BS EN 16454:2023



BSI Standards Publication

Intelligent transport systems — ESafety — ECall end to end conformance testing

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National foreword

This British Standard is the UK implementation of EN 16454:2023. It supersedes BS EN 16454:2015, which is withdrawn.

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

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Intelligente Verkehrssysteme - eSicherheit - Vollständige Konformitätsprüfungen für eCall

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European foreword

This document (EN 16454:2023) 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of an identical text or by endorsement, at the latest by March 2024, and conflicting national standards shall be withdrawn at the latest by March 2024.

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

This document supersedes EN 16454:2015.

The following changes have been introduced in this revision:

— IVS and PSAP test added to check for compliance with MSD version 3

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

— PSAP tests added to check for ASN.1 compliance

— Corrections in multiple tests

— Voided Annex A, B, C, D and E

— Added Annex F

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.

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Introduction

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

NOTE 1 EN 15722 specifies a standardized MSD for *eCall*, EN 16062 specifies high level application protocols for eCall and EN 16072 specifies pan-European *eCall* operating requirements. For third party systems, EN 16102 specifies third party services supporting *eCall* operating requirements. (See EC Communication on *eCall* Implementation 2009 [COM(2009) 434 final] for more information.)

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

This document provides tests to enable actors in the eCall chain to be able to claim conformance to the eCall Standards, even though they are unable to control the behaviour of systems of other actors in the eCall chain

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

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

The European Committee for Standardization (CEN) draws attention to the fact that it is claimed that compliance with this 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.

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1 Scope

This document specifies the key actors in the eCall chain of service provision as:

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

2) Mobile network Operator (MNO),

3) Public safety assistance point [provider](PSAP),

and in some circumstances can also involve:

4) Third Party Service Provider (TPSP),

and to provide conformance tests for actor groups 1) - 4).

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

This document covers conformance testing (and approval) of new engineering developments, products and systems, and does not imply testing associated with individual installations in vehicles or locations.

2 Normative references

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

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

EN 16062:2022, *Intelligent transport systems — ESafety — eCall high level application requirements (HLAP) using GSM/UMTS circuit switched networks*

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

EN 16102:2011, *Intelligent transport systems — eCall — Operating requirements for third party support*

ETSI TS 102 936-1, *eCall Network Access Device (NAD) conformance specification; Part 1: Protocol test specification*

ETSI TS 102 936-2, *eCall Network Access Device (NAD), conformance specification; Part 2: Test Suites*

ETSI TS 122 003, *Digital cellular communications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Circuit Teleservices supported by a Public Land Mobile Network (PLMN) (3GPP TS 22.003 version 12.0.0 Release 12) [Teleservice 12/TC12) /E12]*

ETSI TS 122 011, *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Service accessibility (3GPP TS 22.011 version 8.9.0 Release 8)*

ETSI TS 122 101, *Universal Mobile Telecommunications System (UMTS); LTE ;Service aspects; Service principles (Release 8)*

ETSI TS 122 105, *Universal Mobile Telecommunications System (UMTS); Services and service capabilities (3GPP TS 22.105 version 8.4.0 Release 8)*

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ETSI TS 123 107, *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Quality of Service (QoS) concept and architecture (3GPP TS 23.107 version 6.4.0 Release 6)*

ETSI TS 123 122, *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Non-Access-Stratum (NAS) functions related to Mobile Station (MS) in idle mode (3GPP TS 23.122 version 8.12.0 Release 8)*

ETSI TS 124 008, *Digital cellular telecommunications system (Phase 2+);Universal Mobile Telecommunications System (UMTS); LTE; Mobile radio interface Layer 3 specification; Core network protocols; Stage 3*

ETSI TS 126 267,[1] *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); eCall data transfer;In-band modem solution; General description [Version 8.6.0 or later]*

ETSI TS 126 269, *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); eCall data transfer; In-band modem solution; Conformance testing (Version 8.3.0 or later)*

ETSI TS 127 007, *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; AT command set for User Equipment (UE)*

ETSI TS 131 102, *Universal Mobile Telecommunications System (UMTS); Characteristics of the Universal Subscriber Identity Module (USIM) application (3GPP TS 31.102 version 8.17.0 Release 8)*

ETSI TS 134 123-1 V15.6.0 (2022-07) or later, *Universal Mobile Telecommunications System (UMTS); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification (3GPP TS 34.123-1 version 15.6.0)*

ETSI TS 151 010-1 V13.13.0 (2022-05) or later, *Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformance specificatication; Part 1: Conformance specification (3GPP TS 51.101-1 version 13.13.0).*

ETSI TS 103 412 V1.3.1 (2020-03) or later, *Mobile Standards Group (MSG); Pan-European eCall end to end and in-band modem conformance testing; Prose test specification*

3 Terms and definitions

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

3.1

112

single European emergency call number supporting ‘Teleservice 12’

[1] The provisions for eCall in Version 8.6.0 of ETSI TS 126 267 correspond to the provisions for eCall in versions 9.3.0, 10.0.0 and 11.0.0.

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3.2

call clear-down

act of ending a call, following call completion

Note 1 to entry: The event is signalled in accordance with ISUP (ISDN User Part) 'Release Cause Codes'

Note 2 to entry: Usually achieved by hanging up the receiver or pressing 'end call' or similar on screen.

3.3

contracting MNO

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

3.4

cellular network

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

3.5

conformance test point

actual instantiation of equipment performing a conformance test process 'live', using 'live' equipment or 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 stimulation

3.6

data

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

3.7

data concept

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

3.8

data element

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

3.9

E112

emergency communications service using the single European emergency call number, 112, which is enhanced with location information of the calling user TS12

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3.10

E164

ITU-T recommendation that defines the international public telecommunication numbering plan used in the PSTN and some other data networks and also defines the format of telephone number

Note 1 to entry: E.164 numbers can have a maximum of fifteen digits and are usually written with a + prefix.

3.11

eCall

emergency call generated either automatically via activation of in-vehicle sensors or manually by the *vehicle occupants*

Note 1 to entry: when activated it provides notification and relevant location information to the most appropriate *Public Safety Answering Point*, by means of *mobile wireless communications networks*, carries a defined standardized *minimum set of data* (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*

3.12

eCall+

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

3.13

eCall generator

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

3.14

eCall flag

alternative term for eCall identifier

3.15

eCall identifier

one of two mandatory information element bits (flags) included in the emergency call set-up message that may be used by the mobile network to filter and route automatically and manually initiated *eCalls* to a designated PSAP

3.16

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

3.17

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

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3.18
emergency call response centre
term used in ITS Implementation Directive to mean *Public Safety Answering point* (PSAP)

3.19
established
created or set up

3.20
Global Certification Forum
GCF
certification scheme for mobile phones and wireless devices that are based on 3GPP Standards; GCF aims to ensure that a mobile device will work effectively on mobile networks anywhere in the world

3.21
identifier
label, symbol or token that names or identifies an entity or a collection of *data* or the means of designating or referring to a specific instance of a *data concept*

3.22
In progress
taking place

3.23
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*

3.24
in-vehicle system
in-vehicle equipment together with the means to trigger, manage and effect the *eCall transaction*

3.25
minimum set of data
MSD
standardized data concept comprising data elements of relevant vehicle generated data essential for the performance of the eCall service

3.26
mobile wireless communications network
wireless communications network with homogeneous handover between network access points

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3.27

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.

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

3.28

network access device

NAD

see mobile wireless communications network device

3.29

network access points

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.

3.30

public mobile wireless communications network

mobile wireless communications network with access to a public telecommunications network

3.31

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 organisation recognised 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 document.

3.32

service provider

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

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3.33

Teleservice

teleservices supported by a PLMN described by a number of attributes which are intended to be largely independent

Note 1 to entry: They are grouped into three categories:

- High layer attributes.

- Low layer attributes (describing the Bearer capabilities which support the Teleservice).

    - Information transfer attributes.

    - Access attributes.

- General attributes; examples include including fax-on-demand, voice mail computer telephone integration and emergency services support and include services such as TS11 and TS12.

3.34

test point

see ‘conformance test point'

3.35

TPS-eCall short reference identification

TPS-eCall-SID

shortened form of the TPS-eCall-UID, which is restricted to current and recent incidents, designed to be appropriate for forwarding verbally to a PSAP operator, to allow less-equipped PSAPs to refer to a specific TPS-eCall set of data for a current or recent incident

3.36

TS11

Teleservice 11, Telephony

[SOURCE: ETSI TS 100 905, V7.0.0 (1999-08), Annex A.1.1]

3.37

TS12

Teleservice 12, Emergency calls

[SOURCE: ETSI TS 100 905, V7.0.0 (1999-08), Annex A.1.2]

3.38

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

3.39

vehicle occupant(s)

person(s) inside the vehicle

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3.40
wireless communications network
network operating using an air-interface capable of bi-directional transfer of *data* and or voice

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

4 Symbols and abbreviations

3G	third generation mobile telecommunication system
ACD	automatic call distribution
ACK	ACKnowledgement
AL-ACK	application layer acknowledgement
AIeC	automatic Initiated *eCall*
AT	attention (part of modem instruction to dial as specified in ETSI TS 127 007)
CLB	call-back and post eCall
CLR	call cleardown
CRC	cyclic redundancy check
CTP	conformance test point
EC	European Commission
ECI	eCall initiation
ECP	eCall in progress
ETSI	European Telecommunications Standards Institute
GCF	Global Certification Forum
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
GSM	Global System for Mobile communications
HMI	human machine interface
IE	information entity
I-OFF	ignition off/engine control deactivated

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I-ON	ignition on/engine control activated
IAM	Immediate Alert Message
IMSI	International Mobile Subscriber Identity
IVS	In-Vehicle System
LAN	Local Area Network
LL-ACK	link layer acknowledgement
LTE	Long Term Evolution (of 3G UMTS access network)
MIeC	Manually Initiated *eCall*
MSC	Mobile Switching Centre
MNO	Mobile Network Operator
MSISDN	Mobile Subscriber ISDN (integrated services digital network)
MSD	Minimum Set of Data (EN 15722)
NAD	Network Access Device (e.g. a GSM or UMTS module)
PAN	Personal Area Network
PE	Pan-European
PLMN	Public Land Mobile Network
PSAP	Public Safety Answering Point
RSSI	Received signal strength indicator
SID	Session identification
SIM	Subscriber Identity Module (GSM/3GPP)
SUT	System Under Test
TRG	Trigger
TPS	Third Party Service
TPS-eCall-SID	TPS-eCall short reference identification
TPSP	Third Party Service Provider
TPS-N	Third Party Service-Notifier
TPS-R	Third Party Service-Responder
TPS-SID	Third party service-short reference identification

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TPS-UID	Third party service-unique reference identification
TS (i)	Technical Specification
TS (ii)	Teleservice
TS12	Teleservice 12 ETSI TS 122 003
TSD	TPS-eCall set of data
Tx	transmit
UMTS	Universal Mobile Telecommunication System
USIM	User Service Identity Module
VLR	Visited Location Register

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 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 CTP (conformance test procedure) 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

In the introduction to this document, *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*.

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EN 16072 specifies the operating requirements for Pan European eCall. EN 16062 specifies the 'high level application protocols' for Pan European eCall, EN 16102 specifies the operating requirements for eCall provided by a third party service provider, and EN 15722 specifies the data within the 'Minimum Set of Data'(MSD) which comprises the principal data payload of an eCall.

Pan-European *eCall* effects this service using a Circuit Teleservice supported by a Public Land Mobile Network (PLMN) (Teleservice 12/TS12) ETSI TS 122 003. eCall provided by a third party service provider will use other means of communication.

Figure 1 shows an illustrative view of the pan-European eCall service.

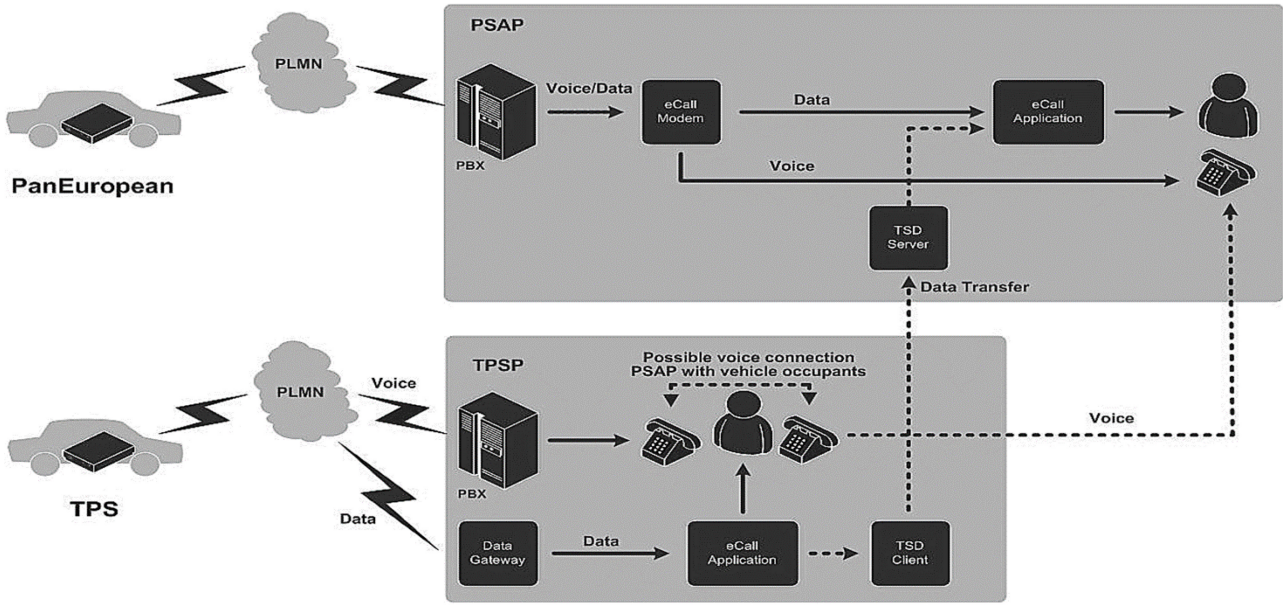


Figure 1 — End-to-end 'panEuropean eCall' and 'TPS-eCall' systems connected to an 'eCall' enabled PSAP

Figure 2, taken from EN 16062:2022, shows the relationship of the eCall transaction to Standards.

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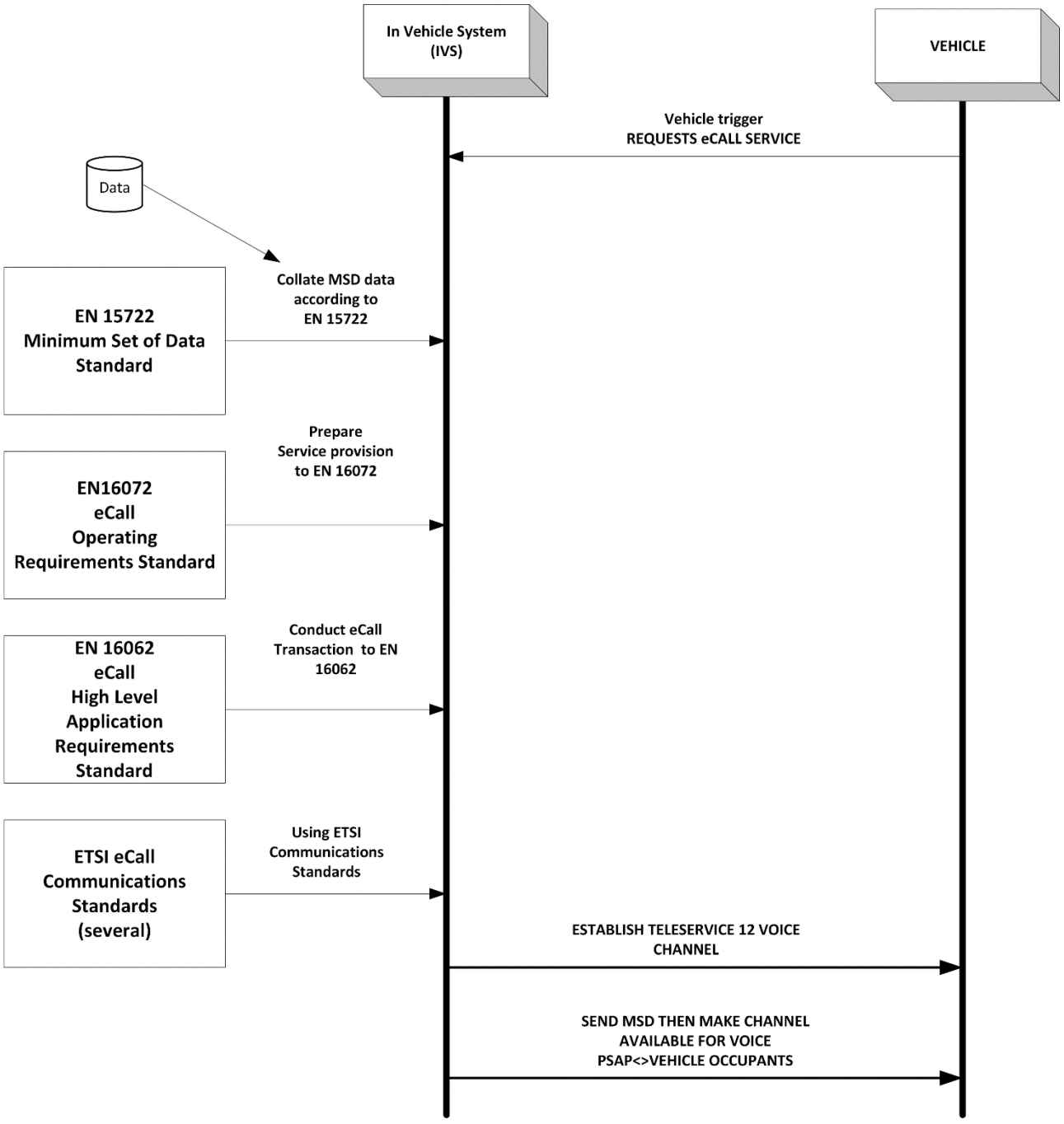


Figure 2 — Relationship of PE eCall transaction to Standards

After the establishment of an emergency voice call TS12 between a vehicle and a *Public Safety Answering point* (PSAP) the audio equipment comprising the microphone and loudspeaker in the vehicle is disconnected from the line whilst the MSD is transmitted, within the voice band, to the PSAP *data* processing equipment. An indication is given to the occupants of the vehicle that an *eCall* is in progress. On completion of the MSD transfer the in-vehicle audio system is reconnected to the line and a voice communication is established between the *vehicle occupants* and a PSAP operator. The incident related information associated with the TS12 voice call, contained within the MSD, is made available to the PSAP operator in the manner decided locally.

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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) remains registered on the mobile network, for the period specified in EN 16072 to enable the PSAP or rescue services to recall the *vehicle occupants*.

The key stages of eCall delivery can be represented as a high-level state transition diagram as in Figure 3. For clarity: in figures, tables and text throughout this document the term 'ignition' is used, which is appropriate for traditional combustion engines. In the case of electric, hybrid and stop/start vehicles, 'ignition on'/'ignition off' should be read as 'engine control activated'/'engine control deactivated'

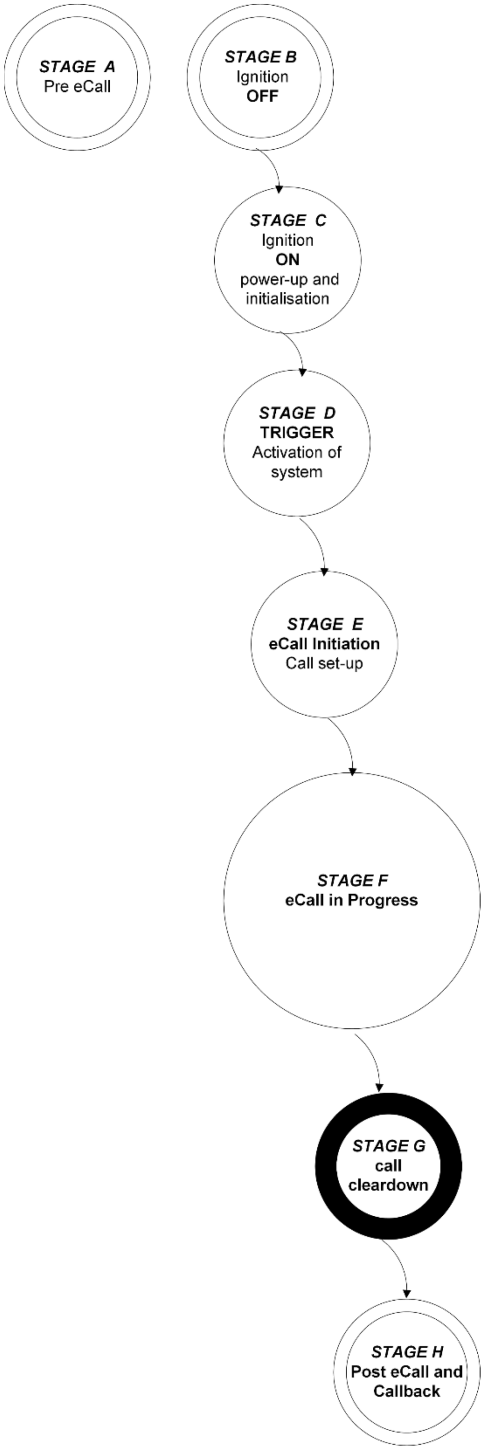


Figure 3 — High level state transition steps of eCall

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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, including relevant conformance tests for: ETSI TS 102 936-1 ETSI TS 102 936-2
STAGE B	Ignition OFF	I-OFF	Start state before engine is started No actions
STAGE C	Ignition ON (no eCall) including power-up	I-ON	Ignition turned on by driver; Power-up and initialisation 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	Network selection and registration (if not already registered on a network). Call set-up
STAGE F	eCall in progress	ECP	Data transfer Establish audio link Clarification of the overall emergency situation and location Initiate incident resolution In the case of PE eCall specifically: Request MSD, send MSD, error check), and link layer ACK (including stop MSD transmissions); Application layer ACK; Establish audio link (including check audio link to vehicle occupants, MSD visualisation, rerouting to another PSAP)
STAGE G	eCall Cleardown	CLR	Terminate call
STAGE H	Post eCall and Call-back	CLB	Remain registered on network to enable PSAP to call-back into vehicle if required

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Some of these state transitions are under the control of one actor (for example 'activation of system'), however others require involvement of multiple actors (for example Call set up, MSD transfer, etc.)

The objective of this document is to view eCall from the point of each of the key actors in turn, and provide tests that encompass the aspects of eCall under their control. If they can demonstrate that they comply to all of the tests identified for their role, they are able to claim that they are compliant to the eCall Standards.

7 How to use this document

7.1 Layout and procedures

Clauses 8 to 12 specify the requirements in order to claim compliance with the suite of eCall Standards described in Figure 2 above.

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). 7.3 explains circumstances where the success of some tests may be assumed if others later in the chain have been passed.

Clause 8 describes and specifies the general objectives of this conformance 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),' Public Safety Assistance Points/Providers' (PSAP) and 'Third Party Service Providers' (TPSP).

In order to demonstrate conformance of a pan European in-vehicle system to the European Standards defining eCall, you can work through and pass the appropriate conformance tests in 9.1 to 9.6. You may want to document the results in a conformance test report and if so this report shall comply with the requirements specified in ISO/IEC 17025. If the in-vehicle system passes all of the conformance tests specified in the appropriate column(s) of Table 9 (columns 3 and 4) in 8.2 (or the 'accelerated tests' of 7.4), then conformance of the pan European in-vehicle system to the eCall Standards has been demonstrated and the in-vehicle system can be said to be conformant with eCall Standards.

In order to demonstrate conformance of a TPS in-vehicle system to the European Standards defining eCall, you can work through and pass the appropriate conformance tests in 9.7 to 9.8. You may want to document the results in a conformance test report and if so this report shall comply with the requirements specified in ISO/IEC 17025. If the in-vehicle system passes all of the conformance tests specified in the appropriate column (column 5) of Table 9 in 8.2, then conformance of the TPS in-vehicle system to the eCall Standards has been demonstrated and the in-vehicle system can be said to be conformant with eCall Standards.

In order to demonstrate conformance of a mobile network operator to the European Standards defining eCall, you can work through and pass the conformance tests in Clause 10. You may want to document the results in a conformance test report and if so this report shall comply with the requirements specified in ISO/IEC 17025. If the mobile network operator system passes all of the conformance tests specified in the appropriate column (column 6) of Table 9 in 8.2 (or the 'accelerated tests' of 7.5), then conformance of the mobile network operator system to the eCall Standards has been demonstrated and the mobile network operator can be said to be conformant with eCall Standards.

In order to demonstrate conformance of a PSAP to the European Standards defining Pan European eCall, you can work through and pass the conformance tests in Clause 11. You may want to document the results in a conformance test report and if so this report shall comply with the requirements specified in ISO/IEC 17025. If the system of the PSAP passes all of the conformance tests specified in the appropriate column (column 7) of Table 9 in 8.2 (or the 'accelerated tests' of 7.6), then conformance of the PSAP system to the pan European eCall Standards has been demonstrated and the PSAP system can be said to be conformant with eCall Standards.

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In order to demonstrate conformance of a PSAP to the European Standards defining TPS eCall, you can work through and pass the conformance tests in Clause 11. You may want to document the results in a conformance test report and if so this report shall comply with the requirements specified in ISO/IEC 17025. If the system of the PSAP passes all of the conformance tests specified in the appropriate column (column 8) of Table 9 in 8.2 (or the 'accelerated tests' of 7.7), then conformance of the PSAP system to the pan European eCall Standards has been demonstrated and the PSAP system can be said to be conformant with eCall Standards.

The tests for a conformant TPS-eCall cannot easily be split into very small steps due to the wide range of possible technical solutions for the IVS, TPS-eCall Responder, and TPS-eCall Notifier with supplier-dependent communications protocol and call-flow.

The individual conformance tests for TPS-eCall are generally more comprehensive and already reflect a pragmatic grouping of several conformance aspects into a given test, thus supporting efficient testing.

Except where explicitly stated within a given CTP that it does not apply to the system variant being tested, the full sequence of tests in Clause 12 shall be undertaken in order to claim conformance.

In order to demonstrate conformance of a TPS service to the European Standards defining eCall, you can work through and pass the conformance tests in Clause 12. You may want to document the results in a conformance test report and if so this report shall comply with the requirements specified in ISO/IEC 17025. If the system of the TPS passes all of the conformance tests specified in the appropriate column(s) (columns 9, 10, 11) of Table 9 in 8.2, then conformance of the TPS system to the eCall Standards has been demonstrated and the TPS system can be said to be conformant with eCall Standards.

7.2 System under test

This deliverable is focussed on the conformance of systems at the application level. The conformance test procedures 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 conformance test procedures (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 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.

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7.3 Accelerated test procedures

General conditions:

A CTP-PASS condition is only confirmed if ALL individual pass conditions written in the “pass conditions” column of a given 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).

While conformance tests have been specified for each of the state transitions for each actor group involved in an eCall transaction, it is an objective of this Standard to make the compliance testing procedure as quick, inexpensive and simple as possible.

Each actor group Clause (IVS, MNO, PSAP, TPSP) contains a subclause ‘Accelerated Test Procedures’.

This subclause identifies a number of key tests which, if they are successfully passed, mean that the tester can assume that many of the other state transitions have been successful, and may be considered as ‘passed’ without specifically separately undertaking each and every test procedure within the process.

For example, in respect of the IVS, conformance test procedure (CTP) 1.1.2.2, in order to reach this point CTPs 1.1.1.1, 1.1.2.1 are conformant, without specifically undertaking the conformance tests at these transition points.

These accelerated test procedures speed up the testing process and minimise, in the event of successful results, the number of tests that have to be separately performed, thus also reducing the costs associated with the achievement of conformance status.

The remaining subclauses of Clause 7 detail the accelerated test procedures for each of the actor groups involved in eCall conformance testing.

7.4 Accelerated test procedures for IVSs

7.4.1 Accelerated test procedures for all types of PE eCall IVS

If the PE eCall IVS system under test has obtained a PASS to all of the tests in column A of Table 2 in 7.4.1, and is an ‘eCall only’ device, proceed to 7.4.2.

If the PE eCall IVS system under test has obtained a PASS to all of the tests in column A of Table 2 in 7.4.1, and was not an ‘eCall only’ system, no further testing is required in order to claim conformance with the requirements of this document.

Table 2

A	B
PE eCall IVS All types: ESSENTIAL TESTS That SHALL ALWAYS Be completed	**TESTS WHICH MAY BE ASSUMED TO BE PASSED IF TESTS IN THE SAME ROW OF ADJACENT COLUMN A HAVE BEEN SUCCESSFULLY PASSED**
CTP 1.1.0.1	
CTP 1.1.0.2	
CTP 1.1.0.3	
CTP 1.1.2.2	CTP 1.1.1.1 CTP 1.1.2.1
CTP 1.1.2.3	

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A	B
CTP 1.1.2.4 CTP 1.1.2.5	
CTP 1.1.3.2	CTP 1.1.3.1
CTP 1.1.5.2	
CTP 1.1.5.3.1	
CTP 1.1.5.3.2	
CTP 1.1.5.4	
CTP 1.1.5.5	
CTP 1.1.5.6	
CTP 1.1.6.1	
CTP 1.1.7.1	
CTP 1.1.8.1	
CTP 1.1.9.1	CTP 1.1.4.1 CTP 1.1.5.1
CTP 1.1.10.1	
CTP 1.1.10.2	
CTP 1.1.10.3	
CTP 1.1.10.5	
CTP 1.1.11.1	
CTP 1.1.12.1	
CTP 1.1.13.1	
CTP 1.1.14.1	
CTP 1.1.15.1	CTP 1.1.14.2
CTP 1.1.15.2	
CTP 1.1.15.3	
CTP 1.1.15.4	
CTP 1.1.15.5	
CTP 1.1.16.1	
CTP 1.1.16.2	
CTP 1.1.16.3	
CTP 1.1.17.2	CTP 1.1.17.1
CTP 1.1.17.3	
CTP 1.1.17.4	
CTP 1.1.18.1	

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7.4.2 Additional accelerated test procedures for PE eCall only IVS

Table 3

A	B
PE eCall Only IVS: Additional ESSENTIAL TESTS That SHALL ALWAYS Be completed	**TESTS WHICH MAY BE ASSUMED TO BE PASSED IF TESTS IN THE SAME ROW OF ADJACENT COLUMN A HAVE BEEN SUCCESSFULLY PASSED**
CTP 1.1.1.2	
CTP 1.1.10.4	
CTP 1.1.17.5	

If the IVS system under test has obtained a PASS to all of the tests in column A of Table 3 in 7.4.2, in addition to obtaining a PASS to all of the tests in column A of Table 2 in 7.4.1, no further testing is required in order to claim conformance with the requirements of this document.

7.5 Accelerated test procedures for MNOs

Table 4

A	B
MNO ESSENTIAL TESTS That SHALL ALWAYS Be completed	**TESTS WHICH MAY BE ASSUMED TO BE PASSED IF TESTS IN THE SAME ROW OF ADJACENT COLUMN A HAVE BEEN SUCCESSFULLY PASSED**
CTP 2.0.1	
CTP 2.0.2	
CTP 2.0.4 CTP 2.11.1	CTP 2.2.1.2 CTP 2.11.2
CTP 2.4.1	CTP 2.1.2 CTP 2.2.1.1 CTP 2.2.1.2 CTP 2.2.1.3
CTP 2.2.2.1	
CTP 2.2.3.3	
CTP 2.5.1	

If the MNO system under test has obtained a PASS to all of the tests in column A, of Table 4 in 7.5, no further testing is required in order to claim conformance with this document.

Where a CTP is shown in the state transition diagrams, but does not appear in the above list, it may be assumed that that state transition does not require a separate test.

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7.6 Accelerated test procedures for PSAPs - PE eCall

Table 5

A	B
PSAP ESSENTIAL TESTS That SHALL ALWAYS Be completed	**TESTS WHICH MAY BE ASSUMED TO BE PASSED IF TESTS IN THE SAME ROW OF ADJACENT COLUMN A HAVE BEEN SUCCESSFULLY PASSED**
CTP 3.1.10	CTP 3.1.0.1 CTP 3.1.0.2 CTP 3.1.1.1 CTP 3.1.1.2 CTP 3.1.2 CTP 3.1.3.1 CTP 3.1.5.1 CTP 3.1.5.2 CTP 3.1.7.3 CTP 3.1.9
CTP 3.1.3.2	
CTP 3.1.6.1 CTP 3.1.6.2	
CTP 3.1.7.1 CTP 3.1.7.4 CTP 3.1.7.5 CTP 3.1.7.6 CTP 3.1.7.7 CTP 3.1.7.8 CTP 3.1.7.9 CTP 3.1.7.10	
CTP 3.1.11	
CTP 3.1.12	
CTP 3.1.13	
CTP 3.1.14.1 CTP 3.1.14.2	
CTP 3.1.15	
CTP 3.1.16	

If the PSAP PE eCall system under test has obtained a PASS to all of the tests in column A, of Table 5 in 7.6, no further testing is required in order to claim conformance with the requirements of this document.

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7.7 Accelerated test procedures for PSAPs - TPS-eCall

Table 6

A PSAP ESSENTIAL TESTS That SHALL ALWAYS Be completed	B TESTS WHICH MAY BE ASSUMED TO BE PASSED IF TESTS IN THE SAME ROW OF ADJACENT COLUMN A HAVE BEEN SUCCESSFULLY PASSED
CTP 3.2.0.1 CTP 3.2.0.2.1 CTP 3.2.0.2.2 CTP 3.2.0.3 CTP 3.2.0.4.1 CTP 3.2.0.4.2 CTP 3.2.0.5	
CTP 3.2.4	CTP 3.2.1 CTP 3.2.2 CTP 3.2.3
CTP 3.2.5	
CTP 3.2.6	
CTP 3.2.9	CTP 3.2.7 CTP 3.2.8
CTP 3.2.10	
CTP 3.2.11	

If the PSAP TPS-eCall system under test has obtained a PASS to all of the tests in column A, of Table 6 in 7.7, no further testing is required in order to claim conformance with the requirements of this document.

7.8 Accelerated test procedures for TPSPs

For the reasons explained in 7.1, there are no accelerated test procedures for TPSP aspects of eCall, and the full sequence in Clause 12 shall be followed and passed in order to claim conformance.

8 Requirements

8.1 Requirements - 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, PSAP, TPS-Notifier and TPS-Responder, 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 scope, the key actors in the eCall chain of service provision are specified as:

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1) In-vehicle system (IVS)/vehicle

2) Mobile network operator (MNO)

3) Public safety assistance point [provider](PSAP)

in some circumstances may also involve

5) Third party service provider (TPSP)

and to provide conformance tests for actor groups 1) - 4)

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

The scope covers conformance testing (and approval) 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, we can specify the transaction 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)

And in some cases

— Third party service providers

The key systems may be described as:

— In-vehicle systems

— Mobile network operator systems

— PSAP systems

And in some cases

— Third party service provider 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 4 to 11, and a classification of testing is provided for all actor groups within 8.1.

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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.

Clauses 9 to 12 then, for each actor group in turn, analyse the tests required for that actor group to be able to claim compliance.

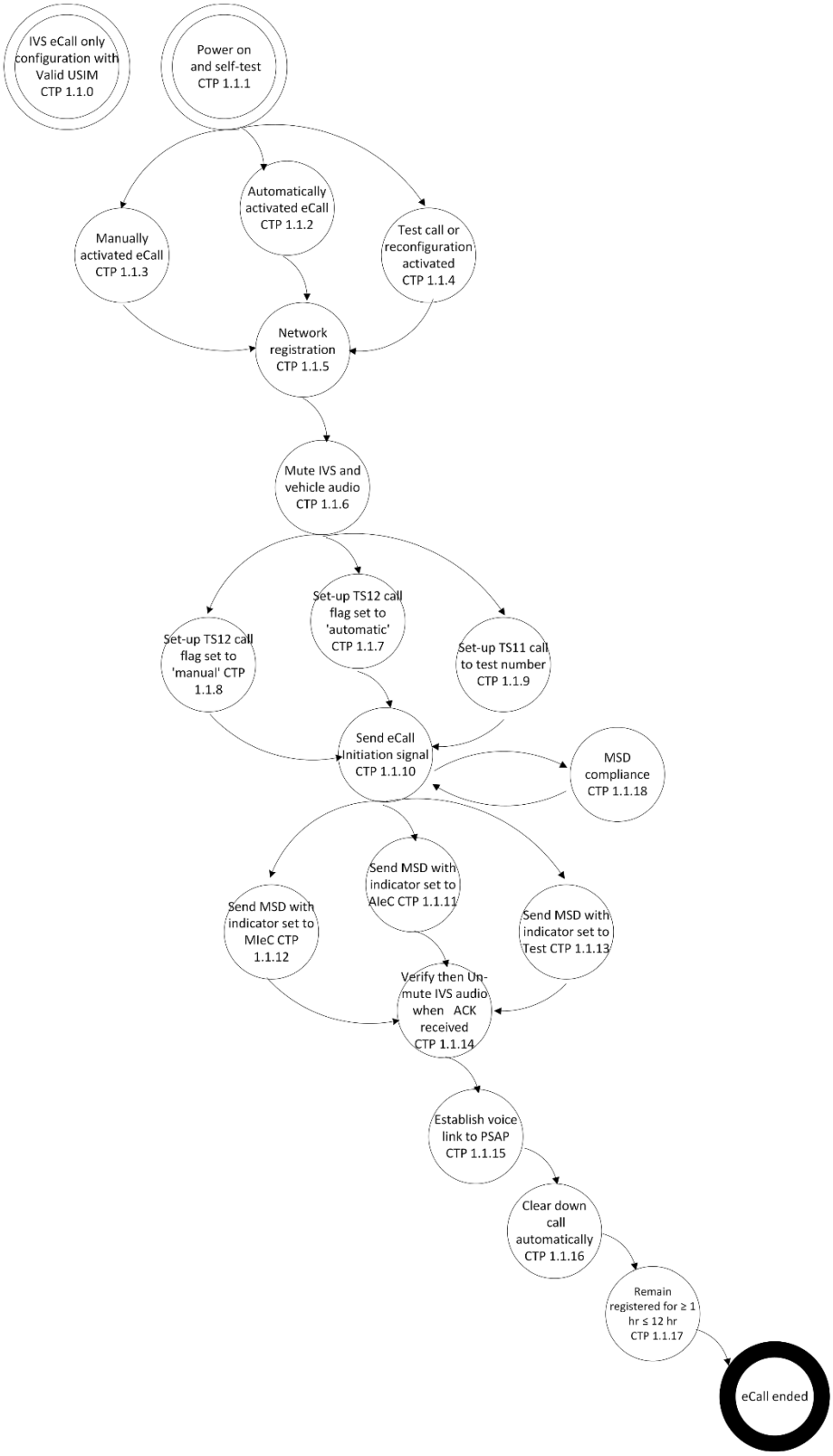


Figure 4 — In-vehicle system state transitions- Pan European eCall only

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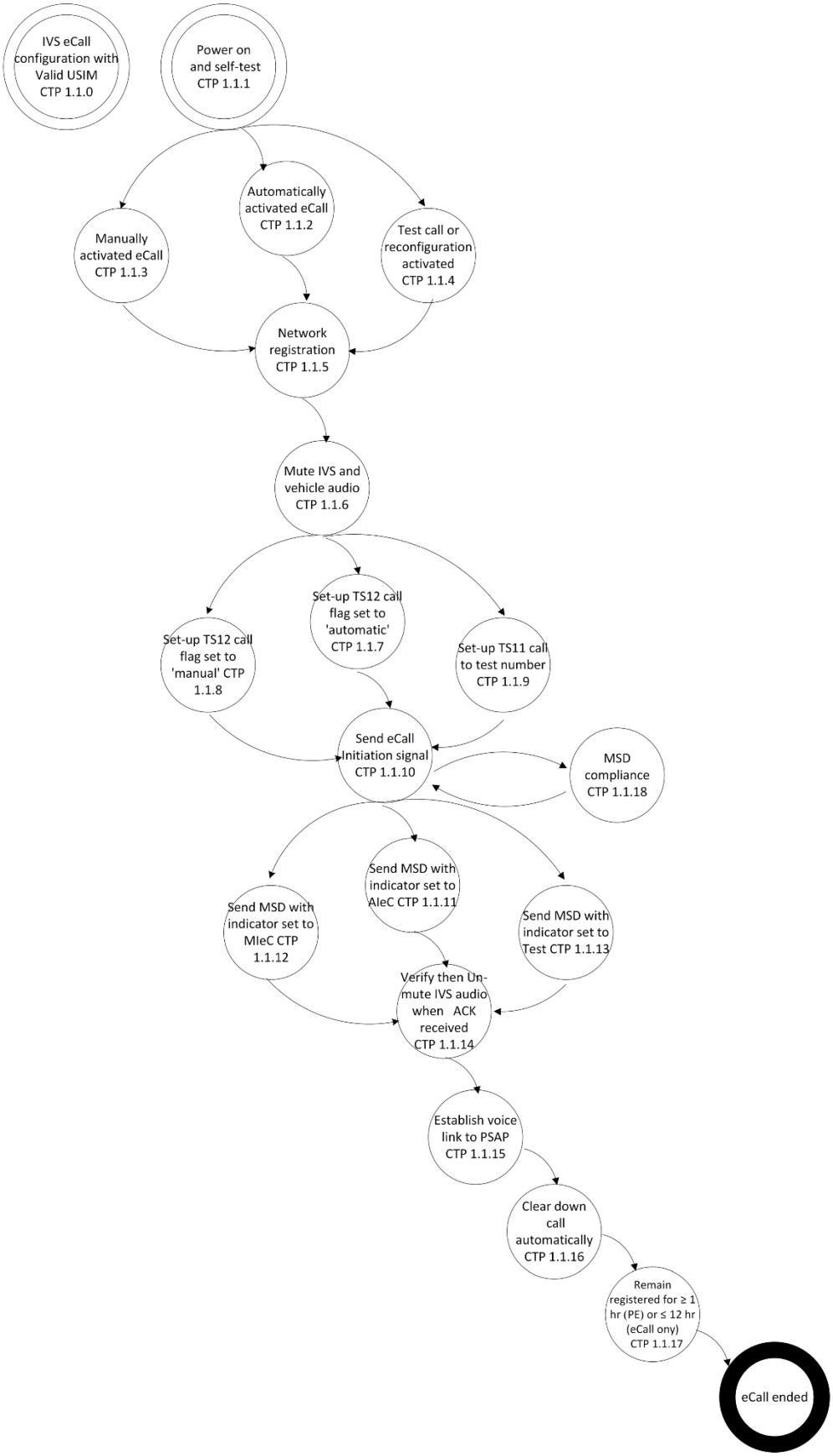


Figure 5 — In-vehicle system state transitions- Pan European eCall + other services

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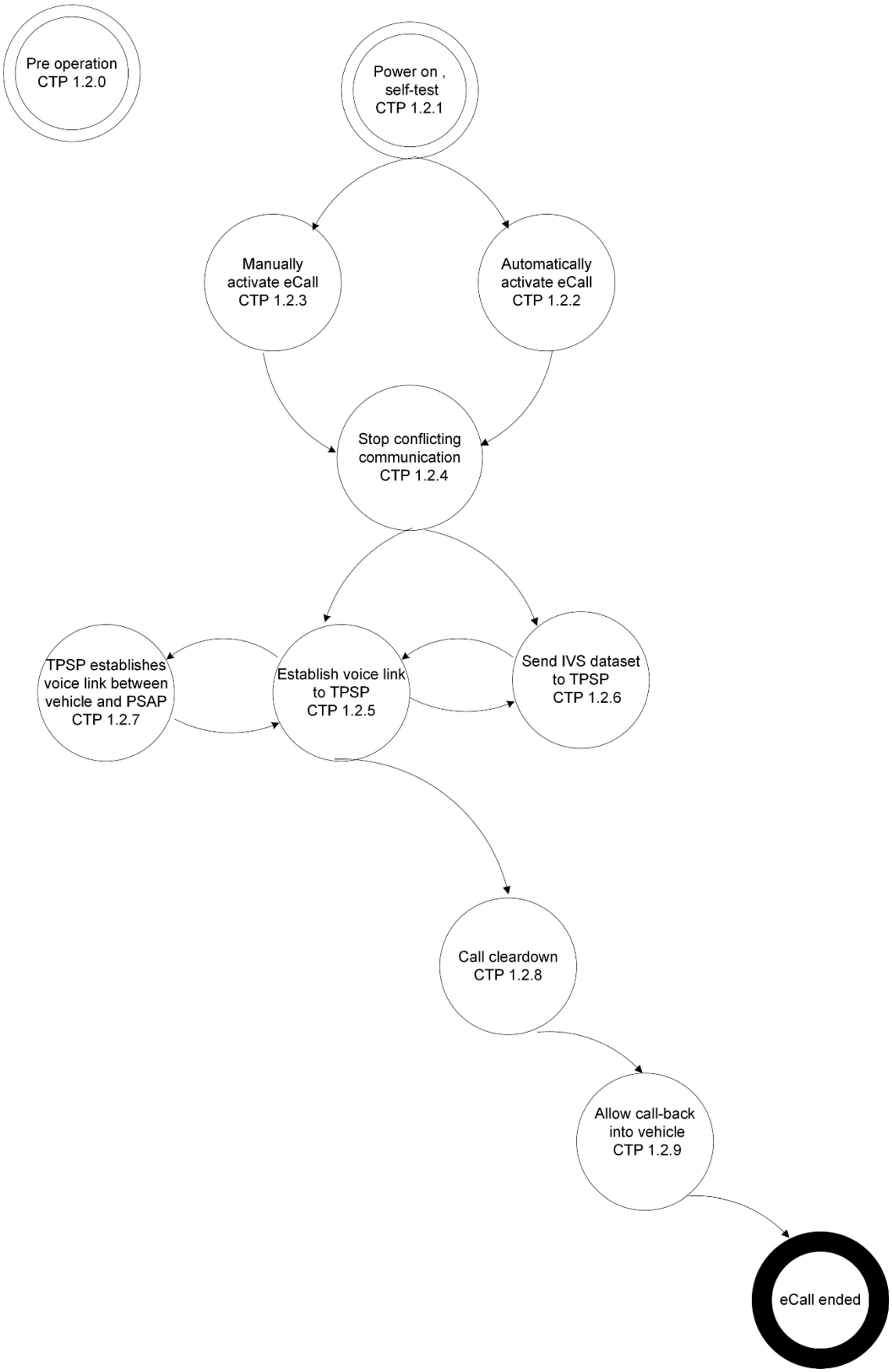


Figure 6 — In-vehicle system state transitions — Third party service provider (TPSP) eCall

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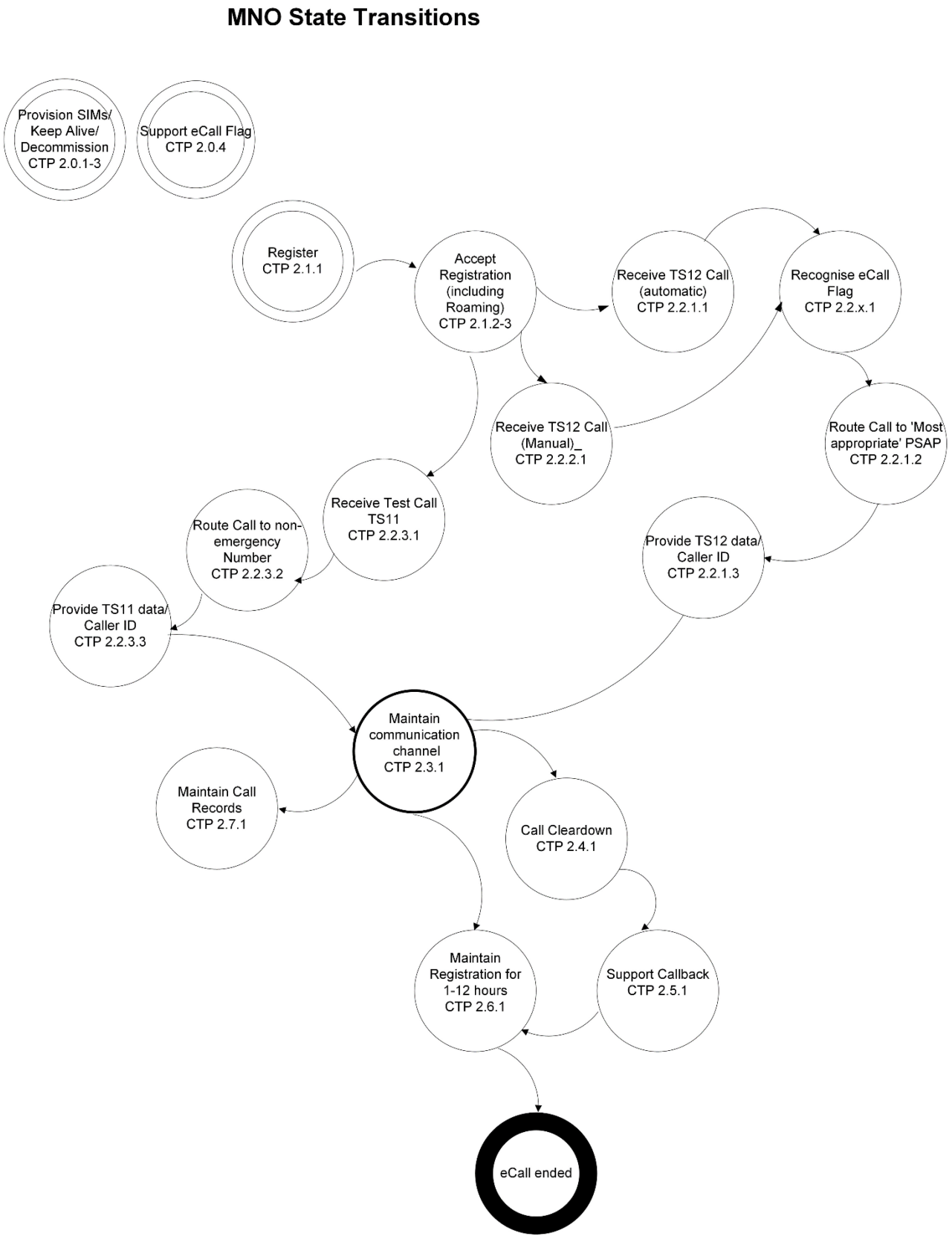


Figure 7 — MNO system state transitions

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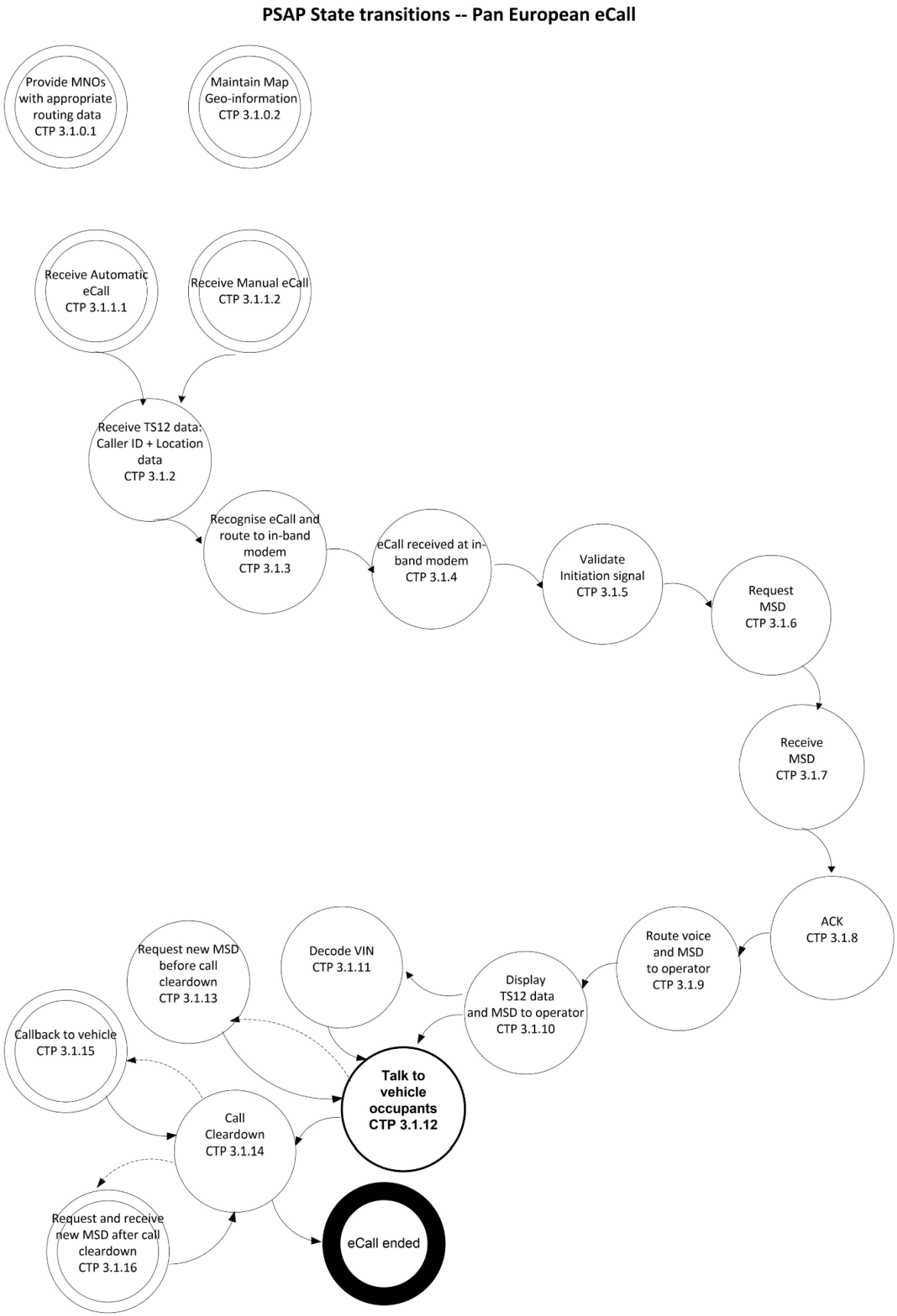


Figure 8 — PSAP State transitions- PE eCall

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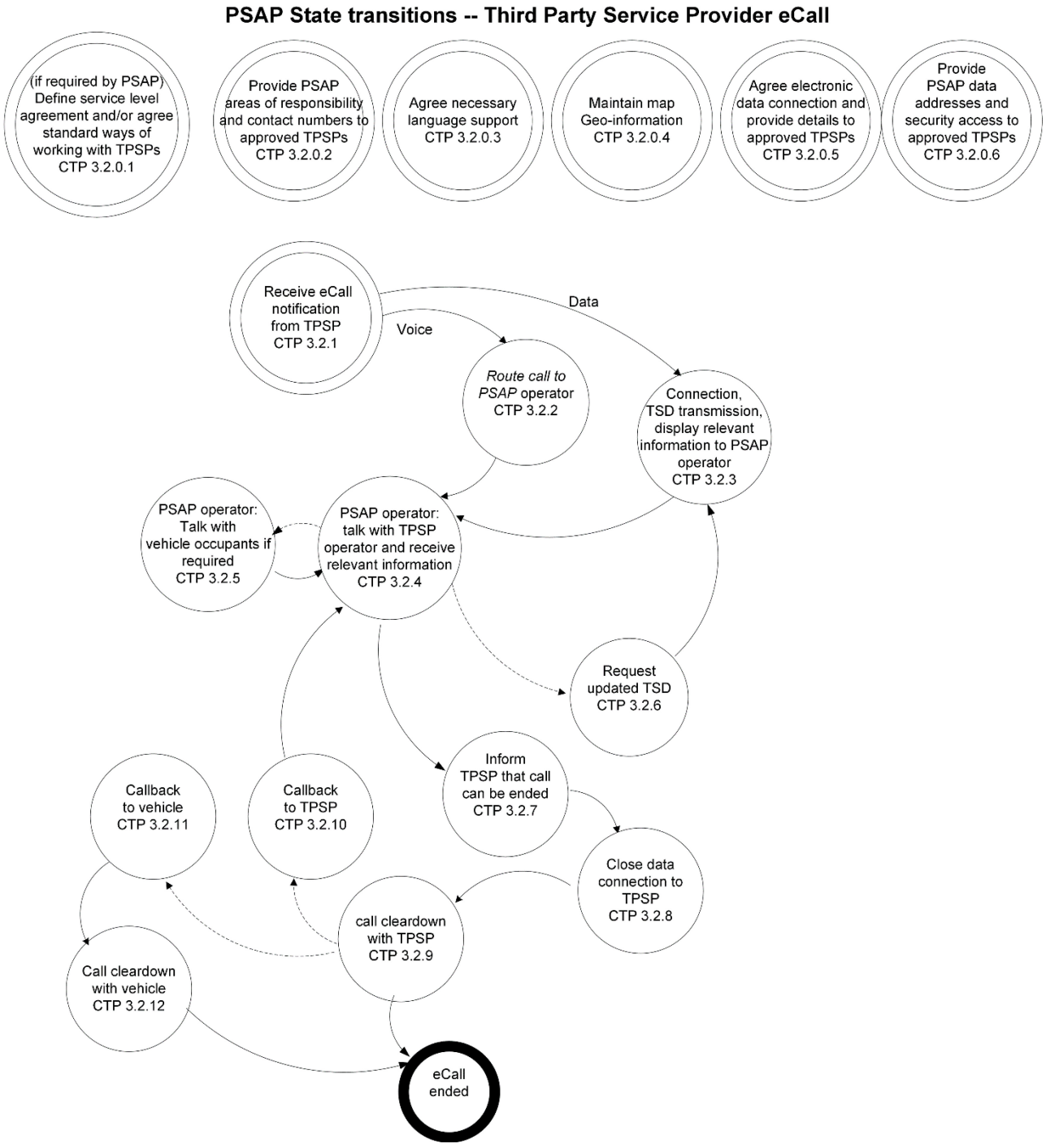


Figure 9 — PSAP State transitions- TPS-eCall

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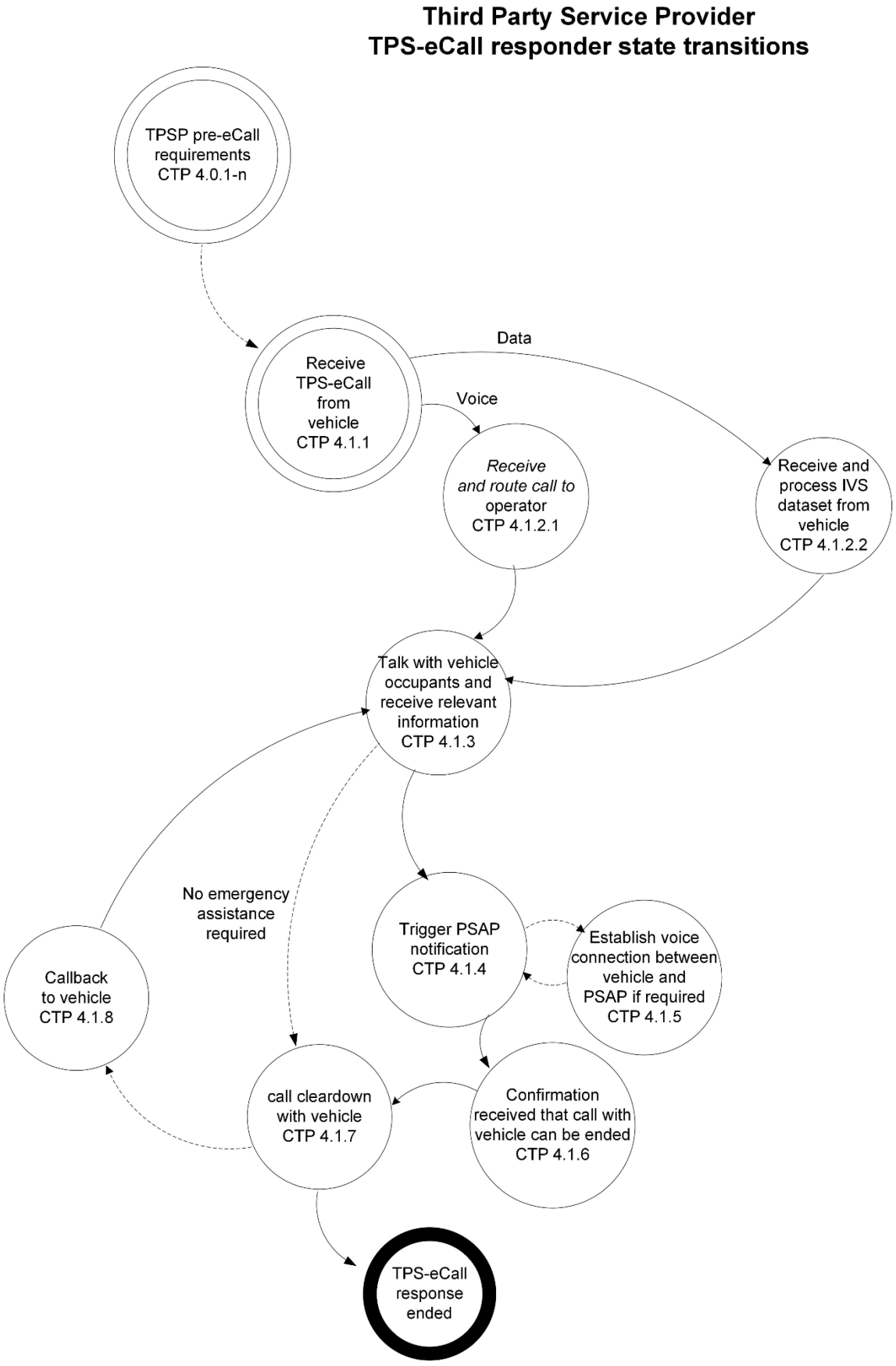


Figure 10 — TPS-Responder state transitions

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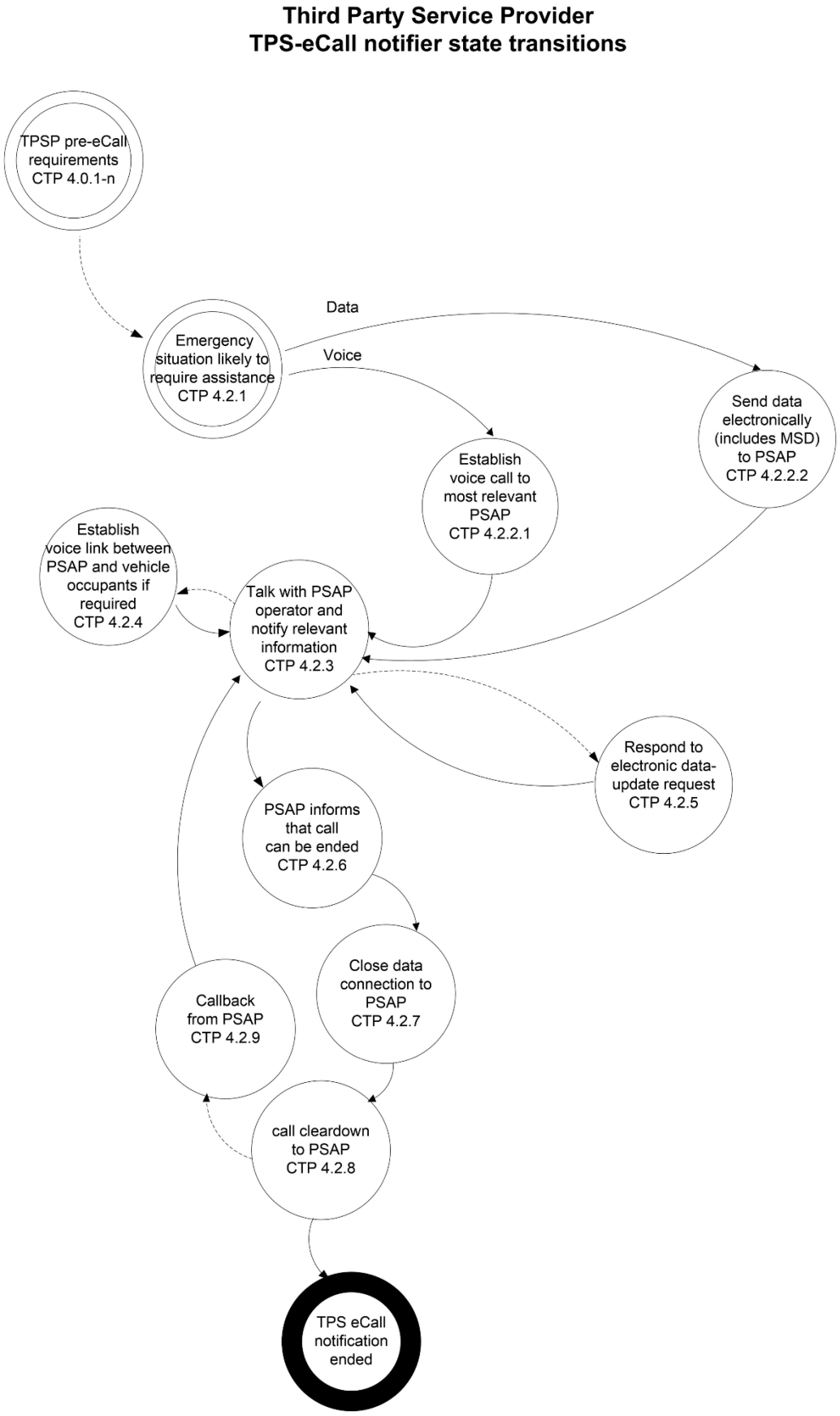


Figure 11 — TPS-Notifier state transitions

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8.1.2 Classification of testing

Table 7 — Classification of testing

Conformance Area	In-vehicle System		MNO	TPSP		PSAP	
	IVS	TPS-IVS		TPS-eCall Responder	TPS-eCall Notifier	eCall PSAP	TPS-eCall PSAP
PRE: Availability of systems			X	X		?	
PRE: Training				X	X	X	X
PRE: Contact details					X	X	X
PRE: Geographical Information System				X		X	X
PRE: NAD conformance tests	X	X					
I-OFF: Ignition-off behaviour	X	X					
I-ON: Ignition-on and power- up behaviour	X	X					
I-ON: Network registration	X		X				
TRG: Trigger	X	X					
TRG: Network registration	X	X	X				
ECI: In-Vehicle HMI	X	X					
ECI: Car audio handling	X	X					
ECP: Post-crash performance	X	X					
ECP: Call car to PSAP	X		X			X	
ECP: Call car to TPSP		X	X	X			
ECP: Call TPSP to PSAP					X		X
ECP: Conference capability				X	X		
ECP: Voice retry car to PSAP	X		X			X	
ECP: Voice retry car to TPSP		X	X	X			
ECP: Qualification time				X		?	
ECP: Transfer MSD car to PSAP	X		X			X	
ECP: Transfer IVS-dataset car to TPSP		X	X	X			
ECP: Transfer MSD (TSD) TPSP to PSAP					X		X
ECP: Test call car to PSAP			X	X		?	
CLR: Call clear-down	X	X		X		X	
CLB: Network de-registration eCall only IVS	X						
CLB: Call-back PSAP to car	X		X			X	
CLB: Call-back TPSP to car		X	X	X			X
CLB: Call-back PSAP to TPSP					X		X

Figure 12 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.

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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 stimulation. 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 specification:

— 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 Pan European eCall.

— TPS-IVS test point

This test point represents the IVS represents the behaviour of the system installed in the vehicle. The infrastructure like vehicle dashboard, microphone, loudspeaker create this test point. TPS-IVS test point is used only for test purposes related to TPS-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 real mobile network, a MNO test point may mode land operate the MNO system software in a simulated environment. The MNO PLMN test point is used only for test purposes related to both Pan European eCall and TPS-eCall.

The MNO PLMN test point is used only for test purposes related to both Pan European eCall and TPS-eCall. The MNO test point acts either as an endpoint for IVS testing, or as starter for PSAP testing.

— 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 to both Pan European eCall and TPS-eCall. The test point is representing the PSAP system and is used only for test purposes related to Pan European eCall.

— TPS-R test point (TPS-eCall Responder)

This test point represents the TPSP located either at eCall application or TSP voice terminal. TPS-R test point is used only for test purposes related to TPS-eCall.

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— TPS-N test point (TPS-eCall Notifier)

This test point represents the stage between TPSP and PSAP. It aims to verify the connection between TSD client and TSD server. TPS-N test point is used only for test purposes related to TPS-eCall.

See Figure 12.

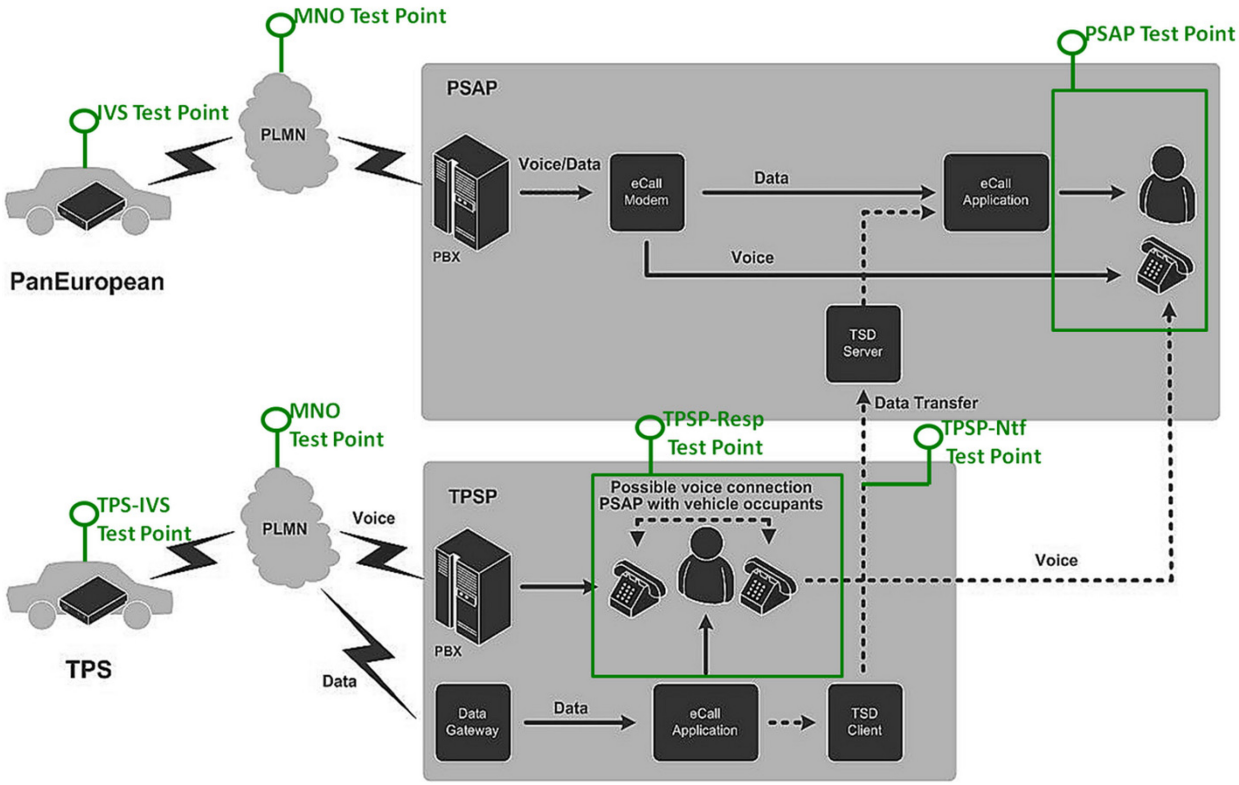


Figure 12 — Test points

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> : PE-IVS, TPS-IVS, MNO, PSAP, TPS-N, TPS-R;

<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 8.

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8.1.4 CTP <stage> naming convention for IVS conformance tests

Table 8 — 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	Ignition OFF	I-OFF
STAGE C	Ignition ON (no eCall) including power-up	I-ON
STAGE D	Trigger	TRG
STAGE E	eCall Initiation	ECI
STAGE F	eCall in progress	ECP
STAGE G	eCall Cleardown	CLR
STAGE H	Post eCall and Call-back	CLB

8.2 CTP structure

Table 9 shows the' Test Suite Structure' (TSS)

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Table 9 — Test suite structures

Group	Group acronym	State transition reference all PE eCall	State transition reference eCall only Additional tests	State transition reference TPSP eCall	State transition reference MNO	State transition reference PSAP PE eCall	State transition reference PSAP TPSP eCall	TPSP pre-eCall	TPSP Responder	TPSP Notifier
Prior to eCall including Provision SIMs/keep alive/decommision NAD Conformance tests in accordance with ETSI TS 102 936-1 ETSI TS 102 936-2	PRE	CTP 1.1.0.1		CTP 1.2.0.1 CTP 1.2.0.2	CTP 2.0.1 CTP 2.0.2 CTP 2.0.4	CTP 3.1.0.1 CTP 3.1.0.2	CTP 3.2.0.1 CTP 3.2.0.2.1 CTP 3.2.0.2.2 CTP 3.2.0.3 CTP 3.2.0.4.1 CTP 3.2.0.4.2 CTP 3.2.0.5	CTP 4.0.1 CTP 4.0.2 CTP 4.0.3.1 CTP 4.0.3.2 CTP 4.0.4 CTP 4.0.5.1 CTP 4.0.5.2 CTP 4.0.5.3 CTP 4.0.6 CTP 4.0.7 CTP 4.0.8 CTP 4.0.9 CTP 4.0.10		
Ignition OFF	I-OFF			CTP 1.2.2.5						
Ignition ON (no eCall) including power-up	I-ON	CTP 1.1.0.2 CTP 1.1.1.1	CTP 1.1.1.2	CTP 1.2.1.1 CTP 1.2.1.2						
Trigger	TRG	CTP 1.1.0.3 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 1.1.3.1 CTP 1.1.3.2 CTP 1.1.4.1 CTP 1.1.11.1 CTP 1.1.12.1 CTP 1.1.13.1		CTP 1.2.2.1 CTP 1.2.2.2 CTP 1.2.2.3 CTP 1.2.2.4 CTP 1.2.3.1 CTP 1.2.3.2					CTP 4.1.1.1 CTP 4.1.1.2	
eCall Initiation	ECI	CTP 1.1.5.1 CTP 1.1.5.6 CTP 1.1.7.1 CTP 1.1.8.1 CTP 1.1.9.1 CTP 1.1.10.1 CTP 1.1.10.5	CTP 1.1.10.4	CTP 1.2.4.1 CTP 1.2.5.3	CTP 2.1.2 CTP 2.2.1.1 CTP 2.2.1.2	CTP 3.1.1.1			CTP 4.1.2.1	

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Group	Group acronym	State transition reference all PE eCall	State transition reference eCall only Additional tests	State transition reference TPSP eCall	State transition reference MNO	State transition reference PSAP PE eCall	State transition reference PSAP TPSP eCall	TPSP pre-eCall	TPSP Responder	TPSP Notifier
eCall in progress	ECP	CTP 1.1.6.1 CTP 1.1.10.2 CTP 1.1.10.3 CTP 1.1.14.1 CTP 1.1.14.2 CTP 1.1.15.1 CTP 1.1.15.2 CTP 1.1.15.3 CTP 1.1.15.4 CTP 1.1.15.5 CTP 1.1.18.1		CTP 1.2.5.1 CTP 1.2.5.2 CTP 1.2.5.4 CTP 1.2.5.5 CTP 1.2.6.1 CTP 1.2.6.2 CTP 1.2.6.3 CTP 1.2.7.1	CTP 2.2.1.3 CTP 2.2.2.1 CTP 2.2.3.3	CTP 3.1.1.2 CTP 3.1.2 CTP 3.1.3.1 CTP 3.1.3.2 CTP 3.1.5.1 CTP 3.1.5.2 CTP 3.1.6.1 CTP 3.1.6.2 CTP 3.1.7.1 CTP 3.1.7.3 CTP 3.1.7.4 CTP 3.1.7.5 CTP 3.1.7.6 CTP 3.1.7.7 CTP 3.1.7.8 CTP 3.1.7.9 CTP 3.1.7.10 CTP 3.1.9 CTP 3.1.10 CTP 3.1.11 CTP 3.1.12 CTP 3.1.13	CTP 3.2.1 CTP 3.2.2 CTP 3.2.3 CTP 3.2.4 CTP 3.2.5 CTP 3.2.6		CTP 4.1.2.2 CTP 4.1.3.1 CTP 4.1.3.2 CTP 4.1.3.3 CTP 4.1.4	CTP 4.2.2.1 CTP 4.2.2.2.1 CTP 4.2.2.2.2 CTP 4.2.3 CTP 4.2.4.1 CTP 4.2.4.2 CTP 4.2.5
eCall Cleardown	CLR	CTP 1.1.5.2 CTP 1.1.5.3.1 CTP 1.1.5.3.2 CTP 1.1.5.4 CTP 1.1.5.5 CTP 1.1.16.1 CTP 1.1.16.2		CTP 1.2.8.1	CTP 2.4.1	CTP 3.1.14.1 CTP 3.1.14.2 CTP 3.1.15 CTP 3.1.16	CTP 3.2.7 CTP 3.2.8		CTP 4.1.6 CTP 4.1.7	
Post eCall and Callback	CLB	CTP 1.1.16.3 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 1.2.9.1 CTP 1.2.9.2 CTP 1.2.9.3	CTP 2.5.1		CTP 3.2.9 CTP 3.2.10 CTP 3.2.11		CTP 4.1.8	

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8.3 eCall timers

In this document multiple eCall timers from EN 16062 are used in certain tests. Table 10 gives a short overview of those timers. The default values and the definition of those timers is available in EN 16062:2022 Annex A Table A.1.

Table 10 — eCall timers

Name	Origin	Description
T1	IVS	Manually initiated eCall (MIeC) false triggering cancellation period
T2	IVS	IVS Call Cleardown Fallback Timer (CCFT)
T3	IVS	IVS INITIATION signal duration
T4	PSAP	PSAP wait for INITIATION signal period
T5	IVS	IVS wait for SEND MSD period
T6	IVS	IVS wait for AL-ACK period
T7	IVS	IVS MSD maximum transmission time
T8	PSAP	PSAP MSD maximum reception time
T9	IVS	IVS NAD minimum network registration period
T10	IVS	IVS NAD network `Deregistration Fallback Timer' (DFT)

9 Conformance test requirements for in-vehicle user equipment and systems (IVS)

9.1 Conformance test requirements for in-vehicle user equipment and systems for Pan European eCall

Test requirements for IVS are specified as test objectives and purposes (see 9.2), classification of testing (see 9.3); and State transition conformance tests (see 9.4, 9.5, 9.6, 9.7, 9.8).

9.2 Test objectives and purposes

The test objectives are to demonstrate that the equipment provided in a vehicle is capable of triggering an eCall, sending the MSD, and making a voice channel available between the PSAP and the occupants of the vehicle.

9.3 Classification of testing and referenced tests for in-vehicle user equipment for Pan European eCall IVS

9.3.1 Taxonomy of testing

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

Conformance requirements and objectives are provided in 9.4.

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

a) pan European eCall –both eCall only and eCall +(other service provision) IVS (9.5) 1.1.x;

b) pan European eCall + only IVS (9.6), additional tests for PE eCall only tests also numbered with the convention 1.1.x;

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c) third party service provider eCall (9.8), tests numbered with the convention 1.2.x.

The state transition points for Pan European eCall (eCall only) IVS are provided in Figure 4 above.

The state transition points for Pan European eCall (eCall + other services) IVS are provided in Figure 5 above.

The state transition points for TPS-eCall IVS are provided in Figure 6 above.

9.3.2 Referenced tests

9.3.2.1 Pre eCall including conformance to ETSI In-vehicle network access device tests

Tests to ascertain the conformance of the in-vehicle network access device (NAD) to ETSI Standards deliverables are to be found in:

ETSI TS 102 936-1 V1.1.1 (2011-04), Technical Specification, eCall Network Access Device (NAD) conformance specification; Part 1: Protocol test specification; and

ETSI TS 102 936-2 V1.1.1 (2011-04), Technical Specification, eCall Network Access Device (NAD), conformance specification; Part 2: Test Suites;

Conformance to EU vehicle regulations, &TTE, EMC & LV Directives, are to be found in ETSI TR 102 937 V1.1.1 eCall communications equipment; Conformance to EU vehicle regulations, R&TTE, EMC & LV Directives, and EU regulations for eCall implementation;

and these documents provide conformance test requirements and test suites in respect of this physical in-vehicle equipment NAD and its installation and operation in respect of telecommunications aspects.

9.3.2.2 In-vehicle eCall system conformance tests

The Pan European eCall system and its data are standardized in EN 15722, EN 16062 and EN 16072.

9.4 State transition conformance tests for in-vehicle equipment and system to comply to Standards for pan European eCall

9.4.1 Conformance requirement

In order to demonstrate or claim compliance to Pan European eCall, the system shall be subjected to the conformance tests specified in 9.5. If the system is ‘eCall only’ the system shall also be subjected to the conformance tests specified in 9.6.

9.4.2 Use case test objectives by stage

9.4.2.1 NAD Conformance tests in accordance with ETSI TS 102 936-1 ETSI TS 102 936-2 (NAD)

NAD Conformance test behaviour and inputs and outputs, with the behaviour, inputs and outputs as specified in ETSI TS 102 936-1 and ETSI TS 102 936-2, are applicable for the IVS. All of them are referred in a test purpose (CTP 1.1.0.1) entitled’ Test for conformance to ETSI TS 102 936-1 and ETSI TS 102 936-2’

9.4.2.2 Ignition OFF (I-OFF)

No tests required.

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