Insulin Delivery Profile (IDP)

***Bluetooth*® Test Suite**

- **Revision:** IDP.TS.p3
- **Revision Date:** 2024-10-08
- **Prepared By:** Medical Devices Working Group
- **Published during TCRL:** TCRL.2024-2-addition

Contents

1 Scope

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

2 References, definitions, and abbreviations

2.1 References

This document incorporates provisions from other publications by dated or undated reference. These references are cited at the appropriate places in the text, and the publications are listed hereinafter. Additional definitions and abbreviations can be found in [1], [2], and [3].

[1] Bluetooth Core Specification, Version 4.0 or later

[2] Test Strategy and Terminology Overview

[3] Insulin Delivery Profile, Version 1.0

[4] Insulin Delivery Service, Version 1.0

[5] ICS Proforma for Insulin Delivery Profile

[6] GATT Test Suite, GATT.TS

[7] Current Time Service, Version 1.1

[8] Device Information Service, Version 1.1

[9] Battery Service, Version 1.0

[10] Bond Management Service, Version 1.0 or later

[11] Insulin Delivery Service Test Suite

[12] GAP Test Suite, GAP.TS

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

[14] Immediate Alert Service, Version 1.0

[15] IXIT Proforma for Insulin Delivery Profile

[16] Insulin Delivery Profile Specification, Version 1.0.1

[17] Insulin Delivery Profile Specification, Version 1.0.2

[18] Insulin Delivery Service Specification, Version 1.0.2

2.2 Definitions

In this Bluetooth document, the definitions from [1], [2], and [3] apply.

2.3 Acronyms and abbreviations

In this Bluetooth document, the definitions, acronyms, and abbreviations from [1], [2], and [3] apply.

3 Test Suite Structure (TSS)

3.1 Overview

The Insulin Delivery Profile requires the presence of GAP, SM, and GATT. This is illustrated in Figure 3.1.

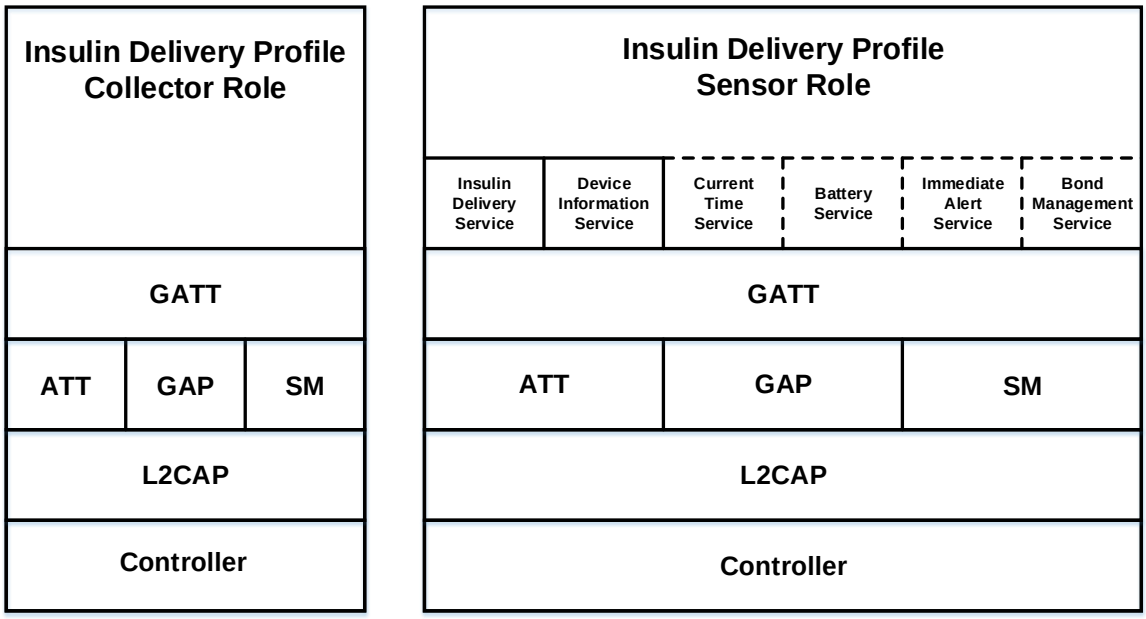

Figure 3.1: Insulin Delivery test models

Support for the Device Information Service is mandatory for the Sensor role, while the Current Time Service, Battery Service, Immediate Alert Service and/or Bond Management Service are optional for the Sensor role.

3.2 Test Strategy

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

The test equipment provides an implementation of the Radio Controller and the parts of the Host needed to perform the test cases defined in this Test Suite. A Lower Tester acts as the IUT's peer device and interacts with the IUT over the air interface. The configuration including the IUT needs to implement similar capabilities to communicate with the test equipment. For some test cases, it is necessary to stimulate the IUT from an Upper Tester. In practice, this could be implemented as a special test interface, a Man Machine Interface (MMI), or another interface supported by the IUT.

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

3.3 Test groups

The following test groups have been defined:

- Insulin Delivery Sensor Role Requirements
- Generic GATT Integrated Tests
- Read Device Information Service Characteristics
- IDD Features
- Characteristics Status
- Status Reader Control Point Procedures
- Command Control Point Procedures
- IDD Record Access Control Point Procedures
- General Error Handling
- Current Time Service
- Battery Service
- Write Alert Level
- Bond Management Service

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

Identifier Abbreviation	**Spec Identifier <spec abbreviation>**
IDP	Insulin Delivery Profile
Identifier Abbreviation	**Role Identifier <IUT role>**
COL	Collector Role
SEN	Insulin Delivery Sensor Role
Identifier Abbreviation	**Reference Identifier <GGIT test group>**
CGGIT	Client Generic GATT Integrated Tests
Identifier Abbreviation	**Reference Identifier <GGIT class>**
CHA	Characteristic
ISFC	Indication Supported Features Characteristic
SER	Service
Identifier Abbreviation	**Feature and Behaviors Identifier <feat>**
BAS	Battery Service
BMS	Bond Management Service
CCP	IDD Command Control Point Procedures
CCPE	IDD Command Control Point Procedures – Error Handling
CTS	Current Time Service
DIS	Device Information Service
FEA	IDD Features
IAS	Immediate Alert Service
IDE	Insulin Delivery Error Handling
IDSA	Insulin Delivery Service Advertisement Data
RAA	IDD RACP – Abort Procedures
RAD	IDD RACP – Delete Procedures
RAE	IDD RACP – Error Handling
RAN	IDD RACP – Number Procedures
RAR	IDD RACP – Report Procedures
RCP	IDD Status Reader Control Point Procedures
RCPE	IDD Status Reader Control Point Procedures – Error Handling

Identifier Abbreviation	Feature and Behaviors Identifier <feat>
SCD	Discovery of Services and Characteristics
STAT	IDD Status Changed, IDD Status and IDD Annunciation Status, IDD Status Reader Control Point, IDD Command Control Point, IDD Record Access Control Point, IDD Command Data and IDD History Data

Table 4.1: IDP TC feature naming conventions

4.1.2 Conformance

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

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

Such tests may verify:

- That claimed capabilities may be used in any order and any number of repetitions not excluded by the specification
- That capabilities enabled by the implementations are sustained over durations expected by the use case
- That the implementation gracefully handles any quantity of data expected by the use case
- That in cases where more than one valid interpretation of the specification exists, the implementation complies with at least one interpretation and gracefully handles other interpretations
- That the implementation is immune to attempted security exploits

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

In any case, where a member finds an issue with the test plan generated by the Bluetooth SIG qualification tool, with the test case as described in the Test Suite, or with the test system utilized, the member is required to notify the responsible party via an erratum request such that the issue may be addressed.

4.1.3 Pass/Fail verdict conventions

Each test case has an Expected Outcome section. The IUT is granted the Pass verdict when all the detailed pass criteria conditions within the Expected Outcome section are met.

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

4.2 Setup preambles

The procedures defined in this section are 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.

  If the Lower Tester and IUT were not previously bonded, perform a pairing procedure with the Bonding_Flags set to Bonding.

  If the Lower Tester and IUT were previously bonded, re-enable encryption if not already enabled.

  Authorization is granted on the IUT to allow access to the characteristics of the Insulin Delivery Service.

4.2.2 IUT to Configure Sensor for use with Control Points

- Preamble Purpose

  This preamble procedure enables the IUT to configure the Sensor for use with the <Control Point Characteristic> and <Corresponding Mandatory Characteristic> described in Table 4.2.

- Preamble Procedure

  1. If a connection exists, it is disconnected.
  2. Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  3. The handles of the <Control Point Characteristic> and <Corresponding Mandatory Characteristic>, as required, have been previously discovered by the Upper Tester during the test procedures in Section 4.4 or are known to the Upper Tester by other means.
  4. The handles of the Client Characteristic Configuration descriptor of the <Control Point Characteristic> and <Corresponding Mandatory Characteristic>, as required, have been previously discovered by the Upper Tester during the test procedure in Section 4.4 or are known to the Upper Tester by other means.
  5. The <Control Point Characteristic> is configured for indications and <Corresponding Mandatory Characteristic>, as required, is configured for notification as described in Table 4.2, for the details for configuring the Client Characteristic Configuration descriptors please see Section 4.7.1.
  6. If <Control Point Characteristic> is the IDD Record Access Control Point, then perform an action on the Lower Tester to delete all history event records.

Control Point Characteristic	Corresponding Mandatory Characteristic	Corresponding Mandatory Characteristic configured for
IDD Status Reader Control Point	N/A	N/A
IDD Command Control Point	IDD Command Data	Notification (e.g., required for Read Basal Rate Profile Template Procedure, Read ISF Profile Template Procedure, Read I2CHO Ratio Profile Template Procedure, Read Target Glucose Range Profile Template Procedure, and Get Template Status and Details Procedure)
IDD Record Access Control Point	IDD History Data	Notification (e.g., required for All IDD RACP procedures)

Table 4.2: Configuration Preamble for IDD Status Reader CP, Command CP, and RACP

4.2.3 Scan to detect Sensor advertisements

- Preamble Purpose

  This procedure specifies how an IUT scans and detects Sensor advertisements.

- Reference

  [1] Volume 3 Part C, Generic Access Profile (GAP) Section 9.3.6, 9.3.8

  [3] 5.1.1, 5.2

- Initial Condition

  - The IUT has been configured to accept commands from the Upper Tester to request and receive insulin delivery data.
  - The IUT is in Link Layer state *Standby*.

- Preamble Procedure

  1. Execute one of the following procedures:

     Alt 1: The IUT performs the Direct Connection Establishment Procedure to connect to a Lower Tester in the Undirected Connectable Mode by performing GAP/CONN/DCEP/BV-03-C [12].

     or

     Alt 2: The IUT performs the General Connection Establishment procedure to connect to a Lower Tester in the Undirected Connectable Mode by performing GAP/CONN/GCEP/BV-02-C [12]

  2. Connection is established.

4.3 Insulin Delivery Sensor Role Requirements – Additional Requirements for LE

The procedures defined in this test group verify implementation of the additional Sensor requirements and recommendations defined in the Insulin Delivery Profile Specifications [3] when using this profile over LE Transport.

IDP/SEN/IDSA/BV-01-C [Insulin Delivery Service UUID in AD over LE]

- Test Purpose

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

- Reference

  [3] 3.1.2.1

- Initial Condition

  - The Sensor IUT is induced to enter a GAP discoverable mode and generate Advertising Packets.

- Test Procedure

  The Lower Tester listens for Advertising Packets from the Sensor IUT.

- Expected Outcome

  Pass verdict

  The Advertising Packets contain the defined Service UUID for «Insulin Delivery Service».

IDP/SEN/IDSA/BV-02-C [Local Name included in AD or Scan Response over LE]

- Test Purpose

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

- Reference

  [3] 3.1.2.2

- Initial Condition

  - The Sensor IUT is induced to enter a GAP connectable mode and generate Advertising Packets.

- Test Procedure

  1. The Lower Tester listens for Advertising Packets from the Sensor IUT.
  2. In response to an Advertising Packet from the Sensor IUT the Lower Tester sends a Scan Request to the Sensor IUT.
  3. The Lower Tester listens for a Scan Response from the IUT Sensor.

- Expected Outcome

  Pass verdict

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

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

IDP/SEN/IDSA/BV-03-C [Appearance included in AD or Scan Response over LE]

- Test Purpose

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

- Reference

  [3] 3.1.2.3

- Initial Condition

  - The Sensor IUT is induced to enter a GAP connectable mode and generate Advertising Packets.

- Test Procedure

  1. The Lower Tester listens for Advertising Packets from the Sensor IUT.
  2. In response to an Advertising Packet from the Sensor IUT the Lower Tester sends a Scan Request to the Sensor IUT.
  3. The Lower Tester listens for a Scan Response from the Sensor IUT.

- Expected Outcome

  Pass verdict

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

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

4.4 Generic GATT Integrated Tests

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

TCID	Service / Characteristic	Reference	Properties	Value Length (Octets)	Type
IDP/COL/CGGIT/SER/BV-01-C [Service GGIT – Insulin Delivery]	Insulin Delivery Service	[3] 4	-	-	Not defined
IDP/COL/CGGIT/SER/BV-02-C [Service GGIT – Device Information]	Device Information Service	[3] 4	-	-	Primary Service
IDP/COL/CGGIT/SER/BV-03-C [Service GGIT – Current Time]	Current Time Service	[3] 4	-	-	Primary Service
IDP/COL/CGGIT/SER/BV-04-C [Service GGIT – Battery]	Battery Service	[3] 4	-	-	Not defined
IDP/COL/CGGIT/SER/BV-05-C [Service GGIT – Immediate Alert]	Immediate Alert Service	[3] 4	-	-	Primary Service
IDP/COL/CGGIT/SER/BV-06-C [Service GGIT – Bond Management]	Bond Management Service	[3] 4	-	-	Not defined
IDP/COL/CGGIT/CHA/BV-01-C [Characteristic GGIT – IDD Status Changed]	IDD Status Changed characteristic	[3] 4, 4.6	0x22 (Read, Indicate)	Skip	-
IDP/COL/CGGIT/CHA/BV-02-C [Characteristic GGIT – IDD Status]	IDD Status characteristic	[3] 4, 4.7	0x22 (Read, Indicate)	Skip	-
IDP/COL/CGGIT/CHA/BV-03-C [Characteristic GGIT – IDD Annunciation Status]	IDD Annunciation Status characteristic	[3] 4, 4.8	0x22 (Read, Indicate)	Skip	-
IDP/COL/CGGIT/CHA/BV-04-C [Characteristic GGIT – IDD Features]	IDD Features characteristic	[16] 4, 4.9	0x22 (Read, Indicate)	Skip	-
IDP/COL/CGGIT/CHA/BV-05-C [Characteristic GGIT – IDD Status Reader Control Point]	IDD Status Reader Control Point characteristic	[3] 4, 4.10	0x28 (Write, Indicate)	Skip	-
IDP/COL/CGGIT/CHA/BV-06-C [Characteristic GGIT – IDD Command Control Point]	IDD Command Control Point characteristic	[3] 4, 4.11	0x28 (Write, Indicate)	Skip	-
IDP/COL/CGGIT/CHA/BV-07-C [Characteristic GGIT – IDD Command Data]	IDD Command Data characteristic	[3] 4, 4.12	0x10 (Notify)	Skip	-
IDP/COL/CGGIT/CHA/BV-08-C [Characteristic GGIT – IDD Record Access Control Point]	IDD Record Access Control Point characteristic	[3] 4, 4.13	0x28 (Write, Indicate)	Skip	-

TCID	Service / Characteristic	Reference	Properties	Value Length (Octets)	Type
IDP/COL/CGGIT/CHA/BV-09-C [Characteristic GGIT – IDD History Data]	IDD History Data characteristic	[3] 4, 4.14	0x10 (Notify)	Skip	-
IDP/COL/CGGIT/CHA/BV-10-C [Characteristic GGIT – Battery Level]	Battery Level characteristic	[3] 4, 4.3	0x12 (Read, Notify)	Skip	-
IDP/COL/CGGIT/CHA/BV-11-C [Characteristic GGIT – Bond Management Feature]	Bond Management Feature characteristic	[16] 4, 4.3	0x22 (Read, Indicate)	1-3	-
IDP/COL/CGGIT/CHA/BV-12-C [Characteristic GGIT – Bond Management Control Point]	Bond Management Control Point characteristic	[3] 4, 4.3	0x88 (Write, Reliable Write)	Skip	-
IDP/COL/CGGIT/CHA/BV-13-C [Characteristic GGIT – Current Time]	Current Time characteristic	[3] 4, 4.3	0x1A (Read, Write, Notify)	Skip	-
IDP/COL/CGGIT/CHA/BV-14-C [Characteristic GGIT – Alert Level]	Alert Level characteristic	[3] 4, 4.3	0x04 (Write Without Response)	Skip	-

Table 4.3: Input for the GGIT Client test procedure

4.4.1 Generic GATT Indication Supported Features characteristic

Execute the Generic GATT Indication Supported Features Characteristic tests defined in Section 6.4, Client test procedures (CGGIT), in [6] using Table 4.4 below as input:

TCID	Characteristic	Reference	TC Configuration
IDP/COL/CGGIT/ISFC/BV-15-C [Characteristic GGIT – IDD Features indication]	IDD Features	[16] 4.9	N/A
IDP/COL/CGGIT/ISFC/BV-16-C [Characteristic GGIT – Bond Management Feature indication]	Bond Management Feature	[16] 4.21.5	N/A

Table 4.4: GGIT Indication Supported Features Characteristic tests

4.4.2 Discovery of Other Service Characteristics

- Test Purpose

  Verify that for each test case listed in Table 4.5, the IUT can discover all characteristics of a specified Service supported by the IUT.

- Reference

  [3] 4.3

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT and run the preamble procedure for the IUT to initiate connection to an Insulin Delivery Sensor included in the Section 4.2.1.
  - The Lower Tester includes one instantiation of the <Service>, in Table 4.5, including all defined characteristics.
  - The IUT has discovered the handle range of the <Service>, in Table 4.5, by using the applicable test procedure in Section 4.4.

- Test Case Configuration

Test Case	Service
IDP/COL/SCD/BV-26-C [Discover Device Information Service characteristics]	Device Information Service ([8])

Table 4.5: Discovery of Other Service Characteristics

- Test Procedure

  For each test case in Table 4.5, the Upper Tester issues a command to the IUT to execute the Discover All Characteristics of a Service sub-procedure or the Discover Characteristics by UUID sub-procedure using each of the UUIDs for the characteristics of the <Service> supported by the Lower Tester.

- Expected Outcome

  Pass verdict

  For each characteristic, the IUT reports an attribute handle/value pair to the Upper Tester.

  For the instantiation of Device Information Service, the attribute handle/value pair for the characteristics are specified in the IXIT [15].

4.5 Read Device Information Service Characteristics

This test group contains test cases to verify the IUT's ability to read the Device Information Service Characteristics.

IDP/COL/DIS/BV-01-C [Read Device Information Service Characteristics]

- Test Purpose

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

- Reference

  [3] 4.17

- Initial Condition
  - The characteristics of the Device Information Service supported by the Lower Tester are specified in the IXIT [15].
  - Establish an ATT Bearer connection between the Lower Tester and IUT and run the preamble procedure for the IUT to initiate connection to an Insulin Delivery Sensor included in the Section 4.2.1.
  - The Lower Tester includes one instantiation of the Device Information Service [8] including all defined characteristics.
  - The IUT has previously executed the procedure included in Section 4.4.2, so it has the handle/value pairs for all characteristics of the Device Information Service supported by the Lower Tester.
- Test Procedure
  1. The Upper Tester issues commands to the IUT to read all characteristics of the Device Information Service supported by the IUT.
  2. For each characteristic of the Device Information Service supported by the IUT, the IUT sends an ATT_Read_Request to the Lower Tester.
  3. The IUT receives and ATT_Read_Response from the Lower Tester.
- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Read_Request command to the Lower Tester.

  The Characteristic handle parameter is set to the handle specified by the Upper Tester.

  For each characteristic contained in the Lower Tester instantiation of the Device Information Service supported by the IUT, the IUT reports the characteristic value for all characteristics specified in the IXIT [15] to the Upper Tester.

4.6 IDD Features

This test group contains test cases to verify the IUT's ability to interpret values of the IDD Features characteristic.

IDP/COL/FEA/BV-01-C [Read IDD Features]

- Test Purpose

  Verify that the IUT can read the IDD Features characteristic of an Insulin Delivery Sensor (Lower Tester).

- Reference

  [3] 4.9

- Initial Condition
  - Configure the Lower Tester with a value for the IDD Feature characteristic.
  - Establish an ATT Bearer connection between the Lower Tester and IUT and run the preamble procedure for the IUT to initiate connection to an Insulin Delivery Sensor included in the Section 4.2.1.
  - The Upper Tester knows the handle of the IDD Features characteristic contained in the Lower Tester.
- Test Procedure

  1. The Upper Tester sends a command to the IUT to read the IDD Features characteristic from the Lower Tester.
  2. The IUT sends an ATT_Read_Request (0x0A) to the Lower Tester containing the handle specified by the Upper Tester.
  3. The Lower Tester receives the ATT_Read_Request (0x0A) and then sends an ATT_Read_Response (0x0B) to the IUT containing the value of the IDD Features characteristic.
  4. The IUT receives the ATT_Read_Response (0x0B) and reports the value to the Upper Tester.
- Expected Outcome

  Pass verdict

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

  The IUT receives the response from the Lower Tester and reports the IDD Features characteristic value to the Upper Tester.

  All Reserved for Future Use bit values are ignored.

  If E2E-Protection is enabled by the device (the IDD Features characteristic Flags field bit 0 is set to 1), the IDD Features characteristic includes an appropriate value for the E2E-CRC and E2E-Counter fields. Otherwise, the E2E-CRC field value is set to 0xFFFF and the E2E-Counter field value is set to 0.

4.7 Characteristics Status

This test group contains test cases to verify the IUT's ability to configure indications, notifications, interpret values and verify that the characteristic values are compliant.

4.7.1 Configure Indication and Notification

- Test Purpose

  This test group verifies compliant operation in response to enable characteristic indication or notification.
- Reference

  [3] 4.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT and run the preamble procedure for the IUT to initiate connection to an Insulin Delivery Sensor included in the Section 4.2.1.
  - For each test case in Table 4.6, the IUT has discovered the Client Characteristic Configuration descriptor of the characteristic contained in the Lower Tester.
- Test Case Configuration

Test Case ID	Reference	Characteristic
IDP/COL/STAT/BV-01-C [Configure IDD Status Changed for Indications]	[3] 4.6	IDD Status Changed characteristic
IDP/COL/STAT/BV-02-C [Configure IDD Status for Indications]	[3] 4.7	IDD Status characteristic
IDP/COL/STAT/BV-03-C [Configure IDD Annunciation Status for Indications]	[3] 4.8	IDD Annunciation Status characteristic
IDP/COL/STAT/BV-04-C [Configure IDD Status Reader Control Point for Indications]	[3] 4.10	IDD Status Reader Control Point characteristic
IDP/COL/STAT/BV-05-C [Configure IDD Command Control Point for Indications]	[3] 4.11	IDD Command Control Point characteristics
IDP/COL/STAT/BV-06-C [Configure IDD Record Access Control Point for Indications]	[3] 4.13	IDD Record Access Control Point characteristics
IDP/COL/STAT/BV-07-C [Configure IDD Command Data for Notifications]	[3] 4.11, 4.12	IDD Command Data characteristic
IDP/COL/STAT/BV-08-C [Configure IDD History Data for Notifications]	[3] 4.13, 4.14	IDD History Data characteristics

Table 4.6: Configure Characteristics for Indications and Notifications

- Test Procedure

  If the test case is for indication, the Upper Tester sends a command to the IUT to configure the Insulin Delivery Sensor to indicate the characteristic.

  If the test case is for notification, the Upper Tester sends a command to the IUT to configure it to receive the characteristic notifications.

- Expected Outcome

  Pass verdict

  If the test case is for indication, the IUT sends a correctly formatted ATT_Write_Request (0x12) to the Lower Tester with the handle set to that of the Client Characteristic Configuration descriptor for the characteristic with the value set to «Indication».

  If the test case is for notification, the IUT sends a correctly formatted ATT_Write_Request (0x12) to the Lower Tester with the handle set to that of the Client Characteristic Configuration descriptor for the characteristic with the value set to «Notification».

IDP/COL/STAT/BV-09-C [Verify E2E-CRC and E2E-Counter calculations - IDD Status Reader CP]

- Test Purpose

  Verify the calculated E2E-CRC and E2E-Counter values when the IUT executes an IDD Status Reader Control Point procedure.

- Reference

  [3] 4.4, 4.10.2.1, 4.15.1.1

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Status Reader Control Point characteristic.
  - The IUT and the Lower Tester have E2E-Protection enabled.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to execute the procedure included in IDP/COL/RCP/BV-01-C [Reset Status] to reset the IDD Status Changed characteristic Flags field bits.
  2. The Lower Tester verifies that the Reset Status Procedure request contains an E2E-CRC field and E2E-Counter field and the calculated CRC and Counter values meet the requirement of the service.
  3. Repeat Step 1 and 2 until the maximum value for the E2E-Counter is reached and a rollover occurs.

- Expected Outcome

  Pass verdict

  At the beginning of each connection, the IUT transmit E2E-Counter starts with a value of 1 and it is incremented by 1.

  When the transmit E2E-Counter value reaches its upper limit, the E2E-Counter rolls over to 1.

  The calculated E2E-CRC field and E2E-Counter field values meet the requirement of the service.

IDP/COL/STAT/BV-10-C [Verify E2E-CRC and E2E-Counter calculations – Multiple Control Points]

- Test Purpose

  Verify the calculated E2E-CRC and E2E-Counter values when the IUT executes multiple control point procedures.

- Reference

  [3] 4.4, 4.10.2.1, 4.15.1.1

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Status Reader Control Point, IDD Command Control Point characteristic, or IDD Record Access Control Point (IDD RACP) characteristic, if supported.
  - The IUT and the Lower Tester have E2E-Protection enabled.

- Test Procedure

  1. The Upper Tester sends at least two commands to the IUT to execute the procedure included in IDP/COL/RCP/BV-01-C [Reset Status], at least twice, to ensure the IUT increments the transmit E2E-Counter for the IDD Status Reader Control Point to a value greater than 1.
  2. The Lower Tester verifies that the Reset Status Procedure requests contain an E2E-CRC field and E2E-Counter field and the calculated CRC and Counter values meet the requirement of the service.
  3. The Upper Tester sends another command to the IUT to execute a supported IDD Record Access Control Point or an IDD Command Control Point procedure.
  4. The Lower Tester verifies that both, IDD Status Reader Control Point and the other control point, procedure requests contain an E2E-CRC field and E2E-Counter field and the calculated CRC and Counter values meet the requirement of the service.

- Expected Outcome

  Pass verdict

  At the beginning of each connection, the IUT transmit E2E-Counter starts with a value of 1 and it is incremented by 1.

  For each control point, the IUT uses its own transmit E2E-Counter.

  The calculated E2E-CRC field and E2E-Counter field values meet the requirement of the service.

4.7.2 Read IDD Status Changed

- Test Purpose

  Verify that the IUT can read the IDD Status Changed characteristic of an Insulin Delivery Sensor (Lower Tester) for various field configurations.

- Reference

  [3] 4.6

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT and run the preamble procedure for the IUT to initiate connection to an Insulin Delivery Sensor included in the Section 4.2.1.
  - The Upper Tester knows the handle of an IDD Status Changed characteristic contained in the Lower Tester.

- Test Case Configuration

Test Case ID	Test Pattern values
IDP/COL/STAT/BV-11-C [Read IDD Status Changed – Case 1]	The Reservoir Status Changed and Total Daily Insulin Status Changed flags set to 1.
IDP/COL/STAT/BV-12-C [Read IDD Status Changed – Case 2]	The Reservoir Status Changed, Therapy Control State Changed and Operational State Changed set to 1.
IDP/COL/STAT/BV-13-C [Read IDD Status Changed – Case 3]	The Active Basal Rate Status Changed and Annunciation Status Changed flags set to 1.

Table 4.7: Test Pattern table for IDD Status Changed Characteristic

- Test Procedure

  1. Configure the Lower Tester with the Test Pattern values for the Flags field of the IDD Status Changed characteristic as described in Table 4.7 (see IDD Status Changed in [18] for additional details).
  2. For each Test Pattern, repeat the following steps:

     a. The Upper Tester sends a command to the IUT to read an IDD Status Changed characteristic from the Lower Tester.

     b. The Lower Tester receives the read request and then sends an ATT_Read_Response (0x0B) to the IUT containing the value of the IDD Status Changed characteristic.

     c. The IUT receives the ATT_Read_Response and reports the value to the Upper Tester.

- Expected Outcome

  Pass verdict

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

  The IUT receives the response from the Lower Tester and reports the IDD Status Changed characteristic value to the Upper Tester.

  All Reserved for Future Use bit values are ignored.

  If E2E-Protection is enabled by the device (the IDD Features characteristic Flags field bit 0 is set to 1), the IDD Annunciation Status characteristic includes the E2E-Counter and E2E-CRC fields set with appropriate values. Otherwise, the E2E-Counter and E2E-CRC fields are excluded.

4.7.3 Read IDD Status

- Test Purpose

  Verify that the IUT can read the IDD Status characteristic of an Insulin Delivery Sensor (Lower Tester) for various field configurations.

- Reference

  [3] 4.7

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT and run the preamble procedure for the IUT to initiate connection to an Insulin Delivery Sensor included in the Section 4.2.1.
  - The Upper Tester knows the handle of an IDD Status characteristic contained in the Lower Tester.

- Test Case Configuration

Test Case ID	Test Pattern values
IDP/COL/STAT/BV-14-C [Read IDD Status – Case 1]	The Therapy_Control_State field set to Stop, Operational_State field set to Priming, and Reservoir Attached flag set to 1.
IDP/COL/STAT/BV-15-C [Read IDD Status – Case 2]	The Therapy_Control_State field set to Pause, Operational_State field set to Waiting, and Reservoir Attached flag set to 0.
IDP/COL/STAT/BV-16-C [Read IDD Status – Case 3]	The Therapy_Control_State field set to Run, Operational_State field set to Ready, and Reservoir Attached flag set to 1.

Table 4.8: Test Pattern table for IDD Status Characteristic

- Test Procedure

1. Configure the Lower Tester with the Test Pattern values for the Therapy Control State, Operational State and Flags fields of the IDD Status characteristic as described in Table 4.8 (see IDD Status in [18] for additional details).
2. For each Test Pattern, repeat the following steps:
    a. The Upper Tester sends a command to the IUT to read an IDD Status characteristic from the Lower Tester.
    b. The Lower Tester receives the read request and then sends an ATT_Read_Response (0x0B) to the IUT containing the value of the IDD Status characteristic.
    c. The IUT receives the ATT_Read_Response and reports the value to the Upper Tester.

- Expected Outcome

Pass verdict

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

The IUT receives the response from the Lower Tester and reports the IDD Status characteristic value to the Upper Tester.

All Reserved for Future Use bit values are ignored.

If E2E-Protection is enabled by the device (the IDD Features characteristic Flags field bit 0 is set to 1), the IDD Status characteristic includes the E2E-Counter and E2E-CRC fields set with appropriate values. Otherwise, the E2E-Counter and E2E-CRC fields are excluded.

4.7.4 Read IDD Annunciation Status

- Test Purpose

Verify that the IUT can read the IDD Annunciation Status characteristic of an Insulin Delivery Sensor (Lower Tester) for various field configurations.

- Reference

[3] 4.8

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT and run the preamble procedure for the IUT to initiate connection to an Insulin Delivery Sensor included in the Section 4.2.1.
  - The Upper Tester knows the handle of an IDD Annunciation Status characteristic contained in the Lower Tester.
- Test Case Configuration

Test Case ID	Test Pattern values
IDP/COL/STAT/BV-17-C [Read IDD Annunciation Status – Case 1]	Only the mandatory Flags field is present and the Annunciation Present bit and AuxInfo Present bits are set to 0.
IDP/COL/STAT/BV-18-C [Read IDD Annunciation Status – Case 2]	In addition to the mandatory Flags field with Annunciation Present bit set to 1 and AuxInfo Present bits set to 0, the Annunciation Instance ID, Annunciation Type and Annunciation Status fields are present and valid.
IDP/COL/STAT/BV-19-C [Read IDD Annunciation Status – Case 3]	In addition to the mandatory Flags field, with Annunciation Present and AuxInfo1 Present bits set to 1, the Annunciation Instance ID, Annunciation Type, Annunciation Status and AuxInfo1 fields are present and valid.
IDP/COL/STAT/BV-20-C [Read IDD Annunciation Status – Case 4]	In addition to the mandatory Flags field, with Annunciation Present, AuxInfo1, and AuxInfo2 and AuxInfo3 Present bits set to 1, the Annunciation Instance ID, Annunciation Type, Annunciation Status, AuxInfo1, AuxInfo2 and AuxInfo3 fields are present and valid.
IDP/COL/STAT/BV-21-C [Read IDD Annunciation Status – Case 5]	In addition to the mandatory Flags field, with Annunciation Present, AuxInfo1-5 Present bits are set to 1, the Annunciation Instance ID, Annunciation Type, Annunciation Status, AuxInfo1, AuxInfo2, AuxInfo3, AuxInfo4 and AuxInfo5 fields are present and valid.

Table 4.9: Test Pattern table for IDD Annunciation Status Characteristic

- Test Procedure

1. Configure the Lower Tester with the Test Pattern values for the Flags, Annunciation Type, Annunciation Status, AuxInfo1, AuxInfo2, AuxInfo3, AuxInfo4 and AuxInfo5 fields of the IDD Annunciation Status characteristic as described in Table 4.9 (see IDD Annunciation Status in [18] for additional details).
2. For each Test Pattern, repeat the following steps:
   a. The Upper Tester sends a command to the IUT to read an IDD Annunciation Status characteristic from the Lower Tester.
   b. The Lower Tester receives the read request and then sends an ATT_Read_Response (0x0B) to the IUT.
   c. The IUT receives the ATT_Read_Response and reports the value to the Upper Tester.

- Expected Outcome

  Pass verdict

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

  The IUT receives the response from the Lower Tester and reports the IDD Annunciation Status characteristic value to the Upper Tester.

  All Reserved for Future Use bit values are ignored.

  If E2E-Protection is enabled by the device (the IDD Features characteristic Flags field bit 0 is set to 1), the IDD Annunciation Status characteristic includes the E2E-Counter and E2E-CRC fields set with appropriate values. Otherwise, the E2E-Counter and E2E-CRC fields are excluded.

IDP/COL/STAT/BV-22-C [Receive IDD Status Changed Indications]

- Test Purpose

  Verify that the IUT can receive indications of the IDD Status Changed characteristic of an Insulin Delivery Sensor (Lower Tester) for various field configurations.

- Reference

  [3] 4.6

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT and run the preamble procedure for the IUT to initiate connection to an Insulin Delivery Sensor included in the Section 4.2.1.
  - The IDD Status Changed characteristic has been configured for indications.
  - The Upper Tester knows the handle of an IDD Status Changed characteristic contained in the Lower Tester.

- Test Procedure

  1. Configure the Lower Tester with the Test Pattern values for the Flags field of the IDD Status Changed characteristic as described in Table 4.7 (see IDD Status Changed in [18] for additional details).
  2. Select a Test Pattern in Table 4.7, and perform the following steps:
     a. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Status Changed characteristic value to the IUT.
     b. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Status Changed characteristic handle and value and reports it to the Upper Tester.
     c. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
     d. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the indications from the Lower Tester in the expected combinations and reports the IDD Status Changed characteristic value to the Upper Tester which evaluates the value using the Test Pattern values in Table 4.7.

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

IDP/COL/STAT/BV-23-C [Receive IDD Status Indications]

- Test Purpose

  Verify that the IUT can receive indications of the IDD Status characteristic of an Insulin Delivery Sensor (Lower Tester) for various field configurations.

- Reference

  [3] 4.7

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT and run the preamble procedure for the IUT to initiate connection to an Insulin Delivery Sensor included in the Section 4.2.1.
  - The IDD Status characteristic has been configured for indications.
  - The Upper Tester knows the handle of an IDD Status characteristic contained in the Lower Tester.

- Test Procedure

  1. Configure the Lower Tester with the Test Pattern values for the Therapy Control State, Operational State and Flags field of the IDD Status characteristic as described in Table 4.8 (see IDD Status in [18] for additional details).
  2. Select a Test Pattern in Table 4.8, and perform the following steps:
     a. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Status characteristic value to the IUT.
     b. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Status characteristic handle and value and reports it to the Upper Tester.
     c. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
     d. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the indications from the Lower Tester in the expected combinations and reports the IDD Status characteristic value to the Upper Tester which evaluates the value using the Test Pattern in Table 4.8.

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

IDP/COL/STAT/BV-24-C [Receive IDD Annunciation Status Indications]

- Test Purpose

  Verify that the IUT can receive indications of the IDD Annunciation Status characteristic of an Insulin Delivery Sensor (Lower Tester) for various field configurations.

- Reference

  [3] 4.8

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT and run the preamble procedure for the IUT to initiate connection to an Insulin Delivery Sensor included in the Section 4.2.1.
  - The IDD Annunciation Status characteristic has been configured for indications.
  - The Upper Tester knows the handle of an IDD Annunciation Status characteristic contained in the Lower Tester.

- Test Procedure

  1. Configure the Lower Tester with the Test Pattern values for the Flags field, the annunciation information, optional auxiliary information fields of the IDD Annunciation Status characteristic as described in Table 4.9 (see IDD Annunciation Status in [18] for additional details).
  2. Select a Test Pattern in Table 4.9, and perform the following steps:
     a. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Annunciation Status characteristic value to the IUT.
     b. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Annunciation Status characteristic handle and value and reports it to the Upper Tester.
     c. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
     d. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the indications from the Lower Tester in the expected combinations and reports the IDD Annunciation Status characteristic value to the Upper Tester which evaluates the value using the Test Pattern in Table 4.9.

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

4.8 Status Reader Control Point Procedures

This test group contains test cases to verify the IUT's ability to configure, conduct compliant operation and interpret values of the IDD Status Reader Control Point characteristic.

Table 3.9 in [4] defines the Op Codes and Operands used in the IDD Status Reader Control Point procedure test cases in this section.

IDP/COL/RCP/BV-01-C [Reset Status]

- Test Purpose

  Verify that the IUT can perform the Reset Status procedure.

- Reference

  [3] 4.10.2.1

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Status Reader Control Point characteristic.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write the Reset Status Op Code (0x030C) to the IDD Status Reader Control Point using an Operand consisting of a Flags field with a value indicating a reset of all status changed flags.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Status Reader Control Point characteristic with the *Response Code* Op Code (0x0303) and an Operand consisting of the Request Op Code (0x030C) followed by the Response Code Value for Success (0x0F).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Status Reader Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends the Reset Status Op Code with appropriate Operand to the IDD Status Reader Control Point.

  The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Status Reader Control Point characteristic handle and value and reports it to the Upper Tester.

4.8.1 Get Active Bolus IDs, Active Bolus Delivery, Total Daily Insulin Status and Insulin On Board Procedures

- Test Purpose

  For each selected test case in Table 4.10, verify that the IUT can perform the selected procedure with the described Op Code and, if applicable, Operand.

- Reference

  [3] 4.10.1

- Initial Condition
  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Status Reader Control Point characteristic.
- Test Case Configuration

Test Case ID	Reference [3]	Op Code	Operand	Response Op Code	Response Operand
IDP/COL/RCP/BV-02-C [Get Active Bolus IDs]	4.10.2.2	Get Active Bolus IDs Op Code (0x0330)	No Operand	Get Active Bolus IDs Response Op Code (0x033F)	Number of Active Boluses = 2 Bolus ID1 and Bolus ID2
IDP/COL/RCP/BV-03-C [Get Active Bolus Delivery – Programmed Details]	4.10.2.3	Get Active Bolus Delivery Op Code (0x0356)	Bolus ID: ID of an active bolus Bolus Value Selection: Programmed (0x0F)	Get Active Bolus Delivery Response Op Code (0x0359)	Active Bolus Delivery record with the programmed details for the requested bolus
IDP/COL/RCP/BV-04-C [Get Active Bolus Delivery – Delivered Details]	4.10.2.3	Get Active Bolus Delivery Op Code (0x0356)	Bolus ID: ID of an active bolus Bolus Value Selection: Delivered (0x3C)	Get Active Bolus Delivery Response Op Code (0x0359)	Active Bolus Delivery record with the delivered details for the requested bolus and the Bolus Delay Time field set to 0xFFFF
IDP/COL/RCP/BV-05-C [Get Total Daily Insulin Status]	4.10.2.5	Get Total Daily Insulin Status Op Code (0x0395)	No Operand	Get Total Daily Insulin Status Response Op Code (0x039A)	Total Daily Insulin Sum of Bolus Delivered Total Daily Insulin Sum of Basal Delivered Total Daily Insulin Sum of Bolus and Basal Delivered
IDP/COL/RCP/BV-06-C [Get Insulin On Board]	4.10.2.8	Get Insulin On Board Op Code (0x03F3)	No Operand	Get Insulin On Board Response Op Code (0x03FC)	Insulin On Board record with: Flags field, Insulin On Board field, and Remaining Duration

Table 4.10: Test Cases for Get Active Bolus IDs, Active Bolus Delivery, Total Daily Insulin Status and Insulin On Board procedures

- Test Procedure

  For each selected test case in Table 4.10:

  1. The Upper Tester sends a command to the IUT to write the <Op Code> to the IDD Status Reader Control Point and, if applicable, the <Operand>, described in Table 4.10.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Status Reader Control Point characteristic with the <Response Op Code> and <Response Operand> described in Table 4.10.
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Status Reader Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  For each selected test case in Table 4.10, the IUT sends to the IDD Status Reader Control Point characteristic the <Opcode> and, if applicable, <Operand>, described in Table 4.10.

  The IUT receives an indication of the IDD Status Reader Control Point characteristic with the <Response Op Code> and an Operand consisting of the <Response Operand> described in Table 4.10 and reports it to the Upper Tester.

IDP/COL/RCP/BV-07-C [Get Active Basal Rate Delivery]

- Test Purpose

  Verify that the IUT can perform the Get Active Basal Rate Delivery procedure.

- Reference

  [3] 4.10.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the desired <Control Point Characteristic> set to IDD Status Reader Control Point characteristic.

- Test Procedure

  1. Perform an action on the Lower Tester that will induce it to activate a programmed basal rate.
  2. The Upper Tester sends a command to the IUT to write the Get Active Basal Rate Delivery Op Code (0x0365) to the IDD Status Reader Control Point with no Operand.
  3. The IUT sends an ATT_Write_Request with the instruction from step 2 to the Lower Tester.
  4. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Status Reader Control Point characteristic with the Get Active Basal Rate Delivery Response Op Code (0x036A) and an Operand consisting of an Active Basal Rate Delivery record containing the delivery details for the active basal rate.
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Status Reader Control Point characteristic handle and value and reports it to the Upper Tester.
  6. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  7. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the IDD Status Reader Control Point characteristic value with an Active Basal Rate Delivery record containing the delivery details of the active basal rate and reports it to the Upper Tester.

4.8.2 Get Counter

- Test Purpose

  Verify that the IUT can perform the Get Counter procedure.

- Reference

  [3] 4.10.2.6

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Status Reader Control Point characteristic.
  - The Upper Tester knows a supported Counter Type and Counter Value Selection of the IUT as specified in the IXIT [15].

- Test Case Configuration

Test Case ID	Counter Value Selection
IDP/COL/RCP/BV-08-C [Get Counter - Remaining]	Remaining
IDP/COL/RCP/BV-09-C [Get Counter - Elapsed]	Elapsed

Table 4.11: Test Cases for IDD Status Reader Control Point Characteristic Get Counter procedures

- Test Procedure

  For one supported Test Case in Table 4.11, perform the following steps:

  1. The Upper Tester sends a command to the IUT to write the Get Counter Op Code (0x03A6) to the IDD Status Reader Control Point with an Operand consisting of supported Counter Type and Counter Value Selection field values.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Status Reader Control Point characteristic with the Get Counter Response Op Code (0x03A9) and an Operand consisting of a Counter record containing the details of the counter type and value requested.
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Status Reader Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the IDD Status Reader Control Point characteristic value with a Counter record containing the details of the counter type and value requested and reports it to the Upper Tester.

IDP/COL/RCP/BV-10-C [Get Delivered Insulin]

- Test Purpose

  Verify that the IUT can perform the Get Delivered Insulin procedure.

- Reference

  [3] 4.10.2.7

- Initial Condition
  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Status Reader Control Point characteristic.
- Test Procedure
  1. The Upper Tester sends a command to the IUT to write the Get Delivered Insulin Op Code (0x03C0) to the IDD Status Reader Control Point with no Operand.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Status Reader Control Point characteristic with the Get Delivered Insulin Response Op Code (0x03CF) and an Operand consisting of a Delivered Insulin record containing the details of the insulin delivered with an amount close to but less than the upper limit of 80000.00 IU.
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Status Reader Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. The Upper Tester sends a command to the IUT to write the Get Delivered Insulin Op Code (0x03C0) to the IDD Status Reader Control Point with no Operand.
  7. The IUT sends an ATT_Write_Request with the instruction from step 6 to the Lower Tester.
  8. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Status Reader Control Point characteristic with the Get Delivered Insulin Response Op Code (0x03CF) and an Operand consisting of a Delivered Insulin record containing the details of the insulin delivered with an amount close to but greater than the lower limit of 0 IU.
  9. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Status Reader Control Point characteristic handle and value and reports it to the Upper Tester.
  10. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  11. Verify that the characteristic values meet the requirements of the service.
- Expected Outcome

  Pass verdict

  The IUT receives the IDD Status Reader Control Point characteristic value with a Delivered Insulin record containing the details of the insulin delivered and reports it to the Upper Tester both before and after the rollover.

4.8.3 IDD Status Reader Control Point – Error Handling

This test group contains test cases to verify compliant operation of the IUT when an IDD Status Reader Control Point error is received from the Server side (Lower Tester).

IDP/COL/RCPE/BI-01-C [Status Reader CP – Invalid Operand]

- Test Purpose

  Verify that the IUT responds appropriately when it receives an Invalid Operand IDD Status Reader Control Point Response Code.
- Reference

  [3] 4.10.2.6, 4.15.5

- Initial Condition
  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Status Reader Control Point characteristic.
  - The Upper Tester knows a supported Counter Type and Counter Value Selection of the IUT as specified in the IXIT [15].
- Test Procedure
  1. The Upper Tester sends a command to the IUT to write the Get Counter Op Code (0x03A6) to the IDD Status Reader Control Point with an Operand consisting of a Counter Type and Counter Value Selection field values supported by the IUT as specified in the IXIT [15].
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Status Reader Control Point characteristic with the Response Code Op Code (0x0303) and an Operand consisting of the Request Op Code (0x03A6) followed by the Response Code Value for Invalid Operand (0x71).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Status Reader Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.
- Expected Outcome

  Pass verdict

  The IUT receives the IDD Status Reader Control Point characteristic value with Response Code for Invalid Operand (0x71) and reports it to the Upper Tester.

IDP/COL/RCPE/BI-02-C [Status Reader CP – Procedure not completed]

- Test Purpose

  Verify that the IUT responds appropriately when it receives a Procedure not completed IDD Status Reader Control Point Response Code.
- Reference

  [3] 4.10.2.5, 4.15.5
- Initial Condition
  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Status Reader Control Point characteristic.
- Test Procedure
  1. The Upper Tester sends a command to the IUT to write the Get Total Daily Insulin Status Op Code (0x0395) to the IDD Status Reader Control Point with no Operand.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Status Reader Control Point characteristic with the Response Code Op Code (0x0303) and an Operand containing a Request Op Code (0x0395) followed by the Response Code Value for Procedure not completed (0x72).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Status Reader Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code Value of Procedure not completed (0x72) and reports it to the Upper Tester.

IDP/COL/RCPE/BI-03-C [Status Reader CP – Op Code not supported]

- Test Purpose

  Verify that the IUT responds appropriately when it receives an Op Code not supported IDD Status Reader Control Point Response Code.

- Reference

  [3] 4.10.2.6, 4.10.2.7, 4.15.5

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Status Reader Control Point characteristic.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write an optional Op Code and an applicable Operand to the IDD Status Reader Control Point.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Status Reader Control Point characteristic with the Response Code Op Code (0x0303) and an Operand containing the Request Op Code (Optional Op Code) followed by the Response Code Value for Op Code not supported (0x70).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Status Reader Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code Value of Op Code not supported (0x70) and reports it to the Upper Tester.

4.9 Command Control Point Procedures

This test group contains test cases to verify the IUT's ability to configure, conduct compliant operation and interpret values of the IDD Command Control Point and IDD Command Data characteristics.

Table 3.10 in [4] defines the Op Codes and Operands used in the IDD Command Control Point procedure test cases in this section.

4.9.1 IDD Command CP procedures using a common response

- Test Purpose

  For each selected test case in Table 4.12, verify that the IUT can perform the selected procedure with the described Op Code and, if applicable, the Operand.

- Reference

  [3] 4.11.1

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Case Configuration

Test Case ID	Reference	Op Code	Operand
IDP/COL/CCP/BV-01-C [Set Therapy Control State]	[3] 4.11.2.3	Set Therapy Control State Op Code (0x0F5A)	Therapy Control State field set to Run (0x55)
IDP/COL/CCP/BV-02-C [Set Flight Mode]	[3] 4.11.2.4	Set Flight Mode Op Code (0x0F66)	No Operand
IDP/COL/CCP/BV-03-C [Cancel TBR Adjustment]	[3] 4.11.2.10	Cancel TBR Adjustment Op Code (0x1111)	No Operand
IDP/COL/CCP/BV-04-C [Start Priming]	[3] 4.11.2.22	Start Priming Op Code (0x127B)	Amount field
IDP/COL/CCP/BV-05-C [Set Initial Reservoir Fill Level]	[3] 4.11.2.24	Set Initial Reservoir Fill Level Op Code (0x128B)	Fill Level field
IDP/COL/CCP/BV-06-C [Reset Reservoir Insulin Operation Time]	[3] 4.11.2.25	Reset Reservoir Insulin Operation Time Op Code (0x12B7)	No Operand
IDP/COL/CCP/BV-07-C [Set Max Bolus Amount]	[3] 4.11.2.33	Set Max Bolus Amount Op Code (0x148D)	Max Bolus Amount field

Table 4.12: IDD Command CP test cases using a common response

- Test Procedure

  For each selected test case in Table 4.12:

  1. The Upper Tester sends a command to the IUT to write the <Op Code> to the IDD Command Control Point and, if applicable, the <Operand>, described in Table 4.12.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Response Code Op Code (0x0F55) and an Operand containing a Request Op Code <Op Code> described in Table 4.12, followed by the Response Code Value for Success (0x0F).

4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  For each selected test case in Table 4.12, the IUT sends to the IDD Command Control Point characteristic the <Op Code> and, if applicable, the <Operand> described in Table 4.12.

  The IUT receives an indication of the IDD Command Control Point characteristic with the Response Code Value set to Success (0x0F) and reports it to the Upper Tester.

4.9.2 IDD Command CP procedures using a unique response

- Test Purpose

  For each selected test case in Table 4.13, verify that the IUT can perform the selected procedure with the described Op Code and, if applicable, the Operand.

- Reference

  [3] 4.11.1

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Case Configuration

Test Case ID	Reference	Op Code	Operand	Response Code Op Code	Response Operand
IDP/COL/CCP/BV-08-C [Snooze Annunciation]	[3] 4.11.2.5	Snooze Annunciation Op Code (0x0F69)	Annunciation Instance ID	Snooze Annunciation Response Op Code (0x0F96)	Annunciation Instance ID of the snoozed annunciation
IDP/COL/CCP/BV-09-C [Confirm Annunciation]	[3] 4.11.2.6	Confirm Annunciation Op Code (0x0F99)	Annunciation Instance ID	Confirm Annunciation Response Op Code (0x0FA5)	Annunciation Instance ID of the confirmed annunciation
IDP/COL/CCP/BV-10-C [Get TBR Template]	[3] 4.11.2.11	Get TBR Template Op Code (0x111E)	TBR Template Number	Get TBR Template Response Op Code (0x1122)	TBR Template record
IDP/COL/CCP/BV-11-C [Set TBR Template]	[3] 4.11.2.12	Set TBR Template Op Code (0x112D)	TBR Template record	Set TBR Template Response Op Code (0x1144)	TBR Template Number
IDP/COL/CCP/BV-12-C [Set Bolus - With a Bolus Template]	[3] 4.11.2.13	Set Bolus Op Code (0x114B)	Bolus record comprising the Bolus Template Number	Set Bolus Response Op Code (0x1177)	Bolus ID
IDP/COL/CCP/BV-13-C [Cancel Bolus]	[3] 4.11.2.14	Cancel Bolus Op Code (0x1178)	Bolus ID	Cancel Bolus Response Op Code (0x1187)	Bolus ID
IDP/COL/CCP/BV-14-C [Get Available Boluses]	[3] 4.11.2.15	Get Available Boluses Op Code (0x1188)	No Operand	Get Available Boluses Response Op Code (0x11B4)	Flags
IDP/COL/CCP/BV-15-C [Get Bolus Template]	[3] 4.11.2.16	Get Bolus Template Op Code (0x11BB)	Bolus Template Number	Get Bolus Template Response Op Code (0x11D2)	Bolus Template record
IDP/COL/CCP/BV-16-C [Reset Template Status]	[3] 4.11.2.19	Reset Template Status Op Code (0x121D)	Number of Templates to Reset Template Numbers	Reset Template Status Response Op Code (0x1221)	Number of Templates Reset Template Numbers

Test Case ID	Reference	Op Code	Operand	Response Code Op Code	Response Operand
IDP/COL/CCP/BV-17-C [Activate Profile Templates]	[3] 4.11.2.20	Activate Profile Templates Op Code (0x122E)	Number of Profile Templates to Activate Profile Template Numbers	Activate Profile Templates Response Op Code (0x1247)	Number of Profile Templates Activated Profile Template Numbers
IDP/COL/CCP/BV-18-C [Get Max Bolus Amount]	[3] 4.11.2.32	Get Max Bolus Amount Op Code (0x147D)	No Operand	Get Max Bolus Amount Response Op Code (0x1482)	Max Bolus Amount

Table 4.13: IDD Command CP test cases using a unique response

- Test Procedure

  For each selected test case in Table 4.13:

  1. The Upper Tester sends a command to the IUT to write the <Op Code> to the IDD Command Control Point and, if applicable, the <Operand>, described in Table 4.13.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the <Response Code Op Code> and <Response Operand> described in Table 4.13.
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  For each selected test case in Table 4.13, the IUT sends to the IDD Command Control Point characteristic the <Op Code> and, if applicable, the <Operand> described in Table 4.13.

  The IUT receives an indication of the IDD Command Control Point characteristic with the <Response Code Op Code> and <Response Operand> described in Table 4.13 and reports it to the Upper Tester.

4.9.3 Read Profile Templates

- Test Purpose

  Verify that the IUT can perform a read of a profile template using the appropriate IDD Command Data procedure.

- Reference

  [3] 4.11.2.1

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Case Configuration

Test Case ID	Reference	<Profile Template Op Code>	<Profile Template Response Op Code>	<Profile Template Record>
IDP/COL/CCP/BV-19-C [Read Basal Rate Profile]	[3] 4.11.2.7	Read Basal Rate Profile Template (0x0FAA)	Read Basal Rate Profile Template Response (0x0FC3)	Basal Rate Profile Template record
IDP/COL/CCP/BV-20-C [Read ISF Profile]	[3] 4.11.2.26	Read ISF Profile Template (0x12B8)	Read ISF Profile Template Response (0x12D1)	ISF Profile Template record

Test Case ID	Reference	<Profile Template Op Code>	<Profile Template Response Op Code>	<Profile Template Record>
IDP/COL/CCP/BV-21-C [Read I2CHO Rate Profile]	[3] 4.11.2.28	Read I2CHO Ratio Profile Template (0x12ED)	Read I2CHO Ratio Profile Template Response (0x1414)	I2CHO Ratio Profile Template record
IDP/COL/CCP/BV-22-C [Read Target Glucose Range Profile]	[3] 4.11.2.30	Read Target Glucose Range Profile Template (0x1428)	Read Target Glucose Range Profile Template Response (0x1441)	Target Glucose Range Profile Template record

Table 4.14: Test Cases for IDD Command Control Point Characteristic read profile template procedures

- Test Procedure

  For each supported profile type in Table 4.14, repeat the following steps:

  1. The Upper Tester sends a command to the IUT to write the appropriate read <Profile Template Op Code> (see Table 4.14) with an Operand consisting of the corresponding template number.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends ATT_Handle_Value_Notifications of the IDD Command Data characteristic with the Response Op Code set to the appropriate <Profile Template Response Op Code> (see Table 4.14) with an Operand containing the corresponding <Profile Template Record> (see Table 4.14) until the profile template has been completely reported to the IUT.
  4. For each ATT_Handle_Value_Notifications from the Lower Tester containing the IDD Command Data characteristic handle and value, the IUT stores the <Profile Template Record> (see Table 4.14) details.
  5. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Response Code Op Code (0x0F55) and an Operand containing a Request Op Code with value of <Profile Template Op Code> (see Table 4.14) followed by the Response Code Value for Success (0x0F).
  6. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  7. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  8. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the appropriate profile template time blocks and reconstructs the profile template and reports it to the Upper Tester.

  The IUT receives the Response Code Value for Success (0xF0) indicating that the complete profile template was reported and reports it to the Upper Tester.

4.9.4 Write Profile Templates

- Test Purpose

  Verify that the IUT can perform a write of a profile template using the appropriate IDD Command Data procedure.

- Reference

  [3] 4.11.2.2

- Initial Condition
  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.
- Test Case Configuration

Test Case ID	Reference	<Profile Template Op Code>	<Profile Template Response Op Code>	<Profile Template Record>
IDP/COL/CCP/BV-23-C [Write Basal Rate Profile Template]	[3] 4.11.2.8	Write Basal Rate Profile Template (0x0FCC)	Write Basal Rate Profile Template Response (0x0FF0)	Basal Rate Profile Template record
IDP/COL/CCP/BV-24-C [Write ISF Profile Template]	[3] 4.11.2.27	Write ISF Profile Template (0x12DE)	Write ISF Profile Template Response (0x12E2)	ISF Profile Template record
IDP/COL/CCP/BV-25-C [Write I2CHO Profile Template]	[3] 4.11.2.29	Write I2CHO Ratio Profile Template (0x141B)	Write I2CHO Ratio Profile Template Response (0x1427)	I2CHO Ratio Profile Template record
IDP/COL/CCP/BV-26-C [Write Target Glucose Range Profile Template]	[3] 4.11.2.31	Write Target Glucose Range Profile Template (0x144E)	Write Target Glucose Range Profile Template Response (0x1472)	Target Glucose Range Profile Template record

Table 4.15: Test Cases for IDD Command Control Point Characteristic write profile template procedures

- Test Procedure

  For each supported profile type in Table 4.15, repeat the following steps:

  1. The Upper Tester sends a sequence of commands to the IUT to write the appropriate write <Profile Template Op Code> with an Operand consisting of the corresponding <Profile Template Record>.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. For each ATT_Write_Request from the IUT, the Lower Tester sends ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the corresponding <Profile Template Response Op Code> with an Operand containing the Flags field, corresponding profile template number and the First Time Block Number Index field.
  4. The IUT receives each ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  5. For each ATT_Handle_Value_Indication from the Lower Tester, the IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Flags field, corresponding profile template number and the First Time Block Number Index field. The Flags fields signals the completion of the write transaction (Bit 0: Transaction Completed set to 1).

  The IUT reports completion of the writing procedure to the Upper Tester.

IDP/COL/CCP/BV-27-C [Set TBR Adjustment Procedure – New & Changed]

- Test Purpose

  Verify that the IUT can perform the Set TBR Adjustment procedure.

- Reference

  [3] 4.11.2.9

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write the Set TBR Adjustment Op Code (0x0FFF) to the IDD Command Control Point with an Operand consisting of a TBR record indicating a new TBR is to be set.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Response Code Op Code (0x0F55) and an Operand containing a Request Op Code (0x0FFF) followed by the Response Code Value for Success (0x0F).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. The Upper Tester sends a command to the IUT to write the Set TBR Adjustment Op Code (0x0FFF) to the IDD Command Control Point with an Operand consisting of a TBR record indicating the previously set TBR should be changed.
  7. The IUT sends an ATT_Write_Request with the instruction from step 6 to the Lower Tester.
  8. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Response Code Op Code (0x0F55) and an Operand containing a Request Op Code (0x0FFF) followed by the Response Code Value for Success (0x0F).
  9. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  10. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  11. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives confirmation of the Set TBR Adjustment procedure for a new TBR and reports it to the Upper Tester.

  The IUT receives confirmation of the Set TBR Adjustment procedure for a changed TBR and reports it to the Upper Tester.

IDP/COL/CCP/BV-28-C [Set Bolus Procedure - Without a Bolus Template]

- Test Purpose

  Verify that the IUT can perform the Set Bolus procedure, with the bolus record not including a Bolus Template Number, using the Test Pattern described in Table 4.16.

Test Pattern	Bolus Type	Bolus Details
1	Fast	Any applicable
2	Extended	Any applicable
3	Multiwave	Any applicable

Table 4.16: Test Pattern table for IDD Command Control Point Characteristic Set Bolus procedure

- Reference

  [3] 4.11.2.13

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Procedure

  For one supported Bolus Type in Table 4.16 Test Pattern, perform the following steps:

  1. The Upper Tester sends a command to the IUT to write the Set Bolus Op Code (0x114B) to the IDD Command Control Point with an Operand consisting of a Bolus record with a supported bolus type as described in Table 4.16.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Set Bolus Response Op Code (0x1177) and an Operand containing a Bolus ID field.
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives confirmation of the Set Bolus procedure requested and reports it to the Upper Tester.

IDP/COL/CCP/BV-29-C [Set Bolus Template Procedure]

- Test Purpose

  Verify that the IUT can perform the Set Bolus Template procedure using the Test Pattern in Table 4.17.

Test Pattern	Bolus Type
1	Fast
2	Extended
3	Multiwave

Table 4.17: Test Pattern table for IDD Command Control Point Characteristic Set Bolus Template procedure

- Reference

  [3] 4.11.2.17

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Procedure

  For one supported Bolus Type in Table 4.17 Test Pattern, perform the following steps:

  1. The Upper Tester sends a command to the IUT to write the Set Bolus Template Op Code (0x11DD) to the IDD Command Control Point with an Operand consisting of a Bolus Template record with a supported bolus type as described in Table 4.17.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Set Bolus Template Response Op Code (0x11E1) and an Operand containing a Bolus Template Number field.
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives confirmation of the Set Bolus Template procedure requested and reports it to the Upper Tester.

IDP/COL/CCP/BV-30-C [Get Template Status and Details Procedure]

- Test Purpose

  Verify that the IUT can perform the Get Template Status and Details procedure.

- Reference

  [3] 4.11.2.18

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write the Get Template Status and Details Op Code (0x11EE) to the IDD Command Control Point with no Operand.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. For each supported profile template type, the Lower Tester sends an ATT_Handle_Value_Notification of the IDD Command Data characteristic with Get Template Status and Details Response Op Code (0x1212) and an Operand containing a Template Status and Details record.
  4. The IUT receives each ATT_Handle_Value_Notification from the Lower Tester containing the IDD Command Data characteristic handle and value and reports it to the Upper Tester.
  5. After all the Template Status and Details records of support profile template types are notified, the Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Response *Code* Op Code (0x0F55) and an Operand containing a Request Op Code (0x11EE) followed by the Response Code Value for Success (0x0F).
  6. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  7. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  8. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives details of all the supported profile template types and reports them to the Upper Tester.

  The IUT receives confirmation of the Get Template Status and Details procedure requested and reports it to the Upper Tester.

IDP/COL/CCP/BV-31-C [Get Activated Profile Templates Procedure]

- Test Purpose

  Verify that the IUT can perform the Get Activated Profile Templates procedure.

- Reference

  [3] 4.11.2.21

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write the Get Activated Profile Templates Op Code (0x1248) to the IDD Command Control Point with no Operand.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Get Activated Profile Templates Response Op Code (0x1274) and an Operand containing a Number of Active Profile Templates field set to 0.
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Perform an action on the Lower Tester that will induce it to activate a profile template.

7. The Upper Tester sends a command to the IUT to write the Get Activated Profile Templates Op Code (0x1248) to the IDD Command Control Point with no Operand.
8. The IUT sends an ATT_Write_Request with the instruction from step 7 to the Lower Tester.
9. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Get Activated Profile Templates Response Op Code (0x1274) and an Operand containing a Number of Active Profile Templates field set to 1 and an array of template numbers containing the profile template number.
10. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
11. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
12. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT, in Step 4, reports to the Upper Tester that the Number of Active Profile Templates field is set to 0.

  The IUT, in Step 10, reports to the Upper Tester that the Number of Active Profile Templates field is set to 1 and the corresponding profile template number.

IDP/COL/CCP/BV-32-C [Stop Priming Procedure]

- Test Purpose

  Verify that the IUT can perform the Stop Priming procedure.

- Reference

  [3] 4.11.2.23

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to start the priming procedure by performing IDP/COL/CCP/BV-04-C [Start Priming].
  2. The Upper Tester sends a command to the IUT to write the Stop Priming Op Code (0x1284) to the IDD Command Control Point with no Operand.
  3. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  4. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Response Code Op Code (0x0F55) and an Operand containing a Request Op Code (0x1284) followed by the Response Code Value for Success (0x0F)
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  6. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  7. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives confirmation of the Stop Priming procedure requested and reports it to the Upper Tester.

4.9.5 IDD Command Control Point – Error Handling

This test group contains test cases to verify compliant operation of the IUT when an IDD Command Control Point error is received from the Server side (Lower Tester).

IDP/COL/CCPE/BI-01-C [Command CP – Procedure not completed]

- Test Purpose

  Verify that the IUT responds appropriately when it receives a Procedure not completed IDD Command Control Point Response Code.

- Reference

  [3] 4.11.2.3, 4.15.5

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write the Set Therapy Control *State* Op Code (0x0F5A) to the IDD Command Control Point with an Operand comprising the Therapy Control State field set to Run (0x55).
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Response Code Op Code (0x0F55) and an Operand containing a Request Op Code (0x0F5A) followed by the Response Code Value for Procedure not completed (0x72).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code Value of Procedure not completed (0x72) and reports it to the Upper Tester.

IDP/COL/CCPE/BI-02-C [Command CP – Parameter out of range]

- Test Purpose

  Verify that the IUT responds appropriately when it receives a Parameter out *of range* IDD Command Control Point Response Code.

- Reference

  [3] 4.11.2.8, 4.15.5

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write the Write Basal Rate Profile *Template* Op Code (0x0FCC) to the IDD Command Control Point with an Operand consisting of a basal rate profile template record including a template number.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Response Code Op Code (0x0F55) and an Operand containing a Request Op Code (0x0FCC) followed by the Response Code Value for Parameter out of range (0x73).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code Value of Parameter out of range (0x73) and reports it to the Upper Tester.

IDP/COL/CCPE/BI-03-C [Command CP – Procedure not applicable]

- Test Purpose

  Verify that the IUT responds appropriately when it receives a Procedure not applicable IDD Command Control Point Response Code.

- Reference

  [3] 4.11.2.23, 4.15.5

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write the Stop Priming Op Code (0x1284) to the IDD Command Control Point and no Operand.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Response Code Op Code (0x0F55) and an Operand containing the Request Op Code (0x1284) followed by the Response Code Value for Procedure not applicable (0x74).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code Value of Procedure not applicable (0x74) and reports it to the Upper Tester.

IDP/COL/CCPE/BI-04-C [Command CP – Plausibility check failed]

- Test Purpose

  Verify that the IUT responds appropriately when it receives a Plausibility check failed IDD Command Control Point Response Code.

- Reference

  [3] 4.11.2.2, 4.11.2.8, and 4.15.5

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Command Control Point characteristic.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write the Write Basal Rate Profile Template Op Code (0x0FCC) to the IDD Command Control Point with an Operand consisting of a basal rate profile template record.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD Command Control Point characteristic with the Response Code Op Code (0x0F55) and an Operand containing a Request Op Code (0x0FCC) followed by the Response Code Value for Plausibility check failed (0x75).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD Command Control Point characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code Value of Plausibility check failed (0x75) and reports it to the Upper Tester.

4.10 IDD Record Access Control Point

This test group contains test cases to verify the IUT's ability to configure, conduct compliant operation and interpret values of the IDD Record Access Control Point and IDD History Data characteristics.

Table 3.22 in [18] defines the Op Codes and Operands used in the IDD Record Access Control Point procedure test cases in this section.

4.10.1 Report Stored Records

- Test Purpose

  For each selected test case in Table 4.18, verify that the IUT can perform the Report Stored Records procedure with the described Operator and, if applicable, the Operand.

- Reference

  [17] 4.13.1, 4.13.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.

- Test Case Configuration

Test Case ID	Operator	Operand Filter Type	Operand Filter Parameter	# of Notifications
IDP/COL/RAR/BV-01-C [Report Stored Records – All records]	All records (0x33)	N/A	N/A	3 notifications representing all records
IDP/COL/RAR/BV-02-C [Report Stored Records – First record]	First Record (0x66)	N/A	N/A	1 notification representing the oldest record
IDP/COL/RAR/BV-03-C [Report Stored Records – Last record]	Last Record (0x69)	N/A	N/A	1 notification representing the newest record
IDP/COL/RAR/BV-04-C [Report Stored Records – Greater than or equal to]	Greater than or equal to (0x55)	Sequence Number (0x0F)	minimum filter value = 2	2 notifications representing the 2nd and 3rd record
IDP/COL/RAR/BV-05-C [Report Stored Records – Within range of (inclusive)]	Within range of (inclusive) (0x5A)	Sequence Number (0x0F)	minimum filter value = 1, maximum filter value = 2	2 notifications representing the 1st and 2nd record

Table 4.18: Report Stored Record Op Code with selected Operators

- Test Procedure

  For each selected test case in Table 4.18:

  1. Perform an action on the Lower Tester that will induce it to generate three records.
  2. The Upper Tester sends a command to the IUT to write the Report Stored Records Op Code (0x33) to the IDD RACP using the <Operator>, and as applicable <Operand Filter Type> and <Operand Filter Parameter>, described in Table 4.18.
  3. The IUT sends an ATT_Write_Request with the instruction from step 2 to the Lower Tester.
  4. The Lower Tester sends <# of Notifications> ATT_Handle_Value_Notifications of the IDD History Data characteristic.
  5. The IUT receives <# of Notifications> ATT_Handle_Value_Notifications from the Lower Tester containing the IDD History Data characteristic handle and values and reports them to the Upper Tester.
  6. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand consisting of the Request Op Code (0x33) followed by the Response Code Value for Success (0xF0).
  7. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value.
  8. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  9. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  For each selected test case in Table 4.18, the IUT receives <# of Notifications> with the request to report <Operator> and reports them to the Upper Tester.

  The IUT receives the Response Code Value for Success (0xF0) and reports it to the Upper Tester.

IDP/COL/RAR/BV-06-C [Report Stored Records – Greater than or equal to with Sequence Number Filtered by Reference Time Event]

- Test Purpose

  Verify that the IUT can perform the Report Stored Records procedure with an Operator of Greater than or equal to and Filter Type of Sequence Number Filtered by Reference Time Event.

- Reference

  [3] 4.13.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.

- Test Procedure

  1. Perform an action on the Lower Tester that will induce it to generate three records.
  2. Perform an action on the Lower Tester that will induce the recording of a Reference Time history event.
  3. The Upper Tester sends a command to the IUT write the Report Stored Records Op Code (0x33) to the IDD RACP using an Operator of Greater than or equal *to* (0x55) and Operand consisting of a Filter Type Sequence Number Filtered by Reference Time Event (0x33) followed by a minimum filter value representing the second record of the generated records.
  4. The IUT sends an ATT_Write_Request with the instruction from step 3 to the Lower Tester.
  5. The Lower Tester sends an ATT_Handle_Value_Notification of the IDD History Data characteristic representing the Reference Time history event record (last record).
  6. The IUT receives the ATT_Handle_Value_Notification from the Lower Tester containing the IDD History Data characteristic handle and value and reports it to the Upper Tester.
  7. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand consisting of the Request Op Code (0x33) followed by the Response Code Value for *Success* (0xF0).
  8. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value.
  9. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  10. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Reference Time history event record (last record) with the request to report stored records greater than or equal to the second record filtered by reference time event and reports it to the Upper Tester.

  The IUT receives the Response Code Value for Success (0xF0) and reports it to the Upper Tester.

IDP/COL/RAR/BV-07-C [Report Stored Records – Greater than or equal to with Sequence Number Filtered by Non-Reference Time Event]

- Test Purpose

  Verify that the IUT can perform the Report Stored Records procedure with an Operator of Greater than or equal *to* and Filter Type of Sequence Number Filtered by Non-Reference Time Event.

- Reference

  [3] 4.13.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.

- Test Procedure

  1. Perform an action on the Lower Tester that will induce it to generate three records.
  2. Perform an action on the Lower Tester that will induce the recording of a Reference Time history event.
  3. The Upper Tester sends a command to the IUT to write the Report Stored Records Op Code (0x33) to the IDD RACP using an Operator of Greater than or equal *to* (0x55) and Operand consisting of a Filter Type Sequence Number Filtered by Non-Reference Time Event (0x3C) followed by a minimum filter value representing the second record of the generated records.
  4. The IUT sends an ATT_Write_Request with the instruction from step 3 to the Lower Tester.
  5. The Lower Tester sends two ATT_Handle_Value_Notifications of the IDD History Data characteristic representing the second and third record.
  6. The IUT receives the ATT_Handle_Value_Notifications from the Lower Tester containing the IDD History Data characteristic handle and value and reports them to the Upper Tester.
  7. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand consisting of the Request Op Code (0x33) followed by the Response Code Value for Success (0xF0).
  8. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value.
  9. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  10. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the second and third records with the request to report stored records greater than or equal to the second record and reports them to the Upper Tester.

  The IUT receives the Response Code Value for Success (0xF0) and reports it to the Upper Tester.

IDP/COL/RAR/BV-08-C [Report Stored Records – Record Added]

- Test Purpose

  Verify that the IUT responds properly for the case where a record is added between the Report Number of Stored Records procedure and the Report Stored Records procedure.

- Reference

  [17] 4.13.2, 4.13.2.2, and 4.13.2.4

- Initial Condition
  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.
- Test Procedure
  1. Perform an action on the Lower Tester that will induce it to generate three records.
  2. The Upper Tester sends a command to the IUT to write the Report Number of Stored Records Op Code (0x5A) to the IDD RACP using an Operator of All records (0x33).
  3. The IUT sends an ATT_Write_Request with the instruction from step 2 to the Lower Tester.
  4. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Report Number of Stored Records Response Op Code (0x66), an Operator of Null (0x0F) and an Operand representing that three records were found.
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value and reports it to the Upper Tester.
  6. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  7. Perform an action on the Lower Tester that will induce it to generate another record.
  8. The Upper Tester sends a command to the IUT to write the Report Stored Records Op Code (0x33) to the IDD RACP using an Operator of All records (0x33).
  9. The IUT sends an ATT_Write_Request with the instruction from step 8 to the Lower Tester.
  10. The Lower Tester sends four ATT_Handle_Value_Notifications of the IDD History Data characteristic.
  11. The IUT receives four ATT_Handle_Value_Notifications from the Lower Tester containing the IDD History Data characteristic handle and values and reports them to the Upper Tester.
  12. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand consisting of the Request Op Code (0x33) followed by the Response Code Value for Success (0xF0).
  13. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value.
  14. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  15. Verify that the IUT received all characteristic values and continues to process commands normally.
- Expected Outcome

  Pass verdict

  The IUT receives the four records with the request for report all stored records and reports them to the Upper Tester.

  The IUT receives the Response Code Value for Success (0xF0) and reports it to the Upper Tester.

IDP/COL/RAR/BV-09-C [Report Stored Records – Record Deleted]

- Test Purpose

  Verify that the IUT responds properly for the case where a record is deleted between the Report Number of Stored Records procedure and the Report Stored Records procedure.
- Reference

  [17] 4.13.2, 4.13.2.2, and 4.13.2.4

- Initial Condition
  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.
- Test Procedure
  1. Perform an action on the Lower Tester that will induce it to generate three records.
  2. The Upper Tester sends a command to the IUT to write the Report Number of Stored Records Op Code (0x5A) to the IDD RACP using an Operator of All records (0x33).
  3. The IUT sends an ATT_Write_Request with the instruction from step 2 to the Lower Tester.
  4. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Report Number of Stored Records Response Op Code (0x66), an Operator of Null (0x0F) and an Operand representing that three records were found.
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value and reports it to the Upper Tester.
  6. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  7. Perform an action on the Lower Tester that will induce it to delete a stored record.
  8. The Upper tester sends a command to the IUT to write the Report Stored Records Op Code (0x33) to the IDD RACP using an Operator of All records (0x33).
  9. The IUT sends an ATT_Write_Request with the instruction from step 8 to the Lower Tester.
  10. The Lower Tester sends two ATT_Handle_Value_Notifications of the IDD History Data characteristic.
  11. The IUT receives two *ATT*_Handle_Value_Notifications from the Lower Tester containing the IDD History Data characteristic handle and values and reports them to the Upper Tester.
  12. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand consisting of the Request Op Code (0x33) followed by the Response Code Value for Success (0xF0).
  13. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value.
  14. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  15. Verify that the IUT received all characteristic values and continues to process commands normally.
- Expected Outcome

  Pass verdict

  The IUT receives the two records with the request for report all stored records and reports them to the Upper Tester.

  The IUT receives the Response Code Value for Success (0xF0) and reports it to the Upper Tester.

4.10.2 Delete Stored Records

- Test Purpose

  For each selected test case in Table 4.19, verify that the IUT can perform the Delete Stored Records procedure with the described Operator and, if applicable, the Operand.
- Reference

  [17] 4.13.1, 4.13.2.3
- Initial Condition
  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.

- Test Case Configuration

Test Case ID	Operator	Operand Filter Type	Operand Filter Parameter
IDP/COL/RAD/BV-01-C [Delete Stored Records - All records]	All records (0x33)	N/A	N/A
IDP/COL/RAD/BV-02-C [Delete Stored Records - Less than or equal to]	Less than or equal to (0x3C)	a supported Operand Filter Type	<maximum filter value>

Table 4.19: Delete Stores Records Op Code with Operators All records and Less than or equal

- Test Procedure

  For each selected test case in Table 4.19:

  1. The Upper Tester sends a command to the IUT to write the Delete Stored Records Op Code (0x3C) to the IDD RACP using the <Operator>, and as applicable, <Operand Filter Type> and <Operand Filter Parameter>, described in Table 4.19.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand consisting of the Request Op Code (0x3C) followed by the Response Code Value for Success (0xF0).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic values meet the requirements of the service.

- Expected Outcome

  Pass verdict

  For each selected test case in Table 4.19, the IUT receives the Response Code Value for Success (0xF0) and reports it to the Upper Tester.

4.10.3 Report Number of Stored Records

- Test Purpose

  For each selected test case in Table 4.20, verify that the IUT can perform the Report Number of Stored Records procedure with the described Operator and, if applicable, the Operand .

- Reference

  [17] 4.13.2.2

- Initial Condition

  Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.

- Test Case Configuration

Test Case ID	Operator	Operand Filter Type	Operand Filter Parameter	Response Operand
IDP/COL/RAN/BV-01-C [Report Number of Stored Records - All records]	All records (0x33)	N/A	N/A	3

Test Case ID	Operator	Operand Filter Type	Operand Filter Parameter	Response Operand
IDP/COL/RAN/BV-02-C [Report Number of Stored Records - Greater than or equal to]	Greater than or equal to (0x55)	Sequence Number (0x0F)	minimum filter value = 2	2

Table 4.20: Report Number of Stored Records Op Code with Operators All records and Greater than or equal to

- Test Procedure

  For each selected test case in Table 4.20

  1. Perform an action on the Lower Tester that will induce it to generate three records.
  2. The Upper Tester sends a command to the IUT to write the Report Number of Stored Records Op Code (0x5A) to the IDD RACP using the <Operator>, and as applicable, <Operand Filter Type> and <Operand Filter Parameter>, described in Table 4.20.
  3. The IUT sends an ATT_Write_Request with the instruction from step 2 to the Lower Tester.
  4. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Report Number of Stored Records Response Op Code (0x66), an Operator of Null (0x0F) and the Operand <Response Operand> representing the number of records found.
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value and reports it to the Upper Tester.
  6. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  For each selected test case in Table 4.20, the IUT receives one indication of the IDD RACP characteristic with the Report Number of Stored Records Response Op Code (0x66), an Operator of Null (0x0F) and an Operand <Response Operand> representing the number of records found and reports it to the Upper Tester.

IDP/COL/RAA/BV-01-C [Abort Operation – Report Stored Records]

- Test Purpose

  Verify that the IUT can perform the Abort Operation procedure when a Report Stored Records procedure is being executed by the IDD RACP characteristic.

- Reference

  [17] 4.13.2.4, 4.13.2.5

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.

- Test Procedure

  1. Perform an action on the Lower Tester that will induce it to generate enough records such that the transmission is not able to complete before the IDD RACP Abort Operation procedure is attempted. In most cases ~200 records are sufficient since this will take over 5 seconds to transfer. Alternatively, the Lower Tester could transmit the records slowly.
  2. The Upper Tester sends a command to the IUT to write the Report Stored Records Op Code (0x33) to the IDD RACP using an Operator of All records (0x33).

3. The IUT sends an ATT_Write_Request with the instruction from step 2 to the Lower Tester.
4. The Lower Tester starts to send a number of notifications of the IDD History Data characteristic.
5. The IUT receives one or more ATT_Handle_Value_Notification from the Lower Tester containing the IDD History Data characteristic handle and value and reports it to the Upper Tester.
6. The Upper Tester sends a command to the IUT to write the Abort Operation Op Code (0x55) to the IDD RACP with an Operator of Null (0x0F) and no Operand.
7. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand containing a Request Op Code (0x55) followed by the Response Code Value for *Success* (0xF0).
8. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value and reports it to the Upper Tester.
9. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
10. Verify that the IDD History Data notifications stop.
11. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives some, but not all notifications of the IDD History Data characteristic.

  The IUT receives one indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand containing a Request Op Code (0x55) followed by the Response Code Value for Success (0xF0) and reports it to the Upper Tester.

4.10.4 IDD Record Access Control Point – Error Handling

This test group contains test cases to verify compliant operation of the IUT when an IDD RACP error is received from the Server side (Lower Tester).

IDP/COL/RAE/BI-01-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 the Sensor responds with No Records Found.

- Reference

  [17] 4.13.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.

- Test Procedure

  1. Perform an action on the Lower Tester that will induce it to contain no stored records.
  2. The Upper Tester sends a command to the IUT to write the Report Stored Records Op Code (0x33) to the IDD RACP using an Operator of All records (0x33).
  3. The IUT sends an ATT_Write_Request with the instruction from step 2 to the Lower Tester.
  4. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand consisting of the Request Op Code (0x33) followed by the Response Code Value for No Records Found (0x06).

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

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code Value for No Records Found (0x06) and reports it to the Upper Tester.

IDP/COL/RAE/BI-02-C [IDD Record Access Control Point – Procedure Timeout Handling]

- Test Purpose

  Verify that if the IUT does not receive a response to an IDD RACP Op Code, it will timeout after the Attribute Protocol Timeout.

- Reference

  [17] 4.13.2.4, 4.15.4

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.

- Test Procedure

  1. Create a stored record with at least one IDD History Data characteristic event.
  2. The Upper Tester sends a command to the IUT to write the Report Stored Records Op Code (0x33) to the IDD RACP using an Operator of All records (0x33).
  3. The IUT sends an ATT_Write_Request with the instruction from step 2 to the Lower Tester.
  4. The Lower Tester does NOT send an indication of the IDD RACP characteristic for at least a time longer than the Attribute Protocol Timeout period.
  5. After the specified timeout period, the IUT sends a notification of the Attribute Transaction Timeout to the Upper Tester, and the IUT considers the procedure to have failed.

- Expected Outcome

  Pass verdict

  After the Attribute Protocol Timeout period, the IUT notifies the Upper Tester of the timeout.

IDP/COL/RAE/BI-03-C [IDD Record Access Control Point – Operator not supported]

- Test Purpose

  Verify that the IUT responds appropriately when it receives an Operator not supported IDD RACP Response Code.

- Reference

  [3] 4.13.2.6

- Initial Condition
  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.
  - The Upper Tester knows the IUT supported optional Operator, as specified in the IXIT [15], and supported Op Code and corresponding supported Operand.
- Test Procedure
  1. The Upper Tester sends a command to the IUT to write a supported Op Code to the IDD RACP using a supported optional Operator and corresponding supported Operand Filter Type with appropriate Filter Parameters.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand consisting of the Request Op Code (supported Op Code value) followed by the Response Code Value for Operator not supported (0x04).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the IUT returns to stable state and can process commands normally.
- Expected Outcome

  Pass verdict

  The IUT receives the Response Code Value of Operator not supported (0x04) and reports it to the Upper Tester.

IDP/COL/RAE/BI-04-C [IDD Record Access Control Point – Abort unsuccessful]

- Test Purpose

  Verify that the IUT responds appropriately when it receives an Abort unsuccessful IDD RACP Response Code.
- Reference

  [17] 4.13.2.4, 4.13.2.5
- Initial Condition
  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.
- Test Procedure
  1. Perform an action on the Lower Tester that will induce it to generate enough records such that the transmission is not able to complete before the IDD RACP Abort Operation procedure is attempted. In most cases ~200 records are sufficient since this will take over 5 seconds to transfer. Alternatively, the Lower Tester could transmit the records slowly.
  2. The Upper Tester sends a command to the IUT to write the Report Stored Records Op Code (0x33) to the IDD RACP using an Operator of All records (0x33).
  3. The IUT sends an ATT_Write_Request with the instruction from step 2 to the Lower Tester.
  4. The Lower Tester starts to send a number of notifications of the IDD History Data characteristic.
  5. The IUT receives one or more ATT_Handle_Value_Notification from the Lower Tester containing the IDD History Data characteristic handle and value and reports it to the Upper Tester.

6. The Upper Tester sends a command to the IUT to write the Abort Operation Op Code (0x55) to the IDD RACP with an Operator of Null (0x0F) and no Operand.
7. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand containing a Request Op Code (0x55) followed by the Response Code Value for Abort unsuccessful (0x07).
8. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value and reports it to the Upper Tester.
9. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
10. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code Value of Abort unsuccessful (0x07) and reports it to the Upper Tester.

- Notes

  The Lower Tester will not allow an abort for this test case.

IDP/COL/RAE/BI-05-C [IDD Record Access Control Point – Procedure not completed]

- Test Purpose

  Verify that the IUT responds appropriately when it receives a Procedure not completed IDD RACP Response Code.

- Reference

  [17] 4.13.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.

- Test Procedure

  1. Perform an action on the Lower Tester that will induce it to generate three records.
  2. The Upper Tester sends a command to the IUT to write the Report Stored Records Op Code (0x33) to the IDD RACP using an Operator of All records (0x33).
  3. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  4. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand consisting of the Request Op Code (0x33) followed by the Response Code Value for Procedure not completed (0x08).
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value and reports it to the Upper Tester.
  6. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  7. Verify that the IUT returns to stable state and can process commands normally.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code Value of Procedure not completed (0x08) and reports it to the Upper Tester.

IDP/COL/RAE/BI-06-C [IDD Record Access Control Point – Operand not supported]

- Test Purpose

  Verify that the IUT responds appropriately when it receives an Operand not supported IDD RACP Response Code.

- Reference

  [3] 4.13.2.6

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.
  - The Upper Tester knows the IUT optional supported Operand, as specified in the IXIT [15], and supported Op Code and Operator.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write a supported Op Code to the IDD RACP using a supported Operator and corresponding optional supported Operand Filter Type with appropriate Filter Parameters.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Handle_Value_Indication of the IDD RACP characteristic with the Response Code Op Code (0x0F), an Operator of Null (0x0F) and an Operand consisting of the Request Op Code (supported Op Code value) followed by the Response Code Value for Operand not supported (0x09).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the IDD RACP characteristic handle and value and reports it to the Upper Tester.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the IUT returns to stable state and can process commands normally.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code Value of Operand not supported (0x09) and reports it to the Upper Tester.

IDP/COL/RAE/BI-07-C [IDD Record Access Control Point – Procedure Already in Progress]

- Test Purpose

  Verify that the IUT responds appropriately when it receives a Procedure Already in Progress ATT Error Code.

- Reference

  [17] 4.13, 4.15.2

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point characteristic.

- Test Procedure

  1. Perform an action on the Lower Tester that will induce it to generate enough records such that the transmission is not able to complete before the next procedure is attempted. In most cases ~200 records are sufficient since this will take over 5 seconds to transfer. Alternatively, the Lower Tester could transmit the records slowly.
  2. The Upper Tester sends a command to the IUT to write the Report Stored Records Op Code (0x33) to the IDD RACP using an Operator of All records (0x33).
  3. The IUT sends an ATT_Write_Request with the instruction from step 2 to the Lower Tester.
  4. The Lower Tester starts to send a number of notifications of the IDD History Data characteristic.
  5. The IUT receives one or more ATT_Handle_Value_Notification from the Lower Tester containing the IDD History Data characteristic handle and value and reports it to the Upper Tester.
  6. The Upper Tester sends a command to the IUT to write the Report Number of Stored Records Op Code (0x5A) to the IDD RACP with an Operator of All records (0x33).
  7. The Lower Tester sends an ATT_Error_Response with Error Code Procedure Already in Progress (0xFE).
  8. The IUT receives an ATT_Error_Response from the Lower Tester and reports its Error Code to the Upper Tester.
  9. Verify that the IUT returns to stable state and can process commands normally.

- Expected Outcome

  Pass verdict

  The IUT receives the ATT Error Code of Procedure Already in Progress (0xFE) and reports it to the Upper Tester.

4.11 General Error Handling

This test group contains test cases to verify the IUT's error handling behavior for various scenarios.

IDP/COL/IDE/BI-01-C [General Error Handling – Non-zero RFU bit values]

- Test Purpose

  Verify that the IUT responds appropriately when it receives a non-zero RFU bit value.

- Reference

  [3] 4.7

- Initial Condition

  - A connection between the Lower Tester and the IUT has been established.
  - The Upper Tester knows the handle of the IDD Status characteristic contained in the Lower Tester.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to read the IDD Status characteristic.
  2. The IUT sends an ATT_Read_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Read_Response to the IUT with at least 1 RFU bit of the Flags field set to 1.
  4. The IUT receives the ATT_Read_Response and reports the values to the Upper Tester.

- Expected Outcome

  Pass verdict

  The IUT sends an ATT_Read_Request to read the IDD Status characteristic.

  The IUT receives an ATT_Read_Response with at least 1 RFU bit set to 1 and the IUT processes the at least 1 RFU bit as if the at least 1 RFU bit was set to 0. The IUT reports the values to the Upper Tester.

IDP/COL/IDE/BI-02-C [General Error Handling – Client Characteristic Configuration Descriptor Improperly Configured]

- Test Purpose

  Verify that the IUT responds appropriately when it receives a Client Characteristic Configuration Descriptor Improperly Configured ATT Error Code.

- Reference

  [3] 4.15.5

- Initial Condition

  - A connection between the Lower Tester and the IUT has been established.
  - The IDD Status Reader Control Point on the Lower Tester is not configured for indication.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write the Get Active Bolus IDs Op Code (0x0330) to the IDD Status Reader Control Point with no Operand.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Error_Response with Error Code Client Characteristic Configuration Descriptor Improperly Configured (0xFD).
  4. The IUT receives an ATT_Error_Response from the Lower Tester and reports its Error Code to the Upper Tester.
  5. Verify that the IUT returns to stable state and can process commands normally.

- Expected Outcome

  Pass verdict

  The IUT receives the ATT Error Code of Client Characteristic Configuration Descriptor Improperly Configured (0xFD) and reports it to the Upper Tester.

IDP/COL/IDE/BI-03-C [General Error Handling – Invalid CRC]

- Test Purpose

  Verify that the IUT responds appropriately when it receives an Invalid CRC ATT Application Error code.

- Reference

  [3] 4.10.2.5, 4.15.5

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Status Reader Control Point characteristic.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write the Get Total Daily Insulin Status Op Code (0x0395) to the IDD Status Reader Control Point with no Operand and a valid E2E-CRC field value.
  2. The IUT sends an ATT_Write_Request with the instruction from step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Error_Response with Error Code Invalid CRC (0x81).
  4. The IUT receives an ATT_Error_Response from the Lower Tester and reports its Error Code to the Upper Tester.
  5. Verify that the IUT returns to stable state and can process commands normally.

- Expected Outcome

  Pass verdict

  The IUT receives the ATT Error Code of Invalid CRC (0x81) and reports it to the Upper Tester.

IDP/COL/IDE/BI-04-C [General Error Handling – Invalid Counter]

- Test Purpose

  Verify that the IUT responds appropriately when it receives an Invalid Counter ATT Application Error code.

- Reference

  [3] 4.10.2.5, 4.15.5

- Initial Condition

  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Status Reader Control Point characteristic.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to write the Get Total Daily Insulin Status Op Code (0x0395) to the IDD Status Reader Control Point with no Operand and a valid E2E-Counter field value.
  2. The IUT sends an ATT_Write_Request with the instruction from Step 1 to the Lower Tester.
  3. The Lower Tester sends an ATT_Error_Response with Error Code Invalid Counter (0x82).
  4. The IUT receives an ATT_Error_Response from the Lower Tester and reports its Error Code to the Upper Tester.
  5. Verify that the IUT returns to stable state and can process commands normally.

- Expected Outcome

  Pass verdict

  The IUT receives the ATT Error Code of Invalid Counter (0x82) and reports it to the Upper Tester.

4.12 Current Time Service

This test group contains test cases to verify the IUT's ability to configure and interpret values of the Current Time Service Current Time characteristic.

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

- Test Purpose

  Verify that the IUT can configure an Insulin Delivery Sensor (Lower Tester) to notify the Current Time characteristic of the Current Time Service.

- Reference

  [3] 4.18

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The IUT has discovered the Client Characteristic Configuration descriptor of the Current Time characteristic contained in the Lower Tester.

- Test Procedure

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

- Expected Outcome

  Pass verdict

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

IDP/COL/CTS/BV-02-C [Read Current Time Characteristic]

- Test Purpose

  Verify that the IUT can read the Current Time characteristic from an Insulin Delivery Sensor (Lower Tester).

- Reference

  [3] 4.18

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The Upper Tester knows the handle of a Current Time characteristic contained in the Lower Tester.

- Test Procedure

  1. The Upper Tester sends a command to the IUT to read the Current Time characteristic from the Lower Tester.

2. The Lower Tester receives the read request and then sends an ATT_Read_Response (0x0B) to the IUT containing a defined value of the Current Time characteristic.
3. The IUT receives the ATT_Read_Response and reports the value to the Upper Tester.

- Expected Outcome

  Pass verdict

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

  The IUT receives the response from the Lower Tester and sends the response containing the correct Exact Time 256 value and Adjust reason to the Upper Tester.

IDP/COL/CTS/BV-03-C [Verify that the timestamp in the Reference Time event agrees with the Current Time Service value]

- Test Purpose

  Verify that the value of the Date Time field provided in the Reference Time history event of the IDD Record Access Control Point and IDD History data characteristics is the same as the value of the Date Time field within the Current Time characteristic, within a small tolerance.

- Reference

  [17] 4.13, 4.14, and 4.18

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester as described in Section 4.2.1.
  - Since IUT permissions for the IDD RACP and IDD History Data characteristics require a specific security mode and security level, establish a connection meeting those requirements.
  - Perform the preamble described in Section 4.2.2 with the <Control Point Characteristic> set to IDD Record Access Control Point (RACP) characteristic.
  - The handle of each characteristic value referenced in the test case below has been previously discovered by the IUT and it is known by the Upper Tester.

- Test Procedure

  1. Perform an action on the Lower Tester that will induce the recording of a Reference Time history event.
  2. The Upper Tester sends a command to the IUT to write the Report Stored Records Op Code (0x33) to the IDD RACP using an Operator of Last Record (0x69).
  3. The IUT sends an ATT_Write_Request with the instruction from Step 2 to the Lower Tester.
  4. The IUT receives an ATT_Handle_Value_Notification from the Lower Tester containing the Reference Time history event including the Date Time field.
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester signaling the end of the IDD RACP Report Stored Records with Operator Last Record procedure.
  6. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  7. Immediately upon the IUT sending the ATT_Handle_Value_Confirmation, the Upper Tester sends a command to the IUT to read the value of the Current Time characteristic. The IUT sends an ATT_Read_Request (0x0A) to the Lower Tester containing the handle specified by the Upper Tester.

8. The IUT receives an ATT_Read_Response (0x0B) and reports the value to the Upper Tester.
9. Compare the Date Time field value reported in the Reference Time history event received from the IDD History Event notification at Step #4 with the Date Time field value reported in the Current Time characteristic received at Step #8.

- Expected Outcome

  Pass verdict

  The two Date Time fields values, from Step 4 and 8, are comparable within reason.

- Note

  The Upper Tester measures the duration between Step 1 through Step 8.

4.13 Battery Service

This test group contains test cases to verify the IUT's ability to configure and interpret values of the Battery Service Battery Level characteristic.

IDP/COL/BAS/BV-01-C [Configure Battery Level Characteristic for Notification]

- Test Purpose

  Verify that the IUT can configure an Insulin Delivery Sensor (Lower Tester) to notify the Battery Level characteristic of the Battery Service.

- Reference

  [3] 4.19

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The IUT has discovered the Client Characteristic Configuration descriptor of the Battery Level characteristic contained in the Lower Tester.

- Test Procedure

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

- Expected Outcome

  Pass verdict

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

IDP/COL/BAS/BV-02-C [Read Battery Level Characteristic]

- Test Purpose

  Verify that the IUT can read the Battery Level characteristic from an Insulin Delivery Sensor (Lower Tester).

- Reference

  [3] 4.19

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The Upper Tester knows the handle of a Battery Level characteristic contained in the Lower Tester.
- Test Procedure
  1. The Upper Tester sends a command to the IUT to read the Battery Level characteristic from the Lower Tester.
  2. The Lower Tester receives the read request and then sends an ATT_Read_Response (0x0B) to the IUT containing a defined value of the Battery Level characteristic.
  3. The IUT receives the ATT_Read_Response and reports the value to the Upper Tester.
- Expected Outcome

  Pass verdict

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

  The IUT receives the response from the Lower Tester and sends the response containing the correct Battery Level value to the Upper Tester.

4.14 Write Alert Level

This test group contains test cases to verify the IUT's ability to write values to the Immediate Alert Service Alert Level characteristic.

IDP/COL/IAS/BV-01-C [Write to Alert Level Characteristic]

- Test Purpose

  Verify that the IUT can write to the Alert Level characteristic of the Immediate Alert Service of an Insulin Delivery Sensor (Lower Tester).
- Reference

  [3] 4.20
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The Upper Tester knows the handle of an Alert Level characteristic contained in the Lower Tester.
- Test Procedure

  The Upper Tester sends a command to the IUT to write a mild alert level to the Lower Tester.
- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Write_Command (0x52) to the Lower Tester with the handle set to that of the Alert Level characteristic with the value set to «Mild Alert».

4.15 Bond Management Service

This test group contains test cases to verify compliant operation when the Bond Management Control Point procedures are used.

Table 3.3 in [10] defines the Op Codes and Operand values, valid for the LE transport, used in the Bond Management Control Point procedure test cases in this section.

IDP/COL/BMS/BV-02-C [Write Bond Management Control Point Characteristic Value – with Parameter]

- Test Purpose

  Verify that the IUT can write to the Bond Management Control Point characteristic using the Test Pattern described in Table 4.21.

Test Pattern	BM Features Supported Bit	Op Code	Parameter Value
1	Bit 5, Octet 0	0x03	Authorization Code
2	Bit 3, Octet 1	0x06	Authorization Code
3	Bit 1, Octet 2	0x09	Authorization Code

Table 4.21: Test Pattern for Writing to Bond Management CP

- Reference

  [3] 3.3, 4.21

  [10] 3.1.1

- Initial Condition

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

- Test Procedure

  1. For one supported Test Pattern described in Table 4.21, the Upper Tester sends a command to the IUT to write an ATT_Write_Request containing the handle of the Bond Management Control Point characteristic, <Op Code> and a <Parameter Value>, corresponding to the required authorization code, which fits within the used MTU.
  2. The IUT sends the ATT_Write_Request with the instruction from Step 1 to the Lower Tester.
  3. The IUT receives an ATT_Write_Response from the Lower Tester and reports the results to the Upper Tester.
  4. Re-establish an ATT Bearer connection between the Lower Tester and IUT by running the preamble procedure in Section 4.2.1.
  5. For each of the remaining supported Op Code(s), described in Table 4.21, after the connection is re-established, repeat Steps 1-4.

- Expected Outcome

  Pass verdict

  For each supported Op Code:

  - The IUT sends a correctly formatted ATT_Write_Request to the Lower Tester.
  - The IUT receives an ATT_Write_Response from the Lower Tester.

- The parameter value received by the Lower Tester corresponds to the value sent by the IUT.
- Upon receiving the ATT_Write_Response from the Lower Tester, the IUT sends the result to the Upper Tester.

IDP/COL/BMS/BI-01-C [Write Bond Management Control Point Characteristic Value – Insufficient Authorization]

- Test Purpose

  Verify that the IUT responds appropriately when it receives an Insufficient Authorization ATT Error Response Code.

- Reference

  [3] 3.3, 4.21.4

  [10] 3.1.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The IUT has the necessary security permissions from the Lower Tester to access the Bond Management Service characteristics.

- Test Procedure

  1. For a supported Op Code, the Upper Tester sends a command to the IUT to send an ATT_Write_Request containing the handle of the Bond Management Control Point characteristic, the supported Op Code, and a parameter value, corresponding to the required authorization code, containing a value which fits within the used MTU.
  2. The IUT sends the ATT_Write_Request with the instruction from Step 1 to the Lower Tester.
  3. The IUT receives an ATT_Error_Response with the Error Code set to Insufficient Authorization from the Lower Tester and reports it to the Upper Tester.
  4. Verify that the IUT considers the procedure to have failed.

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Write_Request to the Lower Tester.

  The IUT receives an ATT_Error_Response with the Error Code set to Insufficient Authorization from the Lower Tester.

  Upon receiving the ATT_Error_Response from the Lower Tester, the IUT sends the result to the Upper Tester.

IDP/COL/BMS/BI-02-C [Write Bond Management Control Point Characteristic Value – Operation Failed]

- Test Purpose

  Verify that the IUT behaves appropriately when it receives an Operation Failed Attribute Application Error Code.

- Reference

  [3] 3.3, 4.21.4

  [10] 3.1.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The IUT has the necessary security permissions from the Lower Tester to access the Bond Management Service characteristics.

- Test Procedure

  1. For a supported Op Code, the Upper Tester sends a command to the IUT to send an ATT_Write_Request containing the handle of the Bond Management Control Point characteristic, the supported Op Code, and a parameter value, corresponding to the required authorization code, which fits within the used MTU.
  2. The IUT sends the ATT_Write_Request with the instruction from Step 1 to the Lower Tester.
  3. The IUT receives an error response with the Attribute Application Error Code set to Operation Failed from the Lower Tester and reports it to the Upper Tester.
  4. Verify that the IUT considers the procedure to have failed.

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Write_Request to the Lower Tester.

  The IUT receives an error response with the Attribute Application Error Code set to Operation Failed from the Lower Tester.

  Upon receiving the Attribute Application Error Code from the Lower Tester, the IUT sends the result to the Upper Tester.

IDP/COL/BMS/BI-03-C [Write Bond Management Control Point Characteristic Value – Op Code not supported]

- Test Purpose

  Verify that the IUT behaves appropriately when it receives an Op Code not supported Attribute Application Error Code.

- Reference

  [3] 3.3, 4.21.4

  [10] 3.1.1

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The IUT has the necessary security permissions from the Lower Tester to access the Bond Management Service characteristics.
  - The Upper Tester knows the IUT supported optional Op Code and corresponding parameter value as specified in the IXIT [15].
- Test Procedure
  1. The Upper Tester sends a command to the IUT to send an ATT_Write_Request with the handle of the Bond Management Control Point characteristic, an optional Op Code, and a parameter value, corresponding to the required authorization code, containing a value which fits within the used MTU.
  2. The IUT sends the ATT_Write_Request with the instruction from Step 1 to the Lower Tester.
  3. The IUT receives an error response with the Attribute Application Error Code set to Op Code not supported from the Lower Tester and reports it to the Upper Tester.
  4. Verify that the IUT considers the procedure to have failed.
- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Write_Request to the Lower Tester.

  The IUT receives an error response with the Attribute Application Error Code set to Op Code not supported from the Lower Tester.

  Upon receiving the Attribute Application Error Code from the Lower Tester, the IUT sends the result to the Upper Tester.

IDP/COL/BMS/BV-03-C [Write Long Bond Management Control Point Characteristic Value]

- Test Purpose

  Verify that the IUT can write a long characteristic value to the Bond Management Control Point characteristic.
- Reference

  [3] 3.3, 4.1, 4.21

  [10] 3.1.1
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The IUT has the necessary security permissions from the Lower Tester to access the Bond Management Service characteristics.
  - The length of the parameter used is higher than the used MTU size.

- Test Procedure

  The following test procedure has to be executed for one of the supported Op Codes in Table 4.21.

  1. The Upper Tester commands the IUT to execute the GATT Characteristic Value Reliable Writes sub-procedure with the handle and the value of the Bond Management Control Point characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Prepare_Write_Request to the Lower Tester.

  The IUT receives an ATT_Write_Response from the Lower Tester.

  The IUT sends a correctly formatted ATT_Execute_Write_Request to the Lower Tester.

  Upon receiving an ATT_Execute_Write_Response from the Lower Tester the IUT sends the result to the Upper Tester.

  The characteristic value received by the Lower Tester meets the requirements of the service.

4.16 Common Behavior for IDD Features and Bond Management Feature characteristics

This test group contains test cases to verify compliant operation when configuring for indication or reading the IDD Features and Bond Management Feature characteristics upon reconnection.

4.16.1 Read feature characteristic with bonding enabled

- Test Purpose

  Verify that, after the initial connection and bonding, the IUT can read the feature characteristics listed in Table 4.22.

- Reference

  [16] 4

- Initial Condition

  - For each test case in Table 4.22, the Upper Tester knows the handle of the Feature characteristic contained in the Lower Tester.
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The IUT is bonded with the Lower Tester.

- Test Case Configuration

Test Case	Reference	Feature characteristic
IDP/COL/FEA/BV-02-C [Read IDD Features characteristic - Bonding enabled]	[16] 4.9	IDD Features characteristic
IDP/COL/BMS/BV-04-C [Read Bond Management Feature characteristic - Bonding enabled]	[16] 4.21.5	Bond Management Feature characteristic

Table 4.22: Read Feature characteristics with bonding enabled

- Test Procedure

  1. The Upper Tester commands the IUT to read the Feature characteristic, listed in Table 4.22, from the Lower Tester.
  2. The IUT sends an ATT_Read_Request to the Lower Tester containing the handle specified by the Upper Tester.
  3. The Lower Tester receives the ATT_Read_Request and then sends an ATT_Read_Response to the IUT containing the value of the characteristic.
  4. The IUT receives the ATT_Read_Response and reports the value to the Upper Tester.

- Expected Outcome

  Pass verdict

  The IUT reads the Feature characteristic, listed in Table 4.22, and reports its value to the Upper Tester.

  Reserved for future use bit values are ignored.

4.16.2 Enable feature characteristic for indication or read Feature characteristic upon reconnection

- Test Purpose

  Verify that, for each test case in Table 4.23, the IUT can either enable for indication the Feature characteristic or read the characteristic upon reconnection.

- Reference

  [16] 4

- Initial Condition

  - For each test case in Table 4.23, the handles of the Feature characteristic and Client Characteristic Configuration descriptors have been previously discovered by the Upper Tester during the test procedure in Section 4.4.1 or are known to the Upper Tester by other means.
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1.
  - The IUT is not paired and bonded with the Lower Tester.

- Test Case Configuration

Test Case	Reference	Feature characteristic
IDP/COL/FEA/BV-03-C [Enable IDD Features characteristic for indication or read characteristic upon reconnection]	[16] 4.9	IDD Features characteristic
IDP/COL/BMS/BV-05-C [Enable Bond Management Feature characteristic for indication or read characteristic upon reconnection]	[16] 4.21.5	Bond Management Feature characteristic

Table 4.23: Enable Feature characteristic for indication or read characteristic upon reconnection

- Test Procedure

  1. The Upper Tester orders the IUT to initiate pairing and bonding.
  2. The Upper Tester commands the IUT to perform, either alternative 2A or 2B:

     Alternative 2A (Configure the Feature characteristic, listed in Table 4.23, for indication):
     2A.1. The IUT configures the Feature characteristic for indication.

     Or,

     Alternative 2B (Read the Feature characteristic, listed in Table 4.23, upon reconnection):
     2B.1. The Upper Tester commands the IUT to disconnect, and the IUT terminates the connection with the Lower Tester.
     2B.2. The Upper Tester commands the IUT to reconnect to the Lower Tester.
     2B.3 The IUT reads the Feature characteristic from the Lower Tester and reports the value to the Upper Tester.

- Expected Outcome

  Pass verdict

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

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

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

  Reserved for future use bit values are ignored.

5 Test case mapping

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

The columns for the TCMT are defined as follows:

Item: Contains a logical expression based on specific entries from the associated ICS document. Contains a logical expression (using the operators AND, OR, NOT as needed) based on specific entries from the applicable ICS document(s). The entries are in the form of y/x references, where y corresponds to the table number and x corresponds to the feature number as defined in the ICS document for Insulin Delivery Profile (IDP) [5].

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

Test Case(s): The applicable test case identifiers are required for Bluetooth Qualification if the corresponding y/x references defined in the Item column are supported. Further details about the function of the TCMT are elaborated in [2].

For the purpose and structure of the ICS/IXIT, refer to [2].

Item	Feature	Test Case(s)
IDP 3/3	Insulin Delivery Service UUID in AD over LE	IDP/SEN/IDSA/BV-01-C
IDP 3/4	Local Name included in AD or Scan Response over LE	IDP/SEN/IDSA/BV-02-C
IDP 3/5	Appearance included in AD or Scan Response over LE	IDP/SEN/IDSA/BV-03-C
IDP 9/1	Discover Insulin Delivery Service and Characteristic	IDP/COL/CGGIT/SER/BV-01-C
IDP 8/2 AND IDP 9/2	Discover Device Information Service and Characteristics	IDP/COL/CGGIT/SER/BV-02-C IDP/COL/SCD/BV-26-C
IDP 8/3 AND IDP 9/3	Discover Current Time Service and Characteristics	IDP/COL/CGGIT/SER/BV-03-C IDP/COL/CGGIT/CHA/BV-13-C
IDP 8/4 AND IDP 9/4	Discover Battery Service and Characteristics	IDP/COL/CGGIT/SER/BV-04-C IDP/COL/CGGIT/CHA/BV-10-C
IDP 8/5 AND IDP 9/5	Discover Immediate Alert Service and Characteristic	IDP/COL/CGGIT/SER/BV-05-C IDP/COL/CGGIT/CHA/BV-14-C
IDP 8/6	Discover Bond Management Service and Characteristics	IDP/COL/CGGIT/SER/BV-06-C IDP/COL/CGGIT/CHA/BV-11-C IDP/COL/CGGIT/CHA/BV-12-C
IDP 10a/3	Bond Management Feature indication	IDP/COL/CGGIT/ISFC/BV-16-C
IDP 10a/4	Read Bond Management Feature characteristic - Bonding enabled	IDP/COL/BMS/BV-04-C
IDP 10a/3 OR IDP 10a/4	Enable Bond Management Feature characteristic for indication or read characteristic upon reconnection	IDP/COL/BMS/BV-05-C

Item	Feature	Test Case(s)
IDP 10/1	IDD Status Changed Characteristic	IDP/COL/CGGIT/CHA/BV-01-C IDP/COL/STAT/BV-01-C IDP/COL/STAT/BV-11-C IDP/COL/STAT/BV-12-C IDP/COL/STAT/BV-13-C IDP/COL/STAT/BV-22-C
IDP 10/2	IDD Status Characteristic	IDP/COL/CGGIT/CHA/BV-02-C IDP/COL/STAT/BV-02-C IDP/COL/STAT/BV-14-C IDP/COL/STAT/BV-15-C IDP/COL/STAT/BV-16-C IDP/COL/STAT/BV-23-C IDP/COL/IDE/BI-01-C
IDP 10/3	IDD Annunciation Status Characteristic	IDP/COL/CGGIT/CHA/BV-03-C IDP/COL/STAT/BV-03-C IDP/COL/STAT/BV-17-C IDP/COL/STAT/BV-18-C IDP/COL/STAT/BV-19-C IDP/COL/STAT/BV-20-C IDP/COL/STAT/BV-21-C IDP/COL/STAT/BV-24-C
IDP 10/4 AND IDP 10/12	IDD Features Characteristic	IDP/COL/CGGIT/CHA/BV-04-C IDP/COL/FEA/BV-01-C
IDP 10a/1	IDD Features indication	IDP/COL/CGGIT/ISFC/BV-15-C
IDP 10a/2	Read IDD Features characteristic - Bonding enabled	IDP/COL/FEA/BV-02-C
IDP 10a/1 OR IDP 10a/2	Enable IDD Features characteristic for indication or read characteristic upon reconnection	IDP/COL/FEA/BV-03-C
IDP 10/5	IDD Status Reader Control Point Characteristic	IDP/COL/CGGIT/CHA/BV-05-C IDP/COL/STAT/BV-04-C
IDP 10/6	IDD Command Control Point Characteristic	IDP/COL/CGGIT/CHA/BV-06-C IDP/COL/STAT/BV-05-C
IDP 10/7	IDD Command Data Characteristic	IDP/COL/CGGIT/CHA/BV-07-C IDP/COL/STAT/BV-07-C
IDP 10/8	IDD Record Access Control Point Characteristic	IDP/COL/CGGIT/CHA/BV-08-C IDP/COL/STAT/BV-06-C IDP/COL/RAE/BI-03-C IDP/COL/RAE/BI-06-C
IDP 10/9	IDD History Data Characteristic	IDP/COL/CGGIT/CHA/BV-09-C IDP/COL/STAT/BV-08-C
IDP 17/1	Read Device Information Service characteristic values	IDP/COL/DIS/BV-01-C
IDP 10/28 AND IDP 11/1	Verify E2E-CRC and E2E-Counter calculations - IDD Status Reader CP	IDP/COL/STAT/BV-09-C

Item	Feature	Test Case(s)
IDP 10/28 AND (IDP 10/6 OR IDP 10/8) AND IDP 11/1	Verify E2E-CRC and E2E-Counter calculations – Multiple Control Points	IDP/COL/STAT/BV-10-C
IDP 11/1	Reset Status	IDP/COL/RCP/BV-01-C
IDP 10/17 OR IDP 10/18 OR IDP 10/19	Get Active Bolus IDs or Get Active Bolus Delivery	IDP/COL/RCP/BV-02-C IDP/COL/RCP/BV-03-C IDP/COL/RCP/BV-04-C IDP/COL/IDE/BI-02-C
IDP 10/13	Get Active Basal Rate Delivery	IDP/COL/RCP/BV-07-C
IDP 11/5	Get Total Daily Insulin Status	IDP/COL/RCP/BV-05-C IDP/COL/RCPE/BI-02-C
IDP 11/6	Get Counter	IDP/COL/RCP/BV-08-C IDP/COL/RCP/BV-09-C IDP/COL/RCPE/BI-01-C
IDP 11/7	Get Delivered Insulin	IDP/COL/RCP/BV-10-C
IDP 10/27	Get Insulin On Board	IDP/COL/RCP/BV-06-C
IDP 10/5 AND (IDP 11/6 OR IDP 11/7)	IDD Status Reader Control Point Characteristic – Op Code not supported	IDP/COL/RCPE/BI-03-C
IDP 10/6 AND IDP 12/1	Set Therapy Control State	IDP/COL/CCP/BV-01-C IDP/COL/CCPE/BI-01-C
IDP 10/6 AND IDP 12/2	Set Flight Mode	IDP/COL/CCP/BV-02-C
IDP 10/6 AND IDP 12/3	Snooze Annunciation	IDP/COL/CCP/BV-08-C
IDP 10/6 AND IDP 12/4	Confirm Annunciation	IDP/COL/CCP/BV-09-C
IDP 10/6 AND IDP 10/13	Basal Rate	IDP/COL/CCP/BV-19-C IDP/COL/CCP/BV-23-C IDP/COL/CCPE/BI-02-C IDP/COL/CCPE/BI-04-C
IDP 10/6 AND IDP 10/24	ISF Profile	IDP/COL/CCP/BV-20-C IDP/COL/CCP/BV-24-C
IDP 10/6 AND IDP 10/25	I2CHO Ratio Profile	IDP/COL/CCP/BV-21-C IDP/COL/CCP/BV-25-C
IDP 10/6 AND IDP 10/26	Target Glucose Range Profile	IDP/COL/CCP/BV-22-C IDP/COL/CCP/BV-26-C
IDP 10/6 AND (IDP 10/14 OR IDP 10/15)	TBR Adjustment	IDP/COL/CCP/BV-03-C IDP/COL/CCP/BV-27-C
IDP 10/6 AND IDP 10/16 AND (IDP 10/14 OR IDP 10/15)	Get or Set TBR Template	IDP/COL/CCP/BV-10-C IDP/COL/CCP/BV-11-C

Item	Feature	Test Case(s)
IDP 10/6 AND (IDP 10/17 OR IDP 10/18 OR IDP 10/19)	Set Bolus Procedure - Without a Bolus Template or Cancel Bolus or Get Available Boluses Procedure	IDP/COL/CCP/BV-13-C IDP/COL/CCP/BV-14-C IDP/COL/CCP/BV-28-C
IDP 10/6 AND (IDP 10/17 OR IDP 10/18 OR IDP 10/19) AND IDP 10/21	Set Bolus Procedure - With a Bolus Template, Get or Set Bolus Template Procedure	IDP/COL/CCP/BV-12-C IDP/COL/CCP/BV-15-C IDP/COL/CCP/BV-29-C
IDP 10/6 AND (IDP 10/13 OR IDP 10/16 OR IDP 10/21 OR IDP 10/24 OR IDP 10/25 OR IDP 10/26)	Get Template Status and Details Procedure or Reset Template Status Procedure	IDP/COL/CCP/BV-16-C IDP/COL/CCP/BV-30-C
IDP 10/6 AND (IDP 10/13 OR IDP 10/24 OR IDP 10/25 OR IDP 10/26)	Activate Profile Templates or Get Activated Profile Templates Procedure	IDP/COL/CCP/BV-17-C IDP/COL/CCP/BV-31-C
IDP 10/6 AND IDP 12/20	Start Priming or Stop Priming Procedure	IDP/COL/CCP/BV-04-C IDP/COL/CCP/BV-32-C IDP/COL/CCPE/BI-03-C
IDP 10/6 AND IDP 12/22	Set Initial Reservoir Fill Level Procedure	IDP/COL/CCP/BV-05-C
IDP 10/6 AND IDP 12/23	Reset Reservoir Insulin Operation Time Procedure	IDP/COL/CCP/BV-06-C
IDP 10/6 AND IDP 12/30	Get Max Bolus Amount Procedure	IDP/COL/CCP/BV-18-C
IDP 10/6 AND IDP 12/31	Set Max Bolus Amount Procedure	IDP/COL/CCP/BV-07-C
IDP 13/3 AND IDP 16/1	Report Stored Records – with operator All records	IDP/COL/RAR/BV-01-C IDP/COL/RAR/BV-08-C IDP/COL/RAR/BV-09-C IDP/COL/RAE/BI-01-C IDP/COL/RAE/BI-02-C IDP/COL/RAE/BI-05-C IDP/COL/RAE/BI-07-C
IDP 13/3 AND IDP 16/13	Report Stored Records – with operator First record	IDP/COL/RAR/BV-02-C
IDP 13/3 AND IDP 16/16	Report Stored Records – with operator Last record	IDP/COL/RAR/BV-03-C
IDP 13/3 AND IDP 16/4	Report Stored Records – with operator Greater than or Equal to and Operand Filter Type Sequence Number	IDP/COL/RAR/BV-04-C
IDP 13/3 AND IDP 16/5	Report Stored Records – with operator Greater than or equal to and Operand Filter Type Sequence Number Filtered by Reference Time Event	IDP/COL/RAR/BV-06-C

Item	Feature	Test Case(s)
IDP 13/3 AND IDP 16/6	Report Stored Records – with operator Greater than or equal to and Operand Filter Type Sequence Number Filtered by Non-Reference Time Event	IDP/COL/RAR/BV-07-C
IDP 13/3 AND IDP 16/10	Report Stored Records – with operator Within range of (inclusive) and Operand Filter Type Sequence Number	IDP/COL/RAR/BV-05-C
IDP 13/2 AND IDP 15/1	Delete Stored Records – with operator All records	IDP/COL/RAD/BV-01-C
IDP 13/2 AND (IDP 15/7 OR IDP 15/8 OR IDP 15/9)	Delete Stored Records – with operator Less than or equal to	IDP/COL/RAD/BV-02-C
IDP 13/1 AND IDP 14/1	Report Number of Stored Records – with operator All records	IDP/COL/RAN/BV-01-C
IDP 13/1 AND IDP 14/4	Report Number of Stored Records – with operator Greater than or equal to and Operand Filter Type Sequence Number	IDP/COL/RAN/BV-02-C
IDP 13/4	Abort Operation – Report Stored Records	IDP/COL/RAA/BV-01-C IDP/COL/RAE/BI-04-C
IDP 10/28 AND IDP 11/5	General Error Handling – Invalid CRC or Counter	IDP/COL/IDE/BI-03-C IDP/COL/IDE/BI-04-C
IDP 18/2	Current Time Characteristic	IDP/COL/CTS/BV-01-C IDP/COL/CTS/BV-02-C
IDP 18/2 AND (IDP 13/3 AND IDP 16/16)	Verify that the timestamp in the Reference Time event agrees with the Current Time Service value	IDP/COL/CTS/BV-03-C
IDP 19/2	Battery Level	IDP/COL/BAS/BV-01-C
IDP 19/1	Read Battery Level Characteristic	IDP/COL/BAS/BV-02-C
IDP 20/1	Write to Alert Level Characteristic	IDP/COL/IAS/BV-01-C
IDP 10/23 AND IDP 8/6 AND (IDP 21/4 OR IDP 21/5 OR IDP 21/6)	Bond Management Service	IDP/COL/BMS/BV-02-C IDP/COL/BMS/BI-01-C IDP/COL/BMS/BI-02-C IDP/COL/BMS/BI-03-C IDP/COL/BMS/BV-03-C

Table 5.1: Test case mapping

6 IDD RACP Test Matrix

The following tables summarize the features of IDD RACP and the combinations with other features that are tested and not tested. For the tables, below, the following key applies:

YES = A test for this combination exists.
NO = A test for this combination does not exist.
N/A = Not a valid combination.

IDD RACP Operator	IDD RACP Op Code			
	Report stored records	Delete stored records	Abort operation	Report number of stored records
All records	YES	YES	N/A	YES
Less than or equal to	NO	YES	N/A	NO
Greater than or equal to	YES	NO	N/A	YES
Within range of (inclusive)	YES	NO	N/A	NO
First record	YES	NO	N/A	NO
Last record	YES	NO	N/A	NO
Null	N/A	N/A	YES	N/A

Table 6.1: IDD RACP Operator test coverage

IDD RACP Response Code	IDD RACP Op Code				
	Report stored records	Delete stored records	Abort operation	Report number of stored records	Other
Success	YES	YES	YES	N/A	N/A
Report Number of Stored Records Response	N/A	N/A	N/A	YES	N/A
Op Code not supported	N/A	NO	N/A	N/A	N/A
Invalid Operator	NO	NO	NO	NO	N/A
Operator not supported	NO	NO	NO	NO	YES
Invalid Operand	NO	NO	NO	NO	N/A
No records found	YES	NO	N/A	N/A	N/A
Abort unsuccessful	N/A	N/A	YES	N/A	N/A
Procedure not completed	YES	NO	NO	NO	N/A
Operand not supported	NO	NO	N/A	NO	YES
Procedure not applicable	N/A	NO	N/A	N/A	N/A
Procedure already in progress*	YES	NO	N/A	NO	N/A

Table 6.2: IDD RACP Response Code test coverage
* ATT error code

IDD RACP Operator	Filter Type		
	Sequence Number	Sequence Number Filtered by Reference Time Event	Sequence Number Filtered by Non-Reference Time Event
All records	YES - No Operand Used		
Less than or equal to	YES	NO	NO
Greater than or equal to	YES	YES	YES
Within range of (inclusive)	YES	NO	NO
First record	YES - No Operand Used		
Last record	YES - No Operand Used		
Null	N/A	N/A	N/A

Table 6.3: IDD RACP Filter Type test coverage

7 IDD Command CP Test Matrix

The following table summarizes the combination of some of the IDD Command Control Point Op Codes and the Response Code Values that are tested and not tested. For the table, below, the following key applies:

YES = A test for this combination exists.
NO = A test for this combination does not exist.
N/A = Not a valid combination.

IDD Command CP Response Code	**IDD Command CP Op Code**			
	Set Therapy Control State	Write Basal Rate Profile	Stop Priming	Set Bolus Template
Success	YES	N/A	YES	N/A
Op Code not supported	N/A	NO	NO	NO
Invalid Operand	NO	NO	N/A	N/A
Procedure not completed	YES	NO	NO	N/A
Parameter out of range	N/A	YES	N/A	N/A
Procedure not applicable	NO	NO	YES	N/A
Plausibility check failed	N/A	YES	N/A	N/A
Maximum Bolus Number reached	N/A	N/A	N/A	NO
Procedure already in progress*	NO	NO	NO	N/A

Table 7.1: IDD Command Control Point Response Code test coverage
* ATT error code

8 IDD Status Reader CP Test Matrix

The following table summarizes the combination of some of the IDD Status Reader Control Point Op Codes and the Response Code Values that are tested and not tested. For the tables, below, the following key applies:

YES = A test for this combination exists.
NO = A test for this combination does not exist.
N/A = Not a valid combination.

IDD Status Reader CP Response Code	**IDD Status Reader CP Op Code**				
	Get Total Daily Insulin Status	Get Active Basal Rate Delivery	Get Counter	Other	Reset Status
Success	N/A	N/A	N/A	N/A	YES
Op Code not supported	N/A	NO	NO	YES	N/A
Invalid Operand	N/A	N/A	YES	N/A	NO
Procedure not completed	YES	NO	NO	NO	NO
Parameter out of range	N/A	N/A	N/A	N/A	N/A
Procedure not applicable	NO	NO	NO	NO	N/A
Procedure already in progress*	NO	NO	NO	NO	NO

Table 8.1: IDD Status Reader Control Point Response Code test coverage
* ATT error code

9 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2018-06-20	Approved by BTI. Prepared for publication.
	p1r00–r08	2021-03-28 – 2021-12-23	TSE 16936 (rating 4): Added new test group ISFC. Added new test cases: IDP/COL/CGGIT/ISFC/BV-15-C and -16-C, IDP/COL/FEA/BV-02-I and -03-I, IDP/COL/BMS/BV-04-I and -05-I (E16486). Updated TCMT accordingly. TSE 18089 (rating 2): Converted the following test cases into GGIT tests: IDP/COL/SCD/BV-01-I – -25-I, IDP/COL/SCD/BV-27-I – -30-I, and IDP/COL/BMS/BV-01-I. The new GGIT converted TCIDs are: IDP/COL/CGGIT/SER/BV-01-C – -06-C, and IDP/COL/CGGIT/CHA/BV-01-C – -14-C. Updated TCMT accordingly. TSE 18090 (rating 1): Removed direct references to GATT test cases in the following test cases: IDP/COL/CTS/BV-03-I and IDP/COL/BMS/BV-03-I. Made template-related editorial changes and updated the copyright page to align with v2 of the DNMD.
1	p1	2022-01-25	Approved by BTI on 2022-01-06. Prepared for TCRL 2021-2 publication.
	p2r00–r01	2023-10-30 – 2023-11-08	TSE 23276 (rating 1): Converted -I tests to -C tests as appropriate; updated the TCMT and TCRL accordingly. Performed other editorials to align the document with the latest TS template, including updates to the references, Test Strategy, conformance, Pass/Fail verdict conventions, and TCMT introductory text. Deleted draft revision history comments prior to p0.
2	p2	2024-07-01	Approved by BTI on 2024-04-21. Prepared for TCRL 2024-1 publication.
	p3r00	2024-08-06 – 2024-08-07	TSE 24615 (rating 1): Per E24597 and E24938, updated the reference, TC configuration, and test procedure for IDP/COL/RAR/BV-01-C – -03-C; IDP/COL/RAD/BV-01-C; and IDP/COL/RAN/BV-01-C. Updated the reference and test procedure for IDP/COL/RAR/BV-08-C and -09-C; IDP/COL/RAA/BV-01-C; IDP/COL/RAE/BI-01-C, -02-C, -04-C, -05-C, and -07-C; and IDP/COL/CTS/BV-03-C. Updated that TCMT, including removal of references to IDP 15/2 and IDP 15/3. Updated the references list to add IDP and IDS v1.0.2. Updated the IDD RACP Filter Type test coverage table. TSE 25004 (rating 1): Per E24908, updated a cross-reference in the test procedure for IDP/COL/STAT/BV-11-C – -24-C to point to IDS v1.0.2. TSE 25411 (rating 1): Updated the test procedure for IDP/COL/STAT/BV-17-C – -21-C.

Publication Number	Revision Number	Date	Comments
3	p3	2024-10-08	Approved by BTI on 2024-09-11. IDP v1.0.2 adopted by the BoD on 2024-10-01. Prepared for TCRL 2024-2-addition publication.

Acknowledgments

Name	Company
Jörg Brakensiek	Bluetooth SIG, Inc.
Ismail Mohamud	Bluetooth SIG, Inc.
Christoph Fischer	F. Hoffmann-La Roche AG
Nathaniel Hamming	F. Hoffmann-La Roche AG
Harald Prinzhorn	F. Hoffmann-La Roche AG
Leif-Alexandre Aschehoug	Nordic Semiconductor ASA