



Dolby Digital Plus Online Delivery Playback

Interactive Test Help

30 April 2026
Version 1.6

Notices

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Introduction

This documentation provides associated information for the interactive test procedures used to verify that a product can properly demultiplex, decode, and play back Dolby Digital Plus bitstreams contained in online delivery formats, including MPEG-DASH and HTTP Live Streaming.

- [Using this test procedure](#)
- [New in this version](#)
- [Approval process](#)
- [Contacting Dolby](#)

1.1 Using this test procedure

To perform tests on a playback product, follow the detailed instructions generated from the interactive test procedure in conjunction with using this documentation.

This information set and the interactive test procedure are major parts of the Dolby Digital Plus Online Delivery Kit, which contains all materials (such as test signals, testing tools, web-based interactive test instructions, and so on) necessary for evaluating a playback product.

This documentation is part of the Dolby Digital Plus Online Delivery Kit, which contains all materials (such as test signals, test applications, web-based interactive test instructions, and so on) necessary for evaluating a playback product. The Dolby Digital Plus Online Delivery Kit are available from the <https://ott.dolby.com>.

Choose a method to use the kit:

- Download the kit package to your local web server.
- Access the test materials, and stream test signals using your playback products directly from the <https://ott.dolby.com>.

1.2 New in this version

These updates have been made to the latest version of this document.

Instructions for using the test applications have been updated.

Related information

[Test applications](#) on page 15

1.3 Approval process

To gain approval for your product, you must perform all required tests to ensure that all stated requirements for the product have been met.

Licensees are required to meet all stated requirements and perform all required tests as part of the approval process.

1.3.1 Submitting test results to Dolby Laboratories

Procedure

1. Record all test results in the *Test results* form, exported from the interactive test procedure.
2. When the test procedure is completed and all test results appear to be accurate, send these items to Dolby:
 - The product under test
 - The completed questionnaire and test-case list exported as .json files from the interactive test procedure
 - A product with your Implementation
 - The completed *Test results* form
 - Any test scripts written or modified for automated testing of your Implementation
 - All log files generated by test scripts or other testing tools

Submission of these items allows Dolby to complete the testing process without undue delays. It also ensures correlation of submitted data with that taken during the evaluation.



Note: Make sure you provide your product sequence number.

1.3.2 Self-test evaluation

Your product may be eligible for the self-test program, under which an approval can be issued based on the test results data submitted.

Certain restrictions may apply. For more details, please contact systemsupport@dolby.com.

1.4 Contacting Dolby

Support services are available to address any questions and to provide advice about integrating Dolby technology into your product.

For product design or testing, contact Dolby at systemsupport@dolby.com. By utilizing Dolby expertise, especially during the design process, many problems that might require design revisions before a product is approved can be prevented.

Dolby is also available to review product plans, including preliminary design information, markings, displays, and control and menu layouts, with the goal of preventing problems early in the product development cycle.

If you have comments or feedback about this documentation, send us an email at documentation@dolby.com.

Test overview

General information relevant to the playback system test is provided to assist you in managing the tests within the interactive test framework.

- [Testing a playback product](#)
- [Product features and testing](#)
- [Test signals](#)
- [Listening test](#)
- [Product configuration](#)

2.1 Testing a playback product

This topic provides an overview of how to test a playback product by using the Dolby Digital Plus Online Delivery Kit.

Procedure

1. Access the Dolby Digital Plus Online Delivery Kit at <https://ott.dolby.com>.
2. Download the kit package to your local web server or access the test materials, and stream test signals using your playback products directly from the <https://ott.dolby.com>.
3. Complete the interactive test procedure questionnaire.
This generates a test-case list with detailed test instruction for each test case.
4. Play back test signals for each test case by using the product under test.
5. Analyze the resulting test signals using the specified method and tools described in this test help.
6. Submit the test results to Dolby for approval.

2.2 Product features and testing

Many feature-set variations are possible in a product that includes Dolby Digital Plus technology. Test the features that your product supports.

The interactive test procedure uses the form of a questionnaire to request information about which features are supported by a product, and then uses this information to provide test instructions for all applicable test cases. Unless otherwise stated in the individual test instructions, running each test case for each supported feature is generally recommended.

Factors influencing product features are described in this section.

2.2.1 Online delivery formats

A product may support encoding and multiplexing of media content into one or more online delivery formats and profiles.

Online delivery formats include:

- MPEG Dynamic Adaptive Streaming over HTTP format (DASH)
 - MPEG-DASH Live profile
 - MPEG-DASH On Demand profile
- Apple HTTP Live Streaming format
- Progressive download (MP4)

2.2.2 Video encoding formats

A product may support one or more video encoding formats and profiles. Dolby Digital Plus Online Delivery Kit provides test streams that are used in the test cases.

It is possible to create a Licensed Product that does not support all of these video coding formats.

Unless otherwise stated in the individual test instructions, run each test case for each supported video encoding format.

This table lists all video profiles of the test streams.

Table 1: Video encoding formats and profiles of test streams

Encoding	Video profiles	Resolutions	Frame rates	Bit rates
H.264	Main profile at level 4.0	1280 × 720p	25 and 29.97 fps	2 Mbps ^[a]
			50 and 59.94 fps	3 Mbps

Table 1: Video encoding formats and profiles of test streams (continued)

Encoding	Video profiles	Resolutions	Frame rates	Bit rates
H.265	Main 10 profile at level 4.0	1280 × 720p	25 and 29.97 fps	1 Mbps
			50 and 59.94 fps	1.5 Mbps
		1920 × 1080 (for audio video synchronization only)	25 and 29.97 fps	3 Mbps

[a] For audio video synchronization content, the bit rate is 3 Mbps.

2.2.3 Audio encoding formats

In addition to Dolby Digital Plus, a product may support various audio codecs, such as Dolby AC-4 and MPEG AAC.

It is possible to create a Licensed Product that does not support all of these audio coding formats. For example, a playback product targeted specifically at the US market could support decoding of Dolby Digital Plus only.

Unless otherwise stated in the individual test instructions, run each test case for each supported audio encoding format.

2.2.4 Output interfaces

Two-channel and multichannel outputs can be routed to a variety of interfaces, including:

- HDMI
- S/PDIF
- Line level
- Speakers
- Headphones

Certain tests must be repeated on all digital output interfaces (such as HDMI and S/PDIF) supported by the product under test.

2.2.5 Dolby Atmos

A product may support playback of Dolby Digital Plus with Dolby Atmos content.

Some test streams contain Dolby Digital Plus with Dolby Atmos content in it. These test streams are designed to verify that a product has the capability of playing back Dolby Digital Plus and reproducing the Dolby Atmos content by using the object audio metadata contained in the stream.

For a product that includes an HDMI source (output) and supports playback of Dolby Digital Plus with Dolby Atmos content, it identifies Dolby Atmos content from online delivery formats, and by default passes it through the HDMI or Audio Return Channel (ARC) to an A/V receiver enabled for Dolby Atmos. For a product that does not support Dolby Atmos content, it drops the object audio metadata and decodes the stream as a normal Dolby Digital Plus stream with a backward-compatible downmixed channel configuration.

2.3 Test signals

Test signals are designed to verify that a product can properly demultiplex, decode, and play back Dolby Digital Plus bitstreams contained in online delivery formats.

Generally, test signals were created by multiplexing one or more audio elementary streams and one or more H.264 (or H.265) video elementary streams. Depending on the use case, the audio elementary streams can be in the Dolby Digital Plus or other format.

2.3.1 Test vectors

A test vector is a set of test signals that are involved in running a test case.

For the MPEG-DASH test cases, a test vector is composed of the test files as listed in the table.

MPEG-DASH profiles	Files in a test vector
MPEG-DASH Live	One Media Presentation Description (MPD) manifest file (.mpd file) A sequence of .mp4 files for each video stream A sequence of .mp4 files for each audio stream
MPEG-DASH On Demand	One MPD manifest file (.mpd file) One .mp4 file for each video stream One .mp4 file for each audio stream

For the HTTP Live Streaming test cases, a test vector is composed of these test files:

- Playlist files (.m3u8 files)
- A sequence of media segment files (.mp4 files)
- A sequence of ID3 format files (.ec3 or .aac files)

Each manifest (or playlist) file uses relative paths to the media files. The relative file locations between the media files and the manifest file must be kept while a test vector being copied or moved. This enables the manifest file to locate the media files for playback after you move the test vectors from one directory to another directory, including to a server location, to simulate a server/client media streaming process.

2.3.2 File-name channel configuration abbreviations

The test files of this kit include abbreviations that indicate the channel configuration of the test signal. For example, the manifest file `Audio_ID_720p_25fps_h264_6ch_256kbps_ddp.mpd` contains 5.1 content. The table lists the channel configuration abbreviations.

Table 2: File-name channel configuration abbreviations

Abbreviation	Configuration
2ch	Stereo: Left, Right
6ch	5.1 channels: Left, Center, Right, Left Surround, Right Surround, Low-Frequency Effects
514ch	5.1.4 channels: Left, Center, Right, Left Surround, Right Surround, Top Front Left, Top Front Right, Top Back Left, Top Back Right, Low-Frequency Effects

2.3.3 Test file naming conventions

A generic naming convention is used for the test files included in the kit.

A test file name is structured in the pattern:

```
<additional info>_<stream contents>_<video resolution>_<video
framerate>_<video codec>_<output channel configurations>_<bitrates>_<audio
codecs>.<file extension>
```

The file name convention is described in this table.

Term	Description
<additional info>	Indicates additional information about the test signal, such as payload byte order. For example, LE indicates that the signal is in little-endian byte order.
<stream contents>	Indicates the stream contents. For example, ChID_voic_e indicates voice content for the channel identification test.
<video resolution>	Indicates the video resolution.
<video framerate>	Indicates the video frame rate.
<video codec>	Indicates the video codecs used by a test signal.
<output channel configurations>	Indicates output channel configuration.
<bitrates>	Indicates the bit rate at which a test file is encoded.
<audio codecs>	Indicates the audio codecs used by a test signal.
<file extension>	Indicates file formats.

For example, in the file `Audio_ID_720p_25fps_h264_6ch_256kbps_ddp.mpd`, the name of the MPEG-DASH test vector represents one Dolby Digital Plus audio track encoded at 256 kbps with 5.1-channel output, and one H.264 video track with a resolution of 1280×720p at a frame rate of 25 fps.

If a test signal contains more than one video or audio track, the file name will not include the information that is associated with the multiple tracks. For example, a test signal contains two audio tracks, one 5.1-channel AAC track at 640 kbps and one 5.1-channel Dolby Digital Plus track at 256 kbps. The <audio codecs> and <bitrates> information will not be included in its file name.

`Multi_Codec_Select_720p_25fps_h264.mpd`

2.4 Listening test

Listening tests enable you to check for audible failures in the decoding of Dolby Digital Plus. Listening tests can reveal obvious faults not apparent while conducting other tests.

Perform the listening tests by listening to the product outputs while playing the supplied test signals. Use these general guidelines for performing all listening tests:

- Choose the audio output to monitor.
- For most tests, it is sufficient to monitor the two-channel analog output using the line-level or headphone output. (Use the PCM output if no analog outputs are provided.) Make all necessary equipment connections and product UI selections to listen to this output.
- Unless otherwise indicated, you can instead choose to monitor the digital outputs (for example, High-Definition Multimedia Interface (HDMI) or S/PDIF).
- Perform listening tests in a quiet environment.
- Listen carefully to the decoded output.
- Verify that the product reproduces the test signal as expected.
- Ensure that any additional processing (such as a virtualizer) is turned off.
- Listen for any loud pops, clicks, distortion, excessive mutes, or other audible objectionable behavior.
- Perform all of the listening tests for every feature the product supports.

2.5 Product configuration

Run every test with the default configuration settings unless different configuration settings are provided.

Dynamic range control mode	Default mode
Output channel configuration	Maximum supported by the output type
Channels to monitor	All, simultaneously if possible
Output type	All analog and digital outputs
Measurement tool	A number of speakers equal to the product maximum output channel configuration for the specified output type

3

The interactive test procedure

This development kit includes a browser-based interactive test procedure to assist you through the testing process for the playback kit Implementation.

- [Testing with the interactive procedure](#)

3.1 Testing with the interactive procedure

Follow these instructions to generate and complete the interactive test procedure.

Prerequisites

- Before you start, make sure you are familiar with product variations.
- The interactive test procedure does not support Internet Explorer. We recommend using recent versions of Mozilla Firefox.
- JavaScript support must be enabled in your browser.

Procedure

1. Open the Dolby online delivery website at <https://ott.dolby.com>.
2. Navigate to the **Dolby Digital Plus Online Delivery Kit > View > Interactive test procedure > Interactive test procedure for playback**.

If this is the first time you run the interactive test procedure, an empty product configuration questionnaire appears. If you have run the procedure before, you may need to clear the settings by clicking **Settings** , and then **New session**.

3. Fill in the product configuration questionnaire.

To obtain the list of relevant test cases for your system, you must answer some questions regarding system capabilities. The questionnaire may have multiple pages. In a completed questionnaire, every required question must have a  sign.

As you fill in the questionnaire, certain questions and answers automatically become inactive, because they are incompatible with the feature you are selecting.

If you wish to send a question or comment to the Dolby team, you can use the **Add a comment** function.

4. Click **Next** when you have completed each page, then click **Done** when you have completed the entire questionnaire.

A test-case list is generated and appears in a new page with the required and recommended tests for your system. You must complete all required tests listed for your system capabilities.

5. **Optional:** Sort, filter, and save the test-case list for better orientation and for future reference:

- You can show or hide columns using the check boxes on the side panel (for example, **Approach** or **Standard**). By default, the list shows **Test Case**, **Purpose**, **Test Case Type**, **Online Delivery Format**, **Video Codec**, **Frame Rate**, and **Status**.
- You can sort the list by clicking the column headers.
- You can apply filtering criteria on a relevant column in the list using the filtering check boxes on the side panel.
- You can save or load a session under **Settings > Session management**. The settings you filled in for your system are saved in a .json log file.

6. For each test case:

- a. Click the test case in the list, and read the test-case description and procedure.
- b. Create playlist and play the streams listed in the **Test Signal** section by using the playback product under test.
- c. Follow the step-by-step instructions on the page to complete the tests.
- d. Compare the test results with the expected results shown on the page, and select **Pass** or **Fail**.
- e. To go to the next test case in the list, click **Next**.

If you want to see the entire list again and check the tests' status, click **Up one level** or **Tests Overview**.

A **Test suite progress** of 100 percent indicates that you have completed all of the required tests.

7. Save the printable versions of the questionnaire and test cases under **Settings > Print versions**.

Click **All** to generate an .html file that contains the completed questionnaire and the test-case list together with test results.

4

Test applications

Use applications capable of playing back Dolby Digital Plus bitstreams for testing, such as ExoPlayer and Shaka Player.

Instructions for running tests with ExoPlayer and Shaka Player are provided. You can also run tests on HLS streams using hls.js or on DASH streams using dash.js. The hls.js demo player is available at <https://hlsjs.video-dev.org/demo/>, and the dash.js demo player is available at <https://reference.dashif.org/dash.js/nightly/samples/dash-if-reference-player/index.html>.

- [ExoPlayer](#)
- [Shaka Player](#)
- [DRM licensing information](#)

4.1 ExoPlayer

ExoPlayer is used to test the playback of Dolby Digital Plus content on an Android device.

These items are required for running tests with ExoPlayer:

- Your product under test, an Android device
- A testing PC
- A USB cable for connecting the Android device to the PC

4.1.1 Building and running ExoPlayer for testing

Apply a Dolby patch, build, and run ExoPlayer for testing.

Prerequisites

Android Studio is installed on your testing PC. For information about Android Studio, see <https://developer.android.com/studio>.

Procedure

1. Download the source code of ExoPlayer from <https://github.com/androidx/media>.
2. Open the ExoPlayer project in Android Studio.
3. Create application playlists to include the testing manifest files.

For example, include manifest files for unencrypted content.

```
{
  "name": "HD (MP4, AAC, DDP, H264)",
  "uri": "https://ott.dolby.com/manifest/path/DASH/OnDemand/MPD/test.mpd"
},
{
  "name": "Apple master playlist (fMP4)",
  "uri": "https://ott.dolby.com/manifest/path/Manifest_fMP4/master.m3u8"
}
```

Include a manifest file for Widevine content.

```
{
  "name": "HD (cenc)",
  "uri": "https://storage.googleapis.com/wvmedia/cenc/tears/tears.mpd",
  "drm_scheme": "widevine",
  "drm_license_uri": "https://widevine-dash.ezdrm.com/proxy?pX=E8A6EE"
}
```

Testing manifest files are available at [Multiplexed streams](#).

4. Connect your device to the testing PC using the USB cable.
5. In Android Studio, build and run ExoPlayer on your device.

For more information, see the section regarding building and running your app in the Android Studio user's guide at <https://developer.android.com/studio/intro>.

6. Select and play test signals on your device.

4.2 Shaka Player

Shaka Player is a web-based video player that can be opened in any supported web browser. Use Shaka Player to verify that a web browser that supports HTML5 or a Chromecast device is able to play back Dolby Digital Plus bitstreams.

When playing back a test signal in a web browser that does not support Dolby Digital Plus correctly, the video plays properly but the audio is muted.

For instructions on how to build and configure Shaka player, see <https://shaka-project.github.io/shaka-player/docs/api/tutorial-welcome.html>.

4.2.1 Testing a web browser

Use the Shaka Player that you have built or the Shaka demo player to test a web browser.

About this task

You can find the Shaka demo player at

<https://shaka-player-demo.appspot.com/demo/#build=uncompiled>.

Testing manifest files are available at [Multiplexed streams](#).

Procedure

1. Launch the web browser under test, and enter the URL of your Shaka Player.
2. Create a playlist, and enter the required information according to the content type.
For DRM content, see the URLs listed in [DRM licensing information](#) on page 17.
3. Play the test signals.

4.2.2 Testing a Chromecast device

Connect the Chromecast device to a TV, and use Shaka Player to test the device.

About this task

We recommend using a PC or Mac for running the test. You may need to upgrade the Chrome web browser to the latest version to have the cast capability.

Procedure

1. Connect the Chromecast device to a TV.
For detailed information, see <https://store.google.com>. Make sure that the Chromecast device and your testing PC is in the same LAN network. We recommend using cable connections to the same router.
2. Open the Chrome web browser on the PC, and enter the URL of your Shaka Player.
>
3. Mirror the content from the PC to the TV.
 - a. To mirror the content, you can either click the cast icon , available on the upper-right corner of the Chrome web browser, or click the **Start App** button on the lower-right corner of the test application UI.
 - b. To stop mirroring, click the cast icon  again or the **Stop App** button.
4. Create a playlist, and enter the required information according to the content type.
For DRM content, see the URLs listed in [DRM licensing information](#) on page 17.
5. Play the test signals.

4.3 DRM licensing information

License server and certificate URLs required for testing DRM content across different player platforms.

Content type	Custom license server URL	Custom license certificate URL
Google Widevine	https://widevine-dash.ezdrm.com/proxy?pX=E8A6EE	N/A
Microsoft PlayReady	https://playready.ezdrm.com/cency/preauth.aspx?pX=DCB4DB	N/A
Apple FairPlay	For content-specific information, see Multiplexed streams .	https://ott.dolby.com/OnDelKits/fairplay.cer

Glossary

HDMI

High-Definition Multimedia Interface. A high-speed, high-capacity format for transferring digital information and the specific hardware interface for the format.



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