



# JVET-P0337-v2 AHG17: On porting SEI messages specified in HEVC and AVC

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## Proposal

Add 89 SEI messages to Draft Rec. ITU-T H.SEI | Draft ISO/IEC 23002-7, “Supplemental enhancement information messages for coded video bitstreams”

- All 89 proposed SEI messages are currently specified in HEVC and AVC
- ~~8 of the proposed SEI messages are equivalently specified in AVC~~
- Syntax and semantics are copied from the HEVC specification
- Modifications from HEVC text are only to align with Draft Rec. ITU-T H.SEI | Draft ISO/IEC 23002-7 and VVC specifications

## Proposed SEI messages

AVC/HEVC payloadType	Specified in		SEI message	Summary
	AVC	HEVC		
4	x	x	User data registered by Rec. ITU-T T.35	Contains user data registered as specified in Recommendation ITU-T T.35
19	x	x	Film grain characteristics	Provides the decoder with a parameterized model for film grain synthesis
45	x	x	Frame packing arrangement	Provides information for display or other purposes when constituent frames are packed into one frame
137	x	x	Mastering display colour volume	Identifies the colour volume of a display that was used for viewing while authoring the video content
143		✖	<del>Deinterlaced field identification</del>	<del>Indicates that the current picture represents a frame that was interpolated via a deinterlacing process prior to encoding</del>
144	x	x	Content light level information	Identifies the light level of the pictures of the CLVS corresponding to the use of CEA 861.3
147	x	x	Alternative transfer characteristics information	Provides a preferred alternative value for the transfer_characteristics syntax element.
148	x	x	Ambient viewing environment	Provides information about the nominal ambient viewing environment to be used to adapt received video for local display
149	x	x	Content colour volume	Describes the colour volume characteristics of the associated pictures.

## User data registered by Rec. ITU-T T.35 SEI message

This SEI message contains user data registered as specified in Recommendation ITU-T T.35, “Procedure for the allocation of ITU-T defined codes for non-standard facilities.”

**itu\_t\_t35\_country\_code** shall be a byte having a value specified as a country code by Annex A of Recommendation ITU-T T.35.

**itu\_t\_t35\_country\_code\_extension\_byte** shall be a byte having a value specified as a country code by Annex B of Recommendation ITU-T T.35.

**itu\_t\_t35\_payload\_byte** shall be a byte containing data registered as specified in Recommendation ITU-T T.35.

## Film grain characteristics SEI message

This SEI message provides the decoder with a parameterized model for film grain synthesis.

Use of this SEI message requires the definition of the following parameters: Representations of bit depth corresponding to luma and chroma clour component signals, denoted herein by  $\text{BitDepth}_Y$  and  $\text{BitDepth}_C$ , respectively. The semantics of  $\text{BitDepth}_Y$  and  $\text{BitDepth}_C$  are as specified for the  $\text{BitDepth}_Y$  and  $\text{BitDepth}_C$  parameters in Rec. ITU-T H.273 | ISO/IEC 23091-2.

## Frame packing arrangement SEI message

This SEI message informs the decoder that the output cropped decoded picture contains samples of multiple distinct spatially packed constituent frames that are packed into one frame, or that the output cropped decoded pictures in output order form a temporal interleaving of alternating first and second constituent frames, using an indicated frame packing arrangement scheme. This information can be used by the decoder to appropriately rearrange the samples and process the samples of the constituent frames appropriately for display or other purposes (which are outside the scope of this Specification).

Use of this SEI message requires the definition of the following parameter: sample aspect ratio, denoted herein by SAR. The semantics of SAR are as specified for the SampleAspectRatio parameter in Rec. ITU-T H.273 | ISO/IEC 23091-2.

## Mastering display colour volume SEI message

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 identify the measurement methodologies and procedures used for determining the indicated values or provide 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 SMPTE ST 2086 (2018).

## Deinterlaced field identification SEI message syntax and semantics

The deinterlaced picture information SEI message indicates that the current picture represents a frame that was interpolated via a deinterlacing process prior to encoding, and indicates the field parity of the associated source field prior to the deinterlacing process. When a progressive to interlace conversion process is applied to the decoded picture prior to display, it is recommended that the field of the decoded frame with the indicated field parity should be used.

Use of this SEI message requires the definition of the following parameter: field sequence flag, denoted herein by `field_seq_flag`. The semantics of `field_seq_flag` as follows. `field_seq_flag` equal to 1 indicates that the CVS conveys pictures that represent fields, and specifies that a picture timingframe-field information SEI message shall be present in every access unit of the current CVS. `field_seq_flag` equal to 0 indicates that the CVS conveys pictures that represent frames and that a picture timingframe-field information SEI message may or may not be present in any access unit of the current CVS. When `field_seq_flag` is not present, it is inferred to be equal to 0. When `general_frame_only_constraint_flag` is equal to 1, the value of `field_seq_flag` shall be equal to 0.



## Content light level information SEI message

This SEI message identifies upper bounds for the nominal target brightness light level of the pictures of the CLVS.

The information conveyed in this SEI message is intended to be adequate for purposes corresponding to the use of the Consumer Electronics Association 861.3 specification.

## Alternative transfer characteristics information SEI message

The alternative transfer characteristics SEI message provides a preferred alternative value for the transfer\_characteristics syntax element that is indicated for the associated CLVS by the colour description syntax of VUI parameters of the SPS.

Use of this SEI message requires the definition of the following parameters: Transfer characteristics and preferred alternative transfer characteristics, denoted herein by transfer\_characteristics and preferred\_transfer\_characteristics. The semantics of transfer\_characteristics and preferred\_transfer\_characteristics are as specified for the TransferCharacteristics parameter in Rec. ITU-T H.273 | ISO/IEC 23091-2.

The alternative transfer characteristics SEI message is intended to be used in cases when some value of transfer\_characteristics is preferred for interpretation of the pictures of the CLVS although some other value of transfer\_characteristics may also be acceptable for interpretation of the pictures of the CLVS and that other value is provided in the colour description syntax of the associated CLVS VUI parameters of the SPS for interpretation by decoders that do not support interpretation of the preferred value (e.g., because the preferred value had not yet been defined in a previous version of this Specification).

## Ambient viewing environment SEI message

The ambient viewing environment SEI message identifies the characteristics of the nominal ambient viewing environment for the display of the associated video content. The syntax elements of the ambient viewing environment SEI message may assist the receiving system in adapting the received video content for local display in viewing environments that may be similar or may substantially differ from those assumed or intended when mastering the video content.

## Content colour volume SEI message

The content colour volume SEI message describes the colour volume characteristics of the associated pictures. These colour volume characteristics are expressed in terms of a nominal range, although deviations from this range may occur.

Use of this SEI message requires the definition of the following parameters:

- Transfer characteristics and alternative transfer characteristics, denoted herein by `transfer_characteristics` and `preferred_transfer_characteristics`, respectively. The semantics of `transfer_characteristics` and `preferred_transfer_characteristics` are as specified for the `TransferCharacteristics` parameter in Rec. ITU-T H.273 | ISO/IEC 23091-2
- Video colour primaries and matrix colour coefficients, denoted herein by `colour_primaries` and `matrix_coeff`, respectively. The semantics of `colour_primaries` and `matrix_coeff` are as specified for the `ColourPrimaries` and `MatrixCoefficients` parameters, respectively, in Rec. ITU-T H.273 | ISO/IEC 23091-2.

## Persistence scope of SEI message (informative)

**Table 7.x – Persistence scope of SEI messages (informative)**

<b>SEI message</b>	<b>Persistence scope</b>
User data registered by Rec. ITU-T T.35	Unspecified
Film grain characteristics	Specified by the syntax of the SEI message
Frame packing arrangement	Specified by the syntax of the SEI message
Mastering display colour volume	The CLVS containing the SEI message
<del>Deinterlaced field identification</del>	<del>One or more pictures associated with the access unit containing the SEI message</del>
Content light level information	The CLVS containing the SEI message
Alternative transfer characteristics	The CLVS containing the SEI message
Ambient viewing environment	The CLVS containing the SEI message
Content colour volume	Specified by the syntax of the SEI message

## Conclusion

Adopt the following SEI messages into Draft Rec. ITU-T H.SEI | Draft ISO/IEC 23002-7, “Supplemental enhancement information messages for coded video bitstreams”

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