HID over GATT Profile (HOGP)

***Bluetooth*® Test Suite**

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1 Scope

This Bluetooth document contains the Test Suite Structure (TSS) and test cases to test the implementation of the Bluetooth HID over GATT Profile 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 provisions from other publications by dated or undated reference. These references are cited at the appropriate places in the text, and the publications are listed hereinafter. Additional definitions and abbreviations can be found in [4].

[1] Test Strategy and Terminology Overview

[2] Specification of the Bluetooth System, Version 4.0 or later

[3] ICS Proforma for HID Over GATT Profile, Version 1.0

[4] HID over GATT Profile Specification, Version 1.0 or later

[5] GAP Test Suite, GAP.TS

[6] GATT Test Suite, GATT.TS

[7] SM Test Suite, SM.TS

[8] HID Service Specification, Version 1.0 or later

[9] Battery Service Specification, Version 1.0

[10] Device Information Service, Version 1.1

[11] Scan Parameters Service Specification, Version 1.0

[12] Scan Parameters Profile Specification, Version 1.0

[13] SCPP Test Suite, SCPP.TS

[14] HIDS Test Suite, HIDS.TS

[15] IXIT Proforma for HID Over GATT Profile

[16] HID over GATT Profile Specification, Version 1.1 or later

[17] HID over GATT Profile Specification, Version 1.2

[18] HID Service Specification, Version 1.1

2.2 Definitions

In this Bluetooth document, the definitions from [1] and [2] apply.

2.3 Acronyms and abbreviations

In this Bluetooth document, the definitions, acronyms, and abbreviations from [1] and [2] apply.

3 Test Suite Structure (TSS)

3.1 Overview

The HID over GATT Profile is a client of GAP and GATT. This is illustrated in Figure 3.1.

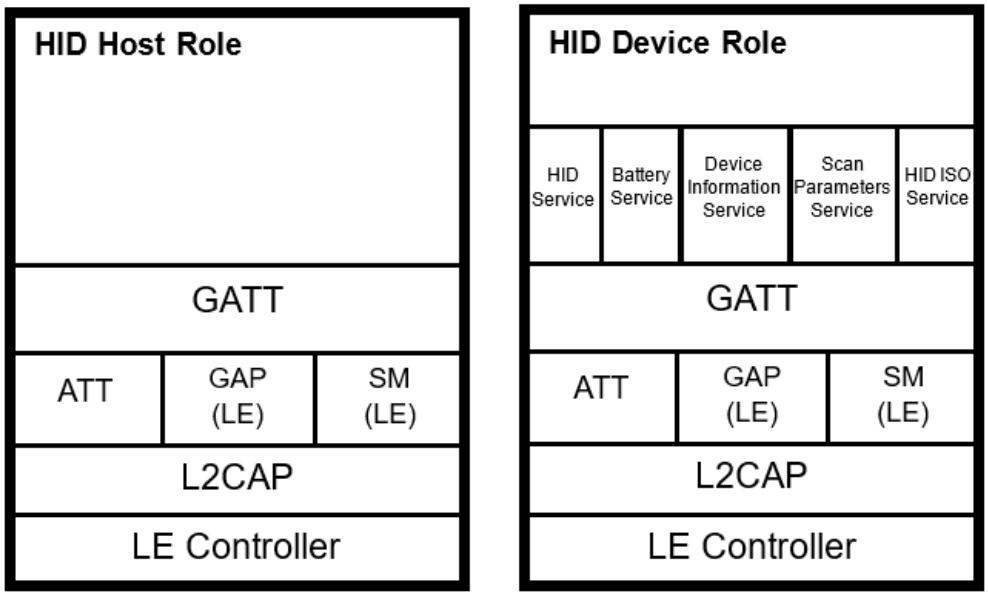


Figure 3.1: HOGP test model

3.2 Test Strategy

The test objectives are to verify functionality of the HID over GATT Profile within a Bluetooth Host and enable interoperability between Bluetooth Hosts on different devices. The testing approach covers mandatory and optional requirements in the specification and matches these to the support of the IUT as described in the ICS. Any defined test herein is applicable to the IUT if the ICS logical expression defined in the Test Case Mapping Table (TCMT) evaluates to true.

The test equipment provides an implementation of the Radio Controller and the parts of the Host needed to perform the test cases defined in this Test Suite. A Lower Tester acts as the IUT's peer device and interacts with the IUT over-the-air interface. The configuration, including the IUT, needs to implement similar capabilities to communicate with the test equipment. For some test cases, it is necessary to stimulate the IUT from an Upper Tester. In practice, this could be implemented as a special test interface, a Man Machine Interface (MMI), or another interface supported by the IUT.

This Test Suite contains Valid Behavior (BV) tests complemented with Invalid Behavior (BI) tests where required. The test coverage mirrored in the Test Suite Structure is the result of a process that started with catalogued specification requirements that were logically grouped and assessed for testability enabling coverage in defined test purposes.

3.2.1 HID over GATT Profile HID Host Testing Configuration

The following configuration is recommended for testing HID over GATT Profile HID Host IUT:

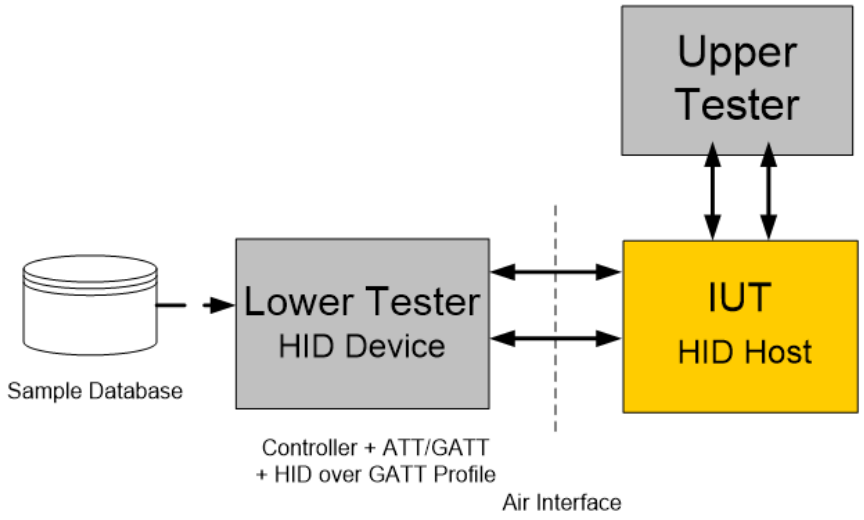


Figure 3.2: HID over GATT Profile HID Host Testing Configuration

The sample database of Characteristics used by the Lower Tester is specified in each test case.

All HID over GATT Profile HID Host test cases, which use a configuration as shown in Figure 3.2, contain test procedure descriptions and expected results. These in turn use example message syntax between the Upper tester and the IUT. Those example messages are generic; there is no normative specification for these messages. The normative specifications are the functional descriptions for the test procedures and the expected results.

In test cases where more than one alternative method of performing the test case exists, a HID Host IUT performs the test case once for each supported alternative method.

3.2.2 HID over GATT Profile HID Device Testing Configuration

The following configuration is recommended for testing HID over GATT Profile HID Device IUT:

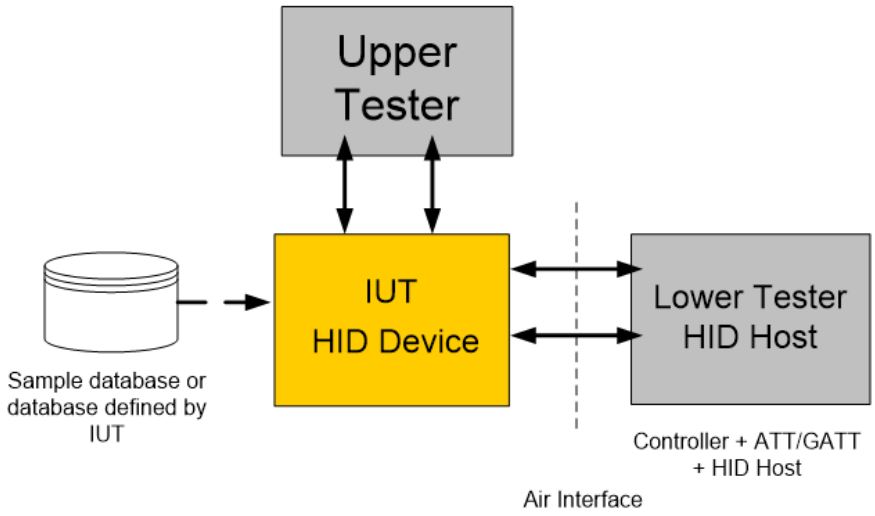


Figure 3.3: HID over GATT Profile HID Device Testing Configuration

In test cases where more than one alternative method of performing the test case exists, a HID Device IUT performs the test case once for each supported alternative method.

3.2.3 Test database requirements

The following requirements apply to the set of databases used by the Lower Tester for testing of GATT Client functionality:

- The Lower Tester includes multiple instantiations of the HID Service, including all defined characteristics.
- The Lower Tester includes one instantiation of the HID ISO Service, including all defined characteristics.

3.3 Test groups

The following test groups have been defined:

- Generic GATT Integrated Tests
- Discovery of Characteristics and Characteristic Descriptors
- Read Features
- Write Features (including HID SCI mode configuration)
- Configuration Features
- Notification Features
- HID ISO Report Host
- HID ISO Device

4 Test cases (TC)

4.1 Introduction

4.1.1 Test case identification conventions

Test cases are assigned unique identifiers per the conventions in [1]. The convention used here is:
<spec abbreviation>/<IUT role>/<class>/**<feat>**/<func>/<subfunc>/<cap>/**<xx>-<nn>-<y>**.

Additionally, testing of this specification includes tests from the GATT Test Suite [6] referred to as Generic GATT Integrated Tests (GGIT); when used, the test cases in GGIT are referred to through a TCID string using the following convention:
<spec abbreviation>/<IUT role>/<GGIT test group>/< GGIT class >/<xx>-<nn>-<y>.

Identifier Abbreviation	**Spec Identifier <spec abbreviation>**
HOGP	HID over GATT Profile
Identifier Abbreviation	**Role Identifier <IUT role>**
BH	HID over GATT Profile Boot Host Role
HD	HID over GATT Profile HID Device Role
RH	HID over GATT Profile Report Host Role
Identifier Abbreviation	**Reference Identifier <GGIT test group>**
CGGIT	Client Generic GATT Integrated Tests
SGGIT	Server Generic GATT Integrated Tests
Identifier Abbreviation	**Reference Identifier <GGIT class>**
CHA	Characteristic
DES	Descriptor
SER	Service
Identifier Abbreviation	**Class identifier <class>**
HGCF	HID over GATT Profile Configuration Features
HGDC	HID over GATT Profile Discovery of Characteristics and Characteristic Descriptors
HGDR	HID over GATT Profile Related Services Discovery
HGDS	HID over GATT Profile Discovery of Services
HGIOM	HID ISO Operation Modes
HGIPS	HID ISO Packet Structure
HGIPT	HID ISO Protocol
HGNF	HID over GATT Profile Notification Features
HGRF	HID over GATT Profile Read Features
HGWF	HID over GATT Profile Write Features

Table 4.1: HOGP TC feature naming conventions

Note: The term HID Host is used throughout this document to refer to a GATT Client which implements the HID over GATT Profile; there are two variations of the HID Host Role; the Report Host and the Boot Host. Where Report Host is used, it refers only the Report Host Role as defined in the HID over GATT Profile. Where Boot Host is used, it refers only to the Boot Host Role as defined in the HID over GATT Profile. Where HID Host is used, it refers equally to either the Report Host Role or the Boot Host Role.

4.1.2 Conformance

When conformance is claimed for a particular specification, all capabilities are to be supported in the specified manner. The mandatory 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 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 to constitute a Pass verdict. However, it is noted that 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 the Bluetooth SIG qualification tool, with 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 erratum 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 Setup preambles

The procedures defined in this section are used to achieve specific conditions on the IUT and the test equipment within the tests defined in this document. The preambles here are commonly used to establish initial conditions.

4.2.1 ATT Bearer on LE Transport

Preamble procedure:

1. Establish an LE transport connection between the IUT and the Lower Tester.
2. Establish an L2CAP channel 0x0004 between the IUT and the Lower Tester over that LE transport.

4.2.2 HID Device: Initiate Undirected Connectable mode before Notification

This is a setup procedure for the HID Device to enter the Undirected Connectable mode and accept connection from a HID Host.

- Reference

  [2] GAP 9.3.4

- Initial Condition
  - A preamble procedure defined in paragraph 4.2.1 is used to setup the LE transport and L2CAP channel. The HID Device (IUT) and the Lower Tester (HID Host) have bonded following GAP procedures.
  - The HID Device is disconnected.
  - The HID Device has been configured to accept commands from the Upper Tester to generate HID Reports.
- Preamble Procedure
  1. The Lower Tester waits for the IUT to send ADV_IND packets (GAP Undirected Connectable Mode).
  2. After receipt of either advertising packet, the Lower Tester sends CONNECT_REQ and an empty packet to the HID Device IUT.

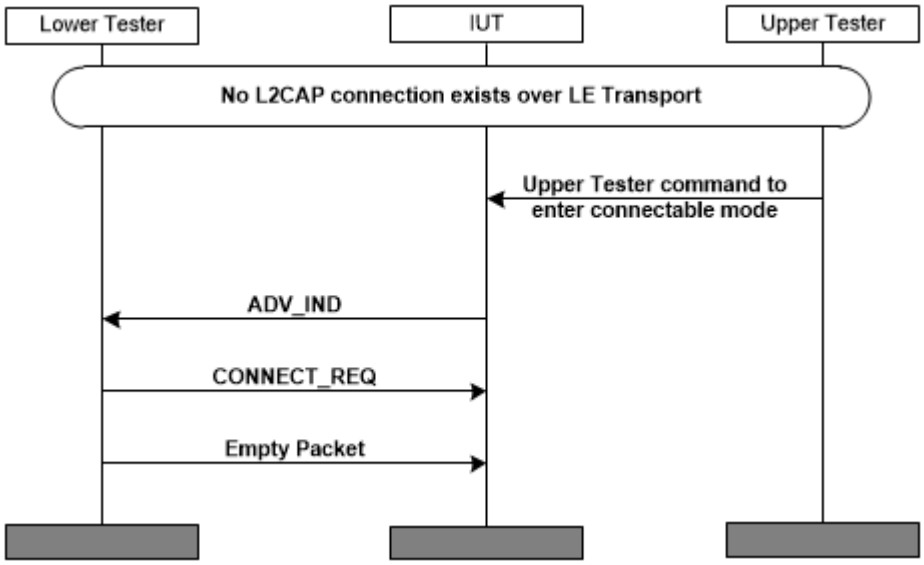


Figure 4.1: Setup preamble for HID Device: Initiate Undirected Connectable mode before Notification

4.2.3 HID Host: Initiate Connection when ready to receive Notifications

This is a setup procedure for the HID Host to initiate connection to a HID Device.

- Reference

  [2] GAP 9.3.4

- Initial Condition
  - A preamble procedure defined in paragraph 4.2.1 is used to setup the LE transport and L2CAP channel. The HID Host (IUT) and the Lower Tester (HID Device) have bonded following GAP procedures.
  - The HID Host is disconnected.
  - The HID Host has been configured to accept commands from the Upper Tester to request and receive Reports.
- Preamble Procedure
  1. The Upper Tester commands the HID Host IUT to initiate a connection.
  2. The Lower Tester sends ADV_IND packets (GAP Undirected Connectable Mode) to the HID Host IUT.
  3. The Lower Tester waits for responses from the HID Host IUT.
  4. The HID Host IUT sends a CONNECT_REQ and an empty packet to the Lower Tester.

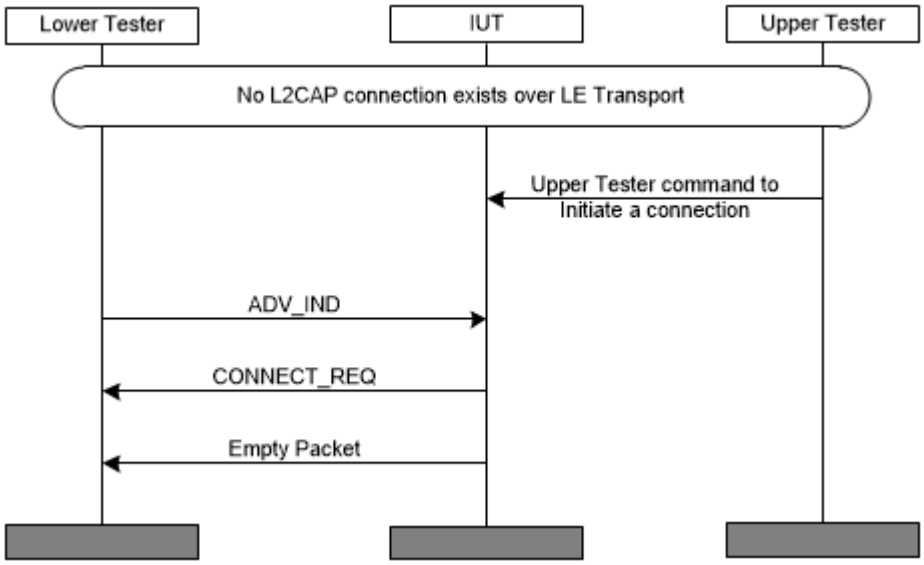


Figure 4.2: Setup preamble for HID Host: Initiate Connection when ready to receive Notifications

4.3 Generic GATT Integrated Tests

Execute the Generic GATT Integrated Tests defined in Section 6.3, Server test procedures (SGGIT), and Section 6.4, Client test procedures (CGGIT), in [6] using Table 4.2 and Table 4.3 below as input:

TCID	Service / Characteristic	Reference	Properties	Value Length (Octets)	Service Type
HOGP/RH/CGGIT/SER/BV-01-C [Service GGIT – HID Service – RH]	HID Service – RH	[4] 4.5.1	-	-	Primary Service
HOGP/BH/CGGIT/SER/BV-01-C [Service GGIT – HID Service – BH]	HID Service – BH	[4] 4.3.1	-	-	Primary Service
HOGP/RH/CGGIT/SER/BV-02-C [Service GGIT – Battery Service – RH]	Battery Service – RH	[4] 4.5.3	-	-	Primary Service
HOGP/BH/CGGIT/SER/BV-02-C [Service GGIT – Battery Service – BH]	Battery Service – BH	[4] 4.5.3	-	-	Primary Service
HOGP/RH/CGGIT/SER/BV-03-C [Service GGIT – Device Information Service – RH]	Device Information Service – RH	[4] 4.5.2	-	-	Primary Service
HOGP/BH/CGGIT/SER/BV-03-C [Service GGIT – Device Information Service – BH]	Device Information Service – BH	[4] 4.5.2	-	-	Primary Service
HOGP/RH/CGGIT/SER/BV-04-C [Service GGIT – HID ISO Service]	HID ISO Service	[16] 4.5.4	-	-	Primary Service, Unique
HOGP/RH/CGGIT/CHA/BV-01-C [Characteristic GGIT – Report Map – RH]	Report Map Characteristic – RH	[4] 4.6.1.1	0x02 (Read)	Variable	-
HOGP/RH/CGGIT/CHA/BV-02-C [Characteristic GGIT – HID Information – RH]	HID Information Characteristic – RH	[4] 4.6.1.4, [8] 2.10	0x02 (Read)	4	-
HOGP/RH/CGGIT/CHA/BV-03-C [Characteristic GGIT – HID Control Point]	HID Control Point Characteristic	[4] 4.6.1.3	0x04 (Write Without Response)	Skip	-
HOGP/RH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Protocol Mode – RH]	Protocol Mode Characteristic – RH	[4] 4.6.1.5	0x06 (Read, Write Without Response)	Skip	-

TCID	Service / Characteristic	Reference	Properties	Value Length (Octets)	Service Type
HOGP/BH/CGGIT/CHA/BV-01-C [Characteristic GGIT – Protocol Mode – BH]	Protocol Mode Characteristic – BH	[4] 4.6.1.5	0x06 (Read, Write Without Response)	Skip	-
HOGP/BH/CGGIT/CHA/BV-02-C [Characteristic GGIT – Boot Keyboard Input Report – BH]	Boot Keyboard Input Report Characteristic – BH	[4] 4.4.1.2	0x1A (Read, Write, Notify)	Variable	-
HOGP/BH/CGGIT/CHA/BV-03-C [Characteristic GGIT – Boot Keyboard Output Report – BH]	Boot Keyboard Output Report Characteristic – BH	[4] 4.4.1.3	0x0E (Read, Write, Write Without Response)	Variable	-
HOGP/BH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Boot Mouse Input Report – BH]	Boot Mouse Input Report – BH	[4] 4.4.1.4	0x0A (Read, Write)	Variable	-
HOGP/RH/CGGIT/CHA/BV-05-C [Characteristic GGIT – Battery Level – RH]	Battery Level Characteristic – RH	[4] 4.6.3.1	0x12 (Read, Notify)	1	-
HOGP/BH/CGGIT/CHA/BV-05-C [Characteristic GGIT – Battery Level – BH]	Battery Level Characteristic – BH	[4] 4.4.3.1	0x12 (Read, Notify)	1	-
HOGP/RH/CGGIT/CHA/BV-06-C [Characteristic GGIT – PnP ID – RH]	PnP ID Characteristic – RH	[4] 4.5.2, 4.6.2.1	0x02 (Read)	7	-
HOGP/BH/CGGIT/CHA/BV-06-C [Characteristic GGIT – PnP ID – BH]	PnP ID Characteristic – BH	[4] 4.5.2, 4.6.2.1	0x02 (Read)	7	-
HOGP/RH/CGGIT/CHA/BV-07-C [Characteristic GGIT – HID ISO Properties]	HID ISO Properties characteristic	[16] 4.6.4.1	0x02 (Read)	9–19	-
HOGP/RH/CGGIT/CHA/BV-08-C [Characteristic GGIT – LE HID Operation Mode]	LE HID Operation Mode characteristic	[16] 4.6.4.2	0x28 (Write, Indication)	Skip	-
HOGP/RH/CGGIT/DES/BV-01-C [Descriptor GGIT – External Report Reference for Report Map]	External Report Reference Characteristic Descriptors for Report Map Characteristic	[4] 4.6.1.1	0x02 (Read)	Skip	-

TCID	Service / Characteristic	Reference	Properties	Value Length (Octets)	Service Type
HOGP/RH/CGGIT/CHA/BV-09-C [Characteristic GGIT – HID SCI Information]	HID SCI Information characteristic	[17] 4.6.1.6	0x02 (Read)	Variable	Unique
HOGP/RH/CGGIT/CHA/BV-10-C [Characteristic GGIT – HID SCI Mode]	HID SCI Mode characteristic	[17] 4.6.1.7	0x12 (Read, Notify)	1	Unique

Table 4.2: Input for the GGIT Client test procedure

TCID	Service / Characteristic	Reference	Properties	Value Length (Octets)	Service Type
HOGP/HD/SGGIT/SER/BV-01-C [Service GGIT – HID Service – Single Instance]	HID Service – Single Instance	[4] 3.1	-	-	Primary Service, Unique
HOGP/HD/SGGIT/SER/BV-02-C [Service GGIT – HID Service – Multiple Instances]	HID Service – Multiple Instances	[4] 2.5, 3.1	-	-	Primary Service, Multiple
HOGP/HD/SGGIT/SER/BV-03-C [Service GGIT – Battery Service]	Battery Service	[4] 3.2	-	-	Primary Service
HOGP/HD/SGGIT/SER/BV-04-C [Service GGIT – Device Information Service]	Device Information Service	[4] 3.3	-	-	Primary Service, Unique
HOGP/HD/SGGIT/SER/BV-05-C [Service GGIT – Scan Parameters Service]	Scan Parameters Service	[4] 3.4	-	-	Primary Service, Unique
HOGP/HD/SGGIT/SER/BV-06-C [Service GGIT – HID ISO Service]	HID ISO Service	[16] 6.4, 4.5.4	-	-	Primary Service, Unique
HOGP/HD/SGGIT/CHA/BV-01-C [Characteristic GGIT – HID ISO Properties]	HID ISO Properties characteristic	[16] 6.5	0x02 (Read)	9–19	-
HOGP/HD/SGGIT/CHA/BV-02-C [Characteristic GGIT – LE HID Operation Mode]	LE HID Operation Mode characteristic	[16] 6.5, 6.3	0x08 (Write)	Skip	-
HOGP/HD/SGGIT/CHA/BV-03-C [Characteristic GGIT – LE HID Operation Mode – Indication]	LE HID Operation Mode characteristic	[16] 6.5, 6.3	0x28 (Write, Indication)	Skip	-

Table 4.3: Input for the GGIT Server test procedure

4.4 Discovery of Characteristics and Characteristic Descriptors

The procedures defined in this Test Group verify discovery of the Characteristics and Characteristic Descriptors defined in the HID Service Specification [8], the Battery Service Specification [9] and the Device Information Service Specification [10] by a HID Host IUT, a Report Host IUT and a Boot Host IUT.

HOGP/RH/HGDC/BV-03-C [Discover Report Characteristics]

- Test Purpose

  Verify that all Report characteristic can be discovered by a Report Host IUT.

- Reference

  [4] 4.6.1.2

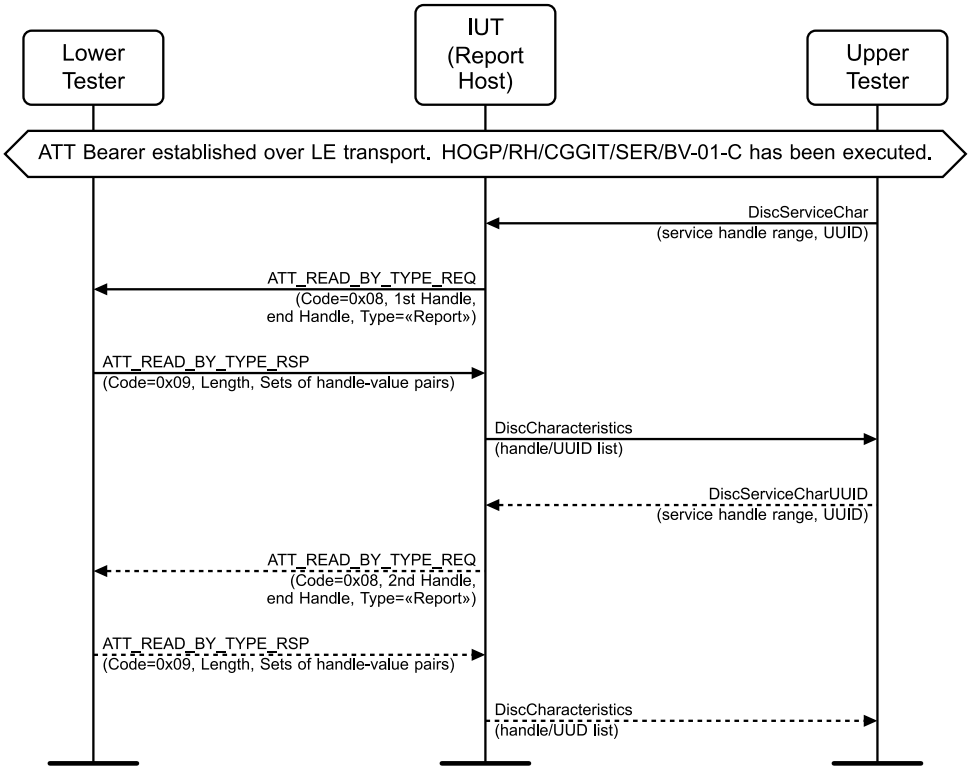
- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8].
  - The IUT has executed HOGP/RH/CGGIT/SER/BV-01-C [Service GGIT – HID Service – RH] or HOGP/BH/CGGIT/SER/BV-01-C [Service GGIT – HID Service – BH] and has saved the handle range for each instance of the HID Service available in the Lower Tester. Each instance contains one or more instances of the Report characteristic.

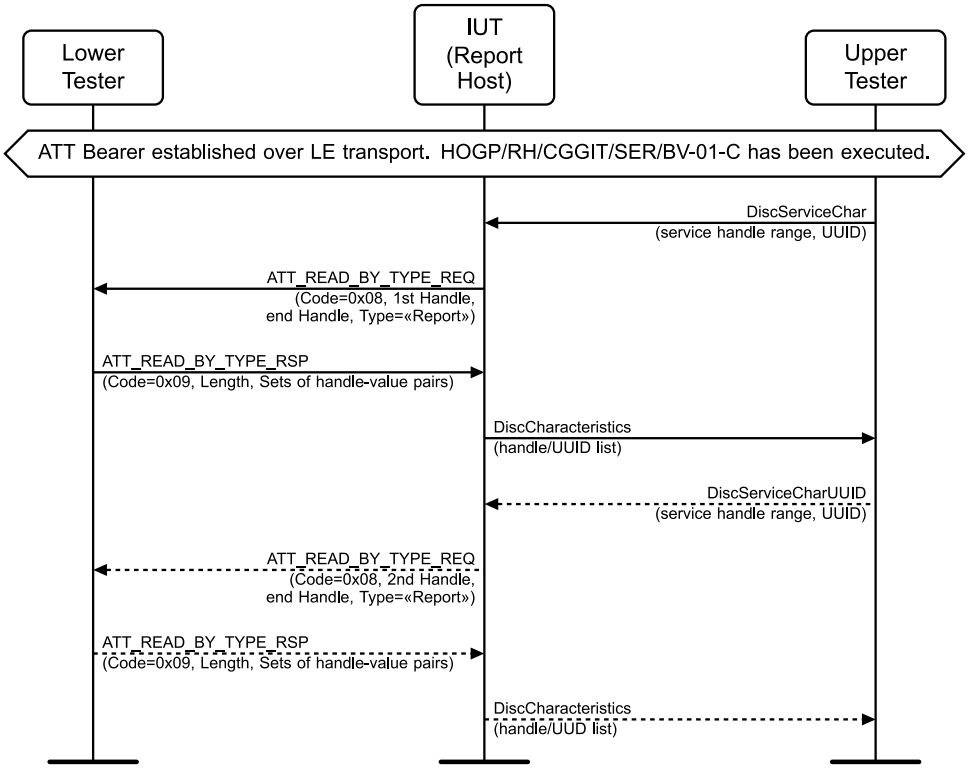
- Test Procedure

  The Upper Tester issues a command to the IUT to discover characteristics using the handle ranges returned in the initial condition. There are two alternatives:

  1. Execute the GATT Discover All Characteristics of a Service sub-procedure once for each HID Service instance, with the handle ranges specified in initial conditions.



2. Execute the GATT Discover Characteristics by UUID sub-procedure once for each HID Service instance, with the characteristic UUID set to «Report» with the database specified in [8].



- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_READ_BY_TYPE_REQ* to the Lower Tester.

  The IUT receives the *ATT_READ_BY_TYPE_RSP* from the Lower Tester and reports the attribute handle-value pair for each discovered Report characteristic discovered to the Upper Tester.

  Each attribute handle-value pair returned matches a Report characteristic attribute handle-value pair implemented in the Lower Tester.

HOGP/RH/HGDC/BV-04-C [Discover Report Characteristic Client Characteristic Configuration Descriptors]

- Test Purpose

  Verify that the Client Characteristic Configuration characteristic descriptors for all Report characteristics can be discovered by a Report Host IUT.

- Reference

  [4] 4.6.1.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8].
  - The IUT has executed HOGP/RH/HGDC/BV-03-C [Discover Report Characteristics] and has saved the handle range for each instance of the HID Service and the handles for each instance of the Report characteristic available in the Lower Tester. At least one HID Service instance has at least one instance of the Report characteristic, and each instance of the Report characteristic may have one and only one Client Characteristic Configuration Descriptor.

- Test Procedure

  The Upper Tester issues a command to the IUT to Discover All Characteristic Descriptors using the handle ranges returned after running HOGP/RH/HGDC/BV-03-C [Discover Report Characteristics] above.

  The IUT executes one pass of the GATT Discover all Characteristics Descriptors sub-procedure for each instance of the Report characteristic, using the handle ranges specified in initial conditions.

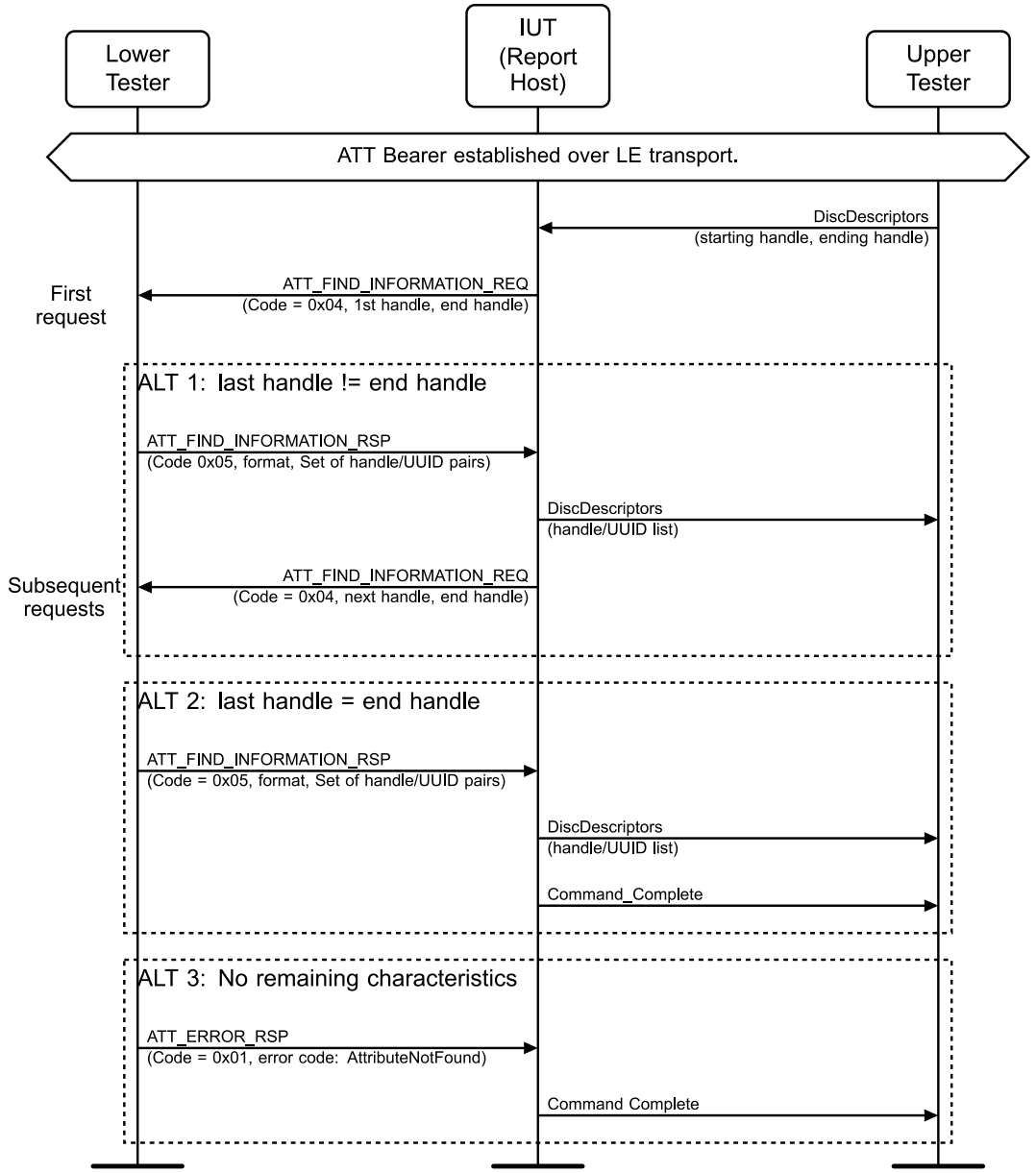


Figure 4.3: HOGP/RH/HGDC/BV-04-C [Discover Report Characteristic Client Characteristic Configuration Descriptors] MSC

- Expected Outcome

  Pass verdict

  The IUT sends *ATT_FIND_INFORMATION_REQs* to the Lower Tester until all Client Characteristic Configuration Descriptors of all Report characteristics are found.

  All attribute handle/UUID pairs are returned with UUID = «Client Characteristic Configuration» and matching attribute handle for each Client Characteristic Configuration characteristic descriptor of each Report characteristic implemented in the Lower Tester.

HOGP/RH/HGDC/BV-05-C [Discover Report Characteristic Report Reference Characteristic Descriptors]

- Test Purpose

  Verify that all Report Reference characteristic descriptors for all Report characteristics can be discovered by a Report Host IUT.

- Reference

  [4] 4.6.1.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8].
  - The IUT has executed HOGP/RH/HGDC/BV-03-C [Discover Report Characteristics] and has saved the handle range for each instance of the HID Service and each instance of the Report characteristic available in the Lower Tester. At least one HID Service instance has at least one instance of the Report characteristic, and each instance of the Report characteristic has one and only one Report Reference characteristic descriptor. Each Report Reference characteristic descriptor contains a Report ID and Report Type field.

- Test Procedure

  The Upper Tester issues a command to the IUT to Discover All Characteristic Descriptors using the handle ranges returned after running HOGP/RH/HGDC/BV-03-C [Discover Report Characteristics] above.

  The IUT executes one pass of the GATT Discover all Characteristic Descriptors sub-procedure for each instance of the Report characteristic, using the handle ranges specified in initial conditions.

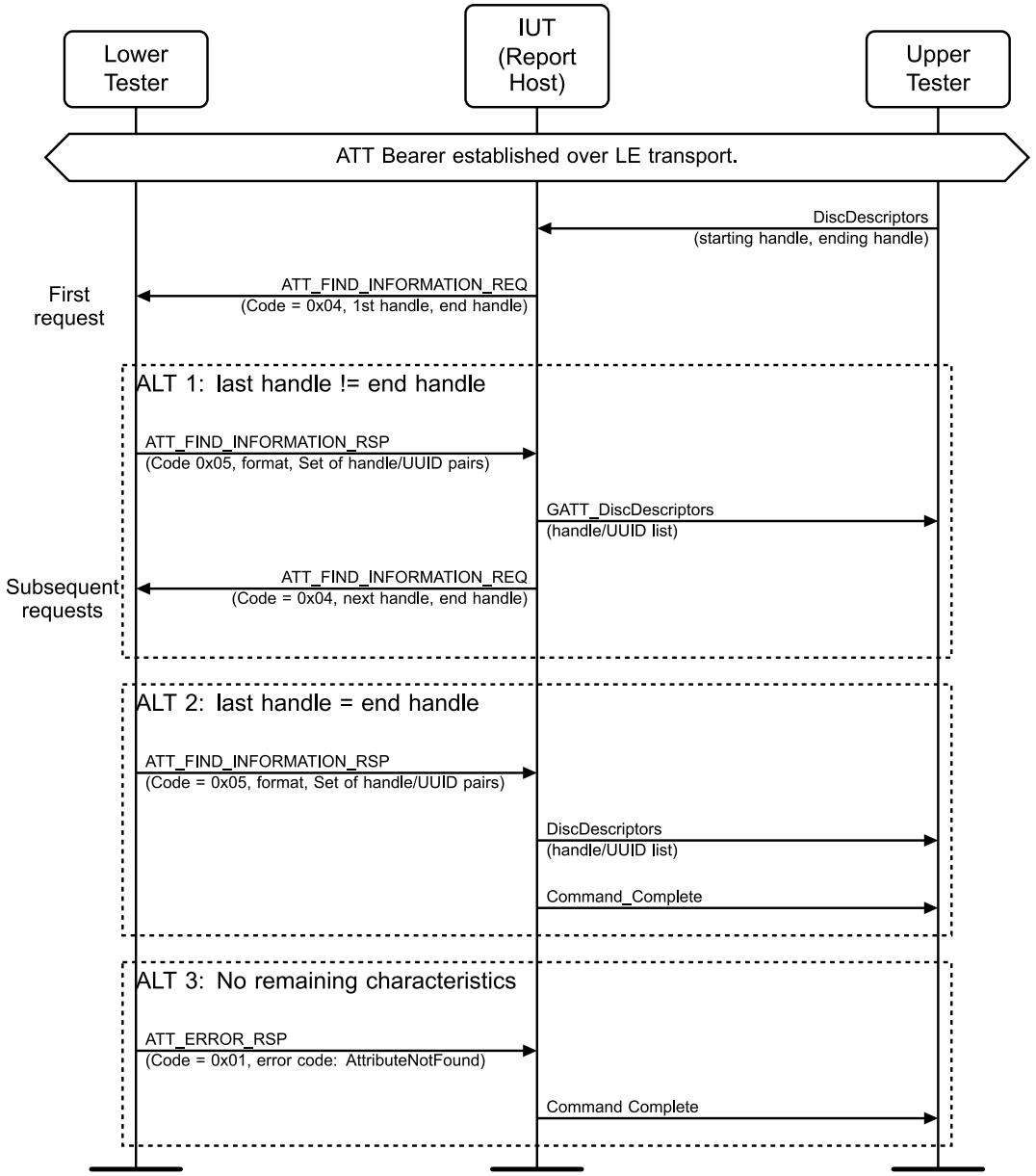


Figure 4.4: HOGP/RH/HGDC/BV-05-C [Discover Report Characteristic Report Reference Characteristic Descriptors] MSC

- Expected Outcome

  Pass verdict

  The IUT sends *ATT_FIND_INFORMATION_REQs* to the Lower Tester until all Report Reference characteristic descriptors of all Report characteristics are found.

  All attribute handle/UUID pairs are returned with UUID = «Report Reference» and matching attribute handle for each Report Reference characteristic descriptor of each Report characteristic implemented in the Lower Tester.

  The Report ID and Report Type values in each Report Reference characteristic descriptor match the values

implemented in the Lower Tester.

HOGP/BH/HGDC/BV-13-C [Discover Boot Mouse Input Report Client Characteristic Configuration Descriptor]

- Test Purpose

  Verify that the Client Characteristic Configuration characteristic descriptor for the Boot Mouse Input Report characteristic can be discovered by a Boot Host IUT.

- Reference

  [4] 4.4.1.4

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. One HID Service instance has one instance of the Boot Mouse Input Report characteristic, and the instance of the Boot Mouse Input Report characteristic has one Client Characteristic Configuration Descriptor.
  - The IUT may have executed HOGP/BH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Boot Mouse Input Report – BH] and saved the handle range for the instance of the Boot Mouse Input Report characteristic available in the Lower Tester.
  - If the IUT has not executed HOGP/BH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Boot Mouse Input Report – BH], it must have executed HOGP/BH/CGGIT/CHA/BV-06-C [Characteristic GGIT – PnP ID – BH] or HOGP/RH/CGGIT/CHA/BV-06-C [Characteristic GGIT – PnP ID – RH] and saved the handle range for the instance of the Boot Mouse Input Report characteristic available in the Lower Tester.

- Test Procedure

  The Upper Tester issues a command to the IUT to Discover All Characteristic Descriptors using the handle range returned in the initial condition.

  The IUT executes one pass of the GATT Discover all Characteristic Descriptors sub-procedure for each HID Service instance, using the handle range specified in initial conditions.

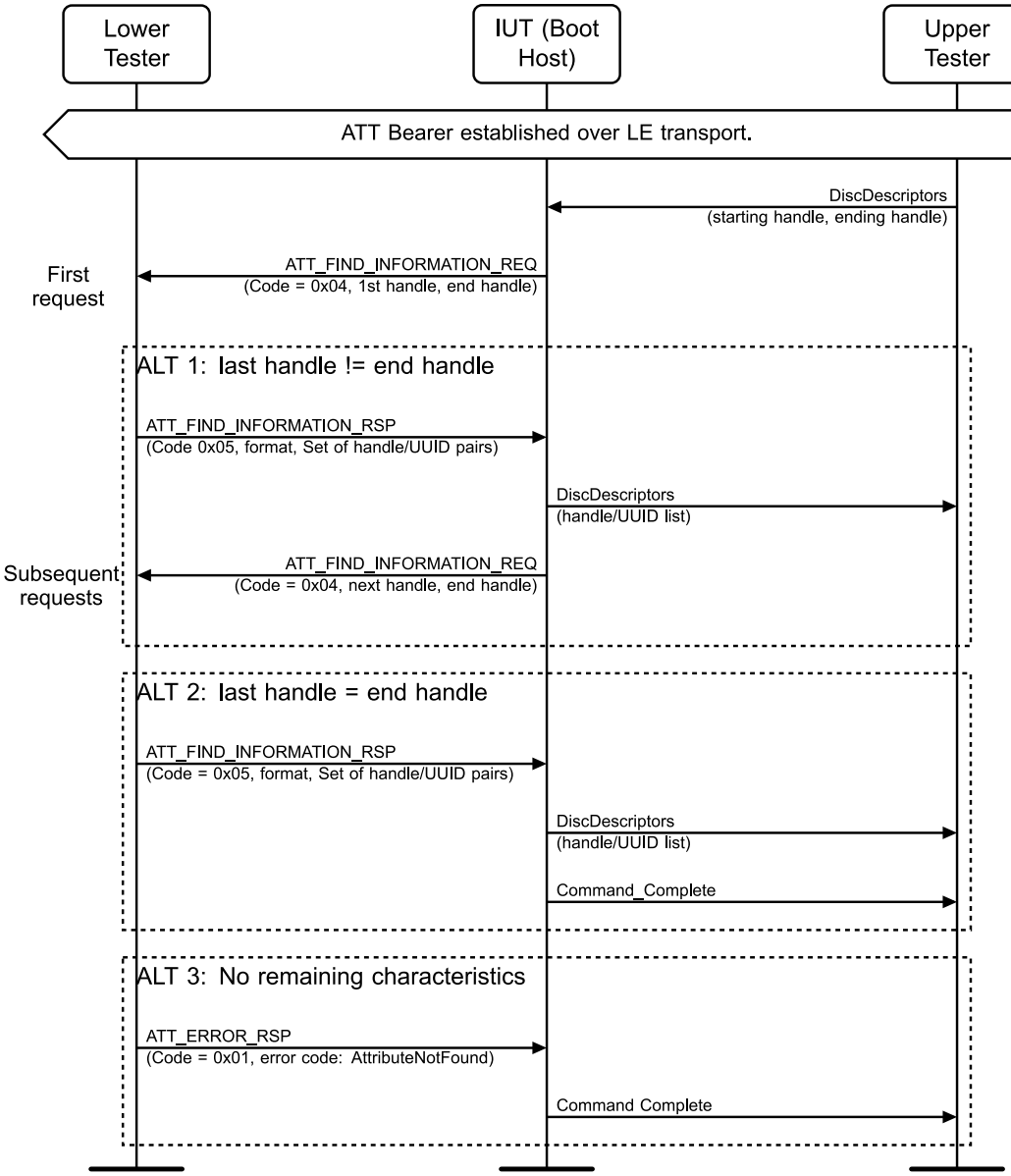


Figure 4.5: HOGP/BH/HGDC/BV-13-C [Discover Boot Mouse Input Report Client Characteristic Configuration Descriptor] MSC

- Expected Outcome

  Pass verdict

  The IUT sends *ATT_FIND_INFORMATION_REQs* to the Lower Tester until the Client Characteristic Configuration Descriptor of the Boot Mouse Input Report characteristics is found.

  One attribute handle/UUID pair is returned with UUID = «Client Characteristic Configuration» and matching attribute handle for the Client Characteristic Configuration characteristic descriptor of the Boot Mouse Input Report characteristic implemented in the Lower Tester.

4.5 Read Features

The procedures defined in this test group verify IUT implementation of the Read Features defined in the HID over GATT Profile Specification [4] by a HID Host IUT, a Report Host IUT, and a Boot Host IUT.

HOGP/RH/HGRF/BV-02-C [Read External Report Reference Characteristic Descriptors for Report Map Characteristics]

- Test Purpose

  Verify that all External Report Reference characteristic descriptors for all Report Map characteristics can be read by a Report Host IUT.

- Reference

  [4] 4.7

  [8] 2.6.3.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8] and one non-HID Service instance with a characteristic whose value is described within the Report Map characteristic value. Each HID Service instance contains a single instance of the Report Map characteristic. One instance of the Report Map characteristic descriptor contains one instance of the External Report Reference characteristic descriptor. Each characteristic UUID contained within the External Report Reference characteristic descriptors matches a non-HID Service characteristic UUID.
  - The IUT has executed HOGP/RH/CGGIT/CHA/BV-01-C [Characteristic GGIT – Report Map – RH] and has saved the attribute handle for each instance of the Report Map characteristic available in the Lower Tester.
  - The IUT has executed HOGP/RH/CGGIT/DES/BV-01-C [Descriptor GGIT – External Report Reference for Report Map] and has saved the attribute handle for each instance of the External Report Reference characteristic descriptor available in the Lower Tester.

- Test Procedure

  The Upper Tester issues a command to the IUT to read characteristic descriptors.

  Execute the GATT Read Characteristic Descriptors sub-procedure once for each handle for the External Report Reference characteristic descriptor specified in initial conditions.

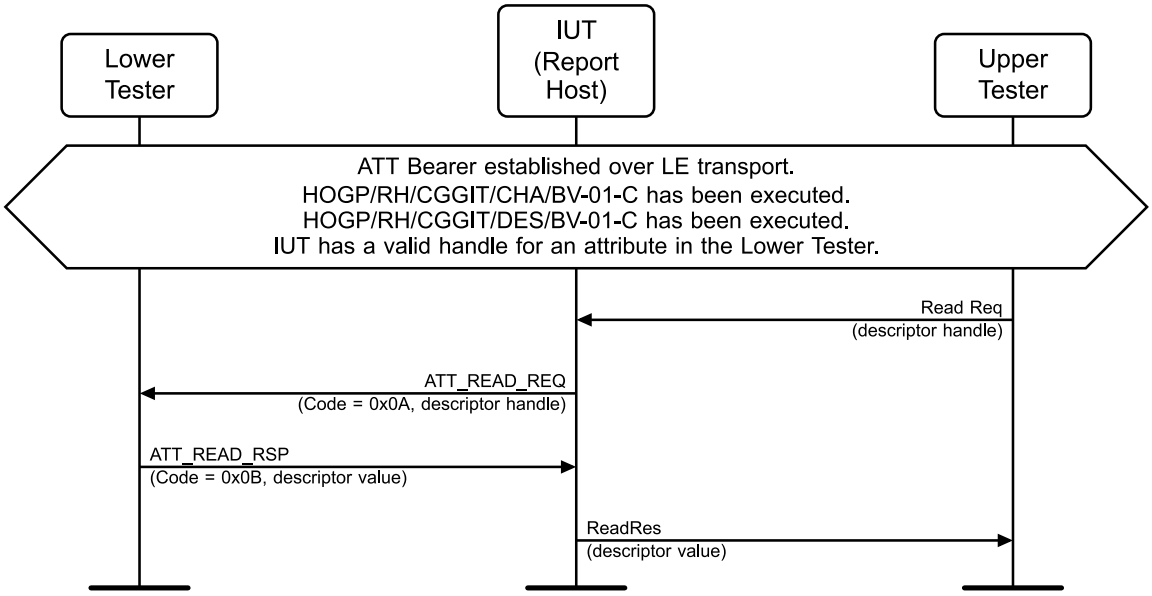


Figure 4.6: HOGP/RH/HGRF/BV-02-C [Read External Report Reference Characteristic Descriptors for Report Map Characteristics] MSC

- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_READ_REQ* commands to the Lower Tester containing the handle values specified by the Upper Tester.

  The IUT receives correctly formatted *ATT_READ_RSPs* to the Upper Tester for each instance of the External Report Reference characteristic descriptor.

  The complete characteristic descriptors reported to the Upper Tester match the values implemented in the Lower Tester.

HOGP/RH/HGRF/BV-03-C [Read Report Characteristics – Input Report]

- Test Purpose

  Verify that all Report characteristics with a Report Type of Input Report can be read by a Report Host IUT.

- Reference

  [4] 4.8

  [8] 2.5.2

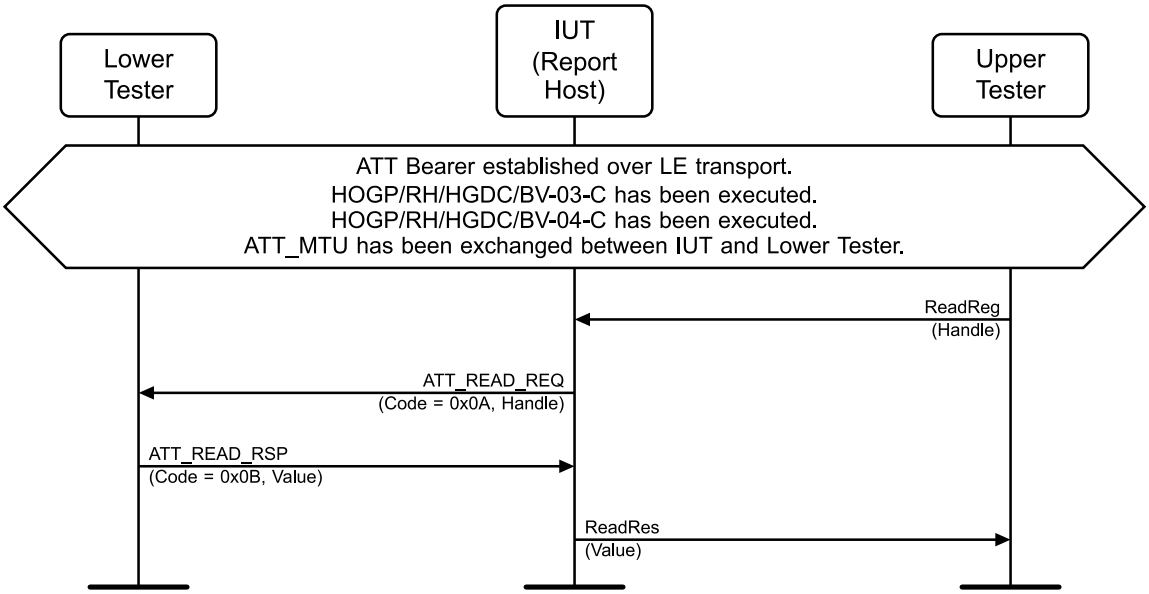
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - ATT_MTU has been exchanged between the IUT and Lower Tester
  - The IUT and Lower Tester have bonded following GAP procedures.

- The Lower Tester has two instances of the HID Service [8]. Each HID Service instance contains one instance of the Report characteristic with a single instance of the Report Reference characteristic descriptor. The HID Report is an Input Report as described via the Report Reference characteristic descriptor.
- The IUT has executed HOGP/RH/HGDC/BV-03-C [Discover Report Characteristics] and has saved the attribute handle for each instance of the Report characteristic available in the Lower Tester.
- The IUT has executed HOGP/RH/HGDC/BV-05-C [Discover Report Characteristic Report Reference Characteristic Descriptors] and has saved the attribute handle for each instance of the Report Reference characteristic descriptor available in the Lower Tester.

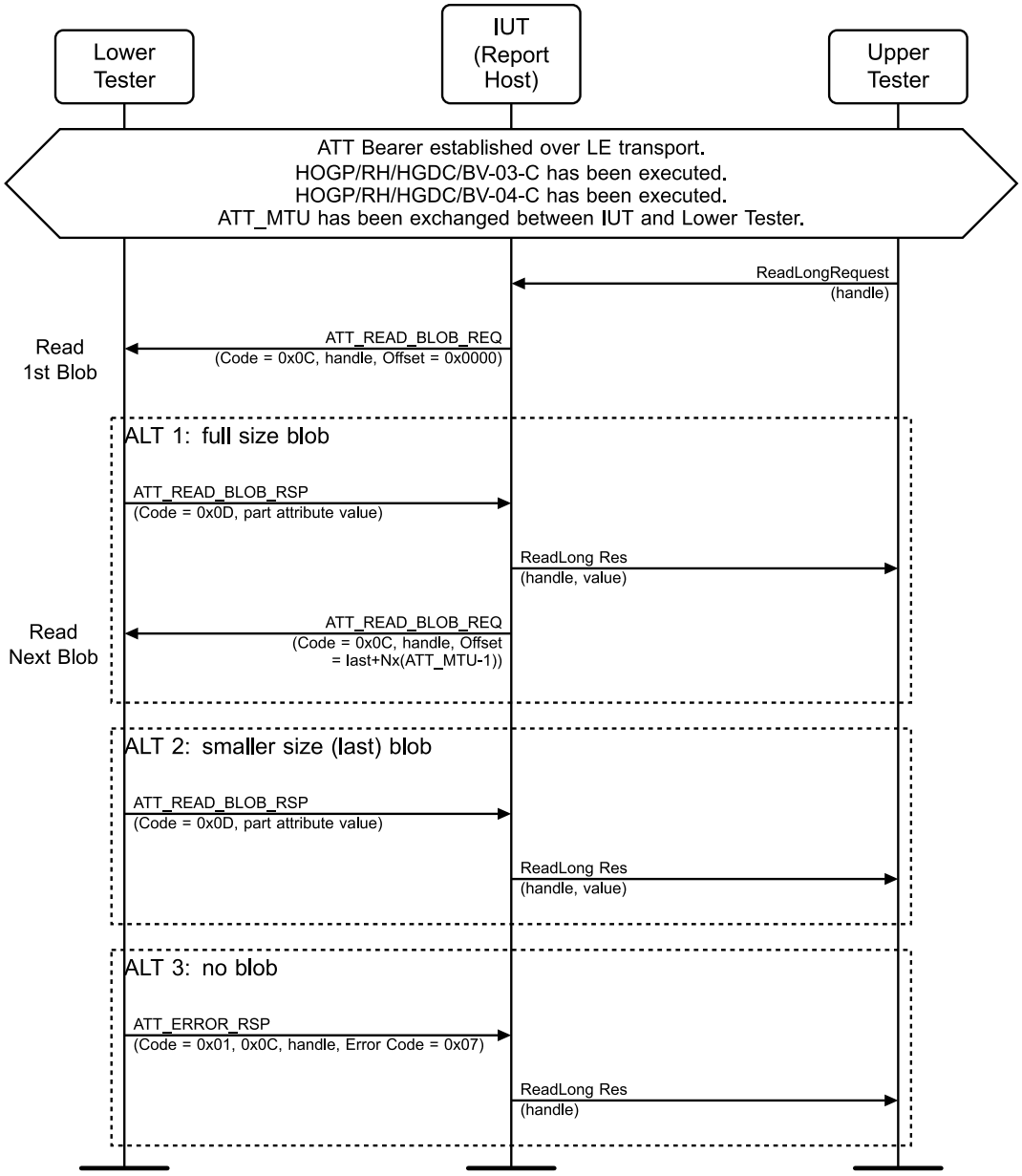
• Test Procedure

The Upper Tester issues a command to the IUT to read characteristics. There are two alternatives:

1. If the length of the Report characteristic value is less than ATT_MTU, execute the GATT Read Characteristic Value sub-procedure once for each Report characteristic, with the handle for the Report characteristic specified in initial conditions.



2. If the length of the Report characteristic value is greater than ATT_MTU, execute the GATT Read Long Characteristic Value sub-procedure once for each Report characteristic, with the handle for the Report characteristic specified in initial conditions.



- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_READ_BLOB_REQ* commands to the Lower Tester containing the handle specified by the Upper Tester.

  Note: The first request may be an *ATT_READ_REQ*; in that case the Lower Tester replies with an *ATT_READ_RSP*, and, if the characteristic value length is greater than ATT_MTU, the IUT detects that the characteristic value is long, and continue with *ATT_READ_BLOB_REQs*.

  The *ATT_READ_BLOB_REQ* specifies the handle of the characteristic value to be read and the offset value of the first octet to be read. The offset for the first request is 0x0000; subsequent offset values are sequential values of Nx(ATT_MTU-1). The IUT detects the end of the long characteristic value in either of

two ways:

- ALT2: Detect the size of the last part attribute value is less than [ATT_MTU-1].
- ALT3: Detect an error response of Invalid Offset, indicating that it has read the complete characteristic value.

Each complete Report characteristic value reported to the Upper Tester matches the value implemented in the Lower Tester.

HOGP/RH/HGRF/BV-04-C [Read Report Reference Characteristic Descriptors for Report Characteristics – Input Report]

- Test Purpose

  Verify that all Report Reference characteristic descriptors for all Report characteristics of Report Type: Input Report can be read by a Report Host IUT.

- Reference

  [4] 4.8

  [8] 2.5.3.2

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each HID Service instance contains one instance of the Report characteristic. Each instance of the Report characteristic contains one and only one instance of the Report Reference characteristic descriptor. Each Report Reference characteristic descriptor contains the value for Report Type which defines an Input Report.
  - The IUT has executed HOGP/RH/HGRF/BV-03-C [Read Report Characteristics – Input Report] and has saved the attribute handle for each instance of the Report characteristic and each instance of the Report Reference characteristic descriptor available in the Lower Tester.

- Test Procedure

  The Upper Tester issues a command to the IUT to read characteristic descriptors.

  Execute the GATT Read Characteristic Descriptors sub-procedure once for each instance of the Report Reference characteristic descriptor specified in initial conditions.

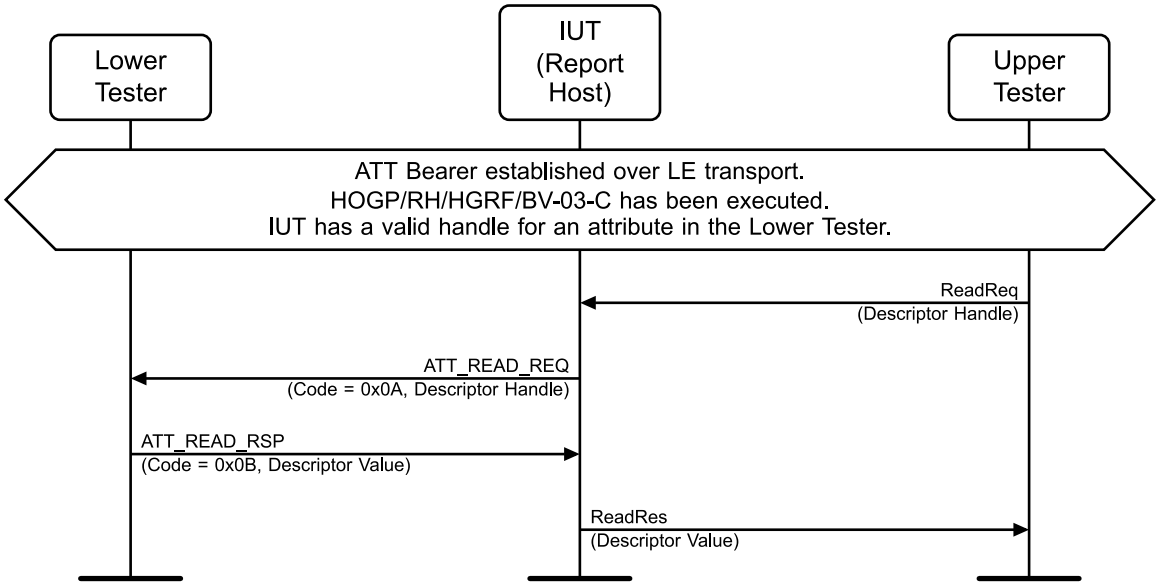


Figure 4.7: HOGP/RH/HGRF/BV-04-C [Read Report Reference Characteristic Descriptors for Report Characteristics – Input Report] MSC

- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_READ_REQ* commands to the Lower Tester containing the handle values specified by the Upper Tester.

  The IUT receives correctly formatted *ATT_READ_RSPs* to the Upper Tester for each instance of the Report Reference characteristic descriptor.

  The Report Type field of each Report Reference characteristic descriptor reported to the Upper Tester matches the value for Report Type=Input Report, and matches the values implemented in the Lower Tester.

HOGP/RH/HGRF/BV-05-C [Read Client Characteristic Configuration Descriptors for Report Characteristics – Input Report]

- Test Purpose

  Verify that all Client Characteristic Configuration characteristic descriptors for all Report characteristics of Report Type: Input Report can be read by a Report Host IUT.

- Reference

  [4] 4.8

  [8] 2.5.3.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.

- The IUT and Lower Tester have bonded following GAP procedures.
- The Lower Tester has two instances of the HID Service [8]. Each HID Service instance contains one instance of the Report characteristic. Each instance of the Report characteristic contains one and only one instance of the Client Characteristic Configuration characteristic descriptor.
- The IUT has executed HOGP/RH/HGDC/BV-03-C [Discover Report Characteristics] and has saved the attribute handle for each instance of the Report characteristic available in the Lower Tester.
- The IUT has executed HOGP/RH/HGDC/BV-04-C [Discover Report Characteristic Client Characteristic Configuration Descriptors] and has saved the attribute handle for each instance of the Client Characteristic Configuration characteristic descriptor for the Report characteristics available in the Lower Tester.
- The IUT has executed HOGP/RH/HGDC/BV-05-C [Discover Report Characteristic Report Reference Characteristic Descriptors] and has saved the attribute handle for each instance of the Report Reference characteristic descriptor where the Report Type defined in the Report Reference characteristic descriptor is an Input Report available in the Lower Tester.

• Test Procedure

The Upper Tester issues a command to the IUT to read characteristic descriptors.

Execute the GATT Read Characteristic Descriptors sub-procedure once for each instance of the Report characteristic whose Report Reference characteristic descriptor defines an Input Report as specified in initial conditions.

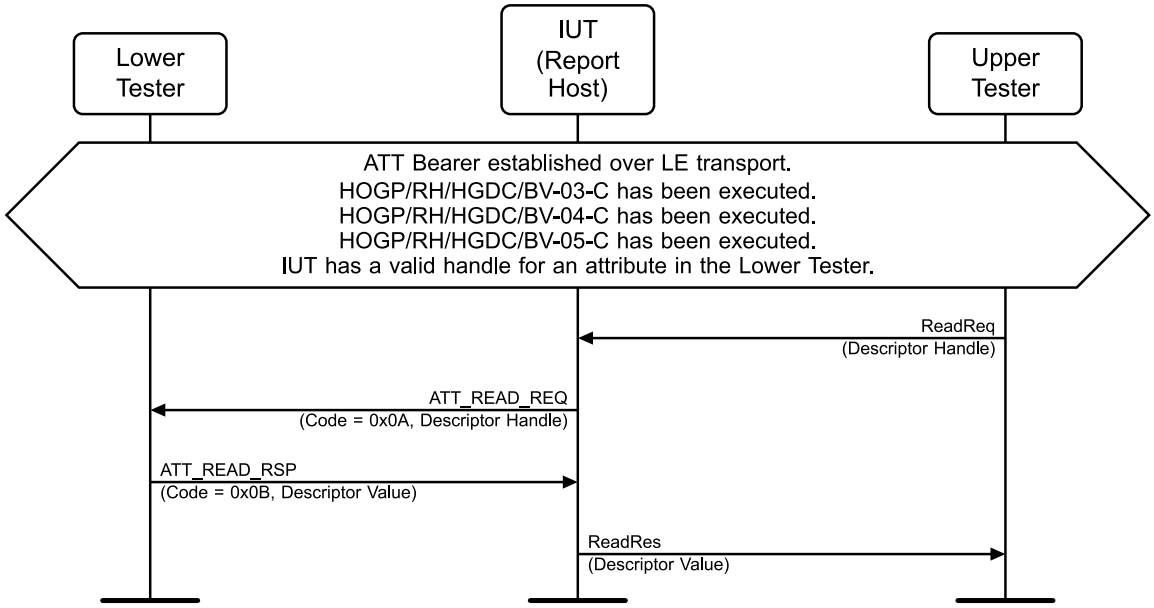


Figure 4.8: HOGP/RH/HGRF/BV-05-C [Read Client Characteristic Configuration Descriptors for Report Characteristics – Input Report] MSC

- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_READ_REQ* commands to the Lower Tester containing the attribute handle values specified by the Upper Tester.

  The IUT receives correctly formatted *ATT_READ_RSPs* to the Upper Tester for each instance of the Client Characteristic Configuration characteristic descriptor.

  The attribute value field of each Client Characteristic Configuration characteristic descriptor reported to the Upper Tester matches the values implemented in the Lower Tester.

HOGP/RH/HGRF/BV-19-C [Read Report Characteristics – Output Report]

- Test Purpose

  Verify that all Report characteristics with a Report Type of Output Report can be read by a Report Host IUT.

- Reference

  [4] 4.8

  [8] 2.5.2

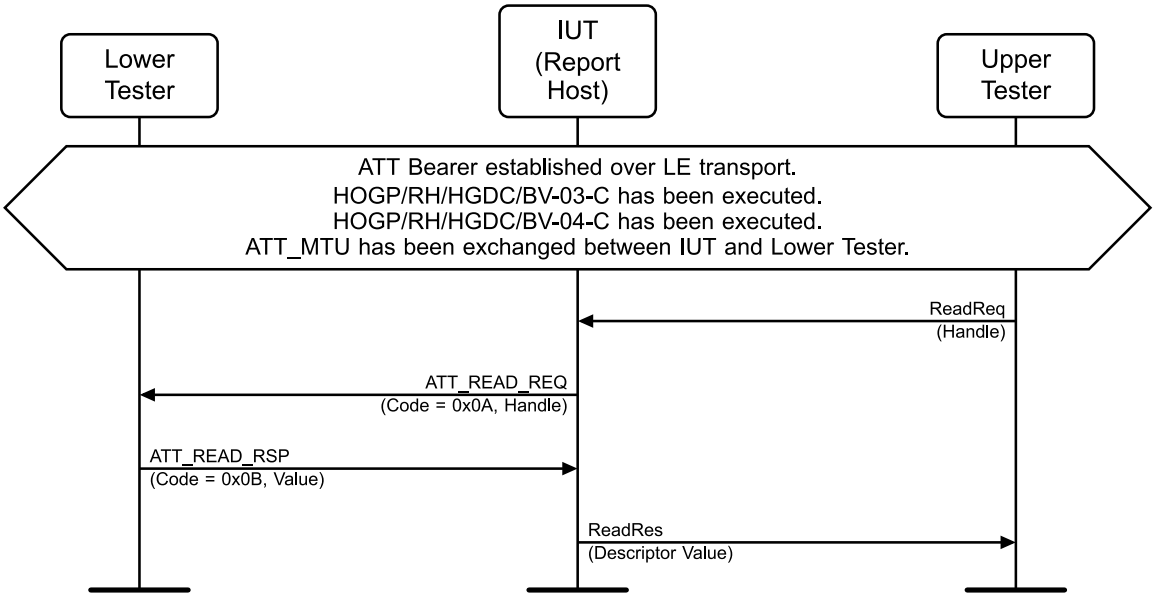
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - ATT_MTU has been exchanged between the IUT and Lower Tester.
  - The IUT and Lower Tester have bonded following GAP procedures.

- The Lower Tester has two instances of the HID Service [8]. At least one HID Service instance contains at least one instance of the Report characteristic with a single instance of the Report Reference characteristic descriptor. The HID Report is an Output Report as described via the Report Reference characteristic descriptor.
- The IUT has executed HOGP/RH/HGDC/BV-03-C [Discover Report Characteristics] and has saved the attribute handle for each instance of the Report characteristic available in the Lower Tester.
- The IUT has executed HOGP/RH/HGDC/BV-04-C [Discover Report Characteristic Client Characteristic Configuration Descriptors] and has saved the attribute handle for each instance of the Report Reference characteristic descriptor available in the Lower Tester.

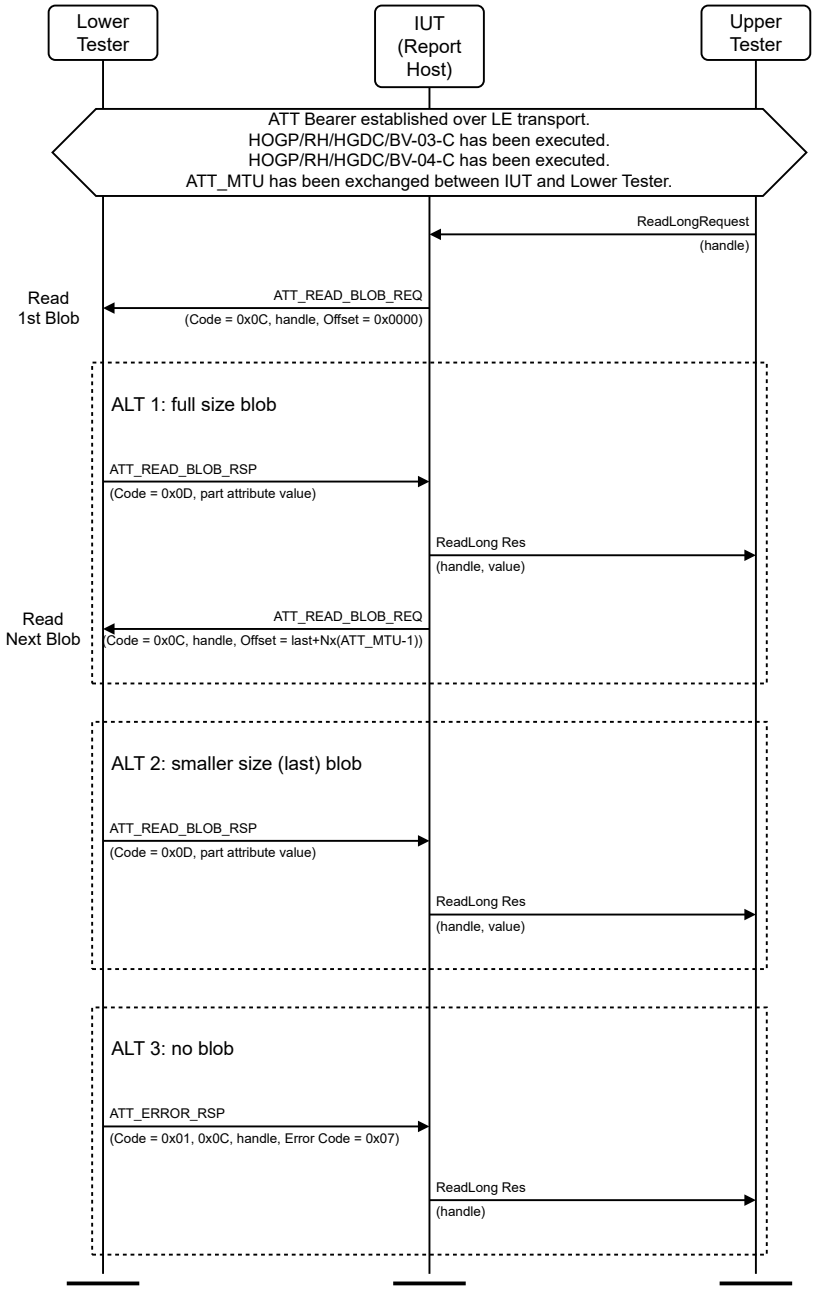
• Test Procedure

The Upper Tester issues a command to the IUT to read characteristics. There are two alternatives:

1. If the length of the HID Report characteristic value is less than ATT_MTU, execute the GATT Read Characteristic Value sub-procedure once for each Report characteristic, with the handles for the Report characteristic specified in initial conditions.



2. If the length of the HID Report characteristic value is greater than ATT_MTU, execute the GATT Read Long Characteristic Value sub-procedure once for each Report characteristic, with the handle for the Report characteristic specified in initial conditions.



- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted ATT_READ_BLOB_REQ commands to the Lower Tester containing the handle specified by the Upper Tester.

Note: The first request may be an *ATT_READ_REQ*; in that case the Lower Tester replies with an *ATT_READ_RSP*, and, if the characteristic value length is greater than ATT_MTU, the IUT detects that the characteristic value is long, and continue with ATT_READ_BLOB_REQs.

The ATT_READ_BLOB_REQ specifies the handle of the characteristic value to be read and the offset value of the first octet to be read. The offset for the first request is 0x0000; subsequent offset values are sequential values of Nx(ATT_MTU-1). The IUT detects the end of the long characteristic value in either of two ways:

- ALT2: Detect the size of the last part attribute value is less than [ATT_MTU-1].
- ALT3: Detect an error response of Invalid Offset, indicating that it has read the complete characteristic value.

Each complete Report characteristic value reported to the Upper Tester matches the value implemented in the Lower Tester.

HOGP/RH/HGRF/BV-06-C [Read Report Reference Characteristic Descriptors for Report Characteristics – Output Report]

- Test Purpose

  Verify that all Report Reference characteristic descriptors for all Report characteristics of Report Type: Output Report can be read by a Report Host IUT.

- Reference

  [4] 4.8

  [8] 2.5.3.2

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each HID Service instance contains one instance of the Report characteristic. Each instance of the Report characteristic contains one and only one instance of the Report Reference characteristic descriptor. Each Report Reference characteristic descriptor contains the value for Report Type which defines an Output Report.
  - The IUT has executed HOGP/RH/HGRF/BV-19-C [Read Report Characteristics – Output Report] and has saved the attribute handle for each instance of the Report characteristic and each instance of the Report Reference characteristic descriptor available in the Lower Tester.

- Test Procedure

  The Upper Tester issues a command to the IUT to read characteristic descriptors.

  Execute the GATT Read Characteristic Descriptors sub-procedure once for each instance of the Report Reference characteristic descriptor specified in initial conditions.

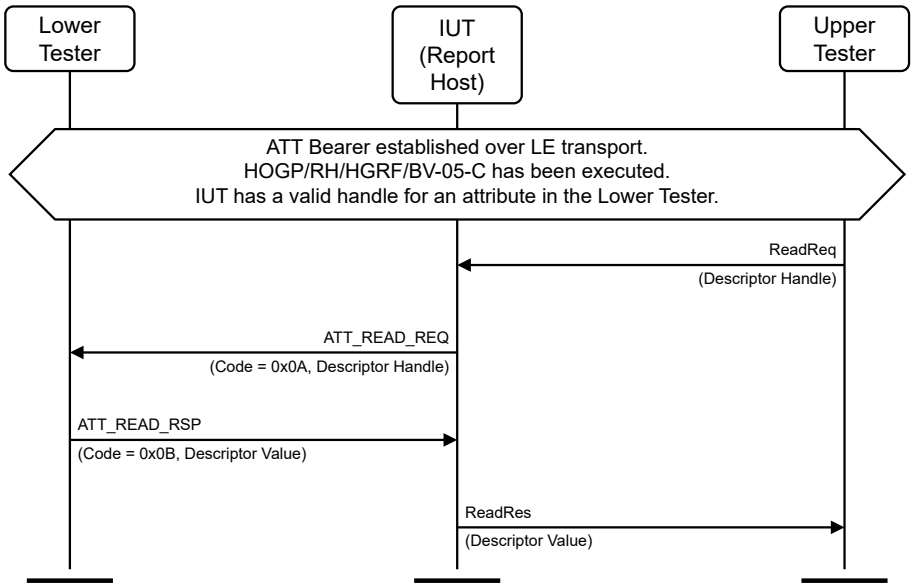


Figure 4.9: HOGP/RH/HGRF/BV-06-C [Read Report Reference Characteristic Descriptors for Report Characteristics – Output Report] MSC

- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_READ_REQ* commands to the Lower Tester containing the handle values specified by the Upper Tester.

  The IUT receives correctly formatted *ATT_READ_RSPs* to the Upper Tester for each instance of the Report Reference characteristic descriptor.

  The Report Type field of each Report Reference characteristic descriptor reported to the Upper Tester matches the value for Report Type= Output Report, and matches the values implemented in the Lower Tester.

HOGP/RH/HGRF/BV-07-C [Read Report Characteristics – Feature Report]

- Test Purpose

  Verify that all Report characteristics with a Report Type of Feature Report can be read by a Report Host IUT.

- Reference

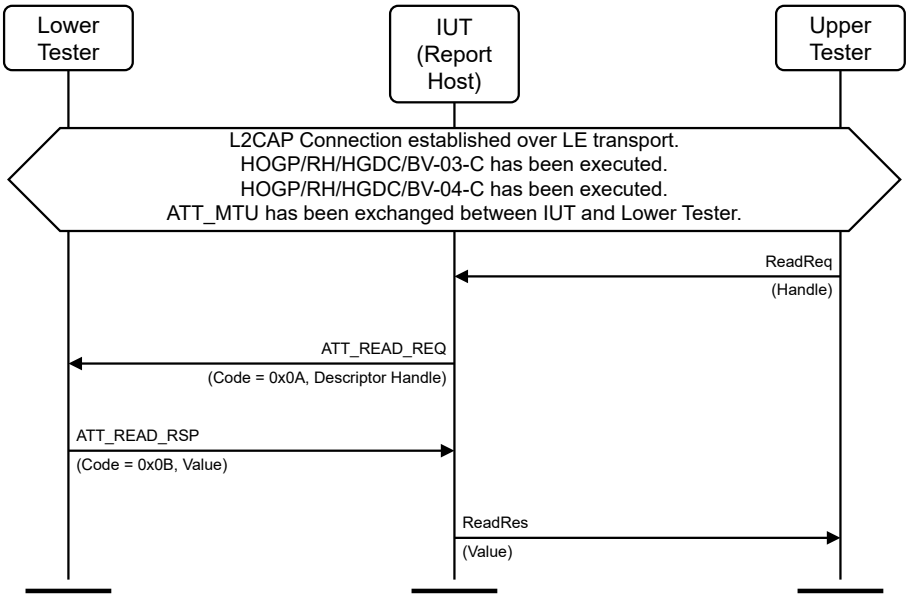
  [4] 4.8

[8] 2.5.2

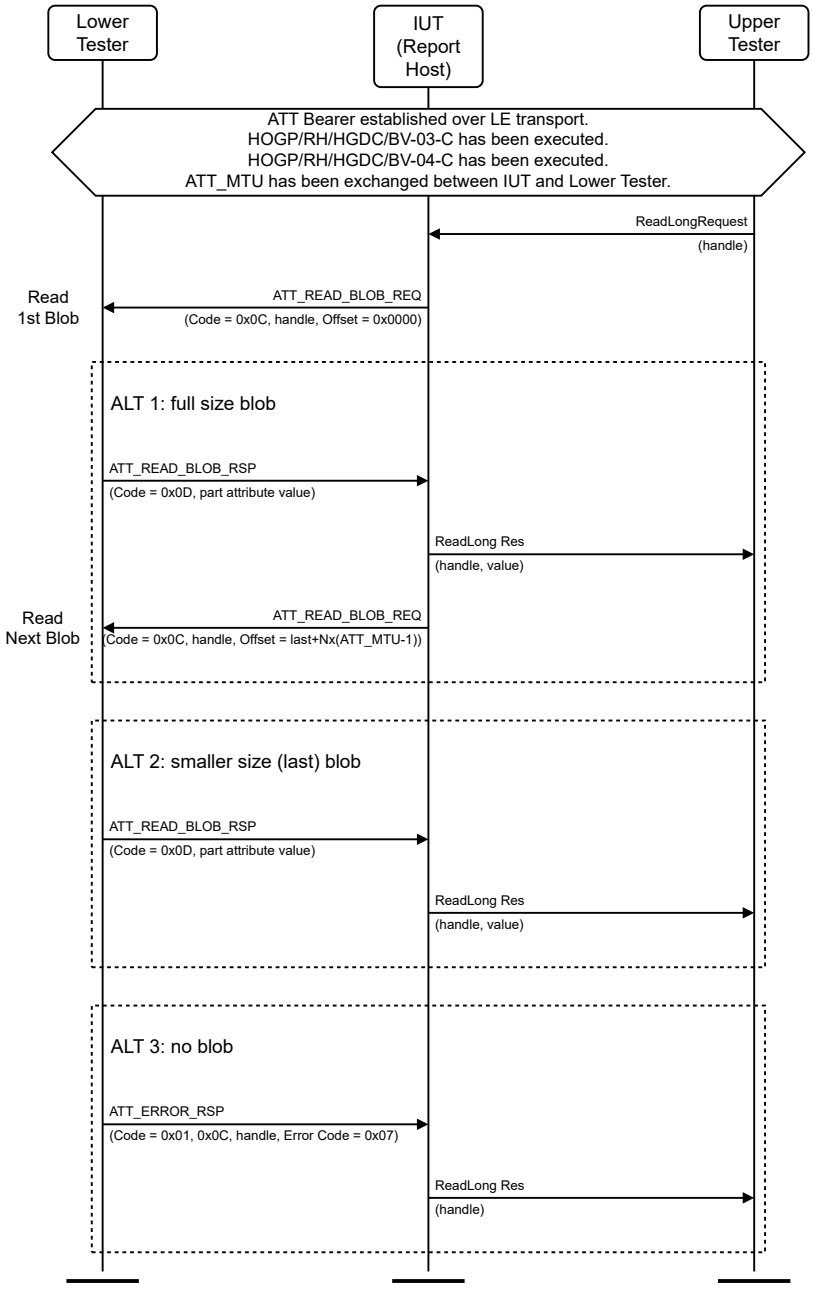
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - ATT_MTU has been exchanged between the IUT and Lower Tester.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each HID Service instance contains one instance of the Report characteristic, each with a single instance of the Report Reference characteristic descriptor. Each Report characteristic is a Feature Report as defined by the Report Reference characteristic descriptor.
  - The IUT has executed HOGP/RH/HGDC/BV-03-C [Discover Report Characteristics] and has saved the attribute handle for each instance of the Report characteristic available in the Lower Tester.
  - The IUT has executed HOGP/RH/HGDC/BV-04-C [Discover Report Characteristic Client Characteristic Configuration Descriptors] and has saved the attribute handle for each instance of the Report Reference characteristic descriptor available in the Lower Tester.
- Test Procedure

  The Upper Tester issues a command to the IUT to read characteristics. There are two alternatives:

  1. If the length of the HID Report characteristic value is less than ATT_MTU, execute the GATT Read Characteristic Value sub-procedure once for each Report characteristic, with the handle for the Report characteristic specified in initial conditions.



2. If the length of the HID Report characteristic value is greater than ATT_MTU, execute the GATT Read Long Characteristic Value sub-procedure once for each Report characteristic, with the handle for the Report characteristic specified in initial conditions.



- Expected Outcome

  Pass verdict

The IUT sends correctly formatted ATT_READ_BLOB_REQ commands to the Lower Tester containing the handle specified by the Upper Tester.

Note: The first request may be an *ATT_READ_REQ*; in that case the Lower Tester replies with an *ATT_READ_RSP*, and if the characteristic value length is greater than ATT_MTU, the IUT detects that the characteristic value is long, and continue with ATT_READ_BLOB_REQs.

The ATT_READ_BLOB_REQ specifies the handle of the characteristic value to be read and the offset value of the first octet to be read. The offset for the first request is 0x0000; subsequent offset values are sequential values of Nx(ATT_MTU-1). The IUT detects the end of the long characteristic value in either of two ways:

- ALT2: Detect the size of the last part attribute value is less than [ATT_MTU-1].
- ALT3: Detect an error response of Invalid Offset, indicating that it has read the complete characteristic value.

Each complete Report characteristic value reported to the Upper Tester matches the value implemented in the Lower Tester.

HOGP/RH/HGRF/BV-08-C [Read Report Reference Characteristic Descriptors for Report Characteristics – Feature Report]

- Test Purpose

  Verify that all Report Reference characteristic descriptors for all Report characteristics of Report Type: Feature Report can be read by a Report Host IUT.

- Reference

  [4] 4.8

  [8] 2.5.3.2

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each HID Service instance contains one instance of the Report characteristic. Each instance of the Report characteristic contains one and only one instance of the Report Reference characteristic descriptor. Each Report Reference characteristic descriptor contains the value for Report Type which defines a Feature Report.
  - The IUT has executed HOGP/RH/HGRF/BV-07-C [Read Report Characteristics – Feature Report] and has saved the attribute handle for each instance of the Report characteristic and each instance of the Report Reference characteristic descriptor available in the Lower Tester.

- Test Procedure

  The Upper Tester issues a command to the IUT to read characteristic descriptors.

  Execute the GATT Read Characteristic Descriptors sub-procedure once for each instance of the Report

Reference characteristic descriptor specified in initial conditions.

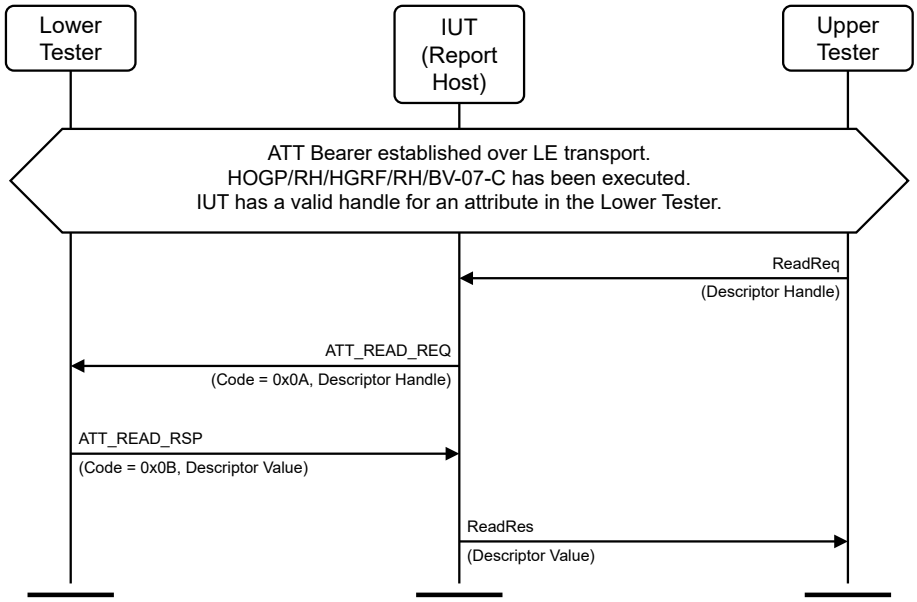


Figure 4.10: HOGP/RH/HGRF/BV-08-C [Read Report Reference Characteristic Descriptors for Report Characteristics – Feature Report] MSC

- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_READ_REQ* commands to the Lower Tester containing the handle values specified by the Upper Tester.

  The IUT receives correctly formatted *ATT_READ_RSPs* to the Upper Tester for each instance of the Report Reference characteristic descriptor.

  The Report Type field of each Report Reference characteristic descriptor reported to the Upper Tester matches the value for Report Type= Feature Report, and matches the values implemented in the Lower Tester.

4.5.1 Read Protocol Mode Characteristics (Get Protocol Mode Command)

- Test Purpose

  Verify that all Protocol Mode characteristics can be read by a HID Host IUT.

- Test Case Configuration

Test Case
HOGP/RH/HGRF/BV-18-C [Read Protocol Mode Characteristics (Get Boot Protocol Mode Command) – RH]
HOGP/BH/HGRF/BV-18-C [Read Protocol Mode Characteristics (Get Boot Protocol Mode Command) – BH]

Table 4.4: Read Protocol Mode Characteristics (Get Protocol Mode Command) test cases

- Reference

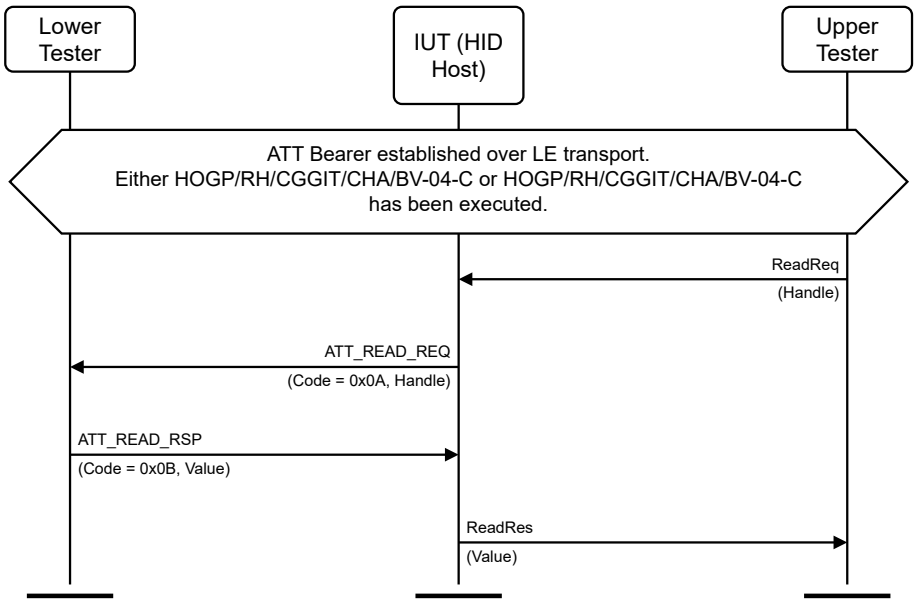
  [4] 4.11

  [8] 2.4.1

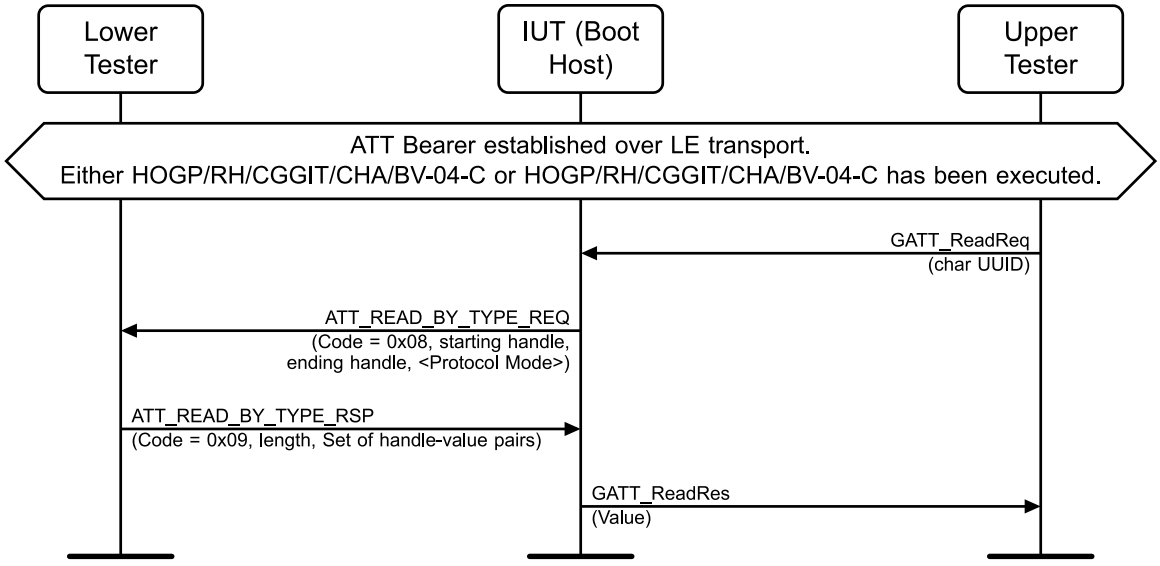
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each instance contains a single instance of the Protocol Mode characteristic.
  - The Report Host IUT has executed either HOGP/RH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Protocol Mode – RH] or HOGP/BH/CGGIT/CHA/BV-01-C [Characteristic GGIT – Protocol Mode – BH] and has saved the attribute handle for each instance of the Protocol Mode characteristic available in the Lower Tester. The Boot Host IUT may have executed either HOGP/RH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Protocol Mode – RH] or HOGP/BH/CGGIT/CHA/BV-01-C [Characteristic GGIT – Protocol Mode – BH] and saved the attribute handle for each instance of the Protocol Mode characteristic available in the Lower Tester.
  - If the Boot Host IUT has executed neither HOGP/RH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Protocol Mode – RH] nor HOGP/BH/CGGIT/CHA/BV-01-C [Characteristic GGIT – Protocol Mode – BH], it must have executed either HOGP/RH/CGGIT/SER/BV-01-C [Service GGIT – HID Service – RH] or HOGP/BH/CGGIT/SER/BV-01-C [Service GGIT – HID Service – BH] and have saved the handle range for all HID Service instances available in the Lower Tester.
- Test Procedure

  The Upper Tester issues a command to the IUT to read characteristics, there are two alternatives:

  1. Execute the GATT Read Characteristic Value sub-procedure once for each instance of the Protocol Mode characteristic, with the handles specified in initial conditions.



2. If the Boot Host IUT has not executed HOGP/RH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Protocol Mode – RH] nor HOGP/BH/CGGIT/CHA/BV-01-C [Characteristic GGIT – Protocol Mode – BH], execute the GATT Read Using Characteristic UUID sub-procedure once for each HID Service instance, with the characteristic UUID set to «Protocol Mode», with the HID Service handle ranges saved as specified in initial conditions.



- Expected Outcome

Pass verdict

1. The IUT sends correctly formatted *ATT_READ_REQs* to the Lower Tester, containing the attribute handle values specified by the Upper Tester and receives correctly formatted *ATT_READ_RSPs* from the Lower Tester containing the values of all Protocol Mode characteristics. The IUT reports all received Protocol Mode characteristic values to the Upper Tester.

   Or:

2. The Boot Host IUT sends correctly formatted *ATT_READ_BY_TYPE_REQ* to the Lower Tester containing the characteristic UUID values specified by the Upper Tester and receives correctly formatted *ATT_READ_BY_TYPE_RSP* containing the values of all Protocol Mode characteristics. The IUT reports all received Protocol Mode characteristic values to the Upper Tester.

Each complete Protocol Mode characteristic value reported to the Upper Tester matches the values implemented in the Lower Tester for the Protocol Mode field.

4.6 Write Features

The procedures defined in this test group verify IUT implementation of the Write Features defined in the HID over GATT Profile Specification [4] by a HID Host IUT, a Report Host IUT, and a Boot Host IUT.

HOGP/RH/HGWF/BV-01-C [Write Report Characteristics – Input Report]

- Test Purpose

  Verify that all Report characteristics with a Report Type of Input Report can be written by a Report Host IUT.

- Reference

  [4] 4.8

  [8] 2.5.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each instance of the HID Service contains at least one instance of the Report characteristic and a single instance of the Report Reference characteristic descriptor within each Report characteristic definition. Each Report Reference characteristic descriptor has the Report Type value field set to the value for Input Report as defined in the HID Service.
  - The IUT has executed HOGP/RH/HGDC/BV-03-C [Discover Report Characteristics] and saved the attribute handles for all Report characteristics available in the Lower Tester. The IUT has also executed HOGP/RH/HGDC/BV-05-C [Discover Report Characteristic Report Reference Characteristic Descriptors] and has saved the attribute handles for all Report Reference characteristic descriptors available in the Lower Tester whose Report Type field is set to the value for Input Report.

- The contents of the Input Report Data have been declared via IXIT and whose length is small enough to fit in a single transaction (i.e., <= [ATT_MTU-3]).

- Test Procedure

  The Upper Tester issues a command to the IUT to write characteristics.

  Execute the GATT Write Characteristic Value sub-procedure once for each Report characteristic of Input Report Type with the handles specified in initial conditions and the value declared for Input Report contents via IXIT.

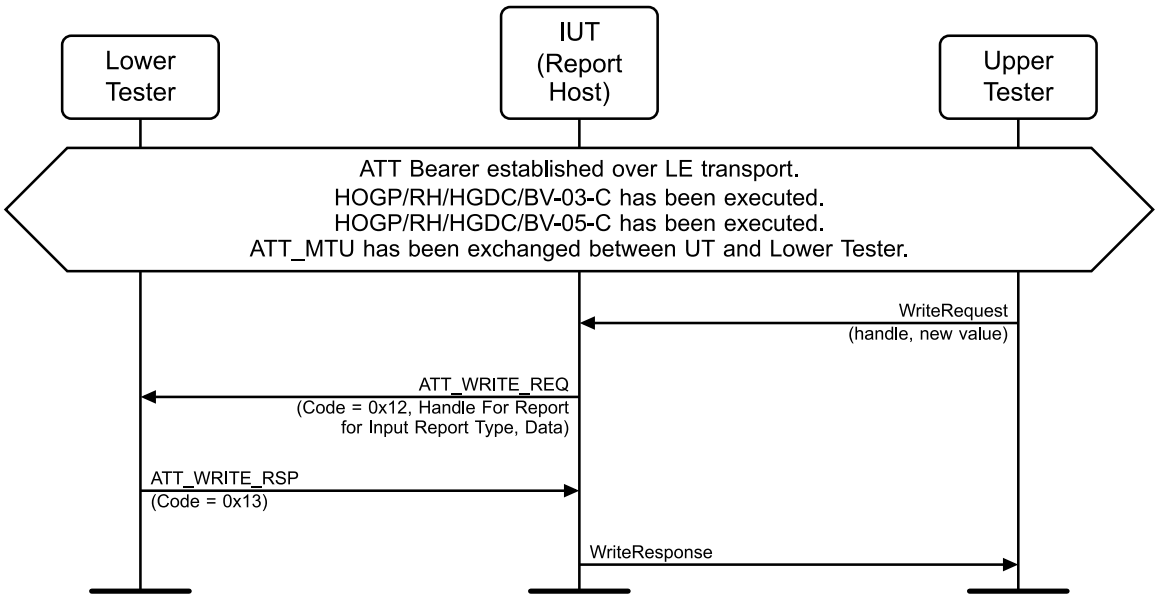


Figure 4.11: HOGP/RH/HGWF/BV-01-C [Write Report Characteristics – Input Report] MSC

- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_WRITE_REQs* to the Lower Tester using the attribute handle specified by the Upper Tester and the values declared via IXIT for Input Report Data.

  The Lower Tester confirms the written Report characteristic values match the values sent to the IUT by the Upper Tester.

HOGP/RH/HGWF/BV-02-C [Write Report Characteristics – Output Report]

- Test Purpose

  Verify that all Report characteristics with a Report Type of Output Report can be written by a Report Host IUT.

- Reference

  [4] 4.8

  [8] 2.5.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each instance of the HID Service contains at least one instance of the Report characteristic and a single instance of the Report Reference characteristic descriptor within each Report characteristic definition. Each Report Reference characteristic descriptor has the Report Type value field set to the value for Output Report as defined in the HID Service.
  - The IUT has executed HOGP/RH/HGDC/BV-03-C [Discover Report Characteristics] and saved the attribute handles for all Report characteristics available in the Lower Tester. The IUT has also executed HOGP/RH/HGDC/BV-05-C [Discover Report Characteristic Report Reference Characteristic Descriptors] and has saved the attribute handles for all Report Reference characteristic descriptors available in the Lower Tester whose Report Type field is set to the value for Output Report
  - The contents of all Output Report Data have been declared via IXIT and whose length is small enough to fit in a single transaction (i.e., <= [ATT_MTU-3]).
- Test Procedure

  The Upper Tester issues a command to the IUT to write characteristics.

  There are two alternatives:

  1. Execute the GATT Write Characteristic Value sub-procedure once for each Report characteristic of Output Report Type, with the handles specified in initial conditions and the value declared for Output Report contents via IXIT.

     Or

  2. Execute the GATT Write Without Response sub-procedure once for each Report characteristic of Output Report Type, with the handles specified in initial conditions and the value declared for Output Report contents via IXIT.

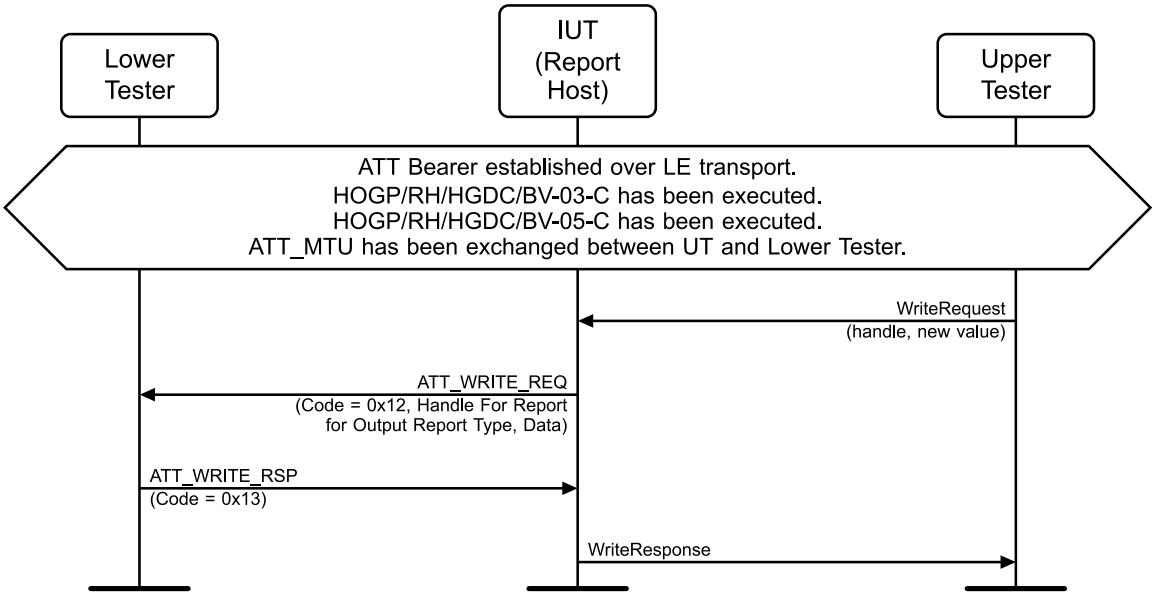


Figure 4.12: Alternative 1: Upper Tester Sends WriteRequest – ATT_WRITE_REQ

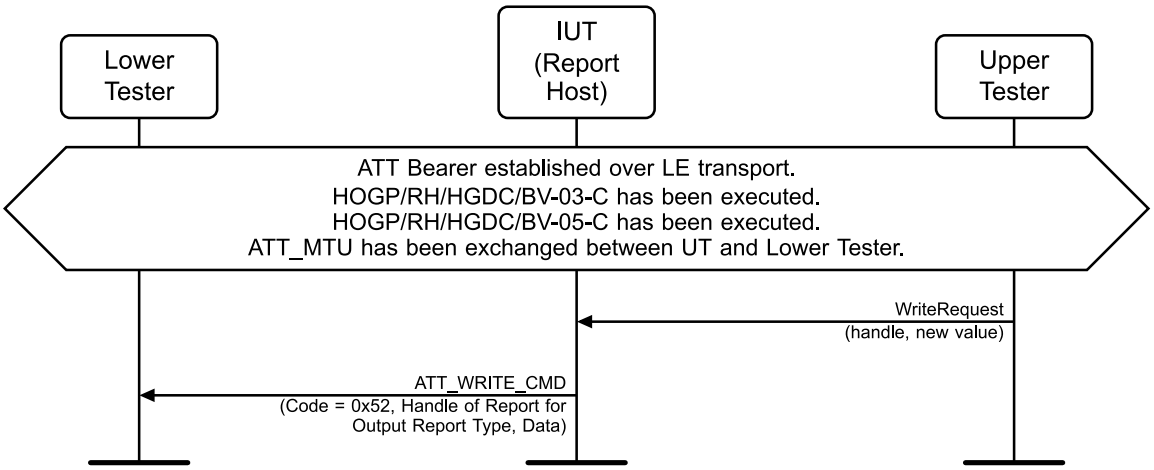


Figure 4.13: Alternative 2: Upper Tester Sends WriteRequest – ATT_WRITE_CMD

- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted write requests (either *ATT_WRITE_REQs or ATT_WRITE_CMDs)* to the Lower Tester using the handles specified by the Upper Tester and the values declared via IXIT for Output Report Data.

  The Lower Tester confirms the written Report characteristic values match the values sent to the IUT by the Upper Tester.

HOGP/RH/HGWF/BV-04-C [Write Report Characteristics – Feature Report]

- Test Purpose

  Verify that all Report characteristics with a Report Type of Feature Report can be written by a Report Host IUT.

- Reference

  [4] 4.8

  [8] 2.5.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each instance of the HID Service contains one instance of the Report characteristic and a single instance of the Report Reference characteristic descriptor within each Report characteristic definition. Each Report Reference characteristic descriptor has the Report Type value field set to the value for Feature Report as defined in the HID Service.
  - The IUT has executed HOGP/RH/HGDC/BV-03-C [Discover Report Characteristics] and saved the attribute handles for all Report characteristics available in the Lower Tester. The IUT has also executed HOGP/RH/HGDC/BV-05-C [Discover Report Characteristic Report Reference Characteristic Descriptors] and has saved the attribute handles for all Report Reference characteristic descriptors available in the Lower Tester whose Report Type field is set to the value for Feature Report.
  - The contents of the Feature Report Data have been declared via IXIT and whose length is small enough to fit in a single transaction (i.e. <= [ATT_MTU-3]).

- Test Procedure

  The Upper Tester issues a command to the IUT to write characteristics.

  Execute the GATT Write Characteristic Value sub-procedure once for each Report characteristic of Feature Report Type with the handles specified in initial conditions and the value declared for Feature Report contents via IXIT.

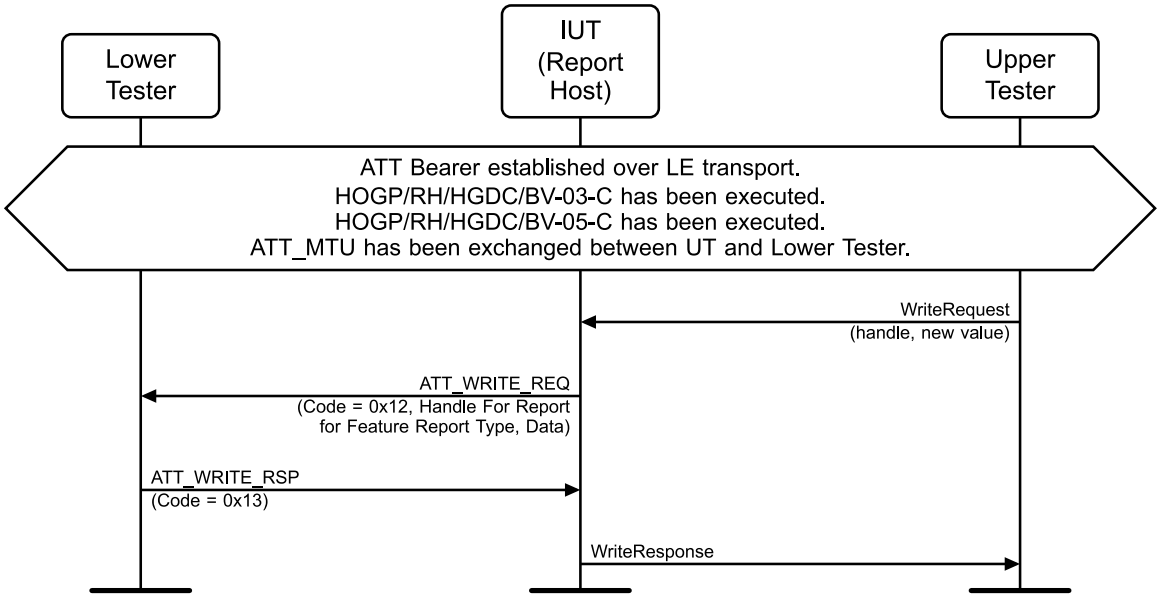


Figure 4.14: HOGP/RH/HGWF/BV-04-C [Write Report Characteristics – Feature Report] MSC

- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_WRITE_REQs* to the Lower Tester using the attribute handle specified by the Upper Tester and the values declared via IXIT for Feature Report Data.

  The Lower Tester confirms the written Report characteristic values match the values sent to the IUT by the Upper Tester.

HOGP/RH/HGWF/BV-05-C [Write HID Control Point Characteristics – Suspend]

- Test Purpose

  Verify that all HID Control Point characteristics can be written with the Suspend command by a Report Host IUT.

- Reference

  [4] 4.9

  [8] 2.11.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each HID Service instance contains a single instance of the HID Control Point characteristic.
  - The IUT has executed HOGP/RH/CGGIT/CHA/BV-03-C [Characteristic GGIT – HID Control Point] and has saved the attribute handle of all HID Control Point characteristics available in the Lower Tester.

- Test Procedure

  The Upper Tester commands the IUT to write.

  Execute the GATT Write Without Response sub-procedure once for each HID Service instance, using the handles returned after running HOGP/RH/CGGIT/CHA/BV-03-C [Characteristic GGIT – HID Control Point], and the value 0x0000 which corresponds to the Suspend command.

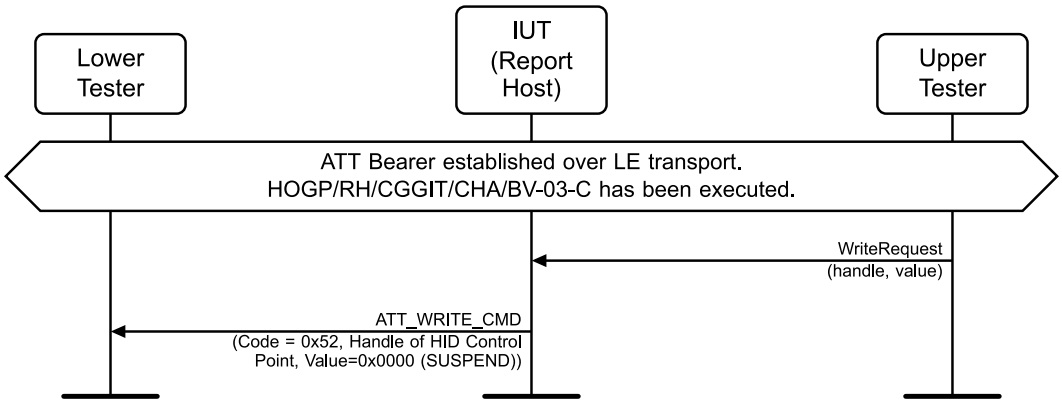


Figure 4.15: HOGP/RH/HGWF/BV-05-C [Write HID Control Point Characteristics – Suspend] MSC

- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_WRITE_CMDs* to the Lower Tester using the handles specified by the Upper Tester and the value 0x0000 which corresponds to the Suspend command.

  The Lower Tester confirms all HID Control Point characteristic values are written and the values match the values sent by the Upper Tester to the IUT.

HOGP/RH/HGWF/BV-06-C [Write HID Control Point Characteristics – Exit Suspend]

- Test Purpose

  Verify that all HID Control Point characteristics can be written with the Exit Suspend command by a Report Host IUT.

- Reference

  [4] 4.9

  [8] 2.11.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The Lower Tester has two instances of the HID Service [8]. Each instance contains a single instance of the HID Control Point characteristic.
  - The IUT has executed HOGP/RH/CGGIT/CHA/BV-03-C [Characteristic GGIT – HID Control Point] and

has saved the attribute handles of all HID Control Point characteristics available in the Lower Tester.

- Test Procedure

  The Upper Tester commands the IUT to write characteristics.

  Execute the GATT Write Without Response sub-procedure once for each instance of the HID Service, with the handles using the handles returned after running HOGP/RH/CGGIT/CHA/BV-03-C [Characteristic GGIT – HID Control Point], and the value for the Exit Suspend command (0x0001).

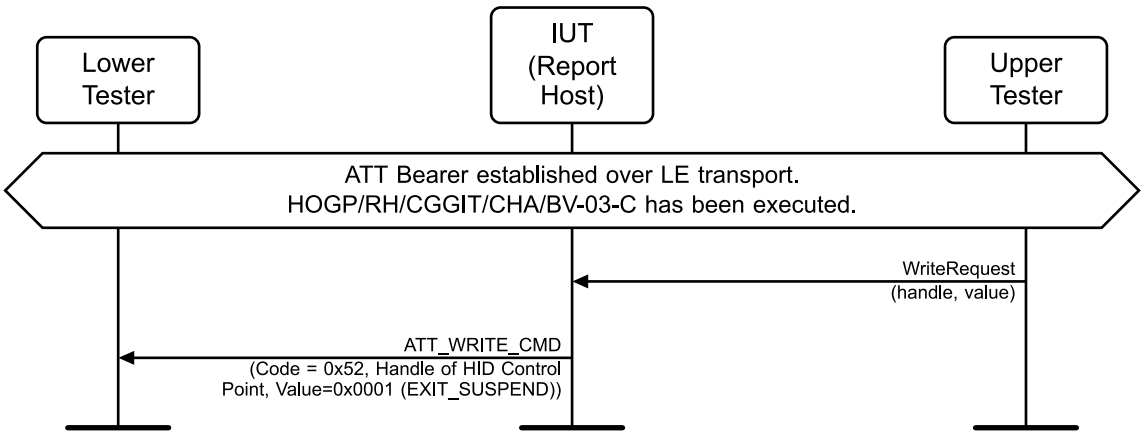


Figure 4.16: HOGP/RH/HGWF/BV-06-C [Write HID Control Point Characteristics – Exit Suspend] MSC

- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_WRITE_CMDs* to the Lower Tester using the handles specified by the Upper Tester and the value 0x0001 which corresponds to the Exit Suspend command.

  The Lower Tester confirms all HID Control Point characteristic values are written and the values match the values sent by the Upper Tester to the IUT.

HOGP/RH/HGWF/BV-07-C [Write Protocol Mode Characteristics – Set Protocol Command (Protocol Mode = Report Protocol Mode)]

- Test Purpose

  Verify that all Protocol Mode characteristics can be written with the Set Protocol command (Set Report Protocol Mode) by a Report Host IUT.

- Reference

  [4] 4.11

  [8] 2.4.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.

- The IUT and Lower Tester have bonded following GAP procedures.
- The Lower Tester has two instances of the HID Service [8]. Each HID Service instance contains a single instance of the Protocol Mode characteristic.
- The Report Host IUT has executed HOGP/RH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Protocol Mode – RH] or HOGP/BH/CGGIT/CHA/BV-01-C [Characteristic GGIT – Protocol Mode – BH] and has saved the attribute handle of all Protocol Mode characteristics available in the Lower Tester.

• Test Procedure

The Upper Tester commands the IUT to write characteristics using the handles returned in the initial condition and the value 0x0001.

Execute the GATT Write Without Response sub-procedure once for each HID Service instance, with the handles specified in initial conditions, and the value 0x0001 which corresponds to the Set Protocol (Set Report Protocol Mode) command.

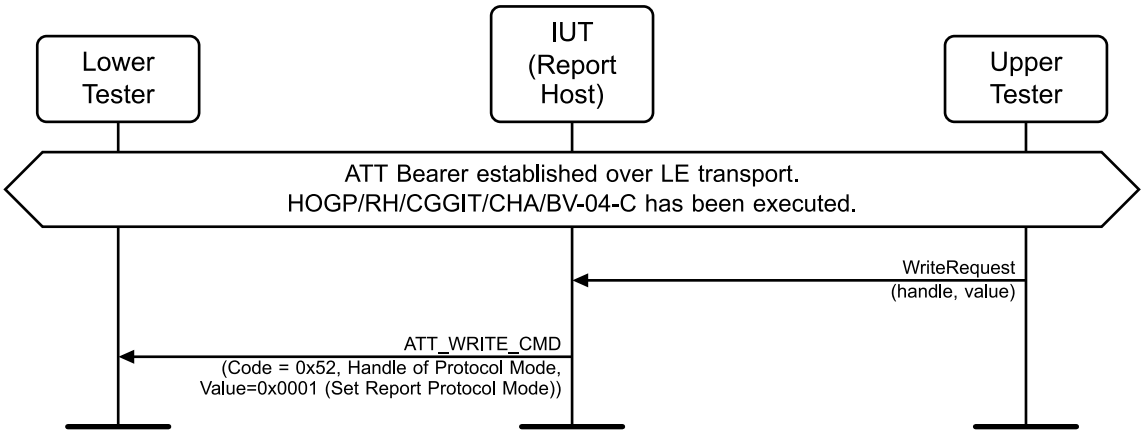


Figure 4.17: HOGP/RH/HGWF/BV-07-C [Write Protocol Mode Characteristics – Set Protocol Command (Protocol Mode = Report Protocol Mode)] MSC

• Expected Outcome

Pass verdict

The IUT sends correctly formatted *ATT_WRITE_CMDs* to the Lower Tester using the handles specified by the Upper Tester and the value 0x0001 which corresponds to the Set Protocol (Set Report Protocol Mode) command.

The Lower Tester confirms all Protocol Mode characteristic values are written and the values match the values sent by the Upper Tester to the IUT.

HOGP/BH/HGWF/BV-08-C [Write Protocol Mode Characteristics – Set Protocol Command (Protocol Mode = Boot Protocol Mode)]

• Test Purpose

Verify that all Protocol Mode characteristics for HID Services supporting Boot Protocol Mode can be written with the Set Protocol command (Set Boot Protocol Mode) by a Boot Host IUT.

- Reference

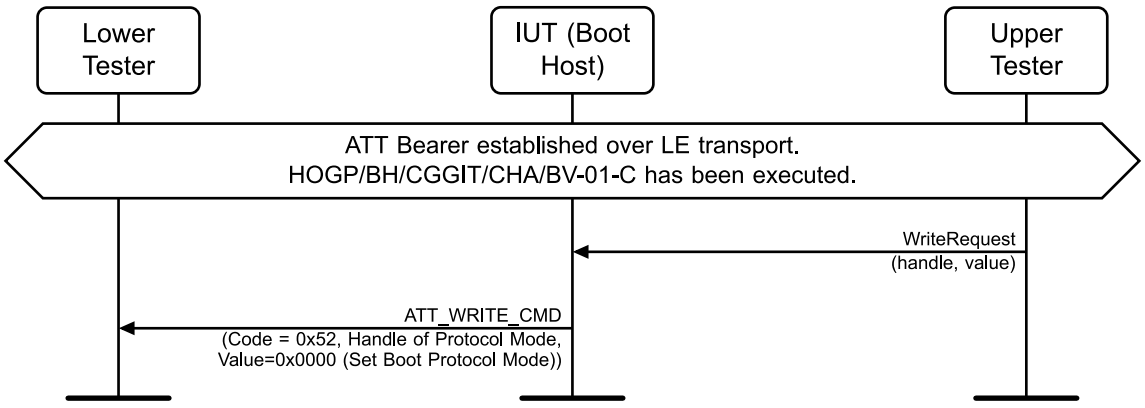
  [4] 4.11

  [8] 2.4.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each HID Service instance contains a single instance of the Protocol Mode characteristic.
  - The IUT may have executed HOGP/BH/CGGIT/CHA/BV-01-C [Characteristic GGIT – Protocol Mode – BH] or HOGP/RH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Protocol Mode – RH] and saved the attribute handle of all Protocol Mode characteristics available in the Lower Tester.
  - If the IUT has not executed HOGP/BH/CGGIT/CHA/BV-01-C [Characteristic GGIT – Protocol Mode – BH] or HOGP/RH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Protocol Mode – RH], it must have executed HOGP/BH/HGRF/BV-18-C [Read Protocol Mode Characteristics (Get Boot Protocol Mode Command) – BH] or HOGP/RH/HGRF/BV-18-C [Read Protocol Mode Characteristics (Get Boot Protocol Mode Command) – RH] and saved the handles for all instances of the Protocol Mode characteristic available in the Lower Tester.
- Test Procedure

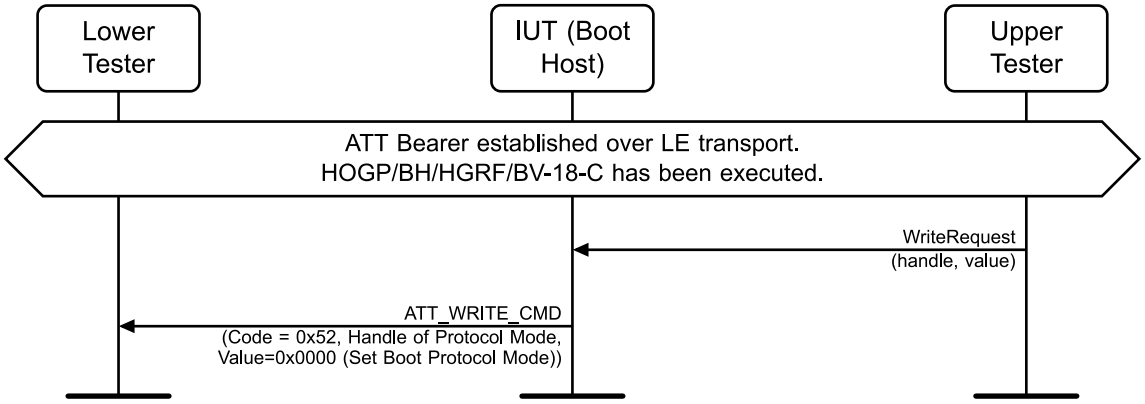
  The Upper Tester commands the IUT to write characteristics, there are two alternatives:

  1. If the IUT has executed HOGP/BH/CGGIT/CHA/BV-01-C [Characteristic GGIT – Protocol Mode – BH] or HOGP/RH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Protocol Mode – RH], execute the GATT Write Without Response sub-procedure once for each instance of the Protocol Mode characteristic using the handles returned in the initial condition, and using the value 0x0000 which corresponds to the Set Protocol (Set Boot Protocol Mode) command.



  2. If the IUT has executed HOGP/BH/HGRF/BV-18-C [Read Protocol Mode Characteristics (Get Boot Protocol Mode Command) – BH] or HOGP/RH/HGRF/BV-18-C [Read Protocol Mode Characteristics (Get Boot Protocol Mode Command) – RH], execute the GATT Write Without Response sub-procedure once for each instance of the Protocol Mode characteristic, with the Protocol Mode handles

saved as specified in initial conditions, and the value 0x0000 which corresponds to the Set Protocol (Set Boot Protocol Mode) command.



- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_WRITE_CMDs* to the Lower Tester using the handles specified by the Upper Tester and the value 0x0000 which corresponds to the Set Protocol (Set Boot Protocol Mode) command.

  The Lower Tester confirms all Protocol Mode characteristic values are written and the values match the values sent by the Upper Tester to the IUT.

4.6.1 Write HID Control Point Characteristic, HID SCI

- Test Purpose

  Verify that the Report Host IUT can successfully request to change HID SCI modes by writing to the HID Control Point characteristic when requested by the Upper Tester.

- Reference

  [17] 7.3.1.1, 7.4.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The Lower Tester contains two instances of the HID Service [18]. Each instance contains all characteristics set to valid values and the HID Information characteristic indicates support for SCI and SCI Low Power mode.
  - The IUT has discovered all instances of the HID Service and characteristics.
  - The amount of time the IUT will wait for HCI_LE_Connection_Rate_Change event before assuming it has failed is defined by the TSPX_hid_sci_mode_fail_time IXIT entry.

- Test Case Configuration

Test Case	HID SCI mode	Value
HOGP/RH/HGWF/BV-08-C [Write HID Control Point Characteristic, Enable SCI Default mode]	Default	0x02
HOGP/RH/HGWF/BV-09-C [Write HID Control Point Characteristic, Enable SCI Fast mode]	Fast	0x03
HOGP/RH/HGWF/BV-10-C [Write HID Control Point Characteristic, Enable SCI Low Power mode]	Low Power	0x04
HOGP/RH/HGWF/BV-11-C [Write HID Control Point Characteristic, Enable SCI Full Range mode]	Full Range	0x05

Table 4.5: Write HID Control Point Characteristic, HID SCI test cases

- Test Procedure

  1. The IUT executes the GATT Read Characteristic Value sub-procedure with the HID Information characteristic.
  2. If the IUT supports HID SCI Mode notifications, the Upper Tester orders the IUT to register for HID SCI Mode notifications and the IUT writes 0x0001 to each HID SCI Mode characteristic's Client Characteristic Configuration descriptor.
  3. The Upper Tester orders the IUT to enable the HID SCI mode in Table 4.5.
  4. The IUT executes the GATT Write Without Response sub-procedure with the HID Control Point characteristic and Value set to the Value in Table 4.5.
  5. Perform either alternative 5A or 5B depending on whether the IUT receives a successful HCI_LE_Connection_Rate_Change event before TSPX_hid_sci_mode_fail_time:

     Alternative 5A (The IUT receives a successful HCI_LE_Connection_Rate_Change event before TSPX_hid_sci_mode_fail_time):

     5A.1. The IUT receives a successful HCI_LE_Connection_Rate_Change event.

     5A.2. If Step 2 occurred, the Lower Tester sends a notification of both HID SCI Mode characteristics.

     Alternative 5B (The IUT does not receive a successful HCI_LE_Connection_Rate_Change event before TSPX_hid_sci_mode_fail_time):

     5B.1. The IUT does not receive a successful HCI_LE_Connection_Rate_Change event before TSPX_hid_sci_mode_fail_time.

     5B.2. Repeat from Step 3. If there has been 1 repeat already without a successful HCI_LE_Connection_Rate_Change event, the test ends in a Fail verdict.

  6. Repeat Steps 3–5 using a different HID SCI mode in Steps 3 and 4. If the HID SCI mode being tested in Table 4.5 is Default, the Upper Tester requests Full Range. Otherwise, the Upper Tester requests Default.

- Expected Outcome

  Pass verdict

  If the IUT supports HID SCI Mode notifications, the IUT successfully registers for and receives HID SCI Mode characteristic notifications in Steps 2 and 5A.2.

In Step 1, the IUT successfully executes the GATT Read Characteristic Value sub-procedure with the HID Information characteristic.

In Step 4, the IUT successfully executes the GATT Write Without Response sub-procedure with the HID Control Point characteristic set to the value in Table 4.5.

In Step 5A.1, the IUT receives a successful HCI_LE_Connection_Rate_Change event.

In alternative 5A, the IUT successfully transitions from not being in a HID SCI mode to the HID SCI mode specified in Table 4.5.

After Step 6, the IUT successfully transitions from one HID SCI mode to another HID SCI mode.

Fail verdict

The IUT fails to receive a successful HCI_LE_Connection_Rate_Change event after 2 consecutive attempts to enter or change the HID SCI mode.

4.7 Configuration Features

The procedures defined in this test group verify IUT implementation of the Configuration Features defined in the HID over GATT Profile Specification [4] by a Report Host IUT or a Boot Host IUT.

HOGP/RH/HGCF/BV-01-C [Report Characteristic – Input Reports – enable notifications (write with 0x0001)]

- Test Purpose

  Verify that all Client Characteristic Configuration characteristic descriptors for all Report characteristics of Report Type: Input Report can be written with the value 0x0001 by a Report Host IUT.

- Reference

  [4] 4.8

  [8] 2.5.3.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each instance of the HID Service contains at least one instance of the Report characteristic with one and only one instance of the Client Characteristic Configuration characteristic descriptor.
  - The IUT has executed HOGP/RH/HGDC/BV-04-C [Discover Report Characteristic Client Characteristic Configuration Descriptors] and saved the attribute handle for the Client Characteristic Configuration characteristic descriptor for each instance of the Report characteristic available in the Lower Tester.

- Test Procedure

The Upper Tester commands the IUT to enable notifications for each Report characteristic using the handles returned after running HOGP/RH/HGDC/BV-04-C [Discover Report Characteristic Client Characteristic Configuration Descriptors].

The IUT sends an *ATT_WRITE_REQ* with the value 0x0001 to the Lower Tester to each of the handles specified in initial conditions.

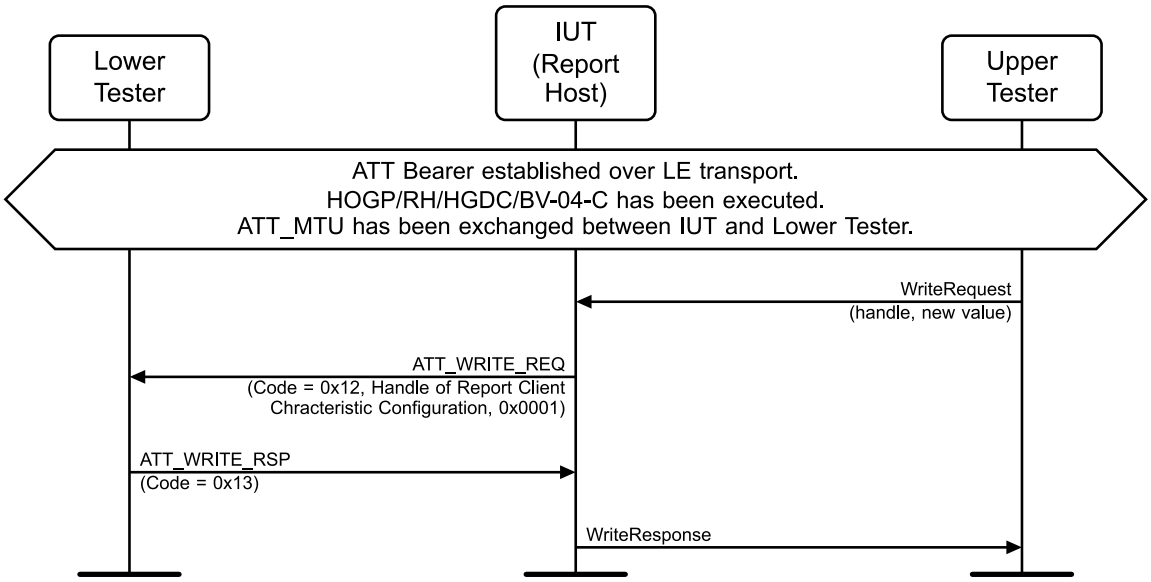


Figure 4.18: HOGP/RH/HGCF/BV-01-C [Report Characteristic – Input Reports – enable notifications (write with 0x0001)] MSC

- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_WRITE_REQs* to the Lower Tester using the handles specified by the Upper Tester and the value 0x0001.

  The IUT receives a correctly formatted *ATT_WRITE_RSP* from the Lower Tester and sends the WriteResponse to the Upper Tester.

HOGP/RH/HGCF/BV-02-C [Report Characteristic – Input Reports – disable notifications (write with 0x0000)]

- Test Purpose

  Verify that all Client Characteristic Configuration characteristic descriptors for all Report characteristics of Report Type: Input Report can be written with the value 0x0000 by a Report Host IUT.

- Reference

  [4] 4.8

  [8] 2.5.3.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each instance of the HID Service contains at least one instance of the Report characteristic with one and only one instance of the Client Characteristic Configuration characteristic descriptor.
  - The IUT has executed HOGP/RH/HGDC/BV-04-C [Discover Report Characteristic Client Characteristic Configuration Descriptors] and saved the attribute handle for the Client Characteristic Configuration characteristic descriptor for each instance of the Report characteristic available in the Lower Tester.
  - The Upper Tester commands the IUT to enable notifications for each Report characteristic using the handles returned after running HOGP/RH/HGDC/BV-04-C [Discover Report Characteristic Client Characteristic Configuration Descriptors]. The IUT sends an *ATT_WRITE_REQ* with the value 0x0001 to the Lower Tester to each of the handles specified in initial conditions as in HOGP/RH/HGCF/BV-01-C [Report Characteristic – Input Reports – enable notifications (write with 0x0001)].
- Test Procedure
  1. The Upper Tester commands the IUT to disable notifications for each Report characteristic using the handles returned after running HOGP/RH/HGDC/BV-04-C [Discover Report Characteristic Client Characteristic Configuration Descriptors].
  2. The IUT sends an *ATT_WRITE_REQ* with the value 0x0000 to the Lower Tester to each of the handles specified in initial conditions.

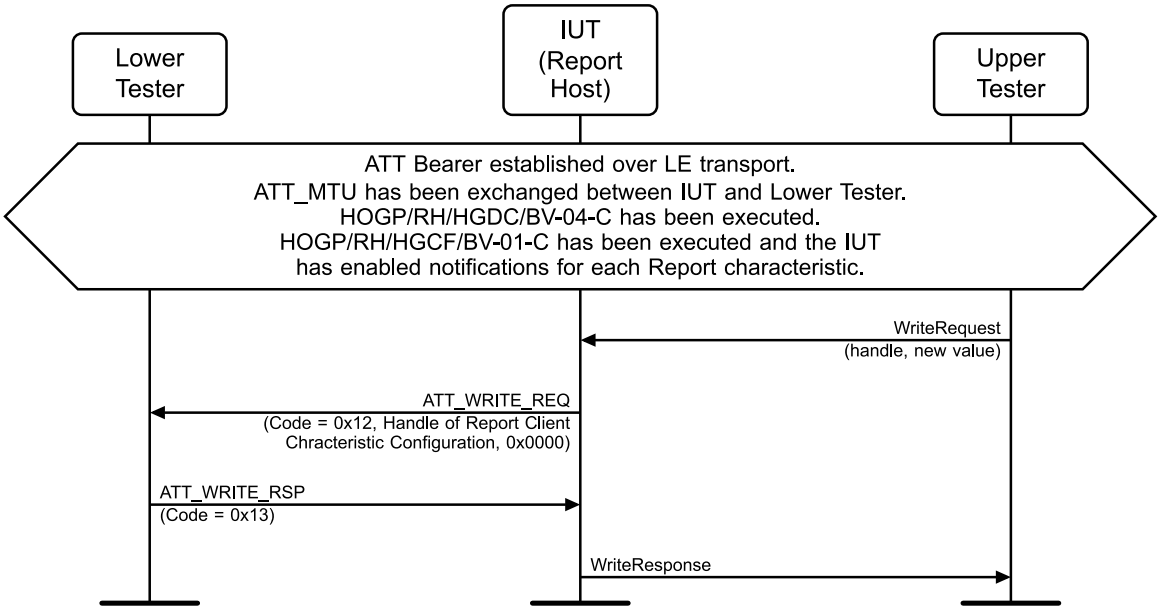


Figure 4.19: HOGP/RH/HGCF/BV-02-C [Report Characteristic – Input Reports – disable notifications (write with 0x0000)] MSC

- Expected Outcome

  Pass verdict

  The IUT sends correctly formatted *ATT_WRITE_REQs* to the Lower Tester using the handles specified by the Upper Tester. The IUT successfully disables notification by writing the value 0x0000 to the Client Characteristic Configuration characteristic descriptors for all Report characteristics of Report Type: Input Report.

  The IUT receives a correctly formatted *ATT_WRITE_RSP* from the Lower Tester and sends the WriteResponse to the Upper Tester.

HOGP/BH/HGCF/BV-03-C [Boot Keyboard Input Report Characteristic – enable notifications (write with 0x0001)]

- Test Purpose

  Verify that the Client Characteristic Configuration characteristic descriptor for the Boot Keyboard Input Report characteristic can be written with the value 0x0001 by a Boot Host IUT.

- Reference

  [4] 4.12

  [8] 2.7.3.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.

- The IUT and Lower Tester have bonded following GAP procedures.
- The Lower Tester has two instances of the HID Service [8]. One instance of the HID Service contains one instance of the Boot Keyboard Input Report characteristic with one instance of the Client Characteristic Configuration characteristic descriptor.
- The IUT may have executed HOGP/BH/CGGIT/CHA/BV-02-C [Characteristic GGIT – Boot Keyboard Input Report – BH] and saved the attribute handle for the Client Characteristic Configuration characteristic descriptor for the instance of the Boot Keyboard Input Report characteristic available in the Lower Tester.

• Test Procedure

The Upper Tester commands the IUT to enable notifications for each Report characteristic using the handle returned after running HOGP/BH/CGGIT/CHA/BV-02-C [Characteristic GGIT – Boot Keyboard Input Report – BH] above.

The IUT sends an *ATT_WRITE_REQ* with the value 0x0001 to the Lower Tester of the handle specified in initial conditions.

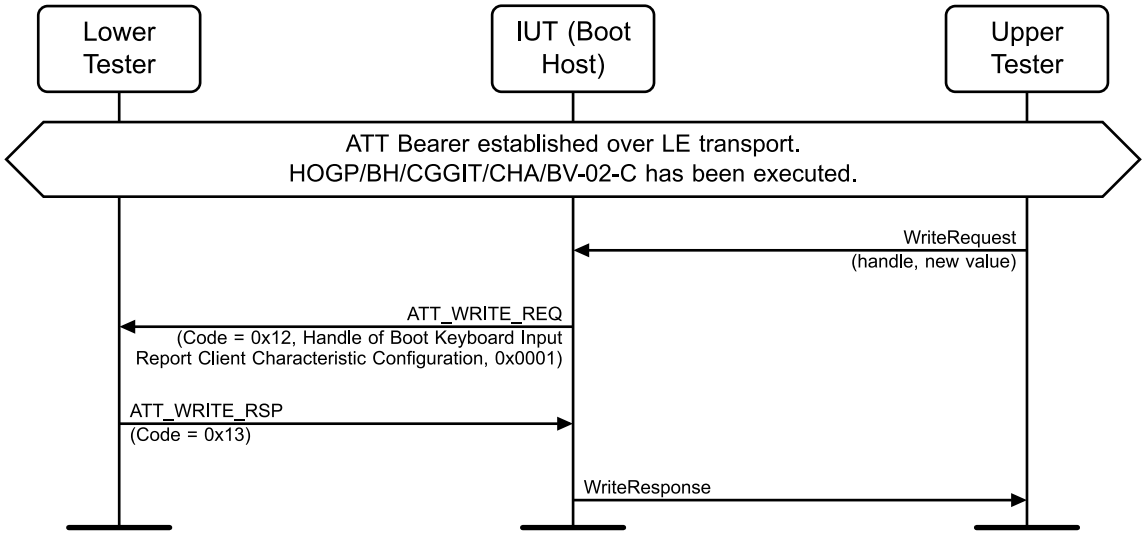


Figure 4.20: HOGP/BH/HGCF/BV-03-C [Boot Keyboard Input Report Characteristic – enable notifications (write with 0x0001)] MSC

• Expected Outcome

Pass verdict

The IUT sends a correctly formatted *ATT_WRITE_REQ* to the Lower Tester using the handle specified by the Upper Tester and the value 0x0001.

The IUT receives a correctly formatted *ATT_WRITE_RSP* from the Lower Tester and sends the WriteResponse to the Upper Tester.

HOGP/BH/HGCF/BV-04-C [Boot Keyboard Input Report Characteristic – disable notifications (write with 0x0000)]

- Test Purpose

  Verify that the Client Characteristic Configuration characteristic descriptor for the Boot Keyboard Input Report characteristic can be written with the value 0x0000 by a Boot Host IUT.

- Reference

  [4] 4.12

  [8] 2.7.3.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. One instance of the HID Service contains one instance of the Boot Keyboard Input Report characteristic with one instance of the Client Characteristic Configuration characteristic descriptor.
  - The IUT may have executed HOGP/BH/CGGIT/CHA/BV-02-C [Characteristic GGIT – Boot Keyboard Input Report – BH] and saved the attribute handle for the Client Characteristic Configuration characteristic descriptor for the instance of the Boot Keyboard Input Report characteristic available in the Lower Tester.

- Test Procedure

  The Upper Tester commands the IUT to enable notifications for each Report characteristic using the handle returned after running HOGP/BH/CGGIT/CHA/BV-02-C [Characteristic GGIT – Boot Keyboard Input Report – BH] above.

  The IUT sends an *ATT_WRITE_REQ* with the value 0x0000 to the Lower Tester to the handles specified in initial conditions.

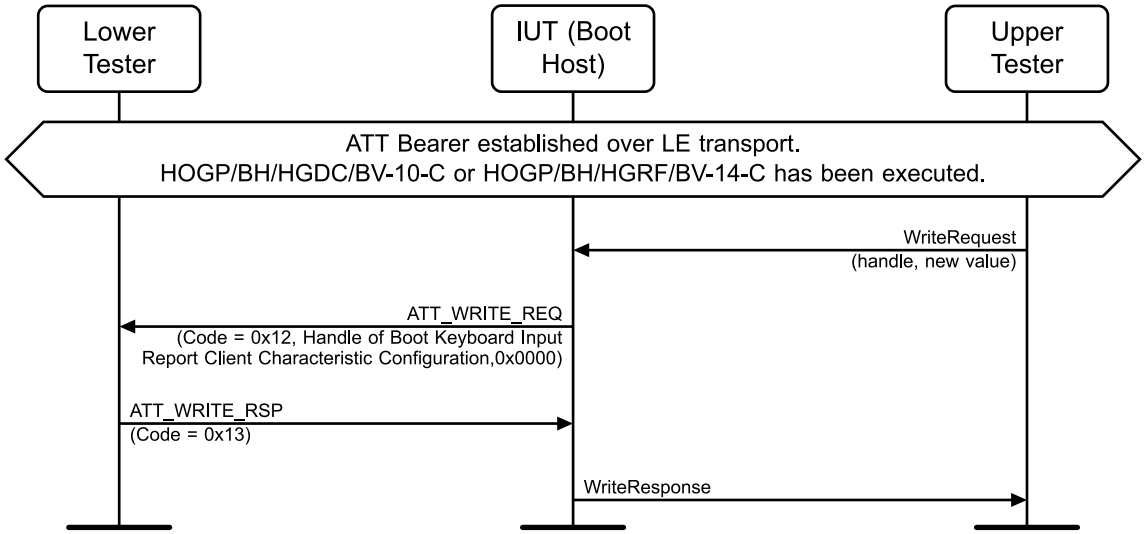


Figure 4.21: HOGP/BH/HGCF/BV-04-C [Boot Keyboard Input Report Characteristic – disable notifications (write with 0x0000)] MSC

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted *ATT_WRITE_REQ* to the Lower Tester using the handles specified by the Upper Tester and the value 0x0000.

  The IUT receives a correctly formatted *ATT_WRITE_RSP* from the Lower Tester and sends the WriteResponse to the Upper Tester.

HOGP/BH/HGCF/BV-05-C [Boot Mouse Input Report Characteristic – enable notifications (write with 0x0001)]

- Test Purpose

  Verify that all Client Characteristic Configuration characteristic descriptors for the Boot Mouse Input Report characteristic can be written with the value 0x0001 by a Boot Host IUT.

- Reference

  [4] 4.14

  [8] 2.9.3.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. One instance of the HID Service contains one instance of the Boot Mouse Input Report characteristic with one instance of the Client Characteristic Configuration characteristic descriptor.

- The IUT may have executed HOGP/BH/HGDC/BV-13-C [Discover Boot Mouse Input Report Client Characteristic Configuration Descriptor] and saved the attribute handles for the Client Characteristic Configuration characteristic descriptor for the instance of the Boot Mouse Input Report characteristic available in the Lower Tester.
- If the IUT has not executed HOGP/BH/HGDC/BV-13-C [Discover Boot Mouse Input Report Client Characteristic Configuration Descriptor] it must have executed HOGP/BH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Boot Mouse Input Report – BH] and saved the attribute handle for the Client Characteristic Configuration characteristic descriptor for the instance of the Boot Mouse Input Report characteristic available in the Lower Tester.

- Test Procedure

  The Upper Tester commands the IUT to enable notifications for each Report characteristic using the handles returned after running HOGP/BH/HGDC/BV-13-C [Discover Boot Mouse Input Report Client Characteristic Configuration Descriptor] or HOGP/BH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Boot Mouse Input Report – BH] above.

  The IUT sends an *ATT_WRITE_REQ* with the value 0x0001 to the Lower Tester to the handle specified in initial conditions.

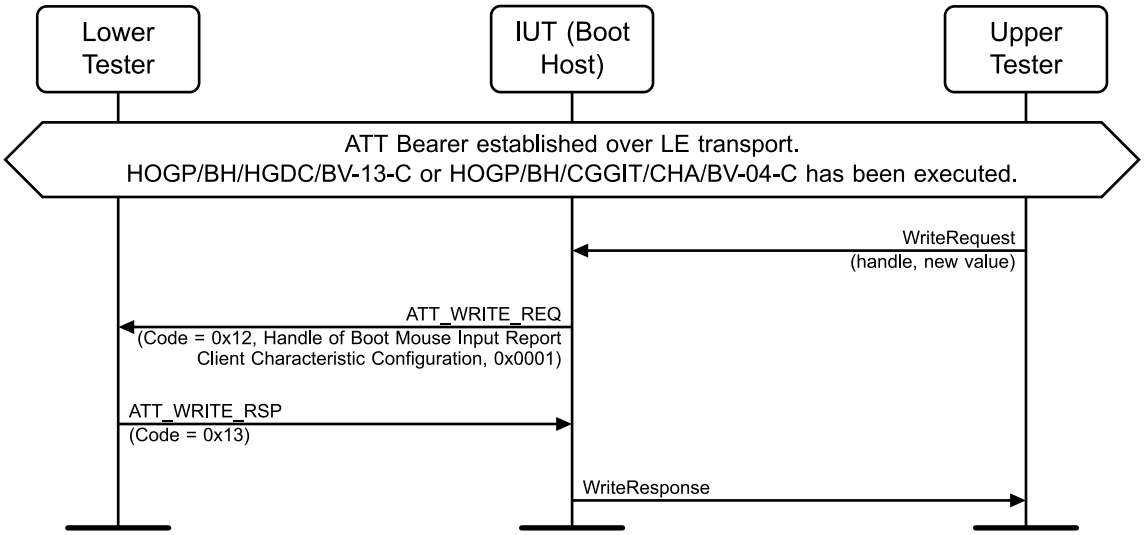


Figure 4.22: HOGP/BH/HGCF/BV-05-C [Boot Mouse Input Report Characteristic – enable notifications (write with 0x0001)] MSC

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted *ATT_WRITE_REQ* to the Lower Tester using the handles specified by the Upper Tester and the value 0x0001.

  The IUT receives a correctly formatted *ATT_WRITE_RSP* from the Lower Tester and sends the WriteResponse to the Upper Tester.

HOGP/BH/HGCF/BV-06-C [Boot Mouse Input Report Characteristic – disable notifications (write with 0x0000)]

- Test Purpose

  Verify that the Client Characteristic Configuration characteristic descriptor for the Boot Mouse Input Report characteristic can be written with the value 0x0000 by a Boot Host IUT.

- Reference

  [4] 4.14

  [8] 2.9.3.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. One instance of the HID Service contains one instance of the Boot Mouse Input Report characteristic with one instance of the Client Characteristic Configuration characteristic descriptor.
  - The IUT may have executed HOGP/BH/HGDC/BV-13-C [Discover Boot Mouse Input Report Client Characteristic Configuration Descriptor] and saved the attribute handle for the Client Characteristic Configuration characteristic descriptor for the instance of the Boot Mouse Input Report characteristic available in the Lower Tester.
  - If the IUT has not executed HOGP/BH/HGDC/BV-13-C [Discover Boot Mouse Input Report Client Characteristic Configuration Descriptor] it must have executed HOGP/BH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Boot Mouse Input Report – BH] and saved the attribute handles for the Client Characteristic Configuration characteristic descriptors for the instance of the Boot Mouse Input Report characteristic available in the Lower Tester.

- Test Procedure

  The Upper Tester commands the IUT to enable notifications for each Report characteristic using the handle returned after running HOGP/BH/HGDC/BV-13-C [Discover Boot Mouse Input Report Client Characteristic Configuration Descriptor] or HOGP/BH/CGGIT/CHA/BV-04-C [Characteristic GGIT – Boot Mouse Input Report – BH] above.

  The IUT sends an *ATT_WRITE_REQ* with the value 0x0000 to the Lower Tester to the handle specified in initial conditions.

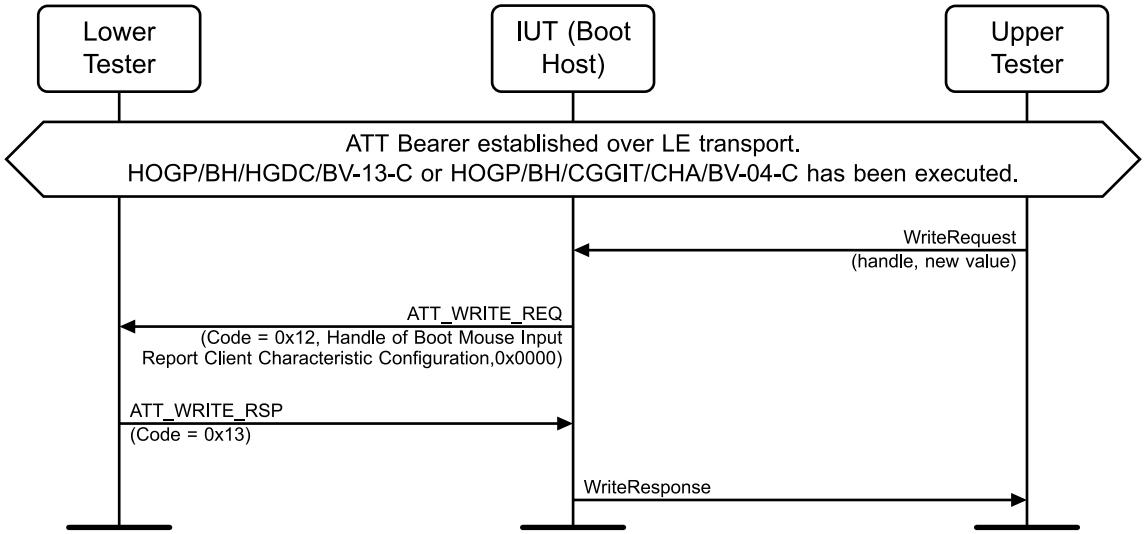


Figure 4.23: HOGP/BH/HGCF/BV-06-C [Boot Mouse Input Report Characteristic – disable notifications (write with 0x0000)] MSC

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted *ATT_WRITE_REQ* to the Lower Tester using the handle specified by the Upper Tester and the value 0x0000.

  The IUT receives a correctly formatted *ATT_WRITE_RSP* from the Lower Tester and sends the WriteResponse to the Upper Tester.

4.8 Notification Features

The procedures defined in this test group verify IUT implementation of the Notification Features defined in the HID over GATT Profile Specification [4] by a Report Host IUT and a Boot Host IUT.

HOGP/RH/HGNF/BV-01-C [Report Characteristic Configuration, receive notifications]

- Test Purpose

  Verify that, when the Client Characteristic Configuration characteristic descriptor is configured for notification, a Report Host IUT can successfully receive notifications for Report characteristics.

- Reference

  [4] 4.8

  [8] 2.5.3.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.

- The Lower Tester has two instances of the HID Service [8]. Each HID Service instance contains one instance of the Report characteristic of Report Type: Input Report with a single instance of the Client Characteristic Configuration characteristic descriptor.
- The IUT has executed HOGP/RH/HGCF/BV-01-C [Report Characteristic – Input Reports – enable notifications (write with 0x0001)] to configure all Report characteristics of Report Type: Input Report available in the Lower Tester for notifications.

- Test Procedure

  The Lower Tester sends *ATT_HANDLE_VALUE_NTFs* containing the characteristic values for all instances of the Report characteristic of Report Type: Input Report to the IUT.

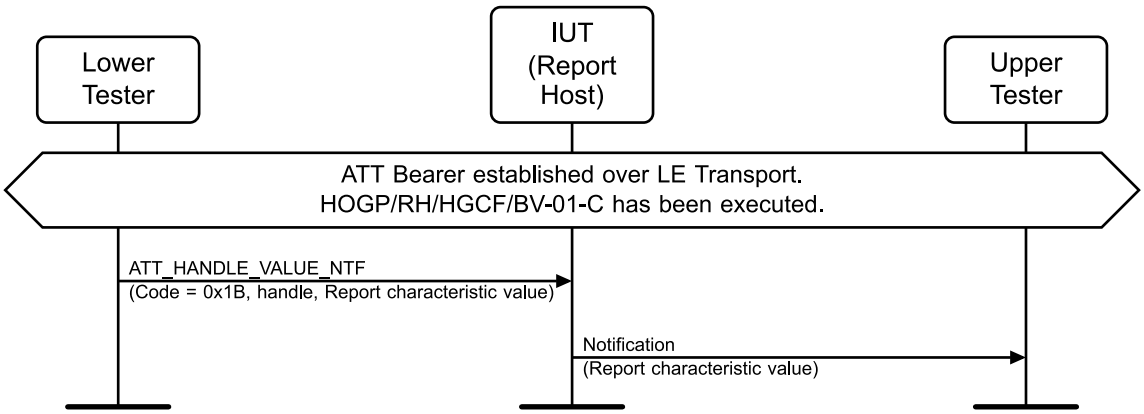


Figure 4.24: HOGP/RH/HGNF/BV-01-C [Report Characteristic Configuration, receive notifications] MSC

- Expected Outcome

  Pass verdict

  The IUT reports all received Report characteristic values to the Upper Tester.

  The reported values for the Report characteristics match the ones sent by the Lower Tester.

HOGP/BH/HGNF/BV-02-C [Boot Keyboard Input Report Characteristic Configuration, receive notifications]

- Test Purpose

  Verify that, when the Client Characteristic Configuration characteristic descriptor is configured for notification, a Boot Host IUT can successfully receive notifications for the Boot Keyboard Input Report characteristic.

- Reference

  [4] 4.12

  [8] 2.7.3.1

- Initial Condition

- Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
- The IUT and Lower Tester have bonded following GAP procedures.
- The Lower Tester has two instances of the HID Service [8]. One HID Service instance contains a single instance of the Boot Keyboard Input Report characteristic with a single instance of the Client Characteristic Configuration characteristic descriptor.
- The IUT has executed HOGP/BH/HGCF/BV-03-C [Boot Keyboard Input Report Characteristic – enable notifications (write with 0x0001)] to configure the Boot Keyboard Input Report characteristic for notifications available in the Lower Tester.

- Test Procedure

  The Lower Tester sends *ATT_HANDLE_VALUE_NTFs* containing the characteristic values for the Boot Keyboard Input Report characteristic to the IUT.

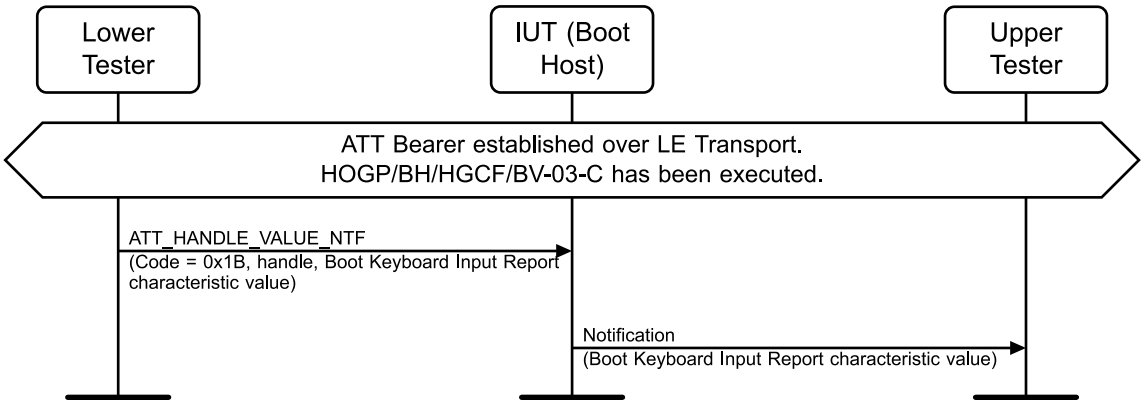


Figure 4.25: HOGP/BH/HGNF/BV-02-C [Boot Keyboard Input Report Characteristic Configuration, receive notifications] MSC

- Expected Outcome

  Pass verdict

  The IUT reports the received Boot Keyboard Input Report characteristic value to the Upper Tester.

  The reported values for the Boot Keyboard Input Report characteristic match the one sent by the Lower Tester.

HOGP/BH/HGNF/BV-03-C [Boot Mouse Input Report Characteristic Configuration, receive notifications]

- Test Purpose

  Verify that, when the Client Characteristic Configuration characteristic descriptor is configured for notification, a Boot Host IUT can successfully receive notifications for the Boot Mouse Input Report characteristic.

- Reference

[4] 4.14

[8] 2.9.3.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. One HID Service instance contains a single instance of the Boot Mouse Input Report characteristic with a single instance of the Client Characteristic Configuration characteristic descriptor.
  - The IUT has executed HOGP/BH/HGCF/BV-05-C [Boot Mouse Input Report Characteristic – enable notifications (write with 0x0001)] to configure the Boot Mouse Input Report characteristic available in the Lower Tester for notifications.
- Test Procedure

  The Lower Tester sends *ATT_HANDLE_VALUE_NTFs* containing the characteristic values for the Boot Mouse Input Report characteristic to the IUT.

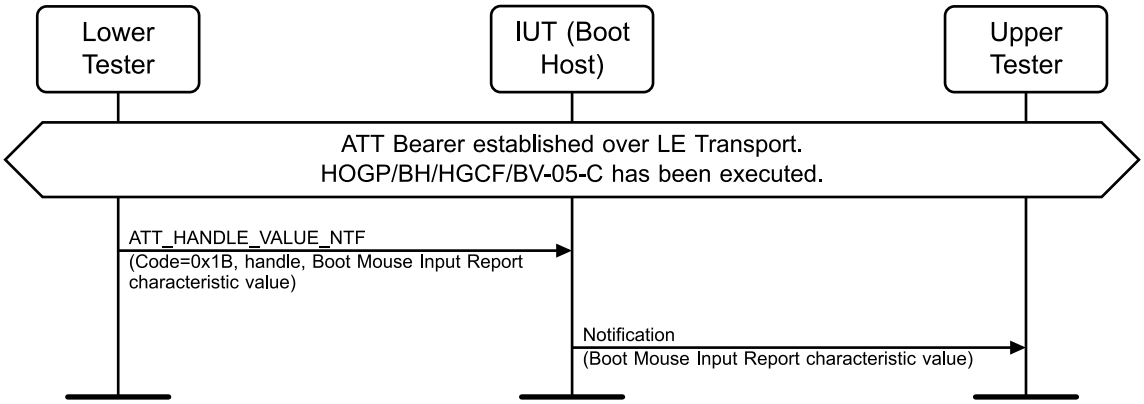


Figure 4.26: HOGP/BH/HGNF/BV-03-C [Boot Mouse Input Report Characteristic Configuration, receive notifications] MSC

- Expected Outcome

  Pass verdict

  The IUT reports the received Boot Mouse Input Report characteristic value to the Upper Tester.

  The reported value for the Boot Mouse Input Report characteristic matches the one sent by the Lower Tester.

HOGP/RH/HGNF/BI-01-C [Boot Keyboard Input Report Characteristic Configuration, ignore notifications, Report Host]

- Test Purpose

  Verify that, when the Client Characteristic Configuration characteristic descriptor is configured for

notification, a Report Host IUT will ignore notifications for the Boot Keyboard Input Report characteristic.

- Reference

  [4] 4.12

  [8] 2.7.3.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. One HID Service instance contains a single instance of the Boot Keyboard Input Report characteristic with a single instance of the Client Characteristic Configuration characteristic descriptor.
  - The Lower Tester has configured the instance of the Boot Keyboard Input Report characteristic for notifications.

- Test Procedure

  The Lower Tester sends *ATT_HANDLE_VALUE_NTFs* containing the characteristic value for the Boot Keyboard Input Report characteristic to the IUT.

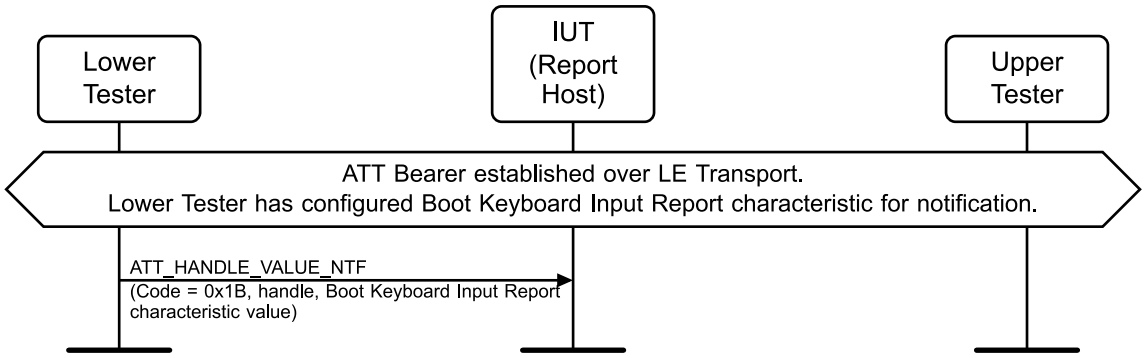


Figure 4.27: HOGP/RH/HGNF/BI-01-C [Boot Keyboard Input Report Characteristic Configuration, ignore notifications, Report Host] MSC

- Expected Outcome

  Pass verdict

  The IUT ignores the received Boot Keyboard Input Report characteristic value and reports no value to the Upper Tester.

HOGP/BH/HGNF/BI-01-C [Report Characteristic Configuration, ignore notifications, Boot Host]

- Test Purpose

  Verify that, when the Client Characteristic Configuration characteristic descriptor is configured for notification, a Boot Host IUT will ignore all notifications for Report characteristics.

- Reference

  [4] 4.8

  [8] 2.5.3.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. Each HID Service instance contains one instance of the Report characteristic of Report Type: Input Report, each with a single instance of the Client Characteristic Configuration characteristic descriptor.
  - The Lower Tester has configured all Report characteristics of Report Type: Input Report for notifications.

- Test Procedure

  The Lower Tester sends *ATT_HANDLE_VALUE_NTFs* containing the characteristic values for all instances of the Report characteristic of Report Type: Input Report to the IUT.

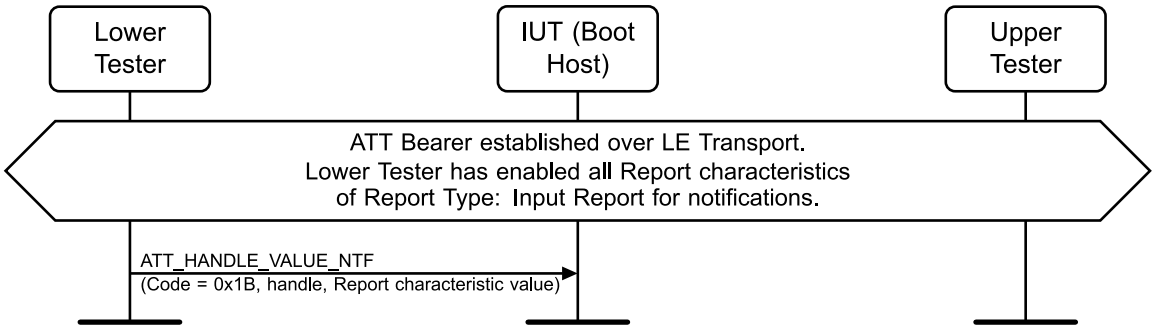


Figure 4.28: HOGP/BH/HGNF/BI-01-C [Report Characteristic Configuration, ignore notifications, Boot Host] MSC

- Expected Outcome

  Pass verdict

  The IUT ignores all received Report characteristic values from the Lower Tester and reports no values to the Upper Tester.

HOGP/RH/HGNF/BI-02-C [Boot Mouse Input Report Characteristic Configuration, ignore notifications, Report Host]

- Test Purpose

  Verify that, when the Client Characteristic Configuration characteristic descriptor is configured for notification, a Report Host IUT will ignore notifications for the Boot Mouse Input Report characteristic.

- Reference

[4] 4.14

[8] 2.9.3.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as defined in Section 4.2.1.
  - The IUT and Lower Tester have bonded following GAP procedures.
  - The Lower Tester has two instances of the HID Service [8]. One HID Service instance contains a single instance of the Boot Keyboard Input Report characteristic with a single instance of the Client Characteristic Configuration characteristic descriptor.
  - The Lower Tester has configured the instance of the Boot Mouse Input Report characteristic for notifications.
- Test Procedure

  The Lower Tester sends *ATT_HANDLE_VALUE_NTFs* containing the characteristic value for the Boot Mouse Input Report characteristic to the IUT.

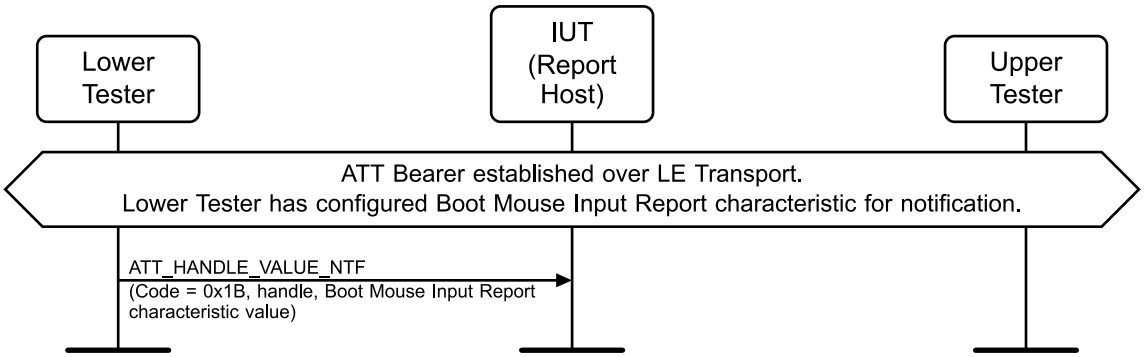


Figure 4.29: HOGP/RH/HGNF/BI-02-C [Boot Mouse Input Report Characteristic Configuration, ignore notifications, Report Host] MSC

- Expected Outcome

  Pass verdict

  The IUT ignores the received Boot Mouse Input Report characteristic value and reports no value to the Upper Tester.

4.9 HID ISO Report Host

The procedures defined in this test group verify IUT behavior of HID ISO procedures.

4.9.1 Operation Mode Behavior – HID ISO Report Host

HOGP/RH/HGIOM/BV-01-C [Change Operation Mode from Host]

- Test Purpose

  Verify that the HID ISO Report Host IUT changes the LE HID Operation Mode characteristics.

- Reference

  [16] 5.2.1, 5.3, 6.5.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The Lower Tester is a HID Device and supports the HID ISO feature.

- Test Procedure

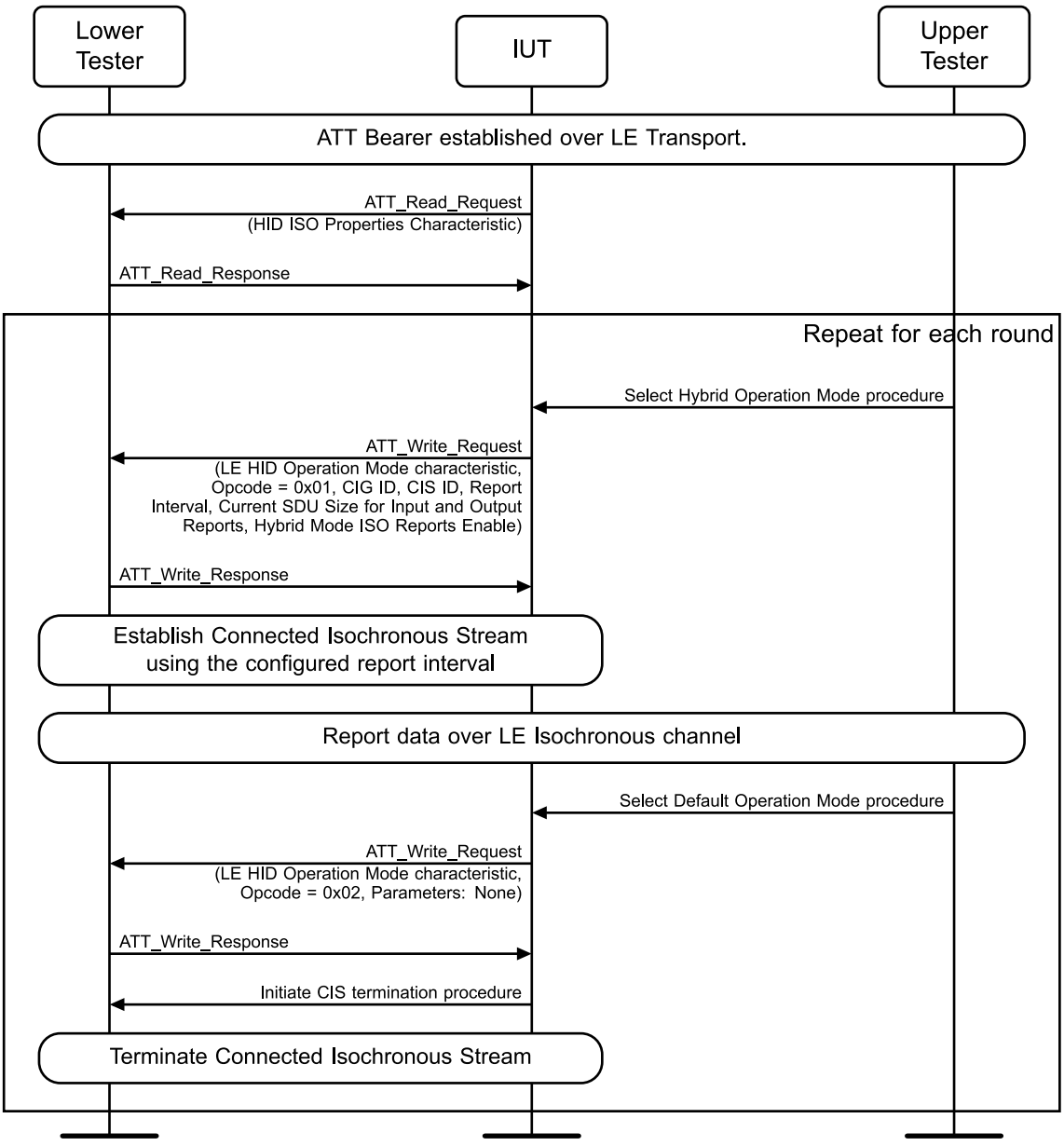


Figure 4.30: HOGP/RH/HGIOM/BV-01-C [Change Operation Mode from Host] MSC

1. The IUT reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value

sub-procedure.

Repeat Steps 2–8 for each supported report interval in Table 4.6. If the report interval is not supported, skip the round.

2. The Upper Tester orders the IUT to execute the Select Hybrid Operation Mode procedure.
3. The IUT executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to: CIG ID, CIS ID, report interval for the round as indicated in Table 4.6, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable.
4. The IUT establishes a CIS using the report interval from Step 3.
5. After successfully establishing the CIS, the HID ISO report data is sent over the LE Isochronous Channel.
6. The Upper Tester orders the IUT to execute the Select Default Operation Mode procedure.
7. The IUT executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x02 (Select Default Operation Mode) and no Parameters field.
8. The IUT initiates the CIS Termination procedure.

Rounds	Report Interval
1	1 ms
2	1.25 ms
3	2 ms
4	2.5 ms
5	3 ms
6	3.75 ms
7	4 ms
8	5 ms
9	7.5 ms

Table 4.6: Change Operation Mode from Host rounds

- Expected Outcome

  Pass verdict

  The IUT sets only one bit to 1 for the report interval in Step 3.

  The Current SDU Size for Input Reports is greater than or equal to the length of the Input report (including HID ISO overhead) and/or the Current SDU Size for Output Reports is greater than or equal to the length of the Output report (including HID ISO overhead) in Step 3.

  The IUT does not configure more than eight report indices for the Hybrid Operation Mode in Step 3.

  The established CIS ID, CIG ID, report interval, Current SDU Size for Input Reports, and Current SDU Size for Output Reports in Step 4 match the values in Step 3. The length of the Output Report (including HID ISO

overhead), sent by the IUT, is less than or equal to Max_SDU_C_to_P in Step 5.

The IUT terminates the CIS in Step 8.

HOGP/RH/HGIOM/BV-02-C [Change Operation Mode from Device]

- Test Purpose

  Verify that the HID ISO Report Host IUT changes the LE HID Operation Mode characteristic when requested by the HID ISO Device.

- Reference

  [16] 5.2, 5.2.2, 5.3

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The Lower Tester is a HID Device and supports the HID ISO feature.
  - The Lower Tester supports the Device Mode Change Supported feature in HID ISO Properties characteristic.
  - The LE HID Operation Mode characteristic is configured for indication.

- Test Procedure

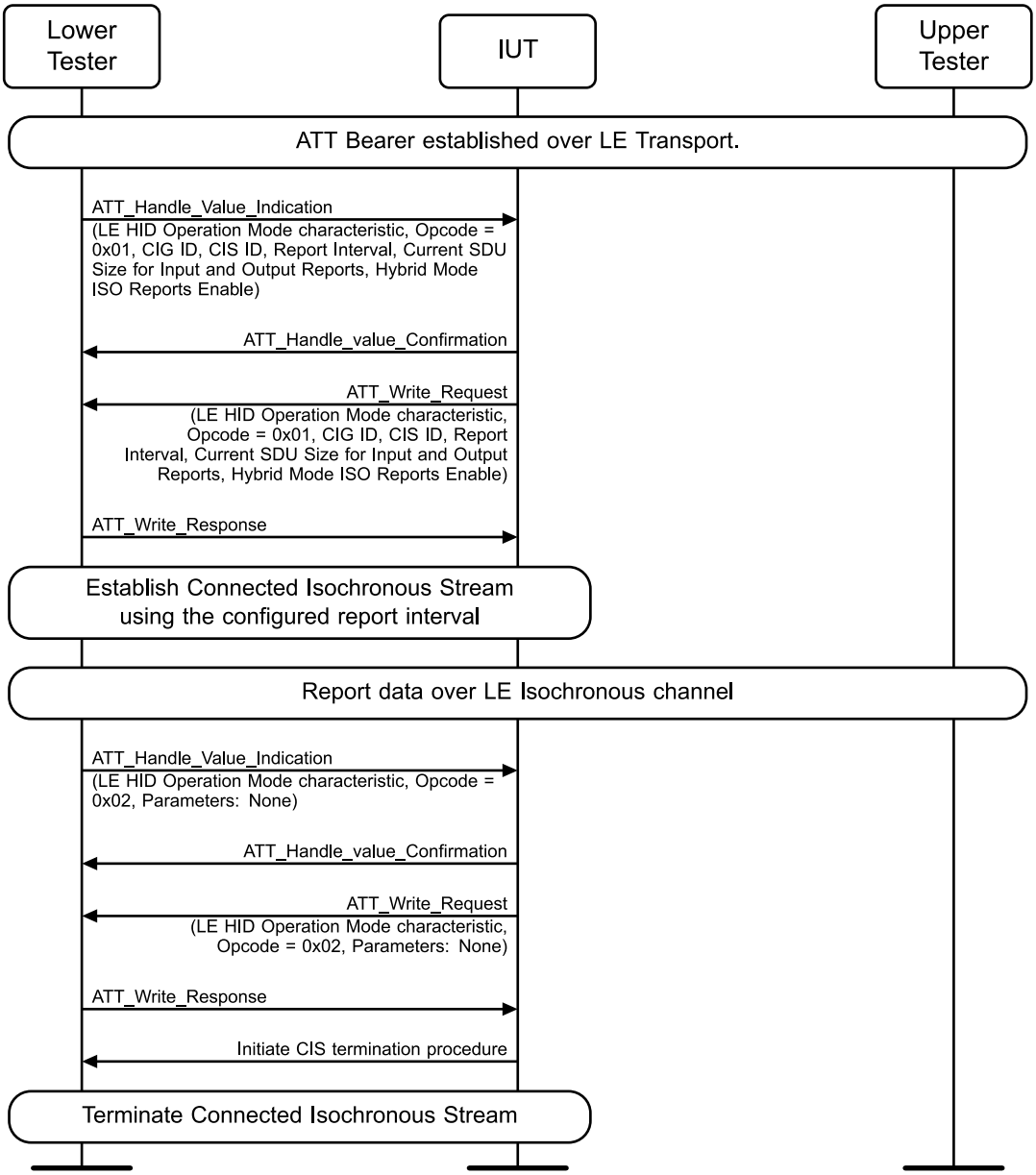


Figure 4.31: HOGP/RH/HGIOM/BV-02-C [Change Operation Mode from Device] MSC

1. The Lower Tester sends an indication of the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to: CIG ID, CIS ID, the IUT supported report interval, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable.
2. The IUT executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the received Parameters field values in Step 1.
3. The IUT establishes a CIS using the supported report interval from Step 1.
4. After successfully establishing the CIS, the HID ISO report data is sent over the LE Isochronous Channel.
5. The Lower Tester sends an Indication of the LE HID Operation Mode characteristic with the Opcode field set to 0x02 (Select Default Operation Mode) and no Parameters field.

6. The IUT executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x02 (Select Default Operation Mode) and no Parameters field.
7. The IUT initiates the CIS Termination procedure.

- Expected Outcome

  Pass verdict

  The IUT sets only one bit to 1 for the report interval in Step 2.

  The established CIS ID and CIG ID in Step 3 match the values in Step 2.

  The Current SDU Size for Input Reports is greater than or equal to the length of the Input report (including HID ISO overhead) and the Current SDU Size for Output Reports is greater than or equal to the length of the Output report (including HID ISO overhead) in Step 2.

  The length of the Output Report (including HID ISO overhead), sent by the IUT, is less than or equal to Max_SDU_C_to_P in Step 4.

  The IUT terminates the CIS in Step 7.

4.9.2 HID ISO Packet Structure – HID ISO Report Host

HOGP/RH/HGIPS/BV-01-C [Valid HID ISO packet structure – Output Report type]

- Test Purpose

  Verify that the HID ISO Report Host IUT sends at least one HID ISO Output Report packet with valid Report IDs.

- Reference

  [16] 5.3

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The IUT has at least one Output Report type that supports HID ISO.

- Test Procedure

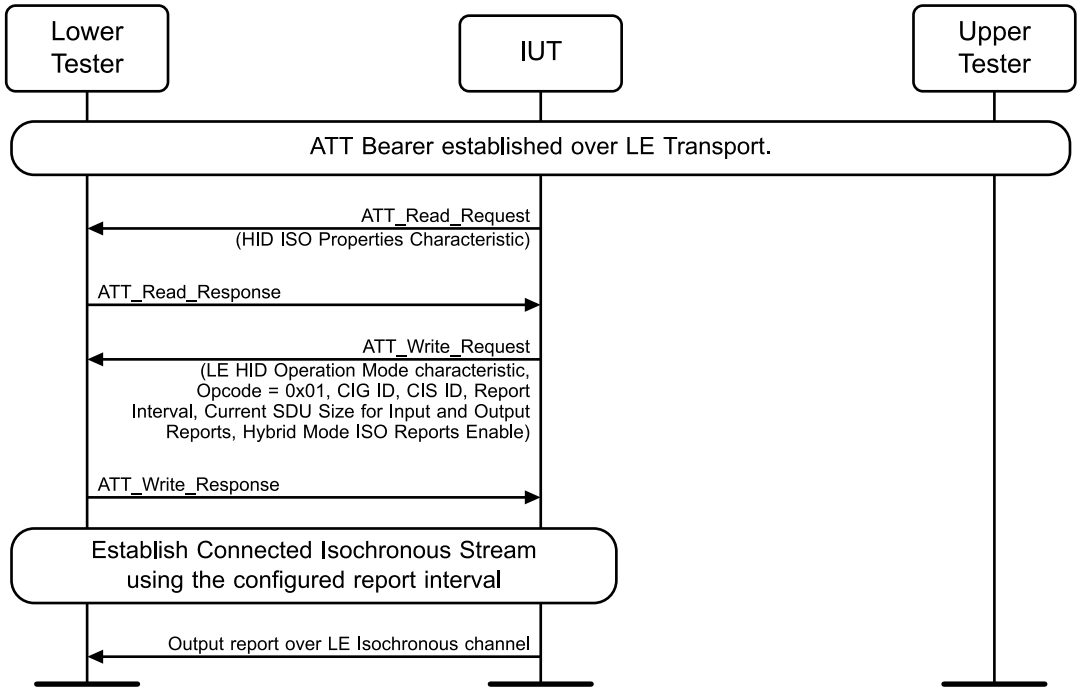


Figure 4.32: HOGP/RH/HGIPS/BV-01-C [Valid HID ISO packet structure – Output Report type] MSC

1. The IUT reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.
2. The IUT executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to CIG ID, CIS ID, report interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable from Step 1.
3. The IUT establishes a CIS using the report interval from Step 2.
4. After successfully establishing the CIS, the IUT sends the HID ISO report data over the LE Isochronous Channel.

- Expected Outcome

  Pass verdict

  The length of the Output Report (including HID ISO overhead), sent by the IUT, is less than or equal to Max_SDU_C_to_P.

  The Current SDU Size for Output Reports is greater than or equal to the length of the Output report (including HID ISO overhead) in Step 2.

  In Step 4, the Lower Tester verifies that the received Report ID(s) in HID ISO report data matches the configured Report ID(s) in the IUT from Step 2.

HOGP/RH/HGIPS/BV-02-C [HID ISO Host – No Report ID, Output Report type]

- Test Purpose

  Verify that the HID ISO Report Host IUT sets the Report ID field to 0 without the Report ID.

- Reference

  [16] 5.3

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The Lower Tester is a HID Device and supports the HID ISO feature.
  - The Lower Tester has an Output Report type that does not include a Report ID in the HID ISO Properties characteristic.

- Test Procedure

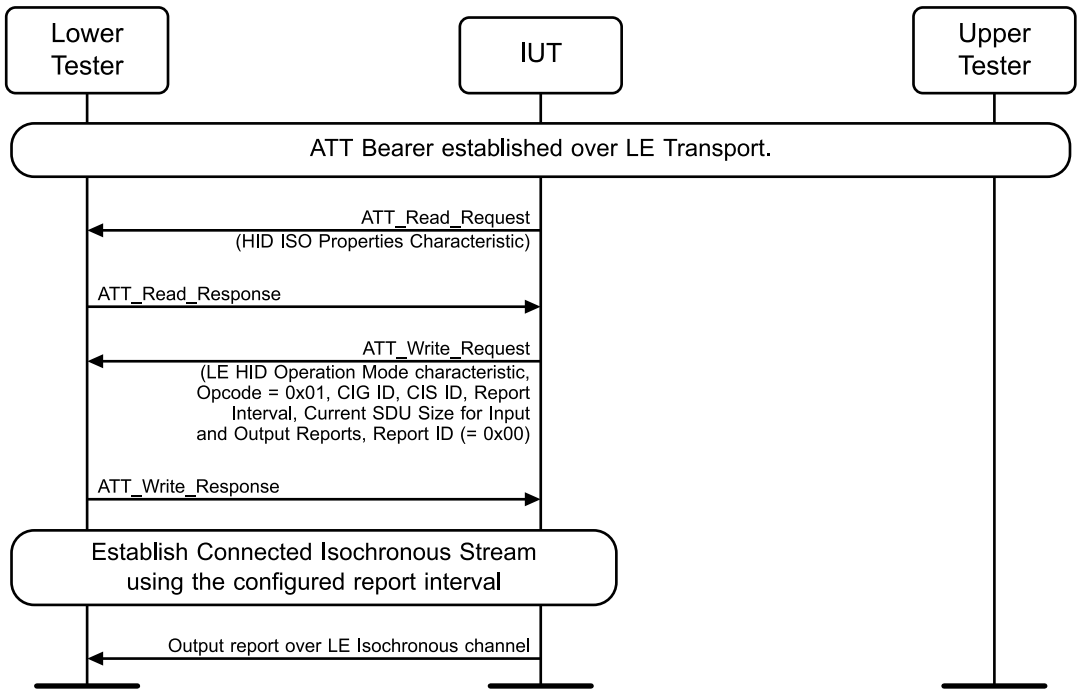


Figure 4.33: HOGP/RH/HGIPS/BV-02-C [HID ISO Host – No Report ID, Output Report type] MSC

1. The IUT reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.
2. The IUT executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to: CIG ID, CIS ID, report interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Report ID set to 0x00.
3. The IUT establishes a CIS using the report interval from Step 2.
4. After successfully establishing the CIS, the IUT sends the HID ISO report data over the LE Isochronous Channel.

- Expected Outcome

  Pass verdict

The length of the Output Report (including HID ISO overhead), sent by the IUT, is less than or equal to Max_SDU_C_to_P in Step 4.

The Current SDU Size for Output Reports is greater than or equal to the length of the output report (including HID ISO overhead) in Step 2.

After Step 4, the HID ISO packets sent contain reports with Report ID set to 0.

HOGP/RH/HGIPS/BV-03-C [HID ISO Host – Input Report type]

- Test Purpose

  Verify that the HID ISO Report Host IUT receives Input reports and delivers the HID reports to the Upper Tester.

- Reference

  [16] 5.3

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The Lower Tester is a HID Device and supports the HID ISO feature.
  - The Lower Tester has at least one Input Report Type that can support HID ISO.

- Test Procedure

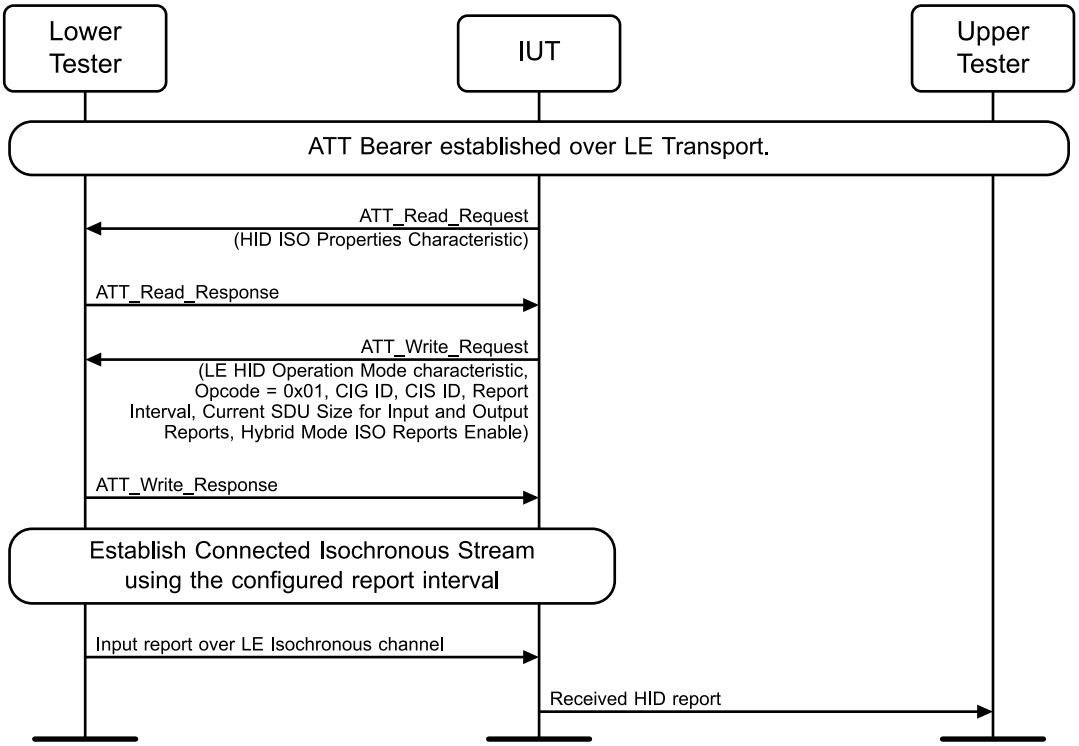


Figure 4.34: HOGP/RH/HGIPS/BV-03-C [HID ISO Host – Input Report type] MSC

1. The IUT reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.
2. The IUT executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to CIG ID, CIS ID, report interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable from Step 1.
3. The IUT establishes a CIS using the report interval from Step 2.
4. After successfully establishing the CIS, the Lower Tester sends HID ISO reports over the LE Isochronous Channel to the IUT.
5. The IUT sends the received HID reports in Step 4 to the Upper Tester.
   - Expected Outcome

     Pass verdict

     The Current SDU Size for Input Reports is greater than or equal to the length of the input report (including HID ISO overhead) in Step 2.

     The IUT delivers the received Input reports to the Upper Tester.

4.9.3 HID ISO Protocol – HID ISO Report Host

HOGP/RH/HGIPT/BV-01-C [Sequence Number Generation for HID ISO with Output Report Type – Incrementing Sequence Number in Multiple Reports in a Single SDU]

- Test Purpose

  Verify that the HID ISO Report Host IUT sends the reports including sequence numbers in sequential order in multiple reports in a single SDU.

- Reference

  [16] 5.3, 5.5, 5.6.1, 5.6.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The Lower Tester has at least one Output Report Type that can support HID ISO.
  - The Lower Tester is a HID Device and supports the HID ISO feature.
  - The Lower Tester enables the Repetition Supported bit (bit 2) in the Additional Info subfield of the Hybrid Mode ISO Reports field of the HID ISO Properties characteristic.
  - The maximum number of repetitions is set to TSPX_Hybrid_Mode_Max_Repetition IXIT entry.

- Test Procedure

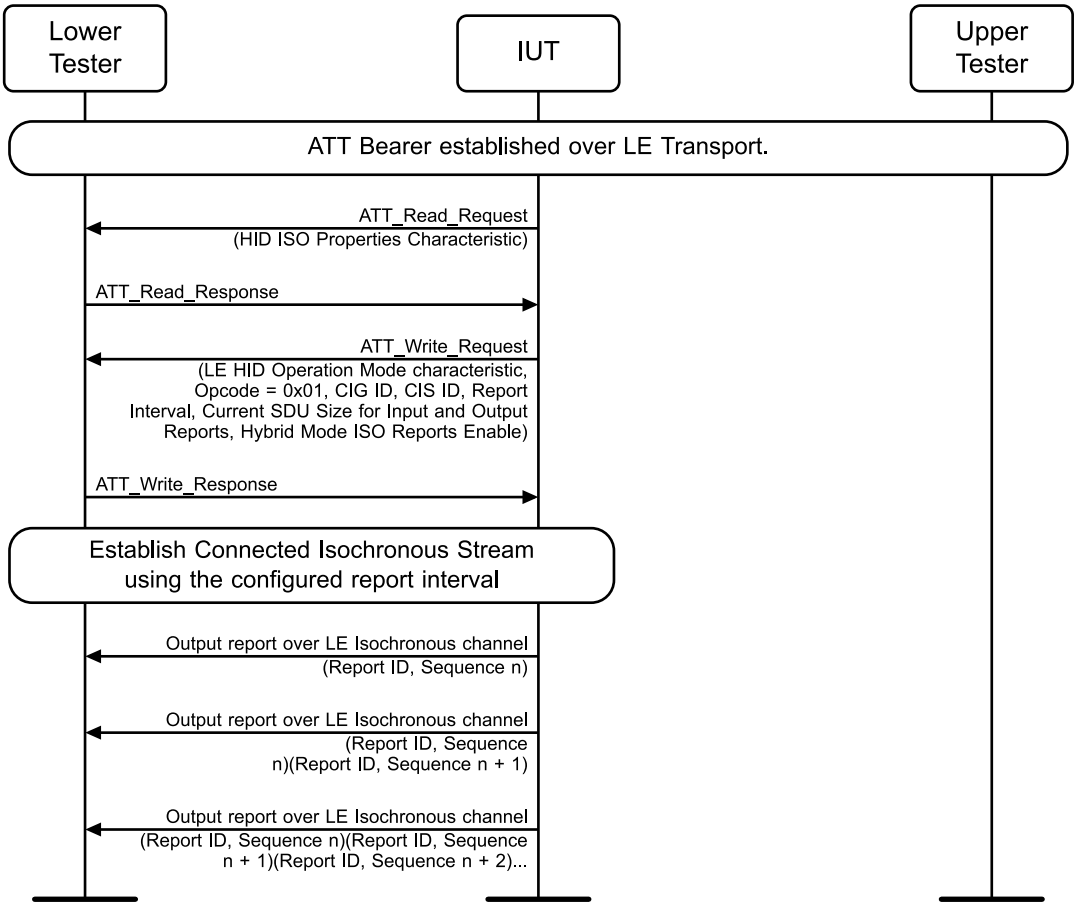


Figure 4.35: HOGP/RH/HGIPT/BV-01-C [Sequence Number Generation for HID ISO with Output Report Type – Incrementing Sequence Number in Multiple Reports in a Single SDU] MSC

1. The IUT reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.
2. The IUT executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to CIG ID, CIS ID, Report Interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable for one output report type from Step 1.
3. The IUT establishes a CIS using the report interval from Step 2.
4. After successfully establishing the CIS, the IUT sends the HID ISO report data over the LE Isochronous Channel.
5. The IUT sends multiple reports in a single SDU.

- Expected Outcome

  Pass verdict

  The Current SDU Size for Output Reports is greater than or equal to the length of the output report (including HID ISO overhead) multiplied by the repetition number in TSPX_Hybrid_Mode_Max_Repetition.

  The Lower Tester verifies the following HID ISO Packet Structure at Step 5:

- The received Report ID(s) in HID ISO report data matches the configured Report ID(s) in the IUT from Step 2.
- The sequence numbers are in ascending order.
- There are no skipped sequence numbers within the same SDU.

HOGP/RH/HGIPT/BV-02-C [Sequence Number Handling for HID ISO with Input Report Type in Multiple Reports in a Single SDU]

- Test Purpose

  Verify that the HID ISO Report Host IUT receives multiple reports in a single SDU and delivers the HID report to the Upper Tester.

- Reference

  [16] 5.3, 5.5, 5.6.1, 5.6.2

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The Lower Tester is a HID Device and supports the HID ISO feature.
  - The Lower Tester enables the Repetition Supported bit (bit 2) in the Additional Info subfield of the Hybrid Mode ISO Reports field of the HID ISO Properties characteristic.

    The maximum number of repetitions is set to TSPX_Hybrid_Mode_Max_Repetition IXIT entry.

- Test Procedure

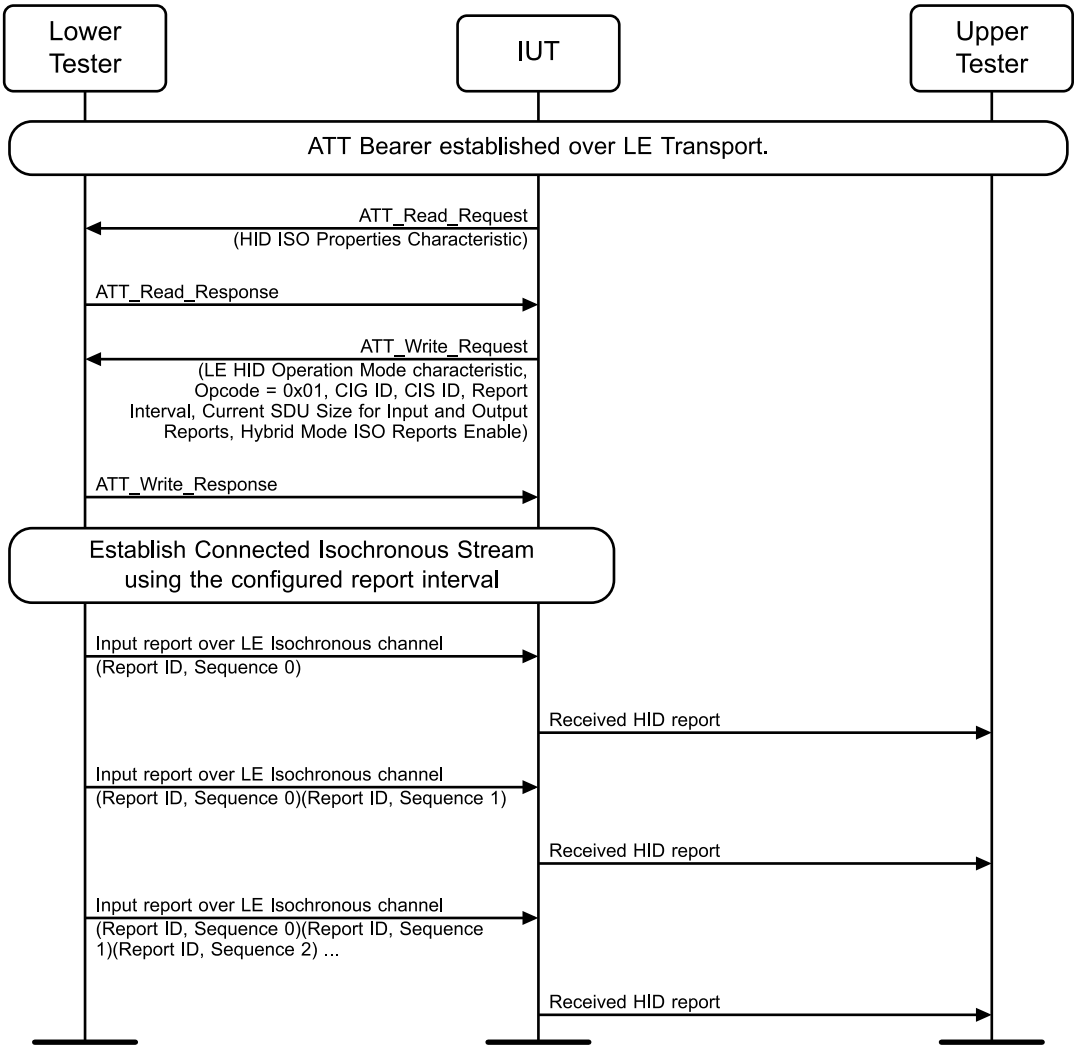


Figure 4.36: HOGP/RH/HGIPT/BV-02-C [Sequence Number Handling for HID ISO with Input Report Type in Multiple Reports in a Single SDU] MSC

1. The IUT reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.
2. The IUT executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to CIG ID, CIS ID, Report Interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable for one input report type from Step 1.
3. The IUT establishes a CIS using the report interval from Step 2.
4. After successfully establishing the CIS, the Lower Tester repeatedly sends multiple HID ISO reports using a single SDU over the LE Isochronous Channel such that a Sequence Number rollover is guaranteed to occur.
5. The IUT sends the received HID reports in Step 4 to the Upper Tester.

- Expected Outcome

  Pass verdict

The Current SDU Size for Input Reports is greater than or equal to the length of the input report (including HID ISO overhead) multiplied by the repetition number in TSPX_Hybrid_Mode_Max_Repetition.

The IUT delivers the most recently received report to the Upper Tester, even when the Sequence Number rolls over from 255 to 0.

HOGP/RH/HGIPT/BV-03-C [Output Report with Confirmation]

- Test Purpose

  Verify that the HID ISO Report Host IUT receives reports in the Confirmation mode and delivers the HID report to the Upper Tester.

- Reference

  [16] 5.4, 5.4.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The Lower Tester is a HID Device and supports the HID ISO feature.
  - The Lower Tester supports at least one Output Report Type with the Confirmation mode.
  - The Lower Tester enables the Confirmation bit (bit 1) in the Additional Info subfield of the Hybrid Mode ISO Reports field of the HID ISO Properties characteristic.

- Test Procedure

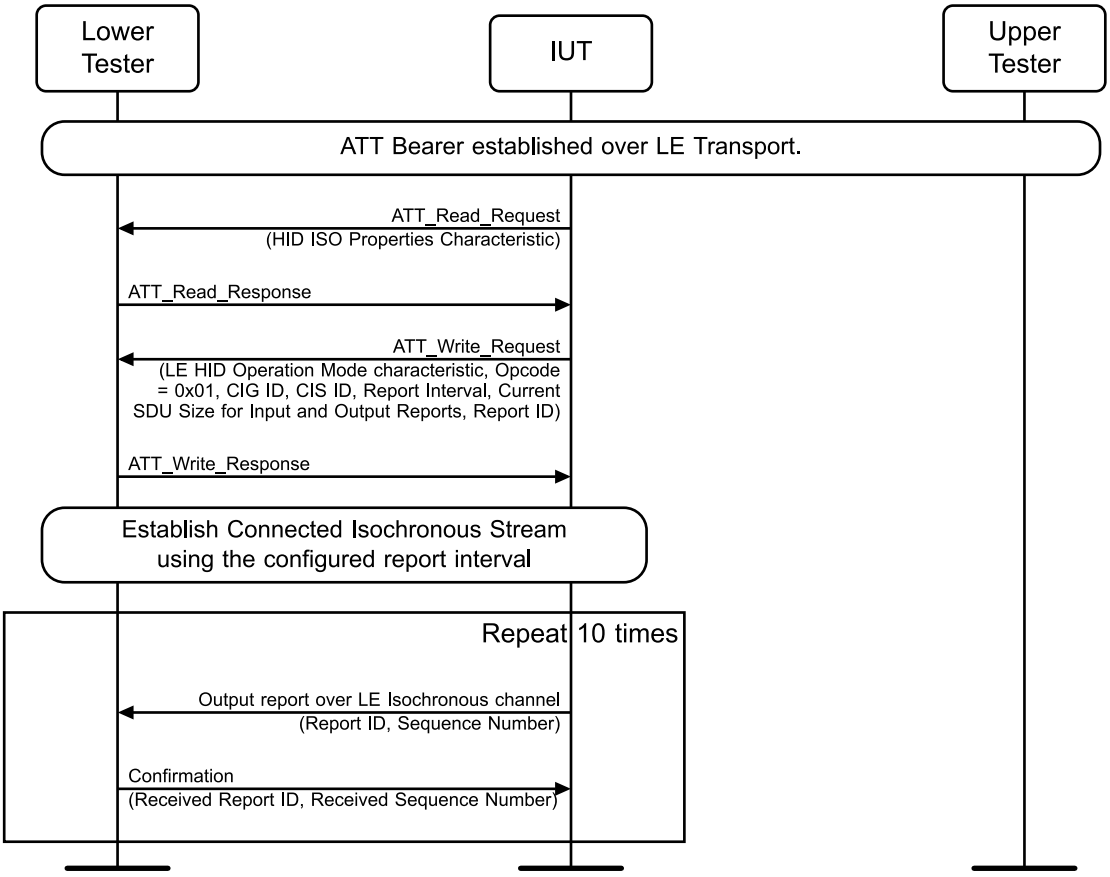


Figure 4.37: HOGP/RH/HGIPT/BV-03-C [Output Report with Confirmation] MSC

1. The IUT reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.
2. The IUT executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to CIG ID, CIS ID, Report Interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable for one output report type into the Hybrid Mode ISO Reports sub-field from Step 1.
3. The IUT establishes a CIS using the report interval from Step 2.

   Repeat Steps 4–5 at least 10 times using the Confirmation mode.

4. The IUT sends the HID ISO Output Report data over the LE Isochronous Channel.
5. The Lower Tester sends a HID ISO confirmation with the sequence number and the Report ID values equal to values of the same fields in the received HID ISO packet.

- Expected Outcome

  Pass verdict

  The Current SDU Size for Output Reports is greater than or equal to the length of the output report (including HID ISO overhead) in Step 2.

  The IUT does not increase the sequence number until the receipt of a HID ISO confirmation in Step 4.

The IUT does not send the report with the same sequence number after Step 5.

4.10 HID ISO Device

4.10.1 Additional Service Requirements for HID ISO support – HID ISO Device HOGP/HD/HGDC/BV-01-C [Report IDs in Multiple HID Services]

- Test Purpose

  Verify that all Report IDs are unique when the HID ISO Device IUT has more than one instance of the HID Service.

- Reference

  [16] 3.1.7

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The IUT has more than one Report Type that can support HID ISO.
  - The IUT is in Default Operation Mode.
  - The Lower Tester is a Report Host and supports the HID ISO feature.
  - The Lower Tester has discovered all HID services.

- Test Procedure

  1. The Lower Tester reads the Report Map Characteristic by executing a GATT Read Characteristic Value sub-procedure.
  2. The Lower Tester reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.

- Expected Outcome

  Pass verdict

  The Lower Tester verifies that all Report IDs are unique within each Report Type in the IUT.

4.10.2 Operation Mode Behavior – HID ISO Device HOGP/HD/HGIOM/BV-01-C [Change Operation Mode from Host]

- Test Purpose

  Verify that the HID ISO Device IUT changes the LE HID Operation Mode characteristic when requested by the HID Report Host.

- Reference

  [16] 5.2, 5.3, 6.5.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The IUT has at least one Input Report Type that can support HID ISO.
  - The IUT is in Default Operation Mode.
  - The Lower Tester is a Report Host and supports the HID ISO feature.
- Test Procedure

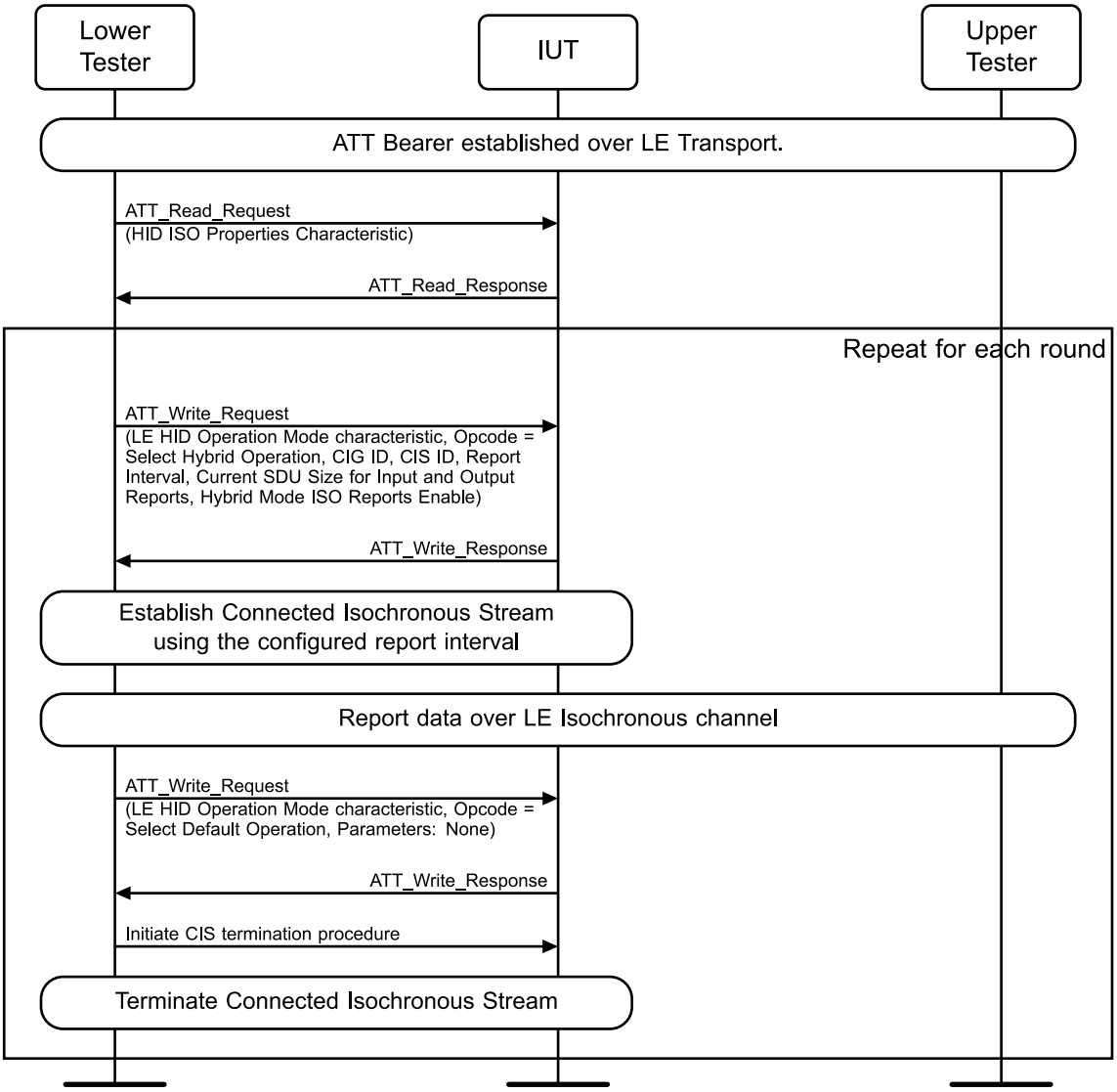


Figure 4.38: HOGP/HD/HGIOM/BV-01-C [Change Operation Mode from Host] MSC

1. The Lower Tester reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.

   Repeat Steps 2–6 for each supported Report Interval in Table 4.7. If the Report Interval is not supported, skip the round.

2. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to CIG ID, CIS ID, Report Interval in Table 4.7, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable from Step 1.
3. The Lower Tester establishes a CIS using the report interval from Step 2.
4. After successfully establishing the CIS, the HID ISO report data is sent over the LE Isochronous Channel.
5. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x02 (Select Default Operation Mode) and

no Parameter field.

6. The Lower Tester initiates the CIS Termination procedure.

Rounds	Report Interval
1	1 ms
2	1.25 ms
3	2 ms
4	2.5 ms
5	3 ms
6	3.75 ms
7	4 ms
8	5 ms
9	7.5 ms

Table 4.7: Change Operation Mode from Host rounds

- Expected Outcome

  Pass verdict

  The Lower Tester and the IUT open a CIS in Step 3.

  The IUT sends the HID ISO report data over the LE Isochronous Channel in Step 4.

  The length of the Input Report (including HID ISO overhead), sent by the IUT, is less than or equal to Max_SDU_P_to_C.

  The Lower Tester and the IUT terminate the CIS in Step 6.

HOGP/HD/HGIOM/BV-02-C [Configure HID ISO Operation Modes – HID ISO Device requested to change operation mode]

- Test Purpose

  Verify that the HID ISO Device IUT can request to change the LE HID Operation Mode characteristic when it supports the Device Mode Change Supported feature.

- Reference

  [16] 5.2, 5.2.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The IUT has at least one Report Type that can support HID ISO.

- The IUT is in Default Operation Mode.
- The IUT supports the Device Mode Change Supported feature in the HID ISO Properties Characteristic.
- The LE HID Operation Mode characteristic is configured for indication.
- The Lower Tester is a Report Host and supports the HID ISO feature.

• Test Procedure

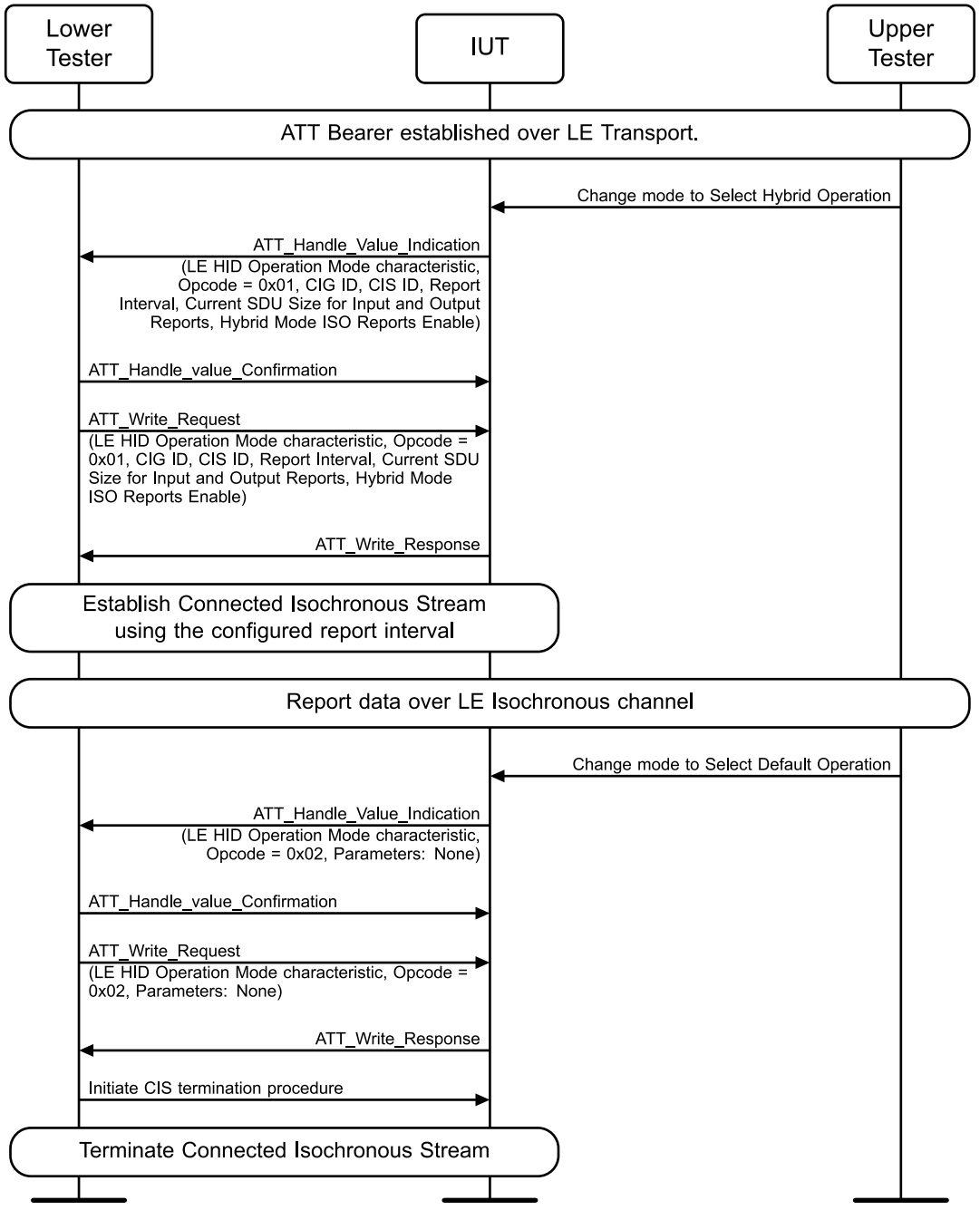


Figure 4.39: HOGP/HD/HGIOM/BV-02-C [Configure HID ISO Operation Modes – HID ISO Device requested to change operation mode] MSC

1. The IUT sends an Indication with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to CIG ID, CIS ID, Report Interval, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and the Hybrid Mode ISO Reports Enable.
2. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the received parameters in Step 1.
3. The Lower Tester establishes a CIS using the report interval from Step 2.
4. After successfully establishing the CIS, the HID ISO report data is sent over the LE Isochronous Channel.
5. The IUT sends an Indication with the Opcode field set to 0x02 (Select Default Operation Mode) and no Parameters field.
6. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x02 (Select Default Operation Mode) and no Parameters field.
7. The Lower Tester initiates the CIS Termination procedure.

- Expected Outcome

  Pass verdict

  The Lower Tester and the IUT open a CIS in Step 3.

  The IUT sends the HID ISO report data over the LE Isochronous Channel in Step 4.

  If the configured report type is Input Report:

  - The IUT sends the length of the Input Report (including HID ISO overhead), and it is less than or equal to Max_SDU_P_to_C in Step 4.

  If the configured report type is Output Report:

  - The Lower Tester sends the length of the Output Report (including HID ISO overhead), and it is less than or equal to Max_SDU_C_to_P in Step 4.

  The Current SDU Size for Reports is greater than or equal to the length of the report (including HID ISO overhead) in Step 1.

  The Lower Tester and the IUT terminate the CIS in Step 7.

HOGP/HD/HGIOM/BI-01-C [HID Device is already in the requested state]

- Test Purpose

  Verify that the HID ISO Device IUT responds to a HID Host initiated Operation Mode change with an error code when the IUT is already in the requested state.

- Reference

  [16] 5.2.1

- Initial Condition

- Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
- The IUT has at least one Report Type that can support HID ISO.
- The IUT defines the Available Report Intervals field in the HID ISO Properties Characteristic.
- The IUT is in the Default Operation Mode.
- The Lower Tester is a Report Host and supports the HID ISO feature.

- Test Procedure

  1. The Lower Tester reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.
  2. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x02 (Select Default Operation Mode) and no Parameters field.
  3. The IUT returns an ATT_ERROR_RSP with Error Code set to 0x82 (Device already in requested state).
  4. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to CIG ID, CIS ID, Report Interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable from Step 1.
  5. The IUT configures the HID ISO report data path from GATT to LE Isochronous Channel.
  6. The Lower Tester establishes a CIS using the report interval from Step 4.
  7. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the values in Step 4.
  8. The IUT returns an ATT_ERROR_RSP with Error Code set to 0x82 (Device already in requested state).

- Expected Outcome

  Pass verdict

  In Steps 3 and 8, the IUT responds to the Lower Tester with the ATT_ERROR_RSP with Error Code set to 0x82 (Device already in requested state).

HOGP/HD/HGIOM/BI-02-C [Receiving LE HID Operation Mode with an RFU value]

- Test Purpose

  Verify that the HID ISO Device IUT responds with an error code to the HID Host when the Lower Tester configures LE HID Operation Mode characteristic with an RFU value.

- Reference

  [16] 5.2.1

- Initial Condition

- Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
- The IUT has at least one HID Report Type that can support HID ISO.
- The IUT defines the Available Report Intervals field in the HID ISO Properties Characteristic.
- The IUT is in the Default Operation Mode.
- The Lower Tester is a Report Host and supports the HID ISO feature.

- Test Procedure

  1. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to an RFU value and Parameters set to CIG ID, CIS ID, Report Interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable.
  2. The IUT returns an ATT_ERROR_RSP with Error Code set to 0x81 (Opcode outside range).

- Expected Outcome

  Pass verdict

  In Step 2, the IUT responds to the Lower Tester with the ATT_ERROR_RSP with Error Code set to 0x81 (Opcode outside range).

HOGP/HD/HGIOM/BI-03-C [Selecting Invalid Report Intervals]

- Test Purpose

  Verify that the HID ISO Device IUT responds with an error code to the HID Host when the Lower Tester configures the LE HID Operation Mode characteristic with multiple report intervals or an unsupported report interval.

- Reference

  [16] 5.2.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The IUT has at least one Report Type that can support HID ISO.
  - The IUT is in the Default Operation Mode.
  - The Lower Tester is a Report Host and supports the HID ISO feature.

- Test Procedure

  1. The Lower Tester reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.

     Repeat Steps 2–3 for each round in Table 4.8.

2. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode), CIG ID, CIS ID, Report Interval specified in Table 4.8, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable from Step 1.
3. The IUT returns an ATT_ERROR_RSP with Error Code set to 0x83 (Unsupported feature).

Round	Report Interval(s)
1	Unsupported report interval from HID ISO Properties characteristic (Skip this round if HID Device supports all report intervals.)
2	RFU
3	Multiple supported report intervals from HID ISO Properties characteristic. If the HID Device supports all supported report intervals, select 5ms and RFU.

Table 4.8: Selecting Invalid Report Intervals rounds

- Expected Outcome

  Pass verdict

  For each round: In Step 3, the IUT responds to the Lower Tester with the ATT_ERROR_RSP with Error Code set to 0x83 (Unsupported feature).

HOGP/HD/HGIOM/BI-04-C [Selecting Invalid Report Indices]

- Test Purpose

  Verify that the HID ISO Device IUT responds with an error code to the HID Host when the Lower Tester configures LE HID Operation Mode characteristic with invalid report indices.

- Reference

  [16] 5.2.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The IUT has at least one Report Type that can support HID ISO.
  - The IUT is in the Default Operation Mode.
  - The Lower Tester is a Report Host and supports the HID ISO feature.
- Test Procedure
  1. The Lower Tester reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.

     Repeat Steps 2–3 for each round in Table 4.9.

2. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to: CIG ID, CIS ID, Report Interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable specified in Table 4.9.
3. The IUT returns an ATT_ERROR_RSP with Error Code set to 0x83 (Unsupported feature).

Round	Invalid Report Indices
1	255 (RFU)
2	0, 1, 2 (more than 2 report indices)
3	Last available index + 1 (Skip this round if HID Device supports 2 report indices.)

Table 4.9: Selecting Invalid Report Indices rounds

- Expected Outcome

  Pass verdict

  For each round: In Step 3, the IUT responds with the error code 0x83 (Unsupported feature).

4.10.3 HID ISO Packet Structure – HID ISO Device HOGP/HD/HGIPS/BV-01-C [Input Report Type]

- Test Purpose

  Verify that the HID ISO Device IUT sends multiple HID ISO Input Reports with the same Report ID.

- Reference

  [16] 5.4

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The IUT has at least one Input Report Type that can support HID ISO.
  - The IUT is in Default Operation Mode.
  - The Lower Tester is a Report Host and supports the HID ISO feature.
- Test Procedure

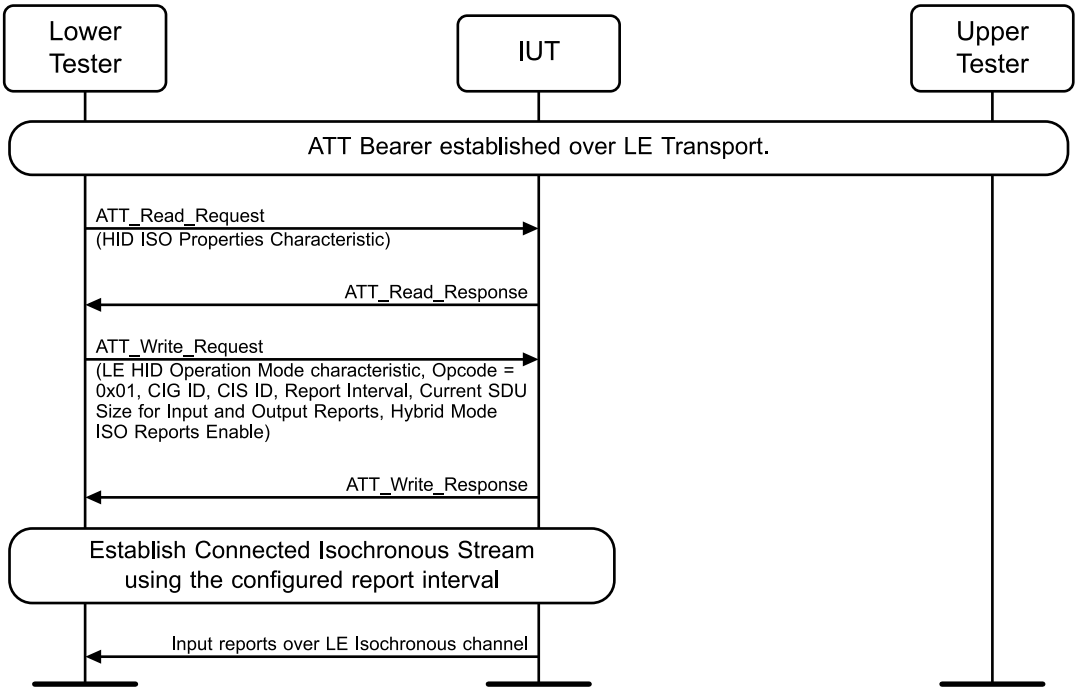


Figure 4.40: HOGP/HD/HGIPS/BV-01-C [Input Report Type] MSC

1. The Lower Tester reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.
2. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to CIG ID, CIS ID, Report Interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable from Step 1.
3. The Lower Tester establishes a CIS using the report interval from Step 2.
4. After successfully establishing the CIS, the IUT sends multiple HID ISO Input Report data over the LE Isochronous Channel.

- Expected Outcome

  Pass verdict

  At Step 4, the Lower Tester verifies that the received Report IDs are the same and the other fields in the multiple HID ISO report data are consistent with the format of the HID ISO packet structure.

HOGP/HD/HGIPS/BV-02-C [Output Report Type]

- Test Purpose

  Verify that the HID ISO Device IUT receives multiple HID ISO Output Reports with the same Report ID.

- Reference

  [16] 5.4

- Initial Condition

- Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
- The Lower Tester has at least one Output Report Type supporting HID ISO.
- The IUT supports at least one Report Interval in the Available Report Intervals field.
- The Lower Tester is a Report Host and supports the HID ISO feature.

• Test Procedure

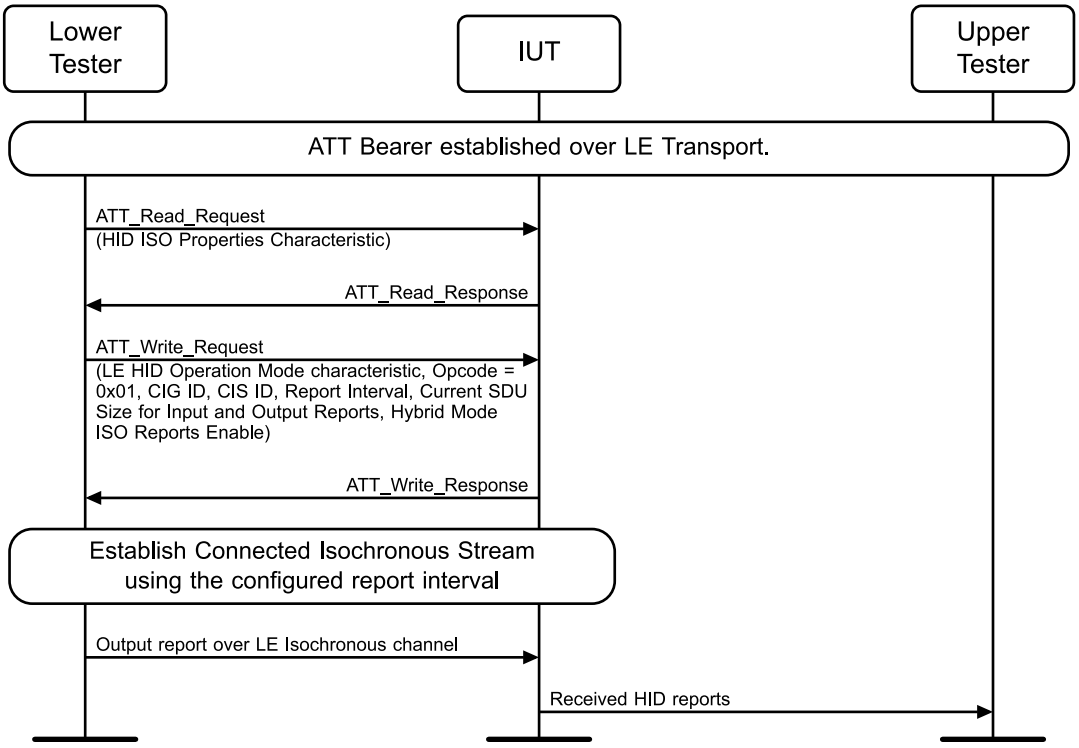


Figure 4.41: HOGP/HD/HGIPS/BV-02-C [Output Report Type] MSC

1. The Lower Tester reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.
2. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to CIG ID, CIS ID, Report Interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable from Step 1.
3. The Lower Tester establishes a CIS using the report interval from Step 2.
4. After successfully establishing the CIS, the Lower Tester sends multiple HID ISO Output Report data over the LE Isochronous Channel.
5. The IUT sends the received HID reports in Step 4 to the Upper Tester.

• Expected Outcome

Pass verdict

At Steps 4 and 5, the IUT can process the multiple Output Reports and report the processed data to the Upper Tester.

HOGP/HD/HGIPS/BV-03-C [No Report ID, Input Report Type]

- Test Purpose

  Verify that the HID ISO Device IUT sends HID ISO Input Reports without Report ID.

- Reference

  [16] 5.4

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The IUT has an Input Report Type that does not include a Report ID in HID ISO Properties characteristic.
  - The Lower Tester is a Report Host and supports the HID ISO feature.

- Test Procedure

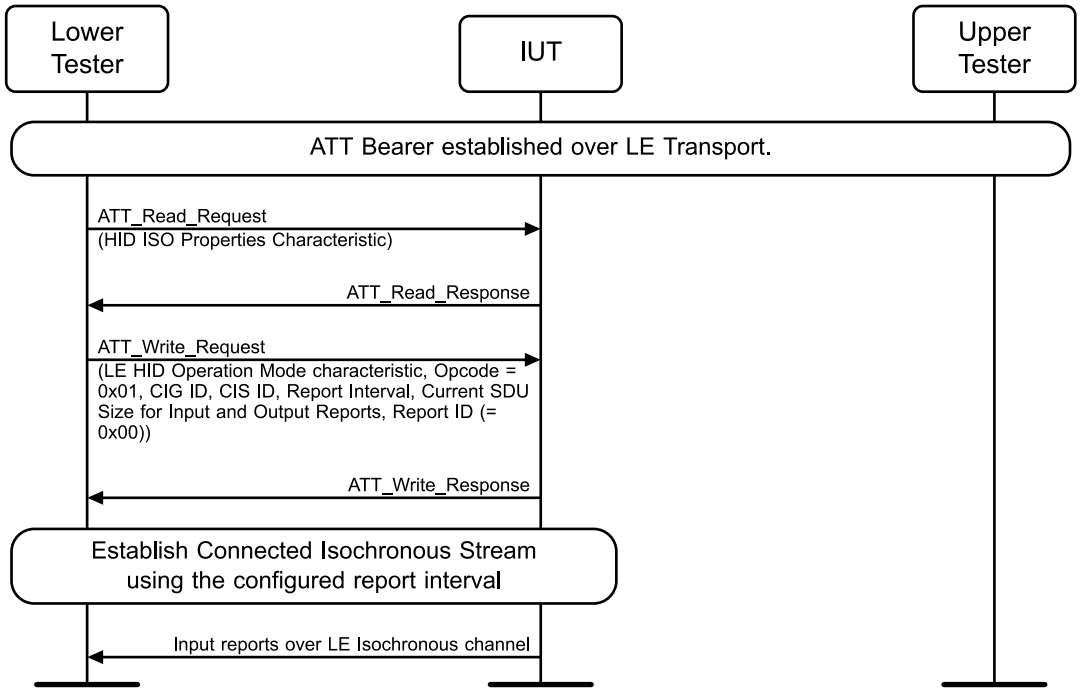


Figure 4.42: HOGP/HD/HGIPS/BV-03-C [No Report ID, Input Report Type] MSC

1. The Lower Tester reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.
2. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to CIG ID, CIS ID, Report Interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Report ID set to 0x00.
3. The Lower Tester establishes a CIS using the report interval from Step 2.

4. After successfully establishing the CIS, the IUT sends HID ISO Input Report data over the LE Isochronous Channel.

- Expected Outcome

  Pass verdict

  After Step 4, the HID ISO packets sent contain reports with Report ID set to 0.

4.10.4 HID ISO Protocol – HID ISO Device HOGP/HD/HGIPT/BV-01-C [Input Report with Confirmation]

- Test Purpose

  Verify that the HID ISO Device IUT can send the Input reports using the Confirmation.

- Reference

  [16] 5.4, 5.5.1, 5.6.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The IUT is in Default Operation Mode.
  - The IUT has at least one Input Report Type that can support HID ISO.
  - The IUT enables the Confirmation bit (bit 1) in the Additional Info subfield of the Hybrid Mode ISO Reports field of the HID ISO Properties characteristic.
  - The Lower Tester is a Report Host and supports the HID ISO feature.

- Test Procedure

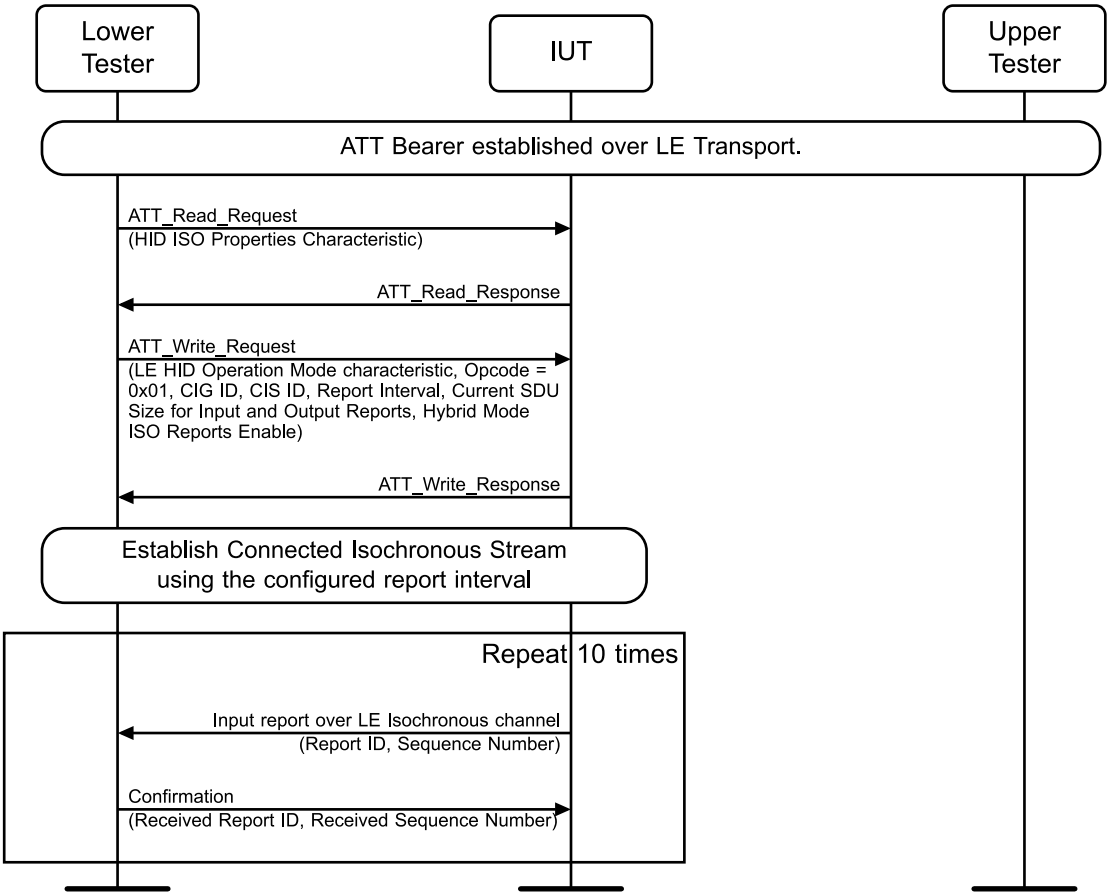


Figure 4.43: HOGP/HD/HGIPT/BV-01-C [Input Report with Confirmation] MSC

1. The Lower Tester reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.
2. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to: CIG ID, CIS ID, Report Interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable and sub-field Confirmation Enable.
3. The Lower Tester establishes a CIS using the report interval from Step 2.

   Repeat Steps 4–5 at least 10 times using the Confirmation.

4. The IUT sends the HID ISO Input Report data over the LE Isochronous Channel.
5. The Lower Tester sends a HID ISO confirmation with the sequence number and the Report ID values equal to values of the same fields in Step 4.

- Expected Outcome

  Pass verdict

  The IUT does not increase the sequence number until the receipt of a HID ISO confirmation in Step 5.

  The IUT does not send the report with the same sequence number after Step 5.

HOGP/HD/HGIPT/BV-02-C [Sequence Number Generation for HID ISO with Input Report Type – Incrementing Sequence Number in Multiple Reports in a Single SDU]

- Test Purpose

  Verify that the HID ISO Device IUT can send the Input reports including sequence numbers in sequential order in multiple reports in a single SDU.

- Reference

  [16] 5.4

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The IUT is in Default Operation Mode.
  - The IUT has at least one Input Report Type that can support HID ISO.
  - The IUT enables the Repetition bit (bit 2) in the Additional Info subfield of the Hybrid Mode ISO Reports field of the HID ISO Properties characteristic.
  - The Lower Tester is a Report Host and supports the HID ISO feature.
  - The maximum number of repetitions is set to TSPX_Hybrid_Mode_Max_Repetition IXIT entry.

- Test Procedure

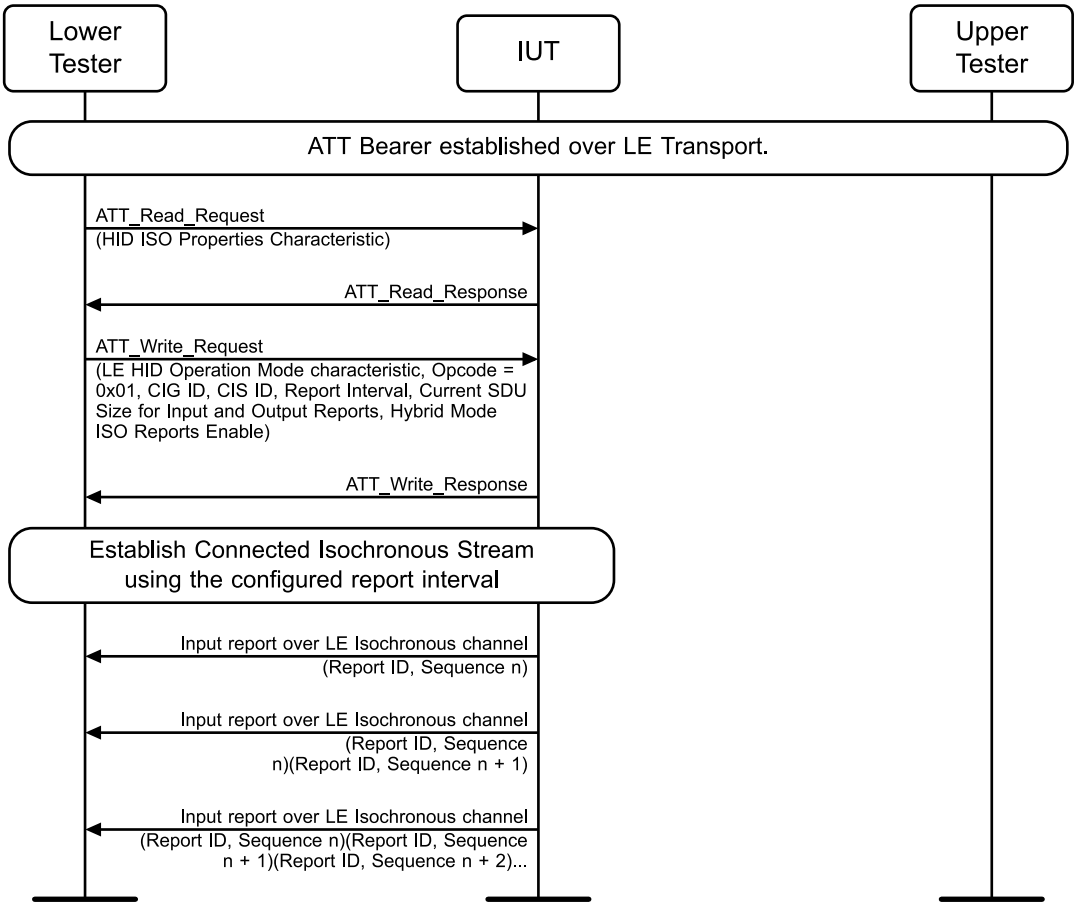


Figure 4.44: HOGP/HD/HGIPT/BV-02-C [Sequence Number Generation for HID ISO with Input Report Type – Incrementing Sequence Number in Multiple Reports in a Single SDU] MSC

1. The Lower Tester reads the HID ISO Properties characteristic by executing a GATT Read Characteristic Value sub-procedure.
2. The Lower Tester executes a GATT Write Characteristic Value sub-procedure for the LE HID Operation Mode characteristic with the Opcode field set to 0x01 (Select Hybrid Operation Mode) and Parameters set to CIG ID, CIS ID, Report Interval set to 5 ms, Current SDU Size for Input Reports, Current SDU Size for Output Reports, and Hybrid Mode ISO Reports Enable and sub-field Repetition Enable.
3. The Lower Tester establishes a CIS using the report interval from Step 2.
4. After successfully establishing the CIS, the IUT sends the HID ISO report data over the LE Isochronous Channel.
5. The IUT sends multiple Input reports in a single SDU.

- Expected Outcome

  Pass verdict

  The Lower Tester sets the Current SDU Size for Input Reports to be greater than or equal to the length of the input report (including HID ISO overhead) multiplied by the repetition number in TSPX_Hybrid_Mode_Max_Repetition from Step 2.

The Lower Tester verifies following HID ISO Packet Structure at Step 5:

- The received Report ID(s) in HID ISO report data matches the configured Report ID(s) in the IUT from Step 2.
- The sequence numbers are in ascending order.
- There are no skipped sequence numbers within the same SDU.
- The number of repetitions matches the repetition number in TSPX_Hybrid_Mode_Max_Repetition.

5 Test case mapping

The Test Case Mapping Table (TCMT) maps test cases to specific requirements in the ICS. The IUT is 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 HID Over GATT Profile (HOGP) [4].

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

Test Case(s): The applicable test case identifiers are required for Bluetooth Qualification if the corresponding y/x references defined in the Item column are supported.

For the purpose and structure of the ICS/IXIT, refer to [1].

Item	Feature	Test Case(s)
HOGP 1/2 AND HOGP 9/1	HID Services – RH	HOGP/RH/CGGIT/SER/BV-01-C
HOGP 1/3 AND HOGP 10/1	HID Services – BH	HOGP/BH/CGGIT/SER/BV-01-C
HOGP 1/2 AND HOGP 9/2	Battery Service – RH	HOGP/RH/CGGIT/SER/BV-02-C
HOGP 1/3 AND HOGP 10/2	Battery Service – BH	HOGP/BH/CGGIT/SER/BV-02-C
HOGP 1/2 AND HOGP 9/3	Device Information Service – RH	HOGP/RH/CGGIT/SER/BV-03-C
HOGP 1/3 AND HOGP 10/3	Device Information Service – BH	HOGP/BH/CGGIT/SER/BV-03-C
HOGP 1/2 AND HOGP 9/17	HID ISO service – RH	HOGP/RH/CGGIT/SER/BV-04-C
HOGP 3/1 AND NOT HOGP 3/2	HID Service – Single Instance	HOGP/HD/SGGIT/SER/BV-01-C
HOGP 3/1 AND HOGP 3/2	HID Service – Multiple Instances	HOGP/HD/SGGIT/SER/BV-02-C
HOGP 3/3	Battery Service	HOGP/HD/SGGIT/SER/BV-03-C
HOGP 3/4	Device Information Service	HOGP/HD/SGGIT/SER/BV-04-C
HOGP 3/5	Scan Parameters Service	HOGP/HD/SGGIT/SER/BV-05-C
HOGP 3/6	HID ISO Service	HOGP/HD/SGGIT/SER/BV-06-C
HOGP 1/2 AND HOGP 9/5	Report Map Characteristics for HID Services	HOGP/RH/CGGIT/CHA/BV-01-C
HOGP 1/2 AND HOGP 9/6	External Report Reference Characteristic Descriptors for Report Map	HOGP/RH/CGGIT/DES/BV-01-C

Item	Feature	Test Case(s)
HOGP 1/2 AND HOGP 9/7	Discover Report Characteristics for HID Services	HOGP/RH/HGDC/BV-03-C
HOGP 1/2 AND HOGP 9/8	Discover Client Characteristic Configuration Descriptor for Report	HOGP/RH/HGDC/BV-04-C
HOGP 1/2 AND HOGP 9/9	Discover Report Reference Characteristic Descriptors for Report	HOGP/RH/HGDC/BV-05-C
HOGP 1/2 AND HOGP 9/10	HID Information Characteristics for HID Services	HOGP/RH/CGGIT/CHA/BV-02-C
HOGP 1/2 AND HOGP 9/11	HID Control Point Characteristics for HID Services	HOGP/RH/CGGIT/CHA/BV-03-C
HOGP 1/2 AND HOGP 9/12	Protocol Mode characteristics for HID Services – RH	HOGP/RH/CGGIT/CHA/BV-04-C
HOGP 1/3 AND HOGP 10/4 AND (HOGP 14/5 OR HOGP 14/6)	Protocol Mode characteristics for HID Services – BH	HOGP/BH/CGGIT/CHA/BV-01-C
HOGP 1/2 AND HOGP 9/13	Battery Level Characteristic for Battery Service – RH	HOGP/RH/CGGIT/CHA/BV-05-C
HOGP 1/3 AND HOGP 10/10 AND (HOGP 14/5 OR HOGP 14/6)	Battery Level Characteristic for Battery Service – BH	HOGP/BH/CGGIT/CHA/BV-05-C
HOGP 1/2 AND HOGP 9/15	PnP ID Characteristic for Device Information Service – RH	HOGP/RH/CGGIT/CHA/BV-06-C
HOGP 1/2 AND HOGP 9/18	HID ISO Properties Characteristic for HID ISO Service – RH	HOGP/RH/CGGIT/CHA/BV-07-C
HOGP 1/2 AND HOGP 9/19	LE HID Operation Mode Characteristic for HID ISO Service – RH	HOGP/RH/CGGIT/CHA/BV-08-C
HOGP 1/3 AND HOGP 10/12 AND (HOGP 14/5 OR HOGP 14/6)	PnP ID Characteristic for Device Information Service – BH	HOGP/BH/CGGIT/CHA/BV-06-C
HOGP 1/3 AND HOGP 10/5 AND (HOGP 14/5 OR HOGP 14/6)	Boot Keyboard Input Report Characteristics for HID Services	HOGP/BH/CGGIT/CHA/BV-02-C
HOGP 1/3 AND HOGP 10/7 AND (HOGP 14/5 OR HOGP 14/6)	Boot Keyboard Output Report Characteristics for HID Services	HOGP/BH/CGGIT/CHA/BV-03-C
HOGP 1/3 AND HOGP 10/8 AND (HOGP 14/5 OR HOGP 14/6)	Boot Mouse Input Report Characteristics for HID Services	HOGP/BH/CGGIT/CHA/BV-04-C
HOGP 1/1 AND HOGP 17/1	HID ISO Properties Characteristic for HID ISO Service – HD	HOGP/HD/SGGIT/CHA/BV-01-C

Item	Feature	Test Case(s)
HOGP 1/1 AND HOGP 17/2 AND NOT HOGP 17/3	LE HID Operation Mode Characteristic for HID ISO Service – HD	HOGP/HD/SGGIT/CHA/BV-02-C
HOGP 1/1 AND HOGP 17/2 AND HOGP 17/3	LE HID Operation Mode Characteristic for HID ISO Service – HD	HOGP/HD/SGGIT/CHA/BV-03-C
HOGP 1/3 AND HOGP 10/9	Discover Client Characteristic Configuration Descriptors for Boot Mouse Input Report	HOGP/BH/HGDC/BV-13-C
HOGP 1/2 AND HOGP 11/2	Read External Report Reference Characteristic Descriptors for Report Map	HOGP/RH/HGRF/BV-02-C
HOGP 1/2 AND HOGP 11/3	Read Report Characteristics: Input Report	HOGP/RH/HGRF/BV-03-C
HOGP 1/2 AND HOGP 11/9	Read Report Reference Characteristic Descriptors	HOGP/RH/HGRF/BV-04-C HOGP/RH/HGRF/BV-06-C HOGP/RH/HGRF/BV-08-C
HOGP 1/2 AND HOGP 11/10	Read Client Characteristic Configuration Descriptors for Report: Input Report	HOGP/RH/HGRF/BV-05-C
HOGP 1/2 AND HOGP 11/5	Read Report Characteristics: Output Report	HOGP/RH/HGRF/BV-19-C
HOGP 1/2 AND HOGP 11/7	Read Report Characteristics: Feature Report	HOGP/RH/HGRF/BV-07-C
HOGP 1/2 AND HOGP 11/17	Read Protocol Mode Characteristics (Get Protocol Mode Command)	HOGP/RH/HGRF/BV-18-C
HOGP 1/3 AND HOGP 12/1	Read Protocol Mode Characteristics (Get Protocol Mode Command)	HOGP/BH/HGRF/BV-18-C
HOGP 1/2 AND HOGP 11/4	Write Report Characteristics: Input Report	HOGP/RH/HGWF/BV-01-C
HOGP 1/2 AND HOGP 11/6	Write Report Characteristics: Output Report	HOGP/RH/HGWF/BV-02-C
HOGP 1/2 AND HOGP 11/8	Write Report Characteristics: Feature Report	HOGP/RH/HGWF/BV-04-C
HOGP 1/2 AND HOGP 11/15	Write HID Control Point Characteristics: Suspend	HOGP/RH/HGWF/BV-05-C

Item	Feature	Test Case(s)
HOGP 1/2 AND HOGP 11/16	Write HID Control Point Characteristics: Exit Suspend	HOGP/RH/HGWF/BV-06-C
HOGP 1/2 AND HOGP 11/18	Write Protocol Mode Characteristics: Set Report Protocol	HOGP/RH/HGWF/BV-07-C
HOGP 1/3 AND HOGP 12/2	Write Protocol Mode Characteristics: Set Boot Protocol	HOGP/BH/HGWF/BV-08-C
HOGP 1/2 AND HOGP 11/11	Report Characteristic: Input Report: Enable Notifications	HOGP/RH/HGCF/BV-01-C
HOGP 1/2 AND HOGP 11/11a	Report Characteristic: Input Report: Disable Notifications	HOGP/RH/HGCF/BV-02-C
HOGP 1/3 AND HOGP 12/6	Boot Keyboard Input Report Characteristic: Enable Notifications	HOGP/BH/HGCF/BV-03-C
HOGP 1/3 AND HOGP 12/6a	Boot Keyboard Input Report Characteristic: Disable Notifications	HOGP/BH/HGCF/BV-04-C
HOGP 1/3 AND HOGP 12/12	Boot Mouse Input Report Characteristic: Enable Notifications	HOGP/BH/HGCF/BV-05-C
HOGP 1/3 AND HOGP 12/12a	Boot Mouse Input Report Characteristic: Disable Notifications	HOGP/BH/HGCF/BV-06-C
HOGP 1/2 AND HOGP 11/24	Report Characteristic: Receive Notifications	HOGP/RH/HGNF/BV-01-C
HOGP 1/3 AND HOGP 12/13	Boot Keyboard or Boot Mouse Input Report Characteristic: Receive Notifications	HOGP/BH/HGNF/BV-02-C HOGP/BH/HGNF/BV-03-C
HOGP 1/3	Boot Host: Ignore Report Notifications	HOGP/BH/HGNF/BI-01-C
HOGP 1/2	Report Host: Ignore Boot Keyboard or Boot Mouse Input Report Notifications	HOGP/RH/HGNF/BI-01-C HOGP/RH/HGNF/BI-02-C
HOGP 1/2 AND HOGP 11/29	Report Host: Change Operation Mode	HOGP/RH/HGIOM/BV-01-C HOGP/RH/HGIOM/BV-02-C
HOGP 1/2 AND HOGP 11/29 AND HOGP 11/34	HID ISO Output Report Validation	HOGP/RH/HGIPS/BV-01-C HOGP/RH/HGIPS/BV-02-C HOGP/RH/HGIPT/BV-01-C

Item	Feature	Test Case(s)
HOGP 1/2 AND HOGP 11/29 AND HOGP 11/33	Sequence Number Handling in Multiple Reports in a Single SDU – Input Report	HOGP/RH/HGIPT/BV-02-C HOGP/RH/HGIPS/BV-03-C
HOGP 1/2 AND HOGP 11/29 AND HOGP 11/34 AND HOGP 21/2	Report Host: Confirmation	HOGP/RH/HGIPT/BV-03-C
HOGP 1/1 AND HOGP 3/2 AND HOGP 3/6	Unique Report IDs in Multiple HID services	HOGP/HD/HGDC/BV-01-C
HOGP 1/1 AND HOGP 3/6	HID Device: LE HID Operation Mode Characteristic	HOGP/HD/HGIOM/BV-01-C HOGP/HD/HGIOM/BI-01-C HOGP/HD/HGIOM/BI-02-C HOGP/HD/HGIOM/BI-03-C HOGP/HD/HGIOM/BI-04-C
HOGP 1/1 AND HOGP 3/6 AND HOGP 17/3 AND HOGP 18/1	HID Device: Change Operation Mode from Device	HOGP/HD/HGIOM/BV-02-C
HOGP 1/1 AND HOGP 3/6 AND HOGP 4/9	HID Device: HID ISO Input report	HOGP/HD/HGIPS/BV-01-C HOGP/HD/HGIPS/BV-03-C
HOGP 1/1 AND HOGP 3/6 AND HOGP 4/10	HID Device: HID ISO Output report	HOGP/HD/HGIPS/BV-02-C
HOGP 1/1 AND HOGP 3/6 AND HOGP 4/9 AND HOGP 18/2	HID Device: Confirmation	HOGP/HD/HGIPT/BV-01-C
HOGP 1/1 AND HOGP 3/6 AND HOGP 4/9 AND HOGP 18/1	HID Device: HID ISO multiple Input reports in a single SDU	HOGP/HD/HGIPT/BV-02-C
HOGP 9/12a	HID SCI Information characteristic	HOGP/RH/CGGIT/CHA/BV-09-C
HOGP 9/12b	HID SCI Mode characteristic	HOGP/RH/CGGIT/CHA/BV-10-C
HOGP 11/36	Write HID Control Point: SCI Default mode	HOGP/RH/HGWF/BV-08-C
HOGP 11/37	Write HID Control Point: SCI Fast mode	HOGP/RH/HGWF/BV-09-C
HOGP 11/38	Write HID Control Point: SCI Low Power mode	HOGP/RH/HGWF/BV-10-C
HOGP 11/39	Write HID Control Point: SCI Full Range mode	HOGP/RH/HGWF/BV-11-C

Table 5.1: Test case mapping

6 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2011-12-27	Adopted by the Bluetooth SIG Board of Directors
	1.0.1r0	2012-05-18	TSE 4714: Value change in Test Procedure and Pass Verdict for HOGP/RH/HGWF/BV-07-I and HOGP/BH/HGWF-BV-08-I (legacy ID: TP/HGWF/RH/BV-07-C and TP/HGWF/BV-08-C). TSE 4789: TCMT update for HIDS/HD/DES/BV-03-C (legacy ID: TP/DES/BV-03-C) TSE 4727: Pass Verdict clarification for HOGP/BH/HGDC/BV-16-I, HOGP/RH/HGDC/BV-16-I (legacy ID: TP/HGDC/HH/BV-16-C) TSE 4728: TCMT update for HOGP/RH/HGCF/BV-02-I (legacy ID: TP/HGCF/RH/BV-02-C) TSE 4674: TCMT update for HOGP/RH/HGDR/BV-01-I (legacy ID: TP/HGDR/RH/BV-01-C)
1	1.0.1	2012-07-24	Prepare for publication.
	1.0.2r1	2012-09-21	TSE 4927: Change all test cases from –C to –I. TSE 4967: Added references to SCPP and HIDS, editorial changes in HOGP/BH/HGWF/BV-08-I (legacy ID: TP/HGWF/BV-08-I), and added cross-references to the TCMT.
2	1.0.2	2012-10-31	Prepare for publication
	1.0.3r00	2014-04-11	TSE 5529: Updated TCMT mapping for HOGP/HD/HGDS/BV-02-I (legacy ID: TP/HGDS/HD/BV-02-I).
3	1.0.3	2014-07-07	TCRL 2014-1 Publication
	1.0.4r00	2015-10-02	TSE 6653: Added cross-reference to HIDS.TS in HOGP (1/1 AND 4/7) in TCMT; revised HOGP (1/3 AND 12/6) and HOGP (1/3 AND 12/12) items in TCMT. TSE 6487: Removed requirement to support reading Report characteristic value for Input, Output, and Feature reports; renamed Input Report variant, and deleted Output and Feature report duplicates in TCMT.
4	1.0.4	2015-12-22	Prepared for TCRL 2015-2 publication.
	1.0.5r00	2016-05-24	Converted to new Test Case ID conventions as defined in TSTO v4.1
	1.0.5r01	2016-06-08	Corrected roles in Test Case IDs

Publication Number	Revision Number	Date	Comments
	1.0.5r02	2016-06-12	Edited MSCs to match new Test Case IDs
	1.0.5r03	2016-06-22	Converted to current TS template
	1.0.5r04	2016-06-24	Corrected roles to match roles declared in ICS.
5	1.0.5	2016-07-13	Prepared for TCRL 2016-1 publication.
	1.0.6r00	2016-10-08	TSE 7451: Introduced alternative path through HOGP/RH/HGWF/BV-02-I and deleted HOGP/RH/HGWF/BV-03-I
6	1.0.6	2016-12-13	Approved by BTI. Prepared for TCRL 2016-2 publication.
	1.0.7r00	2017-04-26	TSE 8014: Corrected TCMT mapping for HOGP/BH/HGRF/BV-11-I.
7	1.0.7	2017-06-26	Approved by BTI. Prepared for TCRL 2017-1 publication.
	1.0.8r00	2018-05-10	TSE 10618 (rating 3): Modified the initial conditions and clarified the MSC, test procedure, and pass verdict for test case HOGP/RH/HGCF/BV-02-I.
8	1.0.8	2018-06-27	Approved by BTI. Prepared for TCRL 2018-1 publication.
	p9r00–r02	2022-09-19 – 2022-11-14	TSE 19166 (rating 2): Updated the TCMT to remove an incorrect line that should be in HIDS.TS per TSE 18204. Deleted Test Case Applicable column from the TCMT. Updated the introductory text to the Test case mapping section. Performed additional template-related formatting fixes. Added a Publication Number column to the Revision History. Revised the document numbering convention, setting the last release publication of 1.0.8 as p8. Replaced Bluetooth logo in footer and updated the copyright page to align with v2 of the DNMD. Removed the numbering of single TCID headings.
9	p9	2023-02-07	Approved by BTI on 2022-12-28. Prepared for TCRL 2022-2 publication.
	p10r00	2023-05-26	TSE 23225 (rating 1): Changed TCID SCPP/CL/SPDS/BV-01-I to SCPP/CL/CGGIT/SER/BV-01-C in the TCMT to reflect the GGIT conversion done in the SCPP Test Suite. Updated formatting of the Test groups section to align the document with the latest TS template.
10	p10	2023-06-29	Approved by BTI on 2023-05-30. Prepared for TCRL 2023-1 publication.

Publication Number	Revision Number	Date	Comments
	p11r00–r04	2023-10-24 – 2024-04-29	TSE 23227 (rating 2): Converted the following 41 test cases to GGIT: HOGP/RH/HGDS/BV-01-I – -03-I; HOGP/BH/HGDS/BV-01-I – -03-I; HOGP/HD/HGDS/BV-01-I – -02-I; HOGP/RH/HGDR/BV-01-I; HOGP/RH/HGDC/BV-01-I and -02-I, -06-I – 08-I, and -14-I – -16-I; HOGP/BH/HGDC/BV-08-I – 12-I and -14-I – -16-I; HOGP/RH/HGRF/BV-01-I and -09-I – -12-I; HOGP/BH/HGRF/BV-10-I – -17-I; and HOGP/BH/HGWF/BV-09-I – -11-I. The 24 new converted TCIDs are: HOGP/BH/CGGIT/CHA/BV-01-C – -06-C, HOGP/BH/CGGIT/SER/BV-01-C – -03-C, HOGP/HD/SGGIT/SER/BV-01-C – -05-C, HOGP/RH/CGGIT/CHA/BV-01-C – -06-C, HOGP/RH/CGGIT/DES/BV-01-C, and HOGP/RH/CGGIT/SER/BV-01-C – -03-C. Added a Test database requirements section. Updated the test procedure and MSCs for HOGP/RH/HGDC/BV-03-I. Updated the test procedure for HOGP/RH/HGDC/BV-04-I and -05-I, HOGP/RH/HGRF/BV-03-I – -08-I and -19-I, and HOGP/RH/HGWF/BV-01-I, -02-I, and -04-I. Updated the initial condition and test procedure for HOGP/BH/HGDC/BV-13-I and HOGP/BH/HGCF/BV-04-I. Updated the initial condition, test procedure, and MSC for HOGP/RH/HGRF/BV-02-I, HOGP/RH/HGRF/BV-18-I, HOGP/BH/HGRF/BV-18-I, HOGP/RH/HGWF/BV-05-I – -07-I, HOGP/BH/HGWF/BV-08-I, and HOGP/BH/HGCF/BV-03-I, -05-I, and -06-I. Updated the TCMT accordingly. Updated the acknowledgments.

Publication Number	Revision Number	Date	Comments
	p11r00–r04	2023-10-24 – 2024-04-29	TSE 23273 (rating 1): Converted -I tests to -C tests as appropriate; updated the TCMT and TCRL accordingly. TSE 23418 (rating 2): To align with updates to the HOGP spec, updated the preamble procedure for ATT Bearer on LE Transport and updated references in HID Device and HID Host preambles. Deleted legacy notation in setup preambles. TSE 25095 (rating 2): Updated the TCMT for HOGP/BH/CGGIT/CHA/BV-01-C – -06-C to replace GATT references with respective HOGP references. Performed other editorials to align the document with the latest TS template, including updates to the test groups and test case identification conventions sections.
11	p11	2024-07-01	Approved by BTI on 2024-04-21. Prepared for TCRL 2024-1 publication.
	p12r00–r02	2025-05-11 – 2025-06-13	Incorporated CR_HOGP_ULL.TS.0.9_r12_Sang CR. To account for the HID ISO feature enhancement in HID Over GATT Profile Specification v1.1, added 7 new GGIT TCs HOGP/RH/CGGIT/SER/BV-04-C, HOGP/RH/CGGIT/CHA/BV-07-C and -08-C, HOGP/HD/SGGIT/SER/BV-06-C, and HOGP/HD/SGGIT/CHA/BV-01-C – -03-C. Added 20 new HID ISO Report Host TCs HOGP/RH/HGIOM/BV-01-C and -02-C, HOGP/RH/HGIPS/BV-01-C – -03-C, HOGP/RH/HGIPT/BV-01-C – -03-C, HOGP/HD/HGDC/BV-01-C, HOGP/HD/HGIOM/BV-01-C and -02-C, HOGP/HD/HGIOM/BI-01-C – -04-C, HOGP/HD/HGIPS/BV-01-C – -03-C, and HOGP/HD/HGIPT/BV-01-C and -02-C. Updated the TCMT accordingly. Updated references, TSS overview, test database requirements, test groups, and TCID naming conventions. Added several missing figure captions.
12	p12	2025-08-12	Approved by BTI on 2025-07-14. HOGP v1.1 adopted by the BoD on 2025-08-11. Prepared for TCRL pkg100-addition publication.

Publication Number	Revision Number	Date	Comments
	p13r00–r05	2026-02-24 – 2026-03-19	Incorporated changes to accommodate integration of Shorter Connection Intervals change request for HOGP v1.2 (HOGP_SCI.TS.CRr03): Added new TCs HOGP/RH/CGGIT/CHA/BV-09-C and -10-C and HOGP/RH/HGWF/BV-08-C – -11-C. Updated the TCMT accordingly. Updated the references list and PDU names throughout, including within MSCs. TSE 28986 (rating 1): Implemented consistency checker editorials: corrected references to IXIT item TSPX_Hybrid_Mode_Max_Repetition and fixed duplicated TCMT items.
13	p13	2026-05-05	Approved by BTI on 2026-03-27. HOGP v1.2 adopted by the BoD on 2026-04-20. Prepared for TCRL pkg102-addition publication.
	p14r00	2026-08-14	TSE 29170 (rating 1): Deleted SCPP/CL/CGGIT/SER/BV-01-C from the TCMT.
14	p14	2026-11-03	Approved by BTI on 2026-10-06. Prepared for TCRL pkg105 publication.

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