SMPTE ST 2067-21:2020
Amendment 1:2020

SMPTE STANDARD

Interoperable Master Format — Application #2E Amendment 1

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Approved October 14, 2020

Foreword

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Intellectual Property

At the time of publication, no notice had been received by SMPTE claiming patent rights essential to the implementation of this Engineering Document. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

1 Scope

This amendment adds the Hybrid Log-Gamma (HLG) high dynamic range format specified in Recommendation ITU-R BT.2100 to SMPTE ST 2067-21:2020 IMF – Application #2E

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword “reserved” indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword “forbidden” indicates “reserved” and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

Unless otherwise specified, the order of precedence of the types of normative information in this document shall be as follows: Normative prose shall be the authoritative definition; Tables shall be next; then formal languages; then figures; and then any other language forms.

3 Amendments

Amendments are detailed and listed by existing SMPTE ST 2067-21:2020 section references.

3.1 Section 3 Normative References

Add the following normative reference:

Recommendation ITU-R BT.2100-2, Image parameter values for high dynamic range television for use in production and international programme exchange

3.2 Section 5 Image Essence

Add COLOR.8 to 10/12 bit 1..3840 and 1..4096 columns in Table 3 Image Characteristics:

Table 3. Image Characteristics.

Image Frame Width	1..3840				1..4096		
Image Frame Height	1..2160				1..3112		
Colorimetry	COLOR.4	COLOR.3	COLOR.5 COLOR.8	COLOR.7	COLOR.3	COLOR.5 COLOR.8	COLOR.6 COLOR.7
Pixel Bit Depth	8 10	8 10 12 16	10 12	10 12 16	8 10 12 16	10 12	10 12 16

Add COLOR.8 definition to Table 4 Colorimetry Systems:

Table 4 Colorimetry Systems.

COLOR.8	R'G'B' components are mapped using the color primaries and white point specified in Recommendation ITU-R BT.2020 and the Hybrid Log-Gamma (HLG) reference non-linear transfer function specified in Recommendation ITU-R BT.2100. R'G'B' components are mapped to $Y'C'_BC'_R$ components using the (non-constant luminance) derivation of Y' and color difference signals specified in Table 4 of Recommendation ITU-R BT.2020.

3.3 Section 6 Image Track Files

Add the following to Section 6.2.2 Transfer Characteristic:

- 06.0E.2B.34.04.01.01.0D.04.01.01.01.01.0B.00.00 if COLOR.8 system is used.

Add COLOR.8 to Section 6.2.3 Coding Equations third bullet:

- 06.0E.2B.34.04.01.01.0D.04.01.01.01.02.06.00.00 (see Annex D) if COLOR.5, COLOR.7 or COLOR.8 systems are used.

Add COLOR.8 to Section 6.2.4 Color Primaries fourth bullet:

- 06.0E.2B.34.04.01.01.0D.04.01.01.01.03.04.00.00 if the COLOR.5, COLOR.7 or COLOR.8 systems are used.

Add COLOR.8 to Section 6.2.7 Master Display Color Volume Metadata as shown:

If COLOR.3, COLOR.5, COLOR.6, COLOR.7 or COLOR.8 system is used then:

- either all or none of the items specified in Annex B shall be present;
- the items specified in Annex B should characterize the mastering display; and
- if the items specified in Annex B are absent, no ST 2086 metadata values are assumed.

If neither COLOR.5, COLOR.6, COLOR.7 nor COLOR.8 system is used, then no item specified in Annex B shall be present.

Note: Annex B.6 contains selected examples values for Mastering Display Color Volume Metadata. Other values, not specified in these examples, are also permitted.

Note: Although COLOR.8 does not use Master Display Color Volume Metadata, the option to include it is intended to facilitate downstream conversion to formats that do require this data. General information on conversion between high dynamic range systems defined by Recommendation ITU-R BT.2100-2 can be found in Report ITU-R BT.2390-8.

Add COLOR.8 to Section 6.4.3 Black Ref Level, White Ref Level and Color Range Values:

If COLOR.1, COLOR.2, COLOR.3, COLOR.4, COLOR.5, COLOR. 7 or COLOR.8 is used, the values of the Black Ref Level, White Ref level and Color Range items shall be set according to Table 13.

Table 13. Black Ref Level, White Ref level and Color Range values for COLOR.1, COLOR.2, COLOR.3, COLOR.4, COLOR.5, COLOR.7 and COLOR.8.

Colorimetry	COLOR.1 COLOR.2				COLOR.4		COLOR.5 COLOR.7		
	COLOR.3						COLOR.8		
Pixel Bit Depth	**8**	**10**	**12**	**16**	**8**	**10**	**10**	**12**	**16**
Black Ref Level	16	64	256	4096	16	64	64	256	4096
White Ref level	235	940	3760	60160	235	940	940	3760	60160
Color Range	254	1013	3585	57345	254	1013	897	3585	57345

Note 1: The White Ref level item applies only to the Y' component, and the Color Range item to the C'_B and C'_R components.

Note 2: In the case of COLOR.7 or COLOR.8, "White Ref" is occasionally referred to as "Nominal Peak".

3.4 Bibliography

Add the following reference:

Report ITU-R BT.2390-8, High dynamic range television for production and international programme exchange