Continuous Glucose Monitoring Profile (CGMP)

***Bluetooth*® Test Suite**

- **Revision:** CGMP.TS.p5
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- **Prepared By:** Medical Devices Working Group
- **Published during TCRL:** TCRL.2024-1

Contents

1 Scope

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

2 References, definitions, and abbreviations

2.1 References

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

[1] Test Strategy and Terminology Overview

[2] Bluetooth Core Specification, Version 4.0 or later

[3] CGM Profile Specification, Version 1.0 or later

[4] ICS Proforma for Continuous Glucose Monitoring Profile, CGMP.ICS

[5] GAP Test Suite, GAP.TS

[6] GATT Test Suite, GATT.TS

[7] CGM Service Specification, Version 1.0 or later

[8] CGM Service Characteristics, Version 1.0 or later

[9] Device Information Service Specification, Version 1.0 or later

[10] Bond Management Service Specification, Version 1.0 or later

[11] CGM Profile Implementation eXtra Information for Test, IXIT

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

[13] Appropriate Language Mapping Tables document

2.2 Definitions

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

2.3 Acronyms and abbreviations

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

Certain terms that were identified as inappropriate have been replaced. For a list of the original terms and their replacement terms, see the Appropriate Language Mapping Tables document [13].

3 Test Suite Structure (TSS)

3.1 Overview

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

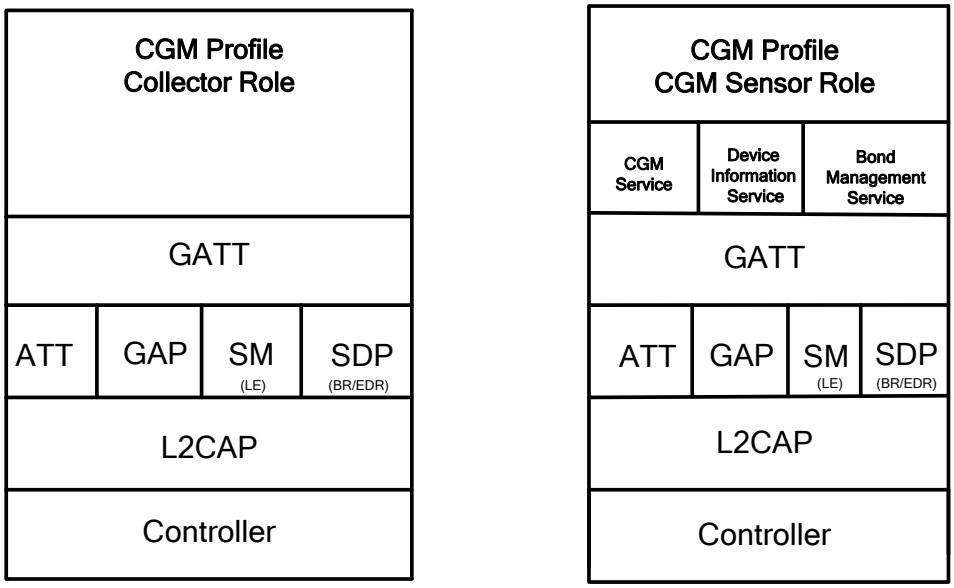

Figure 3.1: Continuous Glucose Monitoring test models

3.2 Test Strategy

The test objectives are to verify functionality of the Continuous Glucose Monitoring 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:

- CGM Sensor Role Requirements
- Generic GATT Integrated Test
- CGM Measurements

- CGM Features
- CGM Status
- CGM Session Start Time
- CGM Session Run Time
- Record Access Control Point Procedures
- CGM Specific Ops Control Point Procedures
- Bond Management Service Procedures
- Common Behavior for CGM Feature and Bond Management Feature characteristics
- Connection Establishment

4 Test cases (TC)

4.1 Introduction

4.1.1 Test case identification conventions

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

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

Identifier Abbreviation	**Spec Identifier <spec abbreviation>**
CGMP	Continuous Glucose Monitoring Profile
Identifier Abbreviation	**Role Identifier <IUT role>**
COL	Collector Role
SEN	CGM 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>**
BMS	Bond Management Service Procedures
CBE	Common Behavior of Control Point – Error Handling
CBT	Common Behavior of Control Point –Timeout Handling
CECC	Connection Establishment – Collector Connection
CGMCP	CGM Specific ops Control Point Procedures
CGMD	Discover and Read Characteristics
CGMF	Features
CGMM	Measurement
CGMR	(Sensor) Requirements
CGMS	Status
CGMST	Start Time (Session Start Time)
CGMRT	Run Time (Session Start Time)
RAA	Record Access Control Point– Abort Procedures
RAD	Record Access Control Point – Delete Procedures
RAE	Record Access Control Point – Specific Errors
RAN	Record Access Control Point – Number Procedures
RAR	Record Access Control Point – Report Procedures

Table 4.1: CGMP TC feature naming conventions

4.1.2 Conformance

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

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

Such tests may verify:

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

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

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

4.1.3 Pass/Fail verdict conventions

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

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

4.2 Setup preambles

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

4.2.1 ATT Bearer on LE transport

- Preamble Procedure

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

4.2.2 ATT Bearer on BR/EDR transport

- Preamble Procedure

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

4.2.3 Collector: Configure Sensor for use with Record Access Control Point

- Preamble Purpose

  This preamble procedure enables the Collector to configure the Sensor for use with Record Access Control Point.

- Preamble Procedure

1. Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.
2. The handles of the CGM Measurement characteristic and Record Access Control Point characteristic have been previously discovered by the Lower Tester during the test procedures in Section 4.4 or are known to the Lower Tester by other means.
3. The handles of the Client Characteristic Configuration descriptor of the CGM characteristic and Record Access Control Point characteristic have been previously discovered by the Lower Tester during the test procedures in Section 4.4 or are known to the Lower Tester by other means.
4. If the Lower Tester and IUT were not previously bonded, perform a bonding procedure. If previously bonded, enable encryption if not already enabled.
5. The CGM Measurement characteristic is configured for notifications.
6. The Record Access Control Point characteristic is configured for indications.

4.2.4 Collector: Configure Sensor for use with CGM Specific Ops Control Point

- Preamble Purpose

  This preamble procedure enables the Collector to configure the Sensor for use with the CGM Specific Ops Control Point.

- 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 if using LE Transport or Section 4.2.2 if using a BR/EDR Transport.
3. The handles of the CGM Measurement characteristic and CGM Specific Ops Control Point characteristic have been previously discovered by the Lower Tester during the test procedures in Section 4.4 or are known to the Lower Tester by other means.
4. The handles of the Client Characteristic Configuration descriptor of the CGM characteristic and CGM Specific Ops Control Point characteristic have been previously discovered by the Lower Tester during the test procedures in Section 4.4 or are known to the Lower Tester by other means.
5. If the Lower Tester and IUT were not previously bonded, perform a bonding procedure. If previously bonded, enable encryption if not already enabled.
6. The CGM Measurement characteristic is configured for notifications.
7. The CGM Specific Ops Control Point characteristic is configured for indications.

4.2.5 LE Collector: Scan to detect Sensor advertisements

- Preamble Purpose

  This preamble procedure specifies for a Sensor to advertise.

- Reference

  [3] 5.2

  [2] GAP 9.3.3, 9.3.4

- Initial Condition

  - The Collector has been configured to accept commands from the Upper Tester to request and receive CGM measurements.

- Preamble Procedure

  1. Execute one of the following test procedures:

     Alt 1: GAP/CONN/ACEP/BV-01-C, included in GAP.TS [5]
     or
     Alt 2: GAP/CONN/GCEP/BV-02-C, included in GAP.TS [5]

  2. Connection is established.

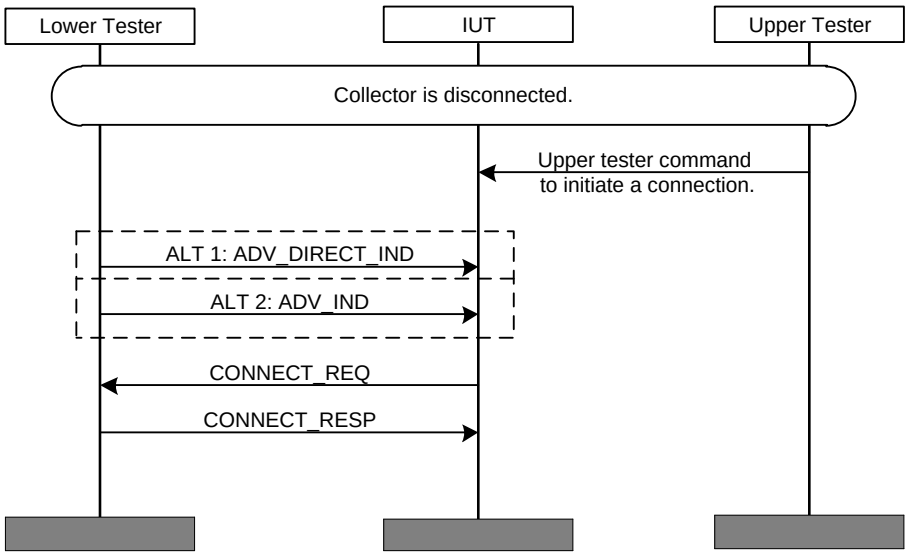

Figure 4.1: Scan to detect Sensor advertisements

4.2.6 BR/EDR Collector

4.2.6.1 Connection Establishment for Unbonded Device

- Preamble Purpose

  This BR/EDR preamble procedure specifies how the Collector IUT scans the CGM Sensor for the case when the CGM Sensor has new data available.

- Reference

  [3] 5.3

  [2] GAP 4.1, 4.2

- Initial Condition
  - A preamble procedure defined in Section 4.2.3 is used as a prerequisite to this preamble.
- Preamble Procedure
  1. Configure the Collector IUT to accept commands to receive CGM Measurements.
  2. Put the CGM Sensor in General Discoverable mode.
  3. The Upper Tester commands the Collector IUT to initiate a connection and the IUT starts scanning.
  4. The CGM Sensor (Lower Tester) exposes the SDP record for the CGM Service.
  5. The Collector IUT validates the SDP record and establishes a connection to the CGM Sensor.

The Collector uses the GAP General Discovery procedures to discover a CGM Sensor and to establish a connection to a CGM Sensor.

4.2.6.2 Connection Establishment for Bonded Device

- Preamble Purpose

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

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

- Reference

  [3] 5.3

  [2] GAP 4.1, 4.2

- Initial Condition
  - A preamble procedure defined in Section 4.2.3 is used as a prerequisite to this preamble.
- Preamble Procedure
  1. Configure the Collector IUT to accept commands to receive CGM Measurements.
  2. Put the “Peripheral to be” in connectable mode to accept a connection from “Central to be”.
  3. The connection is initiated by the “Central to be”.
  4. The “Peripheral to be” exposes the SDP record for the CGM Service.
  5. The “Central to be” validates the SDP record and establishes a connection to the “Peripheral to be”.

  The “Central to be” uses the GAP Link Establishment procedures to connect to any bonded device.

4.3 LE - CGM Sensor Role Requirements

The procedures defined in this test group verify implementation of the additional CGM Sensor requirements and recommendations defined in the CGM Profile Specification [3] when using this profile over Low Energy transport.

CGMP/SEN/CGMR/BV-01-C [CGM Service UUID in AD over LE]

- Test Purpose

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

- Reference

  [3] 3.1.2.1

- Initial Condition

  - The IUT is induced to enter a GAP discoverable mode and generate Advertising Packets (see Section 4.2.5).

- Test Procedure

  The Lower Tester listens for Advertising Packets from the IUT.

- Expected Outcome

  Pass verdict

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

CGMP/SEN/CGMR/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 CGM Sensor IUT when using LE Transport.

- Reference

  [3] 3.1.2.2

- Initial Condition

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

- Test Procedure

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

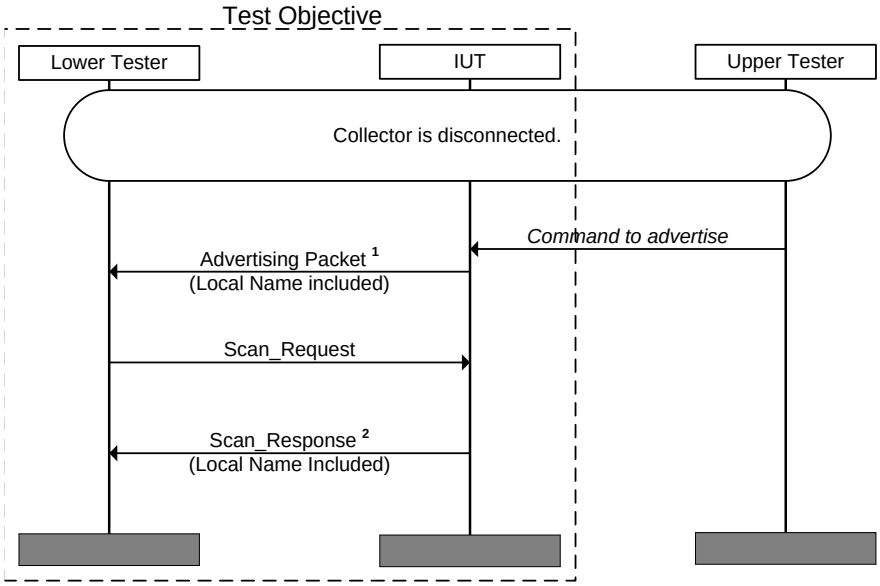

Figure 4.2: CGMP/SEN/CGMR/BV-02-C [Local Name included in AD or Scan Response over LE]

Note :[1, 2]: A Local Name can only be in the Advertising packet or the Scan Response packet, but not both. This means, for example, if a Local Name is in the Advertising packet, no Local Name is in the Scan Response packet.

- Expected Outcome

  Pass verdict

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

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

CGMP/SEN/CGMR/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 CGM Sensor IUT when using LE Transport.

- Reference

  [3] 3.1.2.3

- Initial Condition

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

- Test Procedure

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

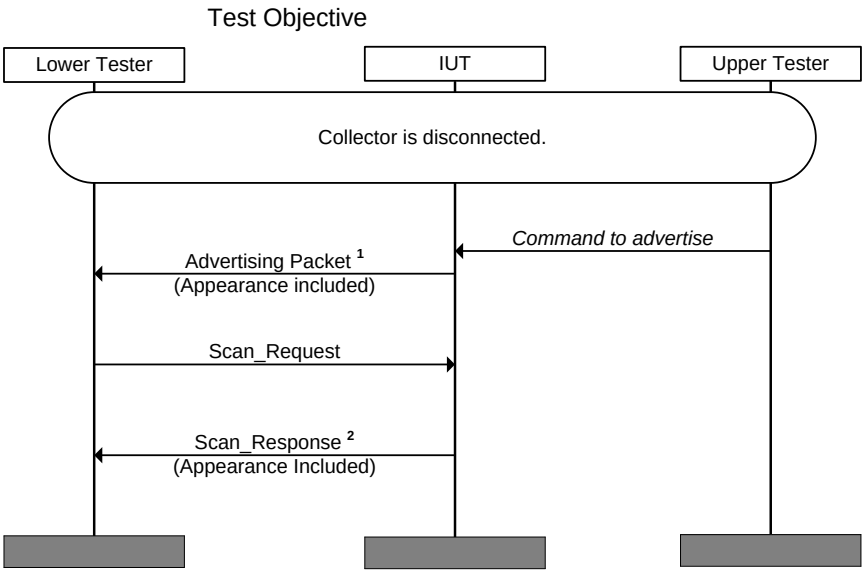

Figure 4.3: CGMP/SEN/CGMR/BV-03-C [Appearance included in AD or Scan Response over LE]

Note :[1, 2]: Appearance can only be in the Advertising packet or the Scan Response packet, but not both. This means, for example, if an Appearance is in the Advertising packet, no Appearance is in the Scan Response packet.

- Expected Outcome

  Pass verdict

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

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

CGMP/SEN/CGMR/BV-04-C [Public Target Address in AD or Scan Response over LE]

- Test Purpose

  Verify that a CGM Sensor IUT that supports multiple bonds and supports a Target Address AD Type includes the Public Client address in the Public Target Address AD Type in its Advertising or Scan Response data when using LE Transport and the Multiple Bond Supported bit is properly set.

- Reference

  [3] 3.1.2.4

- Initial Condition

  - The Lower Tester has previously bonded to the IUT using a public address.
  - The 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 IUT. When the Lower Tester receives an Advertising Packet from IUT, the Lower Tester sends a Scan Request to the IUT. Then the Lower Tester listens for a Scan Response from the IUT.
  2. Run the preamble procedure to enable the Collector to initiate connection to a CGM Sensor included in Section 4.2.5.

3. The Lower Tester executes the GATT Discover Primary Services by Service UUID sub-procedure and saves the handle range for the CGM Service.
4. Send a request from the Lower Tester to IUT to read a CGM Feature characteristic.

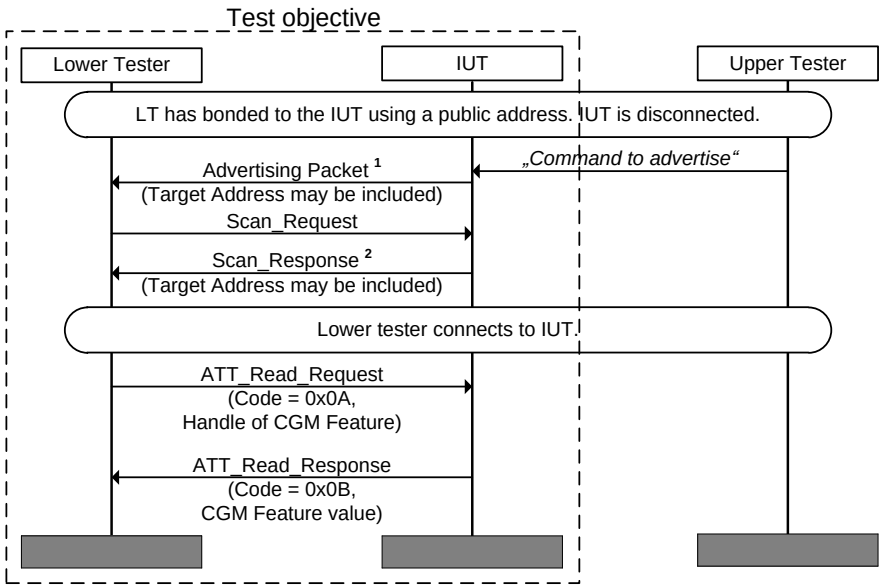

Figure 4.4: CGMP/SEN/CGMR/BV-04-C [Public Target Address in AD or Scan Response over LE]

Note :[1, 2]: A Target Address can only be in the Advertising packet or the Scan Response packet, but not both. This means, for example, if a Target Address is in the Advertising packet, no Target Address is in the Scan Response packet.

- Expected Outcome

  Pass verdict

  The value of the Multiple Bond Supported bit of the CGM Feature characteristic is set to 1.

  The IUT includes a Target Address in either the Advertising packet or Scan Response packet, but not both.

  The Target Address is a Public Address and 6 octets in length.

CGMP/SEN/CGMR/BV-05-C [Private Random Target Address in AD or Scan Response over LE]

- Test Purpose

  Verify that a CGM Sensor IUT that supports a Target Address AD Type includes the Private Random Client address in the Random Target Address AD Type in its Advertising or Scan Response data when using LE Transport.

- Reference

  [3] 3.1.2.4

- Initial Condition

  - The Lower Tester has previously bonded to the IUT using a private random address.
  - The 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 IUT. When the Lower Tester receives an Advertising Packet from IUT, the Lower Tester sends a Scan Request to the IUT. Then the Lower Tester listens for a Scan Response from the IUT.
  2. Run the preamble procedure to enable the Collector to initiate connection to a CGM Sensor included in Section 4.2.5.
  3. The Lower Tester executes the GATT Discover Primary Services by Service UUID sub-procedure and saves the handle range for the CGM Service.
  4. Send a request from the Lower Tester to IUT to read a CGM Feature characteristic.

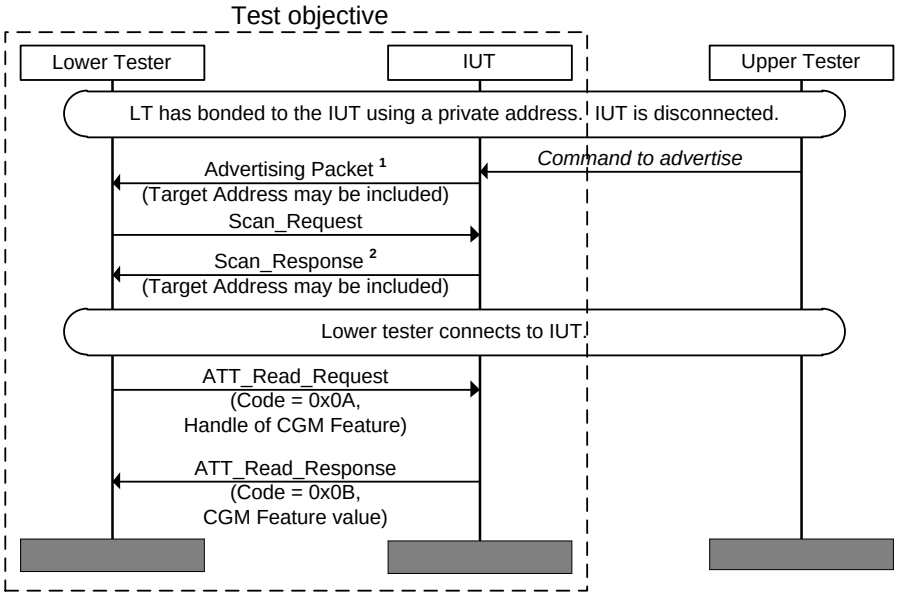

Figure 4.5: CGMP/SEN/CGMR/BV-05-C [Private Random Target Address in AD or Scan Response over LE]

Note :[1, 2]: A Target Address can only be in the Advertising packet or the Scan Response packet, but not both. This means, for example, if a Target Address is in the Advertising packet no Target Address is in the Scan Response packet.

- Expected Outcome

  Pass verdict

  The value of the Multiple Bond Supported bit of the CGM Feature characteristic is set to one.

  The IUT includes a Target Address in either the Advertising packet or Scan Response packet, but not both.

  The Target Address is a Private Random Address and six octets in length.

CGMP/SEN/CGMR/BV-06-C [Static Random Target Address in AD or Scan Response over LE]

- Test Purpose

  Verify that a CGM Sensor IUT that supports multiple bonds and supports a Target Address AD Type includes the Static Random Client address in the Random Target Address AD Type in its Advertising or Scan Response data when using LE Transport and the Multiple Bond Supported bit is properly set.

- Reference

  [3] 3.1.2.4

- Initial Condition

  - The Lower Tester has previously bonded to the IUT using a static random address.
  - The 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 IUT. When the Lower Tester receives an Advertising Packet from IUT, the Lower Tester sends a Scan Request to the IUT. Then the Lower Tester listens for a Scan Response from the IUT.
  2. Run the preamble procedure to enable the Collector to initiate connection to a CGM Sensor included in Section 4.2.5.
  3. The Lower Tester executes the GATT Discover Primary Services by Service UUID sub-procedure and saves the handle range for the CGM Service.
  4. Send a request from the Lower Tester to IUT to read a CGM Feature characteristic.

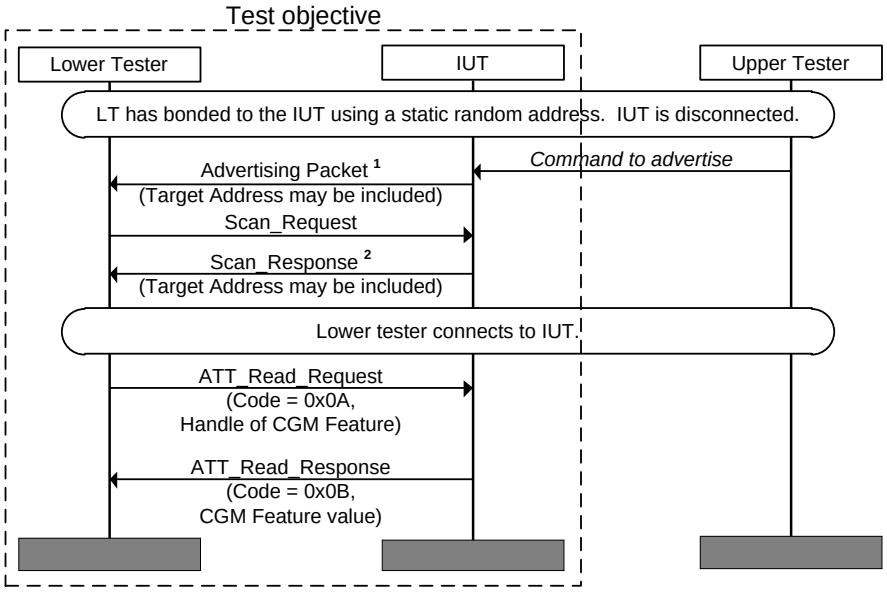

Figure 4.6: CGMP/SEN/CGMR/BV-06-C [Static Random Target Address in AD or Scan Response over LE]

Note :[1, 2]: A Target Address can only be in the Advertising packet or the Scan Response packet, but not both. This means, for example, if a Target Address is in the Advertising packet no Target Address is in the Scan Response packet.

- Expected Outcome

  Pass verdict

  The value of the Multiple Bond Supported bit of the CGM Feature characteristic is set to one.

  The IUT includes a Target Address in either the Advertising packet or Scan Response packet, but not both.

  The Target Address is a Static Random Address and six octets in length.

CGMP/SEN/CGMR/BV-07-C [No Target Address in AD or Scan Response over LE – Multi-Bond]

- Test Purpose

  Verify that a CGM Sensor IUT that supports multiple bonds and does not claim to support a Target Address AD Type and does not include the Client address in a Target Address AD Type in its Advertising or Scan Response data when using LE Transport and the Multiple Bond Supported bit is properly set.

- Reference

  [3] 3.1.2.4, 5.1.5

- Initial Condition

  - The Lower Tester has previously bonded to the IUT.
  - The 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 IUT. When the Lower Tester receives an Advertising Packet from IUT, the Lower Tester sends a Scan Request to the IUT. Then the Lower Tester listens for a Scan Response from the IUT.
  2. Run the preamble procedure to enable the Collector to initiate connection to a CGM Sensor included in Section 4.2.5.
  3. The Lower Tester executes GATT Discover Primary Services by Service UUID sub-procedure and saves the handle range for the CGM Service.
  4. Send a request from the Lower Tester to IUT to read a CGM Feature characteristic.

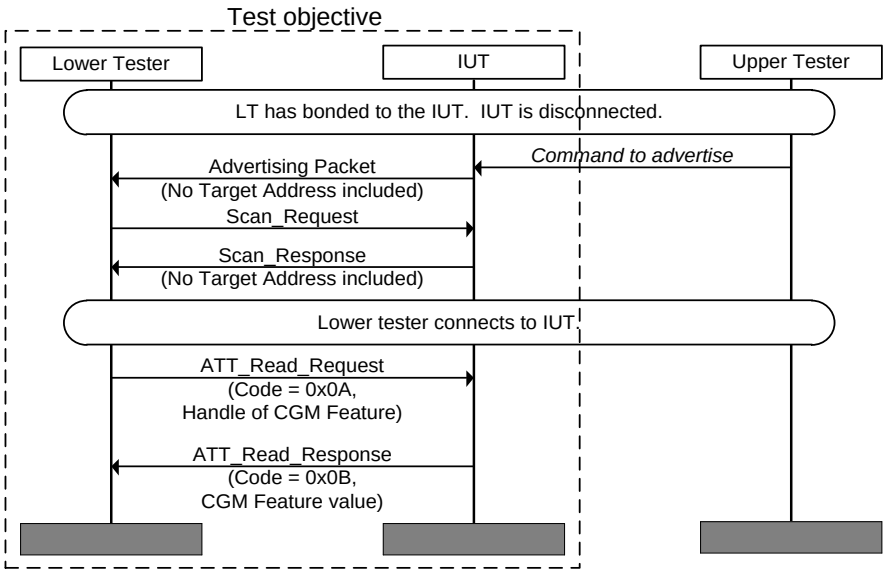

Figure 4.7: CGMP/SEN/CGMR/BV-07-C [No Target Address in AD or Scan Response – Multi-Bond]

- Expected Outcome

  Pass verdict

  The value of the Multiple Bond Supported bit of the CGM Feature characteristic is set to one.

  The IUT does not include the Client address in either the Advertising packet or in a Scan Response packet.

CGMP/SEN/CGMR/BV-08-C [No Target Address in AD or Scan Response over LE – Single Bond]

- Test Purpose

  Verify that a CGM Sensor IUT that does not support multiple bonds and does not claim to support a Target Address AD Type does not include the Client address in a Target Address AD Type in its Advertising or Scan Response data and the Multiple Bond Supported bit is properly set.

- Reference

  [3] 3.1.2.4

- Initial Condition

  - The Lower Tester has previously bonded to the IUT.
  - The 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 IUT. When the Lower Tester receives an Advertising Packet from IUT, the Lower Tester sends a Scan Request to the IUT. Then the Lower Tester listens for a Scan Response from the IUT.
  2. Run the preamble procedure to enable the Collector to initiate connection to a CGM Sensor included in Section 4.2.5.
  3. The Lower Tester executes the GATT Discover Primary Services by Service UUID sub-procedure and saves the handle range for the CGM Service.
  4. Send a request from the Lower Tester to IUT to read a CGM Feature characteristic.

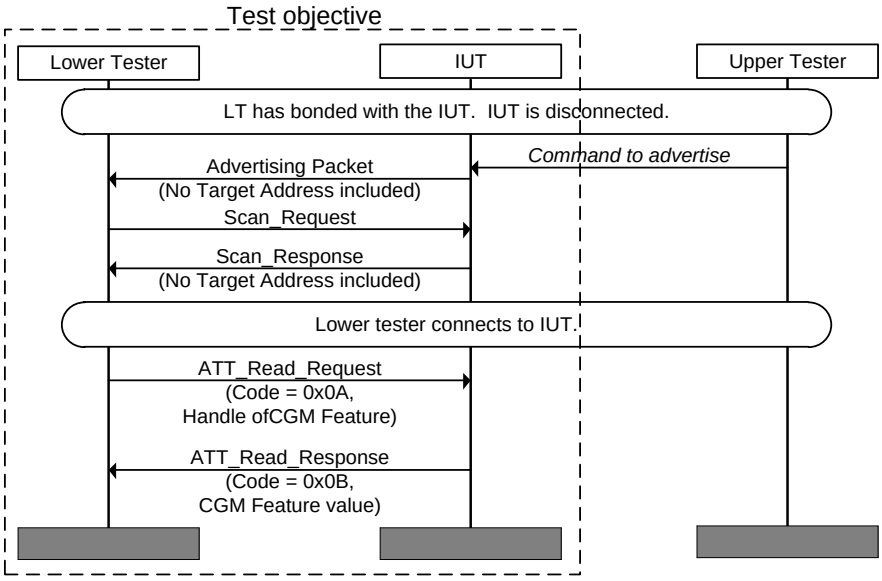

Figure 4.8: CGMP/SEN/CGMR/BV-08-C [No Target Address in AD or Scan Response over LE – Single Bond]

- Expected Outcome

  Pass verdict

  The value of the Multiple Bond Supported bit of the CGM Feature characteristic is set to 0.

  The IUT does not include the Client address in either the Advertising packet or in a Scan Response packet.

4.4 Generic GATT Integrated Test

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
CGMP/COL/CGGIT/SER/BV-01-C [Service GGIT – Continuous Glucose Monitoring]	Continuous Glucose Monitoring (CGM) Service	[3] 4.2.1	-	-	Not defined
CGMP/COL/CGGIT/SER/BV-02-C [Service GGIT – Bond Management]	Bond Management Service	[3] 4.2.2	-	-	Not defined
CGMP/COL/CGGIT/SER/BV-03-C [Service GGIT – Device Information]	Device Information Service	[3] 4.2.3	-	-	Primary Service
CGMP/COL/CGGIT/CHA/BV-01-C [Characteristic GGIT – CGM Measurement]	CGM Measurement characteristic	[3] 4.3.1.1	0x10 (Notify)	Skip	-
CGMP/COL/CGGIT/CHA/BV-02-C [Characteristic GGIT – CGM Feature]	CGM Feature characteristic	[3] 4.3.1.2	0x22 (Read, Indicate)	Skip	-
CGMP/COL/CGGIT/CHA/BV-03-C [Characteristic GGIT – CGM Status]	CGM Status characteristic	[3] 4.3.1.3	0x02 (Read)	Skip	-
CGMP/COL/CGGIT/CHA/BV-04-C [Characteristic GGIT – CGM Session Start Time]	CGM Session Start Time characteristic	[3] 4.3.1.4	0x0A (Read, Write)	Skip	-
CGMP/COL/CGGIT/CHA/BV-05-C [Characteristic GGIT – CGM Session Run Time]	CGM Session Run Time characteristic	[3] 4.3.1.5	0x02 (Read)	Skip	-
CGMP/COL/CGGIT/CHA/BV-06-C [Characteristic GGIT – Record Access Control Point]	Record Access Control Point characteristic	[3] 4.3.1.6	0x28 (Write, Indicate)	Skip	-
CGMP/COL/CGGIT/CHA/BV-07-C [Characteristic GGIT – CGM Specific Ops Control Point]	CGM Specific Ops Control Point characteristic	[3] 4.3.1.7	0x28 (Write, Indicate)	Skip	-
CGMP/COL/CGGIT/CHA/BV-08-C [Characteristic GGIT – Bond Management Control Point]	Bond Management Control Point characteristic	[3] 4.3.2.1	0x88 (Write, Reliable Writes)	Skip	-

TCID	Service / Characteristic	Reference	Properties	Value Length (Octets)	Type
CGMP/COL/CGGIT/CHA/BV-09-C [Characteristic GGIT – Bond Management Feature]	Bond Management Feature characteristic	[3] 4.3.2.2, 4.12.5	0x22 (Read, Indicate)	1-3	-

Table 4.2: 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 4.3 below as input:

TCID	Characteristic	Reference	TC Configuration
CGMP/COL/CGGIT/ISFC/BV-01-C [Characteristic GGIT – CGM Feature indication]	CGM Feature	[3] 4.5	N/A
CGMP/COL/CGGIT/ISFC/BV-02-C [Characteristic GGIT – Bond Management Feature indication]	Bond Management Feature	[3] 4.12.5	N/A

Table 4.3: GGIT Indication Supported Features Characteristic tests

CGMP/COL/CGMD/BV-15-C [Discover Device Information Service Characteristics]

- Test Purpose

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

- Reference

  [3] 3.2, 4.3.3, 4.13

- Initial Condition

  - Via IXIT [11] the IUT manufacturer specifies all characteristics of the Device Information Service supported by the IUT.
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The Lower Tester includes one instantiation of the Device Information Service including all defined characteristics.
  - The IUT has executed the procedure included in CGMP/COL/CGGIT/SER/BV-03-C [Service GGIT – Device Information] (see Section 4.4), and has saved the handle range for the instantiation of the Device Information Service contained in the Lower Tester. The Device Information Service contains one or more characteristics.

- Test Procedure

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

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

- Expected Outcome

  Pass verdict

  For each characteristic supported by the IUT contained in the Lower Tester's instantiation of the Device Information Service, the IUT reports an attribute handle/value pair for each characteristic specified in the IXIT [11] to the Upper Tester.

CGMP/COL/CGMD/BV-16-C [Read Device Information Service Characteristics]

- Test Purpose

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

- Reference

  [3] 3.2, 4.3.2, 4.12

- Initial Condition
  - Via IXIT [11] the IUT manufacturer specifies all characteristics of the Device Information Service supported by the IUT.
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The Lower Tester includes one instantiation of the Device Information Service [9] including all defined characteristics.
  - The IUT has previously executed the procedure included in CGMP/COL/CGGIT/SER/BV-03-C [Service GGIT – Device Information] (see Section 4.4), so it has the handle/value pairs for all characteristics of the Device Information Service supported by the IUT.
- 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 containing the handle specified by the Upper.
  3. The IUT receives an ATT_Read_Response and reports the value to the Upper Tester.
- Expected Outcome

  Pass verdict

  For each characteristic contained in the Lower Tester's instantiation of the Device Information Service supported by the IUT, the IUT reports the characteristic value for all characteristics specified in the IXIT [11] to the Upper Tester.

4.5 CGM Measurement

The procedures defined in this test group verify implementation of the Measurement characteristics for notification as defined in the CGM Profile Specification [3] by a CGM Sensor IUT, and usage of the same features by a Collector IUT.

CGMP/COL/CGMM/BV-01-C [Configure CGM Measurement Characteristic for Notification]

- Test Purpose

  Verify that the Collector IUT can configure a CGM Sensor (Lower Tester) to Notify CGM Measurement characteristics.
- Reference

  [3] 4.4
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The IUT has executed the procedure included in CGMP/COL/CGGIT/CHA/BV-01-C [Characteristic GGIT – CGM Measurement] (see Section 4.4), which returns the handle of a Client Characteristic Configuration Descriptor for a CGM Measurement characteristic contained in the Lower Tester.

- Test Procedure

  The Upper Tester sends a command to the IUT to configure it to receive CGM Measurement characteristic notifications.

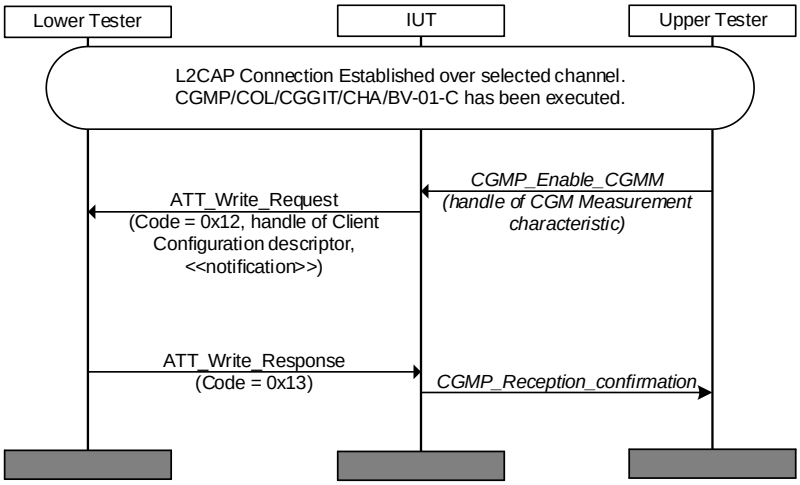

Figure 4.9: CGMP/COL/CGMM/BV-01-C [Configure CGM Measurement Characteristic for Notification]

- Expected Outcome

  Pass verdict

  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 CGM Measurement characteristic, and the value set to «notification».

CGMP/COL/CGMM/BV-02-C [Receive CGM Measurement Notifications]

- Test Purpose

  Verify that the Collector IUT can receive notifications of the CGM Measurement Characteristic for various field configurations.

- Reference

  [3] 4.4

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport orSection 4.2.6 if using a BR/EDR transport.
  - The IUT has executed the procedure included in CGMP/COL/CGMM/BV-01-C [Configure CGM Measurement Characteristic for Notification] (see Section 4.5), which configures it to expect CGM Measurement Notification.
  - The IUT knows the handle of the CGM Measurement characteristic.

- Test Procedure

  1. The Lower Tester sends an ATT_Handle_Value_Notification containing a CGM Measurement characteristic value to the IUT.
  2. The Lower Tester sends count of CGM Measurement characteristic notifications as defined in the Test Patterns shown in Table 4.4 below.

Test Pattern	Definition
1	Create a patient record with at least one CGM Measurement characteristic with only mandatory field values as defined in [12].
2	Create a patient record with at least one CGM Measurement characteristic with at least one optional field values as defined in [12] and supported by device and if applicable.
3	Create a patient record with at least one CGM Measurement characteristic with all optional field values as defined in [12] and supported by device and if applicable.

Table 4.4: Test Pattern table for CGM Measurement Characteristic

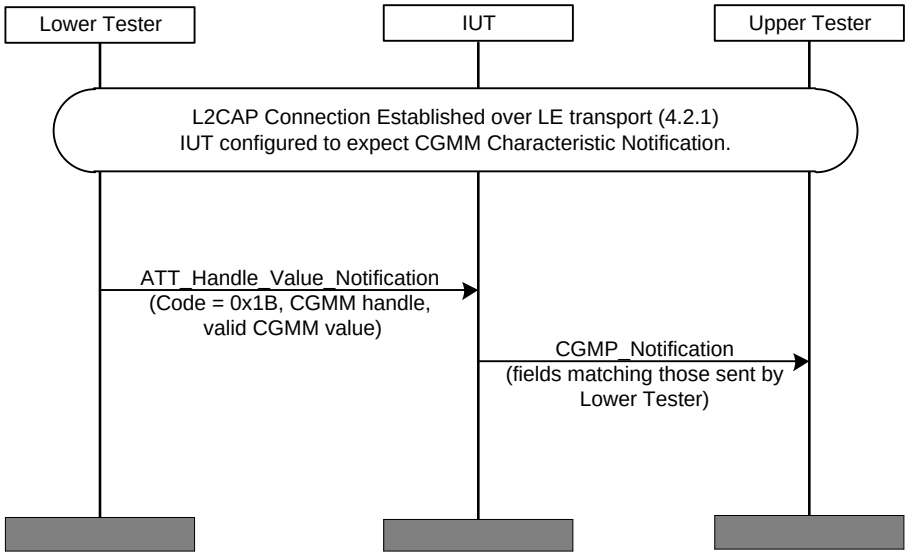

Figure 4.10: CGMP/COL/CGMM/BV-02-C [Receive CGM Measurement Notifications]

- Expected Outcome

  Pass verdict

  IUT sends notifications of CGM Measurement values in expected combinations to the Upper Tester using the pass criteria in the table above.

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

4.6 CGM Features

The procedures defined in this test group verify implementation of the CGM Feature characteristic defined in the CGM Profile Specification [3] by a CGM Sensor IUT, and usage of the same features by a Collector IUT.

CGMP/COL/CGMF/BV-01-C [Read CGM Feature characteristic]

- Test Purpose

  Verify that the Collector IUT can read the CGM Device Feature of the CGM Features characteristic from a CGM Sensor.

- Reference

  [3] 4.5

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The Upper Tester knows the handle of a CGM Feature characteristic contained in the Lower Tester.
- Test Procedure
  1. Configure the IUT with different Test Pattern values for CGM Feature and Type Sample Location (see CGM Features in [12]).
  2. For each Test Pattern, send a command from Upper Tester to request IUT to read a CGM Feature characteristic from the Lower Tester (e.g., CGMP_ReadFeatureRequest (handle)).
  3. After receipt of the expected result by the Lower Tester, send an ATT_Read_Response (0x0B) from the Lower Tester to the IUT.

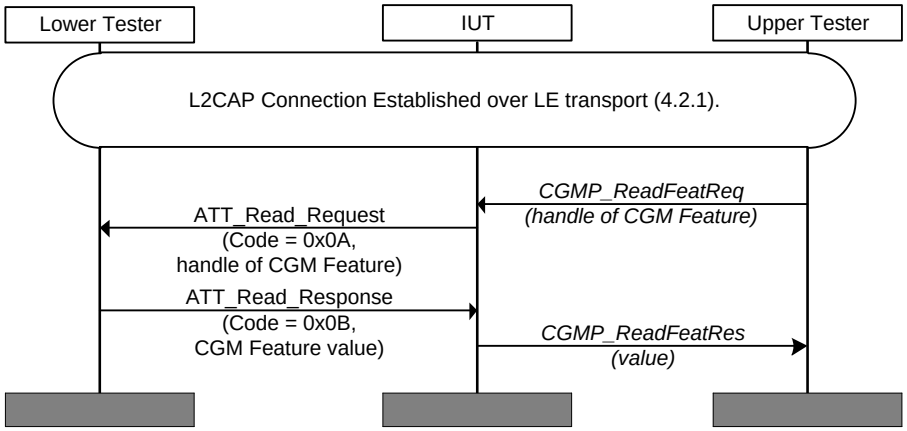

Figure 4.11: CGMP/COL/CGMF/BV-01-C [Read CGM Feature characteristic]

- Expected Outcome

  Pass verdict

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

  The IUT receives the response from the Lower Tester and sends the CGMP_ReadFeatureResponse containing the correct CGM Feature values for CGM Features supported by device to the Upper Tester.

  Reserved for future use bit values will be ignored.

  Feature Extension bit value will be ignored.

  If E2E-CRC safety is supported by the device (Bit 12 of the CGM Feature characteristic is set to 1) the CGM Feature characteristic includes an E2E-CRC field otherwise the E2E-CRC field is set to 0xFFFF.

4.7 CGM Status

The procedures defined in this test group verify implementation of the CGM Status characteristic defined in the CGM Profile Specification [3] by a CGM Sensor IUT, and usage of the same features by a Collector IUT.

CGMP/COL/CGMS/BV-01-C [Read CGM Status characteristic]

- Test Purpose

  Verify that the Collector IUT can read the CGM Status characteristic from a CGM Sensor.

- Reference

  [3] 4.6

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The Upper Tester knows the handle of a CGM Status characteristic contained in the Lower Tester.
  - A CGM Session is not running so that the status cannot be given in the measurement result.

- Test Procedure

  1. Configure the IUT with different Test Pattern values for the CGM Status characteristic (see CGM Features in [12]).
  2. Send a command from Upper Tester to request IUT to read a CGM Status characteristic from the Lower Tester (e.g., CGMP_ReadStatusRequest (handle)).
  3. After receipt of the expected result by the Lower Tester, send an ATT_Read_Response (0x0B) from the Lower Tester to the IUT.

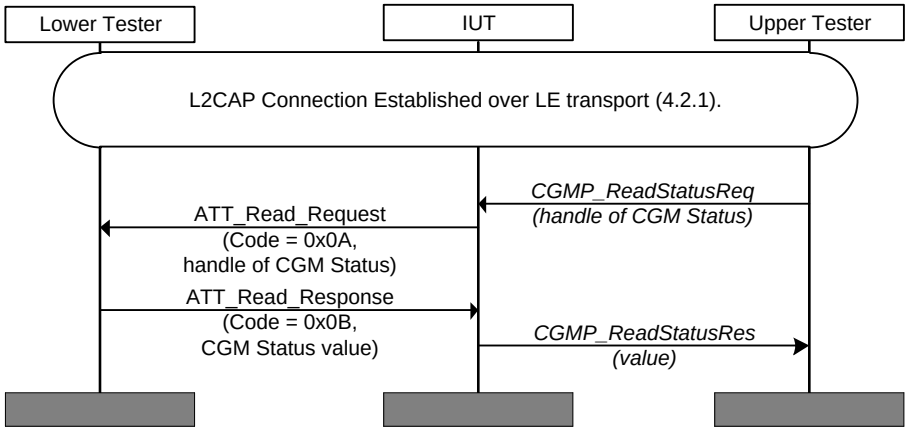

Figure 4.12: CGMP/COL/CGMS/BV-01-C [Read CGM Status characteristic]

- Expected Outcome

  Pass verdict

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

The IUT receives the response from the Lower Tester and sends the CGMP_ReadStatusResponse containing the correct CGM Status value to the Upper Tester.

Reserved for future use bit values will be ignored.

If E2E-CRC safety is supported by the device (Bit 12 of the CGM Feature characteristic is set to 1), the CGM Feature characteristic includes an E2E-CRC field otherwise the E2E-CRC field is excluded.

4.8 CGM Session Start Time

The procedures defined in this test group verify implementation of the CGM Session Start Time characteristic defined in the CGM Profile Specification [3] by a CGM Sensor IUT, and usage of the same features by a Collector IUT.

CGMP/COL/CGMST/BV-01-C [Read CGM Session Start Time characteristic]

- Test Purpose

  Verify that the Collector IUT can read the CGM Session Start Time from a CGM Sensor

- Reference

  [3] 4.7

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The Upper Tester knows the handle of a CGM Session Start Time characteristic contained in the Lower Tester.

- Test Procedure

  1. Send a command from Upper Tester to request IUT to read a CGM Session Start Time characteristic from the Lower Tester (e.g., CGMP_ReadStartTimeRequest (handle)).
  2. After receipt of the expected result by the Lower Tester, send an ATT_Read_Response (0x0B) from the Lower Tester to the IUT.

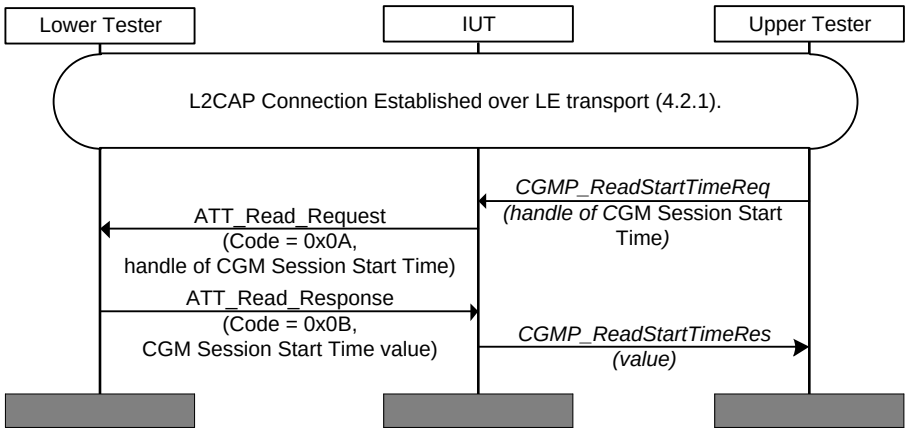

Figure 4.13: CGMP/COL/CGMST/BV-01-C [Read CGM Session Start Time characteristic]

- Expected Outcome

  Pass verdict

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

  The IUT receives the response from the Lower Tester and sends the CGMP_ReadStartTimeResponse containing the correct CGM Session Start Time value to the Upper Tester.

CGMP/COL/CGMST/BV-02-C [Write CGM Session Start Time characteristic]

- Test Purpose

  Verify that the Collector IUT can write the CGM Session Start Time into a CGM Sensor.

- Reference

  [3] 4.7

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The Upper Tester knows the handle of a CGM Session Start Time characteristic contained in the Lower Tester.
  - A session is currently running and an initial Session Start Time is not set.

- Test Procedure

  1. Send a command from Upper Tester to request IUT to write a CGM Session Start Time characteristic from the Lower Tester, (e.g., CGMP_WriteStartTimeRequest (handle)), with a point of time after sensor measurement start.
  2. After receipt of the expected result by the Lower Tester, send an ATT_Write_Response from the Lower Tester to the IUT.
  3. The IUT executes the procedure included in CGMP/COL/CGMST/BV-01-C [Read CGM Session Start Time characteristic] to read out the stored Session Start Time and check that the time is correct adjusted accordingly to the sensor measurement start.

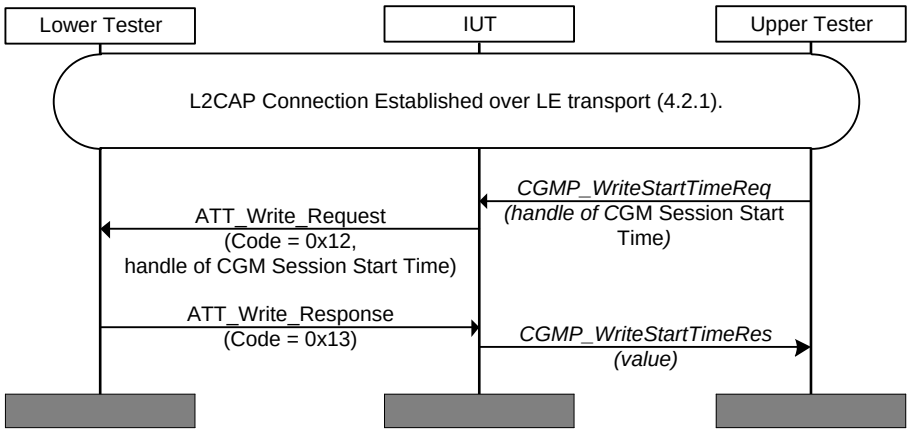

Figure 4.14: CGMP/COL/CGMST/BV-02-C [Write CGM Session Start Time characteristic]

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_Write_Request (0x12) to the Lower Tester containing the handle and value.

  The IUT receives the response from the Lower Tester and sends the CGMP_ReadStartTimeResponse containing the adjusted CGM Session Start Time value to the Upper Tester.

  The CGM Session Start Time is correctly adjusted according to the previously written sensor measurement start.

4.9 CGM Session Run Time

The procedures defined in this test group verify implementation of the CGM Session Run Time characteristic defined in the CGM Profile Specification [3] by a CGM Sensor IUT, and usage of the same features by a Collector IUT.

CGMP/COL/CGMRT/BV-01-C [Read CGM Session Run Time characteristic]

- Test Purpose

  Verify that the Collector IUT can read the CGM Session Run Time from a CGM Sensor.

- Reference

  [3] 4.8

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The Upper Tester knows the handle of a CGM Session Run Time characteristic contained in the Lower Tester.

- Test Procedure

  1. Send a command from Upper Tester to request IUT to read a CGM Session Run Time characteristic from the Lower Tester (e.g., CGMP_ReadRunTimeRequest (handle)).
  2. After receipt of the expected result by the Lower Tester, send an ATT_Read_Response (0x0B) from the Lower Tester to the IUT.

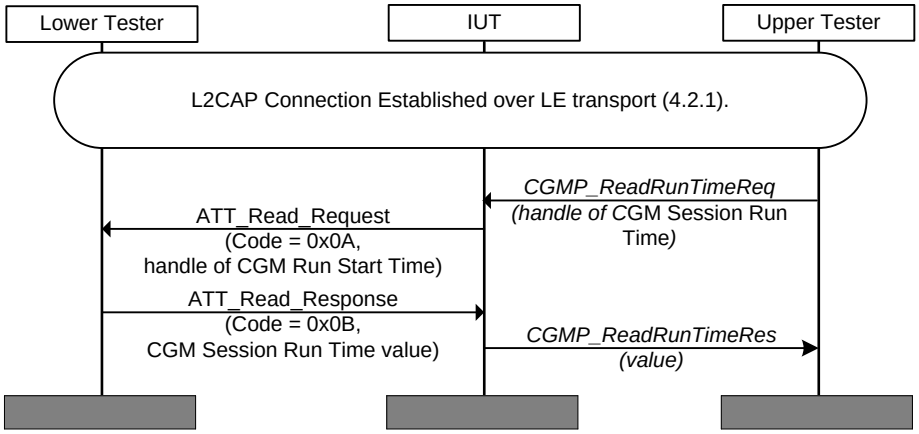

Figure 4.15: CGMP/COL/CGMRT/BV-01-C [Read CGM Session Run Time characteristic]

- Expected Outcome

  Pass verdict

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

  The IUT receives the response from the Lower Tester and sends the CGMP_ReadRunTimeResponse containing the correct CGM Session Run Time value to the Upper Tester.

4.10 Record Access – Report Stored Records

This test group contains test cases to verify compliant operation when the Record Access Control Point (RACP) 'Report Stored Records' procedure is used.

CGMP/COL/RAR/BV-01-C [Report Stored Records – 'All records']

- Test Purpose

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

- Reference

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 3 records.

- Test Procedure

  1. The IUT writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'All records' (0x01) and no Operand.
  2. The Lower Tester sends a number of notifications of the CGM Measurement characteristic depending on the used MTU size.
  3. The IUT receives ATT_Handle_Value_Notifications from the Lower Tester containing the CGM Measurement handles and values.

4. The Lower Tester sends an indication of the Record Access Control Point characteristic with the 'Response Code' Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x01) followed by the Response Code for 'Success' (0x01).
5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
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

  The IUT receives a number of notifications of the CGM Measurement characteristic depending on the used MTU size.

  The CGM Measurement characteristic contains the values of the three records.

  The IUT receives the Response Code for 'Success' (0x01).

  The oldest record is transmitted before newer records.

CGMP/COL/RAR/BV-02-C [Report Stored Records – 'Less than or equal to Time Offset']

- Test Purpose

  Verify that the Collector IUT can perform the 'Report Stored Records' procedure with an Operator of 'Less than or equal to' and using the Time Offset Filter Type.

- Reference

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 3 records.

- Test Procedure

1. IUT writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'Less than or equal to' (0x02) and a Operand representing the Filter Type 'Time Offset' (0x01),followed by the maximum value for the filter representing Time Offset of the second record.
2. The Lower Tester sends notification(s) of CGM Measurement characteristic representing the two oldest records.
3. The IUT receives ATT_Handle_Value_Notification(s) from the Lower Tester containing the CGM Measurement characteristic handle and value.
4. The Lower Tester sends an indication of the Record Access Control Point characteristic with the 'Response Code' Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Code Op Code (0x01) followed by the Response Code for 'Success' (0x01).
5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
6. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
7. Perform step 3 again using a 'Time Offset' filter value lower than the oldest record.
8. The Lower Tester sends an indication of the Record Access Control Point characteristic with the 'Response Code' Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x01) followed by the Response Code for 'No Records found' (0x06).
9. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives a notification of the CGM Measurement characteristic representing the two oldest records.

  For the ‘Success’ case, the IUT receives Response Code for ‘Success’ (0x01).

  For the ‘No Records found’ case, the IUT receives the Response Code for ‘No Records found’ (0x06).

CGMP/COL/RAR/BV-03-C [Report Stored Records – ‘Greater than or equal to Time Offset’]

- Test Purpose

  Verify that the Collector IUT can perform the ‘Report Stored Records’ procedure with an Operator of ‘greater than or equal to’ and using the Time Offset Filter Type.

- Reference

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 3 records.

- Test Procedure

  1. IUT writes the ‘Report Stored Records’ Op Code (0x01) to the RACP using an Operator of ‘Greater than or equal to’ (0x03) and a Operand representing the Filter Type ‘Time Offset’ (0x01), followed by the minimum value for the filter representing Time Offset of the second record.
  2. The Lower Tester sends one notification of the CGM Measurement characteristic representing the two most recent records.
  3. The IUT receives an ATT_Handle_Value_Notification from the Lower Tester containing the CGM Measurement characteristic handle and value.
  4. The Lower Tester sends an indication of the Record Access Control Point characteristic with the ‘Response Code’ Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x01) followed by the Response Code for ‘Success’ (0x01).
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
  6. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  7. Perform step 3 again using a Time Offset filter value newer than the most recent record.
  8. The Lower Tester sends an indication of the Record Access Control Point characteristic with the ‘Response Code’ Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x01) followed by the Response Code for ‘No Records found’ (0x06).
  9. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives a notification of the CGM Measurement characteristic representing the two most recent records.

  For the ‘Success’ case, the IUT receives the Response Code for ‘Success’ (0x01).

  For the ‘No Records found’ case, the IUT receives the Response Code for ‘No Records found’ (0x06).

CGMP/COL/RAR/BV-04-C [Report Stored Records – 'Within range of (inclusive) Time Offset value pair']

- Test Purpose

  Verify that the Collector IUT can perform the 'Report Stored Records' procedure with an Operator of 'Within range of (inclusive)' and using the Time Offset Filter Type.

- Reference

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 5 records.

- Test Procedure

  1. IUT writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'Within range of (inclusive)' (0x04) and a Operand containing the Filter Type 'Time Offset' (0x01) followed by a pair of Time Offset values representing the value of the second record and the value of the third record.
  2. The Lower Tester sends one notification of the CGM Measurement characteristic representing the second and third record.
  3. The IUT receives an ATT_Handle_Value_Notification from the Lower Tester containing the CGM Measurement characteristic handle and value.
  4. The Lower Tester sends an indication of the Record Access Control Point characteristic with the 'Response Code' Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x01) followed by the Response Code for 'Success' (0x01).
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
  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

  The IUT receives notification(s) of the CGM Measurement characteristic representing the second and the third record.

  The IUT receives the Response Code for 'Success' (0x01).

CGMP/COL/RAR/BV-05-C [Report Stored Records – 'First record']

- Test Purpose

  Verify that the Collector IUT can perform the 'Report Stored Records' procedure with an Operator of 'First record'.

- Reference

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 3 records.

- Test Procedure

  1. IUT writes the ‘Report Stored Records’ Op Code (0x01) to the RACP using an Operator of ‘First record’ (0x05) and no Operand.
  2. The Lower Tester sends one notification of the CGM Measurement characteristic representing the oldest record.
  3. The IUT receives one ATT_Handle_Value_Notification from the Lower Tester containing the CGM Measurement characteristic handle and value.
  4. The Lower Tester sends an indication of the Record Access Control Point characteristic with the ‘Response Code’ Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x01) followed by the Response Code for ‘Success’ (0x01).
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
  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

  The IUT receives one notification of the CGM Measurement characteristic representing the oldest record.

  The IUT receives the Response Code for ‘Success’ (0x01).

CGMP/COL/RAR/BV-06-C [Report Stored Records – ‘Last record’]

- Test Purpose

  Verify that the Collector IUT can perform the ‘Report Stored Records’ procedure with an Operator of ‘Last record’.

- Reference

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 3 records.

- Test Procedure

  1. IUT writes the ‘Report Stored Records’ Op Code (0x01) to the RACP using an Operator of ‘Last record’ (0x06) and no Operand.
  2. The Lower Tester sends one notification of the CGM Measurement characteristic representing the most recent record.
  3. The IUT receives an ATT_Handle_Value_Notification from the Lower Tester containing the CGM Measurement characteristic handle and value.
  4. The Lower Tester sends an indication of the Record Access Control Point characteristic with the ‘Response Code’ Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x01) followed by the Response Code for ‘Success’ (0x01).
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
  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

  The IUT receives one notification of the CGM Measurement characteristic representing the most recent record.

  The IUT receives the Response Code for ‘Success’ (0x01).

CGMP/COL/RAR/BV-07-C [Report Stored Records – ‘All records – Record Added’]

- Test Purpose

  Verify that the Collector 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

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 3 records.

- Test Procedure

  1. The IUT writes the ‘Report Number of Stored Records’ Op Code (0x04) to the RACP using an Operator of ‘All records’ (0x01) and no Operand.
  2. The Lower Tester sends an indication of the Record Access Control Point characteristic with the ‘Report Number of Stored Records’ Response Op Code (0x05), an Operator of Null (0x00), and an Operand representing that three records were found (0x0003).
  3. A new record is added at the Lower Tester.
  4. The IUT writes the ‘Report Stored Records’ Op Code (0x01) to the RACP using an Operator of ‘All records’ (0x01) and no Operand.
  5. The Lower Tester sends number of notifications of the CGM Measurement characteristic depending on the used MTU size representing all records (one more record than the IUT expected).
  6. The IUT receives an ATT_Handle_Value_Notification from the Lower Tester containing the CGM Measurement handle and value.
  7. The Lower Tester sends an indication of the Record Access Control Point characteristic with the ‘Response Code’ Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x01) followed by the Response Code for ‘Success’ (0x01).
  8. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point 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.
  11. Verify that the IUT continues to process commands normally.

- Expected Outcome

  Pass verdict

  IUT receives an indication of the Record Access Control Point characteristic with the ‘Report Number of Stored Records Response’ Op Code (0x05), an Operator of Null (0x00), and an Operand representing that three records were found (0x0003).

The IUT receives number of notifications of the CGM Measurement characteristic representing all four records; the number depends on the used MTU size used.

The IUT receives the Response Code for 'Success' (0x01).

The IUT continues to process commands normally.

CGMP/COL/RAR/BV-08-C [Report Stored Records – 'All records – Record Deleted']

- Test Purpose

  Verify that the Collector 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

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.4

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 3 records.

- Test Procedure

  1. IUT writes the 'Report Number of Stored Records' Op Code (0x04) to the RACP using an Operator of 'All records' (0x01) and no Operand.
  2. The Lower Tester sends an indication of the Record Access Control Point characteristic with the 'Report Number of Stored Records' Response Op Code (0x05), an Operator of Null (0x00) and an Operand representing that three records were found (0x0003).
  3. The second record is deleted at the Lower Tester.
  4. IUT writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'All records' (0x01) and no Operand.
  5. The Lower Tester sends number of notifications of the CGM Measurement characteristic representing all records (one less record than the IUT expected); the number depends on the MTU size used.
  6. The IUT receives an ATT_Handle_Value_Notification from the Lower Tester containing the CGM Measurement characteristic handle and value.
  7. The Lower Tester sends an indication of the Record Access Control Point characteristic with the 'Response Code' Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x01) followed by the Response Code for 'Success' (0x01).
  8. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point 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.
  11. Verify that the IUT continues to process commands normally.

- Expected Outcome

  Pass verdict

  IUT receives an indication of the Record Access Control Point characteristic with the 'Report Number of Stored Records Response' Op Code (0x05), an Operator of Null (0x00), and an Operand representing that three records were found (0x0003).

  The IUT receives a notification of the CGM Measurement characteristic representing the two records.

The IUT receives the Response Code for ‘Success’ (0x01).

The IUT continues to process commands normally.

4.11 Record Access - Delete Stored Records

This test group contains test cases to verify compliant operation when the Record Access Control Point (RACP) ‘Delete Stored Records’ procedure is used.

CGMP/COL/RAD/BV-01-C [Delete Stored Records – ‘All records’]

- Test Purpose

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

- Reference

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.3

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 3 records.

- Test Procedure

  1. IUT writes the ‘Report Stored Records’ Op Code (0x01) to the RACP using an Operator of ‘All records’ (0x01) and no Operand.
  2. The Lower Tester sends number of notifications of the CGM Measurement characteristic representing all records; the number depends on the MTU size used.
  3. The IUT receives an ATT_Handle_Value_Notification from the Lower Tester containing the CGM Measurement characteristic handle and value.
  4. The Lower Tester sends an indication of the Record Access Control Point characteristic with the ‘Response Code’ Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x01) followed by the Response Code for ‘Success’ (0x01).
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
  6. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  7. IUT writes the ‘Delete Stored Records’ Op Code (0x02) to the RACP using an Operator of ‘All records’ (0x01) and no Operand.
  8. The Lower Tester sends an indication of the Record Access Control Point characteristic with the Response Code Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x02) followed by the Response Code for ‘Success’ (0x01).
  9. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
  10. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for ‘Success’ (0x01).

  All records have been deleted from the Lower Tester.

CGMP/COL/RAD/BV-02-C [Delete Stored Records – 'Less than or equal to Time Offset']

- Test Purpose

  Verify that the Collector IUT can perform the Delete Stored Records procedure with an Operator of 'Less than or equal to' and using the 'Time Offset' Filter Type.

- Reference

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.3

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 4 records.

- Test Procedure

  1. The IUT writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'All records' (0x01) and no Operand.
  2. The Lower Tester sends number of notifications of the CGM Measurement characteristic representing all records; the number depends on the MTU size used.
  3. The IUT receives an ATT_Handle_Value_Notification from the Lower Tester containing the CGM Measurement characteristic handle and value.
  4. The Lower Tester sends an indication of the Record Access Control Point characteristic with the Response Code Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x01) followed by the Response Code for 'Success' (0x01).
  5. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
  6. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  7. The IUT writes the 'Delete Stored Records' Op Code (0x02) to the RACP using an Operator of 'Less than or equal to' (0x02) and a Operand containing the Filter Type 'Time Offset' (0x01), followed by the maximum value for the filter representing the Time Offset of the second record.
  8. The Lower Tester sends an indication of the Record Access Control Point characteristic with the Response Code Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x02) followed by the Response Code for 'Success' (0x01).
  9. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
  10. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Success' (0x01).

  The two oldest records have been deleted from the Lower Tester.

4.12 Record Access - Abort Operation

This test group contains test cases to verify compliant operation when the Record Access Control Point (RACP) 'Abort Operation' procedure is used.

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

- Test Purpose

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

- Reference

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.5

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - 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 RACP abort is attempted. In most cases, ~200 records is sufficient since this will take over 5 seconds to transfer.

- Test Procedure

  1. IUT writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'All records' (0x01) and no Operand.
  2. The Lower Tester starts to send a number of notifications of the CGM Measurement characteristic; depends on the used MTU size
  3. The IUT receives one or more ATT_Handle_Value_Notification from the Lower Tester containing the CGM Measurement characteristic handle and value.
  4. IUT writes the 'Abort Operation' Op Code (0x03) to the RACP with an Operator of Null and no Operand.
  5. The Lower Tester sends an indication of the Record Access Control Point characteristic with the 'Response Code' Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x03) followed by the Response Code for 'Success' (0x01).
  6. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
  7. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  8. Verify that the notifications stop.
  9. 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 CGM Measurement characteristic. The IUT receives one indication of the Record Access Control Point characteristic with the 'Response Code' Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code (0x03) followed by the Response Code for 'Success' (0x01).

4.13 Record Access – Report Number of Stored Records

This test group contains test cases to verify compliant operation when the Record Access Control Point (RACP) 'Report Number of Stored Records' procedure is used.

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

- Test Purpose

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

- Reference

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.2

- Initial Condition
  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 3 records.
- Test Procedure
  1. IUT writes the Report number of stored records Op Code (0x04) to the RACP using an Operator of 'All records' (0x01) and no Operand.
  2. The Lower Tester sends an indication of the Record Access Control Point characteristic with the 'Report Number of stored Records' response Op Code (0x05), an Operator of Null (0x00), and an Operand representing that three records were found (0x0003).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.
- Expected Outcome

  Pass verdict

  The IUT receives one indication of the Record Access Control Point characteristic with the 'Report Number of stored Records' Response Op Code (0x05) an Operator of Null (0x00) and an Operand representing that three records were found (0x0003).

  The value of the Operand represents that 3 records were found.

CGMP/COL/RAN/BV-02-C [Report Number of Stored Records – 'Greater than or equal to Time Offset']

- Test Purpose

  Verify that the Collector IUT can perform the Report Number of Stored Records procedure with an Operator of 'greater than or equal to' and using the 'Time Offset' Filter Type.
- Reference

  [3] 4.9, 4.9.1, 4.9.2, 4.9.2.2
- Initial Condition
  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 3 records.
- Test Procedure
  1. IUT writes the Report number of stored records Op Code (0x04) to the RACP using an Operator of 'Greater than or equal to' (0x03) and a Operand containing the Sequence Number Filter Type (0x01) followed by the value of the Time Offset of the second record.
  2. The Lower Tester sends an indication of the Record Access Control Point characteristic with the 'Report Number of Stored Records' response Op Code (0x05), an Operator of Null (0x00), and an Operand representing that two records were found (0x0002).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the Record Access Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives one indication of the Record Access Control Point characteristic with the ‘Report Number of Stored Records’ response Op Code (0x05) an Operator of Null (0x00) and an Operand representing that two records were found (0x0002).

  The value of the Operand represents that two records were found.

4.14 Record Access – RACP Specific Errors

This test group contains test cases to verify compliant operation when the Tester uses Record Access Control Point (RACP) procedure and specific error results.

CGMP/COL/RAE/BI-01-C [RACP Specific Errors – ‘Unsupported Operand’]

- Test Purpose

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

- Reference

  [3] 4.9.1, 4.9.2.6

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 3 records.

- Test Procedure

  1. IUT writes any Op Code to the RACP using an appropriate Operator and optional Operand for the Op Code.
  2. The Lower Tester sends an indication of the Record Access Control Point characteristic with the ‘Response Code’ Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code followed by the ‘Response Code’ value (0x09) for ‘Operand not supported’.
  3. Verify that the IUT returns to stable state and can process commands normally.

- Expected Outcome

  Pass verdict

  The IUT receives the ‘Response Code’ value (0x09) for ‘Operand not supported’.

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

CGMP/COL/RAE/BI-02-C [RACP Specific Errors – ‘Unsupported Operator’]

- Test Purpose

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

- Reference

  [3] 4.9.1, 4.9.2.6

- Initial Condition
  - Perform the preamble described in Section 4.2.3.
  - Perform an action on the Lower Tester that will induce it to generate 3 records.
- Test Procedure
  1. IUT writes the Report stored records Op Code (0x01) to the RACP using any optional Operator and no Operand.
  2. The Lower Tester sends an indication of the Record Access Control Point characteristic with the 'Response Code' Op Code (0x06), an Operator of Null (0x00), and an Operand representing Request Op Code followed by the 'Response Code' value (0x04) for 'Operator not supported'.
  3. Verify that the IUT returns to stable state and can process commands normally.
- Expected Outcome

  Pass verdict

  The IUT receives the 'Response Code' value (0x04) for 'Operator not supported'.

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

4.15 CGM Specific Ops

This test group contains test cases to verify compliant operation when the CGM Specific Ops Control Point procedures are used.

CGMP/COL/CGMCP/BV-01-C [CGM Specific Ops – 'Get CGM Communication interval']

- Test Purpose

  Verify that a Collector IUT can perform the 'Get CGM Communication interval' procedure.
- Reference

  [3] 4.10, 4.10.2, 4.10.2.1
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
- Test Procedure
  1. The IUT writes the 'Get CGM Communication interval' Op Code (0x02) to the CGM Specific Ops CP with no operands.
  2. The Lower Tester sends an indication of the CGM Specific Ops CP characteristic with the 'Get CGM Communication Interval response' Op Code (0x03) and an Operand representing the Communication Interval in minutes.
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.
- Expected Outcome

  Pass verdict

  The IUT receives the Communication Interval in minutes.

CGMP/COL/CGMCP/BV-02-C [CGM Specific Ops – 'Set CGM Communication Interval' Type 1]

- Test Purpose

  Verify that the Collector IUT can perform the 'Set CGM Communication Interval' procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.

- Test Procedure

  1. The IUT writes the 'Set CGM Communication interval' Op Code (0x01) to the CGM Specific Ops CP with an Operand containing the value for the new CGM Communication interval time (e.g., 0x05 representing 5 Minutes).
  2. The Lower Tester sends an indication of the CGM Specific Ops CP characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x01) followed by the Response Code for 'Success' (0x01).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Perform CGMP/COL/CGMCP/BV-01-C [CGM Specific Ops – 'Get CGM Communication interval'] to verify that the previous 'Communication Time Interval' is set by the IUT.
  6. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Success' (0x01).

  The new Communication Interval is correctly set by the IUT.

CGMP/COL/CGMCP/BV-03-C [CGM Specific Ops – 'Set CGM Communication Interval' Type 2]

- Test Purpose

  Verify that when the Collector IUT performs the 'Set CGM Communication Interval' procedure with a communication interval value of 0xFF the communication interval is set to the smallest interval supported by the device.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The smallest Communication Interval supported by the device is known.

- Test Procedure

  1. The IUT writes the ‘Set CGM Communication interval’ Op Code (0x01) to the CGM Specific Ops CP with an Operand containing the value 0xFF.
  2. The Lower Tester sends an indication of the CGM Specific Ops CP characteristic with the ‘Response Code’ Op Code (0x1C) and an Operand representing the Request Op Code (0x01) followed by the Response Code for ‘Success’ (0x01).
  3. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The Communication Interval is updated with the correct value.

  The IUT receives the Response Code for ‘Success’ (0x01).

CGMP/COL/CGMCP/BV-04-C [CGM Specific Ops – ‘Disable CGM Communication Interval’]

- Test Purpose

  Verify that the Collector IUT can perform the ‘Set CGM Communication Interval’ procedure with a communication interval value of 0x00.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.

- Test Procedure

  1. The IUT writes the ‘Set CGM Communication Interval’ Op Code (0x01) to the CGM Specific Ops CP with an Operand containing the value 0x00.
  2. The Lower Tester sends an indication of the CGM Specific Ops CP characteristic with the ‘Response Code’ Op Code (0x1C) and an Operand representing the Request Op Code (0x01) followed by the Response Code for ‘Success’ (0x01).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  For the ‘Success’ case, the IUT receives the Response Code for ‘Success’ (0x01) and the periodic communication is disabled.

CGMP/COL/CGMCP/BV-05-C [CGM Specific Ops – 'Set Glucose Calibration Value']

- Test Purpose

  Verify that the Collector IUT can perform the 'Set Glucose calibration' procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Calibration is set to 1.

- Test Procedure

  1. The IUT writes the 'Set Glucose Calibration Value' Op Code (0x04) to the CGM Specific Ops Control Point with an Operand containing a Glucose Calibration value.

An example of a possible valid Glucose Calibration value is shown in the table below:

	Glucose Concentration mg/dL	Calibration Time (Minutes)	Sample Location	Next Calibration (Min)	Calibration Data Record Number	Calibration Status
Value	78	5	Arterial Plasma	5	0	0
Hex	0x004E	0x0005	0x06	0x0005	0x0000	0x00

Note: If the Calibration Data Record gets written, the Calibration Data Record Number and the data in the Calibration Status field will be ignored.

  2. The Lower Tester sends an indication of the CGM Specific Ops CP characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing Request Op Code (0x04) followed by the Response Code for 'Success' (0x01).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The Lower Tester receives the Glucose Calibration value which is written by the IUT.

  The IUT receives the Response Code for 'Success' (0x01).

CGMP/COL/CGMCP/BV-06-C [CGM Specific Ops – 'Get Glucose Calibration Value' Type 1]

- Test Purpose

  Verify that the IUT can perform the 'Get Glucose Calibration value' procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.2

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Calibration is set to 1.
  - One or more Calibration Data records are present in the Lower Tester.
- Test Procedure
  1. The IUT writes the 'Get Glucose Calibration value' Op Code (0x05) to the CGM Specific Ops Control Point with an Operand containing a valid value of a Calibration Data Record Number as defined in [7].
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Get Glucose Calibration Value response' Op Code (0x06) and an Operand representing the actual Calibration Data of the requested record.
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.
- Expected Outcome

  Pass verdict

  The IUT receives the actual Calibration Data of the requested record.

  The Calibration Data value received corresponds to the value of the requested Calibration Data record which is stored in Lower Tester.

CGMP/COL/CGMCP/BV-07-C [CGM Specific Ops – 'Get Glucose Calibration Value' Type 2]

- Test Purpose

  Verify that the IUT can perform the 'Get Glucose Calibration value' procedure with a record number of 0xFFFF to read out the last stored Calibration Data.
- Reference

  [3] 4.10, 4.10.2, 4.10.2.2
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Calibration is set to 1.
  - One or more Calibration Data records are present in the Lower Tester.
- Test Procedure
  1. The IUT writes the 'Get Glucose Calibration value' Op Code (0x05) to the CGM Specific Ops Control Point with an Operand containing 0xFFFF as value for the last stored Calibration Data Record Number.

2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the ‘Get Glucose Calibration Value response’ Op Code (0x06) and an Operand representing the Calibration Data of the last stored record.
3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
5. Verify that the read Calibration Data has the record number of the last stored Calibration Data record.
6. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Calibration Data of the last stored record.

  The received Calibration Data value corresponds to the value of the last Calibration Data record which is stored in Lower Tester.

CGMP/COL/CGMCP/BV-08-C [CGM Specific Ops – ‘Get Glucose Calibration Value’ Type 3]

- Test Purpose

  Verify that the IUT can perform the ‘Get Glucose Calibration value’ procedure with a record number of 0x0000.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Calibration is set to 1.
  - One or more Calibration Data records are present in the Lower Tester.

- Test Procedure

  1. The IUT writes the ‘Get Glucose Calibration value’ Op Code (0x05) to the CGM Specific Ops Control Point with an Operand containing 0x0000 for the value of the Calibration Data Record Number.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the ‘Get Glucose Calibration Value response’ Op Code (0x06) and an Operand representing the Calibration Data.
  3. Verify that the Glucose Concentration Calibration field value is set to NaN as defined in [8].
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Calibration Data.

  The Glucose Concentration Calibration field value is set to NaN as defined in [8].

  The Calibration Time is set to 0.

CGMP/COL/CGMCP/BI-01-C [CGM Specific Ops – 'Set Glucose Calibration Value' Op Code not supported]

- Test Purpose

  Verify that the Collector IUT can't perform the 'Set Glucose calibration' procedure if Calibration is not supported.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Calibration is set to 0.

- Test Procedure

  1. The IUT writes the 'Set Glucose Calibration Value' Op Code (0x04) to the CGM Specific Ops Control Point with an Operand containing a Glucose Calibration value.
  2. The Lower Tester sends an indication of the CGM Specific Ops CP characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing Request Op Code (0x04) followed by the Response Code for 'Op Code not supported' (0x02).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Op Code not supported' (0x02).

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

CGMP/COL/CGMCP/BV-09-C [CGM Specific Ops – 'Get Patient High Alert Level']

- Test Purpose

  Verify that the IUT can perform the 'Get Patient High Alert Level' procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.3

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Patient High/Low Alerts is set to 1.
- Test Procedure
  1. The IUT writes the 'Get Patient High Alert Level' Op Code (0x08) to the CGM Specific Ops Control Point with no Operand.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Get Patient High Alert Level Response' Op Code (0x09) and an Operand representing the actual Patient High Alert Level value in milligram per deciliter.
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.
- Expected Outcome

  Pass verdict

  The IUT receives the Patient High Alert Level value in milligrams per deciliter.

  The value corresponds to stored Patient High Alert Level value in the Lower Tester.

CGMP/COL/CGMCP/BV-10-C [CGM Specific Ops – 'Set Patient High Alert Level']

- Test Purpose

  Verify that the IUT can perform the 'Set Patient High Alert Level' procedure.
- Reference

  [3] 4.10, 4.10.2, 4.10.2.3
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Patient High/Low Alerts is set to 1.
- Test Procedure
  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-09-C [CGM Specific Ops – 'Get Patient High Alert Level'] to read out the actual stored High Alert Level value.
  2. The IUT writes the 'Set Patient High Alert Level' Op Code (0x07) to the CGM Specific Ops Control Point with an Operand containing a Patient High Alert Level value in milligrams per deciliter in a valid range.
  3. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x07) followed by the Response Code for 'Success' (0x01).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.

6. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-09-C [CGM Specific Ops – 'Get Patient High Alert Level'] to verify the new high alert level value.
7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Success' (0x01).

  The 'Patient High Alert Level' is set to the new value as used in Step 3.

CGMP/COL/CGMCP/BI-02-C [CGM Specific Ops – 'Set invalid Patient High Alert Level' Type 1]

- Test Purpose

  Verify that the IUT can't perform the 'Set Patient High Alert Level' procedure with a value above the upper limit of the Patient High Alert Level.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.3

- Initial Condition

  - The upper Patient High Alert level supported by the IUT is higher than the upper Patient High Alert level value of the Lower Tester.
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Patient High/Low Alerts is set to 1.

- Test Procedure

  1. The IUT executes the procedure included CGMP/COL/CGMCP/BV-10-C [CGM Specific Ops – 'Set Patient High Alert Level'] with a value above the upper Patient High Alert level value of the Lower Tester.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x07) followed by the Response Code for 'Parameter out Range' (0x05).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Parameter out of Range' (0x05).

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

CGMP/COL/CGMCP/BI-03-C [CGM Specific Ops – 'Set invalid Patient High Alert Level' Type 2]

- Test Purpose

  Verify that the IUT can't perform the 'Set Patient High Alert Level' procedure with a value below the lower limit of the Patient High Alert Level.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.3

- Initial Condition

  - The lower Patient High Alert level supported by the collector is lower than the lower Patient High Alert level value of the Lower Tester.
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Patient High/Low Alerts is set to 1.

- Test Procedure

  1. The IUT executes the procedure included CGMP/COL/CGMCP/BV-10-C [CGM Specific Ops – 'Set Patient High Alert Level'] with a value below the lower Patient High Alert level value of the Lower Tester.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x07) followed by the Response Code for 'Parameter out Range' (0x05).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Parameter out of Range' (0x05).

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

CGMP/COL/CGMCP/BI-04-C [CGM Specific Ops – 'Set Patient High Alert Level' Op Code not supported]

- Test Purpose

  Verify that the IUT can't perform the 'Set Patient High Alert Level' procedure if Patient High/Low Alerts are not supported.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.3

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Patient High/Low Alerts is set to 0.
- Test Procedure
  1. The IUT executes the procedure included CGMP/COL/CGMCP/BV-10-C [CGM Specific Ops – 'Set Patient High Alert Level'] to set the Patient High Alert Level.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x07) followed by the Response Code for 'OpCode not supported' (0x02).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.
- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Op Code not supported' (0x02).

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

CGMP/COL/CGMCP/BV-11-C [CGM Specific Ops – 'Get Patient Low Alert Level']

- Test Purpose

  Verify that the IUT can perform the 'Get Patient Low Alert Level' procedure.
- Reference

  [3] 4.10, 4.10.2, 4.10.2.3
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Patient High/Low Alerts is set to 1.
- Test Procedure
  1. The IUT writes the 'Get Patient Low Alert Level' Op Code (0x0B) to the CGM Specific Ops Control Point with no Operand.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Get Patient Low Alert Level Response' Op Code (0x0C) and an Operand representing the Patient Low Alert Level value in milligrams per deciliter.
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Patient Low Alert Level value in milligrams per deciliter.

  The received Patient Low Alert Level value corresponds to stored Patient Low Alert Level value in the Lower Tester.

CGMP/COL/CGMCP/BV-12-C [CGM Specific Ops – 'Set Patient Low Alert Level']

- Test Purpose

  Verify that the IUT can perform the 'Set Patient Low Alert Level' procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.3

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Patient High/Low Alerts is set to 1.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-11-C [CGM Specific Ops – 'Get Patient Low Alert Level'] to read out the actual stored Low Alert Level value.
  2. The IUT writes the 'Set Patient Low Alert Level' Op Code (0x0A) to the CGM Specific Ops Control Point with an Operand containing a Patient Low Alert Level value in milligrams per deciliter in a valid range.
  3. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x0A followed by the Response Code for 'Success' (0x01).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-11-C [CGM Specific Ops – 'Get Patient Low Alert Level'] to verify the new low alert level value.
  7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Op Code for 'Success' (0x01).

  The 'Patient Low Alert Level' is set to the new value as used in Step 3.

CGMP/COL/CGMCP/BI-05-C [CGM Specific Ops – 'Set invalid Patient Low Alert Level' Type 1]

- Test Purpose

  Verify that the IUT can't perform the 'Set Patient Low Alert Level' procedure with a value above the upper limit of the Patient Low Alert Level.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.3

- Initial Condition

  - The upper Patient Low Alert level supported by the IUT is higher than the upper Patient Low Alert level value of the Lower Tester.
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Patient High/Low Alerts is set to 1.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-12-C [CGM Specific Ops – 'Set Patient Low Alert Level'] with a value above the upper Patient Low Alert level value of the Lower Tester.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x0A) followed by the Response Code for 'Parameter out Range' (0x05).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Parameter out of Range' (0x05).

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

CGMP/COL/CGMCP/BI-06-C [CGM Specific Ops – 'Set invalid Patient Low Alert Level' Type 2]

- Test Purpose

  Verify that the IUT can't perform the 'Set Patient Low Alert Level' procedure with a value below the lower limit of the Patient Low Alert Level.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.3

- Initial Condition

  - The lower limit of the Patient Low Alert level supported by the collector is lower than the lower limit of the Patient Low Alert level value of the Lower Tester.
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Patient High/Low Alerts is set to 1.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-12-C [CGM Specific Ops – 'Set Patient Low Alert Level'] with a value below the lower Patient Low Alert level value of the Lower Tester.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x0A) followed by the Response Code for 'Parameter out Range' (0x05).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Parameter out of Range' (0x05).

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

CGMP/COL/CGMCP/BI-07-C [CGM Specific Ops – 'Set Patient Low Alert Level' Op Code not supported]

- Test Purpose

  Verify that the IUT can't perform the 'Set Patient Low Alert Level' procedure if Patient High/Low Alerts are not supported.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.3

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Patient High/Low Alerts is set to 0.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-12-C [CGM Specific Ops – 'Set Patient Low Alert Level'] to set the Patient Low Alert Level.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x0A) followed by the Response Code for 'OpCode not supported' (0x02).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Op Code not supported' (0x02).

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

CGMP/COL/CGMCP/BV-13-C [CGM Specific Ops – 'Get Hypo Alert Level']

- Test Purpose

  Verify that the IUT can perform the 'Get Hypo Alert Level' procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.4

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Hypo Alerts is set to 1.

- Test Procedure

  1. The IUT writes the 'Get Hypo Alert Level' Op Code (0x0E) to the CGM Specific Ops Control Point with no Operand.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Get Hypo Alert Level Response' Op Code (0x0F) and an Operand representing the Hypo Alert Level value in milligrams per deciliter.
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Hypo Alert Level value in milligrams per deciliter.

  The received Hypo Alert Level value corresponds to the stored Hypo Alert Level value in the Lower Tester.

CGMP/COL/CGMCP/BV-14-C [CGM Specific Ops – 'Set Hypo Alert Level']

- Test Purpose

  Verify that the IUT can perform the 'Set Hypo Alert Level' procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.4

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Hypo Alerts is set to 1.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-13-C [CGM Specific Ops – 'Get Hypo Alert Level'] to read out the actual stored Hypo Alert Level value.
  2. The IUT writes the 'Set Hypo Alert Level' Op Code (0x0D) to the CGM Specific Ops Control Point with an Operand containing a Hypo Alert Level value in milligrams per deciliter in a valid range.
  3. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x0D) followed by the Response Code for 'Success' (0x01).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-13-C [CGM Specific Ops – 'Get Hypo Alert Level'] to verify the new Hypo Alert Level value.
  7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Op Code for 'Success' (0x01).

  The 'Hypo Alert Level' is set to the new value as used in Step 3.

CGMP/COL/CGMCP/BI-08-C [CGM Specific Ops – 'Set invalid Hypo Alert Level']

- Test Purpose

  Verify that the IUT can't perform the 'Set Hypo Alert Level' procedure with a value below the limit of the Hypo Alert Level.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.4

- Initial Condition

  - The Hypo Alert level supported by the IUT is lower than the Hypo Alert level value of the Lower Tester.
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Hypo Alerts is set to 1.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-14-C [CGM Specific Ops – 'Set Hypo Alert Level'] with a value below the Hypo Alert level value of the Lower Tester.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x0D) followed by the Response Code for 'Parameter out Range' (0x05).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for ‘Parameter out of Range’ (0x05).

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

CGMP/COL/CGMCP/BI-09-C [CGM Specific Ops – ‘Set Hypo Alert Level’ Op Code not supported]

- Test Purpose

  Verify that the IUT can’t perform the ‘Set Hypo Alert Level’ procedure if Hypo Alert is not supported.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.4

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Hypo Alert is set to 0.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-14-C [CGM Specific Ops – ‘Set Hypo Alert Level’] to set the Hypo Alert Level.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the ‘Response Code’ Op Code (0x1C) and an Operand representing the Request Op Code (0x0D) followed by the Response Code for ‘OpCode not supported’ (0x02).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for ‘Op Code not supported’ (0x02).

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

CGMP/COL/CGMCP/BV-15-C [CGM Specific Ops – ‘Get Hyper Alert Level’]

- Test Purpose

  Verify that the IUT can perform the ‘Get Hyper Alert Level’ procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.5

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Hyper Alerts is set to 1.
- Test Procedure
  1. The IUT writes the 'Get Hyper Alert Level' Op Code (0x11) to the CGM Specific Ops Control Point with no Operand.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Get Hyper Alert Level Response' Op Code (0x12) and an Operand representing the Hyper Alert Level value in milligram per deciliter.
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.
- Expected Outcome

  Pass verdict

  The IUT receives the Hyper Alert Level value in milligrams per deciliter.

  The received Hyper Alert Level value corresponds to the stored Hyper Alert Level value in the Lower Tester.

CGMP/COL/CGMCP/BV-16-C [CGM Specific Ops – 'Set Hyper Alert Level']

- Test Purpose

  Verify that the IUT can perform the 'Set Hyper Alert Level' procedure.
- Reference

  [3] 4.10, 4.10.2, 4.10.2.5
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Hyper Alerts is set to 1.
- Test Procedure
  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-15-C [CGM Specific Ops – 'Get Hyper Alert Level'] to read out the actual stored Hyper Alert Level value.
  2. The IUT writes the 'Set Hyper Alert Level' Op Code (0x10) to the CGM Specific Ops Control Point with an Operand containing a Hyper Alert Level value in milligram per deciliter in a valid range.
  3. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x10) followed by the Response Code for 'Success' (0x01).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.

6. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-15-C [CGM Specific Ops – 'Get Hyper Alert Level'] to verify the new Hyper Alert Level value.
7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Success' (0x01).

  The 'Hyper Alert Level' is set to the new value as used in Step 3.

CGMP/COL/CGMCP/BI-10-C [CGM Specific Ops – 'Set invalid Hyper Alert Level']

- Test Purpose

  Verify that the IUT can't perform the 'Set Hyper Alert Level' procedure with a value above the limit of the Hyper Alert Level.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.5

- Initial Condition

  - The Hyper Alert level supported by the IUT is higher than the Hyper Alert level value of the Lower Tester.
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Hyper Alert is set to 1.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-16-C [CGM Specific Ops – 'Set Hyper Alert Level'] with a value above the Hyper Alert level value of the Lower Tester.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x10) followed by the Response Code for 'Parameter out Range' (0x05).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Parameter out of Range' (0x05).

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

CGMP/COL/CGMCP/BI-11-C [CGM Specific Ops – 'Set Hyper Alert Level' Op Code not supported]

- Test Purpose

  Verify that the IUT can't perform the 'Set Hyper Alert Level' procedure if Hyper Alert is not supported.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.5

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Hyper Alert is set to 0.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-16-C [CGM Specific Ops – 'Set Hyper Alert Level'] to set the Hyper Alert Level.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x10) followed by the Response Code for 'OpCode not supported' (0x02).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Op Code not supported' (0x02).

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

CGMP/COL/CGMCP/BV-17-C [CGM Specific Ops – 'Get Rate of Decrease Alert Level']

- Test Purpose

  Verify that the IUT can perform the 'Get Rate of Decrease Alert Level' procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.6

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Rate of Increase / Decrease Alerts is set to 1.

- Test Procedure

  1. The IUT writes the 'Get Rate of Decrease Alert Level' Op Code (0x14) to the CGM Specific Ops Control Point with no Operand.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Get Rate of Decrease Alert Level Response' Op Code (0x15) and an Operand representing the actual Patient Rate of Decrease Level value in milligrams per deciliter per minute.
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the actual Patient Rate of Decrease Alert Level value in milligrams per deciliter per minute.

CGMP/COL/CGMCP/BV-18-C [CGM Specific Ops – 'Set Rate of Decrease Alert Level']

- Test Purpose

  Verify that the IUT can perform the 'Set Rate of Decrease Alert Level' procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.6

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Rate of Increase / Decrease Alerts is set to 1.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-17-C [CGM Specific Ops – 'Get Rate of Decrease Alert Level'] to read out the actual stored Rate of Decrease Alert Level value.
  2. The IUT writes the 'Set Rate of Decrease Alert Level' Op Code (0x13) to the CGM Specific Ops Control Point with an Operand containing a Patient Rate of Decrease Level value in milligrams per deciliter per minute in a valid range.
  3. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x13) followed by the Response Code for 'Success' (0x01).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-17-C [CGM Specific Ops – 'Get Rate of Decrease Alert Level'] to verify the new Rate of Decrease Alert Level value.
  7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for ‘Success’ (0x01).

  The ‘Rate of Decrease Alert Level’ is set to the new value as used in Step 3.

CGMP/COL/CGMCP/BI-12-C [CGM Specific Ops – ‘Set invalid Rate of Decrease Alert Level’]

- Test Purpose

  Verify that the IUT can’t perform the ‘Set Rate of Decrease Alert Level’ procedure with a value above the limit of the Rate of Decrease Alert Level.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.6

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Rate of Increase / Decrease Alerts is set to 1.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-18-C [CGM Specific Ops – ‘Set Rate of Decrease Alert Level’] with a value above the Rate of Decrease Alert level value of the Lower Tester.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the ‘Response Code’ Op Code (0x1C) and an Operand representing the Request Op Code (0x13) followed by the Response Code for ‘Parameter out of Range’ (0x05).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for ‘Parameter out of Range’ (0x05).

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

CGMP/COL/CGMCP/BI-13-C [CGM Specific Ops – ‘Set Rate of Decrease Alert Level’ Op Code not supported]

- Test Purpose

  Verify that the IUT can’t perform the ‘Set Rate of Decrease Alert Level’ procedure if the Rate of Increase / Decrease Alerts are not supported.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.6

- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Rate of Increase / Decrease Alerts is set to 0.
- Test Procedure
  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-18-C [CGM Specific Ops – 'Set Rate of Decrease Alert Level'] to set the Rate of Decrease Alert Level value.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x13) followed by the Response Code for 'Op Code not supported' (0x02).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.
- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Op Code not supported' (0x02).

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

CGMP/COL/CGMCP/BV-19-C [CGM Specific Ops – 'Get Rate of Increase Alert Level']

- Test Purpose

  Verify that the IUT can perform the 'Get Rate of Increase Alert Level' procedure.
- Reference

  [3] 4.10, 4.10.2, 4.10.2.6
- Initial Condition
  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Rate of Increase / Decrease Alerts is set to 1.
- Test Procedure
  1. The IUT writes the 'Get Rate of Increase Alert Level' Op Code (0x17) to the CGM Specific Ops Control Point with no Operand.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Get Rate of Increase Alert Level Response' Op Code (0x18) and an Operand representing the Rate of Increase Alert Level value in milligrams per deciliter per minute.
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Rate of Increase Alert Level value in milligrams per deciliter per minute.

CGMP/COL/CGMCP/BV-20-C [CGM Specific Ops – 'Set Rate of Increase Alert Level']

- Test Purpose

  Verify that the IUT can perform the 'Set Rate of Increase Alert Level' procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.6

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Rate of Increase / Decrease Alerts is set to 1.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-19-C [CGM Specific Ops – 'Get Rate of Increase Alert Level'] to read out the actual stored Rate of Increase Alert Level value.
  2. The IUT writes the 'Set Rate of Increase Alert Level' Op Code (0x16) to the CGM Specific Ops Control Point with an Operand containing a Rate of Increase Alert Level value in milligrams per deciliter per minute in a valid range.
  3. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x16) followed by the Response Code for 'Success' (0x01).
  4. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  5. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  6. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-19-C [CGM Specific Ops – 'Get Rate of Increase Alert Level'] to verify the new Rate of Increase Alert Level value.
  7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Op Code for 'Success' (0x01).

  The 'Rate of Increase Alert Level' is set to the new value as used in Step 3.

CGMP/COL/CGMCP/BI-14-C [CGM Specific Ops – 'Set invalid Rate of Increase Alert Level']

- Test Purpose

  Verify that the IUT can't perform the 'Set Rate of Increase Alert Level' procedure with a value above the limit of the Rate of Increase Alert Level.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.6

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Rate of Increase / Decrease Alerts is set to 1.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-20-C [CGM Specific Ops – 'Set Rate of Increase Alert Level'] with a value above the Rate of Increase Alert level value of the Lower Tester.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x16) followed by the Response Code for 'Parameter out of Range' (0x05).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Request Op Code (0x16) followed by the Response Code for 'Parameter out of Range' (0x05).

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

CGMP/COL/CGMCP/BI-15-C [CGM Specific Ops – 'Set Rate of Increase Alert Level' Op Code not supported]

- Test Purpose

  Verify that the IUT can't perform the 'Set Rate of Increase Alert Level' procedure if the Rate of Increase / Decrease Alerts are not supported.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.6

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Rate of Increase / Decrease Alerts is set to 0.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-20-C [CGM Specific Ops – 'Set Rate of Increase Alert Level'] to set the Rate of Increase Alert Level value.

2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x16) followed by the Response Code for 'Op Code not supported' (0x02).
3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Op Code not supported' (0x02).

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

CGMP/COL/CGMCP/BV-21-C [CGM Specific Ops – 'Reset Device Specific Alert']

- Test Purpose

  Verify that the IUT can perform the 'Reset Device Specific Alert' procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.7

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Device Specific Alert is set to 1.

- Test Procedure

1. The IUT writes 'Reset Device Specific' Op Code (0x19) to the CGM Specific Ops Control Point with no Operand.
2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x19) followed by the Response Code for 'Success' (0x01).
3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Success' (0x01).

CGMP/COL/CGMCP/BI-16-C [CGM Specific Ops – 'Reset Device Specific Alert' Op Code not supported]

- Test Purpose

  Verify that the IUT can't perform the 'Reset Device Specific Alert' procedure if the Device Specific Alert is not supported.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.7

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - The CGM Feature Characteristic bit for supporting Device Specific Alert is set to 0.

- Test Procedure

  1. The IUT executes the procedure included in CGMP/COL/CGMCP/BV-21-C [CGM Specific Ops – 'Reset Device Specific Alert'].
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x19) followed by the Response Code for 'Op Code not supported' (0x02).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
  4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
  5. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Op Code not supported' (0x02).

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

CGMP/COL/CGMCP/BV-22-C [CGM Specific Ops – 'Start Session']

- Test Purpose

  Verify that the IUT can perform the 'Start session' procedure if no session is currently running if supported by device.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.4

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - No CGM Session is currently running.

- Test Procedure

  1. The IUT writes 'Start Session' Op Code (0x1A) to the CGM Specific Ops Control Point with no Operand.
  2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x1A) followed by the Response Code for 'Success' (0x01).
  3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.

4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
5. The IUT executes the procedure included in CGMP/COL/CGMS/BV-01-C [Read CGM Status characteristic] to read out the current CGM Status.
6. Verify that the CGM Status Bit 'Session stopped' is set to 0.
7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Success' (0x01).

  A CGM Session is started.

  The CGM Status Bit 'Session stopped' is set to 0.

CGMP/COL/CGMCP/BV-23-C [CGM Specific Ops – 'Stop Session']

- Test Purpose

  Verify that the IUT can perform the 'Stop session' procedure.

- Reference

  [3] 4.10, 4.10.2, 4.10.2.9

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - A CGM Session is currently running.

- Test Procedure

1. The IUT writes 'Stop Session' Op Code (0x1B) to the CGM Specific Ops Control Point with no Operand.
2. The Lower Tester sends an indication of the CGM Specific Ops Control Point characteristic with the 'Response Code' Op Code (0x1C) and an Operand representing the Request Op Code (0x1B) followed by the Response Code for 'Success' (0x01).
3. The IUT receives an ATT_Handle_Value_Indication from the Lower Tester containing the CGM Specific Ops Control Point characteristic handle and value.
4. The IUT sends an ATT_Handle_Value_Confirmation to the Lower Tester.
5. The IUT executes the procedure included in CGMP/COL/CGMS/BV-01-C [Read CGM Status characteristic] to read out the current CGM Status.
6. Verify that the CGM Status Bit 'Session stopped' bit set to 1.
7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT receives the Response Code for 'Success' (0x01).

  The CGM Status Bit 'Session stopped' is set to 1. After restart, the database is cleared.

4.16 Common Behavior of Control Points – General Error Handling

This test group contains test cases to verify compliant operation when an error is caused by the Server side when Control Point (RACP, and CGM Specific Ops CP) procedures are used.

CGMP/COL/CBE/BI-01-C [General Error Handling – Op Code not supported]

- Test Purpose

  Verify that the Collector IUT responds appropriately when it receives an 'Op Code not supported' RACP Response Code.

- Reference

  [3] 4.11.2

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - The Lower Tester contains at least 3 CGM Measurement records.

- Test Procedure

  1. IUT writes an- optional Op Code which is not valid for the RACP to the RACP using an appropriate Operator and Operand for the Op Code.
  2. The Lower Tester sends an indication of the Record Access Control Point characteristic with the Response Code Op Code (0x06) an Operator of Null (0x00) and an Operand representing Request Op Code followed by the 'Response Code' value (0x02) for 'Op Code not supported'.
  3. Verify that the IUT returns to stable state and can process commands normally.

- Expected Outcome

  Pass verdict

  The IUT receives the 'Response Code' value (0x02) for 'Op Code not supported'.

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

CGMP/COL/CBE/BI-02-C [General Error Handling – Missing CRC]

- Test Purpose

  Verify that the Collector IUT responds appropriately when it receives a 'Missing CRC' Response Code.

- Reference

  [3] 4.11.2

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - E2E-CRC is supported by Device.

- Test Procedure

  1. IUT writes the 'Write CGM Session Start Time' Op Code with an Operand containing a value for a Session Start time as defined in [12] without an E2E-CRC.

2. The Lower Tester sends an ATT_ERROR_Response with the ‘Response Code’ value (0x80) for ‘Missing CRC’.
3. Verify that the IUT returns to stable state and can process commands normally.

- Expected Outcome

  Pass verdict

  The Lower Tester sends an ATT_ERROR_Response with the ‘Response Code’ value (0x80) for ‘Missing CRC’.

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

CGMP/COL/CBE/BI-03-C [General Error Handling – Invalid CRC]

- Test Purpose

  Verify that the Collector IUT responds appropriately when it receives an ‘Invalid CRC’ Response Code

- Reference

  [3] 4.11.2

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - E2E-CRC is supported by Device.

- Test Procedure

1. IUT writes the ‘Write Patient High Alert Level’ Op Code (0x07) to the CGM Specific Ops Control Point with an Operand containing a valid Patient High Alert Level in milligram per deciliter and an invalid CRC.
2. The Lower Tester sends an ATT_ERROR_Response with the ‘Response Code’ value (0x81) for ‘Invalid CRC’.
3. Verify that the IUT returns to stable state and can process commands normally.

- Expected Outcome

  Pass verdict

  The Lower Tester sends an ATT_ERROR_Response with the ‘Response Code’ value (0x81) for ‘Invalid CRC’.

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

4.17 Common Behavior of Control Points – ‘Procedure Timeout’

This test group contains test cases to verify compliant operation when the Tester uses Control Point procedures and a procedure timeout occurs.

CGMP/COL/CBT/BI-01-C [Procedure Timeout Handling]

- Test Purpose

  Verify that if the Collector IUT does not receive a response to a CP Op Code, it will time out after the Attribute Protocol Timeout.

- Reference

  [3] 4.11.1, 4.11.1.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - Perform the preamble described in Section 4.2.3.
  - Create a patient record with at least one CGM Measurement characteristic value.

- Test Procedure

  1. IUT writes the 'Report Stored Records' Op Code (0x01) to the RACP using an Operator of 'All records' (0x01) and no Operand.
  2. The Lower Tester does NOT send an indication of the Record Access Control Point characteristic for at least longer than the Attribute Protocol Timeout.
  3. After the specified timeout 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, the IUT notifies the local upper layer of the time out.

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

4.18 BMS Procedures

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 parameter values used in the test procedures in this section.

CGMP/COL/BMS/BV-01-C [Write BMSCP characteristic value]

- Test Purpose

  Verify that a Collector IUT can write the BMSCP characteristic using ATT Write Request.

- Reference

  [10] 3.11

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.

- Test Procedure

  The following test procedure has to be repeated for each Op Code in Table 3.3 in [10] valid for the used transport:

  1. The Upper Tester commands the IUT to sends an ATT_Write_Request to the Lower Tester with the handle and the value of the BMSCP characteristic and a value containing an Op code as defined in Table 3.3 in [10].
  2. The Lower Tester receives the ATT_Write_Request and then sends an ATT_Write_Response to the IUT.

- Expected Outcome

  Pass verdict

  The IUT receives an ATT_Write_Response from the Lower Tester.

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

CGMP/COL/BMS/BV-02-C [Write BMSCP characteristic value – with Parameter]

- Test Purpose

  Verify that a Collector IUT can write the BMSCP characteristic with data larger than Op Code, using ATT Write Request.

- Reference

  [10] 3.11

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.

- Test Procedure

  The following test procedure has to be repeated for each Op Code in Table 3.3 in [10] valid for the used transport:

  1. The Upper Tester commands the IUT to sends an ATT_Write_Request to the Lower Tester with the handle and the value of the BMSCP characteristic and a value containing an Op code as defined in Table 3.3 in [10] and a parameter value containing a value which fits within the used MTU size.
  2. The Lower Tester receives the ATT_Write_Request and then sends an ATT_Write_Response to the IUT.

- Expected Outcome

  Pass verdict

  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 IUT.

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

CGMP/COL/BMS/BI-01-C [Write BMSCP characteristic value – Insufficient Authorization]

- Test Purpose

  Verify that a Collector IUT can write the BMSCP characteristic with an invalid or missing authorization code, using ATT Write Request.

- Reference

  [10] 3.11

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.

- Test Procedure

  The following test procedure has to be repeated for each Op Code in Table 3.3 in [10] valid for the used transport.

  1. The IUT sends an ATT_Write_Request with the handle of the BMSCP characteristic and a value containing an Op code as defined in Table 3.3 in [10] and a parameter value containing a value which fits within the used MTU size. The value does not contain the required authorization code.
  2. The IUT receives an ATT_Error_Response with the Error Code set to ‘Insufficient Authorization’ from the Lower Tester.
  3. Verify that the IUT considers the procedure to have failed.

- Expected Outcome

  Pass verdict

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

  Upon receiving an ATT_Error_Response from the Lower Tester the IUT sends the result to the Upper Tester and returns to a stable state and can process commands normally.

CGMP/COL/BMS/BI-02-C [Write BMSCP characteristic value – Operation Failed]

- Test Purpose

  Verify that a Collector IUT behaves appropriately when it receives an ‘Operation Failed’ Error Response.

- Reference

  [10] 3.11

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.

- Test Procedure

  The following test procedure has to be repeated for one of the Op Codes in Table 3.3 in [10] valid for the used transport.

  1. The IUT sends an ATT_Write_Request with the handle of the BMSCP characteristic and a value containing an Op code without parameter value as defined in Table 3.3 in [10].
  2. The IUT receives an ATT_Error_Response with the Error Code set to 'Operation Failed' from the Lower Tester.
  3. Verify that the IUT considers the procedure to have failed.

- Expected Outcome

  Pass verdict

  The IUT receives an ATT_Error_Response with the Error Code set to 'Operation Failed' from the Lower Tester.

  Upon receiving an ATT_Error_Response from the Lower Tester the IUT sends the result to the Upper Tester and returns to a stable state and can process commands normally.

CGMP/COL/BMS/BI-03-C [Write BMSCP characteristic value – Op Code not supported]

- Test Purpose

  Verify that a Collector IUT behaves appropriately when it receives an 'Op Code not supported' Error Response.

- Reference

  [10] 3.11

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.

- Test Procedure

  1. The IUT sends an ATT_Write_Request with the handle of the BMSCP characteristic and a value containing a valid Op code.
  2. The IUT receives an ATT_Error_Response with the Error Code set to 'Op Code not Supported' from the Lower Tester.
  3. Verify that the IUT considers the procedure to have failed.

- Expected Outcome

  Pass verdict

  The IUT receives an ATT_Error_Response with the Error Code set to 'Op Code not Supported' from the Lower Tester.

  Upon receiving an ATT_Error_Response from the Lower Tester the IUT sends the result to the Upper Tester and returns to a stable state and can process commands normally.

CGMP/COL/BMS/BV-03-C [Reliable Write BMSCP characteristic value]

- Test Purpose

  Verify that a Collector IUT can write the BMSCP characteristic using ATT Reliable Write.

- Reference

  [10] 3.11

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.

- Test Procedure

  The following test procedure has to be executed for one of the Op Codes in Table 3.3 in [10] valid for the used transport.

  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 BMSCP characteristic.

- Expected Outcome

  Pass verdict

  The IUT receives an ATT_Execute_Write_Response from 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.

CGMP/COL/BMS/BV-04-C [Write Long BMSCP characteristic value]

- Test Purpose

  Verify that a Collector IUT can write a long characteristic value to the BMSCP characteristic.

- Reference

  [10] 3.11

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT, and run the preamble procedure for the Collector to initiate connection to a CGM Sensor included in Section 4.2.5 if using an LE transport or Section 4.2.6 if using a BR/EDR transport.
  - 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 Op Codes in Table 3.3 in [10] valid for the used transport.

  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 BMSCP characteristic.

- Expected Outcome

  Pass verdict

  The IUT receives an ATT_Execute_Write_Response from 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.

4.19 Common Behavior for CGM Feature and Bond Management Feature characteristics

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

4.19.1 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 4.5.

- Reference

  [3] 4

- Initial Condition

  - For each test case in Table 4.5, 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, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - The IUT is bonded with the Lower Tester.

- Test Case Configuration

Test Case	Reference	Feature characteristic
CGMP/COL/CGMF/BV-02-C [Read CGM Feature characteristic - Bonding enabled]	[3] 4.5	CGM Feature characteristic
CGMP/COL/BMS/BV-05-C [Read Bond Management Feature characteristic]	[3] 4.12.5	Bond Management Feature characteristic

Table 4.5: Read Feature characteristics with bonding enabled

- Test Procedure

  1. The Upper Tester commands the IUT to read the Feature characteristic, listed in Table 4.5, 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 4.5, and reports its value to the Upper Tester.

  Reserved for future use bit values are ignored.

4.19.2 Enable feature characteristic for indication or Read Feature characteristic upon reconnection

- Test Purpose

  Verify that, for each test case in Table 4.6, the IUT can either enable for indication the Feature characteristic or read the characteristic upon reconnection.

- Reference

  [3] 4

- Initial Condition

  - For each test case in Table 4.6, 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 or are known to the Upper Tester by other means.
  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using an LE transport, or 4.2.2 if using a BR/EDR transport.
  - The IUT is not paired and bonded with the Lower Tester.

- Test Case Configuration

Test Case	Reference	Feature characteristic
CGMP/COL/CGMF/BV-03-C [Enable CGM Feature characteristic for indication or read characteristic upon reconnection]	[3] 4.5	CGM Feature characteristic
CGMP/COL/BMS/BV-06-C [Enable Bond Management Feature characteristic for indication or read characteristic upon reconnection]	[3] 4.12.5	Bond Management Feature characteristic

Table 4.6: 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 4.6, for indication):
     2A.1. The IUT configures the Feature characteristic for indication.

     Or,

     Alternative 2B (Read the Feature characteristic, listed in Table 4.6, 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.

4.20 Connection Establishment

This test group contains test cases to verify the compliant behavior of a CGM Sensor in bonded and unbonded situations.

CGMP/COL/CECC/BV-01-C [Lost Bond Procedure when using LE transport]

- Test Purpose

  Verify that the Collector IUT starts encryption with a bonded CGM Sensor on reconnection and rediscovers and reconfigures the CGM Sensor if bond is lost.

- Reference

  [3] 5.2.2

- Initial Condition

  - The IUT and the Lower Tester have previously bonded.
  - Perform the preamble procedure described in Section 4.2.3 to enable indications and notifications on the required characteristics of the Lower Tester's CGM Service.
  - The Lower Tester has the CGM Measurement characteristic.
  - No connection is established between the IUT and Lower Tester.
  - The bond is deleted at the Lower Tester.

- Test Procedure

  1. The Lower Tester begins advertising using a GAP undirected connectable mode.
  2. The IUT establishes a connection to the Lower Tester.
  3. Verify that the IUT starts encryption when the connection is established and rediscovers and reconfigures the CGM Sensor upon detection of the lost bond.

- Expected Outcome

  Pass verdict

  The IUT starts encryption when the connection is established.

  The IUT rediscovers the CGM Service.

  The IUT reconfigures the Client Characteristics Configuration descriptors of the CGM Measurement characteristic, the Record Access Control Point characteristic, and CGM Specific Ops Control Point characteristic.

CGMP/COL/CECC/BV-02-C [Lost Bond Procedure when using BR/EDR transport]

- Test Purpose

  Verify that the Collector IUT reconfigures the CGM Sensor if bond is lost.

  In case of BR/EDR, either the Lower Tester or Collector IUT could initiate a connection when they are bonded. The device initiating the connection becomes a Central and is referred here as “Central to be” and the device accepting the connection becomes a Peripheral and is referred here as “Peripheral to be”. Verify that the “Central to be” starts encryption with a bonded “Peripheral to be” on connection

- Reference

  [3] 5.3.1.2

- Initial Condition

  - The IUT and the Lower Tester have previously bonded.
  - The IUT has configured the Lower Tester to enable notifications on the CGM Measurement characteristic of the CGM Service.
  - The Lower Tester has the CGM Measurement characteristic.
  - No connection is established between the IUT and Lower Tester.
  - The bond is deleted at the Lower Tester.

- Test Procedure

  1. The “Peripheral to be” is in connectable mode.
  2. The “Central to be” establishes a connection to the “Peripheral to be”.
  3. The “Central to be” starts encryption when the connection is established.
  4. Verify that the IUT rediscovers and reconfigures the CGM Sensor upon detection of the lost bond.

- Expected Outcome

  Pass verdict

  The “Central to be” starts encryption when the connection is established.

  The IUT rediscovers the CGM Service.

  The IUT reconfigures the Client Characteristics Configuration descriptors of the CGM Measurement characteristic, the Record Access Control Point characteristic and CGM Specific Ops Control Point characteristic.

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 CGMP [4].

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

Test Case(s): The applicable test case identifiers are required for Bluetooth Qualification if the corresponding y/x references defined in the Item column are supported. Further details about the function of the TCMT are elaborated in [1].

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

Item	Feature	Test Case(s)
CGMP 3/3	CGM Service UUID in AD over LE	CGMP/SEN/CGMR/BV-01-C
CGMP 3/4	Local Name included in AD or Scan Response over LE	CGMP/SEN/CGMR/BV-02-C
CGMP 3/5	Appearance included in AD or Scan Response over LE	CGMP/SEN/CGMR/BV-03-C
CGMP 3/6	Public Target Address in AD or Scan Response over LE	CGMP/SEN/CGMR/BV-04-C
CGMP 3/7	Private Random Target Address in AD or Scan Response over LE	CGMP/SEN/CGMR/BV-05-C
CGMP 3/8	Static Random Target Address in AD or Scan Response over LE	CGMP/SEN/CGMR/BV-06-C
CGMP 3/18 AND NOT (CGMP 3/6 OR CGMP 3/7 OR CGMP 3/8)	No Target Address in AD or Scan Response over LE – Multi Bond	CGMP/SEN/CGMR/BV-07-C
CGMP 3/1 AND NOT CGMP 3/18	No Target Address in AD or Scan Response over LE – Single Bond	CGMP/SEN/CGMR/BV-08-C
(CGMP 2/1 OR CGMP 2/2) AND CGMP 9/1	Discover Continuous Glucose Monitoring Service	CGMP/COL/CGGIT/SER/BV-01-C
CGMP 15/1	Discover Bond Management Service	CGMP/COL/CGGIT/SER/BV-02-C
CGMP 14/1	Discover Device Information Service	CGMP/COL/CGGIT/SER/BV-03-C
CGMP 9/2 AND CGMP 9/3	Discover CGM Measurement Characteristic	CGMP/COL/CGGIT/CHA/BV-01-C
CGMP 9/4	Discover CGM Feature Characteristic	CGMP/COL/CGGIT/CHA/BV-02-C
CGMP 9/5	Discover CGM Status Characteristic	CGMP/COL/CGGIT/CHA/BV-03-C
CGMP 9/6	Discover CGM Session Start Time Characteristic	CGMP/COL/CGGIT/CHA/BV-04-C
CGMP 9/7	Discover CGM Session Run Time Characteristic	CGMP/COL/CGGIT/CHA/BV-05-C

Item	Feature	Test Case(s)
CGMP 9/8 AND CGMP 9/9	Discover Record Access Control Point Characteristic	CGMP/COL/CGGIT/CHA/BV-06-C
CGMP 9/10 AND CGMP 9/11	Discover CGM Specific Ops Control Point characteristic	CGMP/COL/CGGIT/CHA/BV-07-C
CGMP 15/2	Bond Management Control Point characteristic	CGMP/COL/CGGIT/CHA/BV-08-C
CGMP 15/3	Bond Management Feature characteristic	CGMP/COL/CGGIT/CHA/BV-09-C
CGMP 10a/1	Characteristic GGIT – CGM Feature indication	CGMP/COL/CGGIT/ISFC/BV-01-C
CGMP 10a/2	Read CGM Feature characteristic - Bonding enabled	CGMP/COL/CGMF/BV-02-C
CGMP 10a/1 OR CGMP 10a/2	Enable CGM Feature characteristic for indication or read characteristic upon reconnection	CGMP/COL/CGMF/BV-03-C
CGMP 10a/3	Characteristic GGIT – Bond Management Feature indication	CGMP/COL/CGGIT/ISFC/BV-02-C
CGMP 10a/4	Read Bond Management Feature characteristic	CGMP/COL/BMS/BV-05-C
CGMP 10a/3 OR CGMP 10a/4	Enable Bond Management Feature characteristic for indication or read characteristic upon reconnection	CGMP/COL/BMS/BV-06-C
CGMP 14/2 OR CGMP 14/3 OR CGMP 14/4	Discover and Read Device Information Service Characteristics	CGMP/COL/CGMD/BV-15-C CGMP/COL/CGMD/BV-16-C
CGMP 10/1	Configure CGM Measurement Characteristic for Notifications	CGMP/COL/CGMM/BV-01-C
CGMP 10/2	Receive CGM Measurement Characteristic Notifications	CGMP/COL/CGMM/BV-02-C
CGMP 10/32	Read CGM Feature Characteristic	CGMP/COL/CGMF/BV-01-C
CGMP 10/33	Read CGM Status Characteristic	CGMP/COL/CGMS/BV-01-C
CGMP 10/35	Read CGM Session Start Time Characteristic	CGMP/COL/CGMST/BV-01-C
CGMP 10/34	Write CGM Session Start Time Characteristic	CGMP/COL/CGMST/BV-02-C
CGMP 10/36	Read CGM Session Run Time Characteristic	CGMP/COL/CGMRT/BV-01-C
CGMP 11/1	Report Stored Records – All Records	CGMP/COL/RAR/BV-01-C
CGMP 11/3	Report Stored Records – Less than or equal to Time Offset	CGMP/COL/RAR/BV-02-C
CGMP 11/5	Report Stored Records – Greater than or equal Time Offset	CGMP/COL/RAR/BV-03-C
CGMP 11/7	Report Stored Records – Within range of (inclusive) Time Offset value pair	CGMP/COL/RAR/BV-04-C
CGMP 11/8	Report Stored Records – First Record	CGMP/COL/RAR/BV-05-C
CGMP 11/9	Report Stored Records – Last Record	CGMP/COL/RAR/BV-06-C

Item	Feature	Test Case(s)
CGMP 11/1 AND CGMP 13/1	Report Stored Records – All Records – Records Added / Deleted	CGMP/COL/RAR/BV-07-C CGMP/COL/RAR/BV-08-C
CGMP 12/1	Delete Stored Records – All Records	CGMP/COL/RAD/BV-01-C
CGMP 12/2	Delete Stored Records – Less or equal to Time Offset	CGMP/COL/RAD/BV-02-C
CGMP 10/11	Abort Operation	CGMP/COL/RAA/BV-01-C
CGMP 13/1	Report Number of Stored Record – All Records	CGMP/COL/RAN/BV-01-C CGMP/COL/CBE/BI-01-C CGMP/COL/CBT/BI-01-C
CGMP 13/5	Report Number of Stored Record – Greater than or equal to Time Offset	CGMP/COL/RAN/BV-02-C
CGMP 1/2	RACP Specific Errors	CGMP/COL/RAE/BI-01-C CGMP/COL/RAE/BI-02-C
CGMP 10/14	CGM Specific Ops – CGM Communication Interval	CGMP/COL/CGMCP/BV-01-C CGMP/COL/CGMCP/BV-02-C CGMP/COL/CGMCP/BV-03-C CGMP/COL/CGMCP/BV-04-C
CGMP 10/15	CGM Specific Ops – Glucose Calibration Value Op Codes	CGMP/COL/CGMCP/BV-05-C CGMP/COL/CGMCP/BV-06-C CGMP/COL/CGMCP/BV-07-C CGMP/COL/CGMCP/BV-08-C CGMP/COL/CGMCP/BI-01-C
CGMP 10/16	CGM Specific Ops – Patient High/Low Alert Level Op Codes	CGMP/COL/CGMCP/BV-09-C CGMP/COL/CGMCP/BV-10-C CGMP/COL/CGMCP/BI-02-C CGMP/COL/CGMCP/BI-03-C CGMP/COL/CGMCP/BI-04-C CGMP/COL/CGMCP/BV-11-C CGMP/COL/CGMCP/BV-12-C CGMP/COL/CGMCP/BI-05-C CGMP/COL/CGMCP/BI-06-C CGMP/COL/CGMCP/BI-07-C
CGMP 10/17	CGM Specific Ops – Get Hypo Alert Level	CGMP/COL/CGMCP/BV-13-C
CGMP 10/18	CGM Specific Ops – Set Hypo Alert Level	CGMP/COL/CGMCP/BV-14-C CGMP/COL/CGMCP/BI-08-C CGMP/COL/CGMCP/BI-09-C
CGMP 10/19	CGM Specific Ops – Get Hyper Alert Level	CGMP/COL/CGMCP/BV-15-C
CGMP 10/20	CGM Specific Ops – Set Hyper Alert Level	CGMP/COL/CGMCP/BV-16-C CGMP/COL/CGMCP/BI-10-C CGMP/COL/CGMCP/BI-11-C
CGMP 10/21	CGM Specific Ops – Get Rate of Decrease/Increase Alert Level Op Codes	CGMP/COL/CGMCP/BV-17-C CGMP/COL/CGMCP/BV-19-C

Item	Feature	Test Case(s)
CGMP 10/22	CGM Specific Ops – Set Rate of Decrease/Increase Alert Level Op Codes	CGMP/COL/CGMCP/BV-18-C CGMP/COL/CGMCP/BI-12-C CGMP/COL/CGMCP/BI-13-C CGMP/COL/CGMCP/BV-20-C CGMP/COL/CGMCP/BI-14-C CGMP/COL/CGMCP/BI-15-C
CGMP 10/23	CGM Specific Ops – Reset Device Specific Alert	CGMP/COL/CGMCP/BV-21-C CGMP/COL/CGMCP/BI-16-C
CGMP 10/24	CGM Specific Ops – Start Session	CGMP/COL/CGMCP/BV-22-C
CGMP 10/25	CGM Specific Ops – Stop Session	CGMP/COL/CGMCP/BV-23-C
CGMP 10/38	General Error Handling – Missing/Invalid CRC	CGMP/COL/CBE/BI-02-C CGMP/COL/CBE/BI-03-C
CGMP 10/39	BMSCP procedures	CGMP/COL/BMS/BV-01-C CGMP/COL/BMS/BV-02-C CGMP/COL/BMS/BI-01-C CGMP/COL/BMS/BI-02-C CGMP/COL/BMS/BI-03-C CGMP/COL/BMS/BV-03-C CGMP/COL/BMS/BV-04-C
CGMP 2/2 AND CGMP 10/31	Verify Bond Status on Reconnection LE	CGMP/COL/CECC/BV-01-C
CGMP 2/1 AND CGMP 10/31	Verify Bond Status on Reconnection BR/EDR	CGMP/COL/CECC/BV-02-C

Table 5.1: Test case mapping

6 RACP Test Matrix

The following tables summarize the features of 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.

	RACP Request Op Codes			
RACP Operands	Report stored records	Delete stored records	Abort operation	Report number of stored records
All records	YES	YES	YES	YES
Less than or equal to	YES	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	N/A
Last record	YES	NO	N/A	NO

	RACP Request Op Codes			
RACP Response Codes	Report stored records	Delete stored records	Abort operation	Report number of stored records
Success	YES	YES	YES	YES
Op Code not supported	YES	N/A	N/A	N/A
Invalid Operator	NO (tested by Service)	NO	N/A	NO
Operator not supported	NO (tested by Service)	NO	N/A	NO
Invalid Operand	NO (tested by Service)	NO	N/A	NO
No records found	NO (tested by Service)	NO	N/A	N/A
Abort unsuccessful	N/A	N/A	NO	N/A
Procedure not completed	N/A	N/A	N/A	N/A
Operand not supported	NO (tested by Service)	N/A	N/A	NO

	Filter Type
RACP Operands	Time Offset
All records	N/A
Less than or equal to	YES
Greater than or equal to	YES
Within range of (inclusive)	YES
First record	N/A
Last record	N/A

7 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2014-11-25	Prepare for Publication
	1.0.1.0r00	2015-10-28	Updated version numbering to align with Specification version change from 1.0 to 1.0.1 for ESR09. With the specification taking a third identifying number, the TS version identifier moves to the fourth number and starts again at 0.
1	1.0.1.0	2015-12-22	Prepared for TCRL 2015-2 publication
	1.0.1.1r00	2016-02-20	Converted to new Test Case ID conventions as defined in TSTO v4.1.
	1.0.1.1r01	2016-06-20	Reviewed by Alicia Courtney
2	1.0.1.1	2016-07-13	Prepared for TCRL 2016-1 publication.
	1.0.1.2r00	2017-08-22	TSE 9381: Update test spec template. Correct formatting issue where test case IDs are formatted as headings instead of bulleted lists. Correct miscellaneous editorials. TSE 9550: For CGMP/COL/BMS/BI-03-I, updated Test Procedure text.
3	1.0.1.2	2017-11-28	Approved by BTI. Prepared for TCRL 2017-2 publication.
	p4r00–r08	2021-03-10 – 2022-01-03	TSE 16858 (4): Changes from E16275. Addition of new test group ISFC. New test cases added: CGMP/COL/CGGIT/ISFC/BV-01-C and -02-C, CGMP/COL/CGMF/BV-02-I and -03-I, CGMP/COL/BMS/BV-05-I and -06-I. Updated TCMT for the new test cases. Made minor editorial updates to the preambles. TSE 18106 (rating 2): Converted the following test cases into GGIT tests: CGMP/COL/CGMD/BV-01-I – -14-I, -17-I, and -18-I. The new GGIT converted TCIDs are: CGMP/COL/CGGIT/SER/BV-01-C – -03-C and CGMP/COL/CGGIT/CHA/BV-01-C – -09-C. Updated TCMT for the new GGIT tests and tests impacted by the GGIT conversion. TSE 18107 (rating 1): Removed direct references to GATT test cases in the following test cases: CGMP/COL/BMS/BV-01-I – -04-I and CGMP/COL/CGMD/BV-15-I and -16-I. TSE 18108 (rating 1): Changes from E15780. Replaced text in the preamble in “4.2.6.2 Connection Establishment for Bonded Device” and in CGMP/COL/CECC/BV-02-I with the Appropriate Language updates. Updated TS to the latest template and made editorial changes, including consistency checker editorials and updates to the copyright page to align with v2 of the DNMD.

Publication Number	Revision Number	Date	Comments
4	p4	2022-01-25	Approved by BTI on 2022-01-06. Prepared for TCRL 2021-2 publication.
	p5r00–r02	2023-10-19 – 2023-12-11	TSE 23256 (rating 1): Converted -I tests to -C tests as appropriate; updated the TCMT and TCRL accordingly. Deleted draft revision history comments prior to p0.
5	p5	2024-07-01	Approved by BTI on 2024-04-21. Prepared for TCRL 2024-1 publication.

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