**3GPP TSG-SA4 Meeting #127** ***S4-240329 revision of S4-240046***

**Sophia-Antipolis, France, 29th Jan 2024 - 2nd Feb 2024**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **26.117** | **CR** | **0006** | **rev** | **1** | **Current version:** | **16.1.0** |  |
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| *For* [***HELP***](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:*** | [5GMS3] Correction on Audio encapsulation in ISO BMFF, 3GP file format, CMAF and DASH | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei Technologies Sweden AB, Dolby, Qualcomm | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5GMS3 | | | | |  | ***Date:*** | | | 2024-01-19 |
|  |  | | | |  | |  | | |  |
| ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | Editorial correction ISO BMFF signaling | | | | | | | | |
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| ***Summary of change:*** | | Rephrasing for ISOBMFF encapsulation is proposed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Incorrect text, inconsistent interpretation and implementation. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | Clause 2  Clause 3.3  Clause 7.2  Clause 7.2.1  Clause 7.2.2  Clause 7.3:  Clause 7.3.1:  Clause 7.3.2:  Clause 7.4:  Clause 7.4.1  Clause 7.4.2  Clause 7.6  Clause 7.6.2  Clause 7.7  Clause 7.7.1  Clause 7.7.2  Clause 7.8  Clause 7.8.  Clause 7.8.2  Clause 7.8.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |



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| **First Change** |

# 2 References

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

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

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

[40] ISO/IEC 14496-14:2003: "Information technology – Coding of audio-visual objects – Part 14: MP4 file format".

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| **Second 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].

AAC Advanced Audio Coding

ABR Adaptive BitRate

AMR Adaptive MultiRate

CMAF Common Media Application Format

DASH Dynamic Adaptive Streaming over HTTP

DRC Dynamic Range Control DTX Discontinuous Transmission

EVS Enhanced Voice Services

ISO BMFF ISO Base Media File Format

HTTP Hyper Text Transfer Protocol

SBR Spectral Band Replication

URN Universal Resource Name

WAVE Web Application Video Ecosystem

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| **Third Change** |

## 7.2 AMR Media Profile

### 7.2.1 Mapping to ISO BMFF

If media is provided following the operation point **AMR** and is encapsulated in the ISO BMFF, then the file format track shall contain the sample entry AMRSampleEntry with box\_type 'samr' as defined in TS 26.244 [29] clause 6.5 and conform to the requirements of the sample entry 'samr' as defined in TS 26.244 [29].

### 7.2.2 Media Profile Definition

#### 7.2.2.1 CMAF Track Definition

If media is provided following the operation point **AMR** and is encapsulated in a CMAF track, then the CMAF track shall conform to 7.2.1, and conform to the general CMAF Track constraints in ISO/IEC 23000-19 [30] as well as the general audio track constraints defined in ISO/IEC 23000-19 [30], clause 10.

#### 7.2.2.2 CMAF Switching Set and Media Profile Definition

If media is provided following the operation point **AMR** and is provided in a CMAF Switching Set, then every CMAF track in the CMAF Switching Set shall conform conform to 7.2.2.1, and shall conform to the general CMAF Switching Set constraints in ISO/IEC 23000-19 [30], clause 7. CMAF Switching Sets that follow these requirements conform to the CMAF AMR media profile 'camr' defined in this clause.

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#### 7.2.2.3 Mapping to DASH Adaptation Set

If media is provided following the operation point **AMR**, a CMAF Switching Set conforming to clause 7.2.2.2 may be provided in a DASH Media Presentation Description in an Adaptation Set, in that case, the Adaptation Set shall conform to the Adaptation Set constraints of the DASH profile for CMAF as defined in ISO/IEC 23009-1 [31] clause 8.12.4.3. The following parameters shall be present on Adaptation Set level and set:

- @codecs is set to 'samr'

- @mimeType is set to be compatible with "audio/mp4 profiles='camr'"

- @audioSamplingRate is set to '8000'

If the Adaptation Set conforms to the constraints for the **AMR** Operation Point as defined in this clause, then the @profiles parameter in the Adaptation Set may signal conformance to this Media Profile by using "urn:3GPP:audio:mp:amr".

#### 7.2.2.4 Playback Requirements

For a receiver supporting the **AMR** media profile the following applies:

- It shall support the receiver requirements as documented in clause 6.2.2.2 for any CMAF Track conforming to the CMAF **AMR** media profile 'camr' as defined in clause 7.2.2.1.

- It shall support the following playback requirements as documented in clause 8 of CTA-WAVE 5003 [32] for any content conforming to a CMAF Switching Set according to CMAF **AMR** media profile 'camr' as defined in clause 7.2.2.2, 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 [29] for any content conforming to a CMAF Switching Set according to CMAF AMR media profile 'camr' as defined in clause 7.2.2.2, namely:

- 8.9 Out-Of-Order Loading

- 8.10 Overlapping Fragments

- 8.12 Playback of Encrypted Content

#### 7.2.2.5 Content Generation Requirements

For a transmitter supporting the AMR media profile the following applies:

- It shall support all media encoding capabilities for AMR as defined in clause 5.3.

- It shall support the sender requirements for AMR as defined in clause 6.2.2.3.

- It shall support the generation of a CMAF Track as defined in clause 7.2.2.1 that conforms to the CMAF Media Profile 'camr' as defined in clause 7.2.2.2.

- If used for Adaptive Bit Rate (ABR) distribution, it shall support the generation of a CMAF Switching Set as defined in clause 7.2.2.4.

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| **Fourth Change** |

## 7.3 AMR-WB Media Profile

### 7.3.1 Mapping to ISO BMFF

If media is provided following the operation point **AMR-WB** and is encapsulated in the ISO BMFF, then the file format track shall contain the AMRSampleEntryBox and shall conform to the requirements of the sample entry 'sawb' as defined in TS 26.244 [29] clause 6.5.

### 7.3.2 Media Profile Definition

#### 7.3.2.1 CMAF Track Definition

If media is provided following the operation point **AMR-WB** and is encapsulated in a CMAF track, then the CMAF track shall conform to 7.3.1, and conform to the general CMAF Track constraints in ISO/IEC 23000-19 [30], clause 7 as well as the general audio track constraints defined in ISO/IEC 23000-19 [30], clause 10.

#### 7.3.2.2 CMAF Switching Set and Media Profile Definition

If media is provided following the operation point **AMR-WB** and is provided in a CMAF Switching Set, then every CMAF track in the CMAF Switching Set shall conform to 7.3.2.1, and shall conform to the general CMAF Switching Set constraints in ISO/IEC 23000-19 [30], clause 7. CMAF Switching Sets that follow these requirements conform to the CMAF AMR WB media profile 'camw' defined in this clause.

#### 7.3.2.3 Mapping to DASH Adaptation Set

If media is provided following the operation point **AMR-WB**, a switching set conforming to clause 7.3.2.2 may be provided in a DASH Media Presentation Description in an Adaptation Set, in that case, the Adaptation Set shall conform to the Adaptation set constraints of the DASH profile for CMAF as defined in ISO/IEC 23009-1 [31] clause 8.12.4.3. The following parameters shall be present on Adaptation Set level: - @codecs is set to 'sawb'

- @mimeType is set to be compatible with "audio/mp4 profiles='camw'"

- @audioSamplingRate is set to '16000'

If the Adaptation Set conforms to the constraints for the **AMR-WB** Operation Point as defined in this clause, then the @profiles parameter in the Adaptation Set may signal conformance to this Media Profile by using "urn:3GPP:audio:mp:amr-wb".

#### 7.3.2.4 Playback Requirements

For a receiver supporting the AMR-WB media profile the following applies:

- It shall support the receiver requirements as documented in clause 6.2.3.2 for any CMAF Track conforming to the CMAF AMR-WB media profile 'camw' as defined in clause 7.3.2.2.

- It shall support the following playback requirements as documented in clause 8 of CTA-WAVE 5003 [32] for any content conforming to a CMAF Switching Set according to CMAF AMR-WB media profile 'camw' as defined in clause 7.3.2.2, 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 [32] for any content conforming to a CMAF Switching Set according to CMAF AMR-WB media profile 'camw' as defined in clause 7.3.2.2, namely:

- 8.9 Out-Of-Order Loading

- 8.10 Overlapping Fragments

- 8.12 Playback of Encrypted Content

#### 7.3.2.5 Content Generation Requirements

For a transmitter supporting the AMR-WB media profile the following applies:

- It shall support all media encoding capabilities for AMR-WB as defined in clause 5.3.

- It shall support the sender requirements for AMR-WB as defined in clause 6.2.3.3.

- It shall support the generation of a CMAF Track as defined in clause 7.3.2.1 that conforms to the CMAF Media Profile 'camw' as defined in clause 7.3.2.2.

- If used for Adaptive Bit Rate (ABR) distribution, it shall support the generation of a CMAF Switching Set as defined in clause 7.3.2.4.

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| **Fifth Change** |

## 7.4 EVS Media Profile

### 7.4.1 Mapping to ISO BMFF

If media is provided following the operation point **EVS** and is encapsulated in the ISO BMFF, then the file format track shall contain the EVSSampleEntryBox with box\_type and conform to the requirements of the sample entry 'sevs' as defined in TS 26.244 [29] clause 14.

### 7.4.2 Media Profile Definition

#### 7.4.2.1 CMAF Track Definition

If media is provided following the operation point **EVS** and is encapsulated in a CMAF track, then the CMAF track shall conform to 7.3.1, and conform to the general CMAF Track constraints in ISO/IEC 23000-19 [30] , clause 7 as well as the general audio track constraints defined in ISO/IEC 23000-19 [30], clause 10.

#### 7.4.2.2 CMAF Switching Set and Media Profile Definition

If media is provided following the operation point **EVS** and is provided in a CMAF Switching Set, then every CMAF track in the CMAF Switching Set shall conform to 7.4.2.1, and shall conform to the general CMAF Switching Set constraints in ISO/IEC 23000-19 [30], clause 7. A CMAF Switching Set that follows these requirements conforms to the CMAF EVS media profile 'cevs' defined in this clause..

#### 7.4.2.3 Mapping to DASH Adaptation Set

If media is provided following the operation point **EVS** and is provided in a DASH Media Presentation in an Adaptation Set, a switching set conforming to clause 7.4.2.2 may be provided in a DASH Media Presentation Description in an Adaptation Set. In that case, the Adaptation Set shall conform to the Adaptation set constraints of the DASH profile for CMAF as defined in ISO/IEC 23009-1 [31]. The following parameters shall be present on Adaptation Set level:

- @codecs is set to 'sevs'

- @mimeType is set to be compatible with "audio/mp4 profiles='cevs'"

- @audioSamplingRate is set to one of the following: '8000', '16000', '24000', '32000'

If the Adaptation Set conforms to the constraints for the **EVS** Operation Point as defined in this clause, then the @profiles parameter in the Adaptation Set may signal conformance to this Media Profile by using "urn:3GPP:audio:mp:evs.

#### 7.4.2.4 Playback Requirements

For a receiver supporting the EVS media profile the following applies:

- It shall support the receiver requirements as documented in clause 6.2.4.2 for any CMAF Track conforming to the CMAF EVS media profile 'cevs' as defined in clause 7.4.2.2.

- It shall support the following playback requirements as documented in clause 8 of CTA-WAVE 5003 [32] for any content conforming to a CMAF Switching Set according to CMAF EVS media profile 'cevs' as defined in clause 7.4.2.2, 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 [32] for any content conforming to a CMAF Switching Set according to CMAF EVS media profile 'cevs' as defined in clause 7.2.2.2, namely:

- 8.9 Out-Of-Order Loading

- 8.10 Overlapping Fragments

- 8.12 Playback of Encrypted Content

#### 7.4.2.5 Content Generation Requirements

For a transmitter supporting the EVS media profile the following applies:

- It shall support all media encoding capabilities for EVS as defined in clause 5.3.

- It shall support the sender requirements for EVS as defined in clause 6.2.4.3.

- It shall support the generation of a CMAF Track as defined in clause 7.4.2.1 that conforms to the CMAF Media Profile 'cevs' as defined in clause 7.4.2.2.

- If used for Adaptive Bit Rate (ABR) distribution, it shall support the generation of a CMAF Switching Set as defined in clause 7.4.2.2.

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| **Sixth Change** |

## 7.6 eAAC+ stereo Media Profile

### 7.6.1 Void

### 7.6.2 Media Profile Definition

#### 7.6.2.1 CMAF Track Definition

If media is provided following the operation point **eAAC+ stereo** and is encapsulated in a CMAF track, then the CMAF track shall conform toand contain the MP4AudioSampleEntry 'mp4a' as defined in ISO/IEC 14496-14 [40] ], the general CMAF Track constraints in ISO/IEC 23000-19 [30], clause 7, the general audio track constraints defined in ISO/IEC 23000-19 [30], clause 10 as well as AAC core constraints in clause 10 of ISO/IEC 23000-19 [30].

NOTE: A CMAF Track conforming to eAAC+ stereo media profile also conforms to the xHE-AAC Media Profile as defined in clause 7.8. Consequently, such CMAF Track can also be played back by receivers conforming to the xHE-AAC Media Profile.

#### 7.6.2.2 CMAF Switching Set and Media Profile Definition

If media is provided following the operation point **eAAC+ stereo** and is provided in a CMAF Switching Set, then every CMAF track in the CMAF Switching Set shall conform to 7.6.2.1, and the tracks shall conform tothe general CMAF Switching Set constraints in ISO/IEC 23000-19 [30], clause 7as well as the AAC core Switching Set constraints in clause 10.5 of ISO/IEC 23000-19 [30]. A CMAF Switching Set following these requirements is defined as the CMAF eAAC+ stereo media profile 'ceac'.

#### 7.6.2.3 Mapping to DASH Adaptation Set

If media is provided following the operation point **eAAC+ stereo,** a switching set conforming to clause 7.6.2.2 may be provided in a DASH Media Presentation Description in an Adaptation Set. In that case, the Adaptation Set shall conform to the Adaptation set constraints of the DASH profile for CMAF as defined in ISO/IEC 23009-1 [31] clause 8.12.4.3. The following parameters shall be present on Adaptation Set level and set:

- @codecs is set to 'mp4a'

- @mimeType is set to be compatible with "audio/mp4 profiles='ceac'"

- @audioSamplingRate is set to '32000','44100', or '48000'

If the Adaptation Set conforms to the constraints for the **eAAC+ stereo** Operation Point as defined in this clause, then the @profiles parameter in the Adaptation Set may signal conformance to this Media Profile by using "urn:3GPP:audio:mp:eAAC+ ".

NOTE: A DASH Adaptation Set conforming to eAAC+ stereo media profile conforms to the xHE-AAC DASH Adaptation Set as defined in clause 7.8. Hence, such DASH Adaptation Set can also be played back by receivers conforming to the xHE-AAC media profile.

#### 7.6.2.4 Playback Requirements

For a receiver supporting the **eAAC+ stereo** media profile the following applies:

- It shall support the receiver requirements as documented in clause 6.3.2.2 for any CMAF Track conforming to the CMAF eAAC+ stereo media profile 'ceac' as defined in clause 7.6.2.2.

- It shall support the following playback requirements as documented in clause 8 of CTA-WAVE 5003 [32] for any content conforming to a CMAF Switching Set according to CMAF eAAC+ stereo media profile 'ceac' as defined in clause 7.6.2.2, 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 [32] for any content conforming to a CMAF Switching Set according to CMAF eAAC+ stereo media profile 'ceac' as defined in clause 7.6.2.2, namely:

- 8.9 Out-Of-Order Loading

- 8.10 Overlapping Fragments

- 8.12 Playback of Encrypted Content

#### 7.6.2.5 Content Generation Requirements

For a transmitter supporting the eAAC+ stereo media profile the following applies:

- It shall support all media encoding capabilities for eAAC+ stereo as defined in clause 5.3.

- It shall support the sender requirements for eAAC+ stereo as defined in clause 6.3.2.3.

- It shall support the generation of a CMAF Track as defined in clause 7.6.2.1 that conforms to the CMAF Media Profile 'ceac' as defined in clause 7.6.2.2.

- If used for Adaptive Bit Rate (ABR) distribution, it shall support the generation of a CMAF Switching Set as defined in clause 7.6.2.2.

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| **Seventh Change** |

## 7.7 AMR-WB+ Media Profiles

### 7.7.1 Mapping to ISO BMFF

If media is provided following the operation point **AMR-WB+** and is encapsulated in the ISO BMFF, then the file format track shall contain the AMRWPSampleEntry with box\_type and conform to the requirements of the sample entry 'sawp' as defined in TS 26.244 [29] clause 6.9.

### 7.7.2 Media Profile Definition

#### 7.7.2.1 CMAF Track Definition

If media is provided following the operation point **AMR-WB+** and is encapsulated in a CMAF track, then the CMAF track shall conform to 7.7.1 and the general CMAF Track constraints in ISO/IEC 23000-19 [30], clause 7 as well as the general audio track constraints defined in ISO/IEC 23000-19, clause 10.

#### 7.7.2.2 CMAF Switching Set and Media Profile Definition

If media is provided following the operation point **AMR-WB+** and is provided in a CMAF Switching Set, then every CMAF track in the CMAF Switching Set shall conform to the requirements of 7.7.2.1 as , the general CMAF Switching Set constraints in ISO/IEC 23000-19 [30], clause 7. A CMAF Switching Set following these requirements is defined as the CMAF AMR-WB+ media profile 'camp'.

#### 7.7.2.3 Mapping to DASH Adaptation Set

If media is provided following the operation point **AMR-WB+,** a switching set conforming to clause 7.7.2.2 may be provided in a DASH Media Presentation in an Adaptation Set. In that case, the Adaptation Set shall conform to the Adaptation set constraints of the DASH profile for CMAF as defined in ISO/IEC 23009-1 [31] clause 8.12.4.3. The following parameters shall be present on Adaptation Set level:

- @codecs is set to 'sawp'

- @mimeType is set to be compatible with "audio/mp4 profiles='camp'"

- @audioSamplingRate is set to any of the following values: '8000', '16000', '32000', or '38400'

If the Adaptation Set conforms to the constraints for the **AMR-WB+** Operation Point as defined in this clause, then the @profiles parameter in the Adaptation Set may signal conformance to this Media Profile by using "urn:3GPP:audio:mp:amr-wb+".

#### 7.7.2.4 Playback Requirements

For a receiver supporting the AMR-WB+ media profile the following applies:

- It shall support the receiver requirements as documented in clause 6.3.2.2 for any CMAF Track conforming to the CMAF AMR-WB+ stereo media profile 'camp' as defined in clause 7.7.2.2.

- It shall support the following playback requirements as documented in clause 8 of CTA-WAVE 5003 [32] for any content conforming to a CMAF Switching Set according to CMAF AMR-WB+ media profile 'camp' as defined in clause 7.7.2.2, 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 [32] for any content conforming to a CMAF Switching Set according to CMAF AMR-WB media profile 'camp' as defined in clause 7.7.2.2, namely:

- 8.9 Out-Of-Order Loading

- 8.10 Overlapping Fragments

- 8.12 Playback of Encrypted Content

#### 7.7.2.5 Content Generation Requirements

For a transmitter supporting the AMR-WB+ media profile the following applies:

- It shall support all media encoding capabilities for AMR-WB+ stereo as defined in clause 5.3.

- It shall support the sender requirements for AMR-WB+ as defined in clause 6.3.3.3.

- It shall support the generation of a CMAF Track as defined in clause 7.7.2.1 that conform to the CMAF Media Profile 'cawp' as defined in clause 7.7.2.2.

- If used for Adaptive Bit Rate (ABR) distribution, it shall support the generation of a CMAF Switching Set as defined in clause 7.7.2.2.

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## 7.8 xHE-AACMedia Profile

### 7.8.1 CMAF Track Definition

If media is provided following the operation point **xHE-AAC stereo** and is encapsulated in a CMAF track, then the CMAF track shall conform to the general CMAF Track constraints in ISO/IEC 23000-19:2023 [30], clause 7, the general audio track constraints defined in ISO/IEC 23000-19:2023 [30], clause 10, as well as MPEG-D USAC track format constraints defined in ISO/IEC 23000-19 [30], Annex K. As specified in 23000-19 Annex K the MP4AudioSampleEntry shall be present with name `mp4a`.

### 7.8.2 CMAF Switching Set and Media Profile Definition

If media is provided following the operation point **xHE-AAC stereo** and is provided in a CMAF Switching Set, then every CMAF track in the CMAF Switching Set shall conform to7.8.1 and the tracks shall conform to the general CMAF Switching Set constraints in ISO/IEC 23000-19 [30], clause 7 as well as the AAC core Switching Set constraints in clause 10.5 of ISO/IEC 23000-19 [30].

A CMAF Switching Set following these requirements is defined as the CMAF USAC stereo media profile 'casu'

### 7.8.3 Mapping to DASH Adaptation Set

If media is provided following the operation point **xHE-AAC stereo** and is provided in a DASH Media Presentation in an Adaptation Set, then the following requirements apply:

- Content representations shall comply with the USAC stereo CMAF media profile 'casu', as defined in ISO/IEC 23000-19 [30] annex K.

- Content representations shall comply with the DASH Profile for CMAF content as defined in ISO/IEC 23009-1:2022 [31]

- If the **ChannelConfiguration** parameter is present in the Movie header, then the identical channel configuration shall be signaled by means of the AudioChannelConfiguration element in the MPD, according to the values specified in ISO/IEC 23000-19 [30] Table K.2.

- @audioSamplingRate is set to '32000','44100', or '48000'

If the Adaptation Set conforms to the constraints for the **xHE-AAC stereo** Operation Point as defined in this clause, then the @profiles parameter in the Adaptation Set may signal conformance to this Media Profile by using "urn:3GPP:audio:mp:xHE-AAC".

### 7.8.4 Playback Requirements

For a receiver supporting the **xHE-AAC** media profile the following applies:

- It shall support the receiver requirements as documented in clause 6.3.4.2 for any CMAF Track conforming to the CMAF USAC stereo media profile 'casu' as defined in clause 7.8.2.

- It should support the audio related playback requirements as documented in clause 8 of CTA-WAVE 5003 [32] for any content conforming to a CMAF Switching Set according to CMAF USAC stereo media profile 'casu' as defined in clause 7.8.2.

### 7.8.5 Content Generation Requirements

For a transmitter supporting the **xHE-AAC** media profile the following applies:

- It shall support all media encoding capabilities for xHE-AAC stereo as defined in clause 5.3.

- It shall support the sender requirements for xHE-AAC stereo as defined in clause 6.3.4.3.

- It shall support the generation of a CMAF Track as defined in clause 7.8.1 that conforms to the CMAF Media Profile 'casu' as defined in clause 7.8.2.

- If used for Adaptive Bit Rate (ABR) distribution, it shall support the generation of a CMAF Switching Set as defined in clause 7.8.2.