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Release 1

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Contents

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS).

Modal verbs terminology

In the present document "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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1 Scope

The present document identifies the documents that form Release 1 of Cooperative ITS (C-ITS).

2 References

2.1 Normative references

Normative references are not applicable in the present document.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] European Commission (M/453): "Standardisation mandate addressed to CEN, CENELEC and ETSI in the field of Information and Communication Technologies to support the interoperability of Co-operative systems for Intelligent Transport in the European Community of 06 October 2009".

3 Definition of terms, symbols and abbreviations

3.1 Terms

Void.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

C-ITS	Cooperative ITS
DCC	Decentralized Congestion Control
DSRC	Dedicated Short Range Communication
EFC	Electronic Fee Collection
EV	Electric Vehicle
ITS	Intelligent Transport Systems
OSI	Open Systems Interconnection
RTTT	Road Transport and Traffic Telematics
V2I	Vehicle-to-Infrastructure
V2V	Vehicle-to-Vehicle

4 Introduction

For the development of standards which address Cooperative Intelligent Transport Systems (C-ITS) a release oriented process has been adopted.

The present document lists standards, specifications and other deliverables which have been developed to form a consistent set of standards as the basis for Release 1 including standards for interoperability developed in accordance with the work plan of the European Commission Standardisation Mandate M/453 [i.1].

Since Mandate M/453 [i.1] expects such a consistent set of standards the present document aims at facilitating the identification of these standards, hence providing guidance to implementation.

The deliverables forming Release 1 are synchronized and harmonized with similar documents prepared by other Standards Developing Organizations such as ISO/CEN, IEEE and SAE. The present document also serves as basis for defining further standardization activities which will lead to forming the Release 2 of standards related to Cooperative ITS.

5 Content Release 1

5.0 General

The deliverables forming Release 1 are based on a list of features required for deployment of Cooperative ITS. The following standards developed for interoperability in particular related to Mandate M/453 [i.1] address this deployment.

5.1 General standards

Standards developed for defining base requirements and procedures.

Table 1: General standards

Standard title	Standard number
Intelligent Transport Systems (ITS); Communications Architecture	ETSI EN 302 665 V1.1.1
Intelligent Transport Systems (ITS); Security; Security Services and Architecture	ETSI TS 102 731 V1.1.1
Intelligent Transport System (ITS); Users and applications requirements; Part 1: Facility layer structure, functional requirements and specifications	ETSI TS 102 894-1 V1.1.1
Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionary	ETSI TS 102 894-2 V1.3.1
Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 3: Network architecture	ETSI TS 102 636-3 V1.1.1
Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 3: Network Architecture	ETSI EN 302 636-3 V1.2.1
Intelligent Transport Systems (ITS); Testing; Framework for conformance and interoperability testing	ETSI EG 202 798 V1.1.1
Intelligent Transport Systems (ITS); Framework for Public Mobile Networks in Cooperative ITS (C-ITS)	ETSI TR 102 962 V1.1.1

5.2 Application requirements

Standards developed for Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) message sets and applications covering both safety and traffic efficiency applications as well as Value Added Services and other comfort applications.

The application and facility layer standards are based on the following general ITS features:

- Vehicle safety:
  - driver assistance information;
  - driver assistance warning;
  - electric vehicles.

Table 2: Standards for application requirements

Standard title	Standard number
Intelligent Transport Systems (ITS); V2X Application; Part 1: Road Hazard Signalling (RHS) application requirements specification	ETSI TS 101 539-1 V1.1.1
Intelligent Transport System (ITS); V2X Application; Part 2: Intersection Collision Risk Warning (ICRW) application requirements specification	ETSI TS 101 539-2 V1.1.1
Intelligent Transport Systems (ITS); V2X Application; Part 3: Longitudinal Collision Risk Warning (LCRW) application requirements specification	ETSI TS 101 539-3 V1.1.1
Intelligent Transport Systems (ITS); Infrastructure to Vehicle Communication; Electric Vehicle Charging Spot Notification Specification	ETSI TS 101 556-1 V1.1.1
Intelligent Transport Systems (ITS); Infrastructure to Vehicle Communication; Part 2: Communication system specification to support application requirements for Tyre Information System (TIS) and Tyre Pressure Gauge (TPG) interoperability	ETSI TS 101 556-2 V1.1.1
Intelligent Transport Systems (ITS); Infrastructure to Vehicle Communications; Part 3: Communications system for the planning and reservation of EV energy supply using wireless networks	ETSI TS 101 556-3 V1.1.1
Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Definitions	ETSI TR 102 638 V1.1.1

5.3 Facilities

Facility layer standards include general message set standards and application supporting standards primarily for V2V and V2I communications.

Table 3: Base standards for facility layer functionalities

Standard title	Standard number
Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service	ETSI TS 102 637-2 V1.2.1
Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service	ETSI EN 302 637-2 V1.4.1

Standard title	Standard number
Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 3: Specifications of Decentralized Environmental Notification Basic Service	ETSI TS 102 637-3 V1.1.1
Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 3: Specifications of Decentralized Environmental Notification Basic Service	ETSI EN 302 637-3 V1.3.1
Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Local Dynamic Map (LDM)	ETSI EN 302 895 V1.1.1

Table 4: Testing standards for facility layer functionalities

Testing Standard title	Standard number
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Cooperative Awareness Basic Service (CA); Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) pro forma	ETSI TS 102 868-1 V1.4.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Cooperative Awareness Basic Service (CA); Part 2: Test Suite Structure and Test Purposes (TSS & TP)	ETSI TS 102 868-2 V1.4.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Cooperative Awareness Basic Service (CA); Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)	ETSI TS 102 868-3 V1.4.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Decentralized Environmental Notification Basic Service (DEN); Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) pro forma	ETSI TS 102 869-1 V1.5.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Decentralized Environmental Notification Basic Service (DEN); Part 2: Test Suite Structure and Test Purposes (TSS & TP)	ETSI TS 102 869-2 V1.5.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Decentralized Environmental Notification Basic Service (DEN); Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)	ETSI TS 102 869-3 V1.5.1
Intelligent Transport Systems (ITS); Testing; Part 1: Conformance test specification for Co-operative Awareness Messages (CAM); CAM validation report	ETSI TR 103 061-1 V1.2.1
Intelligent Transport Systems (ITS); Testing; Part 2: Conformance test specification for Decentralized Environmental Notification basic Service Message (DENM); DENM validation report	ETSI TR 103 061-2 V1.2.1

5.4 Network and Transport

Standards for the network and transport layer related to protocols such as:

- basic transport protocols;
- geoNetworking;
- IPv6.

Table 5: Base standards for the network and transport layer

Standard title	Standard number
Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 1: Requirements	ETSI TS 102 636-1 V1.1.1
Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 1: Requirements	ETSI EN 302 636-1 V1.2.1
Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 2: Scenarios	ETSI TS 102 636-2 V1.1.1
Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 2: Scenarios	ETSI EN 302 636-2 V1.2.1
Intelligent Transport System (ITS); Vehicular communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 1: Media-Independent Functionality	ETSI TS 102 636-4-1 V1.1.1
Intelligent Transport System (ITS); Vehicular communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 1: Media-Independent Functionality	ETSI EN 302 636-4-1 V1.4.1
Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 2: Media dependent functionalities for ITS-G5A	ETSI TS 102 636-4-2 V1.1.1
Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 5: Transport Protocols; Sub-part 1: Basic Transport Protocol	ETSI TS 102 636-5-1 V1.1.1
Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 5: Transport Protocols; Sub-part 1: Basic Transport Protocol	ETSI EN 302 636-5-1 V2.2.1
Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 6: Internet Integration; Sub-part 1: Transmission of IPv6 Packets over GeoNetworking Protocols	ETSI TS 102 636-6-1 V1.1.1
Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 6: Internet Integration; Sub-part 1: Transmission of IPv6 Packets over GeoNetworking Protocols	ETSI EN 302 636-6-1 V1.2.1

Table 6: Testing standards for the network and transport layer

Testing Standard title	Standard number
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for GeoNetworking Basic Transport Protocol (BTP); Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma	ETSI TS 102 870-1 V1.1.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for GeoNetworking Basic Transport Protocol (BTP); Part 2: Test Suite Structure and Test Purposes (TSS&TP)	ETSI TS 102 870-2 V1.1.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Geonetworking Basic Transport Protocol (BTP); Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)	ETSI TS 102 870-3 V1.1.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for GeoNetworking ITS-G5; Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) pro forma	ETSI TS 102 871-1 V1.4.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for GeoNetworking ITS-G5; Part 2: Test Suite Structure and Test Purposes (TSS & TP)	ETSI TS 102 871-2 V1.4.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for GeoNetworking ITS-G5; Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)	ETSI TS 102 871-3 V1.4.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Transmission of IP packets over GeoNetworking; Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma	ETSI TS 102 859-1 V1.2.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Transmission of IP packets over GeoNetworking; Part 2: Test Suite Structure and Test Purposes (TSS & TP)	ETSI TS 102 859-2 V1.2.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Transmission of IP packets over GeoNetworking; Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)	ETSI TS 102 859-3 V1.2.1
Intelligent Transport Systems (ITS); Testing; Part 3: Conformance test specification for Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; GeoNetworking validation report	ETSI TR 103 061-3 V1.2.1
Intelligent Transport Systems (ITS); Testing; Part 4: Conformance test specification for GeoNetworking Basic Transport Protocol (BTP); GeoNetworking BTP validation report	ETSI TR 103 061-4 V1.1.1
Intelligent Transport Systems (ITS); Testing; Part 5: IPv6 over GeoNetworking validation report	ETSI TR 103 061-5 V1.1.1

5.5 Access and media

Standards developed for the access and media layer are based on features such as:

- 5,9 GHz spectrum usage;
- multichannel operation;
- Decentralized Congestion Control (DCC);
- coexistence of ITS and EFC (CEN DSRC) services in the 5,8 GHz and 5,9 GHz bands.

Table 7: Base standards for the access and media layer

Standard title	Standard number
Intelligent Transport Systems (ITS); European profile standard for the physical and medium access control layer of Intelligent Transport Systems operating in the 5 GHz frequency band	ETSI ES 202 663 V1.1.0
Intelligent Transport Systems (ITS); ITS-G5 Access layer specification for Intelligent Transport Systems operating in the 5 GHz frequency band	ETSI EN 302 663 V1.3.1
Intelligent Transport Systems (ITS); Decentralized Congestion Control Mechanisms for Intelligent Transport Systems operating in the 5 GHz range; Access layer part	ETSI TS 102 687 V1.2.1
Intelligent Transport Systems (ITS); Access layer specification for Intelligent Transport Systems using LTE Vehicle to everything communication in the 5,9 GHz frequency band	ETSI TS 103 613 V1.1.1
Intelligent Transport Systems (ITS); Congestion Control Mechanisms for C-V2X PC5 interface; Access layer part	ETSI TS 103 574 V1.1.1
Intelligent Transport Systems (ITS); LTE-V2X Access layer specification for Intelligent Transport Systems operating in the 5 GHz frequency band	ETSI EN 303 613 V1.1.1
Intelligent Transport Systems (ITS); Mitigation techniques to avoid interference between European CEN Dedicated Short Range Communication (CEN DSRC) equipment and Intelligent Transport Systems (ITS) operating in the 5 GHz frequency range	ETSI TS 102 792 V1.2.1
Intelligent Transport Systems (ITS); Harmonized Channel Specifications for Intelligent Transport Systems operating in the 5 GHz frequency band	ETSI TS 102 724 V1.1.1

Table 8: Testing standards for the access and media layer

Testing Standard title	Standard number
Intelligent Transport Systems (ITS); Test specifications for the channel congestion control algorithms operating in the 5,9 GHz range; Part 1: Protocol Implementation Conformance Statement (PICS)	ETSI TS 102 917-1 V1.1.1
Intelligent Transport Systems (ITS); Test specifications for the channel congestion control algorithms operating in the 5,9 GHz range; Part 2: Test Suite Structure and Test Purposes (TSS & TP)	ETSI TS 102 917-2 V1.1.1
Intelligent Transport Systems (ITS); Test specifications for the channel congestion control algorithms operating in the 5,9 GHz range; Part 3: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT)	ETSI TS 102 917-3 V1.1.1
Intelligent Transport Systems (ITS); Test specifications for the methods to ensure coexistence of Cooperative ITS G5 with RTTT DSRC; Part 1: Protocol Implementation Conformance Statement (PICS)	ETSI TS 102 916-1 V1.1.1
Intelligent Transport Systems (ITS); Test specifications for the methods to ensure coexistence of Cooperative ITS G5 with RTTT DSRC; Part 2: Test Suite Structure and Test Purposes (TSS&TP)	ETSI TS 102 916-2 V1.1.1
Intelligent Transport Systems (ITS); Test specifications for the methods to ensure coexistence of Cooperative ITS G5 with RTTT DSRC; Part 3: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT)	ETSI TS 102 916-3 V1.1.1

5.6 Management

Standards developed for management and cross layer issues.

Table 9: Standards for management and cross layer issues

Standard title	Standard number
Intelligent Transport Systems (ITS); ETSI object identifier tree; ITS domain	ETSI TR 102 707 V1.1.1
Intelligent Transport Systems (ITS); Classification and management of ITS application objects	ETSI TS 102 860 V1.1.1
Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 1: Architecture and addressing schemes	ETSI TS 102 723-1 V1.1.1
Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 2: Management information base	ETSI TS 102 723-2 V1.1.1
Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 3: Interface between management entity and access layer	ETSI TS 102 723-3 V1.1.1
Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 4: Interface between management entity and networking & transport layer	ETSI TS 102 723-4 V1.1.1
Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 5: Interface between management entity and facilities layer	ETSI TS 102 723-5 V1.1.1
Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 10: Interface between access layer and networking & transport layer	ETSI TS 102 723-10 V1.1.1
Intelligent Transport Systems (ITS); Application Object Identifier (ITS-AID); Registration	ETSI TR 102 965 V1.4.1

Standard title	Standard number
Intelligent Transport Systems (ITS); Facilities layer function; Part 1: Services Announcement (SA) specification	ETSI TS 102 890-1 V1.1.1
Intelligent Transport Systems (ITS); Cross Layer DCC Management Entity for operation in the ITS G5A and ITS G5B medium	ETSI TS 103 175 V1.1.1
Intelligent Transport Systems (ITS); Pre-standardization study on ITS architecture; Part 2: Interoperability among heterogeneous ITS systems and backward compatibility	ETSI TR 103 576-2 V1.1.1

5.7 Security

Standards developed for security and privacy.

Table 10: Base standards for security and privacy

Standard title	Standard number
Intelligent Transport Systems (ITS); Security; Threat, Vulnerability and Risk Analysis (TVRA)	ETSI TR 102 893 V1.3.2
Intelligent Transport Systems (ITS); Security; Confidentiality services	ETSI TS 102 943 V1.1.1
Intelligent Transport Systems (ITS); Security; Trust and Privacy Management	ETSI TS 102 941 V1.3.1
Intelligent Transport Systems (ITS); Security; Access Control	ETSI TS 102 942 V1.1.1
Intelligent Transport Systems (ITS); Security; ITS communications security architecture and security management	ETSI TS 102 940 V1.3.1
Intelligent Transport Systems (ITS); Security; Security header and certificate formats	ETSI TS 103 097 V1.3.1

Table 11: Testing standards for security and privacy

Testing Standard title	Standard number
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for ITS Security; Part 1: Protocol Implementation Conformance Statement (PICS)	ETSI TS 103 096-1 V1.4.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for ITS Security; Part 2: Test Suite Structure and Test Purposes (TSS & TP)	ETSI TS 103 096-2 V1.4.1
Intelligent Transport Systems (ITS); Testing; Conformance test specifications for ITS Security; Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)	ETSI TS 103 096-3 V1.4.1

History

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