5GAA TR P-200004

Technical Report

5G Automotive Association; Working Group Evaluation, Testbeds and Pilots; Recommended LTE-V2X Related Amendments to ETSI ITS Test Specifications

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Foreword

This Technical Report has been produced by 5GAA.

The contents of the present document are subject to continuing work within the Working Groups (WG) and may change following formal WG approval. Should the WG modify the contents of the present document, it will be re-released by the WG with an identifying change of the consistent numbering that all WG meeting documents and files should follow (according to 5GAA Rules of Procedure):

x-nnzzzz

(1) This numbering system has six logical elements:

(a) x: A single letter corresponding to the working group:

where x =

T (Use Cases and Technical Requirements)

A (System Architecture and Solution Development)

P (Evaluation, Testbed and Pilots)

S (Standards and Spectrum)

B (Business Models and Go-To-Market Strategies)

E (Security and Privacy)

(b) nn: Two digits to indicate the year. i.e. 16,17,18, etc

(c) zzzz: Unique number of the document

(2) No provision is made for the use of revision numbers. Documents which are a revision of a previous version should indicate the document number of that previous version.

(3) The file name of documents shall be the document number. For example, document S-160357 will be contained in file S-160357.doc.

Introduction

Many specifications and standards previously defined by ETSI TC ITS include details and dependencies based on an assumption of using ITS-G5 (which is based on 802.11) as the underlying access layer technology. Relevant protocol specifications and standards within ETSI TC ITS have been enabled in support of LTE-V2X as the underlying access layer technology. As the amended protocol specifications and standards are finalised and approved, the corresponding test specifications must also be amended as needed.

1 Scope

This TR documents the 5GAA recommended amendments to ETSI ITS test specifications. It is intended to guide the efforts and subsequent contributions of 5GAA member companies that are also ETSI members, as they seek to incorporate the amendments within ETSI TC ITS.

The present document provides a list of identified changes which should be considered in order to obtain media-independent test specification.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

3 Abbreviations

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

ATS	Abstract Test Suite
BTP	Basic Transport Protocol
CA	Cooperative Awareness
C-ITS	Cooperative Intelligent Transport System
CSMA/CD	Carrier Sense Multiple Access with Collision Detection
DEN	Decentralised Environmental Notification
EG	ETSI Guide
EN	European Norm
ETSI	European Telecommunications Standards Institute
IEEE	Institute of Electrical and Electronics Engineers
IFS	Interoperability Feature Statement
IP	Internet Protocol
ITS-G5	Intelligent Transport System based on 802.11
LTE-V2X	Long-Term Evolution Vehicular-to-Everything communication based on 3GPP Rel. 14
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PKI	Public Key Infrastructure
TC	Technical Committee
TP	Test Purpose
TR	Technical Report
TS	Technical Specification
TSS	Test Suite Structure

4 Overview

The present document provides a list of recommended amendments for ETS ITS test specifications. The document is structured according to the main ‘clauses’ covering different layers of an ITS system, including general architecture, facilities, transport/network, access, security and other related specifications. Within each clause, sub-clauses for the relevant test specifications are used to list individual items which should be changed to make the specification media independent. Where applicable, references are provided in table format with corresponding parts/clauses of the

documents affected and recommendations provided for the identified items. If not otherwise stated in the present document, only published Technical Specification (TS) documents have been investigated; draft documents and Technical Reports (TR) have been excluded but should be considered for updating accordingly.

5 Interoperability Test Specs

5.1 ETSI EG 202 798 V1.1.1 (2011-01): Intelligent Transport Systems (ITS); Testing; Framework for conformance and interoperability testing

Reference	Description	Recommendation
Clause 2.2	Informal references do not include latest specifications related to LTE-V2X	Add references to ETSI TS 103 574 v1.1.1, ETSI EN 302 571, ETSI EN 303 613
Clauses 4.3, 6.1, 6.3.1	Contains only references to ITS-G5 as access layer and related base specifications	Need to add references to LTE-V2X access layer and related base specifications

5.2 ETSI TS 103 192-1 Ver. 1.1.1 (2018-09): Intelligent Transport Systems (ITS); Testing; Interoperability test specifications for ITS V2X use cases; Part 1: Test requirements and Interoperability Feature Statement (IFS) proforma

Reference	Description	Recommendation
Clause 2.1	Refers to outdated EN 302 636-4-1 (V1.2.1)	Refer to new EN 302 636-4-1 (V1.4.1), which is now technology neutral

5.3 ETSI TS 103 192-2 Ver. 1.1.1 (2018-09): Intelligent Transport Systems (ITS); Testing; Interoperability test specifications for ITS V2X use cases; Part 2: Test Suite Structure and Test Purposes (TSS & TP)

Reference	Description	Recommendation
Clause 2.1	- Refers to outdated EN 302 636-4-1 (V1.2.1) - Refers to IEEE 802.11p - Refers to ETSI EN 302 663 (V1.2.1) which is not applicable for LTE-V2X	- Refer to new EN 302 636-4-1 (V1.4.1), which is now technology neutral - Add references to EN 303 613 V.1.1.1 (2020-01), ETSI TS 136 101 and ETSI TS 136 300 to account for LTE-V2X - Add reference to ETSI EN 302 571 for channel allocation
Clause 4.1.1 and 5.1	Only refers to ITS-G5	Add reference to LTE-V2X

Clause 5.2.1	Refers to ETSI EN 302 663 (V1.2.1) which is not applicable for LTE-V2X	Refer to ETSI EN 302 571 for channel allocation

5.4 ETSI TS 103 192-3 Ver. 1.1.1 (2018-09): Intelligent Transport Systems (ITS); Testing; Interoperability test specifications for ITS V2X use cases; Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)

Reference	Description	Recommendation
Clause 2.1	Refers to outdated EN 302 636-4-1 (V1.2.1)	Refer to new EN 302 636-4-1 (V1.4.1), which is now technology neutral
Clause B.2.8 Table B.7	Mentions ITS-G5 capture	Remove ‘ITS-G5’

5.5 ETSI TR 103 193 V1.1.1 (2018-09): Intelligent Transport Systems (ITS); Testing; Interoperability test specifications for ITS V2X use cases; Architecture of ITS Interoperability Validation Framework

Reference	Description	Recommendation
Clause 2.2	References 802.11p	Add references to EN 303 613 V.1.1.1 (2019-1o), ETSI TS 136 101 and ETSI TS 136 300 to account for LTE-V2X
Clause 5.2 and 5.3	Mentions G5 in the text and in Figure 4	Add LTE-V2X as alternative

5.6 ETSI TR 103 099 V1.4.1 (2017-03): Intelligent Transport Systems (ITS); Architecture of conformance validation framework

Reference	Description	Recommendation
Clause 2.2	References 802.11p and ETSI TS 102 871-3 (V.1.3.1)	Add references to EN 303 613 V.1.1.1 (2019-1o), ETSI TS 136 101 and ETSI TS 136 300 to account for LTE-V2X
Clause 5.1, 5.2, 7.2, Annex D	Mentions ‘G5’ in the text, in Figure 2 and Table D.1	Add LTE-V2X as alternative

6 Facilities Layer Test Specs

6.1 ETSI TS 102 868-1 V1.4.1 (2017-03): 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

Reference	Description	Recommendation
Clause 2.1	Outdated reference to EN 302 637-2 (V1.3.2)	Update to EN 302 637-2 (V1.4.1)
Clause 3.2	DCC included in list of abbreviations, but not used in document (except as part of a parameter name)	Delete from list of abbreviations
Clause A.6, Table A5, Item 3	Parameter T_GENCAMDCC only applicable to ITS-G5 access layer	Clarify applicability as being specific only to the ITS-G5 access layer technology

6.2 ETSI TS 102 868-2 V1.4.1 (2017-03): Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Cooperative Awareness Basic Service (CA); Part 2: Test Suite Structure and Test Purposes (TSS & TP)

Reference	Description	Recommendation
5.2.1.3	Generation frequency CAM conformance refers to DCC-specific parameters; parameter T_GenCam_Dcc is not applicable to LTE-V2X	Clarify that stated conformance test cases are not applicable to LTE-V2X as well

6.3 ETSI TS 102 868-3 V1.4.1 (2017-03): 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)

Reference	Description	Recommendation
Clause 2.1, B.4 Table B.2, B.8.1 Table B.6	Outdated reference to EN 302 637-2 (V1.3.2)	Update to EN 302 637-2 (V1.4.1)
4.1	Figure 1 does not show 3GPP radio access, only ITS-G5 is mentioned	Correct Figure 1 or add a specific figure for LTE-V2X

6.4 ETSI TS 102 869-1 V1.5.1 (2017-03): 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

Reference	Description	Recommendation
Clause 2.1	Outdated reference ETSI EN 302 637-3 (V1.2.2)	New version is ETSI EN 302 637-3 (V1.3.1) which includes LTE-V2X
Clause 4.1 Figure 1	Only includes ITS-G5	Should include also LTE-V2X

6.5 ETSI TS 102 869-2 V1.5.1 (2017-03): 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)

Reference	Description	Recommendation
Clause 2.1	Outdated reference ETSI EN 302 637-3 (V1.2.2)	New version is ETSI EN 302 637-3 (V1.3.1) which includes LTE-V2X

6.6 ETSI TS 102 869-3 V1.5.1 (2017-03): 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)

Reference	Description	Recommendation
Clause 2.1	- Outdated reference ETSI EN 302 637-3 (V1.2.2) - Refers to ETSI TS 102 869-1 (V1.5.1) and ETSI TS 102 869-2 (V1.5.1)	- New version is ETSI EN 302 637-3 (V1.3.1) which includes LTE-V2X - Update references to ETSI TS 102 869-1 and ETSI TS 102 869-2 considering changes from Sections 6.4 and 6.5
Clause 4.1 Figure 1	Does not show 3GPP radio access, only ITS-G5 is mentioned	Correct Figure 1 or add a specific figure for LTE-V2X

6.7 ETSI TS 103 191-1 V1.2.1 (2017-03): Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Facilities layer protocols and communication requirements for infrastructure services; Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) pro forma

No amendments identified

6.8 ETSI TS 103 191-2 V1.2.1 (2017-03): Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Facilities layer protocols and communication requirements for infrastructure services; Part 2: Test Suite Structure and Test Purposes (TSS & TP)

Reference	Description	Recommendation
5.2.3.9 pp	Contains parameters T_GenIvimMin/Max	Check related ETSI specifications whether they are related to DCC and indicate that in this case they are not applicable for C-V2X

6.9 ETSI TS 103 191-3 V1.2.1 (2017-03): Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Facilities layer protocols and communication requirements for infrastructure services; Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)

Reference	Description	Recommendation
Clause 4.1 Figure 1	References ITS-G5	Change or add a figure to show that LTE-V2X can be used

7 Transport/Network Layer Test Specs

7.1 ETSI TS 102 859-1 V1.2.1 (2014-04): 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

Reference	Description	Recommendation
Clause A.5.3.	Virtual Network Interface refers to IEEE 802.3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications	Check relevance of this specification, as it refers to the family of IEEE standards and most likely to IEEE802.11 as well

7.2 ETSI TS 102 859-2 V1.2.1 (2014-04): 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)

Reference	Description	Recommendation
Clause 5.2.1.1	TP/IPv6GEO/MG/GVL/BV/04 Test refers to Virtual Network Interface with Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications	Check relevance of this specification, as it refers to the family of IEEE standards and most likely to IEEE802.11 as well
Clause 5.2.3	Virtual Interface Management refers to IEEE 802.3™-2008, Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications	Check relevance of this specification, as it refers to the family of IEEE standards and most likely to IEEE802.11 as well

7.3 ETSI TS 102 859-3 V1.2.1 (2014-04): 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)

Reference	Description	Recommendation
Clause 4.1 Figure 1	Shows ITS-G5 as lower layers	Add LTE-V2X to the existing figure or insert an additional figure showing LTE-V2X

7.4 ETSI TS 102 870-1 V1.1.1 (2011-03): 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

Reference	Description	Recommendation
Clause 2.1	Refers to outdated ETSI TS 102 636-5-1 (V1.1.1)	Refer to new ETSI EN 302 636-5-1 (V2.2.1) which is now technology neutral

.

7.5 ETSI TS 102 870-2 V1.1.1 (2011-03): Intelligent Transport Systems (ITS); Testing; Conformance test specifications for GeoNetworking Basic Transport Protocol (BTP); Part 2: Test Suite Structure and Test Purposes (TSS&TP)

Reference	Description	Recommendation

Clause 2.1	Refers to outdated ETSI TS 102 636-5-1 (V1.1.1)	Refer to new ETSI EN 302 636-5-1 (V2.2.1) which is now technology neutral

.

7.6 ETSI TS 102 870-3 V1.1.1 (2011-03): 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)

Reference	Description	Recommendation
Clause 2.1	- Refers to outdated ETSI TS 102 636-5-1 (V1.1.1) - Refers to ETSI EG 202 798 V1.1.1	- Refer to new ETSI EN 302 636-5-1 (V2.2.1) which is now technology neutral - Reference to new version of ETSI EG 202 798 considering changes from Section 5.1
Clause 4.1 Figure 1	Refers to ITS-G5	Add LTE-V2X

7.7 ETSI TS 102 871-1 V1.4.1 (2017-05): Intelligent Transport Systems (ITS); Testing; Conformance test specifications for GeoNetworking ITS-G5; Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) pro forma

Reference	Description	Recommendation
Clause 2.1	Refers to outdated EN 302 636-4-1 (V1.2.1)	Refer to new EN 302 636-4-1 (V1.4.1) which is now technology neutral
Title & content	Document claims to be ITS-G5 specific	With minor modifications, the document could be made technology neutral. Consider including the relevant options for other technologies and remove “ITS-G5” from the title, or create a new document number, which can replace this document.
Table A15	Parameter itsGnIfType only includes ITS-G5	New version of ETSI EN 302 636-4-1 includes ‘LTE-V2X’

7.8 ETSI TS 102 871-2 V1.4.1 (2017-05): Intelligent Transport Systems (ITS); Testing; Conformance test specifications for GeoNetworking ITS-G5; Part 2: Test Suite Structure and Test Purposes (TSS & TP)

Reference	Description	Recommendation

Clause 2.1	Refers to outdated EN 302 636-4-1 (V1.2.1) and ETSI TS 102 871-1 (V1.4.1)	Refer to new EN 302 636-4-1 (V1.4.1), which is now technology neutral References to ETSI TS 102 871-1 (V1.4.1) could be updated according to Section 7.7
Title & content	Document claims to be ITS-G5 specific	With minor modifications, the document could be made technology neutral. Consider including the relevant options for other technologies and remove “ITS-G5” from the title, or create a new document number, which can replace this document.

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7.9 ETSI TS 102 871-3 V1.4.1 (2017-05): 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)

Reference	**Description**	**Recommendation**
Clause 2.1	Refers to outdated EN 302 636-4-1 (V1.2.1), ETSI TS 102 871-1 (V1.4.1) and ETSI TS 102 871-2 (V1.4.1))	- Refer to new EN 302 636-4-1 (V1.4.1) which is now technology neutral - References to ETSI TS 102 871-1 (V1.4.1) ETSI TS 102 871-2 (V1.4.1) and could be updated according to Section 7.7 and 7.8
Title & content	Document claims to be ITS-G5 specific	With minor modifications, the document could be made technology neutral. Consider including the relevant options for other technologies and remove ‘ITS-G5’ from the title, or create a new document number, which can replace this document.
Clause 4.1 Figure 1.	Shows ITS-G5 as lower layers	Add LTE-V2X to the existing figure or insert an addition figure showing LTE-V2X
Clause B.4 Table B.2	Refers to ITS-G5	Could be technology neutral by also allowing LTE-V2X

8 Access Layer Test Specs

Current ETSI ITS test specifications for the access layer are ITS-G5 specific and thus not applicable to LTE-V2X.

9 Security Test Specs

9.1 ETSI TS 103 096-1 V1.4.1 (2018-08): Intelligent Transport Systems (ITS); Testing; Conformance test specifications for ITS Security; Part 1: Protocol Implementation Conformance Statement (PICS)

No amendments identified

9.2 ETSI TS 103 096-2 V1.4.1 (2018-08): Intelligent Transport Systems (ITS); Testing; Conformance test specifications for ITS Security; Part 2: Test Suite Structure and Test Purposes (TSS & TP)

Reference	Description	Recommendation
Clause 2.1	Refers to ETSI TS 102 871-1 (V1.4.1)	References to ETSI TS 102 871-1 (V1.4.1) could be updated according to Section 7.7

9.3 ETSI TS 103 096-3 V1.4.1 (2018-08): 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)

Reference	Description	Recommendation
Clause 2.1	Refers to ETSI TS 102 871-2 (V1.4.1) and ETSI TS 102 871-3 (V1.4.1)	References to ETSI TS 102 871-2 (V1.4.1) ETSI TS 102 871-3 (V1.4.1) and could be updated according to Section 7.8 and 7.9

9.4 ETSI TS 103 525-1 V1.1.1 (2019-03): Intelligent Transport Systems (ITS); Testing; Conformance test specifications for ITS PKI management; Part 1: Protocol Implementation Conformance Statement (PICS)

No amendments identified

9.5 ETSI TS 103 525-2 V1.1.1 (2019-03): Intelligent Transport Systems (ITS); Testing; Conformance test specifications for ITS PKI management; Part 2: Test Suite Structure and Test Purposes (TSS & TP)

No amendments identified

9.6 ETSI TS 103 525-3 V1.1.1 (2019-03): Intelligent Transport Systems (ITS); Testing; Conformance test specifications for ITS PKI management; Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)

Reference	Description	Recommendation
Clause 2.1	Refers to ETSI TS 102 871-2 (V1.4.1) and ETSI TS 102 871-3 (V1.4.1)	References to ETSI TS 102 871-2 (V1.4.1) ETSI TS 102 871-3 (V1.4.1) and could be updated according to Section 7.8 and 7.9

9.7 ETSI TS 103 600 V1.1.1 (2019-05): Intelligent Transport Systems (ITS); Testing; Interoperability test specifications for security

Reference	Description	Recommendation
Clause 6.2.1 Fig 1, Fig 2, Fig 3, Fig 4, Fig 5,	Contains term ITS-G5	Add LTE-V2X as an alternative

10 Other Specs

10.1 ETSI TR 101 607 V1.1.1 (2020-01): Intelligent Transport Systems (ITS); Cooperative ITS (C-ITS); Release 1

Reference	Description	Recommendation
Tables 4,6,8,11	Document references in the tables not updated to the latest versions	Update to latest versions of the test specs

Annex A:
Change History

Date	Meeting	TDoc	Subject/Comment
2019-05-19		P-190015	Initial version
2020-01-24		P-200004	Update after review
2020-02-05	F2F Brussels	P-200004	Clean-up after F2F meeting