Weight Scale Profile (WSP)

***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 Weight Scale Profile Specification with the objective to provide a high probability of air interface interoperability between the tested implementation and other manufacturers' Bluetooth devices.

2 References, definitions, and abbreviations

2.1 References

This document incorporates provisions from other publications by dated or undated reference. These references are cited at the appropriate places in the text, and the publications are listed hereinafter. Additional definitions and abbreviations can be found in [1] and [2].

[1] Test Strategy and Terminology Overview

[2] Bluetooth Core Specification, Version 4.0 or later

[3] Test Strategy and Terminology Overview

[4] Weight Scale Profile Specification, Version 1.0 or later

[5] ICS Proforma for Weight Scale Profile, WSP.ICS

[6] GATT Test Suite, GATT.TS

[7] Weight Scale Service Specification, Version 1.0 or later

[8] Body Composition Service Specification, Version 1.0

[9] User Data Service Specification, Version 1.0

[10] Current Time Service Specification, Version 1.1

[11] Device Information Service Specification, Version 1.1

[12] Battery Service Specification, Version 1.0

[13] Weight Scale Profile Implementation eXtra Information for Test, IXIT

[14] Appropriate Language Mapping Tables document

[15] Weight Scale Profile Specification, Version 1.0.1

2.2 Definitions

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

Certain terms that were identified as inappropriate have been replaced. For a list of the original terms and their replacement terms, see the Appropriate Language Mapping Tables document [14].

2.3 Acronyms and abbreviations

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

3 Test Suite Structure (TSS)

3.1 Overview

The Weight Scale Profile requires the presence of GAP, SM (for LE), SDP (for BR/EDR), and GATT. This is illustrated in Figure 3.1.

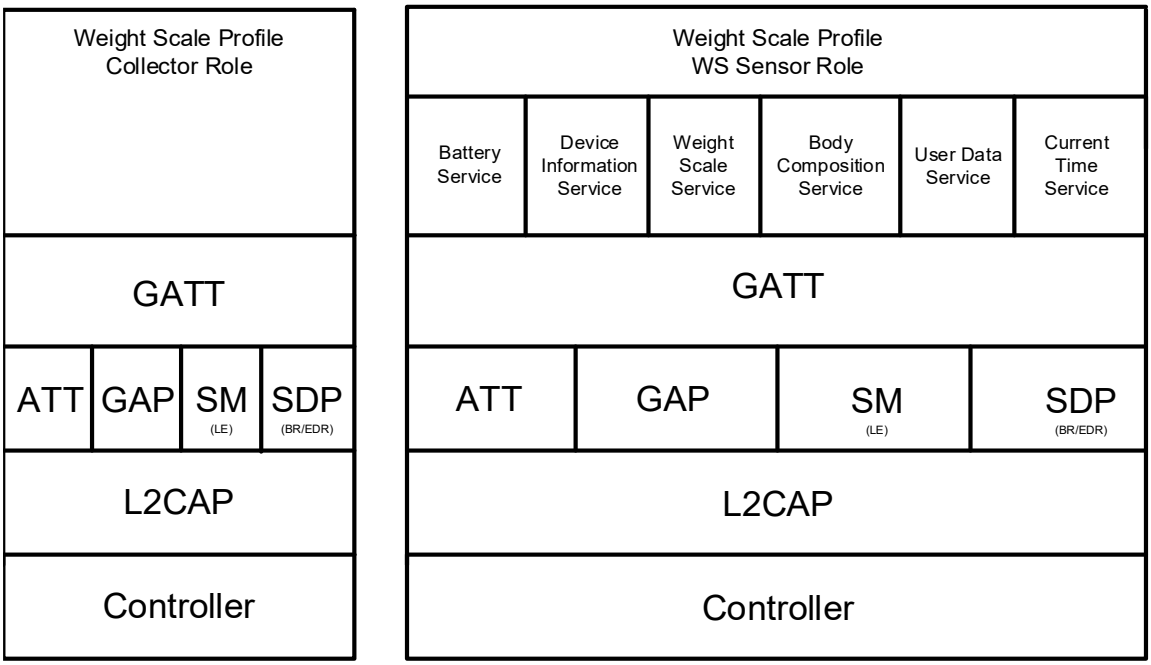

Figure 3.1: Weight Scale test model

Supporting the Device Information Service is mandatory in the WS Sensor role and optional in the WS Collector role.

Supporting the User Data Service is optional in the WS Sensor role and mandatory in the WS Collector role.

The Body Composition Service, Battery Service and/or Current Time Service are either optional or conditional as specified in [4].

3.2 Test Strategy

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

The test equipment provides an implementation of the Radio Controller and the parts of the Host needed to perform the test cases defined in the 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.

Certain tests in this Test Suite require two independent Lower Testers to be run concurrently against the IUT.

3.2.1 Test database requirements

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

- The Lower Tester includes one instantiation of each of the services used by this profile, including all defined characteristics.
- Each service instantiation also contains two «future» characteristics.
  - If possible, with one inserted before the first characteristic defined
  - If possible, with one appended after the last characteristic defined
- Each «future» characteristic has a 16-bit UUID randomly selected from unassigned UUIDs at the time of the test.

3.3 Test groups

The following test groups have been defined.

- Discovery of Services and Characteristics
- Features
- Trust Relationships
- Service Procedures
- Generic GATT Integrated Tests

4 Test cases (TC)

4.1 Introduction

4.1.1 Test case identification conventions

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

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

Identifier Abbreviation	**Spec Identifier <spec abbreviation>**
WSP	Weight Scale Profile
Identifier Abbreviation	**Role Identifier <IUT role>**
COL	Collector Role
SEN	WS Sensor Role
Identifier Abbreviation	**Reference Identifier <GGIT test group>**
CGGIT	Client Generic GATT Integrated Tests
SGGIT	Server Generic GATT Integrated Tests
Identifier Abbreviation	**Reference Identifier <GGIT class>**
CHA	Characteristic
ISFC	Indication Supported Features Characteristic
SDPNF	SDP Record Not Found
SER	Service
Identifier Abbreviation	**Feature Identifier <feat>**
CTS	Current Time Service Features
SPE	Service Procedure – User Data Error Handling
UDS	User Data Service Procedures
WSD	Discovery of Services and Characteristics
WSF	Weight Scale Features
WST	Weight Scale Trust Relationships

Table 4.1: WSP 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

- Preamble Procedure

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

4.2.2 ATT Bearer on BR/EDR Transport

- Preamble Procedure

  1. Establish a BR/EDR transport connection between the IUT and the Lower Tester.
  2. Establish several L2CAP channels (PSM 0x001F) between the IUT and the Lower Tester over that BR/EDR transport.

4.2.3 Configure WS Sensor IUT for use of the User Data Control Point

- Preamble Purpose

  This preamble procedure specifies how the Lower Tester configures the WS Sensor IUT for use with the User Data Control Point and is valid for LE and BR/EDR transports.

- Preamble Procedure

1. Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
2. The handles of the Weight Measurement, the Weight Scale Feature and the User Data Control characteristics have been previously discovered by the Lower Tester during the test procedures in Section 4.3 or are known to the Lower Tester by other means.
3. The handles of the Client Characteristic Configuration descriptor of the Weight Measurement and User Data Control Point characteristics have been previously discovered by the Lower Tester during the test procedures in Section 4.3 or are known to the Lower Tester by other means.
4. Bonding is required.
5. Once bonded, encryption is enabled, if not already enabled.
6. The Weight Measurement characteristic is configured for indications.
7. The User Data Control Point characteristic is configured for indications.
8. The Database Change Increment characteristic is configured for notifications.
9. The Body Composition Measurement characteristic, if supported, is configured for indications

4.2.4 Configure WS Sensor IUT for use of the User Data Control Point

- Preamble Purpose

  This LE preamble procedure specifies how the Collector IUT scans for WS Sensor connectable advertisements and connects to the WS Sensor.

- Reference

  [4] 5.2 and 6.2

  [2] GAP 9.3.3 and 9.3.4

- Preamble Procedure

1. Configure the Collector IUT to accept commands from the Upper Tester to receive data from the WS Sensor (Lower Tester).
2. The Upper Tester commands the Collector IUT to initiate a connection and the IUT starts scanning.
3. The WS Sensor (Lower Tester) requires bonding and LE Security Mode 1 with Security Level 2 or higher.
4. The Lower Tester advertises to the Collector IUT either using:
   - ALT 1: GAP Directed Connectable Mode (send ADV_DIRECT_IND packets)

   or

   - ALT 2: GAP Undirected Connectable Mode (send ADV_IND packets).
5. The Lower Tester waits for responses from the Collector IUT.
6. The Collector IUT sends a CONNECT_REQ and then optionally an empty PDU to the Lower Tester.

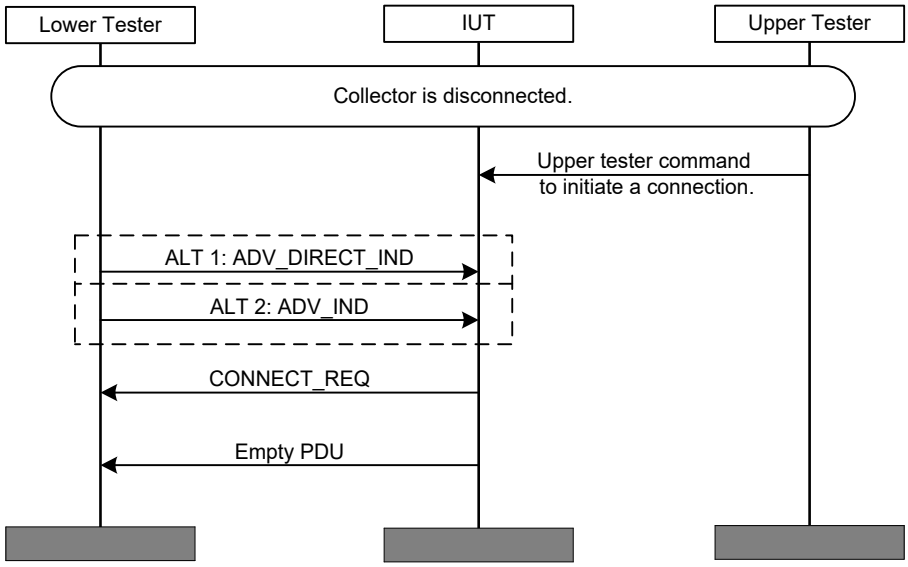

Figure 4.1: Configure WS Sensor IUT for use of the User Data Control Point

4.2.5 BR/EDR Collector

4.2.5.1 Unbonded Devices

- Preamble Purpose

  This BR/EDR preamble procedure specifies how the Collector IUT discovers the WS Sensor using SDP and connects to the WS Sensor.

- Reference

  [4] 5.3 and 6.3

  [2] GAP 4.1 and 4.2

- Preamble Procedure

  1. Configure the Collector IUT to accept commands to receive data from the WS Sensor (Lower Tester).
  2. Put the Lower Tester in GAP General Discoverable Mode.
  3. The Lower Tester requires bonding unless otherwise stated in the test case.
  4. The Upper Tester commands the Collector IUT to initiate a connection and the IUT starts scanning.
  5. The WS Sensor (Lower Tester) exposes the SDP record for the Weight Scale Service.
  6. The Collector IUT validates the SDP record and establishes a connection to the WS Sensor.
  7. The Collector uses the GAP General Discovery procedure to discover a WS Sensor to establish a connection to a WS Sensor.

4.2.5.2 Bonded Devices

- Preamble Purpose

  In case of BR/EDR, either a WS Sensor or Collector could initiate connection when they are bonded. The device initiating the connection becomes a Central and is referred here as “Central to be” and the device accepting the connection becomes a Peripheral and is referred here as “Peripheral to be”.

  This BR/EDR preamble procedure specifies how a “Central to be” connects to “Peripheral to be”.

- Reference

  [4] 5.3 and 6.3

  [2] GAP 4.1 and 4.2

- Preamble Procedure

  1. Configure the Collector IUT to accept commands to receive data from the WS Sensor (Lower Tester).
  2. Put the “Peripheral to be” in connectable mode to accept a connection from the “Central to be”.
  3. The connection is initiated by “Central to be”.
  4. The “Peripheral to be” exposes the SDP record for the Weight Scale Service.
  5. The “Central to be” validates the SDP record and establishes a connection to the “Peripheral to be”.
  6. The “Central to be” uses the GAP Link Establishment Procedure to connect to any bonded device.

4.3 Generic GATT Integrated Tests

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

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)	Service Type
WSP/COL/CGGIT/SER/BV-01-C [Service GGIT – Weight Scale]	Weight Scale Service	[4] 4.2	-	-	Primary Service
WSP/COL/CGGIT/CHA/BV-01-C [Characteristic GGIT – Weight Scale Feature]	Weight Scale Feature Characteristic	[4] 4.3.1	0x22 (Read, Indicate)	4	-
WSP/COL/CGGIT/CHA/BV-02-C [Characteristic GGIT – Weight Measurement]	Weight Measurement Characteristic	[4] 4.3.1	0x20 (Indicate)	Skip	-
WSP/COL/CGGIT/SER/BV-02-C [Service GGIT – Body Composition]	Body Composition Service	[4] 4.2	-	-	Secondary Service
WSP/COL/CGGIT/CHA/BV-03-C [Characteristic GGIT – Body Composition Feature]	Body Composition Feature Characteristic	[4] 4.3.2	0x02 (Read)	4	-
WSP/COL/CGGIT/CHA/BV-04-C [Characteristic GGIT – Body Composition Measurement]	Body Composition Measurement Characteristic	[4] 4.3.2	0x20 (Indicate)	Skip	-
WSP/COL/CGGIT/SER/BV-03-C [Service GGIT – User Data]	User Data Service	[4] 4.2	-	-	Primary Service
WSP/COL/CGGIT/CHA/BV-05-C [Characteristic GGIT – User Index]	User Index Characteristic	[4] 4.3.3	0x02 (Read)	Skip	-
WSP/COL/CGGIT/CHA/BV-06-C [Characteristic GGIT – Database Change Increment]	Database Change Increment Characteristic	[4] 4.3.3	0x1A (Read, Write, Notify)	4	-
WSP/COL/CGGIT/CHA/BV-07-C [Characteristic GGIT – User Control Point]	User Control Point Characteristic	[4] 4.3.3	0x28 (Write, Indicate)	Skip	-
WSP/COL/CGGIT/SER/BV-04-C [Service GGIT – Current Time]	Current Time Service	[4] 4.2	-	-	Not defined
WSP/COL/CGGIT/CHA/BV-08-C [Characteristic GGIT – Current Time]	Current Time Characteristic	[4] 4.3.6	0x1A (Read, Write, Notify)	10	-

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)	Service Type
WSP/COL/CGGIT/SER/BV-05-C [Service GGIT – Device Information]	Device Information Service	[4] 4.2	-	-	Not defined
WSP/COL/CGGIT/SER/BV-06-C [Service GGIT – Battery]	Battery Service	[4] 4.2	-	-	Not defined
WSP/COL/CGGIT/CHA/BV-09-C [Characteristic GGIT – Battery Level]	Battery Level Characteristic	[4] 4.3.5	0x12 (Read, Notify)	1	-
WSP/SEN/SGGIT/SDPNF/BV-01-C [Not discoverable over BR/EDR – Weight Scale Service]	Weight Scale Service	[4] 4.2	-	-	-

Table 4.2: Input for the GGIT Server test procedure

4.3.1 Generic GATT Indication Supported Features characteristic

Execute the Generic GATT Indication Supported Features Characteristic Tests defined in Section 6.4, Client test procedures (CGGIT), in [6] using Table 4.3 below as input:

TCID	Characteristic	Reference	TC Configuration
WSP/COL/CGGIT/ISFC/BV-01-C [Characteristic GGIT – Weight Scale Feature indication]	Weight Scale Feature	[15] 4.4.1	N/A

Table 4.3: Input for the GGIT Indication Supported Features Characteristic tests

4.4 Discover Services and Characteristics

Verify the IUT's ability to discover the services and characteristics exposed by a WS Sensor (Lower Tester).

WSP/COL/WSD/BV-19-C [Discover User Data Service UDS Characteristics]

- Test Purpose

  Verify that a Collector IUT can discover all UDS Characteristics of a User Data Service supported by the IUT.

- Reference

  [4] 4.3.3

- Initial Condition

  - All characteristics of the User Data Service supported by the IUT are specified in the IXIT [13].
  - Run the preamble procedure for the Collector to initiate connection to a WS Sensor included in the Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport.
  - The IUT has executed the WSP/COL/CGGIT/SER/BV-03-C [Service GGIT – User Data] procedure and has saved the handle range for the instantiation of the User Data Service contained in the Lower Tester.

- Test Procedure

  1. The Upper Tester issues a command to the IUT to discover all characteristics of the User Data Service supported by the IUT.
  2. The IUT executes either alternative 2A or 2B.

  Alternative 2A (Discover All Characteristics of a Service sub-procedure):
  2A: Discover All Characteristics of a Service, using the specified handle range, with the Lower Tester instantiating the database specified in Section 3.2.1.
  Alternative 2B (Discover Characteristics by UUID sub-procedure):
  2B: Discover Characteristics by UUID, using each of the UUIDs for the UDS Characteristics of the User Data Service supported by the IUT, with the Lower Tester instantiating the database specified in Section 3.2.1.

- Expected Outcome

  Pass verdict

  For each UDS Characteristic supported by the IUT contained in the Lower Tester's instantiation of the User Data Service, the IUT reports an attribute handle/value pair for each characteristic specified in the IXIT [13] to the Upper Tester.

WSP/COL/WSD/BV-27-C [Discover Device Information Service Characteristics]

- Test Purpose

  Verify that a Collector IUT can discover all characteristics of a Device Information Service supported by the IUT.

- Reference

  [4] 4.3.4

- Initial Condition
  - All characteristics of the Device Information Service supported by the IUT are specified in the IXIT [13].
  - Run the preamble procedure for the Collector to initiate connection to a WS Sensor included in the Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport.
  - The IUT has executed the WSP/COL/CGGIT/SER/BV-05-C [Service GGIT – Device Information] procedure and has saved the handle range for the instantiation of the Device Information Service contained in the Lower Tester.
- Test Procedure

  1. The Upper Tester issues a command to the IUT to discover all characteristics of the Device Information Service supported by the IUT.
  2. The IUT executes either alternative 2A or 2B:

  Alternative 2A (Discover All Characteristics of a Service sub-procedure):
  2A: Discover All Characteristics of a Service, using the specified handle range, with the Lower Tester instantiating the database specified in Section 3.2.1.
  Alternative 2B (Discover Characteristics by UUID sub-procedure):
  2B: Discover Characteristics by UUID, using each of the UUIDs for the characteristics of the Device Information Service supported by the IUT, with the Lower Tester instantiating the database specified in Section 3.2.1.
- Expected Outcome

  Pass verdict

  For each characteristic supported by the IUT contained in the Lower Tester's instantiation of the Device Information Service, the IUT reports an attribute handle/value pair for each characteristic specified in the IXIT [13] to the Upper Tester.

WSP/COL/WSD/BV-28-C [Read Device Information Service Characteristics]

- Test Purpose

  Verify that a Collector IUT can read all characteristics of a Device Information Service supported by the IUT.
- Reference

  [4] 4.7
- Initial Condition
  - All characteristics of the Device Information Service supported by the IUT are specified in the IXIT [13].
  - Run the preamble procedure for the Collector to initiate connection to a WS Sensor included in the Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport.
  - The Lower Tester includes one instantiation of the Device Information Service [11] including all defined characteristics.
  - The IUT has previously executed the WSP/COL/WSD/BV-27-C [Discover Device Information Service Characteristics] procedure, and it has the handle/value pairs for all characteristics of the Device Information Service supported by the IUT.

- For string-based characteristics (i.e., Manufacturer Name String, Model Number String, Serial Number String, Hardware Revision String, Firmware Revision String and Software Revision String), the string initially includes only character values in the ASCII printable range (i.e., 0x20 – 0x7E).
- For the System ID characteristic, the Manufacturer Identifier is set to 0xFFFE9ABCDE and the Organizationally Unique Identifier is set to 0x123456.
- For the IEEE 11073-20601 Regulatory Certification Data List characteristic, the Data field is set to 0x0000-0002-8008-0200-0001-0105-0008-0201-0012-0002.
- For the PnP_ID characteristic, the Vendor ID Source is set to 0x01, the Vendor ID is set to 0x006B, the Product ID is set to 0x1234 and the Product Version is set to 0x0102.

- Test Procedure

  1. The Upper Tester issues a command to the IUT to read all characteristics of the Device Information Service supported by the IUT.
  2. For each characteristic of the Device Information Service supported by the IUT, the IUT sends an ATT_Read_Request to the Lower Tester containing the handle specified by the Upper Tester.
  3. The IUT receives an ATT_Read_Response and reports the value to the Upper Tester.
  4. Repeat steps 1–3 with the string-based characteristics changed to include character values outside the ASCII printable range.

- Expected Outcome

  Pass verdict

  For each characteristic contained in the Lower Tester's instantiation of the Device Information Service supported by the IUT, the IUT reports the characteristic value for all characteristics specified in the IXIT [13] to the Upper Tester, including:

  - For string-based characteristics, any printable or non-printable ASCII values.
  - For the System ID characteristic, the Manufacturer Identifier and Organizationally Unique Identifier.

  For the IEEE 11073-20601 Regulatory Certification Data List characteristic, the IEEE 11073-20601 regulatory certification data list (note that this value is defined in big endian format).

  For the PnP_ID characteristic, the Vendor ID Source, the Vendor ID, the Product ID and the Product Version.

4.5 Weight Scale Service Features

The procedures defined in this test group verify Weight Scale Sensor IUT implementation of the features defined in the Weight Scale Profile Specification [4] by a WS Sensor IUT and usage of the same features by a Collector IUT.

WSP/SEN/WSF/BV-01-C [Weight Scale Service UUID in AD]

- Test Purpose

  Verify that the Weight Scale Service UUID is included in AD (Advertising Data) from the WS Sensor IUT when using the LE Transport.

- Reference

  [4] 3.1.1

- Initial Condition
  - The IUT is powered on in GAP Discoverable Mode.
  - The IUT is induced to generate Advertising Packets.
- Test Procedure

  The Lower Tester listens for Advertising Packets from the IUT.
- Expected Outcome

  Pass verdict

  At least one received Advertising Packet contains the defined Service UUID, «Weight Scale Service».

WSP/SEN/WSF/BV-02-C [Local Name included in AD or Scan Response]

- Test Purpose

  Verify that the Local Name is included in AD (Advertising Data) or Scan Response data from the WS Sensor IUT when using the LE Transport.
- Reference

  [4] 3.1.2
- Initial Condition
  - The IUT is powered on in GAP Discoverable Mode.
  - The IUT is induced to generate Advertising Packets.
- Test Procedure
  1. The Lower Tester listens for Advertising Packets from the IUT.
  2. When the Lower Tester receives an Advertising Packet from IUT, it sends a Scan Request to the IUT. Then the Lower Tester listens for a Scan Response from the IUT.

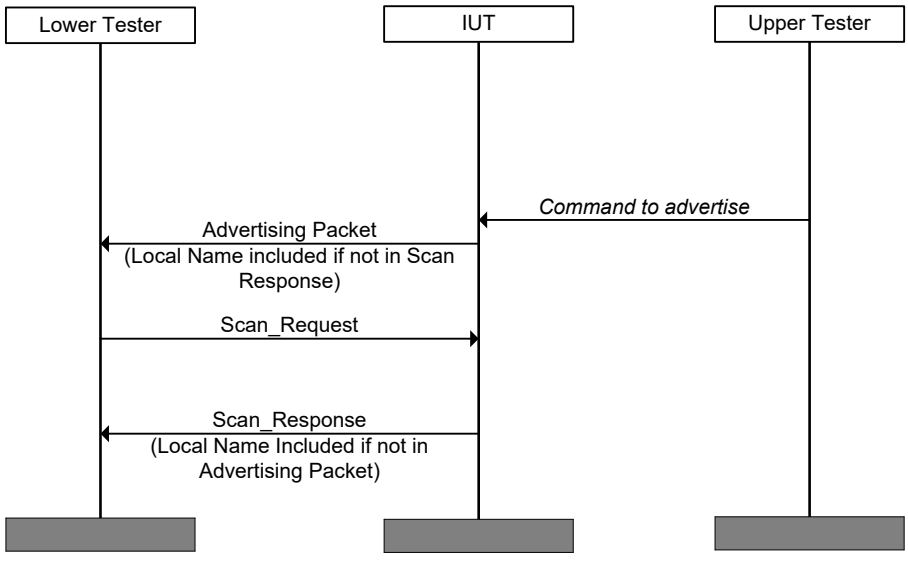

Figure 4.2: WSP/SEN/WSF/BV-02-C [Local Name included in AD or Scan Response]

- Expected Outcome

  Pass verdict

  The IUT sends an Advertising packet and a Scan Response packet.

  The IUT includes the Local Name in either the Advertising packet or Scan Response packet, but not in both.

WSP/SEN/WSF/BV-03-C [Appearance included in AD or Scan Response]

- Test Purpose

  Verify that the Appearance characteristic value is included in AD (Advertising Data) or Scan Response data from the WS Sensor IUT when using the LE Transport.

- Reference

  [4] 3.1.4

- Initial Condition

  - The IUT is powered on in GAP Discoverable Mode.
  - The IUT is induced to generate Advertising Packets.

- Test Procedure

  1. The Lower Tester listens for Advertising Packets from the IUT.
  2. When the Lower Tester receives an Advertising Packet from IUT, it sends a Scan Request to the IUT. Then the Lower Tester listens for a Scan Response from the IUT.

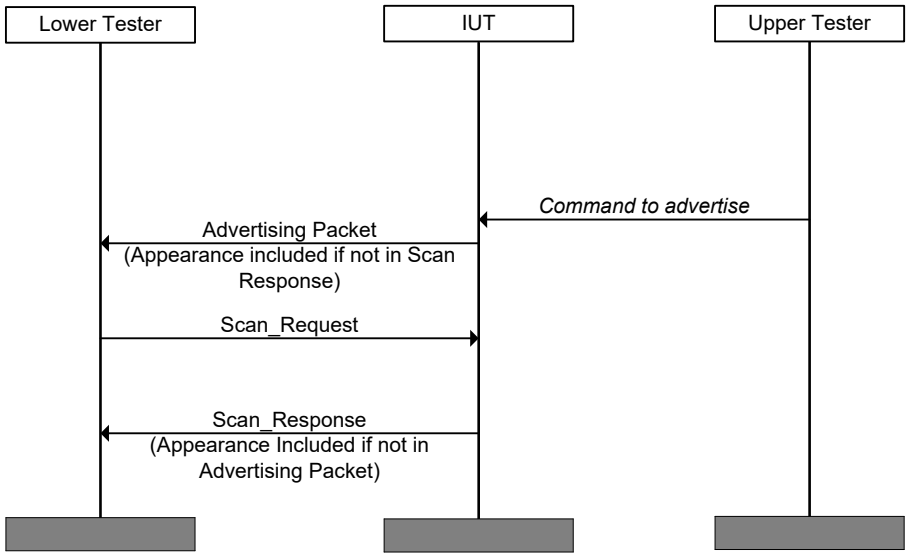

Figure 4.3: WSP/SEN/WSF/BV-03-C [Appearance included in AD or Scan Response]

- Expected Outcome

  Pass verdict

  The IUT sends an Advertising packet and a Scan Response packet.

  The IUT includes the Appearance characteristic value in either the Advertising packet or Scan Response packet, but not in both.

WSP/SEN/WSF/BV-04-C [BMI and Height fields present in Weight Scale Service when Body Composition Service is enabled]

- Test Purpose

  Verify that the IUT includes the BMI and Height field pair in the Weight Scale service by inspecting the value of the Weight Measurement characteristic.

- Reference

  [4] 3.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Weight Measurement characteristic require a specific security mode or security level, establish a connection meeting those requirements.
  - The IUT and the Lower Tester are bonded.
  - The handle of the Weight Measurement characteristic has been previously discovered by the Lower Tester during the test procedures in Section 4.3 or is known to the Lower Tester by other means.

- Test Procedure

  1. Induce the Server to indicate the Weight Measurement characteristic with the Body Composition Service enabled.
  2. Read the value of the Weight Measurement characteristic and inspect the value of the bit in the Flags field that represents ‘BMI and Height Present’.

- Expected Outcome

  Pass verdict

  The value of the bit in the Flags field representing ‘‘BMI and Height Present’ is TRUE (i.e., set to 1).

  The “Height” and “BMI” fields are both present and their values meet the requirements of the service.

WSP/SEN/WSF/BV-05-C [Weight Scale and Body Composition characteristics have compatible flags]

- Test Purpose

  Verify that the support for the Time Stamp feature and the Multiple Users feature is the same across the Weight Scale service and the Body Composition service within the context of the Weight Scale Profile by comparing the values of the relevant feature characteristics.

- Reference

  [4] 3.3

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Body Composition Feature characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- The IUT and the Lower Tester are bonded.
- The handles of the Weight Scale Feature and Body Composition Feature characteristics have been previously discovered by the Lower Tester during the test procedures in Section 4.3 or is known to the Lower Tester by other means.

- Test Procedure

  Read the value of the Weight Scale Feature characteristic and of the Body Composition Feature characteristic and inspect the values of the bits denoting “Time Stamp Supported” and “Multiple Users Supported” in the two characteristic values.

- Expected Outcome

  Pass verdict

  The feature bits representing “Time Stamp Supported” have the same value for both feature characteristics.

  The feature bits representing “Multiple Users Supported” have the same value for both feature characteristics.

WSP/SEN/WSF/BV-06-C [Weight and Height not present in Body Composition Features]

- Test Purpose

  Verify that the IUT does not support the inclusion of the Height or Weight fields in the Body Composition Measurement characteristic by inspecting the value of the Body Composition Feature characteristic.

- Reference

  [4] 3.3

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Body Composition Feature characteristic require a specific security mode or security level, establish a connection meeting those requirements.
  - The IUT and the Lower Tester are bonded.
  - The handle of the Body Composition Feature characteristic has been previously discovered by the Lower Tester during the test procedures in Section 4.3 or is known to the Lower Tester by other means.

- Test Procedure

  Read the value of the Body Composition Feature characteristic and inspect the values of the feature bits representing ‘Weight Supported’ and ‘Height Supported’.

- Expected Outcome

  Pass verdict

  The characteristic is successfully read. The value of the feature bit representing ‘Weight Supported’ is zero and the value of the feature bit representing ‘Height Supported’ is also zero.

WSP/COL/WSF/BI-09-C [Read Weight Scale Feature Characteristic with Reserved Value and additional, unrecognized octets]

- Test Purpose

  Verify that the Collector IUT is tolerant to the presence of RFU values and ignores additional, unrecognized octets.

- Reference

  [4] 4.4.1

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The Upper Tester knows the handle of a Weight Scale Feature characteristic contained in the Lower Tester.
  - For the purposes of this test case, the Weight Scale Feature characteristic value used shows all optional features being supported, the Weight Measurement resolution is set to 0b0011 (Resolution of 0.1 kg or 0.2 lb) and the Height Measurement resolution is set to 0b001 (Resolution of 0.01 meter or 1 inch).

- Test Procedure

  1. Send a command from Upper Tester to request the IUT to read a Weight Scale Feature Characteristic from the Lower Tester e.g., WSP_ReadRequest (handle, value).
  2. After receipt of the expected result by the Lower Tester from the IUT, send an ATT_Read_Response (0x0B) from the Lower Tester to the IUT containing a value in which two RFU bits are non-zero and at least two additional octets are present. The total number of octets does not exceed the capacity of the ATT_MTU size.

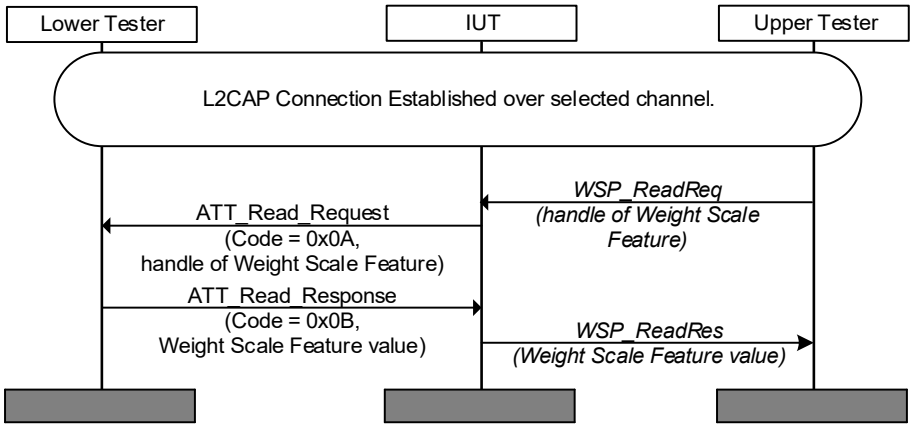

Figure 4.4: WSP/COL/WSF/BI-09-C [Read Weight Scale Feature Characteristic with Reserved Value and additional, unrecognized octets]

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Read_Request (0x0A) to the Lower Tester, containing the handle specified by the Upper Tester.

The IUT receives the response from the Lower Tester, ignores the RFU values and the additional, unrecognized octets and continues to function in accordance with the requirements of the profile.

WSP/COL/WSF/BI-10-C [Read Body Composition Feature Characteristic with Reserved Value and additional, unrecognized octets]

- Test Purpose

  Verify that the Collector IUT is tolerant to the presence of RFU values and ignores additional, unrecognized octets.

- Reference

  [4] 4.5.1

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The Upper Tester knows the handle of a Body Composition Feature characteristic contained in the Lower Tester.
  - For the purposes of this test case, the Body Composition Feature characteristic value used shows all optional features being supported except for Weight and Height which are shown as not supported. The Mass Measurement Resolution is set to 0b0111 (Resolution of 0.005 kg or 0.01 lb) and the Height Measurement resolution is set to 0b000 (“Not Specified”).

- Test Procedure

  1. Send a command from Upper Tester to request the IUT to read a Body Composition Feature Characteristic from the Lower Tester e.g., WSP_ReadRequest (handle, value).
  2. After receipt of the expected result by the Lower Tester from the IUT, send an ATT_Read_Response (0x0B) from the Lower Tester to the IUT containing a value in which two RFU bits are non-zero and at least two additional octets are present. The total number of octets does not exceed the capacity of the ATT_MTU size.

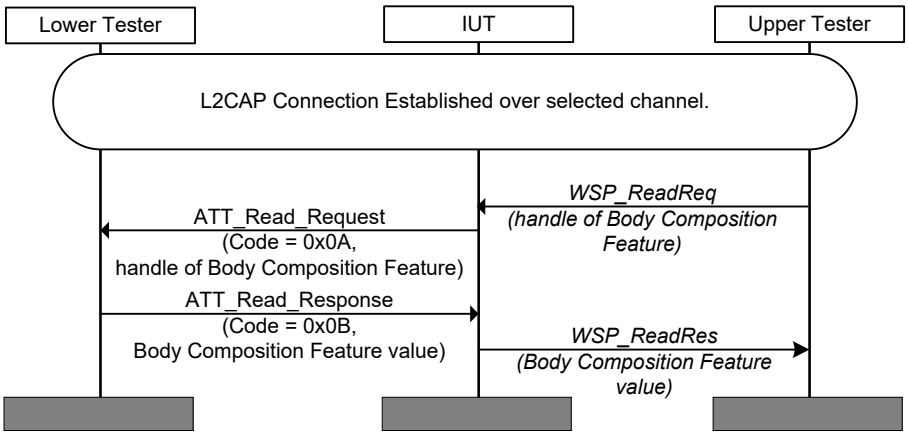

Figure 4.5: WSP/COL/WSF/BI-10-C [Read Body Composition Feature Characteristic with Reserved Value and additional, unrecognized octets]

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Read_Request (0x0A) to the Lower Tester, containing the handle specified by the Upper Tester.

  The IUT receives the response from the Lower Tester, ignores the RFU values and the additional, unrecognized octets and continues to function in accordance with the requirements of the profile.

WSP/COL/WSF/BV-11-C [Configure Weight Measurement for Indication]

- Test Purpose

  Verify that the Collector IUT can configure a WS Sensor (Lower Tester) to indicate Weight Measurement characteristics.

- Reference

  [4] 4.4.2

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has discovered the Client Characteristic Configuration Descriptor for a Weight Measurement characteristic contained in the Lower Tester.

- Test Procedure

  The Upper Tester sends a command to the IUT to configure the WS Sensor to send Weight Measurement characteristics.

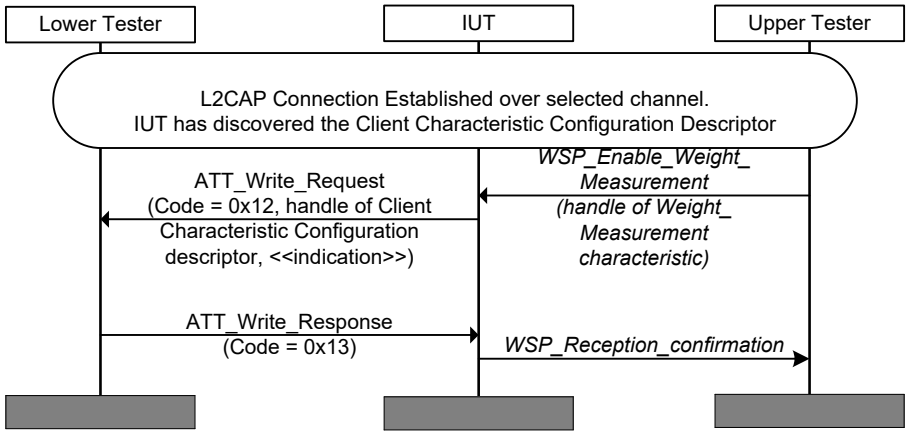

Figure 4.6: WSP/COL/WSF/BV-11-C [Configure Weight Measurement for Indication]

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Write_Request (0x12) to the Lower Tester, with the handle set to that of the Client Characteristic Configuration descriptor for a Weight Measurement characteristic with the value set to «Indication».

WSP/COL/WSF/BV-12-C [Configure Weight Measurement for Indication]

- Test Purpose

  Verify that the Collector IUT can configure a WS Sensor (Lower Tester) to indicate Body Composition Measurement characteristics.

- Reference

  [4] 4.5.2

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has discovered the Client Characteristic Configuration Descriptor for a Body Composition Measurement characteristic contained in the Lower Tester.

- Test Procedure

  The Upper Tester sends a command to the IUT to configure the WS Sensor to send Body Composition Measurement characteristics.

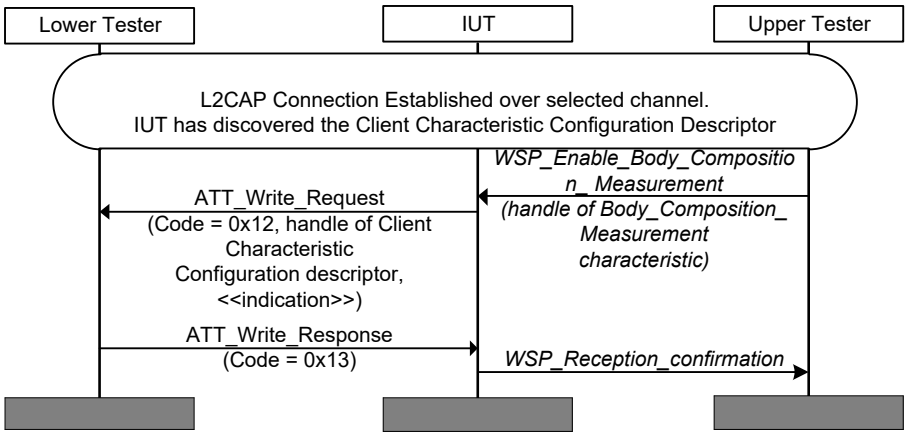

Figure 4.7: WSP/COL/WSF/BV-12-C [Configure Weight Measurement for Indication]

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Write_Request (0x12) to the Lower Tester, with the handle set to that of the Client Characteristic Configuration descriptor for a Body Composition Measurement characteristic with the value set to «Indication».

WSP/COL/WSF/BV-13-C [Receive Weight Measurement Indications]

- Test Purpose

  Verify that the Collector IUT can receive indications of the Weight Measurement Characteristic, including all variants.

- Reference

  [4] 4.4.2

- Initial Condition
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has executed the procedure included in WSP/COL/WSF/BV-11-C [Configure Weight Measurement for Indication]. The Lower Tester configures the IUT to expect Weight Measurement Indications. This may require the use of the user consent procedure.
  - The IUT knows the handle of the Weight Measurement characteristic.
- Test Procedure

1. The Lower Tester sends an ATT_Handle_Value_Indication containing a Weight Measurement characteristic value to the IUT.
2. The Lower Tester sends one Weight Measurement characteristic indication for each Test Pattern shown in the following table. For each Test Pattern, the test values of the Flags field and the Weight field are shown in the table below along with the corresponding pass criteria.
3. In case the Collector IUT does not store the indications, the results for each test pattern are logged before sending the next indication.

Test Pattern	Flags Field Value (bit7..bit0)	Weight Field value	Pass Criteria
1	0000 0000	0x0000	No optional field is present, weight is expressed in kg. Weight = 0.000 kg.
2	0000 0001	0x0800	No optional field is present, weight in lb. Weight = 20.48 lb
3	0000 0010	0x1000	Only optional field present is Timestamp, weight in kg. Weight = 20.480 kg
4	0000 0100	0x2000	Only optional field present is User ID, weight in kg. Weight = 40.960 kg
5	0000 1000	0x4000	Only optional fields present are Height and BMI. Weight is expressed in kg and Height is expressed in cm. Weight = 81.920 kg
6	0000 1111	0x7800	Only optional fields present are Timestamp, User ID, Height and BMI. Weight in lb and Height in inches. Weight = 307.20 lb
7	0000 1001	0x4800	Only optional fields present are Height and BMI. Weight in lb and Height in inches. Weight = 184.32 lb
8	0000 1010	0xFFFF	Only optional fields present are Timestamp, Height and BMI. Weight in kg and Height in cm. Weight = “Measurement Unsuccessful”.
9	0000 1010	0x5000	Only optional fields present are Timestamp, Height and BMI. Weight in kg and Height in cm. Weight = 102.400 kg

Table 4.4: Test pattern table for WSP/COL/WSF/BV-13-C [Receive Weight Measurement Indications]

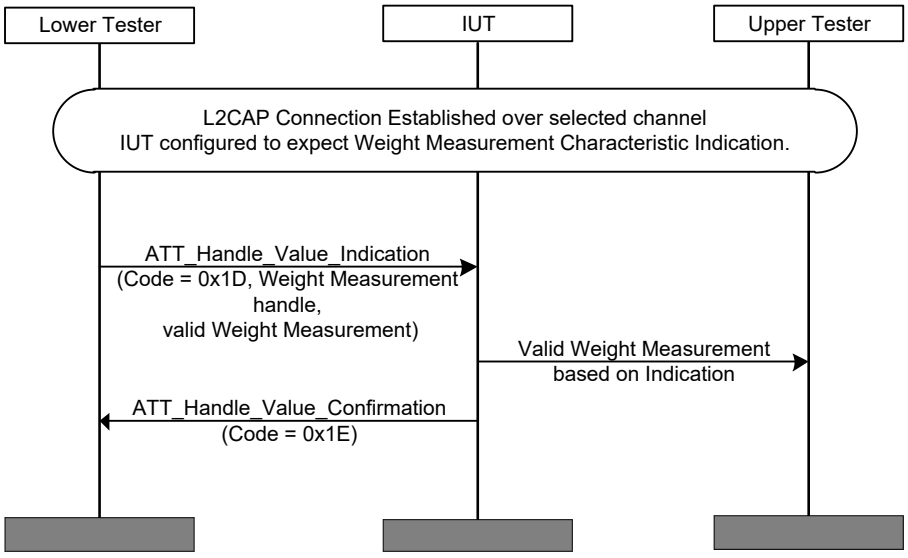

Figure 4.8: WSP/COL/WSF/BV-13-C [Receive Weight Measurement Indications]

- Expected Outcome

  Pass verdict

  The IUT is able to correctly parse the received Weight Measurement values according to the pass criteria in the table above.

  The reported Weight field values match the ones sent by the Lower Tester.

  After handling the special value for “Measurement Unsuccessful”, the IUT continues to process commands and to receive data normally.

WSP/COL/WSF/BV-14-C [Receive Multiple Weight Measurement Indications]

- Test Purpose

  Verify that the Collector IUT can receive multiple indications of the Weight Measurement Characteristic for the case where a Weight Scale sends multiple stored measurements as a batch of indications.

- Reference

  [4] 4.4.2

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has executed the procedure included in WSP/COL/WSF/BV-11-C [Configure Weight Measurement for Indication]. The Lower Tester configures the IUT to expect Weight Measurement Indications. This may require the use of the user consent procedure.
  - The IUT knows the handle of the Weight Measurement characteristic.

- Test Procedure

  The Lower Tester sends multiple ATT_Handle_Value_Indications containing a Weight Measurement characteristic value to the IUT.

  The Lower Tester sends a series of Weight Measurement characteristic indications, one for each Test Pattern and Weight shown in the following table:

Test Pattern	Flags Field Value (bit7..bit0)	Weight Field Value	Description
1	0000 0000	0x0000	No optional field is present, weight is expressed in kg. Weight = 0.000 kg
2	0000 0001	0x0800	No optional field is present, weight in lb. Weight = 20.48 lb
3	0000 0010	0x1000	Only optional field present is Timestamp, weight in kg. Weight = 20.480 kg
4	0000 0100	0x2000	Only optional field present is User ID, weight in kg. Weight = 40.960 kg
5	0000 1000	0x4000	Only optional fields present are Height and BMI. Weight is expressed in kg and Height is expressed in cm. Weight = 81.920 kg
6	0000 1111	0x7800	Only optional fields present are Timestamp, User ID, Height and BMI. Weight in lb and Height in inches. Weight = 307.20 lb
7	0000 1001	0x4800	Only optional fields present are Height and BMI. Weight in lb and Height in inches. Weight = 184.32 lb
8	0000 1010	0xFFFF	Only optional fields present are Timestamp, Height and BMI. Weight in kg and Height in cm. Weight = “Measurement Unsuccessful”.
9	0000 1010	0x5000	Only optional fields present are Timestamp, Height and BMI. Weight in kg and Height in cm. Weight = 102.400 kg

Table 4.5: Test pattern table for WSP/COL/WSF/BV-14-C [Receive Multiple Weight Measurement Indications]

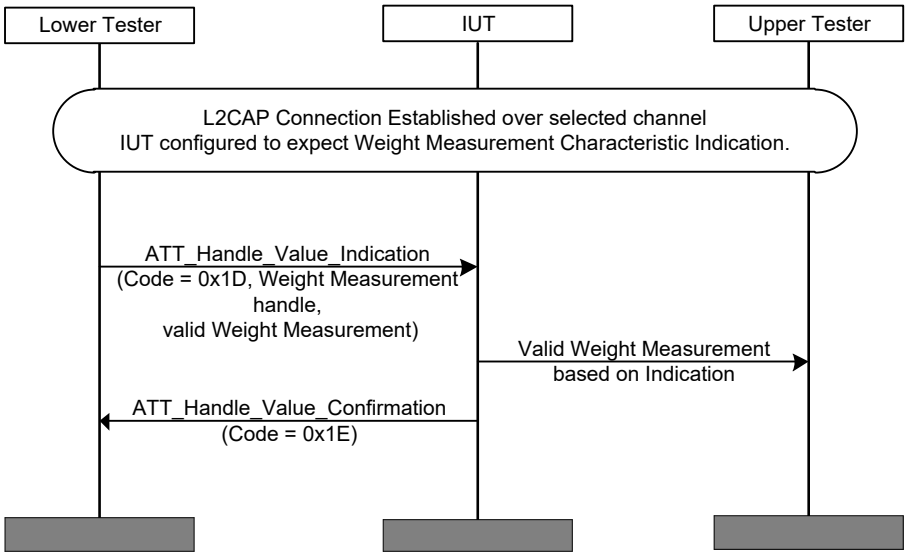

Figure 4.9: WSP/COL/WSF/BV-14-C [Receive Multiple Weight Measurement Indications]

The indication transaction shown is repeated multiple times, once for each test pattern in the table above.

- Expected Outcome

  Pass verdict

  The IUT is able to accept multiple indications.

  After handling the special value for “Measurement Unsuccessful”, the IUT continues to process commands and to receive data normally.

WSP/COL/WSF/BV-15-C [Receive Body Composition Measurement Indications]

- Test Purpose

  Verify that the Collector IUT can receive indications of the Body Composition Measurement Characteristic, including all variants.

- Reference

  [4] 4.5.2

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has executed the procedure included in WSP/COL/WSF/BV-12-C [Configure Weight Measurement for Indication]. The Lower Tester configures the IUT to expect Body Composition Measurement Indications. This may require the use of the user consent procedure.
  - The IUT knows the handle of the Body Composition Measurement characteristic.

- Test Procedure

  1. The Lower Tester sends an ATT_Handle_Value_Indication containing a Body Composition Measurement characteristic value to the IUT.
  2. The Lower Tester sends one Body Composition Measurement characteristic indication for each Test Pattern shown in the following table. For each Test Pattern, the value of the Body Composition Measurement characteristic Flags field and Body Fat Percentage field is shown along with the corresponding pass criteria. In case the Collector IUT does not store the indications, the results for each test pattern are logged before sending the next indication:

Test Pattern	Body Fat Percentage Field Value	Body Composition Measurement Characteristic Flags Field Value (bit15 … bit0)	Pass Criteria
2	0x0014	0000 0000 0000 0000	No optional field is present. Body Fat = 2.0%
2	0x002D	0000 0000 0000 0001	No optional field is present. Body Fat = 4.5%
3	0x003C	0000 0000 0000 0010	Only optional field present is Time Stamp. Body Fat = 6.0%
4	0x0050	0000 0000 0000 0111	Optional fields present are Time Stamp, User ID. Body Fat = 8.0%
5	0x0064	0000 0000 0000 0100	Only optional field present is User ID. Body Fat = 10.0%
6	0x007B	0000 0000 0000 1000	Only optional field present is Basal Metabolism. Body Fat = 12.3%
7	0x008C	0000 0000 0001 0000	Only optional field present is Muscle Percentage. Body Fat = 14.0%
8	0x00A0	0000 0000 0010 0000	Only optional field present is Muscle Mass (in kg) Body Fat = 16.0%
9	0x00B4	0000 0000 0010 0111	Optional fields present are Muscle Mass (in lb), Time Stamp and User ID. Body Fat = 18.0%
10	0x00C8	0000 0000 0100 0000	Only optional field present is Fat Free Mass (in kg). Body Fat = 20.0%
11	0x00DC	0000 0000 0100 0111	Optional fields present are Fat Free Mass (in lb), Time Stamp and User ID. Body Fat = 22.0%
12	0x00F0	0000 0000 1000 0000	Only optional field present is Soft Lean Mass (in kg). Body Fat = 24.0%
13	0x0104	0000 0000 1000 0111	Optional fields present are Soft Lean Mass (in lb), Time Stamp and User ID. Body Fat = 26.0%

Test Pattern	Body Fat Percentage Field Value	Body Composition Measurement Characteristic Flags Field Value (bit15 … bit0)	Pass Criteria
14	0x0118	0000 0001 0000 0000	Only optional field present is Body Water Mass (in kg). Body Fat = 28.0%
15	0x012C	0000 0001 0000 0111	Optional fields present are Body Water Mass (in lb), Time Stamp and User ID. Body Fat = 30.0%
16	0xFFFF	0000 0010 0000 0000	Only optional field present is Impedance. Body Fat = “Measurement Unsuccessful”.
17	0x0149	0000 0010 0000 0000	Only optional field present is Impedance. Body Fat = 32.9%

Table 4.6: Test pattern table for WSP/COL/WSF/BV-15-C [Receive Body Composition Measurement Indications]

- Expected Outcome

  Pass verdict

  The IUT is able to correctly parse the received Body Composition Measurement values according to the pass criteria in the table above.

  The reported Body Composition Measurement field values match the ones sent by the Lower Tester.

  After handling the special value for “Measurement Unsuccessful”, the IUT continues to process commands and to receive data normally.

WSP/COL/WSF/BV-16-C [Receive Body Composition Measurement Indications with Continuation Packets]

- Test Purpose

  Verify that the Collector IUT can receive indications of the Body Composition Measurement Characteristic, including variants with continuation packets.

- Reference

  [4] 4.5.2

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has executed the procedure included in WSP/COL/WSF/BV-12-C [Configure Weight Measurement for Indication]. The Lower Tester configures the IUT to expect Body Composition Measurement Indications. This may require the use of the user consent procedure.
  - The IUT knows the handle of the Body Composition Measurement characteristic.

- Test Procedure

  1. The Lower Tester sends an ATT_Handle_Value_Indication containing a Body Composition Measurement characteristic value to the IUT.
  2. The Lower Tester sends two Body Composition Measurement characteristic indications for each Test Pattern shown in the following table. For each Test Pattern, the value of the Flags field is shown along with the corresponding pass criteria.

Test Pattern	Indication order	Body Composition Measurement Characteristic Flags Field Value (bit15…bit0)	Pass Criteria
1	First	0001 0000 0111 1010	Measurement contains Time Stamp, Basal Metabolism, Muscle Percentage, Muscle Mass In kg, Fat Free Mass in kg, Body Water Mass in kg and Impedance.
	Second	0001 0011 0000 0000	
2	First	0001 0011 0011 0110	Measurement contains Time Stamp, User ID, Muscle Percentage, Muscle Mass In kg, Fat Free Mass in kg, Soft Lean Mass in kg, Body Water Mass in kg and Impedance.
	Second	0001 0000 1100 0000	
3	First	0001 0010 1010 0111	Measurement contains Time Stamp, User ID, Muscle Percentage, Muscle Mass In lb, Fat Free Mass in lb, Soft Lean Mass in lb, Body Water Mass in lb and Impedance.
	Second	0001 0001 0101 0001	
4	First	0001 0000 0111 0011	Measurement contains Time Stamp, Muscle Percentage, Muscle Mass In lb, Fat Free Mass in lb, Soft Lean Mass in lb and Body Water Mass in lb.
	Second	0001 0001 1000 0001	

Table 4.7: Test pattern table for WSP/COL/WSF/BV-16-C [Receive Body Composition Measurement Indications with Continuation Packets]

- Expected Outcome

  Pass verdict

  The IUT is able to correctly parse the received Body Composition Measurement values according to the pass criteria in the table above.

  The reported Body Composition Measurement field values match the ones sent by the Lower Tester.

WSP/COL/WSF/BV-17-C [Receive Multiple Body Composition Measurement Indications]

- Test Purpose

  Verify that the Collector IUT can receive multiple indications of the Body Composition Measurement characteristic, for the case where a Weight Scale sends multiple stored measurements as a batch of indications.

- Reference

  [4] 4.5.2

- Initial Condition
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has executed the procedure included in WSP/COL/WSF/BV-12-C [Configure Weight Measurement for Indication]. The Lower Tester configures the IUT to expect Body Composition Measurement Indications. This may require the use of the user consent procedure.
  - The IUT knows the handle of the Body Composition Measurement characteristic.
- Test Procedure

  The Lower Tester sends multiple ATT_Handle_Value_Indications containing a Body Composition Measurement characteristic value to the IUT.

  The Lower Tester sends a series of Body Composition Measurement characteristic indications, one for each Test Pattern shown in the following table. For each Test Pattern, the value of the Body Composition Measurement characteristic Flags field and Body Fat Percentage field is shown along with the corresponding pass criteria. In case the Collector IUT does not store the indications, the results for each test pattern are logged before sending the next indication.

Test Pattern	Body Fat Percentage Field Value	Body Composition Measurement Characteristic Flags Field Value (bit15 … bit0)	Description
1	0x0014	0000 0000 0000 0000	No optional field is present. Body Fat = 2.0%
2	0x002D	0000 0000 0000 0001	No optional field is present. Body Fat = 4.5%
3	0x003C	0000 0000 0000 0010	Only optional field present is Time Stamp. Body Fat = 6.0%
4	0x0050	0000 0000 0000 0111	Optional fields present are Time Stamp, User ID. Body Fat = 8.0%
5	0x0064	0000 0000 0000 0100	Only optional field present is User ID. Body Fat = 10.0%
6	0x007B	0000 0000 0000 1000	Only optional field present is Basal Metabolism. Body Fat = 12.3%
7	0x008C	0000 0000 0001 0000	Only optional field present is Muscle Percentage. Body Fat = 14.0%
8	0x00A0	0000 0000 0010 0000	Only optional field present is Muscle Mass (in kg) Body Fat = 16.0%
9	0x00B4	0000 0000 0010 0111	Optional fields present are Muscle Mass (in lb), Time Stamp and User ID. Body Fat = 18.0%

Test Pattern	Body Fat Percentage Field Value	Body Composition Measurement Characteristic Flags Field Value (bit15 … bit0)	Description
10	0x00C8	0000 0000 0100 0000	Only optional field present is Fat Free Mass (in kg). Body Fat = 20.0%
11	0x00DC	0000 0000 0100 0111	Optional fields present are Fat Free Mass (in lb), Time Stamp and User ID. Body Fat = 22.0%
12	0x00F0	0000 0000 1000 0000	Only optional field present is Soft Lean Mass (in kg). Body Fat = 24.0%
13	0x0104	0000 0000 1000 0111	Optional fields present are Soft Lean Mass (in lb), Time Stamp and User ID. Body Fat = 26.0%
14	0x0118	0000 0001 0000 0000	Only optional field present is Body Water Mass (in kg). Body Fat = 28.0%
15	0x012C	0000 0001 0000 0111	Optional fields present are Body Water Mass (in lb), Time Stamp and User ID. Body Fat = 30.0%
16	0xFFFF	0000 0010 0000 0000	Only optional field present is Impedance. Body Fat = “Measurement Unsuccessful”.
17	0x0149	0000 0010 0000 0000	Only optional field present is Impedance. Body Fat = 32.9%

Table 4.8: Test pattern table for WSP/COL/WSF/BV-17-C [Receive Multiple Body Composition Measurement Indications]

- Expected Outcome

  Pass verdict

  The IUT is able to accept multiple indications.

  After handling the special value for “Measurement Unsuccessful”, the IUT continues to process commands and to receive data normally.

WSP/COL/WSF/BI-18-C [Receive Weight Measurement Indications with Reserved Flags]

- Test Purpose

  Verify that the Collector IUT can receive indications of the Weight Measurement Characteristic from a WS Sensor including reserved flags.

- Reference

  [4] 4.4.2

- Initial Condition
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has executed the procedure included in WSP/COL/WSF/BV-11-C [Configure Weight Measurement for Indication]. The Lower Tester configures the IUT to expect Weight Measurement Indications. This may require the use of the user consent procedure.
  - The IUT knows the handle of the Weight Measurement characteristic.
- Test Procedure

  The Lower Tester sends an ATT_Handle_Value_Indication containing a Weight Measurement characteristic value to the IUT. There are many combinations of reserved flag settings. For this test use Flags = 0xF0. This includes reserved bits 4, 5, 6, and 7 = 1111. Optional fields are not present in the Weight Measurement characteristic, so other bits of the Flags field are set to 0 as well as the Offset Compensation Indicator.

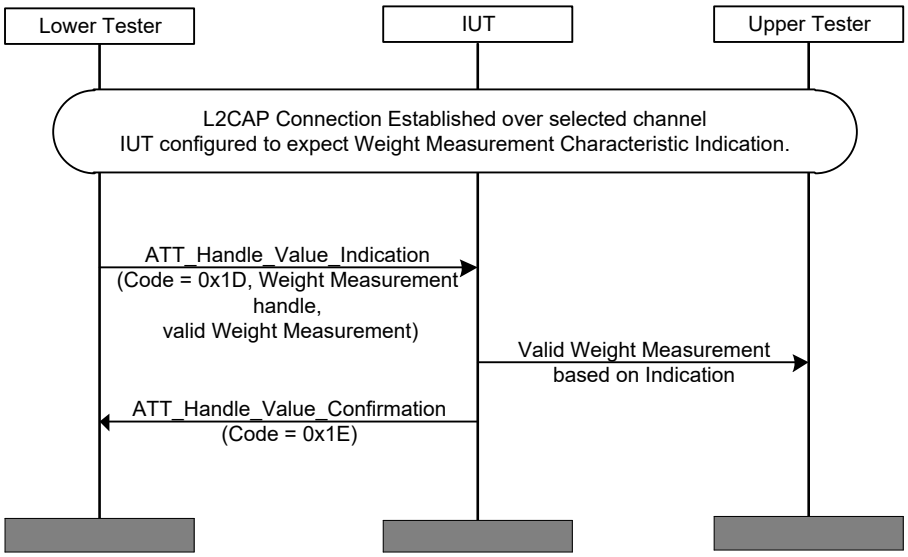

Figure 4.10: WSP/COL/WSF/BI-18-C [Receive Weight Measurement Indications with Reserved Flags]

- Expected Outcome

  Pass verdict

  The IUT reports the received Weight Measurement characteristic value to the Upper Tester. The reported Weight Measurement value matches the one sent by the Lower Tester, as if the reserved bits of the Flags field were not set.

WSP/COL/WSF/BI-19-C [Receive Body Composition Measurement Indications with Reserved Flags]

- Test Purpose

  Verify that the Collector IUT can receive indications of the Body Composition Measurement Characteristic from a WS Sensor including reserved flags.

- Reference

  [4] 4.5.2

- Initial Condition
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has executed the procedure included in WSP/COL/WSF/BV-12-C [Configure Weight Measurement for Indication]. The Lower Tester configures the IUT to expect Body Composition Measurement Indications. This may require the use of the user consent procedure.
  - The IUT knows the handle of the Body Composition Measurement characteristic.
- Test Procedure

  The Lower Tester sends an ATT_Handle_Value_Indication containing a Body Composition Measurement characteristic value to the IUT. There are many combinations of reserved flag settings. For this test use Flags = 0xE000. This includes reserved bits 13, 14, and 15 set to 1. Optional fields are not present in the Body Composition Measurement characteristic, so other bits of the Flags field are set to 0 as well as the Offset Compensation Indicator.

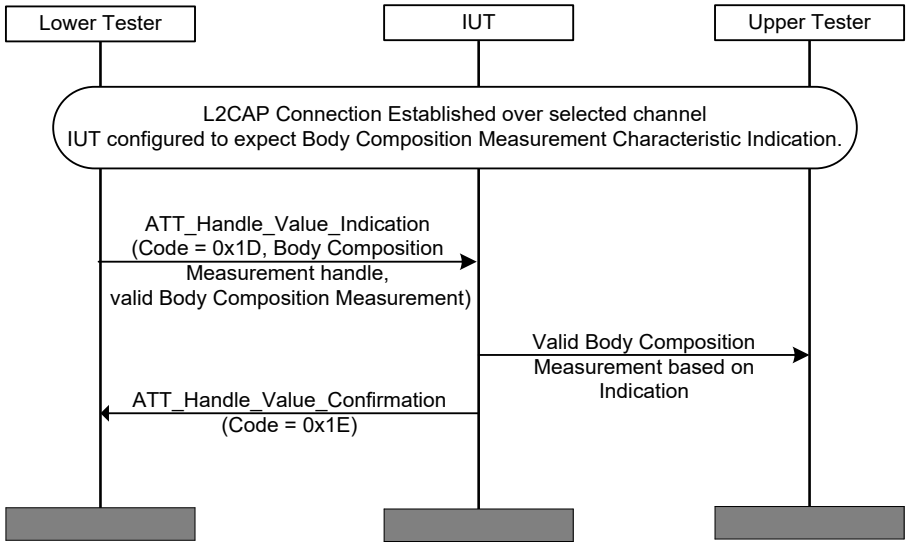

Figure 4.11: WSP/COL/WSF/BI-19-C [Receive Body Composition Measurement Indications with Reserved Flags]

- Expected Outcome

  Pass verdict

  The IUT reports the received Body Composition Measurement value to the Upper Tester. The reported Body Composition Measurement value matches the one sent by the Lower Tester, as if the reserved bits of the Flags field were not set.

WSP/COL/WSF/BV-20-C [Service Changed]

- Test Purpose

  Verify that the Collector IUT re-performs service and characteristic discovery following receipt of a Service Changed indication from a WS Sensor with which it has a trusted relationship and that it refreshes cached values.

- Reference

  [4] 4.10

- Initial Condition

  - The IUT and the Lower Tester have previously bonded and have a trusted relationship.
  - The IUT has previously read the Weight Scale feature characteristic as described in WSP/COL/CGGIT/CHA/BV-01-C [Characteristic GGIT – Weight Scale Feature] and received one or more indications of the Weight Measurement characteristic as described in WSP/COL/WSF/BV-13-C [Receive Weight Measurement Indications]. The IUT has also configured the Service Changed characteristic for indications. The order of the Feature characteristic read and service changed characteristic enabling does not matter.
  - The Lower Tester has the Service Changed characteristic.
  - No connection is established between the IUT and Lower Tester.

- Test Procedure

  1. The Lower Tester begins advertising using GAP undirected connectable mode.
  2. The IUT establishes a connection to the Lower Tester as described in WSP/COL/CGGIT/CHA/BV-01-C [Characteristic GGIT – Weight Scale Feature].
  3. The Lower Tester indicates the Service Changed characteristic. The characteristic value contains the beginning and ending attribute handles for the service definition including the Weight Scale Service.
  4. The Lower Tester indicates the Weight Measurement characteristic to the IUT.
  5. The IUT accepts the indication of the Weight Measurement characteristic as described in WSP/COL/WSF/BV-13-C [Receive Weight Measurement Indications].

- Expected Outcome

  Pass verdict

  The IUT starts encryption when the connection is established.

  The IUT successfully re-discovers the Weight Scale Service, the Weight Scale Feature characteristic, the Weight Measurement characteristic and the Client Characteristic Configuration descriptor of the Weight Measurement characteristic.

  The IUT re-reads the Weight Scale Feature characteristic by sending a correctly formatted ATT_Read_Request (0x0A) to the Lower Tester, containing the refreshed handle value for the Weight Scale Feature characteristic.

  The IUT receives the response from the Lower Tester and sends the WSP_ReadResponse containing the correct Weight Scale Feature value to the Upper Tester.

  The IUT correctly parses the Weight Measurement characteristic value as specified in WSP/COL/WSF/BV-13-C [Receive Weight Measurement Indications].

WSP/COL/WSF/BV-21-C [Configure Battery Level for Notification]

- Test Purpose

  Verify that the Collector IUT can configure a WS Sensor (Lower Tester) to notify the Battery Level characteristic of the Battery Service.

- Reference

  [4] 4.8

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has discovered the Client Characteristic Configuration Descriptor of a Battery Level characteristic contained in the Lower Tester.

- Test Procedure

  The Upper Tester sends a command to the IUT to configure the WS Sensor to notify the Battery Level characteristic.

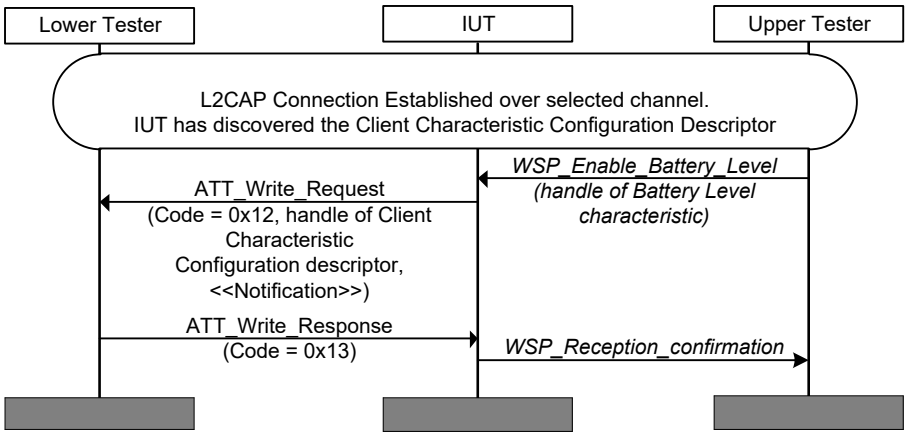

Figure 4.12: WSP/COL/WSF/BV-21-C [Configure Battery Level for Notification]

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Write_Request (0x12) to the Lower Tester, with the handle set to that of the Client Characteristic Configuration descriptor for a Battery Level characteristic with the value set to «Notification».

WSP/COL/WSF/BV-22-C [Read Weight Scale Feature Characteristic with Bonding Enabled]

- Test Purpose

  Verify that, after the initial connection and bonding, the Collector IUT can read the Weight Scale Feature characteristic.

- Reference

  [15] 4.4.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1 if using an LE transport or Section 4.2.2 if using a BR/EDR transport.
  - The IUT is bonded with the Lower Tester.
  - The Upper Tester knows the handle of the Weight Scale Feature characteristic contained in the Lower Tester.
- Test Procedure
  1. The Upper Tester commands the IUT to read the Weight Scale Feature characteristic from the Lower Tester.
  2. The IUT sends an ATT_Read_Request to the Lower Tester containing the handle specified by the Upper Tester.
  3. The Lower Tester receives the ATT_Read_Request and then sends an ATT_Read_Response to the IUT containing the value of the characteristic.
  4. The IUT receives the ATT_Read_Response and reports the value to the Upper Tester.
- Expected Outcome

  Pass verdict

  The IUT reads the Weight Scale Feature characteristic and reports its value to the Upper Tester.

  Reserved for future use bit values are ignored.

WSP/COL/WSF/BV-23-C [Enable Weight Scale Feature Characteristic for Indication or Read Feature Characteristic Upon Reconnection]

- Test Purpose

  Verify that the Collector IUT can either enable the Weight Scale Feature characteristic for indication or read the Weight Scale Feature characteristic upon reconnection.
- Reference

  [15] 4.4.1
- Initial Condition
  - The handles of the Weight Scale Feature characteristic and Client Characteristic Configuration descriptor have been previously discovered by the Upper Tester during the test procedures in Section 4.3 or are known to the Upper Tester by other means.
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1 if using an LE transport or Section 4.2.2 if using a BR/EDR transport.
  - The IUT is not paired and bonded with the Lower Tester.
- Test Procedure
  1. The Upper Tester orders the IUT to initiate pairing and bonding.
  2. The Upper Tester commands the IUT to perform either alternative 2A or 2B:

     Alternative 2A (Configure the Weight Scale Feature characteristic for indication):

     2A.1: The IUT configures the Weight Scale Feature characteristic for indication.

Alternative 2B (Read the Weight Scale Feature characteristic upon reconnection):

2B.1: The Upper Tester commands the IUT to disconnect, and the IUT terminates the connection with the Lower Tester.

2B.2: The Upper Tester commands the IUT to reconnect to the Lower Tester.

2B.3:. The IUT reads the Weight Scale Feature characteristic from the Lower Tester and reports the value to the Upper Tester.

- Expected Outcome

  Pass verdict

  In step 1, the IUT successfully completes pairing and bonding.

  In step 2A.1, the IUT enables the Weight Scale Feature characteristic for indication.

  In step 2B.3, the IUT reads the Weight Scale Feature characteristic and reports its value to the Upper Tester.

  Reserved for future use bit values are ignored.

4.6 Weight Scale Trusted Relationships

WSP/SEN/WST/BI-01-C [Single User Weight Scale – No Bond Relation]

- Test Purpose

  Verify that the WS Sensor IUT does **not** send any indications of the Weight Measurement characteristic or the Body Composition Measurement characteristic to a Collector with which it does not have a trusted relationship.

- Reference

  [4] 3.2

- Initial Condition

  - For the purposes of this test case, a bond is not established between the WS Sensor IUT and the Lower Tester; i.e., they do not have as trusted relationship.
  - Run the preamble procedure defined in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor, without initiating bonding.
  - The Lower Tester knows the handle of the Weight Measurement characteristic and, if supported by the WS Sensor IUT, the handle of the Body Composition Measurement characteristic.

- Test Procedure

  1. The Lower Tester attempts to configure the Client Characteristic Configuration descriptor of the Weight Measurement characteristic to enable indication. If the Body Composition characteristic is supported by the WS Sensor IUT, the Lower Tester also attempts to configure the Client Characteristic Configuration descriptor of the Body Composition Measurement characteristic to enable indication.
  2. Attempt to induce the WS Sensor IUT to send measurements to the Collector.
  3. Monitor indications sent by the WS Sensor IUT for 30 seconds or until a disconnection occurs (whichever comes first).

- Expected Outcome

  Pass verdict

  In step 1, the WS Sensor IUT may reject the Write Request that the Lower Tester sends to the Client Characteristic Configuration descriptor(s).

  Regardless of whether the WS Sensor IUT accepts or rejects a write to the Client Characteristic Configuration descriptor(s) during step 1, the Lower Tester does not receive any indications of the Weight Measurement characteristic or the Body Composition Measurement characteristic from the WS Sensor IUT during steps 1, 2, or 3.

WSP/SEN/WST/BI-02-C [Multi-User Weight Scale – No Consent]

- Test Purpose

  Verify that the WS Sensor IUT does **not** send any indications of the Weight Measurement characteristic or the Body Composition Measurement characteristic to a Collector which has not provided the required Consent code since connecting to the IUT.

- Reference

  [4] 3.2

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.3 to configure the WS Sensor IUT for use with the User Data Control Point.
  - There are at least two registered users already registered in the WS Sensor IUT, which were registered by the Lower Tester (i.e., the same bonded Collector registered all the users). Refer to WSP/COL/UDS/BV-02-C [Register New User] on how to register a user.
  - The Lower Tester does not initiate a Consent procedure.

- Test Procedure

  1. Attempt to induce the WS Sensor IUT to send measurements to the Collector.
  2. Monitor indications sent by the WS Sensor IUT for 30 seconds.
  3. If the IUT has disconnected, the Lower tester reconnects by running the procedure defined in Section 4.2.3 before proceeding.
  4. To prepare for future test cases, the Lower Tester deletes the users that it registered by using the Consent procedure followed by the Delete User Data procedure for each registered user and terminates the connection.

- Expected Outcome

  Pass verdict

  The Lower Tester does not receive an indication of the Weight Measurement characteristic or the Body Composition Measurement characteristic from the WS Sensor IUT.

WSP/SEN/WST/BI-03-C [Multi-User Weight Scale – Wrong Consent Code]

- Test Purpose

  Verify that the WS Sensor IUT does **not** send any indications of the Weight Measurement characteristic or the Body Composition Measurement characteristic to a Collector which provided a Consent code which was not accepted by the IUT.

- Reference

  [4] 3.2

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.3 to configure the WS Sensor IUT for use with the User Data Control Point.
  - There are at least two registered users already registered in the WS Sensor IUT, which were registered by the Lower Tester (i.e., the same bonded Collector registered all the users). Refer to WSP/COL/UDS/BV-02-C [Register New User] on how to register a user.

- Test Procedure

  1. The Lower Tester initiates the Consent procedure in respect of one of the validly registered users and supplies a correctly formatted but non-matching Consent Code.
  2. The WS Sensor IUT rejects the Consent Code.
  3. Monitor indications sent by the WS Sensor IUT for 30 seconds.
  4. If the IUT has disconnected, the Lower tester reconnects by running the procedure defined in Section 4.2.3 before proceeding.
  5. To prepare for future test cases, the Lower Tester deletes the users that it registered by using the Consent procedure followed by the Delete User Data procedure for each registered user and terminates the connection.

- Expected Outcome

  Pass verdict

  The WS Sensor IUT, after sending a Write Response to acknowledge the write to the User Control Point, sends an indication of the User Control Point characteristic containing the Response Code Op Code (0x20), the Request Op Code (0x02) followed by the Response Value for *'User Not Authorized'* (0x05) without a Response Parameter.

  The Lower Tester does not receive any indications of the Weight Measurement characteristic or the Body Composition Measurement characteristic from the WS Sensor IUT.

WSP/SEN/WST/BV-04-C [Multi-User Weight Scale – Single Trusted Collector with Multiple Users]

- Test Purpose

  Verify that the WS Sensor IUT provides only the data that pertains to the correct user when different users use the same Collector.

- Reference

  [4] 3.2, 3.5, and 4.11

- Initial Condition
  - There are at least two registered users already registered in the WS Sensor IUT and these were registered by the same bonded Collector (i.e., the Lower Tester). These users are referred to below as "**User A**" and "**User B**". Refer to WSP/COL/UDS/BV-02-C [Register New User] on how to register a user.
  - The Lower Tester and the WS Sensor IUT are bonded.
- Test Procedure
  1. Run the preamble procedure defined in Section 4.2.3 to configure the WS Sensor IUT for use with the User Data Control Point.
  2. The Lower Tester initiates the Consent procedure and supplies the correct User ID and Consent Code parameters for **User A**.
  3. The WS Sensor IUT confirms that the Consent procedure was completed successfully.
  4. The Lower Tester reads the value of the User Index characteristic. The value is recorded for assessment.
  5. Induce the WS Sensor IUT to indicate the Weight Measurement characteristic and, if supported, the Body Composition Measurement characteristic.
  6. Monitor indications sent by the WS Sensor IUT for 30 additional seconds.
  7. The Lower Tester terminates the connection with the IUT.
  8. Run the preamble procedure defined in Section 4.2.3 to configure the WS Sensor IUT for use with the User Data Control Point, emulating the same Collector as in step 1.
  9. The Lower Tester initiates the Consent procedure and supplies the correct User ID and Consent Code parameters for **User B**.
  10. The WS Sensor IUT confirms that the Consent procedure was completed successfully.
  11. The Lower Tester reads the value of the User Index characteristic. The value is recorded for assessment.
  12. Induce the WS Sensor IUT to indicate the Weight Measurement characteristic and, if supported, the Body Composition Measurement characteristic.
  13. Monitor indications sent by the WS Sensor IUT for a further 30 seconds.
  14. If the IUT has disconnected, the Lower tester reconnects by running the procedure defined in Section 4.2.3 before proceeding.
  15. To prepare for future test cases, the Lower Tester deletes the users that it registered by using the Consent procedure followed by the Delete User Data procedure for each registered user and terminates the connection.
- Expected Outcome

  Pass verdict

  At step 3, the WS Sensor IUT, after sending a Write Response to acknowledge the write to the User Control Point, sends an indication of the User Control Point characteristic containing the Response Code Op Code (0x20), the Request Op Code (0x02) followed by the Response Value for 'Success' (0x01) without a Response Parameter.

  The value of the User Index characteristic recorded at step 4 equals the value of the User Index for User A.

  The value of the User Index field within any indications of the Weight Measurement characteristic or the Body Composition Measurement characteristic received from the WS Sensor IUT during steps 4–6 equals the value of the User Index for User A.

  At step 10, the WS Sensor IUT, after sending a Write Response to acknowledge the write to the User Control Point, sends an indication of the User Control Point characteristic containing the Response

Code Op Code (0x20), the Request Op Code (0x02) followed by the Response Value for 'Success' (0x01) without a Response Parameter.

The value of the User Index characteristic recorded at step 11 equals the value of the User Index for User B.

The value of the User Index field within any indications of the Weight Measurement characteristic or the Body Composition Measurement characteristic received from the WS Sensor IUT during steps 11–13 equals the value of the User Index for User B.

No measurement data belonging to any user other than User A is received during steps 1–7.

No measurement data belonging to any user other than User B is received during steps 8–13.

WSP/SEN/WST/BV-05-C [Multi-User Weight Scale – Multiple Trusted Collectors – Sequential Access]

- Test Purpose

  Verify that the WS Sensor IUT provides only the data that pertains to the correct user when different users use different Collectors and these connect to the WS Sensor IUT at different times.

- Reference

  [4] 3.2, 3.3, 3.5, and 4.11

- Initial Condition

  - There are at least two registered users already registered in the WS Sensor IUT and these were registered by *different* bonded Collectors. These are referred to below as "**User A**" and "**User B**". Refer to WSP/COL/UDS/BV-02-C [Register New User] on how to register a user.

- Test Procedure

  1. The Lower Tester, emulating Collector A, runs the preamble procedure defined in Section 4.2.3 to configure the WS Sensor IUT for use with the User Data Control Point.
  2. The Lower Tester emulating Collector A initiates the Consent procedure and supplies the correct User ID and Consent Code parameters for **User A**.
  3. The WS Sensor IUT confirms that the Consent procedure was completed successfully.
  4. The Lower Tester reads the value of the User Index characteristic. The value is recorded for assessment.
  5. Induce the WS Sensor IUT to indicate the Weight Measurement characteristic and, if supported, the Body Composition Measurement characteristic for User A.
  6. Monitor indications sent by the WS Sensor IUT for an additional 30 seconds or until a disconnection occurs (whichever comes first).
  7. The Lower Tester terminates the connection with the IUT.
  8. The Lower Tester, emulating Collector B, runs the preamble procedure defined in Section 4.2.3 to configure the WS Sensor IUT for use with the User Data Control Point.
  9. The Lower Tester emulating Collector B initiates the Consent procedure and supplies the correct User ID and Consent Code parameters for **User B**.
  10. The WS Sensor IUT confirms that the Consent procedure was completed successfully.
  11. The Lower Tester reads the value of the User Index characteristic. The value is recorded for assessment.
  12. Induce the WS Sensor IUT to indicate the Weight Measurement characteristic and, if supported, the Body Composition Measurement characteristic.
  13. Monitor indications sent by the WS Sensor IUT for 30 additional seconds.

14. If the IUT has disconnected, the Lower tester reconnects by running the procedure defined in Section 4.2.3 before proceeding.
15. To prepare for future test cases, the Lower Tester deletes the users that it registered by using the Consent procedure followed by the Delete User Data procedure for each registered user and terminates the connection.

- Expected Outcome

  Pass verdict

  At step 3, the WS Sensor IUT, after sending a Write Response to acknowledge the write to the User Control Point, sends an indication of the User Control Point characteristic containing the Response Code Op Code (0x20), the Request Op Code (0x02) followed by the Response Value for 'Success' (0x01) without a Response Parameter.

  The value of the User Index characteristic recorded at step 4 equals the value of the User Index for User A.

  The value of the User Index field within any indications of the Weight Measurement characteristic or the Body Composition Measurement characteristic received from the WS Sensor IUT during steps 4–6 equals the value of the User Index for User A.

  At step 10, the WS Sensor IUT, after sending a Write Response to acknowledge the write to the User Control Point, sends an indication of the User Control Point characteristic containing the Response Code Op Code (0x20), the Request Op Code (0x02) followed by the Response Value for 'Success' (0x01) without a Response Parameter.

  The value of the User Index characteristic recorded at step 11 equals the value of the User Index for User B.

  The value of the User Index field within any indications of the Weight Measurement characteristic or the Body Composition Measurement characteristic received from the WS Sensor IUT during steps 11–13 equals the value of the User Index for User B.

  No measurement data belonging to any user other than User A is received during steps 1–7.

  No measurement data belonging to any user other than User B is received during steps 8–14.

  Collector A receives only measurement data that is applicable to User A.

  Collector B receives only measurement data that is applicable to User B.

- Notes

  The Lower Tester emulating Collector A in this test case uses a different Bluetooth Address from the Lower Tester emulating Collector B.

WSP/SEN/WST/BV-06-C [Multi-User Weight Scale – Multiple Trusted Collectors – Concurrent Access]

- Test Purpose

  Verify that the WS Sensor IUT provides only the data that pertains to the correct user to each Collector when different users use different Collectors and two Collectors connect to the WS Sensor IUT concurrently.

- Reference

  [4] 3.2, 3.3, 3.5, and 4.11

- Initial Condition
  - There are at least two registered users already registered in the WS Sensor IUT and these were registered by *different* bonded Collectors. These are referred to below as "**User A**" and "**User B**". Refer to WSP/COL/UDS/BV-02-C [Register New User] on how to register a user.
- Test Procedure
  1. The Lower Tester, emulating Collector A, runs the preamble procedure defined in Section 4.2.3 to configure the WS Sensor IUT for use with the User Data Control Point.
  2. A second Lower Tester, emulating Collector B, runs the preamble procedure defined in Section 4.2.3 to configure the WS Sensor IUT for use with the User Data Control Point.
  3. The WS Sensor IUT successfully establishes and maintains connections with both Collectors concurrently.
  4. The Lower Tester emulating Collector A initiates the Consent procedure and supplies the correct User ID and Consent Code parameters for **User A**.
  5. The WS Sensor IUT confirms to Collector A that the Consent procedure was completed successfully.
  6. The Lower Tester emulating Collector B initiates the Consent procedure and supplies the correct User ID and Consent Code parameters for **User B**.
  7. The WS Sensor IUT confirms to Collector B that the Consent procedure was completed successfully.
  8. The Lower Tester emulating Collector A reads the value of the User Index characteristic. The value is recorded for assessment.
  9. The Lower Tester emulating Collector B reads the value of the User Index characteristic. The value is recorded for assessment.
  10. Induce the WS Sensor IUT to indicate the Weight Measurement characteristic and, if supported, the Body Composition Measurement characteristic for User A and User B.
  11. Monitor indications sent by the WS Sensor IUT for 30 seconds.
  12. If the IUT has disconnected, the Lower tester reconnects by running the procedure defined in Section 4.2.3 before proceeding.
  13. To prepare for future test cases, the Lower Tester deletes the users that it registered by using the Consent procedure followed by the Delete User Data procedure for each registered user and terminates the connection.
- Expected Outcome

  Pass verdict

  At step 5 and at step 7, the WS Sensor IUT, after sending a Write Response to acknowledge the write to the User Control Point, sends an indication of the User Control Point characteristic containing the Response Code Op Code (0x20), the Request Op Code (0x02) followed by the Response Value for 'Success' (0x01) without a Response Parameter.

  The value of the User Index characteristic recorded at step 8 equals the value of the User Index for User A.

  The value of the User Index characteristic recorded at step 9 equals the value of the User Index for User B.

  The value of the User Index field within any indications of the Weight Measurement characteristic or the Body Composition Measurement characteristic received from the WS Sensor IUT by Collector A equals the value of the User Index for User A.

The value of the User Index field within any indications of the Weight Measurement characteristic or the Body Composition Measurement characteristic received from the WS Sensor IUT by Collector B equals the value of the User Index for User B.

Collector A receives only measurement data that is applicable to User A.

Collector B receives only measurement data that is applicable to User B.

4.7 Current Time Service Features

WSP/COL/CTS/BV-01-C [Configure Current Time Characteristic for Notification]

- Test Purpose

  Verify that the Collector IUT can configure a WS Sensor (Lower Tester) to notify the Current Time characteristic of the Current Time Service.

- Reference

  [4] 4.9

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or 4.2.5, if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has discovered the Client Characteristic Configuration Descriptor of the Current Time characteristic contained in the Lower Tester.

- Test Procedure

  The Upper Tester sends a command to the IUT to configure the WS Sensor to notify the Current Time characteristic.

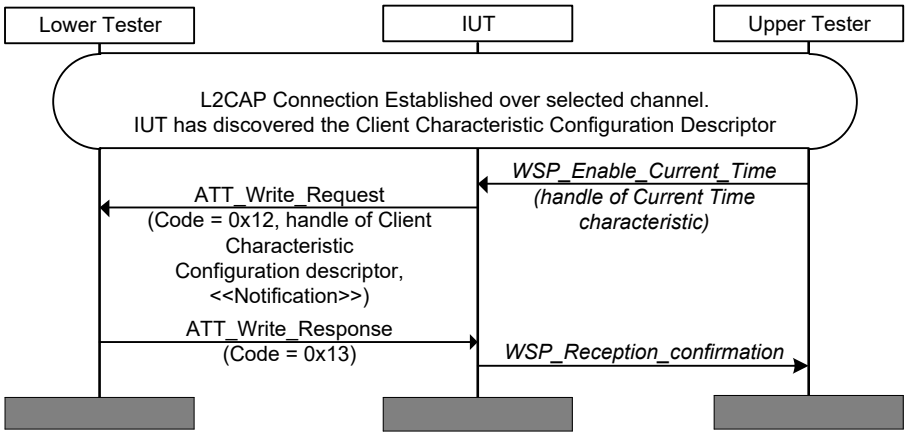

Figure 4.13: WSP/COL/CTS/BV-01-C [Configure Current Time Characteristic for Notification]

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Write_Request (0x12) to the Lower Tester, with the handle set to that of the Client Characteristic Configuration descriptor for the Current Time characteristic with the value set to «Notification».

WSP/SEN/CTS/BV-03-C [Verify that the timestamp in the Weight Measurement characteristic agrees with the Current Time Service value]

- Test Purpose

  Verify that the value of the Time Stamp field provided in the Weight Measurement characteristic is the same as the value of the Date Time field within the Current Time characteristic, within a small tolerance.

- Reference

  [4] 3.2.1

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.1, if using an LE transport, or 4.2.2, if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - If IUT permissions for the Weight Measurement characteristic require a specific security mode or security level, establish a connection meeting those requirements.
  - The handle of each characteristic value referenced in the test case below has been previously discovered by the Lower Tester or is known to the Lower Tester by other means.

- Test Procedure

  1. The Lower Tester configures the Weight Measurement characteristic for indication.
  2. Perform an action on the IUT that will induce it to take a weight measurement and send an indication of the Weight Measurement characteristic along with the Time Stamp field.
  3. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Weight Measurement characteristic handle and value including the Time Stamp field.
  4. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
  5. Immediately upon receiving the ATT_Handle_Value_Indication, the Lower Tester sends an ATT_Read_Request to the IUT containing the handle of the Current Time Characteristic.
  6. Compare the timestamp value reported in the Weight Measurement characteristic indication received at step 3 with the time value reported in the Current Time characteristic received at step 5.

- Expected Outcome

  Pass verdict

  The difference between the two time values compared is less than or equal to 180 s.

WSP/SEN/CTS/BV-04-C [Verify that the timestamp in the Body Composition Measurement characteristic agrees with the Current Time Service value]

- Test Purpose

  Verify that the value of the Time Stamp field provided in the Body Composition Measurement characteristic is the same as the value of the Date Time field within the Current Time characteristic, within a small tolerance.

- Reference

  [4] 3.3.1

- Initial Condition
  - Run the preamble procedure defined in Section 4.2.1, if using an LE transport, or 4.2.2, if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - If IUT permissions for the Body Composition Measurement characteristic require a specific security mode or security level, establish a connection meeting those requirements.
  - The handle of each characteristic value referenced in the test case below has been previously discovered by the Lower Tester or is known to the Lower Tester by other means.
- Test Procedure
  1. The Lower Tester configures the Body Composition Measurement characteristic for indication.
  2. Perform an action on the IUT that will induce it to take a weight measurement and send an indication of the Body Composition Measurement characteristic along with the Time Stamp field.
  3. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Body Composition Measurement characteristic handle and value including the Time Stamp field.
  4. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
  5. Immediately upon receiving the ATT_Handle_Value_Indication, the Lower Tester sends an ATT_Read_Request to the IUT containing the handle of the Current Time Characteristic.
  6. Compare the time value reported in the Body Composition Measurement characteristic indication received at step 3 with the time value reported in the Current Time characteristic received at step 5.
- Expected Outcome

  Pass verdict

  The difference between the two time values compared is less than or equal to 180 s.

4.8 Service Procedures – User Data Service

WSP/COL/UDS/BV-01-C [Configure User Control Point Characteristic for indication]

- Test Purpose

  Verify that the Collector IUT can configure a WS Sensor (Lower Tester) to indicate the User Control Point characteristic.
- Reference

  [4] 4.6.3
- Initial Condition
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has discovered the Client Characteristic Configuration Descriptor for the User Control Point characteristic contained in the Lower Tester.
- Test Procedure

  The Upper Tester sends a command to the IUT to configure the WS Sensor to indicate User Control Point characteristics.

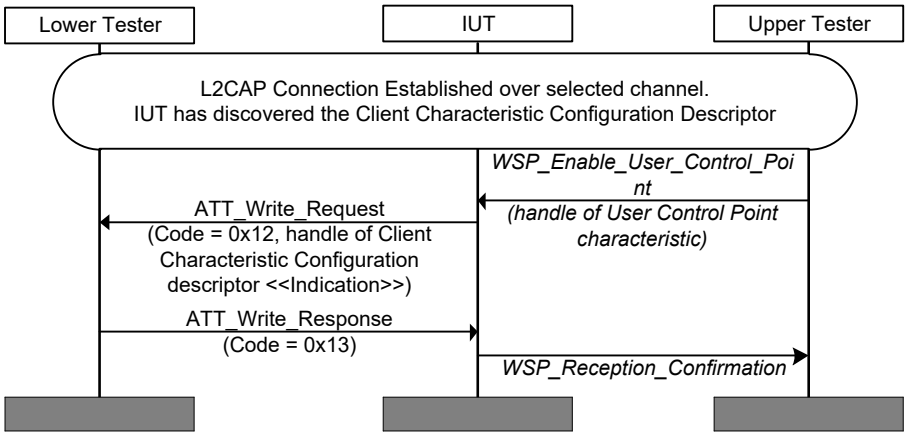

Figure 4.14: WSP/COL/UDS/BV-01-C [Configure User Control Point Characteristic for indication]

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Write_Request (0x12) to the Lower Tester, with the handle set to that of the Client Characteristic Configuration descriptor for the User Control Point characteristic with the value set to «Indication».

WSP/COL/UDS/BV-02-C [Register New User]

- Test Purpose

  Verify that the Collector IUT can perform the Register New User procedure to obtain a User Index value for a new user.

- Reference

  [4] 4.6.3.2.1

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The Lower Tester is configured for use of the User Data Control Point (e.g., refer to WSP/COL/UDS/BV-01-C [Configure User Control Point Characteristic for indication] for configuration of the User Data Control Point).

- Test Procedure

  1. The IUT writes the Register New User Op Code (0x01) to the User Control Point with a Parameter Value of 0x04D2 which represents the Consent Code “1234”.
  2. The Lower Tester, after sending a Write Response to acknowledge the write to the User Control Point, sends an indication of the User Control Point characteristic containing the Response Code Op Code (0x20), the Request Op Code (0x01) followed by the Response Value for ‘success’ (0x01) with the Response Parameter set to the User Index value of 0x02.

- Expected Outcome

  Pass verdict

  The IUT writes a correctly formatted op code and parameter to the User Control Point containing the values specified in the test case.

  The IUT receives the response from the User Control Point containing the User Index parameter value and sends an ATT_Handle_Value_Confirmation to the Lower Tester.

WSP/COL/UDS/BV-03-C [Consent]

- Test Purpose

  Verify that the Collector IUT can perform the Consent procedure.

- Reference

  [4] 4.6.3.2.2

- Initial Condition

  - The Lower Tester is configured for use of the User Data Control Point.
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - A user with the User Index of 0x02 has previously been registered.

- Test Procedure

  1. The Consent Code associated with the User Index may have been previously cached by the IUT or may be entered during this step. The IUT writes the Consent Op Code (0x02) to the User Control Point with a Parameter Value that contains the User Index value 0x02 followed by 0x04D2 which represents the Consent Code “1234”.
  2. The Lower Tester, after sending a Write Response to acknowledge the write to the User Control Point, sends an indication of the User Control Point characteristic containing the Response Code Op Code (0x20), the Request Op Code (0x02) followed by the Response Value for ‘success’ (0x01) without a Response Parameter.

- Expected Outcome

  Pass verdict

  The IUT writes a correctly formatted op code and parameter to the User Control Point containing the values specified in the test case.

  After receiving the indication of the User Control Point, the IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.

WSP/COL/UDS/BV-04-C [Delete User Data]

- Test Purpose

  Verify that the Collector IUT can perform the Delete User Data procedure.

- Reference

  [4] 4.6.3.2.3

- Initial Condition
  - The Lower Tester is configured for use of the User Data Control Point.
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - A user with the User Index of 0x02 has previously been registered by following the procedure described in WSP/COL/UDS/BV-02-C [Register New User].
  - The Upper Tester knows the handles of the User Index characteristic and the User Control Point characteristic contained in the Lower Tester.
  - Perform the Consent procedure described in WSP/COL/UDS/BV-03-C [Consent] so that consent has been granted with respect to the user having the User Index value 0x02.
  - Maintain the connection for the purposes of running the following test procedure.
- Test Procedure
  1. The IUT writes the Delete User Data Op Code (0x03) to the User Control Point without a Parameter Value.
  2. The Lower Tester, after sending a Write Response to acknowledge the write to the User Control Point, sends an indication of the User Control Point characteristic containing the Response Code Op Code (0x20), the Request Op Code (0x03) followed by the Response Value for ‘success’ (0x01) without a Response Parameter.
- Expected Outcome

  Pass verdict

  The IUT writes a correctly formatted op code to the User Control Point containing the values specified in the test case.

  After receiving the indication of the User Control Point, the IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.

WSP/COL/UDS/BV-05-C [Read User Index Characteristic]

- Test Purpose

  Verify that the Collector IUT can read the User Index characteristic from a WS Sensor.
- Reference

  [4] 3.5, 4.6.1
- Initial Condition
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - A user with the User Index of 0x02 has previously been registered by following the procedure described in WSP/COL/UDS/BV-02-C [Register New User].
  - Perform the Consent procedure described in WSP/COL/UDS/BV-03-C [Consent] so that consent has been granted with respect to the user having the User Index value 0x01.
  - The Upper Tester knows the handle of a User Index characteristic contained in the Lower Tester.

- Test Procedure

  1. The Upper Tester requests the IUT to read a User Index characteristic from the Lower Tester.
  2. The IUT sends an ATT_Read_Request to the Lower Tester including the handle of the User Index characteristic.
  3. The Lower Tester responds with an ATT_Read_Response with the value of the User Index characteristic set to 0x01.
  4. The Upper Tester receives the expected value of the User Index characteristic.

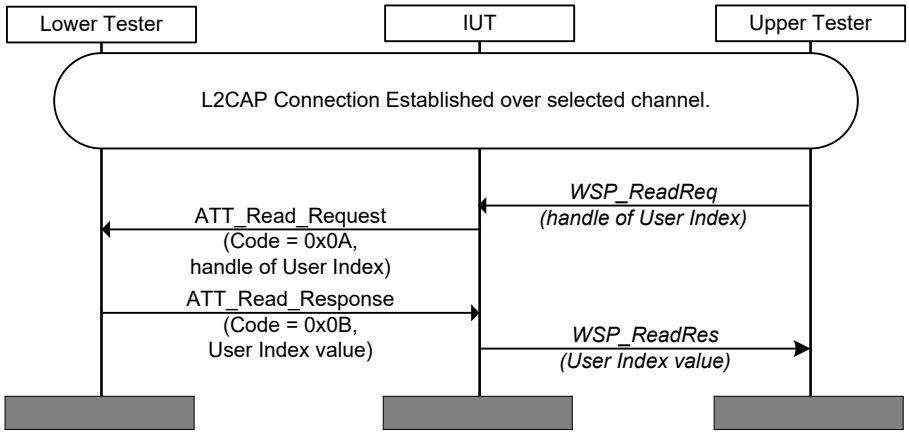

Figure 4.15: WSP/COL/UDS/BV-05-C [Read User Index Characteristic]

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Read_Request (0x0A) to the Lower Tester, containing the handle specified by the Upper Tester.

  The IUT receives the response from the Lower Tester and sends the WSP_ReadResponse containing the correct User Index value to the Upper Tester.

WSP/COL/UDS/BV-06-C [Configure Database Change Increment Characteristic for Notification]

- Test Purpose

  Verify that the Collector IUT can configure a WS Sensor (Lower Tester) to notify the Database Change Increment characteristic.

- Reference

  [4] 4.6.2

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has discovered the Client Characteristic Configuration Descriptor of the Database Change Increment characteristic contained in the Lower Tester.

- Test Procedure

  The Upper Tester sends a command to the IUT to configure the WS Sensor to notify the Database Change Increment characteristic.

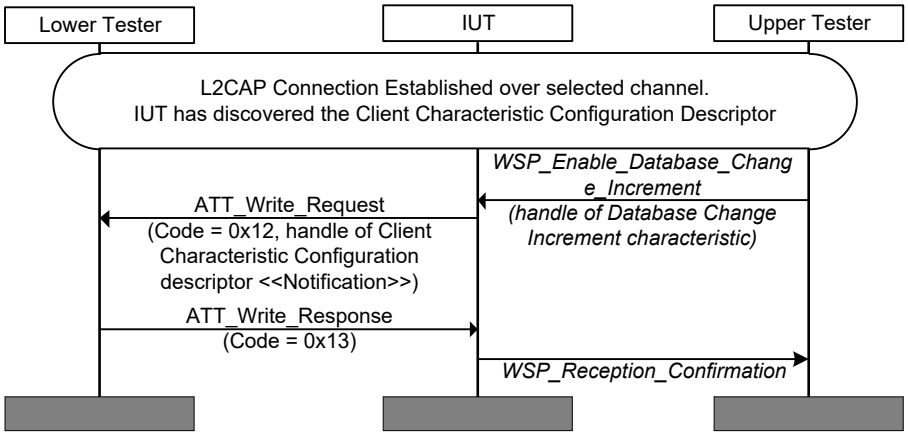

Figure 4.16: WSP/COL/UDS/BV-06-C [Configure Database Change Increment Characteristic for Notification]

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Write_Request (0x12) to the Lower Tester, with the handle set to that of the Client Characteristic Configuration descriptor for the Database Change Increment characteristic with the value set to «Notification».

WSP/COL/UDS/BV-09-C [Database Change Increment Characteristic Notification]

- Test Purpose

  Verify the Collector IUT behavior on receipt of a notification of the Database Change Increment characteristic from a WS Sensor.

- Reference

  [4] 4.6.2

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The IUT has been connected to the Lower Tester and the UDS Characteristics as well as the Database Change Increment are set to the same value in both devices.
  - The IUT has executed the procedure included in WSP/COL/UDS/BV-06-C [Configure Database Change Increment Characteristic for Notification], which configures it to expect Database Change Increment notifications.

- Test Procedure

  1. The Lower Tester updates at least one UDS Characteristic value (e.g., the First Name characteristic value) and also increments the value of Database Change Increment characteristic.
  2. The Lower Tester sends a notification of the Database Change Increment characteristic.
  3. The IUT reads the UDS Characteristics it supports.

- Expected Outcome

  Pass verdict

  The IUT receives the notification of the Database Change Increment characteristic from the Lower Tester.

  The IUT reads the supported UDS characteristics after the notification is received.

WSP/COL/UDS/BV-10-C [Read UDS Characteristics]

- Test Purpose

  Verify that a Collector IUT can read all characteristics of the User Data Service supported by the IUT.

- Reference

  [4] 4.6.4

- Initial Condition

  - All characteristics of the User Data Service supported by the IUT are specified in the IXIT [13].
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The Lower Tester includes one instantiation of the User Data Service [9] including all defined characteristics.
  - The IUT has previously executed the procedure included in WSP/COL/WSD/BV-19-C [Discover User Data Service UDS Characteristics], so it has the handle/value pairs for all characteristics of the User Data Service exposed by the Lower Tester that are supported by the IUT.
  - The test values used for UTF-8 based characteristics include character values outside the ASCII printable range.
  - The length of each UDS Characteristic used in this test case is such that its value can be read in its entirety in a GATT Read transaction when the default ATT_MTU size is used.

- Test Procedure

  1. The Upper Tester issues a command to the IUT to read all characteristics of the User Data Service supported by the IUT.
  2. For each characteristic of the User Data Service supported by the IUT, the IUT sends an ATT_Read_Request to the Lower Tester containing the handle specified by the Upper Tester.
  3. The IUT receives an ATT_Read_Response and reports the value to the Upper Tester.

- Expected Outcome

  Pass verdict

  For each characteristic contained in the Lower Tester's instantiation of the User Data Service supported by the IUT, the IUT reports the characteristic value correctly for all characteristics specified in the IXIT [13] to the Upper Tester, including:

  - For string-based characteristics, any printable or non-printable ASCII values.
  - For numeric-based characteristic, any values in the range of the characteristic.
  - For date-based characteristic, any values in the range of the characteristic.

WSP/COL/UDS/BV-11-C [Read Long UDS Characteristics]

- Test Purpose

  Verify that a Collector IUT can use the GATT Read Long sub-procedure successfully to read UDS Characteristics that contain a value in UTF-8 format and may exceed the capacity of default ATT_MTU size (e.g., the First Name, Last Name or Email Address UDS Characteristic).

- Reference

  [4] 4.6.4

- Initial Condition

  - All characteristics of the User Data Service supported by the IUT that use UTF-8 format are specified in the IXIT [13].
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The Lower Tester includes one instantiation of the User Data Service [9] including all defined characteristics.
  - The IUT has previously executed the procedure included in WSP/COL/WSD/BV-19-C [Discover User Data Service UDS Characteristics], so it has the handle/value pairs for all characteristics of the User Data Service exposed by the Lower Tester that are supported by the IUT.
  - The Lower Tester does not permit an ATT_MTU size larger than the default ATT_MTU size for LE to be negotiated.
  - The length of the UDS Characteristic used in this test case is such that its value cannot be read in its entirety in a GATT Read transaction when the default ATT_MTU size is used and therefore requires the GATT Read Long procedure to be used.

- Test Procedure

  1. The Lower Tester exposes a UTF-8 based characteristic that is supported by the Collector IUT. The length of the characteristic is greater than the capacity of the default ATT_MTU size. The UTF-8 string includes some character values outside the ASCII printable range.
  2. The Upper Tester issues a command to the IUT to read the characteristic referred to in step 1.
  3. The IUT executes the GATT Read Long Characteristic Values sub-procedure.

- Expected Outcome

  Pass verdict

  For each UDS Characteristic using the UTF-8 format for which support was declared in the IXIT [13], the IUT reports the characteristic value correctly, including all the printable and non-printable ASCII values.

WSP/COL/UDS/BV-12-C [Write UDS Characteristics]

- Test Purpose

  Verify that a Collector IUT can write a new value to each writable UDS Characteristic supported by the IUT.

- Reference

  [4] 4.6.4

- Initial Condition
  - All UDS Characteristics for which the IUT supports writing are specified in the IXIT [13].
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The Lower Tester includes one instantiation of the User Data Service [9] including all defined characteristics.
  - The IUT has previously executed the procedure included in WSP/COL/WSD/BV-19-C [Discover User Data Service UDS Characteristics], so it has the handle/value pairs for all characteristics of the User Data Service exposed by the Lower Tester that are supported by the IUT.
  - The test values used for UTF-8 based characteristics include character values outside the ASCII printable range.
  - The length of the test value to be written is such that it can be written in its entirety in a GATT Write transaction, using the default minimum ATT_MTU size.
- Test Procedure

  The following test procedure is repeated for each UDS Characteristics for which the IUT supports writing:

  1. The Upper Tester issues a command to the IUT to write a new value to a UDS Characteristic supported by the IUT, e.g., writing a new value for the ‘Age’, ‘Gender’ or ‘Waist Circumference’ UDS Characteristic.
  2. The IUT sends an ATT_Write_Request command to the Lower Tester with the value specified in step 1.
- Expected Outcome

  Pass verdict

  For each UDS Characteristic for which the IUT supports writing declared in the IXIT [13], the IUT writes the characteristic value(s) correctly to the Lower Tester, including:
  - For string-based characteristics, any printable or non-printable ASCII values.
  - For numeric-based characteristic, any values in the range of the characteristic.
  - For date-based characteristic, any values in the range of the characteristic.

WSP/COL/UDS/BV-13-C [Write Long UDS Characteristics]

- Test Purpose

  Verify that a Collector IUT can use the GATT Write Long sub-procedure successfully to write to UDS Characteristics that contain a value in UTF-8 format when the length of the value to be written exceeds the capacity of default ATT_MTU size (e.g., the First Name, Last Name or Email Address UDS Characteristic).
- Reference

  [4] 4.6.4
- Initial Condition
  - All UDS Characteristics for which the IUT supports writing that use a UTF-8 format are specified in the IXIT [13].

- Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
- The Lower Tester includes one instantiation of the User Data Service [9] including all defined characteristics.
- The IUT has previously executed the procedure included in WSP/COL/WSD/BV-19-C [Discover User Data Service UDS Characteristics], so it has the handle/value pairs for all characteristics of the User Data Service exposed by the Lower Tester that are supported by the IUT.
- The test values used for UTF-8 based characteristics include character values outside the ASCII printable range.
- The length of the UDS Characteristic used in this test case is such that its value cannot be written in its entirety in a GATT Write transaction when the default ATT_MTU size is used and therefore requires the GATT Write Long procedure to be used.

- Test Procedure

  1. The Upper Tester issues a command to the IUT to write a new value to a UDS Characteristic supported by the IUT, e.g., writing a new value for the ‘Last Name’ or ‘Email Address’ UDS Characteristic.
  2. The IUT executes the GATT Write Long Characteristic Values sub-procedure.

- Expected Outcome

  Pass verdict

  For each UDS Characteristic using the UTF-8 format for which the IUT supports writing declared in the IXIT [13], the IUT writes the characteristic value correctly to the Lower Tester including, for string-based characteristics, any printable or non-printable ASCII values.

4.9 Service Procedures – User Data Error Handling

Verify compliant operation when an error is reported by the Server side.

WSP/COL/SPE/BI-01-C [Op Code not supported]

- Test Purpose

  Verify that the Collector IUT behaves appropriately when it receives an ‘Op Code not supported’ User Data Control Point Response Code.

- Reference

  [4] 4.10

- Initial Condition

  - The Lower Tester is configured for use of the User Data Control Point.
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The Upper Tester knows the handle of the User Control Point characteristic contained in the Lower Tester.

- Test Procedure

  1. The IUT writes any Op Code to the User Data Control Point using an appropriate Parameter for the Op Code.
  2. The Lower Tester sends an indication of the User Data Control Point characteristic with the Response Code Op Code (0x20) and a Parameter representing Request Op Code followed by the Response Code Value for ‘Op Code not supported’ (0x02) (i.e., the Lower Tester simulates that it does not support the Op Code).
  3. The IUT considers the procedure to have failed.

- Expected Outcome

  Pass verdict

  The IUT returns to stable state and can process commands normally.

- Notes

  The test purpose is to verify the IUT’s capability to handle an ‘Op Code Not Supported’ response from the Sensor. This Sensor response may be provoked by the IUT writing an Op Code that is not supported by the responding compliant Sensor or the Sensor response to the IUT may be yielded by a test system that emulates that it does not support the Op Code.

WSP/COL/SPE/BI-03-C [Operation Failed]

- Test Purpose

  Verify that the Collector IUT behaves appropriately when it receives an ‘Operation Failed’ User Data Control Point Response Code.

- Reference

  [4] 4.10

- Initial Condition

  - The Lower Tester is configured for use of the User Data Control Point.
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.

- Test Procedure

  1. The IUT writes any Op Code to the User Data Control Point using an appropriate Parameter for the Op Code.
  2. The Lower Tester sends an indication of the User Data Control Point characteristic with the Response Code Op Code (0x20) and a Parameter representing Request Op Code followed by the Response Code Value for 'Operation Failed' (0x04) (i.e., the Lower Tester simulates a failed operation).

- Expected Outcome

  Pass verdict

  The IUT returns to stable state and can process commands normally.

WSP/COL/SPE/BI-04-C [User Data Access Not Permitted]

- Test Purpose

  Verify that the Collector IUT behaves appropriately when it receives an ‘User Data Access Not Permitted’ User Data Control Point Response Code.

- Reference

  [4] 4.10

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The Consent procedure of the User Data Control Point is not executed.

- Test Procedure

  1. A connection is established between the IUT and Lower Tester using the Preamble defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport.
  2. The IUT attempts to read any supported UDS Characteristic, using the procedure described in WSP/COL/UDS/BV-10-C [Read UDS Characteristics].
  3. The Lower Tester sends an Attribute Protocol Application Error response with the error code 0x80, meaning ‘User Data Access Not Permitted’.

- Expected Outcome

  Pass verdict

  The IUT returns to a stable state and can process commands normally.

WSP/COL/SPE/BI-05-C [Procedure Already in Progress]

- Test Purpose

  Verify that the IUT responds appropriately when a Client attempts to perform a User Data Control Point procedure when a procedure is already in progress.

- Reference

  [4] 4.10

- Initial Condition

  - The Lower Tester is configured for use of the User Data Control Point.
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.

- Test Procedure

  1. The IUT sends a Write Request to write a valid Op Code to the User Data Control Point characteristic (e.g., by executing the test case described in WSP/COL/UDS/BV-02-C [Register New User] or by other means).
  2. The Lower Tester sends an Attribute Protocol Error response with the error code set to Procedure Already In Progress (0xFE). The Lower Tester does not indicate the User Data Control Point

characteristic (i.e., the Lower Tester simulates that a control point procedure was already in progress).
3. Verify that the IUT response meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT returns to stable state and can process commands normally.

WSP/COL/SPE/BI-06-C [Client Characteristic Configuration Descriptor Improperly Configured]

- Test Purpose

  Verify that the IUT responds appropriately when a Client attempts to perform a User Data Control Point procedure when the User Data Control Point characteristic has not been configured for indication.

- Reference

  [4] 4.10

- Initial Condition

  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.
  - The User Data Control Point is **not** configured for indication.

- Test Procedure

  1. The IUT sends a Write Request to write a valid Op Code to the User Data Control Point characteristic (e.g., by executing the test case described in WSP/COL/UDS/BV-02-C [Register New User] or by other means).
  2. The Lower Tester sends an Attribute Protocol Error response with the error code set to 'Client Characteristic Configuration Descriptor Improperly Configured' (0xFD). The Lower Tester does not indicate the User Data Control Point characteristic.
  3. Verify that the IUT response meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT returns to stable state and can process commands normally.

WSP/COL/SPE/BI-07-C [User not Authorized]

- Test Purpose

  Verify that the Collector IUT behaves appropriately when it receives a ‘User not Authorized’ User Data Control Point Response Code.

- Reference

  [4] 4.10

- Initial Condition

  - The Lower Tester is configured for use of the User Data Control Point.

- Test Procedure

  1. A connection is established between the IUT and Lower Tester using the Preamble defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport.
  2. The IUT writes any Op Code to the User Data Control Point using an appropriate Parameter for the Op Code.
  3. The Lower Tester sends an indication of the User Data Control Point characteristic with the Response Code Op Code (0x20) and a Parameter representing Request Op Code followed by the Response Code Value for 'User Not Authorized' (0x05) (i.e., the Lower Tester simulates an authorization failure).

- Expected Outcome

  Pass verdict

  The IUT returns to stable state and can process commands normally.

WSP/COL/SPE/BI-08-C [User Data Control Point Procedure Timeout]

- Test Purpose

  Verify that, if the Collector IUT does not receive a response to a User Data Control Point Op Code, it times out after the Attribute Protocol transaction Timeout.

- Reference

  [4] 4.6.3.3

- Initial Condition

  - The Lower Tester is configured for use of the User Data Control Point.
  - Run the preamble procedure defined in Section 4.2.4, if using an LE transport, or Section 4.2.5 if using a BR/EDR transport, to set up the transport and L2CAP channel and initiate connection to a WS Sensor.

- Test Procedure

  1. The Upper Tester induces the IUT to write any of the supported Op Codes to the User Data Control Point.
  2. The IUT writes the required Op Code to the User Data Control Point, along with an appropriate Parameter if one is required by the Op Code.
  3. The Lower Tester does not send an indication of the User Data Control Point characteristic for at least longer than the Attribute Protocol transaction Timeout.
  4. After the specified timeout has expired, the IUT notifies the Upper Tester that the Attribute Protocol transaction Timeout has expired and the IUT considers the procedure to have failed.
  5. The Upper Tester attempts to induce the IUT to perform a further GATT operation by attempting to read the value of the Weight Scale Feature characteristic exposed by the Lower Tester).

- Expected Outcome

  Pass verdict

  The GATT operation attempted in step 5 either fails completely or induces the IUT to establish a new ATT Bearer before the operation is performed.

  If a new ATT Bearer is not established, the IUT does not attempt to read the value of the Weight Scale Feature characteristic.

If a new ATT Bearer is established, the IUT may read the value of the Weight Scale Feature characteristic.

The IUT returns to a stable state in all cases.

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 Weight Scale Profile [5].

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)
WSP 9/1	Discover Weight Scale Service and characteristics	WSP/COL/CGGIT/SER/BV-01-C WSP/COL/CGGIT/CHA/BV-01-C WSP/COL/CGGIT/CHA/BV-02-C
WSP 9/6	Discover User Data Service and characteristics	WSP/COL/CGGIT/SER/BV-03-C WSP/COL/CGGIT/CHA/BV-05-C WSP/COL/CGGIT/CHA/BV-07-C
WSP 9/5	Discover Current Time Service and characteristics	WSP/COL/CGGIT/SER/BV-04-C WSP/COL/CGGIT/CHA/BV-08-C
WSP 9/3	Discover Battery Service and characteristics	WSP/COL/CGGIT/SER/BV-06-C WSP/COL/CGGIT/CHA/BV-09-C
WSP 2/1 AND WSP 3/2 AND GATT 1a/4 AND NOT WSP 3/1	Weight Scale Service not discoverable over BR/EDR	WSP/SEN/SGGIT/SDPNF/BV-01-C
WSP 2/2	Mandatory Weight Scale Features	WSP/COL/WSF/BI-09-C WSP/COL/WSF/BV-11-C WSP/COL/WSF/BV-13-C WSP/COL/WSF/BV-14-C WSP/COL/WSF/BI-18-C WSP/COL/WSF/BV-20-C WSP/COL/UDS/BV-01-C WSP/COL/UDS/BV-02-C WSP/COL/UDS/BV-03-C WSP/COL/UDS/BV-04-C WSP/COL/UDS/BV-05-C WSP/COL/SPE/BI-01-C WSP/COL/SPE/BI-03-C WSP/COL/SPE/BI-05-C

Item	Feature	Test Case(s)
		WSP/COL/SPE/BI-07-C WSP/COL/SPE/BI-08-C
WSP 13a/1	Characteristic GGIT – Weight Scale Feature indication	WSP/COL/CGGIT/ISFC/BV-01-C
WSP 13a/2 AND (WSP 19/4 OR WSP 19/6)	Read Weight Scale Feature characteristic – Bonding enabled	WSP/COL/WSF/BV-22-C
(WSP 13a/1 OR WSP 13a/2) AND (WSP 19/4 OR WSP 19/6)	Enable Weight Scale Feature characteristic for indication or read characteristic upon reconnection	WSP/COL/WSF/BV-23-C
WSP 15/2	Client Characteristic Configuration Descriptor Improperly Configured	WSP/COL/SPE/BI-06-C
WSP 9/4	Mandatory Body Composition Features	WSP/COL/CGGIT/SER/BV-02-C WSP/COL/CGGIT/CHA/BV-03-C WSP/COL/CGGIT/CHA/BV-04-C WSP/COL/WSF/BI-10-C WSP/COL/WSF/BV-12-C WSP/COL/WSF/BV-15-C WSP/COL/WSF/BV-16-C WSP/COL/WSF/BV-17-C WSP/COL/WSF/BI-19-C
WSP 12/6	Discover User Data Service, UDS Characteristics	WSP/COL/WSD/BV-19-C
WSP 12/2	Discover User Data Service, Database Change Increment characteristic	WSP/COL/CGGIT/CHA/BV-06-C
WSP 9/2	Discover Device Information Service and characteristics	WSP/COL/CGGIT/SER/BV-05-C WSP/COL/WSD/BV-27-C WSP/COL/WSD/BV-28-C
WSP 4/2	Weight Scale Service UUID in AD	WSP/SEN/WSF/BV-01-C
WSP 4/3 OR WSP 4/4	Local Name included in AD or Scan Response	WSP/SEN/WSF/BV-02-C
WSP 4/5 OR WSP 4/6	Appearance included in AD or Scan Response	WSP/SEN/WSF/BV-03-C
WSP 4/10	Body Composition Service	WSP/SEN/WSF/BV-04-C WSP/SEN/WSF/BV-05-C WSP/SEN/WSF/BV-06-C
WSP 16/2	Configure Battery Level for Notification	WSP/COL/WSF/BV-21-C
WSP 2/1 AND NOT WSP 5/2	Single User Weight Scale	WSP/SEN/WST/BI-01-C
WSP 5/2	Multi-User Weight Scale	WSP/SEN/WST/BI-02-C WSP/SEN/WST/BI-03-C WSP/SEN/WST/BV-04-C WSP/SEN/WST/BV-05-C
WSP 5/2 AND WSP 5/2a	Multi-User Weight Scale – Concurrent Access	WSP/SEN/WST/BV-06-C

Item	Feature	Test Case(s)
WSP 17/3	Configure Current Time Characteristic for Notification	WSP/COL/CTS/BV-01-C
WSP 4/11 AND WSP 5/3	Verify that the timestamp in the Weight Measurement characteristic agrees with the Current Time Service value	WSP/SEN/CTS/BV-03-C
WSP 4/10 AND WSP 4/11 AND WSP 5/3	Verify that the timestamp in the Body Composition Measurement characteristic agrees with the Current Time Service value	WSP/SEN/CTS/BV-04-C
WSP 15/2	Configure Database Change Increment Characteristic for Notification	WSP/COL/UDS/BV-06-C
WSP 15/3	Receive Database Change Increment Characteristic Notification	WSP/COL/UDS/BV-09-C
WSP 15/10	Read UDS Characteristics	WSP/COL/UDS/BV-10-C WSP/COL/SPE/BI-04-C
WSP 15/11	Read Long UDS Characteristics	WSP/COL/UDS/BV-11-C
WSP 15/1	Write UDS Characteristic Values	WSP/COL/UDS/BV-12-C
WSP 15/12	Write Long UDS Characteristics	WSP/COL/UDS/BV-13-C

Table 5.1: Test case mapping

6 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2014-10-21	Publication
	1.0.1r00	2015-05-10	TSE 6325: Corrected TCMT mapping for WSP/COL/SPE/BI-04-C
1	1.0.1	2015-07-14	Prepared for TCRL 2015-1 publication
	1.0.2r00	2015-10-01	TSE 6454: Updated mapping for TP/UDS/CO/BV-06-I in TCMT.
2	1.0.2	2015-12-22	Prepared for TCRL 2015-2 publication.
	1.0.3r00	2016-05-26	Converted to new Test Case ID conventions as defined in TSTO v4.1.
3	1.0.3	2016-07-14	Prepared for TCRL 2016-1 publication.
	1.0.4r00	2016-08-18	TSE 7404: Deleted test case WSP/COL/SPE/BI-02-C and its entry in the TCMT.
	1.0.4r01	2016-10-20	Converted to current test specification template
4	1.0.4	2016-12-13	Approved by BTI. Prepared for TCRL 2016-2 publication.
	1.0.5r00	2017-04-26	TSE 8147: Corrected TCMT mapping for WSP/COL/UDS/BV-06-I. TSE 8394: Corrected TCMT mapping for WSP/SEN/WST/BV-06-I.
5	1.0.5	2017-06-26	Approved by BTI. Prepared for TCRL 2017-1 publication.
	1.0.6r00	2017-09-14	TSE 9725: Revised Test Purpose and Initial Condition text for test case WSP/COL/WSF/BV-20-I.
6	1.0.6	2017-11-28	Approved by BTI. Prepared for TCRL 2017-2 publication.
	p7r00–r04	2020-03-06 – 2020-11-17	TSE 12479 (rating 2): Updated test cases WSP/SEN/CTS/BV-03-I and -04-I to fix an issue with the CTS time stamp measurement. Updated template items and performed minor editorial fixes. Added publication number, setting previous v1.0.6 as publication 6. Made further template-related updates, including modifying TCIDs to Headings 8 and 9 and replacing Conformance and Pass/Fail Verdict language with that from new template. TSE 16062 (rating 1): Per Erratum 15813, globally changed “master” to “Central” and “slave” to “Peripheral”. Consistency Checker fixes and minor editorials. Mirrored TCMT consistency fixes in the TCRL. Added reference and Definitions text for appropriate language.
7	p7	2020-12-22	Approved by BTI on 2020-12-02. Prepared for TCRL 2020-1 publication.

Publication Number	Revision Number	Date	Comments
	p8r00	2021-03-23	TSE 16654 (rating 1): Revert the naming change from COL to SEN for WSP/SEN/WSD/BV-08-I – 12-I (role name abbreviations were changed in error in the TCRL for the previous release but should have been updated in the TS and TCMT instead).
8	p8	2021-07-13	Approved by BTI on 2021-06-03. Prepared for TCRL 2021-1 publication.
	p8ed2r00	2021-08-03	TSE 17313 (rating 1): Removed GATT references from TCMT for TCIDs WSP/COL/UDS/BV-11-I and -13-I.
	p8 edition 2	2021-09-28	Approved by BTI on 2021-09-27. Prepared for edition 2 publication.
	p9r00–r03	2022-03-16 – 2022-05-19	TSE 17269 (rating 2): Converted tests to GGIT: the new GGIT TCIDs are WSP/COL/CGGIT/CHA/BV-01-C – -09-C, WSP/COL/CGGIT/SER/BV-01-C – -06-C, WSP/SEN/SGGIT/SDPNF/BV-01-C – -05-C and the deleted TCIDs are WSP/COL/WSD/BV-01-I – -07-I, -13-I – -18-I, -20-I – -26-I, and -29-I and -30-I; WSP/COL/WSF/BV-07-I and -08-I; WSP/COL/CTS/BV-02-I; WSP/COL/UDS/BV-07-I and -08-I; and WSP/SEN/WSD/BV-08-I – -12-I. Updated the “Test groups” section, and added the GGIT material to the TCID conventions section. Updated the Discovery of Services and Characteristics section and added Generic GATT Integrated Tests to the test groups. Updated references to the new Generic GATT Integrated Tests section globally. Modified the Initial Condition in WSP/COL/WSD/BV-19-I, -27-I, and -28-I. TSE 18395 (rating 1): Removed direct references to GATT test cases in WSP/COL/WSD/BV-19-I, -27-I, and -28-I; WSP/SEN/CTS/BV-03-I and -04-I; and WSP/COL/UDS/BV-10-I – -13-I and in the Preambles sections for ATT Bearer on LE Transport and ATT Bearer on BR/EDR Transport. TSE 18411 (rating 1): Added a “Test database requirements” section. TSE 18727 (rating 1): Editorials to align the document with the latest TS template in anticipation of a future .Z release. Aligned the copyright page with v2 of the DNMD.
9	p9	2022-06-28	Approved by BTI on 2022-05-31. Prepared for TCRL 2022-1 publication.
	p10r00	2022-08-19	TSE 19011 (rating 2): Corrected the properties for GGIT test WSP/COL/CGGIT/CHA/BV-05-C and the value length for WSP/COL/CGGIT/CHA/BV-01-C.
10	p10	2023-02-07	Approved by BTI on 2022-12-28. Prepared for TCRL 2022-2 publication.
	p11r00–r01	2023-11-03 – 2023-11-29	TSE 23287 (rating 1): Converted -I tests to -C tests as appropriate; updated the TCMT and TCRL accordingly. Deleted draft revision history comments prior to p0.

Publication Number	Revision Number	Date	Comments
11	p11	2024-07-01	Approved by BTI on 2024-04-21. Prepared for TCRL 2024-1 publication.
	p12r00	2024-07-30	TSE 17246 (rating 4): Per E17172, added new tests WSP/COL/CGGIT/ISFC/BV-01-C and WSP/COL/WSF/BV-22-C and -23-C. Updated the TCMT accordingly. Updated the Properties value for WSP/COL/CGGIT/CHA/BV-01-C. Updated the references list and the TCID conventions table.
12	p12	2024-10-08	Approved by BTI on 2024-09-11. WSP v1.0.1 adopted by the BoD on 2024-10-01. Prepared for TCRL 2024-2-addition publication.
	p13r00–r01	2025-07-18 – 2025-08-14	TSE 27523 (rating 2): Updated the TCMT entry for WSP/SEN/SGGIT/SDPNF/BV-01-C to delete GAP 0/3. TSE 27601 (rating 2): Deleted WSP/SEN/SGGIT/SDPNF/BV-02-C – -05-C. Updated the TCMT accordingly.
13	p13	2025-11-04	Approved by BTI on 2025-10-02. Prepared for TCRL pkg101 publication.

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