Broadcom Dolby Vision Source System Testing Guidelines

2018/05/24

Overview

The Broadcom system testing package for Dolby Vision Consumer Source Devices consists of the following:

- The source code for the Broadcom Dynamic Range Test Application
- A set of configuration files required to run the Broadcom Dynamic Range Test Application
- A set of scenario scripts required to run the tests
- A document containing test results for SDK tests that Broadcom supports on the reference platform: `SDK-2.4.1-TB33-TestResults.pdf`
- The source code for a utility to add a BMP header to graphics files, called `rgb2bmp.c`.

All of the software and documentation can be downloaded as a single bundle from your Broadcom distribution channel once Dolby has given Broadcom permission after you have acquired a Dolby Vision license.

NOTE: These instructions assume the user has familiarity with the SDK instructions provided by Dolby.

Test Bench Requirements

- A set-top box (STB) with a Broadcom SoC with Dolby Vision support, such as a 7260xBx, 7268Bx, 7271B0, etc., with a serial console cable (henceforth called the “DUT”)
- The Dolby Vision VS10 Source SDK v2.4.1 GA (from Dolby’s repo, please ensure it contains Technical Bulletin 33 / [TB33])
- The latest zip file of the Unigraf TSI and driver, from the Unigraf web site. An example file looks like this: UCD-300-UFG-06-SW-Bundle-1.4.4.zip, but please get the latest one.
- A Windows 10 64-bit PC that has the Unigraf UCD-323 capture device attached with its drivers installed from the version supplied in the conformance bundle provided by Broadcom (henceforth called the “capture PC”)
- A PC with a serial port (the capture PC will suffice) running TeraTerm (or whatever serial communications program you like) that you can connect to the STB (henceforth called “control PC”)

Preliminary Setup

SDK Deployment

On the capture PC, you will need to unzip the Dolby Vision VS10 Source SDK 2.4.1 GA files retrieved from the Dolby repository. Follow the SDK instructions for installing any prerequisite

tools and libraries required to run the SDK automation tools. Unzip the files into a directory on a USB hard drive with at least 64GB of space. We shall refer to this directory as `$DBV_ROOT`, but you can name it whatever you like.

NOTE: Please ensure you request the latest edidTests.exe and AVTestAnalysis.exe from Dolby as the official released 2.4.1GA versions have a few issues that will prevent tests from running and/or passing. The official versions have a timestamp of 2018/02/28. You need applications whose date is newer than 2018/02/28. If you are failing some EDID tests with HDR10 output with a message in the DRMInfoFrame log that indicates that the whitePoint y coordinate is incorrect, you have the old versions of these test apps.

Please build a Windows version of the `rgb2bmp` utility located in BSEAV/tools/rgb2bmp, and place it under `$DBV_ROOT/Test_Tools/scripts/tools`.

Per TB33, you will need to rename some of the EDID files in the deployed SDK as they do not match the names the SDK automated test tool uses. These are under `$DBV_ROOT/Test_Tools/EDID_Tests/EDIDs`.

```
HDR10_EDID_EOTF-5_CDB-E301.bin -> HDR10_EDID_EOTF_5_CDB_E301.bin
SDR_EDID_CDB-0301_2K.bin -> SDR_EDID_CDB_0301_2K.bin
SDR_EDID_CDB-0301_4K.bin -> SDR_EDID_CDB_0301_4K.bin
HDR10_EDID_EOTF-5_CDB-E301.txt -> HDR10_EDID_EOTF_5_CDB_E301.txt
```

Please create the folder `$DBV_ROOT/EdidTestCaptures` on the capture PC.

Edit `$DBV_ROOT/Test_Tools/EDID_Tests/cfg/HDR10_Mapping.txt` so that the `max_display_mastering_luminance` value is 1000 (from 4000) and the `min_display_mastering_luminance` value is 50 (from 0.05). CEA defines max luminance in units of nits, while min luminance is defined in units of 100 micronits (1/10000th nit).

Copy `BSEAV/app/dynrng/extensions/dbv/patches/scripts.patch` from your Broadcom Dolby Vision release package to `$DBV_ROOT/Test_Tools/scripts` and then manually make the changes from the patch file to the two batch files involved. This fixes a bug in the SDK test generation scripts that creates streams that are unintentionally too long.

Building the Broadcom Dynamic Range Test Application

Please familiarize yourself with the general instructions for building nexus- and nxclient-based applications presented in nexus/docs/nexus_usage.pdf and nexus/nxclient/docs/nxclient.pdf.

The Broadcom Dynamic Range Test Application (abbreviated dynrng) is an nxclient-based application located in BSEAV/app/dynrng. Once you understand how other nxclient apps are built, building dynrng is fairly straightforward. Please open a terminal on your linux build box

and change into the root of your reference software release directory. Then use the following commands.

```
source BSEAV/tools/build/plat <your platform and options>
cd BSEAV/app/dynrng/build
export DYNRNG_EXTENSIONS=console
export DYNRNG_DBV_CONFORMANCE_MODE=y
export BVDC_DBV_MODE_BVN_CONFORM=y
export NEXUS_DISPLAY_DYNRNG_EXTENSION_SUPPORT=y
make
```

This will produce dynrng and nxserver binaries at $NEXUS_BIN_DIR.

License Provisioning

Please ensure your STB is provisioned appropriately for at least the following features:

HEVC decode
Broadcom-licensed Dolby Vision support
Dolby-licensed Dolby Digital Plus support
Dolby-licensed Dolby Vision support

You can verify your licensing status on your STB directly using the following instructions:

1. Build the bp3 application under `BSEAV/tools/bp3`. Please see the readme file in the directory for bp3 application build instructions.
2. Run the bp3 app in nxclient mode. A sample run with the required licensing is shown below.

```
# nexus.client bp3 status
…
Broadcom - H265 (HEVC) [Enabled]
Broadcom - Dolby Vision HDR Activation ($) [Enabled]
…
Dolby - Decode Dolby Digital Plus [Enabled]
Dolby - Decode Dolby Vision [Enabled]
…
```

Test Vector Generation

Please run the scripts that Dolby recommends in the SDK Test Procedure document for generation of the test vectors.

The Broadcom test application does not accept graphics in rgba format. If there are any graphics used for a given test, you will need to convert them to bmp format first.

To convert from planar rgba to interleaved rgba suitable for adding a BMP header, Broadcom used ImageMagick with the following command:

```
convert -depth 8 -channel RGBA -size $IMG_SIZE -interlace plane
$IMAGE_NAME -separate -swap 0,2 -combine -interlace none -flip $
{IMAGE_NAME/P444/I444}
```

For example, if the original image is named Graphic_1920x1080_P444_8b_SDR.rgba, then the command will look like this:

```
convert -depth 8 -channel RGBA -size 1920x1080 -interlace plane
Graphic_1920x1080_P444_8b_SDR.rgba -separate -swap 0,2 -combine -
interlace none -flip  Graphic_1920x1080_I444_8b_SDR.rgba
```

Then you will need to add a bmp header. Broadcom has provided the source code to a utility, rgb2bmp, that will create a bmp header that is compatible with the Broadcom STB software bmp reader. An example invocation follows:

```
$DBV_ROOT/Test_Tools/scripts/tools/rgb2bmp -infile
Graphic_1920x1080_I444_8b_SDR.rgba -outfile
Graphic_1920x1080_I444_8b_SDR.bmp -size 1920,1080 -bpp 32
```

Since the Broadcom implementation does not support 4K graphics, you will only need to create a BMP version of the FHD graphic number 03 under `$DBV_ROOT/Test_Vectors/Dolby_Vision/Graphics_Blending_Tests/rgba/interleaved` using the following commands:

```
convert -depth 8 -channel RGBA -size 1920x1080 -interlace none
03_colorSquare_FHD_Rec709_Gamma2.2.rgba -separate -swap 0,2 -combine -
interlace none -flip 03_colorSquare_FHD_Rec709_Gamma2.2.intl.swap.rgba

$DBV_ROOT/Test_Tools/scripts/tools/rgb2bmp -infile
03_colorSquare_FHD_Rec709_Gamma2.2.intl.swap.rgba -outfile
03_colorSquare_FHD_Rec709_Gamma2.2.intl.bmp -size 1920,1080 -bpp 32
```

Test USB Stick Preparation

Please create the following directory structure on a fresh USB 3.0 stick with at least 64G of space, formatted for FAT32:

```
Test_Scenarios
Test_Playlists
```

Copy the entire `$DBV_ROOT/Test_Vectors` to the root of the USB stick. This will take a long time (~60G).

Copy the entire nexus directory (`$NEXUS_BIN_DIR/..`) created during the build step above to the root of the USB stick.

Depending on the market in which you will deploy your box, the refresh rate chosen for the display will either be 50 or 60 Hz. Below the rate will be specified as `$rate`, but it is intended to be replaced by the number `50` if in a 50 Hz market, or the number `60` if in a 60 Hz market.

Copy the output scenario scripts located at `BSEAV/app/dynrng/extensions/dbv/etc/scenarios/sdk/out/$rate` to the `Test_Scenarios` directory on the USB stick.

Copy the input scenario scripts located at `BSEAV/app/dynrng/extensions/dbv/etc/scenarios/sdk/in/$rate` to the `Test_Scenarios` directory on the USB stick. Then copy the input scenario scripts located at `BSEAV/app/dynrng/extensions/dbv/etc/scenarios/sdk/in/24` to the `Test_Scenarios` directory on the USB stick, **overwriting any duplicates**.

Dolby requires support for both 24 and either 50 or 60 Hz content, and many of the tests are run using 24 Hz content rather than 50 or 60 Hz content, so we need some of the existing 50/60 Hz scenarios to be replaced by the 24 Hz versions.

Copy the files `dbvc.conf` and `nxsvr.conf` from `BSEAV/app/dynrng/extensions/dbv/etc` to the `nexus/etc/dynrng` directory on the USB stick.

Last, you will need to adjust the configuration file at `nexus/etc/dynrng/dbvc.conf` to point to the location you will mount the USB stick on your platform. An example `dbvc.conf` using `/mnt/hd` as the mount point follows.

```
$ cat dbvc.conf
imagesPath=/mnt/hd/Test_Vectors
streamsPath=/mnt/hd/Test_Vectors
scenariosPath=/mnt/hd/Test_Scenarios
playlistPath=/mnt/hd/Test_Playlists
inputMethod=console
```

Test Bench Deployment

The test bench involves the Broadcom Settop Box (the DUT), a control PC, a capture PC (control and capture may be the same PC), and the Unigraf UCD-323. Please see the following diagram for details on the connections between the pieces of the test bench.

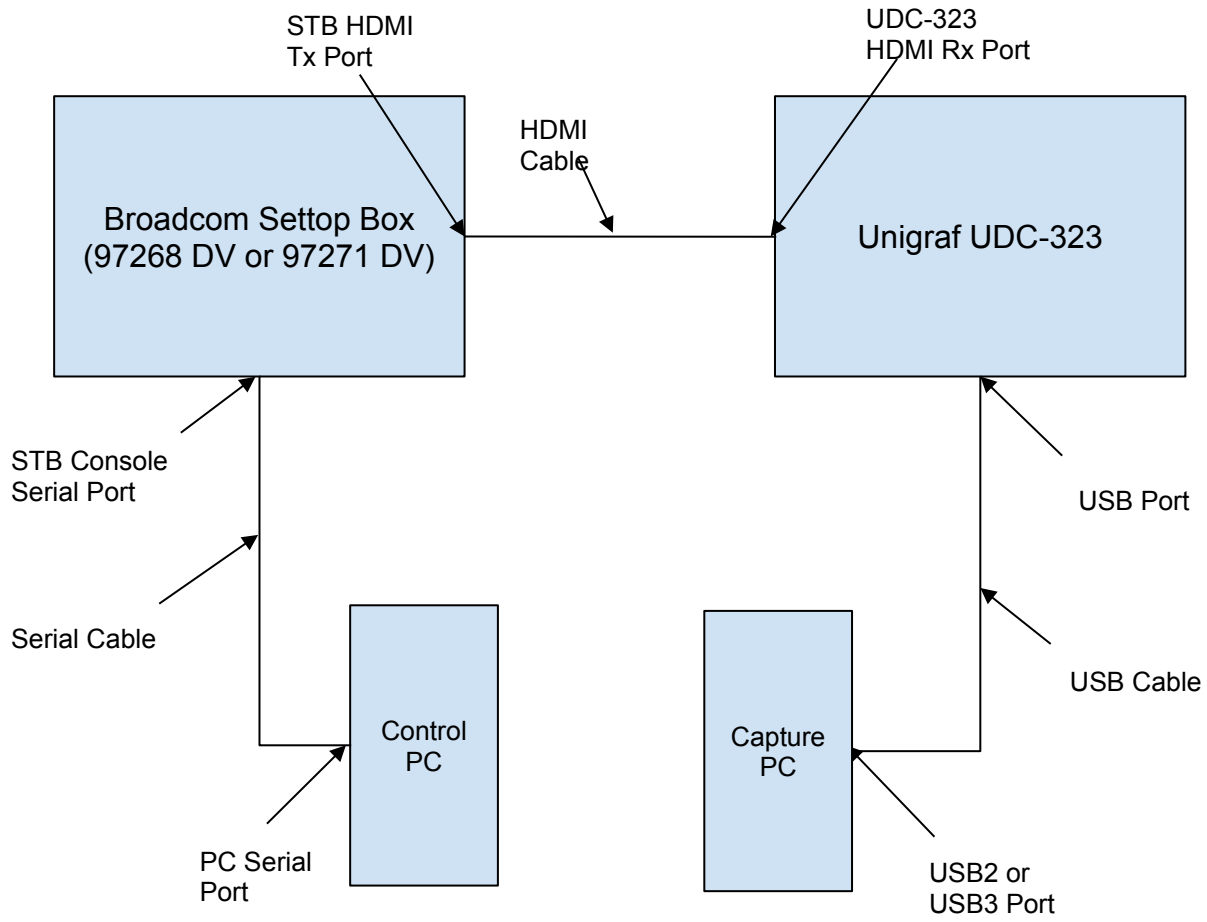

Figure 1. Test bench connections.

STB/DUT Deployment

The Broadcom Dolby Vision system test package can be run from a USB stick that is plugged into a Broadcom Reference Implementation STB for running the conformance tests via the Broadcom Dynamic Range Test Application.

These instructions assume that you have already deployed and loaded any bootloader, kernel, rootfs, middleware and software that you need in order to configure the STB into a mode that will allow running nxserver and the dynrng client app to play MP4 or TS files in the clear from a prepared USB stick.

Once you have completed the USB stick preparation step above, you can eject the USB stick from the capture PC (so that Windows will sync it) and then remove it and insert it into a

Broadcom Reference Implementation STB. Mount the USB stick at the location you specified in the dbv.conf file (default `/mnt/hd`) via the following example command:

```
mount /dev/sda1 /mnt/hd
```

Capture PC Deployment

Please ensure you have installed the Unigraf drivers and UCD console application from the file you downloaded from the Unigraf web site.

Some tests will require connecting an HDMI cable from the Unigraf UCD-323 HDMI input port to the DUT HDMI output port.

Control PC Deployment

Connect a serial cable from the control PC to the STB. Open up a serial comms program. Please use the following settings:

115,200 bps, 8 data bits, 1 stop bit, no flow control

Running Tests

At this point, your STB should have the USB stick mounted and be at a serial console prompt on the control PC.

SDK General Instructions

From the serial console prompt, you will first need to do the following:

1. `cd /mnt/hd/nexus/bin`
2. `B_REFSW_BOXMODE=$BOXMODE nexus nxserver -cfg ../etc/nxsvr.conf &`
3. `nexus.client wait_for_server`
4. `nexus.client dynrng -c ../etc/dbvc.conf`

where `$BOXMODE` is the box mode under which you will run your platform.

This should start up the STB multiprocess server and the Broadcom Dynamic Range Test Application. It will leave you at a "`[dynrng]$`" prompt. You should only need to do this once to get the app and server started.

Then please follow the instructions from the Dolby SDK Test Procedure document. For each group of tests, the required configuration and steps are given. Where the Dolby instructions call for interacting with the DUT in some way, you can follow any test-specific instructions provided below.

For most tests, you will need to type in the name of a scenario that configures the STB output to match the test requirements and hit enter. Then you will need to type in the name of a scenario that starts playback of the appropriate test stream.

If anything goes wrong, you can always kill the dynrng app (Ctrl-C via the serial console, or enter 'q' at the dynrng prompt), or kill the multiprocess server (`killall nxserver`), and restart it and the specific test using the commands above. If that doesn't fix the problem, try power cycling the DUT. If it still doesn't work, then contact Broadcom for help.

NOTE: if you are asked to load an EDID into the PS980 or Unigraf manually, please choose to issue a hotplug, otherwise the Broadcom DUT will not know about the new EDID. Most SDK tests that require custom EDIDs should have their EDID loaded into the Unigraf box via the SDK test app automatically.

NOTE: **Both 50 and 60 Hz tests are included in the test-specific tables below. Please only run the tests that match your deployment market (50 or 60 Hz, usually not both). Dolby requires the 24 Hz tests for all markets.**

Output Formats and TV Capabilities

When testing on the Dolby-Vision-STD-capable TV, you will need to first run the `out_std_$format` scenario, where `$format` is to be replaced by either `fhd` or `uhd`, depending on whether your Dolby-Vision-STD-capable TV indicates support for 4Kp50/60 or not. For example, on a DBV-STD-capable TV that indicates it does not support 4Kp50/60, you would run the `out_std_fhd` scenario.

When testing on an HDR-capable TV, you will need to first run the `out_h10_uhd` scenario.

When testing on a 4K-capable SDR TV, you will need to first run the `out_sdr_uhd` scenario.

When testing on a 2K-capable SDR TV, you will need to first run the `out_sdr_fhd` scenario.

It is possible to run all tests on a single TV that supports all of the above capabilities. All that is needed is to run the appropriate `out_*` scenario to simulate connection to a TV of that capability.

Profiles and Levels Tests

All of the Profiles and Levels Tests (henceforth abbreviated plt) are visually verified. Each of these tests require the use of four different TVs: a Dolby-Vision-STD-capable TV, an HDR-capable TV, a 4K-capable SDR TV, and a 2K-capable SDR TV. For each connection to a TV, you will need to run a scenario file that sets up the output of the DUT appropriate for that TV.

Once the DUT output is set up to match the TV's capabilities, you will need to run the following scenarios per Dolby Test Case ID (in the TestResultsForm spreadsheet) to start playback of the input. Perform verification visually per the SDK instructions.

Test Case ID	Test Scenario Script	Notes
VS10_PLT_23976_dvhe_stn_mp4	plt_p50_24_mp4	
VS10_PLT_23976_dvhe_stn_ts_sPid	plt_p50_24_ts	
VS10_PLT_23976_dvhe_sth_mp4	plt_p81_24_mp4	
VS10_PLT_23976_dvhe_sth_ts_sPid	plt_p81_24_ts	
VS10_PLT_23976_dvav_ser_mp4	plt_p92_24_mp4	1
VS10_PLT_23976_dvav_ser_ts_sPid	plt_p92_24_ts	
VS10_PLT_50_dvhe_stn_mp4	plt_p50_50_mp4	
VS10_PLT_50_dvhe_stn_ts_sPid	plt_p50_50_ts	
VS10_PLT_50_dvhe_sth_mp4	plt_p81_50_mp4	
VS10_PLT_50_dvhe_sth_ts_sPid	plt_p81_50_ts	
VS10_PLT_50_dvav_ser_mp4	plt_p92_50_mp4	
VS10_PLT_50_dvav_ser_ts_sPid	plt_p92_50_ts	
VS10_PLT_5994_dvhe_stn_mp4	plt_p50_60_mp4	
VS10_PLT_5994_dvhe_stn_ts_sPid	plt_p50_60_ts	
VS10_PLT_5994_dvhe_sth_mp4	plt_p81_60_mp4	
VS10_PLT_5994_dvhe_sth_ts_sPid	plt_p81_60_ts	
VS10_PLT_5994_dvav_ser_mp4	plt_p92_60_mp4	1
VS10_PLT_5994_dvav_ser_ts_sPid	plt_p92_60_ts	
VS10_PLT_23976_HDR10_mp4	plt_h10_24_mp4	2
VS10_PLT_23976_HDR10_ts_sPid	plt_h10_24_ts	2
VS10_PLT_50_HDR10_mp4	plt_h10_50_mp4	2
VS10_PLT_50_HDR10_ts_sPid	plt_h10_50_ts	2
VS10_PLT_5994_HDR10_mp4	plt_h10_60_mp4	2
VS10_PLT_5994_HDR10_ts_sPid	plt_h10_60_ts	2
VS10_PLT_23976_SDR_mp4	plt_s265_24_mp4	2
VS10_PLT_23976_SDR_ts_sPid	plt_s265_24_ts	2
VS10_PLT_50_SDR_mp4	plt_s265_60_mp4	2
VS10_PLT_50_SDR_ts_sPid	plt_s265_60_ts	2
VS10_PLT_5994_SDR_mp4	plt_s265_60_mp4	2
VS10_PLT_5994_SDR_ts_sPid	plt_s265_60_ts	2
VS10_PLT_23976_SDR_mp4	plt_s264_24_mp4	1,2

Test Case ID	Test Scenario Script	Notes
VS10_PLT_23976_SDR_ts_sPid	plt_s264_24_ts	2
VS10_PLT_50_SDR_mp4	plt_s264_60_mp4	2
VS10_PLT_50_SDR_ts_sPid	plt_s264_60_ts	2
VS10_PLT_5994_SDR_mp4	plt_s264_60_mp4	1,2
VS10_PLT_5994_SDR_ts_sPid	plt_s264_60_ts	2
1. This test cannot be run because there is an error in the stream. 2. This test is supported only when run against a Dolby-Vision-capable TV in STD mode.		

Table 1. Profiles and Levels Test Case to Scenario Mapping

E-EDID Verification Tests

All of the E-EDID Verification Tests (henceforth abbreviated evt) are tested in an automated fashion using the Unigraf UCD-323 device specified by Dolby.

NOTE: Please ensure you understand the latest HDMI CEA-861 document in that a strict order of the color primaries specified in the DRMIF is not required. As such, the Broadcom implementation DRMIF color primary order may not match the Dolby SDK expected order.

We will be following the steps in section “Performing the E-EDID verification test with the Unigraf UCD-323 frame grabber”.

Please connect the DUT HDMI output to the Unigraf UCD-323 HDMI input as shown in the Prerequisites subsection. Open up a command prompt and change into the `$DBV_ROOT/Test_Tools/EDID_Tests` folder. Perform step 1 in the Procedure subsection.

The general form of the command line is:

```
edidTests.exe --output $out --testID $id [--hdr_mode $mode --hdr_cfg_path $path]
```

`$out` will always be `../../EdidTestCaptures`, which you created when deploying the SDK.
`$id` will be the full text of the Test Case ID for a given test.
`$mode` and `$path` are listed in the table below only for the tests that require them. All other supported tests should not specify `--hdr_mode` nor `--hdr_cfg_path`.

Test Case ID	$mode	$path
UHD_p50_v0-4k60-0-yuv422-0-26Byte_HDR10_ER2	h_Map	cfg/HDR10_Mapping.txt
UHD_p50_v1-4k60-0-yuv422-0-15Byte_HDR10_ER2	h_Map	cfg/HDR10_Mapping.txt
UHD_p50_AVR-v1-4k60-0-yuv422-0-15Byte-to-12Byte_HDR10_ER2	h_Map	cfg/HDR10_Mapping.txt
UHD_p50_HDR10-EDID-EOTF-5-CDB-E301_HDR10_ER1	h_Map	cfg/HDR10_Mapping.txt
UHD_p50_SDR-EDID-CDB-0301-4K_SDR_ER1	*	

Test Case ID	$mode	$path
UHD_p50_SDR-EDID-CDB-0301-2K_SDR_ER1	*	
* TB33 specifies to no longer use --hdr_mode h_SDR for these cases		

Table 2.Test Case-specific HDR Mode and Cfg Parameters

Once you have started the automation application on the capture PC, you will notice that it has loaded an EDID into the Unigraf device. This should have generated a hotplug event on the DUT, which will produce some log messages. It is now safe to run the output scenario script appropriate for this test case ID. Then continue to follow the test procedure from the SDK documentation. At step 7, please run the input scenario script appropriate for this test case ID. Both the output and input scenario scripts are shown in the following table.

NOTE: H.265 SDR tests have been removed per TB33.

Test Case ID	Scenario Script	
	Output	Input
UHD_p50_v0-4k60-0-yuv422-0-26Byte_STD_ER1	out_std_fhd	cnv_p50
UHD_h10_v0-4k60-0-yuv422-0-26Byte_STD_ER1	out_std_fhd	cnv_h10
UHD_p50_v0-4k60-0-yuv422-0-26Byte_HDR10_ER2	out_h10_uhd	cnv_p50
UHD_p50_v0-4k60-1-yuv422-0-26Byte_STD_ER1	out_std_uhd	cnv_p50
UHD_h10_v0-4k60-1-yuv422-0-26Byte_STD_ER1	out_std_uhd	cnv_h10
UHD_p50_AVR-v0-4k60-1-yuv422-0-26Byte-to-12Byte_STD_ER1	out_std_uhd	cnv_p50
UHD_h10_AVR-v0-4k60-1-yuv422-0-26Byte-to-12Byte_STD_ER1	out_std_uhd	cnv_h10
UHD_p50_v1-4k60-0-yuv422-0-15Byte_STD_ER1	out_std_fhd	cnv_p50
UHD_h10_v1-4k60-0-yuv422-0-15Byte_STD_ER1	out_std_fhd	cnv_h10
UHD_p50_v1-4k60-0-yuv422-0-15Byte_HDR10_ER2	out_h10_uhd	cnv_p50
UHD_p50_AVR-v1-4k60-0-yuv422-0-15Byte-to-12Byte_STD_ER1	out_std_fhd	cnv_p50
UHD_h10_AVR-v1-4k60-0-yuv422-0-15Byte-to-12Byte_STD_ER1	out_std_fhd	cnv_h10
UHD_p50_AVR-v1-4k60-0-yuv422-0-15Byte-to-12Byte_HDR10_ER2	out_h10_uhd	cnv_p50
UHD_p50_v1-4k60-1-yuv422-0-15Byte_STD_ER1	out_std_uhd	cnv_p50
UHD_h10_v1-4k60-1-yuv422-0-15Byte_STD_ER1	out_std_uhd	cnv_h10
UHD_p50_v1-4k60-1-yuv422-0-LL-1-12Byte_STD_ER2	out_std_uhd	cnv_p50
UHD_h10_v1-4k60-1-yuv422-0-LL-1-12Byte_STD_ER2	out_std_uhd	cnv_h10
UHD_p50_v2-yuv444-0-yuv422-0-int-2-12Byte_STD_ER2	out_std_uhd	cnv_p50
UHD_h10_v2-yuv444-0-yuv422-0-int-2-12Byte_STD_ER2	out_std_uhd	cnv_h10
UHD_p50_HDR10-EDID-EOTF-5-CDB-E301_HDR10_ER1	out_h10_uhd	cnv_p50
UHD_p50_SDR-EDID-CDB-0301-4K_SDR_ER1	out_sdr_uhd	cnv_p50
UHD_p50_SDR-EDID-CDB-0301-2K_SDR_ER1	out_sdr_fhd	cnv_p50
FHD_s264_v0-4k60-0-yuv422-0-26Byte_STD_ER1	out_std_fhd	cnv_s264
FHD_s264_v0-4k60-1-yuv422-0-26Byte_STD_ER1	out_std_uhd	cnv_s264

Test Case ID	Scenario Script	
	Output	Input
FHD_s264_AVR-v0-4k60-1-yuv422-0-26Byte-to-12Byte_STD_ER1	out_std_uhd	cnv_s264
FHD_s264_v1-4k60-0-yuv422-0-15Byte_STD_ER1	out_std_fhd	cnv_s264
FHD_s264_AVR-v1-4k60-0-yuv422-0-15Byte-to-12Byte_STD_ER1	out_std_fhd	cnv_s264
FHD_s264_v1-4k60-1-yuv422-0-15Byte_STD_ER1	out_std_uhd	cnv_s264
FHD_s264_v1-4k60-1-yuv422-0-LL-1-12Byte_STD_ER2	out_std_uhd	cnv_s264
FHD_s264_v2-yuv444-0-yuv422-0-int-2-12Byte_STD_ER2	out_std_uhd	cnv_s264

Table 3.EVT Output/Input Scenario Script Mapping

Repeat steps 1-10 for each test in the table.

NOTE: TB33 points out that there are a number of tests where the automated tool looks for a Dolby Vision VSIF when outputting SDR or HDR10 video, and that this is no longer required. For tests where the automated tool claims failure only because the Dolby VSIF is missing, ignore the failed result and claim pass.

Graphics Priority Mode Tests

All of the Graphics Priority Mode Tests (abbreviated gpmt) are visually verified. **NOTE: Since the Broadcom implementation does not support 4K graphics, you will have to run all tests with 1080p graphics**. This is acceptable per TB33. Follow the instructions under the section "Performing the graphics priority mode test" in the SDK documentation. After step 2 of the Procedure sub-section, please run either `out_std_fhd` or `out_std_uhd`, depending on your TV's DBV-STD 4Kp50/60 capability. Then for each test case ID, please run the appropriate input scenario script as shown in the table below and verify visually.

Test Case ID	Input Scenario Script
VS10_GPMT_23976_UHD_dvhe_stn_DoVi_STD_mp4	gpmt_p50
VS10_GPMT_23976_UHD_dvhe_sth_DoVi_STD_mp4	gpmt_p81
VS10_GPMT_23976_FHD_dvav_ser_DoVi_STD_mp4	gpmt_p92

Table 4.Graphics Priority Input Scenario Mapping

Longevity Tests

Both Longevity tests (abbreviated lt ['el-tee']) are visually verified. Please follow the instructions in the section "Performing the longevity test". However, perform both tests using **Dolby Vision STD mode output only**.

After connecting to the Dolby-Vision-capable TV, please run either `out_std_fhd` or `out_std_uhd`, depending on your TV's DBV-STD 4Kp50/60 capability. Where the procedure

requests playing the test vector, for each test case ID, please run the appropriate input scenario script as shown in the table below and verify visually.

Test Case ID	Input Scenario Script
VS10_LT_50_UHD_dvhe_stn_DoVi_STD	lt_p50
VS10_LT_50_UHD_dvhe_sth_DoVi_STD	lt_p81

Table 5.Longevity Test Input Scenario Mapping

Implicit Transition Tests

All of the Implicit Transition Tests (abbreviated tti) are visually verified. Please follow the instructions under the sections “Performing the implicit transition test for Dolby Vision to xxx”. In the instructions, each of these tests require the use of three different TVs: a Dolby-Vision-STD-capable TV, an HDR-capable TV, and a 4K-capable SDR TV. However, as the HDR/SDR<->SDR/HDR usage modes do not involve Dolby Vision, they are blocked by the app. Therefore, **only the tests that require a Dolby-Vision-STD-capable TV are listed below**. You will need to run the scenario file that sets up the output of the DUT appropriate for that TV (out_std_fhd or out_std_uhd).

Once the DUT output is set up to match the TV’s capabilities, where the procedure requests playing the test vector, for each test case ID, please run the appropriate input scenario script as shown in the table below and verify visually.

Test Case ID	Input Scenario Script
VS10_TT_DoVi_STD_TV_23976_UHD_DoVi_STD_dvhe_stn_to_HDR10	tti_p50_h10_24
VS10_TT_DoVi_STD_TV_23976_UHD_DoVi_STD_dvhe_sth_to_HDR10	tti_p81_h10_24
VS10_TT_DoVi_STD_TV_23976_UHD_DoVi_STD_dvhe_stn_to_SDR_HEVC	tti_p50_s265_24
VS10_TT_DoVi_STD_TV_23976_UHD_DoVi_STD_dvhe_sth_to_SDR_HEVC	tti_p81_s265_24
VS10_TT_DoVi_STD_TV_23976_FHD_DoVi_STD_dvav_ser_to_SDR_AVC	tti_p92_s264_24
VS10_TT_DoVi_STD_TV_50_UHD_DoVi_STD_dvhe_stn_to_HDR10	tti_p50_h10_50
VS10_TT_DoVi_STD_TV_50_UHD_DoVi_STD_dvhe_sth_to_HDR10	tti_p81_h10_50
VS10_TT_DoVi_STD_TV_50_UHD_DoVi_STD_dvhe_stn_to_SDR_HEVC	tti_p50_s265_50
VS10_TT_DoVi_STD_TV_50_UHD_DoVi_STD_dvhe_sth_to_SDR_HEVC	tti_p81_s265_50
VS10_TT_DoVi_STD_TV_50_FHD_DoVi_STD_dvav_ser_to_SDR_AVC	tti_p92_s264_50
VS10_TT_DoVi_STD_TV_5994_UHD_DoVi_STD_dvhe_stn_to_HDR10	tti_p50_h10_60
VS10_TT_DoVi_STD_TV_5994_UHD_DoVi_STD_dvhe_sth_to_HDR10	tti_p81_h10_60
VS10_TT_DoVi_STD_TV_5994_UHD_DoVi_STD_dvhe_stn_to_SDR_HEVC	tti_p50_s265_60
VS10_TT_DoVi_STD_TV_5994_UHD_DoVi_STD_dvhe_sth_to_SDR_HEVC	tti_p81_s265_60
VS10_TT_DoVi_STD_TV_5994_FHD_DoVi_STD_dvav_ser_to_SDR_AVC	tti_p92_s264_60

Table 6.Implicit Transition Input Scenario Mapping

Metadata Alignment Tests

The metadata alignment test is visually verified. Please follow the instructions under “Performing the composer metadata alignment test”. Once connected to the Dolby-Vision-STD-capable TV, please run either `out_std_fhd` or `out_std_uhd`, depending on your TV’s DBV-STD 4Kp50/60 capability. At step 2 in the Procedure subsection, for each test case ID, please run the input scenario script from the following table and verify visually

Test Case ID	Input Scenario Script
VS10_MAT_CP_DoVi_STD_24_UHD_dvhe_stn_mp4	cpa

Table 7: Metadata Alignment Input Scenario Mapping

MPEG-4 Four-character Code Tests

All of the MPEG-4 Four-character code (abbreviated fcc) tests are visually verified. Please follow the instructions under “Performing the MPEG-4 four-character code test”. Once connected to the Dolby-Vision-STD-capable TV, please run either `out_std_fhd` or `out_std_uhd`, depending on your TV’s DBV-STD 4Kp50/60 capability. At step 1 in the Procedure subsection, for each test case ID, please run the input scenario script from the following table and verify visually.

Test Case ID	Input Scenario Script
VS10_FCC_DoVi_23976_UHD_dvhe_stn_mp4	fcc_p50
VS10_FCC_DoVi_23976_UHD_dvhe_sth_mp4	fcc_p81
VS10_FCC_DoVi_23976_FHD_dvav_ser_mp4	fcc_p92
VS10_FCC_HDR10_23976_UHD_hdr10_mp4	fcc_h10
VS10_FCC_SDR_23976_UHD_hevc_mp4	fcc_s265
VS10_FCC_SDR_23976_FHD_hevc_mp4	fcc_s264

Table 8.FCC Input Scenario Mapping

Negative Tests

The supported negative tests are all verified visually. Please follow the instructions in the section “Performing the unsupported Dolby Vision profiles test”. Once connected to the Dolby-Vision-STD-capable TV, please run either `out_std_fhd` or `out_std_uhd`, depending on your TV’s DBV-STD 4Kp50/60 capability. At step 1 in the Procedure subsection, for each test case ID, please run the input scenario script from the following table and verify visually.

Test Case ID	Input Scenario Script
VS10_UDP_DoVi_23976_UHD_dvhe_dtr_mp4	l2dm_p42_mp4
VS10_UDP_DoVi_23976_UHD_dvhe_dtr_ts_sPid	l2dm_p42_ts

Table 9.Unsupported Profile Input Scenario Mapping