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Intelligent Transport Systems (ITS);
Testing;
Conformance test specifications for GeoNetworking ITS-G5;
Part 2: Test Suite Structure and Test Purposes (TSS & TP)

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Contents

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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 specification for GeoNetworking ITS-G5 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 GeoNetworking ITS-G5 as defined in EN 302 636-4-1 [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 referenced 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.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

[1] ETSI EN 302 636-4-1 (V1.2.0): "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".

[2] ETSI TS 102 871-1 (V1.2.1): "Intelligent Transport Systems (ITS); Testing; Conformance test specifications for GeoNetworking ITS-G5; 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".

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 302 636-4-1 [1], ISO/IEC 9646-1 [3], ISO/IEC 9646-7 [6] and the following apply:

ItsNode: node that implements GeoAdhoc router functionality by EN 302 636-4-1 [1]

neighbour: ItsNode is in direct (single-hop) communication range

"to be in direction of X": to be a valid candidate for a forwarding algorithm to forward the packet to the destination X

NOTE: This means that the candidate ItsNode is geographically closer to X than the IUT.

to broadcast a packet: to send a packet as a link-layer broadcast frame to all surrounding neighbours

to forward a packet: to send a packet as a link-layer unicast frame to the selected node

3.2 Abbreviations

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

BAA	GeoBroadcast Advanced Algorithm
BAH	Basic Header
BC	Broadcast
BCA	GeoBroadcast CBF Algorithm
BEA	Beacon
BI	Invalid Behaviour
BV	Valid Behaviour
CAP	Buffer Capacities
CBF	Contention Based Forwarding
COH	Common Header
DEPV	DEstination Position Vector
FDV	Formatting and Data Validity
FPB	Forwarding Packet Buffer
GAC	Geographically-Scoped Anycast
GBC	Geographically-Scoped Broadcast
GEONW	GeoNetworking
GNA	GeoNetworking Address
GUC	Geographically-Scoped Unicast
HL	Hop Limit
HST	Header Subtype
HT	Header Type
ICS	Implementation Conformance Statement
ITS	Intelligent Transportation Systems
ITS-G5	5 GHz wireless communication
IUT	Implementation Under Test
LOS	Location Service
LPV	Local Position Vector
LS	Location Service
LT	Lifetime
LT/TIC	Transmission Interval Control
MAC	Medium Access Control
MHL	Maximum Hop Limit
MIB	Management Information Base
NH	Next Header
PAI	Position Accuracy Indicator
PDU	Protocol Data Unit
PL	Payload Length

PON	Protocol Operation
PV	Position Vector
RHL	Remaining Hop Limit
SAP	Service Access Point
SCC	Station Country Code
SCF	Store Carry & Forward
SEPV	SEnder Position Vector
SHB	Single Hop Broadcast
SN	Sequence Number
SOPV	SOurce Position Vector
SQN	Sequence Number
ST	Station Type
SUT	System Under Test
TH	Threshold
TP	Test Purposes
TSB	Topologically-Scoped Broadcast
TSS	Test Suite Structure
TST	Timestamp
UC	Unicast

4 Test Configuration

4.1 Test Configuration Overview

This clause introduces the test configurations that have been used for the definition of test purposes. The test configurations cover the various scenarios of the GeoNetworking tests. The test configurations show:

-  green ItsNode: ItsNode is in the communication range of the IUT.
-  red ItsNode: ItsNode is not in the communication range of the IUT.
-  dashed rectangle: definition of a specific geographical area (see note).

NOTE: A geographical area is defined in the GeoBroadcast or GeoAnycast packet by HST field of Common Header and GeoAreaPos Latitude, GeoAreaPos Longitude, DistanceA, DistanceB and Angle fields of the Extended Header.

Seven test configurations are defined below.

4.2 Configuration 1: CF01

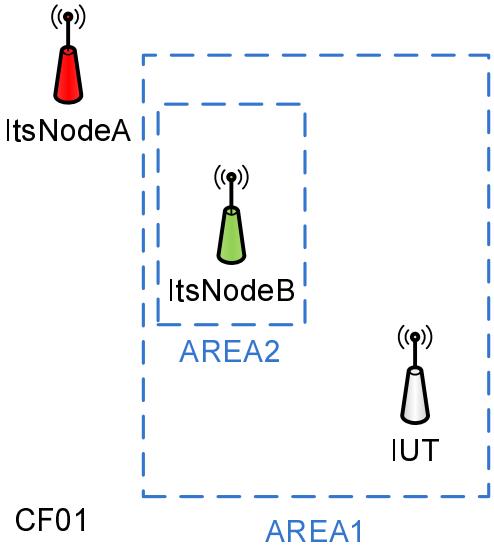

Figure 1

ItsNodeA	is not in IUT's communication range
ItsNodeB	is in IUT's communication range is in direction of ItsNodeA is in AREA1 is in AREA2
IUT	is in AREA1

4.3 Configuration 2: CF02

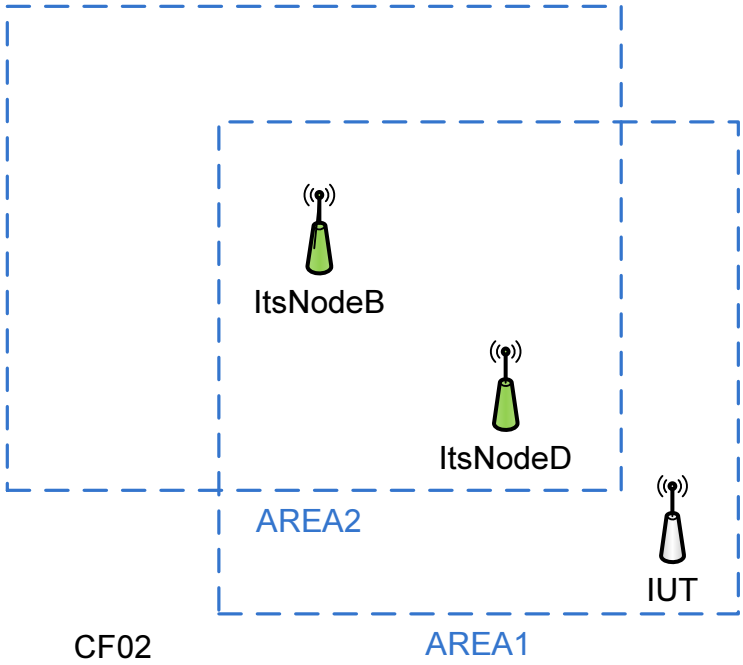

Figure 2

ItsNodeB	is in IUT's communication range is close to the centre of AREA2 is in AREA1 is in AREA2
ItsNodeD	is in IUT's communication range is in direction of ItsNodeB is in AREA1 is in AREA2
IUT	is in AREA1

4.4 Configuration 3: CF03

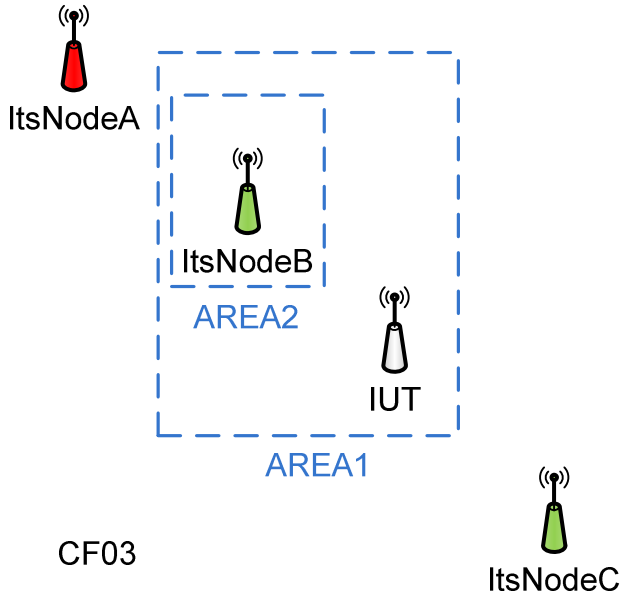

Figure 3

ItsNodeA	is not in IUT's communication range
ItsNodeB	is in IUT's communication range is in direction of ItsNodeA is in AREA1 is in AREA2
ItsNodeC	is in IUT's communication range is not in direction of ItsNodeA
IUT	is in AREA1

4.5 Configuration 4: CF04

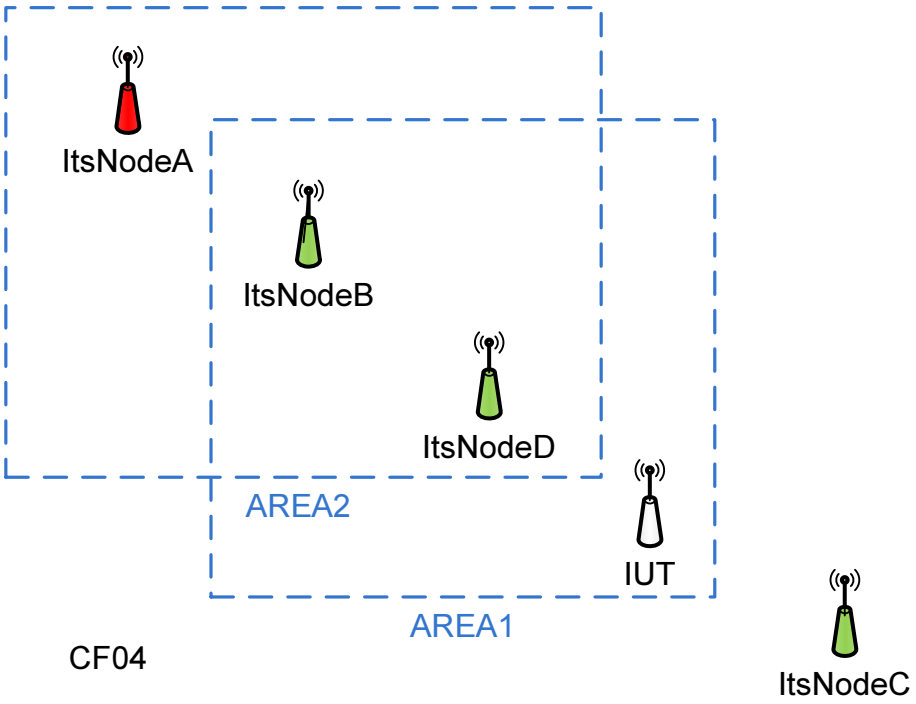

Figure 4

ItsNodeA	is not in IUT's communication range
ItsNodeB	is in IUT's communication range is in direction of ItsNodeA is closer to ItsNodeA than ItsNodeD is in AREA1 is in AREA2. is close to the centre of AREA2
ItsNodeC	is in IUT's communication range is not in direction of ItsNodeA
ItsNodeD	is in IUT's communication range is in direction of ItsNodeA is in AREA1 is in AREA2
IUT	is in AREA1

4.6 Configuration 5: CF05

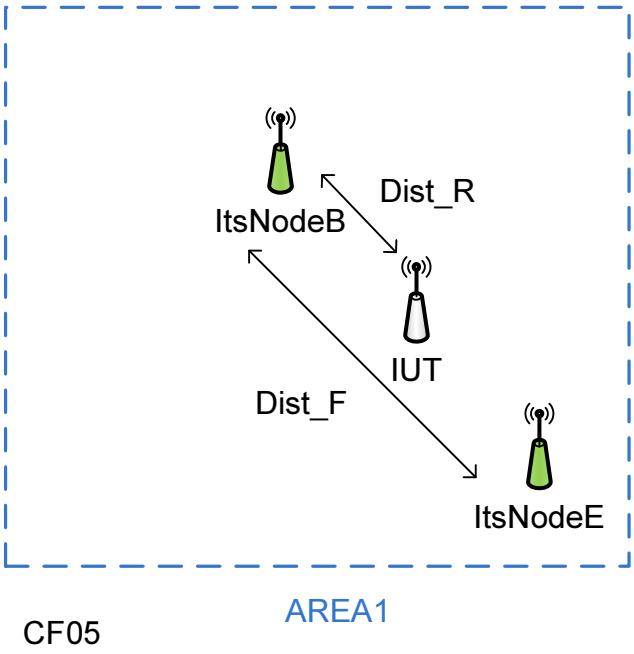

Figure 5

ItsNodeB	is in IUT's communication range is in AREA1 is close to the centre of AREA1
ItsNodeE	is in IUT's communication range is in AREA1
IUT	is in AREA1 is closer to ItsNodeB than ItsNodeE (Dist_R < Dist_F) Angle FSR formed by ItsNodeE, ItsNodeB and IUT is less than Angle_TH

4.7 Configuration 6: CF06

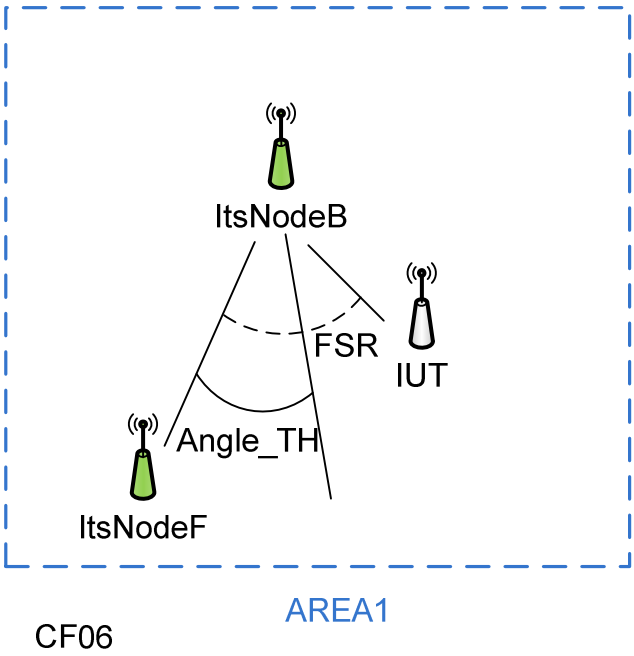

Figure 6

ItsNodeB	is in IUT's communication range is in AREA1 is close to the centre of AREA1
ItsNodeF	is in IUT's communication range is in AREA1
IUT	is in AREA1 is closer to ItsNodeB than ItsNodeE (Dist_R < Dist_F) Angle FSR formed by ItsNodeF, ItsNodeB and IUT is greater than Angle_TH

4.8 Configuration 7: CF07

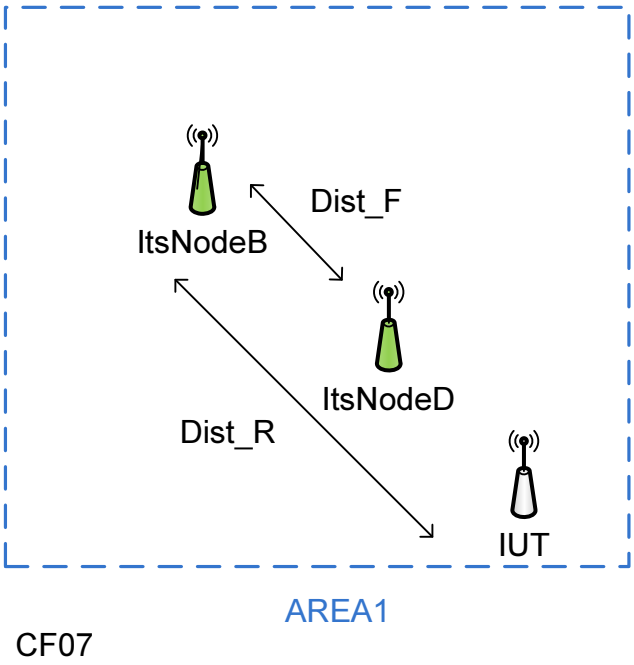

Figure 7

ItsNodeB	is in IUT's communication range is in AREA1 is close to the centre of AREA1
ItsNodeD	is in IUT's communication range is in AREA1 is closer to ItsNodeB than IUT (Dist_R > Dist_F) Angle FSR formed by ItsNodeD, ItsNodeB and IUT is less than Angle_TH
IUT	is in AREA1

5 Test Suite Structure (TSS)

5.1 Structure for GEONW tests

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

Table 1: TSS for GEONW

Root	Group	Sub-group	Category
GEONW	Formatting and data validity	Basic Header	Valid behaviour
		Common Header	Valid behaviour
		Beacon	Valid behaviour
		GeoUnicast	Valid behaviour
		GeoBroadcast	Valid behaviour
		GeoAnycast	Valid behaviour
		Single-Hop Broadcast	Valid behaviour
		Topologically Scoped Broadcast	Valid behaviour
		LS_REQUEST	Valid behaviour
		LS_REPLY	Valid behaviour
	Protocol operation	Location Table	Valid behaviour
		Local Position Vector	Valid behaviour
		Sequence Number	Valid behaviour
		Location Service	Valid behaviour
		Forwarding Packet Buffer	Valid behaviour
		GeoNetworking Address	Valid behaviour
		Beacon	Valid behaviour
		GeoUnicast	Valid behaviour
		GeoBroadcast	Valid behaviour
		GeoAnycast	Valid behaviour
		Single-Hop Broadcast	Valid behaviour
		Topologically Scoped Broadcast	Valid behaviour
		GeoBroadcast CBF algorithm	Valid behaviour
		GeoBroadcast Advanced Algorithm	Valid behaviour
	Buffer Capacities	Location Service	Valid behaviour
		Forwarding Packet Buffer	Valid behaviour

The test suite is structured as a tree with the root defined as GEONW. 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.

5.2 Test groups

5.2.1 Root

The root identifies the GeoNetworking protocol given in EN 302 636-4-1 [1].

5.2.2 Test group

This level contains three major areas identified as: tests of formatting and data validity, tests of protocol operation, tests of buffer capacities.

5.2.3 Test sub-group

This level identifies the sub categories of each Group.

5.2.4 Categories

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

6 Test Purposes (TP)

6.1 Introduction

6.1.1 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 the above clause.
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.
Config Id	The Config Id references the GeoNetworking configuration selected for this TP
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.

6.1.2 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	GEONW	
	<gr> = group	FDV	Formatting and Data Validity
		PON	Protocol Operation
		CAP	Buffer Capacities
	<sgr> =sub-group	BAH	Basic Header
		COH	Common Header
		BEA	Beacon
		GUC	GeoUnicast
		GBC	GeoBroadcast
		GAC	GeoAnycast
		SHB	Single-Hop Broadcast
		TSB	Topologically Scoped Broadcast
		LOT	Location Table
		LPV	Local Position Vector
		SQN	Sequence Number
		LOS	Location Service
		FPB	Forwarding Packet Buffer
		GNA	GeoNetworking Address
		LT/TIC	Transmission Interval Control
		BCA	GeoBroadcast CBF Algorithm
		BAA	GeoBroadcast Advanced Algorithm
	<x> = type of testing	BV	Valid Behaviour tests
		BI	Invalid Syntax or Behaviour Tests
	<nn> = sequential number		01 to 99

6.1.3 Rules for the behaviour description

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

In the TP the following wordings are used:

- "The IUT is **requested to send**": an upper layer requests the geonetworking layer to send a packet
- "The IUT **generates**": for internal events generation, i.e. Beacon packets
- "The IUT **receives**": for packets coming from the network and given by the lower layer
- "The packet is **originated by** ItsNodeX": the source of the packet is ItsNodeX
- "The packet is received **from** ItsNodeX": the sender of the packet is ItsNodeX
- "The packet is addressed **to** ItsNodeX": the destination of the packet is ItsNodeX

6.1.4 Sources of TP definitions

All TPs are specified according to EN 302 636-4-1 [1].

6.1.5 Mnemonics for PICS reference

Table 4 lists mnemonic names and maps them to the PICS item number.

Table 4: Mnemonics for PICS reference

Mnemonic	PICS item
PICS_GN_GEOUNICAST_FORWARDING_ALGORITHM	[2] Table A.32/24
PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM	[2] Table A.32/25

6.2 Test purposes for GEONW

6.2.1 Formatting and Data Validity

6.2.1.1 Basic Header

TP Id	TP/GEONW/FDV/BAH/BV/01
Test objective	Testing defined values of default Gn parameters in the basic header
Reference	EN 302 636-4-1 [1], clauses 9.3.2 , 8.6.2 and annex G
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a GeoUnicast packet
}
then {
the IUT sends a GeoUnicast packet
containing a correctly formatted Basic Header
containing version field
set to itsGnProtocolVersion MIB parameter
containing RHL field
set to itsGnDefaultHopLimit MIB parameter
}
}	

TP Id	TP/GEONW/FDV/BAH/BV/02
Test objective	Testing discard of packet having incorrect version
Reference	EN 302 636-4-1 [1], clause 9.3.3
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT receives the SHB packet from ItsNodeB
containing a correctly formatted Basic Header
containing version field
set to value not equal to itsGnProtocolVersion MIB parameter
}
then {
the IUT discards the received SHB packet
}
}	

6.2.1.2 Common Header

TP Id	TP/GEONW/FDV/COH/BV/01
Test objective	Common GeoNetworking header validity test (PL field)
Reference	EN 302 636-4-1 [1], clauses 8.7.2, 8.7.4, 8.8.6 and 9.3.6
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT generates a Beacon packet
}
then {
the IUT sends a GeoNetworking packet
containing a correctly formatted Common Header
containing HT field
set to '1' (BEACON)
containing HST field
set to '0' (UNSPECIFIED)
containing PL field
set to '0'
}
}	

TP Id	TP/GEONW/FDV/COH/BV/02
Test objective	Common GeoNetworking header validity test (PL field)
Reference	EN 302 636-4-1 [1], clauses 8.7.2, 8.7.4, 8.8.4, 9.3.4 and 9.3.10
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a SHB packet
}
then {
the IUT sends a GeoNetworking packet
containing a correctly formatted Common Header
containing HT field
set to '5' (TSB)
containing HST field
set to '0' (SINGLE_HOP)
containing MHL field
set to '1'
containing PL field
set to the length of the included payload
containing a payload
}
}	

TP Id	TP/GEONW/FDV/COH/BV/03
Test objective	Testing defined values of default Gn parameters in the common header
Reference	EN 302 636-4-1 [1], clauses 8.7.2, 8.8.2, 9.3.4 and annex G
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state"
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT is requested to send a GeoUnicast packet
    }
    then {
        the IUT sends a GeoUnicast packet
            containing a correctly formatted Common Header
                containing Flags field
                    indicating value equalling the itsGnIsMobile MIB parameter
                containing MHL field
                    set to itsGnDefaultHopLimit MIB parameter
    }
}
```

TP Id	TP/GEONW/FDV/COH/BV/04
Test objective	Test that a received TSB packet is discarded if received with RHL > MHL
Reference	EN 302 636-4-1 [1], clauses 9.3.5
Config Id	CF02
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeD and
    the IUT having received Beacon information from ItsNodeB
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a TSB packet
            containing Basic Header
                containing RHL field
                    indicating HL1 higher than MHL1
            containing Common Header
                containing MHL field
                    indicating MHL1
    }
    then {
        the IUT discards the TSB packet
    }
}
```

6.2.1.3 Beacon

TP Id	TP/GEONW/FDV/BEA/BV/01
Test objective	Beacon header validity test
Reference	EN 302 636-4-1 [1], clauses 8.7.2, 8.8.6 and 9.3.6
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT generates a Beacon packet
}
then {
the IUT sends a GeoNetworking packet
containing a correctly formatted Common Header
containing HT field
set to '1' (BEACON)
containing HST field
set to '0' (UNSPECIFIED)
containing NH field
set to '0' (UNSPECIFIED)
containing Extended Header
containing SOPV
indicating LPV of the IUT
}
}	

TP Id	TP/GEONW/FDV/BEA/BV/02
Test objective	GeoNetworking address validity test
Reference	EN 302 636-4-1 [1], clauses 6.3 and 8.8.6.2
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT generates a Beacon packet
}
then {
the IUT sends a GeoNetworking packet
containing SOPV field
containing GN_ADDR field
containing ST field
indicating the ITS Station type
containing SCC field
indicating the ITS Station country code
}
}	

NOTE: Correct Source GeoNetworking address value:== itsGnLocalGnAddr MIB parameter value.	

TP Id	TP/GEONW/FDV/BEA/BV/03
Test objective	Local Position Vector validity test, involving position comparison against sensor input data
Reference	EN 302 636-4-1 [1], clauses 8.5.2.2 and 8.8.6.2
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT generates a Beacon packet
}
then {
the IUT sends a GeoNetworking packet
containing a correct SOPV field
indicating the latest position of the IUT
}
}	

TP Id	TP/GEONW/FDV/BEA/BV/04
Test objective	Local Position Vector validity test, involving timestamp comparison against sensor input data
Reference	EN 302 636-4-1 [1], clauses 8.5.2.2 and 8.8.6.2
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT generates a Beacon packet
}
then {
the IUT sends a GeoNetworking packet
containing a correct SOPV field
indicating the timestamp value corresponding to the sensor acquisition time of position data
}
}	

6.2.1.4 GeoUnicast

TP Id	TP/GEONW/FDV/GUC/BV/01
Test objective	GeoUnicast header validity
Reference	EN 302 636-4-1 [1], clauses 8.7.2, 8.7.4, 8.8.2.2 and 9.3.8
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT is requested to send a GeoUnicast packet to ItsNodeB
    }
    then {
        the IUT sends a GeoNetworking packet
            containing a correctly formatted Common Header
                containing HT field
                    set to '2' (GEOUNICAST)
                containing HST field
                    set to '0' (UNSPECIFIED)
            containing GeoUnicast Extended Header
                containing DEPV field
                    indicating position of the ItsNodeB
                containing SOPV field
                    indicating position of the IUT
    }
}
```

6.2.1.5 GeoBroadcast

TP Id	TP/GEONW/FDV/GBC/BV/01
Test objective	GeoBroadcast header validity
Reference	EN 302 636-4-1 [1], clauses 8.7.2, 8.7.4, 8.8.5.2 and 9.3.11
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from the ItsNodeB
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT is requested to send a GeoBroadcast packet
    }
    then {
        the IUT sends a GeoNetworking packet
            containing a correctly formatted Common Header
                containing HT field
                    set to '4' (GEOBROADCAST)
            containing GeoBroadcast Extended Header
                containing SOPV field
                    indicating position of the IUT
    }
}
```

6.2.1.6 GeoAnycast

TP Id	TP/GEONW/FDV/GAC/BV/01
Test objective	GeoAnycast header validity
Reference	EN 302 636-4-1 [1], clauses 8.7.2, 8.7.4, 8.8.5.2 and 9.3.12
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from the ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a GeoAnycast packet
}
then {
the IUT sends a GeoNetworking packet
containing a correctly formatted Common Header
containing HT field
set to '3' (GEOANYCAST)
containing GeoAnycast Extended Header
containing SOPV field
indicating position of IUT
}
}	

6.2.1.7 Single-Hop Broadcast

TP Id	TP/GEONW/FDV/SHB/BV/01
Test objective	SHB header validity
Reference	EN 302 636-4-1 [1], clauses 8.7.2, 8.7.4, 9.3.4, 8.8.4.2 and 9.3.10
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from the ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a SHB packet
}
then {
the IUT sends a GeoNetworking packet
containing a correctly formatted Common Header
containing HT field
set to '5' (TSB)
containing HST field
set to '0' (SINGLE_HOP)
containing MHL field
set to '1'
containing Extended Header
containing SOPV
indicating LPV of the IUT
}
}	

6.2.1.8 Topologically Scoped Broadcast

TP Id	TP/GEONW/FDV/TSB/BV/01
Test objective	TSB header validity
Reference	EN 302 636-4-1 [1], clauses 8.7.2, 8.7.4, 8.8.3.2 and 9.3.9
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from the ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a TSB packet
}
then {
the IUT sends a GeoNetworking packet
containing a correctly formatted Common Header
containing HT field
set to '5' (TSB)
containing HST field
set to '1' (MULTI_HOP)
containing TSB Extended Header
containing SOPV field
indicating position of the IUT
}
}	

6.2.2 Protocol Operation

6.2.2.1 Location table

TP Id	TP/GEONW/PON/LOT/BV/01
Test objective	Test of adding new entries into location table from Beacon header
Reference	EN 302 636-4-1 [1], clauses 9.3.6.2 and 9.3.8.2
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from the ItsNodeB and
the lifetime of the ItsNodeB Location Table entry not being expired
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a GeoUnicast packet to ItsNodeB
}
then {
the IUT does not send a GeoNetworking packet
containing a LS_REQUEST
containing Request field
containing GN_ADDR
containing M_ID
indicating ItsNodeB
the IUT sends a GeoNetworking packet
containing a correctly formatted Common Header
containing HT field
set to '2' (GEOUNICAST)
containing GeoUnicast Extended Header
containing DEPV field
indicating same position as the SOPV value of the Beacon information received from ItsNodeB
}
}	

TP Id	TP/GEONW/PON/LOT/BV/02
Test objective	Test of adding new entries into location table from LS Reply data
Reference	EN 302 636-4-1 [1], clauses 9.3.7.1.2, 9.3.7.1.4 and 9.3.8.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having been requested to send a first GeoUnicast packet to ItsNodeA and
    the IUT having sent a LS_REQUEST packet
        containing Request field
            containing GN_ADDR
                containing M_ID
                    indicating ItsNodeA
                containing the other bits
                    indicating value 0
    the IUT having received a LS_REPLY packet from ItsNodeA
        containing SOPV field and
    the IUT having sent the GeoUnicast packet to ItsNodeA and
    the lifetime of the ItsNodeA Location Table entry not being expired
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT is requested to send a second GeoUnicast packet to ItsNodeA
    }
    then {
        the IUT does not send a GeoNetworking packet
            containing a LS_REQUEST
                containing Request field
                    containing GN_ADDR
                        containing M_ID
                            indicating ItsNodeA
        the IUT sends a GeoNetworking packet
            containing a correctly formatted Common Header
                containing HT field
                    set to '2' (GEOUNICAST)
            containing GeoUnicast Extended Header
                containing DEPV field
                    indicating same position as the SOPV value of the LS_REPLY packet received from ItsNodeA
    }
}
```

TP Id	TP/GEONW/PON/LOT/BV/03-X
Test objective	Test of adding new entries into location table from extended header processing (e.g. GeoUnicast header)
Reference	EN 302 636-4-1 [1], clauses 9.3.8.4 and 9.3.8.2
Config Id	CF01
PICS Selection	

Initial conditions

with {
the IUT being in the "initial state" and
the IUT having received a **MESSAGE** from ItsNodeA
}

Expected behaviour

ensure that {
when {
the IUT is requested to send a GeoUnicast packet to ItsNodeA
}
then {
the IUT does not send a GeoNetworking packet
containing a LS_REQUEST Extended Header
containing Request field
containing GN_ADDR
containing M_ID
indicating ItsNodeA
the IUT sends a GeoNetworking packet
containing a correctly formatted Common Header
containing HT field
set to '2' (GEOUNICAST)
containing GUC Extended Header
containing DEPV field
indicating same position as the SOPV of the **MESSAGE** received from ItsNodeA
}
}

MESSAGE

Beacon packet
GUC packet
GAC packet
GBC packet
TSB packet
SHB packet
LS Request packet
LS Reply packet

TP Id	TP/GEONW/PON/LOT/BV/04
Test objective	Test of handling entries expiring from location table
Reference	EN 302 636-4-1 [1], clauses 7.1.3, 9.3.8.2, 9.3.7.1.2 and annex G
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB and
    the IUT not having received beacons from ItsNodeB for the duration of itsGnLifetimeLocTE parameter
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT is requested to send a GeoUnicast packet to ItsNodeB
    }
    then {
        the IUT sends a GeoNetworking packet
            containing a LS_REQUEST
                containing Request field
                    containing GN_ADDR
                        containing M_ID
                            indicating ItsNodeB
                        containing the other bits
                            indicating value 0
    }
}
```

TP Id	TP/GEONW/PON/LOT/BV/05-X
Test objective	Test of updating entries in location table with most up-to-date position data extracted from common header processing (including timestamp comparison before updating)
Reference	EN 302 636-4-1 [1], clauses 9.3.8.4 and 9.3.8.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received a MESSAGE from ItsNodeB
        containing Extended Header
            containing SOPV field
                indicating an older timestamp than the last Beacon packet and
                indicating a different position than the position of the last Beacon packet
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT is requested to send a GeoUnicast packet to ItsNodeB
    }
    then {
        the IUT does not send a GeoNetworking packet
            containing a LS_REQUEST Extended Header
                containing Request field
                    containing GN_ADDR
                        containing M_ID
                            indicating ItsNodeB
        the IUT sends a GeoNetworking packet
            containing a correctly formatted Common Header
                containing HT field
                    set to '2' (GEOUNICAST)
            containing GUC Extended Header
                containing DEPV field
                    indicating same position as the SOPV value of the Beacon information received
    }
}
```

MESSAGE

GUC packet
GAC packet
GBC packet
TSB packet
SHB packet
LS Request packet
LS Reply packet

6.2.2.2 Local Position Vector

TP Id	TP/GEONW/PON/LPV/BV/01
Test objective	Test of the updating of the Local position vector
Reference	EN 302 636-4-1 [1], clauses 7.2.3, 9.2.2.2, 9.3.6.1 and annex G
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having changed its position
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT generates eventually a Beacon packet
    }
    then {
        the IUT sends a GeoNetworking packet
            containing a correctly formatted Common Header
                containing HT field
                    set to '1' (BEACON)
                containing HST field
                    set to '0' (UNSPECIFIED)
            containing extended header
                containing SOPV field
                    indicating the new position
    }
}
```

6.2.2.3 Sequence Number

TP Id	TP/GEONW/PON/SQN/BV/01
Test objective	Test of the initial sequence number assignment
Reference	EN 302 636-4-1 [1], clauses 7.3.2, 9.3.8.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT is requested to send a GeoUnicast packet to ItsNodeB
    }
    then {
        the IUT sends a GeoNetworking packet
            containing a correctly formatted Common Header
                containing HT field
                    set to '2' (GEOUNICAST)
                containing HST field
                    set to '0' (UNSPECIFIED)
            containing GeoUnicast Extended Header
                containing SN field
                    indicating value '0'
    }
}
```

TP Id	TP/GEONW/PON/SQN/BV/02
Test objective	Test of the local sequence number incrementing
Reference	EN 302 636-4-1 [1], clauses 7.3.2, 9.3.8.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having sent a GeoUnicast packet to ItsNodeB
        containing the Sequence Number field
            indicating value SN1
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT is requested to send a GeoUnicast packet to ItsNodeB
    }
    then {
        the IUT sends a GeoNetworking packet
            containing a correctly formatted Common Header
                containing HT field
                    set to '2' (GEOUNICAST)
            containing GeoUnicast Extended Header
                containing SN field
                    indicating value SN1 + 1
    }
}
```

6.2.2.4 Location Service

TP Id	TP/GEONW/PON/LOS/BV/01
Test objective	Test of first LS invocation for unknown Destination nodes
Reference	EN 302 636-4-1 [1], clauses 9.3.8.2, 9.2.4 and 9.3.7.1.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having no Location Table Entry for ItsNodeA
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT is requested to send a GeoUnicast packet to ItsNodeA
    }
    then {
        the IUT sends a GeoNetworking packet
            containing a correctly formatted Common Header
                containing HT field
                    set to '6' (LS)
                containing HST field
                    set to '0' (LS_REQUEST)
                containing NH field
                    set to '0' (UNSPECIFIED)
            containing LS_REQUEST Extended Header
                containing Request field
                    containing GN_ADDR
                        containing M_ID
                            indicating ItsNodeA
                        containing the other bits
                            indicating value 0
    }
}
```

TP Id	TP/GEONW/PON/LOS/BV/02
Test objective	Test of no LS invocation for unknown Destination nodes when LS procedure is already active
Reference	EN 302 636-4-1 [1], clauses 9.3.8.2, 9.2.4 and 9.3.7.1.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having no Location Table Entry for ItsNodeA and
    the IUT having been requested to send a first GeoUnicast packet to ItsNodeA and
    the IUT having sent a GeoNetworking packet
        containing a LS_REQUEST
            containing Request field
                containing GN_ADDR
                    containing M_ID
                        indicating ItsNodeA
                    containing the other bits
                        indicating value 0
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT is requested to send a new GeoUnicast packet to ItsNodeA
    }
    then {
        the IUT does not send a second LS_REQUEST packet (see note)
    }
}
```

NOTE: At least not before the LS_REQUEST retransmission timer expires.

TP Id	TP/GEONW/PON/LOS/BV/03
Test objective	Test of packet buffering into LS buffer during Location service procedure, including handling of LT fields in the LT packet buffer
Reference	EN 302 636-4-1 [1], clauses 7.4.2, 9.3.8.2, 9.2.4 and 9.3.7.1.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having no Location Table Entry for ItsNodeA and
    the IUT having been requested to send a GeoUnicast packet to ItsNodeA
        containing TrafficClass.SCF set to 1 and
    the IUT having sent a LS_REQUEST packet
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives the LS_REPLY packet from ItsNodeA
    }
    then {
        the IUT sends the GeoUnicast packet addressed to ItsNodeA
            containing GeoUnicast Extended Header
                containing LT field
                    indicating value (default LT value – WaitingTime (see note))
    }
}
```

NOTE: WaitingTime == time difference between LS_REQUEST sending and LS_REPLY reception.

TP Id	TP/GEONW/PON/LOS/BV/04
Test objective	Test of LS buffer characteristics: FIFO type
Reference	EN 302 636-4-1 [1], clauses 7.4.2, 9.3.8.2, 9.2.4 and 9.3.7.1.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having no Location Table Entry for ItsNodeA and
    the IUT having been requested to send a GeoUnicast packet to ItsNodeA
        containing TrafficClass.SCF set to 1
        containing LT field
            indicating value LT1
        containing payload field
            indicating value PL1 and
    the IUT having sent a LS_REQUEST packet and
    the IUT having been requested to send a second GeoUnicast packet to ItsNodeA
        containing TrafficClass.SCF set to 1
        containing LT field
            indicating LT2
        containing payload field
            indicating value PL2
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives the LS_REPLY packet from ItsNodeA and
        before expiry of LT1 and LT2
    }
    then {
        the IUT sends GeoUnicast packet addressed to ItsNodeA
            containing payload field
                indicating value PL1 and
        the IUT sends GeoUnicast packet addressed to ItsNodeA
            containing payload field
                indicating value PL2
    }
}
```

TP Id	TP/GEONW/PON/LOS/BV/05
Test objective	Test of LS buffer characteristics: discarding upon LT expiration
Reference	EN 302 636-4-1 [1], clauses 7.4.2, 9.3.8.2, 9.2.4 and 9.3.7.1.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having no Location Table Entry for ItsNodeA and
    the IUT having been requested to send multiple GeoUnicast packets to ItsNodeA
        containing TrafficClass.SCF set to 1
        containing LT field
            indicating values LTx and
    the IUT having sent a LS_REQUEST packet
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives the LS_REPLY packet from ItsNodeA after expiry of LTs
    }
    then {
        the IUT does not send any packet to ItsNodeA
    }
}
```

TP Id	TP/GEONW/PON/LOS/BV/06
Test objective	Test of LS Request retransmission if no answer is received
Reference	EN 302 636-4-1 [1], clauses 9.3.7.1.3, 9.3.7.1.2 and 9.3.8.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having no Location Table Entry for ItsNodeA and
    the IUT having been requested to send a GeoUnicast packet to ItsNodeA
        containing TrafficClass.SCF set to 1
        containing LT field
            indicating value LT1 higher than itsGnLocationServiceTimer and
    the IUT having sent a LS_REQUEST packet
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT does not receive LS_REPLY packet from ItsNodeA and
        before expiration of LT1
    }
    then {
        the IUT retransmits the LS_REQUEST packet
            after expiry of itsGnLocationServiceTimer
    }
}
```

TP Id	TP/GEONW/PON/LOS/BV/07
Test objective	Test of LS Request retransmission if no answer is received
Reference	EN 302 636-4-1 [1], clauses 9.3.7.1.2, 9.3.7.1.3 and 9.3.8.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having no Location Table Entry for ItsNodeA and
    the IUT having been requested to send a GeoUnicast packet to ItsNodeA
        containing TrafficClass.SCF set to 1
        containing LT field
            indicating value LT1 higher than (itsGnLocationServiceTimer * itsGnLocationServiceMaxRetrans) and
    the IUT having sent a LS_REQUEST packet
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT does not receive LS_REPLY packet from ItsNodeA
        before expiration of LT1
    }
    then {
        the IUT retransmits the LS_REQUEST packet itsGnLocationServiceMaxRetrans times
    }
}
```

TP Id	TP/GEONW/PON/LOS/BV/08
Test objective	Test of LS Reply generation by destination node
Reference	EN 302 636-4-1 [1], clauses 9.3.7.1.4 and 9.3.5
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state"
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a LS_REQUEST packet
            containing Request field
                indicating the IUT's GN_ADDR
    }
    then {
        the IUT replies with a LS_REPLY packet
            containing Common Header
                containing NH field
                    set to '0' (UNSPECIFIED)
            containing LS_REPLY Extended Header
                containing DEPV field
                    indicating same position as the SOPV value of the received LS_REQUEST
    }
}
```

TP Id	TP/GEONW/PON/LOS/BV/09
Test objective	Test of no LS Reply generation for already answered LS Request packets
Reference	EN 302 636-4-1 [1], clauses 9.3.7.1.4 and 9.3.5
Config Id	CF02
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received a LS_REQUEST packet generated by ItsNodeB from ItsNodeB
    the IUT having sent a LS_REPLY packet to ItsNodeB
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives the same LS_REQUEST packet from ItsNodeD
    }
    then {
        the IUT does not reply with a LS_REPLY packet
    }
}
```

TP Id	TP/GEONW/PON/LOS/BV/10
Test objective	Test of LS Request forwarding
Reference	EN 302 636-4-1 [1], clause 9.3.7.2
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received Beacon information from ItsNodeC
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a LS_REQUEST packet from ItsNodeC
            containing Basic Header
                containing RHL field
                    indicating value greater than 1
            containing LS_REQUEST Extended Header
                containing Request field
                    containing GN_ADDR
                        containing M_ID
                            indicating value differing from the M_ID part of the GN_ADDR of the IUT'   }
    then {
        the IUT re-broadcasts the received LS_REQUEST packet
            containing Basic Header
                containing RHL field
                    indicating value decreased by 1
    }
}
```

TP Id	TP/GEONW/PON/LOS/BV/11
Test objective	Test of LS Reply forwarding
Reference	EN 302 636-4-1 [1], clause 9.3.7.2
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received Beacon information from ItsNodeC
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a LS_REPLY packet from ItsNodeC addressed to ItsNodeB
            containing Basic Header
                containing RHL field
                    indicating value greater than 1
    }
    then {
        the IUT forwards the received LS_REPLY packet to ItsNodeB
            containing Basic Header
                containing RHL field
                    indicating value decreased by 1
    }
}
```

TP Id	TP/GEONW/PON/LOS/BV/12
Test objective	Test flushing of the LS buffer, initiated by the processing of a common header from the target destination
Reference	EN 302 636-4-1 [1], clauses 9.3.8.4, 9.3.7.1.2 and 7.4.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having no Location Table Entry for ItsNodeA and
    the IUT having been requested to send a GeoUnicast packet ItsNodeA
        containing LT field
            indicating LT1 and
    the IUT having sent a LS_REQUEST packet
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoUnicast packet from ItsNodeA before expiry of LT1
    }
    then {
        the IUT sends the waiting GeoUnicast packet to ItsNodeA
    }
}
```

TP Id	TP/GEONW/PON/LOS/BV/13
Test objective	Test of LS buffer characteristics: FIFO type and Lifetime
Reference	EN 302 636-4-1 [1], clauses 7.4.2 and 9.3.7.1.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having no Location Table Entry for ItsNodeA and
    the IUT having been requested to send a GeoUnicast packet to ItsNodeA
        containing TrafficClass.SCF set to 1
        containing LT field
            indicating value LT1
        containing payload field
            indicating value PL1 and
    the IUT having sent a LS_REQUEST packet and
    the IUT having been requested to send a second GeoUnicast packet to ItsNodeA
        containing TrafficClass.SCF set to 1
        containing LT field
            indicating LT2 lower than LT1
        containing payload field
            indicating value PL2
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives the LS_REPLY packet from ItsNodeA
        after expiry of LT2
        before expiry of LT1
    }
    then {
        the IUT sends GeoUnicast packet addressed to ItsNodeA
            containing payload field
                indicating value PL1
    }
}
```

TP Id	TP/GEONW/PON/LOS/BV/14
Test objective	Test that GeoNetworking packets in LS buffer are discarded when LS does not complete.
Reference	EN 302 636-4-1 [1], clause 7.4.2
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having no Location Table Entry for ItsNodeA and
the IUT having been requested to send a GeoUnicast packet to ItsNodeA
containing TrafficClass.SCF set to 1
containing LT field
indicating value LT1 higher than (itsGnLocationServiceTimer * itsGnLocationServiceMaxRetrans) and
the IUT having sent a LS_REQUEST packet itsGnLocationServiceMaxRetrans times
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GUC packet from ItsNodeA
before expiry of LT1
}
then {
the IUT does not send any packet to ItsNodeA (see note)
}
}	

NOTE: Stored GeoUnicast packets have been discarded upon LS failure.	

6.2.2.5 Forwarding Packet Buffer

TP Id	TP/GEONW/PON/FPB/BV/01
Test objective	Test of Source packet buffering into UC forwarding buffer for unreachable Unicast destinations (absence of a suitable next hop candidate)
Reference	EN 302 636-4-1 [1], clauses 7.5.3, 9.3.6.3 and 9.3.8.2
Config Id	CF03
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT not having received any Beacon information from ItsNodeB and
the IUT having a Location Table Entry for ItsNodeA (see note) and
the IUT having been requested to send a GeoUnicast packet addressed to ItsNodeA
containing TrafficClass.SCF set to 1
}	

Expected behaviour	

ensure that {
when {
the IUT receives a Beacon packet from ItsNodeB
}
then {
the IUT selects the ItsNodeB as the next hop and
the IUT sends the buffered GeoUnicast packet
}
}	

NOTE: Location Table Entry is created by sending any GeoNetworking packet, originated by ItsNodeA, from ItsNodeC to IUT.	

TP Id	TP/GEONW/PON/FPB/BV/02
Test objective	Test of Forwarder packet buffering into UC forwarding buffer for unreachable Unicast destinations (absence of a suitable next hop candidate)
Reference	EN 302 636-4-1 [1], clauses 9.3.8.3, 7.5.3 and 9.3.6.3
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT not having received any Beacon information from ItsNodeB and
    the IUT having received GeoUnicast packets addressed to ItsNodeA from ItsNodeC
        containing TrafficClass.SCF set to 1
        containing Basic Header
            containing LT field
                indicating LT1
            containing RHL field
                indicating value greater than 1
        containing GUC Extended Header
            containing SN field
                indicating value SN1
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a Beacon packet from ItsNodeB
    }
    then {
        the IUT selects the ItsNodeB as the next hop and
        the IUT forwards the buffered GeoUnicast packet
            containing Basic Header
                containing RHL field
                    indicating value decreased by 1
            containing GUC extended header
                containing SN field
                    indicating value SN1
    }
}
```

TP Id	TP/GEONW/PON/FPB/BV/03
Test objective	Test of UC forwarding buffer characteristics: FIFO type
Reference	EN 302 636-4-1 [1], clauses 7.5.3, 9.3.6.3 and 9.3.8.3
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT not having received any Beacon information from ItsNodeB and
    the IUT having received a GeoUnicast (GEOUNI1) packet addressed to ItsNodeA from ItsNodeC
        containing TrafficClass.SCF set to 1
        containing Basic Header
            containing LT field
                indicating value LT1 and
            containing RHL field
                indicating value greater than 1
        containing GUC Extended Header
            containing SN field
                indicating value SN1
    the IUT having received a second GeoUnicast (GEOUNI2) packet addressed to ItsNodeA from ItsNodeC
        containing TrafficClass.SCF set to 1
        containing Basic Header
            containing LT field
                indicating LT2
            containing RHL field
                indicating value greater than 1
        containing GUC Extended Header
            containing SN field
                indicating value SN2
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a Beacon packet from ItsNodeB
        before expiry of LT1 and LT2
    }
    then {
        the IUT selects ItsNodeB as the next hop and
        the IUT forwards the GEOUNI1 buffered packet
            containing GUC Extended Header
                containing SN field
                    indicating value SN1
        the IUT forwards the GEOUNI2 buffered packet
            containing GUC Extended Header
                containing SN field
                    indicating value SN2
    }
}
```

TP Id	TP/GEONW/PON/FPB/BV/04
Test objective	Test of UC forwarding buffer characteristics: discarding upon LT expiration
Reference	EN 302 636-4-1 [1], clauses 7.5.3, 9.3.6.3 and 9.3.8.3
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT not having received any Beacon information from ItsNodeB and
    the IUT having received a GeoUnicast packet addressed to ItsNodeA from ItsNodeC
        containing TrafficClass.SCF set to 1
        containing Basic Header
            containing LT field
                indicating LT1
            containing RHL field
                indicating value greater than 1
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a Beacon packet from ItsNodeB
        after expiry of LT1
    }
    then {
        the IUT does not forward the buffered GeoUnicast packet addressed to ItsNodeA
    }
}
```

TP Id	TP/GEONW/PON/FPB/BV/06
Test objective	Test of Source packet buffering into BC forwarding buffer for no GeoBroadcast recipients
Reference	EN 302 636-4-1 [1], clauses 9.3.5, 7.5.3, 9.3.6.3 and 9.3.11.2
Config Id	CF02
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT not having received Beacon information from ItsNodeD and
    the IUT not having received Beacon information from ItsNodeB and
    the IUT having been requested to send a GeoBroadcast packet to AREA1
        containing TrafficClass.SCF set to 1
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a Beacon packet from either ItsNodeB or ItsNodeD
    }
    then {
        the IUT broadcasts the buffered GeoBroadcast packet
    }
}
```

TP Id	TP/GEONW/PON/FPB/BV/07
Test objective	Test of BC forwarding buffer characteristics: FIFO type
Reference	EN 302 636-4-1 [1], clauses 7.5.3, 9.3.6.3 and 9.3.11.2
Config Id	CF02
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT not having received Beacon information from ItsNodeD and
    the IUT not having received Beacon information from ItsNodeB and
    the IUT having been requested to send a GeoBroadcast (GEOBROAD1) packet to AREA1
        containing TrafficClass.SCF set to 1
        containing Basic Header
            containing LT field
                indicating LT1
        containing GBC Extended Header
            containing SN field
                indicating value SN1
    the IUT having been requested to send a GeoBroadcast (GEOBROAD2) packet to AREA1
        containing TrafficClass.SCF set to 1
        containing LT field
            indicating LT2
        containing SN field
            indicating value SN2
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a Beacon packet from either ItsNodeD or ItsNodeB
        before expiry of LT1 and LT2
    }
    then {
        the IUT broadcasts GEOBROAD1 packet
            containing GBC Extended Header
                containing SN field
                    indicating value SN1
        the IUT broadcasts GEOBROAD2 packet
            containing GBC Extended Header
                containing SN field
                    indicating value SN2
    }
}
```

TP Id	TP/GEONW/PON/FPB/BV/08
Test objective	Test of BC forwarding buffer characteristics: discarding upon LT expiration
Reference	EN 302 636-4-1 [1], clauses 7.5.3, 9.3.6.3 and 9.3.11.2
Config Id	CF02
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT not having received Beacon information from ItsNodeD and
    the IUT not having received Beacon information from ItsNodeB and
    the IUT having been requested to send a GeoBroadcast (GEOBROAD1) packet to AREA1
        containing TrafficClass.SCF set to 1
        containing Basic Header
            containing LT field
                indicating LT1
    the IUT having been requested to send a GeoBroadcast (GEOBROAD2) packet to AREA1
        containing TrafficClass.SCF set to 1
        containing Basic Header
            containing LT field
                indicating LT2
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a Beacon packet from either ItsNodeB or ItsNodeD
        after expiry of LT1 and LT2
    }
    then {
        the IUT does not broadcast any of the buffered GEOBROAD1 and GEOBROAD2
    }
}
```

TP Id	TP/GEONW/PON/FPB/BV/09
Test objective	Test of Source packet buffering into UC forwarding buffer for handling of LT fields in absence of a suitable next hop candidate
Reference	EN 302 636-4-1 [1], clauses 7.5.3, 9.3.6.3 and 9.3.8.2
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT not having received any Beacon information from ItsNodeB and
    the IUT having a Location Table Entry for ItsNodeA and
    the IUT having been requested to send a GeoUnicast packet addressed to ItsNodeA
        containing TrafficClass.SCF set to 1
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a Beacon packet from ItsNodeB
    }
    then {
        the IUT selects the ItsNodeB as the next hop and
        the IUT sends the buffered GeoUnicast packet
            containing GUC Extended Header
                containing LT field
                    indicating (default LT value – WaitingTime (see note))
    }
}
```

NOTE: WaitingTime == time difference between Upper layer packet generation and the neighbour Beacon reception.

TP Id	TP/GEONW/PON/FPB/BV/10
Test objective	Test of Source packet buffering into BC forwarding buffer for handling of LT fields for no GeoBroadcast recipients
Reference	EN 302 636-4-1 [1], clauses 7.5.3, 9.3.6.3 and 9.3.11.2
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT not having received Beacon information from ItsNodeD and
the IUT not having received Beacon information from ItsNodeB and
the IUT having been requested to send a GeoBroadcast packet to AREA1
containing TrafficClass.SCF set to 1
}	

Expected behaviour	

ensure that {
when {
the IUT receives a Beacon packet from either ItsNodeB or ItsNodeD
}
then {
the IUT broadcasts the buffered GeoBroadcast packet
containing GBC Extended Header
containing LT field
indicating (default LT value – WaitingTime (see note))
}
}	

NOTE: WaitingTime == time difference between Upper layer packet generation and the Beacon reception.	

TP Id	TP/GEONW/PON/FPB/BV/11-X
Test objective	Test of immediate broadcasting in absence of a suitable next hop candidate when SCF is disabled
Reference	EN 302 636-4-1 [1], clause 9.3.8.2
Config Id	CF03
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT not having received any Beacon information from ItsNodeB and
the IUT having a Location Table Entry for ItsNodeA (see note)
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a **MESSAGE**
containing TrafficClass.SCF set to 0
}
then {
the IUT broadcast the **MESSAGE** immediately
}
}	

NOTE: Location Table Entry is created by sending any GeoNetworking packet, originated by ItsNodeA, from ItsNodeC to IUT.	
MESSAGE	
GUC packet addressed to ItsNodeA	
GAC packet containing GeoBroadcast DestinationArea indicating AREA2	
GBC packet containing GeoBroadcast DestinationArea indicating AREA2	
TSB packet	
SHB packet	

TP Id	TP/GEONW/PON/FPB/BV/12-X
Test objective	Test of immediate broadcasting in absence of a suitable next hop candidate when SCF is disabled
Reference	EN 302 636-4-1 [1], clause 9.3.8.3
Config Id	CF03
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT not having received any Beacon information from ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT receives a **MESSAGE**
containing TrafficClass.SCF set to 0
}
then {
the IUT broadcast the **MESSAGE** immediately
}
}	

MESSAGE	
GUC packet addressed to ItsNodeA	
GAC packet containing GeoBroadcast DestinationArea indicating AREA2	
GBC packet containing GeoBroadcast DestinationArea indicating AREA2	
TSB packet	

6.2.2.6 GeoNetworking Address

TP Id	TP/GEONW/PON/GNA/BV/01
Test objective	Test the initial GeoNetworking address assignment by IUT with auto-address configuration
Reference	EN 302 636-4-1 [1], clauses 9.2.1.2 and 9.3.6.2
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT's itsGnLocalAddrConfMethod MIB parameter is set to AUTO (0)
}	

Expected behaviour	

ensure that {
when {
the IUT generates a Beacon packet
}
then {
the IUT sends a GeoNetworking packet
containing a correctly formatted Common Header
containing HT field
set to '1' (BEACON)
containing HST field
set to '0' (UNSPECIFIED)
containing Beacon Extended Header
containing SOPV field
containing GN_ADDR field
indicating itsGnLocalGnAddr MIB parameter
}
}	

TP Id	TP/GEONW/PON/GNA/BV/02
Test objective	Test the proper functioning of duplicate address detection mechanism
Reference	EN 302 636-4-1 [1], clause 9.2.1.5
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having sent some Beacon packets
}	

Expected behaviour	

ensure that {
when {
the IUT receives a Beacon packet from ItsNodeB
containing Beacon Extended Header
containing SOPV field
containing GN_ADDR field
indicating same GN_ADDR as the GN_ADDR field in the last Beacon originated by the IUT
}
then {
the IUT sends subsequent Beacon packets
containing Beacon Extended Header
containing SOPV field
containing GN_ADDR field
indicating different GN_ADDR as the previous used GN_ADDR
}
}	

6.2.2.7 Beaconing

TP Id	TP/GEONW/PON/BEA/BV/01
Test objective	Test that the IUT transmits Beacons at prescribed periodicity in the absence of other originated packets
Reference	EN 302 636-4-1 [1], clause 9.3.6.2
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT generates Beacon packets
}
then {
the IUT sends each Beacon packet
after expiry of itsGnBeaconServiceRetransmitTimer
and before expiry of itsGnBeaconServiceRetransmitTimer + itsGnBeaconServiceMaxJitter
}
}	

TP Id	TP/GEONW/PON/BEA/BV/02
Test objective	Test that the IUT resets its timer for next Beacon transmission when originating other packets
Reference	EN 302 636-4-1 [1], clauses 9.2.3 and 9.3.10.2
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a SHB packet }
then {
the IUT broadcasts a SHB packet and
the IUT sends the next Beacon packet
after expiry of itsGnBeaconServiceRetransmitTimer
and before expiry of itsGnBeaconServiceRetransmitTimer + itsGnBeaconServiceMaxJitter
}
}	

6.2.2.8 GeoUnicast

TP Id	TP/GEONW/PON/GUC/BV/01
Test objective	Test that the reception of a unicast packet over upper Gn SAP triggers the origination of a GeoUnicast packet
Reference	EN 302 636-4-1 [1], clauses 9.3.8.2 and 9.3.6.3
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a GeoUnicast packet to ItsNodeB
}
then {
the IUT sends a GeoNetworking packet
containing a correctly formatted Common Header
containing HT field
set to '2' (GEOUNICAST)
containing GeoUnicast Extended Header
containing DEPV field
indicating same position as the SOPV value of the Beacon information received
}
}	

TP Id	TP/GEONW/PON/GUC/BV/02
Test objective	Test that a received GeoUnicast packet is routed to the correct next hop neighbour according to the greedy forwarding rules
Reference	EN 302 636-4-1 [1], clauses 9.3.8.3 and D.2
Config Id	CF04
PICS Selection	PICS_GN_GEOUNICAST_FORWARDING_ALGORITHM == 'GREEDY' OR PICS_GN_GEOUNICAST_FORWARDING_ALGORITHM == 'UNSPECIFIED'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeD and
the IUT having received Beacon information from ItsNodeC
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoUnicast packet addressed to ItsNodeA from ItsNodeC
containing TrafficClass.SCF set to 1
containing Basic Header
containing RHL field
indicating value greater than 1
}
then {
the IUT selects ItsNodeB as the next hop ITS station and
the IUT forwards the GeoUnicast packet
}
}	

TP Id	TP/GEONW/PON/GUC/BV/03
Test objective	Test that the protocol header fields (RHL, PV) are correctly updated at each forwarding step
Config Id	CF03
Reference	EN 302 636-4-1 [1], clause 9.3.8.3
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received Beacon information from ItsNodeC and
    the IUT having received a GeoUnicast packet (GEOUNI1) originated by ItsNodeA
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoUnicast packet (GEOUNI2) addressed to ItsNodeA from ItsNodeC
            containing TrafficClass.SCF set to 1
            containing Basic Header
                containing RHL field
                    indicating value greater than 1
            containing Common Header
                containing MHL field
                    indicating value MHL1
            containing GeoUnicast Extended Header
                containing DEPV field
                    indicating position different from the SOPV value of GEOUNI1
                containing TST field
                    indicating older value than the TimeStamp value of GEOUNI1
    }
    then {
        the IUT selects ItsNodeB as the next hop ITS station and
        the IUT forwards GEOUNI2
            containing Basic Header
                containing RHL field
                    indicating value decreased by 1 from the incoming value
            containing Common Header
                containing MHL field
                    indicating value MHL1
            containing GeoUnicast Extended Header
                containing DEPV field
                    indicating same position as the SOPV value of GEOUNI1
    }
}
```

TP Id	TP/GEONW/PON/GUC/BV/04
Test objective	Test that the RHL restriction is correctly handled at a forwarding step
Reference	EN 302 636-4-1 [1], clause 9.3.8.3
Config Id	CF03
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeC
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoUnicast packet addressed to ItsNodeA from ItsNodeC
containing TrafficClass.SCF set to 1
containing Basic Header
containing RHL field
indicating 1
}
then {
the IUT does not forward the GeoUnicast packet
}
}	

TP Id	TP/GEONW/PON/GUC/BV/05
Test objective	Test that a received GeoUnicast packet is passed over the Gn SAP to the correct upper protocol if the Destination address matches the IUT address
Reference	EN 302 636-4-1 [1], clause 9.3.8.4
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoUnicast packet addressed to it
}
then {
the IUT passes the received GeoUnicast packet to the correct Upper Layer protocol
}
}	

TP Id	TP/GEONW/PON/GUC/BV/06
Test objective	Test that a received GeoUnicast packet is forwarded at the correct time according to the contention based forwarding rules
Reference	EN 302 636-4-1 [1], clauses 9.3.8.3 and D.3
Config Id	CF03
PICS Selection	PICS_GN_GEOUNICAST_FORWARDING_ALGORITHM == 'CBF'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeC and
the distance between IUT and ItsNodeA being
less than itsGnDefaultMaxCommunicationRange MIB attribute
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoUnicast packet addressed to ItsNodeA from ItsNodeC
containing TrafficClass.SCF set to 1
containing Basic Header
containing RHL field
indicating value greater than 1
}
then {
the IUT re-broadcasts the received GeoUnicast packet
after expiry of calculated CBF delay (see note)
}
}	

NOTE: The CBF delay timer value is calculated from the itsGnDefaultMaxCommunicationRange, itsGnGeoUnicastCbfMinTime, and itsGnGeoUnicastCbfMaxTime MIB attributes, and the distance value between IUT and ItsNodeC.	

TP Id	TP/GEONW/PON/GUC/BV/07
Test objective	Test that a received GeoUnicast packet forwarding is correctly handling the minimum delay value according to the contention based forwarding rules
Reference	EN 302 636-4-1 [1], clauses 9.3.8.3 and D.3
Config Id	CF03
PICS Selection	PICS_GN_GEOUNICAST_FORWARDING_ALGORITHM == 'CBF'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeC and
the distance between IUT and ItsNodeA being
larger than the itsGnDefaultMaxCommunicationRange MIB attribute
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoUnicast packet addressed to ItsNodeA from ItsNodeC
containing TrafficClass.SCF set to 1
containing Basic Header
containing RHL field
indicating value greater than 1
}
then {
the IUT re-broadcasts the received GeoUnicast packet
after expiry of itsGnGeoUnicastCbfMinTime delay
}
}	

TP Id	TP/GEONW/PON/GUC/BV/08
Test objective	Test that GeoUnicast packet forwarding correctly avoids packet duplication according to the contention based forwarding rules
Reference	EN 302 636-4-1 [1], clauses 9.3.8.3 and D.3
Config Id	CF03
PICS Selection	PICS_GN_GEOUNICAST_FORWARDING_ALGORITHM == 'CBF'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeC and
the distance between IUT and ItsNodeA being
less than the itsGnDefaultMaxCommunicationRange MIB attribute and
the IUT having received a GeoUnicast packet addressed to ItsNodeA from ItsNodeC
containing TrafficClass.SCF set to 1
containing Basic Header
containing RHL field
indicating value greater than 1 and
the IUT having started a CBF timer for this packet (see note)
}	

Expected behaviour	

ensure that {
when {
the IUT receives the same GeoBroadcast packet from ItsNodeB
before expiration of the CBF timer
}
then {
the IUT does not re-broadcast the received GeoBroadcast packet
}
}	

NOTE: The CBF delay timer value is calculated from the itsGnDefaultMaxCommunicationRange, itsGnGeoUnicastCbfMinTime, and itsGnGeoUnicastCbfMaxTime MIB attributes, and the distance value between IUT and ItsNodeC.	

TP Id	TP/GEONW/PON/GUC/BV/10
Test objective	Test that a received GeoUnicast packet is forwarded at the correct time according to the contention based forwarding rules when the sender is unknown
Reference	EN 302 636-4-1 [1], clauses 9.3.8.3 and D.3
Config Id	CF03
PICS Selection	PICS_GN_GEOUNICAST_FORWARDING_ALGORITHM == 'CBF'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT not having received any message from ItsNodeC and
the distance between IUT and ItsNodeA being
less than itsGnDefaultMaxCommunicationRange MIB attribute
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoUnicast packet addressed to ItsNodeA from ItsNodeC
containing TrafficClass.SCF set to 1
containing Basic Header
containing RHL field
indicating value greater than 1
}
then {
the IUT re-broadcasts the received GeoUnicast packet
after expiry of CBF_MAX
}
}	

6.2.2.9 GeoBroadcast

TP Id	TP/GEONW/PON/GBC/BV/01
Test objective	Test that the reception of a broadcast indication over upper Gn SAP triggers the origination of a GeoBroadcast packet's broadcasting if the IUT is within the Destination Area
Reference	EN 302 636-4-1 [1], clause 9.3.11.2
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeD and
the IUT having received Beacon information from ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a GeoBroadcast packet
containing TrafficClass.SCF set to 1
containing GeoBroadcast DestinationArea
indicating AREA1
}
then {
the IUT broadcasts immediately the GeoBroadcast packet
containing GeoBroadcast DestinationArea
indicating AREA1
}
}	

TP Id	TP/GEONW/PON/GBC/BV/02
Test objective	Test that the reception of a broadcast indication over upper Gn SAP triggers the origination of a GeoBroadcast packet's line forwarding if the IUT is outside the Destination Area
Reference	EN 302 636-4-1 [1], clauses 9.3.11.2 and E.2
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeD and
the IUT having received Beacon information from ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a GeoBroadcast packet
containing TrafficClass.SCF set to 1
containing GeoBroadcast DestinationArea
indicating AREA2
}
then {
the IUT selects ItsNodeB as the next hop ITS station and
the IUT sends the GeoBroadcast packet (see note)
}
}	

NOTE: Next hop ITS Station being identified by the MAC layer address of ItsNodeB.	

TP Id	TP/GEONW/PON/GBC/BV/03
Test objective	Test that a received GeoBroadcast packet is triggering re-broadcasting if received for the first time within its destination area
Reference	EN 302 636-4-1 [1], clauses 9.3.11.3 and E.2
Config Id	CF02
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'SIMPLE' OR PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'UNSPECIFIED'

Initial conditions

```
with {
    the IUT being in the "initial state" and   the IUT having received Beacon information from ItsNodeD and
    the IUT having received Beacon information from ItsNodeB
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoBroadcast packet
            containing TrafficClass.SCF set to 1
            containing GeoBroadcast DestinationArea
                indicating AREA1
    }
    then {
        the IUT re-broadcasts immediately the GeoBroadcast packet
    }
}
```

TP Id	TP/GEONW/PON/GBC/BV/04
Test objective	Test that a received GeoBroadcast packet is not triggering re-broadcasting if received twice or more (duplicate packet detection)
Reference	EN 302 636-4-1 [1], clauses 9.3.11.3 and A.2
Config Id	CF02
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'SIMPLE' OR PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'UNSPECIFIED'

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeD and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received a GeoBroadcast packet from ItsNodeB
        containing TrafficClass.SCF set to 1
        containing Basic Header
            containing RHL field
                indicating value HL1 higher than 1
        containing GBC Extended  Header
            containing SN field
                indicating value SN1
            containing GeoBroadcast DestinationArea
                indicating AREA1 and
    the IUT having re-broadcast the GeoBroadcast packet
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives the same GeoBroadcast packet from ItsNodeD
            containing Basic Header
                containing RHL field
                    indicating value lower than HL1
            containing GBC Extended  Header
                containing SN field
                    indicating value SN1
    }
    then {
        the IUT does not re-broadcast the GeoBroadcast packet
    }
}
```

TP Id	TP/GEONW/PON/GBC/BV/05
Test objective	Test that a received GeoBroadcast packet is triggering line forwarding if received out of its destination area for the first time
Reference	EN 302 636-4-1 [1], clauses 9.3.11.3 and E.2
Config Id	CF04
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received Beacon information from ItsNodeDand
    the IUT having received Beacon information from ItsNodeC
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoBroadcast packet generated by ItsNodeC
            containing TrafficClass.SCF set to 1
            containing GeoBroadcast DestinationArea
                indicating AREA2
    }
    then {
        the IUT selects ItsNodeB as the next hop ITS station and
        the IUT forwards the GeoBroadcast packet (see note)
    }
}
```

NOTE: Next hop ITS Station being identified by the MAC layer address of ItsNodeB.

TP Id	TP/GEONW/PON/GBC/BV/06
Test objective	Test that a received GeoBroadcast packet is not triggering line forwarding if received out of its destination area twice or more
Reference	EN 302 636-4-1 [1], clause 9.3.11.3
Config Id	CF04
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received Beacon information from ItsNodeD
    the IUT having received a GeoBroadcast packet from ItsNodeC
        containing TrafficClass.SCF set to 1
        containing Basic Header
            containing RHL field
                indicating value HL1 higher than 1
        containing GBC Extended  Header
            containing SN field
                indicating value SN1
            containing GeoBroadcast DestinationArea
                indicating AREA2
    the IUT having forwarded the received GeoBroadcast packet
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives the same GeoBroadcast packet from ItsNodeD
            containing Basic Header
                containing RHL field
                    indicating value lower than HL1
            containing GBC Extended  Header
                containing SN field
                    indicating value SN1
    }
    then {
        the IUT does not forward the received GeoBroadcast packet
    }
}
```

TP Id	TP/GEONW/PON/GBC/BV/07
Test objective	Test that the protocol header fields (RHL) are correctly updated during a GeoBroadcast re-broadcasting step
Reference	EN 302 636-4-1 [1], clause 9.3.11.3
Config Id	CF02
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'SIMPLE' OR PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'UNSPECIFIED'

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeD and
    the IUT having received Beacon information from ItsNodeB
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoBroadcast packet
            containing TrafficClass.SCF set to 1
            containing Basic Header
                containing RHL field
                    indicating value HL1 higher than 1
            containing Common Header
                containing MHL field
                    indicating value MHL1
            containing GeoBroadcast DestinationArea
                indicating AREA1
    }
    then {
        the IUT re-broadcasts the GeoBroadcast packet
            containing Basic Header
                containing RHL field
                    indicating value (HL1 -1)
            containing Common Header
                containing MHL field
                    indicating value MHL1
    }
}
```

TP Id	TP/GEONW/PON/GBC/BV/08
Test objective	Test that the RHL restriction is correctly handled at a GeoBroadcast re-broadcasting step
Reference	EN 302 636-4-1 [1], clause 9.3.11.3
Config Id	CF02
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'SIMPLE' OR PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'UNSPECIFIED'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeD and
the IUT having received Beacon information from ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet
containing TrafficClass.SCF set to 1
containing Basic Header
containing RHL field
indicating 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA1
}
then {
the IUT does not re-broadcast the GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/GBC/BV/09
Test objective	Test that a received GeoBroadcast packet is passed over the Gn SAP to the correct upper protocol if it is received for the first time within the GeoBroadcast destination area
Reference	EN 302 636-4-1 [1], clause 9.3.11.3
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet
containing TrafficClass.SCF set to 1
containing GeoBroadcast DestinationArea
indicating AREA1
}
then {
the IUT passes the received GeoBroadcast packet to the correct Upper Layer protocol
}
}	

TP Id	TP/GEONW/PON/GBC/BV/10
Test objective	Test that a received GeoBroadcast packet is not passed over the Gn SAP if it is received twice or more
Reference	EN 302 636-4-1 [1], clause 9.3.11.2
Config Id	CF02
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeD and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received a GeoBroadcast packet from ItsNodeB
        containing TrafficClass.SCF set to 1
        containing Basic Header
            containing RHL field
                indicating HL1
        containing GBC Extended Header
            containing SN field
                indicating value SN1
            containing GeoBroadcast DestinationArea
                indicating AREA1 and
    the IUT having passed the received GeoBroadcast packet to the correct Upper Layer protocol
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives the same GeoBroadcast packet from ItsNodeD
            containing Basic Header
                containing RHL field
                    indicating value lower than HL1
            containing GBC Extended Header
                containing SN field
                    indicating value SN1
    }
    then {
        the IUT does not pass the received GeoBroadcast packet to any Upper Layer protocol
    }
}
```

TP Id	TP/GEONW/PON/GBC/BV/11
Test objective	Test that a received GeoBroadcast packet is not passed over the Gn SAP if it is received for the first time outside the GeoBroadcast destination area
Reference	EN 302 636-4-1 [1], clause 9.3.11.3
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoBroadcast packet
            containing TrafficClass.SCF set to 1
            containing GeoBroadcast DestinationArea
                indicating AREA2
    }
    then {
        the IUT does not pass the received GeoBroadcast packet to any Upper Layer protocol
    }
}
```

TP Id	TP/GEONW/PON/GBC/BV/12
Test objective	Test that the reception of a broadcast indication over upper Gn SAP triggers the origination of a Simple GeoBroadcast if this method is selected in the MIB
Reference	EN 302 636-4-1 [1], clauses 9.3.11.2 and E.2
Config Id	CF02
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'SIMPLE' OR PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'UNSPECIFIED'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeD and
the IUT having received Beacon information from ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a GeoBroadcast packet
containing TrafficClass.SCF set to 1
containing GeoBroadcast DestinationArea
indicating AREA1
}
then {
the IUT broadcasts immediately the GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/GBC/BV/19
Test objective	Test that a received GeoBroadcast packet is discarded when indicating a too big GeoArea.
Reference	EN 302 636-4-1 [1], clause B.3
Config Id	CF04
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeD
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet from ItsNodeC
containing TrafficClass.SCF set to 1
containing GeoBroadcast DestinationArea
indicating a geoArea bigger than itsGnMaxGeoAreaSize
}
then {
the IUT does not forward the received GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/GBC/BV/20
Test objective	Test that a received GeoBroadcast packet is triggering rebroadcasting if received out of its destination area for the first time from an unknown sender
Reference	EN 302 636-4-1 [1], clauses 9.3.11.3 and E.2
Config Id	CF04
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT not having received any message from ItsNodeD
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet generated by ItsNodeC from ItsNodeD
containing TrafficClass.SCF set to 1
containing GeoBroadcast DestinationArea
indicating AREA2
}
then {
the IUT re-broadcasts the GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/GBC/BV/21
Test objective	Test that a received GeoBroadcast packet is triggering rebroadcasting if received out of its destination area for the first time from a known sender with PAI=0
Reference	EN 302 636-4-1 [1], clauses 9.3.11.3 and E.2
Config Id	CF04
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeD
containing SOPV.PAI indicating 0
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet generated by ItsNodeC from ItsNodeD
containing TrafficClass.SCF set to 1
containing GeoBroadcast DestinationArea
indicating AREA2
}
then {
the IUT re-broadcasts the GeoBroadcast packet
}
}	

6.2.2.10 Topologically Scoped Broadcast

TP Id	TP/GEONW/PON/TSB/BV/01
Test objective	Test that the reception of a TSB indication over upper Gn SAP triggers the origination of a TSB packet
Reference	EN 302 636-4-1 [1], clause 9.3.9.2
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeD
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a TSB packet
}
then {
the IUT broadcasts a TSB packet
}
}	

TP Id	TP/GEONW/PON/TSB/BV/02
Test objective	Test that a received TSB packet is triggering re-broadcasting if received for the first time
Reference	EN 302 636-4-1 [1], clause 9.3.9.3
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeD and
the IUT having received Beacon information from ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT receives a TSB packet
containing Basic Header
containing RHL field
indicating HL1 higher than 1
}
then {
the IUT re-broadcasts the TSB packet
}
}	

TP Id	TP/GEONW/PON/TSB/BV/03
Test objective	Test that a received TSB packet is not triggering re-broadcasting if received twice or more
Reference	EN 302 636-4-1 [1], clause 9.3.9.3
Config Id	CF02
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeD and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received a TSB packet from ItsNodeB
        containing Basic Header
            containing RHL field
                indicating HL1 higher than 1
        containing TSB Extended Header
            containing SN field
                indicating value SN1 and
    the IUT having re-broadcast the TSB packet
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives the same TSB packet from ItsNodeD
            containing Basic Header
                containing RHL field
                    indicating HL1 - 1
            containing TSB Extended Header
                containing SN field
                    indicating value SN1
    }
    then {
        the IUT does not re-broadcast the TSB packet
    }
}
```

TP Id	TP/GEONW/PON/TSB/BV/04
Test objective	Test that the protocol header fields (RHL) are correctly updated during a TSB re-broadcasting step
Reference	EN 302 636-4-1 [1], clause 9.3.9.3
Config Id	CF02
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeD and
    the IUT having received Beacon information from ItsNodeB
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a TSB packet
            containing Basic Header
                containing RHL field
                    indicating HL1
            containing Common Header
                containing MHL field
                    indicating value MHL1
    }
    then {
        the IUT re-broadcasts the TSB packet
            containing Basic Header
                containing RHL field
                    indicating value (HL1 -1)
            containing Common Header
                containing MHL field
                    indicating value MHL1
    }
}
```

TP Id	TP/GEONW/PON/TSB/BV/05
Test objective	Test that the RHL restriction is correctly handled at a TSB re-broadcasting step
Reference	EN 302 636-4-1 [1], clause 9.3.9.3
Config Id	CF02
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state"
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a TSB packet
            containing Basic Header
                containing RHL field
                    indicating 1
    }
    then {
        the IUT does not re-broadcast the TSB packet
    }
}
```

TP Id	TP/GEONW/PON/TSB/BV/06
Test objective	Test that a received TSB packet is passed over the Gn SAP to the correct upper protocol if it is received for the first time
Reference	EN 302 636-4-1 [1], clause 9.3.9.3
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT receives a TSB packet
}
then {
the IUT passes the received TSB packet to the correct Upper Layer protocol
}
}	

TP Id	TP/GEONW/PON/TSB/BV/07
Test objective	Test that a received TSB packet is not passed over the Gn SAP if it is received twice or more
Reference	EN 302 636-4-1 [1], clause 9.3.9.3
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received a TSB packet from ItsNodeB
containing Basic Header
containing RHL field
indicating HL1 higher than 1
containing TSB Extended Header
containing SN field
indicating value SN1 and
the IUT having passed the received TSB packet to the correct Upper Layer protocol
}	

Expected behaviour	

ensure that {
when {
the IUT receives the same TSB packet from ItsNodeD
containing Basic Header
containing RHL field
indicating HL1 - 1
containing TSB Extended Header
containing SN field
indicating value SN1
}
then {
the IUT does not pass the received TSB packet to any Upper Layer protocol
}
}	

6.2.2.11 Single-Hop Broadcast

TP Id	TP/GEONW/PON/SHB/BV/01
Test objective	Test that the reception of a SHB indication over upper Gn SAP triggers the origination of a SHB packet
Reference	EN 302 636-4-1 [1], clause 9.3.10.2
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeD and
the IUT having received Beacon information from ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a SHB packet
}
then {
the IUT broadcasts the SHB packet
}
}	

TP Id	TP/GEONW/PON/SHB/BV/02
Test objective	Test that a received SHB packet is passed over the Gn SAP to the correct upper protocol if it is received for the first time
Reference	EN 302 636-4-1 [1], clause 9.3.10.3
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT receives a SHB packet
}
then {
the IUT passes the received SHB packet to the Upper Layer protocol
}
}	

6.2.2.12 GeoAnycast

TP Id	TP/GEONW/PON/GAC/BV/01
Test objective	Test that the reception of an anycast indication over upper Gn SAP triggers the origination of a GeoAnycast packet's broadcasting if the IUT is within the Destination Area
Reference	EN 302 636-4-1 [1], clause 9.3.12.2
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeD and
the IUT having received Beacon information from ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a GeoAnycast packet
containing TrafficClass.SCF set to 1
containing GeoAnycast DestinationArea
indicating AREA1
}
then {
the IUT broadcasts the GeoAnycast packet
containing GeoBroadcast DestinationArea
indicating AREA1
}
}	

TP Id	TP/GEONW/PON/GAC/BV/02
Test objective	Test that the reception of an anycast indication over upper Gn SAP triggers the origination of a GeoAnycast packet's line forwarding if the IUT is outside the Destination Area
Reference	EN 302 636-4-1 [1], clauses 9.3.12.2 and E.2
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeD and
the IUT having received Beacon information from ItsNodeB
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a GeoAnycast packet
containing TrafficClass.SCF set to 1
containing GeoAnycast DestinationArea
indicating AREA2
}
then {
the IUT selects ItsNodeB as the next hop and
the IUT sends the GeoAnycast packet (see note)
containing GeoBroadcast DestinationArea
indicating AREA2
}
}	

NOTE: Next hop ITS Station being identified by the MAC layer address of ItsNodeB.	

TP Id	TP/GEONW/PON/GAC/BV/03
Test objective	Test that a received GeoAnycast packet is not triggering forwarding or re-broadcasting if the IUT is within the Destination Area
Reference	EN 302 636-4-1 [1], clause 9.3.12.3
Config Id	CF02
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeD and
    the IUT having received Beacon information from ItsNodeB
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoAnycast packet
            containing TrafficClass.SCF set to 1
            containing GeoAnycast DestinationArea
                indicating AREA1
    }
    then {
        the IUT does not re-broadcast the received GeoAnycast packet
    }
}
```

TP Id	TP/GEONW/PON/GAC/BV/04
Test objective	Test that a received GeoAnycast packet is triggering line forwarding if received out of its destination area for the first time
Reference	EN 302 636-4-1 [1], clauses 9.3.12.3 and E.2
Config Id	CF04
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB
    the IUT having received Beacon information from ItsNodeD
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoAnycast packet from ItsNodeC
            containing TrafficClass.SCF set to 1
            containing GeoAnycast DestinationArea
                indicating AREA2
    }
    then {
        the IUT selects ItsNodeB as the next hop and
        the IUT forwards the GeoAnycast packet (see note)
    }
}
```

NOTE: Next hop ITS Station being identified by the MAC layer address of ItsNodeB.

TP Id	TP/GEONW/PON/GAC/BV/05
Test objective	Test that a received GeoAnycast packet is not triggering line forwarding if received out of its destination area twice or more
Reference	EN 302 636-4-1 [1], clause 9.3.12.3
Config Id	CF04
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB
    the IUT having received Beacon information from ItsNodeD
    the IUT having received a GeoAnycast packet from ItsNodeC
        containing TrafficClass.SCF set to 1
        containing Basic Header
            containing RHL field
                indicating value HL1 higher than 1
        containing GAC Extended Header
            containing SN field
                indicating value SN1 and
            containing GeoBroadcast DestinationArea
                indicating AREA2
    the IUT having forwarded the GeoAnycast packet
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives the same GeoAnycast packet from other neighbour
            containing Basic Header
                containing RHL field
                    indicating value lower than HL1
            containing GAC Extended Header
                containing SN field
                    indicating value SN1
    }
    then {
        the IUT does not forward the received GeoAnycast packet
    }
}
```

TP Id	TP/GEONW/PON/GAC/BV/06
Test objective	Test that the protocol header fields (RHL) are correctly updated during a GeoAnycast forwarding step
Reference	EN 302 636-4-1 [1], clauses 9.3.6.3 and 9.3.12.3
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoAnycast packet from ItsNodeC
            containing TrafficClass.SCF set to 1
            containing Basic Header
                containing RHL field
                    indicating value HL1 higher than 1
            containing Common Header
                containing MHL field
                    indicating value MHL1
            containing GeoAnycast DestinationArea
                indicating AREA2
    }
    then {
        the IUT selects the ItsNodeB as the next hop
        the IUT forwards the GeoAnycast packet
            containing Basic Header
                containing RHL field
                    indicating value (HL1 - 1)
            containing Common Header
                containing MHL field
                    indicating value MHL1
            containing GeoAnycast DestinationArea
                indicating AREA2
    }
}
```

TP Id	TP/GEONW/PON/GAC/BV/07
Test objective	Test that the RHL restriction is correctly handled at a GeoAnycast forwarding step
Reference	EN 302 636-4-1 [1], clause 9.3.12.3
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoAnycast packet from ItsNodeC
            containing TrafficClass.SCF set to 1
            containing Basic Header
                containing RHL field
                    indicating 1
            containing GAC Extended Header
                containing GeoBroadcast DestinationArea
                    indicating AREA2
    }
    then {
        the IUT does not forward the GeoAnycast packet
    }
}
```

TP Id	TP/GEONW/PON/GAC/BV/08
Test objective	Test that a received GeoAnycast packet is passed over the Gn SAP to the correct upper protocol if it is received for the first time within the GeoAnycast destination area
Reference	EN 302 636-4-1 [1], clause 9.3.12.3
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state"
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoAnycast packet from ItsNodeB
            containing TrafficClass.SCF set to 1
            containing GeoBroadcast DestinationArea
                indicating AREA1
    }
    then {
        the IUT passes the received GeoAnycast packet to the correct Upper Layer protocol
    }
}
```

TP Id	TP/GEONW/PON/GAC/BV/09
Test objective	Test that a received GeoAnycast packet is not passed over the Gn SAP if it is received twice or more
Reference	EN 302 636-4-1 [1], clause 9.3.12.3
Config Id	CF02
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received a GeoAnycast packet from ItsNodeD
        containing TrafficClass.SCF set to 1
        containing Basic Header
            containing RHL field
                indicating HL1
            containing GAC Extende Header
            containing SN field
                indicating value SN1 and
            containing GeoBroadcast DestinationArea
                indicating AREA1 and
    the IUT having passed the received GeoAnycast packet to the correct Upper Layer protocol
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives the same GeoAnycast packet from ItsNodeB
            containing Basic Header
                containing RHL field
                    indicating value lower than HL1
            containing GAC Extended Header
                containing SN field
                    indicating value SN1
    }
    then {
        the IUT does not pass the received GeoAnycast packet to any Upper Layer protocol
    }
}
```

TP Id	TP/GEONW/PON/GAC/BV/10
Test objective	Test that a received GeoAnycast packet is not passed over the Gn SAP if it is received for the first time outside the GeoAnycast destination area
Reference	EN 302 636-4-1 [1], clause 9.3.12.3
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state"
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoAnycast packet from ItsNodeB
containing TrafficClass.SCF set to 1
containing GeoBroadcast DestinationArea
indicating AREA2
}
then {
the IUT does not pass the received GeoAnycast packet to any Upper Layer protocol
}
}	

TP Id	TP/GEONW/PON/GAC/BV/11
Test objective	Test that a received GeoAnycast packet is discarded when indicating a too big GeoArea.
Reference	EN 302 636-4-1 [1], clause B.3
Config Id	CF04
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB
the IUT having received Beacon information from ItsNodeD
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GAC packet from ItsNodeC
containing TrafficClass.SCF set to 1
containing DestinationArea
indicating a geoArea bigger than itsGnMaxGeoAreaSize
}
then {
the IUT does not forward the received GAC packet
}
}	

TP Id	TP/GEONW/PON/GAC/BV/12
Test objective	Test that a received GeoAnycast packet is triggering line forwarding if received out of its destination area for the first time from an unkown sender
Reference	EN 302 636-4-1 [1], clauses 9.3.11.3 and E.2
Config Id	CF04
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT not having received any message from ItsNodeD
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoAnycast packet generated by ItsNodeC from ItsNodeD
containing TrafficClass.SCF set to 1
containing GeoAnycast DestinationArea
indicating AREA2
}
then {
the IUT re-broadcasts the GeoAnycast packet
}
}	

6.2.2.13 GeoBroadcast CBF Algorithm

TP Id	TP/GEONW/PON/BCA/BV/01
Test objective	Test that a received GeoBroadcast packet is discarded if received twice or more.
Reference	EN 302 636-4-1 [1], clause E.3
Config Id	CF04
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'CBF'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeD
the IUT having received a GBC packet from ItsNodeC
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA1
the IUT having saved the packet into CBF buffer
}	

Expected behaviour	

ensure that {
when {
the IUT receives the same GeoBroadcast packet from ItsNodeD
}
then {
the IUT removes the GeoBroadcast packet from the CBF buffer
the IUT discards the new received GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/BCA/BV/02
Test objective	Test that a received GeoBroadcast packet is triggering contention if received for the first time when inside of the destination area.
Reference	EN 302 636-4-1 [1], clause E.3
Config Id	CF04
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'CBF'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeD
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet from ItsNodeC
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA1
}
then {
the IUT saves the GeoBroadcast packet into the CBF buffer and
the IUT starts the contention timer and
the IUT broadcasts the received GeoBroadcast packet
after expiry of the contention timer
}
}	

TP Id	TP/GEONW/PON/BCA/BV/03
Test objective	Test that a received GeoBroadcast packet from outside of the destination area is triggering line forwarding if received for the first time when IUT is outside of the destination area.
Reference	EN 302 636-4-1 [1], clause E.3
Config Id	CF04
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'CBF'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeD and
the IUT having received Beacon information from ItsNodeC
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet from ItsNodeC
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA2
}
then {
the IUT selects ItsNodeB as the next hop ITS station and
the IUT forwards the GeoBroadcast packet (see note)
}
}	

NOTE: Next hop ITS Station being identified by the MAC layer address of ItsNodeB.	

TP Id	TP/GEONW/PON/BCA/BV/04
Test objective	Test that a received GeoBroadcast packet from inside of the destination area is discarded if received for the first time when IUT is outside of the destination area.
Reference	EN 302 636-4-1 [1], clause E.3
Config Id	CF04
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'CBF'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeD
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet from ItsNodeD
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA2
}
then {
the IUT discards the received GeoBroad packet
}
}	

TP Id	TP/GEONW/PON/BCA/BV/05
Test objective	Test that a received GeoBroadcast packet is triggering contention if received for the first time when IUT is inside of the destination area from an unknown sender
Reference	EN 302 636-4-1 [1], clause E.3
Config Id	CF04
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT is using the CBF algorithm
the IUT having received Beacon information from ItsNodeB and
the IUT not having received any message from ItsNodeD
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet generated by ItsNodeC from ItsNodeD
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA1
}
then {
the IUT saves the GeoBroadcast packet into the CBF buffer and
the IUT starts the contention timer set to CBF_MAX and
the IUT broadcasts the received GeoBroadcast packet
after expiry of the contention timer
}
}	

TP Id	TP/GEONW/PON/BCA/BV/06
Test objective	Test that a received GeoBroadcast packet from outside of the destination area is triggering line forwarding if received for the first time when IUT is outside of the destination area from an unknown sender
Reference	EN 302 636-4-1 [1], clause E.3
Config Id	CF04
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'CBF'

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB and
    the IUT not having received any message from ItsNodeD
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoBroadcast packet generated by ItsNodeC from ItsNodeD
            containing TrafficClass.SCF set to 1
            containing GBC Extended Header
                containing GeoBroadcast DestinationArea
                    indicating AREA2
    }
    then {
        the IUT broadcasts the GeoBroadcast packet
    }
}
```

TP Id	TP/GEONW/PON/BCA/BV/07
Test objective	Test that a received GeoBroadcast packet is rebroadcasted if received for the first time when IUT is outside of the destination area from a known sender having an uncertain position (PAI == 0).
Reference	EN 302 636-4-1 [1], clause E.3
Config Id	CF04
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'CBF'

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received Beacon information from ItsNodeD
        containing Beacon ExtendedHeader
            containing SOPV field
                containing PAI
                    set to ‘0’
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoBroadcast packet generated by ItsNodeC from ItsNodeD
            containing TrafficClass.SCF set to 1
            containing GBC Extended Header
                containing GeoBroadcast DestinationArea
                    indicating AREA2
    }
    then {
        the IUT broadcasts the GeoBroadcast packet
    }
}
```

TP Id	TP/GEONW/PON/BCA/BV/08
Test objective	Test that a received GeoBroadcast packet is triggering contention if received for the first time when IUT is inside of the destination area from a known sender having an uncertain position (PAI == 0).
Reference	EN 302 636-4-1 [1], clause E.3
Config Id	CF04
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT is using the CBF algorithm
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received Beacon information from ItsNodeD
        containing Beacon ExtendedHeader
            containing SOPV field
                containing PAI
                    set to '0'
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoBroadcast packet generated by ItsNodeC from ItsNodeD
            containing TrafficClass.SCF set to 1
            containing GBC Extended Header
                containing GeoBroadcast DestinationArea
                    indicating AREA1
    }
    then {
        the IUT saves the GeoBroadcast packet into the CBF buffer and
        the IUT starts the contention timer set to CBF_MAX and
        the IUT broadcasts the received GeoBroadcast packet
            after expiry of the contention timer
    }
}
```

6.2.2.14 GeoBroadcast Advanced Algorithm

TP Id	TP/GEONW/PON/BAA/BV/01
Test objective	Test that a received GeoBroadcast packet is discarded if received more than MAX_COUNTER times when IUT is inside the destination area.
Reference	EN 302 636-4-1 [1], clause E.4
Config Id	CF06
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'ADVANCED'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeF and
the IUT having received a GeoBroadcast packet GBC1 from ItsNodeF
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA1
the IUT having saved the packet into CBF buffer
the IUT having received MAX_COUNTER– 1 times the GBC1 packet
}	

Expected behaviour	

ensure that {
when {
the IUT receives the same GeoBroadcast packet GBC1
}
then {
the IUT removes GBC1 from the CBF buffer
the IUT discards the new received GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/BAA/BV/02
Test objective	Test that a received GeoBroadcast packet is discarded if received more than once when IUT is inside the destination area and inside the sectorial area of the GeoBroadcast packet Sender.
Reference	EN 302 636-4-1 [1], clause E.4
Config Id	CF05
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'ADVANCED'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeE and
the IUT having received a GeoBroadcast packet GBC1 from ItsNodeB
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA1
the IUT having saved the packet into CBF buffer
}	

Expected behaviour	

ensure that {
when {
the IUT receives the same GeoBroadcast packet GBC1 from ItsNodeE
the IUT is inside the sectorial area of ItsNodeB
}
then {
the IUT removes GBC1 from the CBF buffer
the IUT discards the new received GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/BAA/BV/03
Test objective	Test that a received GeoBroadcast packet is triggering contention if received more than once when IUT is inside the destination area and outside the sectorial area of the GeoBroadcast packet Sender
Reference	EN 302 636-4-1 [1], clause E.4
Config Id	CF06
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'ADVANCED'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeF and
the IUT having received a GeoBroadcast packet GBC1 from ItsNodeB
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA1
the IUT having saved the packet into CBF buffer
}	

Expected behaviour	

ensure that {
when {
the IUT receives the same GeoBroadcast packet GBC1 from ItsNodeF
the IUT is outside the sectorial area of ItsNodeB
}
then {
the IUT saves the GeoBroadcast packet into the CBF buffer and
the IUT starts the contention timer and
the IUT broadcasts the received GeoBroadcast packet
after expiry of the contention timer
}
}	

NOTE: In this configuration IUT is outside sectorial area of ItsNodeB because of the angle FSR.	

TP Id	TP/GEONW/PON/BAA/BV/04
Test objective	Test that a received GeoBroadcast packet with Unicast MAC destination is triggering line forwarding if received for the first time when IUT is inside the destination area.
Reference	EN 302 636-4-1 [1], clause E.4
Config Id	CF05
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'ADVANCED'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeE
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet from ItsNodeE addressed to IUT’s link-layer address
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA1
}
then {
the IUT selects ItsNodeB as the next hop ITS station and
the IUT forwards the GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/BAA/BV/06
Test objective	Test that a received GeoBroadcast packet with Broadcast destination is triggering contention if received for the first time when IUT is inside the destination area.
Reference	EN 302 636-4-1 [1], clause E.4
Config Id	CF05
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'ADVANCED'

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received Beacon information from ItsNodeE
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoBroadcast packet from ItsNodeB
            addressed to broadcast link-layer address
            containing TrafficClass.SCF set to 1
            containing GBC Extended Header
                containing GeoBroadcast DestinationArea
                    indicating AREA1
    }
    then {
        the IUT calculates and starts the contention timer and
        the IUT broadcasts the received GeoBroadcast packet
            after expiry of the contention timer
    }
}
```

TP Id	TP/GEONW/PON/BAA/BV/07
Test objective	Test that a received GeoBroadcast packet from outside the destination area is triggering line forwarding if received for the first time when IUT is outside the destination area.
Reference	EN 302 636-4-1 [1], clause E.4
Config Id	CF04
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'ADVANCED'

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received Beacon information from ItsNodeB and
    the IUT having received Beacon information from ItsNodeC and
    the IUT having received Beacon information from ItsNodeD
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoBroadcast packet from ItsNodeC
            containing TrafficClass.SCF set to 1
            containing GBC Extended Header
                containing GeoBroadcast DestinationArea
                    indicating AREA2
    }
    then {
        the IUT selects ItsNodeB as the next hop ITS station and
        the IUT forwards the GeoBroadcast packet
    }
}
```

TP Id	TP/GEONW/PON/BAA/BV/08
Test objective	Test that a received GeoBroadcast packet from inside the destination area is discarded if received for the first time when IUT is outside the destination area.
Reference	EN 302 636-4-1 [1], clause E.4
Config Id	CF04
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'ADVANCED'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeC and
the IUT having received Beacon information from ItsNodeD
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet from ItsNodeD
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA2
}
then {
the IUT discards the received GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/BAA/BV/09
Test objective	Test that a received GeoBroadcast packet with Broadcast MAC destination is triggering contention if received for the first time from an unknown sender when IUT is inside the destination area.
Reference	EN 302 636-4-1 [1], clause E.4
Config Id	CF05
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'ADVANCED'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT not having received any message from ItsNodeE
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet from ItsNodeE
addressed to link-layer broadcast address
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA1
}
then {
the IUT saves the GeoBroadcast packet into the CBF buffer and
the IUT starts the contention timer set to CBF_MAX and
the IUT broadcasts the received GeoBroadcast packet
after expiry of the contention timer
}
}	

TP Id	TP/GEONW/PON/BAA/BV/10
Test objective	Test that a received GeoBroadcast packet is triggering re-broadcast if received from unknown sender for the first time when IUT is outside the destination area.
Reference	EN 302 636-4-1 [1], clause E.4
Config Id	CF04
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'ADVANCED'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeC and
the IUT not having received any message from ItsNodeD
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet generated by ItsNodeC from ItsNodeD
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA2
}
then {
the IUT re-broadcasts the GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/BAA/BV/11
Test objective	Test that a received GeoBroadcast packet is triggering contention if received more than once when IUT is inside the destination area and outside the sectorial area of the GeoBroadcast packet Sender
Reference	EN 302 636-4-1 [1], clause E.4
Config Id	CF07
PICS Selection	PICS_GN_GEOBROADCAST_FORWARDING_ALGORITHM == 'ADVANCED'
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having received Beacon information from ItsNodeB and
the IUT having received Beacon information from ItsNodeD and
the IUT having received a GeoBroadcast packet GBC1 from ItsNodeB
containing TrafficClass.SCF set to 1
containing GBC Extended Header
containing GeoBroadcast DestinationArea
indicating AREA1
the IUT having saved the packet into CBF buffer
}	

Expected behaviour	

ensure that {
when {
the IUT receives the same GeoBroadcast packet GBC1 from ItsNodeD
the IUT is outside the sectorial area of ItsNodeB
}
then {
the IUT saves the GeoBroadcast packet into the CBF buffer and
the IUT starts the contention timer and
the IUT broadcasts the received GeoBroadcast packet
after expiry of the contention timer
}
}	

NOTE: In this configuration IUT is outside sectorial area of ItsNodeB because of dist_R > dist_F.	

6.2.3 Buffer Capacities

6.2.3.1 Location Service

TP Id	TP/GEONW/CAP/LOS/BV/01
Test objective	Test of LS buffer capacity according to itsGnLocationServicePacketBufferSize parameter and the overflow handling procedure
Reference	EN 302 636-4-1 [1], clause 7.4.2
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT having no Location Table Entry for ItsNodeA and
the IUT having received Beacon information from ItsNodeB and
the IUT having been requested to send multiple GeoUnicast packets to ItsNodeA
containing TrafficClass.SCF set to 1 and
the IUT having sent a LS_REQUEST packet and
the IUT not having received a LS_REPLY packet
}	

Expected behaviour	

ensure that {
when {
the IUT is requested to send a GeoUnicast packet to ItsNodeA
containing TrafficClass.SCF set to 1 and
the location service buffer capacity exceeded (see note 1)
}
then {
the IUT removes the older packet(s) in the location service buffer and,
the IUT inserts the new received packet at the end of the location service buffer (see note 2)
}
}	

NOTE 1: The amount of stored data exceeds Location Service buffer capacity defined by the itsGnLocationServicePacketBufferSize MIB parameter. NOTE 2: Buffered packets will be delivered upon reception of LS_REPLY message.	

6.2.3.2 Forwarding Packet Buffer

TP Id	TP/GEONW/CAP/FPB/BV/01
Test objective	Test of UC forwarding buffer capacity according to itsGnUcForwardingPacketBufferSize parameter and the overflow handling procedure
Reference	EN 302 636-4-1 [1], clause 7.5.3
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having no Location Table Entry for ItsNodeB and
    the IUT having received multiple GeoUnicast packets addressed to ItsNodeA from ItsNodeC
        containing TrafficClass.SCF set to 1
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoUnicast packet addressed to ItsNodeA from ItsNodeC
            containing TrafficClass.SCF set to 1
            containing Basic Header
                containing RHL field
                    indicating HL1 higher than 1
        the UC forwarding packet buffer capacity exceeded (see note 1)
    }
    then {
        the IUT removes the older packet(s) in the UC forwarding packet buffer and,
        the IUT inserts the new received GeoUnicast packet at the end of the UC forwarding packet buffer (see note 2)
    }
}
```

NOTE 1: The amount of stored data exceeds UC forwarding packet capacity defined by the itsGnUcForwardingPacketBufferSize MIB parameter.
NOTE 2: Buffered packets will be delivered upon reception of Beacon message from ItsNodeB

TP Id	TP/GEONW/CAP/FPB/BV/02
Test objective	Test of BC forwarding buffer capacity according to itsGnBcForwardingPacketBufferSize parameter and the overflow handling procedure
Reference	EN 302 636-4-1 [1], clause 7.5.3
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having no Location Table Entry for ItsNodeB
    the IUT having received multiple GeoBroadcast packets
        containing TrafficClass.SCF set to 1
        containing GBC Extended Header
            containing GeoBroadcast Destination Area
                indicating AREA2
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoBroadcast packet
            containing TrafficClass.SCF set to 1
            containing GBC Extended Header
                containing GeoBroadcast Destination Area
                    indicating AREA2 and
        the BC forwarding packet buffer capacity exceeded (see note 1)
    }
    then {
        the IUT removes the older packet(s) in the BC forwarding packet buffer and,
        the IUT inserts the new received GeoBroadcast packet at the end of the BC forwarding packet buffer (see note
2)
    }
}
```

NOTE 1: The amount of stored data exceeds BC forwarding buffer capacity defined by the itsGnBcForwardingPacketBufferSize MIB parameter.
NOTE 2: Buffered packets will be delivered upon reception of Beacon message from ItsNodeB.

Annex A (informative): Bibliography

ETSI TS 102 636-1: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 1: Requirements".

ETSI TS 102 636-2: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 2: Scenarios".

ETSI TS 102 636-3: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 3: Network architecture".

History

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