



**Intelligent Transport Systems (ITS);
Testing;
Conformance test specifications for ITS Security;
Part 6: Validation report**

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS).

The present document is part 6 of a multi-part deliverable covering Intelligent Transport Systems (ITS); Testing; Conformance test specifications for ITS Security, as identified below:

- Part 1: "Conformance test specifications for Co-operative Awareness Messages (CAM); CAM validation report";
 - Part 2: "Conformance test specifications for Decentralized Environmental Notification basic service Messages (DENM); DENM validation report";
 - Part 3: "Conformance test specifications for Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; GeoNetworking validation report";
 - Part 4: "Conformance test specification for GeoNetworking Basic Transport Protocol (BTP); GeoNetworking BTP validation report";
 - Part 5: "IPv6 over GeoNetworking validation report";
 - Part 6: "Validation report".**
-

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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Introduction

In response to EC mandate M/453 [i.6], ETSI Technical Committee ITS has standardized base and test specifications for ITS protocols. In a next step a prototype TTCN-3 test system was built and validated. The present document and its related ETSI TR 103 099 [i.3] (Architecture of Conformance Validation Framework), describe the validation and design of the prototype TTCN-3 test system.

The action described in the present document has supported 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 with a conformance assessment of their implementations. During the lifetime of this action, the conformance validation framework was as well provided at ITS Cooperative Mobility Services Interoperability events.

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

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1 Scope

The present document is the validation report of the ITS Security conformance tests defined in ETSI TS 103 096-3 [i.2] derived from ETSI TS 103 097 (V1.2.1) [i.1]. It provides statistics of executed and validated GeoNetworking conformance tests. The information provided has been produced by validation against at least two prototype implementations from industry.

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>.

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2.2 Informative references

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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.

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 TS 103 097 (V1.2.1): "Intelligent Transport Systems (ITS); Security; Security header and certificate formats".
- [i.2] ETSI TS 103 096-3 (V1.2.1): "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)".
- [i.3] ETSI TR 103 099 (V1.2.1): "Intelligent Transport Systems (ITS); Architecture of conformance validation framework".
- [i.4] 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.5] ETSI ES 201 873-1 (V4.5.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language".
- [i.6] EC mandate M/453: "Standardisation mandate addressed to CEN, CENELEC and ETSI in the field of Information and Communication Technologies to support the interoperability of co-operative Systems for Intelligent Transport in the European Community".
- [i.7] ETSI TS 102 894-2: "Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionary".

3 Abbreviations

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

| | |
|-------|---|
| AA | Authorization Authority |
| ASN.1 | Abstract Syntax Notation One |
| AT | Authorization Ticket |
| ATS | Abstract Test Suite |
| BTP | Basic Transport Protocol |
| CAM | Co-operative Awareness Message |
| CERT | Certificate testing |
| DENM | Decentralized Environmental Notification Messages basic service |
| DEPV | Destination Position Vector |
| EC | European Commission |
| ES | ETSI Standard |
| ITS | Intelligent Transport Systems |
| ITS-S | Intelligent Transport System - Station |
| IUT | Implementation Under Test |
| LS | Location Service |
| MAC | Media Access Control |
| SO | SOurce |
| SQN | SeQuence Number |
| SUT | System Under Test |
| TC | Test Cases |
| TP | Test Purposes |
| TR | Technical Report |
| TS | Technical Standard |
| TTCN | Testing and Test Control Notation |
| UT | Upper Tester |
| UTC | Coordinated Universal Time |

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.4]:

- the test suite has been compiled on more than one TTCN-3 tool;
- the complete suite of tests has been implemented and executed on more than one test platform;
- the complete suite of tests has 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 ITS Security abstract test suite is based on ETSI ES 201 873-1 (V4.5.1) [i.5].

4.2.2 TTCN-3 tools used for compilation

The test suite has been compiled using two different TTCN-3 tools, as detailed in table 1.

Table 1: TTCN-3 tools used for compilation

| Supplier | Tool name | Version | Settings | Compilation result |
|-------------|--------------|---------|--|-------------------------|
| TestingTech | TTworkbench® | 1.1.18 | Support for very large integers ASN.1-Language-Support-v1.1.4 | No error, no warning |
| Elvior™ | TestCast T3™ | 6.8.2 | | 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 Platforms

The validation test platform has been built as described in conformance validation framework ETSI TR 103 099 [i.3] using the components as described in table 2.

Table 2: Validation test platform components

| | |
|---------------------|---|
| TTCN-3 Tool | TestingTech TTworkbench® with ASN.1 support plugin |
| Test Adapter | The applicable software tag is: http://forge.etsi.org/websvn/listing.php?repname=ITS.ITS&path=/tags/v1.2.1/ G5 Radio hardware: Cohda Wireless™ MK2 connected via Ethernet cable |
| Codec | The applicable software tag is: http://forge.etsi.org/websvn/listing.php?repname=ITS.ITS&path=/tags/v1.2.1/ |

4.3.2 SUTs

The SUTs listed in table 3 have been used to validate the GeoNetworking test suite.

Table 3: SUTs used for validation

| Manufacturer | Product name | Version |
|--------------|--------------|-------------|
| COHDA™ | ITS Security | Development |
| COMMSIGNIA™ | ITS Security | Development |
| Hitachi™ | ITS Security | Development |
| IMTECH™ | ITS Security | Development |
| ITRI™ | ITS Security | Development |
| MARBEN™ | ITS Security | Development |
| QMIC™ | ITS Security | Development |
| SIEMENS™ | ITS Security | Development |
| TRIALOG™ | ITS Security | Development |
| UNEX™ | ITS Security | Development |

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4.3.3 Validation Status

Table 4 shows the validation status of each test case of the GeoNetworking abstract test suite.

Table 4: Test case validation status

| ATS Reference | Verdict | Log analysis | Validated |
|------------------------------|---------|--------------|-----------|
| TP_SEC_ITSS_SND_MSG_01_01_BV | PASS | Yes | Yes |
| TP_SEC_ITSS_SND_MSG_04_01_BV | PASS | Yes | Yes |
| TP_SEC_ITSS_SND_MSG_04_02_BV | PASS | Yes | Yes |
| TP_SEC_ITSS_SND_MSG_05_01_BV | PASS | Yes | Yes |
| TP_SEC_ITSS_SND_CAM_02_01_BV | PASS | Yes | Yes |
| TP_SEC_ITSS_SND_CAM_05_01_BV | PASS | Yes | Yes |
| TP_SEC_ITSS_SND_CAM_05_02_BV | PASS | Yes | Yes |