INTERNATIONAL STANDARD

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Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to ISO 13141 —

Part 1: Test suite structure and test purposes

Perception du télépéage — Évaluation des équipments embarqués et en bord de route quant à la conformité avec ISO 13141 —

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

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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.

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems.*

This first edition of ISO 13140-1 cancels and replaces ISO/TS 13140-1:2011, which has been technically revised. This first edition incorporates the following main modifications compared to the Technical Specification:

— conversion from a Technical Specification to an International Standard;

— amendment of terms, in order to reflect harmonization of terms across electronic fee collection (EFC) standards;

— amendments to reflect changes in the underlying base standards, in particular, ISO 13141 and ISO 14906;

— editorial and formal corrections.

A list of all parts in the ISO 13140 series can be found on the ISO website.

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Introduction

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

The set of standards also supports short-range communication links in the context of autonomous electronic fee collection (EFC) on-board equipment (OBE) to enable localization augmentation process. The application interface is defined in ISO 13141.

Within the set of EFC standards, this document defines the process and tests for conformity evaluation of OBE and roadside equipment (RSE) that comply with the requirements in ISO 13141.

This document is intended to

— assess OBU and RSE capabilities,

— assess OBU and RSE behaviour,

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

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

— facilitate communications between parties.

This document is based on

— ISO/TS 13141,

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

— ISO 9646.

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

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Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to ISO 13141 —

Part 1:
Test suite structure and test purposes

1 Scope

This document specifies the test suite structure (TSS) and test purposes (TP) to evaluate the conformity of on-board units (OBU) and roadside equipment (RSE) to ISO 13141.

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

2 Normative references

The following 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 13141:2015, *Electronic fee collection — Localisation augmentation communication for autonomous systems*

ISO 14906:2011/Amd 1:2015, *Electronic fee collection — Application interface definition for dedicated short-range communication/Amendment 1*

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

EN 15876-1:2016, *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:

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

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

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3.1
access credentials
trusted attestation or secure module that establishes the claimed identity of an object or application property that ensures that the actions of an entity may be traced uniquely to that entity

Note 1 to entry: Access credentials carry information needed to fulfil access conditions in order to perform the operation on the addressed *element* (3.7) in the *OBE* (3.10). Access credentials can carry passwords, as well as cryptography-based information such as *authenticators* (3.4).

[SOURCE: EN 15509:2014, 3.1]

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

[SOURCE: ISO 17575-1:2016, 3.2]

3.3
authentication
security mechanism allowing verification of the provided identity

[SOURCE: EN 301 175]

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

[SOURCE: EN 15509:2014, 3.3]

3.5
cryptography
principles, means and methods for the transformation of data in order to hide its information content, prevent its undetected modification or prevent its unauthorized use

[SOURCE: EN 15509:2014, 3.6]

3.6
data group
class of closely related *attributes* (3.2)

[SOURCE: ISO 17575-1:2016, 3.10]

3.7
element
<DSRC> directory containing application information in the form of *attributes* (3.2)

[SOURCE: ISO 14906:2011, 3.11, modified]

3.8
implementation conformance statement
statement of capabilities and options that have been implemented defining to what extent the implementation is compliant with a given specification

[SOURCE: ISO/TS 14907-2:2016, 3.6, modified]

3.9
implementation extra information for testing
statement containing all of the information related to the implementation under test (IUT) and its corresponding system under test (SUT) which will enable the testing laboratory to run an appropriate test suite against that IUT

[SOURCE: ISO/TS 14907-2:2016, 3.8]

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3.10
on-board equipment
OBE
all required equipment on-board a vehicle for performing required EFC functions and communication services

3.11
on-board unit
OBU
single electronic unit on-board a vehicle for performing specific EFC functions and for communication with external systems

3.12
roadside equipment
RSE
equipment located along the road either fixed or mobile

[SOURCE: ISO/TS 19299:2015, 3.34]

3.13
tester
combination of equipment, humans and processes able to perform specified conformance tests

[SOURCE: EN 15876-1:2016, 3.12]

3.14
transaction
whole of the exchange of information between two physically separated communication facilities

[SOURCE: ISO 17575-1:2016, 3.21]

4 Abbreviated terms

AC_CR	Access Credentials
ADU	Application Data Unit
APDU	Application Protocol Data Unit (ISO 14906)
AP	Application Process
ASN.1	Abstract Syntax Notation One (ISO/IEC 8824-1)
ATS	Abstract Test Suite
BI	Behaviour Invalid (i.e. Invalid Behaviour Tests)
B-Kernel	Broadcast Kernel
BST	Beacon Service Table (ISO 14906)
BV	Behaviour Valid (i.e. valid behaviour Tests)
cf	Confirm
DLC	Data Link Control
DSRC	Dedicated Short-Range Communication (ISO 14906)
DUT	Device Under Test (ISO/TS 14907-2)

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