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TECHNICAL SPECIFICATION

**Intelligent Transport Systems (ITS);
Testing;
Conformance test specifications for
Signal Phase And Timing (SPAT) and Map (MAP);
Part 1: Test requirements and Protocol Implementation
Conformance Statement (PICS) pro forma**

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Contents

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Foreword

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

The present document is part 1 of a multi-part deliverable covering Conformance test specification for Signal Phase And Timing (SPAT) and Map (MAP), as identified below:

> **Part 1:** **"Test requirements and Protocol Implementation Conformance Statement (PICS) pro forma";**
>
> Part 2: "Test Suite Structure and Test Purposes (TSS & TP)";
>
> Part 3: "Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)".

The development of ITS test specifications follows the guidance provided in the ETSI EG 202 798 [i.1]. Therefore, the ATS documentation outlined in the present document is also based on the guidance provided in ETSI EG 202 798 [i.1].

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.

1 Scope

The present document provides the Protocol Implementation Conformance Statement (PICS) pro forma for Conformance test specification for MAP-SPAT Messages (MAP-SPAT) as defined in SAE J2735 [1] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [4].

The objective of the present document is to provide a basis for conformance tests for MAP-SPAT Messages (MAP-SPAT) equipment giving a high probability of interoperability between different manufacturers' equipment.

The ISO standard for the methodology of conformance testing (ISO/IEC 9646-1 [2] and ISO/IEC 9646-2 [3]) as well as the ETSI rules for conformance testing (ETSI ETS 300 406 [5]) are used as a basis for the test methodology.

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 reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://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] SAE J2735 (2015-04-30): "Dedicated Short Range Communications (DSRC) Message Set Dictionary".

[2] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[3] ISO/IEC 9646-2 (1994): "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 2: Abstract Test Suite specification".

[4] ISO/IEC 9646-7 (1995): "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 7: Implementation Conformance Statements".

[5] ETSI ETS 300 406 (1995): "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[6] ETSI TS 102 894-2 (V1.2.1): "Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionary".

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 reference 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 EG 202 798 (V1.1.1): "Intelligent Transport Systems (ITS); Testing; Framework for conformance and interoperability testing".

3   Definitions and abbreviations

3.1   Definitions

For the purposes of the present document, the terms and definitions given in SAE J2735 [1], ISO/IEC 9646-1 [2] and ISO/IEC 9646-7 [4] apply.

3.2   Abbreviations

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

ATS	Abstract Test Suite
DSRC	Dedicated Short Range Communications
EU	European Union
ICS	Implementation Conformance Statement
ISO	International Organization for Standardization
ITS	Intelligent Transport Systems
IUT	Implementation Under Test
MAP	MapData Messages
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
RSU	Road Side Unit
SAE	Society of Automotive Engineers
SPAT	Signal Phase And Timing Messages
SUT	System Under Test
TP	Test Purpose
TS	Technical Specification
TSS	Test Suite Structure

4   Conformance requirement concerning PICS

If it claims to conform to the present document, the actual PICS pro forma to be filled in by a supplier shall be technically equivalent to the text of the PICS pro forma given in annex A, and shall preserve the numbering, naming and ordering of the pro forma items.

An ICS which conforms to the present document shall be a conforming PICS pro forma completed in accordance with the instructions for completion given in clause A.2.

Annex A (normative):
MAP-SPAT PICS pro forma

A.1 Partial cancellation of copyright

Notwithstanding the provisions of the copyright clause related to the text of the present document, ETSI grants that users of the present document may freely reproduce the MAP-SPAT PICS pro forma in this annex so that it can be used for its intended purposes and may further publish the completed MAP-SPAT PICS.

A.2 Guidance for completing the ICS pro forma

A.2.1 Purposes and structure

The purpose of this PICS pro forma is to provide a mechanism whereby a supplier of an implementation of the requirements defined in SAE J2735 [1] may provide information about the implementation in a standardized manner.

The PICS pro forma is subdivided into clauses for the following categories of information:

- guidance for completing the ICS pro forma;

- identification of the implementation;

- identification of the SAE J2735 [1];

- global statement of conformance;

- PICS pro forma tables.

A.2.2 Abbreviations and conventions

The ICS pro forma contained in this annex is comprised of information in tabular form in accordance with the guidelines presented in ISO/IEC 9646-7 [4].

The item column contains a number which identifies the item in the table.

Item description column

The item description column describes in free text each respective item (e.g. parameters, timers, etc.). It implicitly means "is <item description> supported by the implementation?".

Status column

The following notations, defined in ISO/IEC 9646-7 [4], are used for the status column:

m	mandatory - the capability is required to be supported.
o	optional - the capability may be supported or not.
n/a	not applicable - in the given context, it is impossible to use the capability.
x	prohibited (excluded) - there is a requirement not to use this capability in the given context.
o.i	qualified optional - for mutually exclusive or selectable options from a set. "i" is an integer which identifies an unique group of related optional items and the logic of their selection which is defined immediately following the table.
c.i	conditional - the requirement on the capability ("m", "o", "x" or "n/a") depends on the support of other optional or conditional items. "i" is an integer identifying an unique conditional status expression which is defined immediately following the table.

i   irrelevant (out-of-scope) - capability outside the scope of the reference specification. No answer is requested from the supplier.

NOTE 1: This use of "i" status is not to be confused with the suffix "i" to the "o" and "c" statuses above.

Reference column

The reference column makes reference to SAE J2735 [1], except where explicitly stated otherwise.

Support column

The support column shall be filled in by the supplier of the implementation. The following common notations, defined in ISO/IEC 9646-7 [4], are used for the support column:

Y or y   supported by the implementation.

N or n   not supported by the implementation.

N/A, n/a or -   no answer required (allowed only if the status is n/a, directly or after evaluation of a conditional status).

NOTE 2: As stated in ISO/IEC 9646-7 [4], support for a received PDU requires the ability to parse all valid parameters of that PDU. Supporting a PDU while having no ability to parse a valid parameter is non-conformant. Support for a parameter on a PDU means that the semantics of that parameter are supported.

Values allowed column

The values allowed column contains the type, the list, the range, or the length of values allowed. The following notations are used:

- range of values: <min value> .. <max value>

EXAMPLE 1:   5 .. 20

- list of values: <value1>, <value2>, ..., <valueN>

EXAMPLE 2:   2 ,4 ,6 ,8, 9

EXAMPLE 3:   '1101'B, '1011'B, '1111'B

EXAMPLE 4:   '0A'H, '34'H, '2F'H

- list of named values: <name1>(<val1>), <name2>(<val2>), ..., <nameN>(<valN>)

EXAMPLE 5:   reject(1), accept(2)

- length: size (<min size> .. <max size>)

EXAMPLE 6:   size (1 .. 8)

Values supported column

The values supported column shall be filled in by the supplier of the implementation. In this column, the values or the ranges of values supported by the implementation shall be indicated.

References to items

For each possible item answer (answer in the support column) within the ICS pro forma a unique reference exists, used, for example, in the conditional expressions. It is defined as the table identifier, followed by a solidus character "/", followed by the item number in the table. If there is more than one support column in a table, the columns are discriminated by letters (a, b, etc.), respectively.

EXAMPLE 7:   A.5/4 is the reference to the answer of item 4 in table 5 of annex A.

EXAMPLE 8:   A.6/3b is the reference to the second answer (i.e. in the second support column) of item 3 in table 6 of annex A.

Prerequisite line

A prerequisite line takes the form: Prerequisite: <predicate>.

A prerequisite line after a clause or table title indicates that the whole clause or the whole table is not required to be completed if the predicate is FALSE.

A.2.3   Instructions for completing the ICS pro forma

The supplier of the implementation shall complete the ICS pro forma in each of the spaces provided. In particular, an explicit answer shall be entered, in each of the support or supported column boxes provided.

If necessary, the supplier may provide additional comments in space at the bottom of the tables or separately.

More detailed instructions are given at the beginning of the different clauses of the ICS pro forma.

A.3   Identification of the implementation

A.3.1   Introduction

Identification of the Implementation Under Test (IUT) and the system in which it resides (the System Under Test (SUT)) shall be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

The product supplier information and client information shall both be filled in if they are different.

A person who can answer queries regarding information supplied in the ICS shall be named as the contact person.

A.3.2   Date of the statement

....

A.3.3   Implementation Under Test (IUT) identification

IUT name:

....

....

IUT version:

....

A.3.4   System Under Test (SUT) identification

SUT name:

....

....

Hardware configuration:

....

....

....

Operating system:

....

A.3.5 Product supplier

Name:

....

Address:

....

....

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

....

A.3.6 Client (if different from product supplier)

Name:

....

Address:

....

....

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

A.3.7 ICS contact person

(A person to contact if there are any queries concerning the content of the ICS)

Name:

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

....

A.4 Identification of the protocol

This ICS pro forma applies to the following standard: SAE J2735 [1]: "Dedicated Short Range Communications (DSRC) Message Set Dictionary".

A.5 Global statement of conformance

Are all mandatory capabilities implemented? (Yes/No)   ....

NOTE: Answering "No" to this question indicates non-conformance to the SPAT MAP standard specification. Non-supported mandatory capabilities are to be identified in the ICS, with an explanation of why the implementation is non-conforming, on pages attached to the ICS pro forma.

A.6 Tables

A.6.1 Introduction

Unless stated otherwise, the column references of all tables below indicate the clause numbers of SAE J2735 [1].

A.6.2 Station type

Table A.1: Station type

Item	Type	Reference	Status	Support
1	RSU	ETSI TS 102 894-2 [6], clause A.78	m	
	Vehicle	ETSI TS 102 894-2 [6], clause A.78		
o.101: It is mandatory to support at least one of these type.				

Table A.2: Message Identifier

Item	Message Identifier	Reference	Allowed Value	Support
1	DSRCmsgID2	clause 7.32	18 19	

Table A.3: Message SubIdentifier

Item	Message Identifier	Reference	Allowed Value	Support
1	DSRCmsgSubID	clause 7.34	0	

Table A.4: MapData message

Item	Name of field	Reference	Type	Status	Support
1	header	ETSI TS 102 894-2 [6], Annex A.114	ItsPduHeader	m	
2	mapData	clause 5.5	MapData (table A.6)	m	

Table A.5: SpatData message

Item	Name of field	Reference	Type	Status	Support
1	header	ETSI TS 102 894-2 [6], Annex A.114	ItsPduHeader	m	
2	spatData	clause 5.11	SpatData (table A.7)	m	

A.6.3   RSU EU profile

Table A.6: RSU MapData

Item	Name of field	Reference	Type	Status	Support
Prerequisite: A.4/2					
1	msgID	clause 7.32	DSRCmsgID2	m	
2	msgSubID	clause 7.34	DSRCmsgSubID	m	
3	msgIssueRevision	clause 7.92	MsgCount	m	
4	layerType	clause 7.83	LayerType	x	
5	layerID	clause 7.82	LayerID	m	
6	intersections	clause 6.27	IntersectionGeometryList	c.601	
7	roadSegments	clause 6.108	RoadSegmentList	c.602	
8	dataParameters	clause 6.16	DataParameters	o	
9	restrictionList	clause 6.103	RestrictionClassList	o	
10	regional	clause 6.86	RegionalMapData	m	
11	crc	clause 7.93	MsgCRC	o	
c.601: IF /2 or /3 THEN m ELSE o.					
c.602: IF /1 THEN m ELSE o.					

Table A.7: RSU SpatData

Item	Name of field	Reference	Type	Status	Support
Prerequisite: A.4/2					
1	msgID	clause 7.32	DSRCmsgID2	m	
2	msgSubID	clause 7.34	DSRCmsgSubID	m	
3	name	clause 7.21	DescriptiveNam	o	
6	intersections	clause 6.27	IntersectionStateList	m	
10	regional	clause 6.86	RegionalSPAT	o	

Annex B (informative):
Bibliography

- ISO/IEC 9646-6 (1994): "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 6: Protocol profile test specification".

History

Document history		
V1.1.1	September 2015	Publication