

# Road transport and traffic telematics — Electronic fee collection — Test procedures for user and fixed equipment —

## Part 2: Conformance test for the onboard unit application interface

ICS 43.040.15; 35.240.60

National foreword

This Draft for Development is the official English language version of CEN ISO/TS 14907-2:2006.

**This publication is not to be regarded as a British Standard.**

It is being issued in the Draft for Development series of publications and is of a provisional nature because technology in this area is rapidly evolving. It should be applied on this provisional basis, so that information and experience of its practical application may be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the European organization responsible for its conversion to a European standard. A review of this publication will be initiated 2 years after its publication by the European organization so that a decision can be taken on its status at the end of its 3-year life. Notification of the start of the review period will be made in an announcement in the appropriate issue of *Update Standards*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into a European standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent in writing to the Secretary of BSI Technical Committee EPL/278, Road transport informatics, at British Standards House, 389 Chiswick High Road, London W4 4AL, giving the document reference and clause number and proposing, where possible, an appropriate revision of the text.

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

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

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Summary of pages

This document comprises a front cover, an inside front cover, the CEN ISO/TS title page, the CEN ISO/TS foreword page, the ISO/TS title page, pages ii to v, a blank page, pages 1 to 92, an inside back cover and a back cover.

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English Version

**Road transport and traffic telematics - Electronic fee collection -  
Test procedures for user and fixed equipment - Part 2:  
Conformance test for the onboard unit application interface  
(ISO/TS 14907-2:2006)**

Télématique de la circulation et du transport routier -  
Perception du télépéage - Modes opératoires relatifs aux  
équipements embarqués et aux équipements fixes - Partie  
2: Essai de conformité de l'interface d'application de l'unité  
embarquée (ISO/TS 14907-2:2006)

Straßentransport- und Verkehrstelematik - Elektronische  
Gebührenerhebung (EFC) - Teil 2: EFC-Anpassung der  
Testspezifikation an die Anwenderschnittstelle (ISO/TS  
14907-2:2006)

This Technical Specification (CEN/TS) was approved by CEN on 28 February 2005 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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COMITÉ EUROPÉEN DE NORMALISATION  
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## Foreword

This document (CEN ISO/TS 14907-2:2006) has been prepared by Technical Committee CEN/TC 278 "Road transport and traffic telematics", the secretariat of which is held by NEN, in collaboration with Technical Committee ISO/TC 204 "Transport information and control systems".

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this CEN Technical Specification: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

# TECHNICAL SPECIFICATION

# ISO/TS 14907-2

First edition  
2006-06-15

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## Road transport and traffic telematics — Electronic fee collection — Test procedures for user and fixed equipment —

### Part 2: Conformance test for the onboard unit application interface

*Télématique de la circulation et du transport routier — Perception du  
télépéage — Modes opératoires relatifs aux équipements embarqués et  
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embarquée*



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ISO/TS 14907-2:2006(E)

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## Foreword

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

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

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

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

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

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

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

ISO/TS 14907-2 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

ISO/TS 14907 consists of the following parts, under the general title *Road transport and traffic telematics — Electronic fee collection — Test procedures for user and fixed equipment*:

- *Part 1: Description of test procedures*
- *Part 2: Conformance test for the onboard unit application interface*

## **Introduction**

This CEN/ISO Technical Specification describes tests that verify OBU conformance of implementations of functions and data structures for EFC applications.



# Road transport and traffic telematics — Electronic fee collection — Test procedures for user and fixed equipment —

## Part 2: Conformance test for the onboard unit application interface

### 1 Scope

This CEN/ISO Technical Specification describes tests that verify OBU conformance of implementations of functions and data structures, as defined in the implementation conformance statement based on ISO 14906, for EFC applications. After the tests of isolated data items and functions (C.1-C.2), an example is given for testing of a complete EFC transaction (C.3).

The scope of this CEN/ISO Technical Specification comprises definitions of OBU conformance assessment tests of:

- Basic DSRC L7 functionality;
- EFC application functions;
- EFC attributes (i.e. EFC application information);
- the addressing procedures of EFC attributes and (hardware) components (e.g. ICC and MMI);
- the EFC transaction model, which defines the common elements and steps of any EFC transaction; and
- the behaviour of the interface so as to support interoperability on an EFC-DSRC application interface level.

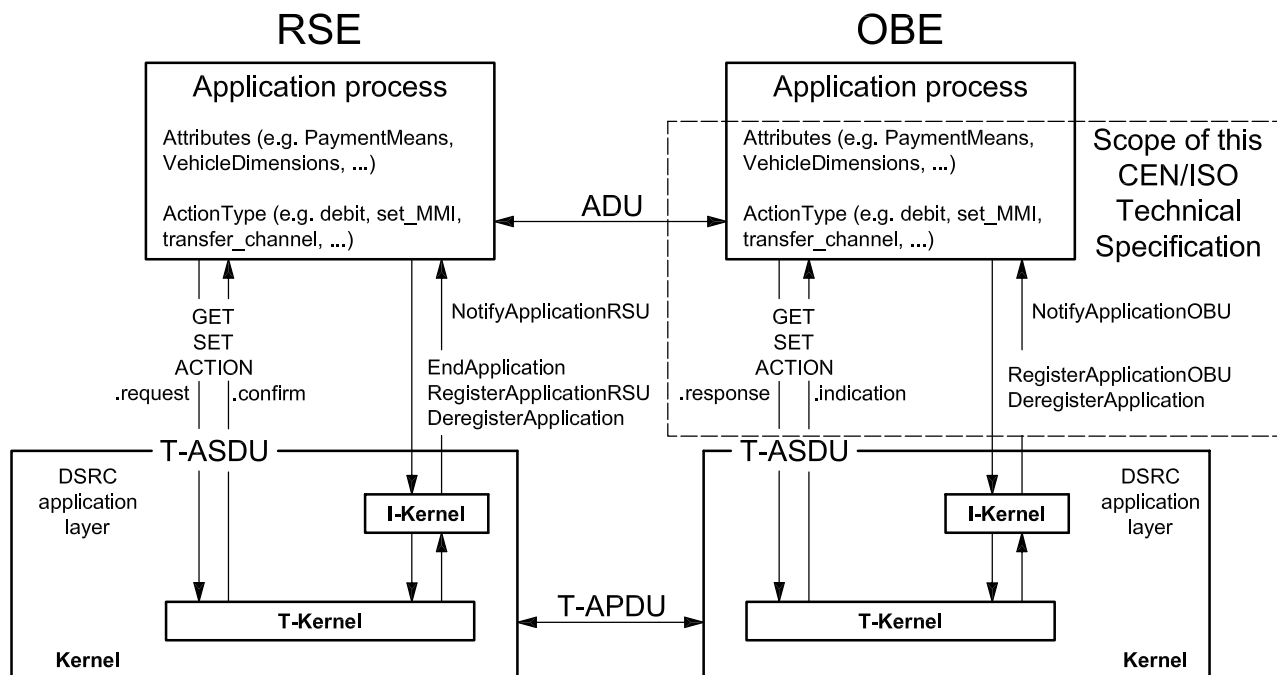


**Figure 1 — The EFC application interface**

The purpose of this CEN/ISO Technical Specification is to define tests that:

- assess OBU capabilities;
- assess OBU behaviour;
- serve as a guide for OBU conformance evaluation and type approval;
- achieve comparability between the results of the corresponding tests applied in different places at different times; and
- facilitate communications between parties.

Whereas this Technical Specification defines examples of test cases for DSRC and EFC functionality in Annex C, it does not intend to specify a complete test suite for a certain implementation. To compose a test suite for a specific EFC implementation, the test cases may have to be modified and new test cases may have to be defined and added in order for the conformance test to be complete. It may be useful to take into account the following considerations when defining a complete test suite:

- Small range: “exhaustive testing” of critical interoperability/compatibility features;
- Large range: testing of boundaries and random values;
- Composite types: testing of individual items in sequence or parallel.

Figure 2 shows the overall procedure of conformance testing.

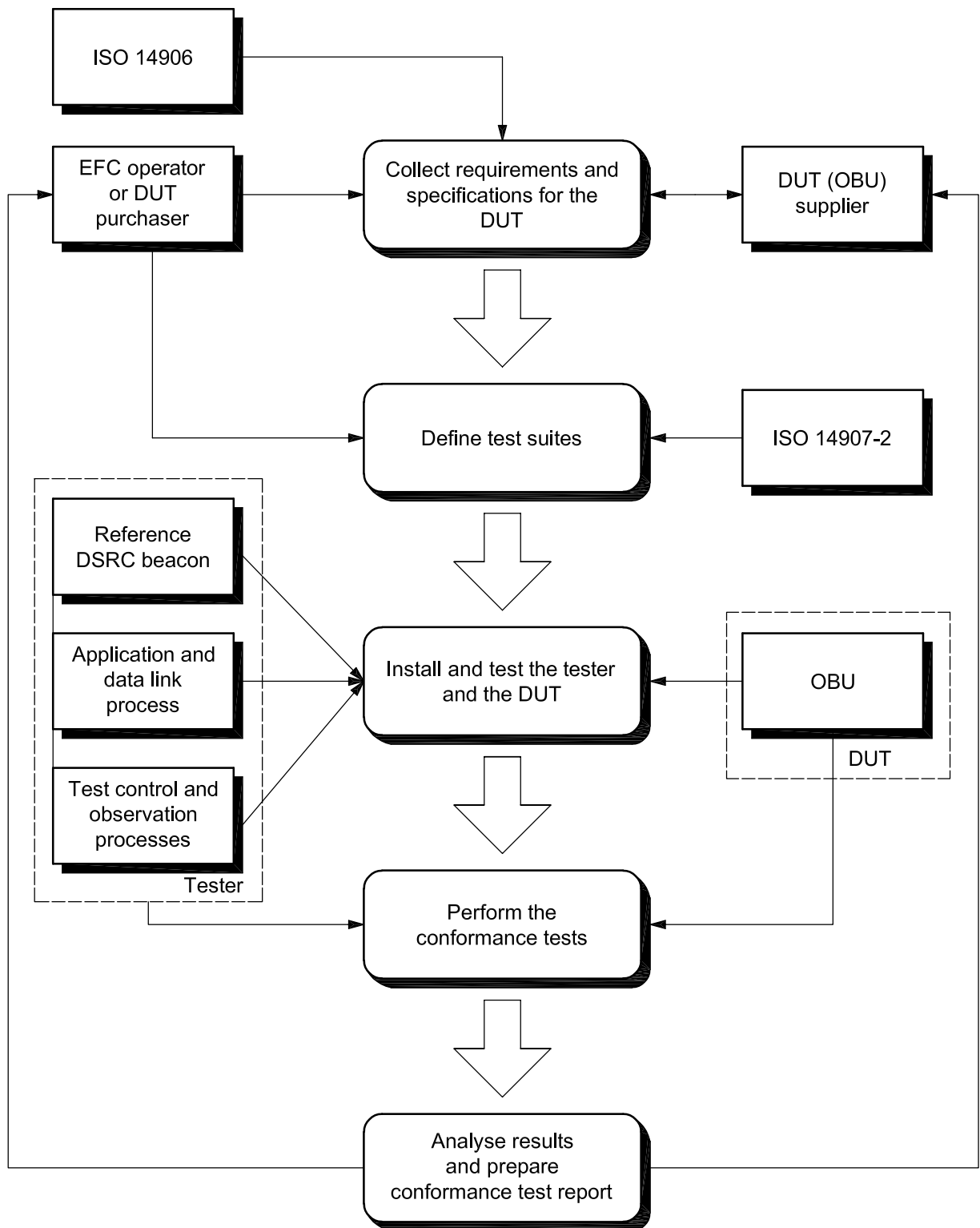


Figure 2 — Conformance testing process

Figure 3 gives a more detailed picture of the interface between the entity performing the conformance test and the supplier of the Device Under Test (DUT). By the EFC application specification, the implementation conformance statement pro forma and the implementation extra information for testing pro forma the supplier is requested to provide the DUT (OBU), containing the Implementation Under Test (IUT), as well as the documentation needed to perform the tests. More details on the content of the different documents are given in Clause 5 on OBU and supporting information.

NOTE 1 The Device Under Test contains the Implementation Under Test.

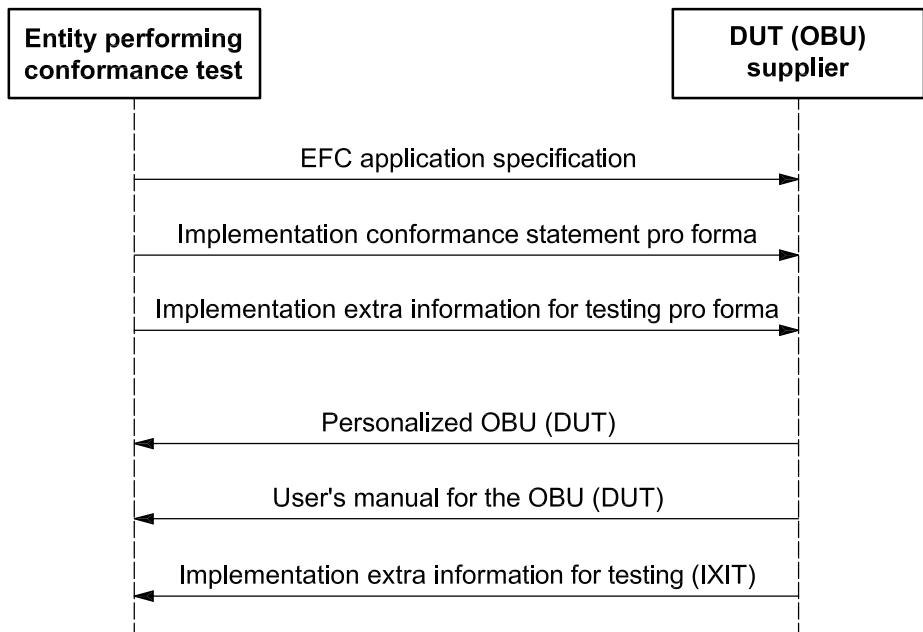


Figure 3 — Documentation DUT supplier

It is outside the scope of this CEN/ISO Technical Specification to define tests that assess:

- performance;
- robustness; and
- reliability of an implementation.

NOTE 2 ISO/TS 14907-1 defines test procedures that are aimed at assessing performance, robustness and reliability of EFC equipment and systems.

NOTE 3 The ISO/IEC 10373 family of International Standards defines test methods for proximity, vicinity, integrated circuits(s) cards and related devices that may be relevant for OBUs that support such cards.

2 Normative references

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

ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation*

ISO/IEC 8825-2, *Information technology — ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*

ISO/IEC 9646-1, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 1: General concepts*

ISO 14906:2004, *Road transport and traffic telematics — Electronic fee collection — Application interface definition for dedicated short-range communication*

ISO/TS 14907-1, *Road transport and traffic telematics — Electronic fee collection — Test procedures for user and fixed equipment — Part 1: Description of test procedures*

ISO/TS 17574, *Road transport and traffic telematics — Electronic fee collection (EFC) — Guidelines for EFC security protection profiles*

EN 12253, *Road transport and traffic telematics — Dedicated short-range communication — Physical layer using microwave at 5,8 GHz*

EN 12795, *Road transport and traffic telematics — Dedicated short-range communication (DRSC) — DRSC data link layer: medium access and logical link control*

EN 12834, *Road transport and traffic telematics — Dedicated short-range communication (DRSC) — DRSC application layer*

EN 13372, *Road transport and traffic telematics (RTTT) — Dedicated short-range communication — Profiles for RTTT applications*

### 3 Terms and definitions

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

#### 3.1

##### **access credentials**

data that is transferred to OBE in order to establish the claimed identity of an RSE application process entity

[ISO 14906]

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

#### 3.2

##### **action**

function that an application process resident at the RSE can invoke in order to make the OBE execute a specific operation during the transaction

[ISO 14906]

#### 3.3

##### **attribute**

application information formed by one or by a sequence of data elements, which is managed by different actions used for implementation of a transaction

[ISO 14906]

#### 3.4

##### **authenticator**

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

[ISO 14906]

**3.5**

**channel**

information transfer path

[ISO/IEC 7498-2 and ISO 14906]

**3.6**

**component**

logical and physical entity composing OBE, supporting a specific functionality

[ISO 14906]

**3.7**

**contract**

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

[ISO 14906]

**3.8**

**cryptography**

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

[ISO/IEC 7498-2 and ISO 14906]

**3.9**

**data group**

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

[ISO 14906]

**3.10**

**data integrity**

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

[ISO/IEC 7498-2 and ISO 14906]

**3.11**

**element**

in the context of DSRC, a directory containing application information in form of attributes

[ISO 14906]

**3.12**

**implementation conformance statement**

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

**3.13**

**implementation conformance statement pro forma**

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

**3.14****implementation extra information for testing**

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

**3.15****implementation extra information for testing pro forma**

document, in the form of a questionnaire, which when completed for an IUT becomes an implementation extra information for testing

**3.16****on-board equipment****OBE**

equipment located within the vehicle and supporting the information exchange with the RSE, it is composed of the OBU and other sub-units whose presence are considered optional for the execution of a transaction

[ISO 14906]

**3.17****on-board unit****OBU**

minimum component of an OBE, whose functionality always includes at least the support of the DSRC interface

[ISO 14906]

**3.18****roadside equipment****RSE**

equipment located at a fixed position along the road transport network, for the purpose of communication and data exchanges with the OBE of passing vehicles

[ISO 14906]

**3.19****service (EFC)**

road-transport-related facility provided by a service provider, normally a type of infrastructure, the use of which is offered to the user for which the user may be requested to pay

[ISO 14906]

**3.20****service primitive (communication)**

elementary communication service provided by the application layer protocol to the application processes

[ISO 14906]

NOTE The invocation of a service primitive by an application process implicitly calls upon and uses services offered by the lower protocol layers.

**3.21****service provider (EFC)**

operator that accepts the user's payment means and in return provides a road-use service to the user

[ISO 14906]

**3.22**

**session**

exchange of information and interaction occurring at a specific EFC station between the RSE and the user/vehicle

[ISO 14906]

**3.23**

**transaction**

whole of the exchange of information between the RSE and the OBE necessary for the completion of an EFC operation over the DSRC

[ISO 14906]

**3.24**

**transaction model**

functional model describing the general structure of EFC transactions

[ISO 14906]

**3.25**

**tester**

combination of equipment and processes which is able to perform conformance tests according to this Technical Specification

**3.26**

**user**

entity that uses transport services provided by the service provider according to the terms of a contract

[ISO 14906]

## **4 Abbreviations**

For the purposes of this Technical Specification, the following abbreviations apply throughout the document unless otherwise specified.

**4.1**

**ADU**

Application Data Unit

**4.2**

**APDU**

Application Protocol Data Unit

**4.3**

**AP**

Application Process

**4.4**

**ARIB**

Association of Radio Industries and Businesses

NOTE ARIB ([www.arib.or.jp](http://www.arib.or.jp)) is based in Japan.

**4.5**

**ASCII**

American Standard Code for Information Interchange

**4.6**

**ASN.1**

Abstract Syntax Notation One

[ISO/IEC 8824-1]

**4.7**

**ASP**

Abstract Service Primitives

[ISO 9646-1]

**4.8**

**AVI**

Automatic Vehicle Identification

**4.9**

**B-Kernel**

Broadcast Kernel

**4.10**

**BST**

Beacon Service Table

**4.11**

**cf**

confirm

**4.12**

**DSRC**

Dedicated Short-Range Communication

**4.13**

**DUT**

Device Under Test

**4.14**

**EID**

Element Identifier

**4.15**

**EFC**

Electronic Fee Collection

**4.16**

**FTP**

File Transfer Protocol

**4.17**

**HDLC**

High-level Data Link Control

**4.18**

**ICS**

Implementation Conformance Statement

**4.19**

**I-Kernel**

Initialization Kernel

**4.20**

**IID**

Invoker Identifier

**4.21**

**ind**

indication

**4.22**

**IUT**

Implementation Under Test

[ISO 9646-1]

**4.23**

**IXIT**

Implementation eXtra Information for Testing

**4.24**

**L1**

Layer 1 of DSRC (physical layer)

**4.25**

**L2**

Layer 2 of DSRC (data link layer)

**4.26**

**L7**

Application Layer Core of DSRC

**4.27**

**LID**

Logical Link Control Identifier

**4.28**

**LLC**

Logical Link Control

**4.29**

**LPDU**

LLC Protocol Data Unit

**4.30**

**M<sub>a</sub>**

ManufacturerID

[EN 12834]

**4.31**

**MAC**

Medium Access Control

**4.32**

**MMI**

Man-Machine Interface

**4.33**

**n.a.**

not applicable

**4.34**

**OBE**

On-Board Equipment

**4.35**

**OBU**

On-Board Unit

**4.36**

**ORSE**

Organization for Road System Enhancement

**4.37**

**P<sub>a,b,c,d</sub>**

Profile

[EN 13372, EN 12834]

EXAMPLE P<sub>0</sub> denotes Profile 0.

**4.38**

**PDU**

Protocol Data Unit

**4.39**

**PER**

Packed Encoding Rules

[ISO/IEC 8825-2]

**4.40**

**PoC**

Point of Control

**4.41**

**PoO**

Point of Observation

**4.42**

**PPDU**

Physical Layer Protocol Data Unit

**4.43**

**PrWA**

Private Window Allocation

[EN 12795]

**4.44**

**PrWRq**

Private Window Request

[EN 12795]

**4.45**

**req**

request

**4.46**

**rs**

response

**4.47**

**RSE**

Roadside Equipment

**4.48**

**RTTT**

Road Transport and Traffic Telematics

**4.49**

**SAM**

Secure Application Module

**4.50**

**T-APDU**

Transfer-Application Protocol Data Unit

**4.51**

**T-ASDU**

Transfer-Application Service Data Unit

**4.52**

**T-Kernel**

Transfer Kernel

**4.53**

**TTI**

Traffic and Traveller Information

**4.54**

**VST**

Vehicle Service Table

## **5 OBU and supporting information**

The supplier shall provide the OBU, i.e. the DUT, and the associated information including:

- OBUs personalized to be able to perform tests according to the ICS and IXIT as defined in 5.1 and 5.2, respectively. At least five samples shall be submitted for test. More samples may be needed if several different data structures and data contents are required in the tests;
- user's manual for the OBU, which shall include instructions how to handle the equipment, and may include further detailed information about the protocol functions;
- implementation conformance statement according to 5.1. The ICS shall include statements regarding the following:
  - layer 7 services that are implemented in the OBU;
  - EFC functions (action types) that are implemented in the OBU;
  - whether or not data elements are used;
- implementation extra information for testing according to 5.2. The IXIT shall, if applicable, include:
  - a statement regarding which layer 2 services shall be used to transfer the L7 services (and EFC services);

- a description of security calculations in the OBU including a specification of the encryption algorithm used;
- values of the test Master Keys for calculation and verification of OBU security data such as authenticators and access credentials.

The supplier should also provide configuration/personalization equipment for the OBU if that ensures effective testing.

## 5.1 ICS

The ICS is a statement made by the supplier that claims conformance to a certain specification. The ICS states which capabilities have been implemented in the specifications. It also states possible limitations in the implementation of the specification.

This Technical Specification describes testing of implementations according to the following standards:

- DSRC application layer; EN 12834;
- EFC application interface; ISO 14906.

Annex A contains the ICS pro forma that shall be used for the ICS.

## 5.2 IXIT

The IXIT is a statement made by the supplier or an implementer of an IUT which contains or references all of the information, in addition to that given in the implementation conformance statement, related to the DUT and its testing environment. The IXIT enables the test laboratory to run an appropriate test suite against the DUT.

In this Technical Specification, the IXIT specifies the services in the lower communication layers that shall be used to perform the services to be tested. These services are described e.g. in EN 12795, EN 12253 and EN 13372.

The IXIT shall also contain further information and describe algorithms and procedures that are not specified in the above standards but are prerequisites to perform the testing. Example of such information is:

- content of the ApplicationContextMark in the VST;
- calculation of access credentials in DSRC services;
- use of ReturnCode in DSRC L7 services and EFC functions; and
- calculation of authenticators in EFC functions.

Annex B contains the IXIT pro forma that shall be used for the declaration of the IXIT.

## 6 Testing requirements

### 6.1 Conceptual test architecture

A remote test method shall be used for the conformance test of OBUs (DUT). Figure 4 shows the conceptual testing architecture of tester and DUT. The conformance test is only related to the implementation of the DUT.

The PoC, which is the point where the test events are controlled, shall be implemented inside the tester on the interface between the application layer and the application process.

The PoO, which is the point where the occurrence of test events is to be observed, shall be implemented inside the tester on the interface between the application layer and the application process. The PoO must also interface the data link layer since some tests require observation of the behaviour on this layer.

The PoC and PoO are characterized by a set of ASPs, according to the specifications of the tests. The test events observed at the PoO may be supplemented by information provided by other sub-units, e.g. MMI or an IC card if available with the DUT.

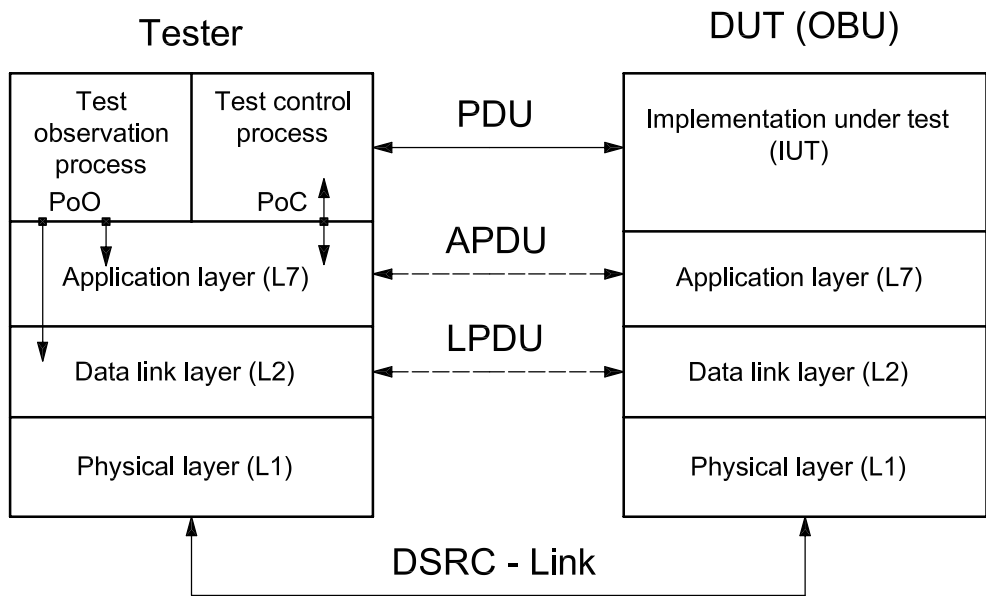


Figure 4 — Conceptual architecture of the conformance test

6.2 Conformance test system

The conformance tests shall be performed under controlled conditions by using a test system according to Figure 5.

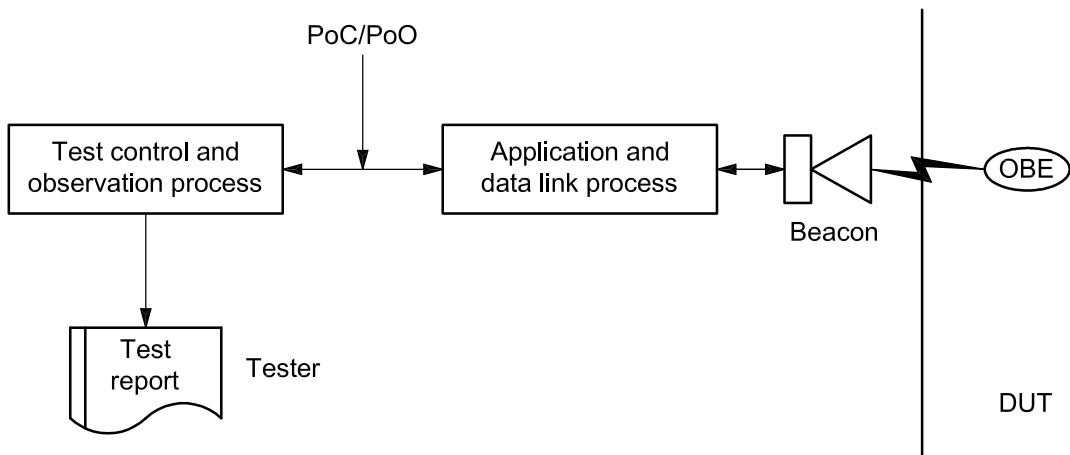


Figure 5 — Test facilities

## 6.2.1 Functionality of tester

### 6.2.1.1 Reference beacon

The beacon shall be a transparent physical layer interface for DSRC according to European or International Standards, which means it shall be able to operate standardized data profiles of DSRC links. A simple beacon may be used which will only send and receive frames to or from the DUT. The communication is controlled by the application and data link process of the tester.

Beacon parameters, e.g. the transmitting power, shall be adjustable by the tester.

### 6.2.1.2 Application and data link process

The tester shall be able to operate the communication link in real time according to data link layer functionality of European or International Standards. The process shall provide the connection to the test control and observation process and shall control the sending and reception of frames to and from the beacon.

### 6.2.1.3 Test control and observation processes

The test control and observation processes shall be implemented on an appropriately equipped computer system. The processes shall comply with the definitions of the application and data link layers defined by European or International standards and shall be able to generate test suites in reference to ISO 14906. The control process shall provide functionality to configure the test-bed, to generate test suites and to perform test suites.

**EXAMPLE** Test suites may be generated in plain ASCII format and may be retrieved by the real-time control process via FTP.

While the tests are being performed, all events shall be observed by the PoO process. All results shall be documented, visualized and be made available for detailed analysis.

## 6.2.2 Conformance testing

The tests performed by the tester shall be able to concentrate on EFC-communication protocol aspects, which are:

- initialization phase (BST-VST exchange);
- application layer services according to EN 12834;
- EFC functions and services according to ISO 14906;
- EFC data and parameters used according to ISO 14906; and
- transaction phase (logical sequence).

The DUT shall be operated in a controlled environment according to the manufacturer's instructions.

All test suites shall be generated corresponding to the specification of the manufacturer, which shall describe the behaviour of the DUT in terms of expected messages from the beacon and intended answers from the DUT. The communication sequence shall be unambiguously defined. The test generation tool shall be able to check the messages against the European or International DSRC standards. All events of a DUT are stored by the tester.

The test suites generated shall strictly correspond to the European or International DSRC standards and to ISO 14906.

The results of the tests shall only be related to the IUT of the DUT. Only the correctness of the implementation shall be tested, and any assessment of performance, robustness or reliability is excluded. The results of the tests shall be able to provide confidence that the DUT works according to ICS, the underlying DSRC standards and to ISO 14906, within the scope of the performed tests.

### 6.3 Test documentation

The test documentation shall provide comprehensive information of the used tester, the DUT, the tests carried out, and the gathered test results.

#### 6.3.1 Tester

All relevant information and specifications of the used tester shall be documented in the test report.

The ICS and the IXIT shall be provided by the manufacturer or supplier of the DUT. The ICS and IXIT shall describe all the capabilities and limitations of the DUT according to Annex A and Annex B, respectively.

#### 6.3.2 Test methods and test cases

A test suite is required which covers all implemented and specified functions of the DUT to be tested based on the provided ICS and IXIT. Completeness and correctness of the test suite is required to verify conformity between IUT and specification, including the referenced standards.

The test suite is separated in test groups; each test group consists of a number of test cases. The tester shall provide a tool which enables the user to specify the test suite and which provides documentation of the test suite.

The user-defined test suite should be automatically translated in a computer form which is executable by the tester.

#### 6.3.3 Test results

Each test case carried out shall be documented by the test generation equipment. For each test case, a verdict shall be given: passed, inconclusive or failed. The results of all test cases shall form the conformance test report.

## Annex A (normative)

### Implementation conformance statement pro forma

The forms in this annex shall be completed by the supplier of the DUT (OBU) to state conformance to applicable parts in EN 12834 (DSRC L7 standard) and ISO 14906.

When the forms are completed, this annex will form the ICS that shall be submitted to the test laboratory before start of the tests.

#### A.1 Identification of OBU supplier

**Table A.1 — Identification of OBU supplier form**

|                |  |
|----------------|--|
| Company        |  |
| Postal address |  |
| Telephone      |  |
| Contact person |  |
| E-mail address |  |

#### A.2 Identification of OBU

**Table A.2 — Identification of OBU form**

|                                  |  |
|----------------------------------|--|
| Brand                            |  |
| Type, Version                    |  |
| ManufacturerID                   |  |
| EquipmentClass                   |  |
| Serial numbers of supplied units |  |

#### A.3 DSRC application layer implementation

##### A.3.1 Declaration of application layer features

The EN 12834 (DSRC L7) implemented functionality shall be declared by completing Table A.3.

**Table A.3 — EN 12834 functionality**

| Feature(s)                 |                               |              | Status             | Implemented<br>Yes/No/n.a. | Restrictions or other<br>comments |
|----------------------------|-------------------------------|--------------|--------------------|----------------------------|-----------------------------------|
| T-KE                       | Fragmentation/defragmentation |              | optional/mand.     |                            |                                   |
|                            | Concatenation/deconcatenation |              | optional/mand.     |                            |                                   |
|                            | Multiplexing/demultiplexing   |              | optional/mand.     |                            |                                   |
|                            | Fragmentation<br>header       | 1 octet      | mand.              |                            |                                   |
|                            |                               | 2 octets     | optional/mand.     |                            |                                   |
|                            |                               | 3 octets     | optional/mand.     |                            |                                   |
|                            | Service<br>Primitives         | GET          | optional           |                            |                                   |
|                            |                               | SET          | optional           |                            |                                   |
|                            |                               | ACTION       | optional           |                            |                                   |
|                            |                               | EVENT-REPORT | mand.              |                            |                                   |
| INITIALIZATION             |                               | mand.        |                    |                            |                                   |
| I-KE                       |                               |              | optional/mand.     |                            |                                   |
| Timer T (second)           |                               |              | 255/0-255          |                            |                                   |
| LID for INITIALIZATION.req |                               |              | broadcast/ private |                            |                                   |

NOTE “/” means selecting any number or feature; “n.a.” means “not applicable”.

### A.3.2 Detailed L7 services statement

For each implemented L7 service, the corresponding table below shall be completed. The information is used to control the tests of the service.

#### A.3.2.1 INITIALIZATION

**Table A.4 — INITIALIZATION.req, BST**

| Data Element        | Data Type                               | Used/Not used, Restrictions |
|---------------------|-----------------------------------------|-----------------------------|
| rsu                 | BeaconID                                |                             |
| time                | Time                                    |                             |
| profile             | Profile                                 |                             |
| mandApplications    | ApplicationList                         |                             |
| nonmandApplications | ApplicationList, OPTIONAL               |                             |
| profileList         | SEQUENCE (SIZE (0..127,...)) OF Profile |                             |

**Table A.5 — INITIALIZATION.rs, VST**

| Data Element     | Data Type        | Used/Not used, Restrictions |
|------------------|------------------|-----------------------------|
| profile          | Profile          |                             |
| applications     | ApplicationList  |                             |
| obeConfiguration | ObeConfiguration |                             |

**A.3.2.2 GET****Table A.6 — GET.req**

| Data Element      | Data Type                | Used/Not used, Restrictions |
|-------------------|--------------------------|-----------------------------|
| eid               | Dsrc-EID                 |                             |
| accessCredentials | OCTET STRING OPTIONAL    |                             |
| iid               | DsrcEID OPTIONAL         |                             |
| attrIdList        | AttributeIdList OPTIONAL |                             |

If access credentials are used, the algorithm for how to calculate these shall be described in the IXIT.

**Table A.7 — GET.rs**

| Data Element  | Data Type               | Used/Not used, Restrictions |
|---------------|-------------------------|-----------------------------|
| eid           | Dsrc-EID                |                             |
| iid           | DsrcEID OPTIONAL        |                             |
| attributelist | AttributeList OPTIONAL  |                             |
| ret           | ResponseStatus OPTIONAL |                             |

**A.3.2.3 SET****Table A.8 — SET.req**

| Data Element      | Data Type             | Used/Not used, Restrictions |
|-------------------|-----------------------|-----------------------------|
| mode              | BOOLEAN               |                             |
| eid               | Dsrc-EID              |                             |
| accessCredentials | OCTET STRING OPTIONAL |                             |
| attrList          | AttributeList         |                             |
| iid               | DsrcEID OPTIONAL      |                             |

If access credentials are used, the algorithm for how to calculate these shall be described in the IXIT.

**Table A.9 — SET.rs**

| Data Element | Data Type               | Used/Not used, Restrictions |
|--------------|-------------------------|-----------------------------|
| eid          | Dsrc-EID                |                             |
| iid          | DsrcEID OPTIONAL        |                             |
| ret          | ResponseStatus OPTIONAL |                             |

## A.3.2.4 EVENT-REPORT

Table A.10 — EVENT-REPORT.req

| Data Element      | Data Type                                    | Used/Not used, Restrictions |
|-------------------|----------------------------------------------|-----------------------------|
| mode              | BOOLEAN                                      |                             |
| eid               | Dsrc-EID                                     |                             |
| eventType         | EventType                                    |                             |
| accessCredentials | OCTET STRING (SIZE (0..127,...))<br>OPTIONAL |                             |
| eventParameter    | Container OPTIONAL                           |                             |
| iid               | DsrcEID OPTIONAL                             |                             |

If access credentials are used, the algorithm for how to calculate these shall be described in the IXIT.

Table A.11 — EVENT-REPORT.rs

| Data Element | Data Type             | Used/Not used, Restrictions |
|--------------|-----------------------|-----------------------------|
| eid          | Dsrc-EID              |                             |
| iid          | DsrcEID OPTIONAL      |                             |
| ret          | ReturnStatus OPTIONAL |                             |

## A.4 EFC Functions

## A.4.1 Declaration of EFC functions implemented

The ISO 14906-implemented EFC functions (DSRC L7 ACTION-services) shall be declared by completing Table A.12.

Table A.12 — EFC Functions

| EFC function     | Implemented Yes/No | Restrictions and remarks |
|------------------|--------------------|--------------------------|
| GET_STAMPED      |                    |                          |
| SET_STAMPED      |                    |                          |
| GET_SECURE       |                    |                          |
| SET_SECURE       |                    |                          |
| GET_INSTANCE     |                    |                          |
| SET_INSTANCE     |                    |                          |
| GET_NONCE        |                    |                          |
| SET_NONCE        |                    |                          |
| TRANSFER_CHANNEL |                    |                          |
| COPY             |                    |                          |
| SET_MMI          |                    |                          |
| SUBTRACT         |                    |                          |
| ADD              |                    |                          |
| DEBIT            |                    |                          |
| CREDIT           |                    |                          |
| ECHO             |                    |                          |

### A.4.2 Detailed EFC functions statement

For each implemented EFC function, the corresponding table below shall be completed. The information is used to control the tests of the function.

#### A.4.2.1 GET STAMPED

**Table A.13 — ACTION.rq (GET STAMPED)**

| Data Element      | Data Type                                                                                                          | Used/Not used, Restrictions |
|-------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------------|
| mode              | BOOLEAN = TRUE                                                                                                     |                             |
| eid               | Dsrc-EID                                                                                                           |                             |
| actionType        | ActionType = 0                                                                                                     |                             |
| accessCredentials | OCTET STRING OPTIONAL                                                                                              |                             |
| actionParameter   | GetStampedRq ::= SEQUENCE {<br>attributeldList AttributeldList,<br>nonce OCTET STRING,<br>keyRef INTEGER(0..255) } |                             |
| iid               | DsrcEID OPTIONAL                                                                                                   |                             |

If access credentials are used, the algorithm for how to calculate these shall be described in the IXIT.

**Table A.14 — ACTION.rs (GET STAMPED)**

| Data Element      | Data Type                                                                                   | Used/Not used, Restrictions |
|-------------------|---------------------------------------------------------------------------------------------|-----------------------------|
| eid               | Dsrc-EID                                                                                    |                             |
| iid               | DsrcEID OPTIONAL                                                                            |                             |
| responseParameter | GetStampedRs ::= SEQUENCE {<br>attributeList AttributeList,<br>authenticator OCTET STRING } |                             |
| ret               | ResponseStatus OPTIONAL                                                                     |                             |

The algorithm for calculation of the authenticator shall be described in the IXIT.

#### A.4.2.2 SET STAMPED

**Table A.15 — ACTION.req (SET STAMPED)**

| Data Element      | Data Type                                                                                                      | Used/Not used, Restrictions |
|-------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------|
| mode              | BOOLEAN = TRUE                                                                                                 |                             |
| eid               | Dsrc-EID                                                                                                       |                             |
| actionType        | ActionType = 1                                                                                                 |                             |
| accessCredentials | OCTET STRING OPTIONAL                                                                                          |                             |
| actionParameter   | SetStampedRq ::= SEQUENCE {<br>attributeList AttributeList,<br>nonce OCTET STRING,<br>keyRef INTEGER(0..255) } |                             |
| iid               | DsrcEID OPTIONAL                                                                                               |                             |

If access credentials are used, the algorithm for how to calculate these shall be described in the IXIT.

**Table A.16 — ACTION.rs (SET STAMPED)**

| Data Element      | Data Type             | Used/Not used, Restrictions |
|-------------------|-----------------------|-----------------------------|
| eid               | Dsrc-EID              |                             |
| iid               | DsrcEID OPTIONAL      |                             |
| responseParameter | OCTET STRING          |                             |
| ret               | ReturnStatus OPTIONAL |                             |

The algorithm for calculation of the authenticator in the responseParameter OCTET STRING shall be described in the IXIT.

#### A.4.2.3 GET SECURE

**Table A.17 — ACTION.req (GET SECURE)**

| Data Element      | Data Type             | Used/Not used, Restrictions |
|-------------------|-----------------------|-----------------------------|
| mode              | BOOLEAN = TRUE        |                             |
| eid               | Dsrc-EID              |                             |
| actionType        | ActionType = 2        |                             |
| accessCredentials | OCTET STRING OPTIONAL |                             |
| actionParameter   | OCTET STRING          |                             |
| iid               | DsrcEID OPTIONAL      |                             |

If access credentials are used, the algorithm for how to calculate these shall be described in the IXIT.

**Table A.18 — ACTION.rs (GET SECURE)**

| Data Element      | Data Type             | Used/Not used, Restrictions |
|-------------------|-----------------------|-----------------------------|
| eid               | Dsrc-EID              |                             |
| iid               | DsrcEID OPTIONAL      |                             |
| responseParameter | OCTET STRING          |                             |
| ret               | ReturnStatus OPTIONAL |                             |

The content in the responseParameter OCTET STRING shall be described in the IXIT.

#### A.4.2.4 SET SECURE

**Table A.19 — ACTION.req (SET SECURE)**

| Data Element      | Data Type             | Used/Not used, Restrictions |
|-------------------|-----------------------|-----------------------------|
| mode              | BOOLEAN               |                             |
| eid               | Dsrc-EID              |                             |
| actionType        | ActionType = 3        |                             |
| accessCredentials | OCTET STRING OPTIONAL |                             |
| actionParameter   | OCTET STRING          |                             |
| iid               | DsrcEID OPTIONAL      |                             |

If access credentials are used, the algorithm for how to calculate these shall be described in the IXIT.