**3GPP TSG SA WG4 #114e *S4-210610***

**E-meeting, 18th – 28th May 2021**

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| *CR-Form-v12.0* | | | | | | | | |
| **draft CHANGE REQUEST** | | | | | | | | |
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|  | **26.118** | **CR** | **<CR#>** | **rev** | **-** | **Current version:** | **16.2.0** |  |
|  | | | | | | | | |
| *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:*** | Spatial positioning requirements the chroma samples for BT.2020 and BT.2100 | | | | | | | | | |
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| ***Source to WG:*** | Qualcomm Incorporated, Tencent | | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI16 | | | | |  | ***Date:*** | | | 2021-03-31 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | For for BT.2020 and BT.2100, the relative spatial positioning of the chroma samples is different than the default and for BT.709. Signaling this difference is only recommended in the HEVC specification and may lead to unnecessary problems shifts in the chroma presentation. | | | | | | | | |
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| ***Summary of change:*** | | Mandate the recommendation from the HEVC specification for 3GPP media profiles using BT.2020 and BT.2100 | | | | | | | | |
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| ***Consequences if not approved:*** | | Ambigous specification leading to interop problems.  Potential visual quality problems in the presentation. | | | | | | | | |
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| ***Clauses affected:*** | | 5.1.5.5, 5.1.6.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |
| ***56*** | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**===== CHANGE =====**

#### 5.1.5.5 Colour information and Transfer Characteristics

A Bitstream conforming to the 3GPP VR Main H.265/HEVC Operation Point shall use either Recommendation ITU-R BT.709 [3] colorimetry or Recommendation ITU-R BT.2020 [4] colorimetry in non-constant luminance for standard dynamic range (SDR).

Specifically, in the VUI, the colour parameter information shall be present, i.e.:

- video\_signal\_type\_present\_flag value and colour\_description\_present\_flag value shall be set to 1.

- If BT.709 [3] is used, it shall be signalled by setting colour\_primaries to the value 1, transfer\_characteristics to the value 1 and matrix\_coeffs to the value 1.

- If BT.2020 [4] and SDR is used,

- it shall be signalled by setting colour\_primaries to the value 9, transfer\_characteristics to the value 14 and matrix\_coeffs to the value 9,

- the chroma\_loc\_info\_present\_flag shall be equal to 1, and

- the chroma\_sample\_loc\_type\_top\_field and chroma\_sample\_loc\_type\_bottom\_field shall both be equal to 2.

A Receiver conforming to the 3GPP VR Main H.265/HEVC Operation Point shall be capable of decoding and rendering according to any of the two above configurations.

**===== CHANGE =====**

#### 5.1.6.5 Colour information and Transfer Characteristics

A Bitstream conforming to the 3GPP VR Flexible H.265/HEVC Operation Point shall use either Recommendation ITU-R BT.709 [3] colorimetry or Recommendation ITU-R BT.2020 [4] colorimetry in non-constant luminance for standard dynamic range (SDR). For High Dynamic Range (HDR), BT.2020 [4] colorimetry in non-constant luminance and Perceptual Quantization (PQ) electro-optical transfer function (EOTF) as defined in Recommendation ITU-R BT.2100 [11] are used.

Specifically, in the VUI, the colour parameter information shall be present, i.e.:

- video\_signal\_type\_present\_flag value and colour\_description\_present\_flag value shall be set to 1.

- If BT.709 [3] is used, it shall be signalled by setting colour\_primaries to the value 1, transfer\_characteristics to the value 1 and matrix\_coeffs to the value 1.

- If BT.2020 [4] and SDR is used,

- it shall be signalled by setting colour\_primaries to the value 9, transfer\_characteristics to the value 14 and matrix\_coeffs to the value 9,

- the chroma\_loc\_info\_present\_flag shall be equal to 1, and

- the chroma\_sample\_loc\_type\_top\_field and chroma\_sample\_loc\_type\_bottom\_field shall both be equal to 2.

- If BT.2020 [4] and ITU-R BT.2100 [11] are used in HDR,

- it shall be signalled by setting colour\_primaries to the value 9, transfer\_characteristics to the value 16 and matrix\_coeffs to the value 9,

- the chroma\_loc\_info\_present\_flag shall be equal to 1, and

- the chroma\_sample\_loc\_type\_top\_field and chroma\_sample\_loc\_type\_bottom\_field shall both be equal to 2.

A Receiver conforming to the 3GPP VR Flexible H.265/HEVC Operation Point shall be capable of decoding and rendering according to any of the three above configurations.

SEI messages for HDR metadata signalling may be used. The requirements and recommendations for Bitstreams and Receivers as documented in TS 26.116 [12], clause 4.5.5.7 also apply for the 3GPP VR Flexible H.265/HEVC Operation Point.