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Foreword

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

Modal verbs terminology

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Introduction

Total Conversation, as defined in Recommendation ITU-T F.703 [2], is a combination of three media in a conversation: video, Real-Time Text and audio and considered as a general multimedia conversational service. Internet-based Total Conversation services and terminals are deployed in a number of countries in Europe, and adopted for example by some persons with disabilities who need video for sign language communication or Real-Time Text for a text based conversation instead of or as complement to a voice conversation. The present document specifies how Total Conversation can be used for access to emergency services by emergency communications employing communication modalities suitable both for the Total Conversation Terminal user and PSAP call-taker. It provides opportunities to more rapid, reliable and confidence-creating resolution of the emergency cases compared to plain voice emergency communications.

The use of Total Conversation is of special interest for enabling access to emergency communications and make the communication more usable for those persons who may have little or no use of voice telephony because of disabilities related to hearing, speech or other human communication functions.

The present document is based on ETSI TR 103 170 [i.5].

1 Scope

The present document defines conditions for using Total Conversation for emergency communications with more media than in the regular voice call. It addresses the answering of Public Safety Answering Points (PSAP) and the potential impact on features provided by PSAPs for handling Total Conversation. The present document also addresses functional requirements regarding the interface to the PSAP, the connection to external supporting services, the transferring and sharing of the communication between emergency communication organizations, the logging and recording at the PSAP, the PSAP call-back aspects and specific communication routing and location information provision aspects for Total Conversation. The present document refers to existing standards relevant for Total Conversation user terminals and serving networks to facilitate a Total Conversation emergency communication. The present document does not imply any requirements on user terminals in general to be Total Conversation terminals.

The service specified here is a solution for accessible emergency communications intended to address requirements in the European Electronic Communications Code [i.1] and the European Accessibility Act [i.2].

Due consideration is taken of related standardization (e.g. 3GPP™ and IETF) and work in other bodies (e.g. the European Emergency Number Association (EENA)).

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 reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found in the [ETSI docbox](#).

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] [Recommendation ITU-T F.700](#): "Framework Recommendation for multimedia services".
- [2] [Recommendation ITU-T F.703](#): "Multimedia conversational services".
- [3] [Recommendation ITU-T G.114](#): "One-way transmission time".
- [4] Void.
- [5] Void.
- [6] Void.
- [7] Void.
- [8] [ITU-T H-series Supplement 1](#): "Application profile - Sign language and lip-reading real-time conversation using low bit rate video communication".
- [9] [Recommendation ITU-T T.140](#): "Protocol for multimedia application text conversation".
- [10] [ETSI TS 122 101](#): "Universal Mobile Telecommunications System (UMTS); Service aspects; Service principles (3GPP TS 22.101)".
- [11] [ETSI TS 122 173](#): "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)".

- [12] [ETSI TS 123 167](#): "Universal Mobile Telecommunications System (UMTS); LTE; IP Multimedia Subsystem (IMS) emergency sessions (3GPP TS 23.167)".
- [13] [ETSI TS 126 114](#): "Universal Mobile Telecommunications System (UMTS); LTE; 5G; IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction (3GPP TS 26.114)".
- [14] Void.
- [15] [ETSI ES 202 975](#): "Human Factors (HF); Requirements for relay services.
- [16] [IETF RFC 3261](#): "SIP: Session Initiation Protocol".
- [17] [IETF RFC 3264](#): "An Offer/Answer Model with Session Description Protocol (SDP)".
- [18] Void.
- [19] Void.
- [20] [IETF RFC 4103](#): "RTP Payload for Text Conversation".
- [21] [IETF RFC 8866](#): "SDP: Session Description Protocol".
- [22] [IETF RFC 5239](#): "A Framework for Centralized Conferencing".
- [23] [IETF RFC 5627](#): "Obtaining and Using Globally Routable User Agent URIs (GRUUs) in the Session Initiation Protocol (SIP)".
- [24] [IETF RFC 5764](#): "Datagram Transport Layer Security (DTLS) Extension to Establish Keys for the Secure Real-time Transport Protocol (SRTP)".
- [25] Void.
- [26] [IETF RFC 6263](#): "Application Mechanism for Keeping Alive the NAT Mappings Associated with RTP / RTP Control Protocol (RTCP) Flows".
- [27] [IETF RFC 6442](#): "Location Conveyance for the Session Initiation Protocol".
- [28] Void.
- NOTE: This is an informational IETF document collecting references to many standard track normative IETF documents of importance for Next Generation Emergency Communications and therefore considered relevant as normative reference.
- [29] [IETF RFC 6881](#): "Best Current Practice for Communications Services in Support of Emergency Calling (BCP 181)".
- NOTE: This is an IETF Best Current Practice document collecting references to many standard track normative IETF documents of importance for Next Generation Emergency Communications.
- [30] [IETF RFC 9071](#): "RTP-Mixer Formatting of Multiparty Real-Time Text".
- [31] [ETSI TS 103 479](#): "Emergency Communications (EMTEL); Core elements for network independent access to emergency services".
- [32] [IETF RFC 7852](#): "Additional Data related to an Emergency Call".
- [33] [IETF RFC 8373](#): "Negotiating Human Language in Real-time Communications".
- [34] [ETSI EN 301 549](#): "Accessibility requirements for ICT products and services".

2.2 Informative references

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] [Directive 2018/1972/EC](#) of the European Parliament and the Council of 11 December 2018 establishing the European Electronic Communications Code (EECC).
- [i.2] [Directive \(EU\) 2019/882](#) of the European Parliament and of the Council of 17 April 2019 on the accessibility requirements for products and services.
- [i.3] ETSI EG 202 320: "Human Factors (HF); Duplex Universal Speech and Text (DUST) communications".
- [i.4] ETSI TR 102 180: "Emergency Communications (EMTEL); Basis of requirements for communication of individuals with authorities/organizations in case of distress (emergency call handling)".
- [i.5] ETSI TR 103 170: "Emergency Communications (EMTEL); Total Conversation Access to Emergency Services".
- [i.6] IETF RFC 5012: "Requirements for Emergency Context Resolution with Internet Technologies".
- [i.7] IETF RFC 5194: "Framework for Real-Time Text over IP Using the Session Initiation Protocol (SIP)".
- [i.8] ETSI TR 103 708: "Human Factors (HF); Real-Time Text (RTT) in Multiparty Conference Calling".

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

address: identifier of the destination of a communication containing only numbers, service URNs, or a wider range of characters depending on the rules established by the application service provider

application service provider: organization or entity that, via a serving network, provides application-layer services, which may include voice, video and text communication

assisting services: services invoked during a communication, assisting the user or the call-taker with specific tasks in the communication

NOTE: Such tasks can for example be language translations, relay service or expert advice.

emergency service 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 emergency communications queue

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

NOTE: An ESInet has an interface to the application service provider conveying emergency communications from users. The ESInet is a managed IP network that is used for emergency services communications, and can be shared by all public safety agencies in a region. 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 internetwork. The term ESInet designates the network, not the services that ride on the network.

home environment: environment responsible for overall provision and control of the Personal Service Environment of its subscribers

IP Multimedia Subsystem (IMS): standardized Next Generation Networking (NGN) architecture for telecom operators that want to provide mobile and fixed multimedia services

modalities: methods for human expression and perception of communication

NOTE: Examples are written, signed and spoken languages, pictures, gestures, etc.

multi-party communication: real-time communication session with more than two participants where media sent from participants are distributed for presentation among the participants in the communication

personal service environment: environment containing personalized information defining how subscribed services are provided and presented towards the user

NOTE: Each subscriber of the Home Environment has her/his own Personal Service Environment. The Personal Service Environment is defined in terms of one or more User Profiles.

Public Safety Answering Point (PSAP): physical location where emergency communications are received under the responsibility of a public authority

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

NOTE: This feature is often called RTT.

relay service: telecommunications service that enables users of different modes of communication e.g. text, sign, speech, to interact by providing conversion between the modes of communication, normally by a human operator

NOTE: A type of assisting service (definition from ETSI ES 202 975 [15]).

serving network: entity that provides the user with access to the services of the Home Environment

SIP: session control environment for communications, using the IETF RFC 3261 [16] and related protocols in the IP networks

NOTE: The above refers to an environment outside the scope of IMS.

total conversation: bidirectional symmetric real-time transfer of motion video, Real-Time Text and voice between users in two or more locations

total conversation service: 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

total conversation terminal: user terminal capable of being used for Total Conversation

user: individual taking advantage of the Total Conversation service

3.2 Symbols

Void.

3.3 Abbreviations

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

3GPP	Third Generation Partnership Project
BOM	Byte Order Mark
CRLF	Carriage Return, Line Feed
CS	Circuit Switched
EC	European Commission
EENA	European Emergency Number Association
EMTEL	Emergency Communications
ESInet	Emergency Services IP network
GRUU	Globally Routable User Agent URI
GTT	Global Text Telephony

IMS MES	IMS Multimedia Emergency Session
IMS	IP Multimedia Subsystem
IP	Internet Protocol
LoST	Location to Service Translation protocol
LTD	Long Term Definition
MES	Multimedia Emergency Session
PSAP	Public Safety Answering Point
PSTN	Public Switched Telephone Network
RCS	Rich Communications Suite
RTP	Real Time Protocol
RTT	Real-Time Text
SIP	Session Initiation Protocol
SOS	Start Of String
SRTP	Secure Real Time Protocol
ST	String Terminator
TLS	Transport Layer Security
UCS	Universal Character Set
URI	Uniform Resource Indicator
URN	Uniform Resource Name
UTF	UCS Transformation Format

4 Background

The Total Conversation service is defined in Recommendation ITU-T F.703 [2]. It is used for user-to-user communication in a variation of media and modes of communication. The present document applies to Total Conversation when used for emergency communications.

Background information can be found in ETSI TR 103 170 [i.5].

5 Total Conversation Functionality for Emergency Communications

5.1 Basic functionality

The emergency communications system capable of handling Total Conversation emergency communications shall provide its users with a way to make and receive emergency communications with Total Conversation and communicate simultaneously in a conversational way using available combinations of video, Real-Time Text and audio. The communication is made in a similar way as for a voice emergency communication.

Emergency numbers and associated URN information are used by the Total Conversation user when initiating emergency communications.

When the emergency Total Conversation communication is answered, the common media supported by the terminal and the PSAP for Total Conversation shall be used to initiate Total Conversation.

If an emergency communications system has both Total Conversation call-taker workstations and workstations supporting fewer media than the Total Conversation workstations, then Total Conversation emergency communication shall be handled by the Total Conversation workstations whenever possible.

If an emergency communication with Total Conversation media requested cannot be handled by a Total Conversation workstation in the PSAP, then the PSAP shall be allowed to handle the communication in a workstation with support of fewer medias. In the case that not all three media are used by the PSAP, or the user requires to use a modality not supported by the PSAP, relay services may be invoked to handle the missing media or modalities if needed.

The present document assumes the conceptual service architecture shown in figure 1.

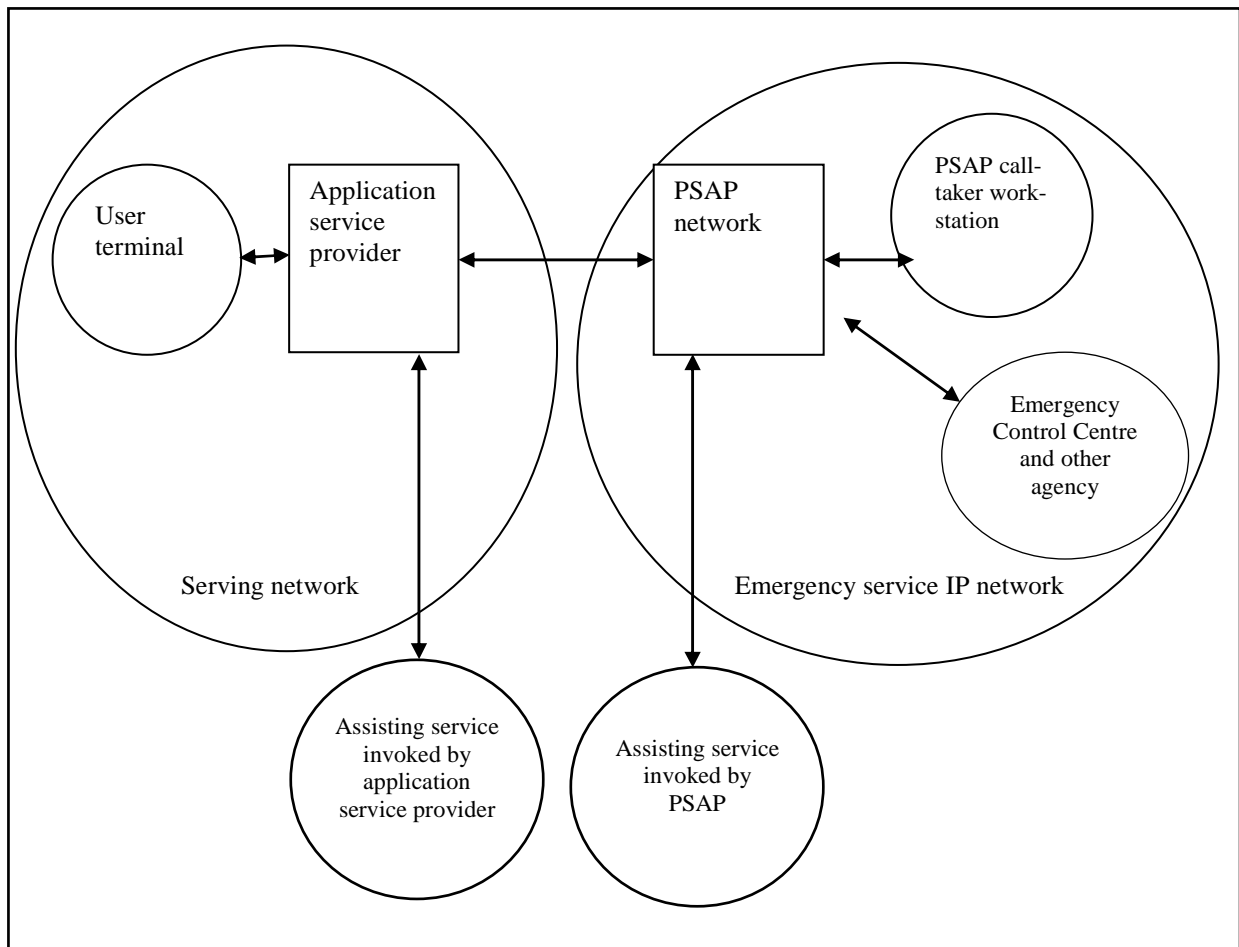


Figure 1: Conceptual service architecture for Total Conversation access to emergency services

5.2 Total Conversation Environments

5.2.0 General

There are currently two main standardized IP network session control environments. They are: SIP and IP Multimedia Subsystem IMS.

Selection of environment for terminal implementation is influenced by conditions out of the scope of the present document. A terminal needs to support only the same environment for Total Conversation emergency communications as it supports for Total Conversation non-emergency communications.

An overview of Total Conversation access to emergency communications for the two session control environments are provided in clauses 5.2.1 and 5.2.2.

Support for Total Conversation access to emergency communications may be added for any other emerging session control environment. The terms for such additions are described in clause 5.2.3.

5.2.1 Session Initiation Protocol (SIP) access

Total Conversation can be based on Internet communication using the session control protocol SIP as specified in IETF RFC 3261 [16] but not necessarily in accordance with the IMS framework specified in 3GPP. In this case Total Conversation can be viewed as an extension of a system for voice over IP (VoIP) based on SIP.

NOTE: A particular characteristic of this environment is that the Internet is an unmanaged network that is untrusted, inherently insecure and does not guarantee any quality of service (i.e. is "best effort").

The specifics for Total Conversation in this environment are specified in IETF RFC 5194 [i.7], and also in ETSI EG 202 320 [i.3]. These two specifications concentrate on describing the conditions for the Real-Time Text medium, while they specify that video and audio may also be enabled in the communication to compose the Total Conversation service.

The requirements for emergency communications in this environment are described in IETF RFC 5012 [i.6].

The specific mechanisms for emergency communications handling in this environment are specified in ETSI TS 103 479 [31].

The main document specifying emergency communications by PSAPs implementing Total Conversation is ETSI TS 103 479 [31], where communication protocols and other details in the interface are specified.

The protocols and procedures used in the interface between the serving network and the Emergency Service IP Network shall be as specified in ETSI TS 103 479 [31], clause 6 except clauses 6.2 and 6.8.

5.2.2 IP Multimedia Subsystem (IMS) access

Total Conversation can be based on the IP Multimedia Subsystem (IMS) as specified by 3GPP and used in mobile communication.

NOTE 1: A particular characteristic of this deployment scenario is that the IMS architecture is an operator managed network that can be trusted, and provides security and quality of service.

Total Conversation in IMS shall be provided by the IMS Multimedia Telephony service described in ETSI TS 122 173 [11], by including all three media of video, real time text and voice, described in ETSI TS 126 114 [13].

The IMS Multimedia Emergency Sessions (MES) as specified in ETSI TS 122 101 [10], clause 10.4.2 shall be used for Total Conversation emergency communications.

NOTE 2: Some functionalities for IMS based access to emergency communications for Total Conversation related to user preference based invocation of assisting services are not supported until Release 12 of the 3GPP specifications.

These specifications are essentially based upon the same session control protocol and media considerations as those used for the SIP case described in clause 5.2.1 of the present document but with IMS specific protocol extensions as described in ETSI TS 122 173 [11] and in ETSI TS 126 114 [13], and IMS specific mechanisms for emergency handling as described in ETSI TS 122 101 [10] and ETSI TS 123 167 [12].

The emergency communications initiated from Total Conversation users in the IMS system, are expected to be routed to PSAPs using SIP according to the principles in clause 5.2.1 of the present document.

The functionality and procedures in the PSAP, Emergency Service IP Network and external services are not influenced by this serving network. They are, in the present document, assumed to be based on SIP.

The opportunity to have emergency communications with the media included in Total Conversation was first specified in 3GPP Release 11 of IMS in the multimedia emergency session concept. Thus the IMS access is valid only for IMS networks implementing 3GPP IMS Release 11 or higher.

The functionality available in emergency communications is specified in ETSI TS 122 101 [10]. The functionality entitled "Global Text Telephony (GTT)" in that description contains the IP based Real-Time Text component in Total Conversation communications. GTT shall be combined with audio and video and be implemented together as the three media in IMS Multimedia Telephony to provide the intended IMS based Total Conversation based emergency communications.

Some of the functionalities needed for Total Conversation access in ETSI TS 122 101 [10] are made conditional on the availability of regulation or national policy.

NOTE 3: The requirements expressed in article 109 in the European Electronic Communication Code [i.1] and its recital 285 are indicating a requirement for availability of such functionalities for Europe. Also the European Accessibility Act [i.2] Article 4.8 relates to accessible emergency communications by e.g. Total Conversation.

The protocols procedures and codecs used in the interface between the serving network and the Emergency Service IP Network shall be as specified ETSI TS 103 479 [31], clause 6 except clauses 6.1 and 6.8. The serving network shall bridge any differences between what is used in IMS and this interface to the emergency service IP network capable of handling Total Conversation emergency communication.

5.2.3 Other IP based protocols access

Total Conversation can be implemented with other protocols between user equipment and communications service than those specified in clauses 5.2.1 and 5.2.2 of the present document. If it is decided that a service using such protocols shall provide emergency communications with the capability to handle Total Conversation, then the default method shall be to use the same interface as for the SIP based protocols described in the present document and ETSI TS 103 479 [31], clause 6 except clauses 6.2 and 6.8. The application service provider using such protocols shall establish the procedures and technology for the conversion.

Only if the protocol used between the Total Conversation user terminal and the application service provider is introduced as a supported standard protocol for emergency service communication systems in the region where it is provided, then that protocol may be used as the emergency communications access protocol. For emergency communications with other regions, not supporting this protocol, conversion to the protocols specified in ETSI TS 103 479 [31], clause 6 except clauses 6.2 and 6.8 shall take place by the application service provider.

The introduction of a new protocol for emergency communication may be done through a revised version of the present document.

5.2.4 Void

5.3 Total Conversation Media

5.3.1 Video

5.3.1.0 General

A capability to use two way video communications in emergency communications shall be provided by PSAP call-taker workstations and emergency service communication systems supporting Total Conversation emergency communications. Emergency communications without video shall also be supported.

A view of the other communicating person(s) shall be provided to each participant in the communication.

NOTE: In sign language communication all users need to see the head and hands of all participants in the communication.

The PSAP call-taker workstations used for Total Conversation shall be capable of transmitting a view of the call-taker from skull to stomach. This view is suitable both in general and for cases when the call-taker is using sign language.

Video communication for conversational use with Total Conversation shall be provided with characteristics and quality suitable for the use of sign language and lip reading when used for emergency communications. This is specified in ITU-T Series H, Supplement 1 [8] as well as in ETSI EN 301 549 [34], clause 6.5.

5.3.1.1 SIP support

Codecs specified in ETSI TS 103 479 [31] clause 6.6.2.3 and transport specification as in ETSI TS 103 479 [31] clause 6.6.1 shall be supported by PSAPs and ESInet in the interface between serving networks and the ESInet.

5.3.1.2 IMS support

Video included in Total Conversation emergency sessions in IMS shall follow the specification in the video-related clauses of ETSI TS 126 114 [13] regarding the Total Conversation user terminal and the serving network.

5.3.2 Real-Time Text

5.3.2.0 General

A capability to use Real-Time Text in emergency communications shall be provided by PSAP call-taker workstations and emergency service communication systems supporting Total Conversation. Emergency communications without Real-Time Text shall also be supported.

When Real-Time Text is provided in a communication, audio shall also be provided.

A capability to use Real-Time Text in the emergency communication interoperable with the emergency service communication system shall be provided by the serving network in interaction with the Total Conversation user terminals.

Real-Time Text communication should be provided in the Total Conversation emergency communication according to the quality criteria for good text conversation communication. Such criteria are described in Recommendations ITU-T F.700 [1], section 7.2 (4) and ITU-T F.703 [2], Annex A.

5.3.2.1 SIP support

Recommendation ITU-T T.140 [9] and IETF RFC 4103 [20] for coding, presentation and transport of Real-Time Text and the update for multiparty communication as in IETF RFC 9071 [30] shall be supported by Total Conversation PSAPs and ESInet as specified in ETSI TS 103 479 [31], clauses 6.6.1 and 6.6.2.4, as well as in ETSI EN 301 549 [34], clause 6.2. These specifications for Real-Time Text shall also be supported by the serving network in the interface between serving networks and the ESInet for Total Conversation emergency communications with Total Conversation user terminals.

NOTE: Errata are available in IETF for IETF RFC 4103 [20].

The need for keep-alive communication should be considered and implemented when needed as described in IETF RFC 6263 [26]. Regular transmission of the UTF-8 BOM character is an acceptable alternative keep-alive method. BOM characters shall not be interpreted as user-generated text.

On reception, any character codes that cannot be presented shall be ignored. This may be because of graphical rendering limitations or for special signalling character codes such as SOS-ST strings specified in Recommendation ITU-T T.140 [9].

When deleting, each backspace character shall delete exactly one Unicode character, regardless of the byte-length of that character in UTF-8. The only exception to this is that CRLF combinations sent by non-compliant systems, instead of the proper Unicode line-separator character, shall be treated as a single character when deleting.

5.3.2.2 IMS support

Real-Time Text included in Total Conversation emergency sessions in IMS shall support the specification in the text-related clauses of ETSI TS 126 114 [13] regarding the Total Conversation user terminal and the serving network.

NOTE: Real time text is varyingly called "real time text" and "text" in ETSI TS 126 114 [13]. In other documents real time text is also called RTT, Global Text Telephony, GTT and GTT-IP.

5.3.3 Audio

5.3.3.0 General

A capability to use bidirectional audio in Total Conversation emergency communications shall be provided by PSAP call-taker workstations and emergency service communication systems.

A capability to use bidirectional audio in the Total Conversation emergency communication interoperable with the emergency service communication system shall be provided by the serving network in interaction with the Total Conversation user terminals.

The emergency service communication system handling Total Conversation communications shall support both wide band and narrow band audio codecs. This is valid for all components of the emergency service communication system, including the ESInet, the PSAP workstation, communication distribution and communication recording equipment.

The Total Conversation user terminals shall at least support a wide band codec.

Preference shall be given to the wide band codec commonly available for the voice communication.

Audio shall be provided meeting the requirements in Recommendations ITU-T F.700 [1] and ITU-T F.703 [2] for conversational audio, and Recommendation ITU-T G.114 [3] for audio latency.

5.3.3.1 SIP support

Codecs specified in ETSI TS 103 479 [31], clauses 6.6.1 and 6.6.2.2, shall be supported by PSAPs, in the interface between serving networks and the ESInet by the combination of serving network and Total Conversation terminal. The wide band codec should be preferred for improved perception by users with hearing-impairments.

PSAPs and the combination of serving network and Total Conversation user terminals may support other audio codecs as well.

5.3.3.2 IMS support

Audio included in Total Conversation emergency sessions in IMS shall support the specification in the audio-related clauses of ETSI TS 126 114 [13] regarding the Total Conversation user terminal and the serving network.

The wide band codec shall be preferred for improved perception by users with hearing-impairments.

5.4 Supplementary and assisting services

5.4.1 General

If a supplementary or assisting service is supported in a non-emergency Total Conversation communication, that service shall be made available for emergency communications using Total Conversation. Some of those services are described below.

5.4.2 Assisting service

5.4.2.0 General

Means to include assisting services in the Total Conversation emergency communication shall be provided. Assisting services may for example provide language interpretation or expert advice.

5.4.2.1 Relay service

There shall be means to invoke available relay services of the types described in ETSI ES 202 975 [15] in emergency communications in order to facilitate communication by interpretation between different modalities. The relay services shall be invoked as a party in a multi-party communication between the user, the PSAP and the relay service.

The authorities responsible for electronic communication accessible to persons with disabilities, the authorities responsible for emergency communications provision and application service providers may decide what types of relay services will be available to the users.

If a relay service is handling regular user-to-user communications as well as emergency communications, the Total Conversation emergency communications shall be given priority in the queues for getting a relay service operator assigned to the communication.

The communication establishment procedure shall enable session setup requests to go to both the emergency service IP network and the relay service in parallel.

NOTE: Because loud noise from the user site can disturb voice communication between the relay service and the PSAP, some means of temporarily reducing such external noise may help increase communication between the user and the PSAP operator. Further details related to this topic may be considered in an implementation guide.

Information about the identity of the invoked relay service shall be provided to the PSAP, conveyed together with other available session setup and emergency case information. The identity shall be in a form that can be resolved to a unique working place and operator of the relay service. The intention of this information is both for logging, and for the ability to call back to the user with the same type of relay service invoked as in the original communication.

5.4.2.2 SIP support

Invocation of relay services shall be done when a user profile or other user indications indicate that this is desired.

A SIP proxy capable of making such decisions and invocations shall be included in the route of the emergency communications possibly requiring relay service invocation.

It is recommended that the invocation of the relay service should be handled through connection of a multi-party bridge. The communication between the user and the bridge, between the PSAP and the bridge and between the relay service and the bridge should be mixed in the multi-party bridge.

When an assisting service is invoked, information about the invoked service shall be included in the signalling as additional data specified in IETF RFC 7852 [32]

5.4.2.3 IMS support

Means shall be provided by the serving network provider to invoke relay services in an IMS Total Conversation emergency communication at the interface between the serving network and the ESInet.

5.4.3 Multi-party multi-media communication

5.4.3.0 General

Means to establish and perform multi-party Total Conversation emergency communications shall be provided by the serving network, in which all the enabled media in the communication are shared between participants.

5.4.3.1 SIP support

The PSAP or ESInet shall be equipped with a Total Conversation conference bridge.

The bridge shall be capable of adding and deleting participants in the communication on request from the PSAP. Guidelines for RTT conference user interfaces and technical support needed to implement the guidelines can be found in ETSI TR 103 708 [i.8].

The bridge shall support IETF RFC 5239 [22] and the update for multiparty calling as in IETF RFC 9071 [30], but shall be able to let devices participate without full support for the IETF RFC 5239 [22] conferencing procedures.

5.4.4 Transfer and Forwarding supplementary services

5.4.4.0 General

Transfer and forwarding supplementary services shall be available for Total Conversation emergency communications for invocation from the PSAP and the application service provider.

Supplementary services operating on media shall apply to all media supported in the communication when applicable.

5.4.4.1 SIP support

The supplementary services for transfer and forwarding shall be supported by the PSAP.

5.5 Initiating the emergency communication

5.5.0 General

A Total Conversation user terminal intended to support emergency communications shall be able to make an emergency communication in accordance with regional regulatory requirements.

5.5.1 SIP support

The procedures for placing an emergency communication specified in ETSI TS 103 479 [31] shall be followed by Total Conversation user terminals, serving networks, ESNets and PSAPs.

If the user terminal recognizes the initiation of an emergency communication by the user, it shall perform the steps required regarding the SIP headers and the routing as specified in ETSI TS 103 479 [31].

A route parameter pointing at the application service provider proxy shall be inserted in the route set to assure that a proxy capable of invoking relay services is included in the communication path.

5.5.2 IMS support

The procedures described in ETSI TS 123 167 [12] for initiating emergency communications with Total Conversation shall be applied.

5.6 Communication scenarios

5.6.0 General

The following Total Conversation emergency communication scenarios shall be supported.

5.6.1 Communication without assisting service

In cases when the user and the PSAP call-taker have suitable common communication modalities, the communication can be made without invoking any assisting service. The decision to do so may be made by comparing capabilities and preferences or by pre-arranged agreements between application service providers and PSAPs.

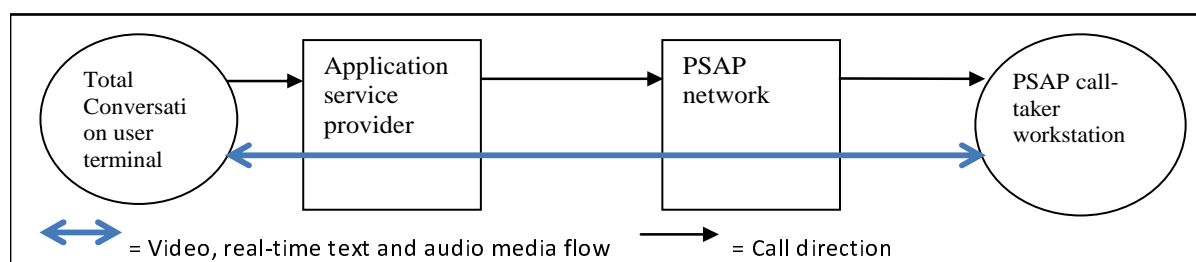


Figure 2: Total Conversation emergency communication with no external assistance invocation

5.6.2 Assisting service need indicated by the user

Users of Total Conversation user terminals are provided with means to request specific assisting services to be invoked in the emergency communications on a per communication basis.

This request shall be satisfied either by the application service provider or the PSAP as described in the scenarios below in clauses 5.6.3 and 5.6.4.

Location provision and routing actions shall be applied. The communication shall be routed towards the PSAP, with an indication what service to invoke or what modality support is required.

5.6.3 Assisting service invoked by the application service provider

5.6.3.0 General

If the application service provider finds during communication setup that an assisting service is desired or needed in the Total Conversation to cover a discrepancy in media or modality capabilities between the Total Conversation user and the PSAP, the application service provider shall perform procedures for connecting a suitable available assisting service to the communication.

Such invocation should be done as a multi-party communication.

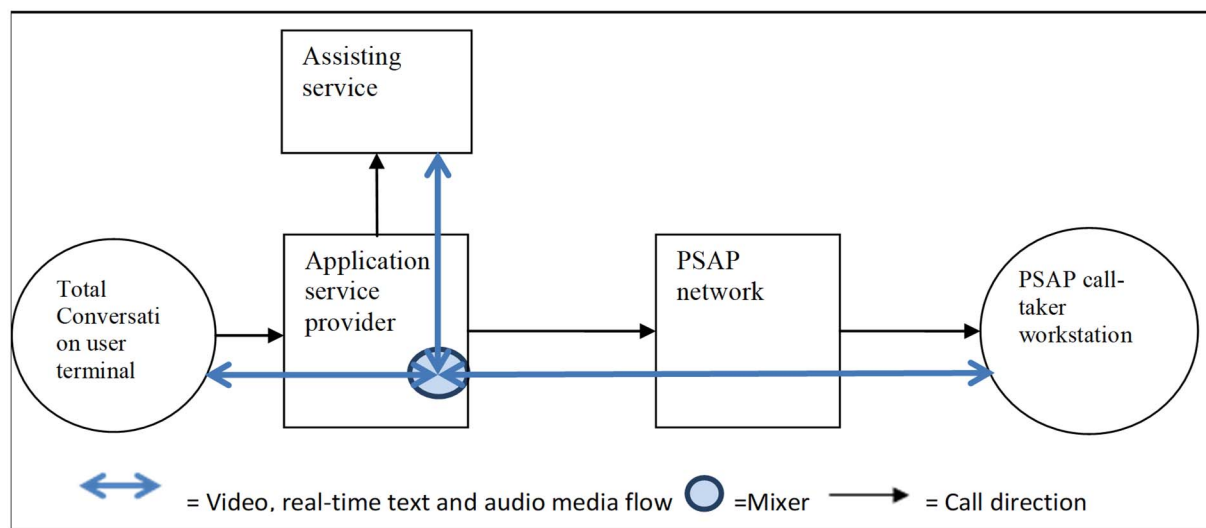


Figure 3: Assisting service invoked by application service provider

5.6.3.1 SIP support

The invocation shall be made as a result of a service subscription functionality provided to the user by the application service provider about how to handle the user's emergency communications or on an indication per communication as described in clause 5.6.2 of the present document.

When the application service provider has included an assisting service in the communication, information about this assisting service shall be included in the session setup information.

5.6.3.2 IMS support

Void.

5.6.4 Assisting service invoked by the PSAP call-taker

The PSAP call-taker shall be provided with means to invoke an assisting service during the communication. Such invocation should be done as a multi-party communication. The use of this type of invocation shall be restricted to cases when it is in accordance with PSAP policy. Automatic means should be used whenever possible.

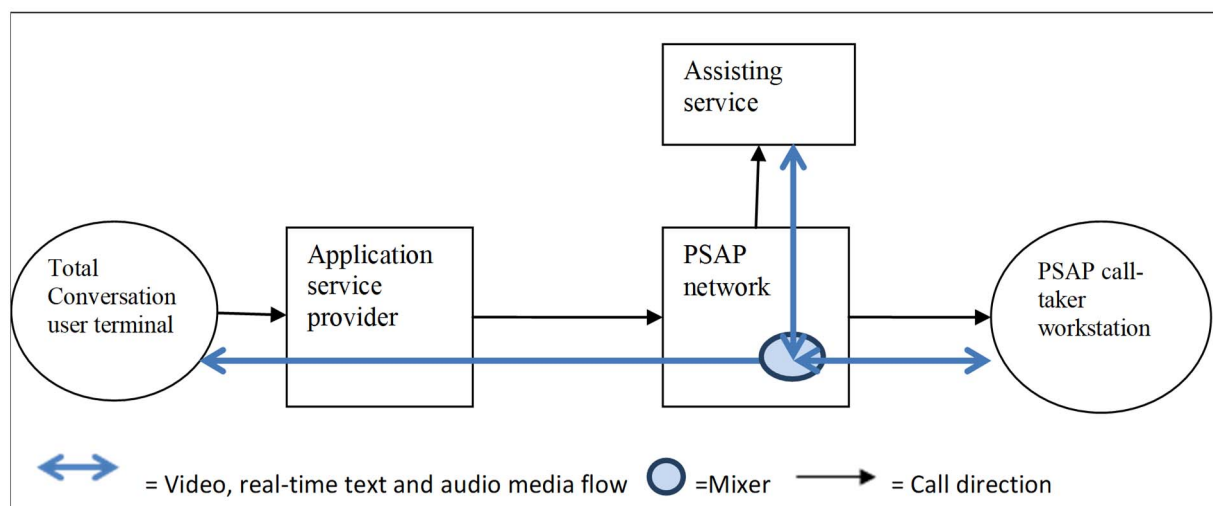


Figure 4: Assisting service invoked by PSAP network

In the communication establishment procedure, the possible inclusion of an assisting service should be supported by information on desired and possible modalities of the users, as well as information about already invoked assisting services.

The desired language and modality may be indicated by IETF RFC 8373 [33] procedures. The included assisting service can be indicated by the IETF RFC 7852 [32] on additional data.

5.7 Variation in services provided and media supported

5.7.0 General

Full Total Conversation support with three media shall be implemented in the PSAP call-taker workstations used for Total Conversation access. User terminals may support subsets of the full media collection when used for emergency. Communications shall be accepted by the PSAP call-taker workstation with the full set of media and any subset of media offered or supported by the user terminal.

The normal modes of operation for a Total Conversation enabled PSAP call-taker workstation can vary according to the needs in actual situations and established working procedures.

The PSAP call-taker may, as an exception, work in voice only and use assisting services for interpretation of other modalities in the communication. This may for example happen in cases of high load if only some of the PSAP workstations are equipped with Total Conversation functionality, while other workstations have support for voice only or another subset of the media of Total Conversation.

The following paragraphs and tables show some examples of variants for sign language related emergency communications. Real situations will imply many more variants. In all these cases, the modalities not shown can be used occasionally depending on the situation.

- 1) Sign language communication is handled between the user and the sign relay service. The sign relay service translates between sign language and voice, so that voice is used between the PSAP and the sign relay service. The PSAP call-taker handles any Real-Time Text conversation, while the PSAP call-taker sees the complete sign language communication as shown in table 1.

Table 1: Example of modality use with user handling sign language and PSAP handling voice and text

Participant	Main modality for expressing information	Main modality for receiving information	Alternate modality for expressing information	Alternate modality for receiving information
User	Sign language	Sign language	Text	Text
PSAP	Voice	Voice	Text	Text
Relay service	Sign language Voice	Sign Language Voice		Text

- 2) The PSAP call-taker only handles voice communication actively for language communication. The communication relies on the relay service to handle sign language and text communication with the user and translating to and from speech. Text and video are also visible to and can be used by the PSAP call-taker and the call-taker can be seen by the user, as shown in table 2.

Table 2: Example of modality use with sign language user and PSAP handling only voice

Participant	Main modality for expressing information	Main modality for receiving information	Alternate modality for expressing information	Alternate modality for receiving information
User	Sign language	Sign language	Text	Text
PSAP	Voice	Voice	Video	Video, text
Relay service	Sign language Voice	Sign Language Voice	Text	Text

- 3) The PSAP has special call-takers, competent in sign and text communication, so no external relay service is used for emergency communications in sign language and in text, as shown in table 3.

Table 3: Example of modality use with sign language user and PSAP handling sign language

Participant	Main modality for expressing information	Main modality for receiving information	Alternate modality for expressing information	Alternate modality for receiving information
User	Sign language	Sign language	Text	Text
PSAP	Sign language	Sign language	Text	Text

- 4) The PSAP and user communicate in text towards the PSAP and speech back.

Table 4: Example of modality use with a non-verbal but hearing user and PSAP handling audio and RTT

Participant	Main modality for expressing information	Main modality for receiving information	Alternate modality for expressing information	Alternate modality for receiving information
User	Text	Speech	Other video-based communication	Text
PSAP	Speech	Text	Text	Other video-based communication

5.7.1 SIP support

The principles of IETF RFC 8866 [21] Session Description Protocol and IETF RFC 3264 [17] shall be applied for deciding on media and codecs to include in emergency communications.

It shall be possible to add and delete media in the SIP dialog by request from either party in the communication.

5.7.2 IMS support

The media included in the emergency communication may be varied according to the description ETSI TS 126 114 [13].

5.8 Addressing emergency communications from the user terminal

5.8.0 General

A consistent address shall be provided for Total Conversation emergency communications. Using just the Emergency number (e.g. 112) in the Total Conversation user terminal as the only address shall result in an emergency communication. If the user is provided with other methods for entering a destination address and other conditions for the communication, e.g. the need to include a relay service, then that form shall also be possible to use with the emergency number as the destination address.

5.8.1 SIP support

The Total Conversation user terminal should insert the service URN `urn:service:sos` or one of its sub-service URNs. in the Request-URI of the SIP request.

If the Total Conversation user terminal did not insert the service URN as the URI, a SIP proxy of the application service provider shall do this insertion.

5.8.2 IMS support

The procedures described in ETSI TS 123 167 [12] for how the emergency communications are addressed shall be applied.

5.9 Routing of emergency communications

5.9.0 General

The general principle for routing of emergency communications is that the emergency communication shall be connected to the appropriate PSAP. See ETSI TS 103 479 [31].

This principle shall also be followed for emergency communications using Total Conversation, taking into account that the appropriate PSAP may be assigned specific interpretation for Total Conversation from two aspects:

- One possible implementation is that the communication is routed to a PSAP or PSAP workstation with media capabilities corresponding to those offered in the communication.
- Another possible implementation is that the communication is routed to a PSAP or PSAP workstation operated by staff with specific competence in handling communication with persons with disabilities.

For cases when the language issues do not call for any special routing, the Total Conversation shall be routed to the appropriate PSAP based on the location of the user and the availability of a PSAP supporting Total Conversation.

The PSAPs completing the emergency communication should be prepared to cooperate with PSAPs close to the emergency site in solving the emergency situation. This can be done by having preparation and working procedures for calling these PSAPs and including them in a conference, and invoking any needed language translation services in the communication.

If the modality preferences and capabilities of the user and the PSAP indicate the need for relay service support, the same type of relay service that is normally invoked in the communications for a user shall also be invoked in emergency communications.

5.9.1 SIP support

The Total Conversation user terminal shall include the application service provider SIP Proxy in a route parameter.

Either the Total Conversation user terminal or the SIP proxy shall make the LoST lookup described in ETSI TS 103 479 [31] to retrieve the PSAP SIP address to insert in the route set.

The routing procedures based on location specified in ETSI TS 103 479 [31] shall be applied.

Media capabilities and AdditionalData may influence routing.

5.9.2 IMS support

The procedures described in ETSI TS 123 167 [12] for how emergency communications are routed to a PSAP shall be applied.

5.10 Location information provision in emergency communications

5.10.0 General

Location information indicating the location of the Total Conversation user shall be provided to the PSAP according to regulatory requirements. The inclusion of relay services shall not modify the location information of the Total Conversation user in the communication.

5.10.1 SIP support

Procedures in ETSI TS 103 479 [31] shall be followed for handling location information provision in emergency Total Conversation communications.

The preferred option should be that the Total Conversation user terminal acquires the location, and conveys the location information in a way specified in IETF RFC 6442 [27].

5.10.2 IMS support

The procedures described in ETSI TS 123 167 [12] for location information retrieval and provision shall be applied.

5.11 PSAP call-back

5.11.0 General

The system shall support a call-back from a PSAP to the same Total Conversation terminal that initiated an emergency communication, and should ensure that the same media and same type of relay service as was invoked with the incoming emergency communication is invoked by the call-back. The invocation of the relay service shall be made with the same priority for getting the relay operator as in situations when the Total Conversation user initiates the emergency communication.

5.11.1 SIP support

In order to support the ability for PSAP call-back the SIP Registrar in the application service provider network shall support the mechanism defined in IETF RFC 5627 [23] for a Total Conversation user terminal to obtain a Globally Routable User Agent URI (GRUU).

The session initiating Total Conversation user terminal shall provide a GRUU address in emergency session requests sent to the PSAP, to be used by the PSAP if it is necessary to call-back according to procedures specified in IETF RFC 6881 [29], section 10 and ETSI TS 103 479 [31].

5.11.2 IMS support

The procedures described in ETSI TS 123 167 [12] for providing an address suitable for calling back, and for making the call-back shall be applied.

NOTE: There are scenarios when an address suitable for calling back cannot be provided, as well as other scenarios where the call-back may fail.

5.12 Connecting the communication with an emergency control centre and other agencies

A PSAP may involve an emergency control centre or another agency to do the required action on the emergency case.

Means shall be provided to transfer the Total Conversation emergency communication to another agency, maintaining all media in the Total Conversation that are supported by the workstation receiving the communication after the transfer.

It shall also be possible for the PSAP call-taker originally responding to the emergency communication, to stay in the communication, with all common media mixed in a multi-party fashion.

Means shall also be provided for the original PSAP to include a suitable available relay service in the communication to cover any modality differences between the user and the agency that is about to be brought into the communication.

The procedures for connecting the communication with the emergency control centre shall be based on using the PSAP bridge and connecting as many media as are supported by the parties in the communication. It is beneficial if emergency control centres have full Total Conversation capability.

5.13 Logging in the PSAP

Logging of facts about the Total Conversation emergency communications shall be done. Such logging shall contain information on call-back address, media used in the communication, and the identity and address of any relay service included in the communication.

5.14 Recording in the PSAP

Recording procedures for Total Conversation emergency communications shall record all media used in the communication, and enable later retrieval and play-back of the contents of all media. Media shall be recorded without quality degradation.

5.15 Language considerations

Considerations for establishing the language competence needed for efficient emergency communication handling is described in ETSI TR 102 180 [i.4].

Technical means to arrange for the best combination of PSAP and assisting service for the languages involved in each emergency communication should be arranged.

Until such technical systems are in place, the procedures described in clause 5.9 of the present document (on routing of emergency communications) apply.

For cases when language mismatches are detected, even with appropriate relay services invoked in the communication, the PSAP shall be provided with means to add language translating services to the communication by adding communication legs to the PSAP bridge. Such additions should be made with as many media as the assisting service supports.

5.16 Co-operation between emergency handling organizations

In order to be able to involve other organizations in handling the communication, the PSAP and such other organizations shall implement interoperable protocols for session control and media handling using SIP specified in the present document.

Specifically for Total Conversation applications in SIP, there is a need to provide information to emergency handling organizations about the call-back SIP address in GRUU form, and information on media, codecs and assisting services involved in the communication. Optionally, languages used in the communication may be registered in such information exchange.

Other aspects of information exchange are out of scope of the present document.

5.17 Security

5.17.0 General

Emergency centres shall have means to conduct emergency communications with protection for privacy and against manipulation of session control, media and location information, using commonly used and standardized technologies.

The security and privacy requirements also include any relay service invoked in the emergency communications, where both technical means and contractual obligations are required to fulfil the requirements.

Measures for protection against session control spam misusing the emergency session control system as well as protection against Denial of Service attacks shall be taken by the emergency centres.

5.17.1 SIP support

The emergency communication shall follow the security recommendations as specified in ETSI TS 103 479 [31], clause 6.1.1. TLS should be used for securing the session control protocol with the Total Conversation user terminal and external assisting services if possible, and SRTP should be used as specified in ETSI TS 103 479 [31], clause 6.1.1 for media encryption. Emergency communications with Total Conversation user terminals unable to apply security measures shall be accepted.

For key management, PSAPs and external services should support both DTLS-SRTP according to IETF RFC 5764 [24]. Total Conversation user terminals may use either of these methods for security.

5.17.2 IMS support

The procedures described in ETSI TS 123 167 [12] for security in Multimedia Telephony emergency sessions shall be applied.

5.18 Test communication

A method shall be supported by the PSAP for brief automated testing of the communication path of all media supported by Total Conversation. Such testing shall not cause excessive load on the PSAP and network components.

Test procedures should be established verifying the Total Conversation capabilities of the PSAPs by this procedure.

Emergency test communications shall be identified as test communications as specified in ETSI TS 103 479 [31], clause 6.1.2.10 and shall be routed to a non-emergency URN. The ESI-net shall divert the emergency test communications to be answered by test response equipment using all media offered in the incoming test communication.

Total Conversation user terminals should initiate emergency test communications according to the mechanism specified in ETSI TS 103 479 [31], clause 6.1.2.10.

Annex A (informative): Bibliography

- "PSAP Directory" EENA 2024.

NOTE: Available at <https://eena.org/knowledge-hub/documents/psap-directory/>.

- [Recommendation ITU-T G.711](#): "Pulse code modulation (PCM) of voice frequencies".
- [Recommendation ITU-T G.722](#): "7 kHz audio-coding within 64 kbit/s".
- [Recommendation ITU-T H.263](#): "Video coding for low bit rate communication".
- [Recommendation ITU-T H.264](#): "Advanced video coding for generic audiovisual services".
- [ETSI TS 124 279](#): "Universal Mobile Telecommunications System (UMTS); LTE; Combining Circuit Switched (CS) and IP Multimedia Subsystem (IMS) services; Stage 3 (3GPP TS 24.279)".
- [IETF RFC 3551](#): "RTP Profile for Audio and Video Conferences with Minimal Control".
- [IETF RFC 3711](#): "The Secure Real-time Transport Protocol (SRTP)".
- [IETF RFC 6189](#): "ZRTP. Media Path Key Agreement for Unicast Secure RTP".
- [IETF RFC 6443](#): "Framework for Emergency Calling Using Internet Multimedia".

History

Document history		
V1.1.1	November 2013	Publication
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