



BSI Standards Publication

**Intelligent transport systems — ESafety —
ECall end to end conformance testing for
eCall HLAP in hybrid circuit switched/
packet switched network environments**

National foreword

This British Standard is the UK implementation of EN 18052:2025.

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

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

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English Version

**Intelligent transport systems - ESafety - ECall end to end
conformance testing for eCall HLAP in hybrid circuit
switched/packet switched network environments**

Systèmes de transport intelligents - eSafety - Essais de
conformité du système eCall de bout en bout pour le
HLAP d'eCall dans les environnements réseaux
hybrides à commutation de circuits et de paquets

Intelligente Verkehrssysteme - eSicherheit - eCall-
Ende-zu-Ende Konformitätsprüfungen für
übergeordnete eCall-Anwendungen in hybriden
leitungs-/paketvermittelnden Netzwerkkumgebungen

This European Standard was approved by CEN on 6 July 2025.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 18052:2025) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2026, and conflicting national standards shall be withdrawn at the latest by April 2026.

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

This document is the result of narrowing down the scope of EN 17240 to exclusively describe end to end conformance tests for the eCall High Level Application Protocols in packet switched networks.

This document complements EN 16454 and EN 17240.

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

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

Introduction

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

NOTE 1 The term PSAP, which is most widely used in the *eCall* documentation, European Commission documents, etc., is used throughout this document and equates to the term *emergency call response centre* used in the ITS Implementation Directive.

EN 15722 specifies a standardized MSD for eCall, EN 16062 specifies high level application protocols for eCall and EN 16072 specifies pan-European eCall operating requirements. For third party systems, EN 16102 specifies third party services supporting eCall operating requirements.

The pan-European *eCall* are made using Public Land Mobile Networks (PLMN) for which operating requirements are specified in a number of ETSI standards and technical specifications. In order to provide the *eCall service* across a wireless network, high level application protocols are required as an important essential element to affect this service provision. Originally PLMN were circuit switched networks for which EN 16062 specifies High Level Application Protocols. In these networks eCall uses Teleservice No 12 (TS12) and in-band modem transfer of data.

Over time, new communication technologies have become available. These technologies use so called 'packet switched' technologies using Internet protocols (IP). Particularly, 3GPP have evolved a communication management system called IMS (IP Multimedia Subsystem) which is suitable to operate over a number of bearer technologies, including LTE, NR and their successors. It is anticipated that packet switched networks (such as LTE, NR and their successors), which now co-exist with circuit switched networks (like GSM/UMTS), will, over the course of time, replace circuit switched networks.

EN 17184 provides High Level Application Protocols (HLAP) for eCall using IMS over packet switched networks. It provides the equivalent of EN 16062 for circuit switched networks and should be suitable for all/any packet switched networks and wireless access such as LTE, NR and their successors. A new Standards Deliverable EN 17905 has been developed for the provision of *eCall* HLAP in hybrid circuit switched/packet switched network environments.

In some areas both circuit switched and packet switched networks will co-exist, but there will be areas that only have packet switched network services. This document specifies the protocols in this hybrid situation, in order to make sure that pan-European *eCall* will function as efficiently as possible.

NOTE 2 A (possibly) large number of vehicles support circuit switched in-band eCall only (and not eCall using IMS over packet switched networks). For these to be able to continue using the *eCall service* either the onboard equipment will need to be upgraded (to support eCall using IMS) or sufficient circuit switched networks need to remain operational. This falls outside the scope of this document and is not addressed herein.

This document complements EN 16454 and EN 17240 and provides a set of end to end conformance tests in order to verify the support of *eCall* HLAP in hybrid circuit switched/packet switched network environments. This document provides tests to enable actors in the eCall chain to be able to claim conformance with EN 17905, even though they are unable to control the behaviour of systems of other actors in the eCall chain.

NOTE 3 Conformance tests in this document allow demonstration that a system complies with EN 17905 and is a prerequisite to providing an interoperable compliant system, but do not by themselves demonstrate that a system will function nor guarantee the quality of service.

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

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

1 Scope

This document describes the key actors in the eCall chain of service provision in hybrid circuit switched/packet switched network environments as:

- 1) *In-Vehicle System (IVS)/vehicle*,
- 2) *Mobile Network Operator (MNO)*,
- 3) *Public Safety Answering Point (PSAP)*,

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

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

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

NOTE 3 These conformance tests are partly based on the appropriate conformance tests from EN 16454 and EN 17240. This deliverable therefore adapts and revises Conformance Test Procedures (CTPs) from EN 16454 and EN 17240 for hybrid circuit switched/packet switched network environments.

This document complements EN 16454 and EN 17240 and provides a suite of conformance tests for IVS equipment, MNOs and PSAPs, required to ensure and demonstrate compliance with EN 17905.

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

2 Normative references

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

EN 17905:2023, *Intelligent transport systems - eSafety - eCall HLAP in hybrid circuit switched/packet switched network environments*

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

EN 16062:2023, *Intelligent transport systems - eSafety - eCall high level application requirements (HLAP) using GSM/UMTS circuit switched networks*

EN 15722, *Intelligent transport systems - eSafety - eCall minimum set of data*

EN 16072:2025, *Intelligent transport systems - eSafety - Pan-European eCall operating requirements*

ETSI TS 124 229 (Release 16), *Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; 5G; IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (3GPP TS 24.229 Release 16)*

ETSI TS 123 167 (Release 16), *Universal Mobile Telecommunications System (UMTS); LTE; IP Multimedia Subsystem (IMS) emergency sessions (3GPP TS 23.167 Release 16)*

3 Terms and definitions

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

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

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

3.1

clear-down

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

3.2

conformance test point test point

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

3.3

CS eCall

eCall making use of a circuit switched mobile network (e.g. GSM or UMTS)

3.4

data

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

3.5

data concept

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

3.6

eCall

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

3.7

eCall-capable

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

3.8

eCall-only

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

3.9

eCall generator

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

3.10

eCall service

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

3.11

eCall transaction

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

3.12

emergency call response centre

term used in ITS Implementation Directive to mean *public safety answering point* (PSAP)

3.13

IMS-eCall

eCall making use of IMS over a packet switched network (e.g. LTE or NR)

3.14

IMS emergency call

IMS based emergency call in packet switched networks, which is the IMS equivalent to Teleservice 12 according to ETSI TS 122 003 in circuit switched networks

Note 1 to entry: In contrast to an IMS-eCall, an IMS emergency call does not include the MSD transfer

3.15

in progress

taking place

3.16**in-vehicle equipment**

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

3.17**in-vehicle system****IVS**

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

3.18**minimum set of data****MSD**

standardized *data concept* comprising *data* elements of relevant vehicle generated *data* essential for the performance of the *eCall service*

Note 1 to entry: See EN 15722.

3.19**mobile wireless communications network**

wireless communications network with homogeneous handover between *network access points*

3.20**most appropriate PSAP**

PSAP defined beforehand by responsible authorities to cover emergency calls from a certain area or for emergency calls of a certain type

Note 1 to entry: See also PSAP (3.22).

Note 2 to entry: A number of different instantiations of PSAP service are supported within this European Standard. A PSAP can be a Public Authority or a private *service provider* operating on behalf of the responsible authorities.

3.21**network access point**

beacon, antenna or similar source of signal propagation and receipt together with equipment to manage communication sessions with users operating within the operating reach of the *network access point* and provide connectivity for the users within the operating reach of the single *access point* to a wider communications network

Note 1 to entry: A *network access point* may, but does not need to provide homogeneous or heterogeneous handover to another *network access point*.

3.22**public mobile wireless communications network**

mobile wireless communications network with access to a public telecommunications network

3.23

public safety answering point

PSAP

physical location working on behalf of the national authorities where emergency calls are first received under the responsibility of a public authority or a private organization recognized by the national government

Note 1 to entry: See also *most appropriate PSAP*.

Note 2 to entry: A number of different instantiations of PSAP service are supported within this deliverable.

3.24

service provider

physical and functional component responsible for providing telematics-based services to its subscribers

3.25

TPS-eCall

eCall provided via a third-party *service provider/operator*

3.26

vehicle manufacturer

entity which first assembles the vehicle and provides *eCall* equipment as part of its specification and subsequently sells the vehicle directly or via an agent

3.27

vehicle occupant(s)

person(s) inside the vehicle

3.28

wireless communications network

network operating using an air-interface capable of bi-directional transfer of *data* and voice

Note 1 to entry: There are different types of wireless communications such as PAN, LAN, cellular network, etc.

4 Abbreviations

3G	3 rd Generation
3GPP	Third Generation Partnership Project
5G	5 th Generation
ACK	ACKnowledgement
AL-ACK	Application Layer ACKnowledgement
CLB	CaLL-Back and post eCall
CLI	Calling Line Identity
CLR	CaLL cleaRdown
CS	Circuit Switched
CTP	Conformance Test Procedure

E-OFF	Engine control off
E-ON	Engine control activated
EC	European Commission
ECI	eCall Initiation
ECL	eCall over IMS support indicator
ECP	eCall in Progress
EHPLMN	Equivalent Home Public Land Mobile Network
EPLMN	Equivalent Public Land Mobile Network
ETSI	European Telecommunications Standards Institute
GSM	Global System for Mobile communications
HMI	Human Machine Interface
HPLMN	Home Public Land Mobile Network
IE	Information Element
IMS	IP-Multimedia Subsystem
IMSI	International Mobile Subscriber Identity
IVS	In-Vehicle System
LTE	Long Term Evolution
MNO	Mobile Network Operator
MSD	Minimum Set of Data
NAD	Network Access Device
NAS	Non-Access Stratum
NR	New Radio
P-CSCF	Proxy Call Session Control Function
PE	Pan-European
PLMN	Public Land Mobile Network
PS	Packet Switched
PSAP	Public Safety Answering Point
RAT	Radio Access Technology
SIM	Subscriber Identity Module
SUT	System Under Test
TPS	Third Party Service
TRG	Trigger
TS (i)	Technical Specification
TS (ii)	Teleservice
TS12	Teleservice 12
UMTS	Universal Mobile Telecommunication System

USIM	Universal Subscriber Identity Module
VPLMN	Visited Public Land Mobile Network

5 Conformance

5.1 General

This document provides conformance tests for each of the key actor groups such that each actor group may be able to ascertain if it is in conformance with the relevant eCall Standards deliverables, and to demonstrate its conformance to eCall standards requirements relevant to that actor group.

Where a supplier elects to claim conformance that its product or service is in accordance with the provisions of this document, it shall only do so if it can evidence that it has undertaken the test procedures relevant to its product(s) and/or service(s) as specified herein and has met all of the PASS criteria requirements specified in the tests appropriate to its product(s) and/or service(s) that are specified herein.

5.2 General conditions

A CTP PASS condition is only confirmed if ALL individual pass conditions written in the “pass conditions” column of a given Conformance Test Procedure (CTP) are observed.

A CTP FAIL condition occurs if one or more of the given individual pass conditions written in the “pass conditions” column of a given CTP are *not* observed (failed).

To be explicitly clear, if a supplier has undertaken the test procedures relevant to its product(s) and/or service(s) as specified herein and has NOT MET all of the PASS criteria requirements specified in the tests appropriate to its product and/or service(s) that are specified herein, i.e. its product or service has failed ANY of the tests relevant to its product or service according to the methods and criteria determined herein, it SHALL NOT claim compliance to this document. A supplier shall not claim ‘partial compliance’ nor ‘compliance to selected tests’ of this document.

6 General overview of the eCall transaction for pan-European eCall

6.1 General principle

In the introduction to the document, EN 16072, *eCall* was described as an emergency call generated either automatically via activation of in-vehicle sensors or manually by the *vehicle occupants* (the *eCall generator*); when activated, it provides notification and relevant location information to the most appropriate *Public Safety Answering Point*, by means of *mobile wireless communications networks* and carries a defined standardized *Minimum Set of Data*, notifying that there has been an incident that requires response from the emergency services and establishes an audio channel between the occupants of the vehicle and the most appropriate *Public Safety Answering Point*.

Figure 1 shows an illustrative view of the pan-European *eCall service*, as defined in EN 16072.

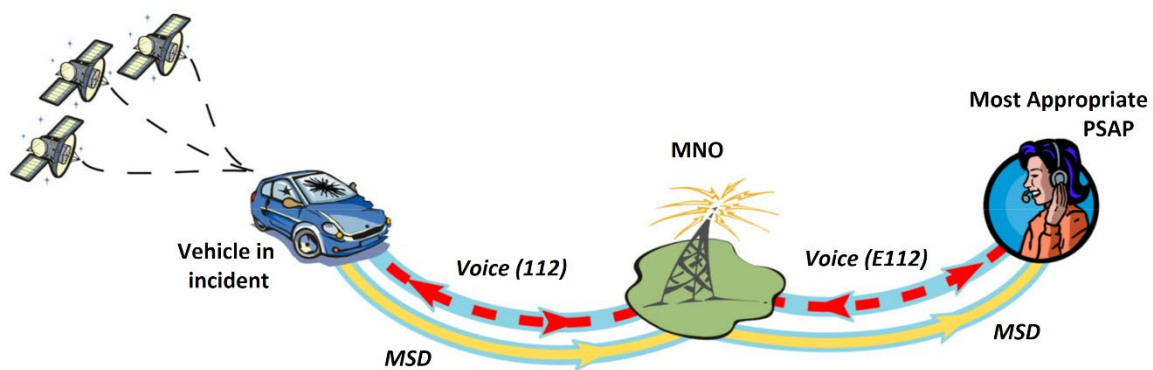


Figure 1 — General overview: pan European eCall service using GSM/UMTS (CS domain)

(SOURCE: European Commission)

In circuit switched networks the eCall is identified as an emergency call and specifically an eCall in the telecircuit switching (TS) process. The emergency number (112) is not dialled as the TS identifiers inform the MNO that the call is an emergency call/eCall and the MNO has procedures to direct these calls to “the most appropriate” PSAP. Having established a voice channel, the microphones and speakers are muted and a modem is used to transfer the *Minimum Set of Data* (MSD) to the PSAP before opening up the line to enable conversation between the PSAP operator and the occupants of the vehicle.

Technology advances and subsequently to the development of the eCall application suite EN 16072, EN 16062 and EN 16454 standards, packet switched networks have become available. Over the course of time, these packet switched networks (such as LTE, NR and their successors) are expected to provide new PLMNs to complement and eventually replace the circuit switched GSM/UMTS networks.

The high level paradigm for eCall remains unchanged, but there are fundamental differences in packet switched networks: the TS mechanism is not available and the switching paradigm is different, allowing for a more robust way of *data* transfer. 3GPP has developed IMS (IP Multimedia Subsystem) which is an all-IP (Internet Protocol) system designed to assist mobile operators deliver next generation interactive and interoperable services, cost-effectively, over an architecture providing the flexibility of the Internet. IMS is designed for packet switched networks and supports IP multimedia applications via IP multimedia sessions over a multitude of IP Connectivity Access Networks, such as NG-RAN, E-UTRAN, UTRAN, GERAN, LAN, DOCSIS®, WiMAX™, cdma2000® and DVB-RCS2 access. It is likely that all subsequent IP based packet switched networks will therefore be able to support IMS, making migration to future, as yet undeveloped technologies, a simpler and easier to achieve process.

It is therefore appropriate to require the availability of IMS on a packet switched network for eCall to function, rather than any of the specific wireless technologies, as it provides greater flexibility and migration potential.

In a packet switched environment where IMS is available, the eCall is established as an internet protocol-based session with the exchange of packets of *data* (which in this case, are largely packets of voice data), and the MSD is provided as part of the session establishment. This is completely different from the mode of operation in circuit switched networks. It was therefore necessary to provide a separate set of standards (EN 17184 and EN 17240) for “High Level Application Protocols” to manage eCall via packet switched networks.

Figure 2 shows the IMS equivalent of Figure 1 and compares it to eCall via circuit switched networks.

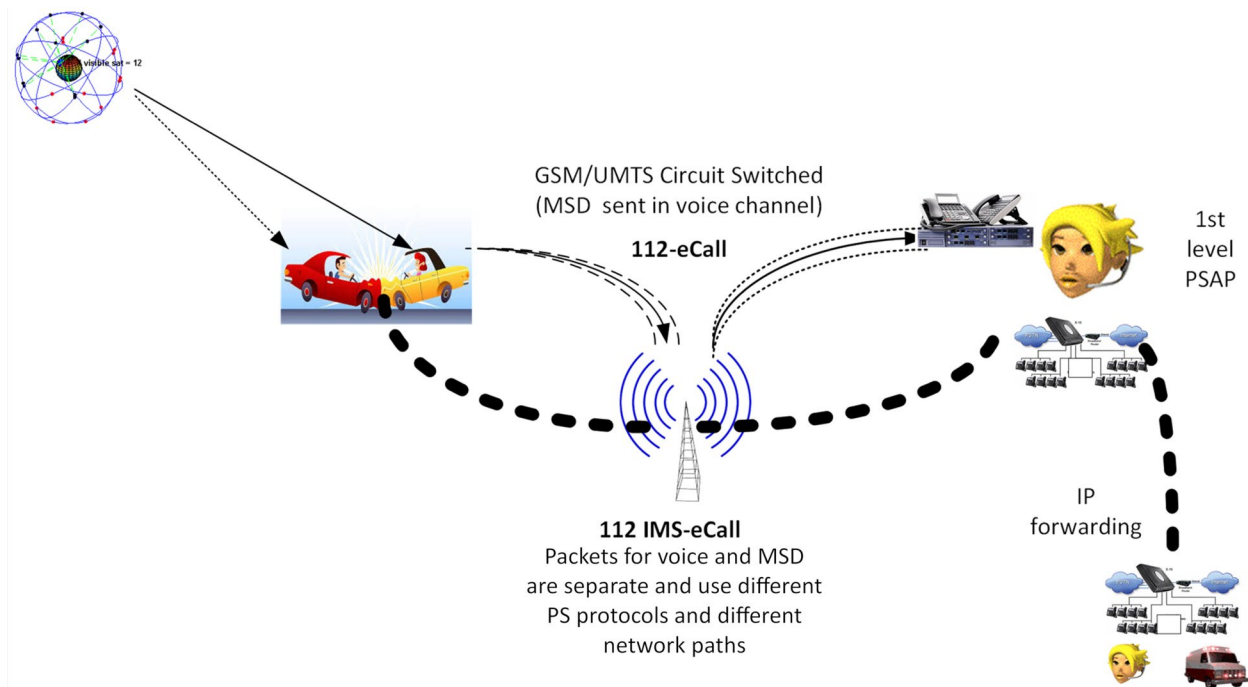


Figure 2 — Overview: eCall using IMS over packet switched networks compared to eCall over CS networks

NOTE 1 Albeit out of scope for this document, IMS has a further advantage in that it can also be used over fixed lines. This makes the forwarding of eCalls from 1st level PSAP responder to 2nd level PSAP responders and responding emergency services via fixed lines an easier and more simple process; and even enabling the call to then be subsequently diverted to a handset of a responding ambulance, fire truck or police responder.

Following the initial resolution of the incident by the PSAP operator, the PSAP operator may *clear-down* the call, however, the *In-Vehicle System* (IVS responsible for the eCall system) remains registered on the mobile network, at least for the period specified in EN 16072:2025, Annex A to enable the PSAP or rescue services to re-call the *vehicle occupants*.

At some moment in time packet switched networks will be the only Public Land Mobile Networks (PLMN) available, which means that any IVS needs to support eCall using IMS over packet switched networks. However as long as GSM/UMTS PLMNs are available (Teleservice 12/TS12) ETSI TS 122 003 will remain operational. A separate normative document EN 17905 for this hybrid situation has been drawn up. This document provides a suite of conformance tests to ensure and demonstrate compliance with EN 17905.

The key stages of eCall delivery can be represented as a high-level state transition diagram as in Figure 3:

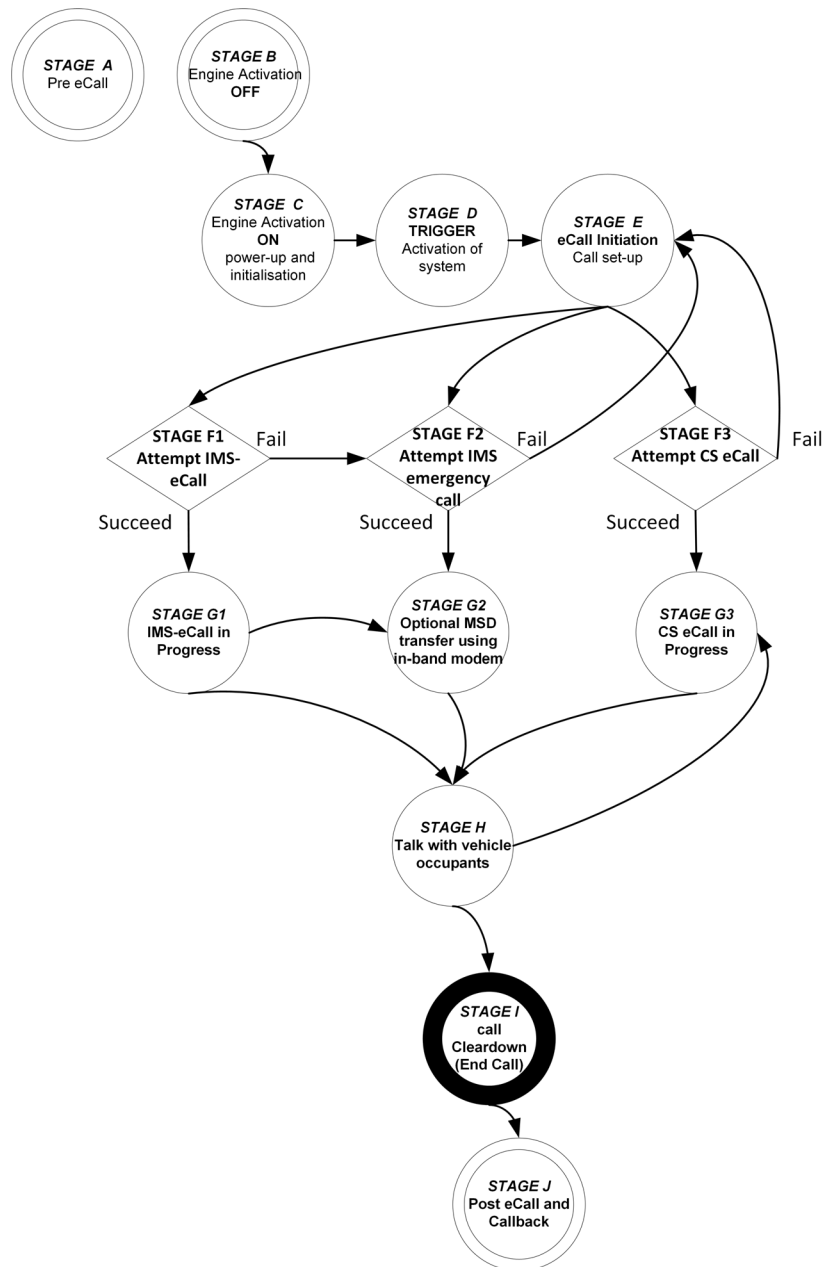


Figure 3 — High level state transition steps of IMS-eCall over PS networks and eCall over CS networks

The test suite structure is as shown in Table 1.

Table 1 — Test suite structure

Stage	Stage description	Stage acronym	Actions
STAGE A	General conformance tests required before eCall is initiated, including relevant NAD conformance tests	PRE	General conformance tests required before eCall is initiated.
STAGE B	Engine Control Not Activated	E-OFF	Start state before engine is started No actions

Stage	Stage description	Stage acronym	Actions
STAGE C	Engine Control Activated (no eCall) including power-up	E-ON	Engine control turned on by driver; Power-up and initialization of system
STAGE D	Trigger	TRG	On-board equipment triggers automatic activation of eCall or occupant manually triggers eCall TRG may occur before Stage C in the case of a manual eCall
STAGE E	eCall Initiation	ECI	Domain selection, network selection and registration (if not already registered on a network). Call set-up
STAGE F1	Attempt IMS-eCall	AIC	Attempt IMS-eCall
STAGE F2	Attempt IMS emergency call	AIC	Attempt IMS emergency call
STAGE F3	Attempt CS eCall	ACC	Attempt CS eCall
STAGE G1	IMS-eCall in progress	ECP	Establish IMS-eCall (Establishment includes sending MSD) Providing a voice link between the PSAP and occupants of the vehicle
STAGE G2	Optional MSD transfer using in-band modem	ECP	Optional MSD transfer using in-band modem
STAGE G3	CS eCall in progress	ECP	Establish CS eCall (Establishment includes sending MSD) Providing a voice link between the PSAP and occupants of the vehicle
STAGE H	Talk with occupants	TWI	Talk with <i>vehicle occupants</i>
STAGE I	eCall clear-down	CLR	Terminate call
STAGE J	Post eCall and Call-back	CLB	Remain registered on network to enable PSAP to call-back into vehicle if required

7 How to use this document

7.1 Layout and procedures

Clauses 8 to 12 specify the requirements in order to claim compliance with EN 17905.

This document is designed to support both self-declaration and independent conformance certification environments.

The full set of tests is specified so that each stage of the process under control of an actor can be tested (which is necessary if any part fails).

Clause 8 describes and specifies the general objectives of this standard and identifies the state transitions for the principal actor groups that need to ascertain or declare conformance: ‘*In-Vehicle Systems*’ (IVS), Mobile Network Operators (MNO), and ‘*Public Safety Answering Points*’ (PSAP).

In order to demonstrate conformance of an *In-Vehicle System* with EN 17905 the IVS shall pass the appropriate conformance tests in clause 9. The corresponding test results shall be documented in a conformance test report and this test report shall comply with the requirements specified in ISO/IEC 17025.

In order to demonstrate conformance of a TPS *In-Vehicle System* to the European Standards defining *TPS-eCall* (EN 16102), refer to the latest version of the accompanying conformance test standard for *TPS-eCall* (at time of writing the appropriate tests can be found in EN 16454).

In order to demonstrate conformance of a Mobile Network Operator (MNO) system with EN 17905 the MNO system shall pass the appropriate conformance tests in clause 10. The corresponding test results shall be documented in a conformance test report and this test report shall comply with the requirements specified in ISO/IEC 17025.

In order to demonstrate conformance of a PSAP system with EN 17905 the PSAP system shall pass the appropriate conformance tests in clause 11. The corresponding test results shall be documented in a conformance test report and this test report shall comply with the requirements specified in ISO/IEC 17025.

In order to demonstrate conformance of a TPS PSAP to the European Standards defining *TPS-eCall* (EN 16102), refer to the latest version of the accompanying conformance test standard for *TPS-eCall* (at time of writing the appropriate tests can be found in EN 16454).

7.2 System under test

This deliverable is focussed on the conformance of systems at the application level. The Conformance Test Procedures (CTPs) specified herein are to ascertain conformance of the application, and therefore are focussed on the ‘system’ under test, and not the physical equipment components that comprise the ‘system’. The CTPs specified herein relate, as far as possible, to tests of the *system* in operation under the control of one of the actor groups (for example: conformance tests for the IVS (any type) are referenced to the ‘IVS’ and not to any components of the IVS, and test only those aspects within the control of the IVS).

These conformance tests therefore test the behaviour/inputs/outputs of the system and not how the components of the system operate, nor where they store their *data*, or how they are configured/designed to achieve the system performance. This allows maximum market flexibility in design and instantiation, yet provides assurance of compliant operation at the system level. This approach will also assist migration over time as equipment design improves and develops, and enables an open and competitive marketplace.

Any references to specific clauses of the standards deliverables, to which these conformance tests are designed to confirm compliance, relate to the behaviour, inputs and outputs specified in the referenced deliverable at the *system* level. Any specification in any referenced standards deliverable as to how a value is calculated, or the location of where *data* is stored, was not tested, nor required for ‘system’ level conformance so long as the results of behaviour and values of inputs and outputs are as required by the referenced standards deliverable.

These conformance tests test conformance to the suite of CEN and ETSI standards deliverables that together enable ‘eCall’ to be achieved in a consistent and interoperable way. They may assist but do not test nor provide GCF certification, and equipment manufacturers should be aware that their equipment may also have to get their product GCF certified in order to be allowed to be used on MNO networks.

8 Requirements

8.1 General objectives

8.1.1 State transitions

Service provision comprises the success of a series of state transitions. Conformance can therefore be ascertained at a system level by demonstration that the state transitions are successfully made.

NOTE 1 The advantages of a 'system under test' approach, rather than a 'device under test' approach include that fewer tests to be undertaken; many tests can be taken at a practical 'has it achieved the objective' level and are less complex (and therefore less costly), and at least in respect of MNO and PSAP, test the system more than they test the equipment that a system happens to be using on a particular day which is a more effective approach.

In the Clause 1 "Scope", the key actors in the eCall chain of service provision in hybrid circuit switched/packet switched network are specified as:

- 1) *In-Vehicle System* (IVS)/vehicle
- 2) Mobile Network Operator (MNO)
- 3) *Public Safety Answering Point* (PSAP)

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

NOTE 2 Conformance tests are not appropriate nor required for *vehicle occupants*, although they are the recipient of the service.

NOTE 3 Third party eCall systems (*TPS-eCall*) are not within the scope of this deliverable. This is because the core *TPS-eCall* standard (EN 16102) does not specify the communications link between the vehicle and the TPS service provider.

NOTE 4 These conformance tests are partly based on the appropriate conformance tests from EN 16454 and EN 17240. This deliverable therefore adapts and revises Conformance Test Procedures (CTPs) from EN 16454 and EN 17240 for hybrid circuit switched/packet switched network environments.

This document complements EN 16454 and EN 17240 and provides a suite of conformance tests for IVS equipment, MNOs and PSAPs, required to ensure and demonstrate compliance with EN 17905.

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

To understand the roles more clearly, the transaction can be specified as one between

- *Vehicle occupants*
- PSAPs

But in order to achieve this transaction, the following actors are required and involved:

- *In-Vehicle System* provider (*Vehicle manufacturers* and providers of aftermarket equipment)
- Mobile Network Operators (to carry the radio transmissions)

The key systems may be described as:

- *In-Vehicle Systems*
- Mobile Network Operator systems

— PSAP systems

Service provision is an interdependent series of actions between the actors and the systems.

Each provision of service has a series of state transitions that it needs to successfully achieve, to provide its part of the service. System level conformance testing can therefore be achieved by demonstrating that a state transition, or sequence of state transitions, successfully achieve their transition.

In respect of the recipient of the *eCall service* – the occupants of the vehicle – they are largely passive in respect of service provision. It is true that they may be able to manually initiate an eCall, but eCall is designed to be provided in circumstances where the occupants of the vehicle may be incapacitated or even unconscious. In any event the occupants of the vehicle do not need to demonstrate that they are compliant to the eCall standards.

Some of the key states and conformance areas for each of the four actor groups are shown to assist the reader in Figures 3 to 7 and 9 to 12, and a classification of testing is provided for all actor groups within 8.1.2.

These diagrams are not intended to fully describe all possible states and state transitions associated with a given actor group, but illustrate key areas where conformance may need to be tested.

The test groups are partly aligned with the corresponding tests groups in EN 16454 and EN 17240. This document complements EN 16454 and EN 17240, and hence provides end to end conformance tests for additional eCall requirements in hybrid circuit switched/packet switched network environments. Aspects which are already covered in EN 16454 and EN 17240 (e.g. the session establishment with a dedicated *eCall service* URN) are not fully repeated within this document.

Clauses 9 to 11 then, for each actor group in turn, analyse the tests required for that actor group to be able to claim compliance.

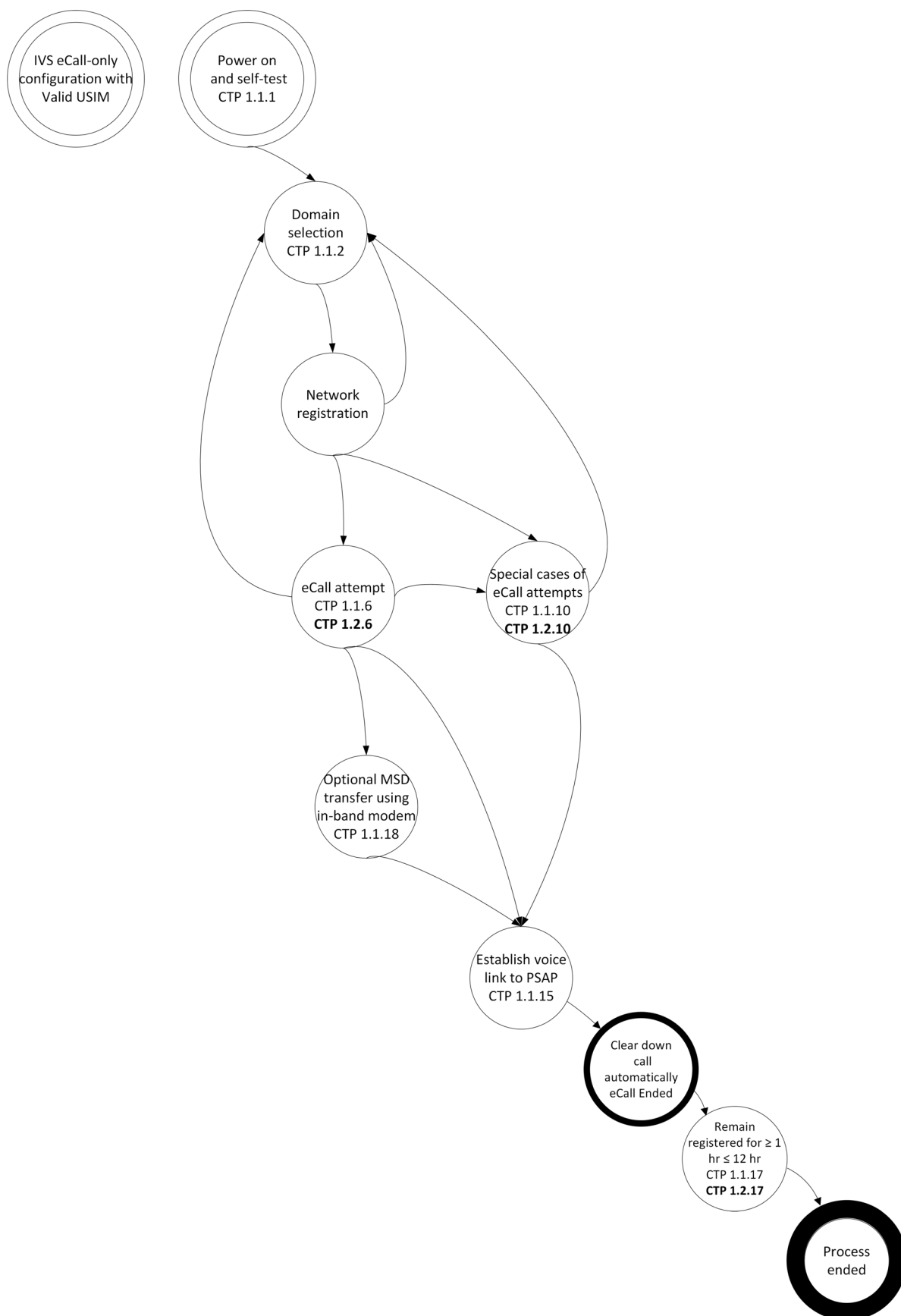


Figure 4 — State transitions for eCall-only IVS in hybrid circuit switched/packet switched network environments

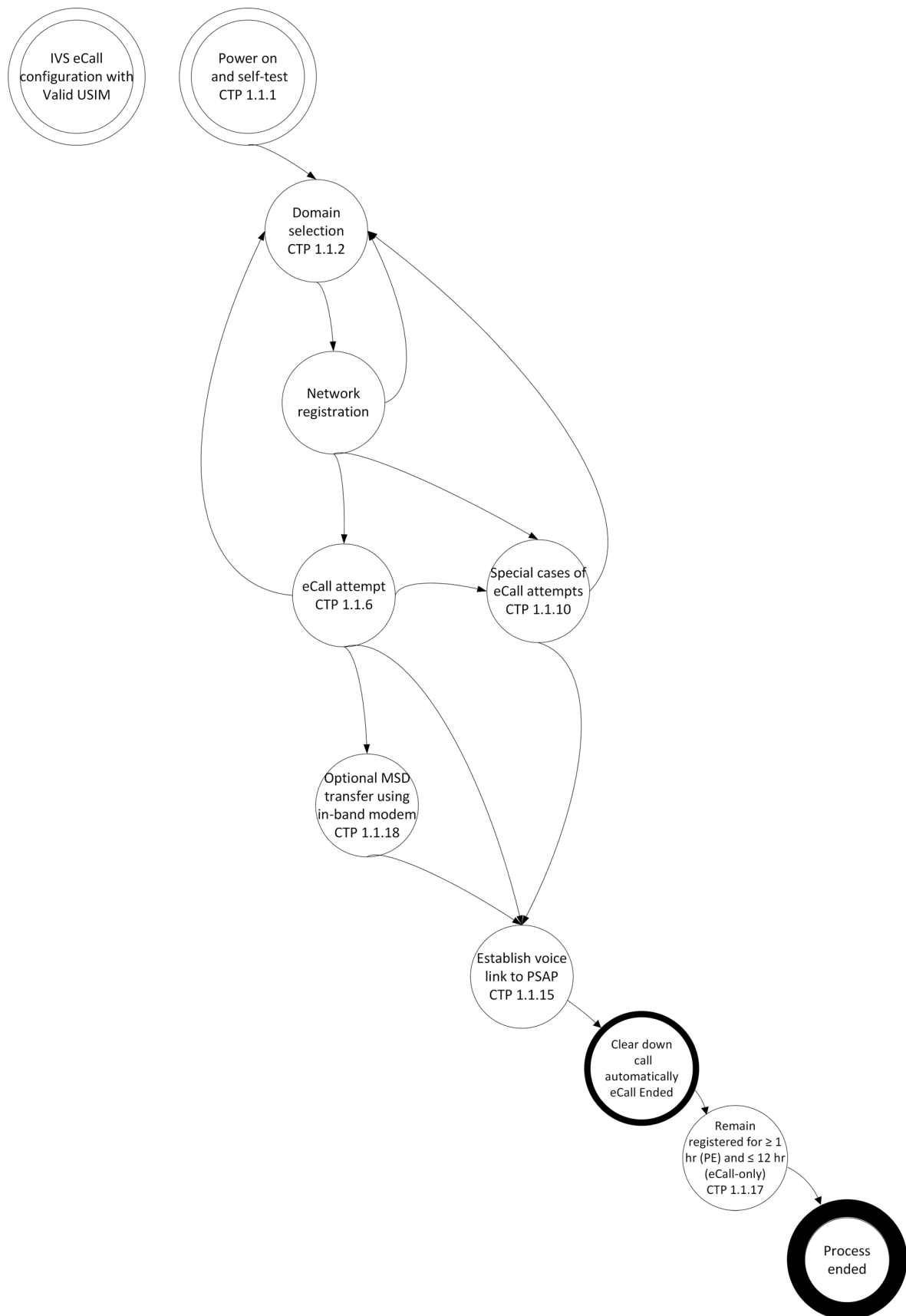


Figure 5 — State transitions for eCall IVS in hybrid circuit switched/packet switched network environments

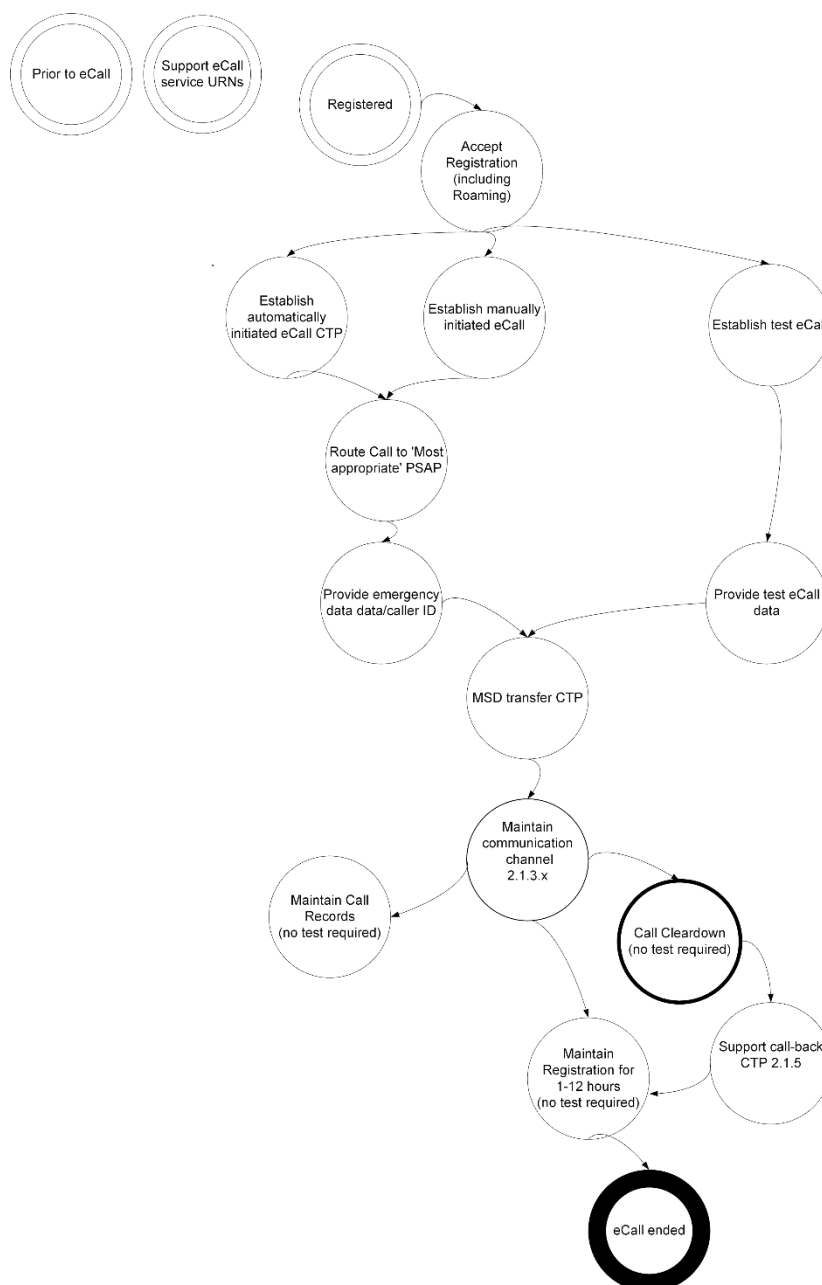


Figure 6 — State transitions for MNO systems supporting eCall in hybrid circuit switched/packet switched network environments

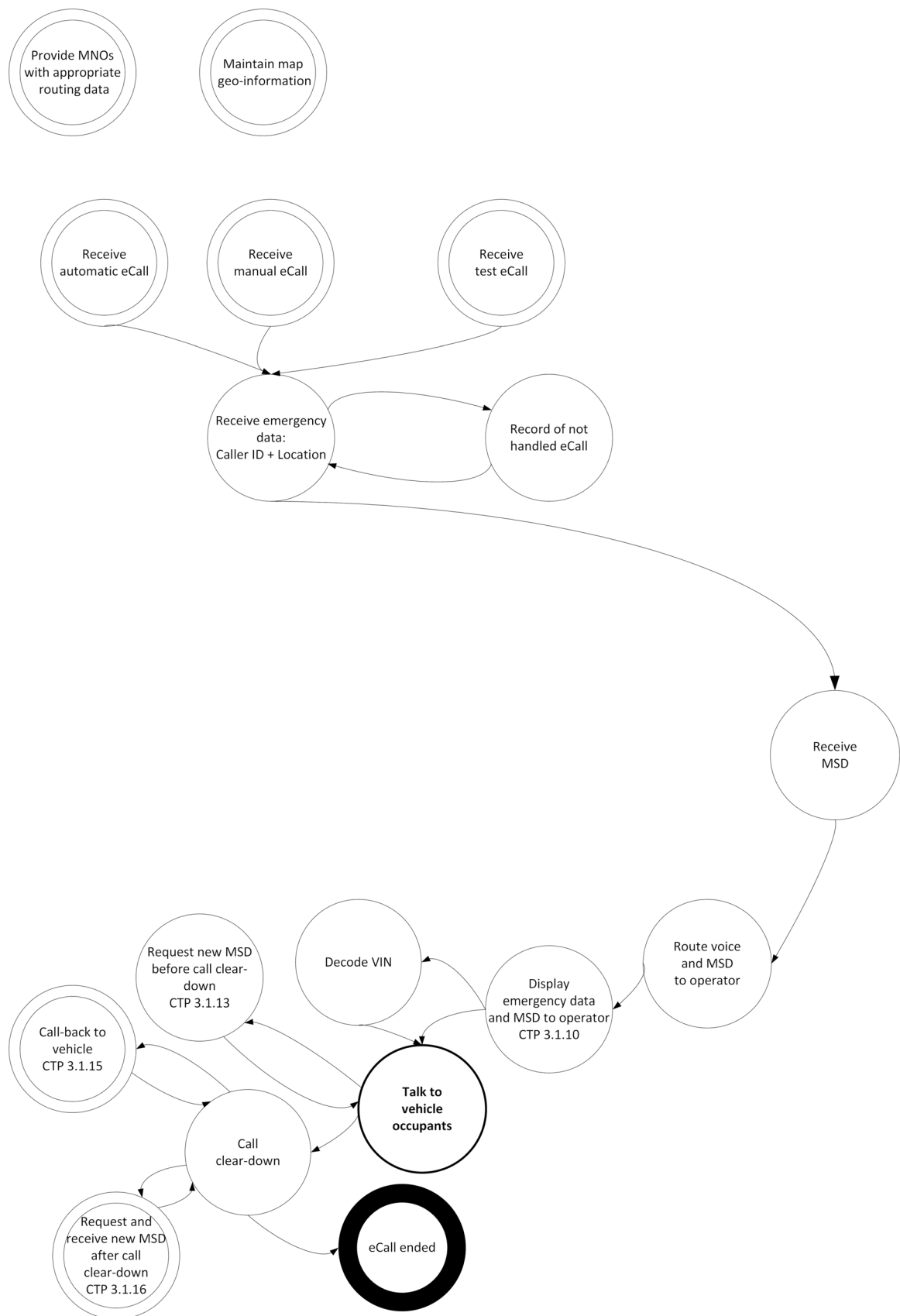


Figure 7 — State transitions for PSAP systems supporting in hybrid circuit switched/packet switched network environments

8.1.2 Classification of testing

Table 2 — Classification of testing

<u>Conformance Area</u>	<u>IVS</u>	<u>MNO</u>	<u>PSAP</u>
PRE: Availability of systems			
PRE: Training			
PRE: Contact details			
PRE: Geographical Information System			
PRE: NAD conformance tests			
E-OFF: Engine control-off behaviour			
E-ON: Engine control-on and power- up behaviour	X		
E-ON: Network registration			
TRG: Trigger			
ECI: Domain selection	X		
ECI: Network selection	X		
ECI: Network registration	X		
ECI: eCall Initiation	X		
AIC: Attempt IMS-eCall			
AIC: Attempt IMS emergency call			
ACC: Attempt CS eCall			
ECP: IMS-eCall in progress	X		X
ECP: Optional MSD transfer using in-band modem	X	X	X
ECP: CS eCall in progress	X		X
TWI: Talk with vehicle occupants			
CLR: eCall clear-down			
CLB: Network de-registration eCall-only IVS	X		
CLB: Call-back PSAP to car	X	X	X

Figure 8 shows the *test points* that are valid for ‘System Under Test’. At each *test point* it is possible to trigger particular action or to observe the system response on particular action.

A *test point* may be an actual instantiation of equipment performing the CTP ‘live’, using ‘live’ equipment. However, it may also be equipment/systems that simulate behaviour of equipment at the point being tested in order to stimulate or observe the behaviour resultant from the stimulation and note the result of that simulation. The objective of using ‘*test points*’ (in addition to not placing a burden on live systems) is to obviate the possibility of error being introduced into the SUT from elsewhere, so that we are sure of the SUT behaviour. However, in some situations where this is not a concern, the test may be, at the discretion of the tester, simply made on a live system so long as it does not place a burden on other actors. Although in terms of the total *eCall transaction*, the IVS is the generator of input to the other actors, the

MNO is a highway for the eCall and the PSAP is the recipient, within the actual transaction and of the actors may be at a particular stage conduct communication in either direction, as appropriate.

For example, when testing whether the IVS equipment transmits an eCall to a PSAP, the objective of the test is to verify that the IVS is working according to the requirements. The behaviour of the MNO carrying the message was not under test in this particular CTP and may therefore be simulated, and what is done with the eCall by the PSAP was not under test in this particular CTP and may also therefore be simulated.

Such simulation will be necessary, for example, to ensure that PSAPs do not receive calls from IVS equipment under CTP test. Similarly, to study the behaviour of the system in the event of a crash impact, simulation tools may be used to avoid the necessity of physically having to crash a car in order to prove that the system passes that CTP test.

The following *test points* are identified and used in this document:

— *IVS test point*

This *test point* represents the behaviour of the system installed in the vehicle, or is a simulation of the output from the vehicle on the MNO and/or PSAP. The *test point* is representing the *In-Vehicle System* and is used only for test purposes related to eCall.

— *MNO test point*

This *test point* represents the 'Public Land Mobile Network' (PLMN) of the 'Mobile Network Operator' (MNO) or is a simulation of the behaviour of the PLMN with the IVS and/or the PSAP. The *test point* can be located at any network element that creates PLMN and is used for particular test purpose. Because some of the test purposes will be difficult to be executed in a real mobile network, an MNO *test point* may operate the MNO system software in a simulated environment. The MNO PLMN *test point* is used only for test purposes related to eCall.

Unless stated otherwise in each testcase, any testcase that uses a CS network MNO *test point* and PS network MNO *test point(s)* shall use a different MNO for the CS network MNO *test point* than for the PS network MNO *test point(s)*.

For an eCall-capable IVS, the initially registered PLMN (MNO *test point*) may be an HPLMN or EHPLMN, but no other PLMN is an HPLMN, EHPLMN or EPLMN to the initially registered PLMN.

The MNO *test points* shall support just one P-CSCF in PS domain per MNO, otherwise a compliant IVS may retry a failed eCall over IMS using a different P-CSCF rather than performing domain reselection.

— *PSAP test point*

This *test point* represents the PSAP located either at eCall application or PSAP voice terminal. The PSAP *test point* is used for test purposes related eCall. The *test point* is representing the PSAP system and is used only for test purposes related to eCall.

See Figure 8.

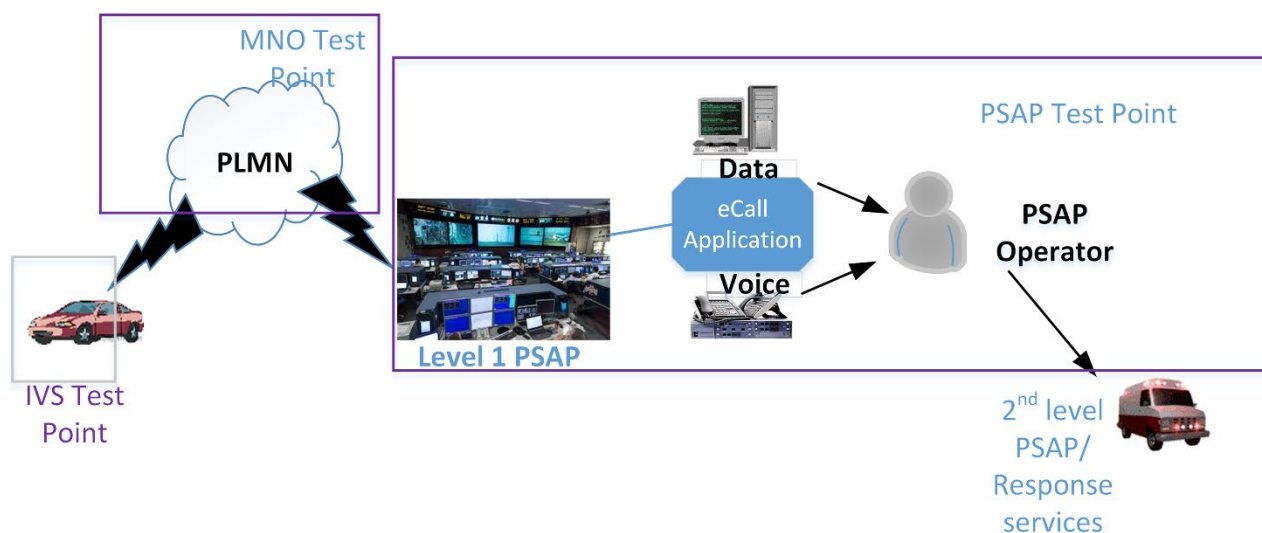


Figure 8 — Test points

8.1.3 CTP naming conventions

Each CTP is given an identification which is built up to contain the following string of information:

CTP/<actor>/<stage>/<n.n.n.n>

- CTP : to indicate that it is a 'Conformance Test Procedure';
- <actor> : IVS, MNO, PSAP;
- <stage> : which stage the CTP belongs to;
- <n.n.n.n> : Unique decimal numbered state transition reference/ CTP number;

NOTE The above identification used in all test procedures specified related to the content of the table, but not to the corresponding clause title.

The naming conventions are as described in Table 3.

8.1.4 CTP <stage> naming convention for conformance tests

Table 3 — CTP <stage> naming convention

Stage	Stage description	Stage acronym <stage>
STAGE A	General conformance tests required before eCall is initiated, including relevant NAD conformance tests	PRE
STAGE B	Engine Control Not Activated	E-OFF
STAGE C	Engine Control Activated (no eCall) including power-up	E-ON
STAGE D	Trigger	TRG
STAGE E	eCall Initiation	ECI
STAGE F1	Attempt IMS-eCall	AIC
STAGE F2	Attempt IMS emergency call	AIC
STAGE F3	Attempt CS eCall	ACC

Stage	Stage description	Stage acronym <stage>
STAGE G1	IMS-eCall in progress	ECP
STAGE G2	Optional MSD transfer using in-band modem	ECP
STAGE G3	CS eCall in progress	ECP
STAGE H	Talk with occupants	TWI
STAGE I	eCall clear-down	CLR
STAGE J	Post eCall and Call-back	CLB

8.2 CTP structure

Table 4 shows the 'Test Suite Structure' (TSS)

Table 4 — Test suite structures for eCall in hybrid circuit switched/packet switched network environments

Group	Group acronym	State transition reference all IVS	State transition reference eCall-only IVS Additional tests	State transition reference MNO	State transition reference PSAP
General conformance tests required before eCall is initiated, including relevant NAD conformance tests	PRE	-	-	-	-
Engine Control Not Activated	E-OFF	-	-	-	-
Engine Control Activated (no eCall) including power-up	E-ON	CTP 1.1.1.1	-	-	-
Trigger	TRG	-	-	-	-
eCall Initiation	ECI	CTP 1.1.2.1 CTP 1.1.2.2 CTP 1.1.2.3 CTP 1.1.2.4 CTP 1.1.2.5 CTP 1.1.6.1 CTP 1.1.6.2 CTP 1.1.6.3 CTP 1.1.10.1 CTP 1.1.10.2 CTP 1.1.10.3 CTP 1.1.10.4 CTP 1.1.10.5 CTP 1.1.10.6 CTP 1.1.10.7 CTP 1.1.10.8 CTP 1.1.10.9 CTP 1.1.10.10 CTP 1.1.10.11 CTP 1.1.10.12 CTP 1.1.10.13 CTP 1.1.10.14 CTP 1.1.10.15 CTP 1.1.10.16 CTP 1.1.10.17 CTP 1.1.10.18	CTP 1.2.6.1 CTP 1.2.10.1 CTP 1.2.10.2 CTP 1.2.10.3	-	-

Group	Group acronym	State transition reference all IVS	State transition reference eCall-only IVS Additional tests	State transition reference MNO	State transition reference PSAP
		CTP 1.1.10.19 CTP 1.1.10.20 CTP 1.1.10.21 CTP 1.1.10.22 CTP 1.1.10.23			
Attempt IMS-eCall / IMS emergency call	AIC	-	-	-	-
Attempt CS eCall	ACC	-	-	-	-
eCall in progress / Optional MSD transfer using in-band modem	ECP	CTP 1.1.15.1 CTP 1.1.18.1 CTP 1.1.18.2	-	CTP 2.1.3.1 CTP 2.1.3.2	CTP 3.1.10.1 CTP 3.1.10.2 CTP 3.1.10.3 CTP 3.1.13.1
Talk with occupants	TWI	-	-	-	-
eCall clear-down	CLR	-	-	-	-
Post eCall and Call-back	CLB	CTP 1.1.17.1 CTP 1.1.17.2 CTP 1.1.17.3 CTP 1.1.17.4 CTP 1.1.17.5	CTP 1.2.17.1	CTP 2.1.5.1 CTP 2.1.5.2 CTP 2.1.5.3 CTP 2.1.5.4	CTP 3.1.15.1 CTP 3.1.15.2 CTP 3.1.15.3 CTP 3.1.16.1 CTP 3.1.16.2 CTP 3.1.16.3 CTP 3.1.16.4

8.3 eCall timers

In this document multiple eCall timers from EN 16062 and EN 17184 are used in certain tests. Table 5 gives a short overview of those timers. The default values and the definition of those timers is available in EN 16062:2023 Annex A Table A.1 and EN 17184:2024 Annex A Table A.1.

Table 5 — eCall timers

Name	Origin	Description	Reference(s)
T1	IVS	Manually initiated eCall (MIeC) false triggering cancellation period	EN 16062:2023; EN 17184:2024
T2	IVS	IVS Call Cleardown Fallback Timer (CCFT)	EN 16062:2023; EN 17184:2024
T7	IVS	IVS MSD maximum transmission time	EN 16062:2023
T8	PSAP	PSAP MSD maximum reception time	EN 16062:2023
T9	IVS	IVS NAD minimum network registration period	EN 16062:2023; EN 17184:2024
T10	IVS	IVS NAD network 'Deregistration Fallback Timer' (DFT)	EN 16062:2023; EN 17184:2024

8.4 CTP Test Applicability

Some CTP tests are applicable only to an IVS or PSAP system that supports certain capabilities. These tests shall not be applied when the indicated capabilities are not supported by the IVS or PSAP system. To allow for possible future change in ETSI specifications (e.g. Release 19), any ETSI specification included as part of test applicability shall refer to the latest Release 16 version of the specification. If the definition of a capability changes in a later version (e.g. Release 19) of the ETSI specification such that an

IVS that supports the later version (e.g. Release 19) of the ETSI specification does not support the capability as defined in Release 16, then the capability shall be considered to be not supported.

NOTE The Technical Committee CEN/TC 278/WG 15 noticed some differences between the latest eCall requirements from CEN compared with the current requirements in ETSI specifications (Release 16 and later) and asked ETSI and 3GPP for alignment. Those alignments are currently planned in ETSI/3GPP Release 19.

9 Conformance tests for in-vehicle systems (IVS)

9.1 Taxonomy of testing

Tests are provided, and are arranged into the state transition points.

In-vehicle eCall system equipment may be set up in one of two ways:

- a) eCall IVS – both *eCall-capable* and *eCall-only* IVS numbered with the convention 1.1.n.n (see 8.1.3);
- b) *eCall-only* IVS – additional tests for *eCall-only* IVS numbered with the convention 1.2.n.n (see 8.1.3);

The state transition points for *eCall-only* IVS are provided in Figure 4 above.

The state transition points for eCall IVS (for both *eCall-capable* and *eCall-only*) are provided in Figure 5 above.

9.2 Conformance tests for eCall In-Vehicle Systems (IVS) to demonstrate compliance with EN 17905

9.2.1 General

Figure 9 shows the state transitions for both cases of eCall IVS (*eCall-capable* and *eCall-only*), and lists the relevant conformance test references against them.

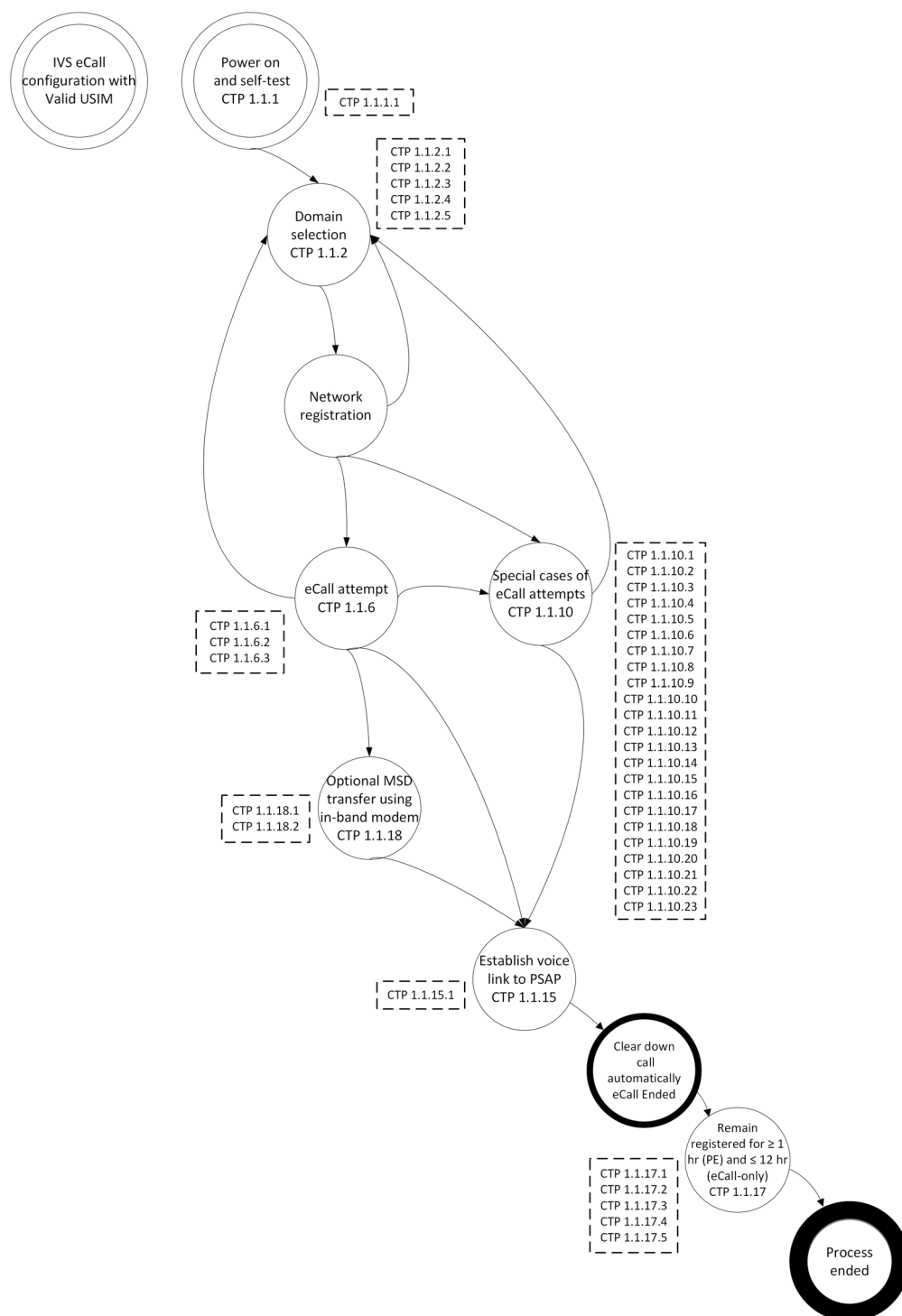


Figure 9 — State transitions for eCall IVS in hybrid circuit switched/packet switched network environments with associated CTP references

9.2.2 CTP 1.1.1.1 Self-test and fault indication IVS

Table 6

SUT reference	'In-Vehicle System'		
CTP/IVS/E-ON/1.1.1.1	Verify that the IVS eCall self-test and fault indication		
SUT test objective	Verify that when powered on, an indication that the eCall function of the IVS (for eCall in CS and PS domain and the additional business logic for domain selection) is functioning correctly, is provided and/or that no warning (fault indication) is indicated. In the event of a critical system failure, detected during or following the self-tests, a warning (fault indication) shall be given to the occupants of the vehicle		
CTP origin	CEN		
Reference requirement	EN 17905:2023, 7.3		
Initial conditions	Engine control not activated IVS is in mobile network coverage A circuit switched network MNO <i>test point</i> is available An ECL capable packet switched network MNO <i>test point</i> is available		
Stimulus and expected behaviour			
Test point		Tester action	Pass condition
IVS SUT	1	Simulate a malfunction of the eCall function of the IVS by introducing a critical failure in one of the items monitored by the self-test function, in accordance with the manufacturer's instructions	
IVS SUT	2	Power on the IVS (or activate engine control), in accordance with the manufacturer's instructions	
IVS SUT	3	Verify that a warning (fault indication) that the eCall function of the IVS (for eCall in CS and PS domain and the additional business logic for domain selection) is not functioning correctly is provided	A warning (fault indication) that the eCall function of the IVS (for eCall in CS and PS domain and the additional business logic for domain selection) is not functioning correctly was provided
IVS SUT	4	Power off the IVS (or deactivate engine control), in accordance with the manufacturer's instructions	
IVS SUT	5	Restore IVS to the initial status by removal of the previously simulated critical failure in one of the items monitored by the self-test function, in accordance with the manufacturer's instructions	
IVS SUT	6	Power on the IVS (or activate engine control), in accordance with the manufacturer's instructions	

IVS SUT	7	Verify that an indication that the eCall function of the IVS (for eCall in CS and PS domain and the additional business logic for domain selection) is functioning correctly is provided and/or that no warning (fault indication) is indicated	An indication that the eCall function of the IVS (for eCall in CS and PS domain and the additional business logic for domain selection) is functioning correctly was provided and/or no warning (fault indication) was indicated
IVS SUT	8	Repeat the above test sequence for each supported item monitored by the self-test function (for eCall in CS and PS domain and the additional business logic for domain selection), in accordance with manufacturer's instructions	All steps of the above sequence are passed for each monitored item. If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

9.2.3 CTP 1.1.2.1 Domain selection skipped and IVS remains registered in CS domain - IVS

Table 7

<i>SUT reference</i>	‘In-Vehicle System’		
CTP/IVS/ECI/1.1.2.1	Verify that the domain selection is skipped and IVS remains registered in CS domain		
SUT test objective	If the IVS is already registered on the CS domain, then the domain selection shall be skipped when an eCall is triggered and the IVS shall remain registered on the circuit switched network		
CTP origin	CEN		
Reference requirement	EN 17905:2023, 7.5.4.5		
Initial conditions	Engine control not activated IVS is configured to <i>eCall-capable</i> mode and is in mobile network coverage A circuit switched network MNO <i>test point</i> is available An ECL capable packet switched network MNO <i>test point</i> (the different PLMN is not HPLMN, EHPLMN to the IVS or EPLMN to the circuit switched network) with reduced power level is available PSAP <i>test point</i> is available		
Test applicability	If the IVS can only support <i>eCall-only</i> mode, then this test is not applicable, otherwise this test should be applied		
Stimulus and expected behaviour			
Test point		Tester action	Pass condition
IVS SUT	1	Power on the IVS (or activate engine control), in accordance with the manufacturer’s instructions	
MNO <i>test point</i>	2	Check that the IVS completed the network registration on the circuit switched network	IVS registration was completed on the circuit switched network
MNO <i>test point</i>	3	Enhance the power level of the ECL capable packet switched network	
IVS SUT	4	Immediately after step 3, initiate an automatic or manual eCall in accordance with the manufacturer’s instructions	
IVS SUT MNO <i>test point</i>	5	IVS shall skip domain selection and shall remain registered on the circuit switched network	IVS remained registered on the circuit switched network
MNO <i>test point</i>	6	Check that the eCall is initiated in CS domain	eCall was initiated in CS domain
PSAP <i>test point</i>	7	PSAP answers the call and transmits SEND MSD*	
IVS SUT	8	IVS sends the MSD	
PSAP <i>test point</i>	9	Check that MSD is received	MSD reached PSAP <i>test point</i>

IVS SUT PSAP <i>test point</i>	10	Confirm that the audio/voice line has been reconnected and the IVS loudspeakers and microphone are working correctly	2-way speech was possible between the IVS and PSAP <i>test point</i> If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL
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* The IVS may send the eCall Initiation signal

9.2.4 CTP 1.1.2.2 Domain selection skipped and IVS remains registered in PS domain - IVS

Table 8

SUT reference	'In-Vehicle System'
CTP/IVS/ECI/1.1.2.2	Verify that the domain selection is skipped and IVS remains registered in PS domain
SUT test objective	If the IVS is already registered on the PS domain of a PLMN advertising ECL capability, then the domain selection shall be skipped when an eCall is triggered and the IVS shall remain registered on the ECL capable packet switched network
CTP origin	CEN
Reference requirement	EN 17905:2023, 7.5.4.5
Initial conditions	Engine control not activated IVS is configured to <i>eCall-capable</i> mode and is in mobile network coverage A circuit switched network MNO <i>test point</i> is available An ECL capable packet switched network MNO <i>test point</i> of the same MNO is available PSAP <i>test point</i> is available
Test applicability	If the IVS can only support <i>eCall-only</i> mode, then this test is not applicable, otherwise this test should be applied

Stimulus and expected behaviour

Test point		Tester action	Pass condition
IVS SUT	1	Power on the IVS (or activate engine control), in accordance with the manufacturer's instructions	
MNO <i>test point</i>	2	Check that the IVS completed the network registration on the ECL capable packet switched network	IVS registration was completed on the ECL capable packet switched network
IVS SUT	3	Initiate an automatic or manual eCall in accordance with the manufacturer's instructions	
IVS SUT MNO <i>test point</i>	4	IVS shall skip domain selection and shall remain registered on the ECL capable packet switched network	IVS remained registered on the ECL capable packet switched network
IVS SUT	5	IVS sends a SIP INVITE message, which contains the initial MSD	
MNO <i>test point</i>	6	Check that the eCall is initiated in PS domain	eCall was initiated in PS domain
PSAP <i>test point</i>	7	PSAP answers the call	
PSAP <i>test point</i>	8	Perform a format check of MSD according to EN 15722	MSD format check succeeded
IVS SUT PSAP <i>test point</i>	9	Confirm that the audio/voice line has been connected and the IVS loudspeakers and microphone are working correctly	2-way speech was possible between the IVS and PSAP <i>test point</i> If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

9.2.5 CTP 1.1.2.3 Domain selection performed and eCall initiated in CS domain - IVS

Table 9

SUT reference	‘In-Vehicle System’		
CTP/IVS/ECI/1.1.2.3	Verify that the domain selection is performed and eCall is initiated in CS domain		
SUT test objective	If the IVS is already registered on the PS domain of a PLMN not advertising ECL capability, then the domain selection shall be performed when an eCall is triggered. If the most recent background scan shows no packet switched network advertising the ECL capability, then the IVS shall activate its circuit switched network stack and perform a circuit switched eCall according to EN 16062		
CTP origin	CEN		
Reference requirement	EN 17905:2023, 7.5.4.4.2 paragraph 1; 7.5.4.5		
Initial conditions	Engine control not activated IVS is configured to <i>eCall-capable</i> mode and is in mobile network coverage A circuit switched network MNO <i>test points</i> (the different PLMN is not HPLMN, EHPLMN to the IVS or EPLMN to the packet switched network) with reduced power level is available A packet switched network MNO <i>test point</i> (without ECL capability) is available No ECL capable packet switched network MNO <i>test point</i> is available PSAP <i>test point</i> is available		
Test applicability	If the IVS can only support <i>eCall-only</i> mode, then this test is not applicable, otherwise this test should be applied		
Stimulus and expected behaviour			
Test point		Tester action	Pass condition
IVS SUT	1	Power on the IVS (or activate engine control), in accordance with the manufacturer’s instructions	
MNO <i>test point</i>	2	Check that the IVS completed the network registration on the packet switched network	IVS registration was completed on the packet switched network
MNO <i>test point</i>	3	Enhance the power level of the circuit switched network	
IVS SUT	4	Immediately after step 3, initiate an automatic or manual eCall in accordance with the manufacturer’s instructions	
IVS SUT MNO <i>test point</i>	5	IVS shall perform domain selection and shall register on the circuit switched network	Domain selection was performed and IVS registered on the circuit switched network
MNO <i>test point</i>	6	Check that the eCall is initiated in CS domain	eCall was initiated in CS domain
PSAP <i>test point</i>	7	PSAP answers the call and transmits SEND MSD*	
IVS SUT	8	IVS sends the MSD	
PSAP <i>test point</i>	9	Check that MSD is received	MSD reached PSAP <i>test point</i>

IVS SUT PSAP <i>test point</i>	10	Confirm that the audio/voice line has been reconnected and the IVS loudspeakers and microphone are working correctly	2-way speech was possible between the IVS and PSAP <i>test point</i> If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL
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* The IVS may send the eCall Initiation signal

9.2.6 CTP 1.1.2.4 Domain selection performed and eCall initiated in PS domain - IVS

Table 10

SUT reference	‘In-Vehicle System’		
CTP/IVS/ECI/1.1.2.4	Verify that the domain selection is performed and eCall is initiated in PS domain		
SUT test objective	If the IVS is already registered on the PS domain of a PLMN not advertising ECL capability, then the domain selection shall be performed when an eCall is triggered		
CTP origin	CEN		
Reference requirement	EN 17905:2023, 7.5.4.5		
Initial conditions	Engine control not activated IVS is configured to <i>eCall-capable</i> mode and is in mobile network coverage No circuit switched network MNO <i>test point</i> is available A packet switched network MNO <i>test point</i> (without ECL capability) is available An ECL capable packet switched network MNO <i>test point</i> (the different PLMN is not HPLMN, EHPLMN to the IVS or EPLMN to the initially available packet switched network) with reduced power level is available PSAP <i>test point</i> is available		
Test applicability	If the IVS can only support <i>eCall-only</i> mode, then this test is not applicable, otherwise this test should be applied		
Stimulus and expected behaviour			
Test point		Tester action	Pass condition
IVS SUT	1	Power on the IVS (or activate engine control), in accordance with the manufacturer’s instructions	
MNO <i>test point</i>	2	Check that the IVS completed the network registration on the packet switched network	IVS registration was completed on the packet switched network
MNO <i>test point</i>	3	Enhance the power level of the ECL capable packet switched network	
IVS SUT	4	Initiate an automatic or manual eCall in accordance with the manufacturer’s instructions	
IVS SUT MNO <i>test point</i>	5	IVS shall perform domain selection and shall register on the ECL capable packet switched network	Domain selection was performed and IVS registered on the ECL capable packet switched network
IVS SUT	6	IVS sends a SIP INVITE message, which contains the initial MSD	
MNO <i>test point</i>	7	Check that the eCall is initiated in PS domain	eCall was initiated in PS domain
PSAP <i>test point</i>	8	PSAP answers the call	
PSAP <i>test point</i>	9	Perform a format check of MSD according to EN 15722	MSD format check succeeded

IVS SUT PSAP <i>test point</i>	10	Confirm that the audio/voice line has been connected and the IVS loudspeakers and microphone are working correctly	2-way speech was possible between the IVS and PSAP <i>test point</i> If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL
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9.2.7 CTP 1.1.2.5 Domain selection performed and eCall initiated in PS domain in different RAT - IVS

Table 11

SUT reference	'In-Vehicle System'		
CTP/IVS/ECI/1.1.2.5	Verify that the domain selection is performed and eCall is initiated in PS domain in different RAT		
SUT test objective	If the IVS is already registered on the PS domain of a PLMN not advertising ECL capability, then the domain selection shall be performed when an eCall is triggered		
CTP origin	CEN		
Reference requirement	EN 17905:2023, 7.5.4.5		
Initial conditions	Engine control not activated IVS is configured to <i>eCall-capable</i> mode and is in mobile network coverage No circuit switched network MNO <i>test point</i> is available A packet switched network MNO <i>test point</i> (without ECL capability) is available An ECL capable packet switched network MNO <i>test point</i> of a different RAT type (e.g. NR) for a different MNO with reduced power level is available PSAP <i>test point</i> is available		
Test applicability	If the IVS can only support <i>eCall-only</i> mode or does not support multiple RAT types in PS domain, then this test is not applicable, otherwise this test should be applied		
Stimulus and expected behaviour			
Test point		Tester action	Pass condition
IVS SUT	1	Power on the IVS (or activate engine control), in accordance with the manufacturer's instructions	
MNO <i>test point</i>	2	Check that the IVS completed the network registration on the packet switched network	IVS registration was completed on the packet switched network
MNO <i>test point</i>	3	Enhance the power level of the ECL capable packet switched network of a different RAT type (e.g. NR) for a different MNO	
IVS SUT	4	Immediately after step 3, initiate an automatic or manual eCall in accordance with the manufacturer's instructions	
IVS SUT MNO <i>test point</i>	5	IVS shall perform domain selection and shall register on the ECL capable packet switched network	Domain selection was performed and IVS registered on the ECL capable packet switched network
IVS SUT	6	IVS sends a SIP INVITE message, which contains the initial MSD	
MNO <i>test point</i>	7	Check that the eCall is initiated in PS domain	eCall was initiated in PS domain
PSAP <i>test point</i>	8	PSAP answers the call	
PSAP <i>test point</i>	9	Perform a format check of MSD according to EN 15722	MSD format check succeeded

IVS SUT PSAP <i>test point</i>	10	Confirm that the audio/voice line has been connected and the IVS loudspeakers and microphone are working correctly	2-way speech was possible between the IVS and PSAP <i>test point</i> If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL
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9.2.8 CTP 1.1.6.1 eCall successful in CS domain - IVS

Table 12

SUT reference	‘In-Vehicle System’		
CTP/IVS/ECI/1.1.6.1	Verify that the IVS successfully completes the eCall in CS domain		
SUT test objective	If the most recent background scan shows no packet switched network advertising the ECL capability, then the IVS shall activate its circuit switched network stack and perform a circuit switched eCall according to EN 16062		
CTP origin	CEN		
Reference requirement	EN 17905:2023, 7.5.4.4.2 paragraph 1		
Initial conditions	Engine control activated and IVS is in mobile network coverage Both packet and circuit switched network MNO <i>test points</i> are available No ECL capable packet switched network MNO <i>test point</i> is available If the IVS is configured to <i>eCall-capable</i> mode, then ensure that the IVS completed the network registration on the packet switched network PSAP <i>test point</i> is available		
Stimulus and expected behaviour			
Test point		Tester action	Pass condition
IVS SUT	1	Initiate an automatic or manual eCall in accordance with the manufacturer’s instructions	
MNO <i>test point</i>	2	Check that the IVS completed the network registration on the circuit switched network	IVS registration was completed on the circuit switched network
MNO <i>test point</i>	3	Check that the eCall is initiated in CS domain	eCall was initiated in CS domain
PSAP <i>test point</i>	4	PSAP answers the call and transmits SEND MSD*	
IVS SUT	5	IVS sends the MSD	
PSAP <i>test point</i>	6	Check that MSD is received	MSD reached PSAP <i>test point</i>
IVS SUT PSAP <i>test point</i>	7	Confirm that the audio/voice line has been reconnected and the IVS loudspeakers and microphone are working correctly	2-way speech was possible between the IVS and PSAP <i>test point</i> If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

* The IVS may send the eCall Initiation signal

* The IVS may send the eCall Initiation signal

9.2.9 CTP 1.1.6.2 eCall successful in CS domain in limited service state - IVS

Table 13

SUT reference	'In-Vehicle System'		
CTP/IVS/ECI/1.1.6.2	Verify that the IVS successfully completes the eCall in CS domain in limited service state		
SUT test objective	If the most recent background scan shows no packet switched network advertising the ECL capability then the IVS shall activate its circuit switched network stack and perform a circuit switched eCall according to EN 16062, even if the network registration with available CS networks fails		
CTP origin	CEN		
Reference requirement	EN 17905:2023, 7.5.4.4.2 paragraph 1; 7.7.1		
Initial conditions	Engine control activated and IVS is in mobile network coverage Both packet and circuit switched network MNO <i>test points</i> are available Circuit switched network MNO <i>test point</i> is only available for emergency calls and is configured to reject network registration No ECL capable packet switched network MNO <i>test point</i> is available If the IVS is configured to <i>eCall-capable</i> mode, then ensure that the IVS completed the network registration on the packet switched network PSAP <i>test point</i> is available		
Stimulus and expected behaviour			
Test point		Tester action	Pass condition
IVS SUT	1	Initiate an automatic or manual eCall in accordance with the manufacturer's instructions	
IVS SUT	2	IVS shall activate its circuit switched network stack and perform a circuit switched eCall	
MNO <i>test point</i>	3	Check that the IVS attempts the network registration on circuit switched network	Recognise network registration attempt on circuit switched network
MNO <i>test point</i>	4	MNO rejects network registration in CS domain	
MNO <i>test point</i>	5	Check that the eCall is initiated in CS domain	eCall was initiated in CS domain
PSAP <i>test point</i>	6	PSAP answers the call and transmits SEND MSD*	
IVS SUT	7	IVS sends the MSD	
PSAP <i>test point</i>	8	Check that MSD is received	MSD reached PSAP <i>test point</i>
IVS SUT PSAP <i>test point</i>	9	Confirm that the audio/voice line has been reconnected and the IVS loudspeakers and microphone are working correctly	2-way speech was possible between the IVS and PSAP <i>test point</i> If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

* The IVS may send the eCall Initiation signal