A TTCN-3-BASED COMPLIANCE ASSESSMENT FRAMEWORK FOR INTELLIGENT TRANSPORT SYSTEMS (ITS)

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ETSI TC ITS – Minimum set of standards for interoperability

Release 2
Adaptive Cruise Control, Platooning, Vulnerable Road User Safety

More than 50 base standards for Release 1 published
Maintenance

More than 18 test Specifications and validation report published
Maintenance

ITS Applications

ITS Facilities

ITS Network & Transport

ITS Access Technologies

ITS Security

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<th>ETSI TC ITS – Major Achievements</th>
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<td><strong>Application</strong></td>
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<td>• V2V/V2I standards</td>
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<td><strong>Facility</strong></td>
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<tr>
<td>• EN 302 637-2 CAM</td>
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<td>• EN 302 637-3 DENM</td>
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<td><strong>Transport/Network</strong></td>
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<td>• EN 302 634-4-1 GeoNetworking</td>
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<td><strong>Access</strong></td>
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<td>• IEEE 802.11p profile</td>
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<td>• Congestion Control</td>
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<td><strong>Security</strong></td>
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<tr>
<td>• TS 103 097 Security Header and Certificate Formats</td>
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<td>• Public Key Infrastructure (PKI)</td>
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<td><strong>Release 1</strong></td>
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<td>• TR 101 607 published</td>
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C2C-CC Organisation

Development and deployment of ITS

Partners with strong strategic interest

700 members from 60 countries driving ICT Standardization
Member and consensus driven
European Commission acceptance - regulatory role
ETSI TC ITS standardization activities for ITS

Standards organisations
27 member states
Deployment preparation towards a competitive environment

- Profiling of standards
- Minimum performance Requirements
- Position and Time
- Forwarding capabilities

- Message formats
- Triggering conditions
- System requirements

- Systems specification
- Sender application specification
- Security PKI
- Compliance assessment

- Public Key infrastructure
- Security/privacy policies

- Compliance assessment/ certification and test procedures
Certification framework for cooperative ITS for COMPASS4D smart cities applications

Road Hazard Warning (RHW)
Red Light Violation Warning (RLVW)
Energy Efficient Intersection (EEI)
ETSI TC ITS Test Activities

Conformance Validation Framework
- ITS Test Framework ETSI EG 202 798
- Test Architecture ETSI TR 103 099
- CAM Tests ETSI TS 102 868
- DENM Tests ETSI TS 102 869
- GeoNetworking Tests ETSI TS 102 871

Interop Validation Framework
- ITS Test Framework ETSI EG 202 798
- End-to-End Tests
- Event Detection and Propagation verification

Open Source Platform
- Standardized test system interfaces for test execution, logging, and adaptation
- Free tests, codec and adaptation
- Tests implemented in the international standardized testing language TTCN-3

65 person month of effort invested since 2010
Conformance Test Architecture
• ItsNodeA is not in IUT’s communication range
• ItsNodeA is in Area 2

• ItsNodeB is in IUT’s communication range
• ItsNodeB is in direction of ItsNodeA
• ItsNodeB is closer to ItsNodeA than ItsNodeD
• ItsNodeB is in Area 1
• ItsNodeB is in Area 2.
• ItsNodeB is close to the center of Area2

• ItsNodeC is in IUT’s communication range
• ItsNodeC is not in direction of ItsNodeA

• ItsNodeD is in IUT’s communication range
• ItsNodeD is in direction of ItsNodeA
• ItsNodeD is in Area 1
• ItsNodeD is in Area 2
• IUT is in Area 1
Interoperability Test System
Open Source Platform

• Extensible with future ITS protocol tests
• Platform-independent in using Java
• Usage of ANSI C as adaptation possible as well
• Compatible with TTCN-3 tools
• Multi link layer support

Software is distributed via ETSI source forge under CeCILL-C license
https://forge.etsi.org/svn/ITS/
Conclusion

- Major ITS deployment preparations towards a competitive environment and region wide interoperability
- Testing (and TTCN-3) is integral part of deployment roadmaps
- ETSI Release 1 covers for initial deployment with Basic Warning Services
- Work on ETSI Release 2 has started with focus on fusion of ITS and Smart Cities, automation and advanced services
- In future more testing services are required
- Join the ITS Testing Community!
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Thank you!