**3GPP TSG-S4 Meeting#133-e*****S4-251334***

**Online, 18th–25th July 2025**

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| *CR-Form-v12.2* | | | | | | | | |
| **PSEUDO CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** |  | | | | | | | | | |
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| ***Source to WG:*** | Apple Inc., Samsung | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | At SA4#130, comments were open for the added Multiview Extended 10 profile and hence was decided to keep this added profile in square brackets. After continuous engagement wither other companies, the proposed way forward is to keep MV-HEVC Main 10 and Extended 10 as separate decoding capabilities and operating points. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Added MV-HEVC Main 10 and Extended 10 as separate decoding capabilities and operating points. | | | | | | | | |
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| ***Consequences if not approved:*** | | Issue to support Extended 10 will remain. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.3.2, 6.1, 6.3.6, 6.3.7 (New) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* First Change \* \* \* \*

5.3.2 HEVC Decoding Capabilities

The following decoding capabilities are defined:

- **HEVC-HD-Dec**: the capability to decode

- a bitstream containing a single sub-bitstream conforming to HEVC/ITU-T H.265 Main Profile, Main Tier, Level 3.1 [h265] with *progressive* constraints as defined in clause 4.5.3, or

- a bitstream containing multiple layers where the base layer sub-bitstream conforms to HEVC/ITU-T H.265 Main Profile, Main Tier, Level 3.1 [h265] with *progressive* constraints as defined in clause 4.5.3.

- **HEVC-FullHD-Dec**: the capability to decode

- a bitstream containing a single sub-bitstream conforming to HEVC/ITU-T H.265 Main 10 Profile, Main Tier, Level 4.1 [h265] with *progressive* constraints as defined in clause 4.5.3, or

- a bitstream containing multiple layers where the base layer sub-bitstream conforms to HEVC/ITU-T H.265 Main 10 Profile, Main Tier, Level 4.1 [h265] with *progressive* constraints as defined in clause 4.5.3.

- **HEVC-UHD-Dec**: the capability to decode

- a bitstream containing a single sub-bitstream conforming to HEVC/ITU-T H.265 Main 10 Profile, Main Tier, Level 5.1 [h265] with *progressive* constraints as defined in clause 4.5.3, or

- a bitstream containing multiple layers where the base layer sub-bitstream conforms to HEVC/ITU-T H.265 Main 10 Profile, Main Tier, Level 5.1 [h265] with *progressive* constraints as defined in clause 4.5.3.

- **HEVC-8K-Dec**: the capability to decode bitstreams conforming to HEVC/ITU-T H.265 Main10 Profile, Main Tier, Level 6.1 [h265] bitstreams with *progressive* and *VUI* constraints as defined in clause 4.5.3 and further constraints:

- the bitstream does not exceed the maximum luma picture size in samples of 33,554,432,

- the maximum VCL Bit Rate is constrained to be 80 Mbps with CpbVclFactor and CpbNalFactor being fixed to be 1000 and 1100, respectively.

**- MV-HEVC-Dual-layers-UHD420-Dec**: the capability to decode bitstreams with

- an HEVC/ITU-T H.265 Main 10 Profile base layer (nuh\_layer\_id=0),

- and a single enhancement layer (nuh\_layer\_id!=0) that is tagged as an HEVC/ITU-T H.265 Multiview Main 10 layer [h265],

- where each layer conforms to Main Tier, Level 5.1 and where UE should be capable of supporting single layer decoding of HEVC/ITU-T H.265 Main 10 Profile bitstreams at Main Tier, Level 5.2.

NOTE: Both layers are in 4:2:0 format and inter-layer prediction is possible.

NOTE: HEVC decoders with this decoding capability are also capable to decode bitstreams with a Main Profile base layer, and a single enhancement Multiview Main layer (with nuh\_layer\_id!=0), with the same tier and level restrictions as above, as specified by H.265/HEVC [h265].

**- MV-HEVC-Ext-Dual-layers-UHD420-Dec**: the capability to decode bitstreams with

- an HEVC/ITU-T H.265 Main 10 Profile base layer (nuh\_layer\_id=0),

- and a single enhancement layer (nuh\_layer\_id!=0) that is tagged as an HEVC/ITU-T H.265 Multiview Extended 10 layer [h265].

- where each layer conforms to Main Tier, Level 5.1 and where UE should be capable of supporting single layer decoding of HEVC/ITU-T H.265 Main 10 Profile bitstreams at Main Tier, Level 5.2.

NOTE: Both layers are in 4:2:0 format and inter-layer prediction is possible.

NOTE: HEVC decoders with this decoding capability can also decode bitstreams with a Main Profile base layer, and a single enhancement Multiview Extended layer (nuh\_layer\_id!=0), with the same tier and level restrictions as above, as specified by H.265/HEVC [h265].

- **HEVC-Frame-Packed-Stereo-Dec**: the capability to decode a bitstream conforming to HEVC/ITU-T H.265 Main 10 Profile, Main Tier, Level 6.0 [h265] bitstreams with *frame-packing* and *VUI* *constraints* as defined in clause 4.5.3

NOTE: The increase from Level 5.2 for MV-HEVC-Dual-layers-UHD420-Dec to Level 6.0 in HEVC-Frame-Packed-Stereo-Dec is only to handle larger buffers per frame. There is no increase in the pixels/second between the two capabilities.

\* \* \* Next Change \* \* \* \*

## 6.1 Introduction

Video operation points define a restricted subset of representation signals and media capabilities. For each Video Operation Point, requirements for the Bitstream and for the Receiver are defined.

Table 6.1-1 provides an overview of defined video operation points.

Table 6.1-1 Overview of Video Operation Points

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Video Format | Decoding Capabilities | Definition |
| 3GPP-AVC-HD | 3GPP-HD (see clause 4.4.3.2) | AVC-FullHD-Dec (see clause 5.4) | 6.2.2 |
| 3GPP-HEVC-HD | 3GPP-HD (see clause 4.4.3.2) | HEVC-FullHD-Dec (see clause 5.4) | 6.3.2 |
| 3GPP-HEVC-HD-HDR | 3GPP-HDR (see clause 4.4.3.3) | HEVC-FullHD-Dec (see clause 5.4) | 6.3.3 |
| 3GPP-HEVC-UHD-HDR | 3GPP-HDR (see clause 4.4.3.3) | HEVC-UHD-Dec (see clause 5.4) | 6.3.4 |
| 3GPP-HEVC-Stereo | 3GPP-Stereo (see clause 4.4.3.4) | HEVC-Frame-Packed-Stereo-Dec (see clause 5.5) | 6.3.5 |
| 3GPP-MV-HEVC-Stereo | 3GPP-Stereo (see clause 4.4.3.4) | MV-HEVC-Dual-layers-UHD420-Dec (see clause 5.3.2) | 6.3.6 |
| 3GPP-MV-HEVC-Ext-Stereo | 3GPP-Stereo (see clause 4.4.3.4) | MV-HEVC-Ext-Dual-layers-UHD420-Dec (see clause 5.3.2) | 6.3.7 |

\* \* \* Next Change \* \* \* \*

6.3.7 3GPP MV-HEVC-Ext Stereo

Editor’s Note: The common specification between cl 6.3.6 and cl 6.3.7 should be moved to a single subclause to avoid duplication.

Editor’s Note: A common issue for cl 6.3.6 and 6.3.7 is to document more on the parameters and their usage from the three\_dimensional\_reference\_displays\_info SEI message.

6.3.7.1 Introduction

The MV-HEVC Stereo Operation Point permits consistent distribution of stereoscopic content using MV-HEVC. The remainder of this clause 6.3.7 defines the Bitstream and Receiver requirements for the 3GPP-MV-HEVC-Ext-Stereo receiver.

6.3.7.2 Bitstream Requirements

Editor’s Note: the Bitstream need to be fully aligned with the 3GPP MV-HEVC Stereo profile. Editing preferably such that the common requirements are only defined once.

A 3GPP-MV-HEVC-Stereo Bitstream shall conform to the following requirements

- the Representation Format included in the Bitstream shall conform to the 3GPP Stereoscopic format as defined in clause 4.4.3.4.

- The bitstream shall conform to the constraints specified in the **MV-HEVC-Ext-Dual-layers-UHD420-Dec** decoding capabilities as defined in clause 5.3.2.

- the Bitstream shall be decodable by

- a decoder with **HEVC-UHD-Dec** decoding capabilities as defined in clause 5.3.2. The single based layer (nuh\_layer\_id = 0) is the only output layer in the target output layer set.

NOTE: According to HEVC/H.265 [h265], a decoder with only **HEVC-UHD-Dec** capability may ignore any output layer set signalling and default to output only the base layer.

- a decoder with **MV-HEVC-Ext-Dual-layers-UHD420-Dec** decoding capabilities as defined in clause 5.3.2. The target output layer set shall contain two output layers, one for each of left and right eye view, respectively.

NOTE: Although the operating point allows for layers in the bitstream that are not output layers, the added storage and/or transport capacity needed for such layers should be taken into account when provisioning a service.

- The chroma sub-sampling shall be 4:2:0 and the value of chroma\_format\_idc shall be set to 1.

- scalability\_mask\_flag[ 1 ] shall be equal to 1 indicating usage of Multiview scalability dimension.

[

- The derived value of AuxId[ lId ] shall be equal to 0 in the VPS extension for an output layer.

Or

- scalability\_mask\_flag[ 3 ] shall be equal to 0 indicating no auxiliary picture data.

]

- The vps\_num\_direct\_ref\_layers[1] may be present, and if present,

- it shall be set to 1.

- the vps\_direct\_ref\_layer\_id[1][0] shall be set to 0.

NOTE: This implies, that layer-dependency is possible, but not needed. The two layers may be independent, or the second layer depend on the base layer.

- In the VUI, The aspect\_ratio\_idc value shall be set to 1, indicating a square pixel format. Either

- the values of colour\_primaries, transfer\_characteristics and matrix\_coeffs each shall be set to 1.

- The value of chroma\_sample\_loc\_type\_top\_field shall be set to 0.

- or

- the values of colour\_primaries and matrix\_coeffs each shall be set to 9, and the value of transfer\_characteristics shall be set to one of the following values: 14 (for SDR with WCG), 16 (for PQ) and 18 (for HLG).

- The value of the chroma\_sample\_loc\_type\_top\_field shall be set to 2.

The timing information may be present.

- If the timing information is present, i.e. the value of vui\_timing\_info\_present\_flag is set to 1, then the values of vui\_num\_units\_in\_tick and vui\_time\_scale shall be set according to the frame rates allowed for each operation point. The timing information present in the video Bitstream should be consistent with the timing information signalled at the system level.

- The frame rate shall not change between two RAPs. fixed\_pic\_rate\_general\_flag value, if present, shall be set to 1.

Bitstreams not required to be associated with frame packing information for all coded video sequences. It is also possible that such information, when present, may differ from one coded video sequence to another.

The bitstream shall include the three\_dimensional\_reference\_displays\_info SEI message as specified in Recommendation ITU-T H.265 / ISO/IEC 23008-2 [h265].

6.3.7.3 Receiver Requirements

Editor’s Note: the Receiver requirements need to be fully aligned with the 3GPP MV-HEVC Stereo profile. Editing preferably such that the common requirements are only defined once.

Receivers conforming to this Operation Point 3GPP-MV-HEVC-Stereo shall support decoding and rendering Bitstreams with the restrictions defined in clause 6.3.6.2, including the necessary processing of three\_dimensional\_reference\_displays\_info SEI message as specified in Recommendation ITU-T H.265 / ISO/IEC 23008-2 [h265].

NOTE 1: Rendering includes adherence to the parameters signalled in the bitstream to characterize the distributed Representation format.

There are no requirements on output timing conformance for H.265/HEVC decoding (Annex C of [6]). The Hypothetical Reference Decoder (HRD) parameters, if present, should be ignored by the Receiver.

\* \* \* End of Changes \* \* \* \*