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| ETSI_logo_Office_Colour_Small | ***ToR STF BJ (TC ITS)*** |
| Version: 1.2 |
| Author: A. Berge/G. Craik – Date:03 July 2017 |
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Terms of Reference - Specialist Task Force STF BJ   
(TC ITS / WG5) – “Conformance Validation Framework Security Test Specifications of TS 103 097”

**Summary information**

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| --- | --- |
| Approval status | Approved by TC ITS#26. Recommended by ETSI STF Review panel and agreed by ETSI Board#113 (22/06/2017) |
| Funding | 55 800 EUR |
| Time scale | October 2017 – July 2018 |
| Work Items | RTS/ITS-00542 (TS 103 096-1), RTS/ITS-00543 (TS 103096-2), RTS/ITS-00544 (TS 103 096-3) |
| Board priority category | Standards enablers/facilitators (e.g. conformance test/interoperability/methodology)  Recommendations: use of TTCN and CTI supervision. |

Part I – Reason for proposing the STF

ETSI Test Specifications already cover security communication between ITS stations.

STF 481 and STF 507 produced about 70 mandatory and 240 optional tests, which cover sending, receiving and exceptional behaviours of the ITS station. All these test purposes have been implemented and validated.

Since the closure of STF 517, ETSI TS 103 097 has been changed significantly and the ITS Conformance Test Specifications need to be updated to align to the new base standard revision in order to provide tests which are up to date.

As a by-product, the proposed STF will aid an improvement in the quality of the base specifications. A change request mechanism will be put in place to allow the timely feedback on revealed bugs and inconsistencies of the base specifications into the TC ITS standardization process, and thus achieve optimized base specifications.

# Rationale

In 2010, TC ITS started a STF funded by the EC/EFTA and worked together with ETSI CTI to produce conformance test specifications for the Release 1 of TC ITS CAM, DENM, BTP, GN and GN6 protocols. In 2011/2012 a prototype test system (so called Conformance Validation Framework) was designed, built and validated (see <http://portal.etsi.org/stfs/STF_HomePages/STF424/STF424.asp>). The security layer test suite containing mandatory tests of sending behaviour, was built and validated at the end of 2014.

The Conformance Validation Framework is a reference implementation and is available to all ITS stakeholders. The Conformance Validation Framework enables vendors to assess the level of compliance of their equipment and the Conformance Validation Framework can be used in support of certification schemes. Also, with its high degree of extensibility, it can be used for company internal testing.

This STF proposal is a further action to maintain the ITS Conformance Validation Framework with tests covering all changes provided in TS 103 097 v2.0.5 (stable draft expected in June 2017).

# Objective

The objective of this STF proposal is to revise the PICS document TS 103 096-1, the TSS & TP document TS 103 096-2 and the ATS document TS 103 096-3 to update all necessary tests to be aligned with TS 103 097 v2.0.5.

The revision of PICS, TSS&TP and ATS documents shall be limited to the test groups SEC/ITS-S/ S-DATA and SEC/ITS-S/R-DATA. All other groups are not included in the objective of this STF proposal.

| Root | Group | Group | category |
| --- | --- | --- | --- |
| SEC | TLM/RootCA/DC | CTL/CRL | Normal behaviour |
| Exceptional behaviour |
| EA | ENR | Normal behaviour |
| Exceptional behaviour |
| AA | AUTH | Normal behaviour |
| Exceptional behaviour |
| ITS-S | ENR | Normal behaviour |
| Exceptional behaviour |
| AUTH | Normal behaviour |
| Exceptional behaviour |
| S-DATA | Normal behaviour |
| Receiving and exceptional behaviour |
| R-DATA | Normal behaviour |
| Receiving and exceptional behaviour |

Major tasks include:

* Change typing to ASN.1
* Revise SSP tests
* Revise certificate constraints tests
* All other changes.

Furthermore, the objective of this present STF proposal is to validate the test specification against at least two security implementations.

# Relation with ETSI strategy and priorities

This action supports the ETSI Long Term Strategy item(s) to:

* create high quality standards for global use and with low time-to-market.
* establish leadership in key areas impacting members’ future activities

This action has a priority category of:

* Standards enablers/facilitators (conformance testing, interoperability, methodology)

# Context of the proposal

## ETSI Members support

|  |  |  |
| --- | --- | --- |
| **ETSI Member** | **Supporting delegate** | **Motivation** |
| Renault | Brigitte Lonc | Renault is supporting the STF to update the TS 103 097 test specification. This is very important for the validation of final TS 103 097 standard that shall meet all the requirements expressed by the C-ITS Platform WG Security and enable initial deployment in Europe. |
| Security Innovation | William Whyte | Security Innovation supports this work. It is vital for the success of C-ITS deployment to have full interoperability testing of the up-to-date standards, and security is no exception. Since 103 097 is considering significant changes through the support of ASN.1, planning should begin now for updating the test standards associated with 103 097. |
| Kapsch TrafficCom AG | Tijink Jasja | Kapsch TrafficCom AG supports this work, since standardized testing “against” base standards is core to obtain interoperability. |
| Filatov DV EURL | Denis Filatov | Conformance test specifications are very important to produce quality harmonized standards. |

## Market impact

Interoperability is a key factor that enables the use of new technologies and provides all benefits attached to them, such as competitiveness, innovation and reliability.

ITS technologies are becoming more and more complex, collaborative and interdependent. Furthermore, ITS systems are often specified by multiple standards from different standardization development organisations (SDOs). These factors potentially lead to non-interoperable implementations. The development of products that rely on non-interoperable solutions, can eventually result in fragmented markets, all of which can impact trustworthiness.

Various measures can significantly improve the reliability and interoperability of complex systems such as ITS. The development of test specifications for conformance and interoperability can be coupled with validation activities, such as building prototype test systems. Likewise, the prototype test systems can be used at interoperability events. Consequently, the project contributes to the effort of testing and validation of ITS systems with the goal to bring the ITS systems to a stage where end users trust the services provided.

## Tasks that cannot be done within the TB and for which the STF support is necessary

Experience with the development of other standards has shown that involvement of expertise on conformance and interoperability testing of protocols requires highly specialised knowledge in testing methodology. The generation of this kind of specification requires significant, concentrated effort that can be done in this case by expertise provided on a funded basis. Hence the involvement of testing expertise is needed in order to assure the timely completion and high quality of the Test Specifications. The providers will use dedicated software tools available at ETSI. Test adapter development and test suite validation are tasks which cannot be provided by a TB on a voluntary basis.

## Related voluntary activities in the TB

Delegates within TC ITS and certain WGs will review the deliverables and deal with the Change Requests to the base specifications that that this action will produce.

## Outcome from previous funded activities in the same domain

TC ITS has benefited from STF support in this domain during the last 5 years:

* TC ITS WG2: STF398 (2010)
* TC ITS WG1/3: STF405 (2010-2012)
* TC ITS WG1/3: STF424 (2010-2012)
* TC ITS WG1/3: STF449 (2013)
* TC ITS WG5: STF452 (2013/2014)
* TC ITS WG1/3: STF462 (2013/2014)
* TC ITS WG5: STF481 (2014/2015)
* TC ITS WG1/3: STF484 (2014/2015)
* TC ITS WG5: STF507 (2015/2016)
* TC ITS WG1/3/5: STF517 (2016/2017)
* TC ITS: STF525 (2017/2018)
* TC ITS WG3: STF527 (2017)

## Consequences if not agreed

The production of test specifications as described in the present document is key to the testing and potential certification activities that should assure the interoperability of ITS equipment. Such devices are required to have high levels of interoperability if safety on road is to be kept at the highest level. The non-availability of such standards may cause problems of interoperability.

Part II – Execution of the work

# Technical Bodies and other Organizations involved

## Leading TB

The leading TB is TC ITS.

ITS WG5 will be the lead working group for the Work Items and will approve the work before submission to TC ITS.

ITS WG1 and WG3 are interested by the Work Items as the security protocols mostly cover messages defined by deliverables of those working groups.

## Other interested ETSI Technical Bodies

N/A

## Other interested Organizations outside ETSI

ERTICO – ITS Europe and ETSI have a MoU in place which defines amongst other activities the cooperation on ‘Testing support and certification initiative’.

The C2C CC has been an observer of the TC ITS test activities since 2010.

European Commission funded pre-deployment pilots such as AUTOPILOT, SCOOP@F and Cooperative ITS Corridor Rotterdam – Frankfurt/M. – Vienna, will benefit from the available tests.

# Base documents and deliverables

## Base documents

|  |  |  |  |
| --- | --- | --- | --- |
| **Document** | **Title** | **Current Status** | **Expected date for stable document** |
| ETSI TS 103 097 v2.0.5  (RTS/ITS-00531) | Intelligent Transport Systems (ITS);  Security;  Security header and certificate formats | TB approval | June 2017 |
| ETSI TS 102 940 V2.0.1 | Intelligent Transport Systems (ITS); Security;  Security Architecture and Management | Early draft | no stable document required for the present work |
| ETSI TS 102 941 V1.1.13 | Intelligent Transport Systems (ITS); Security;  Trust and Privacy Management | Stable draft | June 2017 |
| ETSI EN 302 637-2  V1.3.2 | Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service | Published | Available |
| ETSI EN 302 637-3  V1.2.2 | Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 3: Specifications of Decentralized Environmental Notification Basic Service | Published | Available |
| ETSI EN 302 636-4-1  RENITS-00349 | Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 1: Media-Independent Functionality | Under revision | April 2017 |
| ETSI TS 103 301  V1.1.1 | Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Facilities layer protocols and communication requirements for infrastructure services | Published | Available |

## Deliverables

|  |  |  |
| --- | --- | --- |
| **Deliv.** | **Work Item code**  **Standard number** | **Working title**  **Scope** |
| D1 | RTS/ITS-00542  TS 103 096-1 | Title: Intelligent Transport Systems (ITS); Testing; Conformance test specification for ITS Security; Part 1: Protocol Implementation Conformance Statement (PICS)  Scope: Update the PICS regarding the receiving and exceptional behaviour of ITS stations defined in TS 102 941 and TS 103 097. |
| D2 | RTS/ITS-00543  TS 103 096-2 | Title: Intelligent Transport Systems (ITS); Testing; Conformance test specification for ITS Security; Part 2: Test Suite Structure and Test Purposes (TSS & TP)  Scope: Update the TSS&TP regarding the receiving and exceptional behaviour of ITS stations defined in TS 102 941 and TS 103 097. |
| D3 | RTS/ITS-00544  TS 103 096-3 | Title: Intelligent Transport Systems (ITS); Testing; Conformance test specification for ITS Security; Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)  Scope: Develop a test suite for tests of receiving and exceptional behaviour of ITS stations defined in TS 102 941 and TS 103 097. |

## Deliverables schedule:

RTS/ITS-00534, RTS/ITS-00535, RTS/ITS-00536: Security Testing PICS, TSS&TP and ATS

* Start of work 02-Oct-2017
* ToC and scope 10-Oct-2017
* Early draft 01-Nov-2017 RC
* Stable draft 31-Dec-2017 ITS#29
* Final draft 01-Jun-2018 for WG approval ITS#30
* WG approval 01-Jun-2018 WG approval ITS#30
* TB approval 01-Jun-2018 TC ITS approval ITS#30
* Publication 01-Jul-2018

# Work plan, time scale and resources

## Work plan, time scale and resources

|  |  |  |
| --- | --- | --- |
| **N** | **Task / Milestone / Deliverable** | Target date |
| M0 | Start of work | Oct 2017 |
| T0 | Project management, reporting, meeting attendance, CTI supervision | Oct 2017 – Apr 2018 |
| T1 | Updating of TSS&TP | Oct – Nov 2017 |
| M1 | Early draft and Progress Report available  ITS#28 Progress Report approved | 1 Nov 2017  15 Nov 2017 |
| T2 | Codec and Test Adapter development | Nov 2017 – Jan 2018 |
| T3 | Updating of TTCN-3 scripts | Nov 2017 – Jan 2018 |
| M2 | Stable draft available  ITS#29 Progress Report approved | 31 Dec 2017 Jan 2018 |
| T4 | ATS Validation | Jan – Feb 2018 |
| T5 | Plugtests support | Feb 2018 |
| T6 | TS updates | Feb – Mar 2018 |
| T7.1 | Review of stable drafts (editHelp, WGs, TC ITS) | Mar 2018 |
| T7.2 | Inclusion of comments from stable draft review | Mar 2018 |
| M3 | Final draft approved by ITS WG5 | Apr 2018 |
| T7.3 | Preparation of Final Report | Apr – May 2018 |
| T7.4 | TC ITS approval deliverables and Final Report | Jun 2018 |
| M4 | Final Report approved | Jun 2018 |
| T7.5 | Publication | Jun – Jul 2018 |
| M5 | Deliverables published, STF closed | Jul 2018 |
| **Total** | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Task Milest.** | **Description** | **O** | **N** | **D** | **J** | **F** | **M** | **A** | **M** | **J** | **J** | **A** |
| M0 | Start of work |  |  |  |  |  |  |  |  |  |  |  |
| T0 | Project management |  |  |  |  |  |  |  |  |  |  |  |
| T1 | Update of TSS&TP |  |  |  |  |  |  |  |  |  |  |  |
| M1 | Progress Report ITS#24 (early draft) |  |  |  |  |  |  |  |  |  |  |  |
| T2 | Codec and Test Adapter updates |  |  |  |  |  |  |  |  |  |  |  |
| T3 | Update of TTCN-3 scripts |  |  |  |  |  |  |  |  |  |  |  |
| M2 | Progress Report ITS#25 (stable draft) |  |  |  |  |  |  |  |  |  |  |  |
| T4 | ATS Validation |  |  |  |  |  |  |  |  |  |  |  |
| T5 | Plugtests Attendance |  |  |  |  |  |  |  |  |  |  |  |
| T6 | TS Updates |  |  |  |  |  |  |  |  |  |  |  |
| T7.1 | Review of stable drafts |  |  |  |  |  |  |  |  |  |  |  |
| T7.2 | Inclusion of comments |  |  |  |  |  |  |  |  |  |  |  |
| M3 | Final draft approved by ITS WG5 |  |  |  |  |  |  |  |  |  |  |  |
| T7.3 | Preparation of Final Report |  |  |  |  |  |  |  |  |  |  |  |
| T7.4 | TC ITS approval deliverables and Final Report |  |  |  |  |  |  |  |  |  |  |  |
| M4 | Final Report approved |  |  |  |  |  |  |  |  |  |  |  |
| T7.5 | Publication |  |  |  |  |  |  |  |  |  |  |  |
| M5 | Deliverables published, STF closed |  |  |  |  |  |  |  |  |  |  |  |

*NOTE: Effort estimate includes margin to take into account uncertainty on the technical difficulties. Contracts will be released under the supervision of ITS WG5 and CTI, in order to ensure that only the amount of resources that are actually required will be spent.*

## Task description

Task T0: Project Management

* Attending Technical Body and WG meetings
* Organisation of Devices Under Test (DUTs): communication with providers, establishment of VPN connections, etc.
* Coordination, communication, reporting and leading of activities

This task is under the responsibility of ETSI CTI.

Task T1: Development of TSS&TP

Develop of tests purposes according to base standard revisions:

* Security trust and privacy management (ETSI TS 103 097)

Furthermore, test purposes will be updated according to issues found during the validation phase.

Task T2 – Codec and Test Adapter updates

The Codec and TA software shall be delivered as source code including all source code modules needed for the compilation into an executable version of the software. The software shall be test platform independent. All software shall be accessible from <https://forge.etsi.org>

Task T3 – Development of TTCN-3 scripts

Develop the TTCN-3 part of the ATS test specifications. This applies to test groups SEC/ITS-S/ S-DATA and SEC/ITS-S/R-DATA only.

Task T4: ATS validation

The ITS Conformance Validation Framework shall be validated against a minimum of at least two SUTs. SUTs need to be available at the ETSI premises. In addition and beyond the STF effort, it is expected to get documentation and support from the company providing the SUTs on any issues that may arise. This support shall be limited to reasonable effort.

This STF will provide **level 2 validation**, i.e.:

* Extension and maintenance of the ITS Conformance Validation Framework
* Provision and installation of SUT(s)
* Execution of the tests
* Reporting of errors in the ITS Conformance Validation Framework
* Validation of test verdicts

Task T5: Plugtests support

At least one STF member shall attend the planned ITS Security Plugtest and provide support for conformance tests. The team will provide an on-demand support for the debugging of erroneous device behaviour during the preparation and complete duration of the Plugtest.

Task T6: TS updates

Production of the PICS, TSS&TP and ATS documents. Transfer of findings of the validation process into the test specification, i.e. into the three-part document (ETSI TS) covering PICS, TSS&TP and ATS&PIXIT.

Part 1: PICS: Addition of PICS items where necessary.

Part 2: TSS&TP: Updating test purposes, preparing final document.

Part 3: ATS&PIXIT: Update of the documentation

Task T7: TC ITS approval and publication

**T7.1 – Review of stable drafts**

Before reaching the status of stable draft, the STF will submit the draft deliverables to editHelp for clean-up. The STF will then present the *stable drafts* in parallel to TC ITS WG5 and TC ITS for comments and to the ETSI Secretariat for pre-processing.

T7.2 – Inclusion of comments from stable draft review

The STF will include the comments received from the *stable draft* review and produce the *final drafts* of the deliverables for WG and TC approval.

**T7.3 – Preparation of Final Report**

During the WG approval period, the STF Leader will prepare the Final Report, including the assessment of the Performance Indicators.

**T7.4 – TC ITS approval of the final drafts and final report**

The ETSI Secretariat will submit the *final drafts* and the Final Report to TC ITS for approval.

## Milestones

Milestone 1 – Early draft available

Early draft including the result of Task 1 (Development of TSS&TP) available for review. Progress Report to be approved by Remote Consensus in November 2017. Documents must be uploaded on the TC docbox at least two weeks before the start of the TC RC.

Milestone 2 – Stable draft available

Stable drafts with the complete technical content of PICS, TSS&TP and ATS&PIXIT available for final review. Progress Report approved by ITS#29. Documents must be uploaded on the TC docbox at least two weeks before the start of the TC plenary.

Milestone 3 – Final draft available

All deliverables required by these ToR are available and ready for approval by ITS WG5.

Milestone 4 – Deliverables and STF Final Report approved by TC ITS

All deliverables required by these ToR approved by TC ITS (#31 or RC) and accepted by the ETSI Secretariat for publication. STF Final Report approved by TC ITS (#31 or RC).

Milestone 5 – Deliverables published, STF closed

Deliverables approved by TC ITS and published by ETSI. STF closed.

## Working methods

The STF is under the monitoring and responsibility of TC ITS (WG5), working together with and under the quality control of ETSI CTI. The work will be partially performed remotely, at the contractor’s premises and partially in common sessions in the ETSI premises, to ensure coordination. The participation to the Plugtests event will require a mission travel, which will be reimbursed by ETSI for real cost, under the travel budget.

The following preliminary assumption can be made for the location of the work:

* Task T1: Development of TSS&TP: 90% remote, 10% ETSI
* Task T2: Codec and Test Adapter development: 90% remote, 10% ETSI
* Task T3: Development of TTCN-3 scripts: 90% remote, 10% ETSI
* Task T4: ATS Validation : 100% ETSI
* Task T5: Plugtests Attendance: 100% remote
* Task T6: TS Updates: 100% remote

# Expertise required

Up to 2 service providers to ensure the following mix of skills:

* expert knowledge of TS 102 940, TS 102 941, ETSI EN 103 097;
* expert knowledge of TTCN-3 (ES 201 873);
* expert knowledge in conformance testing;
* expert knowledge in codec and adaptation layer development in Java and C++;
* expert knowledge of ITS Security technologies and implementations;

Part III: Financial conditions

# Maximum budget

The maximum budget for this action will be 55 800 €

## Contractors cost

Maximum budget **52 200 €**

## Travel Costs

Minimum budget estimated at 3 600 €, including reimbursement or real costs

* Travel for 1 or 2 persons to the ITS Plugtests event (Task 5)
* Presentation of progress reports and results to TC ITS and its WGs

## Other Costs

N/A

# Part IV: STF performance evaluation criteria

# Key Performance Indicators

* Contribution from the ETSI Members
  + Number of WG/TC delegates involved in the review of the deliverables
  + Number of comments received
  + Number of Companies providing and installing devices to be tested, free of charge
  + Number of Companies providing the hardware of the ITS test platform during the project.
* Interest from stakeholders other than ETSI Members
  + number of implementations using the test system in the pre-qualification and during the ITS Plugtests
* Quality of deliverables
  + Approval of deliverables from the Reference TB according to schedule
  + Respect of time scale, with reference to start/end dates in the approved ToR

In the course of the activity, the STF Leader will collect the relevant information, as necessary to measure the performance indicators. The result will be presented in the Final Report.

# Document history

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| --- | --- | --- | --- | --- |
|  | **Date** | **Author** | **Status** | **Comments** |
| 0.0 | 23-Mar-2017 | Denis Filatov | First draft |  |
| 0.1 | 19-Apr-2017 | Gavin Craik | Secretariat |  |
| 0.2 | 11-May-2017 | Dennis Filatov & Alexandre Berge (CTI) | 2nd draft |  |
| 1.0 | 10-May-2017 |  | Clean version for OCG/Board consultation |  |
| 1.1 | 5-Jun-2017 | Alexandre Berge/Gavin Craik | Version for ETSI Board#113 agreement | Amended financial details |
| 1.1 | 22-Jun-2017 |  | Board#113 accepted |  |
| 1.2 | 03-Jul-2017 | ETSI Secretariat | Final | Clean version for CfE |