ETSI TS 126 179 V16.0.0 (2020-11)

TECHNICAL SPECIFICATION

LTE;
Mission Critical Push To Talk (MCPTT);
Codecs and media handling
(3GPP TS 26.179 version 16.0.0 Release 16)

Reference
RTS/TSGS-0426179vg00

Keywords
LTE

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

Important notice

The present document can be downloaded from:
http://www.etsi.org/standards-search

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at
https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx

If you find errors in the present document, please send your comment to one of the following services:
https://portal.etsi.org/People/CommiteeSupportStaff.aspx

Copyright Notification

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.

Introduction

Requirements for codecs and media handling in support of the Mission Critical Push To Talk (MCPTT) service are contained in this document.

The MCPTT service supports voice communication between several users (i.e. group call), where each user has the ability to gain access to the permission to talk in an arbitrated manner. The MCPTT service also supports private calls between two users.

Background information in support of this document may be found in TR 26.989 [4].

1 Scope

The present document specifies the codecs and media handling for MCPTT. The corresponding service requirements are defined in 3GPP TS 22.179 [2]. The corresponding functional architecture, procedures and information flows are defined in 3GPP TS 23.179 [3].

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 22.179: "Mission Critical Push To Talk (MCPTT) over LTE; Stage 1".
[3]	3GPP TS 23.179: "Functional architecture and information flows to support mission critical communication services; Stage 2".
[4]	3GPP TR 26.989: "Media codecs and Multimedia Broadcast/Multicast Service (MBMS) enhancements for MCPTT over LTE".
[5]	3GPP TS 24.379: "Mission Critical Push To Talk (MCPTT) call control; Protocol specification".
[6]	3GPP TS 24.380: "Mission Critical Push To Talk (MCPTT) media plane control; Protocol specification".
[7]	3GPP TS 26.171: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; General description".
[8]	3GPP TS 26.173: "ANCI-C code for the Adaptive Multi Rate - Wideband (AMR-WB) speech codec".
[9]	3GPP TS 26.190: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Transcoding functions".
[10]	3GPP TS 26.191: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Error concealment of erroneous or lost frames".
[11]	3GPP TS 26.192: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Comfort noise aspects".
[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 26.194: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; Voice Activity Detector (VAD)".
[14]	3GPP TS 26.204: "Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; ANSI-C code".
[15]	3GPP TS 26.441: "Codec for Enhanced Voice Services (EVS); General overview".
[16]	3GPP TS 26.442: "Codec for Enhanced Voice Services (EVS); ANSI C code (fixed-point)".

[17]   3GPP TS 26.443: "Codec for Enhanced Voice Services (EVS); ANSI C code (floating-point)".

[18]   3GPP TS 26.445: "Codec for Enhanced Voice Services (EVS); Detailed algorithmic description".

[19]   3GPP TS 26.447: "Codec for Enhanced Voice Services (EVS); Error concealment of lost packets".

[20]   3GPP TS 26.449: "Codec for Enhanced Voice Services (EVS); Comfort Noise Generation (CNG) aspects".

[21]   3GPP TS 26.450: "Codec for Enhanced Voice Services (EVS); Discontinuous Transmission (DTX)".

[22]   3GPP TS 26.451: "Codec for Enhanced Voice Services (EVS); Voice Activity Detection (VAD)".

[23]   IETF RFC 4867 (2007): "RTP Payload Format and File Storage Format for the Adaptive Multi-Rate (AMR) and Adaptive Multi-Rate Wideband (AMR-WB) Audio Codecs", J. Sjoberg, M. Westerlund, A. Lakaniemi and Q. Xie.

[24]   IETF RFC 3550 (2003): "RTP: A Transport Protocol for Real-Time Applications", H. Schulzrinne, S. Casner, R. Frederick, V. Jacobson.

[25]   IETF RFC 3551 (2003): "RTP Profile for Audio and Video Conferences with Minimal Control", H. Schulzerinne, S. Casner.

[26]   IETF RFC 3711 (2004): "The Secure Real-time Transport Protocol (SRTP)", M. Baugher, D. McGrew, M. Naslund, E. Carrara, K. Norrman.

[27]   3GPP TS 26.452: "Codec for Enhanced Voice Services (EVS); ANSI C code; Alternative fixed-point using updated basic operators".

3   Definitions and abbreviations

3.1   Definitions

For the purposes of the present document, the terms and definitions 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].

(void)

3.2   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].

AMR-WB	Adaptive Multi Rate Wideband (codec)
AVP	Audio-Video Profile
EVS	Enhanced Voice Services
FB	Fullband
KPI	Key Performance Indicator
MBMS	Multimedia Broadcast Multicast Services
MBSFN	Multicast Broadcast Single Frequency Network
MCPTT	Mission Critical Push-To-Talk
RTP	Real-time Transport Protocol
SAVP	Secure Audio-Video Profile
SRTP	Secure Real-time Transport Protocol
SWB	Super Wideband
WB	Wideband

4 Codecs and media handling for MCPTT

4.1 MCPTT client

4.1.1 Codec

MCPTT clients shall support the AMR-WB codec as specified in 3GPP TS 26.171 [7], 3GPP TS 26.190 [9], 3GPP TS 26.173 [8] and 3GPP TS 26.204 [14], including all 9 modes and source controlled rate operation as specified in 3GPP TS 26.193 [12], voice activity detection as specified in 3GPP TS 26.194 [13], comfort noise generation as specified in 3GPP TS 26.192 [11] and error concealment as specified in TS 26.191[10]. The MCPTT clients shall be capable of operating with any subset of these 9 codec modes.

Based on operator / MCPTT service provider policy, MCPTT clients may additionally support the EVS codec in super-wideband mode.

If an operator / MCPTT service provider chooses to additionally use SWB according to its policy, then an MCPTT client that offers super-wideband speech communication shall support the EVS codec in SWB mode as defined in 3GPP TS 26.441 [15], 3GPP TS 26.445 [18], 3GPP TS 26.442 [16], 3GPP TS 26.452 [27], 3GPP TS 26.443 [17], discontinuous transmission 3GPP TS 26.450 [21], voice activity detection as specified in 3GPP TS 26.451 [22], comfort noise generation as specified in 3GPP TS 26.449 [20] and error concealment as specified in TS 26.447 [19].

> NOTE: In evaluating the codec alternatives for MCPTT, two codecs; AMR-WB and EVS were considered in detail. The EVS codec was shown to provide statistically significant performance improvements relative to the AMR-WB codec for some of the MCPTT KPIs as studied and reported in the TR 26.989 [4]. After consideration of all factors in Release 13, as documented in TR 26.989 [4], the currently widely deployed and available AMR-WB codec meets the needs of MCPTT services and was decided upon as the mandatory codec for MCPTT.

4.1.2 Control plane protocol

General MCPTT client procedures for SDP offer-answer are specified in 3GPP TS 24.379 [5] and 3GPP TS 24.380 [6].

MCPTT clients shall support both "RTP/AVP" [25] and "RTP/SAVP" [26] profiles in SDP offer/answer. MCPTT clients shall not reject an SDP offer due to offered RTP profile being either "RTP/AVP" or "RTP/SAVP". MCPTT clients may, based on operator / MCPTT service provider policy, offer either "RTP/AVP" or "RTP/SAVP" RTP profiles.

MCPTT clients shall support and offer a payload type with AMR-WB.

If an operator / MCPTT service provider policy enables an MCPTT service using the EVS codec in SWB mode, then MCPTT clients may, based on operator / MCPTT service provider policy, additionally offer a payload type with the EVS codec in SWB mode.

The offer-answer protocol, setting of the codec preference order, and the generation of SDP offer and answer shall be configured according to operator / MCPTT service provider policy.

4.1.3 User plane protocol

MCPTT clients shall support both RTP [24] and SRTP [26] media transport.

An MCPTT client shall understand the payload formats and options as defined in RFC 4867 [23]. The MCPTT client does not have to support operating according to all the options defined in RFC 4867 but shall be capable of properly accepting or rejecting all options.

The following payload format options from RFC 4867 are defined as follows to ensure minimum interoperability:

- bandwidth-efficient shall be supported

- mode-set: shall support all modes and shall offer no particular mode set

- mode-change-period: both "1" and "2" shall be supported, "1" shall be offered (or not included)

- mode-change-capability: both "1" and "2" shall be supported, "2" shall be offered

- mode-change-neighbor: both "0" and "1" shall be supported, "0" shall be offered (or not included)

- channels: shall offer "1"

Other parameters:

- ptime: shall be supported, "20" shall be offered

- maxptime: shall be supported, "240" shall be offered

- max-red: shall be supported, "0" shall be offered

If, based on operator / MCPTT service provider policy, the MCPTT service additionally supports the EVS codec in SWB mode, then an MCPTT client that supports the optional EVS codec in SWB mode shall understand the EVS payload format as specified in 3GPP TS 26.445 [18] in order to support EVS in SWB mode. The MCPTT client does not have to support operating according to all the options defined in 3GPP TS 26.445 [18] but must be capable of properly accepting or rejecting all options.

4.1.4   De-jitter buffer

When MCPTT voice traffic is received on the MBMS bearer in MBMS/MBSFN, the traffic is scheduled to arrive at intervals of multiples of 40ms. The received traffic could also exhibit time-varying jitter introduced in the backhaul and the uplink transmission by the talker before being scheduled for transmission on the MBMS bearer. The MCPTT UE receiving traffic on an MBMS bearer shall support and use a de-jitter buffer that is able to manage this amount of jitter.

4.2   MCPTT network

4.2.1   Control plane protocol

MCPTT Server procedures are specified in 3GPP TS 24.379 [5] and 3GPP TS 24.380 [6].

MCPTT call media codec information shall include codecs according to MCPTT Client capabilities as specified in clause 4.1.1.

Annex A (informative):
Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New versio n**
2016-03	SA#71					Approved at TSG SA#71	13.0.0
2016-06	SA#72	SP-160265	0001	1	F	Introduction and correction to scope and adjustment of references to TR 26.879 to reflect its renumbering	13.1.0
2016-09	SA#73	SP-160593	0003	-	F	Addition of mandatory RTP profiles for MCPTT	13.2.0

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	0004	-	B	Correction and addition of reference to Alt_FX_EVS implementation	16.0.0

History

Document history		
V16.0.0	November 2020	Publication