Bluetooth Network Encapsulation Protocol (BNEP)

Bluetooth® **Test Suite**

- **Revision:** BNEP.TS.p9
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- **Group Prepared By:** BTI

Contents

1   Scope

This Bluetooth document contains the Test Suite Structure (TSS) and test cases (TC) to test the implementation of the Bluetooth Networking Encapsulation Protocol (BNEP) Specification with the objective to provide a high probability of air interface interoperability between the tested implementation and other manufacturers' Bluetooth devices.

2   References, definitions, and abbreviations

2.1   References

This document incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter.

[1]   Bluetooth Network Encapsulation Protocol (BNEP) Specification, Version 1.0 or later

[2]   Bluetooth Core Specification, Version 2.0 or later

[3]   Bluetooth SIG Assigned Numbers

[4]   Test Strategy and Terminology Overview

[5]   PAN Profile ICS

[6]   ITU-T X.290 series, OSI CONFORMANCE TESTING METHODOLOGY AND FRAMEWORK PROTOCOL RECOMMENDATIONS FOR ITU-T APPLICATIONS, ITU Recommendation X.290 series (equivalent to ISO 9646)

[7]   BNEP/PAN Implementation eXtra Information for Testing (IXIT)

[8]   BNEP ICS Proforma

2.2   Definitions

For this Bluetooth document, the definitions from [2] and [4] apply.

2.3   Acronyms and abbreviations

For this Bluetooth document, the definitions from [2] and [4] apply.

Abbreviation or Acronym	Meaning
IP	Internet Protocol
L2CAP	Logical Link Control and Adaptation Protocol
MTU	Maximum Transmission Unit

Table 2.1: Abbreviations and acronyms

3   Test Suite Structure (TSS)

3.1   Test strategy

The test strategy will consist of only conformance testing. The conformance testing will focus on testing the Bluetooth Networking Encapsulation Protocol (BNEP) Specification.

3.2   Testing topology

For the testing of the Bluetooth Network Encapsulation Protocol one topology will be used. The topology that is used for BNEP testing consists of two Bluetooth devices connected to each other. While this topology does not represent the complete set of topologies that are possible in an environment using BNEP, they are representative of the most typical topologies and suitable for testing. The topology used for testing BNEP is the simple network as shown in Figure 3.1. The network contains one master (either the Lower Tester or IUT) and a single slave (either the Lower Tester or IUT).
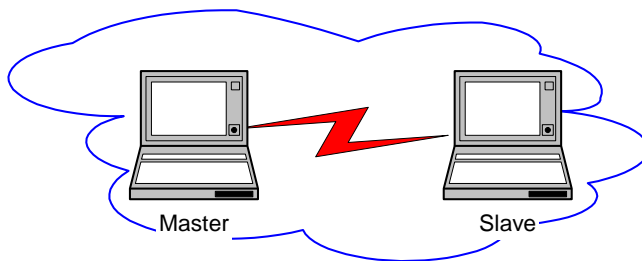
Figure 3.1: BNEP testing topology

The PAN role taken on by the IUT does not matter to achieve a pass verdict for some test cases for this Protocol as indicated in the test purpose and is specified in the test case identifier for role agnostic tests as detailed in Table 4.1: BNEP TC feature naming conventions. The role of the IUT/Lower Tester for these tests is specified in the IXIT [7] in order to enable the correct test environment conditions to provoke the Lower Tester.

3.3   Test groups

The following is the list of BNEP Test Groups:

3.3.1   Control

Tests verifying BNEP Control packets over Bluetooth.

3.3.2   Receive (RX)

Tests verifying the IUT can receive various BNEP packet types such as: BNEP_GENERAL_ETHERNET, BNEP_COMPRESSED_ETHERNET, BNEP_COMPRESSED_ETHERNET_SOURCE_ONLY, BNEP_COMPRESSED_ETHERNET_DEST_ONLY.

3.3.3   Transmit (TX)

Tests verifying the IUT can send various BNEP packet types such as: BNEP_GENERAL_ETHERNET, BNEP_COMPRESSED_ETHERNET, BNEP_COMPRESSED_ETHERNET_SOURCE_ONLY, BNEP_COMPRESSED_ETHERNET_DEST_ONLY.

4   Test cases (TC)

4.1   Introduction

4.1.1   Test case identification conventions

Test cases shall be assigned unique identifiers per the conventions in [4]. The convention used here is
<spec abbreviation>/<func>/**<cap>/<xx>-<nn>-<y>.**

Bolded ID parts shall appear in the order prescribed. Non-bolded ID parts (if applicable) shall appear
between the bolded parts. The order of the non-bolded parts may vary from Test Suite to Test Suite, but
shall be consistent within each individual Test Suite.

Identifier Abbreviation	Spec Identifier <spec abbreviation>
BNEP	Bluetooth Network Encapsulation Protocol
Identifier Abbreviation	**Feature Identifier <feat>**
CTRL	Control Message
RX-TYPE-0	RX for BNEP Packet Type 0x00 - BNEP_GENERAL_ETHERNET
TX-TYPE-0	TX for BNEP Packet Type 0x00 - BNEP_GENERAL_ETHERNET
RX-C	RX for BNEP Packet Type 0x02 - BNEP_COMPRESSED_ETHERNET
RX-C-S	RX for BNEP Packet Type 0x03 - BNEP_COMPRESSED_ETHERNET_SOURCE_ONLY
RX-C-D	RX for BNEP Packet Type 0x04 - BNEP_COMPRESSED_ETHERNET_DEST_ONLY
TX-C	TX for BNEP Packet Type 0x02 - BNEP_COMPRESSED_ETHERNET
TX-C-S	RX for BNEP Packet Type 0x03 - BNEP_COMPRESSED_ETHERNET_SOURCE_ONLY
TX-C-D	RX for BNEP Packet Type 0x04 - BNEP_COMPRESSED_ETHERNET_DEST_ONLY

Table 4.1: BNEP TC feature naming conventions

4.1.2   Conformance

When conformance is claimed for a particular specification, all capabilities are to be supported in the
specified manner (process-mandatory). The mandated tests from this Test Suite depend on the
capabilities to which conformance is claimed.

The Bluetooth Qualification Program may employ tests to verify implementation robustness. The level of
implementation robustness that is verified varies from one specification to another and may be revised for
cause based on interoperability issues found in the market.

Such tests may verify:

▪   That claimed capabilities may be used in any order and any number of repetitions that is not excluded
     by the specification

▪   That capabilities enabled by the implementations are sustained over durations expected by the use
     case

▪   That the implementation gracefully handles any quantity of data expected by the use case

▪ That in cases where more than one valid interpretation of the specification exists, the implementation complies with at least one interpretation and gracefully handles other interpretations

▪ That the implementation is immune to attempted security exploits

A single execution of each of the required tests is required in order to constitute a Pass verdict. However, it is noted that in order to provide a foundation for interoperability, it is necessary that a qualified implementation consistently and repeatedly pass any of the applicable tests.

In any case, where a member finds an issue with the test plan generated by Launch Studio, the test case as described in the Test Suite, or with the test system utilized, the member is required to notify the responsible party via an errata request such that the issue may be addressed.

4.1.3   Pass/Fail verdict conventions

Each test case has an Expected Outcome section. The IUT is granted the Pass verdict when all the detailed pass criteria conditions within the Expected Outcome section are met.

The convention in this Test Suite is that, unless there is a specific set of fail conditions outlined in the test case, the IUT fails the test case as soon as one of the pass criteria conditions cannot be met. If this occurs, the outcome of the test is a Fail verdict.

4.2   BNEP control tests

This test group verifies the IUT conforms to the BNEP Specification for Control messages.

BNEP/CTRL/BV-01-C [Unknown Control Message before BNEP_SETUP_CONNECTION]

• Test Purpose

   Verify the IUT response to an unknown BNEP control message, BNEP_CONTROL (0x01), sent from the Lower Tester before the connection setup is complete.

• Reference

   [1] 2.6, 2.6.2

• Initial Condition

   Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

   BNEP connection setup is not yet completed.

• Test Procedure

   The Lower Tester transmits the following BNEP unknown control message to the IUT.

Figure 4.1: BNEP/CTRL/BV-01-C [Unknown Control Message before BNEP_SETUP_CONNECTION]

CTRL Msg	Value
L2CAP Length	0x0002 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0xFF (Unknown control command)

Table 4.2: BNEP/CTRL/BV-01-C [Unknown Control Message before BNEP_SETUP_CONNECTION]

- Expected Outcome

  Pass verdict

  Data is sent by the IUT as defined below:

CTRL Response Msg	Value
L2CAP Length	0x0003 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x00 (BNEP_CONTROL_COMMAND_NOT_UNDERSTOOD)
Unknown Control Type	0xFF (Message received and not understood)

Table 4.3: BNEP/CTRL/BV-01-C [Unknown Control Message before BNEP_SETUP_CONNECTION]

BNEP/CTRL/BV-02-C [Setup Connection Message Lost]

- Test Purpose

  Verify that when the first control message, BNEP_CONTROL (0x01) for transmitting control packets to another device, is lost, the IUT will resend the control message again, or break the connection after the message has timed out.

- Reference

  [1] 2.6, 2.6.3

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

  BNEP connection setup is not yet completed.

- Test Procedure

  The IUT transmits the following BNEP control message to the Lower Tester.

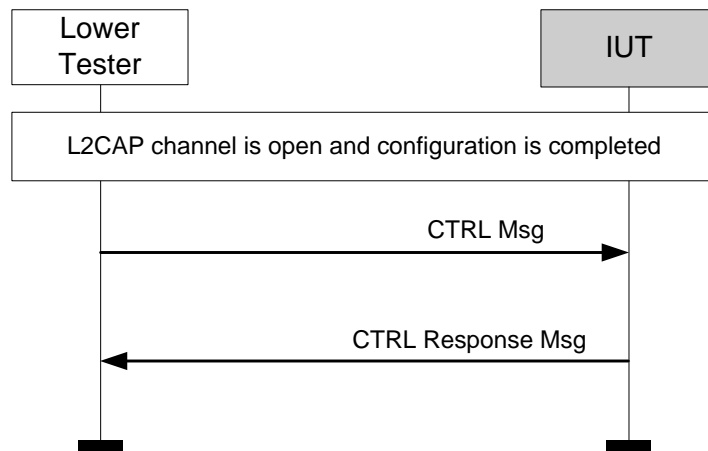

Figure 4.2: BNEP/CTRL/BV-02-C [Setup Connection Message Lost]

CTRL Msg	Value
L2CAP Length	0x0007 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x01 (BNEP_SETUP_CONNECTION_REQUEST_MSG)
UUID Size	0x02 (2 bytes [3])
Destination Service UUID	0x1116 (NAP Service UUID* [3])
Source Service UUID	0x1115 (PANU Service UUID* [3])

Table 4.4: BNEP/CTRL/BV-02-C [Setup Connection Message Lost]

The Lower Tester will intentionally drop the first control message.

- Expected Outcome

  Pass verdict

  Either of these alternatives applies:

  - ALT 1: The IUT resends the original connection setup control message as defined below within 30 seconds:

CTRL Msg	Value
L2CAP Length	0x0007 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)

CTRL Msg	Value
Extension	0x0 (No extension header)
BNEP Control Type	0x01 (BNEP_SETUP_CONNECTION_REQUEST_MSG)
UUID Size	0x02 (2 bytes [3])
Destination Service UUID	0x1116 (NAP Service UUID* [3])
Source Service UUID	0x1115 (PANU Service UUID* [3])

Table 4.5: BNEP/CTRL/BV-02-C [Setup Connection Message Lost]

- ALT 2: The IUT terminates the (L2CAP) connection due to an unsuccessful BNEP SETUP procedure.

- Notes

   Both the destination and source service UUID may be changed to match the supported services for each device under test. Also, in the future, additional profiles may use BNEP and therefore other UUID [3] values are valid.

BNEP/CTRL/BV-03-C [Setup Connection Message]

- Test Purpose

   Verify that IUT will give a proper response for a setup connection request message from the Lower Tester. The test case verifies the use of the BNEP_CONTROL (0x01) for transmitting control packets to another device.

- Reference

   [1] 2.6, 2.6.3.1, 2.6.3.2

- Initial Condition

   Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

   The Lower Tester transmits the following BNEP control message to the IUT.

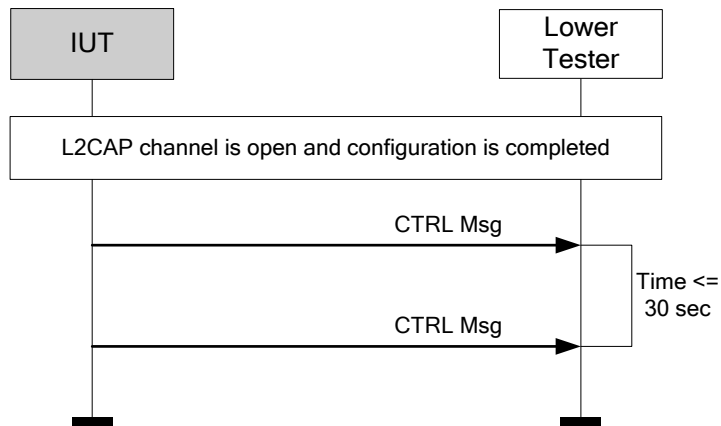*Figure 4.3: BNEP/CTRL/BV-03-C [Setup Connection Message]*

CTRL Msg	Value
L2CAP Length	0x0007 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension)
BNEP Control Type	0x01 (BNEP_SETUP_CONNECTION_REQUEST_MSG)
UUID Size	0x02 (2 bytes [3])
Destination Service UUID	0x1116 (NAP Service UUID* [3])
Source Service UUID	0x1115 (PANU Service UUID* [3])

Table 4.6: BNEP/CTRL/BV-03-C [Setup Connection Message]

- Expected Outcome

  Pass verdict

  Data is sent by the IUT as defined below:

CTRL Response Msg	Value
L2CAP Length	0x0004 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x02 (BNEP_SETUP_CONNECTION_RESPONSE_MSG)
Response Message	0x0000 (Operation Successful)

Table 4.7: BNEP/CTRL/BV-03-C [Setup Connection Message]

- Notes

  Both the destination and source service UUID may be changed to match the supported services for each device under test. Also, in the future, additional profiles may use BNEP and therefore other UUID [3] values are valid.

BNEP/CTRL/BV-04-C [Setup Connection Message after BNEP Connection setup has completed]

- Test Purpose

  Verify the proper response to a BNEP setup connection request message (BNEP_CONTROL (0x01)), after the BNEP connection setup has been completed.

- Reference

  [1] 2.6, 2.6.3.1, 2.6.3.2

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized.

  Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure.

  The Lower Tester transmits the following BNEP control message to the IUT.
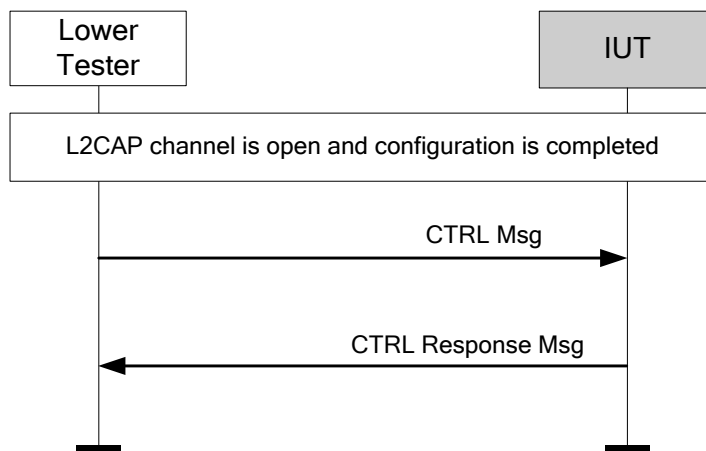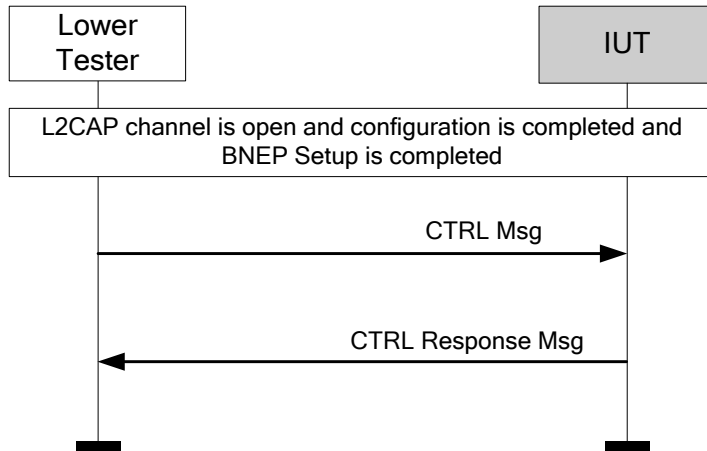

Figure 4.4: BNEP/CTRL/BV-04-C [Setup Connection Message after BNEP Connection setup has completed]

CTRL Msg	Value
L2CAP Length	0x0007 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x01 (BNEP_SETUP_CONNECTION_REQUEST_MSG)
UUID Size	0x02 (2 bytes [3])
Destination Service UUID	0x1116 (NAP Service UUID* [3])
Source Service UUID	0x1115 (PANU Service UUID*[3])

Table 4.8: BNEP/CTRL/BV-04-C [Setup Connection Message after BNEP Connection setup has completed]

- Expected Outcome

  Pass verdict

  Data is sent by the IUT as defined below:

CTRL Response Msg	Value
L2CAP Length	0x0004 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x02 (BNEP_SETUP_CONNECTION_RESPONSE_MSG)
Response Message	0x0000 (Operation Successful) or 0x0004 (Operation Failed: Connection not allowed)

Table 4.9: BNEP/CTRL/BV-04-C [Setup Connection Message after BNEP Connection setup has completed]

- Notes

  The tested scenario may occur if a device currently acting as a GN is connected to another network and wants to acts as a NAP.

  Both the destination and source service UUID may be changed to match the supported services for each device under test. Also, in the future, additional profiles may use BNEP and therefore other UUID [3] values are valid.

BNEP/CTRL/BV-05-C [Unknown Control Message after BNEP Setup Connection Message]

- Test Purpose

  Verify the correct IUT response to receipt of an unknown control message after the BNEP setup is completed.

- Reference

  [1] 2.6, 2.6.3.1, 2.6.3.2

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized.

  Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

  The Lower Tester transmits the following BNEP unknown control message to the IUT.
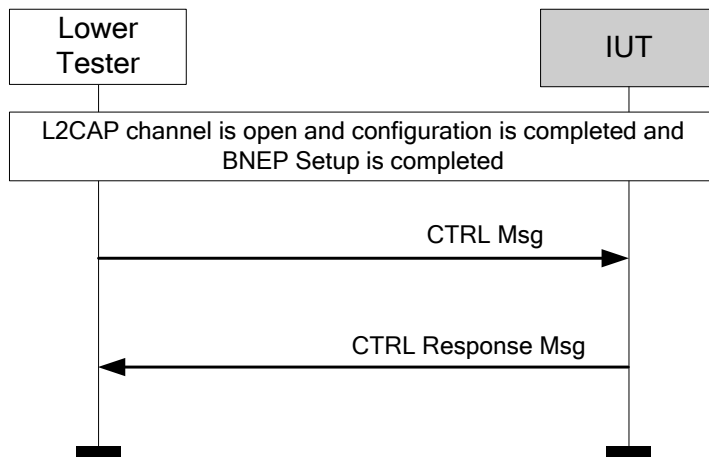
Figure 4.5: BNEP/CTRL/BV-05-C [Unknown Control Message after BNEP Setup Connection Message]

CTRL Msg	Value
L2CAP Length	0x0002 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0xFF (Unknown control command)

Table 4.10: BNEP/CTRL/BV-05-C [Unknown Control Message after BNEP Setup Connection Message]

- Expected Outcome

Pass verdict

Data is sent by the IUT as defined below:

CTRL Response Msg	Value
L2CAP Length	0x0003 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x00 (BNEP_CONTROL_COMMAND_NOT_UNDERSTOOD
Unknown Control Type	0xFF (BNEP control type received and not understood)

Table 4.11: BNEP/CTRL/BV-05-C [Unknown Control Message after BNEP Setup Connection Message]

BNEP/CTRL/BV-06-C [Network Protocol Filter Message]

- Test Purpose

Verify that the IUT responds properly to a network protocol type filter message when the Lower Tester transmits a BNEP control message that sets filters for all networking protocol types except IPv6.

- Reference

[1] 2.6, 2.6.4, 2.6.5

- Initial Condition

Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

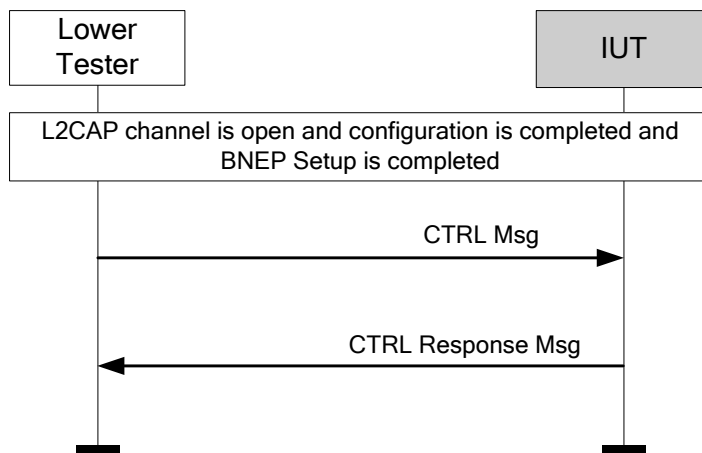The Lower Tester transmits the following BNEP control message to the IUT.

Figure 4.6: BNEP/CTRL/BV-06-C [Network Protocol Filter Message]

CTRL Msg	Value
L2CAP Length	0x0008 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x03 (BNEP_FILTER_NET_TYPE_SET_MSG)
List Length	0x0004 (Length of the list, in bytes, of the network protocols not to be filtered)
Network Protocol Type Range Start #1	0x86DD
Network Protocol Type Range End #1	0x86DD

Table 4.12: BNEP/CTRL/BV-06-C [Network Protocol Filter Message]

- Expected Outcome

  Pass verdict

  - ALT 1: If the IUT supports networking filtering.

  The correct data is sent as defined below:

CTRL Msg	Value
L2CAP Length	0x0004 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x04 (BNEP_FILTER_NET_TYPE_RESPONSE_MSG)
Response	0x0000 (Operation Successful)

Table 4.13: BNEP/CTRL/BV-06-C [Network Protocol Filter Message]

  - ALT 2: If the IUT does not support networking filtering.

  The correct data is sent as defined below:

CTRL Msg	Value
L2CAP Length	0x0004 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x04 (BNEP_FILTER_NET_TYPE_RESPONSE_MSG)
Response	0x0001 (Unsupported Request)

Table 4.14: BNEP/CTRL/BV-06-C [Network Protocol Filter Message]

BNEP/CTRL/BV-07-C [Network Protocol Filter Message Lost]

- Test Purpose

  Verify that the IUT transmits a BNEP Control message to the Lower Tester, which sets filters for all networking protocol types except IPv6, after the BNEP connection is setup. The test case will verify that the BNEP_CONTROL (0x01) packet is retransmitted if it is lost.

- Reference

  [1] 2.6, 2.6.4

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized.

  Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

  The IUT transmits the following BNEP control message to the Lower Tester..
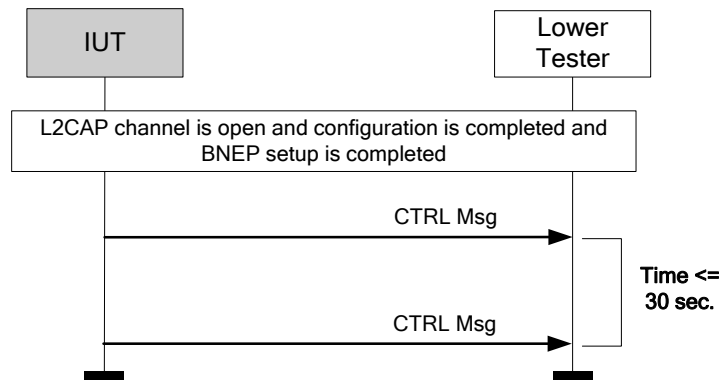
Figure 4.7: BNEP/CTRL/BV-07-C [Network Protocol Filter Message Lost]

CTRL Msg	Value
L2CAP Length	0x0008 ((BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x03 (BNEP_FILTER_NET_TYPE_SET_MSG)
List Length	0x0004 (Length of the list, in bytes, of the network protocols not to be filtered)
Network Protocol Type Range Start #1	See Notes
Network Protocol Type Range End #1	See Notes

Table 4.15: BNEP/CTRL/BV-07-C [Network Protocol Filter Message Lost]

The Lower Tester will intentionally drop the first control message.

- Expected Outcome

  Pass verdict

  The IUT resends the original filter control message as defined above within 30 seconds.

- Notes

  Valid values for the Start/End Network Protocol type are defined in Section 2.6.5 of the BNEP Specification [1].

BNEP/CTRL/BV-08-C [Multicast Address Filter Message]

- Test Purpose

  Verify that the IUT responds properly to a multicast address type filter message, when the Lower Tester transmits a BNEP control message setting filters for all multicast address except IPv4 to the IUT. The test case will verify the use of the BNEP_CONTROL (0x01) for transmitting control packets to another device.

- Reference

  [1] 2.6, 2.6.4, 2.6.6

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

 The Lower Tester transmits the following BNEP control message to the IUT.
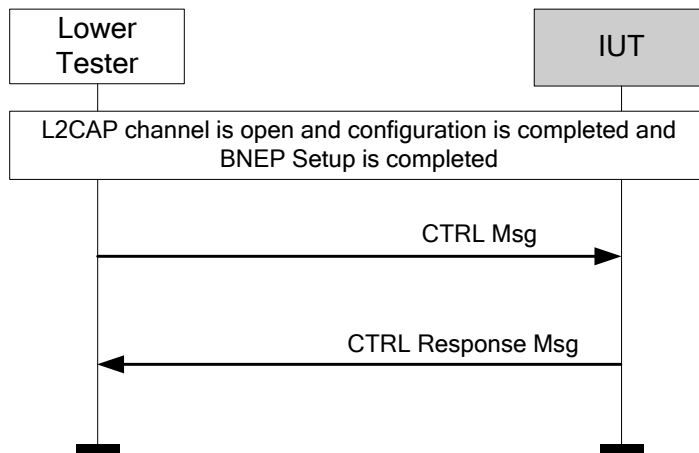
Figure 4.8: BNEP/CTRL/BV-08-C [Multicast Address Filter Message]

CTRL Msg	Value
L2CAP Length	0x0010 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x05 (BNEP_FILTER_MULTI_ADDR_SET_MSG)
List Length	0x000C (Length of the list, in bytes, of the multicast address not to be filtered)
Multicast Address Range Start #1	0x030000200000

CTRL Msg	Value
Multicast Address Range End #1	0x030000200000

Table 4.16: BNEP/CTRL/BV-08-C [Multicast Address Filter Message]

- Expected Outcome

  Pass verdict

  - ALT 1: The IUT supports networking filtering for multicast addresses and sends data as defined below:

CTRL Msg	Value
L2CAP Length	0x0004 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x06 (BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)
Response	0x0000(Operation Successful)

Table 4.17: BNEP/CTRL/BV-08-C [Multicast Address Filter Message]

  - ALT 2: The IUT does not support networking filtering for multicast addresses and sends data as defined below:

CTRL Msg	Value
L2CAP Length	0x0004 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x06 (BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)
Response	0x0001 (Unsupported Request)

Table 4.18: BNEP/CTRL/BV-08-C [Multicast Address Filter Message]

BNEP/CTRL/BV-09-C [Multicast Address Filter Message Lost]

- Test Purpose

  Verify that the IUT can transmit a BNEP control message, which sets filters for all multicast address except IPv4 to the Lower Tester. The test case will verify that the BNEP_CONTROL (0x01) packet is retransmitted if it is lost.

- Reference

  [1] 2.6, 2.6.4, 2.6.6

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

The IUT transmits the following BNEP control message to the Lower Tester. Note that the Upper Tester of the IUT must cause the IUT to send the first CTRL Msg.
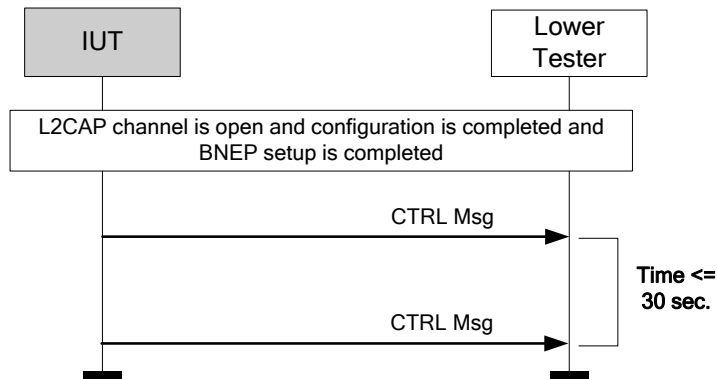

Figure 4.9: BNEP/CTRL/BV-09-C [Multicast Address Filter Message Lost]

CTRL Msg	Value
L2CAP Length	0x0010 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP Type field is BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x05 (BNEP_FILTER_MULTI_ADDR_SET_MSG)
List Length	0x000C (Length of the list, in bytes, of the multicast address not to be filtered)
Multicast Address Range Start #1	Variable, see Notes
Multicast Address Range End #1	Variable, see Notes

Table 4.19: BNEP/CTRL/BV-09-C [Multicast Address Filter Message Lost]

The Lower Tester will intentionally drop the first control message.

- Expected Outcome

Pass verdict

The IUT is successful if it resends the original filter control message as defined above within 30 seconds.

- Notes

Start as well as the End of the range of 48-bit multicast IEEE address not to be filtered. The value shall be less than or equal to the Multicast Address Range End value.

BNEP/CTRL/BV-10-C [Extension Header Message]

- Test Purpose

  Verify the usage of the extension bit when the Lower Tester transmits a BNEP_EXTENSION_CONTROL packet type. The main packet is an empty BNEP packet, the message in the extension header is a BNEP set multicast filter packet.

- Reference

  [1] 2.6, 2.6, 3.3

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

  The Lower Tester transmits the following BNEP_EXTENSION_CONTROL message to the IUT.
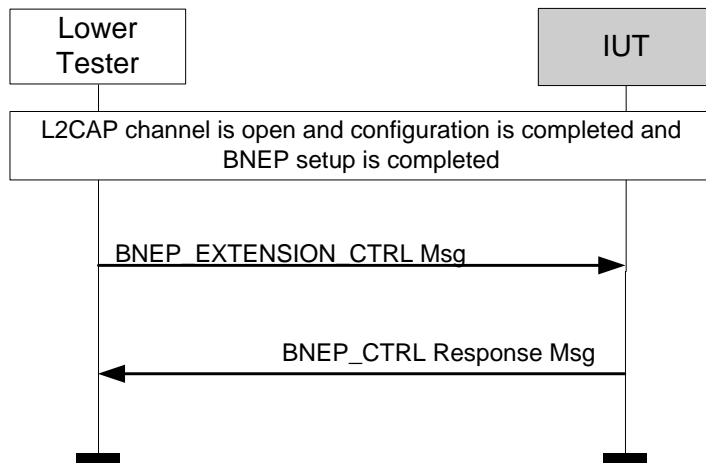
Figure 4.10: BNEP/CTRL/BV-10-C [Extension Header Message]

CTRL Msg	Value
L2CAP Length	0x0014 (BNEP packet length within the L2CAP packet)
BNEP Type	0x02 (BNEP_COMPRESSED_ETHERNET)
Extension	0x1 (Extension header)
Network Protocol Type	0x0800 (IPv4), or 0x86DD (IPv6), or 0xXXXX (Other)
Ext. Header	0x00 (BNEP_EXTENSION_CONTROL)
Ext. Extension	0x0 (No extension header)
Ext. Length	0x0F
Ext. BNEP Control Type	0x05 (BNEP_FILTER_MULTI_ADDR_SET_MSG)
List Length	0x000C (Length of the list, in bytes, of the multicast address not to be filtered)
Network Protocol Type Range Start #1	0x030000200000

CTRL Msg	Value
Network Protocol Type Range End #1	0x030000200000

Table 4.20: BNEP/CTRL/BV-10-C [Extension Header Message]

- Expected Outcome

  Pass verdict

  The IUT sends the following packet:

CTRL Msg	Value
L2CAP Length	0x0004 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x06 (BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)
Response Message	0xXXXX (Any Response allowed by the spec for the BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)

Table 4.21: BNEP/CTRL/BV-10-C [Extension Header Message]

BNEP/CTRL/BV-19-C [Setup message with two known extension headers]

- Test Purpose

  Verify the use of the extension bit when the Lower Tester transmits a BNEP control packet with two extension headers containing other BNEP control messages. The main packet is a BNEP setup connection message with the messages in the extension headers being a BNEP set filter control packet and a BNEP set multicast filter packet.

- Reference

  [1] 2.4, 2.6, 3.3

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

  The Lower Tester transmits the following BNEP control message to the IUT.

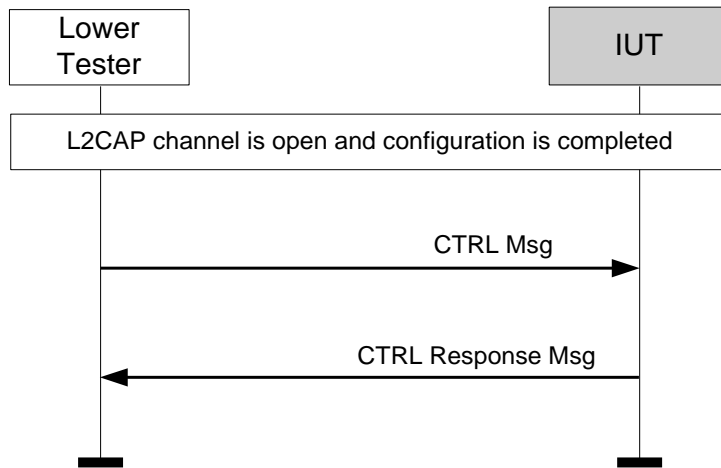*Figure 4.11: BNEP/CTRL/BV-19-C [Setup message with two known extension headers]*

CTRL Msg	Value
L2CAP Length	0x0021 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x1 (Extension header)
BNEP Control Type	0x01 (BNEP_SETUP_CONNECTION_REQUEST_MSG)
UUID Size	0x02 (2 bytes [3])
Destination Service UUID	0x1116 (NAP Service UUID* [3])
Source Service UUID	0x1115 (PANU Service UUID* [3])
Ext. Header	0x00 (BNEP_EXTENSION_CONTROL)
Ext. Extension	0x1 (Extension header)
Ext. Length	0x07
BNEP Control Type	0x03 (BNEP_FILTER_NET_TYPE_SET_MSG)
List Length	0x0004 (Length of the list, in bytes, of the Network protocols not to be filtered)
Network Protocol Type Range Start #1	0x8600
Network Protocol Type Range End #1	0x86DD
Ext. Header	0x00 (BNEP_EXTENSION_CONTROL)
Ext. Extension	0x0 (No extension header)
Ext. Length	0x0F
Ext. BNEP Control Type	0x05 (BNEP_FILTER_MULTI_ADDR_SET_MSG)
List Length	0x000C (Length of the list, in bytes, of the multicast address not to be filtered)
Network Protocol Type Range Start #1	0x030000200000
Network Protocol Type Range End #1	0x030000200000

Table 4.22: BNEP/CTRL/BV-19-C [Setup message with two known extension headers]

- Expected Outcome

Pass verdict

The IUT responds with any of the following alternatives:

- ALT 1:

CTRL Msg	Value
L2CAP Length	0x000E (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x1 (Extension header)
BNEP Control Type	0x02 (BNEP_SETUP_CONNECTION_RESPONSE_MSG)
Response Message	0x0000 (Operation Successful)
Ext. Header	0x00 (BNEP_EXTENSION_CONTROL)
Ext. Extension	0x1 (Extension header)
Ext. Length	0x03
BNEP Control Type	0x06 (BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)
Response Message	0xXXXX (Any Response allowed for the BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)
Ext. Header	0x00 (BNEP_EXTENSION_CONTROL)
Ext. Extension	0x0 (No extension header)
Ext. Length	0x03
BNEP Control Type	0x04 (BNEP_FILTER_NET_TYPE_RESPONSE_MSG)
Response Message	0xXXXX (Any Response allowed for the BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)

Table 4.23: BNEP/CTRL/BV-19-C [Setup message with two known extension headers]

Or

- ALT 2:

CTRL Msg	Value
L2CAP Length	0x000E (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x1 (Extension header)
BNEP Control Type	0x02 (BNEP_SETUP_CONNECTION_RESPONSE_MSG)
Response Message	0x0000 (Operation Successful)
Ext. Header	0x00 (BNEP_EXTENSION_CONTROL)
Ext. Extension	0x1 (Extension header)
Ext. Length	0x03
BNEP Control Type	0x04 (BNEP_FILTER_NET_TYPE_RESPONSE_MSG)
Response Message	0xXXXX (Any Response allowed for the BNEP_FILTER_NET_TYPE_RESPONSE_MSG)

CTRL Msg	Value
Ext. Header	0x00 (BNEP_EXTENSION_CONTROL)
Ext. Extension	0x0 (No extension header)
Ext. Length	0x03
BNEP Control Type	0x06 (BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)
Response Message	0xXXXX (Any Response allowed for the BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)

Table 4.24: BNEP/CTRL/BV-19-C [Setup message with two known extension headers]

Or

- ALT 3:

The response could be in the following three packages, with the connection response message first and the response message for the filter command in any order.

CTRL Response Msg	Value
L2CAP Length	0x0004 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x02 (BNEP_SETUP_CONNECTION_RESPONSE_MSG)
Response Message	0x0000 (Operation Successful)

Table 4.25: BNEP/CTRL/BV-19-C [Setup message with two known extension headers]

CTRL Msg	Value
L2CAP Length	0x0004 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x04 (BNEP_FILTER_NET_TYPE_RESPONSE_MSG)
Response Message	0xXXXX (Any Response allowed for the BNEP_FILTER_NET_TYPE_RESPONSE_MSG)

Table 4.26: BNEP/CTRL/BV-19-C [Setup message with two known extension headers]

CTRL Msg	Value
L2CAP Length	0x0004 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x06 (BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)
Response Message	0xXXXX (Any Response allowed for the BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)

Table 4.27: BNEP/CTRL/BV-19-C [Setup message with two known extension headers]

- Notes

  Both the destination and source service UUID may be changed to match the supported services for each device under test. Also, in the future, additional profiles may use BNEP and therefore other UUID [3] values are valid.

4.3 BNEP RX tests

This subgroup verifies the IUT is able to receive various BNEP packet types.

BNEP/RX-TYPE-0/BV-11-C [RX for BNEP Type 0x00]

- Test Purpose

  Verify the receipt and successful processing of the BNEP_GENERAL_ETHERNET (0x00) header for exchanging Ethernet packets with another device.

- Reference

  [1] 2.5

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

  The Lower Tester transmits a packet to the IUT as defined below:
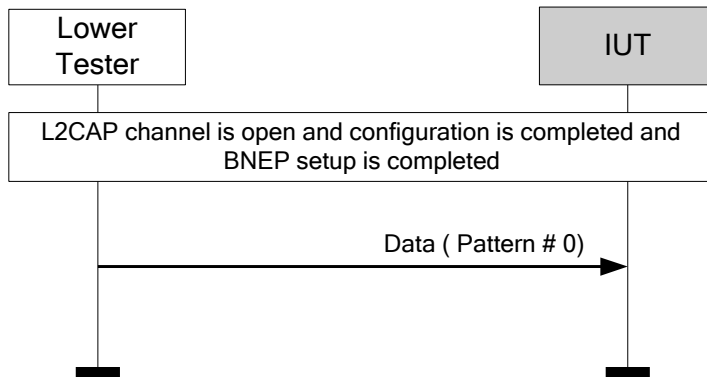
Figure 4.12: BNEP/RX-TYPE-0/BV-11-C [RX for BNEP Type 0x00]

Pattern #0	Value
L2CAP Length	0x5EB (BNEP packet length within the L2CAP packet)
BNEP Type	0x00 (BNEP_GENERAL_ETHERNET)
Extension	0x0 (No extension header)
Destination Address (48 bits)	0xXXXXXXXXXXXX
Source Address (48 bits)	0xXXXXXXXXXXXX
Network Protocol Type	0x0800 (IPv4), or 0x86DD (IPv6), or 0xXXXX (Other)
Dependent Header or other payload information	60 Bytes of data to be ignored

Pattern #0	Value
Data	0x5A0 bytes are:{0x00, 0x01,…,0xFF} *5 + {0x00, 0x01 , …, 0x9E, 0x9F}

Table 4.28: BNEP/RX-TYPE-0/BV-11-C [RX for BNEP Type 0x00]

- Expected Outcome

  Pass verdict

  The IUT is successful if it receives and processes the correct data as defined in the test procedure.

BNEP/RX-C/BV-12-C [RX for BNEP Type 0x02]

- Test Purpose

  Verify the receipt and successful processing of the BNEP_COMPRESSED_ETHERNET (0x02) header for exchanging Ethernet packets with another device.

- Reference

  [1] 2.7

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

 The Lower Tester transmits a packet to the IUT as defined below:
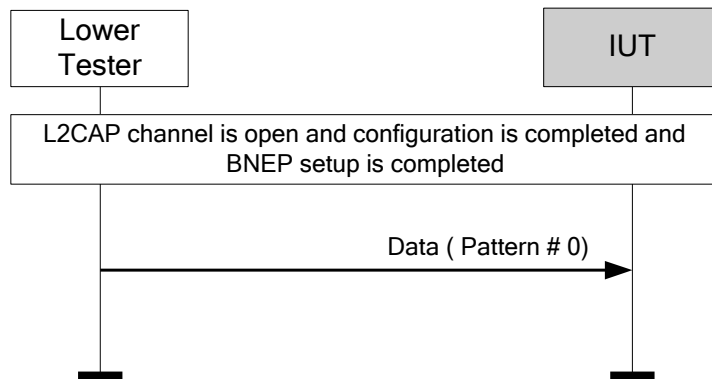
Figure 4.13: BNEP/RX-C/BV-12-C [RX BNEP for Type 0x02]

Pattern #0	Value
L2CAP Length	0x5DF (BNEP packet length within the L2CAP packet)
BNEP Type	0x02 (BNEP_COMPRESSED_ETHERNET)
Extension	0x0 (No extension header)
Network Protocol Type	0x0800 (IPv4), or 0x86DD (IPv6), or 0xXXXX

Pattern #0	Value
Dependent Header or other payload information	60 Bytes (Data to be ignored)
Data	0x5A0 bytes are:{0x00, 0x01,…,0xFF} *5 + {0x00, 0x01 , …, 0x9E, 0x9F}

Table 4.29: BNEP/RX-C/BV-12-C [RX BNEP for Type 0x02]

- Expected Outcome

  Pass verdict

  The IUT receives and successfully processes the correct data as defined in the test procedure.

BNEP/RX-C-S/BV-13-C [RX for BNEP Type 0x03]

- Test Purpose

  Verify the receiving and successful processing of the BNEP_COMPRESSED_ETHERNET_SOURCE_ONLY (0x03) header for exchanging Ethernet packets with another device.

- Reference

  [1] 2.8

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

 The Lower Tester transmits a packet to the IUT as defined below:
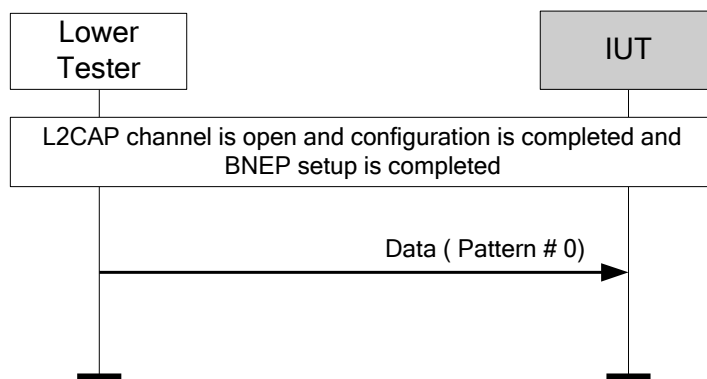
Figure 4.14: BNEP/RX-C-S/BV-13-C [RX for BNEP Type 0x03]

Pattern #0	Value
L2CAP Length	0x5E5 (BNEP packet length within the L2CAP packet)
BNEP Type	0x03 (BNEP_COMPRESSED_ETHERNET_SOURCE_ONLY)

Pattern #0	Value
Extension	0x0 (No extension header)
Source Address (48 bits)	Tester's Bluetooth Address
Network Protocol Type	0x0800 (IPv4), or 0x86DD (IPv6), or 0xXXXX
Dependent Header or other payload information	60 Bytes (Data to be ignored)
Data	0x5A0 bytes are:{0x00, 0x01,…,0xFF} *5 + {0x00, 0x01 , …, 0x9E, 0x9F}

Table 4.30: BNEP/RX-C-S/BV-13-C [RX for BNEP Type 0x03]

- Expected Outcome

  Pass verdict

  The IUT receives and successfully processes the correct data as defined in the test procedure.

BNEP/RX-C-D/BV-14-C [RX for BNEP Type 0x04]

- Test Purpose

  Verify the receipt and successful processing of the BNEP_COMPRESSED_ETHERNET_DEST_ONLY (0x04) header for exchanging Ethernet packets with another device.

- Reference

  [1] 2.9

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

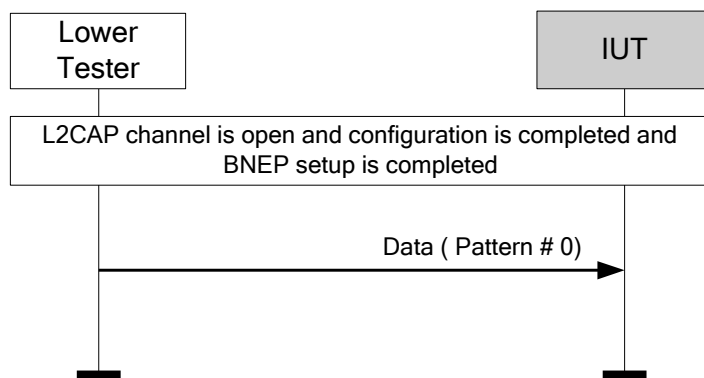 The Lower Tester transmits a packet to the IUT as defined below:

Figure 4.15: BNEP/RX-C-D/BV-14-C [RX for BNEP Type 0x04]

Pattern #0	Value
L2CAP Length	0x5E5 (BNEP packet length within the L2CAP packet)
BNEP Type	0x04 (BNEP_COMPRESSED_ETHERNET_DEST_ONLY)
Extension	0x0 (No extension header)
Destination Address (48 bits)	IUT's Bluetooth Address
Network Protocol Type	0x0800 (IPv4), or 0x86DD (IPv6), or 0xXXXX (Other)
Dependent Header or other payload information	60 Bytes (Data to be ignored)
Data	0x5A0 bytes are:{0x00, 0x01,…,0xFF} *5 + {0x00, 0x01 , …, 0x9E, 0x9F}

Table 4.31: BNEP/RX-C-D/BV-14-C [RX for BNEP Type 0x04]

- Expected Outcome

  Pass verdict

  The IUT receives and successfully processes the correct data as defined in the test procedure.

BNEP/RX-TYPE-0/BV-15-C [RX for BNEP Type 0x00 with extension header]

- Test Purpose

  Verify the receiving and successful processing of the BNEP_GENERAL_ETHERNET (0x00) header with an extension header.

- Reference

  [1] 2.5, 3.1

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

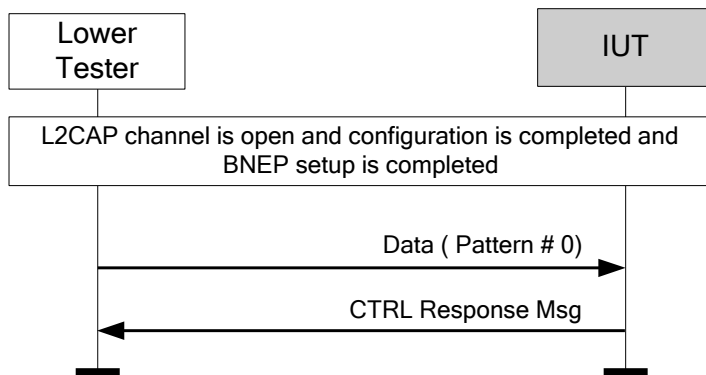 The Lower Tester transmits the following packet to the IUT as defined below:

Figure 4.16: BNEP/RX-TYPE-0/BV-15-C [RX for BNEP Type 0x00 with extension header]

Pattern #0	Value
L2CAP Length	0x5FC (BNEP packet length within the L2CAP packet)
BNEP Type	0x00 (BNEP_GENERAL_ETHERNET)
Extension	0x1 (Extension header)
Destination Address	0xXXXXXXXXXXXX
Source Address	0xXXXXXXXXXXXX
Network Protocol Type	0x0800 (IPv4), Or 0x86DD (IPv6), Or 0xXXXX
Ext. Header	0x00 (BNEP_EXTENSION_CONTROL)
Ext. Extension	0x0 (No extension header)
Ext. Length	0x0F
Ext. BNEP Control Type	0x05 (BNEP_FILTER_MULTI_ADDR_SET_MSG)
List Length	0x000C (Length of the list, in bytes, of the multicast address not to be filtered)
Network Protocol Type Range Start #1	0x030000200000 (Multicast address range start)
Network Protocol Type Range End #1	0x030000200000 (Multicast address range ending)
Dependent Header or other payload information	60 Bytes (Data to be ignored)
Data	0x5A0 bytes are: {0x00, 0x01,…,0xFF} *5 + {0x00, 0x01 , …, 0x9E, 0x9F}

Table 4.32: BNEP/RX-TYPE-0/BV-15-C [RX for BNEP Type 0x00 with extension header]

- Expected Outcome

  Pass verdict

  The IUT receives and processes the correct data packet as defined in the packet above and responds with the packet below:

CTRL Msg	Value
L2CAP Length	0x0004 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x06 (BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)
Response Message	0xXXXX (Any response allowed for the BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)

Table 4.33: BNEP/RX-TYPE-0/BV-15-C [RX for BNEP Type 0x00 with extension header]

BNEP/RX-TYPE-0/BV-16-C [RX for BNEP Type 0x00 with unknown extension header]

- Test Purpose

  Verify the receipt and successful processing of the BNEP_GENERAL_ETHERNET (0x00) header with an extension header containing a large unknown extension header.

- Reference

  [1] 2.5, 3.1

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

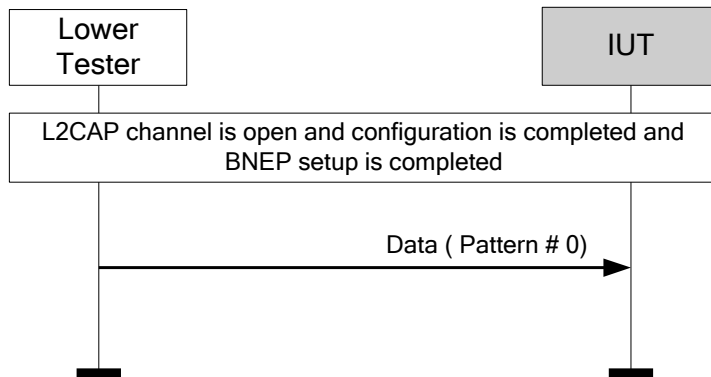 The Lower Tester transmits the following packet to the IUT as defined below:

Figure 4.17: BNEP/RX-TYPE-0/BV-16-C [RX for BNEP Type 0x00 with unknown extension header]

Pattern #0	Value
L2CAP Length	0x69B (BNEP packet length within the L2CAP packet)
BNEP Type	0x00 (BNEP_GENERAL_ETHERNET)
Extension	0x1 (Extension header)
Destination Address (48 bits)	0xXXXXXXXXXXXX
Source Address (48 bits)	0xXXXXXXXXXXXX
Network Protocol Type	0x0800 (IPv4), or 0x86DD (IPv6), or 0xXXXX
Ext. Header	0x7F (Unknown)
Ext. Extension	0x0 (No extension header)
Ext. Length	0xAE
Unknown Extension header payload	0xAE (174 bytes of data to be ignored)
Dependent Header or other payload information	60 (bytes of data to be ignored)
Data	0x5A0 bytes are: {0x00, 0x01,…,0xFF} *5 + {0x00, 0x01 , …, 0x9E, 0x9F}

Table 4.34: BNEP/RX-TYPE-0/BV-16-C [RX for BNEP Type 0x00 with unknown extension header]

- Expected Outcome

  Pass verdict

  The IUT receives and processes the correct data packet as defined in the packet above and ignores the unknown extension.

BNEP/RX-TYPE-0/BV-17-C [RX for BNEP Type 0x00 with 1 known and 1 unknown extension header]

- Test Purpose

  Verify the receipt and successful processing of the BNEP_GENERAL_ETHERNET (0x00) header with one known and one unknown extension header.

- Reference

  [1] 2.5, 3.1

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

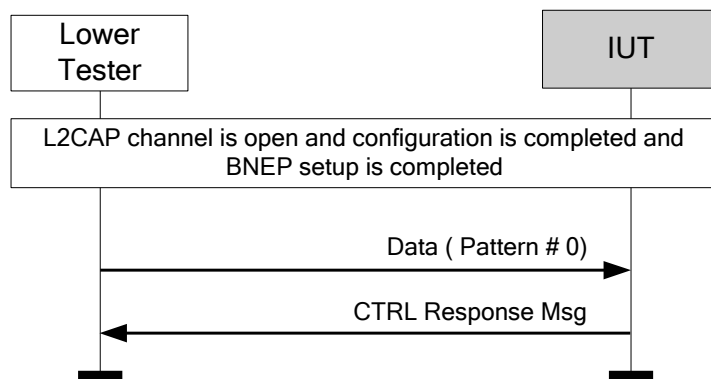 The Lower Tester transmits the following packet to the IUT as defined below:

Figure 4.18: BNEP/RX-TYPE-0/BV-17-C [RX for BNEP Type 0x00 with 1 known and 1 unknown extension header]

Pattern #0	Value
L2CAP Length	0x608 (BNEP packet length within the L2CAP packet)
BNEP Type	0x00 (BNEP_GENERAL_ETHERNET)
Extension	0x1 (Extension header)
Destination Address (48 bits)	0xXXXXXXXXXXXX
Source Address (48 bits)	0xXXXXXXXXXXXX
Network Protocol Type	0x0800 (IPv4), or 0x86DD (IPv6), or 0xXXXX
Ext. Header	0x00 (BNEP_EXTENSION_CONTROL)
Ext. Extension	0x1 (Extension header)
Ext. Length	0x0F
Ext. BNEP Control Type	0x05 (BNEP_FILTER_MULTI_ADDR_SET_MSG)
List Length	0x000C (Length of the list, in bytes, of the multicast address not to be filtered)
Network Protocol Type Range Start #1	0x030000200000 (Multicast address range starting)

Pattern #0	Value
Network Protocol Type Range End #1	0x030000200000 (Multicast address range ending)
Ext. Header	0x7F (Unknown extension header)
Ext. Extension	0x0 (No extension header)
Ext. Length	0x0A
Unknown Extension header payload	0xA (10 bytes of data to be ignored)
Dependent Header or other payload information	60 (60 bytes of data to be ignored)
Data	0x5A0 bytes are: {0x00, 0x01,…,0xFF} *5 + {0x00, 0x01 , …, 0x9E, 0x9F}

Table 4.35: BNEP/RX-TYPE-0/BV-17-C [RX for BNEP Type 0x00 with 1 known and 1 unknown extension header]

- Expected Outcome

  Pass verdict

  The IUT receives and processes the correct data packet as defined in the packet above and responds with the packet below.

CTRL Msg	Value
L2CAP Length	0x0004 (BNEP packet length within the L2CAP packet)
BNEP Type	0x01 (BNEP_CONTROL)
Extension	0x0 (No extension header)
BNEP Control Type	0x06 (BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)
Response Message	0xXXXX (Any Response allowed for the BNEP_FILTER_MULTI_ADDR_RESPONSE_MSG)

Table 4.36: BNEP/RX-TYPE-0/BV-17-C [RX for BNEP Type 0x00 with 1 known and 1 unknown extension header]

BNEP/RX-TYPE-0/BV-18-C [RX for BNEP Type 0x00 with two unknown extension headers]

- Test Purpose

  Verify the receipt and successful processing of the BNEP_GENERAL_ETHERNET (0x00) header with two unknown extension headers.

- Reference

  [1] 2.5, 3.1

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

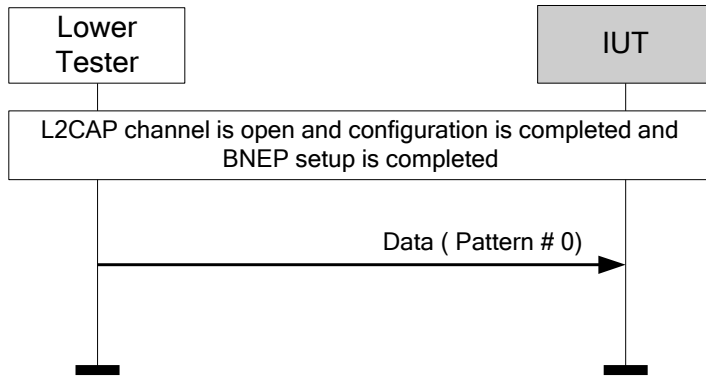The Lower Tester transmits the following packet to the IUT as defined below:

Figure 4.19: BNEP/RX-TYPE-0/BV-18-C [RX for BNEP Type 0x00 with two unknown extension headers]

Pattern #0	Value
L2CAP Length	0x69B (BNEP packet length within the L2CAP packet)
BNEP Type	0x00 (BNEP_GENERAL_ETHERNET)
Extension	0x1 (Extension header)
Destination Address (48 bits)	0xXXXXXXXXXXXX
Source Address (48 bits)	0xXXXXXXXXXXXX
Network Protocol Type	0x0800 (IPv4), or 0x86DD (IPv6), or 0xXXXX
Ext. Header	0x7F (Unknown)
Ext. Extension	0x1 (Extension header)
Ext. Length	0x56
Unknown Extension header payload	0x56 (86 bytes of data to be ignored)
Ext. Header	0x7F (Unknown)
Ext. Extension	0x0 (No extension header)
Ext. Length	0x56
Unknown Extension header payload	0x56 (86 bytes of data to be ignored)
Dependent Header or other payload information	60 (60 bytes of data to be ignored)
Data	0x5A0 bytes are: {0x00, 0x01,…,0xFF} *5 + {0x00, 0x01 , …, 0x9E, 0x9F}

Table 4.37: BNEP/RX-TYPE-0/BV-18-C [RX for BNEP Type 0x00 with two unknown extension headers]

- Expected Outcome

Pass verdict

The IUT receives and processes the correct data packet as defined in the packet above and ignores both of the unknown extension headers.

4.4   BNEP TX tests

This subgroup verifies the IUT is able to transmit various BNEP packet types.

BNEP/TX-TYPE-0/BV-20-C [TX for BNEP Type 0x00]

• Test Purpose

Verify that the IUT supports the use of the BNEP_GENERAL_ETHERNET (0x00) for sending Ethernet packets to another device.

• Reference

[1] 2.4, 2.5

• Initial Condition

Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.
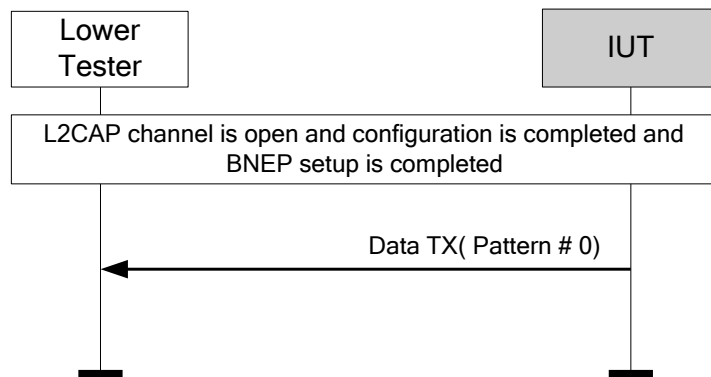
• Test Procedure

Figure 4.20: BNEP/TX-TYPE-0/BV-20-C [TX for BNEP Type 0x00]

The IUT transmits a BNEP packet with Type field BNEP_GENERAL_ETHERNET to the Lower Tester.

Note that the Upper Tester of the IUT must cause the IUT to send the packet.

• Expected Outcome

Pass verdict

The IUT sends the correct data as defined below.

Pattern #0	Value
L2CAP Length	If data payload is included L2CAP length is 0x5EB. Without data payload is 0x4B. (BNEP packet length within the L2CAP packet)
BNEP Type	0x00 (BNEP_GENERAL_ETHERNET)
Extension	0x0 (No extension header)
Destination Address(48 bits)	0xXXXXXXXXXXXX

Pattern #0	Value
Source Address (48 bits)	0xXXXXXXXXXXXX
Network Protocol Type	0x0800 (IPv4), or 0x86DD (IPv6), or 0xXXXX (Other)
Dependent Header or other payload information	60 (60 bytes of data to be ignored)
Data (Optional)	0x5A0 bytes are: {0x00, 0x01,…,0xFF} *5 + {0x00, 0x01 , …, 0x9E, 0x9F}

Table 4.38: BNEP/TX-TYPE-0/BV-20-C [TX for BNEP Type 0x00]

- Notes

  Data payload is optional to send.

BNEP/TX-C/BV-21-C [TX for BNEP Type 0x02]

- Test Purpose

  Verify that the IUT supports the use of the BNEP_COMPRESSED_ETHERNET (0x02) for transmitting Ethernet packets to another device.

- Reference

  [1] 2.4, 2.7

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

  The IUT transmits a BNEP packet with Type field BNEP_COMPRESSED_ETHERNET to the Lower Tester.

  Note that the operator Upper Tester of the IUT must cause the IUT to send the packet.
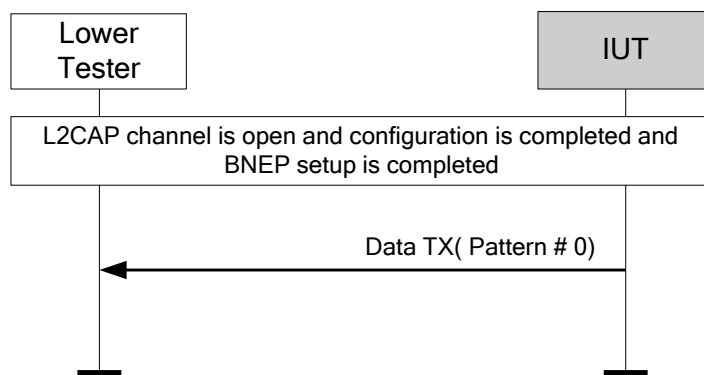

Figure 4.21: BNEP/TX-C/BV-21-C [TX BNEP for Type 0x02]

- Expected Outcome

Pass verdict

The IUT sends the data as defined below.

Pattern #0	Value
L2CAP Length	If data payload is included L2CAP length is 0x5DF. Without data payload is 0x3F. (BNEP packet length within the L2CAP packet)
BNEP Type	0x02 (BNEP_COMPRESSED_ETHERNET)
Extension	0x0 (No extension header)
Network Protocol Type	0x0800 (IPv4), or 0x86DD (IPv6), or 0xXXXX (Other)
Dependent Header or other payload information	60 (60 bytes of data to be ignored)
Data (Optional)	0x5A0 bytes are: {0x00, 0x01,…,0xFF} *5 + {0x00, 0x01 , …, 0x9E, 0x9F}

Table 4.39: BNEP/TX-C/BV-21-C [TX BNEP for Type 0x02]

- Notes

Data payload is optional to send.

BNEP/TX-C-S/BV-22-C [TX for BNEP Type 0x03]

- Test Purpose

Verify that the IUT supports the use of the BNEP_COMPRESSED_ETHERNET_SOURCE_ONLY (0x03) for transmitting Ethernet packets to another device.

- Reference

[1] 2.4, 2.8

- Initial Condition

Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

The IUT transmits a BNEP packet with Type field BNEP_COMPRESSED_ETHERNET_SOURCE_ONLY to the Lower Tester.

Note that the operator Upper Tester of the IUT must cause the IUT to send the packet.
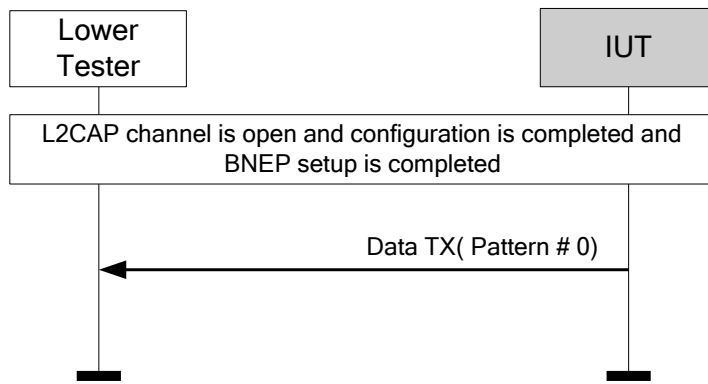
Figure 4.22: BNEP/TX-C-S/BV-22-C [TX BNEP Type 0x03]

- Expected Outcome

  Pass verdict

  The IUT sends the data as defined below.

Pattern #0	Value
L2CAP Length	If data payload is included L2CAP length is 0x5E5. Without data payload is 0x45. (BNEP packet length within the L2CAP packet)
BNEP Type	0x03 (BNEP_COMPRESSED_ETHERNET_SOURCE_ONLY)
Extension	0x0 (No extension header)
Source Address (48 bits)	0xXXXXXXXXXXXX
Network Protocol Type	0x0800 (IPv4), or 0x86DD (IPv6), or 0xXXXX (Other)
Dependent Header or other payload information	60 (60 bytes of data to be ignored)
Data (Optional)	0x5A0 bytes are: {0x00, 0x01,…,0xFF} *5 + {0x00, 0x01 , …, 0x9E, 0x9F}

Table 4.40: BNEP/TX-C-S/BV-22-C [TX BNEP Type 0x03]

- Notes

  Data payload is optional to send.

BNEP/TX-C-D/BV-23-C [TX for BNEP Type 0x04]

- Test Purpose

  Verify that the IUT supports the use of the BNEP_COMPRESSED_ETHERNET_DEST_ONLY (0x04) for transmitting Ethernet packets to another device.

- Reference

  [1] 2.4, 2.9

- Initial Condition

  Both the IUT and the Lower Tester must be switched on and initialized. Initialization may require a PIN if there are any security restrictions already in place on the Bluetooth link.

- Test Procedure

The IUT transmits a BNEP packet with Type field BNEP_COMPRESSED_ETHERNET_DEST_ONLY to the Lower Tester.

Note that the operator Upper Tester of the IUT must cause the IUT to send the packet.
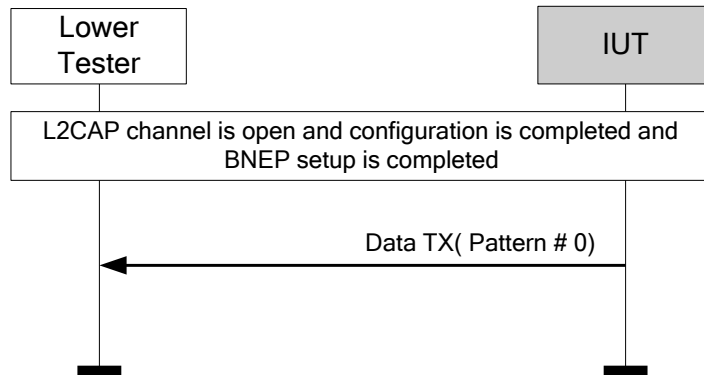

Figure 4.23: BNEP/TX-C-D/BV-23-C [TX for BNEP Type 0x04]

- Expected Outcome

Pass verdict

The IUT is successful if it sends the correct data as defined below.

Pattern #0	Value
L2CAP Length	If data payload is included L2CAP length is 0x5E5. Without data payload is 0x45. (BNEP packet length within the L2CAP packet)
BNEP Type	0x04 (BNEP_COMPRESSED_ETHERNET_DEST_ONLY)
Extension	0x0 (No extension header)
Destination Address (48 bits)	0xXXXXXXXXXXXX
Network Protocol Type	0x0800 (IPv4), or 0x86DD (IPv6), or 0xXXXX (Other)
Dependent Header or other payload information	60 (60 bytes of Data to be ignored)
Data (Optional)	0x5A0 bytes are: {0x00, 0x01,…,0xFF} *5 + {0x00, 0x01 , …, 0x9E, 0x9F}

Table 4.41: BNEP/TX-C-D/BV-23-C [TX for BNEP Type 0x04]

- Notes

Data payload is optional to send.

5   Test case mapping

The Test Case Mapping Table (TCMT) maps test cases to specific requirements in the ICS. The IUT will be tested in all roles for which support is declared in the ICS document.

The columns for the TCMT are defined as follows:

Item: Contains a logical expression based on specific entries from the associated ICS document. Contains a logical expression (using the operators AND, OR, NOT as needed) based on specific entries from the applicable ICS document(s). The entries are in the form of y/x references, where y corresponds to the table number and x corresponds to the feature number as defined in the ICS document for BNEP [8].

Feature: A brief, informal description of the feature being tested.

Test Case(s): The applicable test case identifiers required for Bluetooth Qualification if the corresponding y/x references defined in the Item column are supported. Further details about the function of the TCMT are elaborated in [4].

For purpose and structure of the ICS/IXIT and instructions for completing the ICS/IXIT, refer to the Bluetooth ICS and IXIT Proforma documents.

Item	Feature	Test Case(s)
BNEP 1a/1	BNEP Connection Setup	BNEP/CTRL/BV-01-C BNEP/CTRL/BV-02-C BNEP/CTRL/BV-03-C BNEP/CTRL/BV-04-C
BNEP 1a/2	BNEP Data Packet Reception	BNEP/RX-TYPE-0/BV-11-C BNEP/RX-C/BV-12-C BNEP/RX-C-S/BV-13-C BNEP/RX-C-D/BV-14-C
BNEP 1a/3	BNEP General Ethernet Data Packet Transmission	BNEP/TX-TYPE-0/BV-20-C
BNEP 1a/3a	BNEP Compressed Packet Transmission	BNEP/TX-C/BV-21-C
BNEP 1a/3b	BNEP Compressed Packet Transmission source only	BNEP/TX-C-S/BV-22-C
BNEP 1a/3c	BNEP Compressed Packet Transmission destination only	BNEP/TX-C-D/BV-23-C
BNEP 1a/4	BNEP Control Message Processing	BNEP/CTRL/BV-05-C BNEP/CTRL/BV-06-C BNEP/CTRL/BV-08-C
BNEP 1a/5	BNEP Extension Header Processing	BNEP/CTRL/BV-10-C BNEP/RX-TYPE-0/BV-15-C BNEP/RX-TYPE-0/BV-16-C BNEP/RX-TYPE-0/BV-17-C BNEP/RX-TYPE-0/BV-18-C BNEP/CTRL/BV-19-C
BNEP 1a/6	Network Protocol Filter Message Transmission	BNEP/CTRL/BV-07-C
BNEP 1a/7	Multicast Address Filter Message Transmission	BNEP/CTRL/BV-09-C

Table 5.1: Test case mapping

6   Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0	2003-02-14	Specification Adopted
	1.0.1r0	2005-10-03	TSE 824 for TC TP/BNEP/CTRL//BV-07-C and TSE 826 for TC TP/BNEP/CTRL/BV-09-C
	1.01.r1	2005-10-12	Corrected fail verdict for TP/BNEP/CTRL/BV-07-c. Updated tables for both TP/BNEP/CTRL/BV-07|09-C
1	1.0.1	2005-10-21	Prepare for Publication
	1.0.1r0	2011-11-08	TSE 4473: TP/BNEP/TXC/BV-21|22|23-C: TCMT updates.
2	1.0.2	2012-03-30	Prepare for publication.
	1.0.3r0	2012-10-02	TSE 4957: Removed TP/BNEP/CTRL/BV-05-C and TP/BNEP/CTRL/BV-19-C from BNEP Connection Setup in the TCMT.
3	1.0.3	2012-11-01	Prepare for Publication
	1.0.4r01	2013-11-13	TSE 5269: Reorganized the first few sections for the current Test Spec template for the Test Purposes and Test Suite Structures. Added TP identifiers table to the existing section with the naming conventions. Moved the Abbreviations section and the references section to align with the current template. Enhanced the references. BNEP ICS are in the PAN ICS so all BNEP ICS references point to this item. Added the current Conformance section text. Corrected a heading level error within a test case. Added BNEP section references to all test cases. Rephrased the test objectives for clarity and simplicity. Moved all the MSC's from Initial Conditions to the Test Procedures. Fixed occurrences of "Tester" to "Lower Tester" in accordance with the standard practices. Except in some MSC's that were not Visio figures. Removed all "N/A" sections. For the RX tests I moved the Tester packet definition into the Test Procedure from the pass verdict since the IUT just receives it. Added an initial condition to TP/BNEP/CTRL/BV-01-C. Fixed the fail verdict of TP/BNEP/CTRL/BV-07-C to say "unsuccessful". Fixed the fail verdict of TP/BNEP/RX-C-D/BV-14-C. Regrouped TP/BNEP/CTRL/BV-19-C to be with its test grouping. Modified all the TX tests such that the data payload is optional to send: TP/BNEP/TX-TYPE-0/BV-20-C

Publication Number	Revision Number	Date	Comments
			TP/BNEP/TX-C/BV-21-C TP/BNEP/TX-C-S/BV-22-C TP/BNEP/TX-C-D/BV-23-C Reworded Fail verdict per Miles' comment. Used the current template wording. TSE 5269: Replaced the value and description of Destination Address and Source Address with the wording used in the BNEP Spec in TP/BNEP/TX-TYPE-0/BV-20-C, TP/BNEP/TX-C-S/BV-22-C, TP/BNEP/TX-C-D/BV-23-C, TP/BNEP/RX-TYPE-0/BV-11-C, TP/BNEP/RX-C-S/BV-13-C, TP/BNEP/RX-C-D/BV-14-C, TP/BNEP/RX-TYPE-0/BV-15-C, TP/BNEP/RX-TYPE-0/BV-16-C, TP/BNEP/RX-TYPE-0/BV-17-C, and TP/BNEP/RX-TYPE-0/BV-18-C.
	1.0.4r02	2013-11-13	BQRB Review: Change history for TSEs was missing, replaced.
4	1.0.4	2013-12-03	Prepare for Publication
	1.0.5r00	2015-04-24	TSE 6094: Updated extension header to BNEP_EXTENSION_CONTROL in TP/BNEP/CTRL/BV-10-C
	1.0.5r01	2015-06-03	Reviewed by Magnus Sommansson and Alicia Courtney. Converted to current document template Deleted Fail verdicts that lacked conditions other than the Pass verdict failing to happen. Added Section 3.1.3 on Verdict Conventions Other editorial updates towards current standards
	1.0.5r02	2015-06-04	Removed pre-adoption revision history entries. Fixed broken references. Further minor editorial updates.
5	1.0.5	2015-07-14	Prepared for TCRL 2015-1 publication
	1.0.6r00	2015-10-21	TSE 6489: Added new row to test case mapping to map TP/BNEP/TX-C-D/BV-23-C correctly. TSE 6739: Corrected test case mapping from Table 1 to Table 1a for all tests.
6	1.0.6	2015-12-22	Prepared for TCRL 2015-2 publication
	1.0.7r00	2016-10-10	Converted to new Test Case ID conventions as defined in TSTO v4.1
	1.0.7r01	2016-11-17	Removed role designator following BTI discussion
7	1.0.7	2016-12-13	Approved by BTI. Prepared for TCRL 2016-2 publication.
	1.0.8r00	2017-04-03	TSE 8891: Converted to current template. Fixed test case heading formats.

Publication Number	Revision Number	Date	Comments
	1.0.8r01	2017-05-08	Further editorial updates as a result of TSE 8891. Section 4.1.1(Test Case Identification Conventions), added new row for Feature Identifier in Table 4.1 (BNEP TC Feature Naming Conventions). Revised header row for Spec Identifier.
8	1.0.8	2017-07-03	Approved by BTI. Prepared for TCRL 2017-1 publication.
	p9r00–r08	2021-06-04 – 2021-12-01	TSE 17012 (rating 1): The BNEP ICS is split into a separate ICS document. Reference added. Updated TCMT section. TSE 17075 (rating 1): Editorial overhaul. Updated the TCMT section. Moved all "Notes" sections to the end of the test case per the latest template guidance. Removed unspecific Upper Tester reference in the test procedure of BNEP/CTRL/BV-07-C. Moved location of "for" in description for BNEP/RX-C/BV-12-C, BNEP/TX-C/BV-21-C, and BNEP/TX-C-S/BV-22-C. Updated TCRL accordingly. Performed template-related fixes. Updated the introduction text before the TCMT to align with the template. Updated the copyright page to align with v2 of the DNMD.
9	p9	2022-01-25	Approved by BTI on 2021-12-19. Prepared for TCRL 2021-2 publication.

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