**3GPP TSG-SA4 Meeting #130S4-241986**

**Orlando, 18th - 22nd November 2024 *Revision of S4-241527***

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **26.511** | **CR** | **0013** | **rev** | **1** | **Current version:** | **18.2.0** |  |
|  | | | | | | | | |
| *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 |  |

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|  | | | | | | | | | | |
| ***Title:*** | **[VOPS] Updates for MV-HEVC** | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Apple Inc., Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | **VOPS** | | | | |  | ***Date:*** | | | 2024-11-11 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | 19 |
|  | *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:*** | | As part of VOPS work, related CMAF MV-HEVC extensions need to be added to SA4 streaming specifications. At the same time, CMAF 3rd ed AMD 2 covering MV-HEVC is under work at MPEG. The purpose of this CR is to gather needed changes for SA4 streaming specifications and keeping them up to date with development of CMAF 3rd ed AMD 2 specification. Hence the CR will be provided for endorsement till the implementation is completed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The CR list the relevant sub clauses where necessary changes related to support of MV-HEVC in CMAF 3rd ed AMD 2 still need to be made. This is indicated mostly by editor's notes that will have to be resolved moving forward. | | | | | | | | |
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| ***Consequences if not approved:*** | | This CR is provided for endorsement and should be approved only once related. CMAF 3rd edition AMD 2 work is completed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 3.3, 4.2.2.3.x (new), 5.4.1.2, 5.4.4.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | Revision 1:   * Added reference to TS 26.265 MV-HEVC operating point. * Removed impact on clause 4.2.2.1 and 4.2.2.2 since operating points are being defined in TS 26.265. * Removed EN to CMAF reference since the reference already does not mention any version number.   Revision 2:   * Aligned to TS 26.265 MV-HEVC operating point. | | | | | | | | |

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

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] ITU-T Recommendation H.264 (06/2019): "Advanced video coding for generic audiovisual services".

[3] ITU-T Recommendation H.265 (02/2018): "High efficiency video coding".

[4] 3GPP TS 26.117: "5G Media Streaming (5GMS); Speech and audio profiles".

[5] 3GPP TS 26.501: "5G Media Streaming (5GMS); General description and architecture".

[6] 3GPP TS 26.307: "Presentation Layer for 3GPP Services".

[7] ISO/IEC 23000-19: "Information Technology Multimedia Application Format (MPEG-A) – Part 19: Common Media Application Format (CMAF) for segmented media".

[8] ISO/IEC 23001-7: "MPEG systems technologies - Part 7: Common encryption in ISO base media file format files".

[9] CTA-5003: "Web Application Video Ecosystem (WAVE): Device Playback Capabilities Specification", available at <https://cdn.cta.tech/cta/media/media/resources/standards/pdfs/cta-5003-final.pdf>.

[10] 3GPP TS 26.512: " 5G Media Streaming (5GMS); Protocols".

[11] IETF RFC 6381: The 'Codecs' and 'Profiles' Parameters for "Bucket" Media Types.

[12] 3GPP TS 26.116: "Television (TV) over 3GPP Services; Video Profiles".

[13] 3GPP TS 26.118: "Virtual Reality (VR) profiles for streaming applications".

[14] ISO/IEC 14496-12: "Information technology - Coding of audio-visual objects -Part 12: ISO base media file format".

[15] ISO/IEC 14496-15: "Information technology - Coding of audio-visual objects - Part 15: Carriage of network abstraction layer (NAL) unit structured video in the ISO base media file format".

[16] W3C IMSC1.1: "TTML Profiles for Internet Media Subtitles and Captions 1.1", available at <http://www.w3.org/TR/ttml-imsc1.1>.

[17] ISO/IEC 14496-30: "Information technology - Coding of audio-visual objects - Part 30: Timed text and other visual overlays in ISO base media file format".

[18] W3C Media Capabilities: "Media Capabilities", available at <https://w3c.github.io/media-capabilities/>

[19] CTA-5000-B: " Web Application Video Ecosystem - Web Media API Snapshot 2019", available at <https://cdn.cta.tech/cta/media/media/resources/standards/pdfs/cta-5000-b-final_v2.pdf>.

[20] ISO/IEC 23009-1: "Information Technology - Dynamic Adaptive Streaming Over HTTP (DASH) - Part 1: Media Presentation Description and Segment Formats".

[21] 3GPP TS 26.247: "Transparent end-to-end Packet-switched Streaming Service (PSS); Progressive Download and Dynamic Adaptive Streaming over HTTP (3GP-DASH)".

[22] IETF RFC 8216: "HTTP Live Streaming".

[23] W3C "TTML Media Type Definition and Profile Registry", available at <https://www.w3.org/TR/ttml-profile-registry/>.

[XX] ISO/IEC JTC 1/SC 29 WG 03 MPEG Systems w24128: "WD of ISO/IEC 23000-19 3rd edition AMD 2 New Structural CMAF Brand Profile".

[XY] 3GPP TS 26.265: "Media Delivery: Video Capabilities and Operation Points".

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

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

5GMS 5G Media Streaming

5GMSA 5G Media Streaming Architecture

AMR Adaptive Multi Rate

AMR-WB Adaptive Multi Rate – Wide Band

API Application Programming Interface

AS Application Server

AVC Advanced Video Coding

AVC-HD Advanced Video Codec – High Definition

CMAF Common Media Application Format

DASH Dynamic Adaptive Streaming over HTTP

EVS Enhanced Voice Services

HD High Definition

HDR High Dynamic Range

HD-HDR High Definition and High Dynamic Range

HEVC High Efficiency Video Coding

HLG Hybrid Log-Gamma

HLS HTTP Live Streaming

IMSC Internet Media Subtitles and Captions

IVAS Immersive Voice and Audio Services

MPEG Moving Picture Experts Group

MV-HEVC Multiview HEVC

OMAF Omnidirectional Media Application Format

PSS Packet-switched Streaming Service

TTML Timed Text Markup Language

TV Television

UE User Equipment

UHD Ultra High Definition

VR Virtual Reality

VCL Video Coding Layer

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

4.2.2.3.X HEVC-MV

Editor’s Note: This clause will be completed when all the necessary related specifications, e.g. CMAF 3rd edition AMD 2 with needed MV-HEVC profiles is made available.

4.2.2.3.X.1 ISO BMFF File Format

If HEVC-MV media is provided in a bitstream that is decodable by a decoder capable of the **HEVC-MV-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 with the requirements of the codec entry 'hvc1' or 'hev1' as defined in ISO/IEC 14496-15 [15].

4.2.2.3.X.2 CMAF Track Definition

If HEVC-MV media is provided in a CMAF track, then the CMAF track shall conform with

- the requirements of the ISO BMFF File format track defined in clause 4.2.2.3.X.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.X.3 CMAF Switching Set Definition

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

- every CMAF track in the CMAF Switching Set shall conform with 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.X.4 Playback Requirements

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

- It shall support **MV-HEVC-UHD-Dec** decoding capabilities as defined in TS 26.265 [XY].

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

5.4.1.2 H.265 (HEVC)

If the 5GMSd Client supports the Television (TV) profile, it should support:

*- H.265/HEVC 720p HD* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.2.7;

*- H.265/HEVC Full HD* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.3.7;

*- H.265/HEVC UHD* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.4.7;

*- H.265/HEVC Full HD HDR* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.5.8;

*- H.265/HEVC UHD HDR* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.6.8;

- *H.265/HEVC Full HD HDR HLG* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.7.7; and

*- H.265/HEVC UHD HDR HLG* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.8.7.

If the 5GMSd Client supports the Television (TV) profile, it may support:

*- H.265/HEVC 8K UHD HDR* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.9.8.

If the 5GMSd Client supports the Television (TV) profile and HD-HDR capabilities, it shall support:

- *H.265/HEVC Full HD* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.3.7.

If the 5GMSd Client supports the Television (TV) profile and HEVC-MV capabilities, it shall support:

- *MV-HEVC-UHD-Dec* Operation Point Receiver requirements as specified in TS 26.265 [XY].

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

5.4.4.2 Video media profiles

If the 5GMSd client supports the Television (TV) profile, then the following applies:

- the AVC-HD playback requirements as defined in clause 4.2.1.3.1.4 and the *H.264/AVC 720p HD* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.4.2.6 shall be supported.

- the AVC-FullHD playback requirements as defined in clause 4.2.1.3.1.4 and the *H.264/AVC Full HD* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.4.3.6 should be supported.

- the HEVC-HD playback requirements as defined in clause 4.2.2.3.1.4 and the *H.265/HEVC 720p HD* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.2.7 should be supported.

- the HEVC-FullHD playback requirements as defined in clause 4.2.2.3.2.4 and the *H.265/HEVC Full HD* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.3.7 should be supported.

- the HEVC-FullHD playback requirements as defined in clause 4.2.2.3.2.4 and the *H.265/HEVC Full HD HDR* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.5.7 should be supported.

- the HEVC-FullHD playback requirements as defined in clause 4.2.2.3.2.4 and the *H.265/HEVC Full HD HLG* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.7.7 should be supported.

- the HEVC-UHD playback requirements as defined in clause 4.2.2.3.3.4 and the *H.265/HEVC UHD* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.4.7 may be supported.

- the HEVC-UHD playback requirements as defined in clause 4.2.2.3.3.4 and the *H.265/HEVC UHD HDR* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.5.7 may be supported.

- the HEVC-UHD playback requirements as defined in clause 4.2.2.3.3.4 and the *H.265/HEVC UHD HLG* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.8.7 may be supported.

- the HEVC-8K playback requirements as defined in clause 4.2.2.3.4.4 and *H.265/HEVC 8K UHD HDR* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.9.8 may be supported.

If the 5GMSd Client supports the Television (TV) profile and HD-HDR capabilities, then the following applies:

- the HEVC-FullHD playback requirements as defined in clause 4.2.2.3.2.4 and the *H.265/HEVC Full HD* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.3.7 shall be supported.

- the HEVC-FullHD playback requirements as defined in clause 4.2.2.3.2.4 and the *H.265/HEVC Full HD HDR* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.5.7 shall be supported.

- the HEVC-FullHD playback requirements as defined in clause 4.2.2.3.2.4 and the *H.265/HEVC Full HD HLG* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.7.7 shall be supported.

- the HEVC-UHD playback requirements as defined in clause 4.2.2.3.3.4 and the *H.265/HEVC UHD* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.4.7 may be supported.

- the HEVC-UHD playback requirements as defined in clause 4.2.2.3.3.4 and *the H.265/HEVC UHD HDR* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.5.7 may be supported.

- the HEVC-UHD playback requirements as defined in clause 4.2.2.3.3.4 and the *H.265/HEVC UHD HLG* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.8.7 may be supported.

- the HEVC-8K playback requirements as defined in clause 4.2.2.3.4.4 and *H.265/HEVC 8K UHD HDR* Operation Point Receiver requirements as specified in TS 26.116 [12], clause 4.5.9.8 may be supported.

Editor’s Note: To be update with the needed MV-HEVC related requirements.

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