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

Part 1:
Test suite structure and test purposes

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

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

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Foreword

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

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 278, *Intelligent transport systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 13143-1:2016), which has been technically revised.

The main changes compared to the previous edition are as follows:

— amendments to reflect changes to the underlying requirements standards, in particular ISO 12813 and ISO 14906;

— amendment of terms to reflect the harmonization of terms across electronic fee collection (EFC) standards.

A list of all parts in the ISO 13143 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

On-board equipment (OBE) that uses satellite-based positioning technology to collect data required for charging for the use of roads operates in an autonomous way (i.e. without relying on dedicated roadside infrastructure). The OBE records the amount of road usage in all toll charging systems it passes through.

This document defines the process and tests for evaluation of OBE and roadside equipment (RSE) for conformity to ISO 12813.

ISO 12813 defines requirements for dedicated short-range communication (DSRC) between OBE and an interrogator for the purpose of checking conformance of road use with a local toll regime. It assumes an electronic fee collection (EFC) services architecture according to ISO 17573-1.

This document is intended to:

— assess OBE and RSE capabilities,

— assess OBE and RSE behaviour,

— serve as a guide for OBE 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 communication between parties.

This document is based on:

— ISO 12813,

— the set of DSRC standards defining the communication stack, and

— ISO/IEC 9646.

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

Part 1:
Test suite structure and test purposes

1 Scope

This document specifies the test suite structure (TSS) and test purposes (TPs) for evaluating the conformity of on-board equipment (OBE) and roadside equipment (RSE) to ISO 12813.

It provides a basis for conformance tests for dedicated short-range communication (DSRC) OBE and RSE to support interoperability between different equipment supplied by different manufacturers.

ISO 12813 defines requirements on the compliance check communication (CCC) interface level, but not for the RSE or OBE internal functional behaviour. Consequently, tests regarding OBE and/or RSE functional behaviour remain outside the scope of this document.

2 Normative references

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

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 12813:2019, *Electronic fee collection — Compliance check communication for autonomous systems*

ISO 14816, *Road transport and traffic telematics — Automatic vehicle and equipment identification — Numbering and data structure*

ISO 14906:2018, *Electronic fee collection — Application interface definition for dedicated short-range communication*

ISO/TS 14907-2:2016, *Electronic fee collection — Test procedures for user and fixed equipment — Part 2: Conformance test for the on-board unit application interface*

EN 12834:2003, *Road transport and traffic telematics — Dedicated Short Range Communication (DSRC) — DSRC application layer*

EN 13372:2004, *Road Transport and Traffic Telematics (RTTT) — Dedicated short-range communication — Profiles for RTTT applications*

EN 15509:2014, *Electronic fee collection — Interoperability application profile for DSRC*

EN 15876-1, *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.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
access credentials
AC-CR
trusted attestation or secure module that establishes the claimed identity of an object or application

[SOURCE: ISO/TS 17573-2:2020, 3.4]

3.2
attribute
addressable package of data consisting of a single data element or structured sequences of data elements

[SOURCE: ISO/TS 17573-2:2020, 3.13]

3.3
authentication
security mechanism allowing verification of the provided identity

[SOURCE: ISO/TS 17573-2:2020, 3.15]

3.4
authenticator
data, possibly encrypted, that is used for *authentication* (3.3)

[SOURCE: ISO/TS 17573-2:2020, 3.16]

3.5
data group
class of closely related *attributes* (3.2)

[SOURCE: ISO/TS 17573-2:2020, 3.55]

3.6
Element
dedicated short-range communication (DSRC) directory containing application information in the form of *attributes* (3.2)

3.7
implementation conformance statement
ICS
statement of capabilities and options that have been implemented that defines to what extent the implementation is compliant with a given specification

[SOURCE: ISO/TS 17573-2:2020, 3.90]

3.8
protocol implementation conformance statement
PICS
ICS (3.7) for an implementation or system claimed to conform to a given protocol specification

[SOURCE: ISO/IEC 9646-1:1994, 3.3.80]

3.9
on-board equipment
OBE
all required equipment on-board a vehicle for performing required electronic fee collection (EFC) functions and communication services

[SOURCE: ISO/TS 17573-2:2020, 3.126]

3.10
on-board unit
OBU
electronic unit on-board a vehicle for performing specific electronic fee collection (EFC) functions and for communication with external systems

[SOURCE: ISO/TS 17573-2:2020, 3.127]

3.11
roadside equipment
RSE
fixed of moveable electronic fee collection (EFC) equipment located along or on the road

[SOURCE: ISO/TS 17573-2:2020, 3.161, modified — Note 1 to entry deleted.]

3.12
tester
combination of equipment, humans and processes able to perform specified conformance tests

[SOURCE: ISO/TS 17573-2:2020, 3.188]

3.13
transaction
whole of the exchange of information between two physically separated communication facilities

[SOURCE: ISO/TS 17573-2:2020, 3.211]

4 Abbreviated terms

APDU   application protocol data unit

AP   application process

ATS   abstract test suite

BI   behaviour invalid (i.e. invalid behaviour tests)

BST   beacon service table

BV   behaviour valid (i.e. valid behaviour tests)

CCC   compliance check communication

DLC   data link control

DSRC   dedicated short-range communication

DUT   device under test

EFC   electronic fee collection

EID   Element identifier

LLC	logical link control	
MAC	medium access control	
PCTR	protocol conformance test report	
PDU	protocol data unit	
PIXIT	protocol implementation extra information for testing	
SCTR	system conformance test report	
T-APDU	transfer-application protocol data unit	
TP	test purpose	
TSS	test suite structure	
VST	vehicle service table	

5 Test suite structure (TSS)

5.1 Structure

Table 1 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	OBE	BV
		BI
	RSE	BV
		BI
Data link Control (DLC) Medium Access Control (MAC) sublayer	OBE	BV
		BI
	RSE	BV
		BI
DLC Logical Link Control (LLC) sublayer	OBE	BV
		BI
	RSE	BV
		BI
Application layer	OBE	BV
		BI
	RSE	BV
		BI

Physical layer tests are to be performed in a radio wave laboratory. They will not form part of the abstract test suite (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 identical to 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, for example, 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 the 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 been 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 (TPs)

5.3.1   TP definition conventions

The TPs are defined following the rules shown in Table 2. All TPs 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 is specified according to the TP naming conventions defined in 5.3.2.
Title	Short description of TP objective.
Reference	Contains the reference (document, clause, paragraph) to the subject to be validated by the actual 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 the required initial state of the DUT at the time of launching of 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>   : to which group among those defined in Table 1 the TP applies;

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

<x>   : type of testing (i.e. Valid behaviour tests, BV, or Invalid behaviour tests, BI);

<nn>   : sequential TP number (01 to 99).

The naming conventions are as described in Table 3.

Table 3 — TP naming conventions

<group>	<dut>	<x>
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 protocol data unit (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

5.4 Conformance test report

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

The manufacturer of the OBE shall complete the protocol conformance test report (PCTR) for OBE as defined in Annex C.

The manufacturer of the RSE shall complete the PCTR for roadside equipment as defined in Annex D.

Annex A
(normative)

Test purposes for on-board equipment

A.1 Introduction

A.1.1 General

This annex contains the test purposes (TPs) for the conformity evaluation of OBE to ISO 12813.

A.1.2 Symbols in TP descriptions

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

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

Table A.1 — Description of TP symbols

Symbol	Description
XXX.rq ⇒	The Tester sends the XXX.rq protocol data unit (PDU) to the device under test (DUT).
⇐ 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 → B	Object A "is transformed" into Object B. So, a notation like "Table X → Table Y" means that, for the scope of the TP, any reference of Table X should be changed into a reference 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 → accessCredentials = calculated value", for a given TP, means "change all occurrences in which the field accessCredentials has not been assigned to a calculation of the value accessCredentials to a given value".

A.2 Physical layer

As per ISO 12813:2019, 5.5.2, all test purposes TP/PHY/OBU/Bx/yy defined in EN 15876-1 are applicable for the conformity evaluation of OBE to CEN–DSRC based CCC as defined in ISO 12813:2019, Table B.8, Item 1.

A.3 MAC and LLC

As per ISO 12813:2019, 5.5.2, all test purposes TP/MAC/OBU/Bx/yy (except TP/MAC/OBU/BV/09, see NOTE) and TP/LLC/OBU/Bx/yy defined in EN 15876-1 are applicable for the conformity evaluation of OBE to CEN–DSRC based CCC as defined in ISO 12813:2019, Table B.8, Item 1.

NOTE   Test purpose TP/MAC/OBU/BV/09 has been excluded from this document as this TP does not apply for profiles 0/1 of EN 13372.

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 OBE, is described in Table A.2.

Table A.2 — BST general structure

			Length	Allowed values
T-APDUs			4 bits	'1000' indicating initialisation-request (BST)
Option indicator			1 bit (nonmandApplications opt.)	0/1
RSE	manufacturerid		16 bits	As per 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	As per Profile in EN 13372:2004, 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)
			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)
			5 bits	≠ 20 (= no CCC application)
		Eid	1 bit (eid ext.)	0 (= no extension)
			7 bits	Any
		parameter		Refer to ApplicationContextMark as per 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)
			5 bits	≠ 20 (= no CCC application)
		Eid	1 bit (eid ext.)	0 (= no extension)
			7 bits	Any
		parameter		Refer to ApplicationContextMark as per EN 12834:2003, Annex A
Nonmand Applications			1 bit (mandApplications ext.)	0 (= no extension)
			7 bits (number of applications)	N
	Application 1 (not CCC)		See "Application 2 (not CCC)" of mandApplications	
	…		…	
	Application N (not CCC)		See "Application 2 (not CCC)" of mandApplications	
profileList			1 bit (profileList ext.)	0 (= no extension)

Table A.2 *(continued)*

		Length	Allowed values
		7 bits (number of profiles)	K
	Profile 1	1 bit (Profile ext.)	0 (= no extension)
		7 bits	Refer to Profile as per EN 12834:2003, Annex A and EN 13372:2004, 6.3.2
	...	...	...
	Profile K	1 bit (Profile ext.)	0 (= no extension)
		7 bits	Refer to Profile as per EN 12834:2003, Annex A and EN 13372:2004, 6.3.2

A.4.1.2   VST

The general structure for a VST indicating one CCC-application as is transmitted by the OBE is described in Table A.3.

Table A.3 — VST1 (security level 1): valid VST indicating one CCC application

					Length	Allowed value
Fill					4 bits	Any
Profile					1 bit (Profile ext.)	0 (= no extension)
					7 bits	Refer to Profile as per 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			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)	As per ISO 3166-1
					14 bits (IssuerIdentifier)	As per 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)

Table A.3 *(continued)*

				Length	Allowed value
				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	Refer to DSRCApplicationEntityID, as per EN 12834:2003, Annex A
			eid	1 bit (eid ext.)	0 (= no extension)
				7 bits	Any (≠ other eid used in this VST)
			parameter		Refer to ApplicationContextMark, as per EN 12834:2003, Annex A
		…			
		Application M		1 bit (eid opt.)	0/1
				1 bit (parameter opt.)	0/1
			aid	1 bit (aid ext.)	0 (= no extension)
				5 bits	Refer to DSRCApplicationEntityID, as per EN 12834:2003, Annex A
			eid	1 bit (eid ext.)	0 (= no extension)
				7 bits	Any (≠ other eid used in this VST)
			parameter		Refer to ApplicationContextMark, as per EN 12834:2003, Annex A
OBE Configuration				1 bit (obeStatus opt.)	0/1
	equipmentClass			15 bits	Any
	manufacturerId			16 bits	Any
	obeStatus			16 bits	Any

The general structure for a VST indicating two CCC applications as is optionally transmitted by the OBE is described in [Table A.4](#).

VST2 shall indicate the presence of two CCC applications with the following definitions (refer to ISO 12813:2019, 8.2.3):

— one CCC application shall conform to ISO 12813:2019; and

— the other CCC application shall conform to ISO 12813:2015.

NOTE   Evaluation of conformance with ISO 12813:2015 is outside the scope of this document.

Table A.4 — VST2 (security level 1) — Valid VST indicating two CCC applications

				Length	Allowed value
Fill				4 bits	Any
Profile				1 bit (Profile ext.)	0 (= no extension)
				7 bits	Refer to Profile as per EN 12834:2003, Annex A
				1 bit (applications ext.)	0 (= no extension)
				7 bits (number of applic.)	M (≥2)
				1 bit (eid opt.)	1 (= eid present)
				1 bit (parameter opt.)	1 (= parameter present)

Table A.4 *(continued)*

				Length	Allowed value
Applications	CCC application1	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-ContextMark1	Contract Provider	10 bits (CountryCode)	As per ISO 3166-1
					14 bits (IssuerIdentifier)	As per 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_MasterKeyRef	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
	CCC application2			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	≠ eid of CCC application1
				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
		parameter	CCC-ContextMark2	Contract Provider	10 bits (CountryCode)	As per ISO 3166-1
					14 bits (IssuerIdentifier)	As per 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

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Table A.4 *(continued)*

						Length	Allowed value
			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
	::::						
						1 bit (eid opt.)	1 (= eid present)
						1 bit (parameter opt.)	0 (= parameter not present)
	Optional application M (non CCC-application)		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)
obe Configuration						1 bit (obeStatus opt.)	1 (= obeStatus present)
	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 describe the valid format of the request APDUs:

— Table A.5;

— Table A.6;

— Table A.7;

— Table A.8;

— Table A.9.

No other request commands are used by CCC application.

Fill bits shall always be set to zero.

Table A.5 — GET-Rq parameters (security level 1)

		EN 12834:2003, Annex A	ISO 14906:2018, Annex A	EN 15509:2014, Table C.16
GET-Rq	Fill			=
	Eid			=
	accessCredentials	optional	=	mandatory
	Iid	optional		prohibited
	attributeIdList	optional		mandatory

Table A.6 — Action-Rq parameters for GET_STAMPED action (security level 1)

		EN 12834:2003, Annex A	ISO 14906:2018, Annex A	EN 15509:2014, Table C.16 and ISO 12813
ACTION-Rq	Mode			TRUE
	Eid			=
	actionType		=	0 (GET_STAMPED)
	accessCredentials	optional		mandatory
	actionParameters	optional		GetStampedRq
	Iid	optional		prohibited

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

		EN 12834:2003, Annex A	ISO 14906:2018, Annex A	EN 15509:2014, Table C.16 and ISO 12813
ACTION-Rq	Mode			=
	Eid			0
	actionType		=	10 (SET_MMI)
	accessCredentials	optional		prohibited
	actionParameters	optional		SetMMIRq
	Iid	optional		prohibited

Table A.8 — Action-Rq parameters for ECHO action

		EN 12834:2003, Annex A	ISO 14906:2018, Annex A	EN 15509:2014, Table C.16 and ISO 12813
ACTION-Rq	Mode			=
	Eid			0
	actionType		=	15 (ECHO)
	accessCredentials	optional		prohibited
	actionParameters	optional		mandatory
	Iid	optional		prohibited

Table A.9 — EVENT-REPORT-Rq parameters

		EN 12834:2003, Annex A	ISO 14906:2018, Annex A	EN 15509:2014, Table C.16 and ISO 12813
EVENT-RE-PORT-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 describe the valid format of the response APDUs:

— Table A.10;

— Table A.11;

— Table A.12;

— Table A.13.

No other request commands are used by CCC application.

Fill bits shall always be set to zero.

Table A.10 — GET-Rs parameters

	EN 12834:2003, Annex A		ISO 14906:2018, Annex A	EN 15509:2014, Table C.16
GET-Rs	Fill			=
	Eid			=
	Iid	optional	=	prohibited
	attributeList	optional		mandatory
	Ret	optional		mandatory

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

	EN 12834:2003, Annex A		ISO 14906:2018, Annex A	EN 15509:2014, Table C.16 and ISO 12813
ACTION-Rs	Fill			=
	Eid			=
	Iid	optional	=	prohibited
	responseParameter	optional		mandatory
	Ret	optional		mandatory

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

	EN 12834:2003, Annex A		ISO 14906:2018, Annex A	EN 15509:2014, Table C.16 and ISO 12813
ACTION-Rs	Fill			=
	Eid			0
	Iid	optional	=	prohibited
	responseParameter	optional		prohibited
	Ret	optional		mandatory

Table A.13 — Action-Rs parameters for ECHO action

	EN 12834:2003, Annex A		ISO 14906:2018, Annex A	EN 15509:2014, Table C.16 and ISO 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 TPs for OBE, security level 1

A.4.3.1   General

These TPs apply to security level 1 as defined in ISO 12813:2019, Table B.6, Item 1 and to initialisation and termination processes defined in ISO 12813:2019, Table B.7, Items 1 and 5.

A.4.3.2   Data structures

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

— Table A.14, and

— Table A.15

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

Table A.14 — BST1 (actual BST used, BV) valid BST

		Length	Value
Option indicator		1 bit (nonmandApplications opt.)	0 (= nonmandApplications not present)
RSE	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.15 — 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)
RSE	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 OBE)
		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)**

Table A.15 *(continued)*

	Length	Value
profileList	1 bit (profileList ext.)	0 (= no extension)
	7 bits (number of profiles)	0 (= list empty)

A.4.3.3   BV test purposes

Test subgroup objective:

a)   to test the behaviour of the DUT in relation to:

—   valid BST, and

—   valid EVENT-REPORT-Rq (Release).

b)   to test the DUT support of:

—   BeaconId,

—   Time,

—   Profile,

—   Applications, and

—   LID.

Table A.16 — TP/AP BAS/OBU/BV/01

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, 5.4.1
Reference	ISO 12813:2019, 6.1.2
Initial condition	See TP/AL-I/OBU/BV/01 in ETSI/TS 102 486–2-2, 5.4.1
Stimulus and expected behaviour	
See TP/AL-I/OBU/BV/01 in ETSI/TS 102 486–2-2, 5.4.1.	

Table A.17 — TP/AP BAS/OBU/BV/02

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, 5.4.1
Reference	ISO 12813:2019, 6.1.6
Initial condition	See TP/AL-I/OBU/BV/02 in ETSI/TS 102 486–2-2, 5.4.1
Stimulus and expected behaviour	
See TP/AL-I/OBU/BV/02 in ETSI/TS 102 486–2-2, 5.4.1.	

Table A.18 — TP/AP BAS/OBU/BV/03

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, 5.4.1
Reference	ISO 12813:2019, 6.1.2
Initial condition	Identical to TP/AL-I/OBU/BV/03 in ETSI/TS 102 486–2-2, 5.4.1
Stimulus and expected behaviour	
See TP/AL-I/OBU/BV/03 in ETSI/TS 102 486–2-2, 5.4.1.	

Table A.19 — TP/AP BAS/OBU/BV/04

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, 5.4.1
Reference	ISO 12813:2019, 6.1.2
Initial condition	Identical to TP/AL-I/OBU/BV/04 in ETSI/TS 102 486–2-2, 5.4.1
Test execution option	This TP may be optionally modified in comparison to the original specification in ETSI/TS 102 486-2-2 depending on the time source of the DUT. Tests with OBE which derive their internal time from sources other than the BST received (e.g. from GNSS or CN) may require an additional delay in step 5 for more than 255 seconds before submitting the next BST.
Stimulus and expected behaviour	
See TP/AL-I/OBU/BV/04 in ETSI/TS 102 486–2-2:2008, 5.4.1.	

NOTE   TPs with ID TP/AP-BAS/OBU/BV/05 to TP/AP-BAS/OBU/BV/08 have not been used to be in line with the numbering in ETSI/TS 102 486–2-2.

Table A.20 — TP/AP BAS/OBU/BV/09

TP/AP-BAS/OBU/BV/09	Manage profile selection
TP origin	Identical to TP/AL-I/OBU/BV/09 in ETSI/TS 102 486–2-2:2008, 5.4.1
Reference	ISO 12813:2019, 6.1.2
Initial condition	See TP/AL-I/OBU/BV/09 in ETSI/TS 102 486–2-2:2008, 5.4.1
Stimulus and expected behaviour	
See TP/AL-I/OBU/BV/09 in ETSI/TS 102 486–2-2:2008, 5.4.1.	

Table A.21 — TP/AP BAS/OBU/BV/10

TP/AP-BAS/OBU/BV/10	Verify that the DUT replies to a BST with a VST		
TP origin	Specific		
Reference	ISO 12813:2019, 6.1.2		
Initial condition	DUT not in sleep mode and not yet initialised		
Stimulus and expected behaviour			
	Tester		DUT
1	BST1	⇒	
2		⇐	VST1 or VST2
3	Verify length and allowed values of VST1 (see Table A.3) respectively VST2 (see Table A.4)		
4	IF verification performed in step 3 was not successful THEN TP failed		

A.4.3.4   BI test purposes

Test subgroup objective:

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

Table A.22 — TP/AP BAS/OBU/BI/01

TP/AP-BAS/OBU/BI/01	Manage profile selection
TP origin	Identical to TP/AL-I/OBU/BI/01 in ETSI/TS 102 486–2-2:2008, 5.4.2
Stimulus and expected behaviour	
See TP/AL-I/OBU/BI/01 in ETSI/TS 102 486–2-2, 5.4.2.	

Table A.22 *(continued)*

TP/AP-BAS/OBU/BI/01	Manage profile selection
Reference	ISO 12813:2019, 6.1.2
Initial condition	See TP/AL-I/OBU/BI/01 in ETSI/TS 102 486–2-2:2008, 5.4.2
Stimulus and expected behaviour	

      See TP/AL-I/OBU/BI/01 in ETSI/TS 102 486–2-2, 5.4.2.

Table A.23 — TP/AP BAS/OBU/BI/02

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, 5.4.2
Reference	ISO 12813:2019, 6.1.2
Initial condition	See TP/AL-I/OBU/BI/02 in ETSI/TS 102 486–2-2, 5.4.2
Stimulus and expected behaviour	

      See TP/AL-I/OBU/BI/02 in ETSI/TS 102 486–2-2:2008, 5.4.2.

Table A.24 — TP/AP BAS/OBU/BI/03

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 12813:2019, 6.1.2
Initial condition	DUT not in sleep mode and not yet initialised

Stimulus and expected behaviour			
	Tester		**DUT**
1	`BST2`	⇒	
2	`Verify that DUT does not initialise with INITIALISATION-response (VST1 or VST2).`		
3	`IF verification performed in step 2 was not successful THEN TP failed`		

A.4.4 Application T-kernel TPs for OBE

A.4.4.1 General

These TPs apply to the layer 7 functions related to T-kernel as defined in ISO 12813:2019, Table B.7, Items 2 to 6.

A.4.4.2 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.

Table A.25 — TP/AP FUN/OBU/BV/01

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 102 486–2-2:2008, 5.2.1
Reference	ISO 12813:2019, 6.1.3
Initial condition	See TP/AL-T/OBU/BV/01 in ETSI/TS 102 486–2-2:2008, 5.2.1
Stimulus and expected behaviour	
See TP/AL-T/OBU/BV/01 in ETSI/TS 102 486–2-2:2008, 5.2.1.	
NOTE Request with accessCredentials.	

NOTE 1   TP with ID TP/AP-FUN/OBU/BV/02 to TP/AP-FUN/OBU/BV/07 have not been used to be in line with the numbering in ETSI/TS 102 486–2-2.

Table A.26 — TP/AP FUN/OBU/BV/08

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 102 486–2-2:2008, 5.2.1
Reference	ISO 12813:2019, 6.1.4/6.1.5/6.1.7
Initial condition	See TP/AL-T/OBU/BV/08 in ETSI/TS 102 486–2-2:2008, 5.2.1
Stimulus and expected behaviour	
See TP/AL-T/OBU/BV/08 in ETSI/TS 102 486–2-2:2008, 5.2.1.	
NOTE Request with accessCredentials for GET_STAMPED and without accessCredentials for SET_MMI, ECHO.	

Table A.27 — TP/AP FUN/OBU/BV/09

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 102 486–2-2:2008, 5.2.1
Reference	ISO 12813:2019, 6.1.5/6.1.7
Initial condition	See TP/AL-T/OBU/BV/09 in ETSI/TS 102 486–2-2:2008, 5.2.1
Stimulus and expected behaviour	
See TP/AL-T/OBU/BV/09 in ETSI/TS 102 486–2-2:2008, 5.2.1.	
NOTE Request without accessCredentials.	

Table A.28 — TP/AP FUN/OBU/BV/10

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 102 486–2-2:2008, 5.2.1
Reference	ISO 12813:2019, 6.1.5/6.1.7
Initial condition	See TP/AL-T/OBU/BV/10 in ETSI/TS 102 486–2-2:2008, 5.2.1
Stimulus and expected behaviour	
See TP/AL-T/OBU/BV/10 in ETSI/TS 102 486–2-2:2008, 5.2.1.	
NOTE Request without accessCredentials.	

Table A.29 — TP/AP FUN/OBU/BV/11

TP/AP-FUN/OBU/BV/11	Verify that the OBU can receive ACTION.request with mode = 0 with LID = broadcast after initialisation
TP origin	Identical to TP/AL-T/OBU/BV/11 in ETSI/TS 102 486–2-2:2008, 5.2.1
Reference	ISO 12813:2019, 6.1.5/6.1.7
Initial condition	See TP/AL-T/OBU/BV/11 in ETSI/TS 102 486–2-2:2008, 5.2.1
Stimulus and expected behaviour	

See TP/AL-T/OBU/BV/11 in ETSI/TS 102 486–2-2:2008, 5.2.1.

NOTE Request without accessCredentials.

Table A.30 — TP/AP FUN/OBU/BV/12

TP/AP-FUN/OBU/BV/12	Verify that the OBU can receive and manage ACTION.request with mode = 0 and with LID = broadcast without initialisation
TP origin	Identical to TP/AL-T/OBU/BV/12 in ETSI/TS 102 486–2-2:2008, 5.2.1
Reference	ISO 12813:2019, 6.1.5/6.1.7
Initial condition	See TP/AL-T/OBU/BV/12 in ETSI/TS 102 486–2-2:2008, 5.2.1
Stimulus and expected behaviour	

See TP/AL-T/OBU/BV/12 in ETSI/TS 102 486–2-2:2008, 5.2.1.

NOTE Request without accessCredentials.

Table A.31 — TP/AP FUN/OBU/BV/13

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 102 486–2-2:2008, 5.2.1
Reference	ISO 12813:2019, 6.1.3/6.1.4/6.1.5/6.1.7
Initial Condition	See TP/AL-T/OBU/BV/13 in ETSI/TS 102 486–2-2:2008, 5.2.1
Stimulus and expected behaviour	

See TP/AL-T/OBU/BV/13 in ETSI/TS 102 486–2-2:2008, 5.2.1.

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

Table A.32 — TP/AP FUN/OBU/BV/14

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 102 486–2-2:2008, 5.2.1
Reference	ISO 12813:2019, 6.1.3/6.1.4/6.1.5/6.1.7
Initial condition	See TP/AL-T/OBU/BV/14 in ETSI/TS 102 486–2-2:2008, 5.2.1
Stimulus and expected behaviour	

See TP/AL-T/OBU/BV/14 in ETSI/TS 102 486–2-2:2008, 5.2.1.

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

NOTE 2   TP with ID TP/AP-FUN/OBU/BV/15 has not been used to be in line with the numbering in ETSI/TS 102 486–2-2.

Table A.33 — TP/AP FUN/OBU/BV/16

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 102 486–2-2:2008, 5.2.1
Reference	ISO 12813:2019, 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 102 486–2-2:2008, 5.2.1
Stimulus and expected behaviour	
See TP/AL-T/OBU/BV/16 in ETSI/TS 102 486–2-2:2008, 5.2.1.	
NOTE Request with accessCredentials for GET, GET_STAMPED and without accessCredentials for SET_MMI, ECHO. TP not applicable for SET message.	

Table A.34 — TP/AP FUN/OBU/BV/17

TP/AP-FUN/OBU/BV/17	Attribute encoding tests – GET
TP origin	Identical to TC03-A in ISO/TS 14907-2:2016, C.1.3
Reference	ISO 12813:2019, 6.1.3
Initial condition	See TC03-A in ISO/TS 14907-2:2016, C.1.3
Stimulus and expected behaviour	
TC03-A in ISO/TS 14907-2:2016, C.1.3.	
NOTE Request with accessCredentials.	

NOTE 3   TP with ID TP/AP-FUN/OBU/BV/18 has not been used to be in line with the numbering in ETSI/TS 102 486–2-2.

Table A.35 — TP/AP FUN/OBU/BV/19

TP/AP-FUN/OBU/BV/19	Support of DSRC EFC GET STAMPED
TP origin	Identical to TC10-A in ISO/TS 14907-2:2016, C.2.1
Reference	ISO 12813:2019, 6.1.4
Initial condition	See TC10-A in ISO/TS 14907-2:2016, C.2.1
Stimulus and expected behaviour	
See TC10-A in ISO/TS 14907-2:2016, C.2.1.	
NOTE Request with accessCredentials.	

Table A.36 — TP/AP FUN/OBU/BV/20

TP/AP-FUN/OBU/BV/20	Support of DSRC EFC SET MMI
TP Origin	Identical to TC20-A in ISO/TS 14907-2:2016, C.2.4
Reference	ISO 12813:2019, 6.1.5
Initial Condition	See TC20-A in ISO/TS 14907-2:2016, C.2.4
Stimulus and expected behaviour	
See TC20-A in ISO/TS 14907-2:2016, C.2.4.	
NOTE Request without accessCredentials.	

Table A.37 — TP/AP FUN/OBU/BV/21

TP/AP-FUN/OBU/BV/21	Support of DSRC EFC ECHO
TP origin	Identical to TC25-A in ISO/TS 14907-2:2016, C.2.5
Reference	ISO 12813:2019, 6.1.7
Initial condition	See TC25-A in ISO/TS 14907-2:2016, C.2.5
Stimulus and expected behaviour	
See TC25-A in ISO/TS 14907-2:2016, C.2.5.	
NOTE Request without accessCredentials.	

A.4.4.3 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.

NOTE 1   TP with ID TP/AP-FUN/OBU/BI/01 has not been used to be in line with the numbering in ETSI/TS 102 486–2-2.

Table A.38 — TP/AP FUN/OBU/BI/02

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 102 486–2-2:2008, 5.2.2
Reference	ISO 12813:2019, 6.1.2
Initial condition	See TP/AL-T/OBU/BI/02 in ETSI/TS 102 486–2-2:2008, 5.2.2
Stimulus and expected behaviour	
See TP/AL-T/OBU/BI/02 in ETSI/TS 102 486–2-2:2008, 5.2.2.	

Table A.39 — TP/AP FUN/OBU/BI/03

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 102 486–2-2:2008, 5.2.2
Reference	ISO 12813:2019, 6.1.3/6.1.4/6.1.5/6.1.7
Initial condition	See TP/AL-T/OBU/BI/03 in ETSI/TS 102 486–2-2:2008, 5.2.2
Stimulus and expected behaviour	
See TP/AL-T/OBU/BI/03 in ETSI/TS 102 486–2-2:2008, 5.2.2.	
NOTE Request with accessCredentials for GET, GET_STAMPED and without accessCredentials for SET_MMI, ECHO. TP not applicable for SET message.	

Table A.40 — TP/AP FUN/OBU/BI/04

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 102 486–2-2:2008, 5.2.2
Reference	ISO 12813:2019, 6.1.2
Initial condition	See TP/AL-T/OBU/BI/04 in ETSI/TS 102 486–2-2:2008, 5.2.2
Stimulus and expected behaviour	
See TP/AL-T/OBU/BI/04 in ETSI/TS 102 486–2-2:2008, 5.2.2.	

NOTE 2   TP with ID TP/AP-BAS/OBU/BI/05 has not been used to be in line with the numbering in ETSI/TS 102 486–2-2.

Table A.41 — TP/AP FUN/OBU/BI/06

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 102 486–2-2:2008, 5.2.2
Reference	ISO 12813:2019, 6.1.3/6.1.4/6.1.5/6.1.7
Initial condition	See TP/AL-T/OBU/BI/06 in ETSI/TS 102 486–2-2:2008, 5.2.2
Stimulus and expected behaviour	
See TP/AL-T/OBU/BI/06 in ETSI/TS 102 486–2-2:2008, 5.2.2.	
NOTE Request with accessCredentials for GET, GET_STAMPED and without accessCredentials for SET_MMI, ECHO. TP not applicable for SET message.	

A.4.5 Application data attributes TPs, security level 1

A.4.5.1 General

These TPs apply to security level 1 as defined in ISO 12813:2019, Table B.6, Item 1, GET / GET_STAMPED operations as defined in ISO 12813:2019, Table B.7, Items 2 and 3, and attributes as defined in ISO 12813:2019, Tables B.9, B.10 and B.11.

A.4.5.2 Data attributes definition

Table A.42 contains the references to the standard definition of attributes, length and allowed values.

Table A.42 — Data group definition

Data groups	Attributes	AttrId	Definition of Length	Definition of Allowed values
Identification	CCC-ContextMark	0		ISO 14906:2018, Table 41 and Annex A
	EquipmentOBUId	24		ISO 14906:2018, Table 44 and Annex A
	PaymentMeans	32		ISO 14906:2018, Table 46 and Annex A
Vehicle	VehicleLicencePlateNumber	16	EN 15509:2014, Table 2	EN 15509:2014, Table A.2
	VehicleClass	17		EN 15509:2014, Table A.2
	VehicleDimensions	18		ISO 14906:2018, Table 43 and Annex A
	VehicleAxles	19		ISO 14906:2018, Table 43 and Annex A
	VehicleWeightLimits	20		ISO 14906:2018, Table 43 and Annex A
	VehicleSpecificCharacteristics	22		ISO 14906:2018/Amd 1:2020 and its Annex A
	TrailerCharacteristics	46		ISO 14906:2018, Table 43 and Annex A
	VehicleAxlesHistory	48	ISO 12813:2019, Table 3	ISO 12813:2019, Table 6
	VehicleCurrentMaxTrainWeight	55		ISO 14906:2018, Table 43 and Annex A
	VehicleWeightHistory	60		ISO 12813:2019, Table 6
	ExtendedVehicleAxlesHistory	62		ISO 12813:2019, Table 6
	LocalVehicleClassId	63		ISO 12813:2019, Table 6
Status	CommunicationStatus	49		ISO 12813:2019, Table 5
	GnssStatus	50		ISO 12813:2019, Table 5
	DistanceRecordingStatus	51		ISO 12813:2019, Table 5
	ActiveContexts	52		ISO 12813:2019, Table 5
	ObeStatusHistory	53		ISO 12813:2019, Table 5
	ExtendedOBEStatusHistory	61		ISO 12813:2019, Table 5
	AttributeUpdateInterval	64		ISO 12813:2019, Table 5

Table A.42 *(continued)*

Data groups	Attributes	AttrId	Definition of	
			Length	**Allowed values**
	ExtendedOBUStatusHistoryPart1	99		ISO 12813:2019, Table 5
	ExtendedOBUStatusHistoryPart2	100		ISO 12813:2019, Table 5
	UserConfirmation	101		ISO 12813:2019, Table 5

A.4.5.3 BV test purposes

Test subgroup objective:

a) to test the behaviour of the DUT in relation to the support of mandatory attributes in allowed length and allowed values:

— identification,

— vehicle, and

— status;

by means of the syntactically and contextual correct PDUs:

— GET, and

— GET_STAMPED.

Table A.43 — TP/AP DAT/OBU/BV/01

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 12813:2019, 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 = ac1, iid = Ø, attrIdList = { '24'D - - EquipmentOBUId, '32'D - - PaymentMeans} }	⇒	
2		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('24'D, v1), ('32'D, v2)}, returnStatus }
3	IF (returnStatus NOT OK) OR (response not received) THEN TP failed		
4	Verify length and allowed values of v1 ÷ v2 Table A.16		
5	IF verification performed in step 4 was successful THEN TP passed ELSE TP failed ENDIF		

Table A.44 — TP/AP DAT/OBU/BV/02

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 12813:2019, 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 = ac1, iid = Ø, attrIdList = { '24'D - - EquipmentOBUId }}`	⇒	
2		⇐	`GET.rs = { fill, eid, iid = Ø, attrIdList = {( '24'D, v1) }, returnStatus }`
3	`IF (returnStatus NOT OK) OR (response not received) THEN TP failed`		
4	`GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '32'D - - PaymentMeans }}`	⇒	
5		⇐	`GET.rs = { fill, eid, iid = Ø, attrIdList = {( '32'D, v2) }, returnStatus }`
6	`See step 3`		

7	`Verify length and allowed values of v1 ÷ v2`
	
	`Table A.16`		

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

Table A.45 — TP/AP DAT/OBU/BV/03

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	Specific		
Reference	ISO 12813:2019, 7.4		
Initial condition	OBU initialised and can accept a GET-request		
Stimulus and expected behaviour			
	Tester		**DUT**

Table A.45 *(continued)*

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	Specific		
Reference	ISO 12813:2019, 7.4		
Initial condition	OBU initialised and can accept a GET-request		

1	`GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = {`
	`'16'D - - LicensePlateNumber,`
	`'17'D - - VehicleClass,`
	
	`'18'D - - VehicleDimensions,`
	`'19'D - - VehicleAxles,`
	`'20'D - - VehicleWeightLimits,`
	`'22'D - - VehicleSpecificCharacteristics,`
	`'46'D - - TrailerCharacteristics,`
	`'48'D - - VehicleAxlesHistory,`
	`'55'D - - VehicleCurrentMaxTrainWeight,`
	`'60'D - - VehicleWeightHistory,`
	`'62'D - - ExtendedVehicleAxlesHistory,`
	`'63'D - - LocalVehicleClassId}}`
		⇒	

2		⇐	`GET.rs = { fill, eid, iid = Ø, attrIdList = {( '16'D, v1), ( '17'D, v2),`
			`( '18'D, v3), ( '19'D, v4), ( '20'D, v5),`
			`( '22'D, v6), ( '46'D, v7), ( '48'D, v8),`
			`( '55'D, v9), ( '60'D, v10), ( '62'D, v11),`
			`( '63'D, v12)}, returnStatus }`

3	`IF (returnStatus NOT OK) OR (response not received) THEN TP failed`		

4	`Verify length and allowed values of v1 ÷ v12`
	
	`Table A.16`
		⇒	

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

Table A.46 — TP/AP DAT/OBU/BV/04

TP/AP-DAT/OBU/BV/04	Verify that the OBU supports the read (by means of GET) of the Vehicle attributes, one at a time		
TP origin	Specific		
Reference	ISO 12813:2019, 7.4		
Initial condition	OBU initialised and can accept a GET-request		
Stimulus and expected behaviour			
	Tester		**DUT**

Table A.46 *(continued)*

TP/AP-DAT/OBU/BV/04		Verify that the OBU supports the read (by means of GET) of the Vehicle attributes, one at a time	
1	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '16'D - - LicensePlateNumber }}	⇒	
2		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('16'D, v1) }, returnStatus }
3	IF (returnStatus NOT OK) OR (response not received) THEN TP failed		
4	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '17'D - - VehicleClass }}	⇒	
5		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('17'D, v2) }, returnStatus }
6	See step 3		
7	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '18'D - - VehicleDimensions }}	⇒	
8		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('18'D, v3) }, returnStatus }
9	See step 3		
10	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '19'D - - VehicleAxles }}	⇒	
11		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('19'D, v4) }, returnStatus }
12	See step 3		
13	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '20'D - - VehicleWeightLimits }}	⇒	
14		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('20'D, v5) }, returnStatus }
15	See step 3		
16	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '22'D - - VehicleSpecificCharacteristics }}	⇒	
17		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('22'D, v6) }, returnStatus }
18	See step 3		
19	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '46'D - - TrailerCharacteristics }}	⇒	
20		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('46'D, v7)

Table A.46 *(continued)*

TP/AP-DAT/OBU/BV/04	Verify that the OBU supports the read (by means of GET) of the Vehicle attributes, one at a time		
21	See step 3		
22	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '48'D - - VehicleAxlesHistory }}	⇒	
23		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('48'D, v8) }, returnStatus }
24	See step 3		
25	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '55'D - - VehicleCurrentMaxTrainWeight }}	⇒	
26		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('55'D, v9) }, returnStatus }
27	See step 3		
28	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '60'D - - VehicleWeightHistory }}	⇒	
29		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('60'D, v10) }, returnStatus }
30	See step 3		
31	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '62'D - - ExtendedVehicleAxlesHistory }}	⇒	
32		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('62'D, v11) }, returnStatus }
33	See step 3		
34	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '63'D - - LocalVehicleClassId }}	⇒	
35		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('63'D, v12) }, returnStatus }
36	See step 3		
37	IF all is OK THEN TP passed ELSE TP failed ENDIF		

Table A.47 — TP/AP DAT/OBU/BV/05

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 12813:2019, 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 = ac1, iid = Ø, attrIdList = { '49'D - - CommunicationStatus, '50'D - - GnssStatus, '51'D - - DistanceRecordingStatus, '52'D - - ActiveContexts, '53'D - - ObeStatusHistory, '61'D - - ExtendedOBEStatusHistory, '64'D - - AttributeUpdateInterval} }	⇒	
2		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('49'D, v1), ('50'D, v2), ('51'D, v3), ('52'D, v4) , ('53'D, v5), ('61'D, v6), ('64'D, v7)}, returnStatus }
3	IF (returnStatus NOT OK) OR (response not received) THEN TP failed		
4	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '99'D - - ExtendedOBUStatusHistoryPart1, '100'D - - ExtendedOBUStatisHistoryPart2, '101'D - - UserConfirmation, } }	⇒	
5		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('99'D, v8), ('100'D, v9), ('101'D, v10) }, returnStatus }
6	IF (returnStatus NOT OK) OR (response not received) THEN TP failed		
7	Verify length and allowed values of v1 ÷ v10 Table A.16		
8	IF verification performed in step 7 was successful THEN TP passed ELSE TP failed ENDIF		

Table A.48 — TP/AP DAT/OBU/BV/06

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 12813:2019, 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 = ac1, iid = Ø, attrIdList = { '49'D - - CommunicationStatus }}`	⇒	
2		⇐	`GET.rs = { fill, eid, iid = Ø, attrIdList = {( '49'D, v1) }, returnStatus }`
3	`IF (returnStatus NOT OK) OR (response not received) THEN TP failed`		
4	`GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '50'D - - GnssStatus }}`	⇒	
5		⇐	`GET.rs = { fill, eid, iid = Ø, attrIdList = {( '50'D, v2) }, returnStatus }`
6	`See step 3`		
7	`GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '51'D - - DistanceRecordingStatus }}`	⇒	
8		⇐	`GET.rs = { fill, eid, iid = Ø, attrIdList = {( '51'D, v3) }, returnStatus }`
9	`See step 3`		
10	`GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '52'D - - ActiveContexts }}`	⇒	
11		⇐	`GET.rs = { fill, eid, iid = Ø, attrIdList = {( '52'D, v4) }, returnStatus }`
12	`See step 3`		
13	`GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '53'D - - ObeStatusHistory }}`	⇒	
14		⇐	`GET.rs = { fill, eid, iid = Ø, attrIdList = {( '53'D, v5) }, returnStatus }`
15	`See step 3`		
16	`GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '61'D - - ExtendedOBEStatusHistory }}`	⇒	
17		⇐	`GET.rs = { fill, eid, iid = Ø, attrIdList = {( '61'D, v6) }, returnStatus }`

Table A.48 *(continued)*

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 12813:2019, 7.3		
Initial condition	OBU initialised and can accept a GET-request		
18	See step 3		
19	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '64'D - - AttributeUpdateInterval }}	⇒	
20		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('64'D, v7) }, returnStatus }
21	See step 3		
22	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '99'D - - ExtendedOBUStatusHistoryPart1 }}	⇒	
23		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('99'D, v8) }, returnStatus }
24	See step 3		
25	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '100'D - - ExtendedOBUStatusHistoryPart2 }}	⇒	
26		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('100'D, v9) }, returnStatus }
27	See step 3		
28	GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = ac1, iid = Ø, attrIdList = { '101'D - - UserConfirmation}}	⇒	
29		⇐	GET.rs = { fill, eid, iid = Ø, attrIdList = {('101'D, v10) }, returnStatus }
30	See step 3		
31	Verify length and allowed values of v1 ÷ v10 Table A.16	⇒	
32	IF all is OK THEN TP passed ELSE TP failed ENDIF	⇐	

Table A.49 — TP/AP DAT/OBU/BV/07

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 12813:2019, 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 = ac1, GET-STAMPED.rq = { attrIdList = { '24'D - - EquipmentOBUId, '32'D - - PaymentMeans}, nonce = C1, keyRef = C2}, iid = Ø }`	⇒	
2		⇐	`ACTION.rs = { fill, eid, iid = Ø, GET-STAMPED.rs = { attrIdList = { ('24'D, v2), ('32'D, v3)}, authenticator}, returnStatus }`
3	`IF (returnStatus NOT OK) OR (response not received) THEN TP failed`		

4	`Verify length and allowed values of v1 ÷ v3`
	
	`Table A.16`
	
	`Verify authenticator`		

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

NOTE   TP with ID TP/AP-DAT/OBU/BV/08 has not been used to be in line with the numbering in EN 15876–1.

Table A.50 — TP/AP DAT/OBU/BV/09

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 12813:2019, 7.3		
Initial condition	OBU initialised and can accept a GET-STAMPED-request		
Stimulus and expected behaviour			
	Tester	⇒	**DUT**

Table A.50 *(continued)*

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 12813:2019, 7.3		
Initial condition	OBU initialised and can accept a GET-STAMPED-request		
1	`ACTION.rq = { mode = T, eid = VST. DSRC-eid, actionType = 0, accessCredentials = ac1, GET-STAMPED.rq = { attrIdList = { '49'D - - CommunicationStatus, '50'D - - GnssStatus, '51'D - - DistanceRecordingStatus, '52'D - - ActiveContexts, '53'D - - ObeStatusHistory, '61'D - - ExtendedOBEStatusHistory, '64'D - - AttributeUpdateInterval }, nonce = C1, keyRef = C2}, iid = Ø }`	⇒	
2		⇐	`ACTION.rs = { fill, eid, iid = Ø, GET-STAMPED.rs ={ attrIdList = {('49'D, v1), ('50'D, v2), ('51'D, v3), ('52'D, v4), ('53'D, v5), ('61'D, v6), ('64'D, v7) }, authenticator}, returnStatus }`
3	`IF (returnStatus NOT OK) OR (response not received) THEN TP failed`		
4	`ACTION.rq = { mode = T, eid = VST. DSRC-eid, actionType = 0, accessCredentials = ac1, GET-STAMPED.rq = { attrIdList = { '99'D - - ExtendedOBUStatusHistoryPart1 '100'D - - ExtendedOBUStatusHistoryPart2 '101'D - - UserConfirmation }, nonce = C1, keyRef = C2}, iid = Ø }`	⇒	
5		⇐	`ACTION.rs = { fill, eid, iid = Ø, GET-STAMPED.rs = { attrIdList = {('99'D, v8),('100'D, v9),('101'D, v10) }, authenticator}, returnStatus }`
6	`IF (returnStatus NOT OK) OR (response not received) THEN TP failed`		
7	`Verify length and allowed values of v1 ÷ v10` `Table A.16` `Verify authenticator`		
8	`IF verification performed in step 7 was successful` `THEN TP passed` `ELSE TP failed` `ENDIF`		

Table A.51 — TP/AP DAT/OBU/BV/10

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	Specific		
Reference	ISO 12813:2019, 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 =`
	`ac1, GET-STAMPED.rq = attrIdList = {`
	`'16'D - - LicensePlateNumber,`
	`'17'D - - VehicleClass,`
	`'18'D - - VehicleDimensions,`
	`'19'D - - VehicleAxles,`
	`'20'D - - VehicleWeightLimits,`
	`'22'D - -`
	`VehicleSpecificCharacteristics,`
	`'46'D - -`
	`TrailerCharacteristics,`
	`'48'D - - VehicleAxlesHistory,`
	`'55'D - -`
	`VehicleCurrentMaxTrainWeight,`
	`'60'D - - VehicleWeightHistory,`
	`'62'D - -`
	`ExtendedVehicleAxlesHistory,`
	`'63'D - - LocalVehicleClassId }`
	`nonce = C1, keyRef = C2 },`
	`iid = Ø }`
		⇒	

2		⇐	`ACTION.rs = { fill, eid, iid = Ø,`
			`GET-STAMPED.rs = { attrIdList = {`
			`('16'D, v1), ('17'D, v2),`
			`('18'D, v3), ('19'D, v4),`
			`('20'D, v5), ('22'D, v6),`
			`('46'D, v7), ('48'D, v8),`
			`('55'D, v9), ('60'D, v10),`
			`('62'D, v11), ('63'D, v12),},`
			`authenticator},`
			`returnStatus }`

3	`IF (returnStatus NOT OK) OR (response` `not received) THEN TP failed`		

4	`Verify length and allowed values of v1 ÷`
	`v12`
	
	`Table A.16`
	
	`Verify authenticator`		

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

A.4.5.4 BI test purposes

Test subgroup objective:

a) 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, and

    — status.

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

— no access credentials (like in security level 0); and

— wrong access credentials.

Table A.52 — TP/AP DAT/OBU/BI/01

TP/AP-DAT/OBU/BI/01	Verify that the OBU prevents the update of the read-only Vehicle attributes, one at a time		
TP origin	Specific		
Reference	ISO 12813:2019, 7.4		
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 = Ø, attrIdList = { ( '16'D, x1) }, iid = Ø }`	⇒	
2		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
3	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
4	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = Ø, attrIdList = { ( '17'D, x2) }, iid = Ø }`	⇒	
5		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
6	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
7	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = Ø, attrIdList = { ( '18'D, x3) }, iid = Ø }`	⇒	
8		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
9	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
10	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = Ø, attrIdList = { ( '19'D, x4) }, iid = Ø }`	⇒	
11		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`

Table A.52 *(continued)*

TP/AP-DAT/OBU/BI/01	Verify that the OBU prevents the update of the read-only Vehicle attributes, one at a time		
TP origin	Specific		
Reference	ISO 12813:2019, 7.4		
Initial condition	OBU initialised and can accept a SET-request		
12	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
13	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, 10accessCredentials = Ø, attrIdList = { ( '20'D, x5) }, iid = Ø }`	⇒	
14		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
15	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
16	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = Ø, attrIdList = { ( '22'D, x6) }, iid = Ø }`	⇒	
17		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
18	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
19	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = Ø, attrIdList = { ( '46'D, x7) }, iid = Ø }`	⇒	
20		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
21	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
22	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = Ø, attrIdList = { ( '48'D, x8) }, iid = Ø }`	⇒	
23		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
24	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
25	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = Ø, attrIdList = { ( '55'D, x9) }, iid = Ø }`	⇒	
26		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
27	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
28	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = Ø, attrIdList = { ( '60'D, x10) }, iid = Ø }`	⇒	
29		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
30	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		

Table A.52 *(continued)*

TP/AP-DAT/OBU/BI/01	Verify that the OBU prevents the update of the read-only Vehicle attributes, one at a time		
TP origin	Specific		
Reference	ISO 12813:2019, 7.4		
Initial condition	OBU initialised and can accept a SET-request		
31	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = Ø, attrIdList = { ( '62'D, x11) }, iid = Ø }`	⇒	
32		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
33	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
34	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = Ø, attrIdList = { ( '63'D, x12) }, iid = Ø }`	⇒	
35		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
36	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		

Table A.53 — TP/AP DAT/OBU/BI/02

TP/AP-DAT/OBU/BI/02	Verify that the OBU prevents the update of the read-only Vehicle attribute list		
TP origin	Specific		
Reference	ISO 12813:2019, 7.4		
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 = ac1, attrIdList = { ('16'D, x1), ('17'D, x2), ('18'D, x3), ('19'D, x4), ('20'D, x5), ('22'D, x6), ('46'D, x7), ('48'D, x8), ('55'D, x9), ('60'D, x10), ('62'D, x11), ('63'D, x12)}, iid = Ø }`	⇒	
2		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
3	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		

Table A.54 — TP/AP DAT/OBU/BI/03

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 12813:2019, 7.2
Initial condition	OBU initialised and can accept a SET-request
Stimulus and expected behaviour	

Table A.54 *(continued)*

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 12813:2019, 7.2		
Initial condition	OBU initialised and can accept a SET-request		
	Tester		**DUT**
1	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ( '0'D, x1), ('24'D, x2), ('32'D, x3)}, iid = Ø }`	⇒	
2		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
3	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		

Table A.55 — TP/AP DAT/OBU/BI/04

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 12813:2019, 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 = ac1, attrIdList = { ( '0'D, x1) }, iid = Ø }`	⇒	
2		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
3	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
4	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ( '24'D, x2) }, iid = Ø }`	⇒	
5		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
6	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
7	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ( '32'D, x3) }, iid = Ø }`		
8		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
9	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		

Table A.56 — TP/AP DAT/OBU/BI/05

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 12813:2019, 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 = ac1, attrIdList = { ( '49'D, x1), ('50'D, x2), ('51'D, x3), ('52'D, x4) , ('53'D, x5), ('61'D, x6), ('64'D, x7)}, iid = Ø }`	⇒	
2		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
3	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
4	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ( '99'D, x8), ('100'D, x9), ('101'D, x10) }, iid = Ø }`	⇒	
5		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
6	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		

Table A.57 — TP/AP DAT/OBU/BI/06

TP/AP-DAT/OBU/BI/06		Verify that the OBU prevents the update of the read-only Status attributes, one at a time	
TP origin		Specific	
Reference		ISO 12813:2019, 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 = ac1, attrIdList = { ( '49'D, x1) }, iid = Ø }`	⇒	
2		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
3	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
4	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ( '50'D, x2) }, iid = Ø }`	⇒	
5		⇐	`SET.rs = { fill, eid, iid = Ø, returnStatus }`
6	`IF (SET.rs received AND returnStatus=0) THEN TP failed`		
7	`SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ( '51'D, x3) }, iid = Ø }`	⇒	

Table A.57 *(continued)*

TP/AP-DAT/OBU/BI/06	Verify that the OBU prevents the update of the read-only Status attributes, one at a time		
TP origin	Specific		
Reference	ISO 12813:2019, 7.3		
Initial condition	OBU initialised and can accept a SET-request		
8		⇐	SET.rs = { fill, eid, iid = Ø, returnStatus }
9	IF (SET.rs received AND returnStatus=0) THEN TP failed		
10	SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ('52'D, x4) }, iid = Ø }	⇒	
11		⇐	SET.rs = { fill, eid, iid = Ø, returnStatus }
12	IF (SET.rs received AND returnStatus=0) THEN TP failed		
13	SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ('53'D, x5) }, iid = Ø }	⇒	
14		⇐	SET.rs = { fill, eid, iid = Ø, returnStatus }
15	IF (SET.rs received AND returnStatus=0) THEN TP failed		
16	SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ('61'D, x6) }, iid = Ø }	⇒	
17		⇐	SET.rs = { fill, eid, iid = Ø, returnStatus }
18	IF (SET.rs received AND returnStatus=0) THEN TP failed		
19	SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ('64'D, x7) }, iid = Ø }	⇒	
20		⇐	SET.rs = { fill, eid, iid = Ø, returnStatus }
21	IF (SET.rs received AND returnStatus=0) THEN TP failed		
22	SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ('99'D, x8) }, iid = Ø }	⇒	
23		⇐	SET.rs = { fill, eid, iid = Ø, returnStatus }
24	IF (SET.rs received AND returnStatus=0) THEN TP failed		
25	SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ('100'D, x9) }, iid = Ø }	⇒	
26		⇐	SET.rs = { fill, eid, iid = Ø, returnStatus }
27	IF (SET.rs received AND returnStatus=0) THEN TP failed		
28	SET.rq = { fill = 0, mode = T, eid = VST. DSRC-eid, accessCredentials = ac1, attrIdList = { ('101'D, x10) }, iid = Ø }	⇒	
29		⇐	SET.rs = { fill, eid, iid = Ø, returnStatus }
30	IF (SET.rs received AND returnStatus=0) THEN TP failed		

Table A.58 — TP/AP DAT/OBU/BI/07

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 12813:2019, 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 =`
	`{ '24'D - - EquipmentOBUId,`
	`'32'D - - PaymentMeans} }`
		⇒	

2		⇐	`GET.rs = { fill, eid, iid = Ø, …,` `returnStatus }`
3	`IF (GET.rs NOT received OR (GET.rs received AND returnStatus=0)) THEN TP failed`		
NOTE Invalid_ac is either empty or has incorrect value.			

Table A.59 — TP/AP DAT/OBU/BI/08

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 12813:2019, 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 - - VehicleClass,`
	`'18'D - - VehicleDimensions,`
	`'19'D - - VehicleAxles,`
	`'20'D - - VehicleWeightLimits,`
	`'22'D - - VehicleSpecificCharacteristics`
	`'46'D - - TrailerCharacteristics,`
	`'48'D - - VehicleAxlesHistory,`
	`'55'D - - VehicleCurrentMaxTrainWeight,`
	`'60'D - - VehicleWeightHistory,`
	`'62'D - - ExtendedVehicleAxlesHistory,`
	`'63'D - - LocalVehicleClassId } }`
		⇒	

2		⇐	`GET.rs = { fill, eid, iid = Ø, …,` `returnStatus }`
3	`IF (GET.rs NOT received OR (GET.rs received AND returnStatus=0)) THEN TP failed`		
NOTE Invalid_ac is either empty or has incorrect value.			

Table A.60 — TP/AP DAT/OBU/BI/09

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 12813:2019, 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 = { '49'D - - CommunicationStatus, '50'D - - GnssStatus, '51'D - - DistanceRecordingStatus, '52'D - - ActiveContexts, '53'D - - ObeStatusHistory, '61'D - - ExtendedOBEStatusHistory, '64'D - - AttributeUpdateInterval } }`	⇒	
2		⇐	`GET.rs = { fill, eid,iid = Ø, …, returnStatus }`
3	`IF (GET.rs NOT received OR (GET.rs received AND returnStatus=0)) THEN TP failed`		
4	`GET.rq = { fill = 0, eid = VST. DSRC-eid, accessCredentials = invalid_ac, iid = Ø, attrIdList = { '99'D - - ExtendedOBUStatusHistoryPart1 '100'D - - ExtendedOBUStatusHistoryPart2 '101'D - - UserConfirmation } }`		
5		⇐	`GET.rs = { fill, eid,iid = Ø, …, returnStatus }`
6	`IF (GET.rs NOT received OR (GET.rs received AND returnStatus=0)) THEN TP failed`		
NOTE Invalid_ac is either empty or has incorrect value.			

Table A.61 — TP/AP DAT/OBU/BI/10

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 12813:2019, 7.2		
Initial condition	OBU initialised and can accept a GET-STAMPED-request		
Stimulus and expected behaviour			
	Tester		**DUT**
NOTE Invalid_ac is either empty or has incorrect value.			

Table A.61 *(continued)*

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 12813:2019, 7.2		
Initial condition		OBU initialised and can accept a GET-STAMPED-request		

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

2			⇐	`ACTION.rs = { fill, eid, iid = Ø, …,` `returnStatus }`

3	`IF (ACTION.rs NOT received OR (ACTION.`
	`rs received AND returnStatus = 0)) THEN`
	`TP failed`			

NOTE Invalid_ac is either empty or has incorrect value.				

Table A.62 — TP/AP DAT/OBU/BI/11

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 12813:2019, 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 - - VehicleClass,`
	`'18'D - - VehicleDimensions,`
	`'19'D - - VehicleAxles,`
	`'20'D - - VehicleWeightLimits,`
	`'22'D - -`
	`SpecificCharacteristics,`
	`'46'D - -`
	`TrailerCharacteristics,`
	`'48'D - - VehicleAxlesHistory,`
	`'55'D - -`
	`VehicleCurrentMaxTrainWeight,`
	`'60'D - - VehicleWeightHistory,`
	`'62'D - -`
	`ExtendedVehicleAxlesHistory,`
	`'63'D - - LocalVehicleClassId }, nonce =`
	`C1, keyRef = C2}, iid = Ø }`
		⇒	

2			⇐	`ACTION.rs = { fill, eid, iid = Ø, …,` `returnStatus }`
NOTE Invalid_ac is either empty or has incorrect value.				

Table A.62 *(continued)*

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 12813:2019, 7.4		
Initial condition	OBU initialised and can accept a GET-STAMPED-request		
3	`IF (ACTION.rs NOT received OR (ACTION. rs received AND returnStatus = 0)) THEN TP failed`		
NOTE Invalid_ac is either empty or has incorrect value.			

Table A.63 — TP/AP DAT/OBU/BI/12

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 12813:2019, 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 = {`
	`'49'D - - CommunicationStatus,`
	`'50'D - - GnssStatus,`
	`'51'D - - DistanceRecordingStatus,`
	`'52'D - - ActiveContexts,`
	`'53'D - - ObeStatusHistory,`
	`'61'D - - ExtendedOBEStatusHistory,`
	`'64'D - - AttributeUpdateInterval }, nonce = C1, keyRef = C2}, iid = Ø }`
		⇒	

2		⇐	`ACTION.rs = { fill, eid, iid = Ø, …, returnStatus }`
3	`IF (ACTION.rs NOT received OR (ACTION. rs received AND returnStatus = 0)) THEN TP failed`		

4	`ACTION.rq = { mode = T, eid = VST. DSRC-eid, actionType = 0, accessCredentials = invalid_ac, GET-STAMPED.rq = { attrIdList =`
	`{ '99'D - - ExtendedOBUStatusHistoryPart1`
	`'100'D - - ExtendedOBUStatusHistoryPart2`
	`'101'D - - UserConfirmation}, nonce = C1, keyRef = C2}, iid = Ø }`
		⇒	

5		⇐	`ACTION.rs = { fill, eid, iid = Ø, …, returnStatus }`
NOTE Invalid_ac is either empty or has incorrect value.			

Table A.63 *(continued)*

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 12813:2019, 7.3		
Initial condition	OBU initialised and can accept a GET-STAMPED-request		

6	`IF (ACTION.rs NOT received OR (ACTION.`
	`rs received AND returnStatus = 0)) THEN`
	`TP failed`		

NOTE Invalid_ac is either empty or has incorrect value.			

A.4.6 Application security TPs, security level 1

All test purposes TP/AP-0SEC/OBU/Bx/yy defined in EN 15876-1 are applicable for CCC application as defined in ISO 12813:2019, Table B.6, 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 General

B.1.1 Introduction

This annex contains the test purposes (TP) for the conformity evaluation of RSE to ISO 12813.

B.1.2 Symbols in TP descriptions

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

Symbols are used in the description of the TPs, with meanings according to Table B.1.

Table B.1 — Description of TP symbols

Symbol	Description
XXX.rq ⇒	The device under test (DUT) sends the XXX.rq protocol data unit (PDU) to the Tester.
⇐ YYY.rs	The Tester sends the YYY.rs PDU to the DUT.
A ≡ B	Test purpose A "is congruent to" Test purpose B. The notation "Test purpose A ≡ Test purpose B" means that 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 → B	Object A "is transformed" into Object B. So, a notation like "Table X → Table Y" means that, for the scope of the TP, any reference of Table X should be changed into a reference 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 → accessCredentials = calculated value", for a given TP, means "change all occurrences in which the field accessCredentials has not been assigned to a calculation of the value accessCredentials to a given value.

In addition, the sequence of PDUs issued by an RSE is not constrained by ISO 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 TP, a step is indicated as:

N	See Table B.2

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

Table B.2 — PDU Selector

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

In order for the TPs 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 have been previously successfully performed, the tester has been modelled as controlling a variable, named Error, which indicates if a previously executed test purpose has failed. This allows proper control of the sequence of events in a TP. 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 units carry the mode parameter, which indicates whether a response is expected or not, this mode parameter can be used in some TPs by the tester in order to decide whether to issue a response or not in the case the TP passes, so as to enable the DUT to continue issuing requests in subsequent TPs.

B.2 Physical layer

As per ISO 12813:2019, 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 defined in ISO 12813:2019, Table B.19, Item 1.

B.3 MAC and LLC

As per ISO 12813:2019, 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 defined in ISO 12813:2019, Table B.19, Item 1.

B.4 Application layer TPs

B.4.1 Application initialisation phase TPs

B.4.1.1 General

These TPs apply to the INITIALISATION as defined in ISO 12813:2019, Table B.18, Item 1.

For the purpose of this conformance test, the two VSTs described in Table B.3 and Table B.4 are transmitted to the DUT according to the specification of the individual TPs in 0 below.

Table B.3 — VST1 (security level 1) — Valid VST indicating one CCC application

			Length	Allowed value
Fill			4 bits	Any
Profile			1 bit (Profile ext.)	0 (= no extension)
			7 bits	Refer to Profile as per EN 12834:2003, Annex A
Applications			1 bit (applications ext.)	0 (= no extension)
			7 bits (number of applic.)	2
			1 bit (eid opt.)	1 (= eid present)
			1 bit (parameter opt.)	1 (= parameter present)

Table B.3 *(continued)*

				Length	Allowed value
CCC application		aid		1 bit (aid ext.)	0 (= no extension)
				5 bits	20 (= CCC application)
		eid		1 bit (eid ext.)	0 (= no extension)
				7 bits	Any
	para meter	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)	As per ISO 3166-1
				14 bits (IssuerIdentifier)	As per ISO 14816
			TypeOf Contract	16 bits	Any
			context Version	1 bit (contextVersion ext.)	0 (= no extension)
				7 bits	Any
		AC_CR-Reference		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_Master KeyRef	8 bits	Any
			AC_CR-Diversifier	8 bits	Any
		RndOBE		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
				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)
OBE Configuration				1 bit (obeStatus opt.)	1 (= obeStatus present)
	equipmentClass			15 bits	Any
	manufacturerId			16 bits	Any
	obeStatus			16 bits	Any

VST2 shall indicate the presence of two CCC applications with the following definitions (refer to ISO 12813:2019, 8.2.3):

— one CCC application shall comply with ISO 12813:2019; and

— the other CCC application shall comply with ISO 12813:2015.

Table B.4 — VST2 (security level 1) — Valid VST indicating two CCC applications

	Length	Allowed value
Fill	4 bits	Any

Table B.4 *(continued)*

				Length	Allowed value
Profile				1 bit (Profile ext.)	0 (= no extension)
				7 bits	Refer to Profile as per EN 12834:2003, Annex A
Applications				1 bit (applications ext.)	0 (= no extension)
				7 bits (number of applic.)	3
	CCC application1			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-ContextMark1		
			Contract Provider	10 bits (CountryCode)	As per ISO 3166-1
				14 bits (IssuerIdentifier)	As per 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
				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)

Table B.4 *(continued)*

						Length	Allowed value
		eid				1 bit (eid ext.)	0 (= no extension)
						7 bits	≠ eid of CCC application1
						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 application2	para meter	CCC-ContextMark2	Contract Provider		10 bits (CountryCode)	As per ISO 3166-1
						14 bits (IssuerIdentifier)	As per 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 3	aid				1 bit (eid opt.)	1 (= eid present)
						1 bit (parameter opt.)	0 (= parameter not present)
						1 bit (aid ext.)	0 (= no extension)
						5 bits	≠ 20 (= no CCC application)
		eid				1 bit (eid ext.)	0 (= no extension)
						7 bits	Any (≠ other eid used in this VST)
OBE Configuration						1 bit (obeStatus opt.)	1 (= obeStatus present)
	equipmentClass					15 bits	Any
	manufacturerId					16 bits	Any
	obeStatus					16 bits	Any

B.4.1.2   BV test purposes

Test subgroup objective:

— to test the behaviour of the DUT in relation to valid VST containing one CCC application; and

— to test the behaviour of the DUT in relation to valid VST containing two CCC applications.

Table B.5 — TP/AP BAS/RSE/BV/01

TP/AP-BAS/RSE/BV/01		Verify that DUT supports the VST		
TP origin		Specific		
Reference		ISO 12813:2019, 6.1.2		
Initial condition		DUT and Tester are not in initialisation or transaction phase		
Stimulus and expected behaviour				
	DUT			**Tester**
1	`BST`		⇒	
2				`Verify length and allowed values of BST (see Table A.2)`
3				`IF verification performed in step 2 was not successful THEN TP failed`
4			⇐	`VST1`
5		See Table B.2		

Table B.6 — TP/AP BAS/RSE/BV/02

TP/AP-BAS/RSE/BV/02		Verify that DUT supports the VST		
TP origin		Specific		
Reference		ISO 12813:2019, 6.1.2 and 8.2.3		
Initial condition		DUT and Tester are not in initialisation or transaction phase		
Stimulus and expected behaviour				
	DUT			**Tester**
1	`BST`		⇒	
2				`Verify length and allowed values of BST (see Table A.2)`
3				`IF verification performed in step 2 was not successful THEN TP failed`
4			⇐	`VST2`
5		See Table B.2		

B.4.1.3   BI test purposes

Not applicable.

B.4.2   Application GET-rq PDU test purposes

B.4.2.1   General

These TPs apply to GET as defined in ISO 12813:2019, Table B.18, Item 2.

B.4.2.2   BV test purposes

Test subgroup objective:

a)   to test the DUT support of GET-rq; and

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

Table B.7 — TP/AP GET/RSE/BV/01

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 12813:2019, 6.1.3		
Initial condition	DUT and Tester initialised		
Stimulus and expected behaviour			
	DUT		**Tester**
1	`GET.rq = {fill, eid, accessCredentials, iid, attrIdList = {a1, a2, ..., an}}`	⇒	

2			`1. Verify length and allowed values of request parameters (see Table 5).`
			
			`2. Verify that attrIdList contains data attributes of Table A.16. Note that at least one attribute from the abovementioned 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 = {( 'a1'D, v1), ( 'a2'D, v2), ..., ( 'an'D, vn) }, returnStatus=0}`
5	See <u>Table B.2</u>		

B.4.2.3 BI test purposes

Test subgroup objective:

a) to test the behaviour of the DUT in relation to invalid GET-rs; and

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

Table B.8 — TP/AP GET/RSE/BI/01

TP/AP-GET/RSE/BI/01	Verify that the DUT detects an incorrect attributeList parameter of the GET.rs		
TP origin	Specific		
Reference	ISO 12813:2019, 6.1.3		
Initial condition	DUT and Tester initialised		
Stimulus and expected behaviour			
	DUT		**Tester**
1	`GET.rq = {fill, eid, accessCredentials, iid, attrIdList = {a1, a2, ..., an}}`	⇒	

2			`1. Verify length and allowed values of request parameters (see Table A.5).`
			
			`2. Verify that attrIdList contains data attributes of Table A.16. Note that at least one attribute from the abovementioned table must be present in the request.`

3			`IF verification performed in step 2 was not successful THEN TP failed`
Depending on attrIdList of the request PDU, this TP shall be repeated with different incorrect attributeList in the response.			

Table B.8 *(continued)*

TP/AP-GET/RSE/BI/01	Verify that the DUT detects an incorrect attributeList parameter of the GET.rs		
TP origin	Specific		
Reference	ISO 12813:2019, 6.1.3		
Initial condition	DUT and Tester initialised		
4		⇐	`GET.rs = { fill=0, eid = VST.DSRC-eid, iid = Ø, attrIdList ≠ {( 'a1'D, v1), ( 'a2'D, v2), ..., ( 'an'D, vn) }, returnStatus=0}`
5	See <u>Table B.2</u>		
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

B.4.3.1 General

These TPs apply to GET-STAMPED as defined in ISO 12813:2019, Table B.18, Item 3.

B.4.3.2 BV test purposes

Test subgroup objective:

a) to test the DUT support of GET-STAMPED-rq; and

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

Table B.9 — TP/AP STA/RSE/BV/01

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 12813:2019, 6.1.4		
Initial condition	DUT and Tester initialised		
Stimulus and expected behaviour			
	DUT		**Tester**
1	`ACTION.rq = { mode, eid, actionType = 0, accessCredentials, GET-STAMPED.rq = { attrIdList = {a1, a2, ..., an}, nonce, keyRef}, iid}`	⇒	
2			1. Verify length and allowed values of request parameters (see Table A.6). 2. Verify length and allowed values of GET-STAMPED request parameters. 3. Verify that attrIdList contains data attributes of Table A.16. Note that at least one attribute from the abovementioned 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 = {( 'a1'D, v1), ( 'a2'D, v2), ..., ( 'an'D, vn) }, authenticator = auth}, returnStatus = 0}`

Table B.9 *(continued)*

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 12813:2019, 6.1.4
Initial condition	DUT and Tester initialised
5	See Table B.2

B.4.3.3 BI test purposes

Test subgroup objective:

a) to test the behaviour of the DUT in relation to invalid GET-STAMPED-rs; and

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

Table B.10 — TP/AP STA/RSE/BI/01

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 12813:2019, 6.1.4	
Initial condition		DUT and Tester initialised	
Stimulus and expected behaviour			
	DUT		**Tester**
1	`ACTION.rq = { mode, eid, actionType = 0, accessCredentials, GET-STAMPED.rq = { attrIdList = {a1, a2, ..., an}, nonce, keyRef}, iid}`	⇒	
2			1. Verify length and allowed values of request parameters (see Table A.6).
			2. Verify length and allowed values of GET-STAMPED request parameters.
			3. Verify that attrIdList contains data attributes of (Table A.16). 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 ≠ {( 'a1'D, v1), ( 'a2'D, v2), ..., ( 'an'D, vn) }, authenticator = auth}, returnStatus = 0}`
5	See Table B.2		
Depending on attrIdList of the request PDU, this TP shall be repeated with different incorrect attributeList in the response.			

Table B.11 — TP/AP STA/RSE/BI/02

TP/AP-STA/RSE/BI/02	Verify that the DUT detects an incorrect authenticator parameter of the GETSTAMPED.rs		
TP origin	Specific		
Reference	ISO 12813:2019, 6.1.4		
Initial condition	DUT and Tester initialised		
Stimulus and expected behaviour			
	DUT		**Tester**
1	`ACTION.rq = { mode, eid, actionType = 0, accessCredentials, GET-STAMPED.rq = { attrIdList = {a1, a2, ..., an}, nonce, keyRef}, iid}`	⇒	
2			1. Verify length and allowed values of request parameters (see Table A.6). 2. Verify length and allowed values of GET-STAMPED request parameters. Verify that attrIdList contains data attributes of Table A.16). Note that at least one attribute from the abovementioned 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 = {( 'a1'D, v1), ( 'a2'D, v2), ..., ( 'an'D, vn) }, authenticator = invalid_auth}, returnStatus = 0}`
5	See Table B.2		

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

B.4.4.1 General

These TPs apply to the SET-MMI as defined in ISO 12813:2019, Table B.18, Item 4.

B.4.4.2 BV test purposes

Test subgroup objective:

a)   to test the DUT support of SET-MMI-rq; and

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

Table B.12 — TP/AP MMI/RSE/BV/01

TP/AP-MMI/RSE/BV/01	Verify that DUT supports the SET-MMI-rq		
TP origin	Specific		
Reference	ISO 12813:2019, 6.1.5		
Initial condition	DUT and Tester initialised		
Stimulus and expected behaviour			
	DUT		**Tester**
1	`ACTION.rq = { mode, eid, actionType =10, accessCredentials, SETMMIRq, iid}`	⇒	

Table B.12 *(continued)*

TP/AP-MMI/RSE/BV/01	Verify that DUT supports the SET-MMI-rq		
TP origin	Specific		
Reference	ISO 12813:2019, 6.1.5		
Initial condition	DUT and Tester initialised		
2			`Verify length and allowed values of request parameters (see Table A.7).`
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		

B.4.4.3 BI test purposes

Not applicable.

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

B.4.5.1 General

These test purposes apply to the EVENT-REPORT as defined in ISO 12813:2019, Table B.18, Item 5.

B.4.5.2 BV test purposes

Test subgroup objective:

a) to test the DUT support of EVENT-REPORT-rq; and

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

Table B.13 — TP/AP REL/RSE/BV/01

TP/AP-REL/RSE/BV/01	Verify that DUT supports the EVENT-REPORT-rq		
TP origin	Specific		
Reference	ISO 12813:2019, 6.1.6		
Initial condition	DUT and Tester initialised		
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.9).`
3			`IF verification performed in step 2 was not successful THEN TP failed`

B.4.5.3 BI test purposes

Not applicable.