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Satellite Earth Stations and Systems (SES);
Satellite Emergency Communications (SatEC);
Device classes for Emergency Communication Cells over Satellite (ECCS)

Reference
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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Satellite Earth Stations and Systems (SES).

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**may not**", "**need**", "**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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Introduction

Recent major incidents have raised awareness of the need for effective emergency telecommunication networks. Satellite communication are the cornerstones of emergency management because they are resilient to Earth damage and provide a wide coverage of service.

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1 Scope

The present document defines classes of Emergency Communication Cell over Satellite (ECCS) devices [i.1].

An ECCS device provides short to medium range communication capabilities to emergency responders using terrestrial technologies. In addition, the ECCS device interconnects (backhauls) these terrestrial technologies to remote core networks (e.g. the Internet, the PLMN) by means of a satellite link.

2 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 http://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.

2.1 Normative references

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

[1] IEC 60529: "Degrees of protection provided by enclosures (IP Code)".

[2] IEEE 802.11: "IEEE Standard for Information technology - Telecommunications and information exchange between systems Local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".

[3] IEEE 802.11b-1999: "IEEE Standard for Information Technology - Telecommunications and information exchange between systems - Local and Metropolitan networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications: Higher Speed Physical Layer (PHY) Extension in the 2.4 GHz band".

[4] IEEE 802.11b/Cor 1-2001: "Corrigenda to IEEE 802.11b-1999, Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: Higher Speed Physical Layer (PHY) Extension in the 2.4 GHz Band".

[5] IEEE 02.11g-2003: "IEEE Standard for Information technology - Local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: Further Higher Data Rate Extension in the 2.4 GHz Band".

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] ETSI TR 103 166 (V1.1.1): "Satellite Earth Stations and Systems (SES); Satellite Emergency Communications (SatEC); Emergency Communication Cell over Satellite (ECCS)".

[i.2] ETSI TR 102 641 (V1.2.1): "Satellite Earth Stations and Systems (SES); Overview of present satellite emergency communications resources".

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[i.3] B. Wisner and J. Adams, editors, "Environmental health in emergencies and disasters: a practical guide", World Health Organization, 2003.

[i.4] ETSI EN 300 175-1 (V2.4.1): "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 1: Overview".

[i.5] IEEE 802.15.1: "IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements. Part 15.1: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Wireless Personal Area Networks (WPANs)".

[i.6] ETSI TS 102 658: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Digital Private Mobile Radio (dPMR) using FDMA with a channel spacing of 6,25 kHz".

[i.7] TIA 102 series: "Telecommunications, land mobile communications (APCO/Project 25)".

[i.8] ETSI TR 103 269-1: "TETRA and Critical Communications Evolution (TCCE); Critical Communications Architecture; Part 1: Critical Communications Architecture Reference Model".

[i.9] TETRAPOL: "TETRAPOL Publicly Available Specification from the TETRAPOL Forum".

3 Abbreviations

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

DECT	Digital Enhanced Cordless Telecommunications
dPMR	Digital Private Mobile Radio
ECCS	Emergency Communication Cell over Satellite
GNSS	Global Navigation Satellite Systems
IATA	International Air Transport Association
PLMN	Public Land Mobile Network
PMR	Professional Mobile Radio
POTS	Plain Old Telephone Service
PSTN	Public Switched Telephone Network
TETRA	Terrestrial Trunked Radio

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4 Classes of ECCS devices

An ECCS device provides a temporary emergency communication cell supporting terrestrial wireless and wired standard(s) which are linked/backhauled to a permanent infrastructure by means of bi-directional satellite links [i.1]. The present document does not make any assumption of the satellite access technology that is used.

4.1 Rationale

The present clause refers to three classes of ECCS devices called "pocket", "portable" and "transportable" that are defined in clause 4.2. These classes are sorted by increasing form factor, communication capabilities and likely cost of manufacturing.

The rationale of having multiple classes is to achieve the best fitness for purpose at the right time. Indeed, in the event of an emergency situation, the immediate availability of telecommunication services is of crucial importance, favouring pocket and portable devices. On the longer term, performance of communications (in terms of data rate, scalability, interconnection and service coverage) is equally important in order to sustain the evolving demands of the operations.

Conversely, the impairments of existing telecommunications and energy and networks may significantly compromise regular telecommunication services.

Bearing in mind these considerations, Figure 1 shows a typical evolution over time of responders' demands in terms of communications (dashed line). Regarding the timeline involved (represented on the x-axis of Figure 1), it can last from hours to weeks depending on the situation that is considered [i.3]. Figure 1 also illustrates how responders' demands are provided by devices classes and regular telecommunication as a function of time.

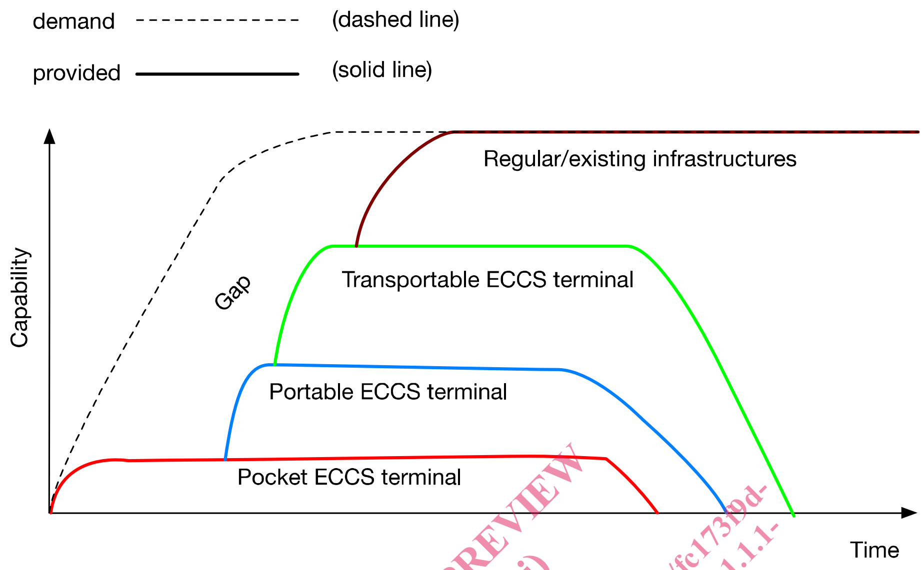

Figure 1: Responders' demand vs capability offered by regular/existing telecommunication and device classes

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4.2 Classes

Three classes are defined: "pocket ECCS", "portable ECCS" and "transportable ECCS". Table 1 lists the correspondence among these classes and the communication capabilities, interconnection capabilities and usage aspects.

Table 1: Communication capabilities, interconnection capabilities and usage aspects for classes A, B and C of ECCS devices

	Minimum communication requirements	Minimum interconnection requirements	Usage requirements
Class "pocket ECCS"	Shall accommodate capacity for 1 voice channel or 32 kbit/s of bi-directional data rate. Shall include a GNSS receiver.	Shall provide interconnection to remote core networks (Internet, PSTN) through satellite communications. Shall provide wireless data connectivity through IEEE 802.11 [2] to [5] and optionally IEEE 802.15.1 [i.5]. Shall provide local voice access through technology embedded in the device and optionally provide hands-free operation either through a speaker/microphone or a headset.	Shall be operative (see note) in no more than 5 minutes. Shall be carried and operated with one hand. Shall not weight more than 300 g with battery. Shall provide at least 3 hours of operation on batteries. Shall be usable while charging. Shall be at least IP 54 [1] compliant in operation. May be used as is in a context of pedestrian mobility or limited (distance and speed) vehicular mobility context by means of a e.g. docking station.

	Minimum communication requirements	Minimum interconnection requirements	Usage requirements
Class "portable ECCS"	Shall accommodate capacity for 3 parallel voice/fax channels or 256 kbit/s of bi-directional data rate.	Shall provide interconnection to remote core networks (Internet, PSTN) through satellite communications. Shall provide wireless data connectivity through IEEE 802.11 [2] to [5] and 1 wired Ethernet RJ45 plug. Shall provide local voice access through wireless handsets (e.g. DECT [i.4]). Shall keep local communications operative regardless of the satellite link status. May provide one analogue POTS RJ11 plug. May provide a local PLMN access through picocell or femtocell. May provide a local PMR (e.g. dPMR [i.6], P25 [i.7], TETRA [i.8], TETRAPOL [i.9]) access.	Shall be operative in no more than 10 minutes. Shall be carried by a single person with one hand when not operating and qualified as IATA hand luggage. Shall provide at least 2 hours of operation on batteries. Shall be usable while charging. Shall be at least IP 54 [1] compliant in operation.
Class "transportable ECCS"	Shall accommodate capacity for 12 parallel voice/fax channels or 500 kbit/s of bi-directional data rate.	Shall provide interconnection to remote core networks through satellite communications. Shall provide wireless data connectivity through IEEE 802.11 [2] to [5] and 4 wired Ethernet RJ45 plug. Shall provide local voice access through wireless handsets (e.g. DECT [i.4]). Shall keep local communications operative regardless of the satellite link status. May provide 2 analogue POTS RJ11 plugs. May provide a local PLMN access through picocell or femtocell. May provide a local PMR (e.g. dPMR [i.6], P25 [i.7], TETRA [i.8], TETRAPOL [i.9]) access.	Shall be operative in no more than 30 minutes. Shall be transportable, may be a vehicle mounted Earth station. Shall provide at least 48 hours of autonomous operations. Shall be at least IP 65 [1] compliant for the outdoor unit. Shall be capable of automatically acquire the correct satellite signal.
NOTE: Time from switch on to operation when already configured.			

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Applicable regulations on usable frequencies and allowed transmitted power shall apply.

Other aspects (e.g. security features, networking functionalities) are left to the vendor implementations. TR 102 641 [i.2] lists some key characteristics of emergency communication devices.