

# SVENSK STANDARD

## SS-EN ISO 13140-2:2016



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### **Vägtrafikinformatik – Elektronisk vägavgiftsupptagning – Utvärdering av överensstämmelse gentemot EN ISO 13141 för fordons- och vägsidesutrustning – Del 2: Abstrakt testsvit (ISO 13140-2:2016)**

### **Electronic fee collection – Evaluation of on-board and roadside equipment for conformity to EN ISO 13141 – Part 2: Abstract test suite (ISO 13140-2:2016)**

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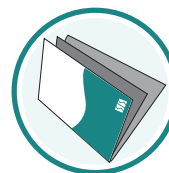
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The European Standard EN ISO 13140-2:2016 has the status of a Swedish Standard. This document contains the official English version of EN ISO 13140-2:2016.

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EUROPEAN STANDARD

**EN ISO 13140-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2016

ICS 03.220.20; 35.240.60

Supersedes CEN ISO/TS 13140-2:2012

English Version

**Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to EN ISO 13141 - Part 2: Abstract test suite (ISO 13140-2:2016)**

Perception du télépéage - Évaluation des équipements embarqués et en bord de route quant à la conformité avec l'ISO 13141 - Partie 2: Suite d'essais abstraite (ISO 13140-2:2016)

Elektronische Gebührenerhebung - Bewertung der Konformität von fahrzeuginternen und straßenseitigen Ausrüstungen nach EN ISO 13141 - Teil 2: Zusammengefasstes Prüfprogramm (ISO 13140-2:2016)

This European Standard was approved by CEN on 6 December 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

**SS-EN ISO 13140-2:2016 (E)**

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## **European foreword**

This document (EN ISO 13140-2:2016) has been prepared by Technical Committee ISO/TC 204 “Intelligent transport systems” in collaboration with Technical Committee CEN/TC 278 “Intelligent transport systems” the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2017, and conflicting national standards shall be withdrawn at the latest by June 2017.

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

This document supersedes CEN ISO/TS 13140-2:2012.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### **Endorsement notice**

The text of ISO 13140-2:2016 has been approved by CEN as EN ISO 13140-2:2016 without any modification.

## SS-EN ISO 13140-2:2016 (E)

### 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 spot checks for the enforcement process. The application interface is defined in ISO 13141:2015.

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 13141:2015.

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 (for example, between equipment manufacturers and test houses).

This document is based on

- ISO 13141:2015,
- 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.



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

## Part 2: Abstract test suite

### 1 Scope

This document specifies the abstract test suite (ATS) to evaluate the conformity of on-board equipment (OBE) and roadside equipment (RSE) to ISO 13141:2015 in accordance with the test suite structure and test purposes defined in ISO 13140-1:2016.

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

**NOTE** The OBE and RSE are subject to additional testing in order to ascertain that they fulfil the essential radio requirements as set out in European Directives, a pre-requisite for CE marking and placing on the European market. They are also likely to be subject to additional testing of physical, environmental endurance, quality assurance and control at manufacturing, charge point integration, as part of factory, site and system acceptance testing. The definition of these tests is 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/IEC 9646-3:1998, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 3: The Tree and Tabular Combined Notation (TTCN)*

ETSI/TS 102 486-2-3 V1.2.1 (2008-10), Electromagnetic compatibility and Radio spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment; Part 2: DSRC application layer; Sub-Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma

### 3 Terms and definitions

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

#### 3.1

##### **base standard**

approved international standard, technical specification or ITU-T Recommendation

Note 1 to entry: This includes but is not limited to approved standard deliverables from ISO, ITU, CEN, CENELEC, ETSI and IEEE.

[SOURCE: ISO/IEC/TR 10000-1:1998, 3.1.1, modified]

## SS-EN ISO 13140-2:2016 (E)

### 3.2

#### **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]

### 3.3

#### **implementation conformance statement proforma**

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

[SOURCE: ISO/IEC 9646-1:1994, 3.3.40]

### 3.4

#### **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/IEC 19015:2000, 3.20]

### 3.5

#### **implementation extra information for testing proforma**

document, in the form of a questionnaire, which when completed for an implementation under test (IUT) becomes an implementation extra information for testing (IXIT)

[SOURCE: ISO/IEC 9646-1:1994, 3.3.42, modified]

### 3.6

#### **on-board equipment**

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

### 3.7

#### **on-board unit**

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

### 3.8

#### **roadside equipment**

equipment located along the road, either fixed or mobile

### 3.9

#### **tester**

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

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

## 4 Abbreviated terms

AP	Application Process (ISO 14906)
ASN.1	Abstract Syntax Notation One (ISO/IEC 8824-1)
ATS	Abstract Test Suite
BI	Behaviour Invalid (i.e. Invalid Behaviour tests)
BV	Behaviour Valid (i.e. Valid Behaviour tests)

Cf	Confirm (ISO 14906)
CM	Co-ordination message
DSRC	Dedicated Short-Range communication (ISO 14906)
DUT	Device Under Test (ISO/TS 14907-2)
EFC	Electronic Fee Collection (ISO 17573)
ICS	Implementation Conformance Statement (EN 15509)
IXIT	Implementation eXtra Information for Testing (ISO/TS 14907-2)
IUT	Implementation Under Test (ISO/TS 14907-2)
MAC	Medium Access Control (EN 12795)
OBE	On-board equipment
OBU	On-board unit
PIXIT	Protocol Implementation extra Information for Testing
RSE	Roadside equipment
SAP	Service Access Point
SCS	Semiconductor Characterization System
TC	Test Case
TSS	Test Suite Structure (EN 15876-1)

## **5 Abstract Test Method (ATM)**

### **5.1 General**

This clause describes the abstract test method (ATM) used to test the layers at the OBE side and at the RSE side.

### **5.2 Test architecture**

Clause 4 in ETSI/TS 102 486-2-3 describes the test architecture for application layer testing. As test purposes (TPs) from ETSI/TS 102 486-2-3 are referenced to in ISO 13140-1, the test architectures presented there are also relevant for the corresponding test cases (TCs). For all specific TPs introduced in ISO 13140-1, the test architecture defined in ETSI/TS 102 486-2-3 is also relevant.

### **5.3 Protocol Implementation Extra Information for Testing (PIXIT)**

The supplier of the OBE and RSE, respectively, is responsible for providing a Protocol Implementation Extra Information for Testing (PIXIT).

The supplier of the OBE and RSE shall complete a PIXIT; see [Annex C](#) and [Annex D](#) for examples of proformas.