Blu-ray Format Extension
Video Parameters
Liaison Information

Blu-ray Disc Association

Updated - November 2014

Blu-ray Format Extension Video Characteristics

Video Codec	HEVC[1]		AVC
Spatial Resolution	3840x2160	1920x1080	1920x1080
Picture Format Aspect Ratio	16:9		
Bit Depth – SDR	10		8[2]
Color Space Primaries	BT.2020[3] BT.709 (SDR only)		BT.709 (SDR only)
Color Sub sampling	4:2:0		
Frame Rates	23.976p, 24p, 25p[4], 50p[4], 59.94p, 60p		23.976p, 24p
Peak Video Bit rate[5]	100Mbps		40Mbps
Bit Depth - HDR	10		
HDR EOTF	SMPTE ST 2084		N/A
Static Metadata	SMPTE ST2086, MaxFALL (HDR only) [6], MaxCLL (HDR only) [6]		

[1] Main 10 High Tier Level 5.1. NOTE: in the mandatory part, HDR content is transmitted using a single layer codec with metadata in SEI messages.

[2] AVC 8-bit BT.709 SDR is allowed only for 1080/23.976p and 1080/24p frame rates and with a peak bit rate that is within existing BD specification

[3] BT.2020 uses the YCbCr non-constant luminance format

[4] Decoding 25Hz and 50Hz video is BD-ROM Player mandatory if a 50Hz TV system is used

[5] Peak Video Bitrate is constrained by the relevant ISO/IEC HRD conformance and by the MPEG-TS T-STD decoder buffer input rate

[6] See following slides for description of MaxFALL and MaxCLL metadata

NOTE:

BDA Authoring Guideline for HDR Content will be prepared to include the following recommendation text: "Maximum Frame Average Light Level" not to exceed 400nits. Over 1000 nits should be limited to specular highlights which are expected to be a small percentage of the picture area.

SD resolution and 3D (MVC) video are not included. HDR Video optional functions under study in BDA.

ST 2084 : High Dynamic Range Electro-Optical Transfer Function of Mastering Reference Displays (published as of September 2014)

ST 2086: Mastering Display Color Volume Metadata Supporting High Luminance and Wide Color Gamut Images (published as of November 2014)

Blu-ray Format Extension - Static Metadata

The Blu-ray Format Extension Video Characteristics allow content to be authored using a wide color gamut (encoded for BT.2020 Color Primaries) and also a large luminance dynamic range (encoded for ST.2084 EOTF). This potentially large encoding space may not be fully used by the encoded authored content and is likely to vary title by title for various reasons. Static Metadata may be included with the authored content to describe the possible range of colors and dynamic range that are used by each encoded content.

SMPTE ST2086 "Mastering Display Color Volume Metadata Supporting High Luminance and Wide Color Gamut Images" will be used to describe the capabilities of the display used to master the content, which includes the CIE (x,y) chromaticity coordinates of the RGB Primaries and White Point of the mastering display, in addition to the minimum and maximum luminance of the mastering display. If traditional mastering practices are followed during content creation, the range of colors and luminance values encoded in the mastered video signal will be limited to the range of colors and luminance values that can be shown on the mastering display. ST2086 may be included in the encoded stream for both SDR and HDR contents.

Blu-ray Format Extension - Static Metadata

The Maximum Frame-Average Light Level (MaxFALL) is an additional Static Metadata item that applies to HDR Content only. HDR Content for Blu-ray Format Extension will be created while considering the authoring guideline that the Maximum Frame-Average Light Level not to exceed 400 nits. The Maximum Frame-Average Light Level corresponds to the highest frame-average brightness per frame in the entire stream.

The Maximum Content Light Level (MaxCLL) is an additional Static Metadata item that applies to HDR Content only. Maximum Content Light Level corresponds to the brightest pixel in the entire stream.