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| **Joint Collaborative Team on Video Coding (JCT-VC)**  **of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11**  6th Meeting: Torino, IT, 14-22 July, 2011 | Document: JCTVC-F289  WG11 Number: m20709 |

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| *Title:* | **On VUI syntax parameters** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Information | | |
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# Abstract

This document enlists the VUI parameters defined in AVC. The AVC VUI syntax structures are shown in a tabular form with some observations about their possible usage in HEVC context.

Usage of AVC VUI parameters in HEVC

In JCTVC-B121[1], there was a brief one-liner note to use VUI parameter "as appropriate", but the details on the possible application(s) of AVC VUI parameters inside HEVC was not looked into by the break-out group.

In this contribution, a table on AVC VUI parameter syntax structures is presented to study the applicability of these VUI parameters to HEVC. This table can be used as the starting point for more elaborate discussion on this topic. The AVC VUI parameters with their corresponding syntax and semantics need to be carefully investigated and adapted in the light of the HEVC context as necessary.

It might be noted that a similar proposal on "Re-use" of SEI messages is already in progress in the previous meetings with contributions JCTVC-E346 [2] and JCTVC-D082.

The table below lists all the VUI parameters available in AVC, and a corresponding comment is added for each VUI parameter. These comments deal with whether the AVC VUI parameter should be supported in HEVC with some reasoning or none, or whether some of these need more studies for future consideration, or whether the definition of syntax / semantics should be modified.

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| **VUI parameters in AVC** | | **In HEVC?** |
| aspect\_ratio\_info\_present\_flag |  | Yes |
| if( aspect\_ratio\_info\_present\_flag ) { |  |  |
|  | aspect\_ratio\_idc | Yes, see Scalability AhG(\*1) |
|  | if( aspect\_ratio\_idc = = Extended\_SAR ) { |  |
|  | sar\_width | Yes |
|  | sar\_height | Yes |
|  | } |  |
| } |  |  |
| overscan\_info\_present\_flag |  | Yes |
| if( overscan\_info\_present\_flag ) | overscan\_appropriate\_flag | Yes |
| video\_signal\_type\_present\_flag |  | Yes |
| If ( video\_signal\_type\_present\_flag ) { |  |  |
|  | video\_format | Yes |
|  | video\_full\_range\_flag | Yes |
|  | colour\_description\_present\_flag | Yes, see AVC Amd1(\*3). Possible applications in Display Color Gamut Mapping! |
|  | if( colour\_description\_present\_flag ) { |  |
|  | colour\_primaries | Yes, see AVC Amd1(\*3). |
|  | transfer\_characteristics | Yes, see AVC Amd1(\*3). |
|  | matrix\_coefficients | Yes, see AVC Amd1(\*3). |
|  | } |  |
| } |  |  |
| timing\_info\_present\_flag |  | Yes. May be used in video editing applications! |
| if( timing\_info\_present\_flag ) { |  |  |
|  | num\_units\_in\_tick | Yes |
|  | time\_scale | Yes |
| } |  |  |
| nal\_hrd\_parameters\_present\_flag |  | Probably Yes. See HRD issue (\*2); Instead of Macroblock, use Coding Unit structures! |
| if( nal\_hrd\_parameters\_present\_flag ) | ***hrd\_parameters( )*** | Probably Yes. See HRD issue (\*2) |
| vcl\_hrd\_parameters\_present\_flag |  | Probably Yes. See HRD issue (\*2) |
| if( vcl\_hrd\_parameters\_present\_flag ) | ***hrd\_parameters( )*** | Probably Yes. See HRD issue (\*2) |
| if( nal\_hrd\_parameters\_present\_flag | | vcl\_hrd\_parameters\_present\_flag ) | low\_delay\_hrd\_flag | Probably Yes. See HRD issue (\*2) |
| bitstream\_restriction\_flag |  | Yes |
| if( bitstream\_restriction\_flag ) { |  |  |
|  | motion\_vectors\_over\_pic\_boundaries\_flag | Yes |
|  | max\_bytes\_per\_pic\_denom | Yes |
|  | max\_bits\_per\_mb\_denom | Probably Yes, but Macroblock structure to be replaced by Coding Block or Largest Coding Block |
|  | log2\_max\_mv\_length\_horizontal | Yes |
|  | log2\_max\_mv\_length\_vertical | Yes |
|  | max\_dec\_frame\_buffering | Yes. Also new definition in semantics for profile\_idc, constraint\_set\_flags (if added, currently "reserved\_zero\_8bits" in WD3). |
| } |  |  |

|  |  |  |
| --- | --- | --- |
| **hrd\_parameters( )** | **VUI parameters in AVC** | **In HEVC?** |
|  | cpb\_cnt\_minus1 | Probably Yes. See HRD issue (\*2) |
|  | bit\_rate\_scale | Probably Yes. See HRD issue (\*2) |
|  | cpb\_size\_scale | Probably Yes. See HRD issue (\*2) |
|  | for( SchedSelIdx = 0; SchedSelIdx <= cpb\_cnt\_minus1; SchedSelIdx++ ) { | Probably Yes. See HRD issue (\*2) |
|  | bit\_rate\_value\_minus1[ SchedSelIdx ] | Probably Yes. See HRD issue (\*2) |
|  | cpb\_size\_value\_minus1[ SchedSelIdx ] | Probably Yes. See HRD issue (\*2) |
|  | cbr\_flag[ SchedSelIdx ] | Probably Yes. See HRD issue (\*2) |
|  | } | Probably Yes. See HRD issue (\*2) |
|  | initial\_cpb\_removal\_delay\_length\_minus1 | Probably Yes. See HRD issue (\*2) |
|  | cpb\_removal\_delay\_length\_minus1 | Probably Yes. See HRD issue (\*2) |
|  | dpb\_output\_delay\_length\_minus1 | Probably Yes. See HRD issue (\*2) |
|  | time\_offset\_length | Probably Yes. See HRD issue (\*2) |

***Notes:***

*\*1: Specifies Sample AR. HEVC Scalability AhG is considering AR Scalability that includes other AR types (Picture, Display). Can be used for Display adjustment wrt Input Source video!*

*\*2: HRD (System) experts should revisit it, and check the exact syntax and semantics.*

*\*3: Same as in AVC Amendment 1 tables for Semantics description.*

# Conclusion

This document can be a starting point to further study the usage of AVC VUI parameters by the JCT-VC group members. This study needs however to be coordinated with ongoing activities in the requirements and related AhG groups.

# Patent rights declaration(s)

Sony Electronics Inc. / Sony Corp. may have current or pending patent rights relating to the technology described in this contribution and, conditioned on reciprocity, is prepared to grant licenses under reasonable and non-discriminatory terms as necessary for implementation of the resulting ITU-T Recommendation | ISO/IEC International Standard (per box 2 of the ITU-T/ITU-R/ISO/IEC patent statement and licensing declaration form).

# References

1. Rickard Sjoberg, “Notes from break-out session on TMuC and AVC high-level syntax” Document of Joint Collaborative Team on Video Coding, JCTVC-B121, July 2010.
2. Ye-Kui Wang, “Reuse of AVC SEI messages” Document of Joint Collaborative Team on Video Coding, JCTVC-E346, March 2011.