TECHNICAL SPECIFICATION

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Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) —

Part 10:
Emergency messaging system/eCall (EMS)

Systèmes intelligents de transport — Cadre pour applications télématiques collaboratives pour véhicules de fret commercial réglementé (TARV) —

Partie 10: Système de messagerie d'urgence/appel électronique (EMS)

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives.

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*

ISO 15638 consists of the following parts, under the general title *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV)*:

— *Part 1 Framework and architecture*

— *Part 2: Common platform parameters using CALM*

— *Part 3: Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services*

— *Part 5: Generic vehicle information*

— *Part 6: Regulated applications* [Technical Specification]

— *Part 7: Other applications*

— *Part 8: Vehicle access monitoring (VAM)* [Technical Specification]

— *Part 9: Remote electronic tachograph monitoring (RTM)* [Technical Specification]

— *Part 10: Emergency messaging system/eCall (EMS)* [Technical Specification]

— *Part 11: Driver work records (work and rest hours compliance) (DWR)* [Technical Specification]

— *Part 12: Vehicle mass monitoring (VMM)* [Technical Specification]

— *Part 14: Vehicle access control (VAC)* [Technical Specification]

— *Part 15: Vehicle location monitoring (VLM)* [Technical Specification]

v

— *Part 16: Vehicle speed monitoring (VSM)* [Technical Specification]

— *Part 17: Consignment and location monitoring (CLM)* [Technical Specification]

— *Part 18: ADR (Dangerous Goods) transport monitoring (ADR)* [Technical Specification]

— *Part 19: Vehicle parking facilities (VPF)* [Technical Specification]

— The following parts are under preparation:

— *Part 4: System security requirements* [Technical Specification]

— *Part 13: 'Mass' information for jurisdictional control and enforcement*

Introduction

Many ITS technologies have been embraced by commercial transport *operators (4.35)* and freight owners, in the areas of fleet management, safety and security. *Telematics (4.45)* applications have also been developed for governmental use. Such regulatory services in use or being considered vary from *jurisdiction (4.30)* to *jurisdiction*, but include electronic on-board recorders, digital *tachograph* , on-board *mass (4.33)* monitoring, 'mass' penalties and levies, vehicle *access methods (4.1)*, *hazardous goods (4.25)* tracking and e-call *(4.20)*. Additional applications with a regulatory impact being developed include fatigue management, speed monitoring and heavy vehicle penalties imposed based on location, distance and time.

In such an emerging environment of regulatory and *commercial applications* , it is timely to consider an overall *architecture (4.9)* (business and functional) that could support these functions from a single platform within a commercial freight vehicle that operates within such regulations. International Standards will allow for a speedy development and *specification (4.44)* of new applications that build upon the functionality of a generic specification platform. A suite of standards is required to describe and define the *framework (4.22)* and requirements so that the on board equipment and back office systems can be commercially designed in an open market to meet common requirements of *jurisdictions (4.30)*.

This suite of standards addresses and defines the *framework (4.22)* for a range of cooperative *telematics (4.45)* applications for *regulated commercial freight vehicles (4.39)* [such as *access methods (4.1)*, driver fatigue management, speed monitoring, on-board *mass (4.33)* monitoring, penalties and levies]. The overall scope includes the concept of operation, legal and regulatory issues, and the generic cooperative provision of services to *regulated commercial freight vehicles (4.39)*, using an on-board ITS platform. The *framework* is based on a (multiple) *service provider (4.42)* oriented approach with provisions for the *approval (4.6)* and *auditing (4.10)* of *service providers*.

This suite of standards will:

- provide the basis for future development of cooperative *telematics (4.45)* applications for *regulated commercial freight vehicles (4.39)*. Many elements to accomplish this are already available. Existing relevant standards will be referenced, and the *specifications (4.44)* will use existing standards (such as *CALM*) wherever practicable;
- allow for a powerful platform for highly cost-effective delivery of a range of *telematics* applications for *regulated commercial freight vehicles (4.39);*
- a business *architecture (4.9)* based on a (multiple) *service provider (4.42)* oriented approach;
- address legal and regulatory aspects for the *approval (4.6)* and *auditing (4.10)* of *service providers.*

This suite of standards deliverables is timely as many governments (Europe, North America, Asia and Australia/New Zealand) are considering the use of *telematics (4.45)* for a range of regulatory purposes. Ensuring that a single in-vehicle platform can deliver a range of services to both government and industry through open standards and competitive markets is a strategic objective.

This part of ISO 15638 provides *specifications (4.44)* for emergency messaging system/eCall.

NOTE 1   The definition of what comprises a 'regulated' vehicle is regarded as an issue for National decision, and may vary from *jurisdiction (4.30)* to *jurisdiction*. This suite of standards does not impose any requirements on nations in respect of how they define a *regulated vehicle (4.39)*.

NOTE 2   The definition of what comprises a 'regulated' service is regarded as an issue for national decision, and may vary from *jurisdiction (4.30)* to *jurisdiction*. This suite of standards does not impose any requirements on nations in respect of which services for *regulated vehicle*s *(4.39) jurisdictions* will require, or support as an option, but will provide standardised sets of requirements descriptions for identified services to enable consistent and cost efficient implementations where implemented.

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Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) —

Part 10:
Emergency messaging system/eCall (EMS)

1   Scope

This part of ISO 15638 addresses the provision of *'Emergency messaging system/eCall'* and specifies the form and content of such data required to support such systems, and *access methods (4.1)* to that data.

This part of ISO 15638 provides *specifications (4.44)* for common communications and data exchange aspects of the *application service (4.3)* 'Emergency Messaging System/eCall' that a *regulator (4.40)* may elect to require or support as an option, including:

a)   high level definition of the service that a s*ervice provider (4.42)* has to provide [the service definition describes common service elements, but does not define the detail of how such an *application service (4.3)* is instantiated, nor the acceptable value ranges of the data concepts defined];

b)   means to realise the service;

c)   application data, naming content and quality that an *IVS (4.26)* has to deliver.

The definition of what comprises a 'regulated' service is regarded as an issue for national decision, and may vary from *jurisdiction (4.30)* to *jurisdiction*. This part of ISO 15638 does not impose any requirements on nations in respect of which services for *regulated vehicle*s *(4.34) jurisdictions* will require, or support as an option, but provides standardized sets of requirements descriptions for identified services to enable consistent and cost efficient implementations where instantiated.

ISO 15638 has been developed for use in the context of regulated commercial freight vehicles (hereinafter referred to as 'regulated vehicles'). There is nothing, however, to prevent a jurisdiction extending or adapting the scope to include other types of regulated vehicles, as it deems appropriate.

2   Conformance

Requirements to demonstrate conformance to any of the general provisions or specific *application services (4.3)* described in this part of ISO 15638 shall be within the regulations imposed by the *jurisdiction (4.30)* where they are instantiated. Conformance requirements to meet the provisions of this part of ISO 15638 are therefore deemed to be under the control of, and to the specification of, the *jurisdiction* where the *application service*(s)is/are instantiated.

The protocols defined in this part of ISO 15638 have been independently tested. Annex A (Informative) provides results of these tests. In any conformance assurance process undertaken by candidate systems, where appropriate the results may be used as part of its process of conformance compliance.

3   Normative references

The following referenced documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15638-1   *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 1: Framework and architecture*

ISO 15638-2   *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 2: Common platform parameters using CALM*

ISO 15638-3   *Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 3: Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services*

ISO 15638-4   *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 4: System security requirements[1]*

ISO 15638-5   *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 5: Generic vehicle information*

ISO/TS 15638-6   *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 6: Regulated applications*

4   Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15638-1 and the following apply.

4.1
access methods
procedures and protocols for the provision and retrieval of data

4.2
app
small (usually) *Java™ (4.29)* applets, organized as software bundles, that support *application services (4.3)* by keeping the *data pantry (4.17)* provisioned with up-to-date data

4.3
application service
service provided by a *service provider (4.42)* enabled by accessing data from the *IVS (4.26)* of a *regulated vehicle (4.39)* via a wireless communications network

4.4
application service provider
ASP
party that provides an *application service (4.3)*

4.5
app library
separately secure area of memory in *IVS (4.26)* where apps are stored [with different access controls to *data pantry (4.17)*]

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[1]   Under preparation.

4.6
approval
formal affirmation that an applicant has satisfied all the requirements for appointment as an *application service provider (4.4)* or that an application service delivers the required service levels

4.7
approval agreement
written agreement made between an *approval authority (regulatory) (4.8)* and a *service provider (4.42)*

NOTE   An *approval authority (regulatory) (4.8)* approval agreement recognizes the fact that a *service provider (4.42)*, having satisfied the *approval authority's* requirements for appointment as a *service provider,* is appointed in that capacity, and sets out the legal obligations of the parties with respect to the on-going role of the *service provider*.

4.8
approval authority (regulatory)
organization (usually independent) which conducts *approval (4.6)* and ongoing *audit (4.10)* for *service providers (4.42)* on behalf of a *jurisdiction (4.30)*

4.9
architecture
formalized description of the design of the structure of *TARV* and its *framework (4.22)*

4.10
audit/auditing
review of a party's capacity to meet, or continue to meet, the initial and ongoing *approval agreements (4.7)* as a *service provider (4.42)*

4.11
basic vehicle data
data that shall be maintained/provided by all *IVS (4.26)* [regardless of *jurisdiction (4.30)*]

4.12
CALM communications access for land mobiles
layered solution that enables continuous or quasi continuous communications between vehicles and the infrastructure, or between vehicles, using such (multiple) wireless telecommunications media that are available in any particular location, and which have the ability to migrate to a different available media where required and where media selection is at the discretion of *user (4.42)* determined parameters by using a suite of standards based on ISO 21217 (*CALM* architecture) and ISO 21210 (*CALM* networking) that provide a common platform for a number of standardized media using *ITS-stations (4.23)* to provide wireless support for applications, such that the application is independent of any particular wireless medium

4.13
consignment
shipment of goods/cargo to a destination

4.14
cooperative ITS
C-ITS
ITS applications for both regulatory and commercial purposes that require the exchange of data between uncontracted parties using multiple *ITS-stations (4.28)* communicating with each other and sharing data with other parties with whom they have no direct contractual relationship to provide one or more *ITS services (4.27)*

4.15
core data
basic vehicle data (4.11) plus any additional data required to provide an implemented *regulated application service (4.38)*

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4.16
dangerous goods
substances or articles which are potentially hazardous (for example, poisonous to humans, harmful to the environment, explosive, flammable or radioactive) that require regulatory control when transported

4.17
data pantry
secure area of memory in *IVS (4.26)* where data values are stored [with different access controls to *app library (4.5)*]

4.18
driver
person driving the *regulated vehicle* at any specific point in time

4.19
driver work records
DWR
collection, collation, and transfer of *driver (4.18)* work and rest hours data from an *in-vehicle system (4.26)* to an *application service provider (4.4)*

4.20
eCall
specialized instantiation of an *EMS (4.21)* that provides incident messaging and communication with a public service assistance point via priority wireless telephone communications using its emergency call capabilities

4.21
emergency message system
EMS
collection, collation, and transfer of emergency message data from an *in-vehicle system (4.26)* to an *application service provider (4.4)*

4.41
framework
particular set of beliefs, ideas referred to in order to describe a scenario or solve a problem

4.25
hazardous goods
HAZMAT
see *dangerous goods (4.32)*/Accord européen relatif au transport international des marchandises Dangereuses par Route (ADR)

4.26
in-vehicle system
IVS
ITS-station (4.28) and connected equipment on board a vehicle

4.27
ITS service
communication functionality offered by an *ITS-station (4.28)* to an *ITS-station* application

4.28
ITS-station
ITS-s
entity in a communication network, comprised of application, *facilities*, networking and access layer components specified in ISO 21217 that operate within a bounded secure management domain

4.29
Java™
object oriented open source operating language developed by SUN systems

4.30
jurisdiction
government, road or traffic authority which owns the r*egulatory applications (4.37)*

EXAMPLE   Country, state, city council, road authority, government department (customs, treasury, transport), etc.

4.32
jurisdiction regulator
agent of the *jurisdiction (4.30)* appointed to regulate and manage *TARV* within the domain of the *jurisdiction*

NOTE   This may or may not be the approval authority (regulatory) (4.8).

4.32
local data tree
LDT
frequently updated data concept stored in the on on-board *data pantry (4.17)* containing a collection of data values deemed essential for either a) *TARV regulated application service (4.38)*, or b) *cooperative intelligent transport systems (4.14)*

4.33
mass
mass of a given heavy vehicle as measured by equipment affixed to the *regulated vehicle (4.39)*

4.34
'mass' data for regulatory control and management
MRC
collection, collation, and transfer of vehicle *mass (4.33)* data from an *in-vehicle system (4.26)* to an *application service provider (4.4)* to enable data provision to *jurisdictions (4.30)* for the control and management of equipped vehicles based on the *mass* of the *regulated vehicle (4.39),* or use of such data to enable compliance with the provisions of regulations

4.35
operator
fleet manager of a *regulated vehicle*

4.36
prime service provider
service provider (4.42) who is the first contractor to provide *regulated application services (4.38)* to the *regulated vehicle (4.39),* or a nominated successor on termination of that initial contract

NOTE   The *prime service provider (4.36)* is also responsible for maintaining the installed *IVS (4.26)*; if the *IVS* was not installed during the manufacture of the vehicle, the *prime service provider (4.36)* is also responsible for installing and commissioning the *IVS (4.26).*

4.37
regulated/regulatory application
application arrangement using TARV utilized by *jurisdictions (4.30)* for granting certain categories of commercial vehicles rights to operate in regulated circumstances subject to certain conditions, or indeed to permit a vehicle to operate within the *jurisdiction*

NOTE   This may be mandatory or voluntary at the discretion of the *jurisdiction.*

4.38
regulated application service
TARV application service to meet the requirements of a regulated application that is mandated by a regulation imposed by a *jurisdiction (4.30),* or is an option supported by a *jurisdiction*

4.39
regulated commercial freight vehicle
regulated vehicle
vehicle that is subject to regulations determined by the *jurisdiction (4.30)* as to its use on the road system of the *jurisdiction* in regulated circumstances, subject to certain conditions, and in compliance with specific regulations for that class of regulated vehicle

NOTE   At the option of *jurisdictions*; this may require the provision of information via *TARV* or provide the option to do so.

4.40
regulator
see jurisdiction regulator (4.31)

4.67
remote tachograph monitoring
RTM
collection, collation, and transfer of data from an on-board electronic *tachograph* system to an *application service provider (4.4)*

4.42
service provider
party which is approved by a approval *authority (regulatory) (4.8)* as suitable to provide regulated or commercial ITS *application services (4.3)*

4.43
session
wireless communication exchange between the *ITS-station (4.28)* of an *IVS (4.26)* and the *ITS-station* of its *application service provider (4.4)* to achieve data update, data provision, upload apps, or otherwise manage the provision of the *application service (4.3),* or a wireless communication provision of data to the *ITS-station* of an *IVS (4.26)* from any other *ITS-station*

4.44
specification
explicit and detailed description of the nature and functional requirements and minimum performance of equipment, service or a combination of both

4.45
telematics
use of wireless media to obtain and transmit (data) from a distant source

4.46
user
individual or party that enrols in and operates within a regulated or *commercial application service (4.3)*

EXAMPLE   *Driver (4.18),* transport *operator (4.35),* freight owner, etc.

4.47
vehicle access control
VAC
control of *regulated vehicle'*s ingress to and egress from controlled areas and associated penalties and levies

4.48
vehicle access management
VAM
monitoring and management of *regulated vehicle*s approaching or within sensitive and controlled areas

4.49
vehicle location monitoring
VLM
collection, collation, and transfer of vehicle location data from an *in-vehicle system (4.26)* to an *application service provider (4.4)*

4.50
vehicle mass monitoring
VMM
collection, collation, and transfer of vehicle *mass (4.33)* data from an *in-vehicle system (4.26)* to an *application service provider (4.4)*

4.51
vehicle parking facility
VPF
system for booking and access to and egress from a *vehicle parking facility*

4.52
vehicle speed monitoring
VSM
collection, collation, and transfer of vehicle speed data from an *in-vehicle system (4.26)* to an *application service provider (4.4)*

5   Symbols and abbreviated terms

app
applet (JAVA^TM application or similar) *(4.2)*

AS
application service

ASP
application service provider (4.4)

CALM
communications access for land mobiles (4.12)

C-ITS
cooperative intelligent transport systems (4.14)

EMS
emergency message system (4.21)

ID
identity

IP
internet protocol

ITS-S
ITS station (4.28)

IVS
In-vehicle system (4.26)

LDT
local data tree (4.30)

MSD
minimum set of data
[*eCall (4.20)* . EN 15722]

OID
object identifier

PSAP
public service answering point

SE
service element

TARV
telematics (4.45) applications for *regulated commercial freight vehicles (4.39)*

TPS
third party service
[*eCall (4.20)* . EN 16102]

TPSP
third party *service provider (4.42)*
[*eCall (4.20)* . EN 16102]

TS11
normal phone connection (teleservice 11)

TS12
emergency call priority phone connection (teleservice 12)

UNECE
United Nations Economic Commission for Europe

UTC
coordinated universal time

6 General overview and framework requirements

ISO TS 15638-1 provided a *framework (4.22)* and *architecture (4.9)* for *TARV*. It provided a general description of the roles of the actors in *TARV* and their relationships.

To understand clearly the *TARV* framework, *architecture (4.9)* and detail and *specification (4.44)* of the roles of the actors involved, the reader is referred to ISO TS 15638-1.

ISO TS 15638-6 provides the core requirements for all regulated applications. To understand clearly the general context in to which the provision of this application service, the reader is referred to ISO TS 15638-6.

In order to be compliant with this part of ISO 15638, the overall architecture employed shall comply to ISO 15638-1.

In order to be compliant with this part of ISO 15638, the communications employed shall comply to ISO 15638-2.

In order to be compliant with this part of ISO 15638, the operating requirements employed shall comply to ISO 15638-3.

In order to be compliant with this part of ISO 15638, the security employed shall comply to ISO 15638-4[2].

In order to be compliant with this part of ISO 15638, the basic vehicle data shall comply to ISO 15638-5.

In order to be compliant with this part of ISO 15638, the generic conditions for this application service shall comply to ISO 15638-6.

ISO 15638 has been developed for use in the context of regulated commercial freight vehicles. There is nothing however to prevent a jurisdiction extending or adapting the scope to include other types of regulated vehicles, as it deems appropriate.

7   Requirements for services using generic vehicle data

The means by which the access commands for generic vehicle information specified in ISO 15638-5 can be used to provide all or part of the data required in order to support a *regulated application service (4.38)* shall be as defined in ISO 15638-6.

8   Application services that require data in addition to basic vehicle data

8.1   General

Shall be conducted as defined in ISO 15638-6.

8.2   Quality of service requirements

This part of ISO 15638 contains no general requirements concerning quality of service. Such aspects shall be determined by a *jurisdiction (4.30)* as part of its *specification (4.44)* for any particular *regulated application service (4.38).* However, where a specified *regulated application service (4.38)* has specific Q of S requirements essential to maintain interoperability, these aspects shall be as specified in Clause 10.

8.3   Test requirements

This part of ISO 15638 contains no general requirements concerning test requirements. Such aspects shall be determined by a *jurisdiction (4.30)* as part of its *specification (4.44)* for any particular *regulated application service (4.38),* and issued as a formal test requirements *specification (4.44)* document. However, where a specified *regulated application service (4.38)* has specific test requirements essential to maintain interoperability, these aspects shall be as specified in Clause 10 relating to this *regulated application service,* or in a separate standards document referenced within that Clause. And where multiple *jurisdictions* recognise a benefit to common test procedures for a specific *regulated application service,* this shall be the subject of a separate standards document.

8.4   Marking, labelling and packaging

This part of ISO 15638 has no specific requirements for marking labelling or packaging.

However, where the privacy of an individual may be potentially or actually compromised by any instantiation based on the ISO 15638 family of Standards, the contracting parties shall make such risk explicitly known to the implementing *jurisdiction (4.30)* and shall abide by the privacy laws and regulations of the implementing *jurisdiction* and shall mark up or label any contracts specifically and explicitly drawing attention to any loss of privacy and precautions taken to protect privacy. Attention is drawn to ISO TR 12859 in this respect.

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2   Under preparation.

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9 Common features of regulated TARV application services

9.1 General

The details of the instantiation of *regulated application service (4.38)* are as designed by the application service system to meet the requirements of a particular *jurisdiction (4.30)* and are not defined herein. ISO 15638-6 specifies the generic roles and responsibilities of actors in the systems, and instantiations that claim compliance with this part of ISO 15638 shall also be compliant with the requirements of ISO 15638-6.

The means by which data is provisioned into the *data pantry (4.17)*, and the means to obtain the *TARV LDT (4.30)* and *core data (4.15)* are described in Clause 8 of ISO 15638-6.

In order to minimise demand on the *IVS (4.26)* (which it is assumed will be performing multiple *application services (4.3)* simultaneously, as well as supporting general safety related cooperative vehicle systems), and because national requirements and system offerings will differ, a 'cloud' approach has been taken in defining *TARV regulated application services (4.38)*.

The *TARV* approach is for the on-board *app (4.2)* supporting the application service to collect and collate the relevant data, and at intervals determined by the *app,* or on demand from the *application service provider (4.4)(ASP),* pass that data to the *ASP.* All of the actual application service processing shall occur in the mainframe system of the *ASP* (in the 'cloud').

For further information see Clause 9 of ISO 15638-6.

At a conceptual level, The *TARV* system is therefore essentially simple, as shown in Figure 1. The process is similar to that for CoreData, but data is supplied to a different on-board file in the *data pantry (4.17)*.
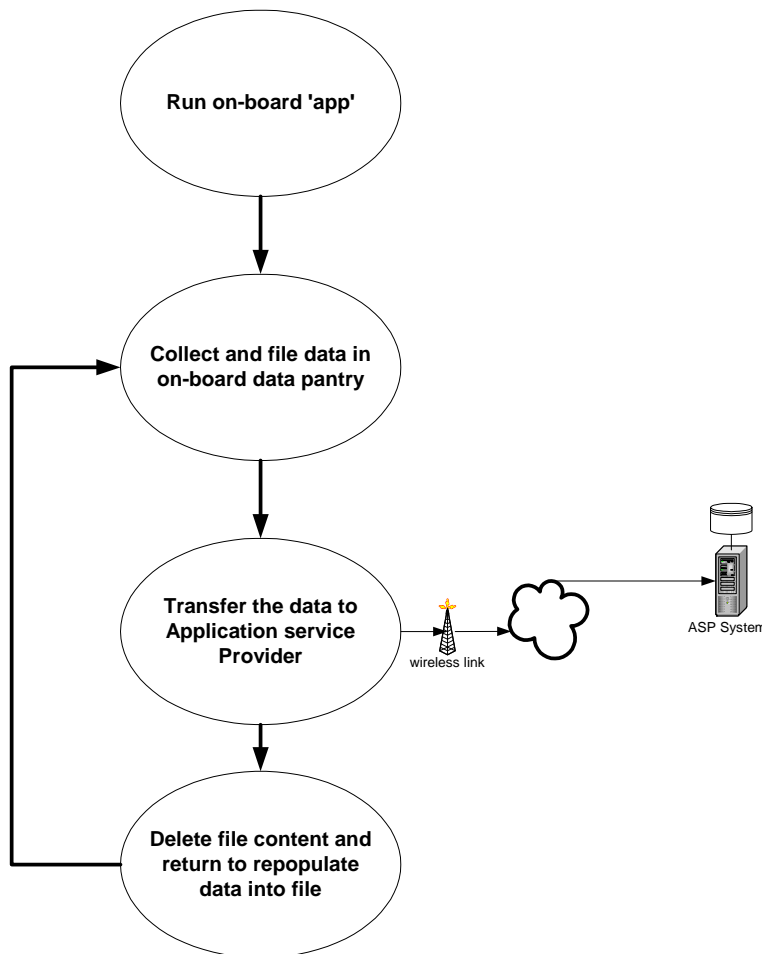
Figure 1 — TARV Regulated application service on-board procedure

At a common generic functional level for this application service, the process may be seen as shown in Figure 2 below, however the connected equipment may/may not be required in all cases.

9.2 Common role of the jurisdiction, approval authority, service provider and user.

The common role of the jurisdiction, approval authority, application service provider and user shall be as defined in ISO 15638-6.

9.3 Common characteristics for instantiations of regulated application services

The common characteristics for instantiations of regulated application services shall be as defined in ISO 15638-6.

9.4 Common sequence of operations for regulated application services

The Common sequence of operations for regulated application services shall be as defined in ISO 15638-6.

9.5 Quality of service

Generic quality of service provisions for *application services (4.3)* shall be as defined in ISO 15638-6.

9.6 Information security

Information security shall be as defined in ISO 15638-6.

9.7 Data naming content and quality

Data naming and quality shall be as defined in ISO 15638-5 subclauses 8.2, 8.3 and 8.4.

Variations specific to the 'Emergency Messaging System/eCall' *application service (4.3)* shall be as defined below.

9.8 Software engineering quality systems

Software engineering quality systems shall be as defined in ISO 15638-6.

9.9 Quality monitoring station

The availability of Quality monitoring stations shall be as defined in ISO 15638-6.

9.10 Audits

Audits shall be as defined in ISO 15638-6.

9.11 Data access control policy

To protect the data and information held by the *application service provider (4.4),* each provider shall adopt a risk based data access control policy for employees of the provider.

9.12 Approval of IVSs and service providers

Generic provisions for the *approval (4.6)* of *IVSs* and *service providers (4.42)* shall be as specified in ISO 15638-3 (*TARV* –Operating requirements, approval procedures, and enforcement provisions for the providers of regulated services). Detailed provisions for specific *regulated applications (4.37)* shall be as specified by the regime of the *jurisdiction (4.30).*

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10 TARV Emergency messaging/eCall System (*EMS*)

10.1 TARV EMS service description and scope

10.1.1 TARV EMS use case
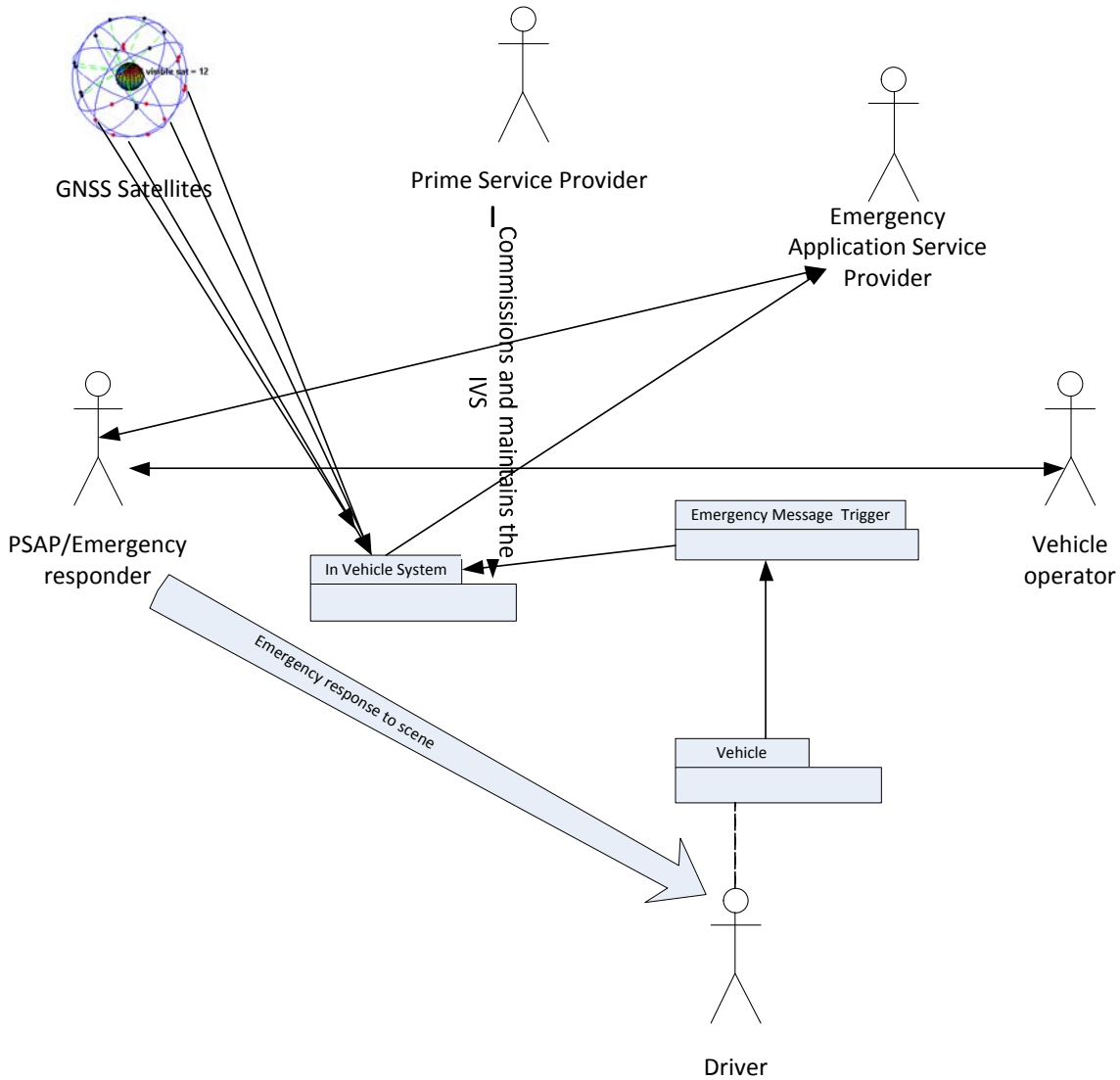
Figure 2 — TARV EMS use case
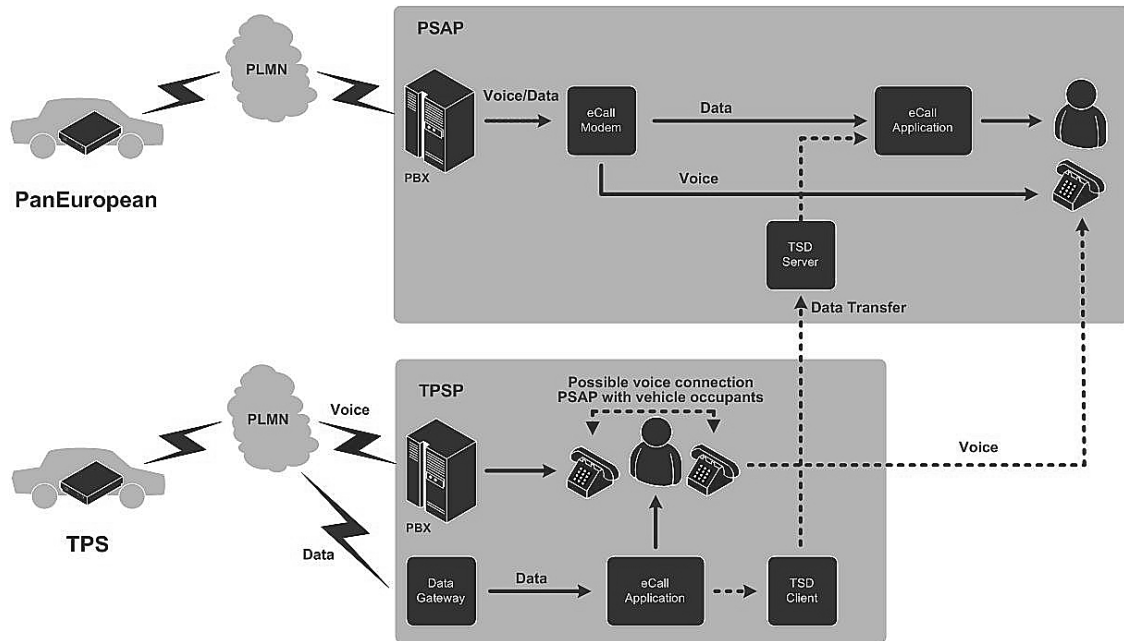
Figure 3 — Use case for end-to-end 'panEuropean eCall' and 'TPS-eCall' systems connected to an 'eCall' enabled PSAP

Figure 3 illustrates the Use case for end-to-end 'panEuropean eCall' and 'TPS-eCall' systems connected to an 'eCall' enabled PSAP

10.1.2 Description of TARV EMS regulated application service

This application service uses the wireless link between the on-board *ITS-station (4.28)* of the *IVS (4.26)* and an *application service provider (4.4),* in order to convey an emergency message from the *regulated vehicle (4.39)* to a public service assistance point or emergency service response unit. See Figure 2.

In the case of EU countries this application may take the form of an *eCall (4.20)* in which case it shall take the form determined in the relevant *eCall* standards referenced herein (See 10.1.3 below). In other *jurisdictions (4.30)*, the content of any message shall adhere to the requirements of the regulations in force in that *jurisdiction,* or shall follow the data content defined herein.

NOTE   This clause deals only with emergency messages in the event of an incident. For *application services (4.3)* to provide data related to the transport of dangerous / *HAZMAT (4.25)* goods, known by the UN as '*ADR*' (Accord européen relatif au transport international des marchandises Dangereuses par Route) goods, please refer to ISO 15638-18. In respect of other consignment and location monitoring application service requirements, please refer to ISO 15638-17.

10.1.3 Description of eCall regulated application service

eCall (4.20) is a specific instantiation of an emergency call being introduced throughout the 27 member states of the European Union. See Figure 3.

This provides a 'minimum set of data' (*MSD*) for any *eCall (4.20)* equipped vehicle of whatever class, to a 'Public Service Answering Point'.The *MSD* has the capacity for an 'optional additional dataset' and CEN TR 16405 defines an optional additional dataset for HGVs, which provides information about the *consignment (4.13)* it is carrying.

The *eCall (4.20)* service also provides a direct voice link between the occupant(s) of the vehicle and the public service assistance point (*PSAP*).

eCall will be compulsory (in Europe) for light vehicles but is optional for heavy goods vehicles.

10.2 Concept of operations for TARV EMS

10.2.1 General

An emergency message is, by definition, an extraordinary event. For normal collection of data about freight see ISO 15638-17 and for non emergency messaging in respect of vehicles carrying *ADR* (dangerous) goods see ISO 15638-18.

What constitutes an extraordinary event that may generate an emergency message is not defined herein, but is likely to be an incident/accident involving the *regulated commercial freight vehicle (4.39)*, an alarm condition on the *regulated commercial freight vehicle*, a hi-jack, *driver (4.18)* disablement, and in the case of vehicles carrying *ADR* (dangerous) goods, may be a breakdown; or similar incident.

Except in the case of an '*eCall (4.20)*' (in the *jurisdictions (4.30)* where that application service is in operation), specific to *eCall* (see 10.3 below), the destination of an emergency message will depend on the actual incident, and it is assumed that the *application service provider (4.4),* with whom the *user (4.46)* is contracted, shall know the appropriate destination for the message. It may be the emergency services (*PSAP*), it may in some circumstances be directly with the police, and in others with some third party support response team, or a team of the *application service provider.*

10.2.2 Statement of the goals and objectives of the TARV EMS

The objective of this Part of ISO 15638 is, in the event of an incident, to alert the appropriate emergency response services via the application service provider and to provide them with key information concerning the *regulated commercial freight vehicle (4.39)* and its *consignment (4.13)*.

For the objectives of the specific *eCall (4.20)* instantiation of this service see Clause 10.3 below, EN16102, EN 15722, CEN TR 16405, CEN TC 16454.

10.2.3 Strategies, tactics, policies, and constraints affecting the TARV EMS

How response is initiated varies from *jurisdiction (4.30)* to *jurisdiction,* so the nexus of this service is the provision of data to a landside *application service provider (4.4)* who shall know who to contact in the event of a specific emergency type.

For the strategies, tactics, policies, and constraints affecting of the specific *eCall (4.20)* instantiation of this service see EN16102, EN 15722, CEN TR 16405 and CEN TC 16454.

10.2.4 Organisations, activities, and interactions among participants and stakeholders in TARV EMS

The emergency service responder may be a *PSAP*, or any responder deemed appropriate by the contract between the *user (4.46)* and the *application service provider (4.4).*

The *prime service provider (4.36)* is the actor who installs and maintains the *emergency message system (4.21)* and its triggering mechanism in the *regulated vehicle (4.39)*.

The *application service provider (4.4)* is the party who contracts with the *user (4.46)* to provide the emergency *application service (4.3).*

The *user (4.46)* is the *regulated vehicle (4.39) operator (4.35)* and his *driver (4.18).*

10.2.5 Clear statement of responsibilities and authorities delegated for TARV EMS

Table 1 — TARV EMS actors involved, their activities and interactions

ACTOR	ROLE	ACTIVITIES	INTERACTIONS
Jurisdiction **(J)** *(4.30)*	Sets requirements for mandatory and supported *EMS (4.21)*	Publishes *specifications (4.44)*	ALL
		Obtains regulations	ALL: Establish regime and regulations *ASP* Register
		Appoints *Approval Authority*	CA: Contract. Instruct . Receive reports
Approval authority **(CA)** *(4.8)*	Implements *jurisdiction* policy at equipment and service approval level	Approves IVS *(4.26)*, *Application Service (4.3)* instantiations	PSP: Approve *IVS* *ASP* : Approve *Application Service*
		Conducts Q of S maintenance to instruction of *jurisdiction*	
Prime service provider **(PSP)** *(4.36)*	Responsibility for *IVS*	Installs and/or commissions *IVS*	CA: May Apply to approve *IVS* Op; Installation
		Maintains *IVS*	Op: Maintain *IVS*
Application service provider **(ASP)** *(4.4)*	Provides *EMS application services (4.3)*	Develops instantiation of *EMS application service*	CA : Applies for approval of Service
		Contracts with *users (4.46)*	Op: Contracts
		Provides *EMS* application service to *users* and jurisdiction	Op: Provides service IVS: Loads data IVS: Receives *EMS* Messages
operator **(Op)** *(4.35)*	Provides *regulated vehicle (4.39)*	'Employs'/contracts *drivers*	Dr :Employs/Contracts
	Uses *regulated vehicle* for commerce and logistics	Operates *regulated vehicle*	PSP: Contracts, receives service *ASP* :Contracts, receives service *ASP* : Provides consignment data
		Receives *EMS* alerts from *ASP*	
Driver **(Dr)** *(4.18)*	Drives *regulated vehicle* to instruction of *operator (4.35)*	Drives *regulated vehicle*	Op: to instructions *ASP* /ESR: talks with in event of *EMS* alert (if possible)
Emergency system responder (ESR)	Receives emergency message	Responds to emergency	Op: obtains information Dr: talks with in event of *EMS* alert (if possible)

The *prime service provider (4.36)* is responsible to properly install and maintain the equipment which triggers the *application service (4.3)*.

The *regulated vehicle (4.39)* *operator (4.35)* (or owner) commissions the service and contracts with the *application service provider (4.4),* and possibly the *prime service provider (4.36)* (although that may be a subcontract of the application service contract with the *application service provider*).

The emergency responder (or *PSAP*) is commissioned by the *application service provider (4.4)* (or generally offers this service to the public) to send the appropriate response to the location of the incident as a matter of priority.

10.2.6 Operational processes for the TARV EMS

A trigger in the *regulated vehicle (4.39)* sets off an emergency messaging sequence. The trigger may be an airbag, accelerometer, gyroscope, or an alarm system monitoring the state of the *regulated vehicle (4.39)* or its *consignment (4.13)*, or similar. The trigger is not defined in this part of ISO 15638.

The *in-vehicle system (4.26)* uses its *ITS-station (4.28)* to send the message and its associated data to the *application service provider (4.4).*

The *application service provider (4.4)* identifies the appropriate emergency response, contacts the responder, and provides relevant data.

The emergency responder may contact the *regulated vehicle (4.39) operator (4.35)* or a predetermined IPv6 address to obtain full information about the *consignment (4.13)* being carried by the affected vehicle.

The emergency responder then sends an appropriate response to the scene.

If the *in-vehicle system (4.26)* supports it, or a mobile phone number is provided, the emergency responder may also obtain voice contact with the *driver (4.18)* and any other occupants of the *regulated vehicle (4.39).*

10.2.7 Role of TARV EMS service provider

The *prime service provider (4.36)* installs and maintains the *emergency message system (4.21)* and its triggering mechanism in the *regulated vehicle (4.39).*

The *application service provider (4.4)* contracts with the *user (4.46)* to provide the emergency *application service (4.3).*

10.2.8 Role of TARV EMS user

The *user (4.46)* (*operator (4.35)* + driver) is the recipient of the service.

The *operator (4.35)* contracts with the *application service provider (4.4)* to provide the service and pays any appropriate fees to the *application service provider.*

The *user (4.46)* (*operator (4.35)*) may maintain a website (IPv6 address) where data relating to the *consignment (4.13)* is made available.

The *user (4.46)* (*operator (4.35)*) may maintain a telephone hotline where data relating to the *consignment (4.13)* is made available.

10.3 Concept of operations for eCall via TARV

10.3.1 General concept of TARV eCall

An *eCall (4.20)* is an emergency call generated either automatically via activation of in-vehicle sensors or manually by the *regulated vehicle (4.39)* occupants; when activated, to provide notification and relevant location information to the most appropriate Public Safety Answering Points (*PSAP*), by means of mobile wireless communications networks and carries a defined standardised 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 *regulated vehicle (4.39)* and the most appropriate *PSAP*.

EN 16102 defines a system of using a 'third party services supported *eCall (4.20)* ', abbreviated as '*TPS-eCall*' inside this document. This is an *eCall* variant which includes the transmission of data to a third party *service*

provider (4.42) (*TPSP)*, and the establishment of a voice call with this *TPSP*. In the case of an emergency situation likely to require assistance from the emergency services, the *TPSP* establishes a voice connection with the 'most appropriate *PSAP*'. The *TPSP* also forwards all relevant information concerning the event, including the information specified as mandatory by the *MSD* standard (EN 15722 -Intelligent transport systems — eSafety — '*eCall*' minimum set of data) as a minimum, to this 'most appropriate *PSAP*'. The *TPSP* also provides voice communication between the *PSAP* and the *regulated vehicle (4.39)* occupants, at least by setting up a conference call, if this is required by any of the parties involved and allowed by the *PSAP*.

In this instantiation, the means by which the *TPSP* obtains the data content of the *MSD* and its HGV/GV additional data concept is via the *TARV in-vehicle system (4.26)*

The *MSD* (specified in EN 15722) contains static information regarding the *regulated vehicle (4.39)*, dynamic information regarding its location, direction of travel etc., at the time of the incident, and makes provision for additional data to be provided.

The 'optional additional data' is provided in accordance to CEN TR 16405   'Intelligent transport systems — eSafety — *eCall* : HGV/GV additional data concept specification*'*, and provides information about the cargo (*consignment (4.13)*) that the *regulated vehicle (4.39)* is transporting.

10.3.2   Statement of the goals and objectives of the TARV eCall system

The objective of implementing a 'Third Party' emergency call is to provide emergency assistance and an automated notification of a traffic incident, using 'Third Party Services' packages where such services are supported between the *regulated vehicle (4.39)* and a 'Third Party Service Provider' in *jurisdictions (4.30)* where such notification of an emergency are supported by *PSAP*s.

The first objective of this *TPS-eCall (4.20)* is to transfer an emergency message from a vehicle to a 'Third Party Service Provider' (*TPSP*) in the event of a crash or an emergency situation, and to establish a voice channel between the in-vehicle equipment and the *TPSP*.

The second objective of this *TPS-eCall* is, in case of an emergency situation likely to require assistance from the emergency services, for the *TPSP* to transfer an emergency message including the data of the 'minimum set of data' (*MSD*) (as defined in EN 15722 (Intelligent transport systems — eSafety — '*eCall* ' minimum set of data)) from the *TPSP* to the 'most appropriate *PSAP*' and to make best efforts to establish a direct voice contact between that *PSAP* and the occupants of the *regulated vehicle (4.39)* if required by the *PSAP*, together with the HGV/GV additional data concept providing information about the *regulated vehicle consignment (4.13)* as defined in CEN TR 16405 - HGV/GV additional data concept *specification (4.44)*.

EN 16102 defines the general operating requirements and intrinsic procedures for an in-vehicle *eCall (4.20)* via the services of a 'Third Party Service Provider' (*TPSP*) and also provides definition of the service(s) provided to the *PSAP* and the method and form of service delivery. EN WI 00278316 provides specifications for end to End conformance tests for the eCall application service, including such specifications for TPS-eCall.

10.3.3   Strategies, tactics, policies, and constraints affecting the TARV eCall system

The provision of the *eCall (4.20)* service for *TARV* vehicles shall conform to one of the communications media specified in ISO 15638-2, and the general provisions of ISO 15638-1, 15638-3, 15638-4, and 15638-5.

The provision of the *eCall (4.20)* service for *TARV* vehicles shall conform to EN16102.

The ''optional additional data' concept shall conform to CEN TR 16405.

10.3.4   Organisations, activities, and interactions among participants and stakeholders for TARV eCall

In the case of *eCall (4.20)* the emergency service responder is a 'Public Service Answering Point' (*PSAP*).

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The *prime service provider (4.36)* is the actor who installs and maintains the *emergency message system (4.21)* and its triggering mechanism in the *regulated vehicle (4.39)*.

The *application service provider (4.4)* is the party who contracts with the *user (4.46)* to provide the emergency *application service (4.3)*.

The *user (4.46)* is the *regulated vehicle (4.39)* *operator (4.35)* and his *driver (4.18)*.

10.3.5 Clear statement of responsibilities and authorities delegated in TARV eCall

The *prime service provider (4.36)* is responsible to properly install and maintain the equipment which triggers the *eCall (4.20)* *application service (4.3)*.

The *regulated vehicle (4.39)* *operator (4.35)* (or owner) commissions the service and contracts with the *application service provider (4.4)*, and possibly the *prime service provider (4.36)* (although that may be a subcontract of the *application service (4.3)* contract with the *application service provider)*.

The *PSAP* normally offers an emergency service to the public normally using the emergency call (*TS12*) system to send the appropriate response to the location of the incident as a matter of priority. However, in the case of *TPSP eCall (4.20)*, the *PSAP* has provided the approved *TPSP* with a *TS11* number at which it can be contacted.

10.3.6 Operational processes for the TARV eCall system

A trigger in the *regulated vehicle (4.39)* sets off an emergency messaging sequence. The trigger may be an airbag, accelerometer, gyroscope, or an alarm system monitoring the state of the *regulated vehicle* or its *consignment (4.13)*, or similar. The trigger is not defined in this part of ISO 15638.

The *in-vehicle system (4.26)* uses its *ITS-station (4.28)* to send the message and its associated data to the *application service provider (4.4)* in accordance with EN 16102:2011 Intelligent transport systems — ESafety — Third party services supported eCall -Operating requirements.

The 'optional additional data concept' shall use the HGV *eCall (4.20)* data concept as defined in CEN TR 16405   Intelligent transport systems — eSafety — eCall : HGV/GV additional data concept specification.

Conformance shall be tested in accordance with the tests specified in EN WI 00278316 – eCall end-to-end conformance tests.

The *PSAP*/emergency responder may contact the *regulated vehicle (4.39)* *operator (4.35)* or a predetermined IPv6 address to obtain full information about the *consignment (4.13)* being carried by the affected vehicle.

The emergency responder then sends an appropriate response to the scene.

EN 16102 makes provision for the *PSAP* to make voice contact with the *driver (4.18)* and any other occupants of the *regulated vehicle (4.39)*.

10.3.7 Role of service provider in TARV eCall

The *prime service provider (4.36)* installs and maintains the *emergency message system (4.21)* and its triggering mechanism in the *regulated vehicle (4.39)*.

The *application service provider (4.4)* contracts with the *user (4.46)* to provide the emergency *application service (4.3)*.

10.3.8 Role of user in TARV eCall

The *user (4.46)* (*operator (4.35)* + driver) is the recipient of the service.

The *operator (4.35)* contracts with the *application service provider (4.4)* to provide the service and pays any appropriate fees to the *application service provider.*

The *user (4.46)* (*operator (4.35)*) may maintain a website (IPv6 address) where data relating to the *consignment (4.13)* is made available.

10.4 Sequence of operations for TARV eCall

The sequence of operations in respect of *eCall (4.20)* shall be as determined in EN 16102.

The sequence of operations in respect of *TARV eCall (4.20)* is illustrated shown in Figure 4 and 5.
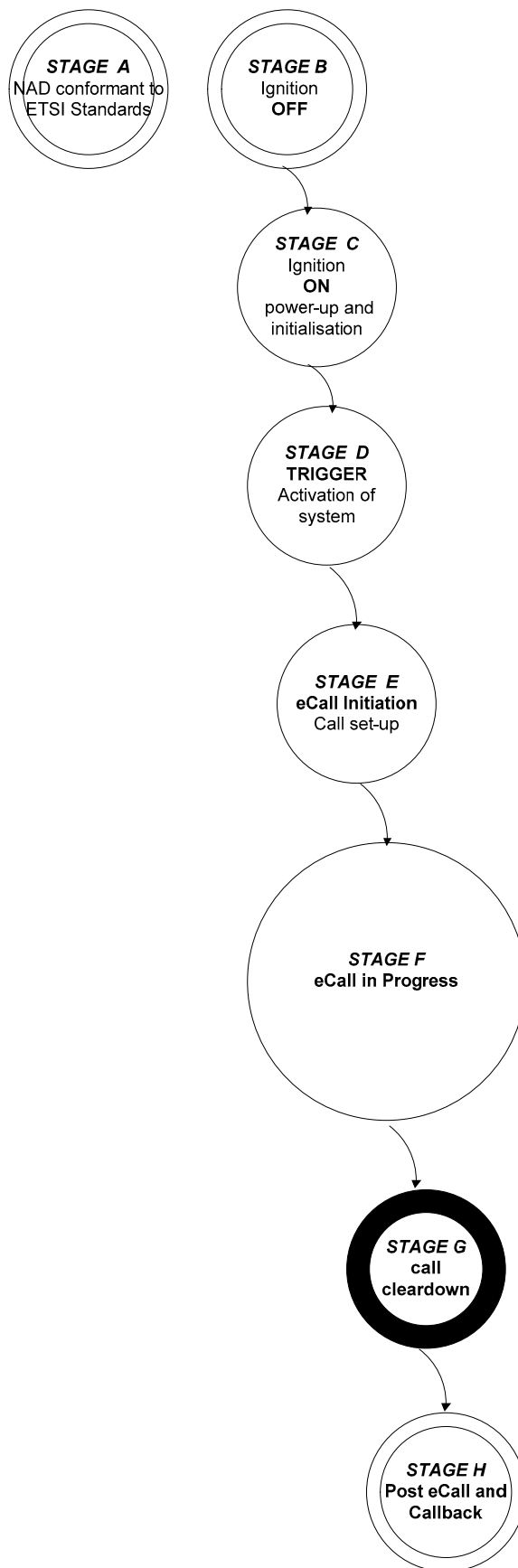
Figure 4 — High level state transition steps of eCall
Source CEN TC 16454
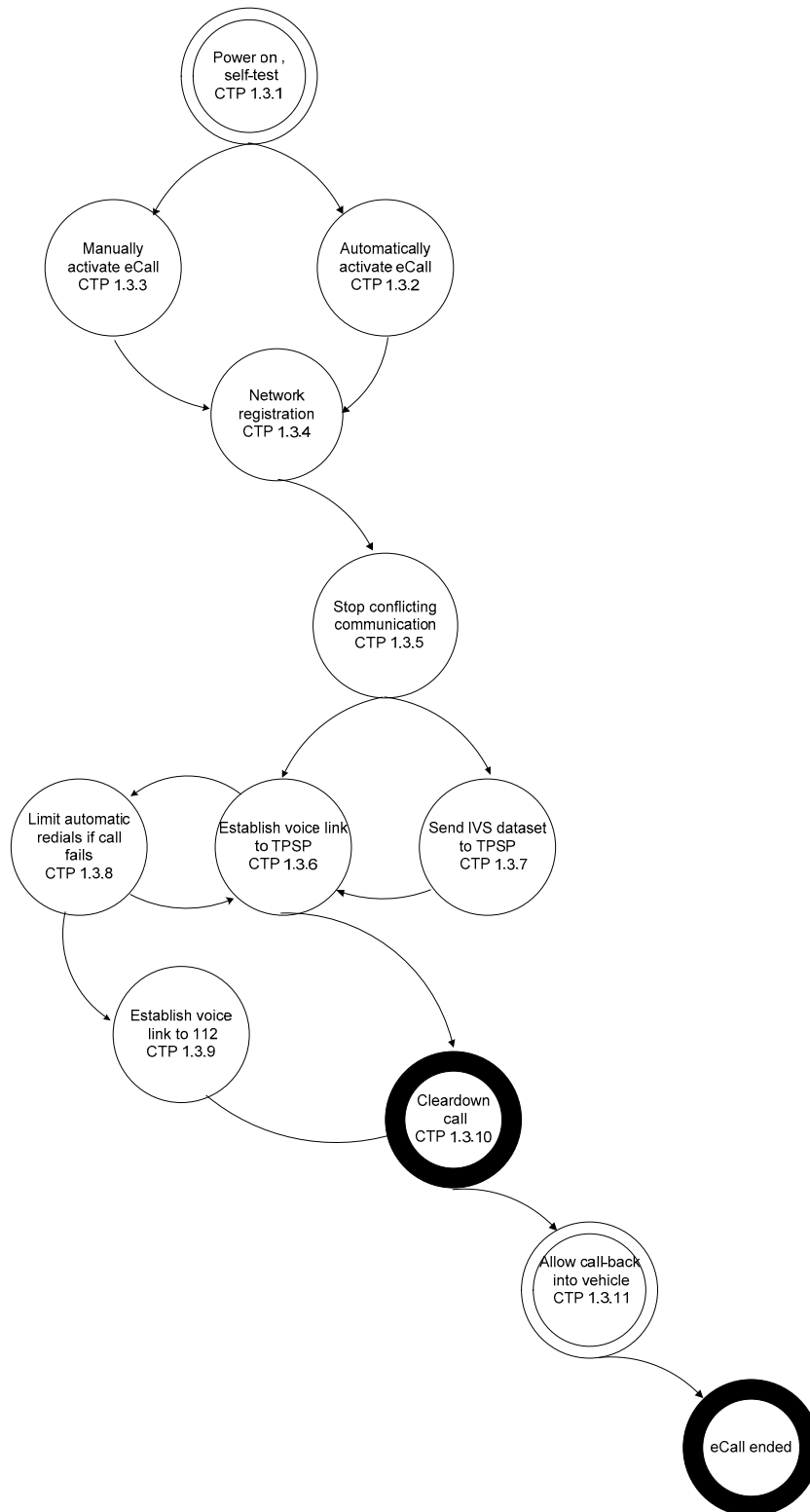
Figure 5 — In-vehicle system state transitions- Third party service provider (TPSP) eCall
Source CEN TC 16454

10.5 Sequence of operations for TARV EMS

The sequence of operations in respect of general *TARV EMS* shall be as shown in Figure 6.
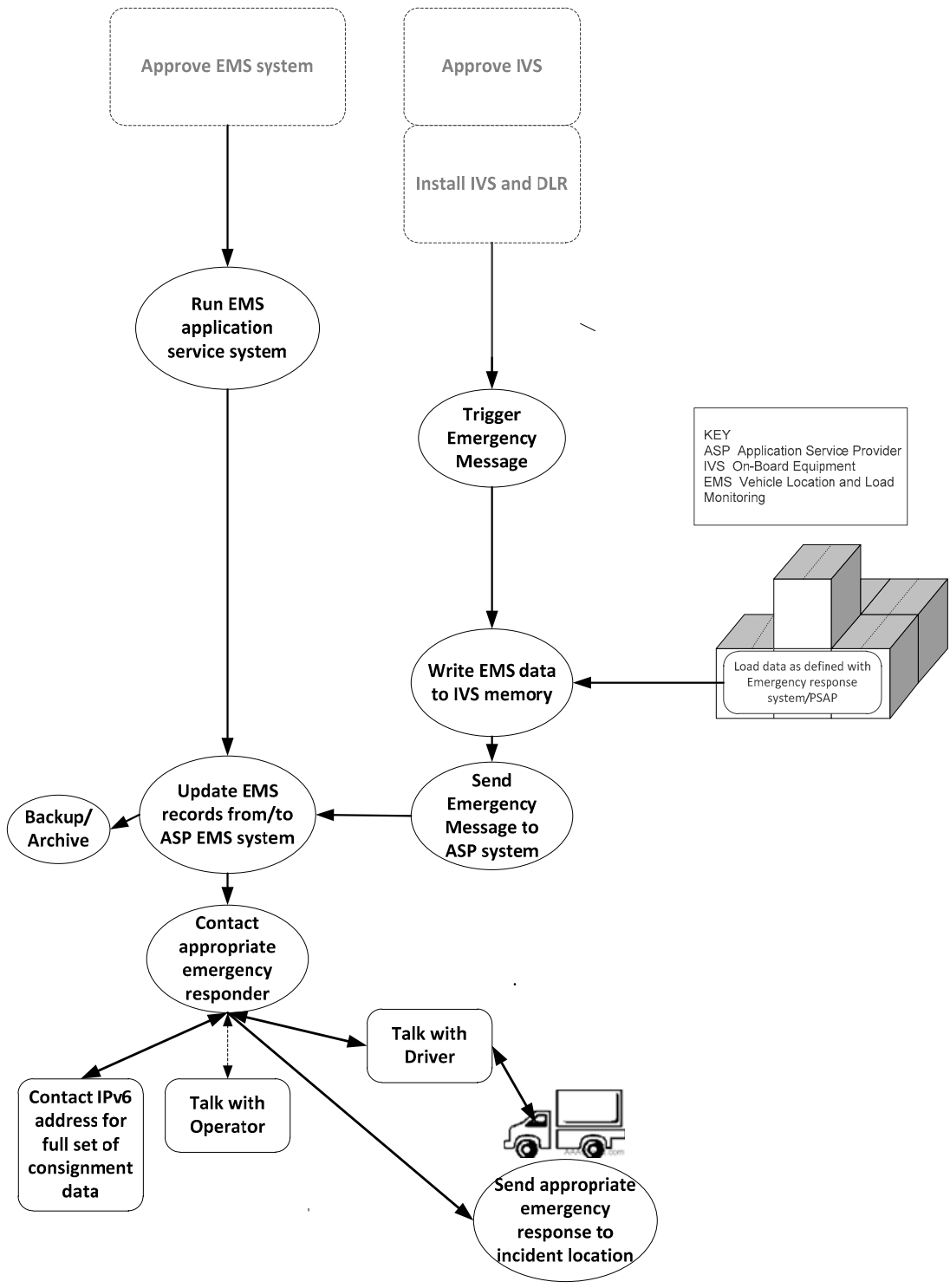
Figure 6 — Sequence of operations for TARV EMS

10.6 TARV EMS naming content and quality

The process to obtain *basic vehicle data (4.11)* (*TARV LDT (4.30)*) data content shall be as defined in ISO 15638-5 subclauses 8.2, 8.3 and 8.4.

10.7 Specific TARV EMS data naming content and quality

10.7.1 eCall Minimum set of data

Where the *eCall (4.20)* variant is used, the minimum set of data shall be in accordance with EN 15722.

10.7.2 HGV eCall dataset

The *eCall (4.20)* HGV dataset shall be in accordance with CEN TR 16405.

10.7.3 Other TARV EMS emergency messages

Where an emergency message is other than an *eCall (4.20)* it shall be determined as required by regulations of the *jurisdiction (4.30)* or shall be as agreed between the *application service provider (4.4)* and the emergency responder. The format and content shall be the subject of a written agreement between the parties. However, for consistency, interpretation and data reuse, wherever the following data concepts elements are used they shall be represented as defined in Clause 10.9, Table 2.

10.8 TARV EMS service elements

10.8.1 TARV EMS SE1: TARV eCall

The service elements for the *TARV eCall (4.20)* variant shall be as determined in EN 16102. See Figures 4 and 5 above for an illustration.

The service elements for general emergency messaging shall be as defined in the following subCluses:

10.8.2 TARV EMS SE2: Establish 'TARV Emergency Call' (TARV EMS) jurisdiction regulations or system specification

The *jurisdiction (4.30)* shall be responsible to define its requirements for its variant of the '*TARV* Emergency Call' (*TARV EMS*) *application service (4.3),* obtain any legislation and/or regulations, and define the procedure for an *application service provider (4.4)* to gain approval for its instantiation of the *TARV EMS application service.*

10.8.3 TARV EMS SE3: Request system approval

The *application service provider (4.4)* shall seek approval for its instantiation of the *TARV EMS* application service from the *approval authority (regulatory) (4.8)* in accordance with the regime established by the *jurisdiction (4.30).*

10.8.4 TARV EMS SE4: User (operator) contracts with prime service provider

It is a prerequisite for any potential vehicle *operator (4.35)* opting or being required to sign up for the *TARV EMS* application service that its *regulated vehicles (4.39)* are *TARV* equipped with a *TARV* compliant *IVS (4.26)* at point of manufacture or installed by a *prime service provider (4.36)*, and that there is a maintenance contract with a *prime service provider* for that equipment. (See ISO 15638-1 - *TARV* framework and architecture).

10.8.5 TARV EMS SE5: User (operator) equips vehicle with a means to provide consignment data

It is a prerequisite for any potential vehicle *operator (4.35)* opting or being required to sign up for the *TARV EMS* application service that its *regulated vehicles (4.39)* are equipped to provide the *consignment (4.13)* data required. If the data is provided via an IPv6 link to a website, no further data is required, but may optionally be provided as backup. If the *jurisdiction (4.30)* has specified the required data it shall be provided to the requirement of the *jurisdiction,* or otherwise as agreed between the *operator (4.35)* and the *TARV EMS application service provider (4.4),* who may choose to maintain some or all of the information in its application system (rather than on-board the *regulated vehicle (4.39).* Suggested data concept elements are provided in

Table 2 below. It is further required that there is a maintenance contract with an approved *service provider (4.42)* for any equipment required to be installed in the *regulated vehicle (4.39)*. That *service provider* shall be, or shall be considered as an agent of, the *prime service provider (4.36)* in respect of the provisions of this part of ISO 15638.

10.8.6 TARV EMS SE6: User contracts with application service provider

The *user (4.46)* (*operator (4.35)*) shall contract with an *application service provider (4.4)* who offers an approved *TARV EMS* application service to provide the *TARV EMS* application service to nominated vehicles.

10.8.7 TARV EMS SE7: application service provider uploads software into the TARV equipped vehicles of the operator

The *service provider (4.42)* shall upload and commission the on-board *TARV EMS app (4.2)* software into the *TARV* equipped vehicles of the *operator (4.35)*.

10.8.8 TARV EMS SE8: Recording of vehicle consignment data

The on-board *TARV EMS app (4.2)* shall create a file, type :EMS [EMS file] within this *specification (4.44)*), named

<EMS><YYMMDDhhmm><vehicle registration number>

Prior to the commencement of each journey, the *application service provider (4.4)* shall establish a communications *session (4.43)* with the *in-vehicle system (4.26)* and update the data content of the *EMS* file with one of the following options (in order of precedence):

 a) current *consignment (4.13)* data as required by the *jurisdiction (4.30)*,
 b) current *consignment* data as required by the contract between the *application service provider* and the *user (4.46)*
 c) a combination of the *TARV LDT (4.30)* data and the *consignment* data determined in Table 2 (as far as it is available, with padded null fields where a data concept element data is not available)

At the start of each journey the *TARV EMS app (4.2)* held in the library of the *IVS (4.26)* shall be initiated.

During the journey the on-board *TARV EMS* 'App' in the in the *IVS (4.26)* shall update the *EMS* file with the following data

<IVS ID>,
<VehicleLocation>,<ConsignmentData>
<IVS ID>
<end>

NOTE   ISO 15638-5 Clause 8.3.11 definition of location includes location, *UTC* time and direction of travel

Vehicle direction of travel shall be calculated as specified in ISO 15638-5 Clause 8.3.13

10.8.9 TARV EMS SE9: EMS Trigger

For most journeys the *EMS* system is a silent observer, and the system proceeds no further than SE9. But in the event that, during the journey, equipment installed in the *regulated vehicle (4.39)* shall trigger an *EMS* emergency message, the *TARV EMS* system initiates the subsequent SEs.

10.8.10   TARV EMS SE10: Make TARV EMS emergency call

The *IVS (4.26)* shall then use the on-board *ITS-station (4.28)* to contact an *ITS-station* of the *application service provider (4.4)* to deliver the *TARV EMS* emergency message.

Where suitably equipped the *IVS (4.26)* may also attempt to make voice contact between the occupants of the *regulated vehicle (4.39)* and a telephone number provided by the *application service provider (4.4).*

The *IVS (4.26)* shall also write a log of the event and associated data into the memory of the *IVS* as a record of the incident.

10.8.11   TARV EMS SE11: Obtain/request consignment data

10.8.11.1   The *application service provider (4.4)* shall use its access to an IPv6 address provided in the *TARV EMS* emergency message to obtain full detail of the *consignment (4.13)* and any associated dangerous goods (ADR) data where appropriate.(This may be to request a resend of data, or as a result of an emergency triggered outside of the vehicle).

10.8.11.2   An interrogating ITS-station shall request specific data as determined in ISO15638-6 clauses 7.1 and 8.1.2.

10.8.11.3   In the event that the IVS of a vehicle receives a wireless interrogation requesting the EMS data, the interrogator shall also provide at the time of the request, a unique 8 byte reference number (URef), and a destination IPv6 address (ReqDest) where it requests the data to be sent.

10.8.11.4   On receipt of the request the IVS shall acknowledge the request with the appropriate ACKnowledgement defined in 8.3.5 of ISO15638-6, <E>, which acknowledges that a request for EMS data has been received.

10.8.11.5   The IVS shall then close the communication session.

10.8.11.6   The IVS shall then open a new communication session using an available and appropriate CALM wireless medium.

10.8.11.7   The IVS shall then send the EMS datafile to a predetermined destination IPv6 (internet) address that has previously been stored in the memory of the data pantry by its ASP, together with the URef and ReqDest provided by the interrogator.

10.8.11.8   On successful receipt of the data, the recipient at the predetermined destination IPv6 address shall send an acknowledgement <EMX> to the IVS.

10.8.11.9   On receipt of the acknowledgement <EMX> the IVS shall close its communication session.

10.8.11.10   The ASP shall be responsible to verify that the interrogation is legitimate, appropriate and from an accepted source, and having verified this, shall be responsible to send the data to the interrogator requested IPv6 address. The means and detail of how this is achieved is outside the scope of this part of ISO 15638.

10.8.12   TARV EMS SE12: Contact emergency responder

The *application service provider (4.4)* shall then contact the appropriate emergency responder, providing the *TARV EMS* data to the responder and shall instruct the emergency responder to appropriately respond to the emergency call. The means by which this is achieved is not specified and may vary according to the location of the incident and the nature of the incident for audit trail purposes and the arrangements in place between the *ASP (4.4)* and *PSAP.*

The *TARV EMS* system of the *application service provider (4.4)* shall also write a log of the event and associated data into the memory of the backup/archive of the *application service provider* as a record of the incident for audit trail purposes.

10.8.13   TARV EMS SE13: Notification to *operator (4.35)*

The *application service provider (4.4)* shall then contact the *operator (4.35)* to notify them of the incident, providing the *TARV EMS* data to the *operator*. The means by which this is achieved is not specified and may vary according to the location of the incident and the nature of the incident for audit trail purposes.

10.8.14   TARV EMS SE13: Emergency response

The emergency responder shall then respond appropriately to the emergency call.

10.9 TARV EMS Emergency messaging access methods to provision and retrieve data

The process to obtain *basic vehicle data (4.11)* (*TARV LDT (4.30)*) data content shall be as defined in ISO 15638-5 subclauses 8.2, 8.3 and 8.4.

The electronic records declared and stored by the *IVS (4.26)* shall be authenticated, have integrity and be secure from interception or corruption.

Consignment (4.13) data shall be provided before the journey commences to the *application service provider (4.4),* normally, but not necessarily, by electronic means, and the *application service provider* shall be responsible to provision any data required into the *data pantry (4.17)* of the *in-vehicle system (4.26)* via the *ITS-station (4.28)* of the *IVS*.

The format and content shall be the subject of a written agreement between the parties. However, for consistency, interpretation and data reuse, wherever the following data concepts elements are used they shall be represented as defined in Table 2.

NOTE   *UNECE* JWG RID are currently reviewing their reference pointers to dangerous goods (*ADR)* information, and this table will be revised if material change is made.

Table 2 — Goods data concepts for both ADR and non ADR consignments in TARV EMS emergency messages

Name	Type	Unit	Description
OID	Integer	1 byte	Optional additional data concept identifier binary value 00000010 identifying HGV Schema A (until allocated a revised *OID* from a central register)
ID	Integer	1 byte	HGV Schema A data concept format version set to 1 to discriminate from later HGV Schema A data concept formats Later versions to be backwards compatible with existing versions. Systems receiving an HGV Schema A data concept to support all standardised HGV Schema A data concept versions, which are each uniquely identified using an HGV Schema A data concept format version parameter which will always be contained in the first byte of all [current and future] HGV Schema A Data concept versions.

Name	Type	Unit	Description
Tanker or other vehicle type plus number of dangerous goods on-board	Octet string (1 Byte) Binary	00000000-10001100	The first binary position of the octet to indicate whether the affected vehicle is a tanker or other type of vehicle where 1nnnnnnn = Tanker 0nnnnnnn = Other type of vehicle The remaining 7 binary positions of the octet to identify the number of types of dangerous goods being carried 1 - 10 (0000000 – 0001010) = number of types of dangerous goods present on board (in binary representation) 0 (0000000) = no dangerous goods on board 12 (0001100) = empty but uncleaned 11 (0001011) = mixed consignment (unspecified number of types of dangerous goods present on-board, but number unknown) 10 (0001010) = 10 or more types of goods present on-board 0 0000000- 1 0001100 Concatenated as octet: 00000000 – 10001100
ADR data address *URL* (information endpoint)	Octet string 35 bytes)	As specified	scheme://domain:port/path?query_string#fragment_id i.e.: The scheme name (commonly called protocol), followed by :// then, depending on scheme, a domain name (alternatively, IP address) : a port number, and / the path of the resource to be fetched or the program to be run. If the scheme name is http, the 'http://' is assumed e.g: www.example.com/path/to/name https://example.com/47.35868 telnet://192.0.2.16:80/ The information endpoint to be contacted and respond in a standardized* way using an access to a standardized method to retrieve data, *the standardized way this is done to be set elsewhere and is outside of the scope of this document.

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Name	Type	Unit	Description
Phone contact number	Integer (16)	As specified	Consignor contact telephone number or telephone number displayed on goods container as contact number in case of emergency. countrycode/areacode/number As : 000 0000 0000000000 Represented as integer 0000000000000000
Alarm information	Octet string (1 Byte)		Any alarm information from on-board sensors (pressure, leakage, shock, temperature etc) Binary Flag 0 = no alarm 1 = alarm 00000000 Binary position L F T S P O R[1] Z L = Leakage alarm F = Fire alarm T = Temperature alarm S = Shock alarm P = Pressure alarm O = Orientation alarm R[1] = reserved for future use Z = Other alarm IMPORTANT NOTE: Emergency services need to be aware that the absence of an alarm indicates only that there was no alarm showing as activated at the time of compiling the data. Alarms raised post the population of/sending of the *MSD* shall not be transmitted. These codes therefore only indicate status before or at the point of the incident, and cannot be taken as the current status post incident.
UN code of hazardous goods	Integer (7)	0000 00 0	Up to 4 materials (most dangerous (based on response code), within same response code prioritised to most impact in fire or largest volume) semantically identified as: *1 UN Code; *2 quantity in tonnes or 1000 cubic metres ;grossmass/net mass; *3; packaging group 0000 00 0; 0000 00 0; 0000 00 0; 0000 00 0 as 0000000, 0000000, 0000000, 0000000 No/no more Hazardous goods identified by '0000000'

Name	Type	Unit	Description
			*1 Issued by UN. May be obtained from http://live.unece.org/trans/danger/publi/adr/adr2011/11contentse.html or http://the-ncec.com/assets/Resources/EAClist2011.pdf *2 Identify quantity as Gross Mass=1; Net Mass=2 *3 packaging group I, 2 or 3 (representing groups I,II,III) 1 I 2 II 3 III
UN code of dangerous goods	Integer (4)	0000	Up to 10 materials identified by UN ADR (Dangerous goods) code, most dangerous listed first (based on response code- same response code prioritised to most impact in fire or largest volume) semantically identified as: 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 No/no more Dangerous goods identified by '0000' *1 Issued by UN. May be obtained from http://live.unece.org/trans/danger/publi/adr/adr2011/11contentse.html or http://the-ncec.com/assets/Resources/EAClist2011.pdf

Additional data to be sent in the event of a response to an interrogation for data.

Data concept name	Use	Format	Notes/Source
Uref	Mandatory	AN (8)	An 8 byte reference provided by the interrogator requesting the data. The alphanumeric or binary content of which is unspecified by ISO 15638, but is intended to be used by the interrogator to provide a unique reference to its request for data

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ReqDes	Mandatory	35 Bytes	Requested Destination IPv6 address for the data to be sent as: scheme://domain:port/path?query_string#fragment_id i.e.: The scheme name (commonly called protocol), followed by :// then, depending on scheme, a domain name (alternatively, IP address) : a port number, and / the path of the resource to be fetched or the program to be run. If the scheme name is http, the 'http://' is assumed e.g: www.example.com/path/to/name https://example.com/47.35868 telnet://192.0.2.16:80/

10.10   TARV EMS application service specific provisions for quality of service

Except for *eCall (4.20)*, shall be at the determination of the *jurisdiction (4.30),* or in the absence of such *specification (4.44)* to the *specification* of the *application service provider (4.4)* in agreement with the emergency responder/*PSAP*.

In the case of *eCall (4.20)* shall conform to CEN TC 16454 'Intelligent transport systems — eSafety — eCall end to end conformance testing'.

The integrity of the data is important, and other sensors as well as parameters may then be required based on the approaches and techniques used to provide assurance of the quality of the data. The generic quality of service provisions for the service elements specified in 10.4 are defined in ISO 15638-6 and ISO 15638-5.

Instantiation specific requirements shall be part of the regulation of the *jurisdiction (4.30).* However, in defining such requirements *jurisdictions* shall wherever possible, use performance based or functionally *specifications (4.44)* in order to avoid locking requirements into technologies that will become obsolete.

NOTE: Having prescribed integrity and its parameters into an operational system, it is harder to move to other integrity indicators when new technologies come along.

See also Clause 9 above for general quality of service requirements.

10.11   TARV EMS application service specific provisions for test requirements

There are no specific provisions for test requirements specified in this Technical Specification version of this document.

10.12   TARV EMS application specific rules for the approval of IVSs and 'Service Providers'

As 9.16.

11 Declaration of patents and intellectual property

This part of ISO 15638 contains no known patents or intellectual property other than that which is implicit in the media standards referenced herein and in ISO 15638-2. While the *CALM* standards themselves are free of patents and intellectual property, *CALM* in many cases relies on the use of public networks and IPR exists in

many of the public network media standards. The reader is referred to those standards for the implication of any patents and intellectual property.

Application services (4.3) specified within this part of ISO 15638 and ISO 15638-7 contain no direct patents nor intellectual property other than the copyright of ISO. However, national, regional or local instantiations of any the applications services defined in this part of ISO 15638 and ISO 15638-7, or of the generic vehicle information defined in ISO 15638-5, the security requirements contained in ISO 15638-4, or the requirements of ISO 15638-3, may have additional requirements which may have patent or intellectual property implications. The reader is referred to the regulation regime of the *jurisdiction (4.30)* and its regulations for instantiation in this respect.

Annex A
(informative)

Independent testing of the protocols defined in this Part of ISO 15638

A.1 Objectives

To test the validity of TARV standards it is necessary to simulate the TARV transactions. These are of two types

I. Instigation
   a) The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below.
   b) The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address
   c) The vehicle sends the datafile to the predetermined destination IPv6 (internet) address
   d) Recipient address sends acknowledgement
   e) IVS closes the communication on receipt of acknowledgement

II. Interrogation
III. The IVS of a vehicle receives a wireless interrogation requesting a packet of data.
   a) The IVS of a vehicle is switched on but is not connected
   b) The IVS of a vehicle receives a wireless interrogation requesting a packet of data.
   c) On receipt it acknowledges the request (ACK)
   d) It closes the communication
   e) Opens a new communication session using one of (and must be tested for each of) several wireless media defined below.
   f) Sends the datafile to a predetermined destination IPv6 (internet) address
   g) Recipient address sends acknowledgement
   h) IVS Closes the communication on receipt of acknowledgement

These scenarios need to be tested using each of 2G, 3G, WiFi, 5.9GHz (IEEE802.11) using the same data

A number of different datafiles (of different length) and acknowledgements need to be sent, which differ according to the application service. Each of the sequences defined below need to be tested.

In respect of 'interrogation' scenarios the ability to receive the interrogation on one medium (esp. 5.9 GHz) and to instigate the subsequent message using a different medium needs to be tested

Preconditions, Assumptions and Simulations

1. The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.)
2. CALM and media choice are assumed, and not s.u.t.
3. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, Mesh WiFi, 5.9GHz (IEEE 802.11p)
4. The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated
5. The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.
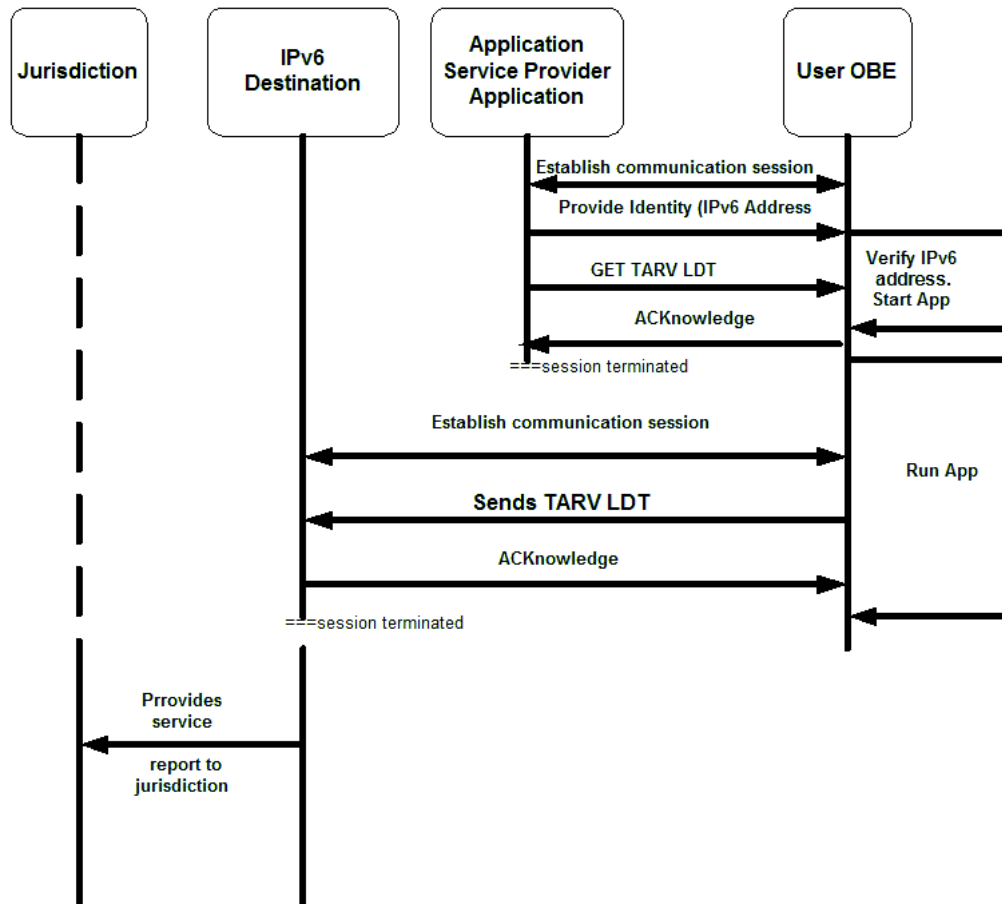
Figure A.1 — Communications sequences to obtain TARV LDT

Application Services where the verity of the communication needs to be physically tested

VAM	*vehicle access monitoring*
RTM	*remote electronic tachograph monitoring*
EMS	*emergency messaging system*
DWR	*driver work records* (work and rest hours compliance)
VMM	*vehicle mass monitoring*
MRC	*'mass' data for regulatory control and management (no test - data as VMM)*
VAC	*vehicle access control (no test - data as VAM)*
VLM	*vehicle location monitoring*
VSM	*vehicle speed monitoring*
CLM	*consignment and location monitoring*
ADR	*Accord Dangereuses par Route (Dangerous Goods) monitoring*
VPF	*vehicle parking facilities*

Test Sequences

A.2 TEST SCRIPT 4   EMS   EMERGENCY MESSAGE

TEST 4.1 .1:EMS– via 2G. Instigated

STEP 4.1.1.1 IVS instigates a communication session using 2G media to predetermined destination IP address

AS	**API**	IPv6 address
As	AS	00000000 00000000 xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx
Example: PSP	128..16511	1050:0000:0000:0000:0005:0600:300c:326b

vehicle unique identifier

Using ',' as a datafield separator

Filename<EMS>

The on-board *TARV EMS app (4.7)* shall create a file, type :EMS [EMS file] within this *specification (4.73)*), named

<EMS><YYMMDDhhmm><vehicle registration number>

<EMS040501094503MV03WRR>

During the journey the on-board *TARV EMS* 'App' in the in the *IVS (4.46)* shall update the *EMS* file with the following data
<IVS ID>,
<VehicleLocation>,<ConsignmentData>
<IVS ID>
<end>

Sample content for <EMS>

FILENAME: <EMS040501094503MV03WR>

FILE CONTENT:
ID0o3M45S,
2,1,3,scheme://domain:port/path?query_string#fragment_id,4412341234567890,85,0123201,0124102,0000000,00000000,1234,1235,0000,0000,0000,0000,0000,0000,0000,0000,
ID0o3M45S
<END>

STEP 4.1.1.2   IVS sends file named < EMS040501094503MV03WR >

STEP 4.1.1.3   Destination address sends ACK <EMX>

STEP 4.1.1.4   IVS receives ACK <EMX>

STEP 4.1.1.5 IVS closes communication session

CTP 4.1.1   Instigated Emergency Message System using 2G

SUT Reference	Instigated send of Emergency Message System using 2G
CTP/4.1.1	
SUT Test Objective	The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address The vehicle sends the datafile to the predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS closes the communication on receipt of acknowledgement
CTP Origin	CSI
Reference requirement	**ISO 15638-10**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
4.1.1.1	1	IVS instigates a communication session using selected media (2G) to predetermined destination IP address	**Session established**
4.1.1.2	2	IVS sends file named <EMS040501094503MV03WRR> <START> ID0o3M45S,2,1,3,scheme://domain:port/path?query_string#fragment_id,4412341234567890,85,0123201,0124102,0000000,	**File sent and arrives correctly at destination**

		00000000,1234,1235,0000,0000,0000,0000,0000,0000,0000,0000, ID0o3M45S <END>	
4.1.1.3	3	Destination address sends ACK <EMX>	
4.1.1.4	4	IVS receives ACK <EMX>	**File received and ACK <EMX> sent**
4.1.1.5	5	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 4.1.1	**PASS / FAIL**	**Date: 28th June 2102**
Signature/initials	**PASS**	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 4.1.2   Interrogated Emergency Message System using 2G

SUT Reference	Interrogated send of Emergency Message System using 2G
CTP/4.1.2	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data.
	The IVS of a vehicle is switched on but is not connected to an active wireless communication session
	The IVS of a vehicle receives a 2G wireless interrogation requesting a packet of data.
	On receipt it acknowledges the request (ACK)
	It closes the communication
	Opens a new communication session using one of (and must be tested for each of) several wireless media defined below.
	Sends the datafile to a predetermined destination IPv6 (internet) address
	Recipient address sends acknowledgement
	IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	**ISO 15638-10**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.)
	CALM and media choice are assumed and not s.u.t.
	The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p)
	The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated
	The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
4.1.2.1	1	session connected (incoming call)	**Call in progress**
4.1.2.2	2	Caller sends data request command (GPRS, EDGE etc)	**Data request sent**
4.1.2.3	3	IVS acknowledges request by returning ACKnowledgement <E>	**ACK <E> received**
4.1.2.4	4	IVS closes communication session	**Communication session closed**
4.1.2.5	5	IVS instigates a communication session using selected media to predetermined destination IP address	**Communication session successfully opened**
4.1.2.5	6	IVS sends file named <EMS040501094503MV03WRR> <START> ID0o3M45S,2,1,3,scheme://domain:port/path?query_string#fragment_id,4412341234567890,85,0123201,0124102,0000000,00000000,1234,1235,0000,0000,0000,0000,0000,0000,0000,0000, ID0o3M45S <END>	**File sent and arrives correctly at destination**
4.1.2.6	7	Destination address sends ACK <EMX>	
4.1.2.7	8	IVS receives ACK <EMX>	**File received and ACK <EMX> sent**
4.1.2.8	9	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 4.1.2	PASS / FAIL	Date: 28th June 2102
Signature/initials	**PASS**	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 4.1.3   Interrogated Emergency Message System using 5.9GHz and responding using 2G or 3G

SUT Reference	Interrogated Emergency Message System using 5.9 GHz and send of Emergency Message System using 2G or 3G
CTP/4.1.3	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected to an active wireless communication session The IVS of a vehicle receives a 5.9GHz (IEEE 802.11p) wireless interrogation requesting a packet of data. On receipt it acknowledges the request (ACK) It closes the communication Opens a new communication session using 2G or 3G. Sends the datafile to a predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	**ISO 15638-10**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

**Stimulus and expected behaviour**			
Test point		**Tester action**	**Pass Condition**
4.1.3.1	**1**	session connected (incoming call) using 5.9 Ghz (IEEE 802.11p)	**Call in progress**
4.1.3.2	**2**	Caller sends data request command GET EMS	**Data request sent**
4.1.3.3	**3**	IVS acknowledges request by returning ACKnowledgement <E>	**ACK <E> received**
4.1.3.4	**4**	IVS closes communication session	**Communication session closed**
4.1.3.5	**5**	IVS instigates a communication session using 2G or 3G	**Communication session successfully opened**
4.1.3.5	**6**	IVS sends file named <EMS040501094503MV03WRR> <START> ID0o3M45S,2,1,3,scheme://domain:port/path?query_string#fragment_id,4412341234567890,85,0123201,0124102,0000000,00000 000,1234,1235,0000,0000,0000,0000,0000,0000,0000,0000, ID0o3M45S <END>	**File sent and arrives correctly at destination**
4.1.3.6	**7**	Destination address sends ACK <EMX>	
4.1.3.7	**8**	IVS receives ACK <EMX>	**File received and ACK <EMX> sent**
4.1.3.8	**9**	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 4.1.3	**PASS / FAIL**	**Date: 28th June 2102**
Signature/initials	**PASS**	innovITS *ADVANCE* k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 4.2.1   Instigated Emergency Message System using 3G

SUT Reference	Instigated send of Emergency Message System using 3G
CTP/4.2.1	
.	
SUT Test Objective	The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address The vehicle sends the datafile to the predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS closes the communication on receipt of acknowledgement
CTP Origin	CSI
Reference requirement	**ISO 15638-10**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated. The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
4.2.1.1	**1**	IVS instigates a communication session using selected media (3G) to predetermined destination IP address	**Session established**
4.2.1.2	**2**	IVS sends file named <EMS040501094503MV03WRR>	**File sent and arrives correctly at destination**

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		<START> ID0o3M45S,2,1,3,scheme://domain:port/path?query_string#fragment_id,4412341234567890,85,0123201,0124102,0000000,00000000,1234,1235,0000,0000,0000,0000,0000,0000,0000,0000, ID0o3M45S <END>	
4.2.1.3	3	Destination address sends ACK <EMX>	
4.2.1.4	4	IVS receives ACK <EMX>	**File received and ACK <EMX> sent**
4.2.1.5	5	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 4.2.1	PASS / FAIL	Date: 28th June 2102
Signature/initials	**PASS**	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 4.2.2   Interrogated at 5.9 GHz and send of Emergency Message System using 3G

SUT Reference	**5.9 GHz Interrogated and send of Emergency Message System using 3G**
CTP/4.2.2	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data.
	The IVS of a vehicle is switched on but is not connected to an active wireless communication session
	The IVS of a vehicle receives a wireless interrogation requesting a packet of data.
	On receipt it acknowledges the request (ACK)
	It closes the communication
	Opens a new communication session using one of (and must be tested for each of) several wireless media defined below.
	Sends the datafile to a predetermined destination IPv6 (internet) address
	Recipient address sends acknowledgement
	IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	**ISO 15638-10**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.)
	CALM and media choice are assumed and not s.u.t.
	The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p)
	The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated
	The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
4.2.2.1	**1**	session connected (incoming call) using 5.9 Ghz (IEEE 802.11p)	**Call in progress**
4.2.2.2	**2**	Caller sends data request command GET EMS	**Data request sent**
4.2.2.3	**3**	IVS acknowledges request by returning ACKnowledgement <E>	**ACK <E> received**
4.2.2.4	**4**	IVS closes communication session	**Communication session closed**

4.2.2.5	5	IVS instigates a communication session using selected media (2G or 3G) to predetermined destination IP address	**Communication session successfully opened**
4.2.2.5	6	IVS sends file named <EMS040501094503MV03WRR> <START> ID0o3M45S,2,1,3,scheme://domain:port/path?query_string#fragment_id,4412341234567890,85,0123201,0124102,0000000,00000000,1234,1235,0000,0000,0000,0000,0000,0000,0000,0000, ID0o3M45S <END>	**File sent and arrives correctly at destination**
4.2.2.6	7	Destination address sends ACK <EMX>	
4.2.2.7	8	IVS receives ACK <EMX>	**File received and ACK <EMX> sent**
4.2.2.8	9	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 4.2.2	**PASS / FAIL**	**Date: 28th June 2102**
Signature/initials	**PASS**	**innovITS** ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 4.3.1   Instigated Emergency Message System using 802.11p (WAVE) 5.9 GHz

SUT Reference	Instigated Emergency Message System using 802.11p (WAVE) 5.9 GHz
CTP/4.3.1 .	
SUT Test Objective	The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address The vehicle sends the datafile to the predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS closes the communication on receipt of acknowledgement
CTP Origin	CSI
Reference requirement	**ISO 15638-10**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
4.3.1.1	1	IVS instigates a communication session using selected media (5.9G) to predetermined destination IP address	**Session established**
4.3.1.2	2	IVS sends file named <EMS040501094503MV03WRR>	**File sent and arrives correctly at destination**

		<START> ID0o3M45S,2,1,3,scheme://domain:port/path?query_string#fragment_id,4412341234567890,85,0123201,0124102,0000000,00000000,1234,1235,0000,0000,0000,0000,0000,0000,0000,0000, ID0o3M45S <END>	
4.3.1.3	3	Destination address sends ACK <EMX>	
4.3.1.4	4	IVS receives ACK <EMX>	**File received and ACK <EMX> sent**
4.3.1.5	5	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 4.3.1	PASS / FAIL	Date: 28th June 2102
Signature/initials	**PASS**	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 4.3.2   Interrogated Emergency Message System using 802.11p (WAVE) 5.9 GHz

SUT Reference	**Interrogated send of Emergency Message System using 802.11p (WAVE) 5.9 GHz**
CTP/4.3.2 .	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data.
	The IVS of a vehicle is switched on but is not connected to an active wireless communication session
	The IVS of a vehicle receives a wireless interrogation requesting a packet of data.
	On receipt it acknowledges the request (ACK)
	It closes the communication
	Opens a new communication session using one of (and must be tested for each of) several wireless media defined below.
	Sends the datafile to a predetermined destination IPv6 (internet) address
	Recipient address sends acknowledgement
	IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	**ISO 15638-10**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.)
	CALM and media choice are assumed and not s.u.t.
	The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p)
	The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated
	The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
4.3.2.1	1	session connected (incoming call) using 5.9 Ghz (IEEE 802.11p)	**Call in progress**
4.3.2.2	2	Caller sends data request command GET EMS	**Data request sent**
4.3.2.3	3	IVS acknowledges request by returning ACKnowledgement <E>	**ACK <E> received**
4.3.2.4	4	IVS closes communication session	**Communication session closed**
4.3.2.5	5	IVS instigates a communication session using 5.9GHz selected media to predetermined destination IP address	**Communication session successfully opened**
4.3.2.5	6	IVS sends file named <EMS040501094503MV03WRR> <START> ID0o3M45S,2,1,3,scheme://domain:port/path?query_string#fragment _id,4412341234567890,85,0123201,0124102,0000000,00000000,12 34,1235,0000,0000,0000,0000,0000,0000,0000,0000, ID0o3M45S <END>	**File sent and arrives correctly at destination**
4.3.2.6	7	Destination address sends ACK <EMX>	
4.3.2.7	8	IVS receives ACK <EMX>	**File received and ACK <EMX> sent**
4.3.2.8	9	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 4.3.2	PASS / FAIL	Date: 28th June 2102
Signature/initials	**PASS**	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 4.4.1   Instigated Emergency Message System using Mesh WiFi

SUT Reference	Instigated send of Emergency Message System using Mesh WiFi
CTP/4.4.1	
SUT Test Objective	The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address The vehicle sends the datafile to the predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS closes the communication on receipt of acknowledgement
CTP Origin	CSI
Reference requirement	**ISO 15638-10**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated. The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
4.4.1.1	1	IVS instigates a communication session using selected media (Mesh WiFi) to predetermined destination IP address	**Session established**
4.4.1.2	2	IVS sends file named	**File sent and arrives correctly at destination**

		<EMS040501094503MV03WRR> <START> ID0o3M45S,2,1,3,scheme://domain:port/path?query_string#fragment_id,4412341234567890,85,0123201,0124102,0000000,00000000,1234,1235,0000,0000,0000,0000,0000,0000,0000,0000, ID0o3M45S <END>	
4.4.1.3	3	Destination address sends ACK <EMX>	
4.4.1.4	4	IVS receives ACK <EMX>	**File received and ACK <EMX> sent**
4.4.1.5	5	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 4.4.1	**PASS / FAIL**	**Date: 28th June 2102**
Signature/initials	**PASS**	innovITS *ADVANCE* k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 4.4.2   Interrogated Emergency Message System using Mesh WiFi

SUT Reference	5.9 GHz Interrogated and send of Emergency Message System using Mesh WiFi
CTP/4.4.2	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected to an active wireless communication session The IVS of a vehicle receives a wireless interrogation requesting a packet of data. On receipt it acknowledges the request (ACK) It closes the communication Opens a new communication session using one of (and must be tested for each of) several wireless media defined below. Sends the datafile to a predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	**ISO 15638-10**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
4.4.2.1	1	session connected (incoming call) using 5.9 Ghz (IEEE 802.11p)	**Call in progress**
4.4.2.2	2	Caller sends data request command (GPRS, EDGE etc) GET EMS	**Data request sent**
4.4.2.3	3	IVS acknowledges request by returning ACKnowledgement <E>	**ACK <E> received**
4.4.2.4	4	IVS closes communication session	**Communication session closed**
4.4.2.5	5	IVS instigates a communication session using mesh WiFi selected media to predetermined destination IP address	**Communication session successfully opened**
4.4.2.5	6	IVS sends file named <EMS040501094503MV03WRR> <START> ID0o3M45S,2,1,3,scheme://domain:port/path?query_string#fragment_id,4412341234567890,85,0123201,0124102,0000000,00000000,1234,1235,0000,0000,0000,0000,0000,0000,0000,0000, ID0o3M45S <END>	**File sent and arrives correctly at destination**
4.4.2.6	7	Destination address sends ACK <EMX>	
4.4.2.7	8	IVS receives ACK <EMX>	**File received and ACK <EMX> sent**
4.4.2.8	9	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 4.4.2	**PASS / FAIL**	**Date: 28th June 2102**
Signature/initials	**PASS**	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

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