

References

CAR 2 CAR Communication Consortium



About the C2C-CC

Enhancing road safety and traffic efficiency by means of Cooperative Intelligent Transport Systems and Services (C-ITS) is the dedicated goal of the CAR 2 CAR Communication Consortium (C2C-CC). The industrial driven, non-commercial association was founded in 2002 by vehicle manufacturers affiliated with the idea of cooperative road traffic based on Vehicle-to-Vehicle Communications (V2V) and supported by Vehicle-to-Infrastructure Communications (V2I). The Consortium members represent worldwide major vehicle manufacturers, equipment suppliers and research organisations.

Over the years, the C2C-CC has evolved to be one of the key players in preparing the initial deployment of C-ITS in Europe and the subsequent innovation phases. C2C members focus on wireless V2V communication applications based on Direct Communication and concentrate all efforts on creating standards to ensure the interoperability of cooperative systems, spanning all vehicle classes across borders and brands. As a key contributor, the C2C-CC and its members work in close cooperation with the European and international standardisation organisations.

Disclaimer

The present document has been developed within C2C-CC and might be further elaborated within C2C-CC. C2C-CC and its members accept no liability for any use of this document and other documents from C2C-CC for implementation. C2C-CC documents should be obtained directly from the C2C-CC.

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Intellectual Property Rights – Essential patents

IPRs essential or potentially essential to profiles or specifications may have been declared to the C2C-CC. The declarations pertaining to these essential IPRs, if any, are publicly available for the C2C-CC members and non-members, and can be found in "Essential or potentially Essential IPRs notified to the C2C-CC in respect of C2C-CC profiles or specifications" ([C2CCC IPR R]), which is available with the latest update from the webpage (<https://www.car-2-car.org>) of the C2C-CC.

Pursuant to the C2C-CC's IPR Policy [C2CCC IPR P], no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by the C2C-CC. No guarantee can be given as to the existence of other IPRs not referenced in [C2CCC IPR R] (or the updates on the C2C-CC web server) which are, or may be, or may become, essential to the present document.

Document information

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Table 1: Document information

Changes since last release

Release	Date	Changes	Edited by	Approved
2.0.1	2025-12-19	Initial release Added as informative references: <ul style="list-style-type: none">• [UNECE R79] Updated normative references: C-Roads [C-ITS Message Profile]	Release Management	Steering Committee
	2024-07-12	Initial setup of document		

Table 2: Changes since last release

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1 Introduction

Other (informational)

RS_Ref_00147

As references to other standards and their versions are essential information in the V2X area, CAR 2 CAR Communication Consortium is providing them in:

- this separate document to make the information:
 - explicitly available (not 'hidden' in the different requirement documents)
 - easily accessible (e.g., for alignment with other organizations)

2 Scope

Other (informational)

RS_Ref_00148

This document holds all normative and informative references of the CAR 2 CAR requirement specifications of this release bundle.

3 References

3.1 Normative references

Definition

RS_Ref_00427

All normative documents, which are not part of this release itself, are listed below.

Symbol	Version	Title
[CMC Basic Specification]	1.0	CMC Basic Specification Overview, Connected Motorcycle Consortium, Available: https://www.cmc-info.net/basic-specification.html
[C-ITS Message Profile]	Latest release	C-Roads, C-ITS Message Profiles and Parameters, Available: https://releases.c-roads.eu/
[C2CCC IPR P]	Latest release	CAR 2 CAR Communication Consortium Intellectual Property Rights Policy; https://www.car-2-car.org/about-us/ipr-policy
[C2CCC IPR R]	Latest release	CAR 2 CAR Communication Consortium Intellectual Property Rights Report; https://www.car-2-car.org/fileadmin/documents/IPR_Report/C2CCC_TR_2323_IPR_Report.pdf
[GDPR]	2016/679	General Data Protection Regulation (GDPR), Available: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679 ; EU
[EN 302 571]	2.1.1 (2017-02)	Intelligent Transport Systems (ITS); Radio communications equipment operating in the 5 855 MHz to 5 925 MHz frequency band; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive.
[EN 302 636-4-1]	1.4.1 (2020-01)	Intelligent Transport Systems (ITS); Vehicular Communication; Geonetworking; Part 4 Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 1: Media-Independent Functionality.
[EN 302 636-5-1]	2.2.1 (2019-05)	Intelligent Transport Systems (ITS); Vehicular Communication; Geonetworking; Part 5: Transport Protocols; Sub-part 1: Basic Transport Protocols.
[EN 302 637-2]	1.4.1 (2019-01)	Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service.
[EN 302 637-3]	1.3.1 (2019-04)	Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 3: Specifications of Decentralized Environmental Notification Basic Service.
[EN 302 663]	1.3.1 (2020-01)	Intelligent Transport Systems (ITS); Access layer specification for Intelligent Transport Systems operating in the 5 GHz frequency band.
[EN 302 665]	1.1.1 (2010-09)	Intelligent Transport Systems (ITS); Communications Architecture
[EN 302 890-2]	2.1.1 (2020-10)	Intelligent Transport Systems (ITS); Facilities Layer function; Part 2: Position and Time management (PoTi); Release 2

[EN 302 931]	1.1.1 (2011-07)	Vehicular Communications; Geographical Area Definition.
[ISO/TS 19321]	(2020-09)	Intelligent Transport Systems - Cooperative ITS - Dictionary of In-Vehicle Information (IVI) Data Structures
[ISO/TS 14823]	(2017-05)	Intelligent Transport Systems - Graphic Data Dictionary
[ISO 8855]	(2011-12)	Road vehicles - Vehicle dynamics and road-holding ability - Vocabulary, ISO, 2011
[TS 102 636-4-2]	1.4.1 (2021-02)	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-G5
[TS 102 687]	1.2.1 (2018-04)	Decentralized Congestion Control Mechanisms for Intelligent Transport Systems operating in the 5 GHz range; Access layer part.
[TS 102 792]	1.2.1 (2015-06)	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.
[TS 102 894-2]	1.3.1 (2018-08)	Intelligent Transport Systems (ITS); Users and applications requirements; Applications and facilities layer common data dictionary.
[TS 102 965]	1.5.1 (2020-01)	Intelligent Transport Systems (ITS); Application Object Identifier (ITS – AID); Registration list.
[TS 103 097]	1.4.1 (2020-10)	Intelligent Transport Systems (ITS); Security; Security Header and Certificate Formats.
[TS 103 248]	1.3.1 (2019-04)	Intelligent Transport Systems (ITS); GeoNetworking; Port Numbers for the Basic Transport Protocol (BTP)
[TS 103 301]	2.1.1 (2021-03)	Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Facilities layer protocols and communication requirements for infrastructure services
[TS 103 831]	V2.3.1 (2025-11)	Intelligent Transport Systems (ITS); Facilities Layer; Decentralized Environmental Notification Service; Release 2
[TS 103 900]	V2.2.1 (2025-02)	Intelligent Transport Systems (ITS); Facilities Layer; Cooperative Awareness Service; Release 2

Table 3: Normative references

3.2 Informative references

Other (informational)		RS_Ref_00151
Symbol	Version	Title
[ADASIS AISBL]	V3.1.0	ADASIS AISBL; ADASIS v3 Reference; Specification v3.1.0; https://adasis.org/adasis-aisbl/
[C2CCC ConV].	R1.6.5	Conventions used, CAR 2 CAR Communication Consortium, 2023-07-21, Available: https://www.car-2-car.org/fileadmin/documents/Basic_System_Profile/Release_1.6.5/C2CCC_TR_2086_Conventions_R165.pdf
[C2CCC Roadmap]	V1.2	Guidance for day 2 and beyond roadmap, CAR 2 CAR Communication Consortium, 2021-07-09, Available: https://www.car-2-car.org/fileadmin/documents/General_Documents/C2CCC_WP_2072_RoadmapDay2AndBeyond_V1.2.pdf
[C-ITS CP]	3.0	'Certificate Policy for Deployment and Operation of European Cooperative Intelligent Transport Systems (C-ITS)'; Available: https://cpoc.jrc.ec.europa.eu/data/documents/E01941_C-ITS_Certificate_Policy_Release_3_0_FINAL.pdf
[C-ITS SP]	3.0	'Security Policy for Deployment and Operation of European Cooperative Intelligent Transport Systems (C-ITS)'; Available: https://cpoc.jrc.ec.europa.eu/data/documents/e01941_C-ITS_Security_Policy_v3.0._20230916.pdf
[CPOC]	1.2 (2021-12)	C-ITS Point of Contact (CPOC) Protocol; Annex VIII: EU CCMS Levels & Requirements; chapter 19
[ECE 13]	(2016-02-18)	Regulation No. 13 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of vehicles of categories M, N and O with regard to braking [2016/194]; Available: http://data.europa.eu/eli/reg/2016/194/oj
[ECE 13H]	(2015-12-22)	Regulation No. 13-H of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of passenger cars with regard to braking [2015/2364]; Available: http://data.europa.eu/eli/reg/2015/2364/oj
[ECE 48]	(2019-01-16)	Regulation No. 48 of the Economic Commission for Europe of the United Nations (UNECE) — Uniform provisions concerning the approval of vehicles with regard to the installation of lighting and light-signalling devices [2019/57]; Available: http://data.europa.eu/eli/reg/2019/57/oj
[ECE 53]	(2020-01-15)	UN Regulation No. 53 — Uniform provisions concerning the approval of category L3 vehicles with regard to the installation of lighting and light-signalling devices

Symbol	Version	Title
		[2020/31]; Available: http://data.europa.eu/eli/reg/2020/31/oj
[ECE 78]	(2017-09-14)	European Norm ECE Regulations No. 78 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of vehicles of categories L1, L2, L3, L4 and L5 with regard to braking; Available: https://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2018/R078r2e.pdf
[ECE R.E.3]	Rev 3 23 rd of January 2014	Consolidated Resolution on the Construction of Vehicles (R.E.3) — Regulation No 3 of the Economic Commission for Europe of the United Nations (UN/ECE) — ECE/TRANS/WP.29/78/Rev.3 Uniform provisions concerning the approval of vehicles of categories M, N and O with regard to braking [2016/194], Available: https://unece.org/fileadmin/DAM/trans/main/wp29/wp29re/solutions/ECE-TRANS-WP29-78-r3e.pdf
[ECID 2020/14 26]	(2020-10-07)	Commission Implementation decision (EU); on the harmonised use of radio spectrum in the 5 875-5 935 MHz frequency band for safety-related applications of intelligent transport systems (ITS) and repealing Decision 2008/671/EC; notified under document C(2020) 6773
[EN 15194]	2017, 2023	CEN, BS EN 15194:2017+A1:2023, Electrically power assisted cycles - EPAC Bicycles, Available: https://www.en-standard.eu/bs-en-15194-2017-a1-2023-cycles-electrically-power-assisted-cycles-epac-bicycles/
[EN 15509]	29 th of March 2023	CEN, EN 15509:2023, Electronic fee collection - Interoperability application profile for DSRC, Available: https://standards.cencenelec.eu/dyn/www/f?p=CEN:110:0:::FSP_PROJECT:71840&cs=1325061795468D97CB974727A211757AD
[EN 16157-3]	(2018)	Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 3: Situation Publication.
[EN 301 893]	Draft V2.2.0 (2023-11)	ETSI, 5 GHz WAS/RLAN; Harmonised Standard for access to radio spectrum, Available: https://www.etsi.org/deliver/etsi_en/301800_301899/301893/02.02.00_20/en_301893v020200ev.pdf
[EU R168]	No 168 / 2013	REGULATION (EU) No 168/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, of 15 January 2013, on the approval and market surveillance of two- or three-wheel vehicles and quadricycles, Available: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:060:0052:0128:en:PDF

Symbol	Version	Title
[EU D42]	17 th of May 2006	DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, of 17 May 2006, on machinery, and amending Directive 95/16/EC (recast), Available: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:157:0024:0086:en:PDF
[GDPR].	27 th of April 2016	Regulation (EU) 2016/679 (General Data Protection Regulation), Available: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679
[IEEE 1609.2]	(2016 amended by 2017 and 2019)	IEEE Std 1609.2™ Standard for Wireless Access in Vehicular Environments -- Security Services for Applications and Management Messages
IEEE 1609.2.1	(2020-12)	IEEE Std. 1609.2.1-2020; Standard for Wireless Access in Vehicular Environments (WAVE) – Certificate Management Interfaces for End Entities
[IEEE 802.11]	(2016)	Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications
[IEEE 802.1D]	(1998)	IEEE Standard for Information technology – Telecommunications and information exchange between systems; Local and metropolitan area networks; Common specifications; Part 3: Media Access Control (MAC) Bridges
[ISO/TS 19091]	(2019)	Intelligent transport systems - Cooperative ITS - Using V2I and I2V communications for applications related to signalized intersections
[ISO 14819-2]	(2021)	Intelligent transport systems — Traffic and travel information messages via traffic message coding; Part 2: Event and information codes for Radio Data System-Traffic Message Channel (RDS-TMC) using ALERT-C
[ISO 21219-15]	(2023-05)	Intelligent transport systems – Traffic and travel information (TTI) via transport protocol experts group; generation 2 (TPEG2); Part 15: Traffic event compact (TPEG2-TEC)
[ITSTF 20001]	1.5 (2021-01-21)	Safety related message sets – Selection of DATEX II Situations; DENM and TPEG2-TEC Causes and TMC Events for EC high level Categories; Available: https://tisa.org/wp-content/uploads/ITSTF20001_SafetyrelatedMessage-Sets-DATEXII_DENM_TPEG-TEC_TMC_-v1.5_FINAL-1.pdf
[PFB Law]	June 2021	PeopleForBikes, Electric Bicycle Law Basics

Symbol	Version	Title
		https://peopleforbikes.cdn.prismic.io/peopleforbikes/29e81dec-5c0b-4b61-a41d-864384d3aec_E-Bike-Law-Primer_June_2021.pdf
[SAE J2945/1]	(2016-03)	SAE J2945/1: On-board System Requirements for V2V Safety Communications
[SAE J2735]	(2016-03)	Dedicated Short Range Communications (DSRC) Message Set Dictionary
[TS 102 731]	1.1.1 (2010-09)	Intelligent Transport Systems (ITS); Security; Security Services and Architecture
[TS 102 894-2 V2.2.1]	V2.2.1	Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionary; Release 2
[TS 102 940]	1.3.1 (2018-04)	Intelligent Transport Systems (ITS); Security; ITS communications security Architecture and security management
[TS 102 941]	1.4.1 (2021-01)	Intelligent Transport Systems (ITS); Security; Trust and Privacy Management
[TS 103 831]	V2.1.1 (2022-11)	Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Decentralized Environmental Notification Service; Release 2
[TR 103 460]	V2.1.1 October 2020-10	Intelligent Transport Systems (ITS); Security; Pre-standardization study on Misbehavior Detection; Release 2; https://www.etsi.org/deliver/etsi_tr/103400_103499/103460/02.01.01_60/tr_103460v020101p.pdf
[UNECE R79]	Revision 5 (2023-10-06)	UN Regulation No. 79 Revision 5 of the Economic Commission for Europe of the United Nations (UNECE) — Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations; Available: https://unece.org/sites/default/files/2024-04/R079r5e.pdf
[WP.5/GE.5]	No. 6 2 nd of November 2023	Informal document WP.5/GE.5 (2023) No. 6, Proposals concerning cycle definition https://unece.org/sites/default/files/2023-11/id23_WP5-GE5_06e.pdf

Table 4: Informative references

3.3 Recognition and validation status of other C-ITS station type profiles

Definition

RS_Ref_00427

In following table provides an overview of the recognition or validation status by C2C-CC of profiles for specific C-ITS station types, of other organization which are not covered by the C2C-CC profile or are extending it.

The used terms have the following meaning:

- Recognized – C2C-CC in general support the used approach and supports to uses these profiles / specifications as basis for implementations
- Validated – C2C-CC has evidence that implementation according these profiles / specifications are a good basis for C-ITS stations, which are compatible with C2C-CC Profile based C-ITS stations. Such evidence can be:
 - Seamlessly operating systems
 - Test reports

C-ITS station Type	Profile			Status	
	Name	Part	Sub-part	[recognized validated]	How achieved
Infrastructure	[C-ITS Message Profile] https://releases.c-roads.eu/	C-ITS EU Handbook MAPEM-SPATEM_2.0.9 for publication		recognized	
		C-Roads_TF1_C-ITS_Security_and_Governance_2.0.7		recognized	
		C-Roads_TF1_C-ITS_Security_Requirements_and_Specifications_2.0.5		recognized	
		C-Roads_WG2_TF2_Service and Use Case Definitions 2.1.0 For Publication	RWW	validated	By operation
			All other parts	recognized	
		C-Roads_WG2_TF3_C-ITS Infrastructure Mobile ITS-G5 System Profile_2.1.0 for publication		--	

C-ITS station Type	Profile			Status	
	Name	Part	Sub-part	[recognized validated]	How achieved
		C-Roads_WG2_TF3_C-ITS MessageProfiles_2.1.0 for publication		recognized	
		C-Roads_WG2_TF3_C-ITS Roadside ITS-G5 System Profile_2.1.0 for publication		recognized	
		C-Roads_WG2_TF4_C-ITS IP Based Interface Profile_2.1.0_SCOM		recognized	
		TF5 C-ITS Test Plan_R2.0.5		recognized	
		TF5_C-ITS_Cross-Border_Testing-PCAP_Exchange_Specification_R2.0.3		recognized	
		TF5_C-ITS_Cross-Border-Testing-and-Validation-Concept_R2.0.3		recognized	
PTW	[CMC Basic Specification] https://www.cmc-info.net/download_s.html	All		recognized	

Table 5: 1.1 Recognition and validation status of other C-ITS station type profiles