ETSI TS 102 859-2 V1.2.1 (2014-04)

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)

Reference
RTS/ITS-0030030

Keywords
IPv6, 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

Contents

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)".

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
}
}	

TP Id	TP/IPv6GEO/MG/GVL/BV/04
Test objective	Checks that an IPv6 unicast message is carried out over a GeoUnicast when using an SGVL associated to an Ethernet V2.0/IEEE 802.3™ [8] LAN type virtual interface with address resolution
Reference	EN 302 636-6-1 [1], clauses 8.2.1 and 10.3
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
    the IUT being configured with MIB attribute itsgn6aslVIResolAddr set to true
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives an IPV6 packet from the Upper Layer
            containing destination address
                indicating unicast IPv6 address of the Tester
    }
    then {
        the IUT sends a valid GeoUnicast message
            containing DEPV field
                containing GN_ADDR field
                    indicating value derived from the unicast IPv6 address IID
            containing NH field
                indicating value '3'
            containing HT field
                indicating value'2'
            carrying the IPv6 packet received from Upper Layer as payload
    }
}
```

TP Id	TP/IPv6GEO/MG/GVL/BV/05
Test objective	Checks that an IPv6 unicast message is carried out over a GeoUnicast when using an SGVL associated to an Ethernet V2.0/IEEE 802.3™ [8] LAN type virtual interface without address resolution
Reference	EN 302 636-6-1 [1], clauses 8.2.1 and 10.3
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
    the IUT being configured with MIB attribute itsgn6aslVIResolAddr set to false
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives an IPV6 packet from the Upper Layer
            containing destination address
                indicating unicast IPv6 address of the Tester
    }
    then {
        the IUT sends a valid GeoUnicast message
            containing DEPV field
                containing GN_ADDR field
                    indicating value derived from the GN6_SAP destination parameter
            containing NH field
                indicating value '3'
            containing HT field
                indicating value'2'
            carrying the IPv6 packet received from Upper Layer as payload
    }
}
```

5.2.1.2 TVL

TP Id	TP/IPv6GEO/MG/TVL/BV/01
Test objective	Checks that an IPv6 unicast message is carried out over a GeoUnicast when using a TVL virtual interface with address resolution
Reference	EN 302 636-6-1 [1], clause 8.2.1
PICS Selection	PICS_TVL
Initial conditions	

with {
the IUT having a configured TVL (TVL1)
the IUT's Upper Layer being configured to use the virtual interface associated with TVL1
the IUT being configured with MIB attribute *itsgn6aslVIResolAddr* set to true
}	

Expected behaviour	

ensure that {
when {
the IUT receives an IPV6 packet from the Upper Layer
containing destination address
indicating unicast IPv6 address of the Tester
}
then {
the IUT sends a valid GeoUnicast message
containing DEPV field
containing GN_ADDR field
indicating value derived from the unicast IPv6 address IID
containing NH field
indicating value '3'
containing HT field
indicating value'2'
carrying the IPv6 packet received from Upper Layer as payload
}
}	

TP Id	TP/IPv6GEO/MG/TVL/BV/02
Test objective	Checks that an IPv6 unicast message is carried out over a GeoUnicast when using a TVL virtual interface without address resolution
Reference	EN 302 636-6-1 [1], clause 8.2.1
PICS Selection	PICS_TVL
Initial conditions	

with {
the IUT having a configured TVL (TVL1) and
the IUT's Upper Layer being configured to use the virtual interface associated with TVL1
the IUT being configured with MIB attribute *itsgn6aslVIResolAddr* set to false
}	

Expected behaviour	

ensure that {
when {
the IUT receives an IPV6 packet from the Upper Layer
containing destination address
indicating unicast IPv6 address of the Tester
}
then {
the IUT sends a valid GeoUnicast message
containing DEPV field
containing GN_ADDR field
indicating value derived from the GN6_SAP destination parameter
containing NH field
indicating value '3'
containing HT field
indicating value'2'
carrying the IPv6 packet received from Upper Layer as payload
}
}	

TP Id	TP/IPv6GEO/MG/TVL/BV/03
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 a TVL
Reference	EN 302 636-6-1 [1], clauses 8.2.1 and 9.2.1
PICS Selection	PICS_TVL
Initial conditions	

with {
the IUT having a configured TVL (TVL1)
the IUT's Upper Layer being configured to use the virtual interface associated with TVL1 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 TSB message
containing NH field
indicating value '3'
containing HT field
indicating value'5
carrying the IPv6 packet received from Upper Layer as payload
}
}	

5.2.2 Message Reception

5.2.2.1 GVL

TP Id	TP/IPv6GEO/MR/GVL/BV/01
Test objective	Checks handling of a received GeoBroadcast message containing an IPv6 packet, which has destination area corresponding to an existing SGVL of the IUT
Reference	EN 302 636-6-1 [1], clause 8.2.2
PICS Selection	PICS_SGVL
Initial conditions	

with {
the IUT having configured SGVL (SGVL1)
the IUT having configured SGVLs (SGVL2 .. SGVLx)
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast message
containing Destination Area parameters corresponding to SGVL1
containing payload
indicating an IPv6 packet
}
then {
the IUT transmits on the virtual interface associated to SGVL1 an Ethernet packet
containing Destination MAC address
indicating the broadcast value
containing Source MAC address
indicating a value derived from Source GN_ADDR field
containing Ether Type value
indicating IPv6
containing the IPv6 packet
}
}	

TP Id	TP/IPv6GEO/MR/GVL/BV/02
Test objective	Checks handling of a received GeoBroadcast message containing an IPv6 packet not carrying a Router Advertisement, which has destination area not corresponding to any existing GVL of the IUT
Reference	EN 302 636-6-1 [1], clause 8.2.2
PICS Selection	PICS_SGVL and PICS_DGVL
Initial conditions	

with {
the IUT having configured SGVLs (SGVL1 .. SGVLx)
the IUT having configured DGVL (DGVL1)
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast message
containing Destination Area parameters not corresponding to any GVLs
containing payload
containing an IPv6 packet
not containing an ICMPv6 RA message
}
then {
the IUT transmits on the virtual interface associated to DGVL1 an Ethernet packet
containing Destination MAC address
indicating the broadcast value
containing Source MAC address
indicating a value derived from Source GN_ADDR field
containing Ether Type value
indicating IPv6
containing the IPv6 packet
}
}	

TP Id	TP/IPv6GEO/MR/GVL/BV/03
Test objective	Checks handling of a received GeoAnycast message containing an IPv6 packet, which has destination area corresponding to an existing SGVL of the IUT
Reference	EN 302 636-6-1 [1], clause 8.2.2
PICS Selection	PICS_SGVL
Initial conditions	

with {
the IUT having configured SGVLs (SGVL1 .. SGVLx)
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoAnycast message
containing Destination Area parameters corresponding to SGVL1
containing payload
indicating an IPv6 packet
}
then {
the IUT transmits on the virtual interface associated to SGVL1 an Ethernet packet
containing Source MAC address
indicating a value derived from Source GN_ADDR field
containing Ether Type value
indicating IPv6
containing the IPv6 packet
}
}	

TP Id	TP/IPv6GEO/MR/GVL/BV/04
Test objective	Checks handling of a received GeoAnycast message containing an IPv6 packet, which has destination area not corresponding to any existing GVL of the IUT
Reference	EN 302 636-6-1 [1], clause 8.2.2
PICS Selection	PICS_SGVL and PICS_DGVL

Initial conditions

```
with {

    the IUT having configured SGVLs (GVL1 .. GVLx)
    the IUT having configured a DGVL (DGVL1)
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoAnycast message
            containing Destination Area parameters not corresponding to any SGVLs and
            containing payload
                indicating an IPv6 packet
    }
    then {
        the IUT transmits on the virtual interface associated to DGVL1 an Ethernet packet
            containing Destination MAC address
                indicating the broadcast value
            containing Source MAC address
                indicating a value derived from Source GN_ADDR field
            containing Ether Type value
                indicating IPv6
            containing the IPv6 packet
    }
}
```

TP Id	TP/IPv6GEO/MR/GVL/BV/05
Test objective	Checks handling of a received GeoBroadcast message containing an IPv6 packet carrying a Router Advertisement, which has destination area not corresponding to any existing GVL of the IUT
Reference	EN 302 636-6-1 [1], clause 8.2.2
PICS Selection	PICS_SGVL

Initial conditions

```
with {
    the IUT having configured SGVLs (SGVL1 .. SGVLx)
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoBroadcast message
            containing Destination Area parameters not corresponding to any SGVLs
                containing an IPv6 packet
                    containing an ICMPv6 RA message
    }
    then {
        the IUT creates a new SGVL and a new virtual interface associated to it
        the IUT transmits on the virtual interface associated to the new GVL an Ethernet packet
            containing Destination MAC address
                indicating '33:33:00:00:00:01'
            containing Source MAC address
                indicating a value derived from Source GN_ADDR field
            containing Ether Type value
                indicating IPv6
            containing the IPv6 packet
    }
}
```

TP Id	TP/IPv6GEO/MR/GVL/BV/06
Test objective	Checks handling of a received GeoUnicast message, containing an IPv6 packet with destination address matching one and only one address associated to a virtual interface of the IUT
Reference	EN 302 636-6-1 [1], clause 8.2.2
PICS Selection	PICS_SGVL

Initial conditions

```
with {
    the IUT having configured SGVLs (SGVL1 .. SGVLx)
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoUnicast message
            containing payload
                containing an IPv6 packet
                    containing a destination address
                        indicating address associated to one SGVL (SGVLy)
    }
    then {
        the IUT transmits on the virtual interface associated to SGVLy an Ethernet packet
            containing Destination MAC address
                indicating a value derived from the Destination GN_ADDR field
            containing Source MAC address
                indicating a value derived from Source GN_ADDR field
            containing Ether Type value
                indicating IPv6
            containing the IPv6 packet
    }
}
```

TP Id	TP/IPv6GEO/MR/GVL/BV/07
Test objective	Checks handling of a received GeoUnicast message, containing an IPv6 packet with destination address not matching addresses associated to IUT's SGVLs and with SOPV contained in one and only one geoArea associated to IUT's SGVLs
Reference	EN 302 636-6-1 [1], clause 8.2.2
PICS Selection	PICS_SGVL

Initial conditions

```
with {
    the IUT having configured SGVLs (SGVL1 .. SGVLx)
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoUnicast message
            containing payload
                containing an IPv6 packet
                    containing a destination address
                        indicating address not associated to any GVL
            containing Source position coordinates only contained in GVLy
    }
    then {
        the IUT transmits on the virtual interface associated to GVLy an Ethernet packet
            containing Destination MAC address
                indicating a value derived from the Destination GN_ADDR field
            containing Source MAC address
                indicating a value derived from Source GN_ADDR field
            containing Ether Type value
                indicating IPv6
            containing the IPv6 packet
    }
}
```

TP Id	TP/IPv6GEO/MR/GVL/BV/08
Test objective	Checks handling of a received GeoUnicast message, containing an IPv6 packet with destination address not matching addresses associated to IUT's GVLs and with SOPV not contained in any geoArea associated to IUT's GVLs
Reference	EN 302 636-6-1 [1], clause 8.2.2
PICS Selection	PICS_SGVL and PICS_DGVL

Initial conditions

```
with {
    the IUT having configured SGVLs (SGVL1 .. SGVLx)
    the IUT having configured a DGVL (DGVL1)
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoUnicast message
            containing payload
                containing an IPv6 packet
                    containing a destination address
                        indicating address not associated to any GVL
            containing Source position coordinates not contained in any GVL
    }
    then {
        the IUT transmits on the virtual interface associated to DGVL an Ethernet packet
            containing Destination MAC address
                indicating a value derived from the Destination GN_ADDR field
            containing Source MAC address
                indicating a value derived from Source GN_ADDR field
            containing Ether Type value
                indicating IPv6
            containing the IPv6 packet
    }
}
```

TP Id	TP/IPv6GEO/MR/GVL/BV/09
Test objective	Checks handling of a received GeoUnicast message, containing an IPv6 packet with destination address not matching addresses associated to IUT's SGVLs and with SOPV contained in more than one geoArea associated to IUT's SGVLs and with IPv6 source address considered to be on-link on at least one of those SGVLs
Reference	EN 302 636-6-1 [1], clause 8.2.2
PICS Selection	PICS_SGVL

Initial conditions

```
with {
    the IUT having configured SGVLs (SGVL1 .. SGVLx)
    GVLb invalidation timer being higher than SGVLa and SGVLc invalidation timers
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoUnicast message
            containing payload
                containing an IPv6 packet
                    containing a destination address
                        indicating address not associated to any SGVL
            containing Source position coordinates contained in SGVLa, SGVLb and SGVLc
    }
    then {
        the IUT transmits on the virtual interface associated to SGVLb an Ethernet packet
            containing Destination MAC address
                indicating a value derived from the Destination GN_ADDR field
            containing Source MAC address
                indicating a value derived from Source GN_ADDR field
            containing Ether Type value
                indicating IPv6
            containing the IPv6 packet
    }
}
```

TP Id	TP/IPv6GEO/MR/GVL/BV/10
Test objective	Checks handling of a received GeoUnicast message, containing an IPv6 packet with destination address not matching addresses associated to IUT's SGVLs and with SOPV contained in more than one geoArea associated to IUT's SGVLs and with IPv6 source address not considered to be on-link on any of those SGVLs
Reference	EN 302 636-6-1 [1], clause 8.2.2
PICS Selection	PICS_SGVL and PICS_DGVL
Initial conditions	

with {
the IUT having configured SGVLs (SGVL1 .. SGVLx)
the IUT having configured a DGVL (DGVL1)
IPv6 address IPV6_SRC not considered to be on-link on SGVLa, SGVLb, and SGVLc
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoUnicast message
containing payload
containing an IPv6 packet
containing a destination address
indicating address not associated to any SGVL
containing a source address IPV6_SRC
containing Source position coordinates contained in SGVLa, SGVLb and SGVLc
}
then {
the IUT transmits on the virtual interface associated to DGVL1 an Ethernet packet
containing Destination MAC address
indicating a value derived from the Destination GN_ADDR field
containing Source MAC address
indicating a value derived from Source GN_ADDR field
containing Ether Type value
indicating IPv6
containing the IPv6 packet
}
}	

5.2.2.2 TVL

TP Id	TP/IPv6GEO/MR/TVL/BV/01
Test objective	Checks handling of a received link-local IPv6 Unicast message, when using a TVL associated to an NBMA type virtual interface
Reference	EN 302 636-6-1 [1], clause 8.2.2
PICS Selection	PICS_TVL
Initial conditions	

with {
the IUT having a configured TVL (TVL1)
}	

Expected behaviour	

ensure that {
when {
the IUT receives a TSB message
containing an IPv6 packet
}
then {
the IUT transmits on the virtual interface associated to TVL1 an Ethernet packet
containing Source MAC address
indicating a value derived from Source GN_ADDR field
containing Ether Type value
indicating IPv6
containing the IPv6 packet
}
}	

5.2.3 Virtual Interface Management

5.2.3.1 New virtual interfaces

TP Id	TP/IPv6GEO/VM/NVI/BV/01
Test objective	Checks the Router Advertisement-triggered creation of a new SGVL associated to an Ethernet V2.0/IEEE 802.3™ [8] LAN type virtual interface
Reference	EN 302 636-6-1 [1], clauses 8.2.2 and 10.2.1
PICS Selection	PICS_SGVL and PICS_Ethernet
Initial conditions	

with {
the IUT having configured SGVLs (SGVL1 .. SGVLx)
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast message
containing Destination Area parameters not corresponding to any GVL
containing an ICMPv6 RA payload
}
then {
the IUT creates a new SGVL and associates to it a new virtual interface (VI1)
having a MAC address
indicating a value derived from the IUT's GN_ADDR (see note)
}
}	

NOTE: Reverse EUI-64 generation procedure.	

5.2.3.2 Expired virtual interfaces

TP Id	TP/IPv6GEO/VM/EVI/BV/01
Test objective	Checks the removal of an expired SGVL and its associated virtual interface
Reference	EN 302 636-6-1 [1], clause 8.2.2
PICS Selection	PICS_SGVL and PICS_Ethernet
Initial conditions	

with {
the IUT having configured a SGVL (SGVL1) derived from a received RA
}	

Expected behaviour	

ensure that {
when {
every prefix entry associated to SGVL1 has expired
}
then {
the IUT removes the expired SGVL SGVL1
the IUT removes the associated virtual interface VI1
}
}	

NOTE: Each Prefix List entry has an expiration time.	

History

Document history		
V1.1.1	March 2011	Publication
V1.2.1	April 2014	Publication