Binary Sensor Profile (BSP)

*Bluetooth® Test Suite*

- **Revision**: BSP.TS.1.0.0
- **Revision Date**: 2019-07-02
- **Group Prepared By**: Personal User Interface Device User Group
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1 Scope

This Bluetooth document contains the Test Suite Structure (TSS) and Test Cases (TC) to test the Binary Sensor Profile (BSP) Specification.

The objective of this Test Suite is to provide a basis for interoperability for Bluetooth devices giving a high probability of air interface interoperability between different manufacturers’ Bluetooth devices.
2 References, definitions, and abbreviations

2.1 References

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

[1] Bluetooth Core Specification version 4.2 or later
[6] Characteristic and Descriptor descriptions are accessible via the Bluetooth SIG Assigned Numbers

2.2 Definitions

For the purpose of this Bluetooth document, the definitions from [1] and [2] apply.

2.3 Acronyms and abbreviations

For the purpose of this Bluetooth document, the definitions from [1] and [2] apply.
3 Test suite structure (TSS)

3.1 Overview

The Binary Sensor Profile (BSP) requires the presence of Binary Sensor Service (BSS) in the Sensor Role and ATT, GAP, SM, and GATT in both the Sensor and the Collector roles. This is illustrated in Figure 3.1.

![Figure 3.1: Binary Sensor Profile test model](image)

3.2 Test strategy

The test objectives are to verify functionality of the Binary Sensor Profile (BSP) within a Bluetooth Host and enable interoperability between Bluetooth Hosts on different devices. The testing approach is to cover mandatory and optional requirements in the specification and to match these to the support of the IUT as described in the ICS.

The test equipment shall provide an implementation of the Radio Controller and the parts of the Host needed to perform the test cases defined in the Binary Sensor Profile (BSP) Test Suite. 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, an MMI, or another interface supported by the IUT.

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

3.3 Test groups

The following test groups have been defined:

- Advertising data
  - Verify the advertising data of the Sensor.

- Service discovery
  - Verify the discovery of the service.
• Characteristic discovery
  Verify the discovery of characteristics.

• Characteristic descriptors
  Verify the discovery of characteristic descriptors.

• Configure indication
  Verify configuration of BSS Response characteristic for indications.

• Binary Sensor Service Control Point procedures and parameters
  This group verifies valid IUT behavior of the implemented Control Point procedures, parameters, and error handling.
4 Test cases (TC)

4.1 Introduction

4.1.1 Test case identification conventions

Test cases shall be assigned unique identifiers per the conventions in [2]. The general convention used here is `<spec abbreviation>/<IUT role>/<class>/<feat>/<func>/<subfunc>/<cap>/<xx><nn>-<y>`.

Additionally, testing of this specification includes a set of tests from the GATT test suite [5] referred to as Generic GATT Integrated Tests (GGIT); when used, the GGIT tests are referred through a TC-ID string using the following convention `<Spec abbreviation>/<IUT role>/<GGIT test group>/<GGIT class>/<xx><nn>-<y>`.

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

<table>
<thead>
<tr>
<th>Identifier Abbreviation</th>
<th>Spec Identifier &lt;spec abbreviation&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSP</td>
<td>Binary Sensor Profile</td>
</tr>
<tr>
<td>Identifier Abbreviation</td>
<td>Role Identifier &lt;IUT role&gt;</td>
</tr>
<tr>
<td>COL</td>
<td>Collector</td>
</tr>
<tr>
<td>SEN</td>
<td>Sensor</td>
</tr>
<tr>
<td>Identifier Abbreviation</td>
<td>Feature Identifier &lt;GGIT test group&gt;</td>
</tr>
<tr>
<td>CGGIT</td>
<td>Client Generic GATT Integrated Tests</td>
</tr>
<tr>
<td>Identifier Abbreviation</td>
<td>Feature Identifier &lt;GGIT class&gt;</td>
</tr>
<tr>
<td>CHA</td>
<td>Characteristic</td>
</tr>
<tr>
<td>DES</td>
<td>Descriptor</td>
</tr>
<tr>
<td>SER</td>
<td>Service</td>
</tr>
<tr>
<td>Identifier Abbreviation</td>
<td>Feature Identifier &lt;feat&gt;</td>
</tr>
<tr>
<td>AD</td>
<td>Advertising Data</td>
</tr>
<tr>
<td>CON</td>
<td>Configuration of Indication</td>
</tr>
<tr>
<td>CPP</td>
<td>Control Point Procedures</td>
</tr>
</tbody>
</table>

Table 4.1: BSP TC feature naming convention

4.1.2 Conformance

When conformance is claimed, all capabilities indicated as mandatory for this Specification shall be supported in the specified manner (process-mandatory). This also applies for all optional and conditional
capabilities for which support is indicated. All mandatory capabilities, and optional and conditional capabilities for which support is indicated, are subject to verification as part of the Bluetooth Qualification Program.

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

Such tests may verify:

- That claimed capabilities may be used in any order and any number of repetitions that is not excluded by the Specification, OR
- That capabilities enabled by the implementations are sustained over durations expected by the use case, OR
- That the implementation gracefully handles any quantity of data expected by the use case, OR
- 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, OR
- That the implementation is immune to attempted security exploits.

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

In any case, where a member finds an issue with the Test Plan Generator, 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 errata request such that the issue may be addressed.

4.1.3 Pass/Fail verdict conventions

Each test case has an Expected Outcome section, which outlines all the detailed pass criteria conditions that shall be met by the IUT to merit a Pass Verdict.

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 shall be the Fail Verdict.

4.2 Setup Preambles

The procedures defined in this section are provided for reference 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 Control Point and Response Configuration Preamble

Follow this procedure as preamble for the IUT to enable it to execute control procedures on the Binary Sensor(s) emulated on the Lower Tester.
1. The Lower Tester contains an instance of the Binary Sensor Service with the following sensors emulated concurrently:
   a. Opening and Closing Sensor with no support for Named Sensor
   b. Human Detection Sensor with support for Named Sensors
   c. Multiple Vibration Sensor with three sensor elements and support for Named Sensors
   Note: The Lower Tester may emulate only one of these sensors at the time if required by implementation restrictions, but that requires that the emulation is adapted to the sensor type required for every test case.

2. The Report Status of the Binary Sensor(s) emulated by the Lower Tester is set to Off.
   Note: This can be accomplished by disconnection.

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

4. If the Lower Tester and IUT require bonding, perform a bonding procedure. If previously bonded, reenable encryption.

5. The handles of the BSS Control Point and BSS Response Characteristic have been previously discovered by the IUT.
   Note: This can be accomplished using the test procedures in Section 4.4.1.

6. The handle of the Client Characteristic Configuration descriptor of the BSS Response characteristic has been previously discovered by the IUT.
   Note: This can be accomplished using the test procedures in Section 4.4.1.

7. The BSS Response characteristic is configured for indication.
   Note: This can be accomplished using the test procedure in Section 4.4.2.

4.3 **Sensor role requirements**

The tests in this test group verify implementation of the Sensor role requirements.

4.3.1 **BSP/SEN/AD/BV-01-I [Service UUID in advertising data]**

* Test Purpose
  Verify that Binary Sensor Service UUID is included in AD (advertising data) from the IUT.

* Reference
  [3] 3.1.1.1

* Initial Condition
  The IUT and Lower Tester do not have a connection.

* Test Procedure
  1. The Upper Tester instructs the IUT to enter a GAP discoverable mode.
  2. The Lower Tester listens for Advertising Packets from the IUT.

* Expected Outcome
  **Pass verdict**
  The Advertising Packets contain the define Service UUID for «Binary Sensor Service».
4.3.2   **BSP/SEN/AD/BV-02-I [Local Name in advertising data]**

- **Test Purpose**
  Verify that the Local Name is included in AD (advertising data) or Scan Response data from the IUT.

- **Reference**
  [3] 3.1.1.2

- **Initial Condition**
  The IUT and Lower Tester do not have a connection.

- **Test Procedure**
  1. The Upper Tester instructs the IUT to enter a GAP discoverable mode.
  2. In response to the Advertising packet from the IUT, the Lower Tester sends a Scan Request to the IUT.
  3. The Lower Tester listens for a Scan Response from the IUT.

- **Expected Outcome**
  Pass verdict
  The IUT includes the Local Name in either the Advertising packet or Scan Response packet, but not in both.

4.4   **Collector role requirements**

The tests in this test group verify implementation of the Collector role requirements.

4.4.1   **Generic GATT Integrated Tests**

This test group verifies basic compliance of Service, Characteristic, and Descriptor defined in [4] using the test procedures defined in the ANNEX to the GATT Test Suite [5] by means of the entries supplied in Table 4.2.
<table>
<thead>
<tr>
<th>TCID</th>
<th>Service/ Characteristic/ Descriptor</th>
<th>Reference</th>
<th>Properties</th>
<th>Value Length (Octets)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4.1.1</td>
<td>BSP/COL/CGGIT/SER/BV-01-I [Service GGIT – Binary Sensor]</td>
<td>Binary Sensor Service</td>
<td>[3] 4.2.1</td>
<td>-</td>
</tr>
<tr>
<td>4.4.1.2</td>
<td>BSP/COL/CGGIT/CHA/BV-01-I [Characteristic GGIT – BSS Control Point]</td>
<td>BSS Control Point Characteristic</td>
<td>[3] 4.3.1.1</td>
<td>0x08 (Write)</td>
</tr>
<tr>
<td>4.4.1.3</td>
<td>BSP/COL/CGGIT/CHA/BV-02-I [Characteristic GGIT – BSS Response]</td>
<td>BSS Response Characteristic</td>
<td>[3] 4.3.1.2</td>
<td>0x10 (Indication)</td>
</tr>
</tbody>
</table>

*Table 4.2: Input for the GGIT Client Test Procedure*

### 4.4.2 BSP/COL/CON/BV-01-I [BSS Response configure indication]

- **Test Purpose**
  
  Verify that the IUT can configure the BSS Response characteristic for indications.

- **Reference**
  
  [3] 4.4

- **Initial Condition**
  
  Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.

  The Lower Tester includes one instantiation of the Binary Sensor Service [4] including all defined characteristics and descriptors.

- **Test Procedure**
  
  1. The Upper Tester instructs the IUT to configure the BSS Response characteristic for indication.
  2. The Lower Tester verifies that the IUT writes the correct value to the Client Characteristic Configuration descriptor of the BSS Response characteristic.

- **Expected Outcome**
  
  **Pass verdict**

  The indication bit in the Client Characteristic Configuration descriptor sent by the IUT was set to 1.

### 4.4.3 BSS Control Point Procedures and Parameters

This test group contains test cases to verify the IUT’s ability to perform compliant operation and interpret values of the BSS Control Point characteristic or the handling of errors specific to the procedure or control point.
4.4.3.1 Get Sensor Status Command Procedure Single Sensor

• Test Purpose
This generic use test group contains several test cases to verify that the IUT can execute the Get Sensor Status Command procedure for a Single Sensor. The verification is performed for several values of the Sensor Status Parameter, as enumerated in the test cases in Table 4.3 below, using this generic test procedure.

• Reference

• Initial Condition
The preamble described in Section 4.2.2 has been executed.

• Test Procedure
1. The Upper Tester instructs the IUT to send a Get Sensor Status Command Message, with the Sensor Type Parameter set to Opening and Closing Sensor.
2. The Lower Tester receives the Get Sensor Status Command Message and verifies that it is correct and sends a Set Sensor Status Response Message to the IUT, using the Sensor Status values (state, count) from Table 4.3.
3. The IUT receives the Set Sensor Status Response Message and reports the Sensor Status (state and count) to the Upper Tester.
4. The Upper Tester verifies that the state and count are the same as sent by the Lower Tester.

• Expected Outcome
Pass verdict
The IUT successfully sends the Get Sensor Status Command Message with one Sensor Type Parameter, with the value set to Opening and Closing Sensor (0x00) and no other Parameters to the Lower Tester. The IUT successfully receives the Get Sensor Status Response Message and decodes the Sensor Status as required in Table 4.3.

<table>
<thead>
<tr>
<th>Test Case</th>
<th>Reference</th>
<th>Values (state, count)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4.3.1.1 BSP/COL/CPP/BV-01-I [GSSCP Single Sensor – Closed, count 0]</td>
<td>[4] 4.3.3.5</td>
<td>0, 0</td>
</tr>
<tr>
<td>4.4.3.1.2 BSP/COL/CPP/BV-02-I [GSSCP Single Sensor – Open, count 1000]</td>
<td>[4] 4.3.3.5</td>
<td>1, 1000</td>
</tr>
</tbody>
</table>

Table 4.3: Get Sensor Status Command Procedure Single Sensor test cases

4.4.3.2 Get Sensor Status Command Procedure Multiple Sensor

• Test Purpose
This generic use test group contains several test cases to verify that the IUT can execute the Get Sensor Status Command procedure for a Multiple Sensor. The verification is performed for several
values of the Multiple Sensor Status Parameter, as enumerated in the test cases in Table 4.4 below, using this generic test procedure.

- **Reference**
  

- **Initial Condition**
  
  The preamble described in Section 4.2.2 has been executed.

- **Test Procedure**

  1. The Upper Tester instructs the IUT to send a Get Sensor Status Command Message, with the Sensor Type Parameter set to Multiple Vibration Sensor.
  2. The Lower Tester receives the Get Sensor Status Command Message and verifies that it is correct and sends a Set Sensor Status Response Message to the IUT, using the Multiple Sensor Status values (state, count) from Table 4.4 for each of the four sensor elements.
  3. The IUT receives the Set Sensor Status Response Message and reports the Multiple Sensor Status (number of elements and state and count for each element) to the Upper Tester.
  4. The Upper Tester verifies that the states and counts are the same as sent by the Lower Tester.

- **Expected Outcome**

  Pass verdict

  The IUT successfully sends the Get Sensor Status Command Message with one Sensor Type Parameter, with the value set to Multiple Vibration Sensor (0x82) to the Lower Tester. The IUT successfully receives the Get Sensor Status Response Message and decodes the Multiple Sensor Status as required in Table 4.4 for three sensor elements.

<table>
<thead>
<tr>
<th>Test Case</th>
<th>Reference</th>
<th>Values (state, count)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4.3.2.1 BSP/COL/CPP/BV-03-I [GSSCP Multiple Sensor – Not Detected, count 0]</td>
<td>[3] 4.3.3.6</td>
<td>0, 0</td>
</tr>
<tr>
<td>4.4.3.2.2 BSP/COL/CPP/BV-04-I [GSSCP Multiple Sensor – Detected, count 1000]</td>
<td>[3] 4.3.3.6</td>
<td>1, 1000</td>
</tr>
</tbody>
</table>

*Table 4.4: Get Sensor Status Command Procedure Multiple Sensor test cases*

**4.4.3.3 BSP/COL/CPP/BV-05-I [Get Sensor Status Command Procedure All Sensor Types]**

- **Test Purpose**

  Verify that the IUT can send correctly all sensor types and correctly detect both Success (sensor type present in Lower Tester) and Failure (sensor type not present in Lower Tester).

- **Reference**


- **Initial Condition**

  The preamble described in Section 4.2.2 has been executed.
• **Test Procedure**

1. Repeat steps 2–4 for each of the six sensor types defined by the Binary Sensor Service specification (Table 4.11 in [4]).
2. Instructed by the Upper Tester, the IUT performs the Get Sensor Status Command Procedure for the current Sensor Type parameter.
3. The Lower Tester responds with a Get Sensor Response Message. The Lower Tester responds with Result Code set to Success for the sensor types emulated by the Lower Tester (see Section 4.2.2) and to Failure for all other sensor types.
4. The IUT reports the Success/Failure for all sensor types to the Upper Tester.

• **Expected Outcome**

**Pass verdict**

The IUT successfully sends one Sensor Status Command Message for each of the six sensor types defined by the Binary Sensor Service specification. The IUT correctly decodes the Result Code as Success (0) for the sensor types emulated by the Lower Tester (see Section 4.2.2) and Failure (1) for all other sensor types.

4.4.3.4 **BSP/COL/CPP/BV-06-I [Setting Sensor Command Procedure Single Sensor]**

• **Test Purpose**


• **Reference**


• **Initial Condition**

The preamble described in Section 4.2.2 has been executed.

• **Test Procedure**

1. The Upper Tester instructs the IUT to perform one Setting Sensor Command Procedure with Sensor Type set to Opening and Closing Sensor and Report Status Parameter set to On and no other Parameters.
2. The Lower Tester receives the Setting Sensor Command Message and verifies that the Report Status Parameter is set to On and responds with a Setting Sensor Response Message with Result Code set to Success and no other Parameters.
3. The Upper Tester instructs the IUT to perform one Setting Sensor Command Procedure with Sensor Type set to Opening and Closing Sensor and Report Status Parameter set to Off and no other Parameters.
4. The Lower Tester receives the Setting Sensor Command Message and verifies that the Report Status Parameter is set to Off and responds with a Setting Sensor Response Message with Result Code set to Success and no other Parameters.
• Expected Outcome
  Pass verdict

  The IUT successfully sends one Setting Sensor Command Message with Sensor Type set to Opening and Closing Sensor for both cases of Report Status Parameter set to On and Report Status Parameter set to Off to the Lower Tester.

4.4.3.5  BSP/COL/CPP/BV-07-I [Sensor Status Event Procedure Single Sensor]

• Test Purpose
  Verify that the IUT can perform Sensor Status Event Parameters for Single Sensor for Report Status On.

• Reference

• Initial Condition
  The preamble described in Section 4.2.2 has been executed.

• Test Procedure
  1. The Upper Tester instructs the IUT to perform one Setting Sensor Command Procedure with Sensor Type set to Opening and Closing Sensor and Report Status Parameter set to On and no other Parameters.
  2. The Lower Tester receives the Setting Sensor Command Message and verifies that the Report Status Parameter is set to On and responds with a Setting Sensor Response Message with Result Code set to Success and no other Parameters.
  3. The Lower Tester sends a Sensor Status Event Message with Sensor Status Parameter set to State = 1, Count = 2.
  4. The IUT receives the Sensor Status Event Message and reports to the Upper Tester the values for the Sensor Type Parameter and the State and Count decoded from the Sensor Status Parameter.

• Expected Outcome
  Pass verdict

  The IUT successfully receives the Sensor Status Event Message in step 4. The IUT correctly decodes the State and Count from the Sensor Status Parameter.

4.4.3.6  BSP/COL/CPP/BV-08-I [Setting Sensor Command Procedure Multiple Sensor]

• Test Purpose
  Verify that the IUT can execute the Setting Sensor Command Procedure for Multiple Sensor both for Report Status On and Report Status Off.

• Reference

• Initial Condition
  The preamble described in Section 4.2.2 has been executed.
• Test Procedure

1. The Upper Tester instructs the IUT to perform one Setting Sensor Command Procedure with Sensor Type set to Multiple Vibration Sensor and Report Status Parameter set to On and no other Parameters.
2. The Lower Tester receives the Setting Sensor Command Message and verifies that the Report Status Parameter is set to On and responds with a Setting Sensor Response Message with Result Code set to Success and optionally three Name Parameters.
3. The Upper Tester instructs the IUT to perform one Setting Sensor Command Procedure with Sensor Type set to Multiple Vibration Sensor and Report Status Parameter set to Off and no other Parameters.
4. The Lower Tester receives the Setting Sensor Command Message and verifies that the Report Status Parameter is set to Off and responds with a Setting Sensor Response Message with Result Code set to Success and optionally three Name Parameters.

• Expected Outcome

Pass verdict

The IUT successfully sends one Setting Sensor Command Message with Sensor Type set to Multiple Vibration Sensor for both cases of Report Status Parameter set to On and Report Status Parameter set to Off to the Lower Tester.

4.4.3.7 BSP/COL/CPP/BV-09-I [Sensor Status Event Procedure Multiple Sensor]

• Test Purpose

Verify that the IUT can execute Sensor Status Event Procedure for Multiple Sensor for Report Status On.

• Reference


• Initial Condition

The preamble described in Section 4.2.2 has been executed.

• Test Procedure

1. The Upper Tester instructs the IUT to perform one Setting Sensor Command Procedure with Sensor Type set to Multiple Vibration Sensor and Report Status Parameter set to On and no other Parameters.
2. The Lower Tester receives the Setting Sensor Command Message and verifies that the Report Status Parameter is set to On and responds with a Setting Sensor Response Message with Result Code set to Success.
3. The Lower Tester sends a Sensor Status Event Message with Multiple Sensor Status Parameter set to State = 1, Count = 2 for all sensor elements in the sensor.
4. The IUT receives the Sensor Status Event Message and reports to the Upper Tester the values for the Sensor Type Parameter and the States and Counts decoded from the Multiple Sensor Status Parameter.
• Expected Outcome

Pass verdict

The IUT successfully receives the Sensor Status Event Message in step 4. The IUT correctly decodes the State and Count from the Multiple Sensor Status Parameter for all three sensor elements.

4.4.3.8 BSP/COL/CPP/BV-10-I [Sensor Status Event Procedure Cancel]

• Test Purpose

Verify that the IUT can handle a Sensor Status Event procedure where the response includes the Cancel parameter.

• Reference


• Initial Condition

The preamble described in Section 4.2.2 has been executed.

• Test Procedure

1. The Upper Tester instructs the IUT to perform one Setting Sensor Command Procedure with Sensor Type set to Multiple Vibration Sensor and Report Status Parameter set to On and no other Parameters.
2. The Lower Tester receives the Setting Sensor Command Message and verifies that the Report Status Parameter is set to On and responds with a Setting Sensor Response Message with Result Code set to Success.
3. The Lower Tester sends a Sensor Status Event with one Cancel parameter with the value set to Cancel (0) and no other Parameters.
4. The IUT receives the Sensor Status Event Message and reports to the Upper Tester the value of the Cancel Parameter.

• Expected Outcome

Pass verdict

The IUT successfully receives the Sensor Status Event Message and decodes the value of the Cancel Parameter as Cancel (0).

4.4.3.9 BSP/COL/CPP/BV-11-I [Setting Sensor Command Procedure with Name Parameter Single Sensor]

• Test Purpose

Verify that the IUT can execute the Setting Sensor Command Procedure with Name Parameter for Single Sensor.

• Reference

• Initial Condition
The preamble described in Section 4.2.2 has been executed.

• Test Procedure
1. The Upper Tester instructs the IUT to perform one Setting Sensor Command Procedure with Sensor Type set to Human Detection Sensor and Report Status Parameter set to Off and Name Parameter set to “A very long sensor name” and no other Parameters.
2. The Lower Tester receives the Setting Sensor Command Message and verifies that it contains a Report Status Parameter and a Name Parameter and no other Parameters.
3. The Lower Tester responds with a Setting Sensor Response Message with Result Code Parameter set to Success and Name Parameter set to the same value as received in the command.
4. The IUT receives the Setting Sensor Response Message and reports to the Upper Tester the values of the Name Parameter received.
5. The Upper Tester verifies the value of the Name Parameters reported by the IUT.

• Expected Outcome
Pass verdict

The IUT successfully sends a Setting Sensor Command Message with one Name Parameter with the value set to “A very long sensor name”. The IUT successfully receives the Setting Sensor Response Message and decodes “A very long sensor name” as the value of the Name Parameter.

4.4.3.10 BSP/COL/CPP/BI-01-I [Setting Sensor Command Procedure – Single Sensor Illegal Packet Sequence]

• Test Purpose
Verify that the IUT can reassemble packets correctly and ignore illegal packet sequences.

• Reference
[3] 5.1.2

• Initial Condition
The preamble described in Section 4.2.2 has been executed.

• Test Procedure
1. The Upper Tester instructs the IUT to perform one Setting Sensor Command Procedure with Sensor Type set to Human Detection Sensor and Report Status Parameter set to Off and Name Parameter set to “A very long sensor name” and no other Parameters.
2. The Lower Tester receives the Setting Sensor Command Message.
3. The Lower Tester responds with TWO Setting Sensor Response Messages with Result Code Parameter set to Success. In the first message, the sequence numbers are set to 0 and 2 (instead of 0 and 1) and the Name Parameter is set to “XXXXXXXXXXXXXXXXXXXXXXXXX”. In the second message, the sequence numbers are correct, and the Name Parameter is set to the same value as received in the command.
4. The IUT receives the Setting Sensor Response Message and reports to the Upper Tester the values of the Name Parameter received.
5. The Upper Tester verifies the value of the Name Parameters reported by the IUT.
• Expected Outcome

Pass verdict

The IUT successfully sends a Setting Sensor Command Message with one Name Parameter with the value set to “A very long sensor name”. The IUT successfully receives the Setting Sensor Response Message and decodes “A very long sensor name” as the value of the Name Parameter.

4.4.3.11 BSP/COL/CPP/BV-12-I [Setting Sensor Command Procedure with Name Parameter Multiple Sensor]

• Test Purpose

Verify that the IUT can execute the Setting Sensor Command Procedure with Name Parameters for Multiple Sensor.

• Reference


• Initial Condition

The preamble described in Section 4.2.2 has been executed.

• Test Procedure

1. The Upper Tester instructs the IUT to perform one Setting Sensor Command Procedure with Sensor Type set to Multiple Vibration and Report Status Parameter set to Off and Name Parameters set to “Sensor no 1”, “Sensor no 2”, and “Sensor no 3”.
2. The Lower Tester receives the Setting Sensor Command Message and verifies that it contains a Report Status Parameter and one Name Parameter for each sensor element and no other Parameters.
3. The Lower Tester verifies the Name Parameters and responds with a Setting Sensor Response Message with Result Code Parameter set to Success and Name Parameters set to the same value as received in the command.
4. The IUT receives the Setting Sensor Response Message and reports to the Upper Tester the value of the Name Parameters received.
5. The Upper Tester verifies the value of the Name Parameters reported by the IUT.

• Expected Outcome

Pass verdict

The IUT successfully sends one Setting Sensor Command Message with three Name Parameters with the values set to “Sensor no 1”, “Sensor no 2”, and “Sensor no 3”. The IUT successfully receives the Setting Sensor Response Message and decodes “Sensor no 1”, “Sensor no 2”, and “Sensor no 3” as the values of the Name Parameters.

4.4.3.12 BSP/COL/CPP/BI-02-I [Setting Sensor Command Procedure – Multiple Sensor Illegal Packet Sequence]

• Test Purpose

Verify that the IUT can reassemble packets correctly and ignore illegal packet sequences.
• Reference

[3] 5.1.2

• Initial Condition

The preamble described in Section 4.2.2 has been executed.

• Test Procedure

1. The Upper Tester instructs the IUT to perform one Setting Sensor Command Procedure with Sensor Type set to Multiple Vibration and Report Status Parameter set to Off and Name Parameters set to “Sensor no 1”, “Sensor no 2”, and “Sensor no 3”.
2. The Lower Tester receives the Setting Sensor Command Message.
3. The Lower Tester responds with TWO Setting Sensor Response Messages with Result Code Parameter set to Success. In the first message, the sequence numbers are set to 0, 2, and 3 (instead of 0, 1, and 2) and Name Parameters are set to “XXXXXXXXXXX”, “YYYYYYYYYY” and “ZZZZZZZZZZZ”. In the second message, the sequence numbers are correct, and the Name Parameters are set to the same value as received in the command.
4. The IUT receives the Setting Sensor Response Message and reports to the Upper Tester the value of the Name Parameters received.
5. The Upper Tester verifies the value of the Name Parameters reported by the IUT.

• Expected Outcome

Pass verdict

The IUT successfully sends one Setting Sensor Command Message with three Name Parameters with the values set to “Sensor no 1”, “Sensor no 2”, and “Sensor no 3”. The IUT successfully receives the Setting Sensor Response Message and decodes “Sensor no 1”, “Sensor no 2”, and “Sensor no 3” as the values of the Name Parameters.

4.4.3.13 BSP/COL/CPP/BV-13-I [Setting Sensor Command Procedure Error]

• Test Purpose

Verify that the IUT can handle a Setting Sensor Command Procedure response with Result Code Failure.

• Reference


• Initial Condition

The preamble described in Section 4.2.2 has been executed.

• Test Procedure

1. The Upper Tester instructs the IUT to send a Setting Sensor Command Message with the Sensor Type Parameter set to Multiple Opening and Closing Sensor and the Report Status Parameter set to Off.
2. The Lower Tester receives the Setting Sensor Command Message and responds with a Setting Sensor Response Message with the Result Code Parameter set to Failure (1) and no other parameters.
3. The IUT receives the Setting Sensor Response Message and reports the value of the received Result Code to the Upper Tester.

4. The Upper Tester verifies the value of the Result Code Parameter reported by the IUT.

- Expected Outcome
  
  Pass verdict

  The IUT successfully receives the Setting Sensor Response Message and decodes the Result Code Parameter reported as Failure (1).
5 Test Case Mapping

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

The columns for the TCMT are defined as follows:

**Item:** Contains a logical expression based on specific entries from the associated ICS document. Contains a logical expression (using the operators AND, OR, NOT as needed) based on specific entries from the applicable ICS document(s). The entries are in the form of y/x references, where y corresponds to the table number and x corresponds to the feature number as defined in the ICS document for Binary Sensor Profile (BSP) [4].

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

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

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Feature</th>
<th>Test Case(s)</th>
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<tbody>
<tr>
<td>BSP 3/2</td>
<td>Service UUID in advertising</td>
<td>BSP/SEN/AD/BV-01-I</td>
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<tr>
<td>BSP 3/3</td>
<td>Local Name in advertising</td>
<td>BSP/SEN/AD/BV-02-I</td>
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<tr>
<td>BSP 6/1</td>
<td>Service discovery</td>
<td>BSP/COL/CGGIT/SER/BV-01-I</td>
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<td>BSP 6/2</td>
<td>BSS Control Point characteristic discovery</td>
<td>BSP/COL/CGGIT/CHA/BV-01-I</td>
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<tr>
<td>BSP 6/3</td>
<td>BSS Response characteristic discovery</td>
<td>BSP/COL/CGGIT/CHA/BV-02-I</td>
</tr>
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<td>BSP 6/4</td>
<td>BSS Response characteristic descriptor discovery</td>
<td>BSP/COL/CGGIT/DES/BV-01-I</td>
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<td>BSP 6/5</td>
<td>Configure indications for BSS Response</td>
<td>BSP/COL/CON/BV-01-I</td>
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<td>BSP 7/1</td>
<td>Get Sensor Status Command Procedure</td>
<td>BSP/COL/CPP/BV-01-I</td>
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<td></td>
<td>BSP/COL/CPP/BV-02-I</td>
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*Table 5.1: Test case mapping*
# Revision History and Contributors

## Revision History

<table>
<thead>
<tr>
<th>Revision Number</th>
<th>Date</th>
<th>Comments</th>
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<tbody>
<tr>
<td>D0.7.0r01</td>
<td>2018-10-22</td>
<td>First draft, including only CP procedures</td>
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<tr>
<td>D0.7.0r02</td>
<td>2018-10-24</td>
<td>Added procedures for GATT and TCMT</td>
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<tr>
<td>D0.7.0r03</td>
<td>2018-10-25</td>
<td>WG comments resolved on the call</td>
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<tr>
<td>D0.7.0r04</td>
<td>2018-12-02</td>
<td>Resolved additional comments from BTI</td>
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<tr>
<td>D0.9.0r02</td>
<td>2018-12-20</td>
<td>Based on approved 0.7 with some minor changes after BARB review of the IOP test plan.</td>
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<tr>
<td>D0.9.0r03</td>
<td>2019-01-24</td>
<td>WG approved BTI edits with some additional editorial changes and insertion of GGIT for GATT testing</td>
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<tr>
<td>D0.9.0r04</td>
<td>2019-02-04</td>
<td>Further edits in BTI comment resolution phase.</td>
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<tr>
<td>D1.0.0r01</td>
<td>2019-02-26</td>
<td>Established D1.0 and added BI test cases for sequence number</td>
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<tr>
<td>D1.0.0r02</td>
<td>2019-05-01</td>
<td>Responded to BTI comments</td>
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<tr>
<td>D1.0.0r03</td>
<td>2019-05-09</td>
<td>Fixed erroneously named GGIT test cases in 4.4.1</td>
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<td>D1.0.0r04</td>
<td>2019-05-21</td>
<td>Additional edits in BTI review accepted.</td>
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<tr>
<td>D1.0.0r04</td>
<td>2019-06-05</td>
<td>Approved by BTI.</td>
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<tr>
<td>1.0.0</td>
<td>2019-07-02</td>
<td>Binary Sensor Profile adopted by the Board of Directors. Prepared for publication.</td>
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## Contributors

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
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<tbody>
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<td>Frank Berntsen</td>
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<td>NTT Docomo</td>
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