|  |  |
| --- | --- |
| **Joint Collaborative Team on Video Coding (JCT-VC)**  **of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11**  37th Meeting: Geneva, CH, 4–10 October 2019 | Document: JCTVC-AK0021-v4 |

|  |  |  |  |
| --- | --- | --- | --- |
| *Title:* | **Some HEVC errata items** | | |
| *Status:* | Input document to JCT-VC | | |
| *Purpose:* | Editorial input | | |
| *Author(s) or Contact(s):* | **Ye-Kui Wang** Futurewei, San Diego, CA, USA  **Alexis M. Tourapis** Apple, Cupertino, CA, USA  **Benjamin Bross** HHI, Berlin, Germany | Tel: Email: | +1-908-903-3888 [ye-kui.wang@futurewei.com](mailto:ye-kui.wang@futurewei.com)  +1-408-228-7983 [atourapis@apple.com](mailto:atourapis@apple.com)  +49-179-760-2480 [benjamin.bross@hhi.fraunhofer.de](mailto:benjamin.bross@hhi.fraunhofer.de) |
| *Source:* | AHG2 | | |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Abstract

This contribution reports some text bugs in the latest HEVC specification text and proposes corresponding fixes.

# Reported errata items for HEVC

## On filtering process for chroma block edges

*In* 8.7.2.5.5, c*hange the following:*

If ChromaArrayType is equal to 1, the variable QpC is determined as specified in Table ‎8‑10 based on the index qPi derived as follows:

qPi = ( ( QpQ + QpP + 1 )  >>  1 ) + cQpPicOffset (‎8‑384)

Otherwise (ChromaArrayType is greater than 1), the variable QpC is set equal to Min( qPi, 51 ).

*to*

The index qPi is derived as follows:

qPi = ( ( QpQ + QpP + 1 )  >>  1 ) + cQpPicOffset (‎8‑384)

The variable QpC is derived as follows:

– If ChromaArrayType is equal to 1, the variable QpC is determined based on qPi as specified in Table Table ‎8‑10.

– Otherwise (ChromaArrayType is greater than 1), the variable QpC is set equal to Min( qPi, 63 ).

## On semantics of nal\_hrd\_parameters\_present\_flag and vcl\_hrd\_parameters\_present\_flag

*Change the semantics of nal\_hrd\_parameters\_present\_flag and vcl\_hrd\_parameters\_present\_flag as follows (additions are yellow-highlighted, removals are strikethrough in red fonts):*

**nal\_hrd\_parameters\_present\_flag** equal to 1 specifies that NAL HRD parameters (pertaining to Type II bitstream conformance) are present in the hrd\_parameters( ) syntax structure. nal\_hrd\_parameters\_present\_flag equal to 0 specifies that NAL HRD parameters are not present in the hrd\_parameters( ) syntax structure.

NOTE 1 – When nal\_hrd\_parameters\_present\_flag is equal to 0, the Type II conformance of the bitstream cannot be verified without provision of the NAL HRD parameters and all buffering period SEI messages, and, when vcl\_hrd\_parameters\_present\_flag is also equal to 0, all the picture timing and decoding unit informatoin SEI messages, by some means not specified in this Specification.

**vcl\_hrd\_parameters\_present\_flag** equal to 1 specifies that VCL HRD parameters (pertaining to Type I ~~all~~ bitstream conformance) are present in the hrd\_parameters( ) syntax structure. vcl\_hrd\_parameters\_present\_flag equal to 0 specifies that VCL HRD parameters are not present in the hrd\_parameters( ) syntax structure.

NOTE 2 – When vcl\_hrd\_parameters\_present\_flag is equal to 0, the Type I conformance of the bitstream cannot be verified without provision of the NAL HRD parameters and all buffering period SEI messages, and, when nal\_hrd\_parameters\_present\_flag is also equal to 0, all the picture timing and decoding unit informatoin SEI messages, by some means not specified in this Specification.

## On setting of HighestTid to sps\_max\_sub\_layers\_minus1

The wording (two instances) of "HighestTid is set equal to sps\_max\_sub\_layers\_minus1" in clauses 8.1.2 and F.8.1.2 is not clear, as there may be multiple layers referring to multiple SPSs and consequently there may be multiple instances of sps\_max\_sub\_layers\_minus1 involved. Which one should be chosen?

Suggestion: To either replace " sps\_max\_sub\_layers\_minus1" with "vps\_max\_sub\_layers\_minus1" or clarify that the sps\_max\_sub\_layers\_minus1 value used is the greatest value of sps\_max\_sub\_layers\_minus1 among the referenced SPSs.

## On HRD text

1. *In C.3.3, change the following:*

Otherwise (PicOutputFlag is equal to 1 and DpbOutputTime[ n ] is greater than AuCpbRemovalTime[ n ] ), the current picture is output later and will be stored in the DPB (as specified in clause ‎C.3.4) and is output at time DpbOutputTime[ n ] unless indicated not to be output by the decoding or inference of no\_output\_of\_prior\_pics\_flag equal to 1 at a time that precedes DpbOutputTime[ n ].

*to*

Otherwise (PicOutputFlag is equal to 1 and DpbOutputTime[ n ] is greater than AuCpbRemovalTime[ n ] ), the current picture is output later and will be stored in the DPB (as specified in clause ‎C.3.4) and is output at time DpbOutputTime[ n ] unless indicated not to be output by NoOutputOfPriorPicsFlag equal to 1.

1. *In F.13.3.3, change the following:*

Otherwise (PicOutputFlag is equal to 1 and DpbOutputTime[ n ] is greater than AuCpbRemovalTime[ n ] ), the current picture is output later and will be stored in the DPB (as specified in clause ‎F.13.3.4) and is output at time DpbOutputTime[ n ] unless indicated not to be output by the decoding or inference of NoOutputOfPriorPicsFlag equal to 1 at a time that precedes DpbOutputTime[ n ].

*to*

Otherwise (PicOutputFlag is equal to 1 and DpbOutputTime[ n ] is greater than AuCpbRemovalTime[ n ] ), the current picture is output later and will be stored in the DPB (as specified in clause ‎F.13.3.4) and is output at time DpbOutputTime[ n ] unless indicated not to be output by NoOutputOfPriorPicsFlag equal to 1.

1. *In C.5.1, change the following:*

A decoder claiming conformance to a specific profile, tier and level shall be able to successfully decode all bitstreams that conform to the bitstream conformance requirements specified in clause ‎C.4, in the manner specified in Annex ‎A, provided that all VPSs, SPSs and PPSs referred to in the VCL NAL units and appropriate buffering period and picture timing SEI messages are conveyed to the decoder, in a timely manner, either in the bitstream (by non-VCL NAL units), or by external means not specified in this Specification.

*to*

A decoder claiming conformance to a specific profile, tier and level shall be able to successfully decode all bitstreams that conform to the bitstream conformance requirements specified in clause ‎C.4, in the manner specified in Annex ‎A, provided that all VPSs, SPSs and PPSs referred to in the VCL NAL units and appropriate buffering period, picture timing, and decoding unit information SEI messages are conveyed to the decoder, in a timely manner, either in the bitstream (by non-VCL NAL units), or by external means not specified in this Specification.

## On SingleLayerSeiList

In D.3.1, there is a discrepancy (of the SEI payloadType 2, i.e., the pan-scan rectangle SEI message) between the definition of the variable SingleLayerSeiList and the subsequent NOTE providing an explanation of SingleLayerSeiList, copied and pasted below:

The list SingleLayerSeiList is set to consist of the payloadType values 3, 6, 9, 15, 16, 17, 19, 22, 23, 45, 47, 56, 128, 129, 131, 132, 134 to 151, inclusive, 154 to 159, and 200 to 201, inclusive.

NOTE 3 – SingleLayerSeiList consists of the payloadType values of the SEI messages specified in Annex D excluding 0 (buffering period), 1 (picture timing), 4 (user data registered by Recommendation ITU-T T.35), 5 (user data unregistered), 130 (decoding unit information) and 133 (scalable nesting).

Due to that this list is mainly used to constrain the value of bitstream\_subset\_flag of the scalable nesting SEI message, and that the value 2 is the pan-scan rectangle SEI message, I think the NOTE is correct, i.e., the value 2 should be added to the definition. This can be confirmed by checking the editing history, e.g., by taking a look at JCTVC-R1008-v1 of the Sapporo meeting in July 2014.