
**Information technology — Coding of
audio-visual objects —**

Part 10:
Advanced Video Coding

AMENDMENT 1: Multi-Resolution frame
compatible stereoscopic video with
depth maps, additional supplemental
enhancement information and video
usability information

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Technologies de l'information — Codage des objets audiovisuels —

Partie 10: Codage visuel avancé

AMENDEMENT 1: Vidéo stéréoscopique multi-résolution à cadre compatible avec cartes de profondeur, information additionnelle d'amélioration supplémentaire et information relative à l'utilisabilité de la vidéo

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

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Page xvi, 0.4

At the end of 0.4, add the following:

Rec. ITU T H.264 | ISO/IEC 14496-10 version 23 (the current Specification) refers to the integrated version 22 text after its amendment to specify multi-resolution frame-compatible (MFC) stereoscopic video with depth maps, including the specification of an additional profile, the MFC Depth High profile, and the mastering display colour volume SEI message, additional colour-related video usability information codepoint identifiers, and miscellaneous minor corrections and clarifications.

Page xx, 0.7

Replace the sentence

Subclause I.10 specifies one profile for MVCD (Multiview and Depth).

with

Subclause I.10 specifies two profiles for MVCD (Multiview Depth High, and MFC Depth High).

Page 42, 7.3.2.1.1

Replace the syntax table with the following:

seq_parameter_set_data() {	C	Descriptor
profile_idc	0	u(8)
constraint_set0_flag	0	u(1)
constraint_set1_flag	0	u(1)
constraint_set2_flag	0	u(1)
constraint_set3_flag	0	u(1)
constraint_set4_flag	0	u(1)
constraint_set5_flag	0	u(1)
reserved_zero_2bits /* equal to 0 */	0	u(2)
level_idc	0	u(8)
seq_parameter_set_id	0	ue(v)

<pre> if(profile_idc == 100 profile_idc == 110 profile_idc == 122 profile_idc == 244 profile_idc == 44 profile_idc == 83 profile_idc == 86 profile_idc == 118 profile_idc == 128 profile_idc == 138 profile_idc == 139 profile_idc == 134 profile_idc == 135) { </pre>		
chroma_format_idc	0	ue(v)
<pre> if(chroma_format_idc == 3) </pre>		
separate_colour_plane_flag	0	u(1)
bit_depth_luma_minus8	0	ue(v)
bit_depth_chroma_minus8	0	ue(v)
qpprime_y_zero_transform_bypass_flag	0	u(1)
seq_scaling_matrix_present_flag	0	u(1)
<pre> if(seq_scaling_matrix_present_flag) </pre>		
<pre> for (i = 0; i < ((chroma_format_idc != 3) ? 8 : 12); i++) { </pre>		
seq_scaling_list_present_flag[i]	0	u(1)
<pre> if(seq_scaling_list_present_flag[i]) </pre>		
<pre> if(i < 6) </pre>		
<pre> scaling_list(ScalingList4x4[i], 16, UseDefaultScalingMatrix4x4Flag[i]) </pre>	0	
<pre> else </pre>		
<pre> scaling_list(ScalingList8x8[i - 6], 64, UseDefaultScalingMatrix8x8Flag[i - 6]) </pre>	0	
<pre> } </pre>		
<pre> } </pre>		
log2_max_frame_num_minus4	0	ue(v)
pic_order_cnt_type	0	ue(v)
<pre> if(pic_order_cnt_type == 0) </pre>		
log2_max_pic_order_cnt_lsb_minus4	0	ue(v)
<pre> else if(pic_order_cnt_type == 1) { </pre>		
delta_pic_order_always_zero_flag	0	u(1)
offset_for_non_ref_pic	0	se(v)
offset_for_top_to_bottom_field	0	se(v)
num_ref_frames_in_pic_order_cnt_cycle	0	ue(v)
<pre> for(i = 0; i < num_ref_frames_in_pic_order_cnt_cycle; i++) </pre>		
offset_for_ref_frame[i]	0	se(v)
<pre> } </pre>		
max_num_ref_frames	0	ue(v)
gaps_in_frame_num_value_allowed_flag	0	u(1)
pic_width_in_mbs_minus1	0	ue(v)
pic_height_in_map_units_minus1	0	ue(v)
frame_mbs_only_flag	0	u(1)
<pre> if(!frame_mbs_only_flag) </pre>		
mb_adaptive_frame_field_flag	0	u(1)

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direct_8x8_inference_flag	0	u(1)
frame_cropping_flag	0	u(1)
if(frame_cropping_flag) {		
frame_crop_left_offset	0	ue(v)
frame_crop_right_offset	0	ue(v)
frame_crop_top_offset	0	ue(v)
frame_crop_bottom_offset	0	ue(v)
}		
vui_parameters_present_flag	0	u(1)
if(vui_parameters_present_flag)		
vui_parameters	0	
}		

Page 45, 7.3.2.1.3

Replace the syntax table with the following:

	C	Descriptor
subset_seq_parameter_set_rbsp() {		
seq_parameter_set_data()	0	
if(profile_idc == 83 profile_idc == 86) {		
seq_parameter_set_svc_extension() /* specified in Annex G */	0	
svc_vui_parameters_present_flag	0	u(1)
if(svc_vui_parameters_present_flag == 1)		
svc_vui_parameters_extension() /* specified in Annex G */	0	
} else if(profile_idc == 118 profile_idc == 128 profile_idc == 134) {		
bit_equal_to_one /* equal to 1 */	0	f(1)
seq_parameter_set_mvc_extension() /* specified in Annex H */	0	
mvc_vui_parameters_present_flag	0	u(1)
if(mvc_vui_parameters_present_flag == 1)		
mvc_vui_parameters_extension() /* specified in Annex H */	0	
} else if(profile_idc == 138 profile_idc == 135) {		
bit_equal_to_one /* equal to 1 */	0	f(1)
seq_parameter_set_mvcd_extension() /* specified in Annex I */		
} else if(profile_idc == 139) {		
bit_equal_to_one /* equal to 1 */	0	f(1)
seq_parameter_set_mvcd_extension() /* specified in Annex I */		
seq_parameter_set_3davc_extension() /* specified in Annex J */	0	
}		
additional_extension2_flag	0	u(1)
if(additional_extension2_flag == 1)		
while(more_rbsp_data())		
additional_extension2_data_flag	0	u(1)
rbsp_trailing_bits()	0	
}		

Page 346, D.1

Insert the following before the row containing only “else”:

else if(payloadType == 137)		
mastering_display_colour_volume(payloadSize)	5	

Page 360, D.1.27

Renumber D.1.27 as D.1.28.

Add the following new subclause as D.1.27:

D.1.27 Mastering display colour volume SEI message syntax

mastering_display_colour_volume(payloadSize) {	C	Descriptor
for(c = 0; c < 3; c++) {		
display primaries_x[c]	5	u(16)
display primaries_y[c]	5	u(16)
}		
white_point_x	5	u(16)
white_point_y	5	u(16)
max_display_mastering_luminance	5	u(32)
min_display_mastering_luminance	5	u(32)
}		

Page 405, D.2.27

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Renumber D.2.27 as D.2.28.

Add the following new subclause as D.2.27:

D.2.27 Mastering display colour volume SEI message semantics

This SEI message identifies the colour volume (the colour primaries, white point, and luminance range) of a display considered to be the mastering display for the associated video content, e.g. the colour volume of a display that was used for viewing while authoring the video content. The described mastering display is a three-colour additive display system that has been configured to use the indicated mastering colour volume.

This SEI message does not specify the measurement methodologies and procedures used for determining the indicated values or any description of the mastering environment. It also does not provide information on colour transformations that would be appropriate to preserve creative intent on displays with colour volumes different from that of the described mastering display.

The information conveyed in this SEI message is intended to be adequate for purposes corresponding to the use of Society of Motion Picture and Television Engineers ST 2086.

The following constraints apply for the presence of mastering display colour volume SEI messages in IDR access units:

- when a mastering display colour volume SEI message is present in any access unit of a coded video sequence and the mastering display colour volume SEI message is not contained within any other SEI message, a mastering display colour volume SEI message that is not contained within any other SEI message shall be present in the IDR access unit that is the first access unit of the coded video sequence;
- when a mastering display colour volume SEI message is present in any access unit of a coded video sequence and the mastering display colour volume SEI message is contained in a scalable

nesting SEI message applying to dependency_id dId, quality_id qId, and temporal_id tId, a mastering display colour volume SEI message that is contained in a scalable nesting SEI message applying to dependency_id equal to dId, quality_id equal to qId, and temporal_id equal to tId shall be present in the IDR access unit that is the first access unit of the coded video sequence;

- when a mastering display colour volume SEI message is present in any access unit of a coded video sequence and the mastering display colour volume SEI message is contained in an MVC scalable nesting SEI message applying to view_id vId and temporal_id tId, a mastering display colour volume SEI message that is contained in an MVC scalable nesting SEI message applying to view_id equal to vId and temporal_id equal to tId shall be present in the IDR access unit that is the first access unit of the coded video sequence;
- when a mastering display colour volume SEI message is present in any access unit of a coded video sequence and the mastering display colour volume SEI message is contained in an MVCD scalable nesting SEI message applying to texture views with view_id vId and temporal_id tId, a mastering display colour volume SEI message that is contained in an MVCD scalable nesting SEI message applying to texture views with view_id equal to vId and temporal_id equal to tId shall be present in the IDR access unit that is the first access unit of the coded video sequence.

The mastering display colour volume SEI message persists in decoding order from the current access unit until the end of the coded video sequence.

When a mastering display colour volume SEI message is not contained within any other SEI message, it pertains only to VCL NAL units with nal_unit_type in the range of 1 to 5, inclusive.

NOTE When the bitstream is a scalable video bitstream according to Annex G, a mastering display colour volume SEI message that is not contained within any other SEI message applies only to the base layer bitstream. When the bitstream is a multiview video bitstream according to Annex H, a mastering display colour volume SEI message that is not contained within any other SEI message applies only to the base layer bitstream. When the bitstream is a multiview video bitstream with depth according to Annex I or Annex J, a mastering display colour volume SEI message that is not contained within any other SEI message applies only to the base texture view.

The following constraints apply for the content of mastering display colour volume SEI messages:

- all mastering display colour volume SEI messages that apply to the same coded video sequence and are not contained within any other SEI message shall have the same content;
- all mastering display colour volume SEI messages that apply to the same coded video sequence and are contained in a scalable nesting SEI message applying to particular values of dependency_id, quality_id, and temporal_id shall have the same content;
- all mastering display colour volume SEI messages that apply to the same coded video sequence and are contained in an MVC scalable nesting SEI message applying to particular values of view_id and temporal_id shall have the same content;
- all mastering display colour volume SEI messages that apply to the same coded video sequence and are contained in an MVCD scalable nesting SEI message applying to texture views with particular values of view_id and temporal_id shall have the same content.

display primaries_x[c] and **display primaries_y[c]** specify the normalized x and y chromaticity coordinates, respectively, of the colour primary component c of the mastering display in increments of 0.00002, according to the CIE 1931 definition of x and y as specified in ISO 11664-1 (see also ISO 11664-3 and CIE 15). For describing mastering displays that use red, green, and blue colour primaries, it is suggested that index value c equal to 0 should correspond to the green primary, c equal to 1 should correspond to the blue primary, and c equal to 2 should correspond to the red colour primary (see also Annex E and Table E-3). The values of display primaries_x[c] and display primaries_y[c] shall be in the range of 0 to 50 000, inclusive.

white_point_x and **white_point_y** specify the normalized x and y chromaticity coordinates, respectively, of the white point of the mastering display in normalized increments of 0.00002, according

to the CIE 1931 definition of x and y as specified in ISO 11664-1 (see also ISO 11664-3 and CIE 15). The values of `white_point_x` and `white_point_y` shall be in the range of 0 to 50 000.

max_display_mastering_luminance and **min_display_mastering_luminance** specify the nominal maximum and minimum display luminance, respectively, of the mastering display in units of 0.0001 candelas per square metre. `min_display_mastering_luminance` shall be less than `max_display_mastering_luminance`.

At minimum luminance, the mastering display is considered to have the same nominal chromaticity as the white point.

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Replace Table E-3 with the following:

Table E-3 — Colour primaries

Value	Primaries	Informative remark
0	Reserved	For future use by ITU-T ISO/IEC
1	primary x y green 0.300 0.600 blue 0.150 0.060 red 0.640 0.330 white D65 0.3127 0.3290	Rec. ITU-R BT.709-5 Rec. ITU-R BT.1361 conventional colour gamut system and extended colour gamut system IEC 61966-2-1 (sRGB or sYCC) IEC 61966-2-4 Society of Motion Picture and Television Engineers RP 177 (1993) Annex B
2	Unspecified	Image characteristics are unknown or are determined by the application.
3	Reserved	For future use by ITU-T ISO/IEC
4	primary x y green 0.21 0.71 blue 0.14 0.08 red 0.67 0.33 white C 0.310 0.316	Rec. ITU-R BT.470-6 System M (historical) United States National Television System Committee 1953 Recommendation for transmission standards for colour television United States Federal Communications Commission Title 47 Code of Federal Regulations (2003) 73.682 (a) (20)
5	primary x y green 0.29 0.60 blue 0.15 0.06 red 0.64 0.33 white D65 0.3127 0.3290	Rec. ITU-R BT.470-6 System B, G (historical) Rec. ITU-R BT.601-6 625 Rec. ITU-R BT.1358 625 Rec. ITU-R BT.1700 625 PAL and 625 SECAM
6	primary x y green 0.310 0.595 blue 0.155 0.070 red 0.630 0.340 white D65 0.3127 0.3290	Rec. ITU-R BT.601-6 525 Rec. ITU-R BT.1358 525 Rec. ITU-R BT.1700 NTSC Society of Motion Picture and Television Engineers 170M (2004) (functionally the same as the value 7)
7	primary x y green 0.310 0.595 blue 0.155 0.070 red 0.630 0.340 white D65 0.3127 0.3290	Society of Motion Picture and Television Engineers 240M (1999) (functionally the same as the value 6)
8	primary x y green 0.243 0.692 (Wratten 58) blue 0.145 0.049 (Wratten 47) red 0.681 0.319 (Wratten 25) white C 0.310 0.316	Generic film (colour filters using Illuminant C)