

HID Service (HIDS)

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 Service 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 hereafter. Additional definitions and abbreviations can be found in [1] and [2].

- [1] Test Strategy and Terminology Overview
- [2] Specification of the Bluetooth System, Version 4.0 or later
- [3] HID Service Specification, Version 1.0 or later
- [4] ICS Proforma for HID Service, Version 1.0
- [5] GATT Test Suite, GATT.TS
- [6] GAP Test Suite, GAP.TS
- [7] Characteristic and Descriptor descriptions are accessible via the [Bluetooth SIG GATT characteristic web pages](#).
- [8] HID Service Specification, Version 1.1

2.2 Definitions

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

2.3 Acronyms and abbreviations

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



3 Test Suite Structure (TSS)

3.1 Overview

The HID Service requires the presence of GAP, SM, and GATT. This is illustrated in [Figure 3.1](#).

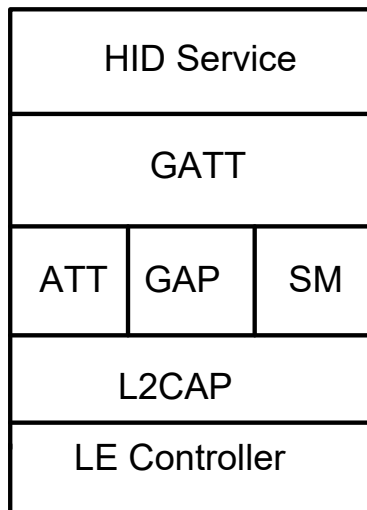


Figure 3.1: HID Service test model

3.2 Test Strategy

The test objectives are to verify functionality of the HID Service 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.

3.3 Test groups

The following test groups have been defined:

- Generic GATT Integrated Tests
- Characteristic Declaration
- Characteristic Descriptors
- Characteristic Read

- Long Characteristic Read
- Characteristic Write
- Configure Notification
- Characteristic Notification
- Descriptor Read
- Descriptor Write
- Service Procedures



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 [5] 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>
HIDS	HID Service
Identifier Abbreviation	Role Identifier <IUT role>
HD	HID Device role
Identifier Abbreviation	Reference Identifier <GGIT test group>
SGGIT	Server Generic GATT Integrated Tests
Identifier Abbreviation	Reference Identifier <GGIT class>
CHA	Characteristic
DES	Descriptor
SER	Service
Identifier Abbreviation	Feature Identifier <feat>
CN	Characteristic Notification
CR	Characteristic Read
CW	Characteristic Write
DEC	Characteristic Declaration
DES	Characteristic Descriptors
DR	Descriptors Read
DW	Descriptors Write
LCR	Long Characteristic Read
SP	Service Procedures

Table 4.1: HID Service TC feature naming conventions

4.1.2 Conformance

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

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

Such tests may verify:

- That claimed capabilities may be used in any order and any number of repetitions 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 provided for information, as they are used by test equipment in achieving the initial conditions in certain tests.

4.2.1 ATT Bearer on LE Transport

Follow the preamble procedure described in [5] Section 4.2.1.2.

4.3 Generic GATT Integrated Tests

Execute the Generic GATT Integrated Tests defined in Section 6.3, Server test procedures (SGGIT), in [5] using Table 4.2 below as input:

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)	Service Type
HIDS/SR/SGGIT/SER/BV-01-C [Service GGIT – HID Service]	HID Service	[3] 2.1	-	-	Primary Service
HIDS/SR/SGGIT/CHA/BV-01-C [Characteristic GGIT – Report Map]	Report Map Characteristic	[3] 2.6.1	0x02 (Read)	Up to 512	-
HIDS/SR/SGGIT/CHA/BV-02-C [Characteristic GGIT – HID Control Point]	HID Control Point Characteristic	[3] 2.11.1	0x04 (Write Without Response)	Skip	-
HIDS/SR/SGGIT/CHA/BV-03-C [Characteristic GGIT – HID Information]	HID Information Characteristic	[3] 2.10.1	0x02 (Read)	4	-
HIDS/SR/SGGIT/CHA/BV-04-C [Characteristic GGIT – Protocol Mode]	Protocol Mode Characteristic	[3] 2.4.1	0x06 (Read, Write Without Response)	Skip-Write	-
HIDS/SR/SGGIT/CHA/BV-05-C [Characteristic GGIT – Boot Keyboard Input Report]	Boot Keyboard Input Report Characteristic	[3] 2.7.1	0x12 (Read, Notify)	Variable	-
HIDS/SR/SGGIT/CHA/BV-06-C [Characteristic GGIT – Boot Keyboard Input Report - Write]	Boot Keyboard Input Report Characteristic	[3] 2.7.1	0x1A (Read, Notify, Write)	Skip-Write	-
HIDS/SR/SGGIT/CHA/BV-07-C [Characteristic GGIT – Boot Keyboard Output Report]	Boot Keyboard Output Report Characteristic	[3] 2.8.1	0x0E (Read, Write, Write Without Response)	Skip-Write	-
HIDS/SR/SGGIT/CHA/BV-08-C [Characteristic GGIT – Boot Mouse Input Report]	Boot Mouse Input Report Characteristic	[3] 2.9.1	0x12 (Read, Notify)	Variable	-
HIDS/SR/SGGIT/CHA/BV-09-C [Characteristic GGIT – Boot Mouse Input Report - Write]	Boot Mouse Input Report Characteristic	[3] 2.9.1	0x1A (Read, Notify, Write)	Skip-Write	-
HIDS/SR/SGGIT/DES/BV-01-C [Descriptor GGIT – External Report Reference]	External Report Reference Descriptor	[3] 2.6.3.1	0x02 (Read)	2	-
HIDS/SR/SGGIT/CHA/BV-10-C [Characteristic GGIT – HID SCI Information]	HID SCI Information	[8] 2.12	0x02 (Read)	Variable	Unique



TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)	Service Type
HIDS/SR/SGGIT/CHA/BV-11-C [Characteristic GGIT – HID SCI Mode]	HID SCI Mode	[8] 2.13	0x12 (Read, Notify)	1	Unique

Table 4.2: Input for the GGIT Server test procedure

4.4 Characteristic Declaration

Verify that the characteristic property field of the characteristic declaration meets the requirements of the service.

HIDS/HD/DEC/BV-02-C [Characteristic Declaration – Report Characteristic]

- Test Purpose

Verify that the characteristic properties bit field of the *Attribute Value* field of the characteristic declaration meets the requirements of the service.

- Reference

[3] Table 2-1, 2.6.1

- Initial Condition

- The handle range of each instance of the HID service has been previously discovered by the Lower Tester in test case [HIDS/SR/SGGIT/SER/BV-01-C \[Service GGIT – HID Service\]](#).
- Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section [4.2.1](#).

- Test Procedure

1. The Lower Tester executes the Discover All Characteristics of a Service or Discover Characteristics by UUID sub-procedure.
2. Verify that the characteristic properties bit field of the Attribute Value field of the characteristic declaration meets the requirements of the service.
3. Repeat Steps 1–2 for each instance of the service.

- Expected Outcome

Pass verdict

The characteristic is discovered and the characteristic properties bit field of the *Attribute Value* field of the characteristic declaration meets the requirements of the service.

4.5 Characteristic Descriptors

- Test Purpose

This test group contains test cases to verify that the characteristic descriptors meet the requirements of the service. The verification is done one descriptor at a time, as enumerated in the test cases in [Table 4.3](#).

- Reference

[3] 2.5.3

- Initial Condition

- The handle range of each characteristic referenced in the test cases that follow has been previously discovered by the Lower Tester during the test procedure in Section [4.3](#) or is known to the Lower Tester by other means.
- Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section [4.2.1](#).



- Test Case Configuration

Test Case	Requirements
HIDS/HD/DES/BV-01-C [Client Characteristic Configuration Descriptor of Report Characteristic]	[3] 2.5.3.1 [7] Human Interface Device service
HIDS/HD/DES/BV-02-C [Report Reference Characteristic Descriptor]	[3] 2.5.3.2 [7] Human Interface Device service

Table 4.3: Characteristic Descriptor test cases

- Test Procedure

1. The Lower Tester executes the Discover All Characteristic Descriptors sub-procedure. The IUT returns one or more handle-UUID pairs.
2. Verify that the value of the characteristic descriptor meets the requirements of the service.
3. Repeat Steps 1–2 for each handle-UUID pair.
4. Repeat Steps 1–3 for each instance of the characteristic and service.

- Expected Outcome

Pass verdict

The characteristic descriptor is discovered, the characteristic descriptor is read, and the value of the characteristic descriptor meets the requirements of the service.

4.6 Characteristic Read

- Test Purpose

This test group contains test cases to read and verify that the characteristic values required by the service are compliant with the specification. The verification is done one value at a time, as enumerated in the test cases in [Table 4.4](#), using this generic test procedure.

- Reference

[\[3\]](#) 2.5

- Initial Condition

- The handle of each characteristic value referenced in the test cases that follow has been previously discovered by the Lower Tester during the test procedure in [Section 4.3](#) or is known to the Lower Tester by other means.
- Establish an ATT Bearer connection between the Lower Tester and IUT as described in [Section 4.2.1](#).
- If IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Case Configuration

Test Case	Requirements
HIDS/HD/CR/BV-01-C [Characteristic Read – Report Characteristic (Feature)]	[3] Table 2-1, 2.5.1 [7] Human Interface Device service
HIDS/HD/CR/BV-02-C [Characteristic Read – Report Characteristic (Input)]	[3] Table 2-1, 2.5.1 [7] Human Interface Device service

Table 4.4: Characteristic Read Value test cases

- Test Procedure

1. The Lower Tester sends an ATT_READ_REQ to the IUT to read the characteristic value.
2. The IUT sends an ATT_READ_RSP to the Lower Tester.
3. Verify that the characteristic value meets the requirements of the service.
4. Repeat Steps 1–3 for each instance of the characteristic and service.

- Expected Outcome

Pass verdict

The characteristic is successfully read and the characteristic value meets the requirements of the service.

4.7 Long Characteristic Read

- Test Purpose

This test group contains test cases to read and verify that the long characteristic values required by the service are compliant with the specification. The verification is done one value at a time, as enumerated in the test cases in [Table 4.5](#), using this generic test procedure.

- Reference

[\[3\]](#) 2.5

- Initial Condition

- The handle of each characteristic value referenced in the test cases that follow has been previously discovered by the Lower Tester during the test procedure in [Section 4.3](#) or is known to the Lower Tester by other means.
- Establish an ATT Bearer connection between the Lower Tester and IUT as described in [Section 4.2.1](#).
- If IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Case Configuration

Test Case	Requirements
HIDS/HD/LCR/BV-02-C [Characteristic Read – Report Characteristic (Input)]	[3] 2.5.1 [7] Human Interface Device service
HIDS/HD/LCR/BV-03-C [Characteristic Read – Report Characteristic (Output)]	[3] 2.5.1 [7] Human Interface Device service
HIDS/HD/LCR/BV-04-C [Characteristic Read – Report Characteristic (Feature)]	[3] 2.5.1 [7] Human Interface Device service

Table 4.5: Long Characteristic Read Value test cases

- Test Procedure

1. The Lower Tester executes the GATT Read Long Characteristic Value sub-procedure.
2. Verify that the characteristic value meets the requirements of the service.
3. Repeat Steps 1–2 for each instance of the characteristic and service.

- Expected Outcome

Pass verdict

The characteristic is successfully read and the characteristic value meets the requirements of the service.

- Notes

The ATT_ERROR_RSPs “Request Not Supported” or “Attribute Not Long” is acceptable outcomes in response to Step 1.

4.8 Characteristic Notification

- Test Purpose

This test group contains test cases to verify responses to enabling and disabling characteristic notifications and compliant operation when the IUT sends notifications of characteristic values. The verification is done one value at a time, as enumerated in the test cases in [Table 4.6](#), using this generic test procedure.

Verify that the IUT sends notifications of characteristic values.

- Reference

[3] 2.5.3, 2.7.3, 2.9.3

- Initial Condition

- The handle of each characteristic value referenced in the test cases that follow has been previously discovered by the Lower Tester during the test procedure in [Section 4.3](#) or [4.4](#) or is known to the Lower Tester by other means.
- The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in [Section 4.3](#) or [4.5](#) or is known to the Lower Tester by other means.
- If the IUT requires a bonding procedure, then perform a bonding procedure.
- Establish an ATT Bearer connection between the Lower Tester and IUT as described in [Section 4.2.1](#).



- If IUT permissions for the characteristic descriptor require a specific security mode or security level, establish a connection meeting those requirements.
 - For test cases involving the Boot Keyboard Input Report, and/or the Boot Mouse Input Report characteristics, the Lower Tester writes the value 0x00 to the Protocol Mode characteristic to configure the HID Device in Boot Protocol Mode.
- Test Case Configuration

Test Case	Requirements
HIDS/HD/CN/BV-01-C [Characteristic Notification Report (Input)]	[3] 2.5.1 [7] Human Interface Device service
HIDS/HD/CN/BV-02-C [Characteristic Notification – Boot Keyboard Input Report Characteristic]	[3] 2.7.1 [7] Human Interface Device service
HIDS/HD/CN/BV-03-C [Characteristic Notification – Boot Mouse Input Report Characteristic]	[3] 2.9.1 [7] Human Interface Device service

Table 4.6: Characteristic Notification Value test cases

- Test Procedure
 1. Disable notification by writing value 0x0000 to the client characteristic configuration descriptor of the characteristic.
 2. Enable notification by writing value 0x0001 to the client characteristic configuration descriptor of the characteristic.
 3. Perform an action on the IUT that will induce it to send a notification of the characteristic.
 4. The Lower Tester receives an `ATT_HANDLE_VALUE_NTF` from the IUT containing the characteristic handle and value.
 5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

Pass verdict

The characteristic is successfully notified and the characteristic value meets the requirements of the service.

4.9 Characteristic Write

- Test Purpose

This test group contains test cases to write to characteristic values and verify that the values written by the service are compliant with specification. The verification is done one value at a time, as enumerated in the test cases in [Table 4.7](#), using this generic test procedure.

- Reference

[3] 2.5, 2.6, 2.7, 2.9

- Initial Condition

- The handle of each characteristic value referenced in the test cases that follow has been previously discovered by the Lower Tester during the test procedure in [Section 4.3](#) or [4.4](#) or is known to the Lower Tester by other means.
- If the IUT requires a bonding procedure then perform a bonding procedure.



- Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
 - If IUT permissions for the characteristic descriptor require a specific security mode or security level, establish a connection meeting those requirements.
 - For test cases involving the Boot Keyboard Input Report, and/or the Boot Mouse Input Report characteristics, the Lower Tester writes the value 0x00 to the Protocol Mode characteristic to configure the HID Device in Boot Protocol Mode.
- Test Case Configuration

Test Case	Requirements
HIDS/HD/CW/BV-01-C [Characteristic Write – Report (Input)]	[3] Table 2-1, 2.5.1 [7] Human Interface Device service
HIDS/HD/CW/BV-02-C [Characteristic Write – Report (Output)]	[3] Table 2-1, 2.5.1 [7] Human Interface Device service
HIDS/HD/CW/BV-03-C [Characteristic Write – Report (Feature)]	[3] Table 2-1, 2.5.1 [7] Human Interface Device service
HIDS/HD/CW/BV-04-C [Characteristic Write – Boot Keyboard Input Report Characteristic]	[3] Table 2-1, 2.7.1 [7] Human Interface Device service
HIDS/HD/CW/BV-05-C [Characteristic Write – Boot Keyboard Output Report Characteristic]	[3] Table 2-1, 2.7.1 [7] Human Interface Device service
HIDS/HD/CW/BV-06-C [Characteristic Write – Boot Mouse Input Report Characteristic]	[3] Table 2-1, 2.7.1 [7] Human Interface Device service

Table 4.7: Characteristic Write test cases

- Test Procedure
 1. The Lower Tester sends an ATT_WRITE_REQ to the IUT to write the characteristic value.
 2. The IUT sends an ATT_WRITE_RSP to the Lower Tester.
 3. The Lower Tester sends an ATT_READ_REQ to the IUT to read the characteristic value written in Step 1.
 4. The IUT sends an ATT_READ_RSP to the Lower Tester.
 5. Verify that the characteristic value is successfully written.

- Expected Outcome

Pass verdict

The characteristic value is successfully written.

4.10 Characteristic Write Without Response

- Test Purpose

This test group contains test cases to write without response to characteristic values and verify that the values written by the service are compliant with specification. The verification is done one value at a time, as enumerated in the test cases in Table 4.8, using this generic test procedure.

- Reference

[3] 2.10, 2.11



- Initial Condition
 - The handle of each characteristic value referenced in the test cases that follow has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or 4.4 or is known to the Lower Tester by other means.
 - If the IUT requires a bonding procedure then perform a bonding procedure.
 - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
 - If IUT permissions for the characteristic descriptor require a specific security mode or security level, establish a connection meeting those requirements.
 - For test cases involving the Boot Keyboard Input Report, and/or the Boot Mouse Input Report characteristics, the Lower Tester writes the value 0x00 to the Protocol Mode characteristic to configure the HID Device in Boot Protocol Mode.
- Test Case Configuration

Test Case	Requirements
HIDS/HD/CW/BV-07-C [Characteristic Write – Report (Output)]	[3] Table 2-1, 2.5.1 [7] Human Interface Device service
HIDS/HD/CW/BV-08-C [Characteristic Write – Protocol Mode (Boot Mode)]	[3] Table 2-1, 2.4.1 [7] Human Interface Device service
HIDS/HD/CW/BV-09-C [Characteristic Write – Protocol Mode (Report Mode)]	[3] Table 2-1, 2.4.1 [7] Human Interface Device service
HIDS/HD/CW/BV-10-C [Characteristic Write – HID Control Point (Suspend)]	[3] Table 2-1, 2.9.1 [7] Human Interface Device service
HIDS/HD/CW/BV-11-C [Characteristic Write – HID Control Point (Exit Suspend)]	[3] Table 2-1, 2.9.1 [7] Human Interface Device service
HIDS/HD/CW/BV-12-C [Characteristic Write – Boot Keyboard Output Report Characteristic]	[3] Table 2-1, 2.9.1 [7] Human Interface Device service

Table 4.8: Characteristic Write Without Response test cases

- Test Procedure
 1. The Lower Tester executes the GATT Write Without Response sub-procedure.
 2. Verify that the characteristic value is successfully written.
- Expected Outcome

Pass verdict

The characteristic value is successfully written.

4.11 Descriptors Read

- Test Purpose

This test group contains test cases to read and verify that the descriptor values required by the service are compliant with the specification. The verification is done one value at a time, as enumerated in the test cases in Table 4.9, using this generic test procedure.
- Reference

[3] 2.6.3, 2.7.3, 2.9.3



- Initial Condition
 - The handle of each descriptor referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or 4.5 or is known to the Lower Tester by other means.
 - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
 - If IUT permissions for the characteristic descriptor require a specific security mode or security level, establish a connection meeting those requirements.
 - For test cases involving the Boot Keyboard Input Report, and/or the Boot Mouse Input Report characteristics, the Lower Tester writes the value 0x00 to the Protocol Mode characteristic to configure the HID Device in Boot Protocol Mode.
- Test Case Configuration

Test Case	Requirements
HIDS/HD/DR/BV-01-C [Client Characteristic Configuration Descriptor of Report Characteristic]	[3] 2.5.3.1 [7] Human Interface Device service
HIDS/HD/DR/BV-02-C [Report Reference Characteristic Descriptor]	[3] 2.5.3.2 [7] Human Interface Device service
HIDS/HD/DR/BV-04-C [Client Characteristic Configuration Descriptor of Boot Keyboard Input Report Characteristic]	[3] 2.7.3.1 [7] Human Interface Device service
HIDS/HD/DR/BV-05-C [Client Characteristic Configuration Descriptor of Boot Mouse Input Report Characteristic]	[3] 2.9.3.1 [7] Human Interface Device service

Table 4.9: Descriptor Read Value test cases

- Test Procedure
 1. The Lower Tester executes the GATT Read Characteristic Descriptors sub-procedure.
 2. Verify that the descriptor value meets the requirements of the service.
 3. Repeat Steps 1–2 for each instance of the descriptor.
- Expected Outcome

Pass verdict

The descriptor is successfully read and the descriptor value meets the requirements of the service.

4.12 Descriptors Write

- Test Purpose

This test group contains test cases to write and verify that the descriptors behavior required by the service is compliant with the specification. The verification is done one value at a time, as enumerated in the test cases in [Table 4.10](#), using this generic test procedure.
- Reference

[3] 2.5.3, 2.6.3, 2.7.3, 2.9.3

- Initial Condition
 - The handle of each descriptor referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or 4.5 or is known to the Lower Tester by other means.
 - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
 - If IUT permissions for the characteristic descriptor require a specific security mode or security level, establish a connection meeting those requirements.
 - For test cases involving the Boot Keyboard Input Report, and/or the Boot Mouse Input Report characteristics, the Lower Tester writes the value 0x00 to the Protocol Mode characteristic to configure the HID Device in Boot Protocol Mode.

- Test Case Configuration

Test Case	Requirements
HIDS/HD/DW/BV-01-C [Client Characteristic Configuration Descriptor of Report Characteristic]	[3] 2.5.3.1 [7] Human Interface Device service
HIDS/HD/DW/BV-02-C [Client Characteristic Configuration Descriptor of Boot Keyboard Input Report Characteristic]	[3] 2.7.3.1 [7] Human Interface Device service
HIDS/HD/DW/BV-03-C [Client Characteristic Configuration Descriptor of Boot Mouse Input Report Characteristic]	[3] 2.9.3.1 [7] Human Interface Device service

Table 4.10: Descriptor Write Value test cases

- Test Procedure
 1. The Lower Tester sends an ATT_WRITE_REQ to the IUT to write the characteristic descriptor.
 2. The IUT sends an ATT_WRITE_RSP to the Lower Tester.
 3. The Lower Tester sends an ATT_READ_REQ to the IUT to read the characteristic descriptor written in Step 1.
 4. The IUT sends an ATT_READ_RSP to the Lower Tester.
 5. Verify that the descriptor behavior meets the requirements of the service.
 6. Repeat Steps 1–5 for each instance of the descriptor.

- Expected Outcome

Pass verdict

The descriptor value is successfully written, and the descriptor behavior meets the requirements of the service.

4.13 Service Procedures

This test group contains test cases to verify all expected features and behavior of the service and to ensure it is compliant with specification.

[HIDS/HD/SP/BV-01-C \[Notification Behavior of Multiple Input Reports\]](#)

- Test Purpose

Verify that the IUT can send input reports once it has been configured to do so.



- Reference
 - [3] 2.5.1
- Initial Condition
 - The Report Characteristic is configured for notification.
 - If the IUT requires a bonding procedure, then perform a bonding procedure.
 - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
 - If IUT permissions for the Report characteristic require a specific security mode or security level, establish a connection meeting those requirements.
- Test Procedure
 1. Perform an action on the IUT that will induce it to send notifications of the Report Characteristic of type Input Report.
 2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to Step 1.
 3. The Lower Tester receives an *ATT_HANDLE_VALUE_NTF* from the IUT containing the Report Characteristic handle and value.
 4. Verify that the characteristic value meets the requirements of the service.
 5. Repeat Steps 3–4 for each received notification until the IUT stops sending notifications.
 6. The Lower Tester configures the Report characteristic to disable notifications.
 7. Repeat Steps 1–2 with notifications disabled.
 8. Verify that the Tester does not receive an *ATT_HANDLE_VALUE_NTF* from the IUT containing the Report Characteristic.
- Expected Outcome
 - Pass verdict
 - The IUT sends a notification of the correct Input Report characteristic, upon reconnection.
 - The value of the Input Report characteristic meets the requirements of the service.
 - The IUT sends one or more notifications of the Report characteristic when the appropriate Reports have been set for notification.
 - The value of the characteristic meets the requirements of the service.
 - The IUT stops sending notifications of the Report characteristic after the Lower Tester configures the characteristic to disable notifications.

4.14 Characteristic Write Without Response, HID SCI

- Test Purpose

Verify that the IUT indicates support for the HID SCI feature in the HID Information characteristic, notifies the HID SCI Mode characteristic properly, and accepts HID Control Point writes from the Lower Tester by changing HID SCI modes.
- Reference
 - [8] 2.11.2, 2.12, 2.13, 3
- Initial Condition
 - The IUT contains at least one instance of the HID Service.



- Test Case Configuration

Test Case	HID SCI mode	Value
HIDS/HD/CW/BV-13-C [Characteristic Write, HID Control Point (Enable SCI Default mode)]	Default	0x02
HIDS/HD/CW/BV-14-C [Characteristic Write, HID Control Point (Enable SCI Fast mode)]	Fast	0x03
HIDS/HD/CW/BV-15-C [Characteristic Write, HID Control Point (Enable SCI Low Power mode)]	Low Power	0x04
HIDS/HD/CW/BV-16-C [Characteristic Write, HID Control Point (Enable SCI Full Range mode)]	Full Range	0x05

Table 4.11: Characteristic Write Without Response, HID SCI test cases

- Test Procedure

- The Lower Tester and IUT establish a bearer connection as described in Section 4.2.1. The Lower Tester discovers the HID service and characteristic handles and registers for notifications for each HID SCI Mode characteristic discovered.
- The Lower Tester executes the GATT Read Characteristic Value sub-procedure with all instances of the HID Information, HID SCI Information, and HID SCI Mode characteristics.
- The Lower Tester executes the GATT Write Without Response sub-procedure with the HID Control Point characteristic and Value set to an RFU value.
- The Lower Tester executes the GATT Write Without Response sub-procedure with the HID Control Point characteristic and Value set to the value in Table 4.11.
- The IUT performs the Enable SCI mode procedure requested by the Lower Tester in Step 4 and receives an HCI_LE_Connection_Rate_Change event.
- Perform either alternative 6A or 6B depending on the HCI_LE_Connection_Rate_Change event received by the IUT in Step 5:

Alternative 6A (The IUT receives a successful HCI_LE_Connection_Rate_Change event):

- 6A.1. The IUT sends a notification of each HID SCI Mode characteristic that was configured for notifications by the Lower Tester with Value set to the value in Step 4.

Alternative 6B (The IUT receives an unsuccessful HCI_LE_Connection_Rate_Change event):

- 6B.1. The IUT does not send a notification of the HID SCI Mode characteristic to the Lower Tester.
- 6B.2. Repeat from Step 4. If there has been 1 repeat already without a successful HCI_LE_Connection_Rate_Change event, the test ends in a Fail verdict.

- Repeat Steps 4–6 using a different Value in Step 4. If the Value being tested in Table 4.11 is 0x02, the Lower Tester uses 0x05 for the Value. Otherwise, the Lower Tester uses 0x02 for the Value.

- Expected Outcome

Pass verdict

The HID Information characteristic value returned by the IUT indicates support for:

- Bit 2: SCI Supported
- Bit 3: SCI Low Power mode supported, if the Value to be used in Table 4.11 is 0x04, otherwise it is optionally supported for all other Values



When read by the Lower Tester, all instances of the HID SCI Mode characteristic are set to 0x00 (None).

When read by the Lower Tester, all instances of the HID SCI Information characteristic are set to the same value.

The IUT tolerates the HID Control Point characteristic being written by the Lower Tester with an RFU value.

The HID Control Point characteristic is successfully written with the value in [Table 4.11](#).

The IUT receives a successful HCI_LE_Connection_Rate_Change event before the IUT sends notifications of the HID SCI Mode characteristics. The IUT sends a notification for each HID SCI Mode characteristic that the Lower Tester has configured for notifications, and all have the Value set to the Value in [Table 4.11](#).

If the IUT receives an unsuccessful HCI_LE_Connection_Rate_Change event, the IUT does not send a notification of the HID SCI Mode characteristic to the Lower Tester.

The IUT successfully transitions from not being in a HID SCI mode to the HID SCI mode specified in [Table 4.11](#).

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 requests to enter or change the HID SCI mode by the Lower Tester.

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 Service [4].

If a test case is mandatory within the respective layer, then the y/x reference is omitted.

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. Further details about the function of the TCMT are elaborated in [1].

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

Item	Feature	Test Case(s)
HIDS 2/1	Service Discovery - HID Service	HIDS/SR/SGGIT/SER/BV-01-C
HIDS 2/5	Protocol Mode Characteristic	HIDS/HD/CW/BV-08-C HIDS/HD/CW/BV-09-C HIDS/SR/SGGIT/CHA/BV-04-C
HIDS 2/11	Report Map Characteristic	HIDS/SR/SGGIT/CHA/BV-01-C
HIDS 2/2 AND HIDS 2/6	Boot Keyboard Input Report Characteristic	HIDS/HD/CN/BV-02-C HIDS/HD/DR/BV-04-C HIDS/HD/DW/BV-02-C
HIDS 2/2 AND HIDS 2/6 AND NOT HIDS 2/7	Boot Keyboard Input Report Characteristic – Read and Notify Only	HIDS/SR/SGGIT/CHA/BV-05-C
HIDS 2/2 AND HIDS 2/6 AND HIDS 2/7	Boot Keyboard Input Report Characteristic - Write	HIDS/HD/CW/BV-04-C HIDS/SR/SGGIT/CHA/BV-06-C
HIDS 2/2 AND HIDS 2/8	Boot Keyboard Output Report Characteristic	HIDS/HD/CW/BV-05-C HIDS/HD/CW/BV-12-C HIDS/SR/SGGIT/CHA/BV-07-C
HIDS 2/3 AND HIDS 2/9	Boot Mouse Input Report Characteristic	HIDS/HD/CN/BV-03-C HIDS/HD/DR/BV-05-C HIDS/HD/DW/BV-03-C
HIDS 2/3 AND HIDS 2/9 AND NOT HIDS 2/10	Boot Mouse Input Report Characteristic – Read and Notify Only	HIDS/SR/SGGIT/CHA/BV-08-C
HIDS 2/3 AND HIDS 2/9 AND HIDS 2/10	Boot Mouse Input Report Characteristic – Write	HIDS/HD/CW/BV-06-C HIDS/SR/SGGIT/CHA/BV-09-C
HIDS 2/11a	External Report Reference Characteristic Descriptor for Report Map Characteristic	HIDS/SR/SGGIT/DES/BV-01-C

Item	Feature	Test Case(s)
HIDS 2/12	Report Characteristic	HIDS/HD/DEC/BV-02-C HIDS/HD/DES/BV-02-C HIDS/HD/DR/BV-02-C
HIDS 2/12 AND HIDS 2/13	Report Characteristic –: Report Type: Input Report	HIDS/HD/CR/BV-02-C HIDS/HD/LCR/BV-02-C HIDS/HD/CN/BV-01-C HIDS/HD/DES/BV-01-C HIDS/HD/DR/BV-01-C HIDS/HD/DW/BV-01-C HIDS/HD/SP/BV-01-C
HIDS 2/13 AND HIDS 2/14	Report Type: Input Report – Write	HIDS/HD/CW/BV-01-C
HIDS 2/12 AND HIDS 2/15	Report Characteristic – Report Reference Characteristic Descriptor Report Type: Output Report	HIDS/HD/LCR/BV-03-C HIDS/HD/CW/BV-02-C HIDS/HD/CW/BV-07-C
HIDS 2/12 AND HIDS 2/16	Report Characteristic – Report Reference Characteristic Descriptor Report Type: Feature Report	HIDS/HD/CR/BV-01-C HIDS/HD/LCR/BV-04-C HIDS/HD/CW/BV-03-C
HIDS 2/17	HID Control Point Characteristic	HIDS/HD/CW/BV-10-C HIDS/HD/CW/BV-11-C HIDS/SR/SGGIT/CHA/BV-02-C
HIDS 2/18	HID Information Characteristic	HIDS/SR/SGGIT/CHA/BV-03-C
HIDS 2/19	HID Control Point SCI mode change	HIDS/HD/CW/BV-13-C HIDS/HD/CW/BV-14-C HIDS/HD/CW/BV-16-C
HIDS 2/20	HID Control Point SCI Low Power	HIDS/HD/CW/BV-15-C
HIDS 2/21	HID SCI Information Characteristic	HIDS/SR/SGGIT/CHA/BV-10-C
HIDS 2/22	HID SCI Mode Characteristic	HIDS/SR/SGGIT/CHA/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 4788: HIDS/HD/DES/BV-03-C (legacy ID: TP/DES/BV-03-C): Remove from TCMT
1	1.0.1	2012-07-24	Prepare for publication.
	1.0.2r1	2013-05-24	TSE 5145: Updated initial condition of boot mode test cases to include, "For Test Cases involving the Boot Keyboard Input Report, and/or the Boot Mouse Input Report characteristics, the Tester shall write the value 0x00 to the Protocol Mode characteristic to configure the HID Device in Boot Protocol Mode." Affects HIDS/HD/CON/BV-02-C, HID/HD/CON/BV-03-C, HIDS/HD/CN/BV-02-C, HIDS/HD/CN/BV-03-C, HIDS/HD/CW/BV-04-C, HIDS/HD/CW/BV-05-C, HIDS/HD/CW/BV-06-C, HIDS/HD/CW/BV-12-C, HIDS/HD/DR/BV-04-C, HIDS/HD/DR/BV-05-C, HIDS/HD/DW/BV-02-C and HIDS/HD/DW/BV-03-C (legacy IDs: TP/CON/BV-02-C, TP/CON/BV-03-C, TP/CN/BV-02-C, TP/CN/BV-03-C, TP/CW/BV-04-C, TP/CW/BV-05-C, TP/CW/BV-06-C, TP/CW/BV-12-C, TP/DR/BV-04-C, TP/DR/BV-05-C, TP/DW/BV-02-C and TP/DW/BV-03-C).
2	1.0.2	2013-07-02	Prepare for Publication
	1.0.3r00	2016-02-16	TSE 6839: Test case reference corrected. Changed "TP/GAW/SR/BV-01-C" to "TP/GAW/SR/BV-03-C." (GATT/SR/GAW/BV-03-C after ID conversion) NOTE: Edits for TSE 6839 also include TSE 6928. TSE 6839 and 6928 are essentially duplicates.
	1.0.3r01	2016-04-13	Converted to new Test Case ID conventions as defined in TSTO v4.1. Deleted Fail verdicts with no content other than "Otherwise."
	1.0.3r02	2016-04-14	Reviewed by Alicia Courtney. Converted to current document template. Additional editorial changes.
	1.0.3r03	2016-06-24	Corrected role abbreviations to match the roles declared in the ICS.
3	1.0.3	2016-07-13	Prepared for TCRL 2016-1 publication.
	1.0.3 edition 2r00	2018-11-29	Editorial changes only. Template updated. Revision History and contributors moved to the end of the document.
	1.0.3 edition 2	2019-12-12	Updated copyright page and confidentiality markings to support new Documentation Marking Requirements, performed minor formatting updates, and accepted all tracked changes to prepare for edition 2 publication.

Publication Number	Revision Number	Date	Comments
	p4r00-r01	2021-08-11 – 2021-11-29	<p>TSE 17130 (rating 2): Removed Configure Notification test cases HIDS/HD/CON/BV-01-C – -03-C. Revised the test purpose, initial condition, and test procedure of the characteristic notification tests to correct for the missing enable notifications configuration step and to remove the dependencies on the Configure Notification section to remove the redundancy in HIDS/HD/CN/BV-01-C – -03-C, which already implicitly contain the configuration steps.</p> <p>Performed template-related editorials. Assigned publication number 3 to previous v1.0.3. Updated and the introduction text before the TCMT to align with the template. Updated copyright page to align with v2 of the DNMD. Minor editorials in the TCMT from the consistency checker.</p>
4	p4	2022-01-25	Approved by BTI on 2022-01-06. Prepared for TCRL 2021-2 publication.
	p5r00-r01	2022-09-22 – 2022-12-12	<p>TSE 18204 (rating 3): Added HIDS/HD/DR/BV-03-C and HIDS/HD/DES/BV-03-C to the TCMT.</p> <p>Performed additional template-related formatting fixes.</p>
5	p5	2023-02-07	Approved by BTI on 2022-12-28. Prepared for TCRL 2022-2 publication.
	p6r00-r01	2023-12-04 – 2024-01-05	<p>TSE 22425 (rating 2): Converted the following 19 test cases to GGIT: HIDS/HD/SD/BV-01-C, HIDS/HD/DEC/BV-01-C and -03-C – -08-C, HIDS/HD/DES/BV-03-C – -05-C, HIDS/HD/CR/BV-03-C – -08-C, HIDS/HD/DR/BV-03-C, and HIDS/HD/LCR/BV-01-C. The 11 new converted TCIDs are: HIDS/SR/SGGIT/DES/BV-01-C, HIDS/SR/SGGIT/SER/BV-01-C, and HIDS/SR/SGGIT/CHA/BV-01-C – -09-C. Updated the TCMT accordingly. Updated the Test Strategy, Test groups, and TCID conventions sections. Updated the references in HIDS/HD/DEC/BV-02-C, HIDS/HD/DES/BV-01-C and -02-C, HIDS/HD/CR/BV-01-C and -02-C, HIDS/HD/DR/BV-01-C, -02-C, -04-C, and -05-C. Updated the test procedure for HIDS/HD/CR/BV-01-C and -02-C, HIDS/HD/LCR/BV-02-C – -04-C, and HIDS/HD/CN/BV-01-C – -03-C. Updated the acknowledgments.</p> <p>TSE 24768 (rating 1): Updated the test procedures for HIDS/HD/DEC/BV-02-C, HIDS/HD/DES/BV-01-C and -02-C, HIDS/HD/CR/BV-01-C and -02-C, HIDS/HD/LCR/BV-02-C – -04-C, HIDS/HD/CW/BV-01-C – -12-C, HIDS/HD/DW/BV-01-C – -03-C, and HIDS/HD/DR/BV-01-C, -02-C, -04-C, and -05-C to remove direct references to GATT test cases from within the corresponding GATT sub-procedure.</p> <p>Performed other editorials to align the document with the latest TS template, including updates to the references.</p>
6	p6	2024-07-01	Approved by BTI on 2024-04-21. Prepared for TCRL 2024-1 publication.



Publication Number	Revision Number	Date	Comments
	p7r00	2024-10-16	TSE 26408 (rating 2): Updated the TCMT for HIDS/SR/SGGIT/CHA/BV-05-C and -08-C and updated the Acknowledgements table.
7	p7	2025-02-18	Approved by BTI on 2024-12-23. Prepared for TCRL 2025-1 publication.
	p8r00–r02	2026-02-10 – 2026-03-18	Incorporated changes to accommodate integration of Shorter Connection Intervals change request for HIDS v1.1 (HIDS_SCI.TS.CRR03): Added new TCs HIDS/SR/SGGIT/CHA/BV-10-C and -11-C and HIDS/HD/CW/BV-13-C – -16-C. Updated the TCMT accordingly. Updated the references list. Updated PDU names and addressed comments. Added an initial condition and updated the test procedure and pass verdict for HIDS/HD/CW/BV-13-C – -16-C.
8	p8	2026-05-05	Approved by BTI on 2026-03-27. HIDS v1.1 adopted by the BoD on 2026-04-20. Prepared for TCRL pkg102-addition publication.

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