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| *Title:* | **Some HEVC and AVC errata items** | | |
| *Status:* | Input document to JCT-VC | | |
| *Purpose:* | Proposal | | |
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# Abstract

This contribution reports some errata items for HEVC and AVC.

# HEVC, for both the ITU-T and the ISO texts:

1. The semantics of the deblocking disable flag in the PPS should be updated to better reflect the behavior.
2. Corresponding to the following changes to VVC, an errata report for AVC and HEVC, to change the MinCr limit to be derived from the CPB size limit or add a note for cases where the CPB size imposes a tighter limit than the MinCr does:

MaxCPB = 80 000 for level 6, 120 000 for level 6.1, 180 000 for level 6.2, and change MinCrScaleFactor for the 4:4:4 profile to 0.75, and change MinCrBase to 8 for level 6.2.

1. The following two bullet items on non-scalable-nested BP/PT/DUI SEI messages should be changed as shown below:

– For a non-scalable-nested SEI message, when payloadType is equal to 0 (buffering period) or 130 (decoding unit information), the non-scalable-nested SEI message applies to the operation point that has OpTid equal to the greatest value of nuh\_temporal\_id\_plus1 among all VCL NAL units in the bitstream, ~~and that~~ has OpLayerIdList containing all values of nuh\_layer\_id in all VCL units in the bitstream, and has only the base layer as the output layer.

– For a non-scalable-nested SEI message, when payloadType is equal to 1 (picture timing), the frame field information carried in the syntax elements pic\_struct, source\_scan\_type and duplicate\_flag, when present, in the non-scalable-nested picture timing SEI message applies to the base layer only, while the picture timing information carried in other syntax elements, when present, in the non-scalable-nested picture timing SEI message applies to the operation point that has OpTid equal to the greatest value of nuh\_temporal\_id\_plus1 among all VCL NAL units in the bitstream, ~~and that~~ has OpLayerIdList containing all values of nuh\_layer\_id in all VCL units in the bitstream, and has only the base layer as the output layer.

1. In the semantics of the decoded picture hash SEI message, the specification that the colour component arrays use two’s complement representation was an error and needs to be corrected. Unsigned integers are used for the colour component arrays.
2. Add derivation of TemporalId and reference pic\_parameter\_set\_id to the decoding process for generating unavailable reference pictures (in order to enable checking of some constraints for them).
3. In clause C.4 (Bitstream conformance), change the constraint on i.e., the number of all pictures n in the DPB for referencing or output after invocation of the process for removal of pictures from the DPB, change "CpbRemovalTime[ n ] less than CpbRemovalTime[ n ]" to "DpbOutputTime[ n ] greater than CpbRemovalTime[ currPic ]". This is asserted to be a bug, because all decoded pictures in the DPB are always decoded earlier than decoding of the current picture, and thus CpbRemovalTime[ n ] in the context is always less than CpbRemovalTime[ currPic ].
4. Remove the following constraint from the definition of the still picture profiles: The active SPS shall have max\_dec\_pic\_buffering\_minus1[ sps\_max\_sublayers\_minus1 ] equal to 0.
5. Relax the semantics so that an extension\_flag in VPS, SPS, or PPS equal to 1 specifies that specifies extension\_data\_flag syntax elements may be present. (Currently, it says these flags are present.)
6. Fix an asserted bug in Equation C.10 as follows, origniated from JVET-S0101:

if( !concatenationFlag ) {  
 baseTime = AuNominalRemovalTime[ firstPicInPrevBuffPeriod ]  
 tmpCpbRemovalDelay = AuCpbRemovalDelayVal  
 tmpCpbDelayOffset = CpbDelayOffset  
} else {  
 baseTime1 = AuNominalRemovalTime[ prevNonDiscardablePic ]  
 tmpCpbRemovalDelay1 = ( auCpbRemovalDelayDeltaMinus1 + 1 )  
 baseTime2 = AuNominalRemovalTime[ n − 1 ]  
 tmpCpbRemovalDelay2 = (C.10)  
 Ceil( ( InitCpbRemovalDelay[ Htid ][ ScIdx ] ÷ 90000 +  
 AuFinalArrivalTime[ n − 1 ] − AuNominalRemovalTime[ n − 1 ] ) ÷ ClockTick )  
 if( baseTime1 + ClockTick \* tmpCpbRemovalDelay1 <  
 baseTime2 + ClockTick \* tmpCpbRemovalDelay2 ) {  
 baseTime = baseTime2  
 tmpCpbRemovalDelay = tmpCpbRemovalDelay2  
 } else {  
 baseTime = baseTime1  
 tmpCpbRemovalDelay = tmpCpbRemovalDelay1  
 }  
 tmpCpbDelayOffset = 0  
}  
AuNominalRemovalTime[ n ] = baseTime + ( ClockTick \* tmpCpbRemovalDelay − tmpCpbDelayOffset

1. In the semantics of elemental\_duration\_in\_tc\_minus1[ i ], the syntax element fixed\_pic\_rate\_general\_flag[ i ] of both the first and second CVS to determine whether the fixed output rate applies also across CVSs. However, it is asserted that the value of fixed\_pic\_rate\_general\_flag[ i ] of the first CVS should not be taken into account for determining whether the fixed output rate applies across the two CVSs. Therefore, the first two instances of fixed\_pic\_rate\_general\_flag highlighted in green below should be fixed\_pic\_rate\_within\_cvs\_flag instead:

**elemental\_duration\_in\_tc\_minus1**[ i ] plus 1 (when present) specifies, when Htid is equal to i, the temporal distance, in clock ticks, between the elemental units that specify the HRD output times of consecutive pictures in output order as specified below. The value of elemental\_duration\_in\_tc\_minus1[ i ] shall be in the range of 0 to 2047, inclusive.

When Htid is equal to i and fixed\_pic\_rate\_general\_flag[ i ] is equal to 1 for a CVS containing picture n, and picture n is a picture that is output and is not the last picture in the bitstream (in output order) that is output, the value of the variable DpbOutputElementalInterval[ n ] is specified by:

* DpbOutputElementalInterval[ n ] = DpbOutputInterval[ n ]  elementalOutputPeriods (113)

where DpbOutputInterval[ n ] is specified in Equation C.16 and elementalOutputPeriods is specified as follows:

– If a PT SEI message is present for picture n, elementalOutputPeriods is equal to the value of pt\_display\_elemental\_periods\_minus1 + 1.

– Otherwise, elementalOutputPeriods is equal to 1.

When Htid is equal to i and fixed\_pic\_rate\_general\_flag[ i ] is equal to 1 for a CVS containing picture n, and picture n is a picture that is output and is not the last picture in the bitstream (in output order) that is output, the value computed for DpbOutputElementalInterval[ n ] shall be equal to ClockTick \* ( elemental\_duration\_in\_tc\_minus1[ i ] + 1 ), wherein ClockTick is as specified in Equation C.1 (using the value of ClockTick for the CVS containing picture n) when one of the following conditions is true for the following picture in output order nextPicInOutputOrder that is specified for use in Equation C.16:

– picture nextPicInOutputOrder is in the same CVS as picture n.

– picture nextPicInOutputOrder is in a different CVS and fixed\_pic\_rate\_general\_flag[ i ] is equal to 1 in the CVS containing picture nextPicInOutputOrder, the value of ClockTick is the same for both CVSs, and the value of elemental\_duration\_in\_tc\_minus1[ i ] is the same for both CVSs.

When Htid is equal to i and fixed\_pic\_rate\_within\_cvs\_flag[ i ] is equal to 1 for a CVS containing picture n, and picture n is a picture that is output and is not the last picture in the CVS (in output order) that is output, the value computed for DpbOutputElementalInterval[ n ] shall be equal to ClockTick \* ( elemental\_duration\_in\_tc\_minus1[ i ] + 1 ), wherein ClockTick is as specified in Equation C.1 (using the value of ClockTick for the CVS containing picture n) when the following picture in output order nextPicInOutputOrder that is specified for use in Equation C.16 is in the same CVS as picture n.

1. In clause 8.1.1, add the derivation of the variables DuHrdPreferredFlag and DecodingUnitHrdFlag, similarly as in HEVC.

# HEVC and AVC

1. Add "The variable DuHrdPreferredFlag is either specified by external means, or when not specified by external means, set equal to 0." to clause 8.1.2.
2. Fix the description of the recovery point picture to consider the case with a recovery POC distance of 0.

# Patent rights declaration(s)

**Bytedance Inc. 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).**