Pulse Oximeter Service (PLXS)

Bluetooth® **Test Suite**

- ▪ **Revision:** PLXS.TS.p4
- ▪ **Revision Date:** 2022-01-25
- ▪ **Group Prepared By:** Medical Devices Working Group

Contents

1   Scope

This Bluetooth document contains the Test Suite Structure (TSS) and test cases to test the implementation of the Bluetooth Pulse Oximeter Service Specification with the objective to provide a high probability of air interface interoperability between the tested implementation and other manufacturers' Bluetooth devices.

2   References, definitions, and abbreviations

2.1   References

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

[1]   Test Strategy and Terminology Overview

[2]   Bluetooth Core Specification, Version 4.0 or later

[3]   Pulse Oximeter Profile Specification, Version 1.0

[4]   ICS Proforma for Pulse Oximeter Service

[5]   GATT Test Suite, GATT.TS

[6]   Pulse Oximeter Service Specification, Version 1.0

[7]   Characteristic and Descriptor descriptions are accessible via the Bluetooth SIG Assigned Numbers

[8]   Pulse Oximeter Service Specification, Version 1.0.1

2.2   Definitions

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

2.3   Acronyms and abbreviations

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

Additionally:

Acronyms and abbreviations	Definition
PLX	Pulse Oximeter
RACP	Record Access Control Point

Table 2.1: Acronyms and abbreviations

3   Test Suite Structure (TSS)

3.1   Overview

The Pulse Oximeter Monitoring Service requires the presence of GAP, SM/SDP, and GATT. This is illustrated in Figure 3.1.

```
┌─────────────────────────────────┐
│                                 │
│         Pulse Oximeter          │
│            Service              │
│                                 │
├─────────────────────────────────┤
│                                 │
│             GATT                │
│                                 │
├──────┬──────┬──────┬────────────┤
│      │      │      │            │
│ ATT  │ GAP  │  SM  │   SDP      │
│      │      │ (LE) │  (BR/EDR)  │
├──────┴──────┴──────┴────────────┤
│                                 │
│            L2CAP                │
│                                 │
├─────────────────────────────────┤
│                                 │
│          Controller             │
│                                 │
└─────────────────────────────────┘
```
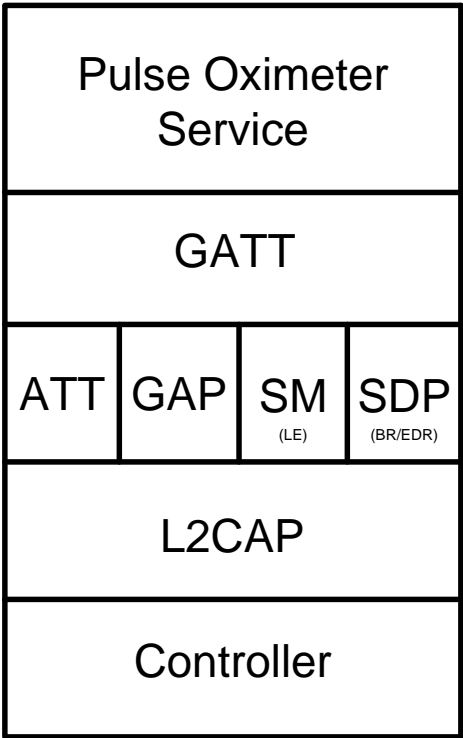
Figure 3.1: Pulse Oximeter Service test model

3.2   Test strategy

The test objectives are to verify functionality of the Pulse Oximeter Service 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. 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.

3.3   Test groups

The following test groups have been defined:

- Generic GATT Integrated Tests

- Characteristic read

- Configure indication and notification

- PLX Spot-check Measurement indication

- PLX Continuous Measurement notification

- Record Access Control Point (RACP) procedures

4 Test cases (TC)

4.1 Introduction

4.1.1 Test case identification conventions

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

Additionally, testing of this specification includes tests from the GATT Test Suite [5] referred to as Generic GATT Integrated Tests (GGIT); when used, the GGIT tests 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>
PLXS	Pulse Oximeter Service
Identifier Abbreviation	**Role Identifier <IUT role>**
SEN	Sensor Role
Identifier Abbreviation	**Reference Identifier <GGIT test group>**
SGGIT	Server Generic GATT Integrated Tests
Identifier Abbreviation	**Reference Identifier <GGIT class>**
CHA	Characteristic
ISFC	Indication Supported Features Characteristic
SDP	Validate SDP Record
SER	Service
Identifier Abbreviation	**Feature and Behaviors Identifier <feat>**
CI	Characteristic Indication
CN	Characteristic Notification
CON	Configure Indication and Notification
CR	Characteristic Read
CW	Characteristic Write
RAA	RACP – Abort Procedure
RAD	RACP – Delete Procedure
RAE	RACP – Specific Errors
RAN	RACP – Number Procedure
RAR	RACP – Report Procedure

Table 4.1: PLXS TC feature naming convention

4.1.2 Conformance

When conformance is claimed for a particular specification, all capabilities are to be supported in the specified manner (process-mandatory). 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 that is 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 Launch Studio, 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. The IUT is granted the Pass verdict when all the detailed pass criteria conditions within the Expected Outcome section are met.

The convention in this test suite is that, unless there is a specific set of fail conditions outlined in the test case, the IUT fails the test case as soon as one of the pass criteria conditions cannot be met. If this occurs, the outcome of the test is a Fail verdict.

4.2 Setup preambles

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

4.2.1 ATT Bearer on LE transport

- Preamble Procedure

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

4.2.2 ATT Bearer on BR/EDR transport

- Preamble Procedure

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

4.2.3 RACP

- Preamble Purpose

  This preamble procedure enables the IUT for use with RACP.

- Preamble Procedure

  1. If a connection exists, it shall be disconnected.
  2. Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.
  3. The handle of the PLX Spot-check Measurement characteristic and RACP characteristic has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.
  4. The handle of the Client Characteristic Configuration descriptor of the PLX Spot-check Measurement characteristic and RACP characteristic has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.
  5. If the Lower Tester and IUT were not previously bonded, perform a bonding procedure. If previously bonded, re-enable encryption.
  6. The PLX Spot-check Measurement characteristic is configured for indications.
  7. The RACP characteristic is configured for indications.

4.3   Generic GATT Integrated Tests

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

TCID	Service / Characteristic	Reference	Properties	Value Length (Octets)	Type
PLXS/SEN/SGGIT/SER/BV-01-C [Service GGIT – Pulse Oximeter]	Pulse Oximeter Service	[6] 2	-	-	Not defined
PLXS/SEN/SGGIT/SDP/BV-02-C [SDP Record – Pulse Oximeter]	Pulse Oximeter Service	[6] 4	-	-	-
PLXS/SEN/SGGIT/CHA/BV-03-C [Characteristic GGIT – PLX Spot-check Measurement]	PLX Spot-check Measurement characteristic	[6] 3.1	0x20 (Indicate)	Skip	-
PLXS/SEN/SGGIT/CHA/BV-04-C [Characteristic GGIT – PLX Continuous Measurement]	PLX Continuous Measurement characteristic	[6] 3.2	0x10 (Notify)	Skip	-
PLXS/SEN/SGGIT/CHA/BV-05-C [Characteristic GGIT – PLX Features]	PLX Features characteristic	[6] 3, 3.3	0x02 (Read)	Skip	-
PLXS/SEN/SGGIT/CHA/BV-06-C [Characteristic GGIT – Record Access Control Point]	Record Access Control Point characteristic	[6] 3.4	0x28 (Write, Indicate)	Skip	-
PLXS/SEN/SGGIT/CHA/BV-07-C [Characteristic GGIT – PLX Features – Indicate]	PLX Features characteristic	[8] 3, 3.3	0x22 (Read, Indicate)	Skip	-

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 6.3, Server test procedures (SGGIT), in [5] using Table 4.3 below as input:

TCID	Characteristic	Reference	TC Configuration
PLXS/SEN/SGGIT/ISFC/BV-08-C [Characteristic GGIT – PLX Features indication]	PLX Features	[8] 3.3.1	N/A

Table 4.3: GGIT Indication Supported Features Characteristic tests

4.4 Characteristic read

- Test Purpose

  This test group is for generic use and contains one or more test cases to read and verify that the characteristic values required by the service are compliant.

- Reference

  [6] 3.3

- Initial Condition

  - The handle of each characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

- Test Case Configuration

Test Case	Value (Requirements)
PLXS/SEN/CR/BV-01-C [Characteristic Read – 'PLX Features']	2, 4, 5, or 7 octets received with RFU bits set to 0. (Section 3.3 in [6])
PLXS/SEN/CR/BV-02-C [Characteristic Read – 'PLX Features – Measurement Status Support Field']	2 octets received in the correct position in the characteristic (after Supported Features field and before Device and Sensor Status Support field, if present) with RFU bits set to 0 (Section 3.3 in [6])
PLXS/SEN/CR/BV-03-C [Characteristic Read – 'PLX Features – Device and Sensor Status Support Field']	3 octets received in the correct position (after Supported Features field and after Measurement Status Support field, if present) in the characteristic with RFU bits set to 0 (Section 3.3 in [6])

Table 4.4: Characteristic Read Value test cases

- Test Procedure

  The following test procedure applies to the test cases listed in Table 4.4:

  1. The Lower Tester sends an *ATT_Read_Request* to the IUT to read the characteristic value.
  2. The IUT sends and *ATT_Read_Response* to the Lower Tester.
  3. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  The following pass verdicts apply to the test cases listed in Table 4.4:

  Pass verdict

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

4.5   Configure indication and notification

• Test Purpose

This test group is for generic use and contains one or more test cases to verify compliant operation in response to enable and disable characteristic indication or notification.

• Reference

[6] 3

• Initial Condition

- The handle of each characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

- The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

- Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

• Test Case Configuration

Test Case	Value (Requirements)
PLXS/SEN/CON/BV-01-C [Configure Indication – 'PLX Spot-check Measurement']	**0x0002** (Section 3 in [6])
PLXS/SEN/CON/BV-02-C [Configure Indication – 'RACP']	**0x0002** (Section 3 in [6])
PLXS/SEN/CON/BV-03-C [Configure Notification – 'PLX Continuous Measurement']	**0x0001** (Section 3 in [6])

Table 4.5: Configure Indication and Notification test cases

• Test Procedure

The following test procedure applies to the test cases listed in Table 4.5:

1. Disable indication or notification by writing value 0x0000 to the client characteristic configuration descriptor of the characteristic.
2. The Lower Tester reads the value of the client characteristic configuration descriptor.
3. If the test case is for notification, enable notification by writing value 0x0001 to the client characteristic configuration descriptor of the characteristic.
4. Otherwise, if the test case is for indication, enable indication by writing value 0x0002 to the client characteristic configuration descriptor of the characteristic.
5. The Lower Tester reads the value of the client characteristic configuration descriptor.

• Expected Outcome

Pass verdict

The characteristic descriptor is successfully written and the value returned when read is consistent with the value written.

4.6   PLX Spot-check Measurement indication

This test group contains test cases to verify compliant operation when the IUT sends indications of characteristic values.

PLXS/SEN/CI/BV-01-C [PLX Spot-check Measurement Indication]

- Test Purpose

  Verify that the IUT can send an indication of the Spot-check Measurement characteristic that includes the mandatory fields (i.e., the Flags field and the SpO2PR-Spot-Check field).

- Reference

  [6] 3.1

- Initial Condition

  - The handle of the PLX Spot-check Measurement characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The client characteristic configuration descriptor for the IUT has been configured for indications.

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

- Test Procedure

  1. Verify that a connection between the Lower Tester and IUT is established.
  2. Perform an action on the IUT to create at least one PLX Spot-check Measurement characteristic with mandatory field values as defined in [6].
  3. Verify that the Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the characteristic handle and value.
  4. Verify that the Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  <u>Pass verdict</u>

  The IUT sends one and only one indication of the PLX Spot-check Measurement characteristic.

  A Flags field and a SpO2PR-Spot-Check field are present in the record.

  The value of the characteristic meets the requirements of the service.

PLXS/SEN/CI/BV-02-C [PLX Spot-check Measurement Indication – Timestamp]

- Test Purpose

  Verify that the IUT can send indications of the PLX Spot-check Measurement characteristic that include Time Stamp values.

- Reference

  [6] 3.11

- Initial Condition

  - The handle of the PLX Spot-check Measurement characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The client characteristic configuration descriptor for the IUT has been configured for indications.

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

- Test Procedure

  1. Verify that a connection between the Lower Tester and IUT is established.
  2. Perform an action on the IUT to create at least one PLX Spot-check Measurement characteristic that include the Timestamp field.
  3. Verify that the Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the characteristic handle and value.
  4. Verify that the Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends one or more indications of the PLX Spot-check measurement characteristic that includes the Timestamp value.

  The value of the characteristic meets the requirements of the service.

PLXS/SEN/CI/BV-03-C [PLX Spot-check Measurement Indication – Measurement Status]

- Test Purpose

  Verify that the IUT can send indications of the PLX Spot-check Measurement characteristic that include Measurement Status values.

- Reference

  [6] 3.1

- Initial Condition

  - The handle of the PLX Spot-check Measurement characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The client characteristic configuration descriptor for the IUT has been configured for indications.

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

- Test Procedure

  1. Verify that a connection between the Lower Tester and IUT is established.
  2. Perform an action on the IUT to create at least one PLX Spot-check Measurement characteristic that include the Measurement Status field.
  3. Verify that the Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the characteristic handle and value.
  4. Verify that the Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends one or more indications of the PLX Spot-check measurement characteristic that includes the Measurement Status value.

  The value of the characteristic meets the requirements of the service.

PLXS/SEN/CI/BV-04-C [PLX Spot-check Measurement Indication – Device and Sensor Status]

- Test Purpose

  Verify that the IUT can send indications of the PLX Spot-check Measurement characteristic that include Device and Sensor Status values.

- Reference

  [6] 3.1

- Initial Condition

  - The handle of the PLX Spot-check Measurement characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The client characteristic configuration descriptor for the IUT has been configured for indications.

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

- Test Procedure

  1. Verify that a connection between the Lower Tester and IUT is established.
  2. Perform an action on the IUT to create at least one PLX Spot-check Measurement characteristic that include the Device and Sensor Status field.
  3. Verify that the Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the characteristic handle and value.
  4. Verify that the Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

Pass verdict

The IUT sends one or more indications of the PLX Spot-check measurement characteristic that includes the Device and Sensor Status value.

The value of the characteristic meets the requirements of the service.

PLXS/SEN/CI/BV-05-C [PLX Spot-check Measurement Indication – Pulse Amplitude Index]

- Test Purpose

Verify that the IUT can send indications of the PLX Spot-check Measurement characteristic that include Pulse Amplitude Index values.

- Reference

[6] 3.1

- Initial Condition

  - The handle of the PLX Spot-check Measurement characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The client characteristic configuration descriptor for the IUT has been configured for indications.

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

- Test Procedure

  1. Verify that a connection between the Lower Tester and IUT is established.
  2. Perform an action on the IUT to create at least one PLX Spot-check Measurement characteristic that include the Pulse Amplitude Index field.
  3. Verify that the Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the characteristic handle and value.
  4. Verify that the Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

Pass verdict

The IUT sends one or more indications of the PLX Spot-check measurement characteristic that includes the Pulse Amplitude Index value.

The value of the characteristic meets the requirements of the service.

4.7   PLX Continuous Measurement notification

This test group contains test cases to verify compliant operation when the IUT sends notifications of characteristic values.

PLXS/SEN/CN/BV-01-C [PLX Continuous Measurement Notification]

- Test Purpose

  Verify that the IUT can send an indication of the Continuous Measurement characteristic that includes the mandatory fields (i.e., the Flags field and the SpO2PR-Normal field).

- Reference

  [6] 3.2

- Initial Condition

  - The handle of the PLX Continuous Measurement characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The client characteristic configuration descriptor for the IUT has been configured for notifications.

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

- Test Procedure

  1. Verify that a connection between the Lower Tester and IUT is established.
  2. Perform an action on the IUT to create at least one PLX Continuous Measurement characteristic with mandatory field values as defined in [6].
  3. Verify that the Lower Tester receives an *ATT_Handle_Value_Notification* from the IUT containing the characteristic handle and value.
  4. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends at least one notification of the PLX Continuous Measurement characteristic.

  A Flags field and a SpO2PR-Normal field are present in the record.

  The value of the characteristic meets the requirements of the service.

PLXS/SEN/CN/BV-02-C [PLX Continuous Measurement Notification – SpO2PR-Fast]

- Test Purpose

  Verify that the IUT can send notifications of the PLX Continuous Measurement characteristic that include SpO2PR-Fast values.

- Reference

  [6] 3.2

- Initial Condition

  - The handle of the PLX Continuous Measurement characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The client characteristic configuration descriptor for the IUT has been configured for notifications.

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

- Test Procedure

  1. Verify that a connection between the Lower Tester and IUT is established.
  2. Perform an action on the IUT to create at least one PLX Continuous Measurement characteristic that includes the SpO2PR-Fast field [6].
  3. Verify that the Lower Tester receives an *ATT_Handle_Value_Notification* from the IUT containing the characteristic handle and value.
  4. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  <u>Pass verdict</u>

  The IUT sends at least one notification of the PLX Continuous Measurement characteristic that includes the SpO2PR-Fast field.

  The value of the characteristic meets the requirements of the service.

PLXS/SEN/CN/BV-03-C [PLX Continuous Measurement Notification – SpO2PR-Slow]

- Test Purpose

  Verify that the IUT can send notifications of the PLX Continuous Measurement characteristic that include SpO2PR-Slow values.

- Reference

  [6] 3.2

- Initial Condition

  - The handle of the PLX Continuous Measurement characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The client characteristic configuration descriptor for the IUT has been configured for notifications.

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

- Test Procedure

    1. Verify that a connection between the Lower Tester and IUT is established.
    2. Perform an action on the IUT to create at least one PLX Continuous Measurement characteristic that includes the SpO2PR-Slow field [6].
    3. Verify that the Lower Tester receives an *ATT_Handle_Value_Notification* from the IUT containing the characteristic handle and value.
    4. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

    Pass verdict

    The IUT sends at least one notification of the PLX Continuous Measurement characteristic that includes the SpO2PR-Slow field.

    The value of the characteristic meets the requirements of the service.

PLXS/SEN/CN/BV-04-C [PLX Continuous Measurement Notification – Measurement Status]

- Test Purpose

    Verify that the IUT can send notifications of the PLX Continuous Measurement characteristic that include Measurement Status values.

- Reference

    [6] 3.2

- Initial Condition

    - The handle of the PLX Continuous Measurement characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

    - The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

    - The client characteristic configuration descriptor for the IUT has been configured for notifications.

    - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

- Test Procedure

    1. Verify that a connection between the Lower Tester and IUT is established.
    2. Perform an action on the IUT to create at least one PLX Continuous Measurement characteristic that includes the Measurement Status field [6].
    3. Verify that the Lower Tester receives an *ATT_Handle_Value_Notification* from the IUT containing the characteristic handle and value.
    4. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

Pass verdict

The IUT sends at least one notification of the PLX Continuous Measurement characteristic that includes the Measurement Status field.

The value of the characteristic meets the requirements of the service.

PLXS/SEN/CN/BV-05-C [PLX Continuous Measurement Notification – Device and Sensor Status]

- Test Purpose

Verify that the IUT can send notifications of the PLX Continuous Measurement characteristic that include Device and Sensor Status values.

- Reference

[6] 3.2

- Initial Condition

  - The handle of the PLX Continuous Measurement characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The client characteristic configuration descriptor for the IUT has been configured for notifications.

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

- Test Procedure

  1. Verify that a connection between the Lower Tester and IUT is established.
  2. Perform an action on the IUT to create at least one PLX Continuous Measurement characteristic that includes the Device and Sensor Status field [6].
  3. Verify that the Lower Tester receives an *ATT_Handle_Value_Notification* from the IUT containing the characteristic handle and value.
  4. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

Pass verdict

The IUT sends at least one notification of the PLX Continuous Measurement characteristic that includes the Device and Sensor Status field.

The value of the characteristic meets the requirements of the service.

PLXS/SEN/CN/BV-06-C [PLX Continuous Measurement Notification – Pulse Amplitude Index]

- Test Purpose

  Verify that the IUT can send notifications of the PLX Continuous Measurement characteristic that include Pulse Amplitude Index values.

- Reference

  [6] 3.2

- Initial Condition

  - The handle of the PLX Continuous Measurement characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.

  - The client characteristic configuration descriptor for the IUT has been configured for notifications.

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.

- Test Procedure

  1. Verify that a connection between the Lower Tester and IUT is established.
  2. Perform an action on the IUT to create at least one PLX Continuous Measurement characteristic that includes the Pulse Amplitude Index field [6].
  3. Verify that the Lower Tester receives an *ATT_Handle_Value_Notification* from the IUT containing the characteristic handle and value.
  4. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends at least one notification of the PLX Continuous Measurement characteristic that includes the Pulse Amplitude Index field.

  The value of the characteristic meets the requirements of the service.

4.8   RACP Indications

4.8.1 Report Number of Stored Records

This test group contains test cases to verify compliant operation when the Lower Tester uses the RACP 'Report Number of Stored Records' procedure.

PLXS/SEN/RAN/BV-01-C [Report Number of Stored Records – 'All records']

- Test Purpose

  Verify that the IUT can perform the 'Report Number of Stored Records' procedure with an Operator of 'All records'.

- Reference

  [6] 3.4.7

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

  1. Perform an action on the IUT that will induce it to generate a defined number of patient records.
  2. Verify that a connection between the Lower Tester and IUT is established.
  3. The Lower Tester writes the 'Report number of stored records' Op Code (0x04) to the RACP using an Operator of 'All records' (0x01) and no Operand.
  4. The IUT sends an indication of the RACP characteristic with the 'Report Number of Stored Records Response' Op Code (0x05) an Operator of Null (0x00) and an Operand representing the number of records a generated in Step 1.
  5. The Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the RACP characteristic handle and value.
  6. The Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.
  7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  For the 'Success' case, the IUT sends one indication of the RACP characteristic with the 'Number of Stored Records Response' Op Code (0x05) an Operator of Null (0x00) and an Operand representing the number of records a generated in Step 1.

  The value of the Operand represents the correct number of all records in the IUT.

4.8.2   Delete Stored Records

This test group contains test cases to verify compliant operation when the Lower Tester uses the RACP 'Delete Stored Records' procedure.

PLXS/SEN/RAD/BV-01-C [Delete Stored Records – 'All records']

- Test Purpose

  Verify that the IUT can perform the 'Delete Stored Records' procedure with an Operator of 'All records'.

- Reference

  [6] 3.4.5

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

  1. Verify that a connection between the Lower Tester and IUT is established.
  2. Perform a 'Report Number of Stored Records' (PLXS/SEN/RAN/BV-01-C [Report Number of Stored Records – 'All records']) procedure.
  3. The Lower Tester writes the 'Delete stored records' Op Code (0x02) to the RACP using an Operator of 'All records' (0x01) and no Operand.

4. The IUT sends an indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code (0x02) followed by the Response Code for 'Success' (0x01).

5. The Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the RACP characteristic handle and value.

6. The Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.

7. The Lower Tester writes the 'Report Number of Stored Records' Op Code (0x05) to the RACP using an Operator of 'All records' (0x01) and no Operand.

8. The IUT sends an indication of the RACP characteristic with the 'Number of Stored Records Response' Op Code (0x05) an Operator of Null (0x00) and an Operand representing that no records were found (0x0000).

9. The Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the RACP characteristic handle and value.

10. The Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.

- Expected Outcome

  Pass verdict

  In step 4 the IUT sends one indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code (0x02) followed by the Response Code for 'Success' (0x01).

  In step 8 the IUT responds, indicating that all records had been deleted from the IUT.

4.8.3 Report Stored Records

This test group contains test cases to verify compliant operation when the Lower Tester uses the RACP 'Report Stored Records' procedure.

PLXS/SEN/RAR/BV-01-C [Report Stored Records – 'All records']

- Test Purpose

  Verify that the IUT can perform the 'Report Stored Records' procedure with an Operator of 'All records'.

- Reference

  [6] 3.4.4

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

  1. Perform an action on the IUT that will induce it to generate a defined number of records.
  2. Verify that a connection between the Lower Tester and IUT is established.
  3. The Lower Tester writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'All Records' (0x01) and no Operand.
  4. The IUT sends a number of indications of the PLX Spot-check Measurement characteristic.
  5. The Lower Tester receives an *ATT_Handle_Value_Indication(s)* from the IUT containing the PLX Spot-check Measurement characteristic handle and value.
  6. The IUT sends an indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code (0x01) followed by the Response Code for 'Success' (0x01).

7. The Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the RACP characteristic handle and value.
8. The Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.
9. The Lower Tester writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'All Records' (0x01) and no Operand.
10. The IUT sends an indication of the RACP characteristic with the 'Response Code' Op Code (0x06) , an Operator of Null (0x00), and an Operand representing Request Op Code (0x01) followed by the Response Code for 'No Records Found' (0x06).
11. The Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the RACP characteristic handle and value.
12. The Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.

- Expected Outcome

Pass verdict

During the first Report Stored Records Procedure, the IUT sends a number of indications of the PLX Spot-check Measurement characteristic.

The received PLX Spot-check Measurement characteristic values contain the records generated in step 1.

The IUT sends one indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code (0x01) followed by the Response Code for 'Success' (0x01).

The oldest record is transmitted before newer records.

During the second Report Stored Records Procedure, the IUT sends one indication of the RACP characteristic with the 'Response Code' Op Code (0x06) and an Operator of Null (0x00) and an Operand representing Request Op Code (0x01) followed by the Response Code for 'No Records Found' (0x06).

PLXS/SEN/RAR/BV-02-C [Report Stored Records – 'No Records Found']

- Test Purpose

Verify that the IUT can perform the 'Report Stored Records' procedure with an Operator of 'All records' when no stored records are available.

- Reference

[6] 3.4.4

- Initial Condition

    - Perform the preamble described in Section 4.2.3.

- Test Procedure

1. Ensure that the IUT has no stored records.
2. Verify that a connection between the Lower Tester and IUT is established.
3. The Lower Tester writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'All Records' (0x01) and no Operand.
4. The IUT sends an indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code (0x01) followed by the Response Code for 'No Records Found' (0x06).

5. The Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the RACP characteristic handle and value.
6. The Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.

- Expected Outcome

   Pass verdict

   The IUT sends one indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code (0x01) followed by the Response Code for 'No Records Found' (0x06).

4.8.4   Abort Operation

This test group contains test cases to verify compliant operation when the Lower Tester uses RACP 'Abort Operation' procedure.

PLXS/SEN/RAA/BV-01-C [Abort Operation – 'Report Stored Records']

- Test Purpose

   Verify that the IUT can perform an 'Abort' of the Report Stored Records procedure.

- Reference

   [6] 3.4.6

- Initial Condition

   - Perform the preamble described in Section 4.2.3.

- Test Procedure

   1. Perform an action on the IUT that will induce it to generate enough records such that the transmission is not able to complete before the abort is attempted.
   2. Verify that a connection between the Lower Tester and IUT is established.
   3. The Lower Tester writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'All records' (0x01) and no Operand.
   4. The IUT starts to send indications of the PLX Spot-check Measurement characteristic.
   5. The Lower Tester receives a number of *ATT_Handle_Value_Indications* from the IUT containing the PLX Spot-check Measurement characteristics handle and value.
   6. The Lower Tester writes the 'Abort Operation' Op Code (0x03) to the RACP with an Operator of Null (0x00) and no Operand.
   7. The IUT sends an indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code (0x03) followed by the Response Code for 'Success' (0x01).
   8. The Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the RACP characteristic handle and value.
   9. The Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.
   10. Verify that the measurement indications stop.
   11. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

   Pass verdict

   The IUT sends one / multiple notification(s) of the PLX Spot-check Measurement characteristic.

   The PLX Spot-check Measurement characteristics contain some but not all record values.

The IUT sends one indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code (0x03) followed by the Response Code for 'Success' (0x01).

The indications stopped after writing the 'Abort Operation' Op Code.

4.8.5   RACP errors

PLXS/SEN/RAE/BI-01-C [RACP Errors – 'Procedure Already In Progress']

- Test Purpose

  Verify that the IUT responds appropriately when a Client attempts to perform a procedure before another procedure is completed.

- Reference

  [6] 3.4.8

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

  1. Perform an action on the IUT that will induce it to generate several records.
  2. Verify that a connection between the Lower Tester and IUT is established.
  3. The Lower Tester writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'all records' (0x01) and no Operand.
  4. Before the procedure is completed, the Lower Tester performs the same procedure again.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  <u>Pass verdict</u>

  The IUT rejects the Write Request to start the second procedure and responds with an Attribute Protocol Application Error Code set to 'Procedure Already in Progress' (0xFE).

PLXS/SEN/RAE/BI-02-C [RACP Errors – 'Client Characteristic Configuration Descriptor Improperly Configured']

- Test Purpose

  Verify that the IUT responds appropriately when a Client attempts to perform an RACP procedure with a Client Characteristic Configuration descriptor that is improperly configured.

- Reference

  [6] 3.4.8

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

  1. Perform an action on the IUT that will induce it to generate 3 records.
  2. Verify that a connection between the Lower Tester and IUT is established.
  3. The Lower Tester resets to 0 one or more of the Client Characteristic Configuration descriptors from the PLX Spot-check Measurement characteristic or RACP characteristic.

4. The Lower Tester writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'all records' (0x01) and no Operand.
5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

Pass verdict

The IUT rejects the Write Request to start the second procedure and responds with an Attribute Protocol Application Error Code set to 'Client Characteristic Configuration Descriptor Improperly Configured' (0xFD).

PLXS/SEN/RAE/BI-03-C [RACP Errors – 'Operator Not Supported']

- Test Purpose

Verify that the IUT responds appropriately when a Client writes an Op Code to the RACP with an unsupported Operator.

- Reference

[6] 3.4.8

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

1. Perform an action on the IUT that will induce it to generate 3 or more records.
2. Verify that a connection between the Lower Tester and IUT is established.
3. The Lower Tester writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator from the 'Reserved for Future Use' range and no Operand.
4. The IUT sends an indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing the Request Op Code (0x01) followed by the Response Code Value for 'Operator not supported' (0x04).
5. The Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the RACP characteristic handle and value.
6. The Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.
7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

Pass verdict

The IUT sends an indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing the Request Op Code (0x01) followed by the Response Code Value for 'Operator not supported' (0x04).

PLXS/SEN/RAE/BI-04-C [RACP Errors – 'Invalid Operator']

- Test Purpose

Verify that the IUT responds appropriately when a Client writes a 'Report Stored Records' Op Code to the RACP with an invalid Operator.

- Reference

[6] 3.4.8

- Initial Condition

    - Perform the preamble described in Section 4.2.3.

- Test Procedure

    1. Perform an action on the IUT that will induce it to generate 3 or more records.
    2. Verify that a connection between the Lower Tester and IUT is established.
    3. The Lower Tester writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of Null (0x00) and no Operand.
    4. The IUT sends an indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code (0x01) followed by the Response Code Value for 'Invalid Operator' (0x03).
    5. The Lower Tester receives an *ATT_Handle_Value_Indication* from the IUT containing the RACP handle and value.
    6. The Lower Tester sends an *ATT_Handle_Value_Confirmation* to the IUT.
    7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

    <u>Pass verdict</u>

    The IUT sends an indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code (0x01) followed by the Response Code Value for 'Invalid Operator' (0x03).

PLXS/SEN/RAE/BI-05-C [RACP Errors – 'Unsupported Operand']

- Test Purpose

    Verify that the IUT responds appropriately when a Client writes a 'Report Stored Records' Op Code to the RACP with an unsupported Operand.

- Reference

    [6] 3.4.8

- Initial Condition

    - Perform the preamble described in Section 4.2.3.

- Test Procedure

    1. Verify that a connection between Tester and IUT is established.
    2. Collector writes any Op Code to the RACP using an appropriate Operator and an invalid operand for the Op Code.
    3. The IUT sends an indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code followed by the 'Response Code' value (0x09) for 'Operand not supported'.

- Expected Outcome

    <u>Pass verdict</u>

    The IUT sends the 'Response Code' value (0x09) for 'Operand not supported'.

PLXS/SEN/RAE/BI-06-C [RACP Errors – 'Op Code not Supported']

- Test Purpose

    Verify that the IUT responds appropriately when a Client writes an Op Code to the RACP that is not supported.

- Reference

    [6] 3.4.8

- Initial Condition

    - Perform the preamble described in Section 4.2.3.

- Test Procedure

    1. Verify that a connection between the Lower Tester and IUT is established.
    2. Collector writes any unsupported Op Code to the RACP.
    3. The IUT sends an indication of the RACP characteristic with the 'Response Code' Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code followed by the 'Response Code' value (0x02) for 'Op Code Not Supported.

- Expected Outcome

    <u>Pass verdict</u>

    The IUT sends the 'Response Code' value (0x02) for 'Op Code not Supported'.

5 Test case mapping

The Test Case Mapping Table (TCMT) maps test cases to specific capabilities in the ICS. The IUT will 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 Pulse Oximeter Service [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. Further details about the function of the TCMT are elaborated in [1].

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

Item	Feature	Test Case(s)
PLXS 3/1	Service definition	PLXS/SEN/SGGIT/SER/BV-01-C
PLXS 1/1	SDP Record	PLXS/SEN/SGGIT/SDP/BV-02-C
PLXS 3/2	Spot check characteristic	PLXS/SEN/SGGIT/CHA/BV-03-C PLXS/SEN/CON/BV-01-C PLXS/SEN/CI/BV-01-C
PLXS 3/9	Continuous characteristic	PLXS/SEN/SGGIT/CHA/BV-04-C PLXS/SEN/CON/BV-03-C PLXS/SEN/CN/BV-01-C
PLXS 3/17 AND NOT PLXS 3a/1	Features characteristic	PLXS/SEN/SGGIT/CHA/BV-05-C
PLXS 3/17 AND PLXS 3a/2	PLX Features Indication	PLXS/SEN/SGGIT/CHA/BV-07-C PLXS/SEN/SGGIT/ISFC/BV-08-C
PLXS 3/21 AND PLXS 2/3	RACP characteristic	PLXS/SEN/SGGIT/CHA/BV-06-C PLXS/SEN/CON/BV-02-C
PLXS 3/17 AND PLXS 3/18	Read Features	PLXS/SEN/CR/BV-01-C
PLXS 3/19 AND PLXS 2/1	Read Features, Measurement Status field	PLXS/SEN/CR/BV-02-C
PLXS 3/20 AND PLXS 2/2	Read Features, Device and Sensor status field	PLXS/SEN/CR/BV-03-C
PLXS 3/5 AND PLXS 2/4	Spot-check characteristic - Timestamp	PLXS/SEN/CI/BV-02-C
PLXS 3/6 AND PLXS 2/1	Spot-check characteristic – Measurement Status	PLXS/SEN/CI/BV-03-C
PLXS 3/7 AND PLXS 2/2	Spot-check characteristic – Device and Sensor Status	PLXS/SEN/CI/BV-04-C
PLXS 3/8 AND PLXS 2/7	Spot-check characteristic – Pulse Amplitude Index	PLXS/SEN/CI/BV-05-C

Item	Feature	Test Case(s)
PLXS 3/12 AND PLXS 2/5	Continuous characteristic – SpO2PR-Fast	PLXS/SEN/CN/BV-02-C
PLXS 3/13 AND PLXS 2/6	Continuous characteristic – SpO2PR-Slow	PLXS/SEN/CN/BV-03-C
PLXS 3/14 AND PLXS 2/1	Continuous characteristic – Measurement Status	PLXS/SEN/CN/BV-04-C
PLXS 3/15 AND PLXS 2/2	Continuous characteristic – Device and Sensor Status	PLXS/SEN/CN/BV-05-C
PLXS 3/16 AND PLXS 2/7	Continuous characteristic – Pulse Amplitude Index	PLXS/SEN/CN/BV-06-C
PLXS 3/25 AND PLXS 7/1 AND PLXS 8/1 AND PLXS 9/1	RACP – Report number of stored records	PLXS/SEN/RAN/BV-01-C
PLXS 3/23 AND PLXS 5/1 AND PLXS 9/1	RACP – Delete stored records	PLXS/SEN/RAD/BV-01-C
PLXS 3/22 AND PLXS 4/1 AND PLXS 9/1	RACP – Report stored records – all records	PLXS/SEN/RAR/BV-01-C PLXS/SEN/RAR/BV-02-C
PLXS 3/24 AND PLXS 6/1 AND PLXS 9/1	RACP – Abort operation – report stored records	PLXS/SEN/RAA/BV-01-C
PLXS 3/21 AND PLXS 9/1	RACP – Error Handling	PLXS/SEN/RAE/BI-01-C PLXS/SEN/RAE/BI-02-C PLXS/SEN/RAE/BI-03-C PLXS/SEN/RAE/BI-04-C PLXS/SEN/RAE/BI-05-C PLXS/SEN/RAE/BI-06-C

Table 5.1: Test case mapping

6   Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2015-07-21	Prepared for publication
	1.0.1r00	2016-05-20	Converted to new Test Case ID conventions as defined in TSTO v4.1.
1	1.0.1	2016-07-14	Prepared for TCRL 2016-1 publication.
	1.0.2r00	2016-08-18	TSE 7139: Changed Item from "1/2" to "1/1" for test case PLXS/SEN/SD/BV-02-C in TCMT.
2	1.0.2	2016-12-13	Approved by BTI. Prepared for TCRL 2016-2 publication.
	1.0.2 edition 2r00	2018-11-29	Editorial changes only. Template updated. Revision History and contributors moved to the end of the document.
	1.0.2 edition 2	2020-01-09	Updated copyright page and confidentiality markings to support new Documentation Marking Requirements, performed minor formatting updates, and accepted all tracked changes to prepare for edition 2 publication.
	1.0.2ed3 r00–r01	2021-03-24 – 2021-04-14	TSE 16465 (rating 1): Removed additional conditions from TCMT. Added a Publication Number column and assigned publication number 2 to the previous v1.0.2.
3	1.0.2 edition 3	2021-05-21	Approved by BTI on 2021-05-06. Prepared for edition 3 publication.
	p4r00–r04	2021-07-27 – 2021-12-20	TSE 16765 (rating 4): Added new test group ISFC. New test cases added: PLXS/SEN/SGGIT/CHA/BV-07-C and PLXS/SEN/SGGIT/ISFC/BV-08-C (E16248). Updated TCMT. TSE 18096 (rating 2): Converted the following test cases into GGIT tests: PLXS/SEN/SD/BV-01-C and -02-C, PLXS/SEN/DEC/BV-01-C – -04-C, and PLXS/SEN/DES/BV-01-C – -03-C. The new GGIT converted TCIDs are: PLXS/SEN/SGGIT/SER/BV-01-C, PLXS/SEN/SGGIT/SDP/BV-02-C, and PLXS/SEN/SGGIT/CHA/BV-03-C – -06-C. Updated TCMT accordingly. TSE 18097 (rating 1): Removed direct references to GATT test cases from PLXS/SEN/CR/BV-01-C – -03-C and PLXS/SEN/CON/BV-01-C – 03-C. TSE 18098 (rating 1): Updated the test case descriptions for PLXS/SEN/CN/BV-02-C – -06-C to refer to "Notification". Performed editorials, including updating to the latest TS template and aligning the copyright page with v2 of the DNMD.

Publication Number	Revision Number	Date	Comments
4	p4	2022-01-25	Approved by BTI on 2022-01-06. Prepared for TCRL 2021-2 publication.