ETSI TR 103 101 V1.1.1 (2014-06)

Intelligent Transport Systems (ITS);
Test suite validation;
Access technology support ISO 21218

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Foreword

This Technical Report (TR) 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**", "**may not**", "**need**", "**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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Introduction

In response to EC mandate M/453, ETSI Technical Committee ITS has standardized test specifications for ITS protocols according to base standards from ISO TC204 WG16. In a next step a prototype TTCN-3 test system was built and validated. The present document describes the validation and design of the prototype TTCN-3 test system.

The action described in the present document supports the implementation of ITS standards by:

- Making available validated and standardized test specifications and thus enabling the application of reliable certification schemes.

- Executing conformance validation framework against real Implementations Under Test (IUTs) from industry and thus providing these companies a conformance assessment of their implementations. During the lifetime of this action, the conformance validation framework was as well demonstrated at a meeting of ISO TC204 in Kobe (Japan), and at an ETSI PlugTest.

- Releasing all software as open source and thus allowing industry to build and run their own conformance validation framework.

1 Scope

The present document is the validation report of the ATSP conformance tests and it provides statistics of executed and validated ATSP conformance tests. The information provided has been produced by validation against one prototype implementation from industry.

Furthermore, identified issues related to the base specifications ISO 21218 [i.3] and test specification ETSI TS 102 760-1 [i.4], ETSI TS 102 760-2 [i.5], and ETSI TS 102 760-3 [i.6] are listed in the present document.

2 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.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

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2.1 Normative references

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

Not applicable.

2.2 Informative references

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 103 099 (V1.1.1): "Intelligent Transport Systems (ITS); Architecture of conformance validation framework".

[i.2] ETSI EG 201 015 (V1.1.1): "Methods for Testing and Specification (MTS); Specification of protocols and services; Validation methodology for standards using SDL; Handbook".

[i.3] ISO 21218:2013: "Intelligent transport systems - Communications access for land mobiles (CALM) - Access technology support".

[i.4] ETSI TS 102 760-1 (V1.2.1): "Intelligent Transport Systems (ITS); Communications Access for Land Mobiles (CALM); Test specifications for Access Technology Support (ISO 21218); Part 1: Implementation Conformance Statement (ICS) proforma".

[i.5] ETSI TS 102 760-2 (V1.2.1): "Intelligent Transport Systems (ITS); Communications Access for Land Mobiles (CALM); Test specifications for Access Technology Support (ISO 21218); Part 2: Test Suite Structure and Test Purposes (TSS & TP)".

[i.6] ETSI TS 102 760-3 (V1.1.1): "Intelligent Transport Systems (ITS); Communications Access for Land Mobiles (CALM); Test specifications for Access Technology Support (ISO 21218); Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma".

[i.7] ETSI ES 201 873-1: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language".

3 Abbreviations

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

ASN   Abstract Syntax Notation
ATS   Abstract Test Suite
ATSP   Access Technology Support Protocols
ITS   Intelligent Transport Systems
ITS   Intelligent Transportation Systems
ITS-SU   ITS Station Unit
PICS   Protocol Implementation Conformance Statement
STF   Specialist Task Force
SUT   System Under Test
TC   Test case
TP   Test Purpose
TTCN-3   Testing and Test Control Notation 3

4 Validation report

4.1 Validation level

Level 3 (Rigorous) abstract test suite validation has been performed, according to the validation handbook ETSI EG 201 015 [i.2]:

- the test suite has been compiled on more than one TTCN-3 tool;

- the complete suite of tests has been implemented and executed on two test platform;

- the suite of tests for implemented protocol options have been executed against SUTs from a range of different suppliers;

- the operation and output traces of all the tests have been validated.

4.2 Source code evaluation

4.2.1 TTCN-3 version

The ATSP abstract test suite ETSI TS 102 760-3 [i.6] is based on TTCN-3 edition 4.2.1 (TTCN3:2010) specified in ETSI ES 201 873-1 [i.7].

4.2.2 TTCN-3 tools used for compilation

The ATSP abstract test suite ETSI TS 102 760-3 [i.6] has been compiled using three different TTCN-3 tools, as detailed in table 1.

Table 1: TTCN-3 tools used for compilation

Supplier	Tool name	Version	Settings	Compilation result
Elvior	TestCast T3	6.7.2.1		No error, no warning
TestingTech	TTworkbench	1.1.16	Support for very large integers ASN.1-Language-Support-v1.1.4	No error, no warning
OpenTTCN	OpenTTCN Tester 2012	4.2.2		No error, no warning
NOTE: This information is given for the convenience of users of the present document and does not constitute an endorsement by ETSI of these products.				

4.3 Validation process

4.3.1 Test platform

The validation test platform has been based on the conformance validation framework outlined in
ETSI TR 103 099 [i.1] using the components presented in table 2.

Table 2: Validation test platform components

TTCN-3 Tool	Elvior TestCastT3 v6.7.2.1
TTCN-3 Tool	TestingTech TTworkbench v13 with ASN.1 support plugin
Test Adapter	Software: Implemented by STF424/STF455. ITS Test Adapter v1.1.2
Codec	Implemented by STF424/STF455. ITS Codec v1.1.2
NOTE:	This information is given for the convenience of users of the present document and does not constitute an endorsement by ETSI of these products.

4.3.2 Systems under test

As no commercial implementation of ATSP in an ITS-SU was available, validation tests were performed against a light
software implementation. As a consequence, none of the validation tests for the test group TC_ATSP_DP could be
executed. It is intended to perform further validation tests as part of the work of TC ITS WG2 once an SUT will be
available.

4.3.3 Validation status

Table 3 shows the validation status of each test case of the ATSP abstract test suite.

Table 3: Testcase validation status

TC identifier	Verdict	Log analysis	Validated
TC_ATSP_SE_BV_07	PASS	OK	Yes
TC_ATSP_SE_BV_09	PASS	OK	Yes
TC_ATSP_SE_BV_11	PASS	OK	Yes
TC_ATSP_MB_BV_01	PASS	OK	Yes
TC_ATSP_MB_BV_02	PASS	OK	Yes
TC_ATSP_MB_BI_01	PASS	OK	Yes
TC_ATSP_MB_BI_02	PASS	OK	Yes
TC_ATSP_MB_BI_03	PASS	OK	Yes
TC_ATSP_HC_BV_03	PASS	OK	Yes
TC_ATSP_HC_BV_04	PASS	OK	Yes
TC_ATSP_HC_BV_05	PASS	OK	Yes
TC_ATSP_HC_BI_01	PASS	OK	Yes
TC_ATSP_SE_BV_01	PASS	OK	Yes
TC_ATSP_SE_BV_02	PASS	OK	Yes
TC_ATSP_SE_BV_03	PASS	OK	Yes
TC_ATSP_SE_BV_04	PASS	OK	Yes
TC_ATSP_SE_BV_05	PASS	OK	Yes
TC_ATSP_SE_BV_06	PASS	OK	Yes
TC_ATSP_SE_BV_08	Tests not executed due to missing implementations in the software simulator		
TC_ATSP_SE_BV_10			
TC_ATSP_SE_BV_12			
TC_ATSP_SE_BV_13			
TC_ATSP_SE_BV_14			
TC_ATSP_SE_BV_15			
TC_ATSP_SE_BV_16			
TC_ATSP_SE_BV_17			
TC_ATSP_SE_BI_01			
TC_ATSP_SE_BI_02			
TC_ATSP_MB_BV_03			
TC_ATSP_HC_BV_01			
TC_ATSP_HC_BV_02			

TC identifier	Verdict	Log analysis	Validated
TC_ATSP_DP_BV_01			
TC_ATSP_DP_BV_02			
TC_ATSP_DP_BV_03			
TC_ATSP_DP_BV_04			
TC_ATSP_DP_BV_05			
TC_ATSP_DP_BV_06			
TC_ATSP_DP_BV_07			
TC_ATSP_DP_BV_08			
TC_ATSP_DP_BV_09			
TC_ATSP_DP_BV_10			
TC_ATSP_DP_BV_11			
TC_ATSP_DP_BV_12			
TC_ATSP_DP_BV_13			
TC_ATSP_DP_BV_14			
TC_ATSP_DP_BI_01			
TC_ATSP_DP_BI_02			

4.4   Feedback to standardization process

No explicit feedback to SDOs (ETSI and ISO) was needed. Experience from validation was directly used to improve the test suite as part of the work of STF 455. Further changes of the ISO base standard ISO 21218 [i.3] are not needed.

History

Document history		
V1.1.1	June 2014	Publication