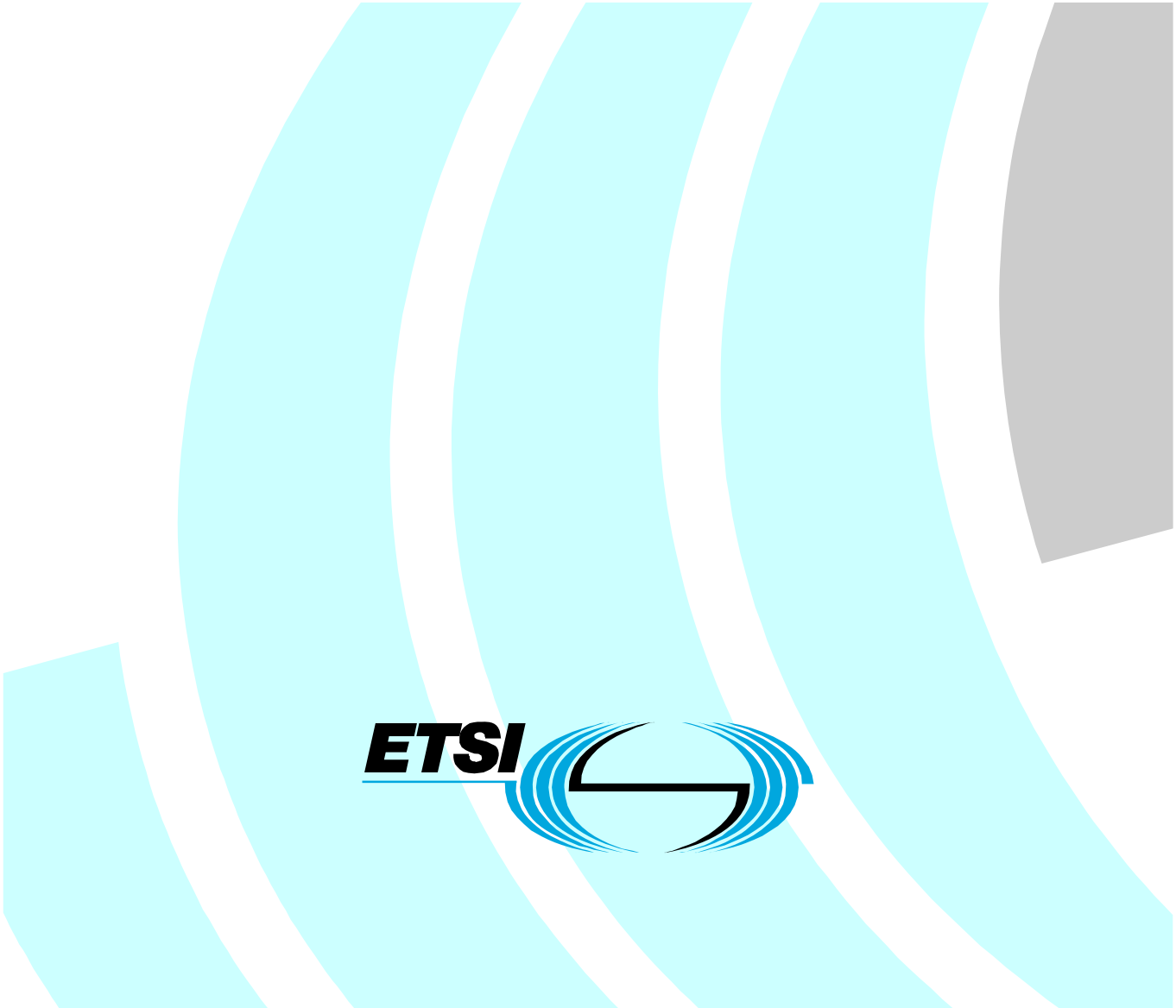
ETSI TS 102 871-2 V1.1.1 (2011-06)

Technical Specification

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 System (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 TS 102 636-4-1 [1] and TS 102 636-4-2 [i.1] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [5].

The ISO standard for the methodology of conformance testing (ISO/IEC 9646-1 [2] and ISO/IEC 9646-2 [3]) as well as the ETSI rules for conformance testing (ETS 300 406 [6]) 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 TS 102 636-4-1 (V1.1.1): "Intelligent Transport System (ITS); Vehicular communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 1: Media independent functionalities".

[2] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[3] ISO/IEC 9646-2 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".

[4] ISO/IEC 9646-6 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol profile test specification".

[5] ISO/IEC 9646-7 (1995): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[6] 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 TS 102 636-4-2: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 2: Media dependent functionalities for ITS-G5A media".

[i.2] ETSI EG 202 798: "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 following terms and definitions apply:

- terms given in TS 102 636-4-1 [1] and TS 102 636-4-2 [i.1].
- terms given in ISO/IEC 9646-6 [4] and in ISO/IEC 9646-7 [5].

ItsNode: node that implements GeoAdhoc router functionality by TS 102 636-4-1 [1]

"to be in direction of X": ItsNode node is a valid candidate for a forwarding algorithm to forward the packet to the destination X. This means that the candidate ItsNode is geographically closer to X than the IUT

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

3.2 Abbreviations

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

BI	Invalid Behaviour
BV	Valid Behaviour
DEPV	DEstination Position Vector
GEONW	GeoNetworking
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
LT	Lifetime
NH	Next Header
PDU	Protocol Data Unit
PL	Payload Length
SAP	Service Access Point
SEPV	SEnder Position Vector
SHB	Single Hop Broadcast
SN	Sequence Number
SOPV	SOurce Position Vector
SUT	System Under Test
TP	Test Purposes
TSS	Test Suite Structure
TST	Timestamp

4 Test Configuration

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.

Four test configurations are defined below.

4.1 Configuration 1: CF01

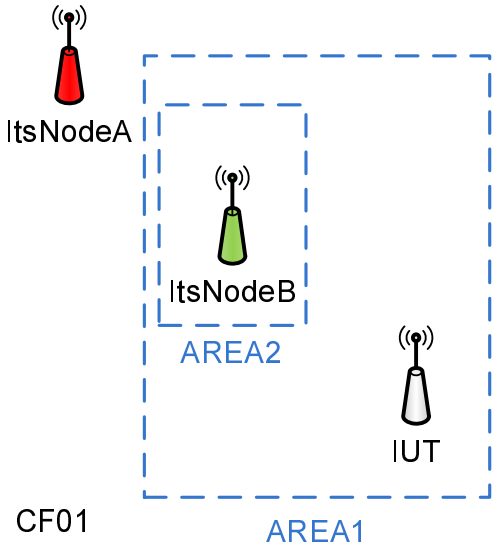

Figure 1

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

4.2 Configuration 2: CF02

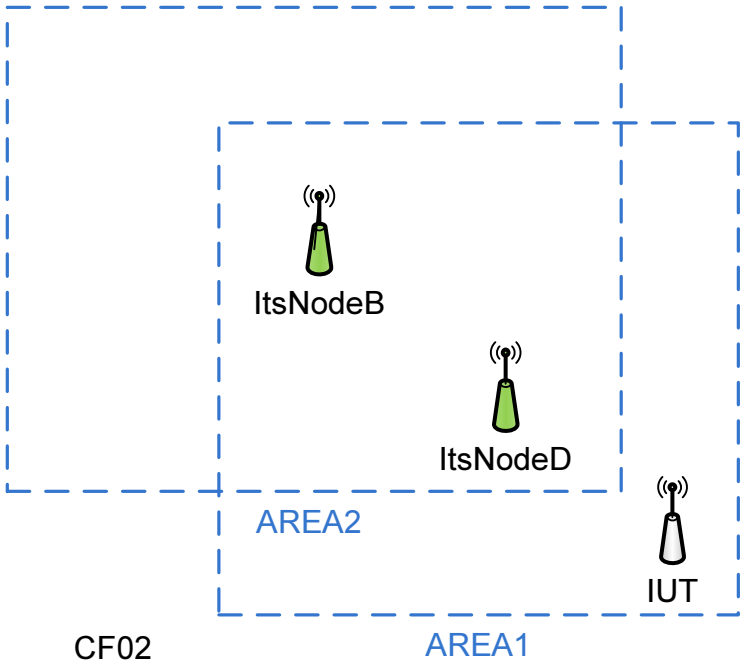

Figure 2

ItsNodeB	is in IUT's communication range is close to the center of Area2 is in Area 1 is in Area 2
ItsNodeD	is in IUT's communication range is in direction of ItsNodeB is in Area 1 is in Area 2
IUT	is in Area 1

4.3 Configuration 3: CF03

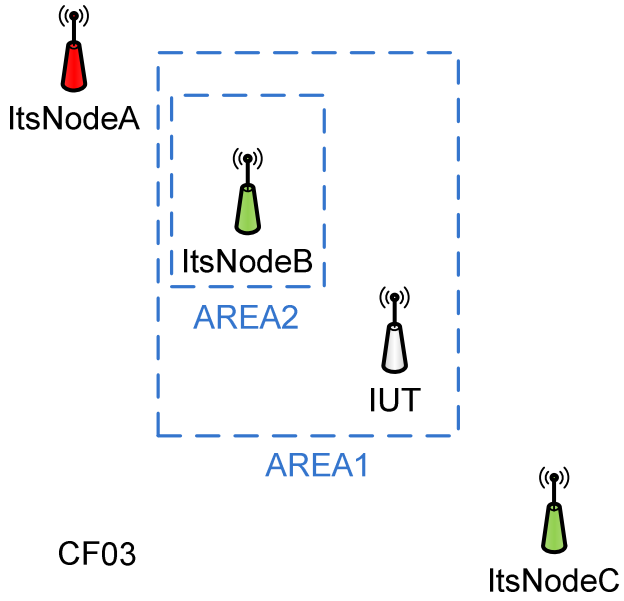

Figure 3

ItsNodeA	is not in IUT's communication range
ItsNodeB	is in IUT's communication range is in direction of ItsNodeA is in Area 1 is in Area 2
ItsNodeC	is in IUT's communication range is not in direction of ItsNodeA
IUT	is in Area 1

4.4 Configuration 4: CF04

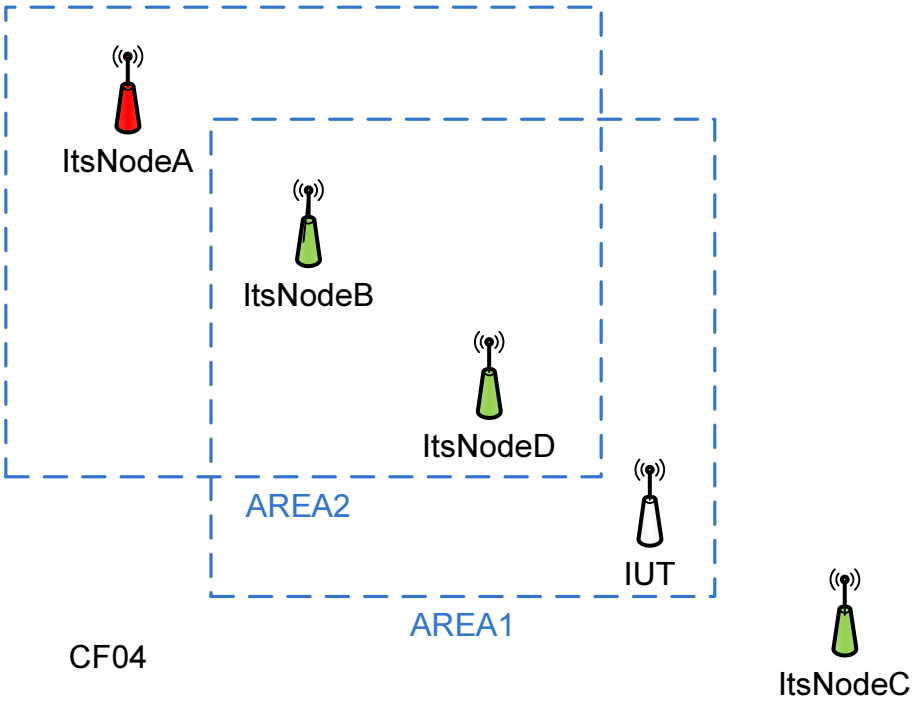

Figure 4

ItsNodeA	is not in IUT's communication range is in Area 2
ItsNodeB	is in IUT's communication range is in direction of ItsNodeA is closer to ItsNodeA than ItsNodeD is in Area 1 is in Area 2. is close to the center 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 Area 1 is in Area 2
IUT	is in Area 1

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	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
	Buffer Capacities	Location Service	Valid behaviour
		Forwarding Packet Buffer	Valid behaviour
	Media Dependent tests	Location Table - Transmission Interval Control	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 TS 102 636-4-1 [1].

5.2.2 Test group

This level contains five major areas identified as: Tests of formatting and data validity, Tests of protocol operation, Tests of capacities, Media dependent Tests and API tests.

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 defines 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
		MDE	Media Dependent tests
	<sgr> =sub-group	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
	<x> = type of testing	BV	Valid Behavior tests
		BI	Invalid Syntax or Behavior 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.2].

In the TP the following wordings are used:

- "The IUT is **requested to send**": An upper layer requests theGEONET 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 TS 102 636-4-1 [1] and TS 102 636-4-2 [i.1].

6.2 Test purposes for GEONW

6.2.1 Formatting and Data Validity

6.2.1.1 Common Header

TP Id	TP/GEONW/FDV/COH/BV/01
Test objective	Common GeoNetworking header validity test (PL field)
Reference	TS 102 636-4-1 [1], clauses 8.5.2, 8.5.4 and 9.2.3.2
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 correctly formatted Common Header
containing HT field
indicating value '1' (BEACON)
containing HST field
indicating value '0' (UNSPECIFIED)
containing PL field
indicating value '0'
}
}	

TP Id	TP/GEONW/FDV/COH/BV/02
Test objective	Common GeoNetworking header validity test (PL field)
Reference	TS 102 636-4-1 [1], clauses 8.5.2, 8.5.4 and 9.3.2
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
indicating value '5' (TSB)
containing HST field
indicating value '0' (SINGLE_HOP)
containing HL field
indicating value '1'
containing PL field
indicating 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	TS 102 636-4-1 [1], clauses 8.5.2, 9.3.2 and annex E
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 Version field
                    indicating value equalling the itsGnProtocolVersion MIB parameter
                containing Flags field
                    indicating value equalling the itsGnStationType MIB parameter
                containing HL field
                    indicating value equalling the itsGnDefaultHopLimit MIB parameter
    }
}
```

TP Id	TP/GEONW/FDV/COH/BV/04
Test objective	GeoNetworking address validity test
Reference	TS 102 636-4-1 [1], clauses 8.5.2 and 6.3
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 SEPV field
                    containing GN_ADDR field
                        containing ST field
                            indicating the ITS Station type
                        containing SST field
                            indicating the ITS Station sub 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/COH/BV/05
Test objective	Local Position Vector validity test, involving position comparison against sensor input data
Reference	TS 102 636-4-1 [1], clauses 8.4.2 and 8.5.2
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 correctly formatted Common Header
containing a correct SEPV field
indicating the latest position of the IUT
}
}	

TP Id	TP/GEONW/FDV/COH/BV/06
Test objective	Local Position Vector validity test, involving timestamp comparison against sensor input data
Reference	TS 102 636-4-1 [1], clauses 8.4.2 and 8.5.2
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 correctly formatted Common Header
containing a correct SEPV field
indicating the timestamp value corresponding to the sensor acquisition time of position data
}
}	

6.2.1.2 Beacon

TP Id	TP/GEONW/FDV/BEA/BV/01
Test objective	Beacon header validity test
Reference	TS 102 636-4-1 [1], clauses 8.5.4, 8.6.6.1 and 8.6.6.2
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 correctly formatted Common Header
containing HT field
indicating value '1' (BEACON)
containing HST field
indicating value '0' (UNSPECIFIED)
containing NH field
indicating value '0' (UNSPECIFIED)
not containing any Extended Header
}
}	

6.2.1.3 GeoUnicast

TP Id	TP/GEONW/FDV/GUC/BV/01
Test objective	GeoUnicast header validity
Reference	TS 102 636-4-1 [1], clauses 8.5.4, 8.6.2.1 and 8.6.2.2
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
indicating value '2' (GEOUNICAST)
containing HST field
indicating value '0' (UNSPECIFIED)
containing SEPV field
indicating position of the IUT
containing GeoUnicast Extended Header
containing DEPV field
indicating position of the ItsNodeB
containing SOPV field
indicating position of the IUT
}
}	

6.2.1.4 GeoBroadcast

TP Id	TP/GEONW/FDV/GBC/BV/01
Test objective	GeoBroadcast header validity
Reference	TS 102 636-4-1 [1], clauses 8.5.4, 8.6.5.1 and 8.6.5.2
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
}	

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
indicating value '4' (GEOBRADCAST)
containing SEPV field
indicating position of the IUT
containing GeoBroadcast Extended Header
containing SOPV field
indicating position of the IUT
}
}	

6.2.1.5 GeoAnycast

TP Id	TP/GEONW/FDV/GAC/BV/01
Test objective	GeoAnycast header validity
Reference	TS 102 636-4-1 [1], clauses 8.5.4, 8.6.5.1 and 8.6.5.2
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
}	

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
indicating value '3' (GEOANYCAST)
containing SEPV field
indicating position of the IUT
containing GeoAnycast Extended Header
containing SOPV field
indicating position of IUT
}
}	

6.2.1.6 Single-Hop Broadcast

TP Id	TP/GEONW/FDV/SHB/BV/01
Test objective	SHB header validity
Reference	TS 102 636-4-1 [1], clauses 8.5.4, 8.6.4.1 and 8.6.4.2
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
}	

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
indicating value '5' (TSB)
containing HST field
indicating value '0' (SINGLE_HOP)
containing HL field
indicating value '1'
not containing any Extended Header
}
}	

6.2.1.7 Topologically Scoped Broadcast

TP Id	TP/GEONW/FDV/TSB/BV/01
Test objective	TSB header validity
Reference	TS 102 636-4-1 [1], clauses 8.5.4, 8.6.3.1 and 8.6.3.2
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
}	

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
indicating value '5' (TSB)
containing HST field
indicating value '1' (MULTI_HOP)
containing SEPV field
indicating position of the IUT
containing TSB Extended Header
containing SOPV field
indicating the same position of the SEPV field of the Common Header
}
}	

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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.4.2
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
indicating value '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	TS 102 636-4-1 [1], clauses 9.2.4.2.2, 9.2.4.2.4 and 9.3.4.2
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
                    indicating value '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
Test objective	Test of adding new entries into location table from common header processing (e.g. GeoUnicast header)
Reference	TS 102 636-4-1 [1], clauses 9.3.4.4 and 9.3.4.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having received a GeoUnicast packet 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
                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
                    indicating value '2' (GEOUNICAST)
            containing GeoUnicast Extended Header
                containing DEPV field
                    indicating same position as the SOPV of the GeoUnicast packet received from ItsNodeA
    }
}
```

TP Id	TP/GEONW/PON/LOT/BV/04
Test objective	Test of handling entries expiring from location table
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3, 7.1.3, 9.3.4.2, 9.2.4.2.2 and annex E
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 (20 sec)
}
```

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
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	TS 102 636-4-1 [1], clauses 7.1.3, 9.2.3.3, 9.3.4.4 and 9.3.4.2
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 GeoUnicast packet from ItsNodeB
        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
                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
                    indicating value '2' (GEOUNICAST)
            containing GeoUnicast Extended Header
                containing DEPV field
                    indicating same position as the SOPV value of the Beacon information received
    }
}
```

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	TS 102 636-4-1 [1], clauses 7.2.3, 9.2.2.2, 9.2.3.2 and annex E
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
                    indicating value '1' (BEACON)
                containing HST field
                    indicating value '0' (UNSPECIFIED)
                containing SEPV 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	TS 102 636-4-1 [1], clauses 7.3.2, 9.2.3.3 and 9.3.4.2
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
indicating value '2' (GEOUNICAST)
containing HST field
indicating value '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	TS 102 636-4-1 [1], clauses 7.3.2, 9.2.3.3, 9.3.4.2
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
indicating value '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	TS 102 636-4-1 [1], clauses 9.3.4.2, 9.2.4.1 and 9.2.4.2.2
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
                    indicating value '6' (LS)
                containing HST field
                    indicating value '0' (LS_REQUEST)
                containing NH field
                    indicating value '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	TS 102 636-4-1 [1], clauses 9.3.4.2, 9.2.4.1 and 9.2.4.2.2
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	TS 102 636-4-1 [1], clauses 7.4.2, 9.3.4.2, 9.2.4.1 and 9.2.4.2.2
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 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)
}
}	

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	TS 102 636-4-1 [1], clauses 7.4.2, 9.3.4.2, 9.2.4.1and 9.2.4.2.2
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 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 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	TS 102 636-4-1 [1], clauses 7.4.2, 9.3.4.2, 9.2.4.1 and 9.2.4.2.2
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 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	TS 102 636-4-1 [1], clauses 9.2.4.2.2, 9.2.4.2.3 and 9.3.4.2
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 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	TS 102 636-4-1 [1], clauses 9.2.4.2.2, 9.2.4.2.3 and 9.3.4.2
Config Id	CF01
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the IUT having no Location Table Entry for ItsNodeB and
    the IUT having been requested to send a GeoUnicast packet to ItsNodeB
        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 ItsNodeB and
        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	TS 102 636-4-1 [1], clauses 9.2.4.2.4 and 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 a LS_REQUEST packet
            containing Request field
                indicating the IUT's GN_ADDR (see note)
    }
    then {
        the IUT replies with a LS_REPLY packet
            containing NH field
                indicating value '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	TS 102 636-4-1 [1], clauses 9.2.4.2.4 and 9.3.3
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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.2.4.3
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 LS_REQUEST packet from ItsNodeC
            containing Request field
                containing GN_ADDR
                    containing M_ID
                        indicating value differing from the M_ID part of the GN_ADDR of the IUT'
            containing HL field
                indicating value greater than 1
    }
    then {
        the IUT re-broadcasts the received LS_REQUEST packet
            containing a correctly formatted Common Header
                containing SEPV field
                    indicating position of the IUT
            containing LS_REQUEST Extended Header
                containing HL field
                    indicating value decreased by 1
    }
}
```

TP Id	TP/GEONW/PON/LOS/BV/11
Test objective	Test of LS Reply forwarding
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.2.4.3
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 LS_REPLY packet from ItsNodeC addressed to ItsNodeB
    }
    then {
        the IUT forwards the received LS_REPLY packet to ItsNodeB
            containing LS_REPLY Extended Header
            containing a correctly formatted Common Header
                containing SEPV field
                    indicating position of the IUT
                containing SOPV field
                    indicating same position as the SOPV value of the received LS_REPLY
                containing DEPV field
                    indicating same position as the DEPV value of the received LS_REPLY
    }
}
```

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	TS 102 636-4-1 [1], clauses 9.2.4.2.2, 9.3.4.2 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
Reference	TS 102 636-4-1 [1], clauses 9.2.4.2.2, 9.3.4.2 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 to ItsNodeA
        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 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
    }
}
```

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	TS 102 636-4-1 [1], clauses 7.5.3, 9.2.3.3 and 9.3.4.2
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
}
```

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	TS 102 636-4-1 [1], clauses 7.5.3, 9.2.3.3 and 9.3.4.3
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 LT field
            indicating LT1
        containing HL field
            indicating value greater than 1
        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 HL field
                indicating value decreased by 1
            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	TS 102 636-4-1 [1], clauses 7.5.3, 9.2.3.3 and 9.3.4.3
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 LT field
            indicating value LT1 and
        containing HL field
            indicating value greater than 1
        containing SN field
            indicating value SN1
    the IUT having received a second GeoUnicast (GEOUNI2) packet addressed to ItsNodeA from ItsNodeC
        containing LT field
            indicating LT2
        containing HL field
            indicating value greater than 1
        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 HL field
                indicating value decreased by 1
            containing SN field
                indicating value SN1
        the IUT forwards the GEOUNI2 buffered packet
            containing HL field
                indicating value decreased by 1
            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	TS 102 636-4-1 [1], clauses 7.5.3, 9.2.3.3 and 9.3.4.3
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 LT field
            indicating LT1
        containing HL 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/05
Test objective	Test flushing of the UC forwarding buffer, initiated by the processing of a common header from the target destination
Reference	TS 102 636-4-1 [1], clauses 7.5.3, 9.2.3.3 and 9.3.4.3
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 LT field
            indicating LT1
        containing HL field
            indicating value greater than 1
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoUnicast packet type originated by ItsNodeB
        before expiry of LT1
    }
    then {
        the IUT selects the ItsNodeB as the next hop and
        the IUT forwards the buffered GeoUnicast packet
            containing HL field
                indicating value decreased by 1
    }
}
```

TP Id	TP/GEONW/PON/FPB/BV/06
Test objective	Test of Source packet buffering into BC forwarding buffer for no GeoBroadcast recipients
Reference	TS 102 636-4-1 [1], clauses 7.5.3, 9.2.3.3 and 9.3.7.2
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
}
```

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	TS 102 636-4-1 [1], clauses 7.5.3, 9.2.3.3 and 9.3.7.2
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 LT field
            indicating LT1
        containing SN field
            indicating value SN1
    the IUT having been requested to send a GeoBroadcast (GEOBROAD2) packet to AREA1
        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 SN field
                indicating value SN1
        the IUT broadcasts GEOBROAD2 packet
            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	TS 102 636-4-1 [1], clauses 7.5.3, 9.2.3.3 and 9.3.7.2
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 LT field
            indicating LT1
    the IUT having been requested to send a GeoBroadcast (GEOBROAD2) packet to AREA1
        containing LT field
            indicating LT2
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a Beacon packet from either ItsNodeB or ItsNodeB
        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	TS 102 636-4-1 [1], clauses 7.5.3, 9.2.3.3 and 9.3.4.2
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
}
```

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 GeoUnicast Extended Header
                containing LT field
                    indicating (default LT value – WaitingTime)
    }
}
```

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 for handling of LT fields when no GeoBroadcast recipients
Reference	TS 102 636-4-1 [1], clauses 7.5.3, 9.2.3.3 and 9.3.7.2
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
}
```

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 GeoBroadcast Extended Header
                containing LT field
                    indicating (default LT value - WaitingTime)
    }
}
```

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

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	TS 102 636-4-1 [1], clauses 9.2.1.2 and 9.2.3.2
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
                    indicating value '1' (BEACON)
                containing HST field
                    indicating value '0' (UNSPECIFIED)
                containing SEPV 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	TS 102 636-4-1 [1], clauses 9.2.1.4, 9.2.3.2, 9.2.3.3 and annex A
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 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 GN_ADDR field
indicating different GN_ADDR as the previous used GN_ADDR
}
}	

NOTE 1: Ssufficient time has to be allowed for the execution of the Gn-MGMT.request - Gn-MGMT.response procedure. NOTE 2: Only M_ID value shall be used for comparison of 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	TS 102 636-4-1 [1], clause 9.2.3.2
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	TS 102 636-4-1 [1], clauses 9.2.3.2 and 9.2.3.3
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 GeoUnicast packet to ItsNodeB and
the IUT sends the next Beacon packet
after expiry of itsGnBeaconServiceRetransmitTimer
and before expiry of itsGnBeaconServiceRetransmitTime*r* + *i*tsGnBeaconServiceMaxJitter
}
}	

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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.4.2
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
indicating value '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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.4.3
Config Id	CF04
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the MIB attribute itsGnGeoUnicastForwardingAlgorithm is set to 1 (GREEDY) 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 Common Header
                containing HL 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 (HL, PV) are correctly updated at each forwarding step
Config Id	CF03
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.4.3
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 Common Header
                containing HL field
                    indicating value greater than 1
            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 Common Header
                containing HL field
                    indicating value decreased by 1 from the incoming value
            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 HL restriction is correctly handled at a forwarding step
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.4.3
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 Common Header
containing HL 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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.4.4
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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.4.3
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the MIB attribute itsGnGeoUnicastForwardingAlgorithm is set to 2 (CBF) 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 Common Header
                containing HL 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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.4.3
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the MIB attribute itsGnGeoUnicastForwardingAlgorithm is set to 2 (CBF) 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 Common Header
                containing HL 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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.4.3
Config Id	CF03
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the MIB attribute itsGnGeoUnicastForwardingAlgorithm is set to 2 (CBF) 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 Common Header
            containing HL 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/09
Test objective	Test that a received GeoUnicast packet is routed according to the greedy forwarding rules when the forwarding algorithm is unspecified
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.4.3
Config Id	CF04
PICS Selection	

Initial conditions

```
with {
    the IUT being in the "initial state" and
    the MIB attribute itsGnGeoUnicastForwardingAlgorithm is set to 0 (UNSPECIFIED) 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 and originated by ItsNodeC
            containing Common Header
                containing HL field
                    indicating value greater than 1
    }
    then {
        the IUT selects ItsNodeB as the next hop ITS station and
        the IUT forwards the GeoUnicast packet
    }
}
```

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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.7.2
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 GeoBroadcast DestinationArea
                indicating AREA1
    }
    then {
        the IUT broadcasts 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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.7.2
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 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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.7.3
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 GeoBroadcast packet
            containing GeoBroadcast DestinationArea
                indicating AREA1
    }
    then {
        the IUT re-broadcasts 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 for the second or more time (duplicate packet detection)
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.7.3
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 GeoBroadcast packet from ItsNodeB
        containing HL field
            indicating value HL1 higher than 1
        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 HL field
                indicating value lower than HL1
            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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.7.3
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 generated by ItsNodeC
            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 for the second or more time
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.7.3
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 HL field
            indicating value HL1 higher than 1
        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 HL field
                indicating value lower than HL1
            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 (HL, PV) are correctly updated during a GeoBroadcast re-broadcasting step
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.7.3
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 GeoBroadcast packet
containing SEPV field
indicating the sender position of the received packet
containing HL field
indicating value HL1 higher than 1
containing GeoBroadcast DestinationArea (see note)
indicating AREA1
}
then {
the IUT re-broadcasts the GeoBroadcast packet
containing SEPV field
indicating position of the IUT
containing HL field
indicating value (HL1 -1)
}
}	

TP Id	TP/GEONW/PON/GBC/BV/08
Test objective	Test that the HL restriction is correctly handled at a GeoBroadcast re-broadcasting step
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.7.3
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 GeoBroadcast packet
containing HL field
indicating 1
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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.7.3
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 GeoBroadcast DestinationArea (see note)
                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 for the second or more time
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.7.2
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 HL field
            indicating HL1
        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 HL field
                indicating value lower than HL1
            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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.7.2
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 receives a GeoBroadcast packet
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	TS 102 636-4-1 [1], annex D:2
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the MIB attribute itsGnGeoBroadcastForwardingAlgorithm is set to 1 (SIMPLE) 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 GeoBroadcast DestinationArea
indicating AREA1
}
then {
the IUT broadcasts immediately the GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/GBC/BV/13
Test objective	Test that the reception of a broadcast indication over upper Gn SAP triggers the origination of a Simple GeoBroadcast if no method is selected in the MIB
Reference	TS 102 636-4-1 [1], annex D
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the MIB attribute itsGnGeoBroadcastForwardingAlgorithm is set to 0 (UNSPECIFIED) 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 GeoBroadcast DestinationArea
indicating AREA1
}
then {
the IUT broadcasts immediately the GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/GBC/BV/14
Test objective	Test that a received geo-broadcast triggers re-broadcasting according to Simple GeoBroadcast method if this method is selected in the MIB
Reference	TS 102 636-4-1 [1], annex D.2
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the MIB attribute itsGnGeoBroadcastForwardingAlgorithm is set to 1 (SIMPLE) 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 GeoBroadcast DestinationArea
indicating AREA1
}
then {
the IUT re-broadcasts immediately the GeoBroadcast packet
}
}	

TP Id	TP/GEONW/PON/GBC/BV/15
Test objective	Test that a received geo-broadcast triggers re-broadcasting according to Simple GeoBroadcast method if no method is selected in the MIB
Reference	TS 102 636-4-1 [1], annex D
Config Id	CF02
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the MIB attribute itsGnGeoBroadcastForwardingAlgorithm is set to 0 (UNSPECIFIED) 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 GeoBroadcast DestinationArea
indicating AREA1
}
then {
the IUT re-broadcasts immediately 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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.5.2
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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.5.3
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 HL 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 for the second or more time
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.5.3
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 HL field
            indicating HL1 higher than 1
        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 HL field
                indicating HL1-1
            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 (HL, PV) are correctly updated during a TSB re-broadcasting step
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.5.3
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 SEPV field
                indicating the sender position of the received packet
            containing HL field
                indicating HL1
    }
    then {
        the IUT re-broadcasts the TSB packet
            containing SEPV field
                indicating position of the IUT
            containing HL field
                indicating value (HL1 -1)
    }
}
```

TP Id	TP/GEONW/PON/TSB/BV/05
Test objective	Test that the HL restriction is correctly handled at a TSB re-broadcasting step
Reference	TS 102 636-4-1 [1], clause 9.3.5.3
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 HL 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	TS 102 636-4-1 [1], clause 9.3.5.3
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 for the second or more time
Reference	TS 102 636-4-1 [1], clause 9.3.5.3
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 HL field
indicating HL1 higher than 1
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 HL field
indicating HL1-1
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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.6.2
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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.6.3
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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.8.2
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 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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.8.2
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 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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.8.3
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 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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.8.3
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 GeoAnycast packet from ItsNodeC
containing GeoAnycast DestinationArea
indicating AREA2
}
then {
the IUT selects ItsNodeB as the next hop and
the IUT forwards the GeoAnycast packet ItsNode (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 for the second or more time
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.8.3
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 HL field
            indicating value HL1 higher than 1
        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 HL field
                indicating value lower than HL1
            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 (HL, PV) are correctly updated during a GeoAnycast forwarding step
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 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
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoAnycast packet from ItsNodeC
            containing SEPV field
                indicating the sender position of the received packet
            containing HL field
                indicating value HL1 higher than 1
            containing GeoAnycast DestinationArea
                indicating AREA2
    }
    then {
        the IUT selects the ItsNodeB as the next hop
        the IUT forwards the GeoAnycast packet
            containing SEPV field
                indicating position of the IUT
            containing HL field
                indicating value (HL1 -1)
            containing GeoAnycast DestinationArea
                indicating AREA2
    }
}
```

TP Id	TP/GEONW/PON/GAC/BV/07
Test objective	Test that the HL restriction is correctly handled at a GeoAnycast forwarding step
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 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
}
```

Expected behaviour

```
ensure that {
    when {
        the IUT receives a GeoAnycast packet from ItsNodeC
            containing HL field
                indicating 1
            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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.8.3
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 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 for the second or more time
Reference	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.8.3
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 HL field
            indicating HL1
        containing SN field
            indicating value SN1 and
        containing GeoBroadcast DestinationArea (see note)
            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 HL field
                indicating value lower than HL1
            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	TS 102 636-4-1 [1], clauses 9.2.3.3 and 9.3.8.3
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 GeoBroadcast DestinationArea
indicating AREA2
}
then {
the IUT does not pass the received GeoAnycast packet to any Upper Layer protocol
}
}	

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	TS 102 636-4-1 [1], clause 7.4.2 and annex E
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 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 and
the location service buffer capacity exceeded (Note1)
}
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	TS 102 636-4-1 [1], clauses7.5.2, 7.5.3 and annex E
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
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoUnicast packet addressed to ItsNodeA from ItsNodeC
containing HL field
indicating HL1 higher than 1
the UC forwarding packet buffer capacity exceeded (Note1)
}
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 (Note2)
}
}	

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	TS 102 636-4-1 [1], clauses 7.5.2, 7.5.3 and annex E
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 GeoBroadcast Destination Area
indicating AREA2
}	

Expected behaviour	

ensure that {
when {
the IUT receives a GeoBroadcast packet
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): API tests

A.1 Test Suite Structure (TSS)

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

Table A.1

Root	Group	Sub-group	Category
GEONW	API tests	Management API	Valid behaviour
		Upper Layer API	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.

A.2 Test Purposes (TP)

A.2.1 TP Identifier naming conventions

The identifier of the TP is built according to table A.2.

Table A.2: TP naming convention

Identifier:	TP/<root>/<gr>/<sgr>/<x>/<nn>		
	<root> = root	GEONW	
	<gr> = group	API	API tests
	<sgr> =sub-group	MNG	Management API
		UPL	Upper Layer API
	<x> = type of testing	BV	Valid Behavior tests
		BI	Invalid Syntax or Behavior Tests
	<nn> = sequential number		01 to 99

A.2.2 Sources of TP definitions

All TPs are specified according to TS 102 636-4-1 [1] and TS 102 636-4-2 [i.1].

A.3 Test purposes for API GEONW

A.3.1 Management API

TP Id	TP/GEONW/API/MNG/BV/01
Test objective	Test the initial GeoNetworking address assignment by IUT with managed address configuration
Reference	TS 102 636-4-1 [1], clause 9.2.1.3.1
Config Id	CF01
PICS Selection	
Initial conditions	

with {
the IUT being in the "initial state" and
the IUT's itsGnLocalAddrConfMethod MIB attribute is set to MANAGED (1) and
the Gn-MGMT.request - Gn-MGMT.response procedure has been executed between the IUT and the test system
}	

Expected behaviour	

ensure that {
when {
the IUT sends a Beacon packet
}
then {
the GN_ADDR field of the Beacon corresponds to the GN_ADDR provided by the Gn-MGMT.response primitive
}
}	

A.3.2 Upper Layer API

TP Id	TP/GEONW/API/UPL/BV/01
Test objective	Test that the originating node is periodically resending the packet within its validity lifetime, if the Repetition interval parameter is set
Reference	TS 102 636-4-1 [1], clause 9.3.4.2
Config Id	CF02
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper Layer packet addressed to ItsNodeD, where the *Repetition Interval* parameter of the Gn-DATA.request primitive is set
}
then {
the IUT transmits several GeoUnicast messages addressed to ItsNodeD, with the time between successive GeoUnicasts corresponding to the *Repetition Interval* parameter, the time between first and last GeoUnicasts corresponding to the LifeTime parameter, and all GeoUnicasts having the same Sequence Number field value
}
}	

TP Id	TP/GEONW/API/UPL/BV/02
Test objective	Test that a requested GeoUnicast is rejected due to maximum length exceeded if the size of the T/GN6-PDU exceeds the MIB attribute itsGnMaxSduSize
Reference	TS 102 636-4-1 [1], clause 9.3.4.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper Layer packet addressed to Node_D, where the *Length* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMaxSduSize MIB attribute
}
then {
the IUT does not transmit the requested GeoUnicast packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to maximum length exceeded'.	

TP Id	TP/GEONW/API/UPL/BV/03
Test objective	Test that a requested GeoUnicast is rejected due to maximum lifetime exceeded if the lifetime exceeds the maximum value of the MIB attribute itsGnMaxPacketLifetime.
Reference	TS 102 636-4-1 [1], clause 9.3.4.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper Layer packet addressed to Node_D, where the *Maximum Packet Lifetime* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMaxPacketLifetime MIB attribute
}
then {
the IUT does not transmit the requested GeoUnicast packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to maximum lifetime exceeded'.	

TP Id	TP/GEONW/API/UPL/BV/04
Test objective	Test that a requested GeoUnicast is rejected due to repetition interval too small, if the repetition interval is smaller than the MIB attribute itsGnMinPacketRepetitionInterval
Reference	TS 102 636-4-1 [1], clause 9.3.4.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper Layer packet addressed to Node_D, where the *Repetition Interval* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMinPacketRepetitionInterval MIB attribute
}
then {
the IUT does not transmit the requested GeoUnicast packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to repetition interval too small'.	

TP Id	TP/GEONW/API/UPL/BV/05
Test objective	Test that a requested GeoUnicast is rejected in case of an unsupported requested traffic class
Reference	TS 102 636-4-1 [1], clause 9.3.4.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper Layer packet addressed to Node_D, where the *Traffic Class* parameter of the Gn-DATA.request primitive is set outside the range of feasible Traffic Class values for the GeoNetworking protocol
}
then {
the IUT does not transmit the requested GeoUnicast packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to unsupported traffic class'.	

TP Id	TP/GEONW/API/UPL/BV/06
Test objective	Test that the originating node is periodically re-broadcasting the packet within its validity lifetime, if the Repetition interval parameter is set
Reference	TS 102 636-4-1 [1], clause 9.3.7.2
Config Id	CF02
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a GeoBroadcast, and where the *Repetition Interval* parameter of the Gn-DATA.request primitive is set
}
then {
the IUT transmits several GeoBroadcast messages, with the time between successive GeoBroadcast corresponding to the *Repetition Interval* parameter, the time between first and last GeoBroadcast corresponding to the LifeTime parameter, and all GeoBroadcasts having the same Sequence Number field value
}
}	

TP Id	TP/GEONW/API/UPL/BV/07
Test objective	Test that a requested GeoBroadcast is rejected due to maximum length exceeded if the size of the T/GN6-PDU exceeds the MIB attribute itsGnMaxSduSize
Reference	TS 102 636-4-1 [1], clause 9.3.7.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a GeoBroadcast, and where the *Length* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMaxSduSize MIB attribute
}
then {
the IUT does not transmit the requested GeoBroadcast packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to maximum length exceeded'.	

TP Id	TP/GEONW/API/UPL/BV/08
Test objective	Test that a requested GeoBroadcast is rejected due to maximum lifetime exceeded if the lifetime exceeds the maximum value of the MIB attribute itsGnMaxPacketLifetime
Reference	TS 102 636-4-1 [1], clause 9.3.7.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a GeoBroadcast, and where the *Maximum Packet Lifetime* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMaxPacketLifetime MIB attribute
}
then {
the IUT does not transmit the requested GeoBroadcast packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to maximum lifetime exceeded'.	

TP Id	TP/GEONW/API/UPL/BV/09
Test objective	Test that a requested GeoBroadcast is rejected due to repetition interval too small, if the repetition interval is smaller than the MIB attribute itsGnMinPacketRepetitionInterval
Reference	TS 102 636-4-1 [1], clause 9.3.7.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a GeoBroadcast, and where the *Repetition Interval* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMinPacketRepetitionInterval MIB attribute
}
then {
the IUT does not transmit the requested GeoBroadcast packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to repetition interval too small'.	

TP Id	TP/GEONW/API/UPL/BV/10
Test objective	Test that a requested GeoBroadcast is rejected in case of an unsupported requested traffic class
Reference	TS 102 636-4-1 [1], clauses 9.3.7.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a GeoBroadcast, and where the *Traffic Class* parameter of the Gn-DATA.request primitive is set outside the range of feasible Traffic Class values for the GeoNetworking protocol
}
then {
the IUT does not transmit the requested GeoBroadcast packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to unsupported traffic class'.	

TP Id	TP/GEONW/API/UPL/BV/11
Test objective	Test that the originating node is periodically re-broadcasting the TSB packet within its validity lifetime, if the Repetition interval parameter is set
Reference	TS 102 636-4-1 [1], clause 9.3.5.2
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 Beacon information from several neighbours
}	

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a TSB broadcast, and where the *Repetition Interval* parameter of the Gn-DATA.request primitive is set
}
then {
the IUT transmits several TSB messages, with the time between successive TSB corresponding to the *Repetition Interval* parameter, the time between first and last TSB corresponding to the LifeTime parameter, and all TSB having the same Sequence Number field value
}
}	

TP Id	TP/GEONW/API/UPL/BV/12
12Test objective	Test that a requested TSB is rejected due to maximum length exceeded if the size of the T/GN6-PDU exceeds the MIB attribute itsGnMaxSduSize
Reference	TS 102 636-4-1 [1], clause 9.3.5.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a TSB, and where the *Length* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMaxSduSize MIB attribute
}
then {
the IUT does not transmit the requested TSB packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to maximum length exceeded'.	

TP Id	TP/GEONW/API/UPL/BV/13
Test objective	Test that a requested TSB is rejected due to maximum lifetime exceeded if the lifetime exceeds the maximum value of the MIB attribute itsGnMaxPacketLifetime
Reference	TS 102 636-4-1 [1], clause 9.3.5.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a TSB, and where the *Maximum Packet Lifetime* parameter of the Gn-DATA.request primitive is set to a larger value than the *itsGnMaxPacketLifetime* MIB attribute
}
then {
the IUT does not transmit the requested TSB packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to maximum lifetime exceeded'.	

TP Id	TP/GEONW/API/UPL/BV/14
Test objective	Test that a requested TSB is rejected due to repetition interval too small, if the repetition interval is smaller than the MIB attribute itsGnMinPacketRepetitionInterval
Reference	TS 102 636-4-1 [1], clause 9.3.5.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a TSB, and where the *Repetition Interval* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMinPacketRepetitionInterval MIB attribute
}
then {
the IUT does not transmit the requested TSB packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to repetition interval too small'.	

TP Id	TP/GEONW/API/UPL/BV/15
Test objective	Test that a requested TSB is rejected in case of an unsupported requested traffic class
Reference	TS 102 636-4-1 [1], clause 9.3.5.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a TSB, and where the *Traffic Class* parameter of the Gn-DATA.request primitive is set outside the range of feasible Traffic Class values for the GeoNetworking protocol
}
then {
the IUT does not transmit the requested TSB packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to unsupported traffic class'.	

TP Id	TP/GEONW/API/UPL/BV/16
Test objective	Test that the originating node is periodically re-broadcasting the SHB packet within its validity lifetime, if the Repetition interval parameter is set
Reference	TS 102 636-4-1 [1], clause 9.3.6.2
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 receives an Upper layer packet which is triggering a SHB broadcast, and where the *Repetition Interval* parameter of the Gn-DATA.request primitive is set
}
then {
the IUT transmits several SHB messages, with the time between successive SHB corresponding to the *Repetition Interval* parameter, the time between first and last SHB corresponding to the LifeTime parameter, and all SHB having the same Sequence Number field value
}
}	

TP Id	TP/GEONW/API/UPL/BV/17
Test objective	Test that a requested SHB is rejected due to maximum length exceeded if the size of the T/GN6-PDU exceeds the MIB attribute itsGnMaxSduSize
Reference	TS 102 636-4-1 [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 receives an Upper layer packet which is triggering a SHB, and where the *Length* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMaxSduSize MIB attribute
}
then {
the IUT does not transmit the requested SHB packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to maximum length exceeded'.	

TP Id	TP/GEONW/API/UPL/BV/18
Test objective	Test that a requested SHB is rejected due to maximum lifetime exceeded if the lifetime exceeds the maximum value of the MIB attribute itsGnMaxPacketLifetime
Reference	TS 102 636-4-1 [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 receives an Upper layer packet which is triggering a SHB, and where the *Maximum Packet Lifetime* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMaxPacketLifetime MIB attribute
}
then {
the IUT does not transmit the requested SHB packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to maximum lifetime exceeded'.	

TP Id	TP/GEONW/API/UPL/BV/19
Test objective	Test that a requested SHB is rejected due to repetition interval too small, if the repetition interval is smaller than the MIB attribute itsGnMinPacketRepetitionInterval
Reference	TS 102 636-4-1 [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 receives an Upper layer packet which is triggering a SHB, and where the Repetition Interval parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMinPacketRepetitionInterval MIB attribute
}
then {
the IUT does not transmit the requested SHB packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the ResultCode indicating 'rejected due to repetition interval too small'.	

TP Id	TP/GEONW/API/UPL/BV/20
Test objective	Test that a requested SHB is rejected in case of an unsupported requested traffic class
Reference	TS 102 636-4-1 [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 receives an Upper layer packet which is triggering a SHB, and where the *Traffic Class* parameter of the Gn-DATA.request primitive is set outside the range of feasible Traffic Class values for the GeoNetworking protocol
}
then {
the IUT does not transmit the requested SHB packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to unsupported traffic class'.	

TP Id	TP/GEONW/API/UPL/BV/21
Test objective	Test that the originating node is periodically re-anycasting the packet within its validity lifetime, if the Repetition interval parameter is set
Reference	TS 102 636-4-1 [1], clause 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 Beacon information from several neighbours
}	

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a GeoAnycast, and where the *Repetition Interval* parameter of the Gn-DATA.request primitive is set
}
then {
the IUT transmits several GeoAnycast messages, with the time between successive GeoAnycast corresponding to the *Repetition Interval* parameter, the time between first and last GeoAnycast corresponding to the LifeTime parameter, and all GeoAnycasts having the same Sequence Number field value
}
}	

TP Id	TP/GEONW/API/UPL/BV/22
Test objective	Test that a requested GeoAnycast is rejected due to maximum length exceeded if the size of the T/GN6-PDU exceeds the MIB attribute itsGnMaxSduSize
Reference	TS 102 636-4-1 [1], clause 9.3.8.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a GeoAnycast, and where the *Length* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMaxSduSize MIB attribute
}
then {
the IUT does not transmit the requested GeoAnycast packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to maximum length exceeded'.	

TP Id	TP/GEONW/API/UPL/BV/23
Test objective	Test that a requested GeoAnycast is rejected due to maximum lifetime exceeded if the lifetime exceeds the maximum value of the MIB attribute itsGnMaxPacketLifetime
Reference	TS 102 636-4-1 [1], clause 9.3.8.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a GeoAnycast, and where the *Maximum Packet Lifetime* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMaxPacketLifetime MIB attribute
}
then {
the IUT does not transmit the requested GeoAnycast packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to maximum lifetime exceeded'.	

TP Id	TP/GEONW/API/UPL/BV/24
Test objective	Test that a requested GeoAnycast is rejected due to repetition interval too small, if the repetition interval is smaller than the MIB attribute itsGnMinPacketRepetitionInterval
Reference	TS 102 636-4-1 [1], clause 9.3.8.2
Config Id	CF01
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the IUT receives an Upper layer packet which is triggering a GeoAnycast, and where the *Repetition Interval* parameter of the Gn-DATA.request primitive is set to a larger value than the itsGnMinPacketRepetitionInterval MIB attribute
}
then {
the IUT does not transmit the requested GeoAnycast packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to repetition interval too small'.	

TP Id	TP/GEONW/API/UPL/BV/25
Test objective	Test that a requested GeoAnycast is rejected in case of an unsupported requested traffic class
Reference	TS 102 636-4-1 [1], clause 9.3.8.2
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 GeoAnycast packet and
the Traffic Class parameteris outside the range of feasible Traffic Class values for the GeoNetworking protocol
}
then {
the IUT does not transmit the requested GeoAnycast packet (see note).
}
}	

NOTE: If the Gn interface is exposed, it can be also tested that the IUT initiates the Gn-DATA.confirm primitive with the *ResultCode* indicating 'rejected due to unsupported traffic class'.	

Annex B (informative): Media dependent tests

B.1 Media Dependent tests

This clause applies to the following standard:

TS 102 636-4-2 [i.1]: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 2: Media dependent functionalities for ITS-G5A media".

B.1.1 Detection based on Location Table knowledge

B.1.1.1 Transmission Interval Control (TIC) mechanism

TP Id	TP/GEONW/MDE/LT/TIC/BV/01
Test objective	Test the correct implementation of the beacon time interval while NetCongestionStatus = 1
Reference	TS 102 636-4-2 [i.1], clause 5.2.1
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the number of neighbours in the Location Table is less than 50
}
then {
the IUT sets the NetCongestingStatus value to 1 and applies a NetBeaconInterval parameter value of "default" for the periodic transmission of beacons.
}
}	

NOTE: The correct values of the NetCongestingStatus and NetBeaconInterval parameters will be checked by verifying the correct periodic transmission timer value.	

TP Id	TP/GEONW/MDE/LT/TIC/BV/02
Test objective	Test the correct implementation of the application repeated message timer while NetCongestionStatus = 1
Reference	TS 102 636-4-2 [i.1], clause 5.2.1
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the number of neighbours in the Location Table is less than 50
}
then {
the IUT sets the NetCongestingStatus value to 1 and applies an AppRepInterval parameter value of "default" for the repeated transmission of application messages.
}
}	

NOTE: The correct values of the NetCongestingStatus and AppRepInterval parameters will be checked by verifying the correct repeated transmission timer value.	

TP Id	TP/GEONW/MDE/LT/TIC/BV/03
Test objective	Test the correct implementation of the network repeated message timer while NetCongestionStatus = 1
Reference	TS 102 636-4-2 [i.1], clause 5.2.1
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the number of neighbours in the Location Table is less than 50
}
then {
the IUT sets the NetCongestingStatus value to 1 and applies an NetRepInterval parameter value of "default" for the repeated transmission of network messages.
}
}	

NOTE: The correct values of the NetCongestingStatus and NetRepInterval parameters will be checked by verifying the correct repeated transmission timer value.	

TP Id	TP/GEONW/MDE/LT/TIC/BV/04
Test objective	Test the correct implementation of the beacon time interval while NetCongestionStatus = 2
Reference	TS 102 636-4-2 [i.1], clause 5.2.1
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the number of neighbours in the Location Table is between 50 and 100
}
then {
the IUT sets the NetCongestingStatus value to 2 and applies a NetBeaconInterval parameter value of "medium" for the periodic transmission of beacons.
}
}	

NOTE: The correct values of the NetCongestingStatus and NetBeaconInterval parameters will be checked by verifying the correct periodic transmission timer value.	

TP Id	TP/GEONW/MDE/LT/TIC/BV/05
Test objective	Test the correct implementation of the application repeated message timer while NetCongestionStatus = 2
Reference	TS 102 636-4-2 [i.1], clause 5.2.1
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the number of neighbours in the Location Table is between 50 and 100
}
then {
the IUT sets the NetCongestingStatus value to 2 and applies an AppRepInterval parameter value of "medium" for the repeated transmission of application messages.
}
}	

NOTE: The correct values of the NetCongestingStatus and AppRepInterval parameters will be checked by verifying the correct repeated transmission timer value.	

TP Id	TP/GEONW/MDE/LT/TIC/BV/06
Test objective	Test the correct implementation of the network repeated message timer while NetCongestionStatus = 2
Reference	TS 102 636-4-2 [i.1], clause 5.2.1
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the number of neighbours in the Location Table is between 50 and 100
}
then {
the IUT sets the NetCongestingStatus value to 2 and applies an NetRepInterval parameter value of "medium" for the repeated transmission of network messages.
}
}	

NOTE: The correct values of the NetCongestingStatus and NetRepInterval parameters will be checked by verifying the correct repeated transmission timer value.	

TP Id	TP/GEONW/MDE/LT/TIC/BV/07
Test objective	Test the correct implementation of the beacon time interval while NetCongestionStatus = 3
Reference	TS 102 636-4-2 [i.1], clause 5.2.1
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the number of neighbours in the Location Table is more than 100
}
then {
the IUT sets the NetCongestingStatus value to 3 and applies a NetBeaconInterval parameter value of "maximum" for the periodic transmission of beacons.
}
}	

NOTE: The correct values of the NetCongestingStatus and NetBeaconInterval parameters will be checked by verifying the correct periodic transmission timer value.	

TP Id	TP/GEONW/MDE/LT/TIC/BV/08
Test objective	Test the correct implementation of the application repeated message timer while NetCongestionStatus = 3
Reference	TS 102 636-4-2 [i.1], clause 5.2.1
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the number of neighbours in the Location Table is more than 100
}
then {
the IUT sets the NetCongestingStatus value to 3 and applies an AppRepInterval parameter value of "maximum" for the repeated transmission of application messages.
}
}	

NOTE: The correct values of the NetCongestingStatus and AppRepInterval parameters will be checked by verifying the correct repeated transmission timer value.	

TP Id	TP/GEONW/MDE/LT/TIC/BV/09
Test objective	Test the correct implementation of the network repeated message timer while NetCongestionStatus = 3
Reference	TS 102 636-4-2 [i.1], clause 5.2.1
PICS Selection	
Initial conditions	

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

Expected behaviour	

ensure that {
when {
the number of neighbours in the Location Table is more than 100
}
then {
the IUT sets the NetCongestingStatus value to 3 and applies an NetRepInterval parameter value of "maximum" for the repeated transmission of network messages.
}
}	

NOTE: The correct values of the NetCongestingStatus and NetRepInterval parameters will be checked by verifying the correct repeated transmission timer value.	

Annex C (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

Document history		
V1.1.1	June 2011	Publication