Human Interface Device Profile 1.0 (HID)

Bluetooth® **Test Suite**

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Contents

1   Scope

This Bluetooth document contains the Test Suite Structure (TSS) and test cases to test the implementation of the Bluetooth Human Interface Device Profile 1.0 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] and [5].

[1]   Universal Serial Bus Specification, Version 1.1 (www.usb.org)

[2]   USB HID Usage Tables, Version 1.1 (www.usb.org)

[3]   USB Device Class Definition for Human Interface Devices, Version 1.1 (www.usb.org)

[4]   Bluetooth Core Specification, Version 1.2 or later

[5]   Test Strategy and Terminology Overview

[6]   Human Interface Device Profile Specification, Version 1.0

[7]   L2CAP Test Suite, L2CAP.TS

[8]   Link Manager Test Suite, LMP.TS

[9]   GAP Test Suite, GAP.TS

[10] Baseband Test Suite, BB.TS

[11] Service Discovery Protocol Test Suite, SDP.TS

[12] ICS Proforma for Human Interface Device (HID) Profile

[13] SDP Test Suite, SDP.TS

[14] IXIT Proforma for Human Interface Device (HID) Profile

2.2   Definitions

In this Bluetooth document, the definitions from [4] and [5] apply.

2.3   Acronyms and abbreviations

In this Bluetooth document, the definitions, acronyms, and abbreviations from [4] and [5] apply.

3 Test Suite Structure (TSS)

3.1 Overview

The figure below shows a typical protocol stack configuration for an HID and HID Host. There are communications flows between each layer of the stack that are tested in this document.
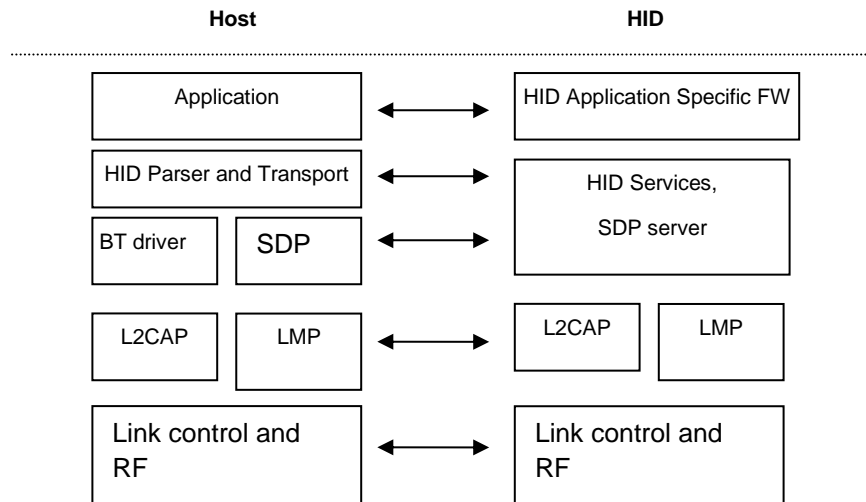
Figure 3.1: HID and Host Protocol Stack

3.2 Test Strategy

The test objectives are to verify the functionality of the Human Interface Device Profile v1.0 (HID) 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 SDP Integrated Tests

- Connection Establishment

- Connection Release

- HID Data Exchange

- HID Protocol

- DATA/DATC

- HID Device SDP Requirements

3.4   General assumptions

- Only a single ACL link exists between HID Host and HID Device.

- A point-to-point connection is used for all test cases.

4   Test cases (TC)

4.1   Introduction

4.1.1   Test case identification conventions

Test cases are assigned unique identifiers per the conventions in [5]. 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 SDP Test Suite [13] referred to as Generic SDP Integrated Tests (GSIT); when used, the GSIT tests are referred to through a TCID string using the following convention:
<spec abbreviation>/<IUT role>/<GSIT test group>/<GSIT class>/<xx>-<nn>-<y>.

Identifier Abbreviation	Specification Identifier <spec abbreviation>
HID	Human Interface Device Profile
Identifier Abbreviation	**Role Identifier <IUT role>**
DEV	HID Device Role
HOS	HID Host Role
Identifier Abbreviation	**Reference Identifier <GSIT test group>**
CGSIT	Client Generic SDP Integrated Tests
SGSIT	Server Generic SDP Integrated Tests
Identifier Abbreviation	**Reference Identifier <GSIT class>**
ATTR	Attribute
OFFS	Attribute ID Offset String
SERR	Service Record
SFC	SDP Future Compatibility
Identifier Abbreviation	**Feature Identifier <feat>**
CON	Connection management
DAT	DATA/DATC
HCE	Host connection establishment
HCR	Host connection release
HDT	HID data transfer
HID	HID Protocol
SDD	Service Discovery Database

Table 4.1: HID 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, then the outcome of the test is a Fail verdict.

4.2 Generic SDP Integrated Tests

4.2.1 Server Generic SDP Integrated Tests

4.2.1.1 HID Profile – Server

Execute the Generic SDP Integrated Tests defined in Section 6.3, Server test procedures (SGSIT), in [13] using Table 4.2 below as input:

TCID	Reference	Attribute ID name	Attribute ID definition source (Universal, Profile)	Value/secondary value	Attribute presence (Present/Present for [role], Optionally present, TCMT defined)
HID/DEV/SGSIT/SERR/BV-01-C [Service record GSIT – HID Device]	[9] 7.11.14	ServiceClassIDList	Universal	"HID" (UUID)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-01-C [Attribute GSIT – Protocol Descriptor List]	[9] 7.11.14	ProtocolDescriptorList	Universal	"L2CAP" (UUID): PSM – "HID_Control" (Uint16), "HID Protocol" (UUID)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-02-C [Attribute GSIT – Additional Protocol Descriptor Lists]	[9] 7.11.14	AdditionalProtocolDescriptorLists	Universal	"L2CAP" (UUID): PSM – "HID_Interrupt" (Uint16), "HID Protocol" (UUID)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-03-C [Attribute GSIT – Bluetooth Profile Descriptor List]	[9] 7.11.14	BluetoothProfileDescriptorList	Universal	"HID" (UUID): Version – "0x0100" (Uint16)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-04-C [Attribute GSIT – Language Base Attribute ID List]	[9] 7.11.14	LanguageBaseAttributeIDList	Universal	skip (Data Element Sequence)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-05-C [Attribute GSIT – HID Device Release Number]	[9] 7.11.1, 7.11.14	HIDDeviceReleaseNumber	Profile	"0x0100" (Uint16)	Optionally present
HID/DEV/SGSIT/ATTR/BV-06-C [Attribute GSIT – HID Parser Version]	[9] 7.11.1, 7.11.14	HIDParserVersion	Profile	"0x0111" (Uint16)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-07-C [Attribute GSIT – HID Device Subclass]	[9] 7.11.2, 7.11.14	HIDDeviceSubclass	Profile	skip (Uint8)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-08-C [Attribute GSIT – HID Country Code]	[9] 7.11.3, 7.11.14	HIDCountryCode	Profile	skip (Uint8)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-09-C [Attribute GSIT – HID Virtual Cable]	[9] 7.11.4, 7.11.14	HIDVirtualCable	Profile	skip (Boolean8)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-10-C [Attribute GSIT – HID Reconnect Initiate]	[9] 7.11.5, 7.11.14	HIDReconnectInitiate	Profile	skip (Boolean8)	Present for DEV

TCID	Reference	Attribute ID name	Attribute ID definition source (Universal, Profile)	Value/secondary value	Attribute presence (Present/Present for [role], Optionally present, TCMT defined)
HID/DEV/SGSIT/ATTR/BV-11-C [Attribute GSIT – HID Descriptor List]	[9] 7.11.6, 7.11.14	HIDDescriptorList	Profile	skip (Data Element Sequence)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-12-C [Attribute GSIT – HID LANG ID Base List]	[9] 7.11.7, 7.11.14	HIDLANGIDBaseList	Profile	skip (Data Element Sequence)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-13-C [Attribute GSIT – HID SDP Disable]	[9] 7.11.8, 7.11.14	HIDSDPDisable	Profile	skip (Boolean8)	Optionally present
HID/DEV/SGSIT/ATTR/BV-14-C [Attribute GSIT – HID Battery Power]	[9] 7.11.9, 7.11.14	HIDBatteryPower	Profile	skip (Boolean8)	Optionally present
HID/DEV/SGSIT/ATTR/BV-15-C [Attribute GSIT – HID Remote Wake]	[9] 7.11.10, 7.11.14	HIDRemoteWake	Profile	skip (Boolean8)	Optionally present
HID/DEV/SGSIT/ATTR/BV-16-C [Attribute GSIT – HID Boot Device]	[9] 7.11.11, 7.11.14	HIDBootDevice	Profile	skip (Boolean8)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-17-C [Attribute GSIT – HID Supervision Timeout]	[9] 7.11.12, 7.11.14	HIDSupervisionTimeout	Profile	skip (Uint16)	Optionally present
HID/DEV/SGSIT/ATTR/BV-18-C [Attribute GSIT – HID Normally Connectable]	[9] 7.11.13, 7.11.14	HIDNormallyConnectable	Profile	skip (Boolean8)	Optionally present
HID/DEV/SGSIT/ATTR/BV-19-C [Attribute GSIT – HID Profile Version]	[9] 7.11.14	HIDProfileVersion	Profile	"0x0100" (Uint16)	Present for DEV
HID/DEV/SGSIT/SERR/BV-02-C [Service record GSIT – DID Server]	[9] 7.10	ServiceClassIDList	Universal	"PnPInformation" (UUID)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-20-C [Attribute GSIT – DID VendorID]	[9] 7.10	VendorID	Profile	skip (Uint16)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-21-C [Attribute GSIT – DID ProductID]	[9] 7.10	ProductID	Profile	skip (Uint16)	Present for DEV
HID/DEV/SGSIT/ATTR/BV-22-C [Attribute GSIT – DID Version]	[9] 7.10	Version	Profile	skip (Uint16)	Present for DEV

Table 4.2: Input for the HID Profile Device SGSIT SDP test procedure

4.2.1.2   HID Profile – Attribute ID Offset String tests

Execute the Generic SDP Integrated Tests defined in Section 6.3, Server test procedures (SGSIT), in [13] using Table 4.3 below as input:

TCID	Reference	ServiceSearchPattern	Attribute ID name	Attribute ID Offset	Attribute presence (Present/Present for [role], Optionally present, TCMT defined)
HID/DEV/SGSIT/OFFS/BV-01-C [Attribute ID Offset String GSIT – Service Name]	[9] 7.11.14	HID	ServiceName	0x0000	Optionally present
HID/DEV/SGSIT/OFFS/BV-02-C [Attribute ID Offset String GSIT – Service Description]	[9] 7.11.14	HID	ServiceDescription	0x0001	Optionally present
HID/DEV/SGSIT/OFFS/BV-03-C [Attribute ID Offset String GSIT – Provider Name]	[9] 7.11.14	HID	ProviderName	0x0002	Optionally present

Table 4.3: Input for the HID Profile SGSIT Attribute ID Offset String tests

4.2.2   Client Generic SDP Integrated Tests

Execute the Generic SDP Future Compatibility Tests defined in Section 6.4, Client test procedures (CGSIT), in [13] using Table 4.4 below as input:

TCID	Reference	Service Record Service Class UUID description	Lower Tester SDP record initial conditions
HID/HOS/CGSIT/SFC/BV-01-C [SDP Future Compatibility – IUT is HID Host]	[9] 7.11.14	HID	The Lower Tester exposes a HID Device SDP record. The version in the Bluetooth Profile Descriptor List is greater than the most recently adopted version. Configuration of the HID Device role is specified by IXIT [14] (e.g., Keyboard, Mouse).

Table 4.4: Input for the Client CGSIT SDP future compatibility tests

4.3   HID Connection Establishment tests

4.3.1   Host Connection Establishment

- Test Purpose

  Verify that the host can initiate a HID protocol connection to the device.

- Reference

  [6] 5.4.5.1

- Initial Condition

  - The device is connectable and in page scan, or combined inquiry and page scan mode. The host is in power down or standby mode. No host connection information is stored in the device and therefore the device has no prior knowledge of the host with which it will be connecting.

- Test Case Configuration

Test Case
HID/DEV/HCE/BV-01-C [Host Connection Establishment]
HID/HOS/HCE/BV-01-C [Host Connection Establishment]

Table 4.5: Host Connection Establishment test cases

- Test Procedure

  1. Initiate a HID connection with the device. This can be initiated by the power-up sequence or by user interaction. First connect the Control Channel, and then connect the Interrupt Channel.
  2. The HID device accepts the HID connection with the host. User input may be required to accept the connection and for security procedures. First accept the Control Channel, then the Interrupt Channel connection request.

- Expected Outcome

  Pass verdict

  Both the HID Control and the HID Interrupt channel are connected with the Control Channel being connected before the Interrupt Channel is connected.

  Upon the HID connection, the device or the host may give an indication that the connection has been completed.

  If no indication is provided, the intended application response can be observed.

4.3.2   Device-Initiated Reconnection

- Test Purpose

  Verify that the device can initiate a HID reconnection.

- Reference

  [6] 4.7.1

- Initial Condition

  - The host is connectable and in page scan mode. The device was previously connected to the host, but connection loss has occurred. Connection loss can be forced by taking the device out of range, or by shielding the device or the host.

- Test Case Configuration

Test Case
HID/DEV/HCE/BV-03-C [Device-Initiated Reconnection]
HID/HOS/HCE/BV-03-C [Device-Initiated Reconnection]

Table 4.6: Device-Initiated Reconnection test cases

- Test Procedure

  1. Initiate a HID reconnection from the HID device with the host after loss of connection.
  2. The HID host accepts a HID reconnection with the device.

- Expected Outcome

  Pass verdict

  Upon the HID connection the device or the host may give an indication that the connection has been completed.

  If no indication is provided, the intended application response can be observed.

4.3.3 Host-Initiated Reconnection

- Test Purpose

  Verify that the host can initiate a HID reconnection.

- Reference

  [6] 4.7.1

- Initial Condition

  - The device is connectable and in page scan mode. The device was previously connected to the host, but connection loss has occurred. Connection loss can be forced by taking the device out of range, or by shielding the device or the host.

- Test Case Configuration

Test Case
HID/DEV/HCE/BV-04-C [Host-Initiated Reconnection]
HID/HOS/HCE/BV-04-C [Host-Initiated Reconnection]

Table 4.7: Host-Initiated Reconnection test cases

- Test Procedure

  1. Device: Accept a HID reconnection with the host.
  2. Automatically initiate a HID reconnection from the HID host with the device after loss of connection.
  3. From the device, accept a HID reconnection with the host.

- Expected Outcome

  <u>Pass verdict</u>

  Upon the HID reconnection, the device or the host may give an indication that the connection has been completed.

  If no indication is provided, the intended application response can be observed.

HID/DEV/HCE/BV-05-C [Virtual Cable Operation]

- Test Purpose

  Verify that a virtual cable is established with the Lower Test host and that the IUT device cannot connect to another host Lower Tester 2.

- Reference

  [6] 6.4

- Initial Condition

  - The IUT and the Lower Tester are not connected.

- Test Procedure

  1. User or automated action allows/initiates the HID connection and virtual cable establishment using the test procedures of Section 4.3.1 Host Connection Establishment.
  2. The IUT operates normally as indicated by HID application response.
  3. A second host as Lower Tester 2 attempts to discover the IUT using inquiry.
  4. Lower Tester 2 attempts to connect to the IUT using paging.

- Expected Outcome

  <u>Pass verdict</u>

  The virtual cable has been created.

  The IUT operates normally as indicated by HID application response.

  Lower Tester 2 fails to discover the device.

  Lower Tester 2 fails to connect to the device.

4.4   HID Connection Release tests

4.4.1   Host-Initiated Connection Release

- Test Purpose

  Verify that the host can initiate a HID connection release and be able to connect after release. Neither the host nor the device should attempt to auto-reconnect, unless prompted by a user action.

- Reference

  [6] 7.1.1

- Initial Condition

  - The host and the device are connected.

- Test Case Configuration

Test Case
HID/DEV/HCR/BV-01-C [Host-Initiated Connection Release]
HID/HOS/HCR/BV-01-C [Host-Initiated Connection Release]

Table 4.8: Host-Initiated Connection Release test cases

- Test Procedure

  1. User action on the host initiates the HID connection release.
  2. The device accepts the connection release and returns to a condition ready to accept or initiate a new connection.
  3. The test procedures in Host Connection Establishment or Device-Initiated Reconnection or Host-Initiated Reconnection should be run after the connection release on the IUT to establish that the IUT is reconnectable.
  4. Declared user interaction can be used on the device to select between either hosts or device-initiated reconnection, but reset of the device should not be required. It is acceptable for a device to power off or go into an unresponsive low-power mode after release, provided a user action returns it to a connectable state.

- Expected Outcome

  Pass verdict

  After release is initiated, the device or the host may give an indication that the connection has been released.

  After release is initiated, the intended HID application response cannot be observed.

  Connection establishment is successful after the connection release, with user actions other than a device reset used to make the device reconnectable.

  For a device or a host, reconnection does not occur without user intervention.

4.4.2   Device-Initiated Connection Release

- Test Purpose

  Verify that the device can initiate a HID connection release and be able to connect after release. Neither the host nor the device should attempt to auto-reconnect, unless prompted by a user action.

- Reference

  [6] 7.1.1

- Initial Condition

  - The host and the device are connected.

- Test Case Configuration

Test Case
HID/DEV/HCR/BV-02-C [Device-Initiated Connection Release]
HID/HOS/HCR/BV-02-C [Device-Initiated Connection Release]

Table 4.9: Device-Initiated Connection Release test cases

- Test Procedure

    1. User action on the device initiates the HID connection release, and the device returns to a condition ready to accept or initiate a new connection.
    2. The host accepts the connection release and returns to a condition ready to accept or initiate a new connection.
    3. The test procedures in Host Connection Establishment or Device-Initiated Reconnection or Host-Initiated Reconnection should be run after the connection release on an IUT to establish that the IUT is reconnectable.
    4. Declared user interaction can be used on the device to select between either hosts or device-initiated reconnection, but reset of the device should not be required. It is acceptable for a device to power off or go into an unresponsive low-power mode after release, provided a user action returns it to a connectable state.

- Expected Outcome

    <u>Pass verdict</u>

    After release is initiated, the device or the host may give an indication that the connection has been released.

    After release is initiated, the intended HID application response cannot be observed.

    Connection establishment is successful after the connection release, with user actions other than a device reset used to make the device reconnectable.

    For a device or a host, reconnection does not occur without user intervention.

4.4.3   Host-Initiated Virtual Cable Unplug

- Test Purpose

    Verify that the host will initiate a virtual cable unplug and can connect after unplug. Neither the host nor the device should attempt to auto-reconnect, unless prompted by a user action.

- Reference

    [6] 6.4

- Initial Condition

    - The host and the device are connected with a virtual cable, using the procedure of test case HID/DEV/HCE/BV-05-C [Virtual Cable Operation].

- Test Case Configuration

Test Case
HID/DEV/HCR/BV-03-C [Host-Initiated Virtual Cable Unplug]
HID/HOS/HCR/BV-03-C [Host-Initiated Virtual Cable Unplug]

Table 4.10: Host-Initiated Virtual Cable Unplug test cases

- Test Procedure

    1. The host initiates a virtual cable unplug, which can be triggered by user or automated action.
    2. The device accepts the virtual cable unplug.
    3. The IUT returns to a condition ready to accept or initiate a new connection.

4. The test procedures in Host Connection Establishment or Device-Initiated Reconnection or Host-Initiated Reconnection should be run after the connection release on an IUT to establish that after connection release the IUT is reconnectable.
5. Declared user interaction can be used on the device to select between either hosts or device-initiated reconnection, but reset of the device should not be required. It is acceptable for a device to power off or go into an unresponsive low-power mode after release, provided a user action returns it to a connectable state.

- Expected Outcome

  Pass verdict

  After the virtual cable unplug is initiated, the IUT may give an indication that the virtual cable has been unplugged.

  After the virtual cable unplug, the intended HID application response cannot be observed.

  Connection establishment is successful after the virtual cable unplug, with user actions other than a device reset used to make the device reconnectable.

  For a device or a host, reconnection does not occur without user intervention.

4.4.4 Device-Initiated Virtual Cable Unplug

- Test Purpose

  Verify that the device will initiate a virtual cable unplug and connect after unplug. Neither the device nor the host should attempt to auto-reconnect, unless prompted by a user action.

- Reference

  [6] 6.4

- Initial Condition

  - The host and the device are connected with a virtual cable, using the procedure of test case HID/DEV/HCE/BV-05-C [Virtual Cable Operation].

- Test Case Configuration

Test Case
HID/DEV/HCR/BV-04-C [Device-Initiated Virtual Cable Unplug]
HID/HOS/HCR/BV-04-C [Device-Initiated Virtual Cable Unplug]

Table 4.11: Device-Initiated Virtual Cable Unplug test cases

- Test Procedure

  1. The device initiates a virtual cable unplug, which can be triggered by user or automated action.
  2. The host accepts the virtual cable unplug.
  3. The IUT returns to a condition ready to accept or initiate a new connection.
  4. The test procedures in Host Connection Establishment or Device-Initiated Reconnection or Host-Initiated Reconnection should be run after the connection release on an IUT to establish that after connection release the IUT is reconnectable. Declared user interaction can be used on the device to select between either hosts or device-initiated reconnection, but reset of the device should not be required. It is acceptable for a device to power off or go into an unresponsive low-power mode after release, provided a user action returns it to a connectable state.

- Expected Outcome

Pass verdict

After the virtual cable unplug is initiated the device or the host may give an indication that the virtual cable has been unplugged.

After the virtual cable unplug, the intended HID application response cannot be observed.

Connection establishment is successful after virtual cable unplug, with user actions other than a device reset used to make the device reconnectable.

For a device or a host, reconnection does not occur without user intervention.

4.5   HID Data Exchange

4.5.1   Device Data Transfer

- Test Purpose

Verify that the host and the device can exchange data.

- Reference

[6] 7.0

- Initial Condition

    - The host and the device are in a HID protocol connection.

- Test Case Configuration

Test Case
HID/DEV/HDT/BV-01-C [Device Data Transfer]
HID/HOS/HDT/BV-01-C [Device Data Transfer]

Table 4.12: Device Data Transfer test cases

- Test Procedure

    1. The device initiates sending of data to the host.
    2. The host accepts data from the device.

- Expected Outcome

Pass verdict

The intended application response at the host can be observed to confirm that the device is sending data and the host is correctly receiving it. Impairment in performance due to radio drop out is acceptable.

- Notes

Any demonstration application that presents the data at the host such that it confirms correct data transfer can be used for this test case. Graphical or GUI interactions are acceptable; it is not necessary to show data values. For example, correct mouse operation can be demonstrated on any PC application.

4.5.2 Host Data Transfer

- Test Purpose

  Verify that the host can send data to a device.

- Reference

  [6] 7.0

- Initial Condition

  - The host and the device are in a HID protocol connection.

- Test Case Configuration

Test Case
HID/DEV/HDT/BV-02-C [Host Data Transfer]
HID/HOS/HDT/BV-02-C [Host Data Transfer]

Table 4.13: Host Data Transfer test cases

- Test Procedure

  1. The host initiates sending of data to the device.
  2. The device accepts data from the host.

- Expected Outcome

  Pass verdict

  The intended application response at the device or the host can be observed to confirm that the host is sending data and the device is correctly receiving it. Impairment in performance due to radio drop out is acceptable.

- Notes

  Any demonstration application that presents the data at the host such that it confirms correct data transfer can be used for this test case. Graphical or GUI interactions are acceptable; it is not necessary to show data values. For example, change of behavior of keys on a keyboard could confirm the correct receipt of data at the device.

4.5.3 Device Boot Protocol Mode Data Transfer

- Test Purpose

  Verify that the device can send data to a host in boot protocol mode.

- Reference

  [6] 7.2.1

- Initial Condition

  - The host and the device are in a HID boot protocol mode connection.

- Test Case Configuration

Test Case
HID/DEV/HDT/BV-03-C [Device Boot Protocol Mode Data Transfer]
HID/HOS/HDT/BV-03-C [Device Boot Protocol Mode Data Transfer]

Table 4.14: Device Boot Protocol Mode Data Transfer test cases

- Test Procedure

  1. The device initiates sending of data to the host.
  2. The host accepts data from the device.

- Expected Outcome

  Pass verdict

  The intended application response at the host can be observed to confirm that the device is sending data in boot protocol mode and the host is correctly receiving it. Impairment in performance due to radio drop out is acceptable.

- Notes

  Any demonstration application that presents the data at the host such that it confirms correct data transfer can be used for this test case. Graphical or GUI interactions are acceptable; it is not necessary to show data values. For example, correct mouse operation can be demonstrated on any PC application.

  It may be that boot protocol operation is transitory and cannot be demonstrated at the application level. Supplementary evidence that confirms boot protocol operation is acceptable for this test case.

4.5.4   Host Boot Protocol Mode Data Transfer

- Test Purpose

  Verify that the host can send data to a device in boot protocol mode.

- Reference

  [6] 7.2.1

- Initial Condition

  - The host and the device are in a HID Boot protocol mode connection.

- Test Case Configuration

Test Case
HID/DEV/HDT/BV-04-C [Host Boot Protocol Mode Data Transfer]
HID/HOS/HDT/BV-04-C [Host Boot Protocol Mode Data Transfer]

Table 4.15: Host Boot Protocol Mode Data Transfer test cases

- Test Procedure

  1. The host initiates sending of data to the device.
  2. The device accepts data from the host.

- Expected Outcome

  Pass verdict

  The intended application response at the device or the host can be observed to confirm that the host is sending data in boot protocol mode and the device is correctly receiving it. Impairment in performance due to radio drop out is acceptable.

- Notes

  Any demonstration application that presents the data at the device such that it confirms correct data transfer can be used for this test case. Graphical or GUI interactions are acceptable; it is not necessary to show data values. It is also possible that host to device data transfer may only be used to modify device behavior. In this case, evidence that the device behavior has changed as intended is sufficient to confirm that data has been transferred.

  It may be that boot protocol operation is transitory and cannot be demonstrated at the application level. Supplementary evidence that confirms boot protocol operation is acceptable for this test case.

4.6   HID Protocol Transactions

4.6.1   Get_Report

- Test Purpose

  Verify that the host can send a valid Get_Report command and that the device responds correctly.

- Reference

  [6] 7.4.3

- Initial Condition

  - The device and the host are connected and both HID control and HID interrupt channels are open.

- Test Case Configuration

Test Case
HID/DEV/HID/BV-01-C [Get_Report]
HID/HOS/HID/BV-01-C [Get_Report]

Table 4.16: Get_Report test cases

- Test Procedure

  1. The host sends a Get_Report with a valid report number to the device on the control channel.
  2. The device responds to a Get_Report with the corresponding report on the control channel (DATA and DATC packets).
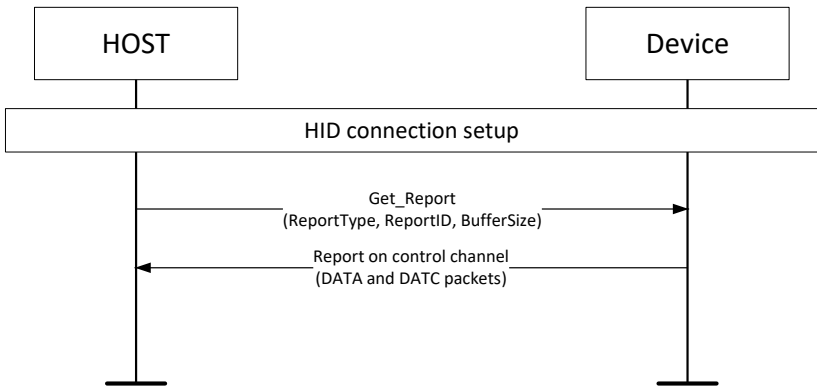
Figure 4.1: HID/DEV/HID/BV-01-C, HID/HOS/HID/BV-01-C [Get_Report]

- Test Condition

  The HID device declares a valid input report (device to host) in SDP attribute HIDDescriptorList and the data is available for polling by the host.

- Expected Outcome

  Pass verdict

  The host sends a Get_Report command with correct syntax and valid report ID on the control channel.

  The device responds to a Get_Report command with the corresponding report (DATA and DATC packets) on the control channel.

4.6.2   Set_Report

- Test Purpose

  Verify that the host can send a valid Set_Report command and that the device responds correctly.

- Reference

  [6] 7.4.4

- Initial Condition

  - The device and the host are connected and both HID control and HID interrupt channels are open.

- Test Case Configuration

Test Case
HID/DEV/HID/BV-02-C [Set_Report]
HID/HOS/HID/BV-02-C [Set_Report]

Table 4.17: Set_Report test cases

- Test Procedure

  1. The host sends a Set_Report command with a valid report ID to the device on the control channel.
  2. The device responds to a Set_Report with a Handshake (successful) message on the control channel.

Figure 4.2: HID/DEV/HID/BV-02-C, HID/HOS/HID/BV-02-C [Set_Report]

- Test Condition

  The HID device declares a valid output report (host to device) in SDP attribute HIDDescriptorList.

- Expected Outcome

  <u>Pass verdict</u>

  The host sends a Set_Report command with correct syntax and valid report number on the control channel.

  The device responds to a Set_Report command with a Handshake (successful) message on the control channel.

4.6.3   Get_Protocol

- Test Purpose

  Verify that the host can send a valid Get_Protocol command and that the device responds correctly.

- Reference

  [6] 7.4.5

- Initial Condition

  - The device and the host are connected and both HID control and HID interrupt channels are open.

- Test Case Configuration

Test Case
HID/DEV/HID/BV-03-C [Get_Protocol]
HID/HOS/HID/BV-03-C [Get_Protocol]

Table 4.18: Get_Protocol test cases

- Test Procedure

  1. The host sends a Get_Protocol command to the device on the control channel.
  2. The device responds to a Get_Protocol with a DATA packet with the currently valid protocol type on the control channel.

Figure 4.3: HID/DEV/HID/BV-03-C, HID/HOS/HID/BV-03-C [Get_Protocol]

- Expected Outcome

  Pass verdict

  The host sends a Get_Protocol command with correct syntax on the control channel.

  The device responds to a Get_Protocol command with a DATA packet containing the currently valid protocol type (Report) on the control channel.

4.6.4   Set_Protocol

- Test Purpose

  Verify that the host can send a valid Set_Protocol command and that the device responds correctly.

- Reference

  [6] 7.4.6

- Initial Condition

  - The device and the host are connected and both HID control and HID interrupt channels are open. Repeat this test in boot mode if the IUT is a host or a device that supports boot mode.

- Test Case Configuration

Test Case
HID/DEV/HID/BV-04-C [Set_Protocol]
HID/HOS/HID/BV-04-C [Set_Protocol]

Table 4.19: Set_Protocol test cases

- Test Procedure

  1. The host sends a Set_Protocol command with Protocol = Report to the device on the control channel.
  2. The device responds to a Set_Protocol with a Handshake (successful) on the control channel.

Figure 4.4: HID/DEV/HID/BV-04-C, HID/HOS/HID/BV-04-C [Set_Protocol]

- Expected Outcome

  Pass verdict

  The host sends a Set_Protocol command with correct syntax on the control channel.

  The device responds to a Set_Protocol command with a Handshake (successful) on the control channel.

4.6.5 Get_Idle

- Test Purpose

  Verify that the host can send a valid Get_Idle command and that the device responds correctly.

- Reference

  [6] 7.4.7

- Initial Condition

  - The device and the host are connected and both HID control and HID interrupt channels are open.

- Test Case Configuration

Test Case
HID/DEV/HID/BV-05-C [Get_Idle]
HID/HOS/HID/BV-05-C [Get_Idle]

  Table 4.20: Get_Idle test cases

- Test Procedure

  1. The host sends a Get_Idle command to the device on the control channel.
  2. The device responds to a Get_Idle with a DATA packet on the control channel containing the currently valid idle rate.

Figure 4.5: HID/DEV/HID/BV-05-C, HID/HOS/HID/BV-05-C [Get_Idle]

- Expected Outcome

  Pass verdict

  The host sends a Get_Idle command with correct syntax on the control channel.

  The device responds to a Get_Idle command with a DATA packet on the control channel containing the currently valid idle rate.

4.6.6 Set_Idle

- Test Purpose

  Verify that the host can send a valid Set_Idle command and that the device responds correctly.

- Reference

  [6] 7.4.8

- Initial Condition

  - The device and the host are connected and both HID control and HID interrupt channels are open.

- Test Case Configuration

Test Case
HID/DEV/HID/BV-06-C [Set_Idle]
HID/HOS/HID/BV-06-C [Set_Idle]

Table 4.21: Set_Idle test cases

- Test Procedure

  1. The host sends a Set_Idle command to the device on the control channel.
  2. The device responds to a Set_Idle with a Handshake (successful) packet on the control channel.

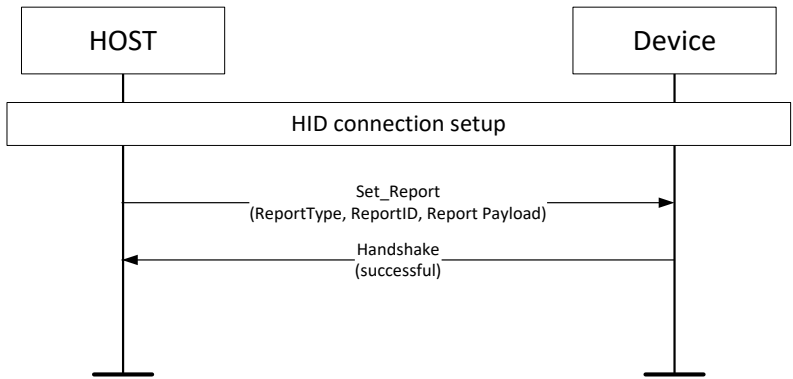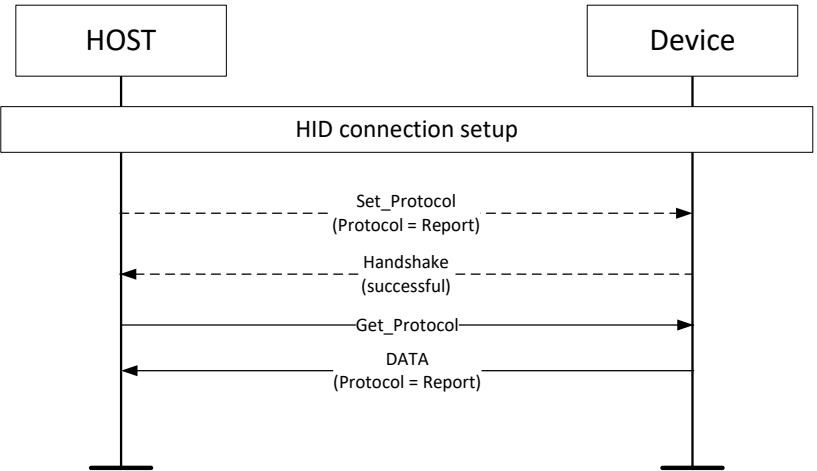*Figure 4.6: HID/DEV/HID/BV-06-C, HID/HOS/HID/BV-06-C [Set_Idle]*

- Expected Outcome

  Pass verdict

  The host sends a Set_Idle command with correct syntax on the control channel.

  The device responds to a Set_Idle command with a Handshake (successful) message on the control channel.

4.6.7   Set_Protocol Immediate

- Test Purpose

  Verify that the Boot Mode Only Host immediately sends a Set_Protocol = BOOT command upon HID Control Channel connection establishment and that the device responds correctly to the Set_Protocol command.

- Reference

  [6] 7.4.6

- Initial Condition

  - The device and the host are connected, and the HID control channel is open.

  - The device is in Report Mode.

- Test Case Configuration

Test Case
HID/DEV/HID/BV-08-C [Set_Protocol Immediate]
HID/HOS/HID/BV-08-C [Set_Protocol Immediate]

Table 4.22: Set_Protocol Immediate test cases

- Test Procedure

  1. The host sends a Set_Protocol = BOOT command to the device on the control channel.
  2. The device responds to a Set_Protocol with a Handshake (successful) on the control channel.

- Expected Outcome

  Pass verdict

  The host sends a Set_Protocol = BOOT command with correct syntax on the control channel.

  The device responds to a Set_Protocol command with a Handshake (successful) on the control channel.

4.6.8 Get_Protocol, Boot Mode

- Test Purpose

  Verify that the device responds correctly to a Get_Protocol command from the host in Boot Mode.

- Reference

  [6] 7.4.5

- Initial Condition

  - The device and the host are connected and both HID control and HID interrupt channels are open.

- Test Case Configuration

Test Case
HID/DEV/HID/BV-09-C [Get_Protocol, Boot Mode]
HID/HOS/HID/BV-09-C [Get_Protocol, Boot Mode]

Table 4.23: Get_Protocol, Boot Mode test cases

- Test Procedure

  1. The host sends a Get_Protocol command with to the device on the control channel.
  2. The device responds to a Get_Protocol with a DATA packet with the currently valid protocol type (Boot) on the control channel.
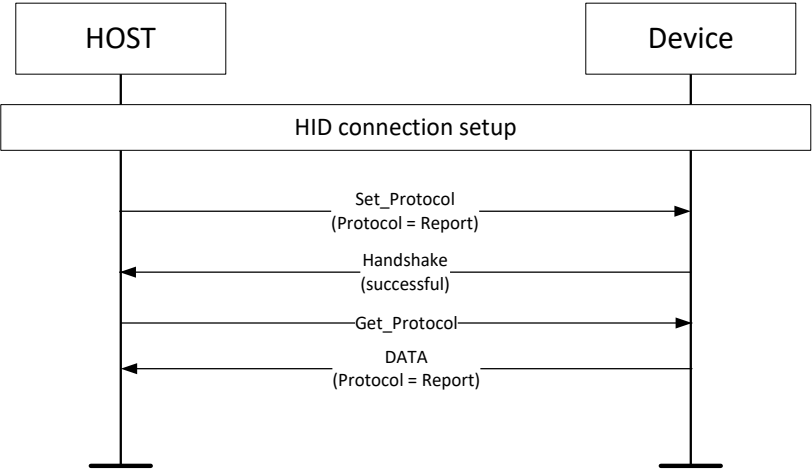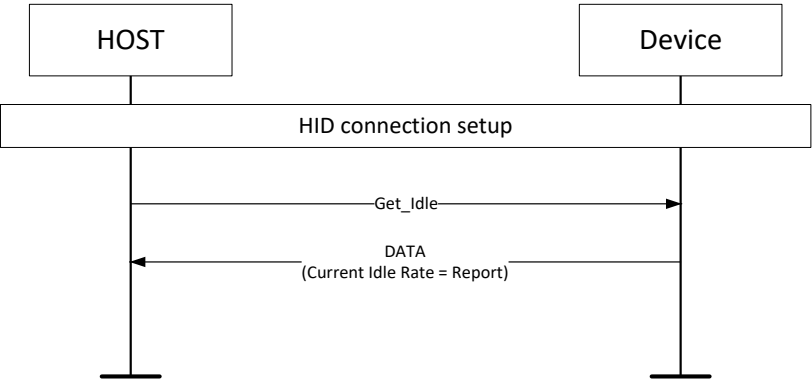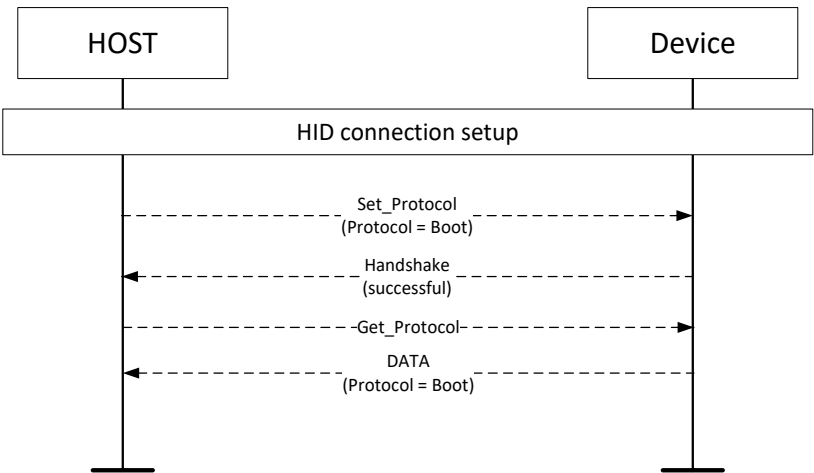

Figure 4.7: HID/DEV/HID/BV-09-C, HID/HOS/HID/BV-09-C [Get_Protocol]

- Expected Outcome

  Pass verdict

  The host sends a Get_Protocol command with correct syntax on the control channel.

  The device responds to a Get_Protocol command with a DATA packet containing the currently valid protocol type (Boot) on the control channel.

4.6.9   Set_Protocol, Boot Mode

- Test Purpose

  Verify that the host can send a valid Set_Protocol command and that the device responds correctly.

- Reference

  [6] 7.4.6

- Initial Condition

  - The device and the host are connected and both HID control and HID interrupt channels are open.

- Test Case Configuration

Test Case
HID/DEV/HID/BV-10-C [Set_Protocol, Boot Mode]
HID/HOS/HID/BV-10-C [Set_Protocol, Boot Mode]

  Table 4.24: Set_Protocol, Boot Mode test cases

- Test Procedure

  1. The host sends a Set_Protocol command with Protocol = Boot to the device on the control channel.
  2. The device responds to a Set_Protocol with a Handshake (successful) on the control channel.

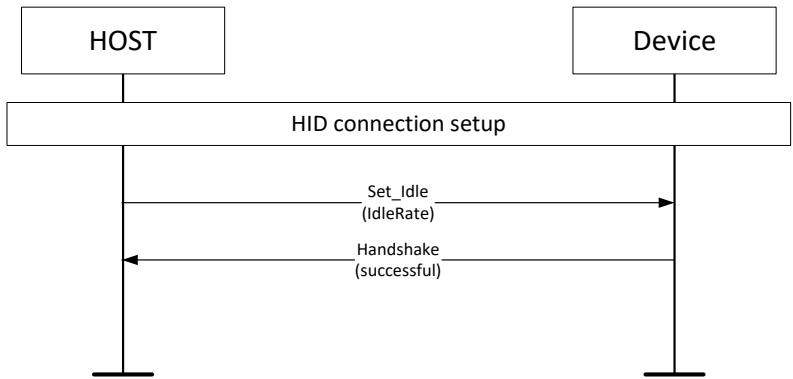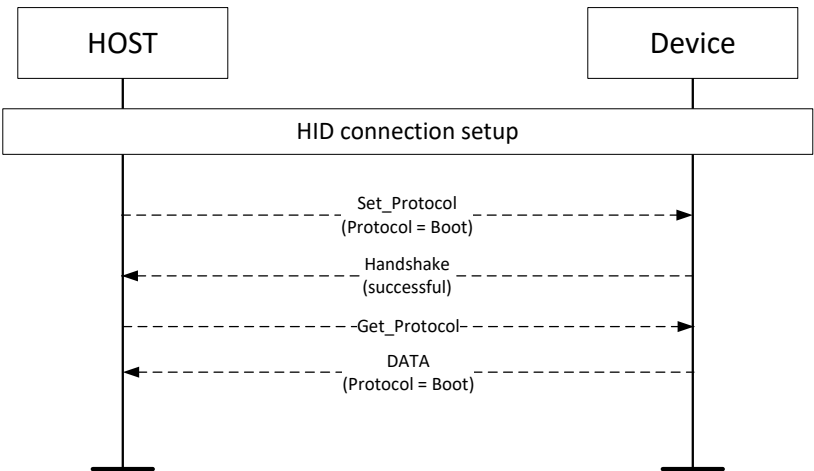*Figure 4.8: HID/DEV/HID/BV-10-C, HID/HOS/HID/BV-10-C [Set_Protocol, Boot Mode]*

- Expected Outcome

  Pass verdict

  The host sends a Set_Protocol command with correct syntax on the control channel.

  The device responds to a Set_Protocol command with a Handshake (successful) on the control channel.

HID/DEV/HID/BI-01-C [Error Message: Invalid Report ID]

- Test Purpose

  Verify that the device IUT responds with an error message to an invalid ReportID.

- Reference

  [6] 7.4.1

- Initial Condition

  - The IUT and the Lower Tester are connected and both HID control and HID interrupt channels are open.

- Test Procedure

  1. The Lower Tester sends a Get_Report or Set_Report with an invalid report ID.
  2. The IUT responds with a Handshake (Err_Invalid_Report_ID) packet.
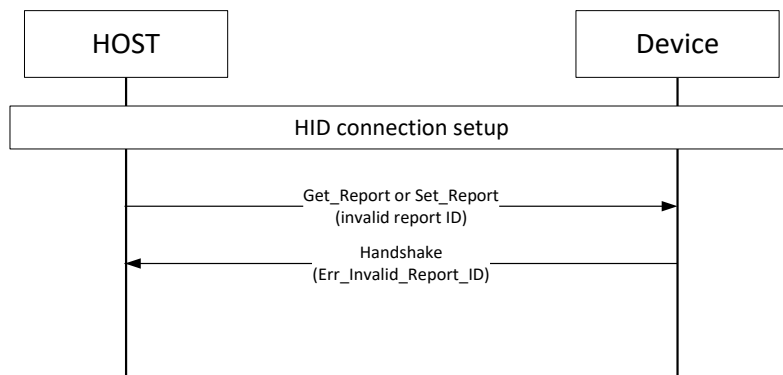
Figure 4.9: HID/DEV/HID/BI-01-C [Error Message: Invalid Report ID]

- Expected Outcome

  Pass verdict

  The device IUT responds with a Handshake (Err_Invalid_Report_ID) packet.

HID/DEV/HID/BI-02-C [Error Message: Unsupported Request]

- Test Purpose

  Verify that the device IUT responds with an error message to an unsupported request.

- Reference

  [6] 7.4.1

- Initial Condition

    - The IUT and the Lower Tester are connected and both HID control and HID interrupt channels are open.

- Test Procedure

    1. The Lower Tester sends a request with an unsupported TransactionType (e.g., 0x02).
    2. The IUT responds with a Handshake (Err_Unsupported_Request) packet.
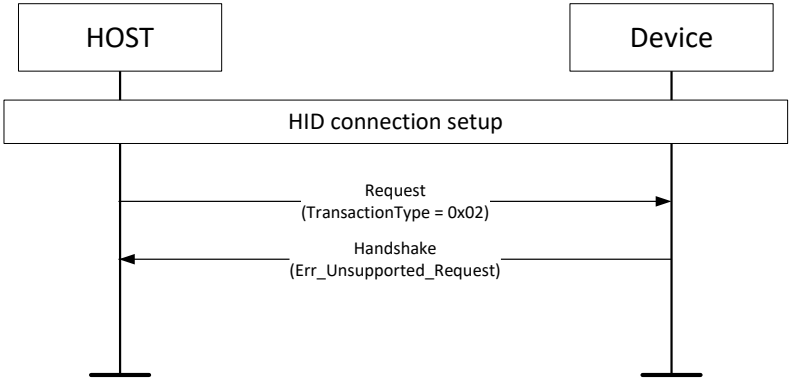
Figure 4.10: HID/DEV/HID/BI-02-C [Error Message: Unsupported Request]

- Expected Outcome

    <u>Pass verdict</u>

    The device IUT responds with a Handshake (Err_Unsupported_Request) packet.

4.7   DATA/DATC tests

4.7.1   Short Reports

- Test Purpose

    Verify that the IUT correctly sends reports shorter than the MTU.

- Reference

    [6] 7.4.9

- Initial Condition

    - The device and the host are connected and both HID control and HID interrupt channels are open.

- Test Case Configuration

Test Case
HID/DEV/DAT/BV-01-C [Short Reports]
HID/HOS/DAT/BV-01-C [Short Reports]

Table 4.25: Short Reports test cases

- Test Procedure

    1. The IUT sends a short report on the interrupt channel.
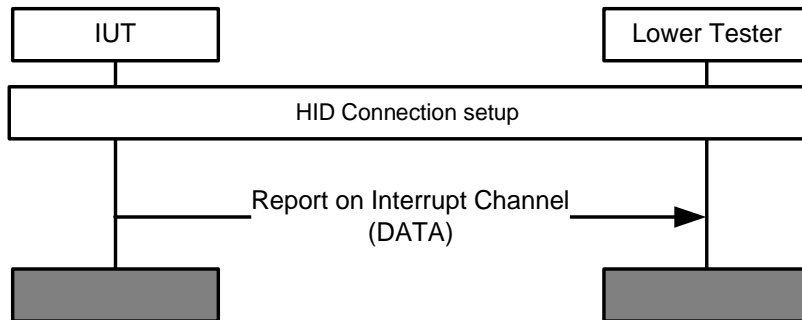
Figure 4.11: HID/DEV/DAT/BV-01-C, HID/HOS/DAT/BV-01-C [Short Reports]

- Expected Outcome

    <u>Pass verdict</u>

    The IUT sends a short report with correct syntax on the interrupt channel using a DATA packet.

HID/HOS/DAT/BV-02-C [Large Reports on interrupt channel – Host to Device]

- Test Purpose

    Verify that the host IUT correctly sends reports larger than the MTU.

- Reference

    [6] 7.4.9, 7.4.10

- Initial Condition

    - The Lower Tester and the IUT are connected and both HID control and HID interrupt channels are open.

    - The interrupt channel has an MTU of at least 48 bytes (minimum MTU), but smaller than the defined reports.

- Test Procedure

    1. The host IUT sends a large report on the interrupt channel if the Lower Tester accepts such a report.
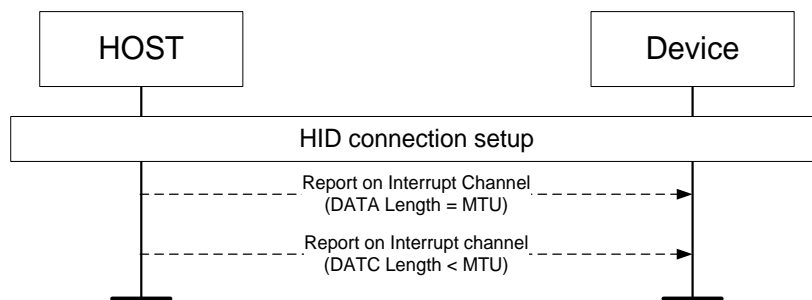
Figure 4.12: HID/HOS/DAT/BV-02-C [Large Reports on interrupt channel]

- Expected Outcome

  <u>Pass verdict</u>

  The IUT sends a large report with correct syntax on the interrupt channel using DATA and DATC packets.

4.7.2   Large Reports on control channel

- Test Purpose

  Verify that the device sends valid reports larger than the host's MTU and that the host correctly receives them.

- Reference

  [6] 7.4.3, 7.4.9, 7.4.10

- Initial Condition

  - The device and the host are connected and both HID control and HID interrupt channels are open.

  - The control channel has an MTU of at least 48 bytes (minimum MTU), but smaller than the defined reports.

  - The report is not truncated by specifying a BufferSize smaller than the MTU.

- Test Case Configuration

Test Case
HID/DEV/DAT/BV-03-C [Large Reports on control channel]
HID/HOS/DAT/BV-03-C [Large Reports on control channel]

Table 4.26: Large Reports on control channel test cases

- Test Procedure

  1. The host sends a Get_Report on the control channel with a BufferSize smaller than the report size but larger than the channel MTU.
  2. The device sends a large report on the control channel as a response to the Get_Report.
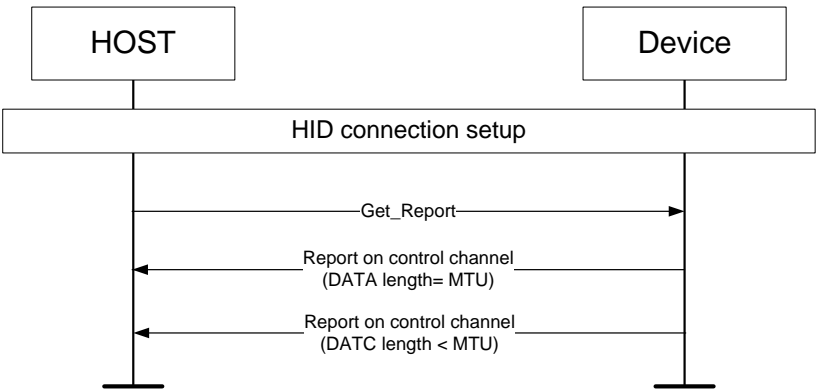
Figure 4.13: HID/HOS/DAT/BV-03-C, HID/DEV/DAT/BV-03-C [Large Reports on control channel]

- Test Condition

  The HID device declares an input or output report.

- Expected Outcome

  Pass verdict

  The device sends a large report with correct syntax on the control channel using DATA and DATC packets with a size of the maximum defined in Get_Report.

  The host correctly requests and receives a large report on the control channel from the device.

HID/DEV/DAT/BV-04-C [Large Reports on interrupt channel – Device to Host]

- Test Purpose

  Verify that the device IUT correctly sends reports larger than the MTU.

- Reference

  [6] 7.4.9, 7.4.10

- Initial Condition

  - The IUT and the Lower Tester are connected and both HID control and HID interrupt channels are open.

  - The interrupt channel has an MTU of at least 48 bytes (minimum MTU), but smaller than the defined reports.

- Test Procedure

  1. The device IUT sends a large report on the interrupt channel if the device defines such a report.
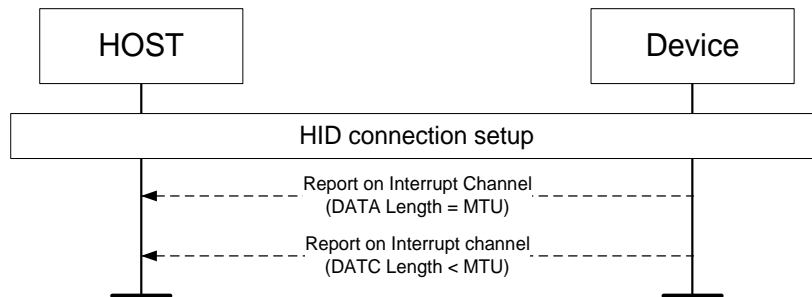
Figure 4.14: HID/DEV/DAT/BV-04-C [Large Reports on interrupt channel - Device to Host]

- Expected Outcome

  Pass verdict

  The IUT sends a large report with correct syntax on the interrupt channel using DATA and DATC packets.

HID/HOS/DAT/BI-01-C [Large Reports on interrupt channel rejected – Boot Mode Only Hosts]

- Test Purpose

  Verify that the Boot Mode Only Host IUT ignores all interrupt channel reports larger than the 48-byte minimum MTU.

- Reference

  [6] 7.4.9, 7.4.10

- Initial Condition

  - The Lower Tester and the IUT are connected and both HID control and HID interrupt channels are open.

  - The interrupt channel has an MTU of at least 48 bytes (minimum MTU), but smaller than the defined reports.

- Test Procedure

  1. The device sends a report with size exceeding 48 bytes on the interrupt channel.
  2. The IUT ignores the large report using DATA packet.

- Expected Outcome

  Pass verdict

  The IUT ignores a large report, sent by the Lower Tester with correct syntax on the interrupt channel, using DATA packets.

HID/HOS/DAT/BI-02-C [Non-Boot Reports on interrupt channel ignored or rejected – Boot Mode Only Hosts]

- Test Purpose

  Verify that the Boot Mode Only Host IUT ignores or rejects all non-boot interrupt channel reports.

- Reference

  [6] 7.2.1.1, 7.4.9, 7.4.10

- Initial Condition

  - The Lower Tester and the IUT are connected and both HID control and HID interrupt channels are open.

- Test Procedure

  1. The Lower Tester sends a non-boot report to the host on the interrupt channel.
  2. The IUT ignores, or rejects using DATA packets, the non-boot report.

- Expected Outcome

  Pass verdict

  The IUT ignores or rejects a non-boot report sent by the Lower Tester on the interrupt channel using DATA packets.

4.7.3   SDP Server Requirements

HID/DEV/SDD/BV-01-C [Retrieve and Validate the HID SDP Record]

- Test Purpose

  Verify that the device IUT responds properly to the SDP commands and implements a correctly formatted Bluetooth HID SDP record, in particular the embedded HID descriptor string, attribute 0x0206, HIDCountryCode 0x0203, and other HID specific attributes.

- Reference

  [6] 7.10

- Initial Condition

  - The IUT and the Lower Tester are connected.

- Test Procedure

  1. The Lower Tester requests the HID SDP record.
  2. The IUT sends the requested HID SDP record.
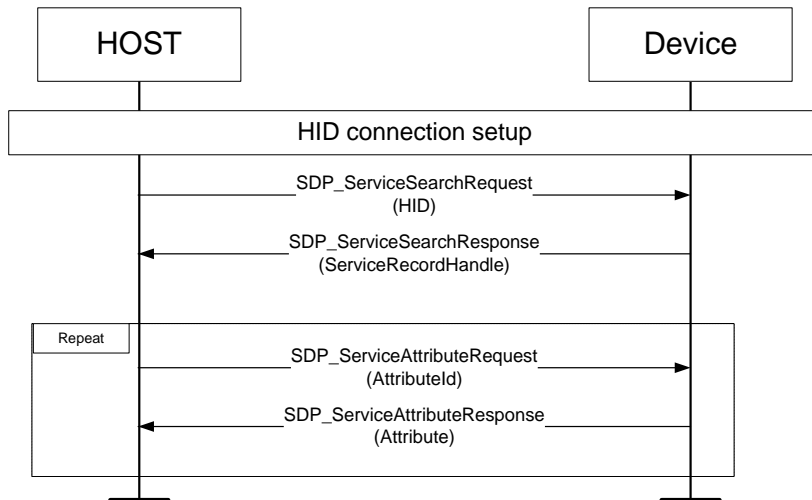
Figure 4.15: HID/DEV/SDD/BV-01-C [Retrieve and Validate the HID SDP Record]

- Expected Outcome

  <u>Pass verdict</u>

  The IUT sends a correctly formatted Bluetooth HID SDP record, in particular the embedded HID descriptor string, attribute 0x0206 and other HID specific attributes.

HID/DEV/SDD/BV-03-C [Retrieve the HID SDP Record when HID Control and Interrupt channel connection present]

- Test Purpose

  Verify that the HID device IUT correctly manages the HIDSDPDisable attribute. Devices with the HIDSDPDisable set to TRUE should not allow SDP connections while the HID Control and HID Interrupt channels are open. Devices with the HIDSDPDisable set to FALSE should allow the SDP record to be successfully retrieved when the HID Control and HID Interrupt channels are open.

- Reference

  [6] 7.11.8

- Initial Condition

  - The Lower Tester and the IUT are not paired or connected.

- Test Procedure

   1. Make the HID device IUT discoverable using the manufacturer-specific operation.
   2. The Lower Tester forms a HID connection with the IUT.
   3. The Lower Tester forms an SDP connection with the IUT.
   4. The Lower Tester retrieves the HID SDP record.

- Expected Outcome

   Pass verdict

   The IUT is connectable, and the Lower Tester can connect to the HID device.

   The IUT makes its SDP record available to the HID host while the HID Control and HID Interrupt channels are actively connected if HIDSDPDisable is set to "FALSE" or not present.

   The IUT declines the SDP connection if the HIDSDPDisable is set to "TRUE".

   The Lower Tester can retrieve the SDP record from the IUT while the HID Control and HID Interrupt channels are connected and active if the HIDSDPDisable bit is set to "FALSE" or not present.

   The Lower Tester cannot retrieve the SDP record from the IUT while the HID Control and HID Interrupt channels are connected and active if the HIDSDPDisable bit is set to "TRUE".

- Notes

   If HIDSDPDisable is not supported, then the SDP record should be retrievable when the HID Control and HID Interrupt channels are actively connected.

4.8   Connection Management

4.8.1   HID Limited Discoverable Mode Behavior

- Test Purpose

   Verify that the HID host can perform inquiry using the Limited Inquiry Access Code (LIAC) as well as General Inquiry to discover a HID device that is in Limited Discoverable Mode that will remain Limited Discoverable for a fixed period of time when triggered to do so.

- Reference

   [6] 5.4.5.9, 6.2

- Initial Condition

   - The Lower Tester and the IUT are not paired or connected.

- Test Case Configuration

Test Case
HID/DEV/CON/BV-01-C [HID Limited Discoverable Mode Behavior]
HID/HOS/CON/BV-01-C [HID Limited Discoverable Mode Behavior]

   Table 4.27: HID Limited Discoverable Mode Behavior test cases

- Test Procedure

   1. The HID device is placed into Limited Discoverable Mode, using the manufacturer-specific operation, if necessary.
   2. The host searches for the HID device using General Inquiry.

3. The host obtains the Class of Device information, including the discoverable mode information of the device.
4. The host searches for the HID device using Limited Inquiry.
5. Wait for discoverability to end on the HID device after a configurable period of time.
6. The host searches for the HID device using Limited Inquiry.
7. The host searches for the HID device using General Inquiry.

- Test Condition

  The HID device supports Limited Discoverable Mode.

  The HID host supports inquiry using the Limited Inquiry Access Code (LIAC).

- Expected Outcome

  Pass verdict

  The HID device can be found by the HID host using General Inquiry after step 2.

  The HID device sets the appropriate bit in the Class of Device (CoD) to indicate that LIAC is being used.

  The HID device can be found by the HID host using Limited Inquiry after step 4.

  After a configurable time period, the device is no longer discoverable using Limited Inquiry, and the CoD bit is cleared following step 5.

- Notes

  The HID device may still be discoverable using General Inquiry after the Limited Discoverable timeout period has elapsed.

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 Human Interface Device Profile v1.0 (HID) [12].

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 [5].

For the purpose and structure of the ICS/IXIT, refer to [5].

Item	Feature	Test Case(s)
HID 1/2	HID Device SDP Service	HID/DEV/SGSIT/SERR/BV-01-C HID/DEV/SGSIT/SERR/BV-02-C HID/DEV/SGSIT/ATTR/BV-01-C HID/DEV/SGSIT/ATTR/BV-02-C HID/DEV/SGSIT/ATTR/BV-03-C HID/DEV/SGSIT/ATTR/BV-04-C HID/DEV/SGSIT/ATTR/BV-05-C HID/DEV/SGSIT/ATTR/BV-06-C HID/DEV/SGSIT/ATTR/BV-07-C HID/DEV/SGSIT/ATTR/BV-08-C HID/DEV/SGSIT/ATTR/BV-09-C HID/DEV/SGSIT/ATTR/BV-10-C HID/DEV/SGSIT/ATTR/BV-11-C HID/DEV/SGSIT/ATTR/BV-12-C HID/DEV/SGSIT/ATTR/BV-13-C HID/DEV/SGSIT/ATTR/BV-14-C HID/DEV/SGSIT/ATTR/BV-15-C HID/DEV/SGSIT/ATTR/BV-16-C HID/DEV/SGSIT/ATTR/BV-17-C HID/DEV/SGSIT/ATTR/BV-18-C HID/DEV/SGSIT/ATTR/BV-19-C HID/DEV/SGSIT/ATTR/BV-20-C HID/DEV/SGSIT/ATTR/BV-21-C HID/DEV/SGSIT/ATTR/BV-22-C HID/DEV/SGSIT/OFFS/BV-01-C HID/DEV/SGSIT/OFFS/BV-02-C HID/DEV/SGSIT/OFFS/BV-03-C
HID 1/1	Successful Connection with future SDP Record value – HID Host	HID/HOS/CGSIT/SFC/BV-01-C

Item	Feature	Test Case(s)
HID 2/1	Establish HID connection	HID/HOS/HCE/BV-01-C
HID 9/2	Establish HID connection	HID/DEV/HCE/BV-01-C
HID 2/6	HID initiated reconnection	HID/HOS/HCE/BV-03-C
HID 9/6	HID initiated reconnection	HID/DEV/HCE/BV-03-C
HID 2/7	Host-initiated reconnection	HID/HOS/HCE/BV-04-C
HID 9/7	Host-initiated reconnection	HID/DEV/HCE/BV-04-C
HID 9/5	Support for virtual cables	HID/DEV/HCE/BV-05-C
HID 2/3	Terminate HID connection	HID/HOS/HCR/BV-01-C
HID 9/4	Terminate HID connection	HID/DEV/HCR/BV-01-C
HID 2/4	Terminate HID connection	HID/HOS/HCR/BV-02-C
HID 9/3	Terminate HID connection	HID/DEV/HCR/BV-02-C
HID 2/14	Support for receiving HID_CONTROL with VIRTUAL_CABLE_UNPLUG	HID/HOS/HCR/BV-03-C
HID 9/16	Support for receiving HID_CONTROL with VIRTUAL_CABLE_UNPLUG	HID/DEV/HCR/BV-03-C
HID 2/15	Support for receiving HID_CONTROL with VIRTUAL_CABLE_UNPLUG	HID/HOS/HCR/BV-04-C
HID 9/15	Support for receiving HID_CONTROL with VIRTUAL_CABLE_UNPLUG	HID/DEV/HCR/BV-04-C
HID 2/9	HID data transfer to Host	HID/HOS/HDT/BV-01-C
HID 9/9	HID data transfer to Host	HID/DEV/HDT/BV-01-C
HID 2/8	Host data transfer to HID	HID/HOS/HDT/BV-02-C
HID 9/8	Host data transfer to HID	HID/DEV/HDT/BV-02-C
HID 2/10 OR HID 3/4	HID Boot mode data transfer to Host	HID/HOS/HDT/BV-03-C
HID 9/10 OR HID 10/4	HID Boot mode data transfer to Host	HID/DEV/HDT/BV-03-C
HID 2/11 OR HID 4/4	Host Boot mode data transfer to HID	HID/HOS/HDT/BV-04-C
HID 9/11 OR HID 11/4	Host Boot mode data transfer to HID	HID/DEV/HDT/BV-04-C
HID 4/3	Data reports shorter than the MTU	HID/HOS/DAT/BV-01-C
HID 10/3 OR HID 11/3	Data reports shorter than the MTU	HID/DEV/DAT/BV-01-C
HID 4/2	Data reports larger than host MTU on Interrupt channel	HID/HOS/DAT/BV-02-C
HID 3/1 AND HID 2/12	Data reports larger than host MTU on Control channel	HID/HOS/DAT/BV-03-C
HID 10/1	Data reports larger than host MTU on Control channel	HID/DEV/DAT/BV-03-C
HID 10/2	Data reports larger than host MTU on Interrupt channel	HID/DEV/DAT/BV-04-C
HID 1/3	Reject data reports larger than device MTU on Interrupt channel.	HID/HOS/DAT/BI-01-C

Item	Feature	Test Case(s)
HID 1/3	Reject or ignore non-boot reports on Interrupt channel	HID/HOS/DAT/BI-02-C
HID 5/6	Get_Report command	HID/HOS/HID/BV-01-C
HID 12/6	Get_Report command	HID/DEV/HID/BV-01-C
HID 5/5	Set_Report command	HID/HOS/HID/BV-02-C
HID 12/5	Set_Report command	HID/DEV/HID/BV-02-C
HID 5/1 AND HID 5/2 AND NOT HID 1/3	Get_Protocol command	HID/HOS/HID/BV-03-C
HID 12/1 AND HID 12/2	Get_Protocol command	HID/DEV/HID/BV-03-C
HID 5/1 AND HID 5/2 AND NOT HID 1/3	Set_Protocol command	HID/HOS/HID/BV-04-C
HID 12/1 AND HID 12/2	Set_Protocol command	HID/DEV/HID/BV-04-C
HID 5/4	Get_Idle command	HID/HOS/HID/BV-05-C
HID 12/4	Get_Idle command	HID/DEV/HID/BV-05-C
HID 5/3	Set_Idle command	HID/HOS/HID/BV-06-C
HID 12/3	Set_Idle command	HID/DEV/HID/BV-06-C
HID 1/3 AND HID 5/1	Set_Protocol command	HID/HOS/HID/BV-08-C
HID 12/1	Set_Protocol command	HID/DEV/HID/BV-08-C
HID 5/1 AND HID 5/2 AND HID 1/3	Set_Protocol command, Boot Mode	HID/HOS/HID/BV-09-C
HID 12/1 AND HID 12/2	Set_Protocol command, Boot Mode	HID/DEV/HID/BV-09-C
HID 5/1 AND HID 5/2 AND HID 1/3	Set_Protocol command, Boot Mode	HID/HOS/HID/BV-10-C
HID 12/1 AND HID 12/2	Set_Protocol command, Boot Mode	HID/DEV/HID/BV-10-C
HID 8/1 OR HID 8/2 OR HID 8/3 OR HID 8/4	Error Message: Invalid Report ID	HID/DEV/HID/BI-01-C
HID 8/1 OR HID 8/2 OR HID 8/3 OR HID 8/4	Error Message: Unsupported Request	HID/DEV/HID/BI-02-C

Item	Feature	Test Case(s)
HID 2/1 AND GAP 3/1 AND GAP 3/2	HID Limited Discoverable Mode	HID/HOS/CON/BV-01-C
HID 1/2 AND GAP 1/2	HID Limited Discoverable Mode	HID/DEV/CON/BV-01-C
HID 8/1 OR HID 8/2 OR HID 8/3	SDP Server	HID/DEV/SDD/BV-01-C
HID 1/2	HID Device SDP with HIDSDPDisable	HID/DEV/SDD/BV-03-C

Table 5.1: Test case mapping

6   Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0	2003/08/04	Renamed version in preparation for release; no content changes.
	1.0.1r1	2005/1/10	Editing and format changes. Document numbering change. Incorporate TSE 1436 to add HID/DEV/SDD/BV-02-C (legacy test case ID TP/SDD/BV-02-C).
1	1.0.1	2005/01/19	Incorporate review comments for release.
	1.0.2	2005/06/20	Incorporate changes to accommodate erratum TSE 799; added HID/HOS/HID/BV-08-C, HID/DEV/HID/BV-08-C, HID/HOS/DAT/BI-01-C, HID/HOS/DAT/BI-02-C (legacy test case IDs TP/HID/BV-08-C, TP/DAT/BI-01-C, and TP/DAT/BI-02-C); Editing and formatting changes
	1.0.2r0	2005/09/21-2005/10/07	Editorial review. TSE 842 for HID/HOS/HCR/BV-04-I, HID/DEV/HCR/BV-04-I (legacy test case ID TP/HCR/BV-04-I); Moved MCS to section 5 TSE 827 for TC HID/HOS/HDT/BV-04-I, HID/DEV/HDT/BV-04-I (legacy test case ID TP/HDT/BV-04-I), TSE 832 for TC HID/HOS/HCE/BV-04-I, HID/DEV/HCE/BV-04-I (legacy test case ID TP/HCE/BV-04-I); Updated Sec. 5 references.
2	1.0.2	2005/10/13	Prepare for Publication
	1.0.3r0	2006/05/12	TSE 846: HID/HOS/DAT/BV-01-C, HID/DEV/DAT/BV-01-C (legacy test case ID TP/DAT/BV-01-C) TC and TCMT
3	1.0.3	2006/06/19	Prepare for publication.
	1.0.4r0 to 1.0.4r2	2006/11/01 – 12/06/2006	TSE 1717: HID/HOS/HID/BV-03-C, HID/DEV/HID/BV-03-C (legacy test case ID TP/HID/BV-03-C) TSE 1856: Change TCMT for HID/HOS/HID/BV-03-C, HID/DEV/HID/BV-03-C, HID/HOS/HID/BV-04-C, HID/DEV/HID/BV-04-C (legacy test case IDs TP/HID/BV-03|04-C) (Set/Get Protocol) TSE 1941: TCMT and test case changes for HID/HOS/HID/BV-01-C, HID/DEV/HID/BV-01-C, HID/HOS/HID/BV-02-C, HID/DEV/HID/BV-02-C (legacy test case IDs TP/HID/BV-01|02-C) Input reviewer's comments Implement TSE 1979 Remove Section 2 (Configuration and Roles) Move Uncertainties text to Notes
4	1.0.4	2007/01/10	Prepare for publication.

Publication Number	Revision Number	Date	Comments
5	1.0.5	2008/04/01	TSE 2325: HID/DEV/HCE/BV-05-I (legacy test case ID TP/HCE/BV-05-I): TCMT and Test purpose; prepare for publication
	1.0.6r0	2008/09/01	TSE 2577: New test HID/HOS/CON/BV-01-I, HID/DEV/CON/BV-01-I (legacy test case ID HID/CON/BV-01-I) TSE 2575: New test case HID/DEV/SDD/BV-03-C (legacy test case ID TP/SDD/BV-03-C) TSE 2576: HID/DEV/SDD/BV-01-C (legacy test case ID TP/SDD/BV-01-C) TSE 2578: HID/HOS/HCE/BV-01-I, HID/DEV/HCE/BV-01-I, HID/HOS/HCE/BV-02-I, HID/DEV/HCE/BV-02-I, HID/DEV/HCE/BV-05-I (legacy test case IDs TP/HCE/BV-01-I, TP/HCE/BV-02-I, TP/HCE/BV-05-I) TSE 2650: TCMT, consolidate TCs that appear more than once. TSE 2579: New test case TP/SDD/BV-03-I (current test case ID HID/DEV/SDD/BV-04-I)
	1.0.6r1	2008/10/29	Created HID/DEV/SDD/BV-04-I (legacy test case ID TP/SDD/BV-04-I) so as not to overwrite TSE 2575
	1.0.6r2	2008/10/31	Clarify test condition for HID/DEV/SDD/BV-03-C (legacy test case ID TP/SDD/BV-03-C)
	1.0.6r3	2008/12/15	Fixed editorial error with TC ID and TCMT expression for HID/HOS/CON/BV-01-I, HID/DEV/CON/BV-01-I (legacy test case ID TP/CON/BV-01-I) Added HID/DEV/SDD/BV-03-C and HID/DEV/SDD/BV-04-I (legacy test case IDs TP/SDD/BV-03-C and TP/SDD/BV-04-I) to TCMT.
6	1.0.6	2008/12/15	Prepare for publication.
	1.0.6a	2009/01/05	Changes to TCMT for new test cases HID/HOS/CON/BV-01-I, HID/DEV/CON/BV-01-I, HID/DEV/SDD/BV-03-C and HID/DEV/SDD/BV-04-I (legacy test case IDs TP/CON/BV-01, TP/SDD/BV-03-C and TP/SDD/BV-04-C)
7	1.0.7	2009/08/05	TSE 2385: update HID/HOS/DAT/BV-02-C (legacy test case ID TP/DAT/BV-02-C), add HID/DEV/DAT/BV-04-C (legacy test case ID TP/DAT/BV-04-C), edit TCMT
	1.0.8r0	2010/08/31	TSE 2597: TP/DAT/BV-01-C: Fix mapping table entries to one entry. TSE 2789: HID/DEV/SDD/BV-03-C (legacy test case ID TP/SDD/BV-03-C): Fix TCMT TSE 3016: HID/HOS/HID/BV-03-C, HID/DEV/HID/BV-03-C, HID/HOS/HID/BV-04-C, HID/DEV/HID/BV-04-C, HID/HOS/HID/BV-09-C, HID/DEV/HID/BV-09-C, HID/HOS/HID/BV-10-C, HID/DEV/HID/BV-10-C (legacy test case IDs HID/BV-03, HID/BV-04, HID/BV-09, HID/BV-10): Fix TCMT

Publication Number	Revision Number	Date	Comments
	1.0.8r1	2011/02/11	Input reviewer's comments for TSE 2597, 3016: typo in TCMT TSE 3370: HID/HOS/HCE/BV-03-I, HID/DEV/HCE/BV-03-I, HID/HOS/HCE/BV-04-I, HID/DEV/HCE/BV-04-I (legacy test case IDs TP/HCE/BV-03-I, TP/HCE/BV-04-I): References
	1.0.8r2	2011/04/28	TSE 2651: HID/HOS/DAT/BI-01-C (legacy test case ID TP/DAT/BI-01-C); update Purpose, Test Procedure and Expected Income. TSE 3044: HID/HOS/CON/BV-01-I, HID/DEV/CON/BV-01-I (legacy test case ID TP/CON/BV-01-I): TCMT TSE 3317: HID/HOS/HCR/BV-03-I, HID/DEV/HCR/BV-03-I, HID/HOS/HCR/BV-04-I, HID/DEV/HCR/BV-04-I (legacy test case IDs TP/HCR/BV-03-I, TP/HCR/BV-04-I): TCMT, Delete TP/HID/BV-07-C TSE 4264: HID/HOS/DAT/BV-03-C (legacy test case ID TP/DAT/BV-03-C): edit pass verdict TSE 3958: HID/HOS/DAT/BV-03-C (legacy test case ID TP/DAT/BV-03-C): TCMT Edit row, delete row.
8	1.0.8	2011/07/21	Prepare for publication.
	1.0.9r0	2011/11/04	TSE 4411 change TCMT for HID/HOS/DAT/BV-02-C, HID/DEV/DAT/BV-04-C (legacy test case IDs TP/DAT/BV-02-C, TP/DAT/BV-04-C) Removed descriptions from TC entries in TCMT for legibility.
9	1.0.9	2012/03/30	Prepare for publication.
	1.0.10r0	2012/05/18	TSE 4671: HID/HOS/DAT/BV-03-C (legacy test case ID TP/DAT/BV-03-C): TCMT change
10	1.0.10	2012/07/24	Prepare for publication.
	1.0.11r1	2013/04/22	TSE 5017: Updated TCMT mapping for HID/DEV/HID/BI-02-C and HID/DEV/HID/BI-01-C (legacy test case IDs TP/HID/BI-02-C and TP/HID/BI-01-C) to remove mapping to HID 1/2.
	1.0.11r2	2013/05/31	BTI Review – Alicia's Review
11	1.0.11	2013/07/02	Prepare for Publication
	1.0.12r01	2013/08/16	TSE 5278: Updated MSC for HID/HOS/HID/BV-05-C, HID/DEV/HID/BV-05-C (legacy test case ID TP/HID/BV-05-C) to read "Get_Idle"
	1.0.12r02	2013/11/13	BQRB Review: Removed inconclusive verdicts
12	1.0.12	2013/12/03	Prepare for Publication
	1.0.13r00	2014/10/21	TSE 5990: Removal of test case TP/HCE/BV-02-I, updated TCMT and Test Suite Structure.
13	1.0.13	2014/12/05	Prepare for TCRL 2014-2 publication
	1.0.14r00	2016/10/04	TSE 7625: Replaced "NONE" with HID Host description; Deleted "Fail Verdict" (HID Device and

Publication Number	Revision Number	Date	Comments
			HID Host); Removed "Appendix A" label from "Test Case Mapping," replaced TCMT description (updated boilerplate), and updated "Test Case(s)" column heading; In the "Test Case Mapping" table, replaced "Item" cell contents for HID Limited Discoverable Mode feature; in HID/HOS/CON/BV-01-I, HID/DEV/CON/BV-01-I (legacy test case ID TP/CON/BV-01-I) section, added periods to all list items that are a phrase or a sentence.
	1.0.14r00	2016-10-03	Converted to new Test Case ID conventions as defined in TSTO v4.1
	1.0.14r01	2016/10/22	Updated template Re-organized TCMT
	1.0.14r02	2016-11-15	Fixed updated test case ID styles and regenerated ToC.
14	1.0.14	2016-12-13	Approved by BTI. Prepared for TCRL 2016-2 publication.
	1.0.14 edition 2r00	2018-11-20	Editorial changes only. Template updated. Revision History and contributors moved to the end of the document.
	1.0.14 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.
	p15r00–r01	2022-02-22 – 2022-04-28	TSE 18271 (rating 2): Added missing TCMT entry for HID/DEV/DAT/BV-03-C. Extensive template-related editorials, including aligning the copyright page with v2 of the DNMD and editorial simplifications to Section 3 from BTI.
15	p15	2022-06-28	Approved by BTI on 2022-05-31. Prepared for TCRL 2022-1 publication.
	p16r00–r04	2023-10-26 – 2024-03-28	TSE 23958 (rating 1): Converted -I tests to -C tests as appropriate; updated the TCMT and TCRL accordingly. TSE 24504 (rating 4): Added a new GSIT section with new TCs HID/DEV/SGSIT/ATTR/BV-01-C – -22-C, HID/DEV/SGSIT/OFFS/BV-01-C – -03-C, HID/DEV/SGSIT/SERR/BV-01-C and -02-C, and HID/HOS/CGSIT/SFC/BV-01-C. Deleted HID/DEV/SDD/BV-02-C and -04-C. Updated the TCMT accordingly. Added references to the SDP TS and the HID IXIT. Updated the Test Groups and TC Conventions sections. Removed the HID Application Interoperability Tests section and the HID Profile Conformance Tests and HID Service Discovery Record Conformance tests headings. Updated to align the document with the latest standards.

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16	p16	2024-07-01	Approved by BTI on 2024-05-22. Prepared for TCRL 2024-1 publication.
	p17r00–r01	2025-04-02 – 2025-04-28	TSE 27070 (rating 2): Updated the attribute presence value for HID/DEV/SGSIT/ATTR/BV-05-C and -16-C.
17	p17	2025-07-08	Approved by BTI on 2025-05-30. Prepared for TCRL pkg100 publication.