

STN	Intelligentné dopravné systémy (ITS) Vozidlové komunikácie Základný súbor aplikácií Časť 2: Špecifikácia základnej informačnej služby o spolupráci	STN EN 302 637-2 V1.4.1 87 2637
------------	---	---

Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 10/19

Obsahuje: EN 302 637-2 V1.4.1:2019

129290

ETSI EN 302 637-2 V1.4.1 (2019-04)



**Intelligent Transport Systems (ITS);
Vehicular Communications;
Basic Set of Applications;
Part 2: Specification of Cooperative
Awareness Basic Service**

Reference

REN/ITS-0010089

Keywords

application, ITS, safety, service, transport

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2019.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.

3GPP™ and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

oneM2M™ logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners.

GSM® and the GSM logo are trademarks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	6
Foreword.....	6
Modal verbs terminology.....	7
Introduction	7
1 Scope	8
2 References	8
2.1 Normative references	8
2.2 Informative references.....	8
3 Definition of terms, symbols and abbreviations.....	10
3.1 Terms.....	10
3.2 Symbols.....	10
3.3 Abbreviations	10
4 CA basic service introduction	11
4.1 Background	11
4.2 Services provided by CA basic service	11
4.3 Sending CAMs	12
4.4 Receiving CAMs	12
5 CA basic service functional description	12
5.1 CA basic service in the ITS architecture	12
5.2 CA basic service functional architecture	13
5.3 Interfaces of the CA basic service	14
5.3.1 Interface to ITS applications.....	14
5.3.2 Interface to data provisioning facilities.....	14
5.3.3 Interface to the Networking & Transport Layer	14
5.3.4 Interfaces protocol stacks of the Networking & Transport Layer.....	15
5.3.4.1 Interface to the GeoNetworking/BTP stack	15
5.3.4.2 Interface to the IPv6 stack and the combined IPv6/GeoNetworking stack	16
5.3.5 Interface to the Management entity	16
5.3.6 Interface to the Security entity.....	16
6 CAM dissemination.....	17
6.1 CAM dissemination concept	17
6.1.1 CAM dissemination requirements	17
6.1.2 CA basic service activation and termination.....	17
6.1.3 CAM generation frequency management for vehicle ITS-Ss	17
6.1.4 CAM generation frequency management for RSU ITS-Ss.....	18
6.1.5 CAM time requirement	18
6.1.5.1 CAM generation time.....	18
6.1.5.2 CAM Time stamp.....	19
6.2 CAM dissemination constraints	19
6.2.1 General Confidence Constraints	19
6.2.2 Security constraints.....	19
6.2.2.1 Introduction.....	19
6.2.2.2 Service Specific Permissions (SSP)	19
6.2.3 General priority constraints.....	21
7 CAM Format Specification	21
7.1 General Structure of a CAM PDU.....	21
7.2 ITS PDU header	22
7.3 Basic container	22
7.4 Vehicle ITS-S containers.....	22
7.5 RSU ITS-S containers	23
7.6 CAM format and coding rules.....	23
7.6.1 Common data dictionary.....	23

7.6.2	CAM data presentation	23
Annex A (normative):	ASN.1 specification of CAM	24
Annex B (normative):	Description for data elements and data frames.....	26
B.0	General requirements	26
B.1	header	26
B.2	cam	26
B.3	generationDeltaTime	26
B.4	camParameters	27
B.5	basicContainer	27
B.6	highFrequencyContainer	27
B.7	lowFrequencyContainer	27
B.8	specialVehicleContainer.....	27
B.9	basicVehicleContainerHighFrequency.....	27
B.10	basicVehicleContainerLowFrequency	28
B.11	publicTransportContainer.....	28
B.12	specialTransportContainer.....	28
B.13	dangerousGoodsContainer	28
B.14	roadWorksContainerBasic.....	28
B.15	rescueContainer	28
B.16	emergencyContainer.....	29
B.17	safetyCarContainer.....	29
B.18	stationType	29
B.19	referencePosition	29
B.20	performanceClass	29
B.21	heading	30
B.22	speed.....	30
B.23	vehicleRole.....	30
B.24	lanePosition	30
B.25	driveDirection.....	30
B.26	longitudinalAcceleration	31
B.27	accelerationControl	31
B.28	lateralAcceleration.....	31
B.29	verticalAcceleration.....	31
B.30	embarkationStatus	31
B.31	curvature.....	32
B.32	curvatureCalculationMode	32
B.33	yawRate.....	32
B.34	steeringWheelAngle	32

B.35	vehicleLength	33
B.36	vehicleWidth	33
B.37	exteriorLights	33
B.38	pathHistory	33
B.39	ptActivation	33
B.40	specialTransportType	34
B.41	dangerousGoodsBasic	34
B.42	roadworksSubCauseCode	34
B.43	closedLanes	34
B.44	trafficRule	34
B.45	speedLimit	35
B.46	lightBarSirenInUse	35
B.47	incidentIndication	35
B.48	emergencyPriority	35
B.49	rsuContainerHighFrequency	35
B.50	protectedCommunicationZoneRSU	36
B.51	cenDsrcTollingZone	36
B.52	protectedZoneLatitude	36
B.53	protectedZoneLongitude	36
Annex C (informative): Protocol operation of the CA basic service		37
C.1	Introduction	37
C.2	Originating ITS-S operation	37
C.2.1	Protocol data setting rules	37
C.2.2	T_CheckCamGen	37
C.2.3	Originating ITS-S message table	37
C.2.4	General protocol operation	38
C.2.5	CAM construction exception	38
C.3	Receiving ITS-S operation	38
C.3.1	Protocol data setting rules	38
C.3.2	General protocol operation	38
C.3.3	Exception handling	39
C.3.3.1	CAM decoding exception	39
Annex D (informative): Flow chart for CAM generation frequency management		40
Annex E (informative): Extended CAM generation		44
History		45

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS).

The present document is part 2 of a multi-part deliverable covering Vehicular Communications; Basic Set of Applications, as identified below:

ETSI TS 102 637-1: "Functional Requirements";

ETSI EN 302 637-2: "Specification of Cooperative Awareness Basic Service";

ETSI EN 302 637-3: "Specifications of Decentralized Environmental Notification Basic Service".

The specification of the CA basic service was initially developed by the European Car-to-Car Communication Consortium, see Car2Car Communication Consortium Manifesto [i.2]. The service was evaluated by several initiatives such as the C2C-CC demonstration in 2008, ETSI Plugtests events and European projects including PRE-DRIVE C2X, DRIVE C2X, SafeSpot, CVIS, CoVeL, eCoMove, SCOR@F and simTD. These evaluation efforts have provided feedback to ETSI TC ITS.

The present document replaces ETSI TS 102 637-2 in whole. It includes improvements and enhancements of the CA basic service specifications in ETSI TS 102 637-2 according to the feedback provided by the various initiatives.

National transposition dates	
Date of adoption of this EN:	1 April 2019
Date of latest announcement of this EN (doa):	31 July 2019
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2020
Date of withdrawal of any conflicting National Standard (dow):	31 January 2020

Modal verbs terminology

In the present document "shall", "shall not", "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).

"must" and "must not" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

Cooperative awareness within road traffic means that road users and roadside infrastructure are informed about each other's position, dynamics and attributes. Road users are all kind of road vehicles like cars, trucks, motorcycles, bicycles or even pedestrians and roadside infrastructure equipment including road signs, traffic lights or barriers and gates. The awareness of each other is the basis for several road safety and traffic efficiency applications with many use cases as described in ETSI TR 102 638 [i.1]. It is achieved by regular exchange of information among vehicles (V2V, in general all kind of road users) and between vehicles and road side infrastructure (V2I and I2V) based on wireless networks, called V2X network and as such is part of Intelligent Transport Systems (ITS).

The information to be exchanged for cooperative awareness is packed up in the periodically transmitted Cooperative Awareness Message (CAM). The construction, management and processing of CAMs is done by the Cooperative Awareness basic service (CA basic service), which is part of the facilities layer within the ITS communication architecture ETSI EN 302 665 [1] supporting several ITS applications.

The CA basic service is a mandatory facility for all kind of ITS-Stations (ITS-S), which take part in the road traffic (vehicle ITS-S, personal ITS-S, etc.). The present document focuses on the specifications for CAMs transmitted by all vehicle ITS-Ss participating in the V2X network. Nevertheless, the present document defines the CAM format with flexibility in order to be easily extendable for the support of other types of ITS-Ss or future ITS applications.

The requirements on the performance of the CA basic service, the content of the CAM and the quality of its data elements are derived from the Basic Set of Applications (BSA) as defined in ETSI TR 102 638 [i.1] and in particular from the road safety applications as defined in ETSI TS 101 539-1 [i.8], ETSI TS 101 539-2 [i.9] and ETSI TS 101 539-3 [i.10].

1 Scope

The present document provides the specifications of the Cooperative Awareness basic service (CA basic service), which is in support of the BSA road safety application.

This includes definition of the syntax and semantics of the Cooperative Awareness Message (CAM) and detailed specifications on the message handling.

2 References

2.1 Normative 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.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://docbox.etsi.org/Reference>.

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 necessary for the application of the present document.

- [1] ETSI EN 302 665 (V1.1.1): "Intelligent Transport Systems (ITS); Communications Architecture".
- [2] ETSI TS 102 894-2 (V1.3.1): "Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionary".
- [3] SAE J2735 (2009-11-19): "Dedicated Short Range Communications (DSRC) Message Set Dictionary".

NOTE: Available at http://standards.sae.org/j2735_200911/.

- [4] Recommendation ITU-T X.691/ISO/IEC 8825-2 (1997-12): "Information technology - ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)".
- [5] ETSI TS 103 097 (V1.3.1): "Intelligent Transport Systems (ITS); Security; Security header and certificate formats".

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] ETSI TR 102 638 (V1.1.1) (2009-06): "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Definitions".
- [i.2] Car2Car Communication Consortium (2007-08): "Car2Car Communication Consortium Manifesto", Version 1.1.

NOTE: Available at <http://www.car-to-car.org/>.

- [i.3] ETSI TR 102 863 (V1.1.1) (2011-06): "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Local Dynamic Map (LDM); Rationale for and guidance on standardization".
- [i.4] ETSI TS 102 636-3 (V1.1.1): "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 3: Network architecture".
- [i.5] ETSI EN 302 636-4-1: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 1: Media-Independent Functionality".
- [i.6] ETSI TS 102 894-1 (V1.1.1): "Intelligent Transport Systems (ITS); Users and applications requirements; Part 1: Facility layer structure, functional requirements and specifications".
- [i.7] ETSI EN 302 636-5-1: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 5: Transport Protocols; Sub-part 1: Basic Transport Protocol".
- [i.8] ETSI TS 101 539-1 (V1.1.1): "Intelligent Transport Systems (ITS); V2X Applications; Part 1: Road Hazard Signalling (RHS) application requirements specification".
- [i.9] ETSI TS 101 539-2: "Intelligent Transport Systems (ITS); V2X Applications; Part 2: Intersection Collision Risk Warning (ICRW) application requirements specification".
- [i.10] ETSI TS 101 539-3 (V1.1.1): "Intelligent Transport Systems (ITS); V2X Applications; Part 3: Longitudinal Collision Risk Warning (LCRW) application requirements specification".
- [i.11] ETSI TS 102 723-5: "Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 5: Interface between management entity and facilities layer".
- [i.12] Void.
- [i.13] ETSI TS 102 723-11: "Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 11: Interface between networking and transport layer and facilities layer".
- [i.14] Void.
- [i.15] ISO EN 17419: "Intelligent Transport Systems -- Cooperative Systems -- Classification and management of ITS applications in a global context".
- [i.16] ETSI TS 102 724 (V1.1.1): "Intelligent Transport Systems (ITS); Harmonized Channel Specifications for Intelligent Transport Systems operating in the 5 GHz frequency band".
- [i.17] Void.
- [i.18] ETSI TR 102 965 (V1.1.1): "Intelligent Transport Systems (ITS); Application Object Identifier (ITS-AID); Registration list".
- [i.19] ISO 1176: "Road vehicles - Masses - Vocabulary and codes".
- [i.20] ETSI EN 302 663 (V1.2.1): "Intelligent Transport Systems (ITS); Access layer specification for Intelligent Transport Systems operating in the 5 GHz frequency band".
- [i.21] ETSI TS 103 613 (V1.1.1): "Intelligent Transport Systems (ITS); Access layer specification for Intelligent Transport Systems using LTE Vehicle to everything communication in the 5,9 GHz frequency band".
- [i.22] ETSI TS 103 574 (V1.1.1): "Intelligent Transport Systems (ITS); Congestion Control Mechanisms for C-V2X PC5 interface; Access layer part".

koniec náhľadu – text ďalej pokračuje v platenej verzii STN