

## CHANGE REQUEST

DASH-IF IOP CR 0023 rev - Current version: 4.2

Status:  Draft  Internal Review  Community Review  Agreed

<b>Title:</b>	Addition of Addition of UHD Dynamic Metadata to DASH-IF IOP	
<b>Source:</b>	UHD TF	
<b>Supporting Companies:</b>	See work item descriptions	
<b>Category:</b>	<b>A</b>	<b>Date:</b> 2018-05-09
	Use <i>one</i> of the following categories: <b>C</b> (correction) <b>A</b> (addition of feature) <b>B</b> (editorial modification)	

<b>Reason for change:</b>	See work item descriptions
<b>Summary of change:</b>	Adds signalling for dynamic metadata
<b>Consequences if not approved:</b>	Not applicable.

<b>Sections affected:</b>	Acronyms, References, 10.2.2.3 (new), 10.3.2.3 (new), 10.3.2.4 (move from 10.3.2.3)
<b>Other comments:</b>	

<b>Disclaimer:</b>	<p>This document is not yet final. It is provided for public review until the deadline mentioned below. If you have comments on the document, please submit comments by one of the following means:</p> <ul style="list-style-type: none"><li>- at the github repository <a href="https://github.com/Dash-IndustryForum/IOP/issues">https://github.com/Dash-IndustryForum/IOP/issues</a> (public at <a href="https://gitreports.com/issue/haudiobe/DASH-IF-IOP">https://gitreports.com/issue/haudiobe/DASH-IF-IOP</a>)</li><li>- <a href="mailto:dashif+iop@groupspaces.com">dashif+iop@groupspaces.com</a> with a subject tag [UHD], or</li></ul> <p>Please add a detailed description of the problem and the comment.</p> <p>Based on the received comments a final document will be published latest by the expected publication date below, integrated in a new version of DASH-IF IOP if the following additional criteria are fulfilled:</p> <ul style="list-style-type: none"><li>- All comments from community review are addressed</li><li>- The relevant aspects for the Conformance Software are provided</li><li>- Verified IOP test vectors are provided</li></ul>
<b>Commenting Deadline:</b>	June 30 <sup>th</sup> , 2018
<b>Expected Publication:</b>	August 31 <sup>st</sup> , 2016

===== 1. CHANGE =====

**Add to Acronyms**

HDR

SDR

SL-HDR1

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===== 2. CHANGE =====

**Add to References**

[TS103433-1] High-Performance Single Layer High Dynamic Range (HDR). System for use in Consumer Electronics devices: Part 1: Directly Standard Dynamic Range (SDR). Compatible HDR System (SL-HDR1)

===== 3. CHANGE =====

**10.2.2.3. HDR Dynamic Metadata**

**10.2.2.3.1 General**

Bitstreams conforming to the UHD HEVC 4K media profile may contain one or more sets of optional dynamic metadata. Details of the various metadata schemes are detailed below.

The presence of dynamic metadata is signalled by a Supplemental Descriptor with @schemeIdURI set to “http://dashif.org/metadata/hdr”, the @value set to once of the values in the following table:

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<u>Dynamic Metadata Scheme</u>	<u>@value parameter</u>
<u>TS 103.433 SEI Messages</u>	<u>TS103433</u>

Details of the metadata schemes are provided in the subsections below:

**10.2.2.3.2 TS 103.433 HDR dynamic metadata**

When the Adaptation Set contains a Supplemental Descriptor with @schemeIdURI set to “http://dashif.org/metadata/hdr” and @value set to “TS103433”, then the bitstream shall contain one or more SL-HDR Information SEI messages, as defined in clause A.2.2 of [TS103433-1], and may contain one or more Mastering Display Colour Volume SEI messages, as defined in HEVC specification [IS23008-2]. The following constraints apply, in addition to those specified above in Section 10.3.2.2:

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- The SL-HDR Information SEI message shall be present at least with every SAP type 1 or type 2.
- When carried, the Mastering Display Colour Volume SEI message shall be present at least with every SAP type 1 or type 2 and shall be used as specified in clause A.3 of [TS103433-1].

## ===== 4. CHANGE =====

### 10.3.2.3. HDR Dynamic Metadata

#### 10.3.2.3.1 General

Bitstreams conforming to the HEVC HDR PQ10 media profile may contain one or more sets of optional dynamic metadata. Details of the various metadata schemes are detailed below.

The presence of dynamic metadata is signalled by a Supplemental Descriptor with @schemeIdURI set to “http://dashif.org/metadata/hdr”, the @value set to one of the values in the following table:

<u>Dynamic Metadata Scheme</u>	<u>@value parameter</u>
<u>CRI SEI Messages</u>	<u>cri</u>
<u>SMPTE 2094-10 SEI Messages</u>	<u>SMPTE2094-10</u>
<u>SMPTE 2094-40 SEI Messages</u>	<u>SMPTE2094-40</u>
<u>TS 103.433 SEI Messages</u>	<u>TS103433</u>

Details of the metadata schemes are provided in the subsections below:

#### 10.3.2.3.2 CRI HDR scheme

When the Adaptation Set contains a Supplemental Descriptor with @schemeIdURI set to “http://dashif.org/metadata/hdr” and @value set to “cri”, then the bitstream shall contain one or more colour remapping information (CRI) SEI messages, the following constraints apply, in addition to those specified above in Section 10.3.2.2:

- The CRI SEI message shall be transmitted at least with every IRAP access unit for each targeted display that is identified by the values of the syntax elements colour\_remap\_id, colour\_remap primaries, and colour\_remap transfer function.
- The syntax element colour\_remap\_video\_signal\_info\_present\_flag shall be set to 1.
- The value of colour\_remap primaries shall be set to 1 for targeting BT.709 colorimetry or 9 for targeting BT.2020 non-constant luminance colorimetry.
- The value of colour\_remap\_matrix\_coefficients shall be set to 1 for targeting BT.709 matrix coefficients or 9 for targeting BT.2020 non-constant luminance matrix coefficients.
- The value of colour\_remap\_transfer\_function shall be set to 1 for targeting BT.709, 14 for targeting BT.2020, or 16 for targeting SMPTE ST 2084 transfer characteristics.
- The values of colour\_remap\_input\_bit\_depth and colour\_remap\_bit\_depth shall be set to 8 or 10 bits.
- Changes to any of the syntax elements colour\_remap\_full\_range\_flag, colour\_remap primaries, colour\_remap\_transfer\_function, colour\_remap\_matrix\_coefficients, colour\_remap\_input\_bit\_depth and colour\_remap\_output\_bit\_depth shall only occur at an IRAP access unit.

- The 7 least significant bits of the colour\_remap\_id shall be set according to the following relation to the target display maximum luminance after remapping (in cd/m2):

$$T_{ml} = 100 \times (\text{colour\_remap\_id} - 128 * \text{floor}(\text{colour\_remap\_id}/128) + 1)$$

Where the function floor() is the downward rounding function and T<sub>ml</sub> is the target display maximum luminance.

Note: The approach using the 7 least significant bits of the colour\_remap\_id had been verified with MPEG in a Liaison exchange. MPEG responded that the usage of this SEI message as described does appear to be allowed by the standard, since the range of values that you discussed for colour\_remap\_id falls within the range that "may be used as determined by the application". MPEG is not aware of specific conflicting uses of the colour\_remap\_id, but applications (i.e. DASH-IF) should be cautious of potential "collisions" of the interpretation for values of ID syntax elements belonging to application-specific ranges. Since different applications might use these IDs for different purposes, particular care should be exercised in the design of encoders that generate SEI messages with these IDs, and in the design of decoders that interpret SEI messages with these IDs. The standard does not define any management for ID values belonging to application-specific ranges. MPEG is suggesting two possibilities to improve the specification.

- To also add a user data SEI message as confirmation that the intended interpretation of the ID value is according to your specification, or
- Using only one ID value, and using a user data SEI message to carry the associated additional details (in your case, the 7-bit indicator of the target display maximum luminance).

DASH-IF is currently investigating to provide a user data SEI message that confirms the intended interpretation.

We encourage comments in the community review if this approach is consider suitable to address the above concerns.

### **10.3.2.3.3 SMPTE 2094-10 HDR dynamic metadata**

When the Adaptation Set contains a Supplemental Descriptor with @schemeIdURI set to "http://dashif.org/metadata/hdr" and @value set to "SMPTE2094-10", then the bitstream shall contain SMPTE 2094-10 metadata, provided as a Supplemental Enhancement Information (SEI) message containing a DM\_data() message (as defined in [Annex C- Display Management Message]) in accordance with "User data registered by Recommendation ITU-T T.35 SEI message" syntax element.

In addition to the Bitstream Requirements defined above in Section 10.3.2.2, when ST2094-40 dynamic metadata is carried, exactly one ST 2094-10 SEI message shall be sent for every access unit of the bitstream..

#### **10.3.2.3.4 SMPTE 2094-40 HDR dynamic metadata**

When the Adaptation Set contains a Supplemental Descriptor with @schemeIdURI set to “http://dashif.org/metadata/hdr” and @value set to “SMPTE2094-40”, then the bitstream shall contain SMPTE 2094-40 metadata, provided as a Supplemental Enhancement Information (SEI) message (as defined in [CTA861-G]) in accordance with “User data registered by Recommendation ITU-T T.35 SEI message” syntax element.

This SEI message provides information to enable colour volume transformation of the reconstructed colour samples of the output pictures. The input to the indicated colour volume transform process is the linearized RGB colour components of the source content. The semantics and usage of the dynamic metadata shall be in conformance with the specifications in [ST2094-40].

In addition to the Bitstream Requirements defined above in Section 10.3.2.2, when ST2094-40 dynamic metadata is carried, exactly one ST 2094-40 SEI message shall be present with every SAP of type 1 or type 2.

#### **10.3.2.3.5 TS 103.433 HDR dynamic metadata**

When the Adaptation Set contains a Supplemental Descriptor with @schemeIdURI set to “http://dashif.org/metadata/hdr” and @value set to “TS103433”, then the bitstream shall contain one or more SL-HDR Information SEI messages, as defined in clause A.2.2 of [TS103433-1], and may contain one or more Mastering Display Colour Volume SEI messages, as defined in HEVC specification [IS23008-2]. The following constraints apply, in addition to those specified above in Section 10.3.2.2:

- The SL-HDR Information SEI message shall be present at least with every SAP type 1 or type 2.
- When carried, the Mastering Display Colour Volume SEI message shall be present at least with every SAP type 1 or type 2 and shall be used as specified in clause A.3 of [TS103433-1].

## **===== 5. CHANGE =====**

#### **10.3.2.3.4. Receiver Requirements**

Receivers conforming to the HEVC HDR PQ10 media profile shall support decoding and displaying HEVC HDR PQ10 bitstreams as defined in section **Error! Reference source not found.**

No additional processing requirements are defined, ~~for example processing of SEI messages is out of scope.~~