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Intelligent transport systems — ESafety — ECall minimum set of data

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee EPL/278, Intelligent transport systems.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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EN 15722

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English Version

Intelligent transport systems - ESafety - ECall minimum set of data

Systèmes de transport intelligents - ESafety - Ensemble minimal de données (MSD) pour l'eCall

Intelligente Transportsysteme - ESicherheit - Minimaler Datensatz für den elektronischen Notruf eCall

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Full document details: BS EN 15722:2020

Contents

Page

European foreword 4
Introduction 5
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
4 Symbols and abbreviated terms 7
5 Requirements 8
5.1 Concepts and formats 8
5.1.1 MSD data concepts 8
5.1.2 Representation of MSD data concepts 8
5.1.3 Different versions of MSD data 9
5.1.4 Distribution of MSD data 9
5.1.5 Additional data 9
5.2 ISO Object identifier 10
5.3 Contents of the 'Minimum Set of Data' (MSD) 11
5.3.1 General 11
5.3.2 Basic contents of MSD version 3 11
5.3.3 Previous versions of MSD message 15
Annex A (normative) ASN.1 definition of MSD 20
A.1 ASN.1 definition of MSD 20
A.2 Syntax check of ASN.1 definition of MSD 24
A.3 Examples of ASN.1 encoded MSD 24
Annex B (informative) ASN.1 Data representation PER and BER explained 26
B.1 What is ASN.1 26
B.2 Encoding data using ASN.1 27
B.2.1 General 27
B.2.2 Basic Encoding Rules (BER) 27
B.2.3 Distinguished Encoding Rules (DER) 27
B.2.4 Packed Encoding Rules (PER/UPER) 27
B.2.5 XML Encoding Rules (XER) 28
B.3 Examples 28
B.3.1 General 28
B.3.2 ASN.1 example definition 28
B.3.3 Encoding using BER or DER 29
B.3.4 Encoding using PER 29
B.3.5 Encoding using XER and EXER 30

Documents
Document Sharing Hub

Full document details: BS EN 15722:2020

Annex C (informative) Formal XML format description (XSD) for the MSD 31
Annex D (informative) Explanation of rationale for MSD data concept elements 36
Annex E (informative) Object Identifiers (OID) 38
E.1 Formal definition of OID 38
E.2 What is an object identifier? 38
E.3 Object Identifiers and ISO standards 38
E.4 OID for eCall data concepts 38
Bibliography 39

Documents
Document Sharing Hub
Full document details: BS EN 15722:2020

European foreword

This document (EN 15722:2020) 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 February 2021, and conflicting national standards shall be withdrawn at the latest by February 2021.

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 EN 15722:2015.

In comparison with the previous edition, the following modifications have been made:

— Correction of some typing errors;

— Added additional clarifications to solve frequently asked questions;

— Inclusion of recent locations mandatory to support more efficient dispatch of emergency services;

— MSD field “numberOfPassengers” replaced by “numberOfOccupants”;

— The number of vehicle categories supported by this standard has been expanded through revision of the enumeration values to enable support for additional categories of vehicles, which now covers the full UNECE categorization;

— Updated privacy requirements to include EU 2016/679 GDPR.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

The pan-European in-vehicle emergency call, 'eCall', is estimated to have the potential to save up to 2 500 fatalities annually in the EU when fully deployed, and furthermore to reduce the severity of injuries, to bring significant savings to the society in and to reduce human suffering.

Emergency calls made from vehicles or mobile telephones using wireless technologies, can assist with the objectives of significantly reducing road deaths and injuries, but drivers often have poor (imprecise) location awareness, especially on interurban roads or abroad. Additionally, in many situations the car occupants may not be in a position to call using a normal mobile phone.

The situation is worse for those travelling abroad. A high (and increasing) number of vehicles travelling outside their home country is thus also contributing to the need for automated emergency call system in vehicles. In EU there are over 100 million trips to another EU country per year, 65 % of the people feel less protected while abroad and most do not know which number to call in an emergency (in some countries over 60 %). Language problems are pertinent and may render proper communication difficult. Yet, in the most crucial cases, the victim(s) may not be able to call because they have been injured/trapped, do not know the local number to call, and in many cases, particularly in rural situations and late at night, there may be no witnesses who happen to have a mobile phone and a sense of community.

eCall, in the context of "Intelligent Transport Systems" or "ITS", (previously known as "Road Traffic and Transport Telematics") can be described as a "user instigated or automatic system to provide notification to public safety answering points, by means of wireless communications, that a vehicle has crashed, and to provide coordinates and a defined minimum set of data, and where possible a voice link to the PSAP".

The objective of implementing the pan-European in-vehicle emergency call system (eCall) is to automate the notification of a traffic accident, wherever in the European Union and associated countries, with the same technical standards and the same quality of services objectives of other emergency services (for example the TS12 emergency call of GSM/UMTS).

This document specifies the "Minimum Set of Data" (MSD) to be transferred by such an in-vehicle eCall system in the event of a crash or emergency.

NOTE The communications media and means of transferring the eCall MSD are not defined in this document. See list of referenced standards.

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1 Scope

This document specifies the standard data concepts that comprise the "Minimum Set of Data" (MSD) to be transferred from a vehicle to a 'Public Safety Answering Point' (PSAP) in the event of a crash or emergency via an 'eCall' communication transaction.

Optional additional data concepts may also be transferred as part of the MSD.

The communications media protocols and methods for the transmission of the eCall message are not specified in this document.

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 16062, *Intelligent transport systems — ESafety — eCall high level application requirements (HLAP) using GSM/UMTS circuit switched networks*

EN 16102, *Intelligent transport systems — eCall — Operating requirements for third party support*

ISO/IEC 8825-2, *Information technology — ASN.1 encoding rules: Specification of Packed Encoding Rules (PER) — Part 2:*

NOTE Communications standards required for transmission of eCall using GSM/UMTS wireless communications networks are referenced in EN 16062 and EN 16072 [6].

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 https://www.iso.org/obp/ui

3.1
ASN.1
Abstract Syntax Notation One
notation that describes rules and structures for representing, encoding, transmitting, and decoding data enabling representation of objects that are independent of machine-specific encoding techniques; see Annex B

3.2
eCall
emergency call generated either automatically via activation of in-vehicle sensors or manually by the vehicle occupants; when activated it 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' 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'

Documents
Document Sharing Hub
Full document details: BS EN 15722:2020

3.3
MSD
minimum set of data
direct, timely data content of an eCall message to the PSAP operator receiving the emergency call containing information about the location of the incident, providing detail characterising the vehicle, and potentially sometimes also providing additional data that is deemed relevant

3.4
PSAP
public safety answering point
'first level' responder to whom an emergency call/eCall is directed

4 Symbols and abbreviated terms

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

ASN.1	abstract syntax notation one (ISO/IEC 8824, ISO/IEC 8825)
3G	third generation mobile cellular network system, defined by 3GPP standards
3GPP	third generation partnership project
BCD	binary coded decimal
BER	basic encoding rules (ASN.1)
CNG	compressed natural gas
CXER	Canonical XML encoding rules
ETSI	European telecommunications standards institute
EC	European Commission
EU	European Union
EXER	extended XML encoding rules
GSM	global system for mobile communications
GNSS	global navigation satellite system
ID	identity
IP	Internet protocol
ISO	international organization for standardization
ITS	intelligent transport system(s)
ITU	international telecommunication union
IVS	in-vehicle system
LPG	liquid propane gas
M	mandatory
MSD	minimum set of data
O	optional
OID	object identifier (ISO/IEC 8824) - see Annex E
P2WV	powered 2-wheel vehicles

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Full document details: BS EN 15722:2020

PDU	protocol data unit (ASN.1)
PER	packed encoding rules (ASN.1)
PSAP	public safety answering point
TPSP	third party service provider
UMTS	universal mobile telecommunications system
UPER	unaligned packet encoding rules (ASN.1)
VDS	vehicle type descriptor (part of VIN)
VIN	vehicle identification number
VIS	vehicle identification sequence (part of VIN)
WMI	world manufacturer index (part of VIN)
WGS84	world geodetic system
XER	XML encoding rules
XML	extensible markup language
XSD	XML Schema Definition

5 Requirements

5.1 Concepts and formats

5.1.1 MSD data concepts

NOTE The minimum set of data is important information to assist the provision of the most appropriate services to the crash or emergency site and to speed up the response. The minimum set of data makes it possible for the PSAP operator to respond to the eCall even without the voice connection.

The "Minimum Set of Data" shall be a direct, timely message to the PSAP operator receiving the emergency call.

The information elements in the MSD have been selected on the basis of their relevance in an emergency rescue situation.

The MSD has an 'optional additional data' block that can be used to add information elements that are relevant to a specific situation. See 5.1.5.

5.1.2 Representation of MSD data concepts

The message shall be sent in the sequence defined within the ASN.1 definition defined in Annex A.

The transferred MSD for Pan-European eCall shall be represented in Abstract Syntax Notation (ASN.1) using the 'Unaligned Packed Encoding Rules' (UPER) as defined in ISO/IEC 8825-2, using the ASN1 definitions found in Annex A. See also 5.1.4.

The transfer of the MSD for Pan-European eCall using other wireless communications media (for example E- UTRAN) may be specified in future standards for 'high level application protocols' for that wireless media.

NOTE 1 An XML encoding of the MSD data representation can be used in TPSP-to-PSAP applications (EN 16102). Annex C contains the derived XSD for such encoding.

NOTE 2 In order to implement presentation in ASN.1 UPER, readers are advised to also read Annex B "ASN.1 Data Representation PER and BER explained"; and also the relevant normative referenced documents.

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5.1.3 Different versions of MSD data

It is foreseen that, over time, new versions of the MSD data definition will occur. Wherever possible, later versions of the MSD shall be backwards compatible with existing versions.

If a future version of the MSD is defined which is not backwards compatible (i.e. cannot be automatically interpreted by receiving systems) then its deployment shall be coordinated to ensure that all receiving systems are ready before IVS adopt this new MSD format.

The main structure of an MSD shall, in any version, contain two elements, the first of which is known as the MSD version (msdVersion) which designates the encoding rules that have been used to create the second element.

Systems receiving an MSD shall support all standardized MSD versions, which are each uniquely identified using this msdVersion parameter.

5.1.4 Distribution of MSD data

The MSD shall be transmitted using one or more communications media as defined in other eCall Standards.

In order to enable interpretation by the PSAP, the MSD shall always be presented in an ASN.1 encoded module: either ASN.1 'Unaligned Packet Encoding Rules' (UPER) or ASN.1 'Extended XML Encoding Rules' (EXER) encoding shall be used.

The ASN.1 module shall contain the MSD as defined in this document plus none or more 'optional additional data' concepts presented as defined in 5.1.5 and whose name, content and presentation has been made available in a data registry as required by this document (See 5.1.5).

In the case of an MSD for pan-European eCall it shall be encoded using 'Unaligned Packed Encoding Rules' (UPER) as defined in ISO/IEC 8825-2. The length of this encoded MSD (including any 'optional additional data') shall not exceed 140 bytes. Any payload bytes received outside of the ASN.1 message length shall be ignored by the receiving entity.

NOTE 1 It is assumed that the integrity of the transmitted data is assured by the underlying communication interface standard used. For example, EN 16072 [6]which defines the operating requirements for the transmission of Pan-European eCall and EN 16062 (eCall high level application protocols for GSM/UMTS) which provide the high level application protocols for sending a Pan-European eCall via a circuit switched GSM/UMTS wireless phone network.

EN 16102 defines provisions for Third Party supported eCall.

NOTE 2 If the MSD is transferred using another means of communication that has no, or less stringent, data limits, XML encoding rules can be used if preferred. Annex C contains the derived XSD for such encoding.

5.1.5 Additional data

The MSD message has a provision for 'optional' additional data. This document specifies the presentation of any such data within an MSD message. The nature and content of such additional data is not part of this document.

EXAMPLE Additional data may contain a reference to an external source of relevant information (such as a phone number, a website URL, etc.) where further information may be found, or additional data specific to the vehicle or incident (e.g. battery temperature in the case of an electric or hybrid vehicle; number of rollovers; URL to the technical specifications to a particular vehicle model; etc.)

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Full document details: BS EN 15722:2020

Optional additional data shall not include any data concerning or identifying a person (personal data) unless the transfer of such data has been explicitly and expressly prior instructed and authorized by the person who is identified by the data and its provision shall in any event only be provided only in accordance with European Union and National privacy regulations pertaining at the time of the transfer of any such personal data and in accordance with the provisions of EU 2016/679 'General Data Protection Requirements' [8].

Any additional data element(s) shall each consist of two parts:

1. a relative 'object identifier' (OID);

2. the data content.

The relative OID shall be allocated by CEN TC278 WG15 or a body nominated by it. For further information see Annex E.

CEN/TC 278/WG15 or a body nominated by it shall allocate an 'Object Identifier' (OID) for each 'oad'-optional additional data'-concept. Within the MSD the 'optional additional data'-concept used shall be identified by a 'relative OID', i.e. it will only contain the arcs of the object identifier of the concept starting below the eCall MSD 'optional additional data'-concept object identifier. See 5.2 below.

Additional data shall be represented using an ASN.1representation definition that itself is made available to emergency services/PSAPs.

When sending an MSD containing this additional data, using GSM/UMTS (EN 16062), the addition of such data shall never cause the total (UPER encoded) MSD message length to exceed the maximum available number of bytes (total message length = 140 bytes).

In order to ensure that the above requirement is met with any combination of optional parameters within the main MSD message, the total length of additional data concepts may not exceed 94 bytes of data encoded in ASN.1 UPER.

5.2 ISO Object identifier

ISO/ITU "Object Identifiers" are explained in informative Annex E.

The full eCall MSD, or any 'optional additional data'-concept, is preceded by its ISO object identifier. When eCall data is stored or used outside of the eCall context this OID shall be prefixed onto all representations of the MSD or any eCall data concept.

In eCall context, when data is being sent to a specific receiver (e.g. PSAP), the OID may be assumed to be known and is not transmitted. Thus the OID is not transferred over the air between the IVS and PSAP.

eCall has been allocated the OID: 1.0.14817.106.2.1

EXPLANATION

1. identifies the data concept as an ISO parent route standard

    0. identifies the arc as being identified by a Standards reference number.

        14817 In this case ISO 14817 being the parent standard for ITS data registry

            106 emergency-service

                2 pre-harmonisation-automated-calls

                1 cen-15722

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Below this OID three nodes are defined:

1.0.14817.106.2.1.1 for 'Mandatory Data Concepts'

1.0.14817.106.2.1.2 for 'Optional Data Concepts'

1.0.14817.106.2.1.3 for eCall data elements

5.3 Contents of the 'Minimum Set of Data' (MSD)

5.3.1 General

The following sub-clauses provide the definition of the minimum set of data that shall be sent from the vehicle in case of an emergency call.

5.3.2 Basic contents of MSD version 3

Table 1 provides a summary of the semantic contents of the MSD.

The sequence of data presentation shall be as specified in Table 1, represented as described in 5.1.2 and distributed as described in 5.1.4.

For clarity the 'type' used in Table 1 is a semantic representation of the type used in the ASN.1 definition. The exact representation is defined in Annex A.

The real position of the element in the data-stream is defined by the ASN.1 'unaligned packet encoding rules (UPER), following the definition in Annex A. Elements therefore do not necessarily start or end on a byte boundary.

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