TECHNICAL SPECIFICATION

ISO/TS 13143-2

First edition
2011-05-15

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

Part 2: Abstract test suite

Perception du télépéage — Évaluation de conformité de l'équipement embarqué et de l'équipement au sol à l'ISO/TS 12813 — Partie 2: Suite d'essais abstraite

Reference number
ISO/TS 13143-2:2011(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn.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 13143-2 was prepared by European Committee for Standardization (CEN) CEN/TC 278, *Road transport and traffic telematics* in collaboration with ISO Technical Committee ISO/TC 204, *Intelligent transport systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO/TS 13143-2 consists of the following parts, under the general title *Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to ISO/TS 12813*:

— *Part 1: Test suite structure and test purposes*

— *Part 2: Abstract test suite*

Introduction

ISO/TS 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/TS 12813:2009.

Within the set of EFC standards, this part of ISO/TS 13143 defines the process and tests for conformity evaluation of OBE and roadside equipment (RSE) that comply with the requirements in ISO/TS 12813:2009.

This part of ISO/TS 13143 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 communication between parties (for example between equipment manufacturers and test houses).

This part of ISO/TS 13143 is based on:

— ISO/TS 12813:2009,

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

— ISO/IEC 9646.

This part of ISO/TS 13143 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/TS 12813 —

Part 2:
Abstract test suite

1 Scope

This part of ISO/TS 13143 specifies the abstract test suite (ATS) to evaluate the conformity of on-board equipment (OBE) and roadside equipment (RSE) to ISO/TS 12813.

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

In order to ascertain that OBE and RSE fulfil essential radio requirements, they are also likely to be subject to additional factory, site and system acceptance testing (e.g. of physical and environmental endurance, quality assurance and control at manufacturing, and charge point integration), which is outside the scope of this part of ISO/TS 13143.

NOTE For example, within the European market, the essential radio requirements are set out in European Directives, compliance with which is a prerequisite for CE marking and placing on the European market.

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 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 V1.1.1 (2006-08), *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
access credentials
data that is transferred to on-board equipment (OBE), in order to establish the claimed identity of a roadside equipment (RSE) application process entity

[ISO 14906:2004]

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

3.2
attribute
application information formed by one or by a sequence of data elements, used for implementation of a transaction

NOTE Adapted from ISO 14906:2004, 3.3.

3.3
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 14906:2004]

3.4
channel
information transfer path

[ISO 14906:2004]

3.5
component
logical and physical entity composing an on-board equipment, supporting a specific functionality

[ISO 14906:2004]

3.6
contract
expression of an agreement between two or more parties concerning the use of the road infrastructure

[ISO 14906:2004]

3.7
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 unauthorised use

[ISO 14906:2004]

3.8
data group
collection of closely related EFC data attributes which together describe a distinct part of an EFC transaction

[ISO 14906:2004]

3.9
data integrity
property that data has not been altered or destroyed in an unauthorised manner

[ISO 14906:2004]

3.10
element
⟨DSRC⟩ directory containing application information in form of attributes

[ISO 14906:2004]

3.11
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

[ISO/TS 14907-2:2006]

3.12
implementation conformance statement proforma
document, in the form of a questionnaire, which when completed for an implementation or system becomes an implementation conformance statement

[ISO/TS 14907-2:2006]

3.13
implementation extra information for testing
IXIT
statement made by the supplier or an implementer of a DUT 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, which will enable the test laboratory to run an appropriate test suite against the DUT

NOTE Adapted from ISO/TS 14907-2:2006.

3.14
implementation extra information for testing proforma
document, in the form of a questionnaire, which when completed for a DUT becomes an implementation extra information for testing

NOTE Adapted from ISO/TS 14907-2:2006.

3.15
on-board equipment
OBE
equipment located within the vehicle and supporting the information exchange with the roadside equipment

NOTE 1 It is composed of the on-board unit and other sub-units whose presence are considered optional for the execution of a transaction.

NOTE 2 Adapted from ISO 14906:2004, 3.12. The additional information in the definition has been moved into Note 1.

3.16
on-board unit
OBU
minimum component of an on-board equipment, whose functionality always includes at least the support of the DSRC interface

[ISO 14906:2004]

3.17
roadside equipment
RSE
equipment located at a fixed position along the road transport network, for the purpose of communication and data exchanges with the on-board equipment of passing vehicles

[ISO 14906:2004]

3.18
service (EFC)
road transport related facility provided by a service provider

NOTE 1 Normally, this is a type of infrastructure, the use of which is offered to the user and for which the user may be requested to pay.

NOTE 2 Adapted from ISO 14906:2004, 3.15. The additional information in the definition has been moved into Note 1.

3.19
service primitive (communication)
elementary communication service provided by the application layer protocol to the application processes

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

[ISO 14906:2004]

3.20
service provider (EFC)
operator that accepts the user's payment means and in return provides a road-use service to the user

[ISO 14906:2004]

3.21
session
exchange of information and interaction occurring at a specific EFC station between the roadside equipment and the user/vehicle

[ISO 14906:2004]

3.22
transaction
whole of the exchange of information between the roadside equipment and the on-board equipment necessary for the completion of an EFC operation over the DSRC

[ISO 14906:2004]

3.23
transaction model
functional model describing the general structure of electronic payment fee collection transactions

[ISO 14906:2004]

3.24
tester
combination of equipment and processes which is able to perform conformance tests according to ISO/TS 13143-2

3.25
user
entity that uses transport services provided by the service provider according to the terms of a contract

4 Abbreviated terms

AC_CR	Access Credentials
ADU	Application Data Unit
AP	Application Process
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation One (ISO/IEC 8824-1)
ASP	Abstract Service Primitive
ATM	Abstract Test Method
ATS	Abstract Test Suite
BI	Behaviour Invalid (i.e. Invalid Behaviour tests)
B-Kernel	Broadcast Kernel
BST	Beacon Service Table
BV	Behaviour Valid (i.e. Valid Behaviour tests)
cf	Confirm
CM	Communication Module
DLC	Data Link Control
DSRC	Dedicated Short Range Communication
DUT	Device Under Test (ISO/TS 14907-2)
EFC	Electronic Fee Collection
EID	Element Identifier
EVENT-RT	EVENT-REPORT
ICS	Implementation Conformance Statement
IUT	Implementation Under Test
IXIT	Implementation eXtra Information for Testing
LLC	Logical Link Control
MAC	Medium Access Control
OBU	On-Board Unit
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
RSE	Roadside Equipment
SAP	Service Access Point
SCS	System Conformance Statement
TC	Test Case