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Emergency Communications (EMTEL);
Accessibility and interoperability of emergency communications and
for the answering of emergency communications by the public safety answering points (PSAPs)
(including to the single European Emergency number 112)

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Foreword

This Technical Specification (TS) has been produced by ETSI Special Committee Emergency Communications (EMTEL).

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).

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Executive summary

Accessible emergency communications is needed to provide equal opportunities for all persons. The present document specifies technical, and accessibility means to provide accessible emergency communications. The communications environment is based on packet switched communications technologies, and ETSI TS 103 479 [3] specifies the details for emergency communications. The present document requires a set of functions to ensure access to other media than voice, namely real time text and video, additional functions such as text messaging and access to supporting services are also specified.

When voice, video and real time text are provided together, the communication is called total conversation and is regarded to make communication more accessible than voice communication.

Video is commonly used for sign language communication. The provision of total conversation in emergency communications enables rapid and fluent emergency communications for sign language users, when competence in the sign language favoured by the user in emergency can be provided. In many cases, interpreters need to be invoked in the communication in a three-party fashion. The present document tells which technical solutions are to be implemented to support such interaction.

Technical details are provided for SIP based technologies, in particular communication services known as IMS and SIP based VoIP. Since the intention is that users shall be able to request emergency assistance through efficient emergency communications anywhere in Europe, it is essential that communication interoperability is established for travelling users. That requires few and well specified interfaces for the communication. Openings for emergency apps and other technologies are briefly mentioned. The present document describes these interfaces, which are consistent with the default interoperability solutions prescribed in ETSI EN 301 549 [1], clause 6, enhancing them with the specific requirements needed for accessible emergency communications.

The present document serves as a basis for a future harmonised standard on the same topic.

General accessibility aspects are presented in ETSI EN 301 549 [1].

Introduction

When communication is made accessible for persons they are provided with accessible complements in communications. This may be in the communication media, where real time text and video are accessible complements for voice in various situations. Larger fonts and a spoken user interface are also used as complements to regular visual user interfaces. The emergency communications related requirements on accessible electronic communications are specified in the present document, while the general accessibility requirements on emergency communications are specified in ETSI EN 301 549 [1].

The present document presents in clause 4 the operational profile concept for expressing a scope for the requirements. In clause 5 the functional accessibility and interoperability requirements, usually on the whole chain involved in an emergency communication. Clause 6 provides a symbolic technical architecture with the division in the components involved in emergency communications from user terminal to PSAP.

Clauses 7-10 shows how these different parts of the emergency communications chain fulfil their requirements when providing accessible and interoperable emergency communications, referring to the functional requirements of clause 5 by a set of labels for requirements established in clause 5, and cross referenced in Annex D.

The division between clauses 7-10 is:

- Clause 7: user equipment requirements.
- Clause 8: originating service requirements.
- Clause 9: emergency communications network and PSAP.
- Clause 10: supporting services.

1 Scope

The present document specifies interoperable and accessible emergency communications, which incorporates voice, video, and real time text. Involvement of originating devices, originating service provider, packet switched emergency communications infrastructure, PSAPs, and supporting services in the emergency communications chain is specified, and the use of the different media.

The present document also addresses technical aspects of interoperability between communication services and emergency communication networks, and the interoperability and functionality required to be able to route emergency communications to the most appropriate PSAP.

Focus is on SIP and IMS technologies for originating services and SIP technology for the emergency communications systems, while also other technologies are briefly touched.

For conversion of modality between sign language and spoken language, the possibility to invoke sign language interpreters in the communication is specified.

The emergency communications related requirements on accessible electronic communications are specified in the present document, while the general accessibility requirements on emergency communications are specified in ETSI EN 301 549 [1].

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference/.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI/CEN/CENELEC EN 301 549 (V3.2.1): "Accessibility requirements for ICT products and services".

[2] ETSI ES 202 975 (V2.1.1): "Human Factors (HF); Requirements for relay services".

[3] ETSI TS 103 479 (V1.2.1): "Emergency Communications (EMTEL); Core elements for network independent access to emergency services".

[4] ETSI TS 103 698 (V1.1.1): "Emergency Communications (EMTEL); Lightweight Messaging Protocol for Emergency Service Accessibility (LMPE)".

[5] ETSI TS 122 101 (V18.6.0): "Universal Mobile Telecommunications System (UMTS); LTE; 5G; Service aspects; Service principles (3GPP TS 22.101)".

[6] ETSI TS 122 173 (V18.0.1): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; IP Multimedia Core Network Subsystem (IMS) Multimedia Telephony Service and supplementary services; Stage 1 (3GPP TS 22.173)".

[7] ETSI TS 123 167 (V17.2.0): "Universal Mobile Telecommunications System (UMTS); LTE; IP Multimedia Subsystem (IMS) emergency sessions (3GPP TS 23.167)".

[8] ETSI TS 124 229 (V18.5.0): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; 5G; IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (3GPP TS 24.229)".

[9] ETSI TS 126 114 (V18.6.0): "Universal Mobile Telecommunications System (UMTS); LTE; 5G; IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction (3GPP TS 26.114)".

[10] IETF RFC 3261 (2002): "Session Initiation Protocol (SIP)", Rosenberg J., et al.

[11] IETF RFC 3550 (2003): "RTP: A Transport Protocol for Real-Time Applications", H. Schulzrinne et al.

[12] IETF RFC 3840 (2004): "Indicating User Agent Capabilities in the Session Initiation Protocol (SIP)", Rosenberg J., et al.

[13] IETF RFC 3841 (2004): "Caller Preferences for the Session Initiation Protocol (SIP)", Rosenberg J., et al.

[14] IETF RFC 4579 (2006): "Session Initiation Protocol (SIP) Call Control - Conferencing for User Agents", Johnston A., Levin O.

[15] IETF RFC 7852 (2016): "Additional Data Related to an Emergency Call", Gellens R., Tschofenig H., Rosen B., Marschall R., Winterbottom J.

[16] IETF RFC 8373 (2018): "Negotiating Human Language in Real-Time Communications", Gellens R.

[17] IETF RFC 8866 (2021): "SDP Session Description Protocol", Began A., et al.

[18] IETF RFC 7090 (2014): "Public Safety Answering Point (PSAP) Callback", Schulzrinne H., et al.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TS 101 470 (V1.1.1): "Emergency Communications (EMTEL); Total Conversation Access to Emergency Services".

[i.2] ETSI TS 122 228 (V18.0.1): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Service requirements for the Internet Protocol (IP) multimedia core network subsystem (IMS); Stage 1 (3GPP TS 22.228)".

[i.3] IETF RFC 4596 (2006): "Guidelines for Usage of the Session Initiation Protocol (SIP) Caller Preferences Extension", Rosenberg J., Kyzivat P.

[i.4] ETSI TS 103 478 (V1.2.1): "Emergency Communications (EMTEL); Pan-European Mobile Emergency Application".

[i.5] ETSI TS 103 755 (V1.1.1): "Emergency Communications (EMTEL); PEMEA ESInet Shared Services".

[i.6] ETSI TS 103 871 (V1.1.1): "Emergency Communications (EMTEL); PEMEA Real-Time Text Extension".

[i.7] ETSI TS 103 872 (V1.1.1): "Emergency Communications (EMTEL); PEMEA Service Discovery Extension".

[i.8] ETSI TS 103 945 (V1.1.1): "Emergency Communications (EMTEL); PEMEA Audio Video Extension".

[i.9] ISO 9241-11:2018: "Ergonomics of human-system interaction; Part 11: Usability: Definitions and concepts".

[i.10] Directive (EU) 2019/882 of the European Parliament and of the Council of 17 April 2019 on the accessibility requirements for products and services.

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the following terms apply:

accessibility: extent to which products, systems, services, environments, and facilities can be used by people from a population with the widest range of user needs, characteristics, and capabilities, to achieve identified goals in identified contexts of use (from ISO 9241-11:2018 [i.9])

NOTE 1: Context of use includes direct use or use supported by assistive technologies.

NOTE 2: The context in which the ICT is used may affect its overall accessibility. This context could include other products and services with which the ICT may interact.

assistive technology any item, piece of equipment, service or product system including software that is used to increase, maintain, substitute, or improve functional capabilities of persons with disabilities or for, alleviation and compensation of impairments, activity limitations or participation restrictions

emergency communication: communication by means of interpersonal communications services between an end-user and the PSAP with the goal to request and receive emergency relief from emergency services

emergency communications system: ESInet and PSAPs together, including technology for both emergency communication handling and additional functions such as emergency communication distribution, emergency communication recording, logging, and connection to the emergency communication queue

Emergency Services IP network (ESInet): Internet Protocol (IP) based communications network dedicated for emergency communications for public safety use

NOTE: An ESInet is a managed IP network that is used for emergency services communications. It provides the IP transport infrastructure upon which independent application platforms and core services can be deployed. ESInets may be interconnected at local, regional, state, federal, national, and international levels to form an IP-based network. The term ESInet designates the network, not the services that are conveyed on the network.

interpersonal communications service: service normally provided for remuneration that enables direct interpersonal and interactive exchange of information via electronic communications networks between a finite number of persons, whereby the persons initiating or participating in the communication determine its recipient(s) and does not include services which enable interpersonal and interactive communication merely as a minor ancillary feature that is intrinsically linked to another service

most appropriate PSAP: PSAP established by responsible authorities to cover emergency communications from a certain area or for emergency communications of a certain type

Real Time Text (RTT): form of text conversation in point-to-point situations or in multipoint conferencing where the text being entered is sent in such a way that the communication is perceived by the user as being continuous on a character-by-character basis

total conversation: multimedia real time conversation service that provides bidirectional symmetric real time transfer of motion video, real time text and voice between users in two or more locations

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

3GPP	Third Generation Partnership Project
AEC	Accessible Emergency Communication
ASR	Automatic Speech Recognition
EAA	European Accessibility Act
ESInet	Emergency Services IP network
GTT	Global Text Telephony = RTT
GTT-IP	Global Text Telephony - Internet Protocols = RTT
ICT	Information and Communications Technology
IMS	IP-Multimedia Subsystem
LoST	Location to Service Translation
MTSI	Multimedia Telephony Service for IMS
PEMEA	Pan-European Mobile Emergency Application
PLMN	Public Land Mobile Network
PSAP	Public Safety Answering Point
RTP	Real Time Protocol
RTT	Real Time Text
SIP	Session Initiation Protocol
UE	User Equipment

4 Operational profile

The technical requirements of the present document apply under the operational profile for the equipment and services, which shall be in accordance with its intended use, but as a minimum, shall be that specified in the applicable operational scenarios for testing contained in clause B.4.2 of the present document. The equipment and services shall comply with all the technical requirements of the present document when operating within the boundary limits of the operational profile defined by its intended use.

5 Accessible Emergency Communication

5.1 General

Making sure that emergency communications are accessible to persons with a range of capabilities implies considerations on many levels. The continuation of clause 5 covers specific interoperability and accessibility aspects and functional requirements on the complete chain of emergency communication technology including accessible interpersonal communication services and emergency communications, emergency service IP networks and PSAPs, as well as relay services and other supporting services.

All requirements or recommendations in this clause are clearly labelled to enable reference to them in the present document. Thereby it is possible to follow up how a functional requirement can be fulfilled. The label consists of three parts: three letters, being AEC for the main area: accessible emergency communication; two letters indicating a sub-area (example ML for modality and language) and a sequence number. The labels are repeated where the requirements are fulfilled by a technical requirement.

A cross reference table is provided in Annex D, providing the clause numbers where requirements are provided corresponding to the functional requirements labels.

Many aspects of accessible emergency communication are described in ETSI TS 101 470 [i.1], where the total conversation access to emergency communications is specified. The use of media for different purposes is described and implementations in various technical environments specified.

5.2 Modality and Language

Proper support for the modalities and languages in communication managed by the user in emergency is a prerequisite for efficient emergency communications. The means for providing of such support is by the user or user equipment providing information about the preferences and capabilities and the emergency services to collect this information and assessing how to best provide the support needed, by routing and possible invocation of supporting services. Modality competence has two directions and therefore, can be different for the two directions of expression and perception.

To support modalities other than voice, accessible emergency communications:

AEC-ML-01: shall enable users to set their modality and language preferences in their equipment or service.

NOTE: The modalities include signed, written and spoken expression carried in video, real time text and audio media together called total conversation enabling language use in all three modalities.

AEC-ML-02: shall enable the users to set their modality and language preferences separately for expression and perception.

AEC-ML-03: shall use the language selected for the user equipment as default language preference, if not set by the user.

AEC-ML-04: shall provide a means of transmitting information on modality and language unchanged to the PSAP at initiation of emergency communication.

AEC-ML-05: shall extract the language and modality preference information and include it in the routing decision.

AEC-ML-06: should upon answering emergency communication, send a greeting and a brief standardized question expressed in the preferred modality and language.

AEC-ML-07: shall upon answering an emergency communications test session, send a text response containing the received location, modality and language preferences and other additional data provided by the user.

AEC-ML-08: shall provide a means of transmitting information on support services desired in the communications unchanged to the PSAP at initiation of emergency communication.

AEC-ML-09: shall extract any information on the preferred support service for modality or language translation to be used and include the information in the emergency communication.

5.3 User Interface and general accessibility

Emergency communications users are best provided with emergency communications when such communications are supported by the end user equipment and electronic communications used in everyday communication.

The user interface and communication features used for accessible emergency communications shall:

AEC-UI-01: comply with the applicable requirements of ETSI EN 301 549 [1], clauses 5, 6, 8, 9, 11 and 13.

AEC-UI-02: provide a means to initiate a general emergency communication recognized as 112.

NOTE: An emergency call button can be more accessible than a numeric keypad, but with this solution follows a risk for communication initiation by mistake. Other ways to initiate the emergency communication without exactly relating it to a number could be considered e.g. because of accessibility reasons.

AEC-UI-03: support the input and output of voice and real time text.

AEC-UI-04: support in PSAP the input and output of video in emergency communications.

AEC-UI-05: support in user equipment the input and output of video in emergency communications if video is supported in other bidirectional communications.

The user interface used for accessible emergency communications may:

AEC-UI-06: provide means to include services or specific parts thereof specialized in different communication modalities and languages or motivated by accessibility reasons.

AEC-UI-07: support the input and output of text messaging.

5.4 Communication Features

5.4.1 General

The present clause specifies general communications operations used in the processing of emergency communications.

5.4.2 Session Control and emergency contextual information

Session setup in accessible emergency communications shall:

AEC-SC-01: include information describing the desired media.

AEC-SC-02: include accurate location information.

AEC-SC-03: include an identity or address to be used for emergency call back.

AEC-SC-04: support the technical possibility to handle the media, modality and language preferred by the user.

Session setup in accessible emergency communications should:

AEC-SC-05: include other contextual information about the user and the emergency available to enable the communication to be routed to the most appropriate PSAP, considering both geographical and accessibility factors.

AEC-SC-06: while in a waiting state, provide information via all activated media indicating to the user that the user is already connected but in a queue.

AEC-SC-07: when the communication is connected to a PSAP, answer the incoming communication with a suitable greeting phrase, if possible, in the preferred modality and language of the user when that can be determined.

5.4.3 Routing

Several factors influence decisions on routing the communication to a region and to a PSAP. Factors are responsibility over the location of the emergency and the load of the PSAP. In relation to accessibility, additional factors are of concern in decision of which is the most appropriate PSAP. The additional factors are capability of handling the modalities that the user in emergency manages (spoken, written and signed), the competence of the call taker in handling the preferred sign language or spoken or written language, experience of the call taker to assess the needs of persons with disabilities and invoke appropriate support in the communication.

The procedures for routing to the most appropriate PSAP in accessible emergency communications shall have the possibility to retrieve the following information for use in the routing decision process:

AEC-RO-01: location information and corresponding regions of PSAPs.

AEC-RO-02: the emergency service or subtype of emergency service (if any) being requested.

NOTE 1: Emergency service subtype e.g. Mountain rescue, coast guard etc. which may be coded into the initiation of the emergency communications.

AEC-RO-03: preferred modalities and language preferences.