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HDR Signalling and Carriage of Dynamic Metadata for Colour Volume Transform; Application #1 for DVB compliant systems

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Foreword

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Modal verbs terminology

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Introduction

SMPTE ST 2094-10 [4] HDR dynamic metadata provides and describes dynamic information about the video signal. The usage of this information can be employed by the display to adapt the delivered HDR imagery to the capability of the display device. The information conveyed in the SEI message carrying SMPTE ST 2094-10 [4] HDR dynamic metadata is adequate for purposes corresponding to the use of Society of Motion Picture and Television Engineers SMPTE ST 2094-1 [3] "Dynamic Metadata for Color Volume Transform - Core Components" and SMPTE ST 2094-10 [4] "Dynamic Metadata for Color Volume Transform - Application #1".

1 Scope

The present document specifies the format of the HEVC SEI message for the carriage of SMPTE ST 2094-10 [4] HDR dynamic metadata.

The present document provides the guidelines for the carriage and signalling the presence of SMPTE ST 2094-10 [4] HDR dynamic metadata (carried in SEI messages defined in the present document) for DVB systems, using private data signalling methods compatible with those defined in ETSI TS 101 154 [8], ETSI TS 103 285 [9] and ETSI EN 300 468 [6].

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] SMPTE ST 2084:2014: "High Dynamic Range Electro-Optical Transfer Function of Mastering Reference Displays".

[2] SMPTE ST 2086:2014: "Mastering Display Color Volume Metadata Supporting High Luminance And Wide Color Gamut Images".

[3] SMPTE ST 2094-1:2016: "Dynamic Metadata for Color Volume Transform - Core Components".

[4] SMPTE ST 2094-10:2016: "Dynamic Metadata for Color Volume Transform - Application #1".

[5] Recommendation ITU-T H.265 | ISO/IEC 23008-2: "Information technology - High efficiency coding and media delivery in heterogeneous environments - Part 2: High efficiency video coding".

[6] ETSI EN 300 468: "Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems".

[7] ETSI TS 101 211: "Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI)".

[8] ETSI TS 101 154: "Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream".

[9] ETSI TS 103 285: "Digital Video Broadcasting (DVB); MPEG-DASH Profile for Transport of ISO BMFF Based DVB Services over IP Based Networks".

[10] Recommendation ITU-T T.35: "Procedure for the allocation of ITU-T defined codes for non-standard facilities".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] Recommendation ITU-R BT.2246-2: "The present state of ultra-high definition television".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

display mapping: adapting the signal to the dynamic range and the colour gamut of the target display

dynamic range: the ratio of the maximum light intensity to the minimum light intensity [i.1]

NOTE: In digital cameras the dynamic range is normally measured in terms of stops, which describe the total light range by power of 2.

extended display mapping metadata: subset of the ST2094_data() structure

high dynamic range: typically, a dynamic range of more than 10 stops is referred to as high dynamic range

standard dynamic range: typically, a dynamic range of up to 10 stops is referred to as standard dynamic range

3.2 Symbols

3.2.1 Arithmetic operators

For the purposes of the present document, the following arithmetic operators apply:

+	Addition
-	Subtraction (as a two-argument operator) or negation (as a unary prefix operator)
x	Multiplication, including matrix multiplication
÷	Used to denote division in mathematical equations where no truncation or rounding is intended
/	Integer division with truncation of the result toward zero

EXAMPLE: 7/4 and - 7/- 4 are truncated to 1 and - 7/4 and 7/- 4 are truncated to - 1.

3.2.2 Relational operators

For the purposes of the present document, the following relational operators apply:

>	Greater than
>=	Greater than or equal to
<	Less than
<=	Less than or equal to
==	Equal to
!=	Not equal to

3.2.3 Assignment operators

For the purposes of the present document, the following assignment operators apply:

=	Assignment operator
++	Increment, i.e. *x* is equivalent to *x* = *x* + 1; when used in an array index, evaluates to the value of the variable prior to the increment operation
--	Decrement, i.e. *x*- - is equivalent to *x* = *x* - 1; when used in an array index, evaluates to the value of the variable prior to the decrement operation
+=	Increment by amount specified, i.e. x += 4 is equivalent to x = x + 4, and x += (-4) is equivalent to x = x + (-4)
-=	Decrement by amount specified, i.e. x -= 4 is equivalent to x = x - 4, and x -= (-4) is equivalent to x = x - (-4)

3.2.4 Mathematical functions

For the purposes of the present document, the following mathematical functions apply:

$$\text{Abs(x)} = \begin{cases} x & ; \quad x \geq 0 \\ -x & ; \quad x < 0 \end{cases}$$

$$\text{Clip3(x, y, z)} = \begin{cases} x & ; \quad z < x \\ y & ; \quad z > y \\ z & ; \quad otherwise \end{cases}$$

Floor(x) the largest integer less than or equal to x.

Round(x)=Sign(x)*Floor(Abs(x)+0,5)

$$\text{Sign(x)} = \begin{cases} 1 & ; \quad \text{x} > 0 \\ 0 & ; \quad x = 0 \\ -1 & ; \quad x < 0 \end{cases}$$

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CVS	Coded Video Sequence
EIT	Event Information Table
EN	European Standard
HDR	High Dynamic Range
HEVC	High Efficiency Video Coding
HFR	High Frame Rate
IRD	Integrated Receiver-Decoder
ITU-R	International Telecommunications Union - Radiocommunications standardization sector
ITU-T	International Telecommunications Union - Telecommunications standardization sector
MPEG	Moving Picture Expert Group
PID	Packet IDentifier
PQ	Perceptual Quantizer

NOTE: As defined in SMPTE ST 2084 [1].

SDT	Service Description Table
SEI	Supplemental Enhancement Information
SI	Service Information
SMPTE	Society of Motion Pictures and Television Engineers
ST	Standard
UHDTV	Ultra High Definition Television

4 ST2094-10_data() structure definition

4.1 Introduction

This clause specifies the syntax and semantics of ST2094-10_data() structure.

Clause 4.1 defines the syntax of the ST2094-10_data() structure.

Clause 4.2 defines the semantics of the ST2094-10_data() structure.

NOTE: The metadata elements of the ST2094-10_data() structure are defined according to the SMPTE standards ST 2086 [2], ST 2094-1 [3] and ST 2094 -10 [4].

4.2 ST2094-10_data() structure syntax

The parsing process of each syntax element by the descriptor u(n) is described in Recommendation ITU-T H.265 [5].

Table 1: ST2094-data() syntax

ST2094-10_data () {	Descriptor
app_identifier	ue(v)
app_version	ue(v)
metadata_refresh_flag	u(1)
if(metadata_refresh_flag) {	
num_ext_blocks	ue(v)
if(num_ext_blocks) {	
while(!byte_aligned())	
dm_alignment_zero_bit	f(1)
for(i = 0; i < num_ext_blocks; i ++) {	
ext_dm_data_block(i)	
}	
}	
}	
while(!byte_aligned())	
dm_alignment_zero_bit	f(1)
}	

Table 2: ext_dm_data_block() syntax

ext_dm_metadata_block(i) {	Descriptor
ext_block_length[i]	ue(v)
ext_block_level [i]	u(8)
ext_dm_data_block_payload(ext_block_length[i], ext_block_level [i])	
}	

Table 3: ext_dm_data_block_payload() syntax

ext_dm_data_block_payload(ext_block_length, ext_block_level) {	Descriptor
ext_block_len_bits = 8 * ext_block_length	
ext_block_use_bits = 0	
if(ext_block_level == 1) {	
min_PQ	u(12)
max_PQ	u(12)
avg_PQ	u(12)
ext_block_use_bits += 36	
}	
if(ext_block_level == 2) {	
target_max_PQ	u(12)
trim_slope	u(12)
trim_offset	u(12)
trim_power	u(12)
trim_chroma_weight	u(12)
trim_saturation_gain	u(12)
ms_weight	i(13)
ext_block_use_bits += 85	
}	
if(ext_block_level == 5) {	
active_area_left_offset	u(13)
active_area_right_offset	u(13)
active_area_top_offset	u(13)
active_area_bottom_offset	u(13)
ext_block_use_bits += 52	
}	
while(ext_block_use_bits++ < ext_block_len_bits)	
ext_dm_alignment_zero_bit	f(1)
}	

4.3 ST2094-10_data() structure semantics

app_identifier identifies an application and shall be set equal to 1 according to constraints of the section 5 of SMPTE ST 2094-10 [4].

app_version specifies the application version in the application and shall be set equal to 0 according to constraints of the section 5 of SMPTE ST 2094-10 [4].

metadata_refresh_flag when set equal to 1 cancels the persistence of any previous extended display mapping metadata in output order and indicates that extended display mapping metadata follows. The extended display mapping metadata persists from the coded picture to which the SEI message containing ST2094-10_data() is associated (inclusive) to the coded picture to which the next SEI message containing ST2094-10_data() and with **metadata_refresh_flag** set equal to 1 in output order is associated (exclusive) or (otherwise) to the last picture in the CVS (inclusive). When set equal to 0 this flag indicates that the extended display mapping metadata does not follow.

num_ext_blocks specifies the number of extended display mapping metadata blocks. The value shall be in the range of 1 to 254, inclusive.

dm_alignment_zero_bit shall be equal to 0.

ext_block_length[i] is used to derive the size of the i-th extended display mapping metadata block payload in bytes. The value shall be in the range of 0 to 1 023, inclusive.

ext_block_level[i] specifies the level of payload contained in the i-th extended display mapping metadata block. The value shall be in the range of 0 to 255, inclusive. The corresponding extended display mapping metadata block types are defined in Table 4. Values of ext_block_level[i] that are reserved shall not be present in the bitstreams conforming to this version of this specification. Blocks using reserved values shall be ignored.

When the value of ext_block_level[i] is set equal to 1, the value of ext_block_length[i] shall be set equal to 5.

When the value of ext_block_level[i] is set equal to 2, the value of ext_block_length[i] shall be set equal to 11.

When the value of ext_block_level[i] is set equal to 5, the value of ext_block_length[i] shall be set equal to 7.

Table 4: Definition of extended display mapping metadata block type

ext_block_level	extended display mapping metadata block type
0	Reserved
1	Level 1 Metadata - Content Range
2	Level 2 Metadata - Trim Pass
3	Reserved
4	Reserved
5	Level 5 Metadata - Active Area
6…255	Reserved

When an extended display mapping metadata block with ext_block_level equal to 5 is present, the following constraints shall apply:

- An extended display mapping metadata block with ext_block_level equal to 5 shall be preceded by at least one extended display mapping metadata block with ext_block_level equal to 1 or 2.
- Between any two extended display mapping metadata blocks with ext_block_level equal to 5, there shall be at least one extended display mapping metadata block with ext_block_level equal to 1 or 2.
- No extended display mapping metadata block with ext_block_level equal to 1 or 2 shall be present after the last extended display mapping metadata block with ext_block_level equal to 5.
- The metadata of an extended display mapping metadata block with ext_block_level equal to 1 or 2 shall be applied to the active area specified by the first extended display mapping metadata block with ext_block_level equal to 5 following this block.
- When the active area defined by the current extended display mapping metadata block with ext_block_level equal to 5 overlaps with the active area defined by preceding extended display mapping metadata blocks with ext_block_level equal to 5, all metadata of the extended display mapping metadata blocks with ext_block_level equal to 1 or 2 associated with the current extended display mapping metadata block with ext_block_level equal to 5 shall be applied to the pixel values of the overlapping area.

min_PQ specifies the minimum luminance value of the current picture in 12-bit PQ encoding. The value shall be in the range of 0 to 4 095, inclusive. Note that the 12-bit min_PQ value with full range is calculated as follows:

$$min\_PQ = Clip3(0, 4\,095, Round(Min \times 4\,095))$$

where Min is MinimumPqencodedMaxrgb as defined in clause 6.1.3 of SMPTE ST 2094-10 [4].

max_PQ specifies the maximum luminance value of current picture in 12-bit PQ encoding. The value shall be in the range of 0 to 4 095, inclusive. Note that the 12-bit max_PQ value with full range is calculated as follows:

$$max\_PQ = Clip3(0, 4\,095, Round(Max \times 4\,095))$$

where Max is MaximumPqencodedMaxrgb as defined in clause 6.1.5 of SMPTE ST 2094-10 [4].

avg_PQ specifies the midpoint luminance value of current picture in 12-bit PQ encoding. The value shall be in the range of 0 to 4 095, inclusive. Note that the 12-bit avg_PQ value with full range is calculated as follows:

$$avg\_PQ = Clip3(0, 4\,095, Round(Avg \times 4\,095))$$

where Avg is AveragePqencodedMaxrgb as defined in section 6.1.4 of SMPTE ST 2094-10 [4].

target_max_PQ specifies the maximum luminance value of a target display in 12-bit PQ encoding. The value shall be in the range of 0 to 4 095, inclusive. The target_max_PQ is the PQ encoded value of TargetedSystemDisplayMaximumLuminance as defined in clause 10.4 of SMPTE ST 2094-1 [3].

If there is more than one extended display mapping metadata block with ext_block_level equal to 2, those blocks shall have no duplicated target_max_PQ.

trim_slope specifies the slope metadata. The value shall be in the range of 0 to 4 095, inclusive. If trim_slope is not present, it shall be inferred to be 2 048. Note that the 12-bit slope value is calculated as follows:

$$trim\_slope = \text{Clip3}(0, 4\,095, \text{Round}((S - 0{,}5) \times 4\,096))$$

where *S* is the ToneMappingGain as defined in clause 6.2.3 of SMPTE ST 2094-10 [4].

trim_offset specifies the offset metadata. The value shall be in the range of 0 to 4 095, inclusive. If trim_offset is not present, it shall be inferred to be 2 048. Note that the 12-bit offset value is calculated as follows:

$$trim\_offset = \text{Clip3}(0, 4\,095, \text{Round}((O + 0{,}5) \times 4\,096))$$

where *O* is the ToneMappingOffset as defined in clause 6.2.2 of SMPTE ST 2094-10 [4].

trim_power specifies the power metadata. The value shall be in the range of 0 to 4 095, inclusive. If trim_power is not present, it shall be inferred to be 2 048. Note that the 12-bit power value is calculated as follows:

$$trim\_power = \text{Clip3}(0, 4\,095, \text{Round}((P - 0{,}5) \times 4\,096))$$

where *P* is the ToneMappingGamma as defined in clause 6.2.4 of SMPTE ST 2094-10 [4].

trim_chroma_weight specifies the chroma weight metadata. The value shall be in the range of 0 to 4 095, inclusive. If trim_chroma_weight is not present, it shall be inferred to be 2 048. Note that the 12-bit chroma weight value is calculated as follows:

$$trim\_chroma\_weight = \text{Clip3}(0, 4\,095, \text{Round}((CW + 0{,}5) \times 4\,096))$$

where *CW* is the ChromaCompensationWeight as defined in clause 6.3.1 of SMPTE ST 2094-10 [4].

trim_saturation_gain specifies the saturation gain metadata. The value shall be in the range of 0 to 4 095, inclusive. If trim_saturation_gain is not present, it shall be inferred to be 2 048. Note that the 12-bit saturation gain value is calculated as follows:

$$trim\_saturation\_gain = \text{Clip3}(0, 4\,095, \text{Round}((SG + 0{,}5) \times 4\,096))$$

where *SG* is the SaturationGain as defined in clause 6.3.2 of SMPTE ST 2094-10 [4].

ms_weight this field is reserved for future specification. This 13-bit signed integer shall be 0x1fff (-1).

active_area_left_offset, active_area_right_offset, active_area_top_offset, active_area_bottom_offset specify the selected pixels of the current picture, in terms of a rectangular region specified in picture coordinates for active area. The values shall be in the range of 0 to 8 191, inclusive. See also ProcessingWindow definitions in SMPTE ST 2094-10 [4].

active_area_left_offset, active_area_right_offset, active_area_top_offset, active_area_bottom_offset represent the coordinates of UpperLeftCorner and LowerRightCorner constrained in clause 7.1 of SMPTE ST 2094-10 [4] as follows:

UpperLeftCorner = (active_area_left_offset, active_area_top_offset)
LowerRightCorner = (XSize - 1 - active_area_right_offset , YSize - 1 - active_area_bottom_offset)

where Xsize is the horizontal resolution of the current picture and Ysize is the vertical resolution of the current picture.

ext_dm_alignment_zero_bit shall be equal to 0.

Annex A (informative): SMPTE ST 2094-10 HDR Dynamic Metadata in MPEG-2 TS for DVB Systems

A.1 Introduction

This annex provides information for the carriage and signalling of SMPTE ST 2094-10 HDR dynamic metadata in DVB systems compliant MPEG-2 transport streams.

NOTE: The terms used in this annex are the terms defined in ETSI TS 101 154 [8] and ETSI EN 300 468 [6].

A.2 Carriage of SMPTE ST 2094-10 HDR Dynamic Metadata

A.2.1 Coding

In an HEVC HDR UHDTV Bitstream using PQ as defined in clause 5.14.4.4.3 of ETSI TS 101 154 [8] the SMPTE ST 2094-10 HDR dynamic metadata may be carried in the data as Supplemental Enhancement Information in HEVC's "User data registered by a Recommendation ITU-T T.35 [10] SEI message" syntactic element.

If the "User data registered by a Recommendation ITU-T T.35 [10] SEI message" carrying SMPTE ST 2094-10 HDR dynamic metadata is present in an HEVC HDR UHDTV Bitstream using PQ as defined in clause 5.14.4.4.3 of ETSI TS 101 154 [8], the following constraints should apply:

- It should be a prefix SEI message (i.e. **nal_unit_type** should be equal to PREFIX_SEI_NUT) sent for every access unit of the HEVC HDR UHDTV Bitstream.
- **app_identifier** should be set equal to "1".
- **app_version** should be set equal to "0".
- The number of extension blocks with **ext_block_level** set equal to "1" should be constrained to be equal to "1".
- The number of extension blocks with **ext_block_level** set equal to "2" should be constrained to be less than or equal to "16".
- The number of extension blocks with **ext_block_level** set equal to "5" should be constrained to be less than or equal to "1".
- The HEVC HDR UHDTV Bitstream should contain a Mastering Display Colour Volume SEI message as specified in clause 5.14.4.4.3.3.2 of ETSI TS 101 154 [8].

A.2.2 Syntax and Semantics

The SMPTE ST 2094-10 HDR dynamic metadata is carried in the video elementary stream as Supplemental Enhancement Information in HEVC's "User data registered by a Recommendation ITU-T T.35 [10] SEI message" syntactic element. The syntax is shown in table A.1.

Table A.1: User_data_registered_itu_t_35 SEI message for SMPTE ST 2094-10 metadata syntax

user_data_registered_itu_t_t35 () {	**Descriptor**
itu_t_t35_country_code	b(8)
itu_t_t35_terminal_provider_code	u(16)
itu_t_t35_terminal_provider_oriented_code	f(32)
data_type_code	u(8)
ST2094-10_data ()	
reserved_ff_8bits	u(8)
}	

itu_t_t35_country_code should be set to 0xB5.

itu_t_t35_terminal_provider_code should be set to 0x003B.

itu_t_t35_terminal_provider_oriented_code should be set to 0x00.

data_type_code should be set to 0x09.

reserved_ff_8bits should be set to 0xFF.

A.3 Service Information Signalling of SMPTE ST 2094-10 HDR Dynamic Metadata

A.3.1 General principles

Service information (SI) data which forms a part of DVB bitstreams provides the user with information to assist in selection of services and enables the IRD to automatically configure itself for the selected service. SI data is specified in ETSI EN 300 468 [6] with associated guidelines in ETSI TS 101 211 [7]. The guidelines in this clause are intended to be in line with those defined in ETSI EN 300 468 [6]. In case of any discrepancy, the specifications defined in ETSI EN 300 468 [6] should take precedence.

This clause specifies the preferred method for signalling of the presence of SMPTE ST 2094-10 HDR dynamic metadata in HEVC video services using the "HEVC digital television service with HDR and/or a frame rate of 100 Hz, 120 000/1 001 Hz, or 120 Hz" (0x20) service type, as defined in clause I.2.6 of ETSI EN 300 468 [6].

One or more component descriptors may be present in the SDT entry of each HEVC digital television service which contains an HEVC HDR UHDTV Bitstream using PQ10 and SMPTE ST 2094-10 HDR dynamic metadata. There should be one and only one component descriptor using values from table A.2, a subset derived from table I.9 of ETSI EN 300 468 [6]. Other component descriptors may also be present in the SDT (such as those defined in table I.7 of ETSI EN 300 468 [6]), but no component descriptor using values from table I.1 or values from table I.9 other than those defined in table A.2 should be present.

Table A.2: HEVC component types from table I.9 of ETSI EN 300 468 [6] for service_type 0x20 and PQ10 HDR

stream_content	stream_content_ext	component_type	Description
0x9	0x0	0x05	HEVC ultra high definition video with PQ10 HDR with a frame rate lower than or equal to 60 Hz conformant to one of the following UHDTV bit stream conformance points defined in table 18b in ETSI TS 101 154 [8]: • HDR with PQ10 frame rate up to 60 Hz or HEVC ultra high definition video with PQ10 HDR with a frame rate of 100 Hz, 120 000/1 001 Hz, or 120 Hz with a half frame rate HEVC temporal video sub-bit-stream conformant to one of the following UHDTV bit stream conformance points defined in table 18b in ETSI TS 101 154 [8]: • HDR with PQ10 HFR dual PID and temporal scalability
		0x07	HEVC ultra high definition video with PQ10 HDR, frame rate of 100 Hz, 120 000/1 001 Hz, or 120 Hz without a half frame rate HEVC temporal video sub-bit-stream conformant to one of the following UHDTV bit stream conformance points defined in table 18b in ETSI TS 101 154 [8]: • HDR with PQ10 HFR single PID
NOTE: This table is a subset copied from table I.9 of ETSI EN 300 468 [6] for convenience only. Any discrepancies between the present document and ETSI EN 300 468 [6] are unintentional, and ETSI EN 300 468 [6] is the sole canonical source.			

If SMPTE ST 2094-10 HDR dynamic metadata is present in an HEVC HDR UHDTV Bitstream using PQ an additional component descriptors as shown in table A.3 may be present in the SDT and/or in the EIT to signal the presence of such metadata. This SMPTE ST 2094-10 HDR dynamic metadata specific component descriptor is supplementary to one or more component descriptors with the same **component_tag**, together defining the codec and video characteristics of the video elementary stream.

Table A.3: Component descriptor signalling the presence of SMPTE ST 2094-10 [4] HDR dynamic metadata

stream_content	stream_content_ext	component_type	Description
0xD	0xF	0xD0	SMPTE ST 2094-10 HDR dynamic metadata
NOTE: Since the ST 2094-10 HDR dynamic metadata specific component descriptor defined in this table is in the user defined range as specified in table 26 of ETSI EN 300 468 [6], it should be preceeded by a private data specifier descriptor with the private data specifier field set to 0x000000D0.			

A.3.2 Summary of signalling different bitstream profiles using service type 0x20, PQ10 HDR and SMPTE ST 2094-10 HDR metadata

Table A.4 summarizes the signalling of different bitstream profiles using service type 0x20, PQ10 HDR, if SMPTE ST 2094-10 HDR dynamic metadata is present. The table is based on the bitstream profiles using service type 0x20 and PQ10 HDR listed in table I.11 of ETSI EN 300 468 [6].

Table A.4: Signalling for HEVC ultra high definition video with PQ10 HDR and SMPTE ST 2094-10 HDR metadata

HEVC Profile	service_type (note 1)	Mandatory SDT component descriptor (note 1)			Optional SDT component descriptor (note 1 and note 2)			Optional SDT SMPTE ST 2094-10 HDR metadata component descriptor (note 2)		
		stream_content	stream_content_ext	component_type	stream_content	stream_content_ext	component_type	stream_content	stream_content_ext	component_type
HEVC ultra high definition video with PQ10 HDR with a frame rate lower than or equal to 60 Hz conformant to the conformance point "HDR with PQ10 frame rate up to 60 Hz" as defined in table 18b in ETSI TS 101 154 [8] and with SMPTE ST 2094-10 HDR metadata	0x20	0x9	0x0	0x05				0xD	0xF	0xD0
HEVC ultra high definition video with PQ10 HDR with a frame rate of 100 Hz, 120 000/1 001 Hz, or 120 Hz containing a half frame rate HEVC temporal video sub-bit-stream and with SMPTE ST 2094-10 HDR metadata	0x20	0x9	0x0	0x05	0xB	0xF	0x05	0xD	0xF	0xD0
HEVC ultra high definition video with PQ10 HDR, frame rate of 100 Hz, 120 000/1 001 Hz, or 120 Hz without a half frame rate HEVC temporal video sub-bit-stream conformant to the conformance point "HDR with PQ10 HFR single PID" as is defined in in table 18b in ETSI TS 101 154 [8] and with SMPTE ST 2094-10 HDR metadata	0x20	0x9	0x0	0x07				0xD	0xF	0xD0

NOTE 1: This table is based on table I.11 of ETSI EN 300 468 [6] and any discrepancies between the present column and the corresponding column of ETSI EN 300 468 [6] are unintentional, and ETSI EN 300 468 [6] is the sole canonical source.

NOTE 2: These component descriptors are optional to broadcast. A broadcaster can signal them if they wish for receivers to be able to group services by their HEVC bit stream profile. There are no requirements for receivers to use these.

History

Document history		
V1.1.1	March 2018	Publication
V1.1.2	July 2018	Publication