

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:

TR 102 180 [7]: "Basis of requirements for communication of individuals with authorities/organizations in case of distress (Emergency call handling)";

TS 102 181: "Requirements for communication between authorities/organizations during emergencies";

TS 102 182 [12]: "Requirements for communications from authorities/organizations to individuals, groups or the general public during emergencies";

TR 102 410 [13]: "Basis of requirements for communications between individuals and between individuals and authorities whilst emergencies are in progress".

Introduction

The present document outlines the requirements for communications between emergency authorities, and the need for standardization in this area to support these requirements. 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 some more operational considerations, which may be useful, 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.

Clearly, the type and number of these authorized representatives in a given situation will directly depend upon the nature of the emergency. In the most frequent cases, only people on duty will 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 including 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; for example utilities companies (water supply, transport, energy, etc.) may have to stop the provision of service or 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.

The present document 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.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
 - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
 - for informative references.

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

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

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

2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] 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.
- [2] ITU-T Recommendation E.409 (2004): "Incident organization and security incident handling: Guidelines for telecommunication organizations".
- [3] ITU-T Recommendation G.114: "One-way transmission time".
- [4] ISO/IEC 15408: "Information technology - Security techniques - Evaluation criteria for IT security".
- [5] ETSI EN 301 419-3 (V5.0.2): "Digital cellular telecommunications system (Phase 2+); Attachment requirements for Global System for Mobilecommunications (GSM); Advanced Speech Call Items (ASCI); Mobile Stations; Access (GSM 13.68 version 5.0.2 Release 1996)".
- [6] ITU-T Recommendation E.106: "International Emergency Preference Scheme (IEPS) for disaster relief operations".

2.2 Informative references

- [7] ETSI TR 102 180: "Basis of requirements for communication of individuals with authorities/organizations in case of distress (Emergency call handling)".
- [8] ITU-T Recommendation Q.931: "ISDN user-network interface layer 3 specification for basic call control".
- [9] ETSI EN 300 403 (all parts): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control".
- [10] ETSI TS 124 008: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Mobile radio interface Layer 3 specification; Core network protocols; Stage 3 (3GPP TS 24.008)".
- [11] 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).
- [12] ETSI TS 102 182: "Emergency Communications (EMTEL); Requirements for communications from authorities/organizations to individuals, groups or the general public during emergencies".
- [13] ETSI TR 102 410: "Emergency Communications (EMTEL); Basis of requirements for communications between individuals and between individuals and authorities whilst emergencies are in progress".

3 Definitions and abbreviations

3.1 Definitions

(TR 102 180 [7] is considered the master document in terms of definitions, by the end of this revision the definitions are to be taken from TR 102 180 [7] and included here to ensure that we have the same definitions.)

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

access network: portion of the telecommunications network that provides access to the switching function and terminates the user access signalling, in a PLMN this is a radio access via a base station

NOTE: See ITU-T Recommendation Q.931 [8], EN 300 403 [9], TS 124 008 [10].

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 calls 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 and GSM 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: 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 [1])

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

location information: data processed in a public mobile network indicating the geographic position of a user's mobile terminal, and data in a public fixed network indicating the physical address of the termination point (see Commission Recommendation C(2003)2657 [1])

originating network: access network from which the emergency call was originated

Public Safety Answering Point (PSAP): physical location where emergency calls are received under the responsibility of a public authority (see Commission Recommendation C(2003)2657 [1]) New definition in 102 476 (23/1 2007, not available at the moment)

3.2 Abbreviations

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

C&C	Command and Control
CBRN	Chemical, Biological, Radiological or Nuclear
CQI	Call Quality Index
DGNA	Dynamic Group Number Assignment
DMO	Direct Mode Operation
EC	European Commission
ECC	Emergency Control Centre
FIFO	First In, First Out
GoS	Grade of Service
GSM	Global System for Mobile telecommunications
ICT	Information and Communication Technologies
IEPS	International Emergency Preference Scheme
ITSEC	Information Technology Security Evaluation Criteria
ITU	International Telecommunication Union
LCS	LoCation Services
NCSA	National Certification Security Agency
NGO	Non-Governmental Organization
PLMN	Public Land Mobile Network
PMR	Professional Mobile Radio
PoC	Push To Talk
PSAP	Public Safety Answering Point
PSTN	Public Switched Telephone Network
QoS	Quality of Service
TCP/IP	Transport Control Protocol /Internet Protocol
TETRA	TErrestrial Trunk Radio Access
VPN	Virtual Private Network
VTC	Video TeleConferencing

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4 Description of the type of relations between authorities

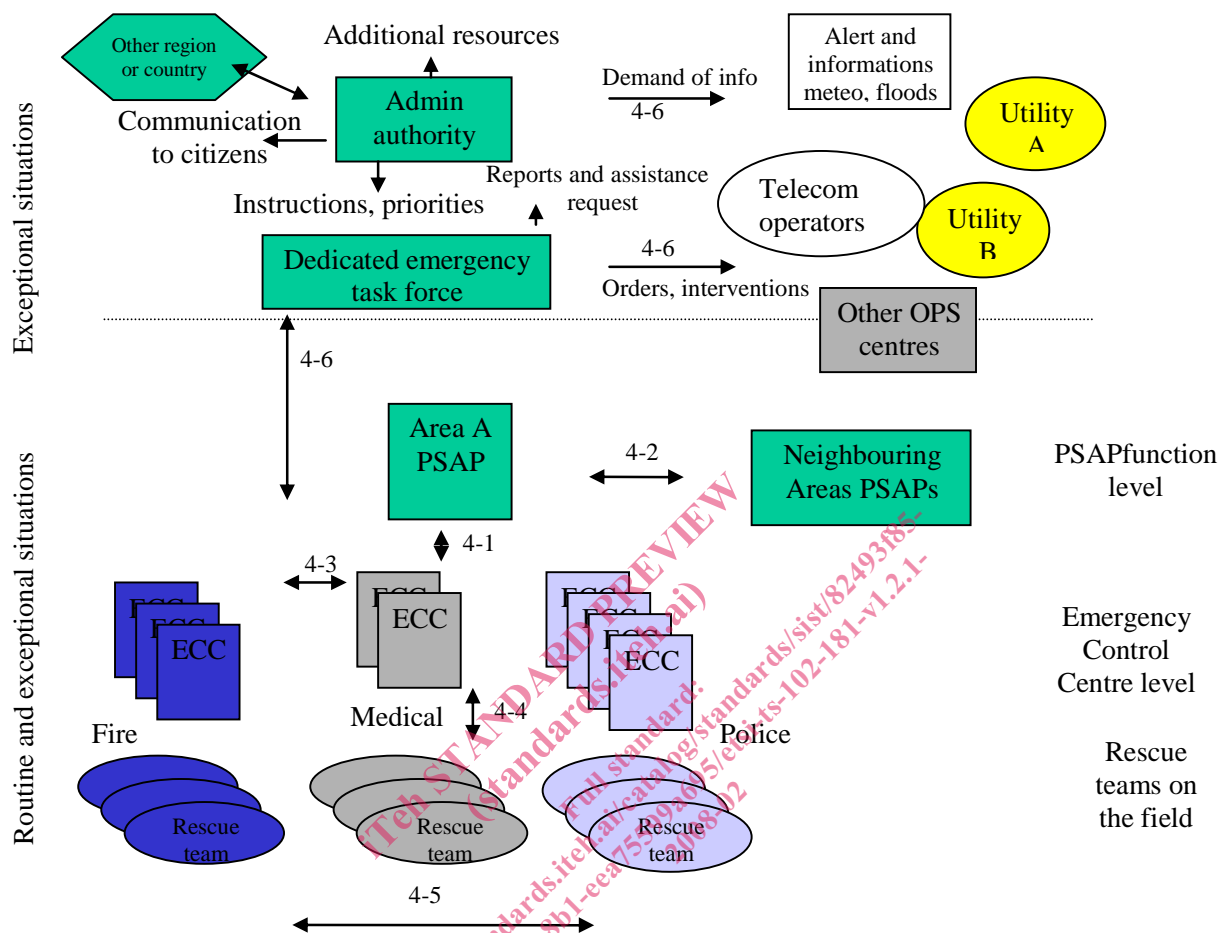


Figure 1: Reference points between functional entities

National bodies should enter into formal agreements to ensure interoperability between services at all levels of incident management. An example is shown in annex D.

The description of the type of relations relies on the model illustrated in figure 1. PSAPs/emergency control centres and rescue services in the field may be organized differently in different countries, e.g. in Sweden the PSAP and control centres for medical services and fire are combined, whereas police have their own control centres (to which calls are transferred from the common PSAP).

NOTE: The Military Agencies (**relation 4.7**) are not shown in figure 1.

The Temporary task force for coordination may be a pre-defined group which is activated according to set criteria, e.g. kind of emergency (landslide, earthquake, etc.), number of casualties, need for resources, etc.

The requirements in the present document cover both public and private networks. However, the implementation of all the requirements may not be possible in both types of networks.

4.1 Relation between PSAP and Emergency Control Centres

PSAP and emergency control centres are two different functionalities that may or may not be integrated.

The PSAP will, after reception of an emergency call, without delay communicate with the competent emergency control centre and transmit the location and nature of the emergency of the calling party along with any other relevant information that may be available associated with the call.

4.2 Relation between PSAPs

PSAPs normally work independently from each other, and their interrelation is not subject to special needs.

In cases where calls arrive at another PSAP than the one responsible for the area where the call is originated (e.g. mobile phones in the bordering area between different PSAPs), there may be a need to transfer the call together with additional information (e.g. location data).

The need will depend upon operation rules which have been established for these types of situation:

- the call is handled by the receiving PSAP;
- the call is immediately transferred to the PSAP appropriate for the incident area; in such a scenario the location data must be made available to the PSAP handling the incident, as for any received call;
- depending on local procedures, the receiving PSAP may transfer the call directly to the relevant ECC, possibly together with information to the correct PSAP that the call has been transferred.

It is the responsibility of the PSAPs or their organization to pre-define these rules of procedures.

4.3 Relation between Emergency Control Centres

ECCs need to have the facilities to collaborate with other ECCs either within the same service or across services (e.g. fire and health).

Examples of cases where this is needed:

- Calls are forwarded to an inappropriate ECC:
 - The call needs to be transferred to the correct ECC together with additional information (e.g. location data).
- Cases involving more than one ECC (e.g. fires with risks for human lives; typically involve fire, health and police, CBRN incidents (or suspected incidents), terrorism).
- The communications facilities exist to integrate the resources from two or more emergency control centres, in case of a larger emergency situation (see figure 1, "Exceptional situations").

Communication requirements between ECCs must:

- Establish communication links to support a number of services, including speech and data.
- Support conference calls including external resources may need to be set up and kept over a substantial amount of time. In contingencies, calls to external resources may be required.

4.4 Relation between Emergency Control Centres and Mobile Rescue Teams/Agents

Access to permanent bidirectional links between emergency control centres and their mobile teams is crucial in the handling of emergencies and need to be available for the duration of the emergency/disaster.

The main communication needs of the mobile rescue teams, representing the emergency services can be briefly categorized as follows:

- specialized functionality in group communications and dispatching, with instant connection and including appropriate security, dynamic management of talkgroups, emergency calls, prioritization of communications, etc.;
- call establishment times, typical requirements for voice call set-up time in the range 0,3 s to 1 s.

- seamless radio coverage throughout the area affected by the incident itself and the areas of operational activities associated to the incident (rescue facilities, hospitals, etc.). - including means to maintain communication during network outage;
- incident capacity; the need for radio capacity is increasing during major incidents and accidents. Efforts have to be made to ensure as far as possible that sufficient communication facilities are available;
- a voice quality sufficient not to impair the understanding of the message;
- access to the network controlled by using functionalities such as assigning priority to potential users, thereby restricting some parties from access to the network under certain circumstances.

These communication links will facilitate the following aims:

- managing the teams and operational coordination;
- communicating between involved parties (mobile team members, control centre staff, receiving and assisting units/institutions);
- reassessing on a continuous basis the overall situation and the priority of the missions;
- enabling the reporting from the teams;
- enabling the teams to call for additional support and resources.

The above requirements are fundamental factors for the efficiency, the safety and survival of the victims of the incident as well as for the rescue agents themselves.

These actions remain the responsibility of a variety of public authorities, but it should be mandatory that technical systems provide solutions for all the above requirements. Technology provides tools to improve the effectiveness and efficiency when handling the tasks and procedures. It can never replace the responsibility of the authorities and the correct application of their agreed procedures in the event of an incident.

The need for radio coverage, instant access (network capacity), reliability and specialized communications facilities such as all informed net (group call) and fast call set-up, is normally considered best served by the use of a solution consisting of a private radio and fixed communications system, shared by several independent authorities. Risk assessments, together with moves towards cross-services and international collaboration, have led to an emphasis on interoperability between various services. For this collaboration to be efficient, the communication systems in use have to be interoperable.

4.5 Relation between Mobile Rescue Teams/Agents

For mobile rescue teams to work efficiently when handling a larger incident, they need facilities for communication with other mobile rescue teams involved in the same incident. The need is for communication across the services involved, as well as within each service. These links will facilitate the following aims:

- managing the teams and operational coordination;
- communicating between team members;
- reassessing on a continuous basis the overall situation and the priority of the missions;
- enabling the reporting within the teams;
- enabling the teams to call for additional support and other resources;
- exchanging information for guidance of the staff involved in the incident and assessment of the injuries and preparation of fixed rescue facilities before arrival of casualties.

Interoperability between the communication systems in use is a pre-requisite for the efficient handling of the emergency.

Fallback communication service needs to be available to the mobile rescue teams in cases where network service is either unavailable or disturbed due to the nature of the emergency/disaster.