



Technical Specification

**Intelligent Transport Systems (ITS);
Testing;
Conformance test specifications for Transmission of
IP packets over GeoNetworking;
Part 2: Test Suite Structure and Test Purposes (TSS & TP)**

STANDARDS PREVIEW
https://standards.iso.org/standards/catalog/454baded-9150-470f-9d8c-5b0312b26666/etsi-ts-102-859-2-v1.2.1-

ReferenceRTS/ITS-0030030

KeywordsIPv6, ITS, network, testing, TSS&TP

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2014.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	4
Foreword.....	4
1 Scope	5
2 References	5
2.1 Normative references	5
2.2 Informative references.....	5
3 Definitions and abbreviations.....	6
3.1 Definitions.....	6
3.2 Abbreviations	6
4 Test Suite Structure (TSS).....	7
4.1 Structure for IPV6overGEONET tests	7
4.2 Test groups	7
4.2.1 Root	7
4.2.2 Groups	7
4.2.3 Sub-groups.....	7
4.2.4 Categories	7
5 Test Purposes (TP)	8
5.1 Introduction	8
5.1.1 TP definition conventions.....	8
5.1.2 TP Identifier naming conventions.....	8
5.1.3 Rules for the behaviour description	8
5.1.4 Sources of TP definitions.....	8
5.1.5 Mnemonics for PICS reference.....	9
5.2 Test purposes for IPV6overGEONET.....	9
5.2.1 Message Generation.....	9
5.2.1.1 GVL	9
5.2.1.2 TVL.....	12
5.2.2 Message Reception	13
5.2.2.1 GVL	13
5.2.2.2 TVL.....	18
5.2.3 Virtual Interface Management.....	19
5.2.3.1 New virtual interfaces	19
5.2.3.2 Expired virtual interfaces	19
History	20

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

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

The present document is part 2 of a multi-part deliverable covering Conformance test specifications for Transmission of IP packets over GeoNetworking as identified below:

- Part 1: "Test requirements and Protocol Implementation Conformance Statement (PICS) proforma";
- Part 2: "Test Suite Structure and Test Purposes (TSS & TP)";**
- Part 3: "Abstract Test Suite (ATS) and Protocol Implementation Extra Information for Testing (PIXIT)".

PREVIEW
iTech STANDARDS
(standards.iteh.ai)
Full standard
https://standards.iteh.ai/catalog/standards/sist/42-859-2-v1.2.1-9150-470f-9d8c-5b05892be346/etsi-ts-102-859-2-v1.2.1-2014-04

1 Scope

The present document provides the Test Suite Structure and Test Purposes (TSS&TP) for Transmission of IP packets over GeoNetworking as defined in EN 302 636-6-1 [1] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [6].

The ISO standard for the methodology of conformance testing (ISO/IEC 9646-1 [3] and ISO/IEC 9646-2 [4]) as well as the ETSI rules for conformance testing (ETS 300 406 [7]) 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 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>.

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 necessary for the application of the present document.

- [1] ETSI EN 302 636-6-1 (V1.2.0): "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 6: Internet Integration; Sub-part 1: Transmission of IPv6 Packets over GeoNetworking Protocols".
- [2] ETSI TS 102 859-1 (V1.2.1): "Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Transmission of IP packets over GeoNetworking; Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma".
- [3] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [4] ISO/IEC 9646-2 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".
- [5] Void.
- [6] ISO/IEC 9646-7 (1995): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".
- [7] ETSI ETS 300 406 (1995): "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".
- [8] IEEE 802.3™-2008: "EEE Standard for Information Technology - Telecommunications and information exchange between systems-Local and metropolitan area networks - Specific requirements - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications".

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 EG 202 798 (V1.1.1): "Intelligent Transport Systems (ITS); Testing; Framework for conformance and interoperability testing".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 302 636-6-1 [1], ISO/IEC 9646-1 [3] and in ISO/IEC 9646-7 [6] apply.

3.2 Abbreviations

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

BI	Invalid Behaviour
BV	Valid Behaviour
DEPV	Destination Position Vector
DGVL	Dynamic Geographical Virtual Link
EUI	Extended Unique Identifier
EVI	Expired virtual interfaces
GVL	Geographical Virtual Link
HT	Header Type
IID	Interface Identifier
IP	Internet Protocol
IPv6	Internet Protocol version 6
ITS	Intelligent Transportation Systems
IUT	Implementation Under Test
LAN	Local Area Network
MAC	Media Access Control
MG	Message Generation
MIB	Management Information Base
MR	Message Reception
NBMA	Non-Broadcast Multi-Access
NH	Next Header
NVI	New virtual interfaces
PICS	Protocol Implementation Conformance Statement
RA	Router Advertisement
SAP	Service Access Point
SGVL	Static Geographical Virtual Link
SOPV	Source Position Vector
SRC	Source address
TP	Test Purposes
TSB	Topologically Scoped Broadcast
TSS	Test Suite Structure
TVL	Topological Virtual Link
VM	Virtual Interface Management

4 Test Suite Structure (TSS)

4.1 Structure for IPV6overGEONET tests

Table 1 shows the IPV6overGEONET Test Suite Structure (TSS) including its subgroups defined for conformance testing.

Table 1: TSS for IPV6overGEONET

Root	Group	Sub-group	category
IPv6GEO	Message Generation	GVL	Valid behaviour
		TVL	Valid behaviour
	Message Reception	GVL	Valid behaviour
		TVL	Valid behaviour
	Virtual Interface Management	New virtual interfaces	Valid behaviour
		Expired virtual interfaces	Valid behaviour

The test suite is structured as a tree with the root defined as IPv6GEO. The tree is of rank 3 with the first rank a Group, the second a Sub-group and the third a Category. The third rank is the standard ISO conformance test categories.

4.2 Test groups

4.2.1 Root

The root identifies the Transmission of **IP packets** over GeoNetworking given in EN 302 636-6-1 [1].

4.2.2 Groups

This level contains three functional areas identified as: Message Generation, Message Reception, and Virtual Interface Management.

4.2.3 Sub-groups

This level contains four sub-functional areas identified as: GVL, TVL, New virtual interfaces, and Expired virtual interfaces.

4.2.4 Categories

This level contains the standard ISO conformance test categories limited to the valid behaviour.

5 Test Purposes (TP)

5.1 Introduction

5.1.1 TP definition conventions

The TPs are defined by the rules shown in table 2.

Table 2: TP definition rules

TP Header	
TP ID	The TP ID is a unique identifier. It shall be specified according to the TP naming conventions defined in clause 5.1.2.
Test objective	Short description of test purpose objective according to the requirements from the base standard.
Reference	The reference indicates the sub-clauses of the reference standard specifications in which the conformance requirement is expressed.
PICS Selection	Reference to the PICS statement involved for selection of the TP. Contains a Boolean expression.
TP Behaviour	
Initial conditions	The initial conditions define in which initial state the IUT has to be to apply the actual TP. In the corresponding Test Case, when the execution of the initial condition does not succeed, it leads to the assignment of an Inconclusive verdict.
Expected behaviour (TP body)	Definition of the events, which are parts of the TP objective, and the IUT are expected to perform in order to conform to the base specification. In the corresponding Test Case, Pass or Fail verdicts can be assigned there.
Final conditions	Definition of the events that the IUT is expected to perform or shall not perform, according to the base standard and following the correct execution of the actions in the expected behaviour above. In the corresponding Test Case, the execution of the final conditions is evaluated for the assignment of the final verdict.

5.1.2 TP Identifier naming conventions

The identifier of the TP is built according to table 3.

Table 3: TP naming convention

Identifier:	TP/<root>/<gr>/<sgr>/<x>/<nn>		
	<root> = root	IPv6GEO	IPv6 over GeoNetworking
	<gr> = group	MG	Message Generation
		MR	Message Reception
		VM	Virtual Interface Management
	<sgr> = subgroup	GVL	GVL
		TVL	TVL
		NVI	New virtual interfaces
		EVI	Expired virtual interfaces
	<x> = type of testing	BV	Valid Behaviour tests
		BI	Invalid Syntax or Behaviour Tests
	<nn> = sequential number		01 to 99

5.1.3 Rules for the behaviour description

The description of the TP is built according to EG 202 798 [i.1].

5.1.4 Sources of TP definitions

All TPs are specified according to EN 302 636-6-1 [1].

5.1.5 Mnemonics for PICS reference

To avoid an update of all TP tables when the PICS document is changed, the following table introduce mnemonics name and the correspondence with the real PICS item number.

Table 4: Mnemonics for PICS reference

Mnemonic	PICS item
PICS_SGVL	A.6/1 [2]
PICS_DGVL	A.6/2 [2]
PICS_TVL	A.6/3 [2]
PICS_Ethernet	A.7/1 [2]

5.2 Test purposes for IPV6overGEONET

5.2.1 Message Generation

5.2.1.1 GVL

TP Id	TP/IPV6GEO/MG/GVL/BV/01
Test objective	Checks that an IPv6 link-local multicast message is carried out over a GeoBroadcast message into the correct geographical area, when sent over an SGVL
Reference	EN 302 636-6-1 [1], clauses 8.2.1 and 9.2.1
PICS Selection	PICS_SGVL
Initial conditions	
with { the IUT having a configured SGVL (SGVL1) the IUT's Upper Layer being configured to use the virtual interface associated with SGVL1 to send link-local multicast packets }	
Expected behaviour	
ensure that { when { the IUT receives an IPV6 packet from the Upper Layer containing destination address indicating a link-local multicast IPv6 address } then { the IUT sends a valid GeoNetworking GeoBroadcast message containing the geographical Destination area corresponding to SGVL1 containing NH field indicating value '3' containing HT field indicating value '4' carrying the IPv6 packet received from Upper Layer as payload } }	

TP Id	TP/IPv6GEO/MG/GVL/BV/02
Test objective	Checks that an IPv6 global-scoped unicast-prefix-based multicast message is carried out over a GeoBroadcast message into the correct geographical area, when sent over an SGVL
Reference	EN 302 636-6-1 [1], clauses 8.2.1 and 9.2.1
PICS Selection	PICS_SGVL
Initial conditions	
with { the IUT having a configured SGVL (SGVL1) }	
Expected behaviour	
ensure that { when { the IUT receives an IPV6 packet from the Upper Layer containing destination address containing a global-scoped unicast-prefix-based multicast IPv6 address indicating prefix associated with SGVL1 } then { the IUT sends a valid GeoNetworking GeoBroadcast message containing the geographical Destination area corresponding to SGVL1 containing NH field indicating value '2' containing HT field indicating value '4' carrying the IPv6 packet received from Upper Layer as payload } }	

TP Id	TP/IPv6GEO/MG/GVL/BV/03
Test objective	Checks that an IPv6 Geographic anycast message is carried out over a GeoAnycast message into the correct geographical area, with an SGVL link manually configured
Reference	EN 302 636-6-1 [1], clauses 8.2.1 and 9.4
PICS Selection	PICS_SGVL
Initial conditions	
with { the IUT having a configured SGVL (SGVL1) the IUT's Upper Layer being configured to use the virtual interface associated with GVL1 to send Geographic anycast packets }	
Expected behaviour	
ensure that { when { the IUT receives an IPV6 packet from the Upper Layer containing destination address indicating a Geographic anycast IPv6 address } then { the IUT sends a valid GeoNetworking GeoAnycast message containing the geographical Destination area corresponding to GVL1 containing NH field indicating value '3' containing HT field indicating value '3' carrying the IPv6 packet received from Upper Layer as payload } }	