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Emergency Communications (EMTEL);
Requirements for communication between authorities/organizations during emergencies

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Foreword

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

The present document is one of several deliverables covering the communication needs of citizens and authorities in emergency situations, as identified below:

- ETSI TR 102 180 [i.1]: "Basis of requirements for communication of individuals with authorities/organizations in case of distress (Emergency call handling)";
- **ETSI TS 102 181 (the present document): "Requirements for communication between authorities/organizations during emergencies";**
- ETSI TS 102 182 [i.3]: "Requirements for communications from authorities/organizations to individuals, groups or the general public during emergencies";
- ETSI TR 102 410 [i.4]: "Basis of requirements for communications between individuals and between individuals and authorities whilst emergencies are in progress".

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Introduction

The present document outlines the requirements for communications between emergency authorities, and the need for standardization in this area to support these requirements. These communications are considered of three types:

a) speech communications between emergency staff members;

b) data communications allowing them to exchange information such as pictures, schemas, files, videos; and

c) IoT communications where physical and virtual "things" have identities, physical attributes, virtual representation, use interfaces to be integrated into the information network where they support the actions of the emergency authorities.

Clause 4 describes the relations between authorities in general terms defining each authority. Clause 5 categorizes the emergency services communications requirements. Clause 6 discusses the scalability and priority issues, including the dynamic need to employ resources. Clause 7 outlines the requirements applicable to the network(s) and user services, describing the services and the network features and capabilities. Clause 8 raises a number of security considerations. The annexes describe additional operational considerations, which may be useful as a background but do not constitute part of the communication requirements.

1 Scope

The present document addresses the requirements for communications between the authorized representatives who can be involved in the responses and actions when handling an emergency.

It describes the functional requirements for communications between the authorized representatives involved in the responses and actions when handling an emergency. The level of precision has been chosen to avoid interaction with the specific local, regional or national organizations and diagrams of relations between authorized representatives. It follows from this that adaptations will have to be done when implementing the present document at a local level. Furthermore, the scope of the present document also encompasses various types of services that can bring an added value to this basic scenario or add new scenarios, such as the services brought by other technologies e.g. IoT devices that support communications between authorities during emergencies.

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] Void.

[2] Recommendation ITU-T E.409 (05/2004): "Incident organization and security incident handling: Guidelines for telecommunication organizations".

[3] Recommendation ITU-T G.114 (05/2003): "One-way transmission time".

[4] ISO/IEC 15408: "Information technology -- Security techniques -- Evaluation criteria for IT security".

[5] Void.

[6] Recommendation ITU-T E.106: "International Emergency Preference Scheme (IEPS) for disaster relief operations".

[7] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), OJ 2016 L 119/1.

[8] ETSI TS 122 179: "LTE; Mission Critical Push to Talk (MCPTT) over LTE; Stage 1 (3GPP TS 22.179)".

[9] ETSI TS 122 280: "LTE; Mission Critical Services Common Requirements (3GPP TS 22.280)".

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.

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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 TR 102 180: "Emergency Communications (EMTEL); Basis of requirements for communication of individuals with authorities/organizations in case of distress (Emergency call handling)".

[i.2] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive).

[i.3] ETSI TS 102 182: "Emergency Communications (EMTEL); Requirements for communications from authorities/organizations to individuals, groups or the general public during emergencies".

[i.4] ETSI TR 102 410: "Emergency Communications (EMTEL); Basis of requirements for communications between individuals and between individuals and authorities whilst emergencies are in progress".

[i.5] ETSI TR 103 582: "EMTEL; Study of use cases and communications involving IoT devices in provision of emergency situations".

[i.6] ETSI TR 102 299 (V1.4.1): "Emergency Communications (EMTEL); Collection of European Regulatory Texts and orientations".

[i.7] ETSI TS 103 479: "Emergency Communications (EMTEL); Core elements for network independent access to emergency services".

[i.8] C(2003)2657 Commission Recommendation of 25th July 2003 on the processing of caller location information in electronic communications networks for the purpose of location-enhanced emergency call services, published on O.J.E.U. L 189/49 the 29.7.2003.

[i.9] ETSI TS 103 260-1: "Satellite Earth Stations and Systems (SES); Reference scenario for the deployment of emergency communications; Part 1: Earthquake".

[i.10] ETSI TS 103 260-2: "Satellite Earth Stations and Systems (SES); Reference scenario for the deployment of emergency communications; Part 2: Mass casualty incident in public transportation".

[i.11] IETF RFC 3261 (June 2002): "SIP: Session Initiation Protocol", J. Rosenberg, H. Schulzrinne, G. Camarillo, A. Johnston, J. Peterson, R. Sparks, M. Handley and E. Schooler.

[i.12] IETF RFC 7852 (July 2016): "Additional Data Related to an Emergency Call", R. Gellens, B. Rosen, H. Tschofenig, R. Marshall, J. Winterbottom.

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI TR 102 180 [i.1], ETSI TR 103 582 [i.5] and the following apply:

authority: organization within the public services fully or partly responsible for emergency preparedness and handling of incidents

authorized representative: individual officer or institution authorized by public service (fire, police or health) to play a key role in handling of an emergency case

emergency control centre: facilities used by emergency organizations to handle rescue actions in answer to an emergency call

NOTE: A PSAP forwards emergency communications to the emergency control centres.

emergency number: special short code(s) or number(s) which is used to contact the PSAP to provide emergency services

NOTE: The emergency number is used by the emergency caller to request assistance from the emergency services. There exist two different types of emergency numbers in Europe:

1) **European emergency number, 112:** unique emergency number for pan-European emergency services and used, for example, in EU member-states, Switzerland and other European countries.

2) **National emergency numbers:** each country may also have a specific set of emergency numbers.

emergency response organization: organization providing response to disaster situations, e.g. the police, fire service and emergency medical services

emergency service: service, recognized as such by the member state, that provides immediate and rapid assistance in situations where there is a direct risk to life or limb, individual or public health or safety, to private or public property, or the environment but not necessarily limited to these situations (see Commission Recommendation C(2003)2657 [i.8])

fleetmap: parameter information programmed into the system infrastructure and into the subscriber radios to control how the radios will behave on the system

incident area: area where the incident occurred, and/or the area which needs communication coverage to manage the response implemented

Internet of Things (IoT): dynamic global network with (self-)configuring capabilities based on communication protocols where physical and virtual "things" have identities, physical attributes, and virtual representation, and use interfaces to be integrated into the information network (from ETSI TR 103 582 [i.5])

NOTE: IoT represents the next step towards digitization where all physical objects, machines, servers, other devices and people can be interconnected through communication networks, in and across private, public and industrial spaces, report about their status and/or about the status of the surrounding environment and exchange data for intelligent applications and services to be developed. The data transmitted over the IoT can be small in size and frequent or infrequent in transmission. The number of connected IoT devices is set to exceed the number of conventional devices such as computers, tablets and fixed line/cellular phones.

IoT device: non-conventional, most often resource-limited, computing device (i.e. not a computer, server, tablet, or smartphone but comprising e.g. a micro-controller-based embedded system) which is connected to a communication network and which includes or connects to one or multiple sensors and actuators to interact with its deployment environment (from ETSI TR 103 582 [i.5])

NOTE: In most cases, an IoT device is a physical object that has been embedded with IoT technology (i.e. communication, processing, and/or storage capabilities) to turn it into a smart device.

IoT platform: set of IoT servers and gateways deployed by an IoT services platform provider that acts as a service layer between the IoT devices and the IoT applications. (from ETSI TR 103 582 [i.5])

NOTE: The composition of the IoT service platform may range from one single IoT server and one single IoT gateway to multiple IoT servers and multiple IoT gateways hierarchically organized.

location information: data processed in a public mobile network indicating the geographic position of a user's mobile device or of an IoT device, and data in a public fixed network indicating the physical address of the termination point (see Commission Recommendation C(2003)2657 [i.8])

originating network: network from which the emergency communication was originated

3.2 Symbols

Void.

3.3 Abbreviations

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

C&C	Command and Control
CBRN	Chemical, Biological, Radiological or Nuclear
COP	Common Operating Picture
CQI	Call Quality Index
D2D	Device to Device (communication)
DGNA	Dynamic Group Number Assignment
DMO	Direct Mode Operation
DMR	Digital Mobile Radio
EC	European Commission
ECC	Emergency Control Centre
EECC	European Electronic Communications Code
FIFO	First In, First Out
FR	First Responders
GDPR	General Data Protection Regulation
GoS	Grade of Service
GSM	Global System for Mobile telecommunications
GSM-R	GSM-Railway
IEPS	International Emergency Preference Scheme
IoT	Internet of Things
IP	Internet Protocol
ITSEC	Information Technology Security Evaluation Criteria
ITU	International Telecommunication Union
LEMA	Local Emergency Management Authority
LMR	Land Mobile Radio
MCPTT	Mission Critical Push To Talk
MCX	Mission Critical X

NOTE: With X = PTT / Video / Data.

MTA	Mass Transportation Accident
NCSA	National Communication Security Authority
NGO	Non-Governmental Organization
PLMN	Public Land Mobile Network
PMR	Professional Mobile Radio
PSAP	Public Safety Answering Point
PSTN	Public Switched Telephone Network
PTT	Push To Talk
QoS	Quality of Service
RF	Radio Frequency
RP	Reference Point
SIP	Session Initiation Protocol
TCP/IP	Transport Control Protocol/Internet Protocol
TETRA	TErrestrial Trunk Radio Access
UAV	Unmanned Aerial Vehicle
VHF	Very High Frequency
VoIP	Voice over IP
VPN	Virtual Private Network
VTC	Video TeleConferencing

4 Relations between authorities

4.0 Introduction to the functional architecture

The type and number of the authorized representatives in a given situation usually directly depend on the nature of the emergency. In the most frequent cases, only people on duty have to intervene according to a day-to-day routine, but in some cases, crisis teams or temporary headquarters will be called. In accordance with a plan, the additional resources will organize a mass action gathering and, if needed, include the resources of several centres, or even include in the rescue plan additional levels of administrative authority, private operators and associations. These new authorized representatives will follow instructions or orders from the administrative crisis authority (also called Local Emergency Management Authority); for example, utilities companies (water supply, transport, energy, etc.) may have to stop the provision of service, install priority of service schemes or execute a coordinated schedule for the restoration of the infrastructure and the service, as applicable.

It is recognized that the public authorities keep the responsibility of overall management of actions during the duration of the crisis, establishment of pre-planned scenarios and, in specific locations e.g. tunnels, underground transports, plants with high level of risk, organization of field exercises involving all these authorized representatives.

Figure 1 illustrates the relations (or Reference Points, RP) between these authorities illustrated as functional entities, and shows them when involved in routine and exceptional emergency situations.

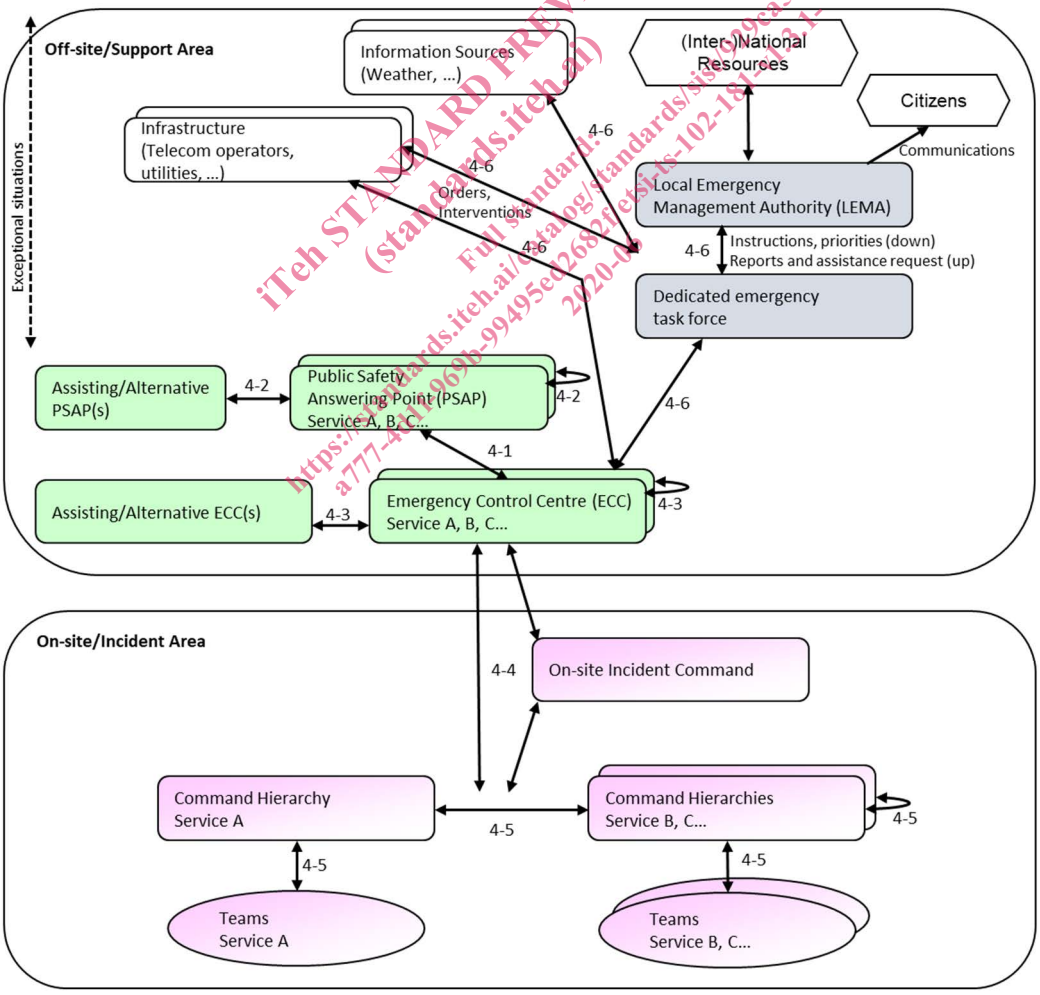

Figure 1: Reference points between functional entities