6LoWPAN Plugtests;
Berlin, Germany;
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ETSI

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

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

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

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Contents

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Principle Authors:

- ETSI CTI (Centre for Testing and Interoperability)
- FP7 Probe-IT
- IPSO ALLIANCE
- IPV6 Forum

1   Scope

This document forms the guidelines to lead the technical organization of the IoT_6LoWPAN Plugtests event, in Berlin, Germany from 27th to 28th July 2013. This document is intended to be upgraded for future interoperability events.

This document describes:

• The testbed architecture showing which 6LoWPAN systems and components are involved and how they are going to interwork

• The configurations used during test sessions, including the relevant parameter values of the different layers

• The interoperability test descriptions, describing the scenarios, which the participants will follow to perform the interoperability tests

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.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1   Normative references

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

[1]   RFC 4944 : Transmission of IPV6 Packet over IEEE 802.15.4 networks;

[2]   RFC 6282 : Compression Format for IPv6 Datagrams over IEEE 802.15.4-Based Networks

[3]   RFC 6775 : Neighbor Discovery Optimization for IPV6 over Low-Power Wireless Personal Area Networks (6LoWPANs)

[4]   IPV6 Ready : Phase-2 Conformance Test Specification 6LoWPAN rev 1.0.0b1

3   Abbreviations

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

TD: Test Description
DAD:Duplicate Address Detection
HUT: Host Under Test
MTU: Maximum Transmission Unit
NCE: Neighbor Cache Entry

NUT: Node Under Test
RUT: Router Under Test
TLLA: Target Link-layer Address
TN: Testing Node
TR: Testing Router
RS: Router Solicitation
RA: Router Advertisement
NS: Neighbor solicitation
NA: Neighbor advertisement
6CO: 6Lowpan Context Option.
ABRO: Authoritative Border Router Option
ARO: Address Registration Option
SLLA: Source Link-Layer Address
TLLA: Target Link-layer Address
PO: Prefix Option

Equipment Type :
6LoWPAN Node (LN): A 6LoWPAN Node is any host or router participating in the LoWPAN.
This term is used when referring to situations in which either a host or router can play the role
described.

6LoWPAN Router (LR): An intermediate router in the LoWPAN who can communicate with other
6LoWPAN Node in the same LoWPAN. 6LoWPAN routers are present only in route-over
topologies.

6LoWPAN Border Router (LBR): A border router located at the junction of separate 6LoWPAN
networks or between a 6LoWPAN network and another IP network. There may be one or more
6LBRs at the 6LoWPAN network boundary. A 6LBR is the responsible authority for IPv6 Prefix
propagation for the 6LoWPAN network it is serving. An isolated LoWPAN also contains a 6LBR in
the network, which provides the prefix(es) for the isolated network.

6LoWPAN Host: A host is participating in the LoWPAN who can communicate with other
6LoWPAN Node in the same LoWPAN.

4   Conventions

4.1   Interoperability test process

4.1.1   Introduction

The goal of interoperability test is to check that devices resulting from protocol implementations are
able to work together and provide the functionalities provided by the protocols. As necessary, a
message may be checked during an interoperability test, when a successful functional verification
may result from an incorrect behaviour for instance. Detailed protocol checks are part of the
conformance testing process and are thus avoided during the Interoperability tests.

The test session will be mainly executed between 2 devices from different vendors. For some test
purposes, it may be necessary to have more than 2 devices involved. The information about the test

configuration like the number of devices or the roles required are indicated in the test description tables below.

4.1.2   The test description proforma

The test descriptions are provided in proforma tables. The following different types of test operator actions are considered during the test execution:

- A **stimulus** corresponds to an event that enforces an EUT to proceed with a specific protocol action, like sending a message for instance

- A **verify** consists of verifying that the EUT behaves according to the expected behaviour (for instance the EUT behaviour shows that it receives the expected message)

- A **configure** corresponds to an action to modify the EUT configuration

- A **check** ensures the correctness of protocol messages on reference points, with valid content according to the specific interoperability test purpose to be verified.

For the execution of the interoperability test sessions, the following conventions apply:

- Every 'Check' step of a test description should be performed using a trace created by a monitor tool (see clause 'Tooling' below) and may be skipped due to time restrictions

4.2   Tooling

- Participant shall use their own tools (e.g. tcpdump, wireshark) for logging and analysing messages for the "check" purposes

- Participants will be given the opportunity to upload their log files to a central server for a format validity check. The checks defined in each test description will be automatically performed by the central server

- Except for the "check" events, the verification of the message correctness is not part of the Interoperability test process

4.3   Test Description naming convention

Table 1: TD naming convention

TD/<root>/<gr>/<nn>		
<root>	6LoWPAN	
<gr> = group	FORMAT	Frame format
	ND	Neighbour Discovery
	HC	Header Compression
	ND-HC	Combined ND-HC
<nn> = sequential number		01 to 99

4.4   6LoWPAN Tests Summary

Table 2: 6LoWPAN Tests

Id	Test Id	Test Summary	Test Group
1	TD_6LoWPAN_FORMAT_01	Check that EUTs correctly handle uncompressed 6LoWPAN packets (EUI-64 link-local)	FORMAT
2	TD_6LoWPAN_FORMAT_02	Check that EUTs correctly handle uncompressed 6LoWPAN packets (16-bit link-local)	FORMAT
3	TD_6LoWPAN_FORMAT_03	Check that EUTs correctly handle uncompressed 6LoWPAN fragmented packets	FORMAT
4	TD_6LoWPAN_FORMAT_04	Check that EUTs correctly handle maximum size uncompressed 6LoWPAN fragmented packets	FORMAT
5	TD_6LoWPAN_FORMAT_05	Check that EUTs correctly handle uncompressed 6LoWPAN multicast to all-nodes (16-bit link-local)	FORMAT
6	TD_6LoWPAN_FORMAT_06	Check that EUTs correctly handle uncompressed 6LoWPAN multicast to all-nodes (EUI-64 link-local)	FORMAT
7	TD_6LoWPAN_FORMAT_07	Check that EUTs correctly handle uncompressed 6LoWPAN packets (EUI-64 to 16-bit link-local)	FORMAT
8	TD_6LoWPAN_FORMAT_08	Check that EUTs correctly handle uncompressed 6LoWPAN packets (16-bit to EUI-64 link-local)	FORMAT
9	TD_6LoWPAN_HC_01	Check that EUTs correctly handle compressed 6LoWPAN packets (EUI-64 link-local, hop limit=64)	HEADER COMPRESSION
10	TD_6LoWPAN_HC_02	Check that EUTs correctly handle compressed 6LoWPAN packets (16-bit link-local, hop limit=64)	HEADER COMPRESSION
11	TD_6LoWPAN_HC_03	Check that EUTs correctly handle compressed 6LoWPAN packets (EUI-64 link-local, hop limit=63)	HEADER COMPRESSION
12	TD_6LoWPAN_HC_04	Check that EUTs correctly handle compressed 6LoWPAN packets (16-bit link-local, hop limit=63)	HEADER COMPRESSION
13	TD_6LoWPAN_HC_05	Check that EUTs correctly handle compressed UDP packets (EUI-64, server port 5683)	HEADER COMPRESSION
14	TD_6LoWPAN_HC_06	Check that EUTs correctly handle compressed UDP packets (16-bit, server port 5683)	HEADER COMPRESSION
15	TD_6LoWPAN_HC_07	Check that EUTs correctly handle compressed UDP packets (EUI-64, server port 61616)	HEADER COMPRESSION
16	TD_6LoWPAN_HC_08	Check that EUTs correctly handle compressed UDP packets (16-bit, server port 61616)	HEADER COMPRESSION
17	TD_6LoWPAN_HC_09	Check that EUTs correctly handle compressed 6LoWPAN packets (EUI-64 to 16-bit link-local, hop limit=64)	HEADER COMPRESSION
18	TD_6LoWPAN_HC_10	Check that EUTs correctly handle compressed 6LoWPAN packets (16-bit to EUI-64 link-local, hop limit=64)	HEADER COMPRESSION
19	TD_6LoWPAN_ND_01	Check that a host is able to register its global IPv6 address (EUI-64)	NETWORK DISCOVERY
20	TD_6LoWPAN_ND_02	Check that a host is able to register its global IPv6 address (16-bit)	NETWORK DISCOVERY
21	TD_6LoWPAN_ND_03	Check Host NUD behavior	NETWORK DISCOVERY
22	TD_6LoWPAN_ND_04	Check 6LR NUD behavior (ICMP version)	NETWORK DISCOVERY
23	TD_6LoWPAN_ND_05	Check 6LR NUD behavior (UDP version)	NETWORK DISCOVERY
24	TD_6LoWPAN_ND_06	Check host behavior under multiple prefixes (EUI-64)	NETWORK DISCOVERY
25	TD_6LoWPAN_ND_07	Check host behavior under multiple prefixes (16-bit)	NETWORK

			DISCOVERY
26	TD_6LoWPAN_ND_HC_01	Check that EUTs make use of context 0 (EUI-64)	COMBINED HC-ND
27	TD_6LoWPAN_ND_HC_02	Check that EUTs make use of context 0 (16-bit)	COMBINED HC-ND
28	TD_6LoWPAN_ND_HC_03	Check that EUTs make use of context ≠ 0 (EUI-64)	COMBINED HC-ND
29	TD_6LoWPAN_ND_HC_04	Check that EUTs make use of context ≠ 0 (16-bit)	COMBINED HC-ND

5 Configuration

5.1 Test Configurations

This section defines the different test configurations.

Most of scenarios involve only a 6lowpan link that interconnects two nodes (Figure 1) or three nodes (Figure 2). Scenarios involving a LBR include a second network (non-6lowpan), the LBR provides the 6 lowpan link and the regular IPv6 network (Figure 3).
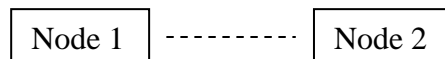

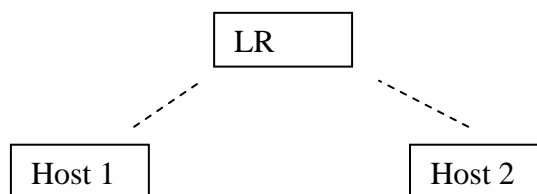**Figure 1 Basic topology (applicable to Node-Node, LR-LR and LR-Host scenarios)**

Figure 2 Topology for LR-2Hosts scenarios
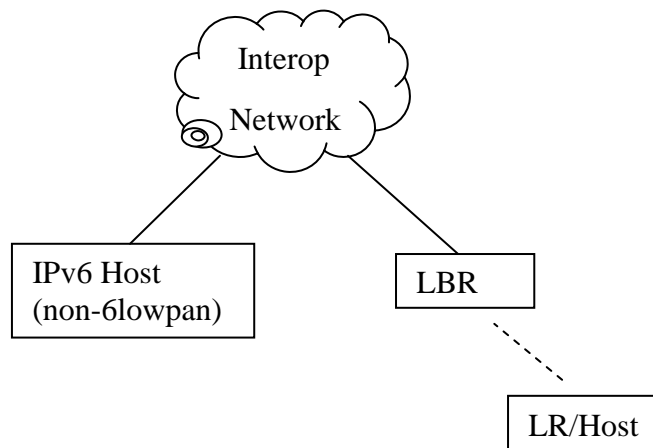
Figure 3 Topology for LBR-Host and LBR-LR scenarios
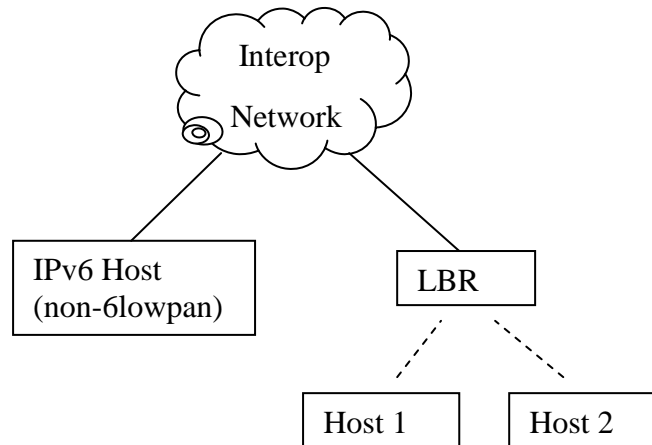
Figure 4 Topology for LBR-2Hosts scenarios

- RFC4944

    - *Node—Node*

  All scenarios should be feasible with link-local addresses (except if we want to cover the mesh header)

- RFC6775
    - *LBR—Host* and *LBR—LR*
        Most scenarios will fit in these two configurations
    - *LR—Host* and *LR—LR*
        Same scenarios, but with a standalone LR
    - *LBR—2 Hosts* and *LR—2 Host*
        Scenarios inolving routing of global addresses between two hosts

- RFC6282
    - *Node—Node*

        Scenarios covering link-local addresses (stateless)
    - *LBR—Host*, *LBR—LR, LR—Host* and *LR—LR*
        Scenarios covering global addresses (stateless or stateful)

6 6LoWPAN Scenarios

This section describes the different test scenarios

6.1 Frame Format

Interoperability Test Description			
Identifier:	TD_6LoWPAN_FORMAT_01		
Objective:	Check that EUTs correctly handle uncompressed 6LoWPAN packets (EUI-64 link-local)		
Configuration:	Node-Node		
References:	RFC 4944 5.1, 8		
Pre-test conditions:	• Header compression is disabled on both EUT1 and EUT2 • EUT1 and EUT2 are configured to use EUI-64		
Test Sequence:	Step	Type	Description
	0	Stimulus	• EUT1 initiates an echo request to EUT2's link-local address • ICMP payload = 4 bytes, total IPv6 size 52 bytes
	1	Check	• EUT1 sends an uncompressed 6LoWPAN packet containing the Echo Request message to EUT2's link-local address • Dispatch value in 6LowPAN packet is "01000001" • Both source and destination addresses are EUI-64 link-local
	2	Verify	EUT2 receives the Echo Request message from EUT1
	3	Check	• EUT2 sends an uncompressed 6LoWPAN packet containing the Echo Reply message to EUT1's link-local address • Dispatch value in 6LowPAN packet is "01000001" • Both source and destination addresses are EUI-64 link-local
	4	Verify	EUT1 receives the Echo Reply message from EUT2
	5	Check	The data received in the echo reply message is identical to that sent in EUT1's echo request message

Interoperability Test Description			
Identifier:	TD_6LoWPAN_FORMAT_02		
Objective:	Check that EUTs correctly handle uncompressed 6LoWPAN packets (16-bit link-local)		
Configuration:	Node-Node		
References:	RFC 4944 5.1, 8		
Pre-test conditions:	• Header compression is disabled on both EUT1 and EUT2 • EUT1 and EUT2 are configured to use 16-bit short address		
Test Sequence:	Step	Type	Description
	0	Stimulus	• EUT1 initiates an echo request to EUT2's link-local address • ICMP payload = 4 bytes, total IPv6 size 52 bytes
	1	Check	• EUT1 sends an uncompressed 6LoWPAN packet containing the Echo Request message to EUT2's link-local address • Dispatch value in 6LowPAN packet is "01000001" • Both source and destination addresses are 16 bit short link-local
	2	Verify	EUT2 receives the Echo Request message from EUT1
	3	Check	• EUT2 sends an uncompressed 6LoWPAN packet containing the Echo Reply message to EUT1's link-local address • Dispatch value in 6LowPAN packet is "01000001" • Both source and destination addresses are 16 bit short link-local
	4	Verify	EUT1 receives the Echo Reply message from EUT2
	5	Check	The data received in the echo reply message is identical to that sent in EUT1's echo request message

Interoperability Test Description	
Identifier:	TD_6LoWPAN_FORMAT_03
Objective:	Check that EUTs correctly handle uncompressed 6LoWPAN fragmented packets
Configuration:	Node-Node
References:	RFC 4944 5.1, 5.3
Pre-test conditions:	Header compression is disabled on both EUT1 and EUT2

Test Sequence:	Step	Type	Description
	0	Stimulus	• EUT1 initiates an echo request to EUT2's link-local address • ICMP payload = 253 bytes, total IPv6 size 301 bytes
	1	Check	• EUT1 sends a sequence of uncompressed 6LoWPAN packets containing the Echo Request fragments to EUT2 • EUT1 correctly fragments the Echo Request: • a 6LoWPAN FRAG1 header (dispatch 11000xxx) is included in the first packet • a 6LoWPAN FRAGN header (dispatch 11100xxx) is included in all following packets • the offsets form a contiguous sequence • all fragments except the last one must be multiples of 8 bytes
	2	Verify	EUT2 reassembles correctly the fragments and receives the Echo Request message from EUT1
	3	Check	• EUT2 sends a sequence of uncompressed 6LoWPAN packets containing the Echo Reply message to EUT1 • EUT1 correctly fragments the Echo Reply: • a 6LoWPAN FRAG1 header (dispatch 11000xxx) is included in the first packet • a 6LoWPAN FRAGN header (dispatch 11100xxx) is included in all following packets • the offsets form a contiguous sequence • all fragments except the last one must be multiples of 8 bytes • The data in the echo reply message packets is identical to that sent in the echo request message packets
	4	Verify	EUT1 correctly reassembles the fragments and receives the Echo Reply message from EUT2
	5	Verify	The data in the received echo reply message is identical to that sent in the echo request message

Interoperability Test Description	
Identifier:	TD_6LoWPAN_FORMAT_04
Objective:	Check that EUTs correctly handle maximum size uncompressed 6LoWPAN fragmented packets
Configuration:	Node-Node
References:	RFC 4944 5.1, 5.3
Pre-test conditions:	Header compression is disabled on both EUT1 and EUT2

Test Sequence:	Step	Type	Description
	0	Stimulus	• EUT1 initiates an echo request to EUT2's link-local address • ICMP payload = 1232 bytes, total IPv6 size 1280 bytes
	1	Check	• EUT1 sends a sequence of uncompressed 6LoWPAN packets containing the Echo Request fragments to EUT2 • EUT1 correctly fragments the Echo Request: • a 6LoWPAN FRAG1 header (dispatch 11000xxx) is included in the first packet • a 6LoWPAN FRAGN header (dispatch 11100xxx) is included in all following packets • the offsets form a contiguous sequence • all fragments except the last one must be multiples of 8 bytes
	2	Verify	EUT2 reassembles correctly the fragments and receives the Echo Request message from EUT1
	3	Check	• EUT2 sends a sequence of uncompressed 6LoWPAN packets containing the Echo Reply message to EUT1 • EUT1 correctly fragments the Echo Reply: • a 6LoWPAN FRAG1 header (dispatch 11000xxx) is included in the first packet • a 6LoWPAN FRAGN header (dispatch 11100xxx) is included in all following packets • the offsets form a contiguous sequence • all fragments except the last one must be multiples of 8 bytes • The data in the echo reply message packets is identical to that sent in the echo request message packets
	4	Verify	EUT1 correctly reassembles the fragments and receives the Echo Reply message from EUT2
	5	Verify	The data in the received echo reply message is identical to that sent in the echo request message

Interoperability Test Description	
Identifier:	TD_6LoWPAN_FORMAT_05
Objective:	Check that EUTs correctly handle uncompressed 6LoWPAN multicast to all-nodes (16-bit link-local)
Configuration:	Node-Node
References:	RFC 4944 5.1, 8
Pre-test conditions:	• Header compression is disabled on both EUT1 and EUT2 • EUT1 and EUT2 are configured to use 16-bit short address

Test Sequence:	Step	Type	Description
	0	Stimulus	EUT1 initiates an echo request to the link-local all-nodes multicast address (FF02::1) (ICMP payload = 4 bytes, total IPv6 size 52 bytes)
	1	Check	EUT1 sends an uncompressed 6LoWPAN packet containing the Echo Request message to EUT2
	2	Check	Dispatch value in 6LowPAN packet is "01000001"
	3	Verify	EUT2 receives the Echo Request message from EUT1
	4	Check	EUT2 sends an uncompressed 6LoWPAN packet containing the Echo Reply message to EUT1
	5	Check	Dispatch value in 6LowPAN packet is "01000001"
	6	Verify	EUT1 receives the Echo Reply message from EUT2
	7	Check	The data in the echo reply message is identical to that in the echo request message

Interoperability Test Description			
Identifier:	TD_6LoWPAN_FORMAT_06		
Objective:	Check that EUTs correctly handle uncompressed 6LoWPAN multicast to all-nodes (EUI-64 link-local)		
Configuration:	Node-Node		
References:	RFC 4944 5.1, 8		
Pre-test conditions:	• Header compression is disabled on both EUT1 and EUT2 • EUT1 and EUT2 are configured to use EUI-64		
Test Sequence:	Step	Type	Description
	0	Stimulus	EUT1 initiates an echo request to the link-local all-nodes multicast address (FF02::1) (ICMP payload = 4 bytes, total IPv6 size 52 bytes)
	1	Check	EUT1 sends an uncompressed 6LoWPAN packet containing the Echo Request message to EUT2
	2	Check	Dispatch value in 6LowPAN packet is "01000001"
	3	Verify	EUT2 receives the Echo Request message from EUT1
	4	Check	EUT2 sends an uncompressed 6LoWPAN packet containing the Echo Reply message to EUT1
	5	Check	Dispatch value in 6LowPAN packet is "01000001"
	6	Verify	EUT1 receives the Echo Reply message from EUT2
	7	Check	The data in the echo reply message is identical to that in the echo request message

Interoperability Test Description			
Identifier:	TD_6LoWPAN_FORMAT_07		
Objective:	Check that EUTs correctly handle uncompressed 6LoWPAN packets (EUI-64 to 16-bit link-local)		
Configuration:	Node-Node		
References:	RFC 4944 5.1, 8		
Pre-test conditions:	• Header compression is disabled on both EUT1 and EUT2 • EUT1 is configured to use EUI-64 and EUT2 is configured to use 16-bit short address		
Test Sequence:	Step	Type	Description
	0	Stimulus	• EUT1 initiates an echo request to EUT2's link-local address • ICMP payload = 4 bytes, total IPv6 size 52 bytes
	1	Check	• EUT1 sends an uncompressed 6LoWPAN packet containing the Echo Request message to EUT2's link-local address • Dispatch value in 6LowPAN packet is "01000001" • Source address is EUI-64 link-local • Destination address is 16 bit short link-local
	2	Verify	EUT2 receives the Echo Request message from EUT1
	3	Check	• EUT2 sends an uncompressed 6LoWPAN packet containing the Echo Reply message to EUT1's link-local address • Dispatch value in 6LowPAN packet is "01000001" • Source address is 16 bit short link-local • Destination address is EUI-64 link-local
	4	Verify	EUT1 receives the Echo Reply message from EUT2
	5	Check	The data received in the echo reply message is identical to that sent in EUT1's echo request message

Interoperability Test Description	
Identifier:	TD_6LoWPAN_FORMAT_08
Objective:	Check that EUTs correctly handle uncompressed 6LoWPAN packets (16-bit to EUI-64 link-local)
Configuration:	Node-Node
References:	RFC 4944 5.1, 8
Pre-test	• Header compression is disabled on both EUT1 and EUT2

conditions:	• EUT1 is configured to use 16-bit short address and EUT2 is configured to use EUI-64		
Test Sequence:	Step	Type	Description
	0	Stimulus	• EUT1 initiates an echo request to EUT2's link-local address • ICMP payload = 4 bytes, total IPv6 size 52 bytes
	1	Check	• EUT1 sends an uncompressed 6LoWPAN packet containing the Echo Request message to EUT2's link-local address • Dispatch value in 6LowPAN packet is "01000001" • Source address is 16 bit short link-local • Destination address is EUI-64 link-local
	2	Verify	EUT2 receives the Echo Request message from EUT1
	3	Check	• EUT2 sends an uncompressed 6LoWPAN packet containing the Echo Reply message to EUT1's link-local address • Dispatch value in 6LowPAN packet is "01000001" • Source address is EUI-64 link-local • Destination address is 16 bit short link-local
	4	Verify	EUT1 receives the Echo Reply message from EUT2
	5	Check	The data received in the echo reply message is identical to that sent in EUT1's echo request message

6.2 Header Compression (RFC 6282)

Interoperability Test Description			
Identifier:	TD_6LoWPAN_HC_01		
Objective:	Check that EUTs correctly handle compressed 6LoWPAN packets (EUI-64 link-local, hop limit=64)		
Configuration:	Node-Node		
References:	RFC 6282 section 3		
Pre-test conditions:	• Header compression is enabled on both EUT1 and EUT2 • EUT1 and EUT2 are configured to use EUI-64 • EUT1 and EUT2 are configured with a default hop limit of 64		
Test Sequence:	Step	Type	Description
	0	Stimulus	• EUT1 initiates an echo request to EUT2's link-local address

			• ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 64, no traffic class or flow label is being used
	1	Check	EUT1 sends a compressed 6LoWPAN packet containing the Echo Request message to EUT2
	2	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	3	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	4	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	5	Feature	In IP_HC, SAC=0, SAM=11; DAC=0; DAM=11
	6	Verify	EUT2 receives the Echo Request message from EUT1
	7	Check	EUT2 sends a compressed 6LoWPAN packet containing the Echo Reply message to EUT1
	8	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	9	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	10	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	11	Feature	In IP_HC, SAC=0, SAM=11; DAC=0; DAM=11
	12	Verify	EUT1 receives the Echo Reply message from EUT2
Notes:			• The feature tests check that best compression is used (but this is not a requirement for interoperability) • The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.

Interoperability Test Description	
Identifier:	TD_6LoWPAN_HC_02
Objective:	Check that EUTs correctly handle compressed 6LoWPAN packets (16-bit link-local, hop limit=64)
Configuration:	Node-Node
References:	RFC 6282 section 3
Pre-test conditions:	• Header compression is enabled on both EUT1 and EUT2 • EUT1 and EUT2 are configured to use 16-bit short address • EUT1 and EUT2 are configured with a default hop limit of 64
Test Sequence:	Step	Type	Description
	0	Stimulus	• EUT1 initiates an echo request to EUT2's link-local address

			• ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 64, no traffic class or flow label is being used
	1	Check	EUT1 sends a compressed 6LoWPAN packet containing the Echo Request message to EUT2
	2	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	3	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	4	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	5	Feature	In IP_HC, SAC=0, SAM=11; DAC=0; DAM=11
	6	Verify	EUT2 receives the Echo Request message from EUT1
	7	Check	EUT2 sends a compressed 6LoWPAN packet containing the Echo Reply message to EUT1
	8	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	9	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	10	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	11	Feature	In IP_HC, SAC=0, SAM=11; DAC=0; DAM=11
	12	Verify	EUT1 receives the Echo Reply message from EUT2
Notes:			• The feature tests check that best compression is used (but this is not a requirement for interoperability) • The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.

Interoperability Test Description	
Identifier:	TD_6LoWPAN_HC_03
Objective:	Check that EUTs correctly handle compressed 6LoWPAN packets (EUI-64 link-local, hop limit=63)
Configuration:	Node-Node
References:	RFC 6282 section 3
Pre-test conditions:	• Header compression is enabled on both EUT1 and EUT2 • EUT1 and EUT2 are configured to use EUI-64 • EUT1 and EUT2 are configured with a default hop limit of 63

Test Sequence:	Step	Type	Description
	0	Stimulus	• EUT1 initiates an echo request to EUT2's link-local address

			• ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 63, no traffic class or flow label is being used
	1	Check	EUT1 sends a compressed 6LoWPAN packet containing the Echo Request message to EUT2
	2	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	3	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	4	Feature	In IP_HC, HLIM (HL) is 00 and the hop limit field is carried in-line
	5	Feature	In IP_HC, SAC=0, SAM=11; DAC=0; DAM=11
	6	Verify	EUT2 receives the Echo Request message from EUT1
	7	Check	EUT2 sends a compressed 6LoWPAN packet containing the Echo Reply message to EUT1
	8	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	9	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	10	Feature	In IP_HC, HLIM (HL) is 00 and the hop limit field is carried in-line
	11	Feature	In IP_HC, SAC=0, SAM=11; DAC=0; DAM=11
	12	Verify	EUT1 receives the Echo Reply message from EUT2
Notes:	• The feature tests check that best compression is used (but this is not a requirement for interoperability) • The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.		

Interoperability Test Description	
Identifier:	TD_6LoWPAN_HC_04
Objective:	Check that EUTs correctly handle compressed 6LoWPAN packets (16-bit link-local, hop limit=63)
Configuration:	Node-Node
References:	RFC 6282 section 3
Pre-test conditions:	• Header compression is enabled on both EUT1 and EUT2 • EUT1 and EUT2 are configured to use 16-bit short address • EUT1 and EUT2 are configured with a default hop limit of 63

Test Sequence:	Step	Type	Description
	0	Stimulus	• EUT1 initiates an echo request to EUT2's link-local address

			• ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 63, no traffic class or flow label is being used
	1	Check	EUT1 sends a compressed 6LoWPAN packet containing the Echo Request message to EUT2
	2	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	3	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	4	Feature	In IP_HC, HLIM (HL) is 00 and the hop limit field is carried in-line
	5	Feature	In IP_HC, SAC=0, SAM=11; DAC=0; DAM=11
	6	Verify	EUT2 receives the Echo Request message from EUT1
	7	Check	EUT2 sends a compressed 6LoWPAN packet containing the Echo Reply message to EUT1
	8	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	9	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	10	Feature	In IP_HC, HLIM (HL) is 00 and the hop limit field is carried in-line
	11	Feature	In IP_HC, SAC=0, SAM=11; DAC=0; DAM=11
	12	Verify	EUT1 receives the Echo Reply message from EUT2
Notes:	• The feature tests check that best compression is used (but this is not a requirement for interoperability) • The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.		

Interoperability Test Description			
Identifier:	TD_6LoWPAN_HC_05		
Objective:	Check that EUTs correctly handle compressed UDP packets (EUI-64, server port 5683)		
Configuration:	Host-6LR		
References:	RFC 6282, 4.3		
Pre-test conditions:	• Header compression is enabled on both Host and Router • Host is configured to use EUI-64 address • A CoAP ping server is installed on port 5683 of the host		
Test Sequence:	Step	Type	Description
	0	Stimulus	6LR initiates a CoAP Ping request to Host's CoAP Ping server

	1	Check	6LR sends a 6LoWPAN packet containing the CoAP Ping message to Host
	2	Feature	NH is set, NHC is 111100x0, the source port is compressed to 8 bits (x=1) or uncompressed (x=0), the destination port is uncompressed 5683
	3	Verify	Host receives the CoAP Ping message from 6LR
	4	Check	Host sends a 6LoWPAN packet containing the CoAP Reset message to 6LR
	5	Feature	NH is set, NHC is 1111000x, the source port is uncompressed 5683, the destination port is compressed to 8 bits (x=1) or uncompressed (x=0)
	6	Verify	6LR receives the CoAP Reset message from Host
Notes:	The feature tests check that best compression is used (but this is not a requirement for interoperability)		

Interoperability Test Description			
Identifier:	TD_6LoWPAN_HC_06		
Objective:	Check that EUTs correctly handle compressed UDP packets (16-bit, server port 5683)		
Configuration:	Host-6LR		
References:	RFC 6282, 4.3		
Pre-test conditions:	• Header compression is enabled on both Host and Router • Host is configured to use 16-bit address • A CoAP ping server is installed on port 5683 of the host		
Test Sequence:	Step	Type	Description
	0	Stimulus	6LR initiates a CoAP Ping request to Host's CoAP Ping server
	1	Check	6LR sends a 6LoWPAN packet containing the CoAP Ping message to Host
	2	Feature	NH is set, NHC is 111100x0, the source port is compressed to 8 bits (x=1) or uncompressed (x=0), the destination port is uncompressed 5683
	3	Verify	Host receives the CoAP Ping message from 6LR
	4	Check	Host sends a 6LoWPAN packet containing the CoAP Reset message to 6LR
	5	Feature	NH is set, NHC is 1111000x, the source port is uncompressed 5683, the destination port is compressed to 8 bits (x=1) or uncompressed (x=0)
	6	Verify	6LR receives the CoAP Reset message from Host

Notes:	The feature tests check that best compression is used (but this is not a requirement for interoperability)

Interoperability Test Description			
Identifier:	TD_6LoWPAN_HC_07		
Objective:	Check that EUTs correctly handle compressed UDP packets (EUI-64, server port 61616)		
Configuration:	Host-6LR		
References:	RFC 6282, 4.3		
Pre-test conditions:	• Header compression is enabled on both Host and Router • Host is configured to use EUI-64 address • A CoAP ping server is installed on port 61616 of the host		
Test Sequence:	Step	Type	Description
	0	Stimulus	6LR initiates a CoAP Ping request to Host's CoAP Ping server
	1	Check	6LR sends a 6LoWPAN packet containing the CoAP Ping message to Host
	2	Feature	NH is set, NHC is 111100x1, the destination port is compressed to 4 bits of 0000 (x=1) or 8 bits of 0xb0 (x=0)
	3	Verify	Host receives the CoAP Ping message from 6LR
	4	Check	Host sends a 6LoWPAN packet containing the CoAP Reset message to 6LR
	5	Feature	NH is set, NHC is 1111001x, the source port is compressed to 4 bits of 0000 (x=1) or 8 bits of 0xb0 (x=0)
	6	Verify	6LR receives the CoAP Reset message from Host
Notes:	The feature tests check that best compression is used (but this is not a requirement for interoperability)		

Interoperability Test Description	
Identifier:	TD_6LoWPAN_HC_08
Objective:	Check that EUTs correctly handle compressed UDP packets (16-bit, server port 61616)
Configuration:	Host-6LR
References:	RFC 6282, 4.3

Pre-test conditions:	• Header compression is enabled on both Host and Router • Host is configured to use 16-bit address • A CoAP ping server is installed on port 61616 of the host		
Test Sequence:	Step	Type	Description
	0	Stimulus	6LR initiates a CoAP Ping request to Host's CoAP Ping server
	1	Check	6LR sends a 6LoWPAN packet containing the CoAP Ping message to Host
	2	Feature	NH is set, NHC is 111100x1, the destination port is compressed to 4 bits of 0000 (x=1) or 8 bits of 0xb0 (x=0)
	3	Verify	Host receives the CoAP Ping message from 6LR
	4	Check	Host sends a 6LoWPAN packet containing the CoAP Reset message to 6LR
	5	Feature	NH is set, NHC is 1111001x, the source port is compressed to 4 bits of 0000 (x=1) or 8 bits of 0xb0 (x=0)
	6	Verify	6LR receives the CoAP Reset message from Host
Notes:	The feature tests check that best compression is used (but this is not a requirement for interoperability)		

Interoperability Test Description			
Identifier:	TD_6LoWPAN_HC_09		
Objective:	Check that EUTs correctly handle compressed 6LoWPAN packets (EUI-64 to 16-bit link-local, hop limit=64)		
Configuration:	Node-Node		
References:	RFC 6282 section 3		
Pre-test conditions:	• Header compression is enabled on both EUT1 and EUT2 • EUT1 is configured to use EUI-64 and EUT2 is configured to use 16-bit short address		
Test Sequence:	Step	Type	Description
	0	Stimulus	• EUT1 initiates an echo request to EUT2's link-local address • ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 64, no traffic class or flow label is being used
	1	Check	EUT1 sends a compressed 6LoWPAN packet containing the Echo Request message to EUT2
	2	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	3	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields

			are compressed away
	4	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	5	Feature	In IP_HC, SAC=0, SAM=11; DAC=0; DAM=11
	6	Verify	EUT2 receives the Echo Request message from EUT1
	7	Check	EUT2 sends a compressed 6LoWPAN packet containing the Echo Reply message to EUT1
	8	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	9	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	10	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	11	Feature	In IP_HC, SAC=0, SAM=11; DAC=0; DAM=11
	12	Verify	EUT1 receives the Echo Reply message from EUT2
Notes:	• The feature tests check that best compression is used (but this is not a requirement for interoperability) • The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.		

Interoperability Test Description			
Identifier:	TD_6LoWPAN_HC_10		
Objective:	Check that EUTs correctly handle compressed 6LoWPAN packets (16-bit to EUI-64 link-local, hop limit=64)		
Configuration:	Node-Node		
References:	RFC 6282 section 3		
Pre-test conditions:	• Header compression is enabled on both EUT1 and EUT2 • EUT1 is configured to use 16-bit short address and EUT2 is configured to use EUI-64		
Test Sequence:	Step	Type	Description
	0	Stimulus	• EUT1 initiates an echo request to EUT2's link-local address • ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 64, no traffic class or flow label is being used
	1	Check	EUT1 sends a compressed 6LoWPAN packet containing the Echo Request message to EUT2
	2	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	3	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields

			are compressed away
	4	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	5	Feature	In IP_HC, SAC=0, SAM=11; DAC=0; DAM=11
	6	Verify	EUT2 receives the Echo Request message from EUT1
	7	Check	EUT2 sends a compressed 6LoWPAN packet containing the Echo Reply message to EUT1
	8	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	9	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	10	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	11	Feature	In IP_HC, SAC=0, SAM=11; DAC=0; DAM=11
	12	Verify	EUT1 receives the Echo Reply message from EUT2
Notes:	• The feature tests check that best compression is used (but this is not a requirement for interoperability) • The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.		

6.3 Neighbour Discovery (RFC 6775)

Interoperability Test Description			
Identifier:	TD_6LoWPAN_ND_01		
Objective:	Check that a host is able to register its global IPv6 address (EUI-64)		
Configuration:	Host-6LR		
References:	RFC 6775 10.2		
Pre-test conditions:	• Header compression is enabled on both Host and Router • Host is configured to use EUI-64 address		
Test Sequence:	Step	Type	Description
	0	Stimulus	Initialize the network interface of the Host
	1	Check	The Host sends a Router Solicitation to all-routers multicast address with SLLAO (EUI-64). Source = link local based on EUI-64
	2	Verify	The Router receives the Router Solicitation from the host.
	3	Check	• The Router sends a unicast Router Advertisement containing PIO and optionally 6COs to the host. • Link local addresses are used.

			• The L bit is not set.
	4	Verify	The host receives the Router Advertisement from the router
	5	Check	The host configures its tentative global IPv6 address based on the PIO information in RA from the Router (EUI-64)
	6	Check	The host registers its tentative address by sending a unicast Neighbor Solicitation containing ARO and SLLAO. Source = GP64
	7	Verify	The Router receives the Neighbor Solicitation from the host.
	8	Check	The Router sends a Neighbor Advertisement with Status set to 0 (Dest = GP64)
	9	Verify	The host updates the status of the tentative address
	10	Stimulus	• The Router initiates an echo request to the Host's new global address, using its own global address as the source • ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 64, no traffic class or flow label is being used
	11	Check	The Router sends a 6LoWPAN packet containing the Echo Request message to the Host
	12	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	13	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	14	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	15	Verify	The Host receives the Echo Request message from the Router
	16	Check	The Host sends a 6LoWPAN packet containing the Echo Reply message to the Router
	17	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	18	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	19	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	20	Verify	The Router receives the Echo Reply message from the Host
Notes:			The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.

Interoperability Test Description			
Identifier:	TD_6LoWPAN_ND_02		
Objective:	Check that a host is able to register its global IPv6 address (16-bit)		
Configuration:	Host-6LR		
References:	RFC 6775 10.2		
Pre-test conditions:	• Header compression is enabled on both Host and Router • Host is configured to use 16 bit short address		
Test Sequence:	Step	Type	Description
	0	Stimulus	Initialize the network interface of the Host
	1	Check	The Host sends a Router Solicitation to all-routers multicast address with SLLAO (EUI-64). Source = link local based on EUI-64
	2	Verify	The Router receives the Router Solicitation from the host.
	3	Check	• The Router sends a unicast Router Advertisement containing PIO and optionally 6COs to the host. • Link local addresses are used. • The L bit is not set.
	4	Verify	The host receives the Router Advertisement from the router
	5	Check	The host configures its tentative global IPv6 address based on the PIO information in RA from the Router (16-bit)
	6	Check	The host registers its tentative address by sending a unicast Neighbor Solicitation containing ARO and SLLAO. Source = GP16
	7	Verify	The Router receives the Neighbor Solicitation from the host.
	8	Check	The Router sends a Neighbor Advertisement with Status set to 0 (Dest = GP16)
	9	Verify	The host updates the status of the tentative address
	10	Stimulus	• The Router initiates an echo request to the Host's new global address, using its own global address as the source • ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 64, no traffic class or flow label is being used
	11	Check	The Router sends a 6LoWPAN packet containing the Echo Request message to the Host
	12	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	13	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	14	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	15	Verify	The Host receives the Echo Request message from the

			Router
	16	Check	The Host sends a 6LoWPAN packet containing the Echo Reply message to the Router
	17	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	18	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	19	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	20	Verify	The Router receives the Echo Reply message from the Host
Notes:	The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.		

Interoperability Test Description			
Identifier:	TD_6LoWPAN_ND_03		
Objective:	Check Host NUD behavior		
Configuration:	Host-6LR		
References:	RFC 6775 5.5		
Pre-test conditions:	• Header compression is enabled on both Host and Router • Host is configured to use EUI-64 address • Host is up and registered its global address with the Router		
Test Sequence:	Step	Type	Description
	0	Stimulus	Host sends a sequence of echo requests to 2001:db8::1
	1	Verify	Host sends a unicast NS message to the 6LR to perform NUD

Interoperability Test Description			
Identifier:	TD_6LoWPAN_ND_04		
Objective:	Check 6LR NUD behavior (ICMP version)		
Configuration:	Host-6LR		
References:	RFC 6775 5.5		
Pre-test conditions:	• Header compression is enabled on both Host and Router • Host is configured to use EUI-64 address • Host is up and registered its global address with the Router		

Test Sequence:	Step	Type	Description
	0	Stimulus	6LR sends a sequence of echo requests to Host
	1	Stimulus	After 10 seconds, echo reply function is disabled on host
	2	Verify	6LR sends a unicast NS message to the host to perform NUD
Notes:	Optional, as not all hosts allow disabling echo reply function		

Interoperability Test Description	
Identifier:	TD_6LoWPAN_ND_05
Objective:	Check 6LR NUD behavior (UDP version)
Configuration:	Host-6LR
References:	RFC 6775 5.5
Pre-test conditions:	• Header compression is enabled on both Host and Router • Host is configured to use EUI-64 address • A CoAP ping server is installed on port 5683 of the host • Host is up and registered its global address with the Router

Test Sequence:	Step	Type	Description
	0	Stimulus	6LR sends a sequence of CoAP pings to Host
	1	Stimulus	After 10 seconds, CoAP server function is disabled on host
	2	Verify	6LR sends a unicast NS message to the host to perform NUD
Notes:	Optional, as not all hosts allow disabling CoAP server function		

Interoperability Test Description	
Identifier:	TD_6LoWPAN_ND_06
Objective:	Check host behavior under multiple prefixes (EUI-64)
Configuration:	Host-6LR
References:	RFC 4861 3.1
Pre-test conditions:	• Header compression is enabled on both Host and Router • Host is configured to use EUI-64 address • Router is configured with multiple prefixes

Test	Step	Type	Description

Sequence:			
	0	Stimulus	Initialize the network interface of the Host
	1	Check	The Host sends a Router Solicitation to all-routers multicast address with SLLAO (EUI-64). Source = link local based on EUI-64
	2	Verify	The Router receives the Router Solicitation from the host.
	3	Check	• The Router sends a unicast Router Advertisement containing PIO with multiple prefixes and optionally 6COs to the host. • Link local addresses are used. • The L bit is not set.
	4	Verify	The host receives the Router Advertisement from the router
	5	Check	The host configures a number of tentative global IPv6 address based on the PIO information in RA from the Router (EUI-64)
	6	Check	The host registers its tentative addresses by sending unicast Neighbor Solicitations containing ARO and SLLAO. Source = GP64
	7	Verify	The Router receives the Neighbor Solicitations from the host.
	8	Check	The Router sends Neighbor Advertisements with Status set to 0 (Dest = GP64)
	9	Verify	The host updates the status of the tentative addresses
	10	Stimulus	• The Router initiates an echo request to one of the Host's new global addresses, using the appropriate own global address as the source • ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 64, no traffic class or flow label is being used
	11	Check	The Router sends a 6LoWPAN packet containing the Echo Request message to the Host
	12	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	13	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	14	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	15	Verify	The Host receives the Echo Request message from the Router
	16	Check	The Host sends a 6LoWPAN packet containing the Echo Reply message to the Router
	17	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	18	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away

	19	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	20	Verify	The Router receives the Echo Reply message from the Host
Notes:	• Optional, as not all 6lrs and hosts allow multiple prefixes • The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.		

Interoperability Test Description			
Identifier:	TD_6LoWPAN_ND_07		
Objective:	Check host behavior under multiple prefixes (16-bit)		
Configuration:	Host-6LR		
References:	RFC 4861 3.1		
Pre-test conditions:	• Header compression is enabled on both Host and Router • Host is configured to use 16 bit short address • Router is configured with multiple prefixes		
Test Sequence:	Step	Type	Description
	0	Stimulus	Initialize the network interface of the Host
	1	Check	The Host sends a Router Solicitation to all-routers multicast address with SLLAO (EUI-64). Source = link local based on EUI-64
	2	Verify	The Router receives the Router Solicitation from the host.
	3	Check	• The Router sends a unicast Router Advertisement containing PIO with multiple prefixes and optionally 6COs to the host. • Link local addresses are used. • The L bit is not set.
	4	Verify	The host receives the Router Advertisement from the router
	5	Check	The host configures a number of tentative global IPv6 address based on the PIO information in RA from the Router (16-bit)
	6	Check	The host registers its tentative addresses by sending unicast Neighbor Solicitations containing ARO and SLLAO. Source = GP16
	7	Verify	The Router receives the Neighbor Solicitations from the host.
	8	Check	The Router sends Neighbor Advertisements with Status set to 0 (Dest = GP16)

	9	Verify	The host updates the status of the tentative addresses
	10	Stimulus	• The Router initiates an echo request to one of the Host's new global addresses, using the appropriate own global address as the source • ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 64, no traffic class or flow label is being used
	11	Check	The Router sends a 6LoWPAN packet containing the Echo Request message to the Host
	12	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	13	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	14	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	15	Verify	The Host receives the Echo Request message from the Router
	16	Check	The Host sends a 6LoWPAN packet containing the Echo Reply message to the Router
	17	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	18	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	19	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	20	Verify	The Router receives the Echo Reply message from the Host
Notes:			• Optional, as not all 6lrs and hosts allow multiple prefixes • The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.

6.4 Combined ND & HC

Interoperability Test Description	
Identifier:	TD_6LoWPAN_ND_HC_01
Objective:	Check that EUTs make use of context 0 (EUI-64)
Configuration:	Host-6LR
References:	RFC 6775 5.4, RFC 6282 3.1.1
Pre-test conditions:	• Header compression is enabled on both EUT1 and EUT2 • EUT1 and EUT2 are configured to use EUI-64 • EUT1 and EUT2 are configured with a default hop limit of 64

Test Sequence:	Step	Type	Description
	0	Stimulus	Host is set up with 6LR and receives context 0 for the global prefix
	1	Stimulus	• EUT1 initiates an echo request to EUT2's GP64 address • ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 64, no traffic class or flow label is being used
	2	Check	EUT1 sends a 6LoWPAN packet containing the Echo Request message to EUT2
	3	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	4	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	5	Feature	The compression makes use of the global prefix (SAC/DAC = 1, SAM/DAM=01/11)
	6	Feature	The context identifier extension is not present (CID = 0)
	7	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	8	Verify	EUT2 receives the Echo Request message from EUT1
	9	Check	EUT2 sends a compressed 6LoWPAN packet containing the Echo Reply message to EUT1
	10	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	11	Feature	The compression makes use of the global prefix (SAC/DAC = 1, SAM/DAM=01/11)
	12	Feature	The context identifier extension is not present (CID = 0)
	13	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
Notes:			• The feature tests check that good compression is used (but this is not a requirement for interoperability) • The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.

Interoperability Test Description	
Identifier:	TD_6LoWPAN_ND_HC_02
Objective:	Check that EUTs make use of context 0 (16-bit)
Configuration:	Host-6LR
References:	RFC 6775 5.4, RFC 6282 3.1.1
Pre-test conditions:	• Header compression is enabled on both EUT1 and EUT2 • EUT1 and EUT2 are configured to use 16-bit short address

	• EUT1 and EUT2 are configured with a default hop limit of 64		
Test Sequence:	Step	Type	Description
	0	Stimulus	Host is set up with 6LR and receives context 0 for the global prefix
	1	Stimulus	• EUT1 initiates an echo request to EUT2's GP16 address • ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 64, no traffic class or flow label is being used
	2	Check	EUT1 sends a 6LoWPAN packet containing the Echo Request message to EUT2
	3	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	4	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	5	Feature	The compression makes use of the global prefix (SAC/DAC = 1, SAM/DAM=10/11)
	6	Feature	The context identifier extension is not present (CID = 0)
	7	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	8	Verify	EUT2 receives the Echo Request message from EUT1
	9	Check	EUT2 sends a compressed 6LoWPAN packet containing the Echo Reply message to EUT1
	10	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	11	Feature	The compression makes use of the global prefix (SAC/DAC = 1, SAM/DAM=10/11)
	12	Feature	The context identifier extension is not present (CID = 0)
	13	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
Notes:	• The feature tests check that good compression is used (but this is not a requirement for interoperability) • The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.		

Interoperability Test Description	
Identifier:	TD_6LoWPAN_ND_HC_03
Objective:	Check that EUTs make use of context ≠ 0 (EUI-64)
Configuration:	Host-6LR
References:	RFC 6775 5.4, RFC 6282 3.1.2
Pre-test	• Header compression is enabled on both EUT1 and EUT2

conditions:	• EUT1 and EUT2 are configured to use EUI-64 • EUT1 and EUT2 are configured with a default hop limit of 64		
Test Sequence:	Step	Type	Description
	0	Stimulus	Host is set up with 6LR and receives context $\neq 0$ for the global prefix
	1	Stimulus	• EUT1 initiates an echo request to EUT2's GP64 address • ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 64, no traffic class or flow label is being used
	2	Check	EUT1 sends a 6LoWPAN packet containing the Echo Request message to EUT2
	3	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	4	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	5	Feature	The compression makes use of the global prefix (SAC/DAC = 1, SAM/DAM=01/11)
	6	Check	A Context Identifier Extension (CID) is used for this
	7	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	8	Verify	EUT2 receives the Echo Request message from EUT1
	9	Check	EUT2 sends a compressed 6LoWPAN packet containing the Echo Reply message to EUT1
	10	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	11	Feature	The compression makes use of the global prefix (SAC/DAC = 1, SAM/DAM=01/11)
	12	Check	A Context Identifier Extension (CID) is used for this
	13	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
Notes:	• The feature tests check that good compression is used (but this is not a requirement for interoperability) • The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.		

Interoperability Test Description	
Identifier:	TD_6LoWPAN_ND_HC_04
Objective:	Check that EUTs make use of context $\neq 0$ (16-bit)
Configuration:	Host-6LR
References:	RFC 6775 5.4, RFC 6282 3.1.2

Pre-test conditions:	• Header compression is enabled on both EUT1 and EUT2 • EUT1 and EUT2 are configured to use 16-bit short address • EUT1 and EUT2 are configured with a default hop limit of 64		
Test Sequence:	Step	Type	Description
	0	Stimulus	Host is set up with 6LR and receives context ≠ 0 for the global prefix
	1	Stimulus	• EUT1 initiates an echo request to EUT2's GP16 address • ICMP payload = 4 bytes, total IPv6 size 52 bytes • Hop Limit is 64, no traffic class or flow label is being used
	2	Check	EUT1 sends a 6LoWPAN packet containing the Echo Request message to EUT2
	3	Feature	In IP_HC, TF is 11 and the ecn, dscp and flow label fields are compressed away
	4	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	5	Feature	The compression makes use of the global prefix (SAC/DAC = 1, SAM/DAM=10/11)
	6	Check	A Context Identifier Extension (CID) is used for this
	7	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
	8	Verify	EUT2 receives the Echo Request message from EUT1
	9	Check	EUT2 sends a compressed 6LoWPAN packet containing the Echo Reply message to EUT1
	10	Feature	In IP_HC, HLIM (HL) is 10 and the hop limit field is compressed away
	11	Feature	The compression makes use of the global prefix (SAC/DAC = 1, SAM/DAM=10/11)
	12	Check	A Context Identifier Extension (CID) is used for this
	13	Check	Dispatch value in 6LowPAN packet is "011TFxHL"
Notes:	• The feature tests check that good compression is used (but this is not a requirement for interoperability) • The Echo Reply message might use a different hop limit in some implementations, then the HLIM value might also be different.		

Change History

Document history		
0.0.1	08.03.2013	Initial Draft
1.0.0	25.07.2013	Final version