TECHNICAL SPECIFICATION

ISO/TS

13143-1

First edition
2011-04-15

Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to ISO/TS 12813 —

Part 1:
Test suite structure and test purposes

Perception du télépéage — Évaluation des équipements embarqués et en bord de route quant à la conformité avec l'ISO/TS 12813 —

Partie 1: Structure de suite d'essais et buts des essais

Reference number
ISO/TS 13143-1:2011(E)

© ISO 2011

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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

ISO/TS 13143-1 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 278, *Road transport and traffic telematics,* in collaboration with Technical Committee ISO/TC 204, *Intelligent transport systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO/TS 13143 consists of the following parts, under the general title *Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to ISO/TS 12813*:

— *Part 1: Test suite structure and test purposes*

— *Part 2: Abstract test suite*

Introduction

ISO/TS 17575 is part of a set of standards that supports interoperability of autonomous EFC-systems. It defines the EFC context data, their charge reports and their use of communication infrastructure.

The set of standards also supports short range communication links in the context of autonomous electronic fee collection (EFC) on-board equipment (OBE) to enable spot checks for the enforcement process. The application interface is defined in ISO/TS 12813:2009.

Within the set of EFC standards this part of ISO 13143 defines the process and tests for conformity evaluation of OBE and roadside equipment (RSE) that comply with the requirements in ISO/TS 12813:2009.

This part of ISO 13143 is intended to

— assess OBU and RSE capabilities,

— assess OBU and RSE behaviour,

— serve as a guide for OBU and RSE conformance evaluation and type approval,

— achieve comparability between the results of the corresponding tests applied in different places at different times, and

— facilitate communications between parties.

This part of ISO 13143 is based on

— ISO/TS 12813:2009,

— the set of dedicated short range communication (DSRC) standards defining the communication stack, and

— ISO/IEC 9646.

This part of ISO 13143 is based on using the tree and tabular combined notation (TTCN) that is a standardized language suitable for specification of test cases and steps for assessment of protocol and application behaviour. The TTCN language is also supported by modern automated tools that accelerate software design, implementation and testing.

Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to ISO/TS 12813 —

Part 1:
Test suite structure and test purposes

1   Scope

This part of ISO/TS 13143 specifies the test suite structure (TSS) and test purposes (TP) to evaluate the conformity of on-board units (OBU) and roadside equipment (RSE) to ISO/TS 12813:2009.

It provides a basis for conformance tests for dedicated short range communication (DSRC) equipment (on-board units and roadside units) to enable interoperability between different equipment supplied by different manufacturers.

2   Normative references

The following referenced documents are indispensable for the application 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.

ISO/TS 12813:2009, *Electronic fee collection — Compliance check communication for autonomous systems*

ISO 14906:2011, *Electronic fee collection — Application interface definition for dedicated short range communications*

ISO/TS 14907-2:2011, *Road transport and traffic telematics — Electronic fee collection — Test procedures for user and fixed equipment — Part 2: Conformance test for the onboard unit application interface*

EN 15509:2007, *Road transport and traffic telematics — Electronic fee collection — Interoperability application profile for DSRC*

EN 15876-1:2010, *Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to EN 15509 — Part 1: Test suite structure and test purposes*

ETSI TS 102 486-2-2 V1.2.1 (2008-10), *Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment; Part 2: DSRC application layer; Sub-Part 2: Test Suite Structure and Test Purposes (TSS&TP)*

3   Terms and definitions

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

3.1
access credentials
data that is transferred to on-board equipment (OBE), in order to establish the claimed identity of a roadside equipment (RSE) application process entity

[ISO 14906:2011, definition 3.1]

NOTE   Access credentials carry information needed to fulfil access conditions in order to perform the operation on the addressed element in the OBE. Access credentials can carry passwords as well as cryptography-based information such as authenticators.

3.2
attribute
application information formed by one or by a sequence of data elements, used for implementation of a transaction

NOTE   Adapted from ISO 14906:2011.

3.3
authenticator
data appended to, or a cryptographic transformation of, a data unit that allows a recipient of the data unit to prove the source and/or the integrity of the data unit and protect against forgery

[ISO 14906:2011, definition 3.4]

3.4
channel
information transfer path

[ISO 7498-2:1989, definition 3.3.13]

3.5
component
logical and physical entity composing an on-board equipment, supporting a specific functionality

[ISO 14906:2011, definition 3.6]

3.6
contract
expression of an agreement between two or more parties concerning the use of the road infrastructure

[ISO 14906:2011, definition 3.7]

3.7
cryptography
discipline which embodies principles, means, and methods for the transformation of data in order to hide its information content, prevent its undetected modification and/or prevent its unauthorized use

[ISO 7498-2:1989, definition 3.3.20]

3.8
data group
collection of closely related EFC data attributes which together describe a distinct part of an EFC transaction

[ISO 14906:2011, definition 3.9]

3.9
data integrity
property that data has not been altered or destroyed in an unauthorized manner

[ISO 7498-2:1989, definition 3.3.21]

3.10
element
⟨DSRC⟩ directory containing application information in the form of attributes

[ISO 14906:2011, definition 3.11]

3.11
implementation conformance statement
statement made by the supplier of an implementation or system claimed to conform to a given specification, stating which capabilities have been implemented

[ISO/TS 14907-2:2011, definition 3.12]

3.12
implementation conformance statement pro forma
document, in the form of a questionnaire, which when completed for an implementation or system becomes an implementation conformance statement

[ISO/TS 14907-2:2011, definition 3.13]

3.13
implementation extra information for testing
statement made by the supplier or an implementor of a DUT which contains or references all of the information (in addition to that given in the implementation conformance statement) related to the DUT and its testing environment, which will enable the test laboratory to run an appropriate test suite against the DUT

NOTE   Adapted from ISO/TS 14907-2:2011.

3.14
implementation extra information for testing pro forma
document, in the form of a questionnaire, which when completed for a DUT becomes an implementation extra information for testing

NOTE   Adapted from ISO/TS 14907-2:2011.

3.15
on-board equipment
OBE
equipment fitted within or on the outside of a vehicle and used for toll purposes

NOTE   The OBE does not need to include payment means.

[ISO 14906:2011, definition 3.13]

3.16
on-board unit
OBU
minimum component of an on-board equipment, whose functionality always includes at least the support of the DSRC interface

[ISO 14906:2011, definition 3.14]

3.17
roadside equipment
RSE
equipment located along the road transport network, for the purpose of communication and data exchanges with on-board equipment

[ISO 14906:2011, definition 3.16]

3.18
session
exchange of information and interaction occurring at a specific electronic fee collection station between the roadside equipment and the user/vehicle

[ISO 14906:2011, definition 3.19]

3.19
transaction
whole of the exchange of information between the roadside equipment and the on-board equipment necessary for the completion of an electronic fee collection operation over the dedicated short range communication

[ISO 14906:2011, definition 3.24]

3.20
transaction model
functional model describing the general structure of electronic payment fee collection transactions

[ISO 14906:2011, definition 3.25]

3.21
tester
a combination of equipment and processes which is able to perform conformance tests according to ISO/TS 13143-1

NOTE   Adapted from ISO/TS 14907-2:2011.

3.22
user
generic term used for the customer of a toll service provider, one liable for toll, the owner of the vehicle, a fleet operator, a driver, etc., depending on the context

[ISO 14906:2011, definition 3.26]

4   Abbreviated terms

AC_CR   Access Credentials

ADU   Application Data Unit

APDU   Application Protocol Data Unit

AP   Application Process

ASN.1   Abstract Syntax Notation One (ISO/IEC 8824-1)

ATS   Abstract Test Suite

BI   Behaviour Invalid (i.e. Invalid Behaviour tests)

B-Kernel   Broadcast Kernel

BST   Beacon Service Table

BV   Behaviour Valid (i.e. Valid Behaviour tests)

cf   Confirm

DLC   Data Link Control

DSRC   Dedicated Short Range Communication

DUT   Device Under Test (ISO/TS 14907-2)

EID	Element IDentifier
EFC	Electronic Fee Collection
EVENT-RT	EVENT-REPORT
ICS	Implementation Conformance Statement
IXIT	Implementation eXtra Information for Testing
LLC	Logical Link Control
MAC	Medium Access Control
PCTR	Proforma Conformance Test Report
TSS	Test Suite Structure
VST	Vehicle Service Table

5 Test suite structure (TSS)

5.1 Structure

The table below shows the Test Suite Structure (TSS) including its subgroups that are inherited from other specifications.

Table 1 — Test Suite Structure

Group	Type of DUT	Behaviour
Physical layer	On-Board Unit	Valid Behaviour
		Invalid Behaviour
	Roadside Equipment	Valid Behaviour
		Invalid Behaviour
DLC MAC sublayer	On-Board Unit	Valid Behaviour
		Invalid Behaviour
	Roadside Equipment	Valid Behaviour
		Invalid Behaviour
DLC LLC sublayer	On-Board Unit	Valid Behaviour
		Invalid Behaviour
	Roadside Equipment	Valid Behaviour
		Invalid Behaviour
Application layer	On-Board Unit	Valid Behaviour
		Invalid Behaviour
	Roadside Equipment	Valid Behaviour
		Invalid Behaviour

Physical layer tests are to be performed in a radio wave lab. They will not form part of the ATS.

5.2 Reference to conformance test specifications

Conformance to a profile standard implies conformance to the related base standards; hence, a number of test cases for the CCC application are exactly the same as the conformance test cases for the related base standards. Other test cases are derived from the base standards conformance test cases, by applying some restrictions or choices in e.g. the parameters values, according to what is stated in the profile standard. Finally, specific conformance test cases for the CCC application are identified for statements contained in the CCC application, which have no equivalence in the base standards. These latter cases cover for example the application layer data test purposes. This document takes into account already defined test purposes for conformance to the base standards by referencing them, so that:

a) For test purposes that are identical to those defined in the base standards conformance test cases (see e.g. [ETSI TS 102 486-2-2] or [EN 15876-1]) a direct reference is reported. For reader's convenience, the title or a verbal description of the referenced test purpose is given, together with the reference.

b) For test purposes that are **derived** from those defined in the base standards conformance test cases, a direct reference is reported, plus an indication on how the referred test purpose has to be modified for the profile conformance testing.

c) For test purposes that are **specific to the standard profile**, a complete description is given.

An indication on whether a test purpose is **identical**, **derived**, or **specific** is given in each test purpose.

5.3 Test Purposes (TP)

5.3.1 TP Definition conventions

The TPs are defined following the rules shown in Table 2 — TP Definition Rules below. All Test Purposes are defined in Annex A and Annex B.

Table 2 — TP Definition Rules

TP ID according to the TP naming conventions	Title
	Reference
	TP origin
	Initial condition
	Stimulus and expected behaviour

TP ID	The TP ID is a unique identifier. It shall be specified according to the TP naming conventions defined in the sub-clause below.
Title	Short description of Test Purpose objective.
Reference	The reference should contain the references of the subject to be validated by the actual TP (specification reference, clause, paragraph), or the reference to the standard document defining the TP.
TP origin	Indicates if the TP is **identical** to a TP defined in another test standard, **derived** from a TP defined in another test standard, or **specific** for this standard profile.
Initial condition	The condition defines in which initial state the DUT has to be to apply the actual TP.
Stimulus and expected behaviour	Definition of the events the tester performs, and the events that are expected from the DUT to conform to the base specification.

5.3.2   TP naming conventions

Each TP is given a unique identification. This unique identification is built up to contain the following string of information:

TP/<group>/<dut>/<x>-<nn>

TP   : to indicate that it is a Test Purpose;

<group> : which group among those defined in Table 1 – Test Suite Structure does the TP apply to;

<dut>   : type of DUT (i.e. OBU or RSE);

X   : type of testing (i.e. Valid Behaviour tests – BV, or Invalid Behaviour tests – BI)

<nn>   : sequential TP number (01-99)

The naming conventions are as described in Table 3.

Table 3 — TP naming convention

Identifier:
TP/<group>/<dut>/<x>-<nn>

<group>		
applicable for OBU/RSE	PHY	Physical layer
applicable for OBU/RSE	MAC/LLC	MAC/LLC sublayer
applicable for OBU/RSE	AP-BAS	Application layer – I Kernel support
applicable for OBU	AP-FUN	Application layer – T Kernel support
applicable for OBU	AP-DAT	Application layer – Data attributes support
applicable for OBU	AP-SEC	Application layer – Security Level 1 support
applicable for RSE	AP-GET	Application layer - GET-rq PDU test purposes,
applicable for RSE	AP-STA	Application layer - GET-STAMPED-rq PDU test purposes
applicable for RSE	AP-MMI	Application layer - SET-MMI-rq PDU test purposes
applicable for RSE	AP-ECH	Application layer - ECHO-rq PDU test purposes
applicable for RSE	AP-REL	Application layer - EVENT-REPORT-rq PDU test purposes
<dut> = type of DUT	OBU	On-Board Unit
	RSE	Roadside Equipment
x = Type of testing	BV	Valid Behaviour Tests
	BI	Invalid Behaviour Tests
<nn> = sequential number	(01-99)	Test Purpose Number

5.4   Conformance test report

The manufacturer of the OBU and RSE, respectively, is responsible for providing a conformance test report.

The manufacturer of the OBU shall complete the proforma conformance test report for on-board units as defined in Annex C.

The manufacturer of the RSE shall complete the proforma conformance test report for roadside equipment as defined in Annex D.

Annex A
(normative)

Test purposes for on-board units

A.1 Introduction

This annex contains the Test Purposes (TP) for the conformity evaluation of OBUs to ISO/TS 12813.

A.1.1 Symbols in TP Descriptions

For the application layer test purposes, a special notation and symbol convention is used, as defined in what follows.

Symbols are used in the description of the TPs, with meanings according to Table A.1 — Description of TP Symbols.

Table A.1 — Description of TP Symbols

SYMBOL	DESCRIPTION
XXX.rq $\Rightarrow$	The Tester sends the XXX.rq PDU to the DUT
$\Leftarrow$ YYY.rs	The DUT sends the YYY.rs PDU to the Tester
A ≡ B	Test Purpose A "is congruent to" Test Purpose B. The notation Test Purpose A ≡ Test Purpose B means that the Test Purpose A is the same as Test Purpose B. If differences in parameters or parameter values have to be applied, these differences are indicated in the text immediately below.
A $\rightarrow$ B	Object A "is transformed" into Object B. So a notation like "Table X $\rightarrow$ Table Y" means that, for the scope of the Test Purpose, any reference of Table X should be changed into references to Table Y.
=	Means "assignment". That is, a notation like "accessCredentials = a value" means that the field accessCredentials is given a value.
Ø	Means "empty" or "not set". So, a notation like "accessCredentials = Ø $\rightarrow$ accessCredentials = calculated value", for a given Test Purpose, means "change all occurrences in which the field accessCredentials has not been assigned to calculation of the value accessCredentials to a given value.

A.2 Physical layer

Per ISO/TS 12813:2009, 5.5.2, all test purposes TP/PHY/OBU/Bx/yy defined in [EN 15876-1] are applicable for the conformity evaluation of OBUs to CEN–DSRC based CCC as claimed in [ISO/TS 12813] Annex B Clause B.4.3 Table B.3 Item 1.

A.3 MAC & LLC

Per ISO/TS 12813:2009, 5.5.2, all test purposes TP/MAC/OBU/Bx/yy and TP/LLC/OBU/Bx/yy defined in [EN 15876-1] are applicable for the conformity evaluation of OBUs to CEN–DSRC based CCC as claimed in ISO/TS 12813:2009, Annex B Clause B.4.3 Table B.3 Item 1.

A.4 Application Layer

A.4.1 Structure of BST and VST

A.4.1.1   BST

The BST general structure, as is transmitted to the OBU, is described in Table A.2 — BST general structure.

Table A.2 — BST general structure

		Length	Allowed Values
T-APDUs		4 bit	'1000' indicating initialisation-request (BST)
Option Indicator		1 bit (nonmandApplications opt.)	0/1
rsu	manufacturerid	16 bits	See [ISO 14816]
	individualid	27 bits	as specified by manufacturer
Time		32 bits	UNIX real time
profile		1 bit (Profile ext.)	0 (= no extension)
		7 bits	See Profile in EN 12834:2003, Annex A and EN 13372:2004, chapter 6.3.2
MandApplications		1 bit (mandApplications ext.)	0 (= no extension)
		7 bits (number of applications)	M
	CCC Application	1 bit (eid opt.)	0 (= eid not present)
		1 bit (parameter opt.)	0 (= parameter not present)
		aid — 1 bit (aid ext.)	0 (= no extension)
		aid — 5 bits	20 (= CCC application)
	Application 2 (not CCC)	1 bit (eid opt.)	0/1
		1 bit (parameter opt.)	0/1
		aid — 1 bit (aid ext.)	0 (= no extension)
		aid — 5 bits	20 (= CCC application)
		eid — 1 bit (eid ext.)	0 (= no extension)
		eid — 7 bits	any
		parameter	See ApplicationContextMark in EN 12834:2003, Annex A
	...	...	...
	Application M (not CCC)	1 bit (eid opt.)	0/1
		1 bit (parameter opt.)	0/1
		aid — 1 bit (aid ext.)	0 (= no extension)
		aid — 5 bits	20 (= CCC application)
		eid — 1 bit (eid ext.)	0 (= no extension)
		eid — 7 bits	any
		parameter	See ApplicationContextMark in EN 12834:2003, Annex A
nonmandApplications		1 bit (mandApplications ext.)	0 (= no extension)
		7 bits (number of applications)	N
	Application 1 (not EFC)	See "Application 2 (not EFC)" of mandApplications	
	...	...	
	Application N (not EFC)	See "Application 2 (not EFC)" of mandApplications	
profileList		1 bit (profileList ext.)	0 (= no extension)
		7 bits (number of profiles)	K
	Profile 1	1 bit (Profile ext.)	0 (= no extension)
		7 bits	See Profile in EN 12834:2003, Annex A and EN 13372:2004, chapter 6.3.2
	...	...	...
	Profile K	1 bit (Profile ext.)	0 (= no extension)
		7 bits	See Profile in EN 12834:2003, Annex A and EN 13372:2004, chapter 6.3.2

A.4.1.2   VST

The VST general structure, as is transmitted by the OBU, is described in Table A.3 — VST general structure (security level 1).

Table A.3 — VST general structure (security level 1)

						Length	Allowed Values
fill						4 bits	any
profile						1 bit (Profile ext.)	0 (= no extension)
						7 bits	See Profile in EN 12834:2003, Annex A
applications						1 bit (applications ext.)	0 (= no extension)
						7 bits (number of applic.)	M
	CCC Application					1 bit (eid opt.)	1 (= eid present)
						1 bit (parameter opt.)	1 (= parameter present)
		aid				1 bit (aid ext.)	0 (= no extension)
						5 bits	20 (= CCC application)
		eid				1 bit (eid ext.)	0 (= no extension)
						7 bits	any (≠ other eid used in this VST)
		parameter	CCC-ContextMark			1 bit (Container ext.)	0 (= no extension)
						7 bits (Container CHOICE)	2 (= OCTET STRING)
						1 bit (octet string ext.)	0 (= no extension)
						7 bits (octet string length)	16
				Contract Provider		10 bits (CountryCode)	See [ISO 3166-1]
						14 bits (IssuerIdentifier)	See [ISO 14816]
				TypeOf Contract		16 bits	any
				Context Version		1 bit (contextVersion ext.)	0 (= no extension)
						7 bits	any
						1 bit (Container ext.)	0 (= no extension)
						7 bits (Container CHOICE)	2 (= OCTET STRING)
						1 bit (octet string ext.)	0 (= no extension)
						7 bits (octet string length)	2
			AC_CR-Reference	AC_Master KeyRef		8 bits	any
				AC_CR-Diversifier		8 bits	any
						1 bit (Container ext.)	0 (= no extension)
						7 bits (Container CHOICE)	2 (= OCTET STRING)
						1 bit (octet string ext.)	0 (= no extension)
						7 bits (octet string length)	4
			RndOBE			32 bits	any
	Application 2					1 bit (eid opt.)	0/1
						1 bit (parameter opt.)	0/1
		aid				1 bit (aid ext.)	0 (= no extension)
						5 bits	See DSRCApplicationEntityID, EN 12834:2003, Annex A
		eid				1 bit (eid ext.)	0 (= no extension)
						7 bits	any (≠ other eid used in this VST)
		parameter					See ApplicationContextMark, EN 12834:2003, Annex A
	...					1 bit (eid opt.)	0/1
						1 bit (parameter opt.)	0/1
	Application M	aid				1 bit (aid ext.)	0 (= no extension)
						5 bits	See DSRCApplicationEntityID, EN 12834:2003, Annex A
		eid				1 bit (eid ext.)	0 (= no extension)
						7 bits	any (≠ other eid used in this VST)
		parameter					See ApplicationContextMark, EN 12834:2003, Annex A
obeConfiguration						1 bit (obeStatus opt.)	0/1
	equipmentClass					15 bits	any
	manufacturerId					16 bits	any
	obeStatus					16 bits	any

A.4.2 PDUs parameters

A.4.2.1   Parameters of request PDUs

The following tables:

⎯ Table A.4 — GET-Rq parameters (security level 1)

⎯ Table A.5 — Action-Rq parameters for GET_STAMPED action (security level 1)

⎯ Table A.6 — Action-Rq parameters for SET_MMI action

⎯ Table A.7 — Action-Rq parameters for ECHO action

⎯ Table A.8 — EVENT-REPORT-Rq parameters

describe the valid format of the request APDUs. No other request commands are used by CCC application.

Fill bits always shall be set to zero.

Table A.4 — GET-Rq parameters (security level 1)

	EN 12834:2003, Annex A		ISO 14906:2011, Annex A	EN 15509:2007, C.4.5.5 Table C.16
GET-Rq	fill			=
	eid			=
	accessCredentials	OPTIONAL	=	mandatory
	iid	OPTIONAL		prohibited
	attributeIdList	OPTIONAL		mandatory

Table A.5 — Action-Rq parameters for GET_STAMPED action (security level 1)

	EN 12834:2003, Annex A		ISO 14906:2011, Annex A	EN 15509:2007, C.4.5.5 Table C.16 and ISO/TS 12813
ACTION-Rq	mode			TRUE
	eid			=
	actionType		=	0 (GET_STAMPED)
	accessCredentials	OPTIONAL		mandatory
	actionParameters	OPTIONAL		GetStampedRq
	iid	OPTIONAL		prohibited

Table A.6 — Action-Rq parameters for SET_MMI action

	EN 12834:2003, Annex A		ISO 14906:2011, Annex A	EN 15509:2007, C.4.5.5 Table C.16 and ISO/TS 12813
ACTION-Rq	mode			=
	eid			0
	actionType		=	10 (SET_MMI)
	accessCredentials	OPTIONAL		prohibited
	actionParameters	OPTIONAL		SetMMIRq
	iid	OPTIONAL		prohibited

Table A.7 — Action-Rq parameters for ECHO action

	EN 12834:2003, Annex A		ISO 14906:2011, Annex A	EN 15509:2007, C.4.5.5 Table C.16 and ISO/TS 12813
ACTION-Rq	mode			=
	eid			0
	actionType		=	15 (ECHO)
	accessCredentials	OPTIONAL		prohibited
	actionParameters	OPTIONAL		mandatory
	iid	OPTIONAL		prohibited

Table A.8 — EVENT-REPORT-Rq parameters

	EN 12834:2003, Annex A		ISO 14906:2011, Annex A	EN 15509:2007, C.4.5.5 Table C.16 and ISO/TS 12813
EVENT-REPORT-Rq	mode			=
	eid			0
	eventType		=	0 (release)
	accessCredentials	OPTIONAL		prohibited
	eventParameters	OPTIONAL		prohibited
	iid	OPTIONAL		prohibited

A.4.2.2 Parameters of response PDUs

The following tables

— Table A.9 — GET-Rs parameters

— Table A.10 — Action-Rs parameters for GET_STAMPED action

— Table A.11 — Action-Rs parameters for SET_MMI action

— Table A.12 — Action-Rs parameters for ECHO action

describe the valid format of the request APDUs. No other request commands are used by CCC application.

Fill bits always shall be set to zero.

Table A.9 — GET-Rs parameters

	EN 12834:2003, Annex A		ISO 14906:2011, Annex A	EN 15509:2007, C.4.5.5 Table C.16
GET-Rs	fill			=
	eid			=
	iid	OPTIONAL	=	prohibited
	attributeList	OPTIONAL		mandatory
	ret	OPTIONAL		mandatory

Table A.10 — Action-Rs parameters for GET_STAMPED action

	EN 12834:2003, Annex A		ISO 14906:2011, Annex A	EN 15509:2007, C.4.5.5 Table C.16 and ISO/TS 12813
ACTION-Rs	fill			=
	eid			=
	iid	OPTIONAL	=	prohibited
	responseParameter	OPTIONAL		mandatory
	ret	OPTIONAL		mandatory

Table A.11 — Action-Rs parameters for SET_MMI action

	EN 12834:2003, Annex A		ISO 14906:2011, Annex A	EN 15509:2007, C.4.5.5 Table C.16 and ISO/TS 12813
ACTION-Rs	fill			=
	eid			0
	iid	OPTIONAL	=	prohibited
	responseParameter	OPTIONAL		prohibited
	ret	OPTIONAL		mandatory

Table A.12 — Action-Rs parameters for ECHO action

	EN 12834:2003, Annex A		ISO 14906:2011, Annex A	EN 15509:2007, C.4.5.5 Table C.16 and ISO/TS 12813
ACTION-Rs	fill			=
	eid			0
	iid	OPTIONAL	=	prohibited
	responseParameter	OPTIONAL		conditional (present when ret=0)
	ret	OPTIONAL		mandatory

A.4.3 Application I-kernel test purposes for On-Board Unit, security level 1

These Test Purposes apply to the security level 1 as claimed in ISO/TS 12813:2009, Annex B Clause B.4.3 Table B.1 Item 1 and to initialisation and termination processes claimed in ISO/TS 12813:2009, Annex B Clause B.4.3 Table B.2 Items 1 and 5.

A.4.3.1   Data Structures

For the purpose of this conformance test, the following BSTs described in

— Table A.13 — BST1 (actual BST used, BV) valid BST

— Table A.14 — BST2 (actual BST used, BI) invalid BST: extraneous parameter (CCC application inserted as non mandatory application)

are transmitted to the DUT. Invalid values are indicated in **boldface**.

Table A.13 — BST1 (actual BST used, BV) valid BST

		Length	Value
Option Indicator		1 bit (nonmandApplications opt.)	0 (= nonmandApplications not present)
RSU	manufacturerid	16 bits	registered value
	individualid	27 bits	any
Time		32 bits	any
profile		1 bit (Profile ext.)	0 (= no extension)
		7 bits	0
MandApplications		1 bit (mandApplications ext.)	0 (= no extension)
		7 bits (number of applications)	1
	CCC Application	1 bit (eid opt.)	0 (= eid not present)
		1 bit (parameter opt.)	0 (= parameter not present)
	aid	1 bit (aid ext.)	0 (= no extension)
		5 bits	20 (= CCC application)
profileList		1 bit (profileList ext.)	0 (= no extension)
		7 bits (number of profiles)	0 (= list empty)

Table A.14 — BST2 (actual BST used, BI) invalid BST: extraneous parameter (CCC application inserted as non mandatory application)

		Length	Value
Option Indicator		1 bit (nonmandApplications opt.)	1 (= nonmandApplications present)
RSU	manufacturerid	16 bits	registered value
	individualid	27 bits	any
Time		32 bits	any
profile		1 bit (Profile ext.)	0 (= no extension)
		7 bits	0
MandApplications		1 bit (mandApplications ext.)	0 (= no extension)
		7 bits (number of applications)	1
	Application #1 (not CCC)	1 bit (eid opt.)	1 (= eid present)
		1 bit (parameter opt.)	0 (= parameter not present)
	aid	1 bit (aid ext.)	0 (= no extension)
		5 bits	≠ 20 (AID that is not supported by the OBU)
	eid	1 bit (eid ext.)	0 (= no extension)
		7 bits	any
nonmandApplications		**1 bit (nonmandApplications ext.)**	**0 (= no extension)**
		7 bits (number of applications)	**1**
	CCC Application	**1 bit (eid opt.)**	**0 (= eid not present)**
		1 bit (parameter opt.)	**0 (= parameter not present)**
	aid	**1 bit (aid ext.)**	**0 (= no extension)**
		5 bits	**20 (= CCC application)**
profileList		1 bit (profileList ext.)	0 (= no extension)
		7 bits (number of profiles)	0 (= list empty)

A.4.3.2　BV test purposes

Test subgroup objective:

— to test the behaviour of the DUT in relation to:

　— valid BST

　— valid EVENT-REPORT-Rq (Release)

— to test the DUT support of:

　— BeaconId

　— Time

　— Profile

　— Applications

　— LID.

TP/AP-BAS/OBU/BV/01	Receive and manage INITIALISATION.request (BST)
TP Origin	Identical to TP/AL-I/OBU/BV/01 in [ETSI TS 102 486-2-2] Clause 5.4.1
Reference	ISO/TS 12813:2009, 6.1.2
Initial Condition	See TP/AL-I/OBU/BV/01 in [ETSI TS 102 486-2-2] Clause 5.4.1
Stimulus and Expected Behaviour	
See TP/AL-I/OBU/BV/01 in [ETSI TS 102 486-2-2] Clause 5.4.1	

TP/AP-BAS/OBU/BV/02	Receive and manage EVENTREPORT request (RELEASE) with mode=0
TP Origin	Identical to TP/AL-I/OBU/BV/02 in [ETSI TS 102 486-2-2] Clause 5.4.1
Reference	ISO/TS 12813:2009, 6.1.6
Initial Condition	See TP/AL-I/OBU/BV/02 in [ETSI TS 102 486-2-2] Clause 5.4.1
Stimulus and Expected Behaviour	
See TP/AL-I/OBU/BV/02 in [ETSI TS 102 486-2-2] Clause 5.4.1	

TP/AP-BAS/OBU/BV/03	Read and manage the BeaconID in the BST
TP Origin	Identical to TP/AL-I/OBU/BV/03 in [ETSI TS 102 486-2-2] Clause 5.4.1
Reference	ISO/TS 12813:2009, 6.1.2
Initial Condition	Identical to TP/AL-I/OBU/BV/03 in [ETSI TS 102 486-2-2] Clause 5.4.1
Stimulus and Expected Behaviour	
See TP/AL-I/OBU/BV/03 in [ETSI TS 102 486-2-2] Clause 5.4.1	

TP/AP-BAS/OBU/BV/04	Read and manage time of reception of BST in parameter Time in BST
TP Origin	Identical to TP/AL-I/OBU/BV/04 in [ETSI TS 102 486-2-2] Clause 5.4.1
Reference	ISO/TS 12813:2009, 6.1.2
Initial Condition	Identical to TP/AL-I/OBU/BV/04 in [ETSI TS 102 486-2-2] Clause 5.4.1
Stimulus and Expected Behaviour	
See TP/AL-I/OBU/BV/04 in [ETSI TS 102 486-2-2] Clause 5.4.1	

TP/AP-BAS/OBU/BV/05	Empty Test Purpose, left to keep numbering aligned with [ETSI TS 102 486-2-2]
TP Origin	
Reference	
Initial Condition	
Stimulus and Expected Behaviour	

TP/AP-BAS/OBU/BV/06	Empty Test Purpose, left to keep numbering aligned with [ETSI TS 102 486-2-2]
TP Origin	
Reference	
Initial Condition	
Stimulus and Expected Behaviour	

TP/AP-BAS/OBU/BV/07	Empty Test Purpose, left to keep numbering aligned with [ETSI TS 102 486-2-2]
TP Origin	
Reference	
Initial Condition	
Stimulus and Expected Behaviour	

TP/AP-BAS/OBU/BV/08	Empty Test Purpose, left to keep numbering aligned with [ETSI TS 102 486-2-2]
TP Origin	
Reference	
Initial Condition	
Stimulus and Expected Behaviour	

TP/AP-BAS/OBU/BV/09	Manage profile selection
TP Origin	Identical to TP/AL-I/OBU/BV/09 in [ETSI TS 102 486-2-2] Clause 5.4.1
Reference	ISO/TS 12813:2009, 6.1.2
Initial Condition	See TP/AL-I/OBU/BV/09 in [ETSI TS 102 486-2-2] Clause 5.4.1
Stimulus and Expected Behaviour	
See TP/AL-I/OBU/BV/09 in [ETSI TS 102 486-2-2] Clause 5.4.1	

TP/AP-BAS/OBU/BV/10	Verify that the DUT replies to a BST with a VST
TP Origin	Specific
Reference	ISO/TS 12813:2009, 6.1.2
Initial Condition	DUT not in sleep mode and not yet initialized

Stimulus and Expected Behaviour

	Tester		DUT
1	BST1	⇒	
2		⇐	VST
3	Verify length and allowed values of VST (see Table A.3 — VST general structure (security level 1))		
4	IF verification performed in step 3 was not successful THEN TP failed		

A.4.3.3 BI test purposes

Test subgroup objective:

— to check the behaviour of the DUT in response to invalid messages

TP/AP-BAS/OBU/BI/01	Manage profile selection
TP Origin	Identical to TP/AL-I/OBU/BI/01 in [ETSI TS 102 486-2-2] Clause 5.4.2
Reference	ISO/TS 12813:2009, 6.1.2
Initial Condition	See TP/AL-I/OBU/BI/01 in [ETSI TS 102 486-2-2] Clause 5.4.2
Stimulus and Expected Behaviour	
See TP/AL-I/OBU/BI/01 in [ETSI TS 102 486-2-2] Clause 5.4.2	

TP/AP-BAS/OBU/BI/02	Manage applications
TP Origin	Identical to TP/AL-I/OBU/BI/02 in [ETSI TS 102 486-2-2] Clause 5.4.2
Reference	ISO/TS 12813:2009, 6.1.2
Initial Condition	See TP/AL-I/OBU/BI/02 in [ETSI TS 102 486-2-2] Clause 5.4.2
Stimulus and Expected Behaviour	
See TP/AL-I/OBU/BI/02 in [ETSI TS 102 486-2-2] Clause 5.4.2	

TP/AP-BAS/OBU/BI/03	Verify that the DUT handles BST with CCC application marked as non-mandatory application
TP Origin	Specific
Reference	ISO/TS 12813:2009, 6.1.2
Initial Condition	DUT not in sleep mode and not yet initialized

Stimulus and Expected Behaviour

	Tester		DUT
1	**BST2**	⇒	
2	Verify that DUT does not initialize with INITIALISATION-response (VST).		
3	IF verification performed in step 2 was not successful THEN TP failed		

A.4.4 Application T-kernel test purposes for On-Board Unit

These Test Purposes apply to the layer 7 functions related to T-kernel as claimed in ISO/TS 12813:2009, Annex B Clause B.4.3 Table B.2 Items 2-6.

A.4.4.1 BV test purposes

Test subgroup objective:

— to test the behaviour of the DUT in relation to syntactically and contextual correct behaviour of the test system.

TP/AP-FUN/OBU/BV/01	Receive GET.request and manage GET.response with LID=private
TP Origin	Identical to TP/AL-T/OBU/BV/01 in [ETSI TS 102 486-2-2] Clause 5.2.1
Reference	ISO/TS 12813:2009, 6.1.3
Initial Condition	See TP/AL-T/OBU/BV/01 in [ETSI TS 102 486-2-2] Clause 5.2.1
Stimulus and Expected Behaviour	
See TP/AL-T/OBU/BV/01 in [ETSI TS 102 486-2-2] Clause 5.2.1 NOTE: Request with accessCredentials	

TP/AP-FUN/OBU/BV/08	Receive ACTION.request with mode=1, manage ACTION.response with LID=private
TP Origin	Identical to TP/AL-T/OBU/BV/08 in [ETSI TS 102 486-2-2] Clause 5.2.1
Reference	ISO/TS 12813:2009, 6.1.4/6.1.5/6.1.7
Initial Condition	See TP/AL-T/OBU/BV/08 in [ETSI TS 102 486-2-2] Clause 5.2.1
Stimulus and Expected Behaviour	
See TP/AL-T/OBU/BV/08 in [ETSI TS 102 486-2-2] Clause 5.2.1 NOTE: Request with accessCredentials for GET_STAMPED and without accessCredentials for SET_MMI, ECHO	

TP/AP-FUN/OBU/BV/09	Receive ACTION.request with mode=0 and LID=private
TP Origin	Identical to TP/AL-T/OBU/BV/09 in [ETSI TS 102 486-2-2] Clause 5.2.1
Reference	ISO/TS 12813:2009, 6.1.5/6.1.7
Initial Condition	See TP/AL-T/OBU/BV/09 in [ETSI TS 102 486-2-2] Clause 5.2.1
Stimulus and Expected Behaviour	
See TP/AL-T/OBU/BV/09 in [ETSI TS 102 486-2-2] Clause 5.2.1 NOTE: Request without accessCredentials	

TP/AP-FUN/OBU/BV/10	Receive ACTION.request with mode=0 and LID=private
TP Origin	Identical to TP/AL-T/OBU/BV/10 in [ETSI TS 102 486-2-2] Clause 5.2.1
Reference	ISO/TS 12813:2009, 6.1.5/6.1.7
Initial Condition	See TP/AL-T/OBU/BV/10 in [ETSI TS 102 486-2-2] Clause 5.2.1
Stimulus and Expected Behaviour	

See TP/AL-T/OBU/BV/10 in [ETSI TS 102 486-2-2] Clause 5.2.1

NOTE: Request without accessCredentials

TP/AP-FUN/OBU/BV/11	Verify that the OBU can receive ACTION.request with mode=0 with LID=broadcast after initialization
TP Origin	Identical to TP/AL-T/OBU/BV/11 in [ETSI TS 102 486-2-2] Clause 5.2.1
Reference	ISO/TS 12813:2009, 6.1.5/6.1.7
Initial Condition	See TP/AL-T/OBU/BV/11 in [ETSI TS 102 486-2-2] Clause 5.2.1
Stimulus and Expected Behaviour	

See TP/AL-T/OBU/BV/11 in [ETSI TS 102 486-2-2] Clause 5.2.1

NOTE: Request without accessCredentials

TP/AP-FUN/OBU/BV/12	Verify that the OBU can receive and manage ACTION.request with mode=0 and with LID=broadcast without initialization
TP Origin	Identical to TP/AL-T/OBU/BV/12 in [ETSI TS 102 486-2-2] Clause 5.2.1
Reference	ISO/TS 12813:2009, 6.1.5/6.1.7
Initial Condition	See TP/AL-T/OBU/BV/12 in [ETSI TS 102 486-2-2] Clause 5.2.1
Stimulus and Expected Behaviour	

See TP/AL-T/OBU/BV/12 in [ETSI TS 102 486-2-2] Clause 5.2.1

NOTE: Request without accessCredentials

TP/AP-FUN/OBU/BV/13	**Verify that the OBU can receive and manage non-fragmented APDUs with random PDU number**
TP Origin	Identical to TP/AL-T/OBU/BV/13 in [ETSI TS 102 486-2-2] Clause 5.2.1
Reference	ISO/TS 12813:2009, 6.1.3/6.1.4/6.1.5/6.1.7
Initial Condition	See TP/AL-T/OBU/BV/13 in [ETSI TS 102 486-2-2] Clause 5.2.1

Stimulus and Expected Behaviour
See TP/AL-T/OBU/BV/13 in [ETSI TS 102 486-2-2] Clause 5.2.1 NOTE: Request with accessCredentials for GET, GET_STAMPED and without accessCredentials for SET_MMI, ECHO. Test purpose not applicable for SET message

TP/AP-FUN/OBU/BV/14	**Verify that the OBU can receive and manage multiplexed APDUs from two different applications**
TP Origin	Identical to TP/AL-T/OBU/BV/14 in [ETSI TS 102 486-2-2] Clause 5.2.1
Reference	ISO/TS 12813:2009, 6.1.3/6.1.4/6.1.5/6.1.7
Initial Condition	See TP/AL-T/OBU/BV/14 in [ETSI TS 102 486-2-2] Clause 5.2.1

Stimulus and Expected Behaviour
See TP/AL-T/OBU/BV/14 in [ETSI TS 102 486-2-2] Clause 5.2.1 NOTE: Request with accessCredentials for GET, GET_STAMPED and without accessCredentials for SET_MMI, ECHO. Test purpose not applicable for SET message

TP/AP-FUN/OBU/BV/16	**Verify that the OBU can receive and manage concatenated and chained APDUs from a single application**
TP Origin	Identical to TP/AL-T/OBU/BV/16 in [ETSI TS 102 486-2-2] Clause 5.2.1
Reference	ISO/TS 12813:2009, 6.1.3/6.1.4/6.1.5/6.1.6/6.1.7
Initial Condition	See TP/AL-T/OBU/BV/16 in [ETSI TS 102 486-2-2] Clause 5.2.1

Stimulus and Expected Behaviour
See TP/AL-T/OBU/BV/16 in [ETSI TS 102 486-2-2] Clause 5.2.1 NOTE: Request with accessCredentials for GET, GET_STAMPED and without accessCredentials for SET_MMI, ECHO. Test purpose not applicable for SET message

TP/AP-FUN/OBU/BV/17	Attribute encoding tests – GET
TP Origin	Identical to TC03-A in ISO/TS 14907-2:2011, C.1.3
Reference	ISO/TS 12813:2009, 6.1.3
Initial Condition	See TC03-A in ISO/TS 14907-2:2011, C.1.3
Stimulus and Expected Behaviour	
TC03-A in ISO/TS 14907-2:2011, C.1.3	
NOTE: Request with accessCredentials	

TP/AP-FUN/OBU/BV/19	Support of DSRC EFC GET STAMPED
TP Origin	Identical to TC10-A in ISO/TS 14907-2:2011, C.2.1
Reference	ISO/TS 12813:2009, 6.1.4
Initial Condition	See TC10-A in ISO/TS 14907-2:2011, C.2.1
Stimulus and Expected Behaviour	
See TC10-A in ISO/TS 14907-2:2011, C.2.1	
NOTE: Request with accessCredentials	

TP/AP-FUN/OBU/BV/20	Support of DSRC EFC SET MMI
TP Origin	Identical to TC20-A in ISO/TS 14907-2:2011, C.2.4
Reference	ISO/TS 12813:2009, 6.1.5
Initial Condition	See TC20-A in ISO/TS 14907-2:2011, C.2.4
Stimulus and Expected Behaviour	
See TC20-A in ISO/TS 14907-2:2011, C.2.4	
NOTE: Request without accessCredentials	

TP/AP-FUN/OBU/BV/21	Support of DSRC EFC ECHO
TP Origin	Identical to TC25-A in ISO/TS 14907-2:2011, C.2.5
Reference	ISO/TS 12813:2009, 6.1.7
Initial Condition	See TC25-A in ISO/TS 14907-2:2011, C.2.5
Stimulus and Expected Behaviour	
See TC25-A in ISO/TS 14907-2:2011, C.2.5	
NOTE: Request without accessCredentials	

A.4.4.2 BI test purposes

Test subgroup objective:

— to check the behaviour of the of the DUT in response to invalid stimuli and behaviour from the test tool.

TP/AP-FUN/OBU/BI/02	Receive and manage PDUs to Broadcast kernel with awake but not yet initialised OBU
TP Origin	Identical to TP/AL-T/OBU/BI/02 in [ETSI TS 102 486-2-2] Clause 5.2.2
Reference	ISO/TS 12813:2009, 6.1.2
Initial Condition	See TP/AL-T/OBU/BI/02 in [ETSI TS 102 486-2-2] Clause 5.2.2
Stimulus and Expected Behaviour	

See TP/AL-T/OBU/BI/02 in [ETSI TS 102 486-2-2] Clause 5.2.2

TP/AP-FUN/OBU/BI/03	Receive and manage non-fragmented PDUs with wrong fragment counter value with initialised OBU
TP Origin	Identical to TP/AL-T/OBU/BI/03 in [ETSI TS 102 486-2-2] Clause 5.2.2
Reference	ISO/TS 12813:2009, 6.1.3/6.1.4/6.1.5/6.1.7
Initial Condition	See TP/AL-T/OBU/BI/03 in [ETSI TS 102 486-2-2] Clause 5.2.2
Stimulus and Expected Behaviour	

See TP/AL-T/OBU/BI/03 in [ETSI TS 102 486-2-2] Clause 5.2.2

NOTE: Request with accessCredentials for GET, GET_STAMPED and without accessCredentials for SET_MMI, ECHO. Test purpose not applicable for SET message

TP/AP-FUN/OBU/BI/04	Receive and manage non-fragmented PDUs with wrong fragment counter value with awake but not yet initialised OBU
TP Origin	Identical to TP/AL-T/OBU/BI/04 in [ETSI TS 102 486-2-2] Clause 5.2.2
Reference	ISO/TS 12813:2009, 6.1.2
Initial Condition	See TP/AL-T/OBU/BI/04 in [ETSI TS 102 486-2-2] Clause 5.2.2
Stimulus and Expected Behaviour	

See TP/AL-T/OBU/BI/04 in [ETSI TS 102 486-2-2] Clause 5.2.2

TP/AP-FUN/OBU/BI/05	Empty Test Purpose, left to keep numbering aligned with [ETSI TS 102 486-2-2]
TP Origin	
Reference	
Initial Condition	
Stimulus and Expected Behaviour	

TP/AP-FUN/OBU/BI/06	Receive and manage concatenated and chained APDUs from a single application with chaining error
TP Origin	Identical to TP/AL-T/OBU/BI/06 in [ETSI TS 102 486-2-2] Clause 5.2.2
Reference	ISO/TS 12813:2009, 6.1.3/6.1.4/6.1.5/6.1.7
Initial Condition	See TP/AL-T/OBU/BI/06 in [ETSI TS 102 486-2-2] Clause 5.2.2
Stimulus and Expected Behaviour	
See TP/AL-T/OBU/BI/06 in [ETSI TS 102 486-2-2] Clause 5.2.2	
NOTE: Request with accessCredentials for GET, GET_STAMPED and without accessCredentials for SET_MMI, ECHO. Test purpose not applicable for SET message	

A.4.5 Application data attributes test purposes, security level 1

These Test Purposes apply to security level 1 as claimed in ISO/TS 12813:2009, Annex B Clause B.4.3 Table B.1 Item 1, GET / GET_STAMPED operations as claimed in ISO/TS 12813:2009, Annex B Clause B.4.3 Table B.2 Items 2 and 3, and attributes as claimed in ISO/TS 12813:2009, Annex B Clause B.4.3 Tables B.4, B.5 and B.6.

A.4.5.1 Data attributes definition

Table A.15 — Data group definition contains the references to the standard definition of attributes length and allowed values.

Table A.15 — Data group definition

Data Groups	Attributes	AttrId	Definition of...	
			Length	**Allowed Values**
Identification	CCC-ContextMark	0	EN 15509:2007, 5.1.3, Table 2	ISO 14906:2011, 8.2, Table 37 & Annex A
	EquipmentOBUId	24		ISO 14906:2011, 8.5, Table 40 & Annex A
	PaymentMeans	32		ISO 14906:2011, 8.7, Table 42 & Annex A
Vehicle	VehicleLicencePlateNumber	16		EN 15509:2007, Annex A, Table A.2
	VehicleClass	17		EN 15509:2007, Annex A, Table A.2
	VehicleDimensions	18		ISO 14906:2011, 8.5, Table 40 & Annex A
	VehicleAxles	19		ISO 14906:2011, 8.5, Table 40 & Annex A
	VehicleWeightLimits	20		ISO 14906:2011, 8.5, Table 40 & Annex A
	VehicleSpecificCharacteristics	22		ISO 14906:2011, 8.5, Table 40 & Annex A
Status	VehicleAxlesHistory	37	ISO/TS12813	ISO/TS 12813:2009, 7.3, Table 5
	CommunicationStatus	38		ISO/TS 12813:2009, 7.3, Table 5
	GnssStatus	39		ISO/TS 12813:2009, 7.3, Table 5
	DistanceRecordingStatus	40		ISO/TS 12813:2009, 7.3, Table 5
	ActiveContexts	41		ISO/TS 12813:2009, 7.3, Table 5
	ObeHistory	42		ISO/TS 12813:2009, 7.3, Table 5

A.4.5.2 BV test purposes

Test subgroup objective:

— to test the behaviour of the DUT in relation to the support of mandatory attributes (in allowed length and allowed values, see below):

  — Identification,

  — Vehicle,

  — Status

— by means of the syntactically and contextual correct PDUs:

  — GET,

  — GET_STAMPED.

TP/AP-DAT/OBU/BV/01	Verify that the OBU supports the read (by means of GET) of the Identification attributes		
TP Origin	Specific		
Reference	ISO/TS 12813:2009, 7.2		
Initial Condition	OBU initialised and can accept a GET-request		
Stimulus and Expected Behaviour			
	Tester		**DUT**
1	**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac_1, iid = Ø, attrIdList = { '24'D - - EquipmentOBUId, '32'D - - PaymentMeans} }	$\Rightarrow$	
2		$\Leftarrow$	**GET.rs** = { fill, eid, iid = Ø, attrIdList = {('24'D, v_1), ('32'D, v_2)}, returnStatus }
3	IF (returnStatus NOT OK) OR (response not received) THEN TP failed		
4	Verify length and allowed values of $v_1 \div v_2$ Table A.15 — Data group definition		

5	IF verification performed in step 4 was successful
	
	     THEN TP passed
	
	     ELSE TP failed
	
	 ENDIF		

TP/AP-DAT/OBU/BV/02	Verify that the OBU supports the read (by means of GET) of the Identification attributes, one at the time
TP Origin	Specific
Reference	ISO/TS 12813:2009, 7.2
Initial Condition	OBU initialised and can accept a GET-request
Stimulus and Expected Behaviour	

		Tester		DUT
1		**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac_1, iid = Ø, attrIdList = { '24'D - - EquipmentOBUId }}	$\Rightarrow$	
2			$\Leftarrow$	**GET.rs** = { fill, eid, iid = Ø, attrIdList = {('24'D, v_1) }, returnStatus }
3		IF (returnStatus NOT OK) OR (response not received) THEN TP failed		
4		**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac_1, iid = Ø, attrIdList = { '32'D - - PaymentMeans }}	$\Rightarrow$	
5			$\Leftarrow$	**GET.rs** = { fill, eid, iid = Ø, attrIdList = {('32'D, v_2) }, returnStatus }
6		See step 3		
7		Verify length and allowed values of $v_1 \div v_2$ Table A.15 — Data group definition		

8		IF all is OK
		
		     THEN TP passed
		
		     ELSE TP failed
		
		 ENDIF		

TP/AP-DAT/OBU/BV/03	Verify that the OBU supports the read (by means of GET) of the Vehicle data group attributes
TP Origin	Identical to TP/AP-0DAT/OBU/BV/03 in EN 15876-1:2010, A.4.5
Reference	ISO/TS 12813:2009, 7.4
Initial Condition	OBU initialised and can accept a GET-request
Stimulus and Expected Behaviour	
NOTE: Request with accessCredentials	

TP/AP-DAT/OBU/BV/04	**Verify that the OBU supports the read (by means of GET) of the Vehicle attributes, one at the time**
TP Origin	Identical to TP/AP-0DAT/OBU/BV/04 in EN 15876-1:2010, A.4.5
Reference	ISO/TS 12813:2009, 7.4
Initial Condition	OBU initialised and can accept a GET-request
Stimulus and Expected Behaviour	

NOTE: Request with accessCredentials

TP/AP-DAT/OBU/BV/05	**Verify that the OBU supports the read (by means of GET) of the Status attributes**
TP Origin	Specific
Reference	ISO/TS 12813:2009, 7.3
Initial Condition	OBU initialised and can accept a GET-request

Stimulus and Expected Behaviour

	Tester		**DUT**
1	**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac_1, iid = Ø, attrIdList = { '37'D - - VehicleAxlesHistory , '38'D - - CommunicationStatus, '39'D - - GnssStatus, '40'D - - DistanceRecordingStatus, '41'D - - ActiveContexts, '42'D - - ObeHistory } }	$\Rightarrow$	
2		$\Leftarrow$	**GET.rs** = { fill, eid, iid = Ø, attrIdList = {('37'D, v_1), ('38'D, v_2), ('39'D, v_3), ('40'D, v_4) , ('41'D, v_5) , ('42'D, v_6)}, returnStatus }
3	IF (returnStatus NOT OK) OR (response not received) THEN TP failed		
4	Verify length and allowed values of $v_1 \div v_6$ Table A.15 — Data group definition		
5	IF verification performed in step 4 was successful THEN TP passed ELSE TP failed ENDIF		

TP/AP-DAT/OBU/BV/06	Verify that the OBU supports the read (by means of GET) of the Status attributes, one at the time
TP Origin	Specific
Reference	ISO/TS 12813:2009, 7.3
Initial Condition	OBU initialised and can accept a GET-request

Stimulus and Expected Behaviour

	Tester		DUT
1	**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac$_1$, iid = Ø, attrIdList = { '37'D - - VehicleAxlesHistory }}	⇒	
2		⇐	**GET.rs** = { fill, eid, iid = Ø, attrIdList = {('37'D, v$_1$) }, returnStatus }
3	IF (returnStatus NOT OK) OR (response not received) THEN TP failed		
4	**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac$_1$, iid = Ø, attrIdList = { '38'D - - CommunicationStatus }}	⇒	
5		⇐	**GET.rs** = { fill, eid, iid = Ø, attrIdList = {('38'D, v$_2$) }, returnStatus }
6	See step 3		
7	**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac$_1$, iid = Ø, attrIdList = { '39'D - - GnssStatus }}	⇒	
8		⇐	**GET.rs** = { fill, eid, iid = Ø, attrIdList = {('39'D, v$_3$) }, returnStatus }
9	See step 3		
10	**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac$_1$, iid = Ø, attrIdList = { '40'D - - DistanceRecordingStatus }}	⇒	
11		⇐	**GET.rs** = { fill, eid, iid = Ø, attrIdList = {('40'D, v$_4$) }, returnStatus }
12	See step 3		
13	**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac$_1$, iid = Ø, attrIdList = { '41'D - - ActiveContexts }}	⇒	
14		⇐	**GET.rs** = { fill, eid, iid = Ø, attrIdList = {('41'D, v$_5$) }, returnStatus }
15	See step 3		
16	**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac$_1$, iid = Ø, attrIdList = { '42'D - - ObeHistory }}	⇒	

17		⇐	**GET.rs** = { fill, eid, iid = Ø, attrIdList = {('42'D, v_6) }, returnStatus }
18	See step 3		
19	Verify length and allowed values of $v_1 \div v_6$ Table A.15 — Data group definition		

20	IF all is OK
	
	     THEN TP passed
	
	     ELSE TP failed
	
	 ENDIF		

TP/AP-DAT/OBU/BV/07	Verify that the OBU supports the read (by means of GET-STAMPED.rq) of the Identification attributes	
TP Origin	Specific	
Reference	ISO/TS 12813:2009, 7.2	
Initial Condition	OBU initialised and can accept a GET-STAMPED-request	
Stimulus and Expected Behaviour		
	Tester		**DUT**

1	**ACTION.rq** = { mode = T, eid = VST. DSRC-eid, actionType = 0, accessCredentials = ac_1,
	 GET-STAMPED.rq = {
	     attrIdList = {
	         '0'D - - CCC-ContextMark ,
	         '24'D - - EquipmentOBUId,
	         '32'D - - PaymentMeans},
	     nonce = C1, keyRef = C2},
	 iid = Ø }
		⇒	

2		⇐	**ACTION.rs** = { fill, eid, iid = Ø,
			     GET-STAMPED.rs = {
			         attrIdList = {
			             ('0'D, v_1), ('24'D, v_2), ('32'D,
			 v_3)}, authenticator},
			     returnStatus }

3	IF (returnStatus NOT OK) OR (response not received) THEN TP failed		
4	Verify length and allowed values of $v_1 \div v_3$ Table A.15 — Data group definition Verify authenticator		

5	IF verification performed in step 4 was successful
	
	     THEN TP passed
	
	     ELSE TP failed
	
	 ENDIF		

TP/AP-DAT/OBU/BV/08	Empty Test Purpose, left to keep numbering aligned with [EN 15876-1]
TP Origin	
Reference	
Initial Condition	
Stimulus and Expected Behaviour	

TP/AP-DAT/OBU/BV/09	Verify that the OBU supports the read (by means of GET-STAMPED.rq) of the Status attributes		
TP Origin	Specific		
Reference	ISO/TS 12813:2009, 7.3		
Initial Condition	OBU initialised and can accept a GET-STAMPED-request		
Stimulus and Expected Behaviour			
	Tester		**DUT**
1	**ACTION.rq** = { mode = T, eid = VST. DSRC-eid, actionType = 0, accessCredentials = ac_1, **GET-STAMPED.rq** = { attrIdList = { '37'D - - VehicleAxlesHistory , '38'D - - CommunicationStatus, '39'D - - GnssStatus, '40'D - - DistanceRecordingStatus, '41'D - - ActiveContexts, '42'D - - ObeHistory }, nonce = C1, keyRef = C2}, iid = Ø }	⇒	
2		⇐	**ACTION.rs** = { fill, eid, iid = Ø, **GET-STAMPED.rs** = { attrIdList = { ('37'D, v_1), ('38'D, v_2), ('39'D, v_3) , ('40'D, v_4) , ('41'D, v_5) , ('42'D, v_6)}, authenticator}, returnStatus }
3	IF (returnStatus NOT OK) OR (response not received) THEN TP failed		
4	Verify length and allowed values of $v_1 \div v_6$ Table A.15 — Data group definition Verify authenticator		
5	IF verification performed in step 4 was successful THEN TP passed ELSE TP failed ENDIF		

TP/AP-DAT/OBU/BV/10	**Verify that the OBU supports the read (by means of GET-STAMPED.rq) of the Vehicle data group attributes**
TP Origin	Identical to TP/AP-0DAT/OBU/BV/10 in EN 15876-1:2010, A.4.5
Reference	ISO/TS 12813:2009, 7.4
Initial Condition	OBU initialised and can accept a GET-STAMPED-request
Stimulus and Expected Behaviour	
NOTE: Request with accessCredentials	

A.4.5.3   BI test purposes

Test subgroup objective:

— to check the behaviour of the DUT in response to invalid stimuli and behaviour from the test tool, in case of:

— update of the read-only attributes:

— Identification

— Vehicle,

— Status

— to check the behaviour of the DUT in response to request with invalid accessCredentials:

— no access credentials (like in security level 0)

— wrong access credentials.

TP/AP-DAT/OBU/BI/01	**Verify that the OBU prevents the update of the read-only Vehicle attributes, one by one**
TP Origin	Identical to TP/AP-0DAT/OBU/BI/01 in EN 15876-1:2010, A.4.5
Reference	ISO/TS 12813:2009, 7.4
Initial Condition	OBU initialised and can accept a SET-request
Stimulus and Expected Behaviour	
NOTE: Request with accessCredentials	

TP/AP-DAT/OBU/BI/02	**Verify that the OBU prevents the update of the read-only Vehicle attribute list**
TP Origin	Identical to TP/AP-0DAT/OBU/BI/02 in EN 15876-1:2010, A.4.5
Reference	ISO/TS 12813:2009, 7.4
Initial Condition	OBU initialised and can accept a SET-request
Stimulus and Expected Behaviour	
NOTE: Request with accessCredentials	

TP/AP-DAT/OBU/BI/03	Verify that the OBU prevents the update of the read-only Identification attribute list
TP Origin	Specific
Reference	ISO/TS 12813:2009, 7.2
Initial Condition	OBU initialised and can accept a SET-request
Stimulus and Expected Behaviour	

	Tester		DUT
1	**SET.rq** = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac_1, attrIdList = { ('0'D, x_1), ('24'D, x_2), ('32'D, x_3)}, iid = $\varnothing$ }	$\Rightarrow$	
2	IF (SET.rs received AND returnStatus=0) THEN TP failed		

TP/AP-DAT/OBU/BI/04	Verify that the OBU prevents the update of the read-only Identification attributes, one by one
TP Origin	Specific
Reference	ISO/TS 12813:2009, 7.2
Initial Condition	OBU initialised and can accept a SET-request
Stimulus and Expected Behaviour	

	Tester		DUT
1	**SET.rq** = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac_1, attrIdList = { ('0'D, x_1) }, iid = $\varnothing$ }	$\Rightarrow$	
2	IF (SET.rs received AND returnStatus=0) THEN TP failed		
3	**SET.rq** = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac_1, attrIdList = { ('24'D, x_2) }, iid = $\varnothing$ }	$\Rightarrow$	
4	IF (SET.rs received AND returnStatus=0) THEN TP failed		
5	**SET.rq** = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac_1, attrIdList = { ('32'D, x_3) }, iid = $\varnothing$ }	$\Rightarrow$	
6	IF (SET.rs received AND returnStatus=0) THEN TP failed		

TP/AP-DAT/OBU/BI/05	Verify that the OBU prevents the update of the read-only Status attribute list		
TP Origin	Specific		
Reference	ISO/TS 12813:2009, 7.3		
Initial Condition	OBU initialised and can accept a SET-request		
Stimulus and Expected Behaviour			

	Tester		DUT

1	**SET.rq** = { fill = 0, mode = T,
	        eid = VST. DSRC-eid,
	        accessCredentials = ac_1,
	        attrIdList = { ('37'D, x_1), ('38'D, x_2),
	                ('39'D, x_3) , ('40'D, x_4) , ('41'D,
	x_5) ,
	                ('42'D, x_6)},
	        iid = Ø }
		$\Rightarrow$	

2	IF (SET.rs received AND returnStatus=0) THEN TP failed		

TP/AP-DAT/OBU/BI/06	Verify that the OBU prevents the update of the read-only Status attributes, one by one
TP Origin	Specific
Reference	ISO/TS 12813:2009, 7.3
Initial Condition	OBU initialised and can accept a SET-request

Stimulus and Expected Behaviour

	Tester		DUT
1	**SET.rq** = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac_1, attrIdList = { ('37'D, x_1) }, iid = Ø }	⇒	
2	IF (SET.rs received AND returnStatus=0) THEN TP failed		
3	**SET.rq** = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac_1, attrIdList = { ('38'D, x_2) }, iid = Ø }	⇒	
4	IF (SET.rs received AND returnStatus=0) THEN TP failed		
5	**SET.rq** = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac_1, attrIdList = { ('39'D, x_3) }, iid = Ø }	⇒	
6	IF (SET.rs received AND returnStatus=0) THEN TP failed		
7	**SET.rq** = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac_1, attrIdList = { ('40'D, x_3) }, iid = Ø }	⇒	
8	IF (SET.rs received AND returnStatus=0) THEN TP failed		
9	**SET.rq** = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac_1, attrIdList = { ('41'D, x_3) }, iid = Ø }	⇒	
10	IF (SET.rs received AND returnStatus=0) THEN TP failed		
11	**SET.rq** = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac_1, attrIdList = { ('42'D, x_3) }, iid = Ø }	⇒	
12	IF (SET.rs received AND returnStatus=0) THEN TP failed		

TP/AP-DAT/OBU/BI/07	Verify that the OBU prevents the read (by means of GET) of the Identification attributes with invalid accessCredentials
TP Origin	Specific
Reference	ISO/TS 12813:2009, 7.2
Initial Condition	OBU initialised and can accept a GET-request

Stimulus and Expected Behaviour

	Tester		DUT
1	**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = invalid_ac, iid = Ø, attrIdList = { '0'D - - CCC-ContextMark , '24'D - - EquipmentOBUId, '32'D - - PaymentMeans} }	⇒	
2	IF (GET.rs received AND returnStatus=0) THEN TP failed		

NOTE: invalid_ac is either empty or has incorrect value

TP/AP-DAT/OBU/BI/08	Verify that the OBU prevents the read (by means of GET) of the Vehicle attributes with invalid accessCredentials
TP Origin	Specific
Reference	ISO/TS 12813:2009, 7.4
Initial Condition	OBU initialised and can accept a GET-request

Stimulus and Expected Behaviour

	Tester		DUT
1	**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = invalid_ac, iid = Ø, attrIdList = { '16'D - - LicencePlateNumber, '17'D - - Class, '18'D - - Dimensions, '19'D - - Axles, '20'D - - WeightLimits, '22'D - - SpecificCharacteristics } }	⇒	
2	IF (GET.rs received AND returnStatus=0) THEN TP failed		

NOTE: invalid_ac is either empty or has incorrect value

TP/AP-DAT/OBU/BI/09	Verify that the OBU prevents the read (by means of GET) of the Status attributes with invalid accessCredentials		
TP Origin	Specific		
Reference	ISO/TS 12813:2009, 7.4		
Initial Condition	OBU initialised and can accept a GET-request		
Stimulus and Expected Behaviour			
	Tester		**DUT**
1	**GET.rq** = { fill = 0, eid = VST. DSRC-eid, accessCredentials = invalid_ac, iid = Ø, attrIdList = { '37'D - - VehicleAxlesHistory , '38'D - - CommunicationStatus, '39'D - - GnssStatus, '40'D - - DistanceRecordingStatus, '41'D - - ActiveContexts, '42'D - - ObeHistory } }	⇒	
2	IF (GET.rs received AND returnStatus=0) THEN TP failed		
NOTE: invalid_ac is either empty or has incorrect value			

TP/AP-DAT/OBU/BI/10	Verify that the OBU prevents the read (by means of GET-STAMPED) of the Identification attributes with invalid accessCredentials		
TP Origin	Specific		
Reference	ISO/TS 12813:2009, 7.2		
Initial Condition	OBU initialised and can accept a GET-STAMPED-request		
Stimulus and Expected Behaviour			
	Tester		**DUT**
1	**ACTION.rq** = { mode = T, eid = VST. DSRC-eid, actionType = 0, accessCredentials = invalid_ac, **GET-STAMPED.rq** = { attrIdList = { '0'D - - CCC-ContextMark , '24'D - - EquipmentOBUId, '32'D - - PaymentMeans}, nonce = C1, keyRef = C2}, iid = Ø }	⇒	
2	IF (GET-STAMPED.rs received AND returnStatus=0) THEN TP failed		
NOTE: invalid_ac is either empty or has incorrect value			

TP/AP-DAT/OBU/BI/11	Verify that the OBU prevents the read (by means of GET-STAMPED) of the Vehicle attributes with invalid accessCredentials
TP Origin	Specific
Reference	ISO/TS 12813:2009, 7.4
Initial Condition	OBU initialised and can accept a GET-STAMPED-request

Stimulus and Expected Behaviour

	Tester		DUT

1	**ACTION.rq** = { mode = T, eid = VST. DSRC-eid,
	actionType = 0,
	accessCredentials = invalid_ac,
	GET-STAMPED.rq = {
	attrIdList = {
	'16'D - - LicencePlateNumber,
	'17'D - - Class,
	'18'D - - Dimensions,
	'19'D - - Axles,
	'20'D - - WeightLimits,
	'22'D - -
	SpecificCharacteristics },
	nonce = C1, keyRef = C2},
	iid = Ø }
		⇒	

2	IF (GET-STAMPED.rs received AND returnStatus=0) THEN TP failed		

NOTE: invalid_ac is either empty or has incorrect value

TP/AP-DAT/OBU/BI/12	Verify that the OBU prevents the read (by means of GET-STAMPED) of the Status attributes with invalid accessCredentials
TP Origin	Specific
Reference	ISO/TS 12813:2009, 7.3
Initial Condition	OBU initialised and can accept a GET-STAMPED-request

Stimulus and Expected Behaviour

	Tester		DUT

1	**ACTION.rq** = { mode = T, eid = VST. DSRC-eid,
	 actionType = 0,
	 accessCredentials = invalid_ac,
	 GET-STAMPED.rq = {
	 attrIdList = {
	 '37'D - - VehicleAxlesHistory,
	 '38'D - - CommunicationStatus,
	 '39'D - - GnssStatus,
	 '40'D - - DistanceRecordingStatus,
	 '41'D - - ActiveContexts,
	 '42'D - - ObeHistory },
	 nonce = C1, keyRef = C2},
	 iid = Ø }
		⇒	

2	IF (GET-STAMPED.rs received AND returnStatus=0) THEN TP failed		

NOTE: invalid_ac is either empty or has incorrect value

A.4.6 Application security test purposes, security level 1

All test purposes TP/AP-0SEC/OBU/Bx/yy defined in [EN 15876-1] are applicable for CCC application as claimed in ISO/TS 12813:2009, Annex B Clause B.4.3 Table B.1 Item 2. Note that every TP related to GET or GET_STAMPED message shall be transformed to security level 1 (i.e. with access credentials).

Annex B
(normative)

Test purposes for roadside equipment

B.1 Introduction

This annex contains the Test Purposes (TP) for the conformity evaluation of RSE to ISO/TS 12813.

B.1.1 TP symbols conventions

For the application layer test purposes, a special notation and symbol convention is used, as defined in what follows.

Symbols are used in the description of the TPs, with meanings according to the table below.

Table B.1 — Description of TP Symbols

SYMBOL	DESCRIPTION
XXX.rq $\Rightarrow$	The Tester sends the XXX.rq PDU to the DUT
$\Leftarrow$ YYY.rs	The DUT sends the YYY.rs PDU to the Tester
A $\equiv$ B	Test Purpose A "is congruent to" Test Purpose B. The notation Test Purpose A $\equiv$ Test Purpose B means that the Test Purpose A is the same as Test Purpose B. If differences in parameters or parameter values have to be applied, these differences are indicated in the text immediately below.
A $\rightarrow$ B	Object A "is transformed" into Object B. So a notation like "Table X $\rightarrow$ Table Y" means that, for the scope of the Test Purpose, any reference of Table X should be changed into references to Table Y.
=	Means "assignment". That is, a notation like "accessCredentials = a value" means that the field accessCredentials is given a value.
Ø	Means "empty" or "not set". So, a notation like "accessCredentials = Ø $\rightarrow$ accessCredentials = calculated value", for a given Test Purpose, means "change all occurrences in which the field accessCredentials has not been assigned to calculation of the value accessCredentials to a given value.

In addition, it has to be noted that the sequence of PDUs issued by an RSE is not constrained by [ISO/TS 12813]. This means that PDUs cannot in general be forced to be generated by the DUT. In order for the test purposes to adequately cover all possibilities, and at the same time avoid the combinatorial explosion, an abbreviated notation has been used. According to the notation, if in a test purpose, a step is indicated as:

n	See Table B.2 — PDU Selector

this means that, according to the received PDU, a corresponding test purpose is to be executed, as indicated in Table B.2 — PDU Selector):

Table B.2 — PDU Selector

n	On arriving	GET.rq	Execute	TP/AP-GET/RSE/...	
		ACTION.rq (GET-STAMPED.rq)		TP/AP-STA/RSE/...	... BI/x
		ACTION.rq (SET-MMI.rq)		TP/AP-MMI/RSE/...	or
		ACTION.rq (ECHO.rq)		TP/AP-ECH/RSE/...	...BV/y
		EVENT-REPORT.rq		TP/AP-REL/RSE/...	
		Any other PDU		TP failed	

In order for the Test Purposes to clearly identify and specify the subject of the test, and because of the fact that most Application Protocol Data Unit exchanges can only be tested after other exchanges had been previously successfully performed, the Tester has been modelled as controlling a variable, named **Error**, which indicates if a previously executed Test Purpose had failed. This allows to properly control the sequence of events in a Test Purpose. The variable Error is set by the Tester to either T (True) or F (False), to indicate whether an error occurred or not.

Additionally, as most Application Protocol Data Unit carry the **mode** parameter, which indicates whether a response is expected or not, this mode parameter can be used in some Test Purpose by the Tester in order to decide whether to issue a response or not in the case the Test Purpose passes, so to enable the DUT to continue issuing requests in subsequent Test Purposes.

B.2 Physical Layer

Per ISO/TS 12813:2009, 5.5.2, all test purposes TP/PHY/RSE/Bx/yy defined in [EN 15876-1] are applicable for the conformity evaluation of RSE to CEN–DSRC based CCC as claimed in ISO/TS 12813:2009, Annex B Clause B.5.3 Table B.10 Item 1.

B.3 MAC & LLC

Per ISO/TS 12813:2009, 5.5.2, all test purposes TP/MAC/RSE/Bx/yy and TP/LLC/RSE/Bx/yy defined in [EN 15876-1] are applicable for the conformity evaluation of RSE to CEN–DSRC based CCC as claimed in ISO/TS 12813:2009, Annex B Clause B.5.3 Table B.10 Item 1.

B.4 Application Layer Test Purposes

B.4.1 Application initialization phase test purposes

These Test Purposes apply to the INITIALISATION as claimed in ISO/TS 12813:2009, Annex B Clause B.5.3 Table B.9 Item 1.

To the purpose of this conformance test, the VST described in Table B.3 — VST1 (security level 1); valid VST is transmitted to the DUT.

Table B.3 — VST1 (security level 1); valid VST

					Length	Allowed Values
fill					4 bits	any
profile					1 bit (Profile ext.)	0 (= no extension)
					7 bits	See Profile in EN 12834:2003, Annex A
applications					1 bit (applications ext.)	0 (= no extension)
					7 bits (number of applic.)	2
	CCC Application				1 bit (eid opt.)	1 (= eid present)
					1 bit (parameter opt.)	1 (= parameter present)
		aid			1 bit (aid ext.)	0 (= no extension)
					5 bits	20 (= CCC application)
		eid			1 bit (eid ext.)	0 (= no extension)
					7 bits	any
		parameter			1 bit (Container ext.)	0 (= no extension)
					7 bits (Container CHOICE)	2 (= OCTET STRING)
					1 bit (octet string ext.)	0 (= no extension)
					7 bits (octet string length)	16
			CCC-ContextMark	Contract Provider	10 bits (CountryCode)	See [ISO 3166-1]
					14 bits (IssuerIdentifier)	See [ISO 14816]
				TypeOf Contract	16 bits	any
				Context Version	1 bit (contextVersion ext.)	0 (= no extension)
					7 bits	any
					1 bit (Container ext.)	0 (= no extension)
					7 bits (Container CHOICE)	2 (= OCTET STRING)
					1 bit (octet string ext.)	0 (= no extension)
					7 bits (octet string length)	2
			AC_CR-Reference	AC_Master KeyRef	8 bits	any
				AC_CR-Diversifier	8 bits	any
					1 bit (Container ext.)	0 (= no extension)
					7 bits (Container CHOICE)	2 (= OCTET STRING)
					1 bit (octet string ext.)	0 (= no extension)
					7 bits (octet string length)	4
			RndOBE		32 bits	any
	Application 2				1 bit (eid opt.)	1 (= eid present)
					1 bit (parameter opt.)	0 (= parameter not present)
		aid			1 bit (aid ext.)	0 (= no extension)
					5 bits	≠ 20
		eid			1 bit (eid ext.)	0 (= no extension)
					7 bits	any (≠ other eid used in this VST)
obeConfiguration					1 bit (obeStatus opt.)	1 (= obeStatus present)
	equipmentClass				15 bits	any
	manufacturerId				16 bits	any
	obeStatus				16 bits	any

B.4.1.1   BV test purposes

Test subgroup objective:

— to test the behaviour of the DUT in relation to valid VST.

TP/AP-BAS/RSE/BV/01	Verify that DUT supports the BST
TP Origin	Specific
Reference	ISO/TS 12813:2009, 6.1.2
Initial Condition	DUT & Tester are not in initialization or transaction phase

Stimulus and Expected Behaviour

	DUT		Tester
1	**BST**	⇒	
2			Verify length and allowed values of BST (see Table A.2 — BST general structure)
3			IF verification performed in step 2 was not successful THEN TP failed
4		⇐	**VST1**
5	See Table A.2 — BST general structure		

B.4.1.2   BI test purposes

Not applicable.

B.4.2 Application GET-rq PDU test purposes

These Test Purposes apply to GET as claimed in ISO/TS 12813:2009, Annex B Clause B.5.3 Table B.9 Item 2.

B.4.2.1 BV test purposes

Test subgroup objective:

— to test the DUT support of GET-rq,

— to test the behaviour of DUT in relation to valid GET-rs.

TP/AP-GET/RSE/BV/01	Verify that DUT supports the read (by means of GET.rq) of the data attributes		
TP Origin	Specific		
Reference	ISO/TS 12813:2009, 6.1.3		
Initial Condition	DUT & Tester initialized		
Stimulus and Expected Behaviour			

	DUT		Tester
1	GET.rq = { fill, eid, accessCredentials, iid, attrIdList = {a_1, a_2, ..., a_n}}	⇒	
2			1. Verify length and allowed values of request parameters (see Table A.4 — GET-Rq parameters (security level 1)). 2. Verify that attrIdList contains data attributes of Table A.15 — Data group definition. Note that at least one attribute from the above mentioned table must be present in the request.
3			IF verification performed in step 2 was not successful TP failed
4		⇐	**GET.rs** = { fill=0, eid = VST.DSRC-eid, iid = Ø, attrIdList = {('a_1'D, v_1), ('a_2'D, v_2), ..., ('a_n'D, v_n) }, returnStatus=0}
5	See Table B.2 — PDU Selector		

B.4.2.2   BI test purposes

Test subgroup objective:

— to test the behaviour of the DUT in relation to invalid GET-rs,

— to test the behaviour of the DUT in relation to invalid response to GET-rq PDU (protocol violation).

TP/AP-GET/RSE/BI/01	Verify that the DUT detects an incorrect attributeList parameter of the GET.rs		
TP Origin	Specific		
Reference	ISO/TS 12813:2009, 6.1.3		
Initial Condition	DUT & Tester initialized		
Stimulus and Expected Behaviour			
	DUT		**Tester**
1	GET.rq = { fill, eid, accessCredentials, iid, attrIdList = $\{a_1, a_2, ..., a_n\}\}$	⇒	
2			1. Verify length and allowed values of request parameters (see Table A.4 — GET-Rq parameters (security level 1)). 2. Verify that attrIdList contains data attributes of Table A.15 — Data group definition. Note that at least one attribute from the above mentioned table must be present in the request.
3			IF verification performed in step 2 was not successful TP failed
4		⇐	**GET.rs** = { fill=0, eid = VST.DSRC-eid, iid = Ø, attrIdList ≠ $\{(\text{'}a_1\text{'}D, v_1), (\text{'}a_2\text{'}D, v_2), ...,$ $(\text{'}a_n\text{'}D, v_n) \}$, returnStatus=0}
5	See Table B.2 — PDU Selector		
NOTE: Depending on attrIdList of the request PDU, this TP shall be repeated with different incorrect attributeList in the response			

B.4.3 Application GET-STAMPED-rq PDU test purposes

These Test Purposes apply to GET-STAMPED as claimed in ISO/TS 12813:2009, Annex B Clause B.5.3 Table B.9 Item 3.

B.4.3.1 BV test purposes

Test subgroup objective:

— to test the DUT support of GET-STAMPED-rq;

— to test the behaviour of the DUT in relation to valid GET-STAMPED-rs.

TP/AP-STA/RSE/BV/01	Verify that DUT supports the read (by means of GET-STAMPED.rq) of the data attributes
TP Origin	Specific
Reference	ISO/TS 12813:2009, 6.1.4
Initial Condition	DUT & Tester initialized

Stimulus and Expected Behaviour

	DUT		Tester
1	**ACTION.rq** = { mode, eid, actionType = 0, accessCredentials, **GET-STAMPED.rq** = { attrIdList = {a_1, a_2, ..., a_n}, nonce, keyRef}, iid}	⇒	
2			1. Verify length and allowed values of request parameters (see Table A.5 — Action-Rq parameters for GET_STAMPED action (security level 1)). 2. Verify length and allowed values of GET-STAMPED request parameters. 3. Verify that attrIdList contains data attributes of Table A.15 — Data group definition. Note that at least one attribute from the above mentioned table must be present in the request.
3			IF verification performed in step 2 was not successful THEN TP failed
4		⇐	**ACTION.rs** = { fill = 0, eid = VST.DSRC-eid, iid = Ø, **GET-STAMPED.rs** = { attrIdList = {('a_1'D, v_1), ('a_2'D, v_2), ..., ('a_n'D, v_n) }, authenticator = auth}, returnStatus = 0}
5	See Table B.2 — PDU Selector		

B.4.3.2 BI test purposes

Test subgroup objective:

— to test the behaviour of the DUT in relation to invalid GET-STAMPED-rs;

— to test the behaviour of the DUT in relation to invalid response to GET-STAMPED-rq PDU.

TP/AP-STA/RSE/BI/01	Verify that the DUT detects an incorrect attributeList parameter of the GET-STAMPED.rs		
TP Origin	Specific		
Reference	ISO/TS 12813:2009, 6.1.4		
Initial Condition	DUT & Tester initialized		
Stimulus and Expected Behaviour			
	DUT		**Tester**

1	**ACTION.rq** = { mode, eid, actionType = 0, accessCredentials,
	    GET-STAMPED.rq = {
	        attrIdList = {a_1, a_2, ..., a_n},
	        nonce, keyRef},
	    iid}
		⇒	

2			1. Verify length and allowed values of request parameters (see Table A.5 — Action-Rq parameters for GET_STAMPED action (security level 1)). 2. Verify length and allowed values of GET-STAMPED request parameters. 3. Verify that attrIdList contains data attributes of Table A.15 — Data group definition. Note that at least one attribute from the above mentioned table must be present in the request.
3			IF verification performed in step 2 was not successful THEN TP failed

4		⇐	**ACTION.rs** = { fill = 0, eid = VST.DSRC-eid,
			    iid = Ø,
			    GET-STAMPED.rs = {
			        attrIdList ≠ {('a_1'D, v_1), ('a_2'D, v_2), ...,
			            ('a_n'D, v_n) },
			        authenticator = auth},
			    returnStatus = 0}

5	See Table B.2 — PDU Selector		
NOTE: Depending on attrIdList of the request PDU, this TP shall be repeated with different incorrect attributeList in the response			

TP/AP-STA/RSE/BI/02	Verify that the DUT detects an incorrect authenticator parameter of the GETSTAMPED.rs
TP Origin	Specific
Reference	ISO/TS 12813:2009, 6.1.4
Initial Condition	DUT & Tester initialized

Stimulus and Expected Behaviour

	DUT		Tester

1	**ACTION.rq** = { mode, eid, actionType = 0, accessCredentials,
	     GET-STAMPED.rq = {
	          attrIdList = {a_1, a_2, ..., a_n},
	          nonce, keyRef},
	     iid}
		⇒	

2			1. Verify length and allowed values of request parameters (see Table A.5 — Action-Rq parameters for GET_STAMPED action (security level 1)). 2. Verify length and allowed values of GET-STAMPED request parameters. Verify that attrIdList contains data attributes of Table A.15 — Data group definition. Note that at least one attribute from the above mentioned table must be present in the request
3			IF verification performed in step 2 was not successful THEN TP failed

4		⇐	**ACTION.rs** = { fill = 0, eid = VST.DSRC-eid,
			     iid = Ø,
			     GET-STAMPED.rs = {
			          attrIdList = {('a_1'D, v_1), ('a_2'D, v_2), ...,
			               ('a_n'D, v_n) },
			          authenticator = invalid_auth},
			     returnStatus = 0}

5	See Table B.2 — PDU Selector		

B.4.4 Application SET-MMI-rq PDU test purposes

These Test Purposes apply to the SET-MMI as claimed in ISO/TS 12813:2009, Annex B Clause B.5.3 Table B.9 Item 4.

B.4.4.1   BV test purposes

Test subgroup objective:

— to test the DUT support of SET-MMI-rq;

— to test the behaviour of the DUT in relation to valid SET-MMI-rs.

TP/AP-MMI/RSE/BV/01	Verify that DUT supports the SET-MMI-rq		
TP Origin	Specific		
Reference	ISO/TS 12813:2009, 6.1.5		
Initial Condition	DUT & Tester initialized		
Stimulus and Expected Behaviour			
	DUT		**Tester**
1	**ACTION.rq** = { mode, eid, actionType =10, accessCredentials, **SETMMIRq**, iid}	⇒	
2			Verify length and allowed values of request parameters (see Table A.6 — Action-Rq parameters for SET_MMI action).
3			IF verification performed in step 2 was not successful THEN TP failed
4			IF mode = F THEN GOTO step 6
5		⇐	**ACTION.rs** = { fill = 0, eid = VST.DSRC-eid, iid = Ø, returnStatus = 0}
6	See Table B.2 — PDU Selector		

B.4.4.2   BI test purposes

Not applicable.

B.4.5 Application EVENT-REPORT-rq PDU test purposes

These Test Purposes apply to the EVENT-REPORT as claimed in ISO/TS 12813:2009, Annex B Clause B.5.3 Table B.9 Item 5.

B.4.5.1 BV test purposes

Test subgroup objective:

— to test the DUT support of EVENT-REPORT-rq

— to test the behaviour of the DUT in relation to valid EVENT-REPORT-rq.

TP/AP-REL/RSE/BV/01	Verify that DUT supports the EVENT-REPORT-rq		
TP Origin	Specific		
Reference	ISO/TS 12813:2009, 6.1.6		
Initial Condition	DUT & Tester initialized		
Stimulus and Expected Behaviour			
	DUT		**Tester**
1	**EVENT-REPORT.rq** = { mode, eid, eventType, accessCredentials, eventParameter, iid}	⇒	
2			Verify length and allowed values of request parameters (see Table A.8 — EVENT-REPORT-Rq parameters).
3			IF verification performed in step 2 was not successful THEN TP failed

B.4.5.2 BI test purposes

Not applicable.

B.4.6 Application ECHO-rq PDU test purposes

These Test Purposes apply to the ECHO as claimed in ISO/TS 12813:2009, Annex B Clause B.5.3 Table B.9 Item 6.

B.4.6.1   BV test purposes

Test subgroup objective:

— to test the DUT support of ECHO-rq;

— to test the behaviour of the DUT in relation to valid ECHO-rs.

TP/AP-ECH/RSE/BV/01	Verify that DUT supports the ECHO-rq		
TP Origin	Specific		
Reference	ISO/TS 12813:2009, 6.1.7		
Initial Condition	DUT & Tester initialized		
Stimulus and Expected Behaviour			
	DUT		**Tester**
1	**ACTION.rq** = { mode, eid, actionType =15, accessCredentials, actionParameter, iid}	⇒	
2			Verify length and allowed values of request parameters (see Table A.7 — Action-Rq parameters for ECHO action).
3			IF verification performed in step 2 was not successful THEN TP failed
4			IF mode = F THEN GOTO step 6
5		⇐	**ACTION.rs** = { fill = 0, eid = VST.DSRC-eid, iid = Ø, returnStatus = 0}
6	See Table B.2 — PDU Selector		

B.4.6.2   BI test purposes

Not applicable.

Annex C
(normative)

PCTR for on-board units

The proforma conformance test report (PCTR) is based on ISO/IEC 9646-6, which can be consulted for any necessary additional information.

C.1 Identification summary

C.1.1 Protocol conformance test report

Table C.1 — Protocol conformance test report

PCTR Number:	
PCTR Date:	
Corresponding SCTR Number:	
Corresponding SCTR Date:	
Test Laboratory Identification:	
Test Laboratory Manager:	
Signature	

C.1.2 DUT identification

Table C.2 — DUT identification

Name:	
Version:	
Protocol specification:	
PICS:	
Previous PCTR if any:	

C.1.3 Testing environment

Table C.3 — Testing environment

PIXIT Number:	
ATS Specification:	
Abstract Test Method:	
Means of Testing identification:	
Date of testing:	
Conformance Log reference(s):	
Retention Date for Log reference(s):	

C.1.4 Limits and reservation

Additional information relevant to the technical contents or further use of the test report, or the rights and obligations of the test laboratory and the client, may be given here. Such information may include restriction on the publication of the report.

....

....

....

....

....

C.1.5 Comments

Additional comments may be given by either the client or the test laboratory on any of the contents of the PCTR, for example, to note disagreement between the two parties.

....

....

....

....

....