**3GPP TSG SA WG4 #112e *S4-210060***

**1st – 10th February 2021**

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| *CR-Form-v12.0* |
| **Draft CHANGE REQUEST** |
|  |
|  | **26.511** | **CR** | **<CR#>** | **rev** | **-** | **Current version:** | **16.1.0** |  |
|  |
| *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:***  | 8K Decoding Capabilities |
|  |  |
| ***Source to WG:*** | Qualcomm Incorporated |
| ***Source to TSG:*** | SA4 |
|  |  |
| ***Work item code:*** | 8K\_VR\_5G |  | ***Date:*** | 2021-01-16 |
|  |  |  |  |  |
| ***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 canbe 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)* |
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| ***Reason for change:*** | No 8K Yet |
|  |  |
| ***Summary of change:*** | Adds 8k decoding capability and 8K to VR |
|  |  |
| ***Consequences if not approved:*** | Feature missing |
|  |  |
| ***Clauses affected:*** | 4.2.2.1, 4.2.2.4.3 (new), 5.5.1.1, 5.5.1.2 |
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|  | **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 =====**

#### 4.2.2.1 Decoding

The following H.265 (HEVC) media decoding capabilities are defined:

- **HEVC-HD-Dec**: the capability to decode H.265 (HEVC) Main Profile, Main Tier, Level 3.1[3] bitstreams that have general\_progressive\_source\_flag equal to 1, general interlaced\_source\_flag equal to 0, general\_non\_packed\_constraint\_flag equal to 1, and general\_frame\_only\_constraint\_flag equal to 1.

- **HEVC-FullHD-Dec**: the capability to decode H.265 (HEVC) Main10 Profile, Main Tier, Level 4.1[3] bitstreams that have general\_progressive\_source\_flag equal to 1, general interlaced\_source\_flag equal to 0, general\_non\_packed\_constraint\_flag equal to 1, and general\_frame\_only\_constraint\_flag equal to 1.

- **HEVC-UHD-Dec**: the capability to decode H.265 (HEVC) Main10 Profile, Main Tier, Level 5.1[3] bitstreams that have general\_progressive\_source\_flag equal to 1, general interlaced\_source\_flag equal to 0, general\_non\_packed\_constraint\_flag equal to 1, and general\_frame\_only\_constraint\_flag equal to 1.

- **HEVC-8K-Dec**: the capability to decode H.265 (HEVC) Main10 Profile, Main Tier, Level 6.1[3] bitstreams that have general\_progressive\_source\_flag equal to 1, general interlaced\_source\_flag equal to 0, general\_non\_packed\_constraint\_flag equal to 1, and general\_frame\_only\_constraint\_flag equal to 1 with the following further limitations:

- if frame rate 60 fps is used, then the bitstream does not exceed the maximum luma picture size in samples of 33,177,600,

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

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

##### 4.2.2.3.4 HEVC-8K

4.2.2.3.4.1 ISO BMFF File Format

If HEVC-8K media is provided in a bitstream that is decodable by a decoder capable of the **HEVC-8K-Dec** decoding capabilities as defined in clause 4.2.2.1 and the media is encapsulated in an ISO BMFF Track [14], then the file format track shall conform to the requirements of the codec entry 'hvc1' or 'hev1' as defined in ISO/IEC 14496-15 [15].

4.2.2.3.4.2 CMAF Track Definition

If HEVC-UHD media is provided in a CMAF track, then the CMAF track shall conform to

- the requirements of the ISO BMFF File format track defined in clause 4.2.2.3.4.1;

- the general CMAF Track constraints in ISO/IEC 23000-19, clause 7, and

- the general video track constraints defined in ISO/IEC 23000-19, clause 9.

4.2.2.3.4.3 CMAF Switching Set Definition

If HEVC-UHD media is provided in a CMAF Switching Set, then

- every CMAF track in the CMAF Switching Set shall conform to the requirements of CMAF Track in clause 4.2.2.3.4.2;

- the general CMAF Switching Set constraints in ISO/IEC 23000-19 [27], clause 7; and

- the general CMAF video track Switching Set constraints defined in ISO/IEC 23000-19 [7], clause 9.

4.2.2.3.4.4 Playback Requirements

For a receiver supporting the HEVC-UHD media profile the following applies:

- It shall support the **HEVC-8K-Dec** decoding capabilities as defined in clause 4.2.2.1.

- It shall support the following playback requirements as documented in clause 8 of CTA-WAVE 5003 [9] for any content conforming to a CMAF Switching Set as defined in clause 4.2.2.3.4.3 namely:

- 8.2 Sequential Track Playback

- 8.3 Random Access to Fragment

- 8.4 Random Access to Time

- 8.5 Switching Set Playback

- 8.6 Regular Playback of Chunked Content

- 8.7 Regular Playback of Chunked Content, non-aligned append

- It should support the following playback requirements as documented in clause 8 of CTA-WAVE 5003 [9] for any content conforming to a CMAF Switching Set as defined in clause 4.2.2.3.4.3 namely:

- 8.9 Out-Of-Order Loading

- 8.10 Overlapping Fragments

- 8.12 Playback of Encrypted Content

~~4.2.2.3.4~~~~.5 Content Generation Requirements~~

~~For a transmitter supporting the HEVC-UHD media profile the following applies:~~

~~- It shall support the~~ **~~HEVC-8K-Enc~~** ~~encoding capabilities as defined in clause 4.2.2.2.~~

~~- It shall support the generation of a CMAF Track that conforms to the requirements in clause 4.2.2.3.3.2.~~

~~- If used for Adaptive Bit Rate (ABR) distribution, it shall support the generation of a CMAF Switching Set as defined in clause 4.2.2.3.3.3.~~

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

#### 5.5.1.1 Operation Points

If the 5GMS UE supports 360 VR video, it shall include a receiver that complies with:

- the *Basic H.264/AVC* Operation Point Receiver requirements as specified in TS 26.118 [13], clause 5.1.4.

If the 5GMS UE supports 360 VR video, it should include a receiver that complies with:

- the *Main* *H.265/HEVC* Operation Point Receiver requirements as specified in TS 26.118 [13], clause 5.1.5.

If the 5GMS UE supports 360 VR video, it may include a receiver that complies with:

- the *Flexible* *H.265/HEVC* Operation Point Receiver requirements as specified in TS 26.118 [13], clause 5.1.6.

If the 5GMS UE supports 360 VR video, it may include a receiver that complies with:

- the *H.265/HEVC 8K* Operation Point Receiver requirements as specified in TS 26.118 [13], clause 5.1.7 and the **HEVC-8K-Dec** decoding capabilities as defined in clause 4.2.2.1.

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

#### 5.5.1.2 DASH encapsulation

If the 5GMS UE supports 360 VR video for DASH services, it shall include a receiver that complies with:

- the Basic Video Media Profile Receiver requirements for DASH as specified in TS 26.118 [13], clause 5.2.2.3.

If the 5GMS UE supports 360 VR video for DASH services, it should include a receiver that complies with:

- the Main Video Media Profile Receiver requirements for DASH as specified in TS 26.118 [13], clause 5.2.3.3.

If the 5GMS UE supports 360 VR video for DASH services, it may include a receiver that complies with:

- the Advanced Video Media Profile Receiver requirements for DASH as specified in TS 26.118 [13], clause 5.2.3.4.

If the 5GMS UE supports 360 VR video, it may include a receiver that complies with:

- the 8K Media Profile Receiver requirements for DASH as specified in TS 26.118 [13], clause 5.2.3.5 and the HEVC-8K playback requirements as defined in clause 4.2.2.3.4.4.