

ETSI TS 102 486-2-3 V1.2.1 (2008-10)

Technical Specification

**Intelligent Transport Systems (ITS);
Road Transport and Traffic Telematics (RTTT);
Test specifications for Dedicated Short
Range Communication (DSRC) transmission equipment;
Part 2: DSRC application layer;
Sub-Part 3: Abstract Test Suite (ATS)
and partial PIXIT proforma**

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Foreword

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

The present document is part 2, sub-part 3 of a multi-part deliverable covering Intelligent Transport Systems (ITS); Dedicated Short Range Communication (DSRC); Data Link Control (DLC) layer as identified below:

Part 1: "DSRC data link layer: medium access and logical link control";

Part 2: "DSRC application layer":

Sub-part 1: "Protocol Implementation Conformance Statement (PICS) proforma specification";

Sub-part 2: "Test Suite Structure and Test Purposes (TSS&TP)";

Sub-part 3: "Abstract Test Suite (ATS) and partial PIXIT proforma".

1 Scope

The present document (TS) contains the Abstract Test Suite (ATS) and partial PIXIT proforma to test the Dedicated Short Range Communication (DSRC); Application layer.

The objective of the present document is to provide a basis for conformance tests for DSRC equipment giving a high probability of inter-operability between different manufacturer's equipment.

The ISO standard for the methodology of conformance testing (ISO/IEC 9646-1 [6], ISO/IEC 9646-2 [7] and ISO/IEC 9646-3 [8]) are used as a basis for the test methodology.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
 - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
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NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] CEN EN 12834 (2003): "Road transport and traffic telematics - Dedicated Short Range Communication (DSRC) - DSRC application layer".
- [2] CEN EN 12795 (2003): "Road transport and traffic telematics - Dedicated Short Range Communication (DSRC) - DSRC data link layer: medium access and logical link control".
- [3] CEN EN 12253 (2003): "Road transport and traffic telematics - Dedicated short-range communication - Physical layer using microwave at 5,8 GHz".
- [4] CEN EN 13372 (2003): "Road transport and traffic telematics (RTTT) - Dedicated short-range communication - Profiles for RTTT".
- [5] ETSI ETS 300 406: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

- [6] ISO/IEC 9646-1: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [7] ISO/IEC 9646-2: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite Specification".
- [8] ISO/IEC 9646-3: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".
- [9] ISO/IEC 9646-6: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol Profile Test Specification".
- [10] ISO/IEC 9646-7: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance statement".
- [11] ISO 14906:2004: "Road transport and traffic telematics -- Electronic fee collection -- Application interface definition for dedicated short-range communication".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] ETSI TS 102 178: "Broadband Radio Access Networks (BRAN); HiperMAN; Data Link Control (DLC) layer".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ISO/IEC 9646-7 [10], EN 12253 [3], EN 12834 [1] and EN 13372 [4] apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in ISO/IEC 9646-1 [6], ISO/IEC 9646-6 [9], ISO/IEC 9646-7 [10], TS 102 178 [i.1], EN 12834 [1] and the following apply:

ASP	Abstract Service Primitive
ATM	Abstract Test Method
ATS	Abstract Test Suite
BI	Invalid Behaviour
BV	Valid Behaviour
CM	Co-ordination Message
IUT	Implementation Under Test
SAP	Service Access Point
SUT	System Under Test
TTCN	Tree and Tabular Combined Notation
UT	Upper Tester

4 Abstract Test Method (ATM)

This clause describes the ATM used to test the DSRC Application layer at the OBU side and at the RSU side.

4.1 Test architecture

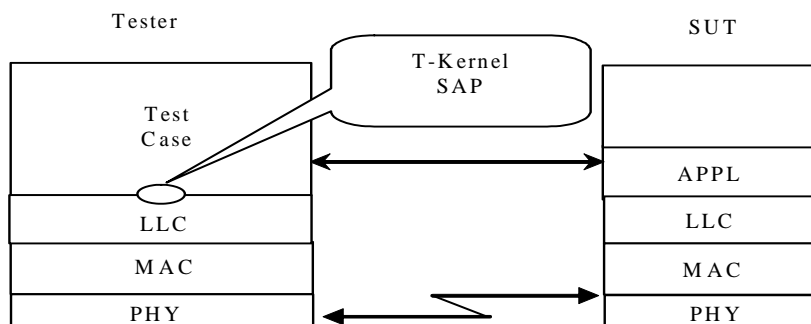


Figure 1: Test architecture for DSRC Application layer

A single party testing concept is used, which consists of the following abstract testing parts:

- Tester:** A test machine that is running a TTCN engine allowing parallel testing and having a standard DSRC LLC, MAC and Physical layer.
- SUT:** System under test: Can be RSU or OBU Implementation.
- Test Case:** A standard TTCN test case.
- APPL:** A standard DSRC Application to be tested.
- LLC:** A standard DSRC LLC layer.
- MAC:** A standard DSRC MAC layer.
- T-Kernel-SAP:** A SAP between T-Kernel and B/I-Kernel, i.e. above T-Kernel encoding/decoding function.

5 Untestable Test Purposes (TP)

This clause gives a list of TPs which are not implemented in the Abstract Test Suites due to the chosen Abstract Test Method or other restrictions.

Table 1: Untestable TPs

Test purpose	Reason

6 ATS conventions

The ATS conventions are intended to give a better understanding of the ATS but they also describe the conventions made for the development of the ATS. These conventions shall be considered during any later maintenance or further development of the ATS.

The ATS conventions contain two clauses, the naming conventions and the implementation conventions. The naming conventions describe the structure of the naming of all ATS elements. The implementation conventions describe the functional structure of the ATS.

To define the ATS, the guidelines of the document ETS 300 406 [5] was considered.

6.1 Naming conventions

6.1.1 Declarations part

This clause describes the naming conventions chosen for the elements of the ATS declarations part.

6.1.1.1 General

The following general rules apply for the names given in the declarations part.

Names of ASN.1 types imported from the base standard are preserved.

Predefined types (e.g. BITSTRING [8]) are never used in structured type definitions, ASP type definitions or PDU type definitions. Simple types are used instead.

All declarations in the test suite are listed in alphabetical order. A different order of listing should be used for only maintenance reasons.

6.1.1.2 Test suite operations

The test suite operation identifiers are prefixed with "TSO_".

EXAMPLE: TSO_substring.

6.1.1.3 Test suite parameter declarations

If the test suite parameter references a Protocol Implementation Conformance Statement (PICS) item, the test suite parameter identifiers are prefixed "TSPC_".

EXAMPLE 1: TPC_extended_rf_carriers.

If the test suite parameter references a PIXIT item, the suite parameter identifiers are prefixed "TSPX_".

EXAMPLE 2: TSP_pmid.

If the test suite parameter represents a system parameter, the complete name defined in the protocol is used.

6.1.1.4 Test case selection expression definition

The test case selection expression identifiers begin with the prefix "SEL_".

6.1.1.5 Test suite constant declarations

The test suite constant identifiers are prefixed "TSC_".

If the test suite constant represents a system parameter, the complete name defined in the protocol is used.

6.1.1.6 Test suite variable declarations

The test suite variable identifiers are prefixed "TSV_".

Complete names as defined in the protocol are used.

6.1.1.7 Test case variable declarations

The test case variable identifiers are prefixed "TCV_".

Complete names as defined in the protocol are used.

6.1.1.8 Timer declarations

Timers begin with the prefix "T_".

6.1.1.9 ASP type definitions

The general conventions in clause 6.1.1.1 applies. All capital letters shall be used.

The identifier of an ASP type uses the same name as the name defined in the protocol.

6.1.1.10 PDU type definitions

The general conventions in clause 6.1.1.1 applies. All capital letters shall be used.

The identifier of a PDU type uses the same name as the name defined in the protocol.

6.1.1.11 Co-ordination Message (CM) type definitions

All capital letters shall be used.

6.1.1.12 Alias definitions

Alias definitions are not used.

6.1.2 Constraints part

This clause describes the naming conventions chosen for the elements of the ATS constraints part.

6.1.2.1 General

Constraints shall be written with all lowercase letters.

6.1.3 Dynamic part

This clause describes the naming conventions used for the elements of the ATS dynamic part.

6.1.3.1 General

All test cases shall be listed in the order in which they appear in the Test Suite Structure (TSS) and TP document.

6.1.3.2 Test Case (TC) identifier

The identifier of the test case is built in a similar way as for the test purpose.

The identifier of a TC is built according to table 2.

Table 2: TC naming convention

Identifier:	TC_<layer>_<sut>_<x>_<nn>		
	<layer>	AL_T	Application Layer – T-Kernel
		AL_I	Application Layer – I-Kernel
	<sut> = type of SUT	OBU	On Board Unit
		RSU	Road Side Unit
	x = Type of testing	BV	Valid Behaviour Tests
		BI	Invalid Behaviour Tests
	<nn> = sequential number	(01-99)	Test Purpose Number

EXAMPLE: TP identifier: TP/AL-T/OBU/BV/01
TC identifier: TC_AL_T_OBU_BV_01.