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TECHNICAL SPECIFICATION

**Intelligent Transport Systems (ITS);
LTE-V2X Access layer for Intelligent Transport Systems
operating in the 5 GHz frequency band;
Test specification**

Reference

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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
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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS).

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).

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1 Scope

The present document specifies the minimum requirements to demonstrate compliance with ETSI EN 303 613 [1].

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.

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The following referenced documents are necessary for the application of the present document.

- [1] ETSI EN 303 613 (V1.1.1): "Intelligent Transport Systems (ITS); LTE-V2X Access layer specification for Intelligent Transport Systems operating in the 5 GHz frequency band".
- [2] ETSI TS 103 574 (V1.1.1): "Intelligent Transport Systems (ITS); Congestion Control Mechanisms for C-V2X PC5 interface; Access layer part".
- [3] ETSI TS 136 523-1: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification (3GPP TS 36.523-1)".
- [4] ETSI TS 136 523-2: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 2: Implementation Conformance Statement (ICS) proforma specification (3GPP TS 36.523-2 Release 14)".
- [5] ETSI TS 136 523-3: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 3: Test suites (3GPP TS 36.523-3)".
- [6] ETSI TS 136 521-1: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing (3GPP TS 36.521-1)".
- [7] ETSI TS 136 521-2: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 2: Implementation Conformance Statement (ICS) (3GPP TS 36.521-2)".
- [8] ETSI TS 136 521-3: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Radio Resource Management (RRM) conformance testing (3GPP TS 36.521-3)".
- [9] 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 1: Protocol Implementation Conformance Statement (PICS)".
- [10] 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 2: Test Suite Structure and Test Purposes (TSS&TP)".
- [11] ETSI TS 102 916-3 (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)".

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.

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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 121 905: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Vocabulary for 3GPP Specifications (3GPP TR 21.905 Release 14)".
- [i.2] ETSI TS 124 385: "LTE; V2X services Management Object (MO) (3GPP TS 24.385 Release 14)".
- [i.3] ETSI TS 124 386 (V14.3.0): "LTE; User Equipment (UE) to V2X control function; protocol aspects; Stage 3 (3GPP TS 24.386 version 14.3.0 Release 14)".
- [i.4] ETSI TS 136 331 (V14.6.2): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification (3GPP TS 36.331 version 14.6.2 Release 14)".
- [i.5] ETSI TS 136 213 (V14.6.0): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures (3GPP TS 36.213 version 14.6.0 Release 14)".
- [i.6] ETSI TS 123 285 (V14.7.0): "Universal Mobile Telecommunications System (UMTS); LTE; Architecture enhancements for V2X services (3GPP TS 23.285 version 14.7.0 Release 14)".
- [i.7] ETSI TS 136 413 (V14.7.0): "LTE; Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP) (3GPP TS 36.413 version 14.7.0 Release 14)".
- [i.8] ETSI TS 136 414 (V14.1.0): "LTE; Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 data transport (3GPP TS 36.414 version 14.1.0 Release 14)".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI EN 303 613 [1] and ETSI TR 121 905 [i.1] apply.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI EN 303 613 [1], ETSI TR 121 905 [i.1] and the following apply:

ATS	Abstract Test Suite
GCF	Global Certification Forum
ICS	Implementation Conformance Statement
IUT	Implementation Under Test
PICS	Protocol Implementation Conformance Statement
PTCRB	PCS Type Certification Review Board
TP	Test Purposes
TSS	Test Suite Structure

TTCN Testing and Test Control Notation
V2X Vehicle to Everything

4 Protocol aspects

The supplier of an implementation shall complete the Implementation Conformance Statement (ICS) in Annex A of ETSI TS 136 523-2 [4]. The parts of the Table A.4.4-1 of ETSI TS 136 523-2 [4] which are applicable to ETSI EN 303 613 [1] are items 148 to 157.

The protocol tests performed shall be as described in clauses 7.3.9.1 and 24.1 of ETSI TS 136 523-1 [3].

The ATS used shall be as specified in ETSI TS 136 523-3 [5].

NOTE: The supplier of an implementation may adhere to a certification regime, e.g. GCF. For GCF, the status of test cases is shown in Annex B.

5 Radio transmission and reception aspects

The supplier of an implementation shall complete the Implementation Conformance Statement (ICS) in Annex A of ETSI TS 136 521-2 [7].

The items applicable to ETSI EN 303 613 [1] are in Tables A.4.3-4d, A.4.3-4da and A.4.3-4db.

The radio transmission and reception tests performed shall be as defined in ETSI TS 136 523-1 [3]. The measurement procedures shall be as defined in ETSI TS 136 521-3 [8].

6 Protection of DSRC tolling stations

The supplier of an implementation shall complete the Protocol Implementation Conformance Statement (PICS) in Annex A of ETSI TS 102 916-1 [9] for Mode A.

The Test Suite Structure and Test Purposes (TSS&TP) used shall be as defined in ETSI TS 102 916-2 [10].

The Abstract Test Suites (ATS) used shall be as defined in ETSI TS 102 916-3 [11].

Annex A (normative): Mapping of core requirements to conformance tests

A.0 General

This annex maps the requirements in the core specification ETSI EN 303 613 [1] to applicable tests.

A.1 PHY, MAC, RLC, PDCP, RRC and NAS layers

The requirements shall be as in Table A.1.

Table A.1: Layers requirements

Item	Core requirements	Applicable tests
1	PHY (clause 5.1 of ETSI EN 303 613 [1])	ETSI TS 136 521-1 [6], clauses 7.4, 7.5 and 7.6
2	MAC (clause 5.2 of ETSI EN 303 613 [1])	ETSI TS 136 523-1 [3], clause 24.1
3	RLC (clause 5.3 of ETSI EN 303 613 [1])	ETSI TS 136 523-1 [3], clause 24.1
4	PDCP (clause 5.4 of ETSI EN 303 613 [1])	ETSI TS 136 523-1 [3], clause 7.3.9
5	RRC (clause 5.5 of ETSI EN 303 613 [1])	ETSI TS 136 523-1 [3], clause 24.1
6	NAS (clause 5.6 of ETSI EN 303 613 [1])	ETSI TS 136 523-1 [3], clause 24.1

A.2 Transmission/reception of V2X communication over PC5

The requirements shall be as in Table A.2.

Table A.2: TX/RX of V2X communication over PC5 requirements

Item	Core requirements	Applicable tests
1	Support of ETSI TS 124 385 [i.2].	See note
2	Support of ETSI TS 124 386 [i.3].	ETSI TS 136 523-1 [3], clauses 24.1.15 and 24.1.18
NOTE: The requirement is implicitly tested in ETSI TS 136 523-1 [3], clause 24.1.		

A.3 Congestion control

The requirements shall be as in Table A.3.

Table A.3: Congestion control requirements

Item	Core requirements	Applicable tests
1	IUT shall adapt its CR according to the measured Channel Busy Ratio (CBR) in order to comply with the required CR limit, as defined in ETSI TS 103 574 [2].	ETSI TS 136 523-1 [3], clauses 24.1.16 and 24.1.19

A.4 CEN DSRC protection

The requirements shall be as in Table A.4.

Table A.4: CEN DSCR protection requirements

Item	Core requirements	Applicable tests
1	IUT shall adjust its output power level to maximum 10 dBm e.i.r.p. If the ITS station is inside the protected zone, it shall fulfil the spurious emissions limit of maximum -65 dBm/MHz within 5 795 MHz to 5 815 MHz.	ETSI TS 102 916-1 [9], mode A

A.5 QoS management

The requirements shall be as in Table A.5.

Table A.5: QoS management requirements

Item	Core requirements	Applicable tests
1	IUT shall (de)prioritizes a data packet according to its PPPP value in access layer as defined in ETSI TS 136 331 [i.4] and ETSI TS 136 213 [i.5].	ETSI TS 136 523-1 [3], clause 24.1.12

A.6 PC5 parameter provisioning

The requirements shall be as in Table A.6.

Table A.6: PC5 parameter provisioning requirements

Item	Core requirements	Applicable tests
1	PC5 parameters required provisioning parameters used by a UE to perform V2X Communication are as defined in ETSI TS 123 285 [i.6], ETSI TS 136 413 [i.7], ETSI TS 136 414 [i.8] and ETSI TS 103 574 [2]	ETSI TS 136 523-1 [3], clause 24.1

A.7 Synchronization

The requirements shall be as in Table A.7.

Table A.7: Synchronization requirements

Item	Core requirements	Applicable tests
1	IUT shall synchronize with a synchronization reference in both time and frequency before communicating with other ITS stations using LTE-V2X	ETSI TS 136 523-1 [3], clause 24.1.5

Annex B (informative): Status of V2X TTCN in GCF

Table B.1 shows the status of of test cases in GCF at the time of publication of the present document.

The latest status can be found in the latest version of the RAN5 status report under the "LTE_TS_status" tab:

- ftp://ftp.3gpp.org/tsg_ran/WG5_Test_ex-T1/TTCN/Reporting/TTCN_status.

Table B.1: Test cases in GCF

TC	Title	RAN WIC	GCF/PTCRB	TTCN-Status
24.1.2	V2X Sidelink Communication/Pre-configured authorization/Utilization of the pre-configured resources/Transmission	TEI14_Test, LTE_SL_V2V-UEConTest	WI-281	approved
24.1.4	V2X Sidelink Communication/Pre-configured authorization/Utilization of the pre-configured resources/Reception	TEI14_Test, LTE_SL_V2V-UEConTest	WI-281	approved
24.1.9	V2X Sidelink Communication/Pre-configured authorization/Utilization of the pre-configured resources/Transmission based on zoning	TEI14_Test, LTE_SL_V2V-UEConTest	WI-281	verifiable
24.1.15	V2X Sidelink Communication/Pre-configured authorization/UE out of coverage on the frequency used for V2X sidelink communication/Operation with/without SyncRef UE/ Transmission SLSS	TEI14_Test, LTE_V2X-UEConTest	WI-282/01	verifiable
24.1.16	V2X Sidelink Communication/Pre-configured authorization/Utilization of the pre-configured resources/CBR measurement	TEI14_Test, LTE_V2X-UEConTest	WI-282/01	approved
24.1.18	V2X Sidelink Communication/Pre-configured authorization/UE out of coverage on the frequency used for V2X sidelink communication and without inter-frequency V2X configuration on anchor carriers/ Operation with/without SyncRef UE/SLSS and MasterInformationBlock-SL-V2X message Transmission/ syncPriority in SL-V2X-Preconfiguration is set to eNB	TEI14_Test, LTE_V2X-UEConTest	WI-282/01	verifiable
24.1.19	V2X Sidelink Communication/Pre-configured authorization/Utilization of the pre-configured resources/CBR measurement/Transmission based on CR limit	TEI14_Test, LTE_V2X-UEConTest	WI-282/01	approved
24.2.3	P2X Sidelink Communication/Pre-configured authorization/Utilization of the pre-configured resources/Transmission	TEI14_Test, LTE_V2X-UEConTest	WI-282/02	verifiable

History

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