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Inteligentni transportni sistemi - e-Varnost - Preskušanje skladnosti e-klica v zvezi pošiljatelj-prejemnik za paketno preklopne sisteme IMS

Intelligent transport systems - ESafety - ECall end to end conformance testing for IMS packet switched based systems

Intelligente Verkehrssysteme - eSicherheit - eCall-Ende-zu-Ende Konformitätsprüfungen für IMS-paketvermittelnde Systeme

Systèmes de transport intelligents - ESafety - Essais de conformité du système eCall de bout en bout pour les systèmes IMS basés sur la commutation de paquets

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Systèmes de transport intelligents - ESafety - Essais de conformité du système eCall de bout en bout pour les systèmes IMS basés sur la commutation de paquets

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European foreword

This document (EN 17240:2024) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2025, and conflicting national standards shall be withdrawn at the latest by June 2025.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TS 17240:2018.

Part of this revision of the document has been aimed at making the document pure packet switched and removing references to eCall over circuit switched networks, this in order to make the document future proof.

The following changes have been introduced in this revision:

— Tests added to check for compliance with MSD version 3

— Tests added to check for support of IPv4 and IPv6

— Tests added to check for MSD transfer using in-band modem

— Tests added to check for compliance with additional data from Euro NCAP

— IVS tests added to check for special cases of eCall attempts

— IVS test added to check for capacity of backup battery

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— PSAP test added to check for compliance with MSD version 2

— PSAP tests added to check for ASN.1 compliance

— Corrections in multiple tests, figures and tables

— Added Annex A and B

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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Introduction

An *eCall* is an emergency call generated either automatically via activation of in-vehicle sensors or manually by the *vehicle occupants*; when activated, to provide notification and relevant location information to the most appropriate *Public Safety Answering Point* (PSAP), by means of *mobile wireless communications networks* and carries a defined standardized *minimum set of data*, notifying that there has been an incident that requires response from the emergency services and establishes an audio channel between the occupants of the vehicle and the *most appropriate PSAP*.

NOTE 1 EN 15722 specifies a standardized MSD for *eCall*, EN 16062 specifies high level application protocols for *eCall* using GSM/UMTS circuit switched networks, EN 17184 specifies *eCall* high level application protocols using IP Multimedia Subsystem over packet switched networks and EN 16072 specifies pan-European *eCall* operating requirements. For third party systems, EN 16102 specifies third party services supporting *eCall* operating requirements. (See EC Communication on *eCall* Implementation 2009 [COM(2009) 434 final] for more information.)

The operating requirements for pan-European *eCall* are made using Public Land Mobile Networks (PLMN) (such as GSM and 3G), as specified in a number of ETSI standards and technical specifications.

While EN 16062 provided high level application protocols (HLAP) for eCall using GSM/UMTS circuit switched networks, a new Standards Deliverable prEN 17184 has been developed for the provision of eCall using IMS over packet switched networks.

European Regulations require support of eCall by *vehicle manufacturers*, other eCall IVS manufacturers, MNO's and PSAPs. (See Clause 2, Normative References).

This Standards Deliverable provides a complete suite for the support of IMS-eCall and may be used to test IMS-eCall aspects of *eCall service* provision. Where appropriate, the tests of EN 16454 are replicated, revised or replaced. Annex A shows the relation of the tests specified in this Standards Deliverable to the tests specified in EN 16454. EN 16454 Conformance Tests that are required in a GSM/UMTS environment but not appropriate in an IMS environment are removed. Where new conformance tests are required for IMS, they have been added as new tests.

This deliverable provides tests to enable actors in the eCall chain to be able to claim conformance to the IMS-eCall standards, even though they are unable to control the behaviour of systems of other actors in the eCall chain.

NOTE 2 Conformance tests in this document allow demonstration that a system complies with the IMS-eCall Standards. Compliance to Standards is a prerequisite to providing an interoperable compliant system, but do not by themselves demonstrate that a system will function nor guarantee the quality of service.

NOTE 3 The term PSAP (Public Safety Answering Point), which is most widely used in the *eCall* documentation, European Commission documents, etc., is used throughout this document and equates to the term *emergency call response centre* used in the ITS Implementation Directive.

The European Committee for Standardization (CEN) draws attention to the fact that it is claimed that compliance with this European Standard may involve the use of patents concerning eCall given in EN 16062 and various ETSI standards for the *network access device* and cellular mobile networks.

CEN takes no position concerning the evidence, validity and scope of these patent rights.

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1 Scope

This document assumes support of eCall using IMS over packet switched networks by an IVS and a PSAP and further assumes that all PLMNs available to an IVS at the time an eCall or test eCall is initiated are packet switched networks. Support of eCall where eCall using IMS over packet switched networks is not supported by an IVS or PSAP is out of scope of this document.

At some moment in time packet switched networks will be the only Public Land Mobile Networks (PLMN) available. However, as long as GSM/UMTS PLMNs are available (Teleservice 12/TS12), ETSI TS 122 003 will remain operational. Both the use of such PLMNs and the logic behind choosing the appropriate network in a hybrid situation (where both packet-switched and circuit-switched networks are available) are out of scope of this document.

This document specifies the key actors in the eCall chain of service provision using IMS over packet switched networks (such as LTE, NR and their successors) as:

1) *In-Vehicle System* (IVS)/vehicle,

2) Mobile Network Operator (MNO),

3) *Public Safety Answering Point* (PSAP),

and to provide conformance tests for actor groups 1) – 3).

NOTE 1 Conformance tests are not appropriate nor required for *vehicle occupants*, although they are the recipient of the service.

NOTE 2 Third party eCall systems (*TPS-eCall*) are not within the scope of this deliverable. This is because the core *TPS-eCall* standard (EN 16102) does not specify the communications link between the vehicle and the TPS *service provider*.

NOTE 3 These conformance tests are based on the appropriate conformance tests from EN 16454 which was published before Internet Protocol multimedia Systems (IMS) packet switched networks were available. This deliverable therefore replicates the appropriate tests from EN 16454 (and acknowledge their source); adapt and revise Conformance Test Procedures (CTP) from EN 16454 to an IMS paradigm; or provide new additional tests that are required for the IMS paradigm. Some 112-eCall (Pan European eCall) tests provided in EN 16454 are specific to GSM/UMTS circuit switched communications and not appropriate for the IMS paradigm and are therefore excluded from this deliverable.

This document therefore provides a suite of ALL conformance tests for IVS equipment, MNO's, and PSAPs, required to ensure and demonstrate compliance to prEN 17184.

The scope covers conformance testing of new engineering developments, products and systems, and does not imply testing associated with individual installations in vehicles or locations.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15722:2020, *Intelligent transport systems — eSafety — ECall minimum set of data*

EN 16072:2022, *Intelligent transport systems — eSafety — Pan—European eCall operating requirements*

EN 17184:2024, *Intelligent transport systems — eSafety — eCall High level application Protocols (HLAP) using IMS packet switched networks*

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ETSI TS 123 401, *LTE; General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access (3GPP TS 23.401)*

ETSI TS 123 501, *5G; System architecture for the 5G System (5GS) (3GPP TS 23.501)*

ETSI TS 131 102, *Universal Mobile Telecommunications System (UMTS); LTE; Characteristics of the Universal Subscriber Identity Module (USIM) application (3GPP TS 31.102)*

ETSI TS 134 229-1 V17.1.0 (2024-07)or later, *Universal Mobile Telecommunications System (UMTS); LTE; Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification (3GPP TS 34.229-1 version 17.1.0)*

ETSI TS 134 229-5 V17.1.0 (2024-08) or later, *5G; Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 5: Protocol conformance specification using 5G System (5GS) (3GPP TS 34.229-5 version 17.1.0)*

ETSI TS 136 523-1 V18.5.0 (2024-08) or later, *LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification (3GPP TS 36.523-1 version 18.5.0)*

ETSI TS 138 523-1 V17.7.0 (2024-08) or later, *5G; LTE; 5GS; User Equipment (UE) conformance specification; Part 1: Protocol (3GPP TS 38.523-1 version 17.1.0)*

ETSI TS 126 269 V18.0.0 (2024-05) or later, *Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); eCall data transfer; In-band modem solution; Conformance testing (3GPP TS 26.269 version 17.0.0 Release 17)*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ITU-T P.1140, *SERIES P: TELEPHONE TRANSMISSION QUALITY, TELEPHONE INSTALLATIONS, LOCAL LINE NETWORKS; Communications involving vehicles; Speech communication requirements for emergency calls originating from vehicles*

Euro NCAP TB 040:2022 V1.0.0, *eCall Additional Data Concept Triggering Incident*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
112
single European emergency call number supporting '*Teleservice* 12'

Note 1 to entry: See ETSI TS 122 003.

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3.2
call clear-down
act of ending a call, following call completion, which is signalled in accordance with ISUP (ISDN User Part) 'Release Cause Codes' (usually achieved by hanging up the receiver or pressing 'end call' or similar on screen)

3.3
contracting MNO
mobile network operator which has responsibility for provisioning and managing a specific SIM

3.4
cellular network
wireless communications network consisting of multiple adjacent access points (cells) with the capability of homogeneous transfer of a communications session instance to an adjacent cell without significant interruption to the session

3.5
conformance test point
point which may be an actual instantiation of equipment performing a conformance test process 'live', using 'live' equipment or may be equipment/systems that simulate behaviour of equipment at the point being tested in order to stimulate or observe the behaviour resultant from the stimulation and note the result of that simulation

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3.6
data
representations of static or dynamic objects in a formalized manner suitable for communication, interpretation, or processing by humans or by machines

3.7
data concept
concept of a group of *data* structures (i.e. object class, property, value domain, *data elements,* message, interface dialogue, *association*) referring to abstractions or things in the natural world that can be identified with explicit boundaries and meaning and whose properties and behaviour all follow the same rules

3.8
data element
single unit of information of interest (such as a fact, proposition, observation, etc.) about some (entity) class of interest (e.g. a person, place, process, property, concept, state, event) considered to be indivisible in a particular context

3.9
eCall
emergency call generated either automatically via activation of in-vehicle sensors or manually by the *vehicle occupants*, which, when activated, provides notification and relevant location information to the most appropriate *Public Safety Answering Point*, by means of *mobile wireless communications networks*, carries a defined standardized *minimum set of data* (MSD) notifying that there has been an incident that requires response from the emergency services, and establishes an audio channel between the occupants of the vehicle and the most appropriate *Public Safety Answering point*

3.10
eCall-capable
provision of *eCall service* with availability of wireless communication network to undertake other application services

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3.11
eCall-only
provision of *eCall service* without availability of wireless communication network to undertake other application services

3.12
eCall generator
occupant of a vehicle or equipment within a vehicle that has cause to trigger an *eCall transaction* by automatic or manual means

3.13
eCall service
end-to-end emergency service to connect occupants of an affected vehicle to the *most appropriate PSAP* via an audio link across a PLMN together with the transfer of a *minimum set of data* to the PSAP

3.14
eCall transaction
establishment of a *mobile wireless communications session* across a *public wireless communications network* and the transmission of a *minimum set of data* from a vehicle to a *public safety answering point* and the establishment of an audio channel between the vehicle and the PSAP

3.15
emergency call response centre
term used in ITS Implementation Directive to mean *Public safety answering point* (PSAP)

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3.16
established
created or set up

3.17
identifier
label, symbol or token that names or identifies an entity or a collection of *data* or the means of designating or referring to a specific instance of a *data concept*

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3.18
IMS-eCall
an eCall making use of packet switched mobile network

3.19
in progress
taking place

3.20
in-vehicle equipment
equipment within the vehicle that provides or has access to in-vehicle *data* required for the *minimum set of data* and any other *data* that is to be sent as part of or complementary to the *minimum set of data* to effect the *eCall transaction* via a *public mobile wireless communications network* providing a link between the vehicle and a means of enacting the *eCall service* via a *public mobile wireless communications network*

3.21
in-vehicle system
in-vehicle equipment together with the means to trigger, manage and effect the *eCall transaction*