ETSI TS 126 446 V16.0.0 (2020-11)

Universal Mobile Telecommunications System (UMTS);
LTE;
Codec for Enhanced Voice Services (EVS);
Adaptive Multi-Rate - Wideband (AMR-WB)
backward compatible functions
(3GPP TS 26.446 version 16.0.0 Release 16)

Reference
RTS/TSGS-0426446vg00

Keywords
LTE,UMTS

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Legal Notice

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

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

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:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies the AMR-WB backward compatible functions of the EVS codec.

The present document is a high level overview of the functionality with reference to the Codec Detailed Algorithmic Description where the functionality is specified in detail.

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 26.445: "Codec for Enhanced Voice Services (EVS); Codec Detailed Algorithmic Description".

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

[4] 3GPP TS 26.443: " Codec for Enhanced Voice Services (EVS); ANSI C code (floating-point)".

[5] 3GPP TS 26.444: " Codec for Enhanced Voice Services (EVS); Test Sequences".

[6] 3GPP TS 26.447: " Codec for Enhanced Voice Services (EVS); Error Concealment of Lost Packets".

[7] 3GPP TS 26.448: " Codec for Enhanced Voice Services (EVS); Jitter Buffer Management".

[8] 3GPP TS 26.449: " Codec for Enhanced Voice Services (EVS); Comfort Noise Generation (CNG) Aspects".

[9] 3GPP TS 26.450: " Codec for Enhanced Voice Services (EVS); Discontinuous Transmission (DTX)".

[10] 3GPP TS 26.451: " Codec for Enhanced Voice Services (EVS); Voice Activity Detection (VAD)".

[11] 3GPP TS 26.171: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; General description".

[12] 3GPP TS 26.173: "ANSI-C code for Adaptive Multi-Rate - Wideband (AMR-WB) speech codec".

[13] 3GPP TS 26.190: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Transcoding functions".

[14] 3GPP TS 26.191: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Error concealment of erroneous or lost frames".

[15] 3GPP TS 26.192: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Comfort noise aspects ".

[16] 3GPP TS 26.193: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Source controlled rate operation".

[17] 3GPP TS 26.194: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Voice Activity Detector (VAD)".

[18] 3GPP TS 26.201: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Frame structure".

[19] 3GPP TS 26.202: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Interface to Iu, Uu, and Nb".

[20] 3GPP TS 26.204: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; ANSI-C code".

[21] IETF RFC 4867: "RTP Payload Format and File Storage Format for the Adaptive Multi-Rate (AMR) and Adaptive Multi-Rate Wideband (AMR-WB) Audio Codecs".

[22] 3GPP TS 26.452: "Codec for Enhanced Voice Services (EVS); ANSI C code; Alternative fixed-point using updated basic operators".

3 Abbreviations

For the purposes of the present document, the abbreviations given in 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 TR 21.905 [1].

AMR-WB	Adaptive Multi Rate Wideband (codec)
CNG	Comfort Noise Generator
DTX	Discontinuous Transmission
EVS	Enhanced Voice Services
FB	Fullband
IO	Interoperable
JBM	Jitter Buffer Management
NB	Narrowband
SID	Silence Insertion Descriptor
SWB	Super Wideband
VAD	Voice Activity Detection
WB	Wideband

4 General

The EVS coder provides enhanced AMR-WB backward compatible operation over all nine source bit rates from 6.6 kbit/s to 23,85 kbit/s, including AMR-WB backward compatible DTX operation. This backward compatible operation is referred to AMR-WB interoperable (AMR-WB IO).

Frames generated by an EVS AMR-WB IO encoder can be decoded by an AMR-WB decoder, without the need for transcoding. Correspondingly, frames generated by an AMR-WB encoder can be decoded by an EVS AMR-WB IO decoder, without the need for transcoding.

In addition to encoder and decoder enhancements, the AMR-WB backward compatible functions in the EVS coder provide the following extra functionalities compared to the AMR-WB coder specified in [11] to [17] and [20]:

- Support of input and output sampling frequencies other than 16 kHz (i.e. 8, 32, 48 kHz)
- Inclusion of jitter buffer management for AMR-WB backward compatible functions
- Switching between AMR-WB IO bit rates and primary EVS bit rates at any 20 ms speech frame boundary

The present document is mandatory for implementation in all network entities and UEs supporting the EVS codec.

In the case of discrepancy between the EVS codec backward compatible functions described in the present document and its ANSI-C code specification contained in [3] the procedure defined by [3] prevails. In the case of discrepancy between the procedure described in the present document and its ANSI-C code specification contained in [4] the

procedure defined by [4] prevails. In the case of discrepancy between the procedure described in the present document and its ANSI-C code specification contained in [22] the procedure defined by [22] prevails.

5 AMR-WB backward compatible transcoding functions

The AMR-WB backward compatible transcoding functions of the EVS coder are described in [2].

6 AMR-WB backward compatible ANSI-C code

The ANSI C-code of the EVS codec, including backward compatible functions, is described in [3] and [22] for fixed point arithmetic operation, using different sets of basic operators, and is described in [4] for floating point arithmetic operation.

7 AMR-WB backward compatible error concealment of erroneous or lost frames

The EVS coder AMR-WB backward compatible error concealment of erroneous or lost frames is described in [2], [6] and [7].

8 AMR-WB backward compatible comfort noise aspects

The AMR-WB backward compatible comfort noise aspects of EVS coder are described in [2] and [8].

9 AMR-WB backward compatible source controlled rate operation

The EVS coder AMR-WB backward compatible source controlled rate operation of the Enhanced Voice Services codec is defined in [2] and [9]. This DTX operation is compliant with [16].

10 AMR-WB backward compatible Voice Activity Detector (VAD)

The AMR-WB backward compatible VAD function of EVS coder is described in [2] and [10].

The VAD algorithm description is detailed in [2], and the corresponding C-code is defined in [3], [4] and [22].

11 AMR-WB backward compatible frame structure and interface to Iu, Uu, and Nb

The EVS coder AMR-WB backward compatible part of the EVS coder supports the formats (IF1, IF2, MIME, RFC 4867 [21]) defined in [18] and [19].

Annex A (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2014-09	65	SP-140461			Presented at TSG SA#65 for approvaal		1.0.0
2014-09	65				Approved at TSG SA#65	1.0.0	12.0.0
2015-12	70				Version for Release 13	12.0.0	13.0.0

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2017-03	75					Version for Release 14	14.0.0
2018-06	80					Version for Release 15	15.0.0
2019-03	83	SP-190036	0001	-	B	Addition of reference to Alt_FX_EVS implementation	16.0.0

History

Document history		
V16.0.0	November 2020	Publication