



SLOVENSKI STANDARD
SIST-TS CEN ISO/TS 12813:2010
01-januar-2010

Elektronsko pobiranje pristojbin - Komunikacija za potrditev skladnosti avtonomnih sistemov (ISO/TS 12813:2009)

Electronic fee collection - Compliance check communication for autonomoussystemss (ISO/TS 12813:2009)

iTeh STANDARD PREVIEW

Perception dutélépéage - Communication de contrôle de conformité pour systèmesautonomes (ISO/TS 12813:2009)

[SIST-TS CEN ISO/TS 12813:2010](https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d07ba310e/sist-ts-cen-iso-ts-12813-2010)

Ta slovenski standard je istoveten z: **CEN ISO/TS 12813:2009**

ICS:

03.220.20	Cestni transport	Road transport
35.240.60	Uporabniške rešitve IT v transportu in trgovini	IT applications in transport and trade

SIST-TS CEN ISO/TS 12813:2010 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST-TS CEN ISO/TS 12813:2010](#)

<https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010>

TECHNICAL SPECIFICATION
SPÉCIFICATION TECHNIQUE
TECHNISCHE SPEZIFIKATION

CEN ISO/TS 12813

November 2009

ICS 35.240.60; 03.220.20

English Version

**Electronic fee collection - Compliance check communication for
autonomous systems (ISO/TS 12813:2009)**

Perception dutélépéage - Communication de contrôle de
conformité pour systèmes autonomes (ISO/TS
12813:2009)

This Technical Specification (CEN/TS) was approved by CEN on 15 September 2009 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.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, 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.

[SIST-TS CEN ISO/TS 12813:2010](https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010)

<https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010>



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....3

**iTeh STANDARD PREVIEW
(standards.iteh.ai)**

[SIST-TS CEN ISO/TS 12813:2010](https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010)

<https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010>

Foreword

This document (CEN ISO/TS 12813:2009) 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 "Intelligent transport systems".

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.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, 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 the United Kingdom.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST-TS CEN ISO/TS 12813:2010](https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010)

<https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST-TS CEN ISO/TS 12813:2010](#)

<https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010>

TECHNICAL SPECIFICATION

ISO/TS 12813

First edition
2009-11-15

Electronic fee collection — Compliance check communication for autonomous systems

*Perception du télépéage — Communication de contrôle de conformité
pour systèmes autonomes*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST-TS CEN ISO/TS 12813:2010](https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010)

<https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010>



Reference number
ISO/TS 12813:2009(E)

© ISO 2009

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST-TS CEN ISO/TS 12813:2010](https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010)

<https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010>

**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2009

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

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	iv
Introduction.....	v
1 Scope	1
2 Normative references	2
3 Terms and definitions	3
4 Abbreviated terms	4
5 Application interface architecture	5
5.1 General	5
5.2 Services provided.....	5
5.3 Attributes.....	6
5.4 Toll context	6
5.5 Use of lower layers	6
6 Functions.....	7
6.1 Functions in detail	7
6.2 Security.....	9
7 Attributes.....	10
7.1 General	10
7.2 Data regarding identification.....	11
7.3 Data regarding status.....	11
7.4 Data regarding vehicle.....	13
8 Transaction model.....	13
8.1 General	13
8.2 Initialisation phase	13
8.3 Transaction phase.....	14
Annex A (normative) CCC data type specifications	15
Annex B (normative) PICS proforma for the attributes.....	18
Annex C (informative) Using the UNI DSRC communication stack for CCC applications	27
Annex D (informative) Using the IR DSRC communication stack (CALM IR) for CCC applications	34
Annex E (informative) Using the ARIB DSRC communication stack for CCC applications.....	35
Annex F (informative) Example CCC transaction	37
Annex G (informative) Security considerations.....	39
Bibliography.....	44

ISO/TS 12813:2009(E)

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 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.

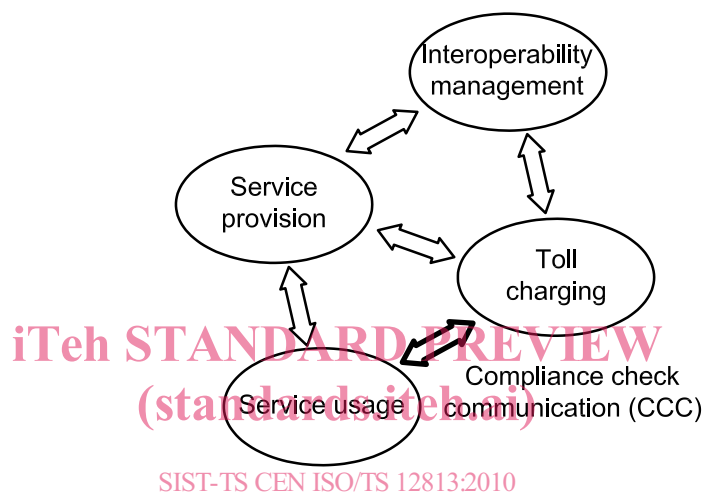
Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 12813 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 278, *Road transport and traffic telematics*, in collaboration with ISO Technical Committee TC 204, *Intelligent transport systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Introduction

On-board equipment (OBE) working with satellite positioning to collect data required for charging for the use of roads operates in an autonomous way, i.e. without relying on dedicated road-side infrastructure. The OBE will record the amount of road usage in all toll charging systems it passes through.

This Technical Specification defines requirements for DSRC (dedicated short-range communication) between OBE and an interrogator for the purpose of checking compliance of road use with a local toll regime. It assumes an EFC (electronic fee collection) services architecture according to ISO 17573. See Figure 1.



SIST-TS CEN ISO/TS 12813:2010

<https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658->

Figure 1 — Compliance check communication in EFC architecture as per ISO 17573

Toll chargers have the need to check whether the road is used in compliance with the rules in the local toll regime. One way of checking compliance is to observe a passing vehicle and to interrogate the OBE. This interrogation happens under control of an entity responsible for toll charging (see Figure 1), accomplished via short-range communication between an interrogator at road-side (or in another vehicle) and the OBE. In an interoperable environment it is essential that this interrogation communication be standardized such that every operator of compliance checking equipment can check all passing OBE. For that purpose, this Technical Specification defines attributes required on all OBE for reading by an interrogator.

In order to protect users against infringement of their privacy, the entity responsible for interrogation will need to avoid keeping a record of the checked transactions where no indication of non-compliance is detected. Local privacy legislation will apply.

This Technical Specification has been prepared considering the prerequisites listed below in a) to e).

- Collected evidence must be court proof. Data must be indisputable and secured such that the operator of the compliance checking interrogator can prove the integrity and authenticity of the data in case of dispute.
- The data required for compliance checking must be read only, since the operator of the interrogator must not interfere with the working of the OBE.
- All attributes must be present in the OBE such that an operator of an interrogator can read the same data from all OBE independent of type and make. In case an attribute does not make sense in a certain OBE implementation, a value assignment for "not applicable" or "not defined" is provided in each case.

ISO/TS 12813:2009(E)

- d) The attributes must be abstract from the individual toll regime and of general importance for all toll system types (motorway tolling, area tolling, tolls for ferries, bridges, tunnels, cordon pricing, etc.).
- e) The attributes must apply to all OBE architectures, and especially to both thin (edge-light) and fat (edge heavy) client architectures. The interrogator must be able to receive the same information irrespective of OBE implementation decisions.

It is assumed that the prime objective of the operator of the compliance checking interrogator is to check whether the user has fulfilled his obligations, especially

- whether the OBE is mounted in the correct vehicle;
- whether the classification data transmitted by the OBE are correct; and
- whether the OBE is in working condition, both in a technical and a contractual sense.

Regarding the last point of the above list, on the operational status of OBE, the following model is assumed.

As long as the OBE signals to the user correct operational status (“green”), the service provider takes full responsibility for the correct working of the OBE and for the payment by the user; hence, as long as the OBE signals “green” and the user fulfils his other obligations (such as entering correct classification data and not tampering with the OBE), the user can expect the OBE to serve as a valid payment means. As soon as the OBE signals an invalid operational status (“red”) — either set by the central system of the service provider (e.g. because the user account is negative) or by internal mechanisms of the OBE itself (e.g. because of a detected defect or an outdated data set) — the user knows that the OBE is no longer a valid payment means. He then has to use alternative means of toll payment until the problem is remedied and the OBE is “green” again.

Ultimately, the policy of when to signal “green” and when “red” is defined by the service provider. As long as the user is signalled “green”, the service provider has an unconditional payment obligation towards the toll charger for all tolls accrued by the user.

In the case where the OBE status turns “red”, the user has to take action and pay by some alternative means as quickly as possible. Until he does, the user is in a potentially non-compliant situation. In order to allow a judgment to be made as to whether or not a user has taken the appropriate action within an acceptable period of time, information is provided by this Technical Specification not only on the “green/red” operational status but also on the length of time that the OBE has been in its current status.

Different toll contexts can overlap geographically. A user could be liable in several toll contexts at once, e.g. for a nation-wide distance-dependent road tax and a local city access pricing scheme — a fact of which the user might not in all cases be aware. This Technical Specification builds on the concept that regarding compliance, there is no notion of toll context (see especially 5.4). It is within the responsibility of the service provider to resolve issues with overlapping toll contexts and to distil all information into a binary “red/green” message to the user.

A secondary objective of the operator of the compliance checking interrogator might be to collect data on the performance of the OBE, e.g. in order to check for the correct technical functioning. Since different OBE can work on quite different principles, the possibilities for doing this in a standardised way are quite limited. This Technical Specification contains some provisions for this task (e.g. the attributes CommunicationStatus, GnssStatus, DistanceRecordingStatus), but otherwise assumes that toll chargers monitor correct recording by comparing observed traffic (e.g. with cameras) with usage data received from service providers.

This Technical Specification has been prepared with the intention to be “minimalist” in the sense that it covers that which is required by operational systems and systems planned in the foreseeable future. Future editions could include additional provisions were, for example, a trusted device inside the OBE to become standard.

1) Here, “red” and “green” are used in the abstract, symbolic sense, and do not imply any physical implementation. The design of the user interface of the OBE is implementation-dependent, and several methods for signalling “red” or “green” are conceivable.

Electronic fee collection — Compliance check communication for autonomous systems

1 Scope

This Technical Specification defines requirements for short-range communication for the purposes of compliance checking in autonomous electronic fee-collecting (EFC) systems. Compliance checking communication (CCC) takes place between a road vehicle's on-board equipment (OBE) and an outside interrogator (road-side mounted equipment, mobile device or hand-held unit), and serves to establish whether the data that are delivered by the OBE correctly reflect the road usage of the corresponding vehicle according to the rules of the pertinent toll regime.

The operator of the compliance checking interrogator is assumed to be part of the toll charging role as defined in ISO 17573. The CCC permits identification of the OBE, vehicle and contract, and verification of whether the driver has fulfilled his obligations and the checking status and performance of the OBE. The CCC reads, but does not write, OBE data.

This Technical Specification is applicable to OBE in an autonomous mode of operation; it is not applicable to compliance checking in dedicated short-range communication (DSRC)-based charging systems. It defines data syntax and semantics, but does not define a communication sequence. All the attributes defined herein are required in any OBE claimed to be compliant with this Technical Specification, even if some values are set to "not defined" in cases where a certain functionality is not present in an OBE. The interrogator is free to choose which attributes are read, as well as the sequence in which they are read. In order to achieve compatibility with existing systems, the communication makes use of the attributes defined in ISO 14906 wherever possible.

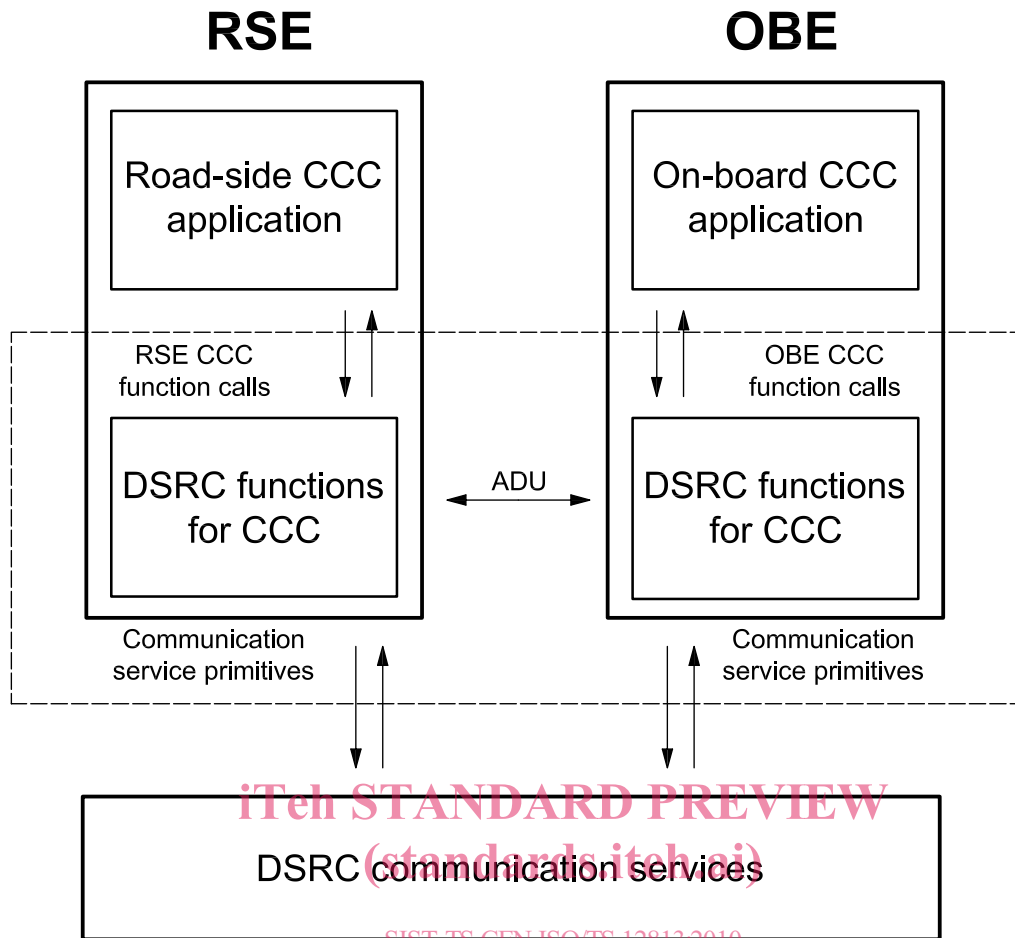
The CCC is suitable for a range of short-range communication media. Specific definitions are given for the CEN-DSRC specified in EN 15509, as well as for the use of ISO CALM IR, UNI DSRC and ARIB DSRC as alternatives to the CEN-DSRC. The attributes and functions defined are for compliance checking by means of the DSRC communication services provided by DSRC layer 7, with the CCC attributes and functions made available to the CCC applications at the road-side equipment (RSE) and OBE. The attributes and functions are defined on the level of ADU (application data units).

The definition of the CCC includes

- the application interface between OBE and RSE,
- use of the generic DSRC application layer as specified in ISO 15628 and EN 12834,
- use of the CEN-DSRC stack as specified in EN 15509, or other equivalent DSRC stacks as described in Annexes C, D and E, and
- security services for mutual authentication of the communication partners and for signing of data (see Annex G).

CCC data type specifications are given in Annex A, protocol implementation conformance statement (PICS) proforma in Annex B. An example CCC transaction is presented in Annex F.

Test specifications are not within the scope of this Technical Specification. See Figure 2.



<https://standards.itech.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-64d07ba9fcc5/sist-ts-cen-iso-ts-12813-2010>

The scope of ISO/TS 12813 is the area within the dashed line.

Figure 2 — CCC application interface

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 — Part 1*

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

ISO 15628:2007, *Road transport and traffic telematics — Dedicated short range communication (DSRC) — DSRC application layer*

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

EN 12834:2003, *Road transport and traffic telematics — Dedicated Short Range Communication (DSRC) — DSRC application layer*

EN 15509:2007, *Road transport and traffic telematics — Electronic fee collection — Interoperability application profile for DSRC*

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]

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

[ISO 14906]

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]

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/8d028053-7b02-4f63-8658-84d007ba316e/sist-ts-cen-iso-ts-12813-2010>

3.4

contract

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

[ISO 14906]

3.5

data integrity

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

[ISO 14906]

3.6

fixed roadside equipment

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

[ISO 14906]

3.7

mobile roadside equipment

(compliance checking communication) roadside equipment located on-board special vehicles using or standing near the road transport network or hand-held equipment, for the purpose of communication and data exchange with the on-board equipment of passing vehicles