



UHD World Association

世界超高清视频产业联盟



Parameters Specifications for 4K Ultra-HD Content Exchange

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Parameters Specifications for 4K Ultra-HD Content Exchange

1 Scope

This document specifies the content exchange parameters and methods during 4K content filming, live broadcast signal transmission, video on-demand, etc.

It applies to the content exchange between 4K content producers and distributors, as well as quantification and analysis of factors that affect 4K content exchange.

It does not apply to evaluation of broadcasting services by content broadcasting platforms.

2 Normative References

This document does not have normative references.

3 Terms and Definitions

3.1 Aspect Ratio

The ratio of width to height of an image.

Note: The standard aspect ratio of 4K TV is 16:9.

3.2 Resolution

The ability to display image details.

Note: It can be described by the number of pixels that can be displayed.

3.3 Frame Rate

The frequency of a frame of bitmap image occurring on the monitor continuously.

3.4 Bitrate

The number of bits of data transmitted in a unit of time during media data transmission.

3.5 Scanning Modes

The way a monitor scans an image. It can be progressive or interlaced.

3.6 Bit Depth

The number of bits used to store the information of every pixel in a digital image.

3.7 Color Gamut

The range of a collection of colors that meets certain conditions in a chromaticity diagram or color space.

3.8 YUV

YUV is a color encoding system.

Note: The commonly used YUV sample formats are: 4:4:4, 4:2:0, 4:2:2, etc.

3.9 Transformation Curve

The opto-electrical/electro-optical transfer function used in HDR technology.

3.10 Peak Brightness

The maximum brightness supported by the video content.

3.11 Sound Channel

Audio sound channel standards, such as 2.0, 5.1, 7.1, 3D sound (5.1.4 or 7.1.4), etc.

3.12 Audio Sample Rate

The number of audio signal samples taken in one second by a recording device.

4 Parameters Specifications for 4K Ultra-HD Content Exchange

4.1 4K Content Filming/Production

The following parameters shall be used for 4K content filming/production.

Parameter	Value
Aspect ratio	16:9
Resolution	3840×2160
Pixel aspect ratio	1:1
Frame rate	50 fps / 60 fps / 100 fps / 120 fps
Bitrate	Above 500 Mbps*
Scanning mode	Progressive
Bit depth	10 bits and above
Color gamut	BT.2020
YUV sampling format	4:2:2 / 4:4:4
Transformation curve	HLG / PQ / SLog3
HDR format	HLG / PQ10 / HDR10 / HDR10+
Peak brightness	1000 nits and above
Sound channel	2.0 / 5.1 / 7.1 / 3D sound (5.1.4 / 7.1.4)
Audio sample rate	48 kHz
Audio coding format	PCM 16/24 bit
*Sony XAVC-I Class 300/480/MXF, 10 bits, bitrate above 500 Mbps; Apple ProRes 422/MOV, 10 bits, bitrate 983 Mbps; DNxHR/MXF, 12 bits, bitrate 1.475 Gbps.	

4.2 Signal Transmission for 4K Content Live Broadcast

The following parameters shall be used during signal transmission for 4K content live broadcast.

Parameter	Value
Mainstream transmission method	TS Over UDP (Unicast / Multicast) / SRT
Mainstream coding format	H.265 / AVS2 / AVS3
Aspect ratio	16:9
Resolution	3840×2160
Pixel aspect ratio	1:1
Frame rate	50 fps / 60 fps / 100 fps / 120 fps
Bitrate	Above 50 Mbps (Reference complexity of H.265)
Scanning mode	Progressive
Bit depth	10 bits and above
Color gamut	BT.2020
YUV sampling format	4:2:0 / 4:2:2 / 4:4:4
Transformation curve	HLG / PQ
HDR format	HLG / PQ10 / HDR10 / HDR10+ / HDR Vivid
Peak brightness	1000 nits and above
Sound channel	2.0 / 5.1 / 7.1 / 3D sound (5.1.4 / 7.1.4)
Audio sample rate	48 kHz

Audio coding format	AAC-LC, HE-AAC, Dolby AC-3, E-AC-3, etc.
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4.3 4K Content On-demand Exchange

4.3.1 Exchange of Non-Linear Edited 4K Content File

The following parameters shall be used for the exchange of non-linear edited 4K content files.

Parameter	Value
Mainstream encapsulation format	MP4 / MOV / MXF
Mainstream coding format	DNxHR / Apple ProRes / Sony XAVC-I Class 300
Aspect ratio	16:9
Resolution	3840×2160 and above
Pixel aspect ratio	1:1
Frame rate	50 fps / 60 fps / 100 fps / 120 fps
Bitrate	Above 500 Mbps (Reference complexity of XAVC)
Scanning mode	Progressive
Bit depth	10 bits and above
Color gamut	BT.2020
YUV sampling format	4:2:0 / 4:2:2 / 4:4:4
Transformation curve	HLG / PQ
HDR format	HLG / PQ10 / HDR10 / HDR10+ / HDR Vivid
Peak brightness	1000 nits and above
Sound channel	2.0 / 5.1 / 7.1 / 3D sound (5.1.4 / 7.1.4)
Audio sample rate	48 kHz
Audio coding format	AAC-LC / HE-AAC / Dolby AC-3 / E-AC-3, etc.

4.3.2 Exchange of Compressed 4K Content File

The following parameters shall be used for the exchange of compressed 4K content files.

Parameter	Value
Mainstream encapsulation format	MP4 / TS / MOV / MKV
Mainstream coding format	H.265 / AVS2 / AVS3
Aspect ratio	16:9
Resolution	3840×2160 and above
Pixel aspect ratio	1:1
Frame rate	50 fps / 60 fps / 100 fps / 120 fps
Bitrate	Above 50 Mbps (Reference complexity of H.265)
Scanning mode	Progressive
Bit depth	10 bits and above
Color gamut	BT.2020
YUV sampling format	4:2:0 / 4:2:2 / 4:4:4
Transformation curve	HLG / PQ

HDR format	HLG / PQ10 / HDR10 / HDR10+ / HDR Vivid
Peak brightness	1000 nits and above
Sound channel	2.0 / 5.1 / 7.1 / 3D sound (5.1.4 / 7.1.4)
Audio sample rate	48 kHz
Audio coding format	AAC-LC / HE-AAC / Dolby AC-3 / E-AC-3, etc.

4.4 4K Content Broadcast

4.4.1 4K Content Live Broadcast

The following parameters shall be used for live broadcast of 4K content.

Parameter	Value
Mainstream transmission method	TS Over UDP (Unicast / Multicast) / HLS / DASH / SRT
Mainstream coding format	H.265 / AVS2 / AVS3
Aspect ratio	16:9
Resolution	3840×2160
Pixel aspect ratio	1:1
Frame rate	50 fps / 60 fps / 100 fps / 120 fps
Bitrate	Above 15 Mbps recommended (Reference complexity of H.265)
Scanning mode	Progressive
Bit depth	10 bits and above
Color gamut	BT.2020
YUV sampling format	4:2:0 / 4:2:2 / 4:4:4
Transformation curve	HLG / PQ
HDR format	HLG/PQ10/HDR10/ HDR10+/HDR Vivid
Peak brightness	1000 nits and above
Sound channel	2.0 / 5.1 / 7.1 / 3D sound (5.1.4 / 7.1.4)
Audio sample rate	48 kHz
Audio coding format	AAC-LC / HE-AAC / Dolby AC-3 / E-AC-3, etc.

4.4.2 4K Content On-Demand Broadcast

The following parameters shall be used for on-demand broadcast of 4K content.

Parameter	Value
Mainstream transmission method	MP4 / TS / MOV / MKV
Mainstream coding format	H.265 / AVS2 / AV1 / AVS3
Aspect ratio	16:9
Resolution	3840×2160
Pixel aspect ratio	1:1
Frame rate	50fps / 60fps / 100fps / 120fps
Bitrate	Above 15 Mbps recommended (Reference complexity of H.265)
Scanning mode	Progressive
Bit depth	10 bits and above
Color gamut	BT.2020

YUV sampling format	4:2:0/4:2:2/4:4:4
Transformation curve	HLG / PQ
HDR format	HLG/PQ10/HDR10/ HDR10+/HDR Vivid
Peak brightness	1000 nits and above
Sound channel	2.0 / 5.1 / 7.1 / 3D sound (5.1.4 / 7.1.4)
Audio sample rate	48 kHz
Audio coding format	AAC-LC / HE-AAC / Dolby AC-3 / E-AC-3, etc.

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