UHD World Association
世界超高清视频产业联盟

High Dynamic Range Video Technology Part 3-3: Technical Requirement and Test Method - Player Device

（V1.1）

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Contents

High Dynamic Range (HDR) video technology Part 3-3: Technical requirements and testing methods for playback devices

1 Scope

This document stipulates technical requirements for HDR adaptation and processing of player devices or systems (hereinafter referred to as "player devices") that support HDR Vivid standard, and methods for testing processing performance.

It applies to player devices that support HDR Vivid adaptation technologies and send a signal to an external display via an output port.

2 Normative References

The following documents are indispensable for the application of this technical specification due to normative references. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

SJ/T 11324 Terminology for Digital Television Display Equipment GY/T 307-2017 Ultra High Definition Television System Program Production and Exchange Parameter Values

GY/T 307-2017 Parameter values for ultra-high definition television systems for programme production and exchange

GY/T 315-2018 High Dynamic Range Television Program Production and Exchange Image Parameter Values

T/UWA 005.1 High Dynamic Range (HDR) Video Technology Part 1: Metadata and Adaptation

T/UWA 005.2-1 High Dynamic Range (HDR) Video Technology Part 2-1: Application Guide System Integration

ISO/CIE 11664-6:2014 Colorimetric methods Part 6: CIEDE2000 color difference formula

3 Terms and Definitions

For the purpose of this document, the terms and definitions below and those provided in SJ/T 11324 apply.

3.1 HDR Vivid

An HDR technical standard provided in T/UWA 005.1. It is the generic term for derivative technologies of the same.

3.2 HDR Vivid Playback Device

A device that decodes video, processes metadata and images in accordance with T/UWA 005.1, and exports the result through a digital visual interface.

3.3 HDR Vivid Display Devices

A device that processes metadata and images in accordance with T/UWA 005.1 and displays the images.

3.4 Statistics Mode

The mode where the dynamic metadata only includes statistics.

3.5 Curve Parameter Mode

The mode where the dynamic metadata includes base curve parameters, refined curve parameters, reference brightness, and cubic spline adjustment, in addition to statistics.

3.6 PQ (Perceived Quantization) Curve

A new gamma curve based on human perception. According to its creator, ambient light is converted into display light used for display. The reference standards are SMPTE ST 2084 or ITU-R BT.2100.

4 Abbreviation

For the purpose of this document, the abbreviations below apply.

EOTF Electro Optical Transfer Function
HDR High Dynamic Range
HLG Hybrid Log-Gamma
OETF Opto-Electrical Transfer Function
PQ Perceptual Quantizer

5 Technical Requirements

5.1 Interface

The player device must have at least one of video stream input interface, video file input interface, or video media interface.

5.2 Support Signal Formats

The player device must support at least signal formats specified in Table 1.

Table 1 Support signal format requirements

No.	Format	Unit	Technical Requirement
1	Resolution	Pixel	3840×2160/7680×4320
2	Frame rate	Hz	50
3	Scanning mode	-	Progressive
4	Quantization accuracy	Bit	10
5	Color gamut	-	Support 3.3 of GY/T 307-2017
6	Transfer functions	-	Support 4.4 of GY/T 315-2018
7	Metadata	-	Support T/UWA 005.1

5.3 Function and Performance Level Requirements

HDR Vivid player devices are classified into three profiles, based on the functions and performance of the player devices. From lowest to highest, the profiles are: compatible, basic and standard. Basic Profile devices shall meet all requirements for compatible profile devices, and standard profile devices shall meet all requirements for Basic Profile devices.

5.3.1 Technical Requirements For Compatible Profile

See Table 2 for details on the technical requirements for compatible profile.

Table 2 Technical Requirements for Compatible Profile

grade	Functional requirements	technical requirement
Compatible Profile	Compatibility requirements on input format	The player device is compatible with HEVC or AVS2 or AVS3, and support HDR Vivid dynamic metadata stream decoding and playback. 1) When playing video streams with HDR Vivid dynamic metadata, the image output by the player device remains normal. 2) When switching between video streams with HDR Vivid dynamic metadata and HDR video content that is not of HDR Vivid format, the image output by the player device remains stable, and there are no obvious abnormalities such as flickering or black screen.

5.3.2 Technical Requirements For Basic Profile

See Table 3 for details on the technical requirements for Basic Profile.

Table 3 Technical Requirements for Basic Profile

grade	Functional requirements	technical requirement
Basic Profile	Input format compatibility requirements	Same as compatibility level requirements
	Basic output format requirements	The player device supports SDR Adaptation Mode, i.e. it meets the following requirements. 1) The device correctly decodes and processes video images and dynamic metadata; and the video image matches the dynamic metadata frame by frame. 2) The output signal is SDR compliant.
		The player device supports HDR10 Optimization Mode and meets the following requirements. 1) The device correctly decodes and processes video images and dynamic metadata; and the video image matches the dynamic metadata frame by frame. 2) The output signal is HDR10 compliant.
	Basic output control requirements	When the input signal of the playback device is HDR Vivid video signal, in addition to automatically setting the output format, the playback device should also provide user interface menu options for manually setting the output signal format and parameters. 1) The following three output formats should be supported: HDR10 optimization mode, SDR adaptation mode, and automatic mode (automatic mode output refers to automatically matching the best output mode based on negotiation with the display device).

		2) When adapting to SDR mode, the maximum display brightness of the adaptive display should provide the following four levels of values for selection and setting: the default maximum display brightness is 100 nits, and support for 200 nits, 300 nits, and 400 nits can be selected. The minimum display brightness is 0.1 nits. The output color gamut of SDR adaptation mode is BT.709, and the transmission curve is Gamma2.2. 3) When in HDR10 optimization mode, the maximum display brightness for the adaptive display should provide the following four levels of values for selection: the default maximum display brightness is 1000 nits, and support for 500 nits, 800 nits, and 1200 nits can be selected. The minimum display brightness is 0.05 nits. The HDR10 optimization mode outputs a color gamut of BT.2020 and a transmission curve of PQ. 4) Manually setting the output mode of the tested playback device will not cause severe distortion or abnormalities in the display screen.
	Processing precision requirements	The CIE DE2000 between output signals in HDR10 Optimization or SDR Adaptation and the reference value in HDR Vivid standard processing shall not exceed 5.

5.3.3 Technical requirements for Standard Profile

See Table 4 for details on the technical requirements for standard profile.

Table 4 Technical Requirements for Standard Profile

grade	Functional Requirement	Technical Requirements
Standard Profile	Input format compatibility requirements	Same as compatibility level requirements
	Standard output format requirements	Support SDR adaptation mode and require the same Baseline level requirements
		Support HDR10 optimization mode and require the same Baseline level requirements
		Supports HDR Vivid receiver mode and meets the following requirements: 1) Correctly decode and transmit video images and dynamic metadata. 2) The output image content should match the dynamic metadata frame by frame. 3) The output signal contains correct dynamic metadata in accordance with the format specified in Table 15 of Section 11.3.3.1 of T/UWA 005.2-1 specification, and the content is consistent with the corresponding metadata content in the

		signal source.
		Supports HDR Vivid monitor mode and meets the following requirements: 1) Correctly decode and process video images and dynamic metadata, and match image content and dynamic metadata frame by frame. 2) The output signal contains correct static metadata, and the format and content comply with the provisions of Table 14 in Section 11.3.2.1 of T/UWA 005.2-1 specification.
	Standard output control requirements	In the user interface menu options, user interface menu options should also be provided for manually setting the format and parameters of the output signal. 1) The following 5 output formats should be supported: HDR10 optimization mode, SDR adaptation mode, HDR Vivid receiver mode, HDR Vivid monitor mode, and automatic mode (automatic mode output refers to automatically matching the best output mode based on negotiation with the display device). 2) When in HDR Vivid monitor mode, the maximum display brightness that is compatible with the display should provide the following four levels of values for selection: the default maximum display brightness is 1000 nits, and support for 500 nits, 800 nits, and 1200 nits can be selected. The minimum display brightness is 0.05 nits.
	Processing accuracy requirements	The CIE DE2000 between the output signals of the player device in HDR Vivid Receiver, HDR Vivid Monitor, SDR Adaptation or HDR10 Optimization Mode and the reference value in HDR Vivid standard processing shall not exceed 5.

During CIE $L^*a^*b^*$ color space conversion, use the following parameters.

1)If the output signal of device under test is in SDR Adaptation Mode, 100% luminance of the output signal is the output peak brightness set in test, such as 100/200/300/400 nits.

2)If the output signal of device under test is in HDR Vivid Receiver Mode, and if the transmission curve of output signal is an HLG curve, 100% luminance of the output signal is 1,000 nits.

3)If the output signal of device under test is in HDR Vivid Monitor or HDR10 Optimization Mode, and if the transmission curve of output signal is a PQ curve, luminance is determined by the absolute luminance mapped to the PQ curve in BT.2100.

To calculate CIE DE2000, use the following parameters: $k_L=1$, $k_C=1$, $k_H=1$.

6 Test Conditions

6.1 Environment

6.1.1 Atmospheric Conditions

The player device must be tested under atmospheric conditions that meet the standard specified below.

—— Temperature: 15°C to 35°C, preferably 20°C
—— Relative humidity: 25% to 75%
—— Atmospheric pressure: 86 kPa to 106 kPa

6.1.2 Power Supply

The device must be tested under the rated supply voltage, and fluctuation of the supply voltage during the test shall not exceed ±2%. When using an AC mains power supply, fluctuation of the power supply frequency shall not exceed ±2%.

6.1.3 Warming-up

To ensure stable device performance, the player device is turned on before the test starts, and given 15 minutes to warm up, with the settings at the default values.

6.2 Test Signal

The test signal should meet the requirements specified in section 5.2 and 5.3.

6.3 Testing Instruments

6.3.1 Digital Visual Interface Analyzer

The digital visual interface analyzer is used for the following:
1) Editing the EDID information in accordance with the test requirements.
2) Displaying images in real time.
3) Receiving and recording digital visual interface data.

6.3.2 Display Device

Display devices include SDR and HDR devices, and HDR Vivid devices that support Receiver Mode.

6.4 Test Signal Input Interface

The test signal is sent to the player device as a video file or video stream.

6.5 Adjustment of Working Status

6.5.1 Initialize the Status

Reset the player device settings to factory setting. If a reset is not possible, manually set the parameters to their standard configuration, and set other menus the same as the original settings when the device is powered on.

6.5.2 Adjustment Of Testing Work Status

Put the device in HDR Vivid mode.

6.5.3 Basic Format Of Output Signal

—— Resolution: 4K playback device should be 3840x2160, 8K playback device should be 7680x4320
—— Frame rate: 50,
—— Quantization precision:10 bits,
—— Chroma downsampling: YCbCr420.

6.6 Position Of Test Instruments

The player device receives and processes HDR Vivid test videos, and then outputs the videos to the HDR Vivid display device or digital visual interface analyzer through the digital visual interface. The HDR Vivid display device is used for partial functional testing. The digital visual interface analyzer is used to capture the output image and related metadata of the player device.

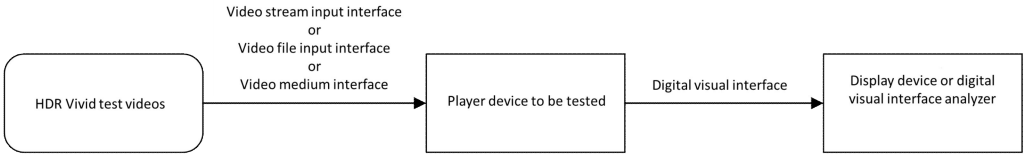


Figure 1: Networking Diagram of the Test Instruments

7 Compatible Profile Test Methods

7.1 Decoding Test of HDR Vivid Format

7.1.1 Overview

The purpose of this test item is to ascertain whether the player device is capable of decoding and playing HDR Vivid video content.
Test signal input interface: Video stream input interface or file input interface.

7.1.2 Test Conditions

Test signal: Test signal #1 in Table B.1 of Appendix B (i.e. 4 test signals from 1-1 to 1-4 in Table B.1).
Output signal: Set to the format specified in Section 6.5.3 The mode is selected automatically by the player device.

7.1.3 Test Procedure

The test procedure is as follows:
a) Adjust the player device as specified in 6.5, and connect it to the SDR and HDR display devices respectively.
b) Input test signals through interfaces specified in 5.1.
c) If the output signals from the player device are normal on the display devices and there is no obvious abnormality such as black screen or flickering, the player device is deemed to have passed the test.

7.1.4 Result

The two possible test results are Compatible with HDR Vivid Signal and Not Compatible with HDR Vivid Signal.

7.2 Multi-format HDR Content Switchover Test

7.2.1 Overview

The purpose of this test item is to test the visual effect when switching from PQ-HDR and HLG-HDR video content to HDR Vivid video content.
Test signal input interface: Video stream input interface or file input interface

7.2.2 Test Conditions

Test signal: Test signal #2 in Table B.1 of Appendix B

Output signal: Set to the format specified in Section 6.5.3. The mode is automatically selected by the player device.

7.2.3 Test Procedure

The test procedure is as follows:
a) Adjust the player device as specified in 6.5, and connect it to the HDR display device.
b) Input test signals through interfaces specified in 5.1.
c) If the player device is able to play the test signal and images are stable on the HDR display device without obvious abnormalities such as black screen and flickering throughout the entire testing process, the device passes the test.

7.2.4 Result

The two possible test results are Pass and Fail.

8 Basic Profile Test Methods

8.1 Input Format Compatibility Test

According to the requirements of 7.1 and 7.2, if the test is conducted and passed, it is considered that the tested playback device has passed the Baseline level input format compatibility test. Otherwise, it is considered that the tested playback device has not passed the Baseline level input format compatibility test.

8.2 SDR Adaptation Mode Test

8.2.1 Overview

The purpose of this test item is to ascertain whether the player device parses and processes HDR Vivid dynamic metadata according to T/UWA 005.1, and is capable of SDR Adaptation Mode.
HDR Vivid uses dynamic metadata, which can change in every frame. On the player device to be tested, ensure that the dynamic metadata of each frame is used accurately.
Use a video of natural scenery (test signal #1-1 in Table B.1) to view the image effect on the corresponding display device according to the maximum luminance set.

8.2.2 Test Conditions

Test signal: Test signal #1-1, #3, and #4 in Table B.1 of Appendix B.
Output signal: Set to the format specified in Section 6.5.3.

8.2.3 Test Procedure

The test procedure is as follows:
a) Adjust the player device as specified in 6.5, and connect it to the SDR display device.
b) Set the player to SDR mode and set the maximum luminance to 400 nits.
c) Input test signals #1-1 through the interfaces specified in 5.1 in turn, and visually check whether there is obvious abnormality on the screen.
d) If there is no obvious abnormality on the display screen, repeat step c) with the maximum luminance of the device set to 300 nits, then 200 nits, and finally 100 nits. If the screen displays normally under the above four maximum display brightness levels, the player device passes the SDR adaptation mode function test. Otherwise, the player device is deemed to have failed the SDR adaptation mode function test.

e) Set the maximum luminance of the player device to be tested to 100 nits, and input test signals #3 and #4 in turn through the interfaces specified in 5.1.
f) If the window luminance at the center of the display screen is stable without visible flickering, the player device passes the SDR Adaptation Mode function test.

8.2.4 Result Representation

The two possible test results are Pass and Fail.

8.3 HDR10 Optimization Mode Test

8.3.1 Overview

The purpose of this test item is to ascertain whether the player device implements HDR Vivid dynamic metadata parsing and processing according to T/UWA 005.1 and supports HDR10 Optimization Mode output.
HDR Vivid uses dynamic metadata, which can change in every frame. On the player device to be tested, ensure that the dynamic metadata of each frame is used accurately.
Use a video of natural scenery and test signal for synchronization test to view the image effect on the corresponding display device according to the maximum luminance set.

8.3.2 Test Conditions

Test signal: Test signal #1-1, #3, and #4 in Table B.1 of Appendix B.
Output signal: Set to the format specified in Section 6.5.3.

8.3.3 Test Procedure

The test procedure is as follows:
a) Adjust the player device as specified in 6.5, and connect it to the HDR display device.
b) Enable the HDR10 Optimization Mode of the player device, connect it to the digital visual interface analyzer, and set the maximum luminance to 1200 nits.
c) Input test signal #1-1 through the interface specified in 5.1, and visually check whether there is obvious abnormality on the screen.
d) If there is no obvious abnormality on the display screen, repeat step c) with the maximum luminance of the device set to 1000 nits, then 800 nits, and finally 500 nits. If the screen displays normally under the above four maximum display brightness levels, the player device passes HDR10 optimization mode function test. Otherwise, the player device is deemed to have failed the HDR10 optimization mode test.
e) Set the maximum luminance of the player device to 500 nits, and input test signals #3 and #4 in turn through the interfaces specified in 5.1.
f) If the window luminance at the center of the display screen is stable without visible flickering, the player device is deemed to have passed the HDR10 Optimization Mode test.

8.3.4 Result Representation

The two possible test results are Pass and Fail.

8.4 Processing Precision Test

8.4.1 Overview

The purpose of this test item is to ascertain whether the player device correctly processes HDR Vivid signals in HDR10 Optimization and SDR Adaptation modes in the Basic Profile.

8.4.2 Test Conditions

Test signal: Test signal #5 to #17 in Table B.1 of Appendix B.
Output signal: Set to the format specified in Section 6.5.3.

8.4.3 Test Procedure for SDR Adaptation Mode

The test procedure is as follows:
a) Adjust the player device as specified in 6.5 and set it to SDR mode. Connect the device to the digital visual interface analyzer and set the maximum luminance to 100 nits.
b) Input test signal #5 to the player device, capture a frame using the digital visual interface analyzer, and read the YCbCr code values PCV1 to PCV741 in the center of each test color block in sequence.
c) Separately calculate the DE2000 mean errors PDE1 to PDE741 between PCV1 to PCV741 and the corresponding reference data PR1 to PR741. If PDEs 1 through 741 meet the processing precision requirements specified in section 5.3.3, the device is deemed to have passed the SDR mode processing precision test for test signal #5.
d) Repeat steps b) and c) using test signal #6 to #10 in sequence, and record the test results each time.
e) Input test signal #11 to the player device, capture a frame using the digital visual interface analyzer, and read the YCbCr code values HCV1 to HCV740 in the center of each test color block in sequence.
f) Separately calculate the DE2000 mean errors HDE1 to HDE740 between HCV1 to HCV740 and the corresponding reference data HR1 to HR740. If HDEs 1 through 740 meet the processing precision requirements specified in section 5.3.3, the device is deemed to have passed the SDR mode processing precision test for test signal #11.
g) Repeat steps e) to f) using test signals #12 to #17 in sequence, and record the test results each time.
h) If the device passes the SDR mode processing precision tests for all the above-mentioned test signals, the device is deemed to have passed the overall processing precision test.

8.4.4 HDR10 Optimization Mode Processing Accuracy Testing Steps

The test procedure is as follows:
a) Adjust the player device as specified in section 6.5, set the device to HDR mode, connect the digital interface analyzer, and set the maximum display brightness to 500 nits.
b) Input test signal #5 to the player device, capture a frame of image and corresponding static HDR metadata packet by using the digital interface analyzer, and read YCbCr elementary values PCV1 to PCV741 in the central area of each test color block in turn.
c) If the signal transmission characteristic of the received static HDR metadata packet is a PQ curve, continue with step d) check the accuracy of the image data. If it is not a PQ curve, the player device is deemed to have failed the HDR10 optimization mode processing precision test, and the test is terminated.
d) Calculate the DE2000 mean errors PDE1 to PDE741 between PCV1 to PCV741 and the corresponding reference data PR1 to PR741, respectively. If PDE1 to PDE741 all meet the processing precision requirements specified in section 5.3.3 of this specification, the HDR display device adaptation mode of the player device is deemed to have passed the test on the processing precision of test signal #5. If any of the PDEs do not meet the specified requirements, the HDR display device adaptation mode of the player device is deemed to have failed the test.
e) Repeat steps b) to d) using test signal #6 to #10 in sequence, and record whether the test results for the corresponding scenarios pass.

f) Input test signal #12 to the device, capture a frame using the digital interface analyzer, and read the YCbCr elementary values HCV1 to HCV740 in the center of each test color block in sequence.
g) Calculate the DE2000 mean errors HDE1 to HDE740 between HCV1 to HCV740 and the corresponding reference data HR1 to HR740, respectively. If HDE1 to HDE740 all meet the processing precision requirements specified in section 5.3.3 of this specification, the HDR display device adaptation mode of the player device is deemed to have passed the processing precision test on the processing precision of test signal #12. If any of the HDEs do not meet the specified requirements, the HDR display device adaptation mode of the player device is deemed to have failed the test.
h) Repeat steps f) to g) using test signal #13 to #17 in sequence, and record whether the test results for the corresponding scenarios pass.
i) Upon passing the processing precision tests of all the test signals to be tested, the HDR display device adaptation mode of the player device is deemed to have passed the processing precision test.

8.4.5 Result

If the processing precision tests of the HDR10 optimization and SDR adaptation functions in this section are passed, the processing precision of the player device is deemed to have met the criteria of the Basic Profile of the HDR Vivid standard.
The two possible test results are Pass and Fail. If the processing precision of a player device meets the base profile criteria of the HDR Vivid standard it is deemed to have passed.

9 Standard Profile Test Method

9.1 Input Format Compatibility Test

According to the requirements of 7.1 and 7.2, if the test is conducted and passed, it is considered that the tested playback device has passed the standard level input format compatibility test. Otherwise, it is considered that the tested playback device has not passed the standard level input format compatibility test.

9.2 SDR Adaptation Mode Test

According to the requirements of 8.2, if the test is conducted and passed, it is considered that the tested playback device has passed the standard level SDR adaptation mode function test. Otherwise, it is considered that the tested playback device has not passed the standard level SDR adaptation mode function test.

9.3 HDR10 Optimization Mode Test

According to the requirements of 8.3, if the test is conducted and passed, it is considered that the tested playback device has passed the standard level HDR10 adaptation mode function test. Otherwise, it is considered that the tested playback device has not passed the standard level HDR10 adaptation mode function test.

9.4 HDR Vivid Receiver Mode Test

9.4.1 Overview

The purpose of this test item is to ascertain whether the player device can process video images and dynamic metadata in the receiver adaptation mode.

9.4.2 Test Conditions

Video test signals: Test signals#2, #3 and #4 (provided in Table B.1 in Appendix B).
Output signal: Set to the format specified in section 6.5.3.

9.4.3 Test Procedure

The test procedure is as follows:
a) Adjust the settings on the player device as specified in section 6.5, put the test playback device in the receiver adaptation mode, and connect an HDR Vivid display device with receiver adaptation mode function;
b) Input the test signal #2 in B.1 to the playback device under test through the input interface specified in 5.1;
c) Observe whether there is significant flickering on the HDR Vivid display device during the entire process of playing the test signal #2. If there is no obvious flicker, the tested playback device meets the requirements for multi format switching effect in the receiving end adaptation mode; Otherwise, the device under test does not meet the requirements for multi format switching effect, nor does it meet the requirements for receiver adaptation mode.
d) Input test signals #3 and #4 sequentially to the device under test, and visually check if the brightness of the window signal in the screen is stable; If the brightness of the signal in the center window of the display screen is stable and there is no obvious flicker, it is judged that the synchronization function test of the receiving end adaptation mode image and metadata information of the tested playback device has passed; Otherwise, it is determined that the adaptation mode function test of the receiving end of the tested playback device has not passed.
e) Set the test playback device to the receiving end adaptation mode, connect the digital interface analysis instrument, and then input the test signal #3 to the test playback device, and continuously capture the VS-EMDS packet of 6 frames of images; If the dynamic metadata information transmitted by each captured VS-EMDS packet is consistent with the dynamic metadata information content defined in Appendix Table A.3, and the dynamic metadata content matches the video frame (i.e. the dynamic metadata of Test Image 1 belongs to the same frame as the signal of Test Image 1, and the dynamic metadata of Test Image 2 belongs to the same frame as Test Image 2), then it is judged that the adaptation mode function test of the receiving end of the tested playback device has passed; Otherwise, it is determined that the adaptation mode function test of the receiving end of the tested playback device has not passed.

9.4.4 Result

The two possible test results are Pass and Fail.

9.5 HDR Vivid Monitor Mode Test

9.5.1 Overview

This section tests whether the playback device has the ability to process video images and dynamic metadata according to the monitor adaptation mode.

9.5.2 Test Conditions

Video test signals: Test signals # 3 and #4 in Table B.1 of Appendix B.
Output signal: Set to the format specified in section 6.5.3.

9.5.3 Test Procedure

The testing steps are as follows:

a) Adjust the test playback device to the testing working state specified in 6.5, set the test playback to monitor adaptation mode, connect the digital interface analysis instrument, and set the maximum display brightness to 500 nits;
b) Input test signals #3 and #4 sequentially to the device under test, capture one VS-IF packet for each test signal, and visually check whether the brightness of the window signal in the screen is stable; If the VS-IF packet of all test signals is completely consistent with the provisions of section 11.3.2.1 of TUWA005.2-1, and the signal brightness of the center window of the display screen is stable without obvious visible flickering, then it is judged that the monitor adaptation mode function test of the tested playback device has passed; Otherwise, it will be determined that the monitor adaptation mode function test of the tested playback device has failed.

9.5.4 Result

The two possible test results are Pass and Fail.

9.6 Processing Precision Test

9.6.1 Overview

This section tests whether the playback device accurately processes HDR Vivid signals in various adaptation modes (receiver adaptation mode, monitor adaptation mode, compatible with HDR display devices, compatible with SDR display devices, etc.).

9.6.2 Test Conditions

Test signals: This section uses test signals 13# numbered #5 to #17 in Table B.1 of Appendix B for testing.
Output signal: Set to the format specified in section 6.5.3.

9.6.3 Test Procedure

The testing steps are as follows:
a) Adjust the test playback device to the testing working state specified in 6.5, set the test playback device to the receiving end adaptation mode, and connect the digital interface analysis instrument.
b) Input the test signal 6# to the device to be tested, and use a digital interface analyzer to capture a frame, and sequentially read the YCbCr code values PCV1 to PCV741 in the center area of each test color block.
c) Calculate the DE2000 average error PDE1 to PDE741 between PCV1 to PCV741 and the corresponding reference data PR1 to PR741. When all PDE1 to PDE741 meet the processing accuracy requirements specified in section 5.3.3 of this specification, it is determined that the receiving end adaptation mode of the tested playback device has passed the processing accuracy test for test signal #6. Otherwise, it is determined that the receiving end adaptation mode of the tested playback device has failed the processing accuracy test for test signal #6.
d) Input the test signal #13 to the device under test, and use a digital interface analyzer to capture one frame, and sequentially read the YCbCr code values HCV1 to HCV740 in the center area of each test color block.
e) Calculate the DE2000 average error HDE1 to HDE740 between HCV1 to HCV740 and the corresponding reference data HR1 to HR740. When all HDE1 to HDE740 meet the processing accuracy requirements specified in section 5.3.3 of this specification, it is determined that the receiving end adaptation mode of the tested playback device has passed the processing accuracy test for test signal #13. Otherwise, it is determined that the receiving end adaptation mode of the tested playback device has failed the processing accuracy test for test signal #13.

f) When all the processing accuracy tests of the test signals mentioned above pass, the processing accuracy test of the tested playback device in the receiving end adaptation mode passes; Otherwise, the processing accuracy test of the tested playback device will not pass in the receiver adaptation mode.

9.6.4 Testing Steps For Processing Accuracy Of Monitor Adaptation Mode

The testing steps are as follows:

a) Adjust the test playback device to the testing working state specified in 6.5, set the test playback device to monitor adaptation mode, connect the digital interface analysis instrument, and set the maximum display brightness to 500 nits.

b) Input test signal #5 to the playback device under test, and sequentially read the YCbCr code values PCV1 to PCV741 in the center area of each test color block.

c) Calculate the DE2000 average error PDE1 to PDE741 between PCV1 to PCV741 and the corresponding reference data PR1 to PR741. When all PDE1 to PDE741 meet the processing accuracy requirements specified in section 5.3.3 of this specification, it is determined that the monitor adaptation mode of the tested playback device has passed the processing accuracy test for test signal #5. Otherwise, it is determined that the monitor adaptation mode of the tested playback device has failed the processing accuracy test for test signal #5.

d) Replace the input test signals #6 to #10 in sequence, repeat steps b) to c), and record whether the test results for the corresponding scenarios pass.

e) Input the test signal #12 to the device to be tested, capture a frame through a digital interface analyzer, and sequentially read the YCbCr code values HCV1 to HCV740 in the center area of each test color block.

f) Calculate the DE2000 average error HDE1 to HDE740 between HCV1 to HCV740 and the corresponding reference data HR1 to HR740. When all HDE1 to HDE740 meet the processing accuracy requirements specified in section 5.3.3 of this specification, it is determined that the monitor adaptation mode of the tested playback device has passed the processing accuracy test for test signal #12. Otherwise, it is determined that the monitor adaptation mode of the tested playback device has failed the processing accuracy test for test signal #12.

g) Replace the input test signals #13 to #17 in sequence, repeat steps e) to f), and record whether the test results for the corresponding scenarios pass.

h) When all the processing accuracy tests of the test signals mentioned above pass, the processing accuracy test of the tested playback device in monitor adaptation mode passes; Otherwise, the processing accuracy test of the tested playback device will not pass in the monitor adaptation mode.

9.6.5 HDR10 Optimization Mode Processing Accuracy Testing Steps

The testing steps are as follows:

a) Adjust the test playback device to the testing working state specified in 6.5, set the test playback device to HDR mode, connect the digital interface analysis instrument, and set the maximum display brightness to 500 nits.

b) Input the test signal #6 to the device under test, capture one frame of image and corresponding static HDR metadata packet through a digital interface analyzer, and sequentially read the YCbCr code values PCV1 to PCV741 in the center area of each test color block.

c) If the signal transmission characteristic of the static HDR metadata packet received is PQ curve, continue with step d) to check the accuracy of the image data; Otherwise, it will be determined that the compatibility HDR display device adaptation mode processing accuracy test of the tested playback device does not pass, and this test will be terminated.

d) Calculate the DE2000 average error PDE1 to PDE741 between PCV1 to PCV741 and the corresponding reference data PR1 to PR741. When all PDE1 to PDE741 meet the processing accuracy requirements specified in section 5.3.3 of this specification, it is determined that the HDR10 optimization mode of the tested playback device has passed the processing accuracy test for test signal #6. Otherwise, it is determined that the HDR10 optimization mode of the tested playback device has failed the processing accuracy test for test signal #6.
e) Input the test signal #13 to the device to be tested, capture a frame through a digital interface analyzer, and sequentially read the YCbCr code values HCV1 to HCV740 in the center area of each test color block.
f) Calculate the DE2000 average error HDE1 to HDE740 between HCV1 to HCV740 and the corresponding reference data HR1 to HR740. When all HDE1 to HDE740 meet the processing accuracy requirements specified in section 5.3.3 of this specification, it is determined that the HDR10 optimization mode of the tested playback device has passed the processing accuracy test for test signal #13. Otherwise, it is determined that the HDR10 optimization mode of the tested playback device has failed the processing accuracy test for test signal #13.
g) When all the processing accuracy tests of the test signals mentioned above pass, the processing accuracy test of the tested playback device in the HDR10 optimization mode passes; Otherwise, the processing accuracy test of the tested playback device will not pass in the HDR10 optimization mode.

9.6.6 SDR Adaptation Mode Processing Accuracy Testing Steps

The testing steps are as follows:
a) Adjust the test playback device to the testing working state specified in 6.5, set the test playback device to SDR mode, connect the digital interface analysis instrument, and set the maximum display brightness to 100 nits.
b) Input test signal #5 to the playback device under test, capture one frame of image through a digital interface analyzer, and sequentially read the YCbCr code values PCV1 to PCV741 in the center area of each test color block.
c) Calculate the DE2000 average error PDE1 to PDE741 between PCV1 to PCV741 and the corresponding reference data PR1 to PR741. When all PDE1 to PDE741 meet the processing accuracy requirements specified in section 5.3.3 of this specification, it is determined that the SDR adaptation mode of the tested playback device has passed the processing accuracy test for test signal #5. Otherwise, it is determined that the SDR adaptation mode of the tested playback device has failed the processing accuracy test for test signal #5.
d) Replace the input test signals #6 to #10 in sequence, repeat steps b) to c), and record whether the test results for the corresponding scenarios pass.
e) Input the 11th test signal to the device to be tested, capture a frame through a digital interface analyzer, and sequentially read the YCbCr code values HCV1 to HCV740 in the center area of each test color block.
f) Calculate the DE2000 average error HDE1 to HDE740 between HCV1 to HCV740 and the corresponding reference data HR1 to HR740. When all HDE1 to HDE740 meet the processing accuracy requirements specified in section 5.3.3 of this specification, it is determined that the SDR adaptation mode of the tested playback device has passed the processing accuracy test for test signal #11. Otherwise, it is determined that the SDR adaptation mode of the tested playback device has failed the processing accuracy test for test signal #11.
g) Replace the input test signals #12 to #17 in sequence, repeat steps e) to f), and record whether the test results for the corresponding scenarios pass.
h) When all the processing accuracy tests of the test signals mentioned above pass, the processing accuracy test of the tested playback device in the compatible SDR display device adaptation mode passes; Otherwise,

the processing accuracy test of the tested playback device will not pass in the compatible SDR display device adaptation mode.

9.6.7 Result

If all four modes ((Receiver, Monitor, HDR10 Optimization, and SDR Adaptation), the player device passes the processing precision tests, then it is deemed to have passed the HDR Vivid processing precision test.

If the device passes the test, it is deemed to meet the requirements of the standard profile of the HDR Vivid standard.

Appendix A
(Normative)
Dynamic Metadata Configuration Parameters

A.1 Configuration 1- Statistics Mode

The dynamic metadata contains only statistical information, which is used for testing the HDR Vivid processing accuracy of a player device. For specific parameters, see Appendix A.1 of T/UWA 005.3-1 *High Dynamic Range Video Technology Part 3-1 Technical Requirements and Test Methods – Display Device.*

A.2 Configuration 2- Curve Parameter Mode

The dynamic metadata contains curve parameter information (base curve parameters, refined curve parameters, reference luminance, and adjustment information of cubic spline), which are used for testing the HDR Vivid processing accuracy of a player device. For specific parameters, see Appendix A.2 of T/UWA 005.3-1 *High Dynamic Range Video Technology Part 3-1 Technical Requirements and Test Methods – Display Device.*

A.3 Configuration 3- Curve Parameters for Synchronization Test

The test signal used for metadata synchronization test is shown in Figure A 1. The stream is composed of two 10% window signals with different luminance, i.e. input image 1 and 2. By using different dynamic metadata, they can output windows with the same luminance. When the processing of dynamic metadata does not synchronize with that of the image, the window is displayed with unstable luminance, and there is visible flickering.

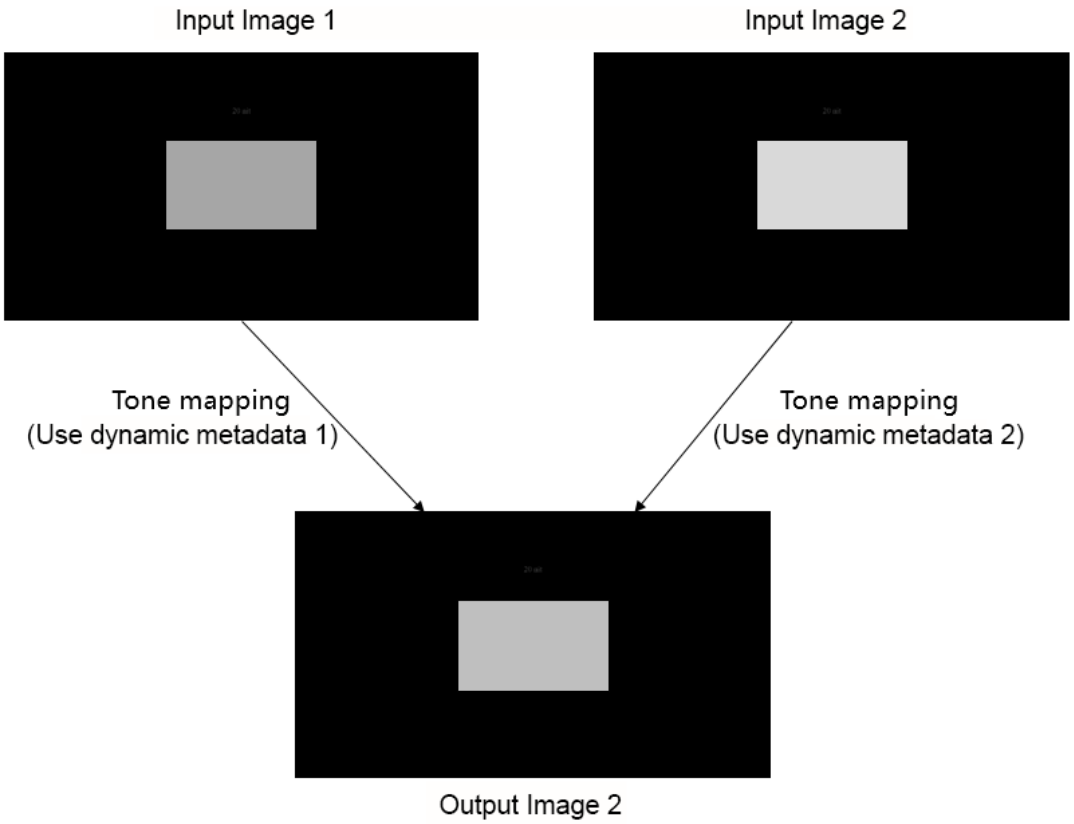


Figure A.1 Synchronization Test Signals

The video content of the metadata synchronization test of PQ curve is 10% window signal with the background luminance at 0 cd/m^2 (corresponding code value for the nonlinear narrow range PQ YCbCr signal is 64/512/512). The input value for each component of the window signal (10-bit BT.2020 color gamut) changes repeatedly according to the signals of test image 1 and test image 2 indicated in Table A 1.

Table A.1 Narrow Range PQ Curve Synchronization Test Signal

	PQ narrow range YCbCr code value		
Number [k]	y-signal	Cb signal	Cr signal
Test Image 1	649	512	512
Test Image 2	719	512	512

The video content of the metadata synchronization test of HLG curve is 10% window signal with the background luminance at 0 (corresponding code value for the nonlinear narrow range HLG YCbCr signal is 64/512/512). The input value for each component of the window signal (10-bit BT.2020 color gamut) changes repeatedly according to the signals of test image 1 and test image 2 indicated in Table A 2.

Table A.2 Synchronization Test Signal of Narrow Range HLG Curve

	HLG narrow range YCbCr code values		
Number [k]	y-signal	Cb signal	Cr signal
Test Image 1	836	512	512
Test Image 2	935	512	512

The dynamic metadata of the test signal contains curve parameter information (base curve parameters, reference luminance, refined curve parameters, and adjustment information of cubic spline), which are used to check the time synchronization between metadata and image content in HDR Vivid image processing of a player device. Relevant settings are listed in Table A 3.

Table A.3 Metadata Parameters for Synchronization Testing of Playback Devices

Static metadata	Test Image 1	Test Image 2
max_display_mastering_luminance	4000	4000
Dynamic Metadata	Test Image 1	Test Image 2
system_start_code	1	1
minimum_maxrgb_pq	0	0
average_maxrgb_pq	3046	3046
variance_maxrgb_pq	1535	1535
maximum_maxrgb_pq	4095	4095
tone_mapping_enable_mode	1	1
tone_mapping_param_enable_num	0	0
targeted_system_display_maximum_luminance_pq[0]	2770	2770
base_enable_flag[0]	1	1
base_param_m_p[0]	5734	5734
base_param_m_m[0]	24	24
base_param_m_a[0]	563	510
base_param_m_b[0]	0	0

Table A.3 (Continued)

Dynamic Metadata	Test Image 1	Test Image 2
base_param_m_n[0]	10	10
base_param_K1[0]	1	1
base_param_K2[0]	1	1
base_param_K3[0]	1	1
base_param_Delta_enable_mode[0]	0	0
base_param_enable_Delta[0]	0	0
3Spline_enable_flag[0]	1	1
3Spline_enable_num[0]	0	0
3Spline_TH_enable_mode[0][0]	0	0
3Spline_TH_enable_MB[0][0]	224	224
3Spline_TH_enable [0][0]	0	0
3Spline_TH_enable_Delta1[0][0]	511	511
3Spline_TH_enable_Delta2[0][0]	511	511
3Spline_enable_Strength[0][0]	127	127
targeted_system_display_maximum_luminance_pq[1]	2080	2080
base_enable_flag[1]	1	1
base_param_m_p[1]	5734	5734
base_param_m_m[1]	24	24
base_param_m_a[1]	563	510
base_param_m_b[1]	0	0
base_param_m_n[1]	10	10
base_param_K1[1]	1	1
base_param_K2[1]	1	1
base_param_K3[1]	1	1
base_param_Delta_enable_mode[1]	0	0
base_param_enable_Delta[1]	0	0
3Spline_enable_flag[1]	1	1
3Spline_enable_num[1]	0	0
3Spline_TH_enable_mode[0][1]	0	0
3Spline_TH_enable_MB[0][1]	224	224
3Spline_TH_enable[0][1]	0	0
3Spline_TH_enable_Delta1[0][1]	511	511
3Spline_TH_enable_Delta2[0][1]	511	511
3Spline_enable_Strength[0][1]	127	127
color_saturation_mapping_flag	1	1
color_saturation_num	2	2
color_saturation_gain[0]	38	38
color_saturation_gain[1]	25	25

Appendix B
(Normative)
Test Signals

B.1 Test Signals

The characteristics of the code stream used for testing are specified in Table B.1. Provide two complete test signals at resolutions of 3840x2160 and 7680x4320

Table B.1 Test Signal List

Serial Number	Signal name	Description	Screenshot of Stream Abbreviation
1-1	Subjective test signal #1	The first 45 seconds are natural scene video encoded with multiple PQs, and the last 45 seconds are the same natural scene video overlaid with BT.2100 PQ narrow signal in a 10% window. The dynamic metadata used for testing the stream includes HDR adaptation and SDR adaptation mapping curves.	
1-2	Subjective test signal #2	The first 45 seconds are natural scene video encoded with multiple PQs, and the last 45 seconds are the same natural scene video overlaid with BT.2100 PQ narrow signal in a 10% window. The dynamic metadata used for testing the stream only contains HDR Vivid statistical information.	ditto
1-3	Subjective test signal 3	The first 45 seconds are natural scene videos encoded by multiple HLGs, and the last 45 seconds are the same natural scene video with BT.2100 HLG narrow signal overlaid in a 10% window. The dynamic metadata used for testing the stream includes HDR adaptation and SDR adaptation mapping curves.	

Table B.1 (Continued)

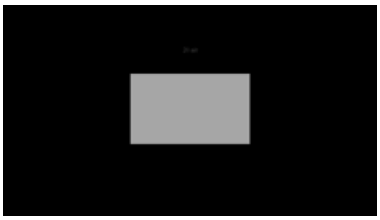
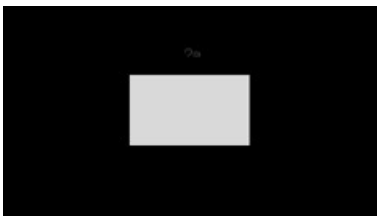
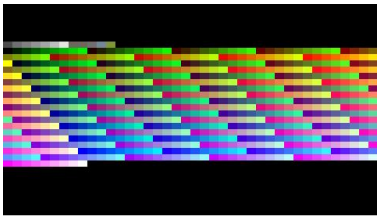
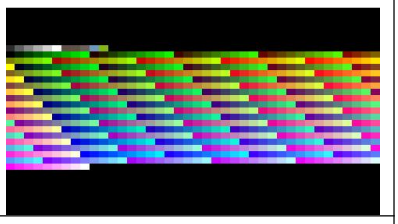
Serial Number	Signal name	Description	Screenshot of Stream Abbreviation
1-4	Subjective test signal 4	The first 45 seconds are natural scene videos encoded by multiple HLGs, and the last 45 seconds are the same natural scene video with BT.2100 HLG narrow signal overlaid in a 10% window. The dynamic metadata used for testing the stream only contains HDR Vivid statistical information.	ditto
2	Multi format switching test signal	Multiple formats such as HDR Vivid, PQ HDR BT2020, HLG BT2020 are integrated into the same stream file to achieve format switching effects.	
3	PQ synchronous test signal	PQ code Two level grayscale alternation (the code value of the grayscale signal is determined by Table A.1) Using the two sets of metadata in Table A.3	
4	HLG synchronous test signal	HLG encoding Two level grayscale alternation (the code value of the grayscale signal is determined by Table A.2) Using the two sets of metadata in Table A.3	
5	PQ scenario 1 dynamic metadata sequence	PQ code 741 grayscale and color test color cards in total Using scenario 1 metadata in A.1	
6	PQ scenario 2 dynamic metadata sequence	Using metadata from scenario 2 in A.1	ditto

Table B.1 (Continued)

Serial Number	Signal name	describe	Screenshot of Stream Abbreviation
7	PQ scenario 3 dynamic metadata sequence	Using metadata from scenario 3 in A.1	ditto
8	PQ scenario 4 dynamic metadata sequence	Using scenario 4 metadata in A.2	ditto
9	PQ Scenario 5 Dynamic Metadata Sequence	Using scenario 5 metadata in A.2	ditto
10	PQ scenario 6 dynamic metadata sequence	Using scenario 6 metadata in A.2	ditto
11	HLG static metadata sequence	HLG encoding 740 grayscale and color test color cards in total CTA861.3 Static metadata	
12	HLG Scenario 1 Dynamic Metadata Sequence	Using scenario 1 metadata in A.1	ditto
13	HLG Scenario 2 Dynamic Metadata Sequence	Using metadata from scenario 2 in A.1	ditto
14	HLG Scenario 3 Dynamic Metadata Sequence	Using metadata from scenario 3 in A.1	ditto
15	HLG Scenario 4 Dynamic Metadata Sequence	Using scenario 4 metadata in A.2	ditto
16	HLG Scenario 5 Dynamic Metadata Sequence	Using scenario 5 metadata in A.2	ditto
17	HLG Scenario 6 Dynamic Metadata Sequence	Using scenario 6 metadata in A.2	ditto

B.2 Code Value for Precision Test Signals

B. 2.1 PQ Test Signal

Numbers 5 to 10 in Table B.1 are PQ test signals. The PQ domain YCbCr code values of each color block in the test signal are shown in Table B.2.

Table B.2 HDR Vivid PQ Dynamic Metadata Test Code Values

Number [k]	TEST	PQ domain YCbCr code value (10 bit, BT.2020 color gamut, narrow range)		
		Y-signal	Cb signal	Cr signal
1	Grayscale 1	327	512	512
2	Grayscale 2	449	512	512
3	Grayscale 3	509	512	512
4	Grayscale 4	571	512	512
5	Grayscale 5	636	512	512
6	Grayscale 6	722	512	512
7	Grayscale 7	854	512	512
8	Skin tone 1	420	499	527
9	Skin color No.2	424	494	529
10	Skin color 3	451	505	519
11	Sky color	522	552	477
12	Plant color	542	361	488
13	Signal 13	64	512	512
14	Signal 14	138	472	461
15	Signal 15	212	431	409
16	Signal 16	287	391	358
17	Signal 17	361	351	306
18	Signal 18	435	310	255
19	Signal 19	509	270	203
20	Signal 20	584	229	152
21	Signal 21	658	189	100
22	Signal 22	93	496	568
23	Signal 23	167	456	517
24	Signal 24	241	416	465
25	Signal 25	315	375	414
26	Signal 26	390	335	362
27	Signal 27	464	295	311
28	Signal 28	538	254	259
29	Signal 29	612	214	208
30	Signal 30	687	173	156
31	Signal 31	122	481	624

32	Signal 32	196	440	573
33	Signal 33	270	400	521
34	Signal 34	344	360	470
35	Signal 35	418	319	418
36	Signal 36	493	279	367
37	Signal 37	567	239	315
38	Signal 38	641	198	264
39	Signal 39	715	158	212
40	Signal 40	150	465	680
41	Signal 41	225	425	629
42	Signal 42	299	384	577
43	Signal 43	373	344	526
44	Signal 44	447	304	474
45	Signal 45	522	263	423
46	Signal 46	596	223	371
47	Signal 47	670	183	320
48	Signal 48	744	142	268
49	Signal 49	179	449	736
50	Signal 50	253	409	685
51	Signal 51	328	369	633
52	Signal 52	402	328	582
53	Signal 53	476	288	530
54	Signal 54	550	248	479
55	Signal 55	625	207	427
56	Signal 56	699	167	376
57	Signal 57	773	127	324
58	Signal 58	208	434	792
59	Signal 59	282	393	741
60	Signal 60	356	353	689
61	Signal 61	431	313	638
62	Signal 62	505	272	586
63	Signal 63	579	232	535
64	Signal 64	653	192	483
65	Signal 65	728	151	432
66	Signal 66	802	111	380
67	Signal 67	237	418	848
68	Signal 68	311	378	797
69	Signal 69	385	337	745
70	Signal 70	459	297	694
71	Signal 71	534	257	642
72	Signal 72	608	216	591
73	Signal 73	682	176	539

74	Signal 74	756	136	488
75	Signal 75	831	95	436
76	Signal 76	265	403	904
77	Signal 77	340	362	853
78	Signal 78	414	322	801
79	Signal 79	488	281	750
80	Signal 80	562	241	698
81	Signal 81	637	201	647
82	Signal 82	711	160	595
83	Signal 83	785	120	544
84	Signal 84	859	80	492
85	Signal 85	294	387	960
86	Signal 86	368	347	909
87	Signal 87	443	306	857
88	Signal 88	517	266	806
89	Signal 89	591	225	754
90	Signal 90	665	185	703
91	Signal 91	740	145	651
92	Signal 92	814	104	600
93	Signal 93	888	64	548
94	Signal 94	70	568	507
95	Signal 95	145	528	456
96	Signal 96	219	487	405
97	Signal 97	293	447	353
98	Signal 98	367	407	302
99	Signal 99	442	366	250
100	Signal 100	516	326	199
101	Signal 101	590	285	147
102	Signal 102	664	245	96
103	Signal 103	99	552	563
104	Signal 104	174	512	512
105	Signal 105	248	472	461
106	Signal 106	322	431	409
107	Signal 107	396	391	358
108	Signal 108	470	351	306
109	Signal 109	545	310	255
110	Signal 110	619	270	203
111	Signal 111	693	229	152
112	Signal 112	128	537	619
113	Signal 113	202	496	568
114	Signal 114	277	456	517
115	Signal 115	351	416	465

116	Signal 116	425	375	414
117	Signal 117	499	335	362
118	Signal 118	573	295	311
119	Signal 119	648	254	259
120	Signal 120	722	214	208
121	Signal 121	157	521	675
122	Signal 122	231	481	624
123	Signal 123	305	440	573
124	Signal 124	380	400	521
125	Signal 125	454	360	470
126	Signal 126	528	319	418
127	Signal 127	602	279	367
128	Signal 128	676	239	315
129	Signal 129	751	198	264
130	Signal 130	186	505	731
131	Signal 131	260	465	680
132	Signal 132	334	425	629
133	Signal 133	408	384	577
134	Signal 134	483	344	526
135	Signal 135	557	304	474
136	Signal 136	631	263	423
137	Signal 137	705	223	371
138	Signal 138	779	183	320
139	Signal 139	214	490	787
140	Signal 140	289	449	736
141	Signal 141	363	409	685
142	Signal 142	437	369	633
143	Signal 143	511	328	582
144	Signal 144	586	288	530
145	Signal 145	660	248	479
146	Signal 146	734	207	427
147	Signal 147	808	167	376
148	Signal 148	243	474	843
149	Signal 149	317	434	792
150	Signal 150	392	393	741
151	Signal 151	466	353	689
152	Signal 152	540	313	638
153	Signal 153	614	272	586
154	Signal 154	689	232	535
155	Signal 155	763	192	483
156	Signal 156	837	151	432
157	Signal 157	272	459	899

158	Signal 158	346	418	848
159	Signal 159	420	378	797
160	Signal 160	495	337	745
161	Signal 161	569	297	694
162	Signal 162	643	257	642
163	Signal 163	717	216	591
164	Signal 164	792	176	539
165	Signal 165	866	136	488
166	Signal 166	301	443	955
167	Signal 167	375	403	904
168	Signal 168	449	362	853
169	Signal 169	523	322	801
170	Signal 170	598	281	750
171	Signal 171	672	241	698
172	Signal 172	746	201	647
173	Signal 173	820	160	595
174	Signal 174	895	120	544
175	Signal 175	77	624	503
176	Signal 176	151	584	451
177	Signal 177	225	543	400
178	Signal 178	300	503	349
179	Signal 179	374	463	297
180	Signal 180	448	422	246
181	Signal 181	522	382	194
182	Signal 182	597	341	143
183	Signal 183	671	301	91
184	Signal 184	106	608	559
185	Signal 185	180	568	507
186	Signal 186	254	528	456
187	Signal 187	328	487	405
188	Signal 188	403	447	353
189	Signal 189	477	407	302
190	Signal 190	551	366	250
191	Signal 191	625	326	199
192	Signal 192	700	285	147
193	Signal 193	135	593	615
194	Signal 194	209	552	563
195	Signal 195	283	512	512
196	Signal 196	357	472	461
197	Signal 197	431	431	409
198	Signal 198	506	391	358
199	Signal 199	580	351	306

200	Signal 200	654	310	255
201	Signal 201	728	270	203
202	Signal 202	163	577	671
203	Signal 203	238	537	619
204	Signal 204	312	496	568
205	Signal 205	386	456	517
206	Signal 206	460	416	465
207	Signal 207	534	375	414
208	Signal 208	609	335	362
209	Signal 209	683	295	311
210	Signal 210	757	254	259
211	Signal 211	192	561	727
212	Signal 212	266	521	675
213	Signal 213	341	481	624
214	Signal 214	415	440	573
215	Signal 215	489	400	521
216	Signal 216	563	360	470
217	Signal 217	637	319	418
218	Signal 218	712	279	367
219	Signal 219	786	239	315
220	Signal 220	221	546	783
221	Signal 221	295	505	731
222	Signal 222	369	465	680
223	Signal 223	444	425	629
224	Signal 224	518	384	577
225	Signal 225	592	344	526
226	Signal 226	666	304	474
227	Signal 227	741	263	423
228	Signal 228	815	223	371
229	Signal 229	250	530	839
230	Signal 230	324	490	787
231	Signal 231	398	449	736
232	Signal 232	472	409	685
233	Signal 233	547	369	633
234	Signal 234	621	328	582
235	Signal 235	695	288	530
236	Signal 236	769	248	479
237	Signal 237	844	207	427
238	Signal 238	278	515	895
239	Signal 239	353	474	843
240	Signal 240	427	434	792
241	Signal 241	501	393	741

242	Signal 242	575	353	689
243	Signal 243	650	313	638
244	Signal 244	724	272	586
245	Signal 245	798	232	535
246	Signal 246	872	192	483
247	Signal 247	307	499	951
248	Signal 248	381	459	899
249	Signal 249	456	418	848
250	Signal 250	530	378	797
251	Signal 251	604	337	745
252	Signal 252	678	297	694
253	Signal 253	753	257	642
254	Signal 254	827	216	591
255	Signal 255	901	176	539
256	Signal 256	83	680	498
257	Signal 257	158	640	447
258	Signal 258	232	599	395
259	Signal 259	306	559	344
260	Signal 260	380	519	293
261	Signal 261	455	478	241
262	Signal 262	529	438	190
263	Signal 263	603	397	138
264	Signal 264	677	357	87
265	Signal 265	112	664	554
266	Signal 266	186	624	503
267	Signal 267	261	584	451
268	Signal 268	335	543	400
269	Signal 269	409	503	349
270	Signal 270	483	463	297
271	Signal 271	558	422	246
272	Signal 272	632	382	194
273	Signal 273	706	341	143
274	Signal 274	141	649	610
275	Signal 275	215	608	559
276	Signal 276	289	568	507
277	Signal 277	364	528	456
278	Signal 278	438	487	405
279	Signal 279	512	447	353
280	Signal 280	586	407	302
281	Signal 281	661	366	250
282	Signal 282	735	326	199
283	Signal 283	170	633	666

284	Signal 284	244	593	615
285	Signal 285	318	552	563
286	Signal 286	393	512	512
287	Signal 287	467	472	461
288	Signal 288	541	431	409
289	Signal 289	615	391	358
290	Signal 290	689	351	306
291	Signal 291	764	310	255
292	Signal 292	199	617	722
293	Signal 293	273	577	671
294	Signal 294	347	537	619
295	Signal 295	421	496	568
296	Signal 296	496	456	517
297	Signal 297	570	416	465
298	Signal 298	644	375	414
299	Signal 299	718	335	362
300	Signal 300	792	295	311
301	Signal 301	227	602	778
302	Signal 302	302	561	727
303	Signal 303	376	521	675
304	Signal 304	450	481	624
305	Signal 305	524	440	573
306	Signal 306	599	400	521
307	Signal 307	673	360	470
308	Signal 308	747	319	418
309	Signal 309	821	279	367
310	Signal 310	256	586	834
311	Signal 311	330	546	783
312	Signal 312	405	505	731
313	Signal 313	479	465	680
314	Signal 314	553	425	629
315	Signal 315	627	384	577
316	Signal 316	702	344	526
317	Signal 317	776	304	474
318	Signal 318	850	263	423
319	Signal 319	285	571	890
320	Signal 320	359	530	839
321	Signal 321	433	490	787
322	Signal 322	508	449	736
323	Signal 323	582	409	685
324	Signal 324	656	369	633
325	Signal 325	730	328	582

326	Signal 326	805	288	530
327	Signal 327	879	248	479
328	Signal 328	314	555	946
329	Signal 329	388	515	895
330	Signal 330	462	474	843
331	Signal 331	536	434	792
332	Signal 332	611	393	741
333	Signal 333	685	353	689
334	Signal 334	759	313	638
335	Signal 335	833	272	586
336	Signal 336	908	232	535
337	Signal 337	90	736	494
338	Signal 338	164	696	442
339	Signal 339	238	655	391
340	Signal 340	313	615	339
341	Signal 341	387	575	288
342	Signal 342	461	534	237
343	Signal 343	535	494	185
344	Signal 344	610	453	134
345	Signal 345	684	413	82
346	Signal 346	119	720	550
347	Signal 347	193	680	498
348	Signal 348	267	640	447
349	Signal 349	341	599	395
350	Signal 350	416	559	344
351	Signal 351	490	519	293
352	Signal 352	564	478	241
353	Signal 353	638	438	190
354	Signal 354	713	397	138
355	Signal 355	148	705	606
356	Signal 356	222	664	554
357	Signal 357	296	624	503
358	Signal 358	370	584	451
359	Signal 359	444	543	400
360	Signal 360	519	503	349
361	Signal 361	593	463	297
362	Signal 362	667	422	246
363	Signal 363	741	382	194
364	Signal 364	176	689	662
365	Signal 365	251	649	610
366	Signal 366	325	608	559
367	Signal 367	399	568	507

368	Signal 368	473	528	456
369	Signal 369	547	487	405
370	Signal 370	622	447	353
371	Signal 371	696	407	302
372	Signal 372	770	366	250
373	Signal 373	205	673	718
374	Signal 374	279	633	666
375	Signal 375	354	593	615
376	Signal 376	428	552	563
377	Signal 377	502	512	512
378	Signal 378	576	472	461
379	Signal 379	650	431	409
380	Signal 380	725	391	358
381	Signal 381	799	351	306
382	Signal 382	234	658	774
383	Signal 383	308	617	722
384	Signal 384	382	577	671
385	Signal 385	457	537	619
386	Signal 386	531	496	568
387	Signal 387	605	456	517
388	Signal 388	679	416	465
389	Signal 389	753	375	414
390	Signal 390	828	335	362
391	Signal 391	263	642	830
392	Signal 392	337	602	778
393	Signal 393	411	561	727
394	Signal 394	485	521	675
395	Signal 395	560	481	624
396	Signal 396	634	440	573
397	Signal 397	708	400	521
398	Signal 398	782	360	470
399	Signal 399	856	319	418
400	Signal 400	291	627	886
401	Signal 401	366	586	834
402	Signal 402	440	546	783
403	Signal 403	514	505	731
404	Signal 404	588	465	680
405	Signal 405	663	425	629
406	Signal 406	737	384	577
407	Signal 407	811	344	526
408	Signal 408	885	304	474
409	Signal 409	320	611	942

410	Signal 410	394	571	890
411	Signal 411	469	530	839
412	Signal 412	543	490	787
413	Signal 413	617	449	736
414	Signal 414	691	409	685
415	Signal 415	766	369	633
416	Signal 416	840	328	582
417	Signal 417	914	288	530
418	Signal 418	96	792	489
419	Signal 419	171	752	438
420	Signal 420	245	711	386
421	Signal 421	319	671	335
422	Signal 422	393	631	283
423	Signal 423	468	590	232
424	Signal 424	542	550	181
425	Signal 425	616	509	129
426	Signal 426	690	469	78
427	Signal 427	125	776	545
428	Signal 428	199	736	494
429	Signal 429	274	696	442
430	Signal 430	348	655	391
431	Signal 431	422	615	339
432	Signal 432	496	575	288
433	Signal 433	571	534	237
434	Signal 434	645	494	185
435	Signal 435	719	453	134
436	Signal 436	154	761	601
437	Signal 437	228	720	550
438	Signal 438	302	680	498
439	Signal 439	377	640	447
440	Signal 440	451	599	395
441	Signal 441	525	559	344
442	Signal 442	599	519	293
443	Signal 443	674	478	241
444	Signal 444	748	438	190
445	Signal 445	183	745	657
446	Signal 446	257	705	606
447	Signal 447	331	664	554
448	Signal 448	405	624	503
449	Signal 449	480	584	451
450	Signal 450	554	543	400
451	Signal 451	628	503	349

452	Signal 452	702	463	297
453	Signal 453	777	422	246
454	Signal 454	212	729	713
455	Signal 455	286	689	662
456	Signal 456	360	649	610
457	Signal 457	434	608	559
458	Signal 458	508	568	507
459	Signal 459	583	528	456
460	Signal 460	657	487	405
461	Signal 461	731	447	353
462	Signal 462	805	407	302
463	Signal 463	240	714	769
464	Signal 464	315	673	718
465	Signal 465	389	633	666
466	Signal 466	463	593	615
467	Signal 467	537	552	563
468	Signal 468	612	512	512
469	Signal 469	686	472	461
470	Signal 470	760	431	409
471	Signal 471	834	391	358
472	Signal 472	269	698	825
473	Signal 473	343	658	774
474	Signal 474	418	617	722
475	Signal 475	492	577	671
476	Signal 476	566	537	619
477	Signal 477	640	496	568
478	Signal 478	715	456	517
479	Signal 479	789	416	465
480	Signal 480	863	375	414
481	Signal 481	298	683	881
482	Signal 482	372	642	830
483	Signal 483	446	602	778
484	Signal 484	521	561	727
485	Signal 485	595	521	675
486	Signal 486	669	481	624
487	Signal 487	743	440	573
488	Signal 488	818	400	521
489	Signal 489	892	360	470
490	Signal 490	327	667	937
491	Signal 491	401	627	886
492	Signal 492	475	586	834
493	Signal 493	549	546	783

494	Signal 494	624	505	731
495	Signal 495	698	465	680
496	Signal 496	772	425	629
497	Signal 497	846	384	577
498	Signal 498	921	344	526
499	Signal 499	103	848	485
500	Signal 500	177	808	433
501	Signal 501	251	767	382
502	Signal 502	326	727	330
503	Signal 503	400	687	279
504	Signal 504	474	646	227
505	Signal 505	548	606	176
506	Signal 506	623	565	125
507	Signal 507	697	525	73
508	Signal 508	132	832	541
509	Signal 509	206	792	489
510	Signal 510	280	752	438
511	Signal 511	354	711	386
512	Signal 512	429	671	335
513	Signal 513	503	631	283
514	Signal 514	577	590	232
515	Signal 515	651	550	181
516	Signal 516	726	509	129
517	Signal 517	160	817	597
518	Signal 518	235	776	545
519	Signal 519	309	736	494
520	Signal 520	383	696	442
521	Signal 521	457	655	391
522	Signal 522	532	615	339
523	Signal 523	606	575	288
524	Signal 524	680	534	237
525	Signal 525	754	494	185
526	Signal 526	189	801	653
527	Signal 527	263	761	601
528	Signal 528	338	720	550
529	Signal 529	412	680	498
530	Signal 530	486	640	447
531	Signal 531	560	599	395
532	Signal 532	635	559	344
533	Signal 533	709	519	293
534	Signal 534	783	478	241
535	Signal 535	218	785	709

536	Signal 536	292	745	657
537	Signal 537	367	705	606
538	Signal 538	441	664	554
539	Signal 539	515	624	503
540	Signal 540	589	584	451
541	Signal 541	663	543	400
542	Signal 542	738	503	349
543	Signal 543	812	463	297
544	Signal 544	247	770	765
545	Signal 545	321	729	713
546	Signal 546	395	689	662
547	Signal 547	470	649	610
548	Signal 548	544	608	559
549	Signal 549	618	568	507
550	Signal 550	692	528	456
551	Signal 551	766	487	405
552	Signal 552	841	447	353
553	Signal 553	276	754	821
554	Signal 554	350	714	769
555	Signal 555	424	673	718
556	Signal 556	498	633	666
557	Signal 557	573	593	615
558	Signal 558	647	552	563
559	Signal 559	721	512	512
560	Signal 560	795	472	461
561	Signal 561	869	431	409
562	Signal 562	304	739	877
563	Signal 563	379	698	825
564	Signal 564	453	658	774
565	Signal 565	527	617	722
566	Signal 566	601	577	671
567	Signal 567	676	537	619
568	Signal 568	750	496	568
569	Signal 569	824	456	517
570	Signal 570	898	416	465
571	Signal 571	333	723	933
572	Signal 572	407	683	881
573	Signal 573	482	642	830
574	Signal 574	556	602	778
575	Signal 575	630	561	727
576	Signal 576	704	521	675
577	Signal 577	779	481	624

578	Signal 578	853	440	573
579	Signal 579	927	400	521
580	Signal 580	109	904	480
581	Signal 581	184	864	429
582	Signal 582	258	823	377
583	Signal 583	332	783	326
584	Signal 584	406	743	274
585	Signal 585	481	702	223
586	Signal 586	555	662	171
587	Signal 587	629	621	120
588	Signal 588	703	581	69
589	Signal 589	138	888	536
590	Signal 590	212	848	485
591	Signal 591	287	808	433
592	Signal 592	361	767	382
593	Signal 593	435	727	330
594	Signal 594	509	687	279
595	Signal 595	584	646	227
596	Signal 596	658	606	176
597	Signal 597	732	565	125
598	Signal 598	167	873	592
599	Signal 599	241	832	541
600	Signal 600	315	792	489
601	Signal 601	390	752	438
602	Signal 602	464	711	386
603	Signal 603	538	671	335
604	Signal 604	612	631	283
605	Signal 605	687	590	232
606	Signal 606	761	550	181
607	Signal 607	196	857	648
608	Signal 608	270	817	597
609	Signal 609	344	776	545
610	Signal 610	418	736	494
611	Signal 611	493	696	442
612	Signal 612	567	655	391
613	Signal 613	641	615	339
614	Signal 614	715	575	288
615	Signal 615	790	534	237
616	Signal 616	225	841	704
617	Signal 617	299	801	653
618	Signal 618	373	761	601
619	Signal 619	447	720	550

620	Signal 620	521	680	498
621	Signal 621	596	640	447
622	Signal 622	670	599	395
623	Signal 623	744	559	344
624	Signal 624	818	519	293
625	Signal 625	253	826	760
626	Signal 626	328	785	709
627	Signal 627	402	745	657
628	Signal 628	476	705	606
629	Signal 629	550	664	554
630	Signal 630	624	624	503
631	Signal 631	699	584	451
632	Signal 632	773	543	400
633	Signal 633	847	503	349
634	Signal 634	282	810	816
635	Signal 635	356	770	765
636	Signal 636	431	729	713
637	Signal 637	505	689	662
638	Signal 638	579	649	610
639	Signal 639	653	608	559
640	Signal 640	727	568	507
641	Signal 641	802	528	456
642	Signal 642	876	487	405
643	Signal 643	311	795	872
644	Signal 644	385	754	821
645	Signal 645	459	714	769
646	Signal 646	534	673	718
647	Signal 647	608	633	666
648	Signal 648	682	593	615
649	Signal 649	756	552	563
650	Signal 650	831	512	512
651	Signal 651	905	472	461
652	Signal 652	340	779	928
653	Signal 653	414	739	877
654	Signal 654	488	698	825
655	Signal 655	562	658	774
656	Signal 656	637	617	722
657	Signal 657	711	577	671
658	Signal 658	785	537	619
659	Signal 659	859	496	568
660	Signal 660	934	456	517
661	Signal 661	116	960	476

662	Signal 662	190	920	424
663	Signal 663	264	879	373
664	Signal 664	339	839	321
665	Signal 665	413	799	270
666	Signal 666	487	758	218
667	Signal 667	561	718	167
668	Signal 668	636	677	115
669	Signal 669	710	637	64
670	Signal 670	145	944	532
671	Signal 671	219	904	480
672	Signal 672	293	864	429
673	Signal 673	367	823	377
674	Signal 674	442	783	326
675	Signal 675	516	743	274
676	Signal 676	590	702	223
677	Signal 677	664	662	171
678	Signal 678	739	621	120
679	Signal 679	173	929	588
680	Signal 680	248	888	536
681	Signal 681	322	848	485
682	Signal 682	396	808	433
683	Signal 683	470	767	382
684	Signal 684	545	727	330
685	Signal 685	619	687	279
686	Signal 686	693	646	227
687	Signal 687	767	606	176
688	Signal 688	202	913	644
689	Signal 689	276	873	592
690	Signal 690	351	832	541
691	Signal 691	425	792	489
692	Signal 692	499	752	438
693	Signal 693	573	711	386
694	Signal 694	648	671	335
695	Signal 695	722	631	283
696	Signal 696	796	590	232
697	Signal 697	231	897	700
698	Signal 698	305	857	648
699	Signal 699	379	817	597
700	Signal 700	454	776	545
701	Signal 701	528	736	494
702	Signal 702	602	696	442
703	Signal 703	676	655	391

704	Signal 704	751	615	339
705	Signal 705	825	575	288
706	Signal 706	260	882	756
707	Signal 707	334	841	704
708	Signal 708	408	801	653
709	Signal 709	482	761	601
710	Signal 710	557	720	550
711	Signal 711	631	680	498
712	Signal 712	705	640	447
713	Signal 713	779	599	395
714	Signal 714	854	559	344
715	Signal 715	289	866	812
716	Signal 716	363	826	760
717	Signal 717	437	785	709
718	Signal 718	511	745	657
719	Signal 719	586	705	606
720	Signal 720	660	664	554
721	Signal 721	734	624	503
722	Signal 722	808	584	451
723	Signal 723	882	543	400
724	Signal 724	317	851	868
725	Signal 725	392	810	816
726	Signal 726	466	770	765
727	Signal 727	540	729	713
728	Signal 728	614	689	662
729	Signal 729	689	649	610
730	Signal 730	763	608	559
731	Signal 731	837	568	507
732	Signal 732	911	528	456
733	Signal 733	346	835	924
734	Signal 734	420	795	872
735	Signal 735	495	754	821
736	Signal 736	569	714	769
737	Signal 737	643	673	718
738	Signal 738	717	633	666
739	Signal 739	792	593	615
740	Signal 740	866	552	563
741	Signal 741	940	512	512

The corresponding test signal schematic is shown in Figure B.1.

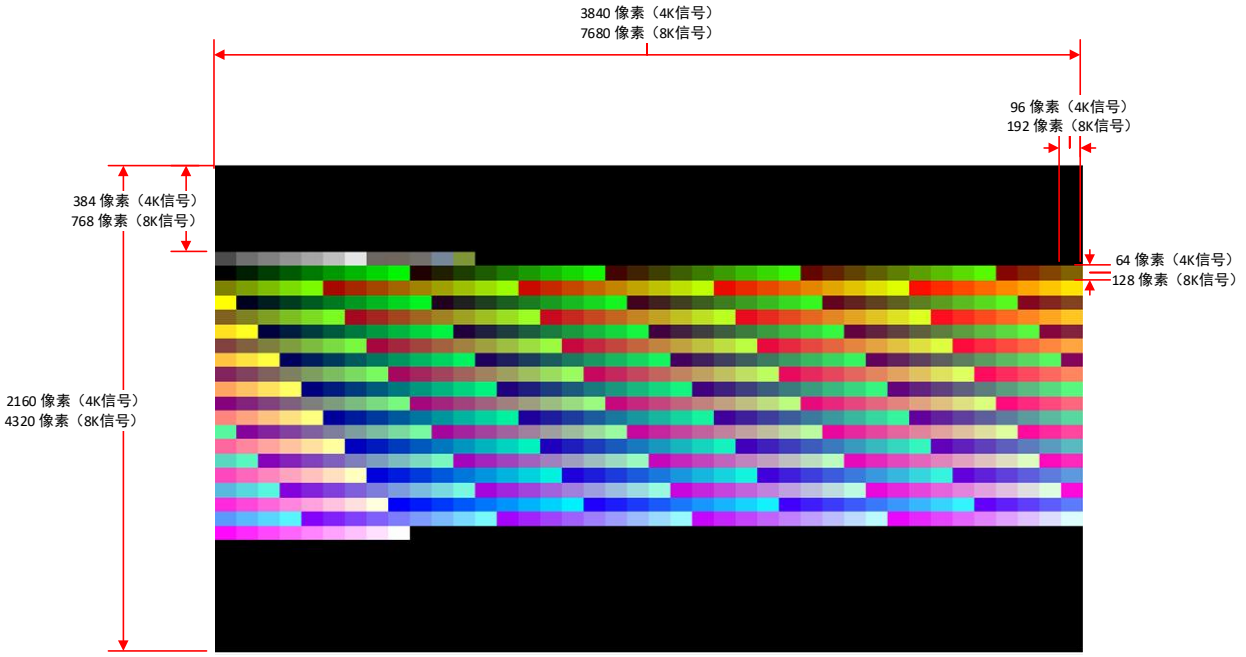


Figure B.1 Schematic diagram of HDR Vivid PQ dynamic metadata testing

B. 2.2 HLG Test Signal

Numbers 11 to 17 are HLG test signals. The HLG domain YCbCr code values of each color block in the test signal are shown in Table B.3. Table B.3 HDR Vivid HLG Static Mapping and Dynamic Metadata Test Code Values

Number [k]	TEST	HLG domain YCbCr code value (10 bit, BT.2020 color gamut, narrow range)		
		Y-signal	Cb signal	Cr signal
1	Grayscale 1	216	512	512
2	Grayscale 2	402	512	512
3	Grayscale 3	541	512	512
4	Grayscale 4	671	512	512
5	Grayscale 5	791	512	512
6	Grayscale 6	940	512	512
7	Skin tone 1	349	490	539
8	Skin color No.2	356	481	543
9	Skin color 3	407	498	528
10	Sky color	567	595	433
11	Plant color	616	262	457
12	Signal 12	64	512	512
13	Signal 13	138	472	461
14	Signal 14	212	431	409
15	Signal 15	287	391	358
16	Signal 16	361	351	306
17	Signal 17	435	310	255

18	Signal 18	509	270	203
19	Signal 19	584	229	152
20	Signal 20	658	189	100
21	Signal 21	93	496	568
22	Signal 22	167	456	517
23	Signal 23	241	416	465
24	Signal 24	315	375	414
25	Signal 25	390	335	362
26	Signal 26	464	295	311
27	Signal 27	538	254	259
28	Signal 28	612	214	208
29	Signal 29	687	173	156
30	Signal 30	122	481	624
31	Signal 31	196	440	573
32	Signal 32	270	400	521
33	Signal 33	344	360	470
34	Signal 34	418	319	418
35	Signal 35	493	279	367
36	Signal 36	567	239	315
37	Signal 37	641	198	264
38	Signal 38	715	158	212
39	Signal 39	150	465	680
40	Signal 40	225	425	629
41	Signal 41	299	384	577
42	Signal 42	373	344	526
43	Signal 43	447	304	474
44	Signal 44	522	263	423
45	Signal 45	596	223	371
46	Signal 46	670	183	320
47	Signal 47	744	142	268
48	Signal 48	179	449	736
49	Signal 49	253	409	685
50	Signal 50	328	369	633
51	Signal 51	402	328	582
52	Signal 52	476	288	530
53	Signal 53	550	248	479
54	Signal 54	625	207	427
55	Signal 55	699	167	376
56	Signal 56	773	127	324
57	Signal 57	208	434	792
58	Signal 58	282	393	741
59	Signal 59	356	353	689

60	Signal 60	431	313	638
61	Signal 61	505	272	586
62	Signal 62	579	232	535
63	Signal 63	653	192	483
64	Signal 64	728	151	432
65	Signal 65	802	111	380
66	Signal 66	237	418	848
67	Signal 67	311	378	797
68	Signal 68	385	337	745
69	Signal 69	459	297	694
70	Signal 70	534	257	642
71	Signal 71	608	216	591
72	Signal 72	682	176	539
73	Signal 73	756	136	488
74	Signal 74	831	95	436
75	Signal 75	265	403	904
76	Signal 76	340	362	853
77	Signal 77	414	322	801
78	Signal 78	488	281	750
79	Signal 79	562	241	698
80	Signal 80	637	201	647
81	Signal 81	711	160	595
82	Signal 82	785	120	544
83	Signal 83	859	80	492
84	Signal 84	294	387	960
85	Signal 85	368	347	909
86	Signal 86	443	306	857
87	Signal 87	517	266	806
88	Signal 88	591	225	754
89	Signal 89	665	185	703
90	Signal 90	740	145	651
91	Signal 91	814	104	600
92	Signal 92	888	64	548
93	Signal 93	70	568	507
94	Signal 94	145	528	456
95	Signal 95	219	487	405
96	Signal 96	293	447	353
97	Signal 97	367	407	302
98	Signal 98	442	366	250
99	Signal 99	516	326	199
100	Signal 100	590	285	147
101	Signal 101	664	245	96

102	Signal 102	99	552	563
103	Signal 103	174	512	512
104	Signal 104	248	472	461
105	Signal 105	322	431	409
106	Signal 106	396	391	358
107	Signal 107	470	351	306
108	Signal 108	545	310	255
109	Signal 109	619	270	203
110	Signal 110	693	229	152
111	Signal 111	128	537	619
112	Signal 112	202	496	568
113	Signal 113	277	456	517
114	Signal 114	351	416	465
115	Signal 115	425	375	414
116	Signal 116	499	335	362
117	Signal 117	573	295	311
118	Signal 118	648	254	259
119	Signal 119	722	214	208
120	Signal 120	157	521	675
121	Signal 121	231	481	624
122	Signal 122	305	440	573
123	Signal 123	380	400	521
124	Signal 124	454	360	470
125	Signal 125	528	319	418
126	Signal 126	602	279	367
127	Signal 127	676	239	315
128	Signal 128	751	198	264
129	Signal 129	186	505	731
130	Signal 130	260	465	680
131	Signal 131	334	425	629
132	Signal 132	408	384	577
133	Signal 133	483	344	526
134	Signal 134	557	304	474
135	Signal 135	631	263	423
136	Signal 136	705	223	371
137	Signal 137	779	183	320
138	Signal 138	214	490	787
139	Signal 139	289	449	736
140	Signal 140	363	409	685
141	Signal 141	437	369	633
142	Signal 142	511	328	582
143	Signal 143	586	288	530

144	Signal 144	660	248	479
145	Signal 145	734	207	427
146	Signal 146	808	167	376
147	Signal 147	243	474	843
148	Signal 148	317	434	792
149	Signal 149	392	393	741
150	Signal 150	466	353	689
151	Signal 151	540	313	638
152	Signal 152	614	272	586
153	Signal 153	689	232	535
154	Signal 154	763	192	483
155	Signal 155	837	151	432
156	Signal 156	272	459	899
157	Signal 157	346	418	848
158	Signal 158	420	378	797
159	Signal 159	495	337	745
160	Signal 160	569	297	694
161	Signal 161	643	257	642
162	Signal 162	717	216	591
163	Signal 163	792	176	539
164	Signal 164	866	136	488
165	Signal 165	301	443	955
166	Signal 166	375	403	904
167	Signal 167	449	362	853
168	Signal 168	523	322	801
169	Signal 169	598	281	750
170	Signal 170	672	241	698
171	Signal 171	746	201	647
172	Signal 172	820	160	595
173	Signal 173	895	120	544
174	Signal 174	77	624	503
175	Signal 175	151	584	451
176	Signal 176	225	543	400
177	Signal 177	300	503	349
178	Signal 178	374	463	297
179	Signal 179	448	422	246
180	Signal 180	522	382	194
181	Signal 181	597	341	143
182	Signal 182	671	301	91
183	Signal 183	106	608	559
184	Signal 184	180	568	507
185	Signal 185	254	528	456

186	Signal 186	328	487	405
187	Signal 187	403	447	353
188	Signal 188	477	407	302
189	Signal 189	551	366	250
190	Signal 190	625	326	199
191	Signal 191	700	285	147
192	Signal 192	135	593	615
193	Signal 193	209	552	563
194	Signal 194	283	512	512
195	Signal 195	357	472	461
196	Signal 196	431	431	409
197	Signal 197	506	391	358
198	Signal 198	580	351	306
199	Signal 199	654	310	255
200	Signal 200	728	270	203
201	Signal 201	163	577	671
202	Signal 202	238	537	619
203	Signal 203	312	496	568
204	Signal 204	386	456	517
205	Signal 205	460	416	465
206	Signal 206	534	375	414
207	Signal 207	609	335	362
208	Signal 208	683	295	311
209	Signal 209	757	254	259
210	Signal 210	192	561	727
211	Signal 211	266	521	675
212	Signal 212	341	481	624
213	Signal 213	415	440	573
214	Signal 214	489	400	521
215	Signal 215	563	360	470
216	Signal 216	637	319	418
217	Signal 217	712	279	367
218	Signal 218	786	239	315
219	Signal 219	221	546	783
220	Signal 220	295	505	731
221	Signal 221	369	465	680
222	Signal 222	444	425	629
223	Signal 223	518	384	577
224	Signal 224	592	344	526
225	Signal 225	666	304	474
226	Signal 226	741	263	423
227	Signal 227	815	223	371

228	Signal 228	250	530	839
229	Signal 229	324	490	787
230	Signal 230	398	449	736
231	Signal 231	472	409	685
232	Signal 232	547	369	633
233	Signal 233	621	328	582
234	Signal 234	695	288	530
235	Signal 235	769	248	479
236	Signal 236	844	207	427
237	Signal 237	278	515	895
238	Signal 238	353	474	843
239	Signal 239	427	434	792
240	Signal 240	501	393	741
241	Signal 241	575	353	689
242	Signal 242	650	313	638
243	Signal 243	724	272	586
244	Signal 244	798	232	535
245	Signal 245	872	192	483
246	Signal 246	307	499	951
247	Signal 247	381	459	899
248	Signal 248	456	418	848
249	Signal 249	530	378	797
250	Signal 250	604	337	745
251	Signal 251	678	297	694
252	Signal 252	753	257	642
253	Signal 253	827	216	591
254	Signal 254	901	176	539
255	Signal 255	83	680	498
256	Signal 256	158	640	447
257	Signal 257	232	599	395
258	Signal 258	306	559	344
259	Signal 259	380	519	293
260	Signal 260	455	478	241
261	Signal 261	529	438	190
262	Signal 262	603	397	138
263	Signal 263	677	357	87
264	Signal 264	112	664	554
265	Signal 265	186	624	503
266	Signal 266	261	584	451
267	Signal 267	335	543	400
268	Signal 268	409	503	349
269	Signal 269	483	463	297

270	Signal 270	558	422	246
271	Signal 271	632	382	194
272	Signal 272	706	341	143
273	Signal 273	141	649	610
274	Signal 274	215	608	559
275	Signal 275	289	568	507
276	Signal 276	364	528	456
277	Signal 277	438	487	405
278	Signal 278	512	447	353
279	Signal 279	586	407	302
280	Signal 280	661	366	250
281	Signal 281	735	326	199
282	Signal 282	170	633	666
283	Signal 283	244	593	615
284	Signal 284	318	552	563
285	Signal 285	393	512	512
286	Signal 286	467	472	461
287	Signal 287	541	431	409
288	Signal 288	615	391	358
289	Signal 289	689	351	306
290	Signal 290	764	310	255
291	Signal 291	199	617	722
292	Signal 292	273	577	671
293	Signal 293	347	537	619
294	Signal 294	421	496	568
295	Signal 295	496	456	517
296	Signal 296	570	416	465
297	Signal 297	644	375	414
298	Signal 298	718	335	362
299	Signal 299	792	295	311
300	Signal 300	227	602	778
301	Signal 301	302	561	727
302	Signal 302	376	521	675
303	Signal 303	450	481	624
304	Signal 304	524	440	573
305	Signal 305	599	400	521
306	Signal 306	673	360	470
307	Signal 307	747	319	418
308	Signal 308	821	279	367
309	Signal 309	256	586	834
310	Signal 310	330	546	783
311	Signal 311	405	505	731

312	Signal 312	479	465	680
313	Signal 313	553	425	629
314	Signal 314	627	384	577
315	Signal 315	702	344	526
316	Signal 316	776	304	474
317	Signal 317	850	263	423
318	Signal 318	285	571	890
319	Signal 319	359	530	839
320	Signal 320	433	490	787
321	Signal 321	508	449	736
322	Signal 322	582	409	685
323	Signal 323	656	369	633
324	Signal 324	730	328	582
325	Signal 325	805	288	530
326	Signal 326	879	248	479
327	Signal 327	314	555	946
328	Signal 328	388	515	895
329	Signal 329	462	474	843
330	Signal 330	536	434	792
331	Signal 331	611	393	741
332	Signal 332	685	353	689
333	Signal 333	759	313	638
334	Signal 334	833	272	586
335	Signal 335	908	232	535
336	Signal 336	90	736	494
337	Signal 337	164	696	442
338	Signal 338	238	655	391
339	Signal 339	313	615	339
340	Signal 340	387	575	288
341	Signal 341	461	534	237
342	Signal 342	535	494	185
343	Signal 343	610	453	134
344	Signal 344	684	413	82
345	Signal 345	119	720	550
346	Signal 346	193	680	498
347	Signal 347	267	640	447
348	Signal 348	341	599	395
349	Signal 349	416	559	344
350	Signal 350	490	519	293
351	Signal 351	564	478	241
352	Signal 352	638	438	190
353	Signal 353	713	397	138

354	Signal 354	148	705	606
355	Signal 355	222	664	554
356	Signal 356	296	624	503
357	Signal 357	370	584	451
358	Signal 358	444	543	400
359	Signal 359	519	503	349
360	Signal 360	593	463	297
361	Signal 361	667	422	246
362	Signal 362	741	382	194
363	Signal 363	176	689	662
364	Signal 364	251	649	610
365	Signal 365	325	608	559
366	Signal 366	399	568	507
367	Signal 367	473	528	456
368	Signal 368	547	487	405
369	Signal 369	622	447	353
370	Signal 370	696	407	302
371	Signal 371	770	366	250
372	Signal 372	205	673	718
373	Signal 373	279	633	666
374	Signal 374	354	593	615
375	Signal 375	428	552	563
376	Signal 376	502	512	512
377	Signal 377	576	472	461
378	Signal 378	650	431	409
379	Signal 379	725	391	358
380	Signal 380	799	351	306
381	Signal 381	234	658	774
382	Signal 382	308	617	722
383	Signal 383	382	577	671
384	Signal 384	457	537	619
385	Signal 385	531	496	568
386	Signal 386	605	456	517
387	Signal 387	679	416	465
388	Signal 388	753	375	414
389	Signal 389	828	335	362
390	Signal 390	263	642	830
391	Signal 391	337	602	778
392	Signal 392	411	561	727
393	Signal 393	485	521	675
394	Signal 394	560	481	624
395	Signal 395	634	440	573

396	Signal 396	708	400	521
397	Signal 397	782	360	470
398	Signal 398	856	319	418
399	Signal 399	291	627	886
400	Signal 400	366	586	834
401	Signal 401	440	546	783
402	Signal 402	514	505	731
403	Signal 403	588	465	680
404	Signal 404	663	425	629
405	Signal 405	737	384	577
406	Signal 406	811	344	526
407	Signal 407	885	304	474
408	Signal 408	320	611	942
409	Signal 409	394	571	890
410	Signal 410	469	530	839
411	Signal 411	543	490	787
412	Signal 412	617	449	736
413	Signal 413	691	409	685
414	Signal 414	766	369	633
415	Signal 415	840	328	582
416	Signal 416	914	288	530
417	Signal 417	96	792	489
418	Signal 418	171	752	438
419	Signal 419	245	711	386
420	Signal 420	319	671	335
421	Signal 421	393	631	283
422	Signal 422	468	590	232
423	Signal 423	542	550	181
424	Signal 424	616	509	129
425	Signal 425	690	469	78
426	Signal 426	125	776	545
427	Signal 427	199	736	494
428	Signal 428	274	696	442
429	Signal 429	348	655	391
430	Signal 430	422	615	339
431	Signal 431	496	575	288
432	Signal 432	571	534	237
433	Signal 433	645	494	185
434	Signal 434	719	453	134
435	Signal 435	154	761	601
436	Signal 436	228	720	550
437	Signal 437	302	680	498

438	Signal 438	377	640	447
439	Signal 439	451	599	395
440	Signal 440	525	559	344
441	Signal 441	599	519	293
442	Signal 442	674	478	241
443	Signal 443	748	438	190
444	Signal 444	183	745	657
445	Signal 445	257	705	606
446	Signal 446	331	664	554
447	Signal 447	405	624	503
448	Signal 448	480	584	451
449	Signal 449	554	543	400
450	Signal 450	628	503	349
451	Signal 451	702	463	297
452	Signal 452	777	422	246
453	Signal 453	212	729	713
454	Signal 454	286	689	662
455	Signal 455	360	649	610
456	Signal 456	434	608	559
457	Signal 457	508	568	507
458	Signal 458	583	528	456
459	Signal 459	657	487	405
460	Signal 460	731	447	353
461	Signal 461	805	407	302
462	Signal 462	240	714	769
463	Signal 463	315	673	718
464	Signal 464	389	633	666
465	Signal 465	463	593	615
466	Signal 466	537	552	563
467	Signal 467	612	512	512
468	Signal 468	686	472	461
469	Signal 469	760	431	409
470	Signal 470	834	391	358
471	Signal 471	269	698	825
472	Signal 472	343	658	774
473	Signal 473	418	617	722
474	Signal 474	492	577	671
475	Signal 475	566	537	619
476	Signal 476	640	496	568
477	Signal 477	715	456	517
478	Signal 478	789	416	465
479	Signal 479	863	375	414

480	Signal 480	298	683	881
481	Signal 481	372	642	830
482	Signal 482	446	602	778
483	Signal 483	521	561	727
484	Signal 484	595	521	675
485	Signal 485	669	481	624
486	Signal 486	743	440	573
487	Signal 487	818	400	521
488	Signal 488	892	360	470
489	Signal 489	327	667	937
490	Signal 490	401	627	886
491	Signal 491	475	586	834
492	Signal 492	549	546	783
493	Signal 493	624	505	731
494	Signal 494	698	465	680
495	Signal 495	772	425	629
496	Signal 496	846	384	577
497	Signal 497	921	344	526
498	Signal 498	103	848	485
499	Signal 499	177	808	433
500	Signal 500	251	767	382
501	Signal 501	326	727	330
502	Signal 502	400	687	279
503	Signal 503	474	646	227
504	Signal 504	548	606	176
505	Signal 505	623	565	125
506	Signal 506	697	525	73
507	Signal 507	132	832	541
508	Signal 508	206	792	489
509	Signal 509	280	752	438
510	Signal 510	354	711	386
511	Signal 511	429	671	335
512	Signal 512	503	631	283
513	Signal 513	577	590	232
514	Signal 514	651	550	181
515	Signal 515	726	509	129
516	Signal 516	160	817	597
517	Signal 517	235	776	545
518	Signal 518	309	736	494
519	Signal 519	383	696	442
520	Signal 520	457	655	391
521	Signal 521	532	615	339

522	Signal 522	606	575	288
523	Signal 523	680	534	237
524	Signal 524	754	494	185
525	Signal 525	189	801	653
526	Signal 526	263	761	601
527	Signal 527	338	720	550
528	Signal 528	412	680	498
529	Signal 529	486	640	447
530	Signal 530	560	599	395
531	Signal 531	635	559	344
532	Signal 532	709	519	293
533	Signal 533	783	478	241
534	Signal 534	218	785	709
535	Signal 535	292	745	657
536	Signal 536	367	705	606
537	Signal 537	441	664	554
538	Signal 538	515	624	503
539	Signal 539	589	584	451
540	Signal 540	663	543	400
541	Signal 541	738	503	349
542	Signal 542	812	463	297
543	Signal 543	247	770	765
544	Signal 544	321	729	713
545	Signal 545	395	689	662
546	Signal 546	470	649	610
547	Signal 547	544	608	559
548	Signal 548	618	568	507
549	Signal 549	692	528	456
550	Signal 550	766	487	405
551	Signal 551	841	447	353
552	Signal 552	276	754	821
553	Signal 553	350	714	769
554	Signal 554	424	673	718
555	Signal 555	498	633	666
556	Signal 556	573	593	615
557	Signal 557	647	552	563
558	Signal 558	721	512	512
559	Signal 559	795	472	461
560	Signal 560	869	431	409
561	Signal 561	304	739	877
562	Signal 562	379	698	825
563	Signal 563	453	658	774

564	Signal 564	527	617	722
565	Signal 565	601	577	671
566	Signal 566	676	537	619
567	Signal 567	750	496	568
568	Signal 568	824	456	517
569	Signal 569	898	416	465
570	Signal 570	333	723	933
571	Signal 571	407	683	881
572	Signal 572	482	642	830
573	Signal 573	556	602	778
574	Signal 574	630	561	727
575	Signal 575	704	521	675
576	Signal 576	779	481	624
577	Signal 577	853	440	573
578	Signal 578	927	400	521
579	Signal 579	109	904	480
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584	Signal 584	481	702	223
585	Signal 585	555	662	171
586	Signal 586	629	621	120
587	Signal 587	703	581	69
588	Signal 588	138	888	536
589	Signal 589	212	848	485
590	Signal 590	287	808	433
591	Signal 591	361	767	382
592	Signal 592	435	727	330
593	Signal 593	509	687	279
594	Signal 594	584	646	227
595	Signal 595	658	606	176
596	Signal 596	732	565	125
597	Signal 597	167	873	592
598	Signal 598	241	832	541
599	Signal 599	315	792	489
600	Signal 600	390	752	438
601	Signal 601	464	711	386
602	Signal 602	538	671	335
603	Signal 603	612	631	283
604	Signal 604	687	590	232
605	Signal 605	761	550	181

606	Signal 606	196	857	648
607	Signal 607	270	817	597
608	Signal 608	344	776	545
609	Signal 609	418	736	494
610	Signal 610	493	696	442
611	Signal 611	567	655	391
612	Signal 612	641	615	339
613	Signal 613	715	575	288
614	Signal 614	790	534	237
615	Signal 615	225	841	704
616	Signal 616	299	801	653
617	Signal 617	373	761	601
618	Signal 618	447	720	550
619	Signal 619	521	680	498
620	Signal 620	596	640	447
621	Signal 621	670	599	395
622	Signal 622	744	559	344
623	Signal 623	818	519	293
624	Signal 624	253	826	760
625	Signal 625	328	785	709
626	Signal 626	402	745	657
627	Signal 627	476	705	606
628	Signal 628	550	664	554
629	Signal 629	624	624	503
630	Signal 630	699	584	451
631	Signal 631	773	543	400
632	Signal 632	847	503	349
633	Signal 633	282	810	816
634	Signal 634	356	770	765
635	Signal 635	431	729	713
636	Signal 636	505	689	662
637	Signal 637	579	649	610
638	Signal 638	653	608	559
639	Signal 639	727	568	507
640	Signal 640	802	528	456
641	Signal 641	876	487	405
642	Signal 642	311	795	872
643	Signal 643	385	754	821
644	Signal 644	459	714	769
645	Signal 645	534	673	718
646	Signal 646	608	633	666
647	Signal 647	682	593	615

648	Signal 648	756	552	563
649	Signal 649	831	512	512
650	Signal 650	905	472	461
651	Signal 651	340	779	928
652	Signal 652	414	739	877
653	Signal 653	488	698	825
654	Signal 654	562	658	774
655	Signal 655	637	617	722
656	Signal 656	711	577	671
657	Signal 657	785	537	619
658	Signal 658	859	496	568
659	Signal 659	934	456	517
660	Signal 660	116	960	476
661	Signal 661	190	920	424
662	Signal 662	264	879	373
663	Signal 663	339	839	321
664	Signal 664	413	799	270
665	Signal 665	487	758	218
666	Signal 666	561	718	167
667	Signal 667	636	677	115
668	Signal 668	710	637	64
669	Signal 669	145	944	532
670	Signal 670	219	904	480
671	Signal 671	293	864	429
672	Signal 672	367	823	377
673	Signal 673	442	783	326
674	Signal 674	516	743	274
675	Signal 675	590	702	223
676	Signal 676	664	662	171
677	Signal 677	739	621	120
678	Signal 678	173	929	588
679	Signal 679	248	888	536
680	Signal 680	322	848	485
681	Signal 681	396	808	433
682	Signal 682	470	767	382
683	Signal 683	545	727	330
684	Signal 684	619	687	279
685	Signal 685	693	646	227
686	Signal 686	767	606	176
687	Signal 687	202	913	644
688	Signal 688	276	873	592
689	Signal 689	351	832	541

690	Signal 690	425	792	489
691	Signal 691	499	752	438
692	Signal 692	573	711	386
693	Signal 693	648	671	335
694	Signal 694	722	631	283
695	Signal 695	796	590	232
696	Signal 696	231	897	700
697	Signal 697	305	857	648
698	Signal 698	379	817	597
699	Signal 699	454	776	545
700	Signal 700	528	736	494
701	Signal 701	602	696	442
702	Signal 702	676	655	391
703	Signal 703	751	615	339
704	Signal 704	825	575	288
705	Signal 705	260	882	756
706	Signal 706	334	841	704
707	Signal 707	408	801	653
708	Signal 708	482	761	601
709	Signal 709	557	720	550
710	Signal 710	631	680	498
711	Signal 711	705	640	447
712	Signal 712	779	599	395
713	Signal 713	854	559	344
714	Signal 714	289	866	812
715	Signal 715	363	826	760
716	Signal 716	437	785	709
717	Signal 717	511	745	657
718	Signal 718	586	705	606
719	Signal 719	660	664	554
720	Signal 720	734	624	503
721	Signal 721	808	584	451
722	Signal 722	882	543	400
723	Signal 723	317	851	868
724	Signal 724	392	810	816
725	Signal 725	466	770	765
726	Signal 726	540	729	713
727	Signal 727	614	689	662
728	Signal 728	689	649	610
729	Signal 729	763	608	559
730	Signal 730	837	568	507
731	Signal 731	911	528	456

732	Signal 732	346	835	924
733	Signal 733	420	795	872
734	Signal 734	495	754	821
735	Signal 735	569	714	769
736	Signal 736	643	673	718
737	Signal 737	717	633	666
738	Signal 738	792	593	615
739	Signal 739	866	552	563
740	Signal 740	940	512	512

The corresponding test signal schematic is shown in Figure B.2.

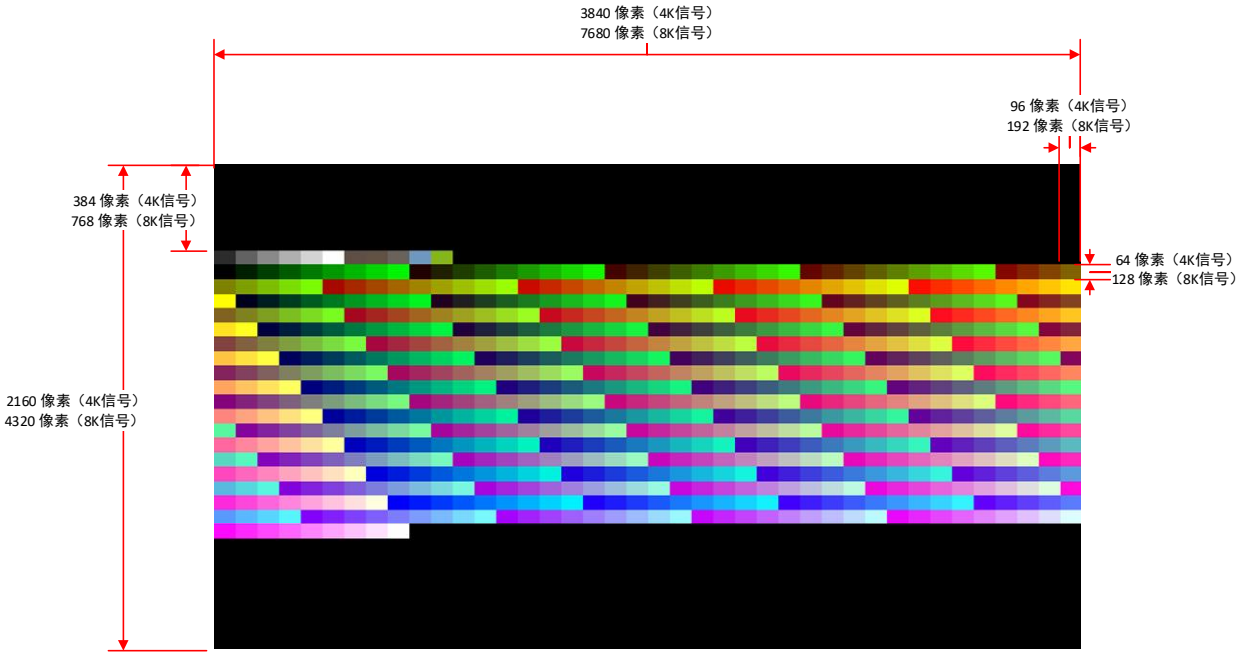

Figure B.2 Schematic diagram of HDR Vivid HLG static mapping and dynamic metadata testing