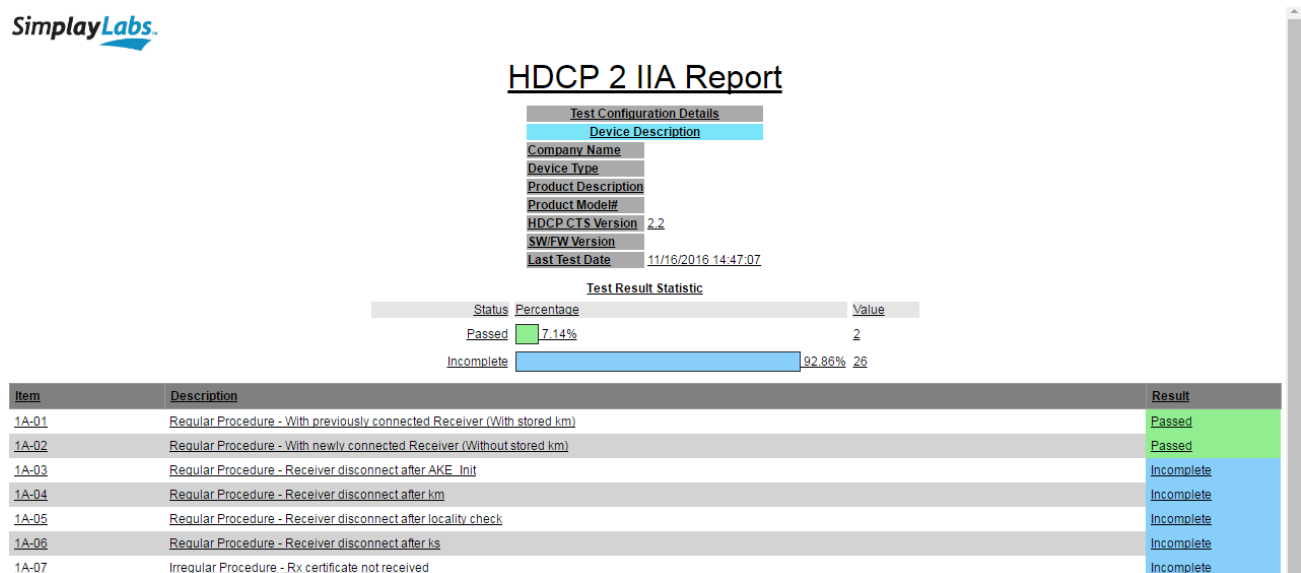


Figure 2.2. Sample Report File of Testing Source Device

3. HDCP 2.2 IIA Receiver Test for Sink Device

This section describes the test items, test operation guide, sample log file, and sample report file.

3.1. Test Items

For sink device testing, these items are tested when SL-8810 emulates a transmitter.

2C. Upstream procedure with Transmitter		
Item ID	Test Description	Check Video
2C_01_T1	Regular Procedure (AKE_No_Stored_km)	Yes
2C_01_T2	Regular Procedure (AKE_Stored_km)	Yes
2C_02	Irregular Procedure - New Authentication after AKE_Init	Yes
2C_03	Irregular Procedure - New Authentication during Locality Check	Yes
2C_04	Irregular Procedure - New Authentication After SKE_Send_Eks	Yes
2C_05	Irregular Procedure - New Authentication during Link Synchronization	Yes
2C_06	Irregular Procedure – Invalid L	No

3.2. Test Operation

3.2.1. Connection Setup for Sink Device Testing

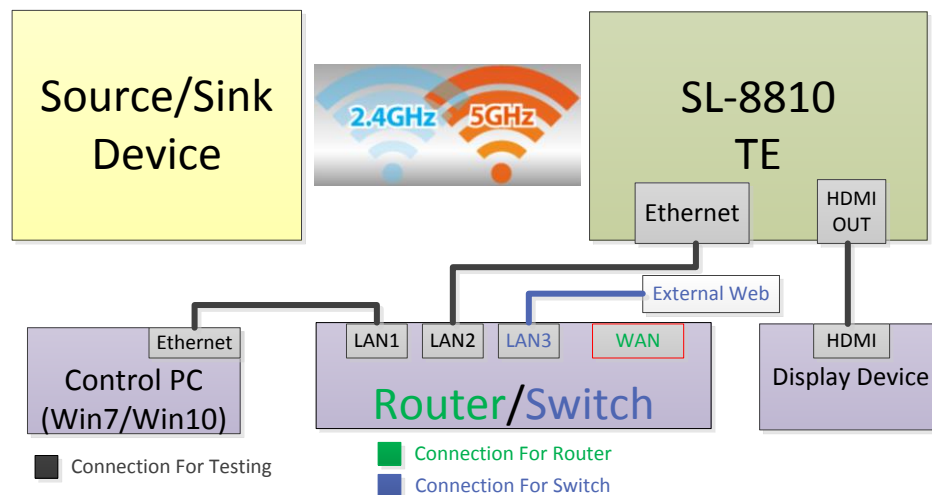


Figure 3.1. Connection Setup for the Sink Device

Figure 3.1 shows the connection between the SL-8810 (see Figure 1.1), sink device, and display device. Follow these steps to setup the connection and start testing.

1. Connect <HDMI OUT> port to TV or other display device, then power on SL-8810. The TE IP address is showed.
CAUTION: Do not connect SL 8810 <Ethernet> port to external web directly.
2. Turn on the sink device and enter miracast sink mode.
3. Double-click the "HDCP2_IIA" icon on the PC screen. The HDCP 2.2 IIA Protocol Analyzer GUI main window appears. Expand the "Receiver Test" field (see area 1 of Figure 1.8).
4. Click "Set LogPath" to change the log directory to a desired location if needed (see area 7 of Figure 1.8).
5. Set "Wifi_5G" in Settings to 0/1 for 2.4G/5GHz testing (default is 0 for 2.4 GHz).

6. Enter the TE IP address (see area 12 of [Figure 1.8](#)), then select test items to test and click the “Start Test” button. Now the verification process starts.

3.2.2. Verification Test of the Authentication Procedure

1. Wait for about 120s for each test item.
2. If the test case shows video at the end of the test and the authentication process has completed successfully, the dialog box with the “Select Output Video” option (see [Figure 1.11](#)) pops up to let you select the output video pattern that matches the one on the display device. If the test case does not show video at the end of the test, the dialog box without the “Select Output Video” option (see [Figure 1.12](#)) pops up to let you decide whether to continue next item by selecting “Continue” or “Abort.”
3. The GUI does not generate a report, rather only txt file for each test item, if “Abort” is selected.
4. Check the results according to GUI or the report.

Note: SL-8810 source side generates a fixed pattern to test the sink device.

3.3. Report File

The sample report file is displayed as follows. See [Figure 3.2](#).

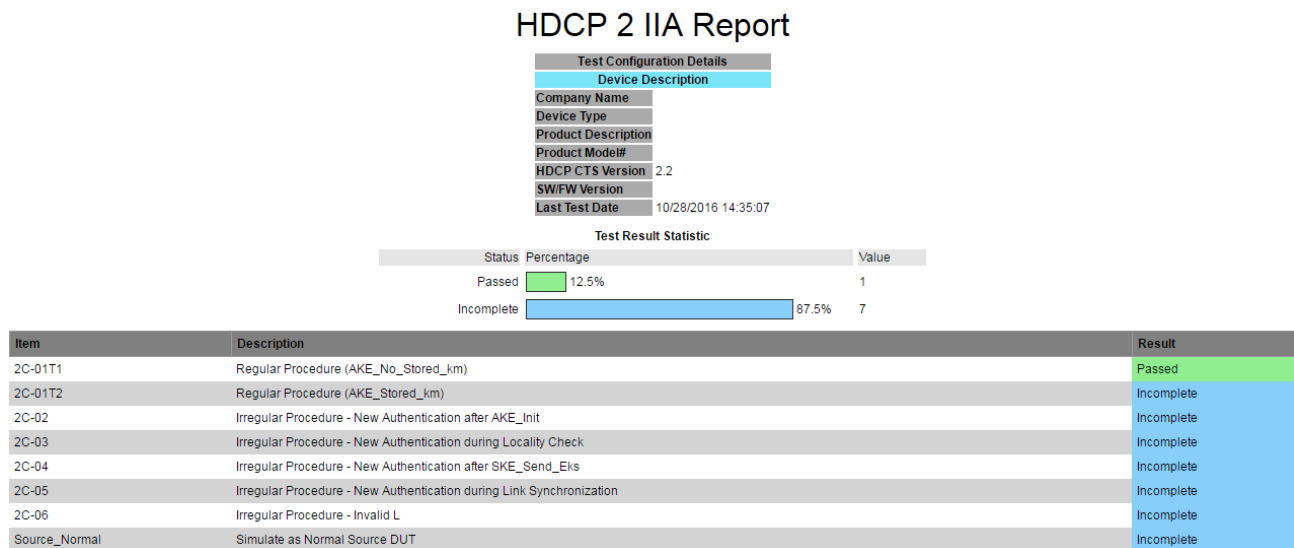


Figure 3.2. Sample Report File of Testing Sink Device

4. Log Information

The time written for each DDC instruction in the LOG contains the time from the SL-8810 and the time difference, in milliseconds, from the previous instructions.

Read activity log:

```
[<Differential time>]Read Back <Number to receive> bytes from wireless network,
Rcv_Buf_RdInd:<read index of received buffer>, Rcv_Buf_WrInd:<write index of received
buffer>
```

Write activity log:

```
[<Differential time>]Send Out <Number to send> bytes to wireless network
```

Receiver(rx) and transmitter(tx) message log:

```
rx: <Message_Name>
tx: <Message_Name>
```

4.1. Sample Sink Log File

ERROR and WARNING are outputted as follows:

- ERROR: [error content] : The tested device operation does not meet expectations and it is prohibited.
- WARNING: [warning content] : The tested device operation does not meet expectations but it is not treated as a failure. If the verification test is completed with the tested device, the software outputs "PASS"/"FAIL" at the end of the Log file.

This is the sample sink log file of 1A_01.

```
Test Time:9/28/2016 14:45:32
***** Configure Settings Info *****
[ TE_VERSION] 1.01
[ SW Release Version] 1.01
[ VERSION] 2.2
[ DEVICE] Miracast
[ WPS_CM] PBC
[ WPS_PIN] 12345670
[ Repeat_Times] 1
[ Wifi_5G] 0
[ Miracast_Intent] 13
[ wfd_connector_type] 5
[ Source_Localityprecompute] 1
[ hdcp_dis_time_out] 1000
[ hdcp_en_time_out] 1000
[ AKE_init_receive_time] 10000
[ AKE_Stored_km_receive_time] 100
[ LC_Init_receive_time] 100
[ SKE_Send_Eks_receive_time] 100
[ RepeaterAuth_Send_Ack_receive_time] 1000
[ RepeaterAuth_Stream_Manage_receive_time] 200
[ RTT_Challenge_receive_time] 100
[ AKE_Transmitter_Info_receive_time] 100
[ H_timeout_10T2] 350
[ H_timeout_10T3] 1300
[ TE_1B_CASCADE_DEPTH] 4
[ TE_1B_DEVICE_COUNT] 31
[ msgtx_timeout] 1000
[ verbose] 1
[ interim_verbose] 1
[ rand_gen] 1
[ time_out] 10000
*****
=====Test Item(1A-01) Iteration(1) Begin=====
```

```

HDCP Starting...OK
Miracast Sink Init...
Bring up wlan0 just in case...
Increase rmem_default...
Kill running application...

Start Miracast Sink Core...

Miracast sink function test
Stopping DHCP server: dhcpd3no /usr/sbin/dhcpd found; none killed
.

Remove and install driver

Using 2.4G mode configure for hostapd
Starting DHCP server: .

Start dhcp
p2p_set_wfd_device_type_sink:

ifconfig: SIOCGIFFLAGS: No such device
ifconfig: SIOCSIFADDR: No such device
route: SIOCADDRT: No such device
killall: core: no process killed
killall: wpa_supplicant: no process killed
killall: hostapd: no process killed
killall: dhclient: no process killed
rmmod: ERROR: Module 8812au is not currently loaded

** (core:670): WARNING **: set state returned 2

Miracast Sink Connecting...OK

Waiting for incoming connection...
peer_status: 2[P2P_STATE_LISTEN]
peer_status: 2[P2P_STATE_LISTEN]
peer_status: 2[P2P_STATE_LISTEN]
peer_status: 2[P2P_STATE_LISTEN]
peer_status: 2[P2P_STATE_LISTEN]
peer_status: 2[P2P_STATE_LISTEN]
peer_status: 2[P2P_STATE_LISTEN]
peer_status: 2[P2P_STATE_LISTEN]
peer_status: 2[P2P_STATE_LISTEN]
peer_status: 2[P2P_STATE_LISTEN]
peer_status: 22[P2P_STATE_TX_INFOR_NOREADY]
Getting peer device address...
p2p_peer_devaddr_get:
peer_devaddr: BE:6E:64:83:68:9C
p2p_wpsinfo:
Getting peer authentication type...
p2p_req_cm_get:
wlan0      p2p_get:

CM=pbcc

Confirming peer authentication...
p2p_set_negotiation:
mac: BE:6E:64:83:68:9C

peer_status: 10[P2P_STATE_GONEGO_OK]

```

```

Negotiation succeeded!
wlan0      p2p_get:

Role=03

Go mode
do_wps_hostapd_cli:
Selected interface 'wlan0'
OK

wps passed!
read_all_sta:
read_all_sta:
read_all_sta:
read_all_sta:
read_all_sta:
read_all_sta:
read_all_sta:
Wireless display negotiation completed!
Checking leased IP...
.
lease table has not been updated, wait for a second...
.
dhclient has requested IP!
leased IP:  192.168.2.30
DUT IP: 192.168.2.30 TE IP: 192.168.2.254

Miracast Sink Testing...
. . . Done

Func ID:21 Attr:1 Timeout:1000
    sink_1A_01
    sink_STEP_1A_01_1
sink TE::HDCP2x_Init
(HDCP): tcp_sock Initialized.
(HDCP): hdcp_fd Initialized.
    sink_STEP_1A_01_2
[3    ms]Read Back 15 bytes from wireless network, Rcv_Buf_RdInd:0(ID: AKE_Init),
Rcv_Buf_WrInd:15
1  sink<-rx::AKE_Init
   Rx      : dd b8 bb a3 54 a5 c5 c1
2  sink<-rx::AKE_Transmitter_Info
   Tx Version: 02
   Tx Caps : 00 03
   sink_STEP_1A_01_3
3  source->tx::AKE_Send_Cert
   Note: will send out AKE_Send_Cert with AKE_Receiver_Info together
   Repeater: 00
   CertRx  : 3e 2d c2 48 7b 9d a5 da bd ee c2 cf 2e 14 c8 9d
              61 2f de d1 28 65 ae 29 be 92 ae 06 de 82 f8 4b
              33 c4 d6 c5 c0 e0 c0 27 11 84 42 eb 33 1a c9 62
              5d 1b 00 dc 7a 64 ff 6d b1 6b 07 fe d9 e4 a8 7c
              ca 1c ee bd a7 8a 17 e9 80 b9 bc 98 7f 80 da 1c
              6a ee 47 42 c3 f1 ab 6d 2f f8 7e b3 4b 59 da 45
              09 81 6a a9 c8 0f 52 e5 e3 61 dc d7 8d 41 f7 d5
              ae d5 04 95 29 8c 99 d9 a3 ce 85 ff c7 19 b7 4b
              ad de f8 2c 8b 01 00 01 00 00 90 a4 1d 3e 71 60
              2a f3 05 6b 73 48 9f 63 70 c6 b6 99 c0 0c 63 84
              72 c1 57 32 c3 09 73 e0 0b 45 0c 22 ba ab a2 9e
              f1 fe 30 98 00 6a e3 c7 27 93 db c4 5a f0 10 cd
              07 54 4e b0 c4 1a 2a c2 20 4f c8 04 e9 58 c2 21
              60 78 85 1e cc d0 fb 73 29 ea 10 b6 32 9c d8 34

```

```

5a 6a 04 91 2b ad a9 29 59 55 e3 0a fb 75 67 96
2c 20 96 12 80 74 a0 31 ff f5 0e 93 f0 31 cd 92
1f 57 30 d1 ea 5e 69 e7 4d df eb ca 47 89 1b 1d
69 57 9e 97 e5 4d a7 d4 c5 3a 5f ad 62 f9 f0 54
ca 5f 10 0d 45 2c bc 7e d8 29 f3 70 6d 75 03 c8
2c 9f f8 8a 75 98 21 a8 06 cc 97 6e d4 42 41 53
c7 7e 46 ac 17 6d 45 55 93 ad 7a ab d8 d8 30 c5
1a 46 fb 50 33 0c 7a a1 11 97 c5 69 4d 2e 8a 7a
9b 60 31 26 aa 44 b7 e5 4c 36 0b f1 43 90 ec 7b
33 f1 96 c0 d5 a3 36 f0 76 45 5b 52 4d 29 4a 7f
4f 04 f7 19 6e 1c 78 60 6f f9 90 30 ad c3 36 4c
b6 30 f4 c3 15 17 75 bf 6a 51 56 d2 e0 8b 89 a5
68 ab e6 c9 f6 ca 00 21 23 83 06 0f e5 46 15 24
47 05 cd 93 f7 ba c9 ad 74 c1 68 e3 da 2c 74 5e
df 05 00 90 51 ab 8c 82 e1 bb 5d 58 29 5e a7 2e
6b 66 bb 1b 9e 1e 6d aa 1e aa 24 bf 59 e8 d6 f6
47 f6 a1 e1 32 4e cd 33 cd 9b 26 13 c5 31 c5 33
3a 7c a8 c7 f5 a1 e6 88 c7 4f 7f d3 4a 5a 79 f4
b5 54 76 66 6f 73 66 18 ea ba
HDCP:protocol descriptor is 0x00
4 source->tx::AKE_Receiver_Info
[1 ms]Send Out 530 bytes to wireless network
Rx Version: 02
Rx Caps : 00 01
[40 ms]Read Back 33 bytes from wireless network, Rcv_Buf_RdInd:15(ID: AKE_Stored_km),
Rcv_Buf_WrInd:48
5 sink<-rx::AKE_Stored_km
Ekh(km) : f5 4a 2a 37 ab ba b3 78 31 c4 60 a5 c5 c0 f8 c2
m : f7 0f ef 77 d0 43 72 ac 8e 57 b1 24 3f bc 88 d5
6 source->tx::AKE_Send_rrx
Note: will send out AKE_Send_rrx with AKE_Send_H_prime together
Rrx : f7 9a 0a a9 b7 df 94 20
7 source->tx::AKE_Send_H_prime
[2 ms]Send Out 42 bytes to wireless network
H' : e4 30 60 b8 1a 2a a2 ca f5 f4 77 d6 f8 38 9e 7d
ca 49 1d 6b dd 42 3c f4 a7 ad 90 39 b1 fe 78 5c
sink_STEP_1A_01_4
8 sink<-rx::LC_Init
Rn : 4f ef 40 05 12 78 fc 20
9 source->tx::RTT_Ready
[26 ms]Read Back 9 bytes from wireless network, Rcv_Buf_RdInd:48(ID: LC_Init),
Rcv_Buf_WrInd:57
[0 ms]Send Out 1 bytes to wireless network
[5 ms]Read Back 17 bytes from wireless network, Rcv_Buf_RdInd:57(ID: RTT_Challenge),
Rcv_Buf_WrInd:74
10 sink<-rx::RTT_Challenge
L[127..0]: bd 0f 4c f8 d8 4e 08 d8 21 08 dd 48 3e d0 5b 95
11 source->tx::LC_Send_L_prime
[0 ms]Send Out 17 bytes to wireless network
L'[255..128]: 0d 07 b7 da e6 44 bd fa 49 00 2e 61 1f 5d ec 3f
sink_STEP_1A_01_5
[8 ms]Read Back 25 bytes from wireless network, Rcv_Buf_RdInd:74(ID: SKE_Send_Eks),
Rcv_Buf_WrInd:99
12 sink<-rx::SKE_Send_Eks
Edkey(Ks): e8 44 f0 4e 2c 00 fd 92 96 18 e5 71 ae 51 0f b8
Riv : 90 80 6b ba 0b e1 46 a1
sink_STEP_1A_01_6

=====Test Item(1A-01) Iteration(1) Passed=====
***** Miracast Message Dump Start(Not used for Judgement of HDCP Test) *****

Connecting to IP: 192.168.2.30 Port: 7236
Receive M1 request: 'OPTIONS * RTSP/1.0\r\ncSeq: 0\r\nRequire: org.wfa.wfdl.0\r\n\r\n'

```

Simplay-UG-02002-C

4.2. Sample Source Log File

This is the sample source log file of 2C-01T1.

```
Test Time:10/28/2016 14:34:24
***** Configure Settings Info *****
[  TE_VERSION]                               1.01
[  SW Release Version]                       1.01
[  VERSION]                                  2.2
[  DEVICE]                                    Miracast
[  WPS_CM]                                    PBC
[  WPS_PIN]                                   12345670
[  Repeat_Times]                             1
[  Wifi_5G]                                  0
[  Miracast_Intent]                          13
[  wfd_connector_type]                       5
[  Source_Localityprecompute]                1
[  hdcp_dis_time_out]                        1000
[  hdcp_en_time_out]                         1000
[  AKE_init_receive_time]                    10000
[  AKE_Stored_km_receive_time]               100
[  LC_Init_receive_time]                     100
[  SKE_Send_Eks_receive_time]                100
[  RepeaterAuth_Send_Ack_receive_time]       1000
[  RepeaterAuth_Stream_Manage_receive_time]  200
[  RTT_Challenge_receive_time]               100
[  AKE_Transmitter_Info_receive_time]        100
[  H_timeout_10T2]                           350
[  H_timeout_10T3]                           1300
[  TE_1B_CASCADE_DEPTH]                      4
[  TE_1B_DEVICE_COUNT]                       31
[  msgtx_timeout]                            1000
[  verbose]                                  1
[  interim_verbose]                          1
[  rand_gen]                                  1
[  time_out]                                 10000
*****

=====Test Item(2C-01T1) Iteration(1) Begin=====
Miracast Source Init...
Error: killall: wpa_supplicant: no process killed
killall: dhclient: no process killed

Scanning miracast Sink Devices...
0  Xperia Z4 Tablet_4e34  MAC:BE:6E:64:83:68:9C
HDCP Starting...OK
Miracast Connecting to 0 BE:6E:64:83:68:9C...
sending provision discovery request
peer_status: 6[P2P_STATE_TX_PROVISION_DIS_REQ]
peer_status: 6[P2P_STATE_TX_PROVISION_DIS_REQ]
peer_status: 6[P2P_STATE_TX_PROVISION_DIS_REQ]
peer_status: 6[P2P_STATE_TX_PROVISION_DIS_REQ]
peer_status: 7[P2P_STATE_RX_PROVISION_DIS_RSP]
p2p_wpsinfo:
p2p_set_nego:
mac: BE:6E:64:83:68:9C

peer_status: 10[P2P_STATE_GONEGO_OK]
Negotiation succeeded!
wlan0      p2p_get:

Role=02

Client mode
```

```
wpa_supplicant_start:

do wps_wpa_cli:
Selected interface 'wlan0'
OK

wps passed!
wpa_state=SCANNING
wpa_state=ASSOCIATED
wpa_state=ASSOCIATED
wpa_state=ASSOCIATING
wpa_state=COMPLETED
Wireless display negotiation completed!

dhcpcd server IP: 192.168.49.1
DUT IP: 192.168.49.1 TE IP: 192.168.49.23

ioctl[SIOCSIWAP]: Operation not permitted
Internet Systems Consortium DHCP Client 4.2.5-P1
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For info, please visit https://www.isc.org/software/dhcp/

Listening on LPF/wlan0/74:da:38:65:a2:a6
Sending on LPF/wlan0/74:da:38:65:a2:a6
Sending on Socket/fallback
DHCPDISCOVER on wlan0 to 255.255.255.255 port 67 interval 4
DHCPDISCOVER on wlan0 to 255.255.255.255 port 67 interval 8
DHCPREQUEST on wlan0 to 255.255.255.255 port 67
DHCPOFFER from 192.168.49.1
DHCPACK from 192.168.49.1
bound to 192.168.49.23 -- renewal in 1750 seconds.

Miracast Source Testing...
. . Done

Func ID:61 Attr:1 Timeout:1000
    source 2C 01T1
Sink DUT IP:192.168.49.1, PortNum:6789
source TE::HDCP2x_Init
1  source->tx::AKE_Init
[1  ms]Send Out 9 bytes to wireless network
    Rtx      : 1b 8b 30 c1 64 78 51 dd
2  source->tx::AKE_Transmitter_Info
[0  ms]Send Out 6 bytes to wireless network
    Tx Version: 02
    Tx Caps : 00 03
[14 ms]Read Back 524 bytes from wireless network, Rcv_Buf_RdInd:0(ID: AKE_Send_Cert),
Rcv_Buf_WrInd:524
3  sink<-rx::AKE_Send_Cert
    Repeater: 00
    CertRx   : 4b 5d b4 86 47 cd e4 1f 66 a7 ee 21 cb 91 7c 5d
                1a ec 47 2d e6 98 90 9b 91 2a 5f 35 aa 77 06 eb
                8f 4c d3 23 f8 14 f4 33 7d a5 82 7d 57 9f 8c 62
                cb 64 a6 86 3a 3e 0c 2a c8 55 d7 0e e8 d0 08 e5
                27 98 fb 9d 45 80 22 a4 34 01 1f 86 b1 17 e8 c6
                5d 7f fc da ca 30 7a 9b 14 b3 00 33 3d 72 27 2f
                c7 88 0a 51 6c 69 59 eb a6 f2 e7 3e 7a 4d 29 82
                28 7b 0d 9b 9c 73 e6 c2 27 ac 53 98 cf 6f 98 b2
                d7 67 6b b7 f7 01 00 01 10 00 7a 0e 54 68 0d 08
                89 c0 88 c0 4e dc 1f 8a 1c f5 77 72 70 ac a9 56
                ec 06 4c 65 fe e3 c7 6c 4e 0c cf cb 59 72 f6 9d
                94 d0 ce 79 d6 e0 17 96 5e 7d 42 3b e5 65 14 d2
                f3 77 7c 82 99 58 cf 85 a6 51 ba af d9 75 7f d4
```



```

b2 ab e2 8b 1f 67 a4 a7 6d d4 6a bf 52 81 4b ce
67 7c f3 98 b1 55 3e a4 76 14 46 7a 8c 17 75 8e
15 9c a0 16 b3 f3 d3 d7 17 bc 0c 92 36 74 72 c5
98 be c6 2f a6 ea bb 05 0a 20 e1 e7 b4 bf 3a 56
3d 7d 67 bf 0f 63 d8 55 d6 dc 04 ef 6b 9f 48 92
24 b0 d0 84 97 2d d9 a6 16 24 33 c5 62 fa 71 03
dc a4 b8 71 93 03 da a2 11 2c cc 10 e4 f2 26 d3
62 f0 a5 9d 7c a2 59 f1 e3 bb 8f 64 77 ba 27 2d
53 92 b7 15 65 ae 9f 07 99 ca 57 57 89 ad 3c 25
3f e8 d1 50 17 f4 3f 54 2f fd 81 2d 42 d6 2c 56
f5 6d 13 c9 5b db 38 68 a6 8d 2d 58 3e 5a b3 de
48 54 09 ec 79 5d 12 f5 48 a5 b4 6f 06 63 15 17
67 18 99 d0 cd a3 dc 4c 8f b5 9b 53 24 63 ae be
d7 0e 79 7f 3d a6 e1 9e 45 e9 d2 54 95 6a 53 5a
0a 1c 27 43 1b 42 96 b3 42 5b 61 29 94 a6 bd a9
ea e2 e4 9e 5e 30 98 3e 63 23 1c 73 9e fb 8e b8
59 f1 e3 36 57 8a 8c da 9a 8d 28 fd 94 2f 34 30
51 97 e3 bc da bd 44 29 3e c0 0b d7 dd 58 32 8c
f3 12 f0 73 53 c5 5c cc 06 b1 05 86 ca f7 e1 70
ed b0 b7 e0 34 f1 72 0b 0d 30
HDCP:protocol descriptor is 0x10
[3 ms]Read Back 6 bytes from wireless network, Rcv_Buf_RdInd:524(ID:
AKE_Receiver_Info), Rcv_Buf_WrInd:530
4 sink<-rx::AKE_Receiver_Info
Rx Version: 02
Rx Caps : 00 01
5 source->tx::AKE_No_Stored_km
[3 ms]Send Out 129 bytes to wireless network
Ecpub(km): 17 69 84 ec 6d 00 9d ad 01 5a 55 84 0f 1d 5b bf
d0 3a 2d c8 8c 48 c2 f5 7b 63 9a b4 91 62 73 02
ad be e0 99 6c be cd 60 be fa a6 9f 59 9b bd c2
9e e2 93 45 c5 00 26 d0 1e 21 93 08 c2 65 3b 03
65 f6 bb 4a e2 80 e7 ba be 6d 55 73 64 e2 f0 7d
5b b7 d3 eb 5f 78 b4 5f aa e1 5c 8a 08 16 74 96
ed c5 d9 ac a7 65 72 4c 76 2f b9 26 9f 88 2e 7b
09 81 12 18 b1 37 55 14 26 07 1e 6c c5 4a 13 85
[6 ms]Read Back 9 bytes from wireless network, Rcv_Buf_RdInd:530(ID: AKE_Send_rrx),
Rcv_Buf_WrInd:539
6 sink<-rx::AKE_Send_rrx
Rrx : 1d 62 8e 0e 58 78 4d bf
[14 ms]Read Back 33 bytes from wireless network, Rcv_Buf_RdInd:539(ID:
AKE_Send_H_prime), Rcv_Buf_WrInd:572
7 sink<-rx::AKE_Send_H_prime
H' : ab a0 63 c9 02 d1 2f 3c 2a 32 4e f1 63 1d d3 cc
ca dd 6f bf c8 a8 91 0d c1 79 73 e9 24 4a eb c2
[2 ms]Read Back 17 bytes from wireless network, Rcv_Buf_RdInd:572(ID:
AKE_Send_Pairing_Info), Rcv_Buf_WrInd:589
8 sink<-rx::AKE_Send_Pairing_Info
Ekh_Km : 52 e0 6c 78 a8 5f d3 ae ac 4b c5 d3 a2 e6 f1 bc
9 source->tx::LC_Init
[1 ms]Send Out 9 bytes to wireless network
Rn : ab e4 e3 3a c3 71 ed
[8 ms]Read Back 1 bytes from wireless network, Rcv_Buf_RdInd:589(ID: RTT_Ready),
Rcv_Buf_WrInd:590
10 sink<-rx::RTT_Ready
11 source->tx::RTT_Challenge
[0 ms]Send Out 17 bytes to wireless network
L[127..0]: 71 de e8 fa c9 21 f0 c0 d7 0f 8e 30 44 15 c5 2a
[6 ms]Read Back 17 bytes from wireless network, Rcv_Buf_RdInd:590(ID:
LC_Send_L_prime), Rcv_Buf_WrInd:607
12 sink<-rx::LC_Send_L_prime
L'[255..128]: ff 62 2c d4 7d a0 40 0c 5f 7d 04 d6 bc 4c 54 15
13 source->tx::SKE_Send_Eks
[1 ms]Send Out 25 bytes to wireless network
Edkey(Ks): 5e 3c 85 09 a1 6a 7b ff c9 24 73 a3 94 31 ec f3

```

```
Riv      : 2e c9 d6 fb 12 a3 b4 b6

=====Test Item(2C-01T1) Iteration(1) Passed =====
***** Miracast Message Dump Start(Not used for Judgement of HDCP Test) *****

Connected with 192.168.49.1:37752
Send M1 request: 'OPTIONS * RTSP/1.0\r\nDate: Fri Oct 28 14:34:58 2016\r\nCSeq:
1\r\nRequire: org.wfa.wfd1.0\r\n\r\n'

Receive M1 response: 'RTSP/1.0 200 OK\r\nCSeq: 1\r\nPublic: org.wfa.wfd1.0,
GET_PARAMETER, SET_PARAMETER\r\n\r\n'

Receive M2 request: 'OPTIONS * RTSP/1.0\r\nCSeq: 0\r\nRequire: org.wfa.wfd1.0\r\n\r\n'

send M2 response: 'RTSP/1.0 200 OK\r\nDate: Fri Oct 28 14:34:58 2016\r\nCSeq:
0\r\nPublic: org.wfa.wfd1.0, SETUP, TEARDOWN, PLAY, PAUSE, GET_PARAMETER,
SET_PARAMETER\r\n\r\n'

send M3 request: 'GET_PARAMETER rtsp://localhost/wfd1.0 RTSP/1.0\r\nDate: Fri Oct 28
14:34:58 2016\r\nCSeq: 2\r\nContent-Type: text/parameters\r\nContent-Length:
83\r\n\r\n\r\nwfd_content_protection\r\nwfd_video_formats\r\nwfd_audio_codecs\r\nwfd_client_r
tp_ports\r\n'

Receive M3 response: 'RTSP/1.0 200 OK\r\nCSeq: 2\r\nContent-Type:
text/parameters\r\nContent-Length: 302\r\n\r\n\r\nwfd_content_protection: HDCP2.1
port=6789\r\nwfd_video_formats: 38 00 01 04 000180A3 00000000 00000000 00 0000 0000 00
none none, 02 04 000180A3 00000000 00000000 00 0000 0000 00 none
none\r\nwfd_audio_codecs: LPCM 00000002 00, AAC 00000001 00\r\nwfd_client_rtp_ports:
RTP/AVP/UDP;unicast 12345 0 mode=play\r\n'

send M4 request: 'SET_PARAMETER rtsp://localhost/wfd1.0 RTSP/1.0\r\nDate: Fri Oct 28
14:35:00 2016\r\nCSeq: 3\r\nContent-Type: text/parameters\r\nContent-Length:
249\r\n\r\n\r\nwfd_video_formats: 00 00 02 02 00000020 00000000 00000000 00 0000 0000 00 none
none\r\nwfd_audio_codecs: LPCM 00000002 00\r\nwfd_presentation_URL:
rtsp://192.168.49.23/wfd1.0/streamid=0 none\r\nwfd_client_rtp_ports: RTP/AVP/UDP;unicast
12345 0 mode=play\r\n'

Receive M4 response: 'RTSP/1.0 200 OK\r\nCSeq: 3\r\n\r\n'

send M5 request: 'SET_PARAMETER rtsp://localhost/wfd1.0 RTSP/1.0\r\nDate: Fri Oct 28
14:35:00 2016\r\nCSeq: 4\r\nContent-Type: text/parameters\r\nContent-Length:
27\r\n\r\n\r\nwfd_trigger_method: SETUP\r\n'

Receive M5 response: 'RTSP/1.0 200 OK\r\nCSeq: 4\r\n\r\n'

Receive M6 request: 'SETUP rtsp://192.168.49.23/wfd1.0/streamid=0 RTSP/1.0\r\nCSeq:
1\r\nTransport: RTP/AVP/UDP;unicast;client_port=12345\r\n\r\n'

send M6 response: 'RTSP/1.0 200 OK\r\nDate: Fri Oct 28 14:35:00 2016\r\nCSeq:
1\r\nSession: 955984038;timeout=30\r\nTransport:
RTP/AVP/UDP;unicast;client_port=12345;server_port=52532\r\n\r\n'

Receive M7 request: 'PLAY rtsp://192.168.49.23/wfd1.0/streamid=0 RTSP/1.0\r\nCSeq:
2\r\nSession: 955984038\r\n\r\n'

send M7 response: 'RTSP/1.0 200 OK\r\nDate: Fri Oct 28 14:35:00 2016\r\nCSeq: 2\r\n\r\n'

Receive: 'SET_PARAMETER rtsp://192.168.49.23/wfd1.0/streamid=0 RTSP/1.0\r\nCSeq:
3\r\nContent-Type: text/parameters\r\nContent-Length: 17\r\nSession:
955984038\r\n\r\n\r\nwfd_idr_request\r\n'

Send default_response: 'RTSP/1.0 200 OK\r\nDate: Fri Oct 28 14:35:00 2016\r\nCSeq:
3\r\n\r\n'
```

```
Create AV thread successfully
[INFO] Product Info: i.MX6Q/D/S
[INFO] ringBufferEnable 0, chromaInterleave 0, mapType 0, linear2TiledEnable 0
[WARN] VPU iram is less than needed, some parts don't use iram
catch interrupt
[Errno 4] Interrupted system call

***** Miracast Message Dump End ( Not used for Judgement of HDCP Test ) *****
```

References

This is a list of the standards abbreviations appearing in this document.

Abbreviation	Standards Publication, Organization, and Date
HDCP Specification	<i>High-bandwidth Digital Content Protection System Interface Independent Adaption Revision 2.2</i> , 16 October, 2012
HDCP CTS	<i>High-bandwidth Digital Content Protection System Interface Independent Adaption Revision 2.2, Compliant Test Specification Version 1.1</i> , 14 January 2014
Wi-Fi Display	<i>Wi-Fi Display Technical Specification Version 1.1</i>

Revision History

Revision C, January 2017

Additions and changes:

- Updated [Figure 1.3](#) and added Wi-Fi Dongle to the SL-8810 Test Equipment section.
- Changed Two HDMI cables to One HDMI cable in the Inside the Box section.
- Added the Facsimile Keys Support, an optional selection, to the Using the HDCP 2.2 IIA Protocol Analyzer GUI section. Added [Figure 1.9](#).
- Updated [Figure 1.13](#).
- Added Caution to the Connection Setup for Source Device Testing section and the Connection Setup for Sink Device Testing section.
- Updated the Sample Sink Log File section and the Sample Source Log File section to reflect adding WIFI-dongle to the test.

Revision B, July 2015

Removed the reference to Miracast.

Revision A, May 2015

First production release.

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