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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

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In the present document, modal verbs have the following meanings:

shall indicates a mandatory requirement to do something

shall not indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

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need not indicates permission not to do something

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can indicates that something is possible

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The constructions "can" and "cannot" are not substitutes for "may" and "need not".

will indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

will not indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

might indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document specifies speech and audio media capabilities, operation points and media profiles for 5G Media Streaming in the context of 3GPP services and deployments. Speech and audio media capabilities, operation points and media profiles are also provided for usage in other streaming applications.

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

[3] 3GPP TS 26.071: "Mandatory Speech Codec speech processing functions; AMR Speech CODEC; General description".

[4] 3GPP TS 26.090: "Mandatory Speech Codec speech processing functions; Adaptive Multi-Rate (AMR) speech codec; Transcoding functions".

[5] 3GPP TS 26.073: "ANSI-C code for the Adaptive Multi Rate (AMR) speech codec".

[6] 3GPP TS 26.104: "ANSI-C code for the floating-point Adaptive Multi Rate (AMR) speech codec".

[7] 3GPP TS 26.093: "Mandatory speech codec speech processing functions; Adaptive Multi-Rate (AMR) speech codec; Source controlled rate operation".

[8] 3GPP TS 26.171: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; General description".

[9] 3GPP TS 26.190: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Transcoding functions".

[10] 3GPP TS 26.173: "ANCI-C code for the Adaptive Multi Rate - Wideband (AMR-WB) speech codec".

[11] 3GPP TS 26.204: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; ANSI-C code".

[12] 3GPP TS 26.193: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Source controlled rate operation".

[13] 3GPP TS 26.441: "Codec for Enhanced Voice Services (EVS); General Overview".

[14] 3GPP TS 26.442: "Codec for Enhanced Voice Services (EVS); ANSI C code (fixed-point)".

[15] 3GPP TS 26.443: "Codec for Enhanced Voice Services (EVS); ANSI C code (floating-point)".

[16] 3GPP TS 26.445: "Codec for Enhanced Voice Services (EVS); Detailed Algorithmic Description".

[17] 3GPP TS 26.446: "Codec for Enhanced Voice Services (EVS); Adaptive Multi-Rate - Wideband (AMR-WB) backward compatible functions".

[18] 3GPP TS 26.450: "Codec for Enhanced Voice Services (EVS); Discontinuous Transmission (DTX)".

[19] 3GPP TS 26.401: "General audio codec audio processing functions; Enhanced aacPlus general audio codec; General description".

[20] 3GPP TS 26.402: "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Additional decoder tools".

[21] 3GPP TS 26.403: "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Encoder specification; Advanced Audio Coding (AAC) part".

[22] 3GPP TS 26.404: "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Enhanced aacPlus encoder Spectral Band Replication (SBR) part".

[23] 3GPP TS 26.405: "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Encoder specification parametric stereo part".

[24] 3GPP TS 26.410: "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Floating-point ANSI-C code".

[25] 3GPP TS 26.411: "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Fixed-point ANSI-C code".

[26] 3GPP TS 26.290: "Audio codec processing functions; Extended Adaptive Multi-Rate - Wideband (AMR-WB+) codec; Transcoding functions".

[27] 3GPP TS 26.304: "Extended Adaptive Multi-Rate - Wideband (AMR-WB+) codec; Floating-point ANSI-C code".

[28] 3GPP TS 26.273: "ANSI-C code for the fixed-point Extended Adaptive Multi-Rate - Wideband (AMR-WB+) speech codec".

[29] 3GPP TS 26.244: "Transparent end-to-end streaming service; 3GPP file format (3GP)".

[30] ISO/IEC 23000-19:2019 "Information Technology Multimedia Application Format (MPEG-A) – Part 19: Common Media Application Format (CMAF) for segmented media".

[31] ISO/IEC 23009-1:2019/Amd.1:2020: "Information technology -- Dynamic adaptive streaming over HTTP (DASH) -- Part 1: Media presentation description and segment formats."

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

[33] 3GPP TS 26.244: "Transparent end-to-end streaming service; 3GPP file format (3GP)".

[34] 3GPP TS 26.452: "Codec for Enhanced Voice Services (EVS); ANSI C code; Alternative fixed-point using updated basic operators".

[35] 3GPP TS 26.447: "Codec for Enhanced Voice Services (EVS); Error concealment of lost packets".

[36] 3GPP TS 26.511: "5G Media Streaming (5GMS); Profiles, Codecs and Formats".

3 Definitions of terms, symbols and abbreviations

3.1 Terms

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

Bitstream: A media bitstream that conforms to an audio/speech encoding format and certain Operation Point.

Media Profile: A combination of a Bitstream encapsulated into a media container suitable for 5G Media Streaming Delivery.

Operation Point: A collection of discrete combinations of different content formats and the encoding format.

Receiver: A receiver that can decode and render any bitstream that is conforming to a certain Operation Point.

Sender: An entity that can process and encode formats associated to an Operation Point.

3.2 Symbols

Void.

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
DTX	Discontinuous Transmission
EVS	Enhanced Voice Services
ISO BMFF	ISO Based Media File Format
HTTP	Hyper Text Transfer Protocol
SBR	Spectral Band Replication
URN	Universal Resource Name
WAVE	Web Application Video Ecosystem

4 Overview

The speech and audio media capabilities defined in this specification are primarily introduced in order to be used as content format in the context of 5G Media Streaming, but not restricted to this use case. Parameters for audio encoder/decoder, content format and transport are defined.

The present document defines:

- Media decoding capabilities: the requirements for a receiver in terms of decoding
- Media encoding capabilities: the requirements for a sender in terms of encoding
- Operation Points: A collection of discrete combinations of different content formats and the encoding formats. Operation Points are supported by
    - Bitstream Requirements: A media bitstream that conforms to an audio or speech encoding format and certain Operation Point.
    - Receiver Requirements: A function that can decode and playback any Bitstream that is conforming to a certain Operation Point in real-time.
    - Sender Requirements: A function that can process and encode any Bitstream that is conforming to a certain Operation Point in real-time.
- The integration of each Operation Point in 5G Media Streaming as defined in TS 26.501 [2] and TS 26.511 [36].

5 Media Capabilities

5.1 Introduction

This clause documents speech and audio media capabilities in terms of decoding capabilities.

5.2 Decoding Capabilities

The following speech media decoding capabilities are defined:

- *AMR*: All decoding requirements for the AMR speech codec as specified in 3GPP TS 26.071 [3], 3GPP TS 26.090 [4], 3GPP TS 26.073 [5] and 3GPP TS 26.104 [6]) including all 8 modes and source-controlled rate operation 3GPP TS 26.093 [7].
- *AMR-WB*: All decoding requirements for the AMR-WB codec as specified in 3GPP TS 26.171 [8], 3GPP TS 26.190 [9], 3GPP TS 26.173 [10] and 3GPP TS 26.204 [11] including all 9 modes and source-controlled rate operation 3GPP TS 26.193 [12].
- *EVS*: All decoding requirements for the EVS codec as specified in 3GPP TS 26.441 [13], 3GPP TS 26.445 [16], 3GPP TS 26.442 [14] and 3GPP TS 26.443 [15] as described below including functions for backwards compatibility with AMR-WB (3GPP TS 26.446 [17]) and discontinuous transmission (3GPP TS 26.450 [18]).

The following audio media decoding capabilities are defined:

- *eAAC+*: All decoding requirements for the eAAC+ audio codec as specified in 3GPP TS 26.401 [19], 3GPP TS 26.402 [20], 3GPP TS 26.410 [24] and 3GPP TS 26.411 [25].
- *AMR-WB+*: All decoding requirements for the AMR-WB+ audio codec as specified in 3GPP TS 26.290 [26], 3GPP TS 26.304 [27] and 3GPP TS 26.273 [28].

5.3 Encoding Capabilities

The following speech media encoding capabilities are defined:

- *AMR*: The encoding requirements for the AMR speech codec as specified in 3GPP TS 26.401 [19], clause 7, as well as 3GPP TS 26.403 [21], 3GPP TS 26.404 [22] and 3GPP TS 26.405 [23].
- *AMR-WB*: The encoding requirements for the AMR-WB by one of the following methods:
  - according to 3GPP TS 26.173 [10]
  - according to 3GPP TS 26.204 [11];
  - the AMR-WB IO mode according to TS 26.442 [14] and TS 26.443 [15],
  - the AMR-WB IO mode according to TS 26.452 [34].
- *EVS*: The encoding requirements for the EVS codec by one of the following methods:
  - TS 26.442 [14] and TS 26.443 [15] encoding functions; or
  - TS 26.452 [34] encoding functions.

The following audio media encoding capabilities are defined:

- *eAAC+*: The encoding requirements for the AAC+ audio codec as specified 3GPP TS 26.401 [19], clause 7, as well as 3GPP TS 26.403 [21], 3GPP TS 26.404 [22] and 3GPP TS 26.405 [23].
- *AMR-WB+*: The encoding requirements for the AMR-WB+ audio codec by one of the following methods
  - according to 3GPP TS 26.273 [28]; or

- according to 3GPP TS 26.304 [27].

6 Operation Points

6.1 Introduction

The speech and audio Operation Points defined in this clause are primarily introduced in order to be used as content format in the context of 5G Media Streaming, but not restricted to this use case.

An operation point is a combination of rendering formats and media decoding capabilities.

For each Operation Point, Bitstream and Receiver requirements are detailed in the remainder of clause 6.

Table 6.1 provides an overview of the Operation Points defined in the present document.

Table 6.1: Speech and Audio Operation Points

Operation Point name	Format Properties	Decoding and Encoding Capabilities	Reference
AMR speech	Sampling frequency: 8 kHz	*AMR*	6.2.2
AMR-WB speech	Sampling frequency: 16 kHz	*AMR-WB*	6.2.3
EVS mono	Sampling frequency: 8, 16, 32, 48 kHz	*EVS*	6.2.4
eAAC+ stereo	Sampling frequency: 32, 44.1, 48 kHz	*eAAC+*	6.3.2
AMR-WB+	Sampling frequency: 8, 16, 32, 48 kHz	*AMR-WB+*	6.3.3

6.2 Speech Operation Points

6.2.1 Introduction

This clause defines speech operation points. For each operation point, the requirements for the bitstream as well as for the receiver are defined.

6.2.2 AMR

6.2.2.1 Bitstream Encoding Requirements

The following requirements apply to the **AMR** Operation Point.

- The sampling frequency shall be 8 kHz.
- The bitstream shall be encoded according to either 3GPP TS 26.073 [5] or 3GPP TS 26.104 [6].

Note that the bitstream produced by the AMR encoder consists of 20ms encoded speech frames.

6.2.2.2 Receiver Requirements

Receivers conforming to the **AMR** Operation Point shall support the *AMR* speech media decoding capability according to clause 5.2 and shall support playback of the decoded signal.

6.2.2.3 Sender Requirements

Senders conforming to the **AMR** Operation Point shall support the *AMR* speech media encoding capability according to clause 5.3 in real-time for any speech source format with sampling frequency 8kHz.

6.2.3 AMR-WB

6.2.3.1 Bitstream Requirements

The following requirements apply to the **AMR-WB** Operation Point.

- The sampling frequency shall be 16 kHz.
- The bitstream shall be encoded by one of the following methods:
  - according to 3GPP TS 26.173 [10]
  - according to 3GPP TS 26.204 [11];
  - the AMR-WB IO mode according to TS 26.442 [14] and TS 26.443 [15],
  - the AMR-WB IO mode according to TS 26.452 [34].

Note that the bitstream produced by the AMR-WB encoder consists of 20 ms encoded speech frames.

6.2.3.2 Receiver Requirements

Receivers conforming to the **AMR-WB** Operation Point shall support the *AMR-WB* speech media decoding capability according to clause 5.2 and shall support playback of the decoded signal.

6.2.3.3 Sender Requirements

Senders conforming to the **AMR-WB** Operation Point shall support the *AMR-WB* speech media encoding capability according to clause 5.3 in real-time for any speech source format with sampling frequency 16kHz.

6.2.4 EVS

6.2.4.1 Bitstream Encoding Requirements

The following requirements apply to the **EVS** Operation Point:

- The sampling frequency shall be one of the following: 8, 16, 32, 48 kHz.
- The bitstream shall be encoded according to one of the following methods
  - TS 26.442 [14] and TS 26.443 [15] encoding functions; or
  - TS 26.452 [34] encoding functions.

Note that the bitstream produced by the EVS encoder consists of 20ms encoded speech frames.

6.2.4.2 Receiver Requirements

Receivers conforming to the **EVS** Operation Point shall support the *EVS* speech media decoding capability according to clause 5.2 and shall support playback of the decoded signal.

6.2.4.3 Sender Requirements

Senders conforming to the **EVS** Operation Point shall support the *EVS* speech media encoding capability according to clause 5.3 in real-time for any speech source format with sampling frequency 8, 16, 32, 48 kHz.

6.3 Audio Operation Points

6.3.1 Introduction

This clause defines audio operation points. For each operation point, the requirements for the bitstream as well as for the receiver are defined.

6.3.2 eAAC+ stereo

6.3.2.1 Bitstream Encoding Requirements

The following requirements apply to the **eAAC+ stereo** Operation Point.

- The sampling frequency shall be either 32 kHz, 44.1 kHz or 48 kHz.
- The bitstream shall be encoded according to 3GPP TS 26.401 [19], clause 7, as well as 3GPP TS 26.403 [21], 3GPP TS 26.404 [22] and 3GPP TS 26.405 [23].

NOTE: The specified eAAC+ encoder consists of AAC-LC with additional tools that can be enabled (SBR, PS and more), see [19].

6.3.2.2 Receiver Requirements

Receivers conforming to the **eAAC+ stereo** Operation Point shall support the *eAAC+* media decoding capability according to clause 5.2 and shall support playback of the decoded signal.

NOTE: The eAAC+ decoder supports decoding of streams encoded with AAC-LC or aacPlus, see [19].

6.3.2.3 Sender Requirements

Senders conforming to the **eAAC+ stereo** Operation Point shall support the *eAAC+ stereo* audio media encoding capability according to clause 5.3 in real-time for any stereo audio source format with sampling frequency 32kHz, 44.1kHz, 48kHz.

6.3.3 AMR-WB+

6.3.3.1 Bitstream Encoding Requirements

The following requirements apply to the **AMR-WB+** Operation Point.

- The sampling frequency shall be either 8, 16, 32 or 48 kHz.
- The bitstream shall be encoded by one of the following methods
  - according to 3GPP TS 26.273 [28]; or
  - according to 3GPP TS 26.304 [27].

6.3.3.2 Receiver Requirements

Receivers conforming to the **AMR-WB+** Operation Point shall support the *AMR-WB+* media decoding capability according to clause 5.2 and shall support playback of the decoded signal.

6.3.3.3 Sender Requirements

Senders conforming to the **AMR-WB+** Operation Point shall support the *AMR-WB+* audio media encoding capability according to clause 5.3 in real-time for any stereo audio source format with sampling frequency 8, 16, 32 or 48 kHz.

7 Mapping to 5GMS delivery

7.1 Introduction

This clause defines the mapping of the Operation Points as defined in clause 6 to 5G Media Streaming delivery. In particular the following aspects are addressed:

- Encapsulation of a bitstream into an ISO BMFF track.
- Definition of media content and receivers conforming to media profile including:
  - Encapsulation of a bitstream into a CMAF track
  - Providing the content in a CMAF Switching Set
  - Mapping to DASH-based distribution
  - Playback Requirements for a receiver conforming to this media profile

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 conform to the requirements of the codec 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 the requirements of the codec entry `'samr'` as defined in TS 26.244 [29], 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.

7.2.2.2 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 to the requirements of the codec entry `'samr'` as defined in TS 26.244 [29], the general CMAF Switching Set constraints in ISO/IEC 23000-19 [30], clause 7 as well as the general CMAF audio track Switching Set constraints defined in ISO/IEC 23000-19 [30], clause 10. A CMAF Switching Set following these requirements is defined as the CMAF AMR media profile `'camr'`.

7.2.2.3 Mapping to DASH Adaptation Set

If media is provided following the operation point **AMR** and is provided in a DASH Media Presentation in an Adaptation Set, then the Adaptation Set shall conform to the DASH profile for CMAF as defined in ISO/IEC 23009-1 [31]. 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 7.2.2.2 that conforms to the CMAF Media Profile `'camr'` as defined in clause 7.2.2.3.
- 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.

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 conform to the requirements of the codec entry `'sawb'` as defined in TS 26.244 [29].

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 the requirements of the codec entry `'sawb'` as defined in TS 26.244 [29], the general CMAF Track constraints in ISO/IEC 23000-19, 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 the requirements of the codec entry `'sawb'` as defined in TS 26.244 [29], the general CMAF Switching Set constraints in ISO/IEC 23000-19 [30], clause 7 as well as the general CMAF audio track Switching Set constraints defined in ISO/IEC 23000-19 [30], clause 10. A CMAF Switching Set following these requirements is defined as the CMAF AMR-WB media profile `'camw'`.

7.3.2.3 Mapping to DASH Adaptation Set

If media is provided following the operation point **AMR-WB** and is provided in a DASH Media Presentation in an Adaptation Set, then the Adaptation Set shall conform to the DASH profile for CMAF as defined in ISO/IEC 23009-1 [31]. The following parameters shall be present on Adaptation Set level and set:

- `@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 7.3.2.2 that conforms to the CMAF Media Profile `'camw'` as defined in clause 7.3.2.3.

- 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.

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 conform to the requirements of the codec entry `'sevs'` as defined in TS 26.244 [29].

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 the requirements of the codec entry `'sevs'` as defined in TS 26.244 [29], 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 the requirements of the codec entry `'sevs'` as defined in TS 26.244 [29], the general CMAF Switching Set constraints in ISO/IEC 23000-19 [30], clause 7 as well as the general CMAF audio track Switching Set constraints defined in ISO/IEC 23000-19 [30], clause 10. A CMAF Switching Set following these requirements is defined as the CMAF EVS media profile `'cevs'`.

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, then the Adaptation Set shall conform to the DASH profile for CMAF as defined in ISO/IEC 23009-1 [31]. The following parameters shall be present on Adaptation Set level and set:

- `@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 7.4.2.4.

7.5 void

7.6 eAAC+ stereo Media Profile

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 to the requirements of the codec entry `'mp4a'` as defined in TS 26.244 [29], 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].

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 the requirements of the codec entry `'mp4a'` as defined in TS 26.244 [29], the general CMAF Switching Set constraints in ISO/IEC 23000-19 [30], clause 7, the general CMAF audio track Switching Set constraints defined in ISO/IEC 23000-19 [30], clause 10 as well as the AAC core Switching Set constraints in clause 10 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** and is provided in a DASH Media Presentation in an Adaptation Set, then the Adaptation Set shall conform to the DASH profile for CMAF as defined in ISO/IEC 23009-1 [31]. 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+` ".

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 6.3.1.2 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+ 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 AMR-WB 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 6.6.2.3.
- It shall support the generation of a CMAF Track as defined in clause 7.6.2.2 that conforms to the CMAF Media Profile `'ceac'` as defined in clause 7.6.2.3.
- If used for Adaptive Bit Rate (ABR) distribution, it shall support the generation of a CMAF Switching Set as defined in clause 7.6.2.4.

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 conform to the requirements of the codec entry `'sawp'` as defined in TS 26.244 [29].

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 the requirements of the codec entry `'sawp'` as defined in TS 26.244 [29], 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 the codec entry `'sawp'` as defined in TS 26.244 [29], the general CMAF Switching Set constraints in ISO/IEC 23000-19 [30], clause 7 as well as the general CMAF audio track Switching Set constraints defined in ISO/IEC 23000-19 [30], clause 10. 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+** and is provided in a DASH Media Presentation in an Adaptation Set, then the Adaptation Set shall conform to the DASH profile for CMAF as defined in ISO/IEC 23009-1 [31]. The following parameters shall be present on Adaptation Set level and set:

- `@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 7.7.2.2 that conforms to the CMAF Media Profile `'cawp'` as defined in clause 7.7.2.3.
- If used for Adaptive Bit Rate (ABR) distribution, it shall support the generation of a CMAF Switching Set as defined in clause 7.7.2.4.

Annex A (informative): Registration Information

A.1 3GPP Registered URIs

The clause documents the registered URIs in the present document following the process in http://www.3gpp.org/specifications-groups/34-uniform-resource-name-urn-list

Table A-1 lists all registered URN values as well as:

- a brief description of its functionality;
- a reference to the specification or other publicly available document (if any) containing the definition;
- the name and email address of the person making the application; and
- any supplementary information considered necessary to support the application.

Table A-1: 3GPP Registered URNs

URN	Description	Reference	Contact	Remarks
urn:3GPP:audio:mp:amr	AMR Media Profile	TS 26.117, clause 7.2.2.3	Thomas Stockhammer tsto@qti.qualcomm.com	none
urn:3GPP:audio:mp:amr-wb	AMR-WB Media Profile	TS 26.117, clause 7.3.2.3	Thomas Stockhammer tsto@qti.qualcomm.com	none
urn:3GPP:audio:mp:evs	EVS Media Profile	TS 26.117, clause 7.4.2.3	Thomas Stockhammer tsto@qti.qualcomm.com	none
urn:3GPP:audio:mp:eAAC+	eAAC+ stereo Media Profile	TS 26.117, clause 7.6.2.3	Thomas Stockhammer tsto@qti.qualcomm.com	none
urn:3GPP:audio:mp:amr-wb+	AMR-WB+ Media Profile	TS 26.117, clause 7.7.2.3	Thomas Stockhammer tsto@qti.qualcomm.com	none

Annex B (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2019-12	SA#86	SP-190990				Presented to TSG SA#86 (for information)	1.0.0
2020-01	SA4#107	S4-200245				Version agreed by TSG SA WG 4 to be sent for SA approval	1.1.0
2020-03	SA#87-e	SP-200049				Presented to TSG SA#87-e (for approval)	2.0.0
2020-03	SA#87-e	SP-200049				Approved by TSG SA#87-e	16.0.0
2022-04	-	-	-	-	-	Update to Rel-17 version (MCC)	**17.0.0**
2023-06	SA#100	SP-230546	0004	-	A	Corrections to references	**17.1.0**

History

Document history		
V17.0.0	May 2022	Publication
V17.1.0	July 2023	Publication