**3GPP TSG-SA WG4 Meeting #125 S4-231xxx**

**Meeting, 21 – 25 Aug 2023 revision of S4-231266**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **26.114** | **CR** | **0557** | **rev** | **1** | **Current version:** | **18.3.0** |  |
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| *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:*** | Supporting HD video calls | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | China Mobile Com. Corporation, Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** | SA4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI18+FS\_5GVideo | | | | |  | ***Date:*** | | | 19-08-2023 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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)* | |
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| ***Reason for change:*** | | Meanwhile with the development of folding screens, the size of the screen used for calls will also enlarge. Therefore, HD video calls help to improve user experience and in some scenarios (eg. AR assistance) is helpful to improve user experience, and sometimes it is even necessary. In a multi-party conference scenario, the images of multiple participants will be integrated into the same call screen for display. At this time, better resolution can also display more details of the participants' videos.  This effort is for example motivated by the conclusions in TR26.955 which states  One important outcome of the work documented in this Technical Report is the characterization and evaluation of H.265/HEVC against relevant scenarios and its characterization against H.264/AVC. Also, a first understanding of H.265/HEVC performances versus new codecs was developed. From the scenarios and results in this Technical Report it is observed that:   * H.265/HEVC does not show any functional deficiencies or gaps, nor does it lack any relevant features. * In terms of compression efficiency, H.265/HEVC, evaluated based on the HM, performs sufficiently well for all the scenarios in this technical report.   Providing consistent HEVC-based interoperability in 3GPP services, for traditional and new scenarios, is definitely beneficial. It is recommended that 3GPP consider upgrading specifications to support profiles, levels, and possibly features available in HEVC. | | | | | | | | |
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| ***Summary of change:*** | | Upgrade the video capabilities to recommend support for HD resolution for AVC and HEVC. | | | | | | | | |
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| ***Consequences if not approved:*** | | The current minimum requirement for MTSI clients is to support level 3.1, which is not very friendly for certain scenarios that require high-definition video calls. | | | | | | | | |
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| ***Clauses affected:*** | | 5.2.2 | | | | | | | | |
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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:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*Start of changes*

### 5.2.2 Video

MTSI clients in terminals offering video communication shall support:

- H.264 (AVC) [24] Constrained Baseline Profile (CBP) Level 1.2;

- H.265 (HEVC) [119] Main Profile, Main Tier, Level 3.1. The only exception to this requirement is for the MTSI client in constrained terminal offering video communication, in which case the MTSI client in constrained terminal should support H.265 (HEVC) Main Profile, Main Tier, Level 3.1.

In addition, they should support:

- H.264 (AVC) [24] Constrained Baseline Profile (CBP) Level 4.0;

- H.264 (AVC) [24] Constrained High Profile (CHP) Level 3.1;

- H.265 (HEVC) [119] Main Profile, Main Tier, Level 4.0.

For backwards compatibility to previous releases, if H.264 (AVC) [24] Constrained High Profile Level 3.1 is supported, then H.264 (AVC) [24] Constrained Baseline Profile (CBP) Level 3.1 should also be offered.

H.264 (AVC) shall be used without requirements on output timing conformance (annex C of [24]). Each sequence parameter set of H.264 (AVC) shall contain the vui\_parameters syntax structure including the num\_reorder\_frames syntax element set equal to 0.

H.265 (HEVC) Main Profile shall be used with general\_progressive\_source\_flag equal to 1, general\_interlaced\_source\_flag equal to 0, general\_non\_packed\_constraint\_flag equal to 1, general\_frame\_only\_constraint\_flag equal to 1, and sps\_max\_num\_reorder\_pics[ i ] equal to 0 for all i in the range of 0 to sps\_max\_sub\_layers\_minus1, inclusive, without requirements on output timing conformance (annex C of [119]).

For both H.264 (AVC) and H.265 (HEVC), the decoder needs to know the Sequence Parameter Set (SPS) and the Picture Parameter Set (PPS) to be able to decode the received video packets. A compliant H.265 (HEVC) bitstream must include a Video Parameter Set (VPS), although the VPS may be ignored by the decoder in the context of the present specification. When H.264 (AVC) or H.265 (HEVC) is used it is recommended to transmit the parameter sets within the SDP description of a stream, using the relevant MIME/SDP parameters as defined in RFC6184 [25] for H.264 (AVC) and in [120] for H.265 (HEVC), respectively. Each media source (SSRC) shall transmit the currently used parameter sets at least once in the beginning of the RTP stream before being referenced by the encoded video data to ensure that the parameter sets are available when needed by the receiver. If the video encoding is changed during an ongoing session such that the previously used parameter set(s) are no longer sufficient then the new parameter sets shall be transmitted at least once in the RTP stream prior to being referenced by the encoded video data to ensure that the parameter sets are available when needed by the receiver. When a specific version of a parameter set is sent in the RTP stream for the first time, it should be repeated at least 3 times in separate RTP packets with a single copy per RTP packet and with an interval not exceeding 0.5 seconds to reduce the impact of packet loss. A single copy of the currently active parameter sets shall also be part of the data sent in the RTP stream as a response to FIR. Moreover, it is recommended to avoid using a sequence or picture parameter set identifier value during the same session to signal two or more parameter sets of the same type having different values, such that if a parameter set identifier for a certain type is used more than once in either SDP description or RTP stream, or both, the identifier always indicates the same set of parameter values of that type.

The video decoder in a multimedia MTSI client in terminal shall either start decoding immediately when it receives data, even if the stream does not start with an IDR/IRAP access unit (IDR access unit for H.264, IRAP access unit for H.265) or alternatively no later than it receives the next IDR/IRAP access unit or the next recovery point SEI message, whichever is earlier in decoding order. The decoding process for a stream not starting with an IDR/IRAP access unit shall be the same as for a valid video bit stream. However, the MTSI client in terminal shall be aware that such a stream may contain references to pictures not available in the decoded picture buffer. The display behaviour of the MTSI client in terminal is out of scope of the present document.

An MTSI client in terminal offering H.264 (AVC) CBP support at a level higher than Level 1.2 shall support negotiation to use a lower Level as described in [25] and [58].

An MTSI client in terminal offering H.264 (AVC) CHP support at a level higher than Level 3.1 shall support negotiation to use a lower Level as described in [25] and [58].

An MTSI client in terminal offering video support shall include in the SDP offer H.264 CBP at Level 1.2 or higher.

An MTSI client in terminal offering video support for H.265 (HEVC) [119] Main Profile, Main Tier, Level 3.1, should normally set it to be preferred.

An MTSI client in terminal offering H.265 (HEVC) shall support negotiation to use a lower Level than the one in the offer, as described in [120] and [58].

If a codec is supported at a certain level, then all (hierarchically) lower levels shall be supported as well.

NOTE 1: An example of a lower level than Level 1.2 is Level 1 for H.264 (AVC) Constrained Baseline Profile.

NOTE 2: All levels are minimum requirements. Higher levels may be supported and used for negotiation.

NOTE 3: MTSI clients in terminals may use full-frame freeze and full-frame freeze release SEI messages of H.264 (AVC) to control the display process. For H.265 (HEVC), MTSI clients may set the value of pic\_output\_flag in the slice segment headers to either 0 or 1 to control the display process.

NOTE 4: An H.264 (AVC) encoder should code redundant slices only if it knows that the far-end decoder makes use of this feature (which is signalled with the redundant-pic-cap MIME/SDP parameter as specified in RFC 6184 [25]). H.264 (AVC) encoders should also pay attention to the potential implications on end‑to‑end delay. The redundant slice header is not supported in H.265 (HEVC).

NOTE 5: If a codec is supported at a certain level, it implies that on the receiving side, the decoder is required to support the decoding of bitstreams up to the maximum capability of this level. On the sending side, the support of a particular level does not imply that the encoder will produce a bitstream up to the maximum capability of the level. This method can be used to set up an asymmetric video stream. For H.264 (AVC), another method is to use the SDP parameters ‘level-asymmetry-allowed’ and ‘max-recv-level’ that are defined in the H.264 payload format specification, [25]. For H.265 (HEVC) it is possible to use the SDP parameter ‘max-recv-level-id’ defined in the H.265 payload format specification, [120], to indicate a higher level in the receiving direction than in the sending direction. See also clause 6.2.3.2, Annex A.4.5 for SDP examples with asymmetric video using H.264 (AVC) and Annex A.4.8 for SDP examples with asymmetric video using both H.264 (AVC) and H.265 (HEVC). Other methods for asymmetric video transmission are also possible.

NOTE 6: If video is used in a session, an MTSI client in terminal should offer at least one video stream with a picture aspect ratio in the range from 0.7 to 1.4. For all offered video streams, the width and height of the picture should be integer multiples of 16 pixels. For example, 224x176, 272x224, and 320x240 are image sizes that satisfy these conditions.

NOTE 7: For H.264 (AVC) and H.265 (HEVC), respectively, multiple sequence and picture parameter sets can be defined, as long as they have unique parameter set identifiers, but only one sequence and picture parameter set can be active between two consecutive IDRs and IRAPs, respectively.

NOTE 8: For H.264 (AVC), Constrained High Profile (CHP) Level 3.1 is not required to be supported as it is less bit rate efficient than H.265 (HEVC) Main Profile, Main Tier, Level 3.1. However, it is recommended for interoperability.

*End of changes*