SLOVENSKI STANDARD
oSIST prEN ISO 13140:2025

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Elektronsko pobiranje pristojbin - Vrednotenje skladnosti opreme v vozilu in obcestni napravi s standardom ISO 13141 (ISO/DIS 13140:2024)

Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to ISO 13141 (ISO/DIS 13140:2024)

Elektronische Gebührenerhebung - Bewertung der Konformität fahrzeuginterner und straßenseitiger Ausrüstung nach ISO 13141 (ISO/DIS 13140:2024)

Perception de télépéage - Évaluation des équipements embarqués et en bord de route quant à la conformité avec ISO 13141 (ISO/DIS 13140:2024)

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

ICS: 03.220.20; 35.240.60

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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 second edition of ISO 13140 cancels and replaces ISO/TS 13140-1:2016, which has been technically revised. In addition, as a result of the withdrawal of ISO 13140-2, the title of this document is changed to ISO 13140 Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to ISO 13141.

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

— amendments to reflect changes to the underlying requirements standards, in particular ISO 13141 in which data specifications have been revised;

— terms and definitions have been updated and ISO/TS 17573-2 has been included as the primary source for harmonized terminology across electronic fee collection (EFC) standards;

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. For this purpose, autonomously operating OBE need real-time and precise information about the location it is present. Location information is provided by satellite-based systems, optionally supported by on-board sensors. Occasionally, location information may also be provided by fixed roadside infrastructure, by means of DSRC-based localization augmentation communication (LAC).

This document specifies the process and tests for evaluation of OBE and roadside equipment (RSE) for conformity to ISO 13141.

ISO 13141 specifies requirements for dedicated short-range communication (DSRC) between OBE and an interrogator for the purpose of localization augmentation. 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 communications between parties.

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

1 Scope

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

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

ISO 13141 specifies requirements for the localization augmentation communication (LAC) interface level, but not for the RSE or OBE internal functional behaviour. Consequently, tests regarding OBE and 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 code*

ISO 13141:2024, *Electronic fee collection — Localization augmentation communication for autonomous systems*

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

ISO 14906:2022, *Electronic fee collection — Application interface definition for dedicated short-range communication*

ISO 14907-2:2021, *Electronic fee collection — Test procedures for user and fixed equipment — Part 2: Conformance test for the on-board unit application interface*

ISO/TS 17573-2:2020, *Electronic fee collection — System architecture for vehicle related tolling — Part 2: Vocabulary*

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 15509:2023, *Electronic fee collection — Interoperability application profile for DSRC*

prEN 15876:2024, *Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to EN 15509*

ETSI/TS 102 486-2-2:2008, *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 and definitions provided in ISO/TS 17573-2:2020 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 https://www.electropedia.org/

3.1
Element
DSRC directory containing application information in the form of *attributes*

[SOURCE: 14906:2022, 3.8]

3.2
protocol implementation conformance statement
ICS for an implementation or system claimed to conform to a given protocol specification

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

4 Abbreviated terms

AC_CR	access credentials
ADU	application data unit
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)
DLC	data link control
DSRC	dedicated short-range communication
DUT	device under test
EID	Element identifier
EFC	electronic fee collection
ICS	implementation conformance statement
LLC	logical link control
MAC	medium access control
PCTR	protocol conformance test report
PDU	protocol data unit

PICS protocol implementation conformance statement

PIXIT protocol implementation extra information for testing

SCTR system conformance test report

T-APDU transfer-application protocol data unit

TP test purpose

TP-ID test purpose identifier

TSS test suite structure

VST vehicle service table

5 Conformance

The conformance tests shall be performed as specified in Annex A and Annex B for OBE and RSE respectively.

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

The conformity assessment body of the OBE shall complete the protocol conformance test report (PCTR) for the OBE as specified in Annex C.

The conformity assessment body of the RSE shall complete the PCTR for the RSE as specified in Annex D.

NOTE The PCTR forms a basis for the manufacturer's declaration of conformity.

6 Test suite structure (TSS)

6.1 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	Valid behaviour (BV)
		Invalid behaviour (BI)
	RSE	B
		BI
Data link control (DLC) Medium access control (MAC) sublayer	OBE	BV
		BI
	RSE	BV
		BI
DLC Logical link control (LLC) sub-layer	OBE	BV
		BI
	RSE	BV
		BI

Table 1 *(continued)*

Group	Type of DUT	Behaviour
Application layer	OBE	BV
		BI
	RSE	BV
		BI

Physical layer tests are to be performed in a radio wave laboratory.

6.2 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 LAC application are exactly the same as the conformance test cases for the related base standards. Other test cases are derived from the base standards conformance test cases by applying some restrictions or choices in elements such as the parameters values, according to what is stated in the profile standard. Specific conformance test cases for the LAC application are identified for statements contained in the LAC application, which have no equivalence in the base standards. These latter cases cover, for example, the application layer data test purposes. This document considers existing test purposes for conformance to the base standards by referencing them, so that:

a) for test purposes that are identical to those specified in the base standards conformance test cases (see e.g. ETSI/TS 102 486-2-2 or EN 15876), a direct reference is reported.

   NOTE For the reader's convenience, the title or a verbal description of the referenced test purpose is provided, together with the reference.

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

c) for test purposes that are specific to the standard profile, a complete description is provided.

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

6.3 Test purposes (TP)

6.3.1 TP definition conventions

The TPs are specified following the rules shown in Table 2.